

# Zinc Phosphide

## Technical Fact Sheet

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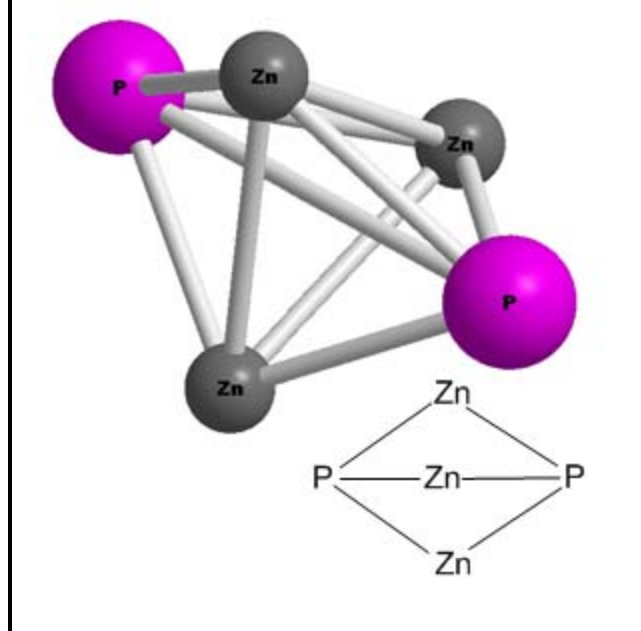
### Chemical Class and Type:

- Zinc phosphide is an inorganic compound that is used in pesticide products as a rodenticide. The International Union of Pure and Applied Chemistry (IUPAC) chemical name is trizinc diphosphide,<sup>1</sup> and the Chemical Abstracts Service (CAS) registry number is 1314-84-7.<sup>2</sup>
- Zinc phosphide was first registered for use as a pesticide in the United States by the U.S. Department of Agriculture (USDA) in 1947.<sup>2</sup> Subsequently, a Registration Standard for zinc phosphide was issued by the United States Environmental Protection Agency (U.S.

### Molecular Structure - Zinc Phosphide

EPA) in 1982.<sup>3</sup> A Reregistration Eligibility Decision, or RED, was issued by the U.S. EPA in 1998.<sup>2</sup> See the text box on **Laboratory Testing**.

- Zinc phosphide converts to phosphine gas in the presence of moisture and acid in the stomach. The toxicity of zinc phosphide is due to phosphine gas exposure.<sup>2</sup> This fact sheet will discuss both zinc phosphide and phosphine.
- Phosphine in this fact sheet refers to the gaseous form of this compound. The chemical reaction that releases phosphine is<sup>11</sup>:  $\text{Zn}_3\text{P}_2 + 6\text{H} \rightarrow \text{PH}_3 \uparrow + 3\text{Zn}^{++}$
- Aluminum phosphide and magnesium phosphide also react with water to produce phosphine. These compounds are frequently used to fumigate grain storage facilities. They may be used as rodenticides as well as insecticides.<sup>3</sup>
- Phosphine is used in the electronics industry and in the manufacture of organophosphate insecticides.<sup>4</sup> Phosphine may also be produced during the manufacture of methamphetamine depending on the method used.<sup>5</sup>
- Under natural conditions, phosphine can be produced during the anaerobic decomposition of organic matter, such as in the production of swamp gas.<sup>4,6</sup> It is also produced in sewage treatment plant sediments.<sup>7</sup>



**Laboratory Testing:** Before pesticides are registered by the U.S. EPA, they must undergo laboratory testing for short-term (acute) and long-term (chronic) health effects. Laboratory animals are purposely given high enough doses to cause toxic effects. These tests help scientists judge how these chemicals might affect humans, domestic animals, and wildlife in cases of overexposure.

## Physical / Chemical Properties:

- Zinc phosphide is a gray-black powder with an odor similar to garlic.<sup>1</sup> Phosphine is a colorless and flammable gas. The odor of industrial or technical grade phosphine gas is similar to garlic or rotting fish, but phosphine in its pure form is odorless.<sup>1,8</sup> Humans can begin to detect phosphine at 2 ppm, although toxicity can occur at lower concentrations.<sup>9</sup>
- Vapor pressure: When dry, zinc phosphide has negligible vapor pressure.<sup>1</sup> The vapor pressure of phosphine is  $2.93 \times 10^4$  mmHg at 25 °C.<sup>8</sup>
- Octanol-Water Partition Coefficient ( $\log K_{ow}$ )<sup>10</sup>: Not found. Zinc phosphide is not soluble in alcohol or water.
- Henry's constant<sup>8</sup>: Zinc phosphide, none found; phosphine,  $2.44 \times 10^{-2}$  atm·m<sup>3</sup>/mol.
- Molecular weight (g/mol)<sup>8</sup>: Zinc phosphide, 258.12 g/mol; phosphine, 34 g/mol.
- Solubility (water): Zinc phosphide is practically insoluble in water<sup>1</sup> and insoluble in alcohol.<sup>10</sup> Phosphine is considered slightly soluble in water.<sup>8</sup>
- Soil Sorption Coefficient ( $K_{oc}$ ): Not found.

## Uses:

- Rodenticides containing zinc phosphide are used in both agricultural and residential settings. Formulations include bait pellets, granules, dust, and tracking powders.<sup>2</sup> Uses for individual products containing zinc phosphide vary widely. Always read and follow the label when applying pesticide products.
- Signal words for products containing zinc phosphide may range from Caution to Danger. The signal word reflects the combined toxicity of the active ingredient and other ingredients in the product. See the

pesticide label on the product and refer to the NPIC fact sheets on **Signal Words** and **Inert or "Other" Ingredients**.

- To find a list of products containing zinc phosphide which are registered in your state, visit the website [http://npic.orst.edu/reg/state\\_agencies.html](http://npic.orst.edu/reg/state_agencies.html) and search by "active ingredient."

## Mode of Action:

### Target Organisms

- Rodenticide baits containing zinc phosphide must be ingested to be effective.<sup>2</sup> They are used to control both commensal rodents such as house mice and rats, and "field" rodents such as voles, ground squirrels, pocket gophers, and prairie dogs. Jack rabbits are also targeted pests.<sup>2</sup>
- The toxicity of zinc phosphide is due to the production of phosphine.<sup>10</sup> This is also true of aluminum phosphide and magnesium phosphide.<sup>3</sup> Zinc phosphide requires acidic conditions for appreciable hydrolysis and subsequent formation of phosphine, whereas aluminum phosphide and magnesium phosphide will hydrolyze to form phosphine in neutral pH.<sup>11</sup>
- Hydrolysis is strongly pH-dependent for zinc phosphide. At pH 4, 7.1% of zinc phosphide hydrolyzed in 12 hours, whereas 38.8% hydrolyzed at pH 2 over the same period.<sup>4</sup>
- Once released in the gastrointestinal tract, phosphine gas is absorbed along with zinc.<sup>12</sup>
- Phosphine disrupts mitochondrial respiration once it is absorbed. The exact mechanism is unknown, but phosphine appears to block protein and enzyme synthesis.<sup>13</sup> Phosphine is a cytochrome C oxidase inhibitor, but this does not appear to be its sole mechanism of toxicity.<sup>14</sup>
- Other possible mechanisms of action for phosphine include creation of hydroxyl radicals while simultaneously inhibiting catalase and peroxidase, corrosion of exposed tissues, and metal toxicity from the zinc, magnesium or aluminum.<sup>6,14,15</sup>
- Anticholinesterase activity by phosphine has also been suggested, but evidence for this has been mixed.<sup>14</sup>

### Non-target Organisms

- Ingestion of zinc phosphide by non-target mammals or birds leads to the liberation of phosphine and subsequent toxicosis in the same manner that target mammals are affected. Zinc phosphide is highly toxic to sheep, cows, and goats as well as non-ruminants.<sup>16</sup>
- Non-target organisms such as rabbits that are unable to vomit are at particular risk of phosphine poisoning.<sup>11</sup>
- Phosphine production is increased at decreasing pH. Animals that have recently eaten and have food in their stomachs are at greater risk than animals with empty stomachs prior to consuming zinc phosphide. This is because of the secretion of gastric acid into the stomach for digestion.<sup>17,18</sup>
- Animals with relatively constant release of gastric acid regardless of food intake, such as rats, are at greater risk than animals such as dogs whose gastric acid is released only following ingestion of food.<sup>17</sup>
- Zinc phosphide is not expected to pose a secondary poisoning hazard because of its rapid breakdown in the bodies of animals that ingested it directly. However, experimental oral exposures to animals poisoned by zinc phosphide have led to secondary poisonings in both cats and dogs.<sup>19</sup>
- Secondary poisoning appears to be rare in wildlife, although it has occurred in experimental settings. Risk appears to be dependent at least in part on the consumption of the gastrointestinal tract of the poisoned animal by either a predator or scavenger. Domestic dogs and cats appear to be more likely to consume the gastrointestinal tract of poisoned prey than are wild animals.<sup>19</sup>

#### TOXICITY CLASSIFICATION - ZINC PHOSPHIDE/PHOSPHINE

	High Toxicity	Moderate Toxicity	Low Toxicity	Very Low Toxicity

Acute Oral LD <sub>50</sub>	Up to and including 50 mg/kg (≤ 50 mg/kg)	Greater than 50 through 500 mg/kg (>50-500 mg/kg)	Greater than 500 through 5000 mg/kg (>500-5000 mg/kg)	Greater than 5000 mg/kg (>5000 mg/kg)
Inhalation LC <sub>50</sub>	Up to and including 0.05 mg/L (≤0.05 mg/L)	Greater than 0.05 through 0.5 mg/L (>0.05-0.5 mg/L)	Greater than 0.5 through 2.0 mg/L (>0.5-2.0 mg/L)	Greater than 2.0 mg/L (>2.0 mg/L)
Dermal LD <sub>50</sub>	Up to and including 200 mg/kg (≤200 mg/kg)	Greater than 200 through 2000 mg/kg (>200-2000 mg/kg)	<b>Greater than 2000 through 5000 mg/kg (&gt;2000-5000 mg/kg)</b>	Greater than 5000 mg/kg (>5000 mg/kg)
Primary Eye Irritation	Corrosive (irreversible destruction of ocular tissue) or corneal involvement or irritation persisting for more than 21 days	Corneal involvement or other eye irritation clearing in 8 - 21 days	Corneal involvement or other eye irritation clearing in 7 days or less	<b>Minimal effects clearing in less than 24 hours</b>
Primary Skin Irritation	Corrosive (tissue destruction into the dermis and/or scarring)	Severe irritation at 72 hours (severe erythema or edema)	Moderate irritation at 72 hours (moderate erythema)	<b>Mild or slight irritation at 72 hours (no irritation or erythema)</b>

The highlighted boxes reflect the values in the "Acute Toxicity" section of this fact sheet. Modeled after the U.S. Environmental Protection Agency, Office of Pesticide Programs, Label Review Manual, Chapter 7: Precautionary Labeling.

<http://www.epa.gov/oppfead1/labeling/lrm/chap-07.pdf>

## Acute Toxicity:

### Oral

- The oral LD<sub>50</sub> for rats was determined to be 21 mg/kg, with a range of 12-35 mg/kg in one study, and 43-56 mg/kg in another.<sup>20,21</sup> The U.S. EPA considered zinc phosphide to be highly toxic via oral exposure.<sup>2</sup> See the text boxes on **Toxicity Classification** and **LD<sub>50</sub>/LC<sub>50</sub>**.
- The oral LD<sub>50</sub> for sheep is 60-70 mg/kg.<sup>16</sup>
- Oral LD<sub>50</sub> values were compiled for wild mammals and ranged from 8 mg/kg for kangaroo rats (*Dipodomys spectabilis*) and black-tailed jackrabbits (*Lepus californicus*) to 93 mg/kg for a kit fox (*Vulpes macrotus mutica*).<sup>19</sup>

**LD<sub>50</sub>/LC<sub>50</sub>:** A common measure of acute toxicity is the lethal dose (LD<sub>50</sub>) or lethal concentration (LC<sub>50</sub>) that causes death (resulting from a single or limited exposure) in 50 percent of the treated animals. LD<sub>50</sub> is generally expressed as the dose in milligrams (mg) of chemical per kilogram (kg) of body weight. LC<sub>50</sub> is often expressed as mg of chemical per volume (e.g., liter (L)) of medium (i.e., air or water) the organism is exposed to. Chemicals are considered highly toxic when the LD<sub>50</sub>/LC<sub>50</sub> is small and practically non-toxic when the value is large. However, the LD<sub>50</sub>/LC<sub>50</sub> does not reflect any effects from long-term exposure (i.e., cancer, birth defects or reproductive toxicity) that may occur at levels below those that cause death.

### Dermal

- The dermal LD<sub>50</sub> in rabbits was determined to be 2000-5000 mg/kg.<sup>22</sup> Zinc phosphide is considered to be low in toxicity based on these results.<sup>2</sup>
- Eye irritation tests performed with zinc phosphide on rabbits resulted in discharge, chemosis or swelling of the eyelid and eye surface tissue, and some redness in the conjunctiva. The U.S. EPA considered zinc phosphide to be very low in toxicity for eye irritation.<sup>2</sup>
- Researchers applied zinc phosphide to the skin of rabbits to determine if it is a skin irritant. Zinc phosphide was found to be non-irritating. Based on the low dermal toxicity and lack of dermal irritation, the U.S. EPA waived the skin sensitization tests.<sup>2</sup>

### Inhalation

- The U.S. EPA waived the re-registration requirement of determining an inhalation LC<sub>50</sub> for zinc phosphide and considered it highly toxic via inhalation exposure.<sup>2</sup>
- Rats exposed to 0, 2.5, 5.0, and 10.0 ppm phosphine for 6 hours all survived, although some animals exhibited nasal discharge during the exposure. Nasal discharge cleared after the exposure ended, and no



exposure-related effects were noted 14 days after exposure.<sup>23</sup>

## Signs of Toxicity - Animals

- Animals that ingest zinc phosphide may begin showing clinical signs within 1 to 4 hours. Early signs of exposure include loss of appetite and depressed activity followed by vomiting and painful retching. These signs progress to anxiousness, ataxia or uncoordinated movements, weakness, labored breathing, thrashing, muscle tremors and convulsions.<sup>9,11</sup>
- Onset of signs may be delayed for up to 12 hours or more in animals who consumed the bait without any other food in their stomachs.<sup>9</sup> Gastric acid release in animals that have recently eaten causes more rapid release of phosphine.<sup>17</sup>
- The vomit of poisoned animals may contain blood. The vomit can also include phosphine, which can be dangerous to humans at levels below which its odor can be detected.<sup>9,11</sup>
- Rats poisoned with 10 mg/kg aluminum phosphide administered intraperitoneally demonstrated a drop of 47% in cholinesterase activity.<sup>24</sup>
- Researchers exposed rats to aluminum phosphide by inserting it through the stomach wall. Treated rats developed methemoglobinemia.<sup>25</sup>

## Signs of Toxicity - Humans

- Zinc phosphide dust may release phosphine once it contacts the moist tissues of the respiratory tract if the dust is inhaled, resulting in pulmonary edema and cardiotoxicity. If ingested, zinc phosphide releases phosphine in the gut and may cause headache, dizziness, fatigue, nausea and vomiting, cough, dyspnea, chest tightness, and thirst. Other signs include liver failure, jaundice, loss of ability to urinate, tetany, delirium, convulsions, coma, and death.<sup>12,14</sup>
- Death in humans from fatal doses may be delayed for 30 hours after exposure, with the majority of tissue damage occurring in the liver, kidneys and heart.<sup>26</sup>
- Victims of lethal phosphine exposure were found to have liver, myocardial, and alveolar cell necrosis, pulmonary edema and microscopic pulmonary congestion, and anoxic damage in the brain.<sup>6</sup>
- Hyperglycemia following exposure to phosphine has also been reported.<sup>13,27</sup> In a study of 45 patients admitted to the hospital following aluminum phosphide poisoning, researchers noted that increased blood glucose levels or hyperglycemia were associated with fatal outcomes.<sup>13</sup>
- Elevated levels of the enzyme creatine phosphokinase were found in two instances of severe poisoning by phosphine.<sup>28,29</sup>
- Aluminum and phosphine have been shown to interfere with acetylcholinesterase in humans, but the impact of this inhibition on the toxicity is not clear.<sup>14</sup>
- Always **follow label instructions** and take steps to **minimize exposure**. If any exposure occurs, be sure to follow the First Aid instructions on the product label carefully. For additional treatment advice, contact the Poison Control Center at 1-800- 222-1222. If you wish to **discuss an incident** with the National Pesticide Information Center, please call 1-800-858-7378.

## Chronic Toxicity:

### Animals

- Rats inhaled phosphine 5 days a week, 6 hours a day, for up to 2 years. The concentrations tested were 0.3, 1.0, and 3.0 ppm. The researchers did not detect any toxic or carcinogenic effects from these exposures.<sup>30</sup>
- Rats inhaled phosphine at concentrations of 0, 0.3, 1.0, and 3.0 ppm for 6 hours a day for 13 weeks. An additional group of rats was exposed to 5.0 ppm of phosphine for 6 hours a day for 13 days. Rats exposed to 1.0 ppm or more gained less weight and consumed less food than controls. Minor changes in blood

- parameters and kidney function were noted in animals in the 3.0 and 5.0 ppm exposure groups, although all effects disappeared after cessation of exposure.<sup>23</sup>
- Mice inhaled phosphine at concentrations of 0, 0.3, 1.0, and 4.5 ppm for 6 hours per day, 5 days per week for 13 weeks. Dose-related decrease in weight gain was noted particularly in female mice. Masses of male kidneys, heart, brain, and lungs were less than those of controls at all dose levels, whereas females' organs increased in mass at the 4.5 ppm exposure level.<sup>31</sup>
  - Researchers fed rats baits containing either 0.02 or 0.03% zinc phosphide for up to 58 or 31 days, respectively. During the first week, rats in the treatment groups gained less weight than control group rats. All rats in the 0.03% treatment group died, and two rats from the lower-dose group died by the end of the study. Researchers found liver injury in rats from the high-dose group. Lung damage was also noted.<sup>17</sup>
  - A 90-day subchronic study was performed on rats. Researchers administered zinc phosphide by gavage (stomach tube) at doses of 0.1, 1.0, or 3.0 mg/kg/day. Animals dosed with 1.0 or 3.0 mg/kg/day showed excess salivation and lowered external body temperature. Hydronephrosis, or swelling of the kidney with excess urine, was noted in the male rats in the 1.0 and 3.0 mg/kg/day dose groups, and males in the highest dose group also developed kidney infections. The NOEL was established at 0.1 mg/kg/day.<sup>2</sup> See the text boxes on **NOAEL, NOEL, LOAEL, and LOEL**.
  - The chronic RfD for zinc phosphide was set at 0.0001 mg/kg/day based on the subchronic exposure study in rats.<sup>2</sup> See the text box on **Reference Dose (RfD)**.
  - Rats were dosed with 40, 80, or 160 mg zinc phosphide or fed bait containing 2% zinc phosphide prior to being offered to ferrets. Ferrets were fed a total of five rats over a 10-day period. Ferrets fed control rats readily ate the gastrointestinal tracts, but ferrets fed dosed rats began to avoid eating the gastrointestinal tracts of poisoned rats after 4 days, particularly those in the high-dose group. Blood chemistry of ferrets fed poisoned rats had reduced hemoglobin-to-iron ratios and increased triglyceride concentrations compared to control ferrets, although there was considerable individual variation.<sup>32</sup>
  - Researchers fed gray foxes (*Urocyon cinereoargenteus*) and red foxes (*Vulpes vulpes*) exclusively on voles killed with zinc phosphide for 3 days. Dosed foxes ate less food and cached fewer poisoned voles than they had when fed unpoisoned voles prior to the study.<sup>33</sup>

**NOAEL: No Observable Adverse Effect Level**

**NOEL: No Observed Effect Level**

**LOAEL: Lowest Observable Adverse Effect Level**

**LOEL: Lowest Observed Effect Level**

## Humans

- Chronic, low-level inhalation or oral exposures to zinc phosphide in people have been associated with weakness, anemia, toothache, necrosis of the jaw bones and associated swelling, weight loss, and spontaneous fractures.<sup>4</sup>
- Blood samples taken from fumigant applicators and control subjects were examined for chromosomal abnormalities. Researchers collected samples during the application season, and 6 weeks to 3 months after application. Fumigant applicators who had been exposed to phosphine had more chromosome abnormalities than control subjects during the application season. Chromosomal rearrangements were more common in phosphine applicators than in controls 3 months after exposure.<sup>34</sup>
- More recent investigations repeated the earlier work above, but found no such differences.<sup>35,36</sup> One group of researchers hypothesized that improved personal protective equipment practices were responsible for the change.<sup>36</sup> Other researchers reported that chromosomal breaks were more prevalent in men who used fumigants relative to controls, but these applicators also used insecticides and herbicides.<sup>37</sup>

**Cancer: Government agencies in the United States and abroad have developed programs to evaluate the potential for a chemical to cause cancer. Testing guidelines and classification**

## Endocrine Disruption:

- No data were found on the ability of zinc phosphide or phosphine to disrupt the endocrine system.

## Carcinogenicity:

### Animals

- The U.S. EPA waived requirements for carcinogenicity studies for zinc phosphide because chronic exposure is not expected.<sup>2</sup>
- Rats were fed diets for 2 years that had been fumigated with phosphine at rates of 48 and 90 g/metric ton for 48 and 72 hours, respectively. Feed was stored frozen following fumigation and residues at time of thawing averaged 1 ppm. Residues were expected to begin to dissipate at thawing, and were therefore unknown at time of consumption. No signs of carcinogenicity were noted.<sup>38</sup>
- Rats exposed to phosphine through whole-body inhalation at concentrations of 0.3, 1.0, and 3.0 ppm for up to 2 years exhibited no carcinogenic effects.<sup>30</sup>

### Humans

- The U.S. EPA determined that chronic exposure to zinc phosphide should be negligible and therefore waived carcinogenicity testing requirements for reregistration.<sup>2</sup> See the text box on **Cancer**.
- No human data were found on carcinogenic effects of zinc phosphide or phosphine.

## Reproductive or Teratogenic Effects:

### Animals

- Researchers dosed 25 pregnant female rats per group daily by stomach tube at doses of 1, 2, or 4 mg/kg/day during the second week of the pregnancy. Nine of the rats in the highest dose group died although the cause of death was not determined. Rats in the highest dose group also ate less and lost weight in the first half of the week. Both parameters returned to pre-study levels by the end of the treatment period. The maternal NOEL was established at 2 mg/kg/day.<sup>39</sup>
- Researchers exposed 24 pregnant female rats to phosphine for the 20 days of gestation at concentrations of 0, 0.03, 0.33, 2.80, 4.90, and 7.50 ppm in whole-body exposure tests. Fourteen of the females died by day 10 in the high-dose group. No treatment-related effects were noted in the dams of all other exposure groups.<sup>23</sup>
- Ten male and 10 female adult rats were fed 0.03% zinc phosphide for 22 days. One male and four females died before the end of the exposure. All of the surviving rats maintained their fertility despite the exposure.<sup>17</sup>

### Humans

- No human data were found on the teratogenic or reproductive effects of zinc phosphide or phosphine exposure.

## Fate in the Body:

### Absorption

- Absorption of phosphine occurs through inhalation. It also occurs across the gastro-intestinal tract following ingestion of zinc phosphide and subsequent production of phosphine. Dermal absorption of zinc phosphide is low.<sup>4,16</sup>
- Aluminum phosphide and magnesium phosphide are expected to hydrolyze to phosphine upon contact with moist respiratory membranes, and the phosphine can then be absorbed by the lungs.<sup>4</sup>
- Inhalation exposure to zinc phosphide may lead to exposure through the gastrointestinal tract via particulate clearance mechanisms in the lungs, which could result in ingestion of particulate matter containing zinc phosphide. Subsequent hydrolysis and absorption of phosphine may occur.<sup>4</sup>

## Distribution

- Clinical signs in human poisonings suggest that phosphine is widely distributed to the liver, kidneys, and central nervous system.<sup>4</sup>

## Metabolism

- Metabolism of zinc phosphide is not well understood.<sup>14</sup>

## Excretion

- Phosphine may be exhaled from the lungs as the parent compound.<sup>4</sup>
- The primary metabolite excreted in animal urine is hypophosphite.<sup>4</sup>

## Medical Tests and Monitoring:

- Tissue samples taken from suicide victims were analyzed using headspace gas chromatography with inductively coupled plasma mass spectrometry or a nitrogen-phosphorus detector following the fatal ingestion of aluminum phosphide tablets. Phosphine residues were detected in the brain, kidney, liver, heart, and surrenals. Phosphorus and aluminum residues were detected in blood.<sup>40,41</sup>
- Silver nitrate strips have also been used to detect phosphine in post-mortem tissue samples. However, the process of anaerobic decomposition may produce traces of phosphine that are independent of any exogenous exposure.<sup>42</sup>
- These biomarkers have not been widely utilized.

## Environmental Fate:

### Soil

- Zinc phosphide oxidized in 5 weeks when placed in soils that had at least 50% moisture saturation.<sup>4</sup>
- Three volcanic soil types with organic matter ranging from 3-15% were mixed with water to 25, 50, 75, and 100% saturation. Researchers then added 4.17 mg/g zinc phosphide to the soil and sealed the mixtures in glass vials. The maximum amount of phosphine liberated from one saturated soil type was 32% of the total amount possible based on phosphorus content of the zinc phosphide. Phosphine production from the soils peaked at 1-9 days after addition, depending on soil type and moisture content.<sup>43</sup>
- In the same study, researchers added zinc phosphide to dry soils and sealed the mixture in glass vials. During the incubation process, no phosphine was detected in the headspace of the vials. The researchers concluded that zinc phosphide may have oxidized to zinc phosphate, and that any phosphine produced during the decomposition subsequently oxidized as well.<sup>43</sup>
- Phosphine diffuses into the voids within soil but this process is reduced with increasing soil moisture levels.<sup>43</sup> Phosphine absorbed by soils is subsequently oxidized to orthophosphate.<sup>4</sup>

- Five commercial zinc phosphide baits placed on silt clay loam from harvested sugar cane fields retained 50-100% of the original zinc phosphide content at the end of 16 days. The loss was greatest in the oat bait that had a surface treatment of zinc phosphide.<sup>44</sup>

## Water

- Zinc phosphide placed in fresh or salt water for 11 days showed little hydrolysis.<sup>4</sup>
- Hydrolysis of zinc phosphide is substantial only in highly acidic conditions of pH 4 or below.<sup>4</sup>
- Sediments in water are expected to facilitate the breakdown of zinc phosphide to either phosphine under anaerobic conditions, or phosphoric acid under aerobic conditions.<sup>4</sup>
- Phosphine will oxidize in water to form hypophosphorus acid.<sup>4</sup>

The "half-life" is the time required for half of the compound to break down in the environment.

1 half-life = 50% remaining  
 2 half-lives = 25% remaining  
 3 half-lives = 12% remaining  
 4 half-lives = 6% remaining  
 5 half-lives = 3% remaining

Half-lives can vary widely based on environmental factors. The amount of chemical remaining after a half-life will always depend on the amount of the chemical originally applied. It should be noted that some chemicals may degrade into compounds of toxicological significance.

## Air

- Phosphine released into the air rapidly breaks down following reaction with hydroxyl radicals, with a half-life of 5-28 hours. The oxidation products are inorganic phosphate and phosphorus oxyacids.<sup>4</sup> See the text box on **Half-life**.
- Phosphine will spontaneously combust at concentrations of greater than 1.8% and temperatures of 38 °C (104 °F). If other phosphorus hydride impurities are present, phosphine may ignite at room temperature.<sup>4</sup>

## Plants

- Commercial rodenticide pellets containing 2% zinc phosphide were placed in artificial gopher burrows in an alfalfa field. Pellets were applied at 3 pounds per acre (the label rate), 6 pounds per acre, and 9 pounds per acre in burrows 8" deep and 10' apart. Above-ground portions of the alfalfa were harvested after 1, 2, 7, and 30 days. No residues of zinc phosphide were detected in the alfalfa.<sup>45</sup>
- A rodenticide bait containing 2% zinc phosphide was broadcast at rates of 5, 10, and 50 lbs/acre on sugarcane in Hawaii four times at two-month intervals. Samples of vegetation were taken one week after the final application and at harvest, 110 days later. The samples at one week contained 0.004-0.015 ppm of phosphine at the dry site and 0-0.045 ppm of phosphine at the wet site. At harvest, phosphine residues at the dry site were 0.006-0.032 ppm. No residues were detected at the wet site at harvest.<sup>46</sup>

## Indoor

- No data were found on indoor fate of either zinc phosphide or phosphine.

## Food Residue

- The USDA does not monitor food samples for zinc phosphide or phosphine as part of the Pesticide Data Program.<sup>47,48</sup> Phosphine tolerances from the use of zinc phosphide are established for hay, wheat, alfalfa, barley, potatoes, grapes, sugar beets, and beans.<sup>49</sup>
- The U.S. EPA determined that neither acute nor chronic exposure to zinc phosphide was expected through the diet.<sup>2</sup>

## Ecotoxicity Studies:



## Birds

- The acute LD<sub>50</sub> for northern bobwhite quail (*Colinus virginianus*) is 12.9 mg/kg,<sup>50</sup> and the LD<sub>50</sub> for mallard ducks (*Anas platyrhynchos*) is 67.4 mg/kg.<sup>51</sup> The 5-day LC<sub>50</sub> was 469 ppm in bobwhite quail and 2885 ppm in mallards.<sup>52,53</sup>
- The LD<sub>50</sub> values for other bird species ranged from 7.5 to 12.0 mg/kg for three species of geese (Canada goose *Branta canadensis*, white-fronted goose *Anser albifrons*, and snow goose *A. caerulescens*) and 24 to 178 mg/kg for red-winged blackbirds (*Agelaius phoeniceus*).<sup>19,54</sup>
- Canada geese (*Branta canadensis moffitti*) and white-fronted geese (*Anser albifrons*) were placed in pens in alfalfa and fescue fields that were treated with a 1% zinc phosphide grain bait. The exposure interval was 4 days. Four of the six Canada geese died following exposure to grain bait on fescue, and the rest lost weight. White-fronted geese exposed to bait on alfalfa all survived, although the geese did consume sublethal amounts of the bait. The white-fronted geese appeared to develop an aversion to the bait, which may have been due to the strong emetic action of zinc phosphide. The researchers concluded that insufficient forage leads to greater likelihood of bait ingestion.<sup>54</sup>
- Wild geese and domestic fowl exposed to repeated sublethal doses of zinc phosphide appeared in some cases to develop diarrhea. Researchers noted increased excretion of bile pigments in the droppings of the domestic fowl.<sup>54,55</sup>
- Researchers fed great horned owls (*Bubo virginianus*) for 3 days exclusively on voles killed with 87 mg/kg zinc phosphide 5 hours prior to being offered to the owls. The owls began roosting on the floor of their pens rather than on perches and refused to take flight when disturbed.<sup>33</sup>

## Fish and Aquatic Life

- Phosphine is poorly soluble in water, but when it is in solution it can be acutely toxic to aquatic life.<sup>4</sup>
- The 96-hour LC<sub>50</sub> for phosphine exposure in rainbow trout (*Oncorhynchus mykiss*) was 0.0097 ppm. The EC<sub>50</sub> for Daphnia exposed to phosphine in a 24-hour test was 0.2 mg/L.<sup>1</sup> See the text box on EC<sub>50</sub>.
- An acute LC<sub>50</sub> for rainbow trout exposed to phosphine was reported as 0.5 mg/L, and for bluegill sunfish (*Lepomis macrochirus*) the LC<sub>50</sub> was 0.8 mg/L.<sup>1</sup>

EC<sub>50</sub>: The median effective concentration (EC<sub>50</sub>) may be reported for sublethal or ambiguously lethal effects. This measure is used in tests involving species such as aquatic invertebrates where death may be difficult to determine. This term is also used if sublethal events are being monitored.

Newman, M.C.; Unger, M.A. *Fundamentals of Ecotoxicology*; CRC Press, LLC.: Boca Raton, FL, 2003; p 178.

## Terrestrial Invertebrates

- No information was found on the effects of zinc phosphide or phosphine on terrestrial invertebrates.

## Regulatory Guidelines:

- The chronic reference dose or cRfD for zinc phosphide is 0.0001 mg/kg/day.<sup>2</sup> See the text box on **Reference Dose (RfD)**.
- The U.S. EPA did not classify zinc phosphide or phosphine with regards to carcinogenicity because chronic exposure is not expected.<sup>2</sup> See the text box on **Cancer**.
- The National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limit, Time-Weighted Average (REL, TWA) for phosphine is 0.4 mg/m<sup>3</sup>.<sup>51</sup>

Reference Dose (RfD): The RfD is an estimate of the quantity of chemical that a person could be exposed to every day for the rest of their life with no appreciable risk of adverse health effects. The reference dose is typically measured in milligrams (mg) of chemical per kilogram (kg) of body weight per day.

U.S. Environmental Protection Agency, Technology Transfer Network, Air Toxics Health Effects Glossary, 2009.  
<http://www.epa.gov/ttnatw01/hlthef/hapglossaryrev.html#RfD>

- The Permissible Exposure Limit (PEL) for phosphine is 0.4 mg/m<sup>3</sup>.<sup>56</sup>
- The Acute Exposure Guideline Levels, or AEGLs, for zinc phosphide range from 3.6 ppm for AEGL-3 for a 10-minute exposure to 0.13 for an 8-hour exposure, AEGL-2.<sup>57</sup>
- The ACGIH Threshold Limit Value, or TLV, for phosphine is 0.3 ppm or 0.4 mg/m<sup>3</sup>.<sup>58</sup>
- The exposure level considered Immediately Dangerous to Life and Health, or IDLH, for phosphine is 50 ppm.<sup>58</sup>

**Date Reviewed: September 2010**

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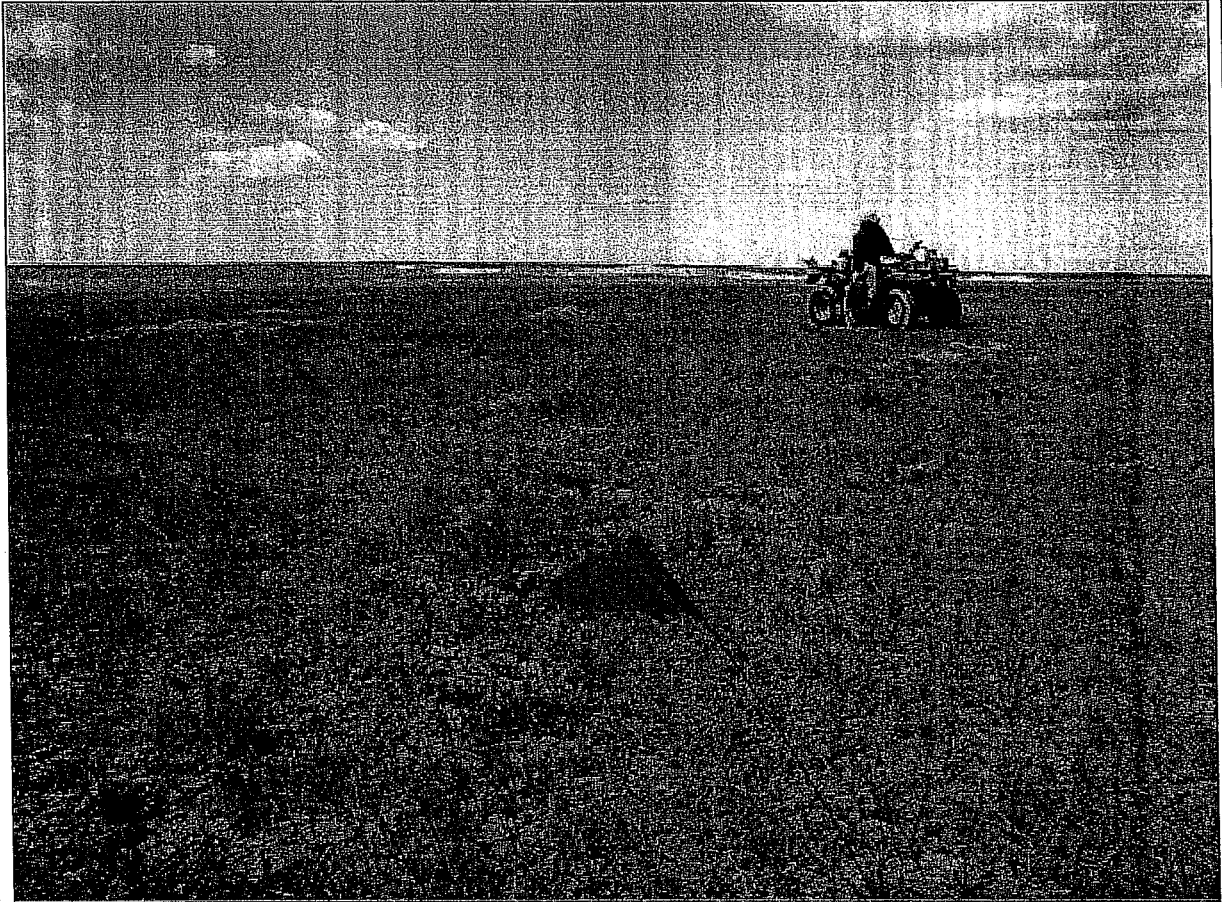
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**WALL RANGER DISTRICT  
CONATA BASIN  
2008 PLAGUE CONTROL REPORT**



By: /s/ *Randall L. Griebel*

Randall L. Griebel  
Wildlife Biologist

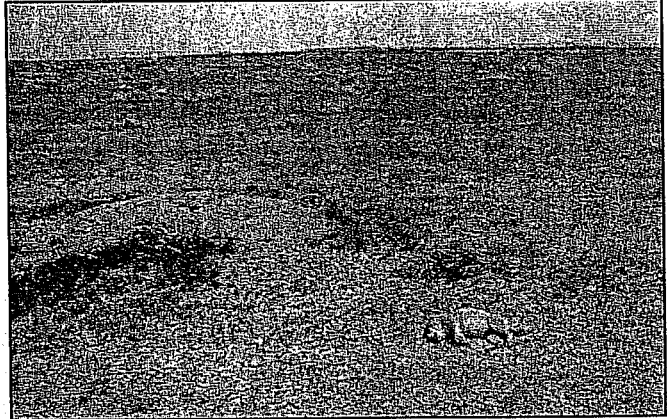
Date: 11 December 2008

Nebraska National Forest  
Buffalo Gap National Grassland  
Wall Ranger District  
Wall, South Dakota



## INTRODUCTION

On May 13, 2008, a dead prairie dog was discovered in the Lower Sage Creek area of the Wall Ranger District by Forest Service (FS) personnel and volunteers that were in that location building electric fence in the Boundary Management Zone (BMZ). The prairie dog was collected and sent-in to the Centers for Disease Control (CDC) in Fort Collins, Colorado for plague testing. A more thorough reconnaissance of the area was conducted on May 14-15, 2008 by FS and US Fish and Wildlife Service (FWS) personnel. The evidence showed we were now dealing with an epizootic plague event, especially with the large number of dead prairie dogs observed and lack of prairie dog activity in sizable areas (Figure 1). On the afternoon of May 15, 2008, the CDC confirmed the presence of plague in the prairie dog that was collected.



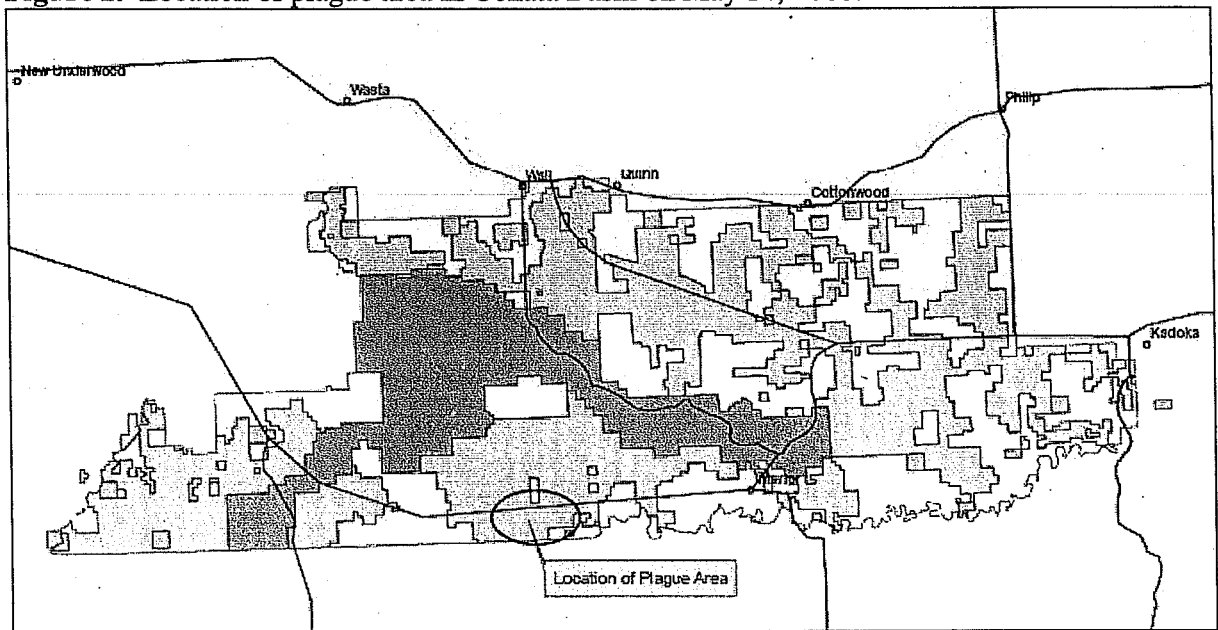
**Figure 1.** Dead prairie dog observed during early stages of plague epizootic in the Conata Basin.

A conference call was initiated on May 19, 2008 between the FS, FWS, National Park Service (NPS), Animal and Plant Health Inspection Service (APHIS), Prairie Wildlife Research (PWR) and South Dakota Game, Fish and Parks (SDGFP). The initial plague impact area was estimated at 3,000 acres and growing. All agencies participating in the call acknowledged the urgency of the situation and a face-to-face meeting was planned for May 22, 2008. The primary purpose of the meeting was to identify what colonies would be dusted, how many people from each agency could help dust, equipment needs, contribution for purchasing dust, and vaccinating ferrets. The plan developed from that meeting was to dust the high priority ferret areas which consisted of eight colonies or parts of larger colonies that totaled approximately 11,000 acres. Additionally, PWR would take the lead in trapping and vaccinating ferrets.

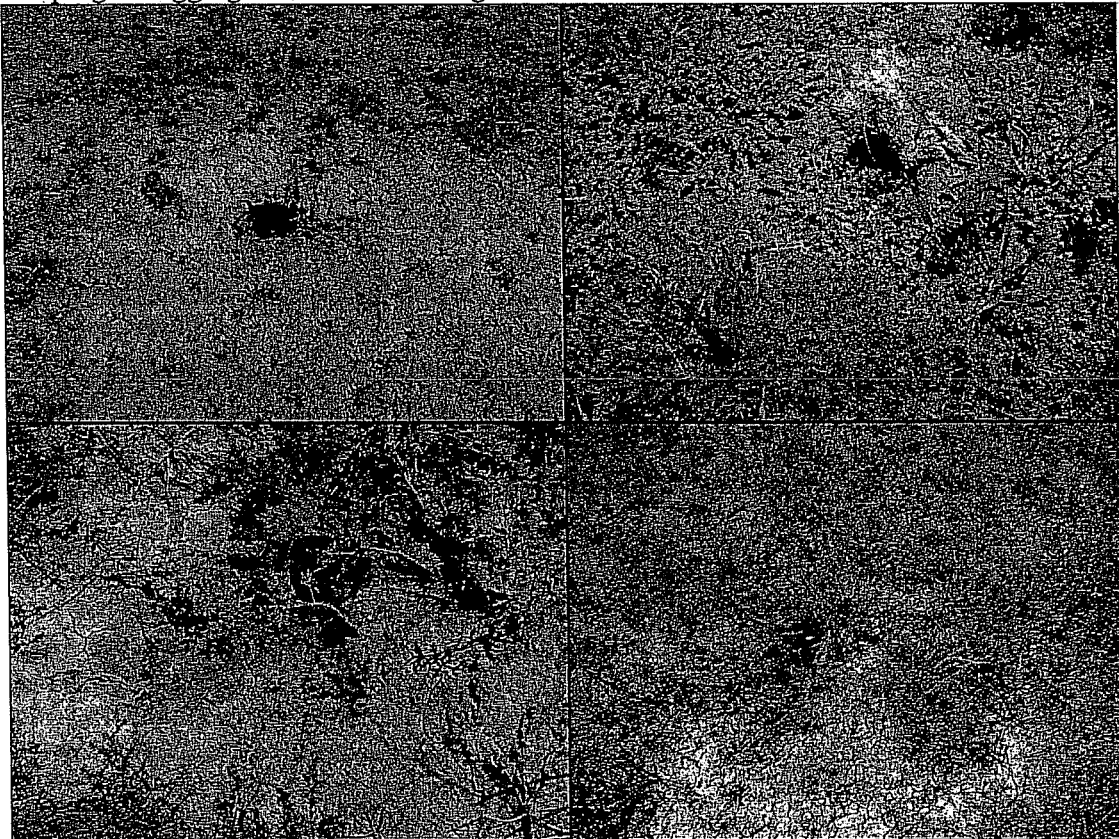
## PLAGUE TRACKING

The initial discovery of plague was located in the Lower Sage Creek area of the Conata Basin (Figure 2) and quickly spread in all directions from there. Upon discovery, the estimated size of the area impacted with plague was approximately 3,000 acres. Within the plague zone, one would typically find individual animals, or in some cases, small pockets (i.e., 1 – 10 acres) of dead prairie dogs scattered above ground. When dead prairie dogs were not seen, the plague area was mapped by surveying the burrows for signs of activity (Figure 3) in combination with aboveground observations compared to unaffected areas. The rate of expansion slowed considerably after mid-June and then essentially stopped spreading from mid-July to early September. However, since September there has been a noticeable increase in the rate of spread where it went from expanding by 60 acres on September 3, to an additional 294 acres on October 8 to 801 acres on November 4 (Figure 4).

**Figure 2.** Location of plague area in Conata Basin on May 14, 2008.

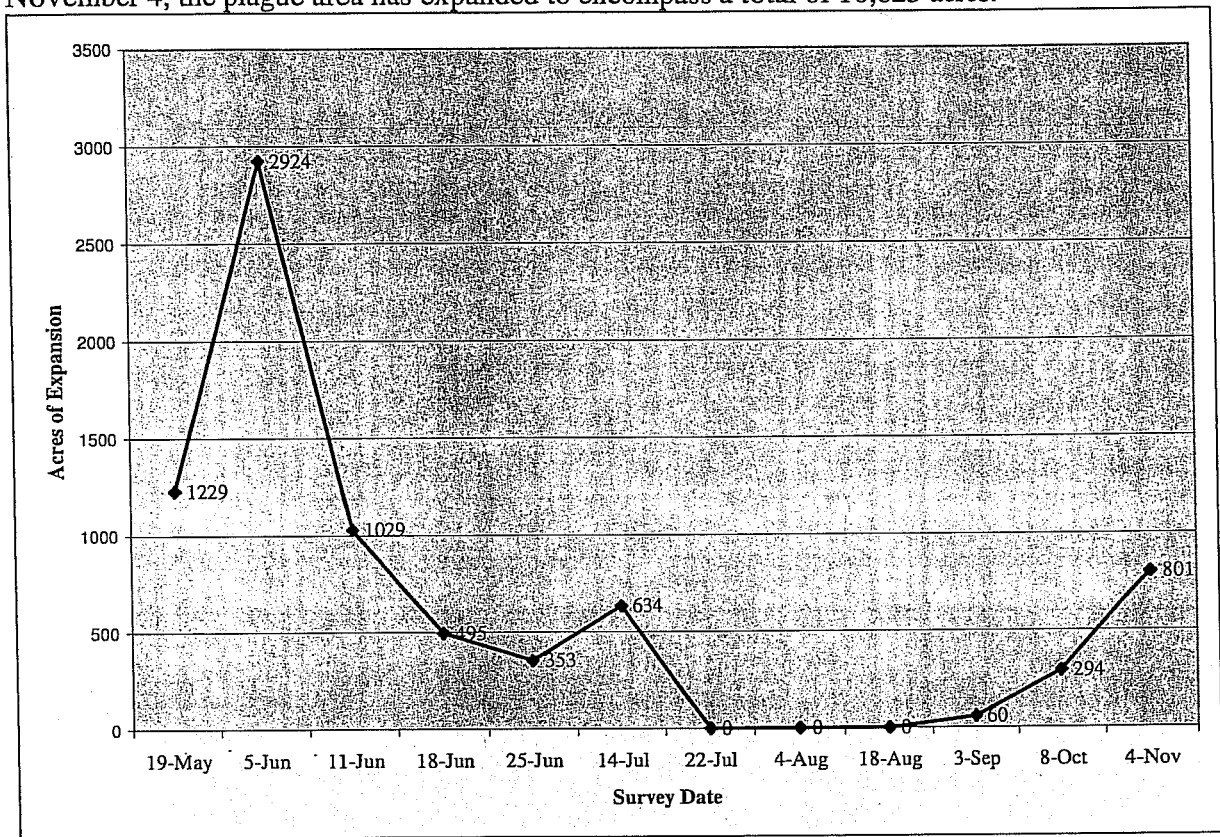


**Figure 3.** Typical prairie dog burrows in plague area. Notice unclipped vegetation, lack of scat, scraping or digging and burrows filling-in with soil.



## Wall Ranger District – 2008 Conata Basin Plague Control Report

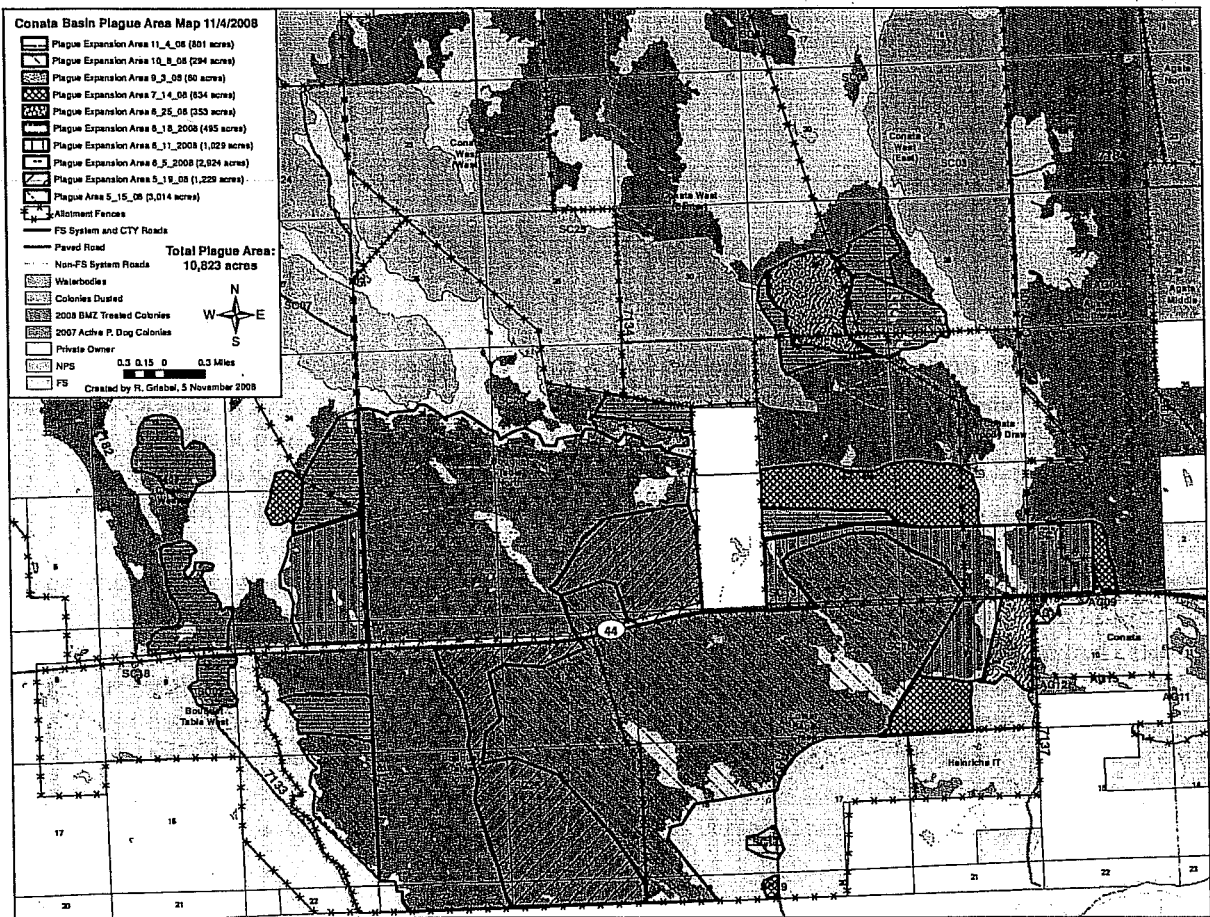
**Figure 4.** Plague expansion in the Conata Basin. Baseline was set on May 15 at 3,014 acres; thus, on May 19 an additional 1,229 acres were affected with plague and so forth. As of November 4, the plague area has expanded to encompass a total of 10,823 acres.



After the June 11<sup>th</sup> survey, the expansion rate slowed-down dramatically and we were no longer seeing dead prairie dogs aboveground; identifying plague in an area became more subtle and was judged on prairie dog activity and burrow condition. One interesting note is that this epizootic was generally expanding at the periphery of the main plague area until the June 5<sup>th</sup> survey in which a “hot-spot” or new plague area polygon was mapped approximately one mile north of anything previously mapped. On the November 4<sup>th</sup> survey, two more “hot-spots” were discovered a half-mile west of the nearest plague area. Thus, there are now four distinct plague locations mapped, although they are relatively close to each other and will probably merge eventually (Figure 5).

Within the mapped plague area, prairie dog activity varies greatly. Prairie dogs are nearly absent from the Lower Sage Creek allotment and east half of the Bouquet Table allotment south of highway 44. These were the earliest known plague locations and had the highest concentrations of dead prairie dogs observed aboveground. Outside of those two allotments, one will typically see scattered individuals or small pockets (i.e., 1-2 acres) of prairie dogs within the plague zone that either have a natural immunity to plague or simply by chance, were never bitten by plague-infected fleas. Additionally, there has been some recolonization of the plague area with a noticeable increase in the number of prairie dogs observed throughout sections 2 and 35 of the Bouquet Table allotment north of highway 44 (refer to Figure 5).

Figure 5. Conata Basin plague area locations.



The actual area affected by plague is probably slightly underestimated since the private parcel in the middle of the plague area and the FS BMZ areas adjacent to the mapped plague locations more than likely have plague also. These areas have been repeatedly treated with rodenticide over the last four years and actually resemble a plagued-out area already. No dead prairie dogs were found for testing from these sites.

## VACCINATIONS

There was a concern that with the rapid movement of plague and length of time it would take to get everything dusted, we would lose a number of black-footed ferrets through dispersal into the plague zone. Additionally, ferrets may be lost by simply occupying areas that may be plague-free one day and infected the next. Although the goal was to give each animal two shots (the second being a booster given at least two-weeks after the first shot), these are rare, wild animals that are difficult to track and locate a second time. However, there is enough evidence to suggest that even one shot provides some level of protection so it was decided to vaccinate as many ferrets as possible with at least one shot. Travis Livieri of PWR headed-up the ferret vaccination effort which consisted of spotlighting and trapping ferrets with the help of on-the-ground graduate students already in the Basin conducting research, FS and FWS personnel, and volunteers. This process started in June and continued throughout the fall (Table 1).

## Wall Ranger District – 2008 Conata Basin Plague Control Report

**Table 1.** Status of black-footed ferret plague vaccinations in the Conata Basin as of October 31, 2008. Information provided by Travis Livieri of PWR.

Age	Gender	No Shots	One Shot	Two Shots	Total	
Kit	Male	10	48	1	59	
Kit	Female	5	53	4	62	<b>121 Total Kits</b>
Adult	Male	3	30	8	41	
Adult	Female	5	48	24	77	<b>118 Total Adults</b>
<b>Total</b>		<b>23</b>	<b>179</b>	<b>37</b>	<b>239</b>	

### DUSTING

There were eight distinct areas identified as high priority for dusting in regards to black-footed ferret-use, which totaled a little over 11,000 acres. Seven of these sites were in the Conata Basin of the Wall Ranger District while the other site was located in Badlands National Park (i.e., Roberts Prairie Dog Colony) (Figure 6). Dusting began on June 2, 2008 in Roberts and ironically ended on September 16, 2008 in Roberts. A total of 11,239.3 acres and 453,560 burrows were dusted. The original plan was to begin dusting colonies in the Conata Basin closest to the plague zone as a priority. However, significant rainfall forced a change in where we could actually dust so we started in Roberts because the soil conditions could handle ATV traffic better than the “gumbo” down in the Basin. There were a total of 10 days throughout the dusting period where crews could not work because it was too wet. We worked in Roberts until June 11, 2008 when it dried-out enough to shift our efforts to SC 03 in the Basin. Although Roberts wasn’t finished, the close proximity of the mapped plague area and incidental observations that plague may be in the early stages of infiltrating SC 03, the decision was made to move there and begin dusting; the rest of Roberts would be finished at a later date.

### Methods

Generally, individuals from the FS, FWS and APHIS would meet at the Wall Ranger District office at 0500, load-up dust, charged techniduster batteries and ATV fuel and depart for the site by 0530. Depending on location, crews would arrive on site between 0615 and 0700, fuel-up ATVs, set-up the technidusters, get positioned in the dusting-line, identify flagger(s) and begin actual dusting between 0700-0730. Flaggers would adjust the lane width according to how many dusters were planned for that day and upcoming days. NPS crews usually met on site since they were driving from Interior. Crews would quit dusting for the day between 1530-1600, remove technidusters from ATVs and lock up equipment on-site. Personnel would usually arrive back in Wall somewhere between 1700 and 1730.

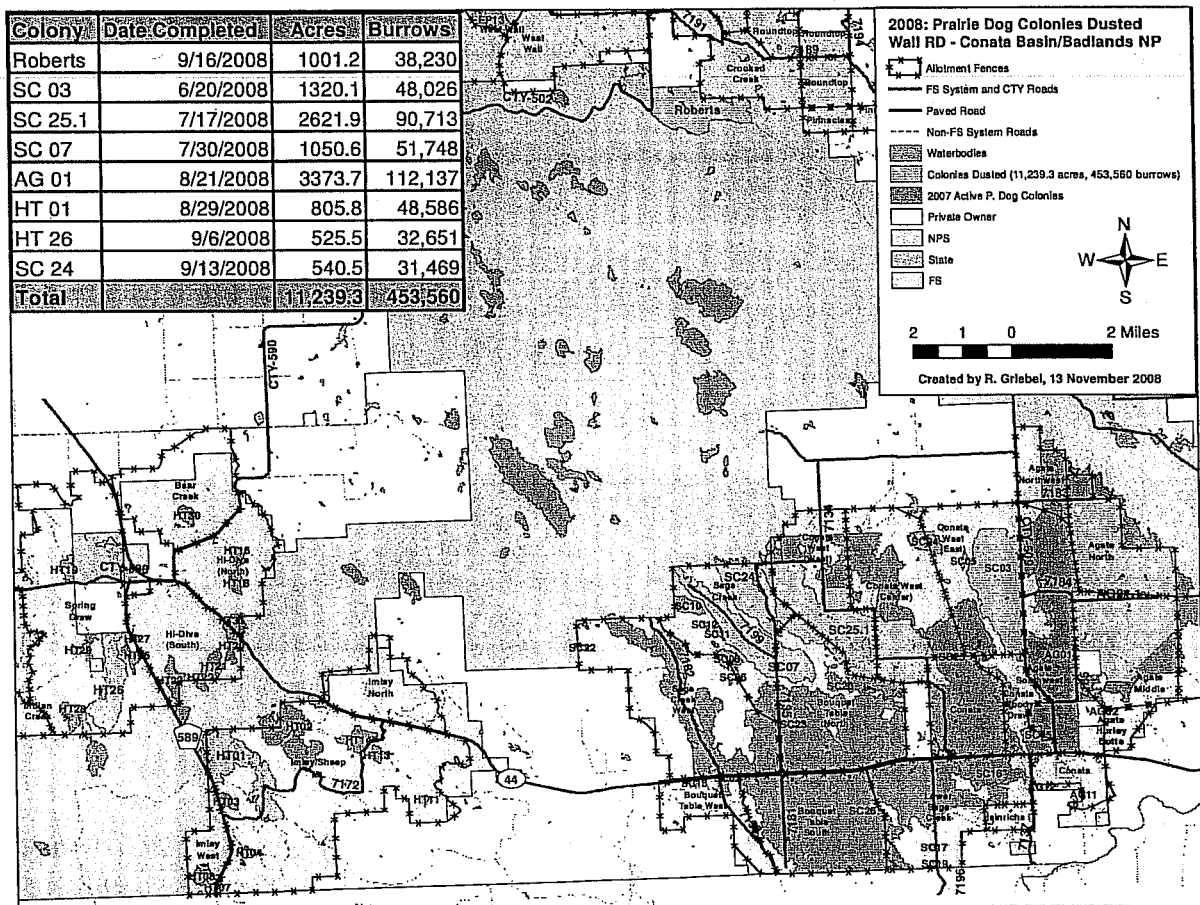
The number of individuals working on a daily basis varied depending on who was taking time-off and rotation of personnel from different agencies. Crews worked Monday through Saturday and some Sundays; however, most Sundays were dedicated to repairing broken dusters and blowing-out the functioning ones. New crew members were calibrated in regards to amount of dust they were applying (i.e., application rate of 4-5 grams per burrow). Each individual marked and re-used the same techniduster on a daily basis, which reduced the need to conduct calibration checks down to 1-2 times per week for those individuals. While dusting, each individual kept track of the number of burrows dusted through the use of a “clicker” mounted to the ATV. At the end of the day, the name of the individual, hours worked and total number of burrows dusted



## Wall Ranger District – 2008 Conata Basin Plague Control Report

was recorded. Additionally, the area dusted was GPS'd and acres recorded on the same data sheet. All burrows, whether they were active, inactive or badger burrows were dusted.

**Figure 6.** Colonies dusted in 2008; Conata Basin and Badlands National Park.



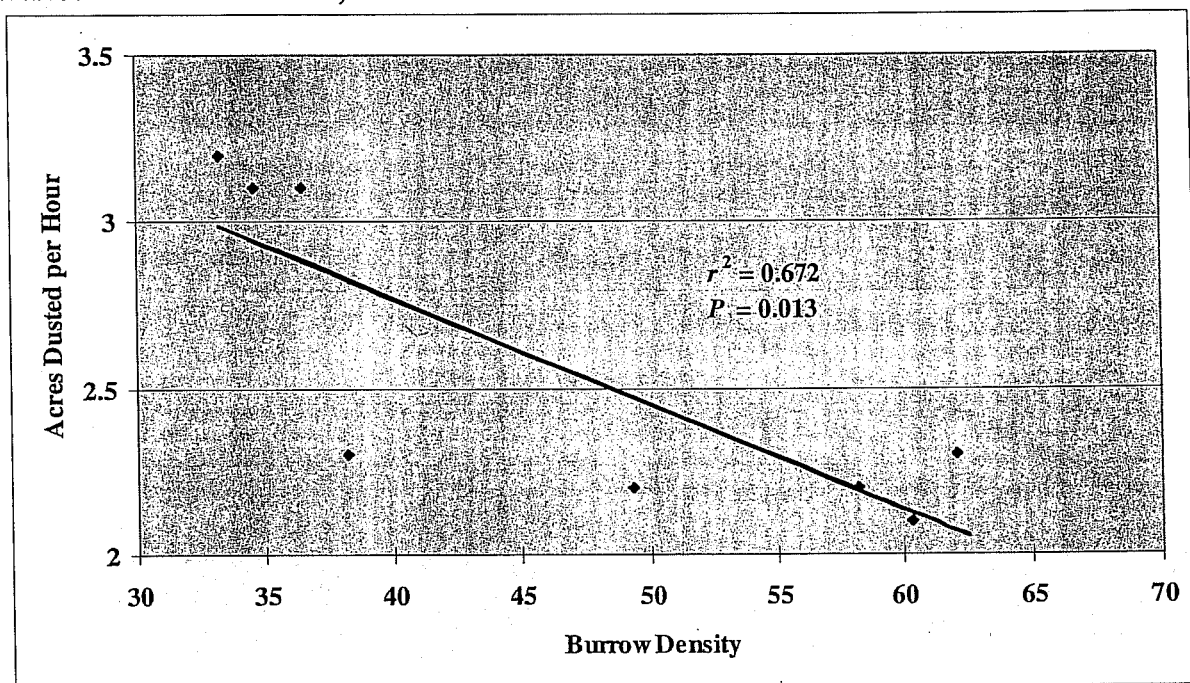
## Results

It took 78 days (i.e., actual days on the ground dusting) with a mean crew size of 7.6 individuals (range: 5-12) to dust 11,239.3 acres and 453,560 burrows. Thus, on average, a crew could expect to dust approximately 144 acres and 5,815 burrows in a day although this depended on the burrow density and number of individuals working that day. Burrow density has a significant negative relationship with the number of acres that can be dusted in a given time frame (Figure 7). In regards to worker-hours, it took a grand total of 4,522 hours (429.75 hours flagging, 4,092.25 hours dusting) to accomplish this task. Worker-hours are figured as the total number of hours an individual spent actually dusting or flagging. This figure includes breaks taken during the dusting period but does not include transportation to and from the site or set-up and tear-down for the day.

A total of 42 individuals from four different agencies and one volunteer helped with this project on the ground either dusting, flagging or both. The NPS had the greatest number of individuals assist in the project but the FWS was by far the biggest contributor in regards worker-hours and

number of burrows dusted (Table 2). According to this year's data, on average, an individual can expect to dust about 111 burrows/hour while a flagger can lay-out 26 acres/hour. The average work effort (work effort = dusting + flagging time) across all the colonies resulted in dusting 109.4 burrows in 2.4 acres per hour (Table 3).

**Figure 7.** Number of acres dusted per work-hour in relation to burrow density in a colony (Total Acres / Total Hours Dusted).



**Table 2.** Final dusting statistics by agency (Total Work Hours = Flag Hours + Dusting Hours).

Agency	# of Individuals	Flag Hours	Dusting Hours	Total Work Hours	Burrows Dusted
APHIS	10	146.5	561.75	708.25	63,239
FS	7	50.75	950	1,000.75	91,230
FWS	7	156	1,633.25	1,789.25	204,611
NPS	17	4	947.25	951.25	94,480
VOLUNTEER	1	72.5	0	72.5	0
<b>Total</b>	<b>42</b>	<b>429.75</b>	<b>4,092.25</b>	<b>4,522</b>	<b>453,560</b>

### Cost

The total cost of the dusting operation was \$313,546 and was split between four different agencies and three Non-Government Organization's (NGO's) that helped purchase dust (Table 4). The bulk of the expenditures were in salaries and travel; when combined, those two areas accounted for 81% of the total costs. Using the total dollar figure and acres dusted, this resulted in a cost per acre of \$27.90 or \$0.69 per dusted burrow. It took 78 work days to complete the dusting; thus, on average it cost \$4,020 per day. The final cost documented in this report does not take into account activities that will need to be done over the winter to prepare for next year such as techniduster repairs and resupply of worn-out items/equipment.

## Wall Ranger District – 2008 Conata Basin Plague Control Report

**Table 3.** Colony-level dusting attributes. Work Hour = Dusting + Flagging.

Colony	Burrow Density	Acres	Flag Hours	Dust Hours	Acres Dusted/ Hour	Total Work Hours	Burrows Dusted/ Work Hour	Acres Dusted /Work Hour
AG 01	33.2	3,373.70	136	1069	3.2	1205	93.1	2.8
HT 01	60.3	805.8	25	386	2.1	411	118.2	2
Roberts	38.2	1001.2	29	430	2.3	459	83.3	2.2
HT 26	62.1	525.5	30.5	224.5	2.3	255	128	2.1
SC 24	58.2	540.5	29	241	2.2	270	116.6	2
SC 07	49.3	1050.6	31.5	471.5	2.2	503	102.9	2.1
SC 25.1	34.6	2621.9	105.5	837.75	3.1	943.25	96.2	2.8
SC 03	36.4	1320.1	43.25	432.5	3.1	475.75	101	2.8
<b>MEAN</b>	<b>46.5</b>	<b>1404.9</b>	<b>53.7</b>	<b>511.5</b>	<b>2.6</b>	<b>565.3</b>	<b>104.9</b>	<b>2.4</b>

**Table 4.** Dusting expenditures by Agency/Organization.

Agency	Salaries <sup>1</sup>	Travel <sup>2</sup>	Delta Dust <sup>3</sup>	ATV Maint.	ATV Fuel <sup>4</sup>	Vehicle Fuel <sup>5</sup>	Misc. Supplies	Total
FS	\$26,794	\$1,241	\$10,000	\$50	\$1,620	\$513	\$500	<b>\$40,718</b>
FWS	\$72,700	\$45,000	\$17,000	\$1,500	\$2,796	\$1,778	\$1,000	<b>\$141,774</b>
NPS	\$30,166		\$9,000	\$100	\$1,524	\$547	\$600	<b>\$41,937</b>
APHIS	\$53,152	\$24,149		\$100	\$1,080	\$536	\$100	<b>\$79,117</b>
NGO <sup>6</sup>			\$10,000					<b>\$10,000</b>
<b>Total</b>	<b>\$182,812</b>	<b>\$70,390</b>	<b>\$46,000</b>	<b>\$1,750</b>	<b>\$7,020</b>	<b>\$3,374</b>	<b>\$2,200</b>	<b>\$313,546</b>

<sup>1</sup>Salaries include base pay and overtime.

<sup>2</sup>Travel pay is per diem and transportation costs for individuals that worked as part of the crew but were stationed elsewhere.

<sup>3</sup>Dust cost was generally split between the three agencies and combined NGO's; however, FWS had 1000 lbs on-hand at the start of the operation. These 1000 lbs were figured into the FWS contribution for a total of \$8000. Thus, FWS purchased \$9000 worth of dust and then had \$8000 worth of dust on-hand for a total contribution of \$17,000.

<sup>4</sup>ATV fuel was figured at \$4.00/gal and each individual dusting or flagging used 3 gal per day.

<sup>5</sup>Vehicle fuel was figured at \$3.80/gal and approximately 3 gal per day was used for each vehicle transporting personnel to and from the work sites.

<sup>6</sup>World Wildlife Federation contributed \$5000, Defenders of Wildlife contributed \$3,500 and The Prairie Dog Coalition contributed \$1,500 for a combined total of \$10,000.

### PRAIRIE DOG BURROW DENSITIES

Burrow density was determined for each colony treated and figured as burrows/acre (Table 3). The density figure includes all burrows whether they were active, inactive, badger or other. There was a brief attempt early-on to track active vs. inactive burrows but the experience level of the crew members and the fact that personnel were rotating in and out on almost a daily basis led to a wide-range of variability so the decision was just to keep track of all the burrows dusted. The mean burrow density per colony in 2008 was 46.5 burrows/acre, which was slightly more

## **Wall Ranger District – 2008 Conata Basin Plague Control Report**

than the burrow density for dusted colonies in 2005 (43.1 burrows/acre); the difference between years was non-significant ( $t_7 = 0.709$ ,  $P = 0.501$ ). There were six colonies dusted in 2005 that were also dusted in 2008. Burrow density increased in four of the six colonies over the three year period (Table 5).

**Table 5.** Burrow density comparison between colonies dusted in 2005 and 2008. Burrow density is figured as the total number of burrows dusted (includes active, inactive and badger burrows) per acre.

Colony	2005 Burrow Density	2008 Burrow Density
SC 03	37.2	36.4
SC 07	38.2	49.3
SC 24	49.6	58.2
SC 25.1	46.9	34.6
HT 01	56.4	60.3
HT 26	54.4	62.1

### **Ferret Family Rating (FFR)**

We used burrow data from the dusting effort to estimate the FFR for the Conata Basin. Since total burrows were tracked while dusting, we used 95% as the measure to figure active burrow densities from the total. Active and inactive burrow densities were tracked in the 2005 dusting effort which resulted in a mean active burrow distribution of 95% across the Basin. The territory adjusted FFR for 2008 came-out to 286.5 (Table 6), which has decreased quite considerably from 2006 (2006 territory adjusted FFR = 400.8). Prairie dog densities in 2006 were similar with an average of 12.0; thus, the driving factor behind the decrease in FFR is habitat loss due to plague. The 95% active burrow number used for this exercise may be inflated somewhat because plague was not in the Basin in 2005; thus, the FFR may actually be lower. Additionally, plague is still moving through the Basin and reducing available habitat for the black-footed ferret.

### **CONCLUSION**

Through the combined efforts of the FS, FWS, NPS and APHIS, 11,239.3 acres (453,560 burrows) of black-tailed prairie dog habitat was treated with Delta Dust in 78 days to reduce the threat of plague in and around the Conata Basin. Additionally, three NGO's contributed funding for dust and one volunteer helped flag lanes for nine days. There were a total of 239 black-footed ferrets trapped this year for micro-chipping and population analysis, of which 216 received at least one plague vaccination. This level of effort and detail in trapping and vaccinating ferrets in the Conata Basin would not have been possible without the dedicated work of Travis Livieri of PWR. Discovery of this plague epizootic resulted in an emergency response to keep one of the most successful black-footed ferret re-introduction sites from possibly crashing; the work that was accomplished by all those involved ensured its success. Data and lessons learned from this year will be used to guide future plague management in the Conata Basin/Badlands area.

Table 6. Results of prairie dog burrow density data derived from 2008 dusting effort in the Conata Basin.

Colony	Colony Size (acres) <sup>1</sup>	Area Dusted <sup>2</sup> (acres)	#Active Burrows <sup>3</sup>	Active Burrow Density (burrows / acre) <sup>4</sup>	Prairie Dog Density (prairie dogs / acre) <sup>5</sup>	Total # Prairie Dogs <sup>6</sup>	Ferret Family Rating <sup>7</sup>	Territory Adjustment <sup>8</sup>	Adjusted Ferret Family Rating <sup>8</sup>
AG 01	7,197.0	3,373.7	106,530	31.6	10.0	71,970	94.3	0.012332144	88.7
HT 01	805.8	805.8	46,158	57.3	18.1	14,585	19.1	0.016280683	13.1
HT 26	525.5	525.5	31,019	59.0	18.7	9,827	12.9	0.016304781	8.6
SC 03	1341.1	1320.1	45,625	34.6	10.9	14,618	19.2	0.013103304	17.6
SC 07	1050.6	1050.6	49,161	46.8	14.8	15,549	20.4	0.015486111	16.3
SC 24	540.5	540.5	29,896	55.3	17.5	9,459	12.4	0.016219642	8.8
SC 25.1	4,848.0	2621.9	86,177	32.9	10.4	50,419	66.1	0.012686309	61.5
Sub-total	16,308.5	10,238.1	394,566	Mean = 35.8*	Mean = 11.3*	186,427	244.4		214.6
Rest of Conata Basin	5,358.5				~11.3	60,551	79.4	0.013420399	71.9
Total	21,667.0	15,771.2	605,425	Mean = 35.8*	Mean = 11.3*	246,978	323.8		286.5
Roberts (BNP)	1046.2	1001.2	36,319	36.3	11.5	12,031	15.8	0.013574266	14.2

<sup>1</sup>Colony Size in most cases is the same as what was dusted except for Roberts, SC 03, AG 01 and SC 25.1. Mapped plague areas within the colony are not included in the acreage - only active prairie dog colony acres are used.

<sup>2</sup>Total acres GPS'd while dusting.

<sup>3</sup>The number of active burrows for each colony is figured from the total number of burrows x 0.95.

<sup>4</sup>Active Burrow Density = Active Burrows / Area Dusted.

<sup>5</sup>Prairie Dog Density = (0.179 x Active Burrow Density) / 0.566 (Biggens et al. 1993).

<sup>6</sup>Total Prairie Dogs = Prairie Dog Density x Colony Size.

<sup>7</sup>Ferret Family Rating = Total Prairie Dogs / 763 (Biggens et al. 1993).

<sup>8</sup>Territorial adjustment developed from Biggens et al. (2006).

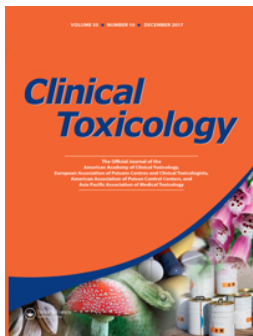
\*Area-weighted mean.

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## 2016 Annual Report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 34th Annual Report

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## ABSTRACT

**Introduction:** This is the 34th Annual Report of the American Association of Poison Control Centers' (AAPCC) National Poison Data System (NPDS). As of 1 January 2016, 55 of the nation's poison centers (PCs) uploaded case data automatically to NPDS. The upload interval was 9.50 [7.33, 14.6] (median [25%, 75%]) min, facilitating a near real-time national exposure and information database and surveillance system.

**Methods:** We analyzed the case data tabulating specific indices from NPDS. The methodology was similar to that of previous years. Where changes were introduced, the differences are identified. Cases with medical outcomes of death were evaluated by a team of medical and clinical toxicologist reviewers using an ordinal scale of 1–6 to assess the Relative Contribution to Fatality (RCF) of the exposure.

**Results:** In 2016, 2,710,042 closed encounters were logged by NPDS: 2,159,032 human exposures, 54,019 animal exposures, 490,215 information cases, 6687 human confirmed non-exposures, and 89 animal confirmed non-exposures. US PCs also made 2,718,022 follow-up calls in 2016. Total encounters showed a 2.94% decline from 2015, while health care facility (HCF) human exposure cases increased by 3.63% from 2015. All information calls decreased by 12.5% but HCF information calls increased 0.454%, and while medication identification requests (Drug ID) decreased 29.6%, human exposure cases were essentially flat, decreasing by 0.431%. Human exposures with less serious outcomes have decreased 2.59% per year since 2008 while those with more serious outcomes (moderate, major or death) have increased by 4.39% per year since 2000.

The top five substance classes most frequently involved in all human exposures were analgesics (11.2%), household cleaning substances (7.54%), cosmetics/personal care products (7.20%), sedatives/hypnotics/antipsychotics (5.84%), and antidepressants (4.74%). As a class, sedative/hypnotics/antipsychotics exposures increased most rapidly, by 10.7% per year (2088 cases/year), over the last 15 years for cases showing more serious outcomes. The top five most common exposures in children age 5 years or less were cosmetics/personal care products (13.3%), household cleaning substances (11.1%), analgesics (9.21%), foreign bodies/toys/miscellaneous (6.48%), and topical preparations (5.07%). Drug identification requests comprised 28.1% of all information calls. NPDS documented 1977 human exposures resulting in death; 1492 (75.5%) of these were judged as related (RCF of 1 – undoubtedly responsible, 2 – probably responsible, or 3 – contributory).

**Conclusions:** These data support the continued value of PC expertise and need for specialized medical toxicology information to manage more serious exposures, despite a decrease in cases involving less serious exposures. Unintentional and intentional exposures continue to be a significant cause of morbidity and mortality in the US. The near real-time, always current status of NPDS represents a national public health resource for collecting and monitoring US exposure cases and information calls. The continuing mission of NPDS is to provide a nationwide infrastructure for surveillance for all types of exposures (e.g. foreign body, infectious, venomous, chemical agent, or commercial product), and the identification and tracking of significant public health events. NPDS is a model system for the real-time surveillance of national and global public health.

**NOTE:** Comparison of exposure or outcome data from previous AAPCC Annual Reports is problematic. In particular, the identification of fatalities (attribution of a death to the exposure) differed from pre-2006 Annual Reports (see Fatality Case Review – Methods). Death cases were

described as all cases resulting in death and those determined to be exposure-related fatalities. Likewise, [Table 22](#) (Exposure Cases by Generic Category) since year 2006 restricts the breakdown of included deaths to single-substance cases to improve precision and avoid misinterpretation.



## Introduction

This is the 34th Annual Report of the American Association of Poison Control Centers' (AAPCC; <http://www.aapcc.org>) National Poison Data System (NPDS) [1]. On 1 January 2016, 55 regional poison centers (PCs) serving the entire population of the 50 United States, American Samoa, District of Columbia, Federated States of Micronesia, Guam, Puerto Rico, and the US Virgin Islands submitted information and exposure case data collected during the course of providing telephonic patient tailored exposure management and poison information.

NPDS is the data warehouse for the nation's PCs. Poison centers place emphasis on exposure management, accurate data collection and coding, and responding to the continuing need for poison related public and professional education. The PC's healthcare professionals are available free of charge to users, 24-h a day, every day of the year. Poison centers respond to questions from the public, health care professionals, and public health agencies. The continuous staff dedication at the PCs is evident as the number of exposure and information call encounters averages 3.0 million annually. Poison center encounters either involve an exposed human or animal (EXPOSURE CALL) or a request for information with no person or animal exposed to any foreign body, viral, bacterial, venom, chemical agent, or commercial product (INFORMATION CALL). A unique feature of PC case management is the use of follow-up calls to monitor case progress and medical outcome.

### The NPDS products database

The NPDS products database contains over 430,000 products ranging from viral and bacterial agents to commercial chemical and drug products. The products database is maintained and continuously updated by data analysts at the Micromedex Poisindex® System (Micromedex Healthcare Series [Internet database], Greenwood Village, CO: Truven Health Analytics). A robust generic coding system categorizes the product data into 1092 generic codes. These generic codes collapse into Pharmaceutical (530) and Non-Pharmaceutical (562) groups. These two groups are divided into Major (68) and Minor (181) categories. The generic coding schema undergoes continuous improvement through the work of the AAPCC – Micromedex Joint Coding Group. The group consists of AAPCC members and editorial and lexicon staff working to meet best terminology practices. The generic code system provides enhanced report granularity as reflected in Table 22. The following 23 new generic codes were introduced in 2016.

## Methods

### Characterization of participating poison centers and population served

All 55 US PCs submitted data to AAPCC through 31 December 2016. Fifty-three centers (96.4%) were accredited by AAPCC as of 1 July 2016. The entire population of the 50 United States, American Samoa, the District of Columbia, Federated States of

### Generic Codes Added in 2016<sup>a</sup>

1	Angiotensin Converting Enzyme Inhibitor in Combination with Diuretic
2	Angiotensin Converting Enzyme Inhibitor in Combination with Other Drugs (Excluding Calcium Antagonists)
3	Angiotensin Receptor Blocker in Combination with Diuretic
4	Angiotensin Receptor Blocker in Combination with Other Drugs (Excluding Calcium Antagonists)
5	Antihyperlipidemic Combinations (Excluding Calcium Antagonists)
6	Antihypertensive in Combination with Diuretic
7	Antihypertensive in Combination with Other Drugs (Excluding Diuretics)
8	Beta Blocker in Combination with Diuretic
9	Beta Blocker in Combination with Other Drugs (Excluding Calcium Antagonists)
10	Calcium Antagonist in Combination with Angiotensin Converting Enzyme Inhibitor
11	Calcium Antagonist in Combination with Angiotensin Receptor Blocker
12	Calcium Antagonist in Combination with Antihyperlipidemic
13	Calcium Antagonist in Combination with Diuretic
14	Calcium Antagonist in Combination with Other Drugs
15	Hypoglycemic: Biguanide Combinations (Excluding Sulfonylurea)
16	Hypoglycemic: Other or Unknown Oral Hypoglycemic Combination
17	Hypoglycemic: Sulfonylurea Combinations
18	Marijuana: Concentrated Extract (Including Oils and Tinctures)
19	Marijuana: Edible Preparation
20	Marijuana: Oral Capsule or Pill Preparation
21	Marijuana: Other or Unknown Preparation
22	Marijuana: Topical Preparation
23	Marijuana: Undried Plant

<sup>a</sup>Because the new codes were added during 2016, the numbers for these generic codes in Table 22 do not reflect the entire year. For completeness, certain categories require customized data retrieval until they have been in place for more than one calendar year.

Micronesia, Guam, Puerto Rico, and the US Virgin Islands was served by the US PC network in 2016 [2].

The average number of human exposure cases managed per day by all US PCs was 5899. Similar to other years, higher volumes were observed in the warmer months, with a mean of 6224 cases per day in June compared with 5427 per day in December. On an average, US PCs received a call about an actual human exposure every 14.6 seconds.

### Call management – specialized poison exposure emergency providers

Poison center Managing Directors are primarily responsible for patient care/information service operations, clinical education, and staff instruction. Most are pharmacists or nurses with American Board of Applied Toxicology (ABAT) board certification in clinical toxicology. Medical direction is provided by Medical Directors who are board-certified physician medical toxicologists. At some PCs, the Managing and Medical Director roles are held by the same individual.

Calls received at US PCs are managed by healthcare professionals who have received specialized training in toxicology to allow for assessment, triage, management and monitoring of toxic exposure emergencies. These providers include medical and clinical toxicologists, registered nurses, pharmacists (PharmD or BS), physicians, and physician assistants. Most commonly, registered nurses and pharmacists make up the contingent of "Specialists in Poison Information" (SPIs) or "Certified Specialists in Poison Information" (CSPIs) in the US. These (C)SPIs triage lay public calls to the most appropriate level of care and provide health care professionals with the most up-to-date management

recommendations to care for their poisoned/overdosed patients. In order for a SPI to become nationally certified as a CSPI, (s)he must log a minimum of 2000h in a PC and handle 2000 human exposure cases prior to being considered eligible to take the national certification examination. Of note, while the only individuals eligible to sit for the CSPI examination are nurses, pharmacists, physicians and physicians assistants, there is a lack of an appropriate, core toxicology training within most graduate medical education curricula to allow them to be prepared for PC patient management operations. These individuals must receive significant additional training beyond their degree programs to become (C)SPIs. Such training is only offered within the PCs. "Poison Information Providers" (PIPs) are allied healthcare professionals who are allowed to manage information-type and low acuity (non-hospital) cases while working under the supervision of a CSPI. Poison centers undergo a rigorous accreditation process administered by the AAPCC and must submit an annual accreditation report and an extensive reaccreditation application every ten years.

### NPDS – near real-time data capture

Extensively enhanced over its predecessor, the Toxic Exposure Surveillance System (TESS) which began collecting data in 1983, and near real-time data since 2003, NPDS was launched on 12 April 2006. NPDS is the data repository for all US PCs and includes all case information collected by its predecessor. In 2016, all 55 US PCs uploaded case data automatically to NPDS in near real-time, making NPDS one of the few operational systems of its kind. Poison center staff record cases contemporaneously in 1 of 4 electronic medical record systems. Each PC uploads case data automatically. The time to upload data for all PCs is 9.50 [7.33, 14.6] (median [25%, 75%]) minutes creating a real-time national exposure database and surveillance system.

The web-based NPDS software facilitates the detection, analysis, and reporting of surveillance anomalies. System software offers a myriad of surveillance uses allowing AAPCC, its member centers and public health agencies to utilize NPDS exposure data. Users are able to access local and regional data for their own areas and view national aggregate data. Custom surveillance definitions are available, along with ad hoc reporting tools. Information in the NPDS database is dynamic. Each year the database is locked prior to extraction of annual report data to prevent inadvertent changes and ensure consistent, reproducible reports. Additional information including autopsy data on fatalities may now be added after the lock date as an addenda to the fatality narrative. The 2016 database was locked on 1 August 2017 at 16:22 EDT.

### Annual report case inclusion criteria

Note: In this and last years' reports, human and animal "exposure calls" have been renamed to human and animal "exposure cases", since a single call may result in multiple cases and the NPDS database contains information about

**Table 1A.** AAPCC Population served and reported exposures (1983–2016).

Year	No. of participating centers	Population served (in millions)	Human exposures	Exposures per thousand population
1983	16	43.1	251,012	5.8
1984	47	99.8	730,224	7.3
1985	56	113.6	900,513	7.9
1986	57	132.1	1,098,894	8.3
1987	63	137.5	1,166,940	8.5
1988	64	155.7	1,368,748	8.8
1989	70	182.4	1,581,540	8.7
1990	72	191.7	1,713,462	8.9
1991	73	200.7	1,837,939	9.2
1992	68	196.7	1,864,188	9.5
1993	64	181.3	1,751,476	9.7
1994	65	215.9	1,926,438	8.9
1995	67	218.5	2,023,089	9.3
1996	67	232.3	2,155,952	9.3
1997	66	250.1	2,192,088	8.8
1998	65	257.5	2,241,082	8.7
1999	64	260.9	2,201,156	8.4
2000	63	270.6	2,168,248	8.0
2001	64	281.3	2,267,979	8.1
2002	64	291.6	2,380,028	8.2
2003	64	294.7	2,395,582	8.1
2004	62	293.7	2,438,643	8.3
2005	61	296.4	2,424,180	8.2
2006	61	299.4	2,403,539	8.0
2007	61	305.6	2,482,041	8.1
2008	61	308.5 <sup>b</sup>	2,491,049	8.1
2009	60	310.9 <sup>b</sup>	2,479,355	8.0
2010	60 <sup>a</sup>	313.3 <sup>b</sup>	2,384,825	7.6
2011	57 <sup>c</sup>	315.7 <sup>b</sup>	2,334,004	7.4
2012	57	318.0 <sup>b</sup>	2,275,141	7.2
2013	57 <sup>d</sup>	320.2 <sup>e</sup>	2,188,013	6.8
2014	56 <sup>d</sup>	322.9 <sup>f</sup>	2,165,142	6.7
2015	55 <sup>g</sup>	325.4 <sup>h</sup>	2,168,371	6.7
2016	55	327.0 <sup>i</sup>	2,159,032	6.6
Total			66,609,913	

<sup>a</sup>As of 1 July 2010, there were 60 participating centers.

<sup>b</sup>AAPCC total as of 1 July Mid Year US Census (2012 data for 50 United States, District of Columbia and Puerto Rico; 2011 data for Guam; 2010 data for American Samoa, Federated States of Micronesia, and the US Virgin Islands).

<sup>c</sup>As of 1 July 2011, there were 57 participating centers.

<sup>d</sup>One participating center closed in September 2013. Their data are included in the 2013 totals but not in the 2014 data.

<sup>e</sup>AAPCC total as of 1 July Mid Year US Census (2013 data for 50 United States, District of Columbia and Puerto Rico, Guam, American Samoa, Federated States of Micronesia, and the US Virgin Islands).

<sup>f</sup>AAPCC total as of 1 July Mid Year US Census (2014 data for 50 United States, District of Columbia and Puerto Rico, Guam, American Samoa, Federated States of Micronesia, and the US Virgin Islands) [2,3].

<sup>g</sup>One participating center closed in July 2014. Their data are included in the 2014 totals but not in the 2015 data.

<sup>h</sup>AAPCC total as of 1 July Mid Year US Census (2015 data for 50 United States, District of Columbia and Puerto Rico, Guam, American Samoa, Federated States of Micronesia, and the US Virgin Islands) [2,3].

<sup>i</sup>AAPCC total as of 1 July Mid Year US Census (2016 data for 50 United States, District of Columbia and Puerto Rico, Guam, American Samoa, Federated States of Micronesia, and the US Virgin Islands) [2,3].

**Table 1B.** Non-human exposures by animal type.

Animal	N	%
Dog	48,539	89.86
Cat	4712	8.72
Bird	162	0.30
Rodent/lagomorph	121	0.22
Horse	98	0.18
Sheep/goat	59	0.11
Cow	36	0.07
Aquatic	22	0.04
Other	270	0.50
Total	54,019	100.00

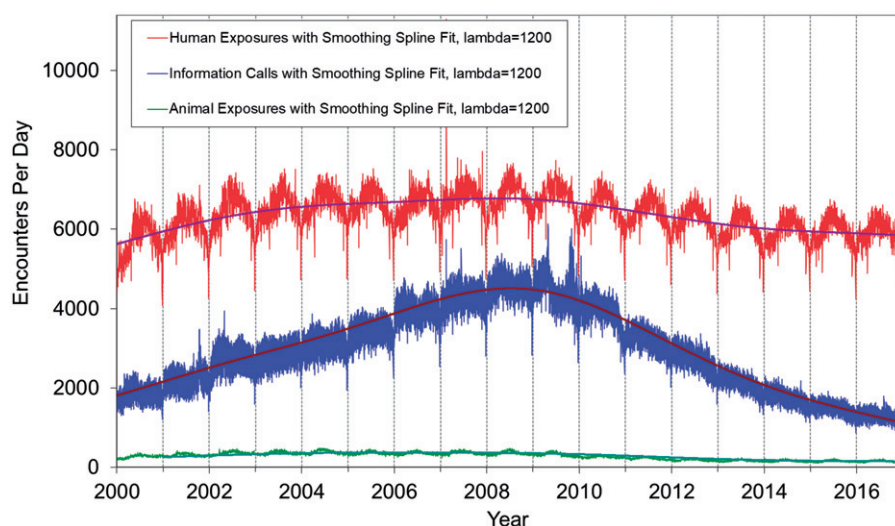
**Table 1C.** Distribution of information calls.

Information call type	N	% of Info. calls
<b>Drug identification</b>		
Public inquiry: drug sometimes involved in abuse	52,921	10.80
Public inquiry: drug not known to be abused	28,853	5.89
Public inquiry: unknown abuse potential	1199	0.24
Public inquiry: unable to identify	12,633	2.58
HCP inquiry: drug sometimes involved in abuse	1028	0.21
HCP inquiry: drug not known to be abused	1682	0.34
HCP inquiry: unknown abuse potential	80	0.02
HCP inquiry: unable to identify	672	0.14
Law Enf. Inquiry: drug sometimes involved in abuse	23,066	4.71
Law Enf. Inquiry: drug not known to be abused	11,820	2.41
Law Enf. Inquiry: unknown abuse potential	419	0.09
Law Enf. Inquiry: unable to identify	2891	0.59
Other drug ID	616	0.13
Subtotal	137,880	28.13
<b>Drug information</b>		
Adverse effects (no known exposure)	7759	1.58
Brand / generic name clarifications	793	0.16
Calculations	104	0.02
Compatibility of parenteral medications	140	0.03
Compounding	219	0.04
Contraindications	1370	0.28
Dietary supplement, herbal, and homeopathic	407	0.08
Dosage	10,004	2.04
Dosage form / formulation	1188	0.24
Drug use during breast-feeding	1717	0.35
Drug-drug interactions	20,351	4.15
Drug-food interactions	1403	0.29
Foreign drug	123	0.03
Generic substitution	183	0.04
Indications / therapeutic use	5774	1.18
Medication administration	4380	0.89
Medication availability	376	0.08
Medication disposal	2194	0.45
Pharmacokinetics	1383	0.28
Pharmacology	805	0.16
Regulatory	1713	0.35
Stability / storage	1753	0.36
Therapeutic drug monitoring	312	0.06
Other drug info	16,396	3.34
Subtotal	80,847	16.49
<b>Environmental information</b>		
Air quality	1,520	0.31
Carbon monoxide – no known patient(s)	577	0.12
Carbon monoxide alarm use	582	0.12
Chem/bioterrorism/weapons (suspected or confirmed)	6	0.00
Clarification of media reports of environmental contamination	25	0.01
Clarification of substances involved in a HAZMAT incident – no known victim(s)	93	0.02
General questions about contamination of air and/or soil	358	0.07
HAZMAT planning	106	0.02
Lead – no known patient(s)	554	0.11
Mercury thermometer cleanup	1064	0.22
Mercury (excluding thermometers) cleanup	2115	0.43
Notification of a HAZMAT incident – no known patient(s)	696	0.14
Pesticide application by a professional pest control operator	604	0.12
Pesticides (other)	2347	0.48
Potential toxicity of chemicals in the environment	1082	0.22
Radiation	49	0.01
Safe disposal of chemicals	1017	0.21
Water purity / contamination	765	0.16
Other environmental	3106	0.63
Subtotal	16,666	3.40
<b>Medical information</b>		
Dental questions	106	0.02
Diagnostic or treatment recommendations for diseases or conditions – non-toxicology	6912	1.41
Disease prevention	1564	0.32
Explanation of disease states	4945	1.01
General first-aid	850	0.17
Interpretation of non-toxicology laboratory reports	123	0.03
Medical terminology questions	48	0.01
Rabies - no known patient(s)	223	0.05
Sunburn management	48	0.01
Other medical	46,377	9.46
Subtotal	61,196	12.48

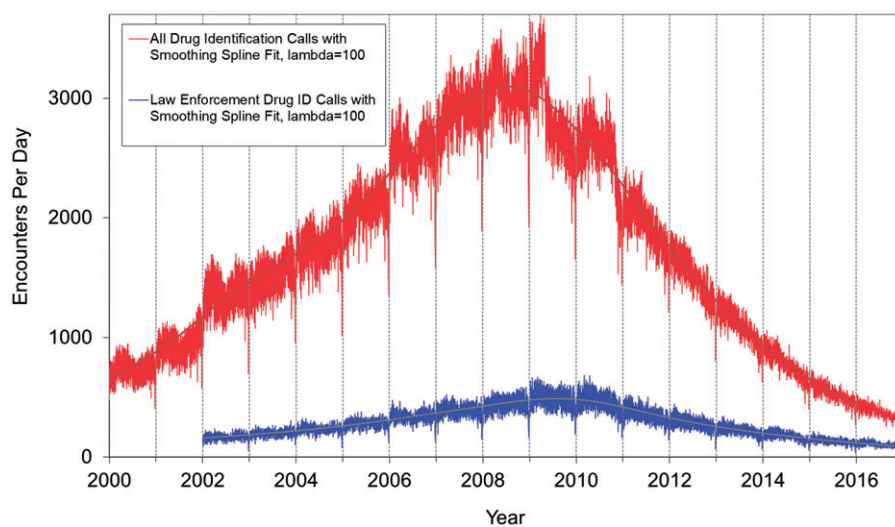
(continued)

Table 1C. Continued

Information call type	N	% of Info. calls
Occupational information		
Occupational treatment / first-aid guidelines – no known patient(s)	24	0.00
Information on chemicals in the workplace	91	0.02
MSDS interpretation	25	0.01
Occupational MSDS requests	431	0.09
Routine toxicity monitoring	21	0.00
Safe handling of workplace chemicals	52	0.01
Other occupational	186	0.04
Subtotal	830	0.17
Poison information		
Analytical toxicology	703	0.14
Carcinogenicity	50	0.01
Food poisoning – no known patient(s)	1890	0.39
Food preparation / handling practices	5364	1.09
General toxicity	21,335	4.35
Mutagenicity	44	0.01
Plant toxicity	1644	0.34
Recalls of non-drug products (including food)	256	0.05
Safe use of household products	3567	0.73
Toxicology information for legal use / litigation	149	0.03
Other poison	15,092	3.08
Subtotal	50,094	10.22
Prevention/safety/education		
Confirmation of poison center number	12,531	2.56
General (non-poison) injury prevention requests	522	0.11
Media requests	181	0.04
Poison prevention material requests	6241	1.27
Poison prevention week date inquiries	27	0.01
Professional education presentation requests	171	0.03
Public education presentation requests	251	0.05
Other prevention	801	0.16
Subtotal	20,725	4.23
Teratogenicity information		
Teratogenicity	2054	0.42
Subtotal	2054	0.42
Other information		
Other	47,911	9.77
Subtotal	47,911	9.77
Substance abuse		
Drug screen information	2460	0.50
Effects of illicit substances – no known patient(s)	125	0.03
New trend information	144	0.03
Withdrawal from illicit substances – no known patient(s)	92	0.02
Other substance abuse	454	0.09
Subtotal	3275	0.67
Administrative		
Expert witness requests	36	0.01
Faculty activities	36	0.01
Funding	16	0.00
Personnel issues	141	0.03
Poison center record request	141	0.03
Product replacement/malfunction (issues intended for the manufacturer)	2602	0.53
Scheduling of poison center rotations	86	0.02
Other administration	17,222	3.51
Subtotal	20,280	4.14
Caller referred		
Immediate referral – animal poison center or veterinarian	17,070	3.05
Immediate referral – animal poison center or veterinarian	18,750	3.82
Immediate referral – drug identification	1791	0.37
Immediate referral – drug information	126	0.03
Immediate referral – health department	9511	1.94
Immediate referral – medical advice line	570	0.12
Immediate referral – pediatric triage service	106	0.02
Immediate referral – pesticide hotline	319	0.07
Immediate referral – pharmacy	517	0.11
Immediate referral – poison center	3171	0.65
Immediate referral – private physician	2003	0.41
Immediate referral – psychiatric crisis line	106	0.02
Immediate referral – teratology information program	142	0.03
Other call referral	11,345	2.31
Total	490,215	100.00



**Figure 1.** Human exposure cases, information calls and animal exposure cases by day since 1 January 2000. Smoothing spline fits using  $\lambda = 1200$  for human exposures had associated  $RSqr = 0.426$ , information calls  $RSqr = 0.891$ , and animal exposures  $RSqr = 0.858$ .



**Figure 2.** All drug identification and law enforcement drug identification calls by day since 1 January 2000. Smoothing spline fits used  $\lambda = 100$ , all drug identification calls had associated  $RSqr = 0.960$ , and law enforcement drug ID calls  $RSqr = 0.849$ .

individual exposure cases. The information in this report reflects only those cases that are not duplicates and classified by the PC as CLOSED. A case is closed when the PC has determined that no further follow-up/recommendations are required or no further information is available. Exposure cases are followed to obtain the most precise medical outcome possible. Depending on the case specifics, most cases are “closed” within a few hours of the initial call. Some cases regarding complex hospitalized patients or resulting in death may remain open for weeks or months while data continues to be collected. Follow-up calls provide a proven mechanism for monitoring the appropriateness of management recommendations, enabling continual updates of case information, augmenting patient guidelines, and providing poison prevention education, as well as obtaining final/known medical outcome status to make the data collected as accurate and complete as possible.

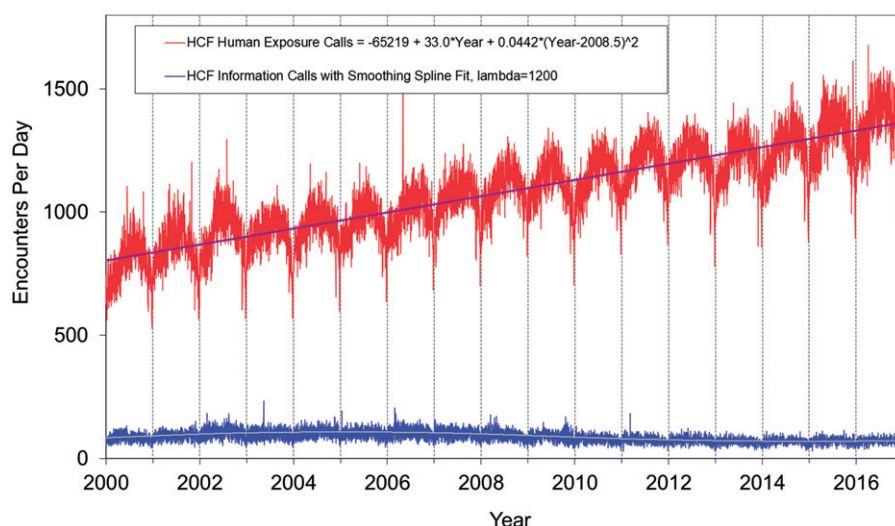
### Statistical methods

All tables except [Tables 3\(B\)](#) and [17\(B\)](#) were generated directly by the NPDS web-based application and can thus be reproduced by each PC. The analyses for [Figures 1–4](#) and [Table 17\(B\)](#) were done using SAS JMP<sup>®</sup> version 12.0.1 (SAS Institute, Cary, NC) and summary counts were generated by the NPDS web-based application.

### NPDS surveillance

As previously noted, all of the active US PCs upload case data automatically to NPDS. This unique near real-time upload is the foundation of the NPDS surveillance system, making both spatial and temporal case volume and case based surveillance possible. NPDS software allows creation of volume and case based definitions. Definitions can be





**Figure 3.** Health care facility (HCF) exposure cases and HCF information calls by day since 1 January 2000. Both linear and second order (quadratic) terms were statistically significant for regression of HCF human exposure with associated  $RSqr = 0.742$ . Smoothing spline fit with  $\lambda = 1200$  for HCF information calls had associated  $RSqr = 0.353$ .

applied to national, regional, state, or ZIP code coverage areas. Geocentric definitions can also be created, which use cases reported from a geographic location regardless of which PC managed the case. This functionality is available not only to the AAPCC surveillance team, but to every PC. Poison centers also have the ability to share NPDS real-time surveillance technology with external organizations such as their state and local health departments or other regulatory agencies. Another NPDS feature is the ability to generate system alerts on adverse drug events and other drug or commercial products of public health interest like contaminated food or product recalls. Thus, NPDS can provide real-time adverse event monitoring, surveillance, resilience, response and situational awareness.

Surveillance definitions can be created to monitor a variety of parameters, i.e. volume; case based; on any desired substance or commercial product in the Micromedex Poisindex products database; and/or set of clinical effects or other parameters. The products database contains over 430,000 entries ranging from viral and bacterial agents to commercial chemical and drug products. Surveillance definitions may be constructed using volume or case-based definitions with a variety of mathematical options and historical baseline periods from 1 to 15 years. NPDS surveillance tools include:

- Volume Alert Surveillance Definitions
- Total Call Volume
- Human Exposure Call Volume
- Animal Exposure Call Volume
- Information Call Volume
- Clinical Effects Volume (signs and symptoms, or laboratory abnormalities)
- Case Based Surveillance Definitions utilizing various NPDS data fields linked in Boolean expressions
  - Substance
  - Clinical Effects
  - Species
  - Medical Outcome and others

- Syndromic Surveillance Definitions allows Boolean based definitions utilizing various NPDS data fields to be run based on historical trends for user defined periods of interest.

Incoming data is monitored continuously and anomalous signals generate an automated email alert to the AAPCC's surveillance team, designated PC or public health agency staff. These anomaly alerts are reviewed daily by the AAPCC surveillance team, the PC, or the public health agency that created the surveillance definition. When reports of potential public health significance are detected, additional information is obtained from reporting PCs via the NPDS surveillance correspondence system or phone as appropriate. The PC then alerts their respective local or state health departments. Public health issues are brought to the attention of the Health Studies Branch, National Center for Environmental Health, Centers for Disease Control and Prevention (HSB/NCEH/CDC). This near real-time tracking ability is a unique feature offered by NPDS and the PCs.

AAPCC Surveillance Team clinical and medical toxicologists review surveillance definitions on a regular basis to fine-tune the queries. The CDC, as well as state and local health departments with NPDS access as granted by their respective PCs, also have the ability to create surveillance definitions for routine surveillance tasks or to respond to emerging public health events.

### **Fatality case review and narrative selection**

NPDS fatality cases are recorded as DEATH or DEATH (INDIRECT REPORT). Medical outcome of death is by direct report. Deaths (indirect reports) are deaths that the PC acquired from medical examiners or media, but did not manage or answer any questions related specifically to that case.

Although PCs may report death as an outcome, the death may not be a direct result of the exposure. We define exposure-related fatality as a death judged by the AAPCC Fatality Review



Team to be at least contributory to the exposure. The definitions used for the Relative Contribution to Fatality (RCF) classification are defined in [Appendix B](#) and the methods to select narratives for publication are described in [Appendix C](#). For details of the AAPCC fatality review process, see the 2008 annual report [1].

### Pediatric fatality case review

A focused Pediatric Fatality Review team composed of six pediatric toxicologists evaluated cases for patients under 20 years of age. The panel reviewed the documentation of all such cases, with specific focus on the conditions behind the poisoning exposure and finding commonalities which might inform efforts at prevention. The reviewed pediatric fatality cases exhibited a bimodal age distribution. Exposures causing death in children  $\leq 5$  years of age were mostly coded as "Unintentional-General," while those in ages  $>13$  years were mostly "Intentional." Often the Reason Code did not capture the complexities of the case. For example, there were few mentions of details such as the involvement of law enforcement or child protective services. While there were some complete and informative reports, in many narratives the

**Table 2.** Site of call and site of exposure, human exposure cases.

Site	Site of caller		Site of exposure	
	N	%	N	%
Residence				
Own	1,458,293	67.54	1,961,761	90.86
Other	29,230	1.35	47,408	2.20
Workplace	22,244	1.03	36,781	1.70
Health care facility	500,649	23.19	7073	0.33
School	10,391	0.48	28,553	1.32
Restaurant/food service	473	0.02	4951	0.23
Public area	7525	0.35	22,474	1.04
Other	124,692	5.78	27,135	1.26
Unknown	5,535	0.26	22,896	1.06

circumstances which preceded the exposure thought responsible for the death were unclear or absent. In response to these findings, the pediatric fatality review team developed and distributed Pediatric Narrative Guidelines, with specific attention to the root cause of these cases. Poison centers are requested to heed these guidelines and the need for a more in-depth investigation of "causality."

## Results

### Information calls to poison centers

Data from 490,215 information calls to PCs in 2016 ([Table 1\(C\)](#)) was transmitted to NPDS, including calls in

**Table 3(B).** Population-Adjusted Exposures by Age Group

Age group	Exposures/ 100 k population	Number of exposures <sup>a</sup>	Population <sup>b</sup>
Children (<20)			
<1	2849	114,147	4,007,157
1	8083	326,087	4,034,009
2	7675	309,487	4,032,577
3	3478	139,939	4,023,628
4	1711	68,973	4,030,495
5	1022	41,674	4,076,128
Child 6–12	448	130,604	29,142,676
Teen 13–19	558	165,853	29,704,242
Subgroup	1569	1,303,193	83,050,912
Adults ( $\geq 20$ )			
20–29	415	190,157	45,805,022
30–39	356	152,978	43,028,073
40–49	290	119,465	41,129,152
50–59	267	118,302	44,321,378
60–69	236	86,583	36,749,106
70–79	255	52,145	20,481,139
80–89	289	28,543	9,882,082
90+	265	6,679	2,523,430
Subgroup	345	842,034	243,919,382
Overall total	660	2,159,032	326,970,294

<sup>a</sup>Number of exposures excludes UNKNOWN ages from the individual age categories, but includes them in the subtotals and overall total (see [Table 3\(A\)](#)).

**Table 3(A).** Age and gender distribution of human exposures.

Age (y)	Male		Female		Unknown gender		Total		Cumulative total	
	N	% of age group total	N	% of age group total	N	% of age group total	N	% of total exposures	N	%
Children (<20)										
<1	59,457	52.09	54,307	47.58	383	0.34	114,147	5.29	114,147	5.29
1	169,380	51.94	156,186	47.90	521	0.16	326,087	15.10	440,234	20.39
2	162,134	52.39	146,798	47.43	555	0.18	309,487	14.33	749,721	34.72
3	76,886	54.94	62,700	44.81	353	0.25	139,939	6.48	889,660	41.21
4	38,844	56.32	29,918	43.38	211	0.31	68,973	3.19	958,633	44.40
5	23,814	57.14	17,689	42.45	171	0.41	41,674	1.93	1,000,307	46.33
Unknown $\leq 5$	882	43.30	838	41.14	317	15.56	2037	0.09	1,002,344	46.43
Child 6–12	74,647	57.16	54,938	42.06	1,019	0.78	130,604	6.05	1,132,948	52.47
Teen 13–19	61,659	37.18	103,422	62.36	772	0.47	165,853	7.68	1,298,801	60.16
Unknown Child	1608	36.61	1498	34.11	1286	29.28	4392	0.20	1,303,193	60.36
Subtotal	669,311	51.36	628,294	48.21	5588	0.43	1,303,193	60.36	1,303,193	60.36
Adults ( $\geq 20$ )										
20–29	88,079	46.32	101,909	53.59	169	0.09	190,157	8.81	1,493,350	69.17
30–39	67,046	43.83	85,830	56.11	102	0.07	152,978	7.09	1,646,328	76.25
40–49	49,219	41.20	70,177	58.74	69	0.06	119,465	5.53	1,765,793	81.79
50–59	47,809	40.41	70,403	59.51	90	0.08	118,302	5.48	1,884,095	87.27
60–69	33,363	38.53	53,162	61.40	58	0.07	86,583	4.01	1,970,678	91.28
70–79	18,933	36.31	33,176	63.62	36	0.07	52,145	2.42	2,022,823	93.69
80–89	9886	34.64	18,640	65.30	17	0.06	28,543	1.32	2,051,366	95.01
$\geq 90$	2105	31.52	4571	68.44	3	0.04	6679	0.31	2,058,045	95.32
Unknown adult	33,692	38.65	51,300	58.84	2190	2.51	87,182	4.04	2,145,227	99.36
Subtotal	350,132	41.58	489,168	58.09	2734	0.32	842,034	39.00	2,145,227	99.36
Other										
Unknown age	4433	32.11	5875	42.56	3497	25.33	13,805	0.64	2,159,032	100.00
Total	1,023,876	47.42	1,123,337	52.03	11,819	0.55	2,159,032	100.00	2,159,032	100.00

**Table 4.** Distribution of age<sup>a</sup> and gender for fatalities<sup>b</sup>

Age (y)	Male	Female	Unknown	Total (%)	Cumulative total (%)
< 1 year	1	2	0	3 (0.2)	3 (0.2)
1 year	4	1	0	5 (0.4)	8 (0.6)
2 years	4	2	0	6 (0.4)	14 (1.0)
3 years	5	0	0	5 (0.4)	19 (1.3)
4 years	1	0	0	1 (0.1)	20 (1.4)
5 years	3	1	0	4 (0.3)	24 (1.7)
Unknown <=5 years	0	0	0	0 (0.0)	24 (1.7)
Child 6–12 years	1	6	0	7 (0.5)	31 (2.2)
Teen 13–19 years	20	22	0	42 (3.0)	73 (5.2)
20–29 years	118	80	0	198 (14.0)	271 (19.2)
30–39 years	125	124	0	249 (17.6)	520 (36.8)
40–49 years	111	139	0	250 (17.7)	770 (54.4)
50–59 years	94	155	0	249 (17.6)	1019 (72.0)
60–69 years	93	110	0	203 (14.4)	1222 (86.4)
70–79 years	38	62	0	100 (7.1)	1322 (93.4)
80–89 years	23	38	0	61 (4.3)	1383 (97.7)
>= 90 years	9	6	0	15 (1.1)	1398 (98.8)
Unknown adult	9	3	0	12 (0.9)	1410 (99.7)
Unknown age	2	1	2	5 (0.4)	1415 (100.0)
Total	661	752	2	1415 (100.0)	1415 (100.0)

<sup>a</sup>Age includes cases with both actual and estimated ages as shown in Table 21.

<sup>b</sup>Includes cases with RCF of 1 – undoubtedly responsible, 2 – probably responsible, or 3 – contributory. This excludes reports with outcome of Death INDIRECT.

**Table 5.** Number of substances involved in human exposure cases.

No. of substances	Human exposures		Fatal exposures <sup>a</sup>	
	N	%	N	%
1	1,905,848	88.27	593	41.91
2	158,282	7.33	366	25.87
3	53,004	2.45	180	12.72
4	21,736	1.01	119	8.41
5	9636	0.45	52	3.67
6	4417	0.20	38	2.69
7	2462	0.11	24	1.70
8	1415	0.07	16	1.13
>=9	2232	0.10	27	1.91
Total	2,159,032	100.00	1415	100.00

<sup>a</sup>Includes cases with RCF of 1 – undoubtedly responsible, 2 – probably responsible, or 3 – contributory. This excludes reports with outcome of Death INDIRECT.

optional reporting categories such as prevention/safety/education (20,725), administrative (20,280), and caller referral (48,457).

Figure 2 shows that all Drug ID calls have decreased dramatically since mid-2008 through 2016. Law enforcement Drug ID Calls also showed a decline. The most frequent information call was for Drug ID, comprising 137,880 calls to PCs during the year. Of these, 77,015 (55.9%) were identified as drugs with known abuse potential. However, these cases were categorized based on the drug's abuse potential without knowledge of whether abuse was actually intended.

While the number of Drug Information calls decreased 7.20% from 2015 (87,117 calls) to 2016 (80,847 calls), the distribution of these call types slightly increased to 16.5% of all information request calls. The most common drug information requests were about drug–drug interactions, followed by other drug information, questions about dosage, inquiries of adverse effects (without a known exposure), and therapeutic use and indications. Environmental inquiries comprised 3.40% of all information calls. Of these environmental inquiries, specific questions related to

**Table 6(A).** Reason for human exposure cases.

Reason	N	% Human exposures
Unintentional		
Unintentional – general	1,115,088	51.6
Unintentional – therapeutic error	276,743	12.8
Unintentional – misuse	136,397	6.3
Unintentional – environmental	55,953	2.6
Unintentional – bite/sting	43,775	2.0
Unintentional – occupational	28,041	1.3
Unintentional – food poisoning	19,852	0.9
Unintentional – unknown	3796	0.2
Subtotal	1,679,645	77.8
Intentional		
Intentional – suspected suicide	262,969	12.2
Intentional – misuse	58,726	2.7
Intentional – abuse	49,473	2.3
Intentional – unknown	19,692	0.9
Subtotal	390,860	18.1
Adverse reaction		
Adverse reaction – drug	36,904	1.7
Adverse reaction – other	11,297	0.5
Adverse reaction – food	5547	0.3
Subtotal	53,748	2.5
Unknown		
Unknown reason	17,877	0.8
Subtotal	17,877	0.8
Other		
Other – contamination/tampering	7695	0.4
Other – malicious	7448	0.3
Other – withdrawal	1759	0.1
Subtotal	16,902	0.8
Total	2,159,032	100.0

cleanup of mercury (thermometers and other) remained the most common, followed by questions involving pesticides and air quality.

Of all the information calls, poison information comprised 10.2% of the requests with inquiries involving general toxicity the most common followed by questions involving food preparation practices/food poisoning, safe use of household products and plant toxicity.

### Exposure calls to poison centers

In 2016, the participating PCs logged 2,710,042 total encounters including 2,159,032 closed human exposure cases (Table 1(A)), 54,019 animal exposures (Table 1(B)), 490,215 information calls (Table 1(C)), 6687 human confirmed non-exposures, and 89 animal confirmed non-exposures. An additional 290 cases were still open at the time the database was locked. The cumulative AAPCC database now contains more than 66 million human exposure case records (Table 1(A)). A total of 18,814,865 information calls have been logged into the AAPCC database since the year 2000.

Figure 1 shows the human exposures, information calls and animal exposures by day since 1 January 2000. Smoothing spline fit of these data shows departure from linearity (declining rate of cases since mid-2007) for Human Exposure Cases with some flattening over the last 2 years. Information calls are declining more rapidly and are also described by a smoothing spline fit, and Animal Exposure Cases have likewise been declining since mid-2005. The 2 May 2006 exposure data spike on Figure 1 was the result of 602 children in a Midwest school reporting a noxious odor which caused anxiety, but resolved without sequelae.

**Table 6(B).** Scenarios for therapeutic errors<sup>a</sup> by age<sup>b</sup>.

Scenario	N	<=5 year (row %)	6–12 y (row %)	13–19 y (row %)	>=20 y (row %)	Unknown child (row %)	Unknown adult (row %)	Unknown age (row %)
Inadvertently took/given medication twice	84,297	16.32	11.88	5.58	60.38	0.05	5.54	0.26
Wrong medication taken/given	46,100	15.43	11.52	5.90	61.59	0.06	5.18	0.33
Other incorrect dose	40,824	32.04	11.65	6.39	45.88	0.10	3.58	0.36
Medication doses given/taken too close together	30,298	16.45	9.44	6.34	61.51	0.06	5.91	0.30
Inadvertently took/given someone else's medication	23,872	15.04	19.30	7.03	54.13	0.06	4.26	0.18
Other/unknown therapeutic error	16,829	20.17	10.32	7.00	55.11	0.14	6.77	0.51
Incorrect dosing route	12,346	8.50	4.11	3.30	72.74	0.15	10.46	0.75
Confused units of measure	9103	58.78	18.61	3.76	17.40	0.09	1.31	0.05
Incorrect formulation or concentration given	5968	48.58	15.85	4.73	28.49	0.03	2.20	0.13
Dispensing cup error	5541	67.05	19.13	2.58	10.32	0.11	0.69	0.13
Health professional/iatrogenic error (pharmacist/nurse/physician)	5436	25.02	11.33	6.38	52.26	0.18	3.88	0.94
More than 1 product containing same ingredient	4520	10.31	14.40	13.03	55.95	0.04	5.73	0.53
Drug interaction	2418	6.87	8.68	6.29	64.19	0.25	13.19	0.54
10-fold dosing error	1328	58.66	8.21	2.86	28.01	0.38	1.51	0.38
Incorrect formulation or concentration dispensed	1211	44.84	16.27	5.12	31.21	0.00	2.06	0.50
Exposure through breast milk	173	93.06	0.58	0.00	2.89	1.73	1.16	0.58

<sup>a</sup>All cases with a scenario category of therapeutic error regardless of reason.<sup>b</sup>Of the human exposure cases reported to U.S. Poison Centers in 2016, 415,071 (19.2%) were coded to one or more of 54 scenarios.**Table 7.** Distribution of reason for exposure by age.

Reason	<=5 year		6–12 year		13–19 year		>=20 year		Unknown child		Unknown adult		Unknown age		Total	
	N	Row %	N	Row %	N	Row %	N	Row %	N	Row %	N	Row %	N	Row %	N	%
Unintentional	996,705	62.00	112,234	6.98	56,086	3.49	434,470	27.03	3,869	0.24	68,210	4.24	8071	0.50	1,679,645	77.80
Intentional	90	0.02	13,285	3.49	102,060	26.79	262,376	68.87	206	0.05	9655	2.53	3188	0.84	390,860	18.10
Adverse reaction	3422	7.18	2576	5.40	3873	8.12	36,852	77.29	123	0.26	5945	12.47	957	2.01	53,748	2.49
Unknown	883	5.32	970	5.84	1999	12.04	11,883	71.58	65	0.39	1210	7.29	867	5.22	17,877	0.83
Other	1244	8.51	1539	10.53	1835	12.56	9271	63.45	129	0.88	2162	14.80	722	4.94	16,902	0.78
Total	1,002,344	48.48	130,604	6.32	165,853	8.02	754,852	36.51	4392	0.21	87,182	4.22	13,805	0.67	2,159,032	100.00

A hallmark of PC case management is the use of follow-up calls to monitor case progress and medical outcome. US PCs made 2,718,022 follow-up calls in 2016. Follow-up calls were done in 47.1% of human exposure cases. One follow-up call was made in 22.2% of human exposure cases and multiple follow-up calls (range 2–173) were placed in 25.0% of cases. For human exposure cases in which follow up calls were documented, an average of 2.58 calls per case was done.

Figure 3 shows a graphic summary and analyses of Health Care Facility (HCF) Exposure and HCF information calls. HCF Exposure Cases slightly departs from linearity but continues to increase at a steady rate, while the rate of HCF information calls has declined since early 2005 although has leveled off since late 2013. This increasing use of the PCs for the more serious exposures (HCF cases) is important in the face of the overall decline in exposure and information encounters.

Tables 22(A) (Non-pharmaceuticals) and 22(B) (Pharmaceuticals) provide summary demographic data on patient age, reason for exposure, medical outcome, and use of a HCF for all 2,159,032 human exposure cases, presented by substance categories. The Pharmaceuticals category includes both licit and illicit drugs.

Column 1: Name of the major, minor generic categories and their associated generic substances. Note that for pharmaceuticals, the generic category or generic substance listed is for the initial FDA approved indication and may not reflect current indications or uses for the pharmaceutical.

Column 2: Number of Case Mentions (all exposures) in grey shading displays the number of times that the specific generic code was reported in any human exposure case. If a human exposure case has multiple instances of a specific generic code it is only counted once.

Column 3: Number of Single Exposures displays the number of human exposure cases that identified only one substance (one case, one substance).

The succeeding columns (Age, Reason, Treatment Site, and Outcome) show selected detail from these single-substance exposure cases. Death cases include both cases that have the outcome of Death or Death (indirect report). These death cases are not limited by the RCF.

Tables 22(A) and 22(B) restrict the breakdown columns to single-substance cases. Prior to 2007, when multi-substance exposures were included, a relatively innocuous substance could be mentioned in a death column when, for example, the death was attributed to an antidepressant, opioid, or cyanide. This subtlety was not always appreciated by the user of this table. The restriction of the breakdowns to single-substance exposures should increase precision and reduce misrepresentation of the results in this unique by-substance table. Single substance cases reflect the majority (88.3%) of all exposures. In contrast, only 41.9% of fatalities are single substance exposures (Table 5).

Tables 22(A) and 22(B) tabulate 2,576,766 substance-exposures, of which 1,905,848 were single-substance exposures, including 980,550 (51.4%) non-pharmaceuticals and 925,298

**Table 8.** Distribution of reason for exposure and age for fatalities<sup>a</sup>.

Reason	<=5 year	6–12 year	13–19 year	>=20 year	Unknown child	Unknown adult	Unknown age	Total
Unintentional								
Unintentional – general	9	0	1	18	0	0	0	28
Unintentional – environmental	8	1	1	33	0	0	1	44
Unintentional – occupational	0	0	0	13	0	1	0	14
Unintentional – therapeutic error	0	0	0	26	0	0	0	26
Unintentional – misuse	0	0	0	16	0	0	0	16
Unintentional – bite/sting	0	0	0	5	0	0	0	5
Unintentional – food poisoning	0	1	0	1	0	0	0	2
Unintentional – unknown	0	0	0	5	0	0	0	5
Subtotal	17	2	2	117	0	1	1	140
Intentional								
Intentional – suspected suicide	0	3	26	725	0	3	2	759
Intentional – misuse	0	1	0	57	0	0	0	58
Intentional – abuse	0	0	9	188	0	4	2	203
Intentional – unknown	0	1	1	76	0	1	0	79
Subtotal	0	5	36	1,046	0	8	4	1,099
Other								
Other – contamination/tampering	0	0	0	1	0	0	0	1
Other – malicious	3	0	0	1	0	0	0	4
Other – withdrawal	0	0	0	2	0	0	0	2
Subtotal	3	0	0	4	0	0	0	7
Adverse reaction								
Adverse reaction – drug	0	0	0	37	0	0	0	37
Adverse reaction – other	0	0	0	1	0	0	0	1
Subtotal	0	0	0	38	0	0	0	38
Unknown								
Unknown reason	4	0	4	120	0	3	0	131
Subtotal	4	0	4	120	0	3	0	131
Total	24	7	42	1325	0	12	5	1415

<sup>a</sup>Includes cases with RCF of 1 – undoubtedly responsible, 2 – probably responsible, or 3 – contributory. This excludes reports with outcome of Death INDIRECT.

**Table 9.** Route of exposure for human exposure cases.

Route	Human exposures			Fatal exposures <sup>a</sup>		
	N	% of all routes	% of all cases	N	% of all routes	% of all cases
Ingestion	1,810,030	79.63	83.84	1138	73.42	80.42
Dermal	152,020	6.69	7.04	15	0.97	1.06
Inhalation/nasal	133,761	5.88	6.20	136	8.77	9.61
Ocular	91,207	4.01	4.22	1	0.06	0.07
Bite/sting	43,735	1.92	2.03	5	0.32	0.35
Parenteral	20,687	0.91	0.96	92	5.94	6.50
Unknown	14,274	0.63	0.66	128	8.26	9.05
Other	2517	0.11	0.12	3	0.19	0.21
Otic	1764	0.08	0.08	0	0.0	0
Aspiration (with ingestion)	1212	0.05	0.06	32	2.06	2.26
Vaginal	987	0.04	0.05	0	0.0	0
Rectal	782	0.03	0.04	0	0.0	0
Total number of routes	2,272,976	100.00	105.28	1550	100.00	109.54 <sup>b</sup>

<sup>a</sup>Includes cases with RCF of 1 – undoubtedly responsible, 2 – probably responsible, or 3 – contributory. This excludes reports with outcome of Death INDIRECT.

<sup>b</sup>Each exposure case may have more than one route.

**Table 10.** Management site of human exposures.

Site of management	N	%
Managed on site, non-HCF	1,437,493	66.6
Managed in healthcare facility		
Treated/evaluated and released	303,668	14.1
Admitted to critical care unit	102,668	4.8
Patient lost to follow-up/left AMA	85,183	4.0
Admitted to psychiatric facility	79,348	3.7
Admitted to non-critical care unit	76,591	3.6
Subtotal (managed in HCF)	647,458	30.0
Other	19,737	0.9
Refused referral	27,501	1.3
Unknown	26,843	1.2
Total	2,159,032	100.0

(48.6%) pharmaceuticals. In 22.0% of single-substance exposures that involved pharmaceutical substances, the reason for exposure was intentional, compared to only 3.94% when the

exposure involved a non-pharmaceutical substance. Correspondingly, treatment in a HCF was provided in a higher percentage of exposures that involved pharmaceutical substances (32.8%) compared with non-pharmaceutical substances (17.0%). Exposures to pharmaceuticals also had more severe outcomes. Of single-substance exposure-related fatal cases, 690 (72.9%) were pharmaceuticals compared with 256 (27.1%) non-pharmaceuticals.

### Age and gender distributions

The age and gender distribution of human exposures is outlined in Table 3(A). Children younger than 3 years of age were involved in 34.7% of exposures and children ≤5 years accounted for approximately half of all human exposures

**Table 11.** Medical outcome of human exposure cases by patient age<sup>a</sup>.

Outcome	<=5 year		6–12 year		13–19 year		>=20 year		Unknown child		Unknown adult		Unknown age		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
No effect	234,640	23.41	23,215	17.78	31,391	18.93	94,887	12.57	832	18.94	9,005	10.33	1,664	12.1	395,634	18.32
Minor effect	84,227	8.40	19,478	14.91	47,272	28.50	178,623	23.66	493	11.22	12,062	13.84	1,945	14.1	344,100	15.94
Moderate effect	9853	0.98	4365	3.34	27,375	16.51	119,473	15.83	56	1.28	2,522	2.89	533	3.9	164,177	7.60
Major effect	832	0.08	246	0.19	2824	1.70	20,528	2.72	5	0.11	145	0.17	48	0.4	24,628	1.14
Death	37	0.00	12	0.01	63	0.04	1,707	0.23	0	0.00	21	0.02	12	0.1	1,852	0.09
No follow-up, non-toxic	171,295	17.09	18,247	13.97	6952	4.19	42,829	5.67	533	12.14	10,669	12.24	895	6.5	251,420	11.65
No follow-up, minimal toxicity	470,571	46.95	59,228	45.35	35,620	21.48	226,198	29.97	1,861	42.37	38,635	44.32	4195	30.4	836,308	38.74
No follow-up, potentially toxic	17,567	1.75	2938	2.25	10,290	6.20	40,197	5.33	495	11.27	10,653	12.22	4072	29.5	86,212	3.99
Unrelated effect	13,315	1.33	2874	2.20	4058	2.45	30,321	4.02	117	2.66	3458	3.97	433	3.1	54,576	2.53
Death, indirect report	7	0.00	1	0.00	8	0.00	89	0.01	0	0.00	12	0.01	8	0.1	125	0.01
Total	1,002,344	100.00	130,604	100.0	165,853	100.00	754,852	100.00	4,392	100.00	87,182	100.00	13,805	100.00	2,159,032	100.00

<sup>a</sup>Total number of cases where Death was an outcome (1852 + 125) is greater than the number of fatalities (1415) judged to be exposure-related (RCF of 1 – undoubtedly responsible, 2 – probably responsible, or 3 – contributory).

**Table 12.** Medical outcome by reason for exposure in human exposures<sup>a</sup>.

Outcome	Unintentional		Intentional		Other		Adverse reaction		Unknown		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
No effect	324,274	19.31	66,041	16.90	2120	12.54	1792	3.33	1407	7.87	395,634	18.32
Minor effect	208,966	12.44	116,562	29.82	2948	17.44	12,673	23.58	2951	16.51	344,100	15.94
Moderate effect	43,694	2.60	106,763	27.31	1416	8.38	7813	14.54	4491	25.12	164,177	7.60
Major effect	2770	0.16	19,238	4.92	168	0.99	852	1.59	1600	8.95	24,628	1.14
Death	183	0.01	1322	0.34	17	0.10	79	0.15	251	1.40	1852	0.09
Death, indirect report	21	0.00	71	0.02	5	0.03	4	0.01	24	0.13	125	0.01
No follow-up, non-toxic	244,742	14.57	3975	1.02	1219	7.21	1192	2.22	292	1.63	251,420	11.65
No follow-up, minimal toxicity	777,427	46.29	32,883	8.41	6027	35.66	17,846	33.20	2125	11.89	836,308	38.74
No follow-up, potentially toxic	42,745	2.54	35,412	9.06	1699	10.05	3276	6.10	3080	17.23	86,212	3.99
Unrelated effect	34,823	2.07	8593	2.20	1283	7.59	8221	15.30	1656	9.26	54,576	2.53
Total	1,679,645	100.00	390,860	100.00	16,902	100.00	53,748	100.00	17,877	100.00	2,159,032	100.00

<sup>a</sup>Total number of cases where Death was an outcome (1852 + 125) is greater than the number of fatalities (1415) judged to be exposure-related (RCF of 1 – undoubtedly responsible, 2 – probably responsible, or 3 – contributory).

**Table 13.** Duration of clinical effects by medical outcome.

Duration of effect	Minor effect		Moderate effect		Major effect	
	N	%	N	%	N	%
<=2 h	107,039	31.11	7,390	4.50	755	3.07
>2 h, <=8 h	95,699	27.81	32,646	19.88	1478	6.00
>8 h, <=24 h	66,230	19.25	59,763	36.40	5174	21.01
>24 h, <=3 d	21,488	6.24	34,145	20.80	8556	34.74
>3 d, <=1 week	4031	1.17	8219	5.01	4561	18.52
>1 week, <=1 month	1200	0.35	1689	1.03	1362	5.53
>1 month	395	0.11	345	0.21	188	0.76
Anticipated permanent	460	0.13	180	0.11	491	1.99
Unknown	47,558	13.82	19,800	12.06	2063	8.38
Total	344,100	100.00	164,177	100.00	24,628	100.00

**Table 14.** Decontamination and therapeutic interventions.

Therapy	N	%
Decontamination only	1,027,581	47.6
Therapeutic intervention only	268,028	12.4
Decontamination and therapeutic intervention	131,248	6.1
Not coded	732,175	33.9
Total	2,159,032	100.0

(46.4%). A male predominance was found among cases involving children  $\leq 12$  years, but this gender distribution was reversed in teenagers and adults, with females comprising the majority of reported exposures. The overall rate of poison exposures is 660/100,000 population (Table 3(B)).

The highest rates of poison exposures are in children aged one (8083/100,000 population) and two (7675/100,000 population) and decline progressively as the age rises, resulting in a rate of 345/100,000 population in adults  $\geq 20$  years.

### Caller site and exposure site

As shown in Table 2, of the 2,159,032 human exposures reported, 68.9% of calls originated from a residence (own or other) but 93.1% actually occurred at a residence (own or other). Another 23.2% of calls were made from a HCF. Beyond residences, exposures occurred in the workplace (1.70% of cases), schools (1.32%), HCF (0.328%), and restaurants or food services (0.229%).

### Exposures in pregnancy

Exposure during pregnancy occurred in 7287 women (0.338% of all human exposures). Of those with known pregnancy duration ( $n=6769$ ), 31.7% occurred in the first trimester, 37.9% in the second trimester, and 30.4% in the third trimester. Most (72.0%) were unintentional exposures and 21.2% were intentional exposures. There were seven deaths in pregnant females in 2016.



**Table 15.** Therapy provided in human exposures by age.

Therapy	<=5 year	6–12 year	13–19 year	>=20 year	Unknown child	Unknown adult	Unknown age	Total
Decontamination								
Cathartic	376	118	1500	2971	1	14	5	4985
Charcoal, multiple doses	53	11	297	678	0	6	0	1045
Charcoal, single dose	6,280	853	11,421	20,902	2	113	17	39,588
Dilute/irrigate/wash	478,121	49,517	28,544	179,700	1,241	28,670	2606	768,399
Food/snack	128,831	11,529	6118	31,884	221	4456	285	183,324
Fresh air	6546	3932	4514	40,167	654	10,660	1503	67,976
Ipecac	22	5	22	38	0	1	0	88
Lavage	47	20	337	1029	0	4	3	1440
Other emetic	7131	625	1309	5409	8	429	63	14,974
Whole bowel irrigation	61	19	310	1259	0	4	0	1653
Other Therapies								
2-PAM	5	0	4	42	0	1	0	52
Alkalinization	109	85	2126	9975	0	24	5	12,324
Amyl nitrite	0	0	0	3	0	0	0	3
Antiarrhythmic	8	12	285	1868	0	10	1	2184
Antibiotics	1758	748	1265	14,311	9	455	47	18,593
Anticonvulsants <sup>a</sup>	76	34	195	1191	0	5	0	1,501
Antiemetics	1342	694	7,723	15,704	2	94	11	25,570
Antihistamines	1839	1165	1,704	9355	14	774	92	14,943
Antihypertensives	19	16	173	2995	0	8	1	3212
Antivenin (fab fragment)	203	224	157	1647	0	12	4	2247
Antivenin/antitoxin <sup>b</sup>	60	38	33	281	10	4	2	428
Atropine	101	38	163	1336	0	3	0	1641
BAL	2	0	2	7	0	0	0	11
Benzodiazepines	1123	523	7069	31,604	1	155	28	40,503
Bronchodilators	398	180	373	4616	5	139	99	5810
Calcium	7357	515	328	3067	6	79	6	11,358
Cardioversion	4	1	26	277	0	4	0	312
CPR	69	14	114	1552	0	11	5	1765
Deferoxamine	7	0	28	29	0	0	0	64
ECMO	5	1	14	34	0	0	0	54
EDTA	15	1	1	4	0	0	0	21
Ethanol	0	1	2	74	0	4	0	81
Extracorp. procedure (other)	2	0	4	61	0	0	0	67
Fab fragments	13	10	19	570	0	3	0	615
Fluids, IV	6395	2614	34,459	128,947	2	540	102	173,059
Flumazenil	89	26	200	1406	1	7	1	1730
Folate	12	1	31	1628	0	3	0	1675
Fomepizole	111	10	107	1806	0	7	3	2044
Glucagon	44	10	130	2098	0	4	1	2287
Glucose, > 5%	426	31	389	4130	0	13	3	4992
Hemodialysis	8	4	133	2668	0	10	2	2825
Hemoperfusion	0	0	3	33	0	0	0	36
Hydroxocobalamin	12	7	2	101	0	1	0	123
Hyperbaric oxygen	20	29	51	414	2	9	2	527
Insulin	11	11	163	2307	0	4	0	2496
Intubation	545	142	1974	20,872	0	115	22	23,670
Methylene blue	8	1	16	157	0	2	0	184
NAC, IV	170	253	5585	15,655	0	67	18	21,748
NAC, PO	43	44	975	2,346	0	5	6	3419
Nalmefene	0	0	2	11	0	0	0	13
Naloxone	1147	192	2087	21,835	2	175	64	25,502
Neuromuscular blocker	56	7	181	1709	0	10	0	1963
Octreotide	101	4	55	392	0	1	0	553
Other	32,232	7191	12,729	78,621	122	3657	732	135,284
Oxygen	1572	708	3926	44,972	13	440	160	51,791
Pacemaker	0	1	5	193	0	0	0	199
Penicillamine	0	0	0	0	1	0	0	1
Physostigmine	8	9	142	237	0	0	1	397
Phytonadione	10	9	89	641	0	1	0	750
Pyridoxine	4	2	36	449	0	3	0	494
Sedation (other)	441	145	2152	19,081	0	99	21	21,939
Sodium nitrite	4	1	2	22	0	0	0	29
Sodium thiosulfate	5	2	1	37	0	0	0	45
Steroids	611	324	527	4827	6	279	110	6684
Succimer	102	9	9	57	0	1	0	178
Transplantation	1	1	1	10	0	0	0	13
Vasopressors	86	38	412	6746	0	24	7	7,313
Ventilator	507	137	1870	19,882	0	109	20	22,525

<sup>a</sup>Excludes benzodiazepines.<sup>b</sup>Excludes Fab fragments.



**Table 16(A).** Decontamination trends (1985–2016).

Year	Human exposures	Ipecac administered (% of all exposures)	Activated charcoal administered (% of all exposures)	Exposures involving children ≤5 y (% of all exposures)	Ipecac administered (% of child exposures)	Activated charcoal administered (% of child exposures)
1985	886,389	132,947 (14.999)	41,063 (4.6)	568,691 (64.2)	94,919 (16.6908)	14,718 (2.59)
1986	1,095,228	145,516 (13.286)	56,481 (5.2)	690,137 (63.0)	99,688 (14.4447)	18,191 (2.64)
1987	1,164,648	117,840 (10.118)	60,310 (5.2)	730,228 (62.7)	83,443 (11.427)	18,507 (2.53)
1988	1,364,113	114,654 (8.4050)	88,876 (6.5)	843,106 (61.8)	80,749 (9.5776)	26,118 (3.10)
1989	1,578,968	110,545 (7.0011)	101,368 (6.4)	963,924 (61.0)	79,192 (8.2156)	30,345 (3.15)
1990	1,646,946	98,986 (6.0103)	108,341 (6.6)	999,751 (60.7)	73,469 (7.3487)	31,579 (3.16)
1991	1,836,364	94,877 (5.1666)	129,092 (7.0)	1,099,179 (59.9)	73,069 (6.6476)	36,177 (3.29)
1992	1,862,796	79,493 (4.2674)	135,625 (7.3)	1,094,256 (58.7)	63,486 (5.8018)	38,937 (3.56)
1993	1,747,147	65,078 (3.7248)	127,893 (7.3)	978,560 (56.0)	50,834 (5.1948)	35,791 (3.66)
1994	1,926,992	51,356 (2.6651)	138,247 (7.2)	1,042,651 (54.1)	41,489 (3.9792)	35,670 (3.42)
1995	2,023,089	47,359 (2.3409)	155,880 (7.7)	1,070,472 (52.9)	38,372 (3.5846)	38,095 (3.56)
1996	2,155,952	39,376 (1.8264)	157,331 (7.3)	1,137,263 (52.7)	32,622 (2.8685)	37,986 (3.34)
1997	2,192,088	32,098 (1.4643)	156,213 (7.1)	1,150,931 (52.5)	26,536 (2.3056)	35,856 (3.12)
1998	2,241,082	26,653 (1.1893)	152,134 (6.8)	1,180,989 (52.7)	22,247 (1.8838)	34,302 (2.90)
1999	2,201,156	21,942 (0.9968)	145,853 (6.6)	1,154,799 (52.5)	18,326 (1.5869)	33,812 (2.93)
2000	2,168,248	18,177 (0.8383)	145,911 (6.7)	1,142,796 (52.7)	15,239 (1.3335)	31,554 (2.76)
2001	2,267,979	16,058 (0.7080)	149,442 (6.6)	1,169,478 (51.6)	13,389 (1.1449)	30,367 (2.60)
2002	2,380,028	13,555 (0.5695)	149,527 (6.3)	1,227,381 (51.6)	11,163 (0.9095)	30,340 (2.47)
2003	2,395,582	9284 (0.3875)	140,412 (5.9)	1,245,584 (52.0)	7310 (0.5869)	28,888 (2.32)
2004	2,438,643	4701 (0.1928)	135,969 (5.6)	1,250,536 (51.3)	3366 (0.2692)	28,335 (2.27)
2005	2,424,180	3027 (0.1249)	123,263 (5.1)	1,233,695 (50.9)	1999 (0.1620)	26,338 (2.13)
2006	2,403,539	2176 (0.0905)	111,351 (4.6)	1,223,815 (50.9)	1337 (0.1092)	23,843 (1.95)
2007	2,482,041	1740 (0.0701)	106,010 (4.3)	1,271,595 (51.2)	1052 (0.0827)	22,829 (1.80)
2008	2,491,049	1205 (0.0484)	97,297 (3.9)	1,292,754 (51.9)	641 (0.0496)	21,286 (1.65)
2009	2,479,355	658 (0.0265)	84,805 (3.4)	1,290,784 (52.1)	330 (0.0256)	19,168 (1.48)
2010	2,384,825	360 (0.0200)	74,431 (3.1)	1,207,575 (50.6)	163 (0.0100)	16,581 (1.37)
2011	2,334,004	262 (0.0100)	66,770 (2.9)	1,144,729 (49.1)	98 (0.0100)	13,930 (1.22)
2012	2,275,141	193 (0.0100)	57,888 (2.5)	1,102,307 (48.5)	83 (0.0100)	11,284 (1.02)
2013	2,188,013	134 (0.0100)	50,459 (2.3)	1,049,475 (48.0)	42 (0.0000)	9334 (0.89)
2014	2,165,142	132 (0.0061)	46,030 (2.1)	1,031,927 (47.7)	41 (0.0040)	7977 (0.77)
2015	2,168,371	105 (0.0048)	42,712 (2.0)	1,017,369 (46.9)	29 (0.0029)	6965 (0.68)
2016	2,159,032	88 (0.0041)	40,633 (1.9)	1,002,344 (46.4)	22 (0.0022)	6333 (0.63)

**Table 16B.** Decontamination trends: total human and pediatric exposures <=5 years<sup>a</sup>.

Therapy	Human exposures		Exposures children ≤5 year	
	N	%	N	%
Activated charcoal administered	40,633	1.88	6333	0.63
Cathartic	4985	0.23	376	0.04
Ipecac administered	88	0.00	22	0.00
Lavage	1440	0.07	47	0.00
Other Emetic	14,974	0.69	7131	0.71
Whole Bowel Irrigation	1653	0.08	61	0.01
Total	63,773	2.95	13,970	1.39

<sup>a</sup>Human exposures = 2,159,032; pediatric exposures = 1,002,344.

### Chronicity

Most human exposures, 1,873,714 (86.8%), were acute cases (single, repeated or continuous exposure occurring over 8 hours or less) compared with 1050 acute cases among the 1977 fatalities (53.1%). Chronic exposures (continuous or repeated exposures occurring over >8 h) comprised 2.17% (46,822) of all human exposures. Acute-on-chronic exposures (single exposure that was preceded by a continuous, repeated, or intermittent exposure occurring over a period greater than 8 h) numbered 206,192 (9.55%).

### Reason for exposure

The reason category for most human exposures was unintentional (77.8%), including: unintentional general (51.6%),

therapeutic error (12.8%), and unintentional misuse (6.3%) (Table 6(A)).

### Scenarios

Of the total 276,743 therapeutic errors, the most common scenarios for all ages included inadvertent double-dosing (30.5%), wrong medication taken or given (16.7%), other incorrect dose (14.8%), doses given/taken too close together (10.9%), and inadvertent exposure to someone else's medication (8.6%). The types of therapeutic errors observed are different for each age group and are summarized in Table 6(B).

### Reason by age

Intentional exposures accounted for 18.1% of human exposures. Suicidal intent was suspected in 12.2% of cases, intentional misuse in 2.72%, and intentional abuse in 2.29%. Unintentional exposures outnumbered intentional exposures in all age groups with the exception of ages 13–19 years (Table 7). In contrast, of the 1415 reported fatalities with RCF 1–3, the major reason reported for children ≤5 years was unintentional while most fatalities in adults (≥20 years) were intentional (Table 8).

### Route of exposure

Ingestion was the route of exposure in 83.8% of cases (Table 9), followed in frequency by dermal (7.04%), inhalation/nasal (6.20%), and ocular routes (4.22%). For the 1415

**Table 17(A).** Substance categories most frequently involved in human exposures (top 25).

Substance (major generic category)	All substances	% <sup>a</sup>	Single substance exposures	% <sup>b</sup>
Analgesics	290,561	11.19	184,255	9.67
Cleaning substances (household)	195,715	7.54	176,828	9.28
Cosmetics/personal care products	186,970	7.20	180,065	9.45
Sedative/hypnotics/antipsychotics	151,620	5.84	55,314	2.90
Antidepressants	122,975	4.74	51,509	2.70
Antihistamines	108,777	4.19	75,833	3.98
Cardiovascular drugs	107,493	4.14	46,890	2.46
Foreign bodies/toys/miscellaneous	93,911	3.62	90,667	4.76
Pesticides	83,559	3.22	77,573	4.07
Topical preparations	72,134	2.78	70,352	3.69
Alcohols	72,088	2.78	22,289	1.17
Stimulants and street drugs	66,132	2.55	36,486	1.91
Vitamins	63,931	2.46	54,276	2.85
Anticonvulsants	63,488	2.45	25,844	1.36
Hormones and hormone antagonists	57,316	2.21	38,090	2.00
Cold and cough preparations	56,720	2.19	39,435	2.07
Antimicrobials	55,654	2.14	45,180	2.37
Dietary supplements/herbals/homeopathic	51,272	1.98	42,523	2.23
Gastrointestinal preparations	49,443	1.90	36,158	1.90
Bites and envenomations	48,423	1.87	46,989	2.47
Plants	47,793	1.84	45,150	2.37
Chemicals	39,807	1.53	33,910	1.78
Fumes/gases/vapors	34,345	1.32	31,337	1.64
Other/unknown non-drug substances	29,968	1.15	27,350	1.44
Hydrocarbons	29,796	1.15	27,807	1.46

<sup>a</sup>Percentages are based on the total number of substances reported in all exposures ( $N = 2,595,526$ ).<sup>b</sup>Percentages are based on the total number of single substance exposures ( $N = 1,905,848$ ).**Table 17B.** Substance categories with the greatest rate of exposure increase (top 25).

Substance (major generic category)	Increase in serious exposures per year <sup>a</sup>		All substances in 2016
	Mean	95% CI <sup>b</sup>	
Sedative/hypnotics/antipsychotics	2088	[1719, 2457]	50,894
Analgesics	1863	[1594, 2132]	49,546
Antidepressants	1312	[1177, 1447]	40,068
Cardiovascular drugs	984	[943, 1024]	22,052
Alcohols	930	[863, 997]	24,081
Stimulants and street drugs	863	[585, 1142]	25,066
Anticonvulsants	693	[630, 757]	17,725
Antihistamines	616	[526, 707]	15,966
Muscle relaxants	441	[381, 502]	10,153
Unknown drug	376	[311, 442]	8941
Hormones and hormone antagonists	252	[239, 265]	6695
Cold and cough preparations	242	[182, 302]	7722
Gastrointestinal preparations	93.3	[76, 111]	3365
Miscellaneous drugs	84.9	[56, 114]	2186
Diuretics	53.4	[45, 62]	1566
Anticoagulants	50.9	[45, 57]	1173
Electrolytes and minerals	41.0	[35, 47]	1093
Vitamins	37.5	[31, 44]	1036
Anticholinergic drugs	34.4	[26, 43]	1062
Other/unknown nondrug substances	29.5	[5, 55]	1160
Weapons of mass destruction	17.1	[9, 25]	310
Antimicrobials	14.0	[-6, 34]	2638
Automotive/aircraft/boat products	11.7	[2, 22]	1240
Tobacco/nicotine/eCigarette products	11.6	[5, 18]	371
Essential oils	11.5	[10, 13]	260

<sup>a</sup>Serious exposures have outcomes of moderate, major, or death.<sup>b</sup>Increase and confidence intervals are based on least squares linear regression of the number of calls per year for 2000–2016.

exposure-related fatalities, ingestion (80.4%), inhalation/nasal (9.61%), unknown (9.05%), and parenteral (6.50%) were the predominant exposure routes. Each exposure case may have more than one route.

### Clinical effects

The NPDS database allows for the coding of up to 131 individual clinical effects (signs, symptoms, or laboratory abnormalities) for each case. Each clinical effect can be further

categorized as related, not related, or unknown if related. Clinical effects were coded in 821,577 (38.1%) cases (17.7% had one effect, 9.69% had two effects, 5.34% had three effects, 2.46% had four effects, 1.22% had five effects, and 1.67% had >5 effects coded). Of clinical effects coded, 77.1% were deemed related to the exposure, 9.94% were considered not related, and 13.0% were coded as unknown if related.

**Table 17(C).** Substance categories most frequently involved in pediatric ( $\leq 5$  years) exposures (top 25)<sup>a</sup>.

Substance (major generic category)	All substances	% <sup>b</sup>	Single substance exposures	% <sup>c</sup>
Cosmetics/personal care products	138,904	13.29	136,004	13.98
Cleaning substances (household)	115,701	11.07	111,445	11.45
Analgesics	96,312	9.21	87,710	9.02
Foreign bodies/toys/miscellaneous	67,771	6.48	65,864	6.77
Topical preparations	52,984	5.07	52,030	5.35
Antihistamines	47,476	4.54	43,143	4.43
Vitamins	46,306	4.43	41,912	4.31
Pesticides	34,608	3.31	33,458	3.44
Dietary supplements/herbals/homeopathic	34,443	3.29	32,059	3.30
Plants	28,636	2.74	27,565	2.83
Gastrointestinal preparations	27,617	2.64	24,933	2.56
Antimicrobials	24,710	2.36	23,274	2.39
Cardiovascular drugs	21,940	2.10	13,824	1.42
Cold and cough preparations	21,098	2.02	19,267	1.98
Arts/crafts/office supplies	20,723	1.98	20,096	2.07
Electrolytes and minerals	18,420	1.76	16,700	1.72
Hormones and hormone antagonists	18,416	1.76	14,346	1.47
Deodorizers	17,611	1.68	17,398	1.79
Essential oils	13,981	1.34	13,264	1.36
Other/unknown nondrug substances	12,907	1.23	12,118	1.25
Tobacco/nicotine/eCigarette products	11,462	1.10	11,358	1.17
Antidepressants	11,390	1.09	8244	0.85
Sedative/hypnotics/antipsychotics	10,498	1.00	8119	0.83
Chemicals	10,111	0.97	9328	0.96
Alcohols	9838	0.94	9562	0.98

<sup>a</sup>Includes all children with actual or estimated ages  $\leq 5$  years old. Results do not include “unknown child” or “unknown age”.

<sup>b</sup>Percentages are based on the total number of substances reported in pediatric exposures ( $N = 1,045,339$ ).

<sup>c</sup>Percentages are based on the total number of single substance pediatric exposures ( $N = 972,914$ ).

**Table 17(D).** Substance categories most frequently involved in adult ( $\geq 20$  years) exposures (top 25)<sup>a</sup>.

Substance (major generic category)	All substances	% <sup>b</sup>	Single substance exposures	% <sup>c</sup>
Analgesics	134,737	11.59	61,641	9.28
Sedative/hypnotics/antipsychotics	117,948	10.14	36,793	5.54
Antidepressants	80,916	6.96	28,144	4.24
Cardiovascular drugs	72,985	6.28	26,408	3.98
Cleaning substances (household)	63,102	5.43	50,780	7.64
Alcohols	55,325	4.76	10,025	1.51
Anticonvulsants	47,118	4.05	16,640	2.51
Pesticides	40,970	3.52	36,706	5.53
Stimulants and street drugs	38,509	3.31	17,853	2.69
Antihistamines	36,904	3.17	17,549	2.64
Hormones and hormone antagonists	33,043	2.84	19,925	3.00
Bites and envenomations	32,526	2.80	31,425	4.73
Cosmetics/personal care products	31,211	2.68	28,421	4.28
Fumes/gases/vapors	24,638	2.12	22,452	3.38
Chemicals	23,988	2.06	19,707	2.97
Antimicrobials	22,557	1.94	16,186	2.44
Muscle relaxants	20,841	1.79	7511	1.13
Cold and cough preparations	20,264	1.74	11,028	1.66
Hydrocarbons	16,940	1.46	15,608	2.35
Gastrointestinal preparations	16,592	1.43	7997	1.20
Topical preparations	14,799	1.27	14,201	2.14
Unknown drug	14,626	1.26	9128	1.37
Foreign bodies/toys/miscellaneous	12,856	1.11	11,871	1.79
Other/unknown nondrug substances	12,478	1.07	11,088	1.67
Miscellaneous drugs	12,271	1.06	6215	0.94

<sup>a</sup>Includes all adults with actual or estimated ages  $\geq 20$  years old. Results also include “unknown adult” but do not include “unknown age”.

<sup>b</sup>Percentages are based on the total number of substances reported in adult exposures ( $N = 1,162,641$ ).

<sup>c</sup>Percentages are based on the total number of single substance adult exposures ( $N = 664,227$ ).

### Case management site

The majority of cases reported to PCs were managed outside of a HCF (66.6%), usually at the site of exposure, primarily the patient's own residence (Table 10). Treatment in a HCF was rendered in 30.0% of cases. Only 1.27% of cases were referred to a HCF but refused referral.

Of the 647,458 cases managed in a HCF, 303,668 (46.9%) were treated and released, 102,668 (15.9%) were admitted for critical care, 76,591 (11.8%) were admitted to a non-critical unit, and 79,348 (12.3%) were admitted directly to a psychiatric facility.

The percentage of patients treated in a HCF varied considerably with age. Only 12.8% of children  $\leq 5$  years and only

**Table 17(E).** Substance categories most frequently involved in pediatric ( $\leq 5$  years) deaths<sup>a</sup>

Substance (major generic category)	All substances	% <sup>b</sup>	Single substance exposures	% <sup>c</sup>
Fumes/gases/vapors	12	18.18	8	21.62
Analgesics	11	16.67	9	24.32
Cardiovascular drugs	7	10.61	1	2.70
Antidepressants	6	9.09	1	2.70
Antihistamines	5	7.58	3	8.11
Batteries	4	6.06	4	10.81
Unknown drug	4	6.06	4	10.81
Stimulants and street drugs	3	4.55	1	2.70
Chemicals	2	3.03	0	0.00
Pesticides	2	3.03	1	2.70
Plants	2	3.03	2	5.41
Sedative/hypnotics/antipsychotics	2	3.03	0	0.00
Alcohols	1	1.52	1	2.70
Antimicrobials	1	1.52	0	0.00
Cosmetics/personal care products	1	1.52	1	2.70
Dietary supplements/herbals/homeopathic	1	1.52	1	2.70
Diuretics	1	1.52	0	0.00
Hormones and hormone antagonists	1	1.52	0	0.00
Total	66	100.00	37	100.00

<sup>a</sup>Includes all children with actual or estimated ages  $\leq 5$  years old. Results do not include "unknown child" or "unknown age". Includes death and death, indirect regardless of RCF.

<sup>b</sup>Percentages are based on the total number of substances reported in pediatric fatalities ( $N = 66$ ).

<sup>c</sup>Percentages are based on the total number of single substance pediatric fatalities ( $N = 37$ ).

**Table 17(F).** Substance categories most frequently identified in drug identification calls (top 25).

Substance (major generic category)	All substances	% <sup>a</sup>
Analgesics	57,281	35.00
Sedative/hypnotics/antipsychotics	29,468	18.01
Unknown drug	9808	5.99
Cardiovascular drugs	9681	5.92
Antidepressants	8329	5.09
Muscle relaxants	7520	4.59
Anticonvulsants	6301	3.85
Antihistamines	6274	3.83
Stimulants and street drugs	5634	3.44
Antimicrobials	5362	3.28
Information calls	4652	2.84
Hormones and hormone antagonists	3390	2.07
Gastrointestinal preparations	3335	2.04
Diuretics	1984	1.21
Miscellaneous drugs	1329	0.81
Cold and cough preparations	787	0.48
Anticholinergic drugs	396	0.24
Asthma therapies	395	0.24
Anticoagulants	383	0.23
Electrolytes and minerals	350	0.21
Vitamins	314	0.19
Dietary supplements/herbals/homeopathic	108	0.07
Other/unknown nondrug substances	103	0.06
Narcotic antagonists	82	0.05
Antineoplastics	66	0.04

<sup>a</sup>Percentages are based on the total number of substances reported in all drug identification calls ( $N = 163,663$ ).

17.6% of children between 6 and 12 years were managed in a HCF compared with 64.8% of teenagers (13–19 years) and 48.9% of adults (age  $\geq 20$  years).

### Medical outcome

Table 11 displays the medical outcome of human exposure cases distributed by age. Older age groups exhibit a greater number of severe medical outcomes. Table 12 compares medical outcome and reason for exposure and shows a greater frequency of serious outcomes in intentional exposures.

The duration of effect is required for all cases which report at least one clinical effect and have a medical outcome of minor, moderate or major effect ( $n = 532,905$ ; 24.7% of exposures). Table 13 demonstrates an increasing duration of the clinical effects observed with more severe outcomes.

### Decontamination procedures and specific antidotes

Tables 14 and 15 outline the use of decontamination procedures, specific physiological antagonists (antidotes), and measures to enhance elimination in the treatment of patients reported in the NPDS database. These should be interpreted as minimum frequencies because of the limitations of telephone data gathering.

Ipecac-induced emesis for poisoning continues to decline as shown in Tables 16(A) and 16(B). Ipecac was administered in only 22 (0.00219%) pediatric exposures in 2016. The continued decrease in ipecac syrup use over the last two decades was likely a result of ipecac use guidelines issued in 1997 by the American Academy of Clinical Toxicology and the European Association of Poisons Centres and Clinical Toxicologists and updated in 2004 [3,4]. In a separate report, the American Academy of Pediatrics concluded not only that ipecac should no longer be used routinely as a home treatment strategy but also recommended disposal of home ipecac stocks [5]. A decline was also observed since the early 1990s for reported use of activated charcoal. While not as dramatic as the decline in use of ipecac, reported use of activated charcoal decreased from 3.66% of pediatric cases in 1993 to just 0.632% in 2016.

### Top substances in human exposures

Table 17(A) presents the most common 25 substance categories, listed by frequency of human exposure for cases with more serious outcomes (moderate, severe, and death). This

ranking provides an indication where prevention efforts might be focused, as well as the types of serious exposures PCs regularly manage. It is relevant to know whether exposures to these substances are increasing or decreasing.

To better understand these relationships, we examined exposures with more serious outcomes per year over the last 16 years for the change over time for each of the 68 major generic categories via least squares linear regression. The serious outcome exposure cases per year over this period were increasing for 36 and decreasing for 32 of the 68 categories with data over the entire time period. The change over time for the 16 yearly values was statistically significant ( $p < .05$ ) for 48 of the 68 categories with data for the entire time period. Table 17(B) shows the 25 categories which were increasing the most rapidly. Statistical significance of the linear regressions can be verified by noting the 95% confidence interval on the rate of increase excludes zero for all but one of the 25 categories. Figure 4 shows the change over time and linear regressions for the top four increasing categories in Table 17(B).

Tables 17(C) and 17(D) present exposure results for children and adults, respectively, and show the differences between substance categories involved in pediatric and adult exposures.

Table 17(E) reports the 25 categories of substances most frequently involved in pediatric ( $\leq 5$  years) fatalities in 2016.

Table 17(F) reports the 25 Drug ID categories most frequently queried in 2016, highlighting the value of Drug ID information to the AAPCC, public health, public safety, and regulatory agencies. Internet based resources do not afford the caller the option to speak with a health care professional if needed. Proper resources to continue this vital public service are essential, especially since the top 10 substance categories include antibiotics as well as drugs with widespread use and abuse potential such as opioids and benzodiazepines.

Table 17(G) reports the 25 substance categories most frequently reported in exposures involving pregnant patients.

### Changes over time

Total encounters peaked in 2008 at 4,333,012 calls with 2,491,049 human exposure cases and 1,703,762 information calls. Total encounters decreased 2.94% from 2,792,130 in 2015 to 2,710,042 in 2016. Information calls decreased by 12.5% from 560,467 calls in 2015 to 490,215 in 2016, with a 29.6% decrease in drug identification calls and a 0.454% increase in HCF information calls. Human exposures remained essentially level, decreasing by 0.431% from 2,168,371 to 2,159,032 cases over the same time period.

Figure 5 shows the year-to-year change through 2016 as a percentage of year 2000 for human exposure cases broken down into cases with more serious outcomes (death, major effect, and moderate effect) and less serious outcomes (minor effect, no effect, not followed (non-toxic), not followed (minimal toxicity possible), unable to follow (potentially toxic), and unrelated effect). Since 2000, cases with more serious outcomes have increased by 4.39% (95% CI

[4.06%, 4.72%]) per year from 108,148 cases in 2000 to 190,657 cases in 2016. However, cases with less serious outcomes have decreased since 2008 by 2.59% (95% CI [-3.35%, -1.82%]) per year from 2,339,460 in 2008 to 1,968,250 cases in 2016. This has driven the overall decrease in human exposures since 2008.

Thus, we see a consistent increase in exposure cases from HCFs (Figure 3) and for more severe exposures (Figure 5), despite a decrease in cases involving less severe exposures.

### Distribution of suicides

Table 19(A) shows a modest variation in the distribution of suicides and pediatric deaths over the past 2 decades as reported to the NPDS national database. Within the last decade, the percent of exposures determined to be suspected suicides ranged from 30.3% to 50.5% and the percent of pediatric cases has ranged from 1.52% to 3.18%. The relatively large change seen for 2011 and 2012 reflects the large increase in indirect death reports in those years. Analyses of suicides and pediatric deaths for Direct and Indirect reports are shown in Table 19(B).

### Plant exposures

Table 20 provides the number of times the specific plant was reported to NPDS ( $N = 47,793$ ). The 25 most commonly involved plant species and categories account for 41.3% of all plant exposures reported. Three of the top five categories in the table are essentially synonymous for unknown plant and comprise 11.2% (5,357/47,793) of all plant exposures. For a variety of reasons, it was not possible to make a precise identification in these three groups. The top most frequent plant exposures where positive plant identification was made were (descending order): *Phytolacca americana*, *Cherry* (species unspecified), *Spathiphyllum* species, *Ilex* species, *Philodendron* (species unspecified), *Caladium* species, *mold* (food-related), and *Malus* species.

### Deaths and exposure-related fatalities

A listing of cases (Table 21) and summary of cases (Tables 4, 5, 8, 9, 18, and 22) are provided for fatal cases for which there exists reasonable confidence that the death was a result of that exposure (exposure-related fatalities). Tables 11, 12, and 19 consider all deaths, irrespective of the RCF. Beginning in 2010, deaths recorded as Indirect Report were not further reviewed by the AAPCC fatality review team and the RCF was determined by the reporting PC.

There were 125 deaths, indirect and 1852 deaths. Of these 1977 cases, 1492 were judged exposure-related fatalities (RCF = 1 – undoubtedly responsible, 2 – probably responsible, or 3 – contributory). The remaining 485 cases were judged as follows: 98 as RCF = 4 – probably not responsible, 62 as RCF = 5 – clearly not responsible, and 325 as RCF = 6 – unknown.

Deaths are sorted in Table 21 according to the category, then substance deemed most likely responsible for the death



Table	Fatalities included	RCF	N
4	Death only	1,2,3	1415
5	Death only	1,2,3	1415
8	Death only	1,2,3	1415
9	Death only	1,2,3	1415
11	Death and Death (indirect report)	All	1977
12	Death and Death (indirect report)	All	1977
17E	Pediatric Death and Death (indirect report)	All	44
18	Death only	1,2,3	1415
19A	Death and Death (indirect report)	All	1977
19B	Death and Death (indirect report)	All	1977
21	Death and Death (indirect report)	1,2,3	1492
22	Death and Death (indirect report) - Single substance deaths only	All	946

(Cause Rank), and then by patient age. The Cause Rank permits the PC to judge 2 or more substances as indistinguishable in terms of cause, e.g. two substances which appear equally likely to have caused the death could have Substance Rank of 1,2 and Cause Rank of 1,1. Additional agents implicated are listed below the primary agent in the order of their contribution to the fatality.

As shown in Table 5, a single substance was implicated in 88.3% of reported human exposures, and 11.7% of patients were exposed to two or more drugs or products. The exposure-related fatalities involved a single substance in 593 cases (41.9%), two substances in 366 cases (25.9%), three in 180 cases (12.7%), and four or more in the balance of the cases.

In Table 21, the Annual Report ID number [bracketed] indicates that the narrative for that case is included in Appendix C. The letters following the Annual Report ID number indicate: i=Death, Indirect report (occurred in 77, 5.2% of cases), p=prehospital cardiac and/or respiratory arrest (occurred in 546 of 1,492, 36.6% of cases), h=hospital records reviewed (occurred in 945, 63.3% of cases), a=autopsy report reviewed (occurred in 439, 29.4% of cases). The distribution of NPDS RCF was 1=undoubtedly responsible in 782 cases (52.4%), 2=probably responsible in 564 cases (37.8%), and 3=contributory in 146 cases (9.79%). The denominator for these (Table 21) percentages is 1492.

### All fatalities – all ages

Table 4 presents the age and gender distribution for these 1415 exposure-related fatalities (excluding death, indirect). The age distribution of reported fatalities showed a decrease in deaths among children (<20 years old) compared to 2015, with 73 cases representing 5.16% of fatalities. This was an absolute decrease of 17 fatalities with an 18.9% decrease in that age group. The age distribution of reported fatalities in adults (≥20 years) is similar to prior years with 1337 of 1415 (94.5%) fatal cases occurring in that age group and five (0.353%) occurring in unknown age patients. While children ≤5 years old were involved in the majority of exposures, the 24 deaths in this group comprised just 1.70% of the exposure-related fatalities. The number of deaths in this age group remained unchanged from 2015. Most (66.9%) of the fatalities occurred in 20–59-year-old individuals, a slightly increased percentage from prior years.

Table 21 lists each of the 1492 human fatalities (including death, indirect report) along with all of the substances involved for each case. Please note: the substance listed in

column 3 of Tables 21 (alternate name) was chosen to be the most specific generic name based upon the Micromedex Poisindex product name and generic code selected for that substance. Alternate names are maintained in the NPDS for each substance involved in a fatality. The cross-references at the end of each major category section in Table 21 list all cases that identify the substance as other than the primary substance. This alternate name may not agree with the AAPCC generic categories used in the summary tables (including Table 22).

Table 18 lists the top 25 minor generic substance categories associated with reported fatalities and the number of single substance exposure fatalities for that category: miscellaneous sedative/hypnotics/antipsychotics, opioids, miscellaneous stimulants and street drugs, and miscellaneous alcohols lead this list followed by acetaminophen alone, calcium antagonist, acetaminophen combinations, beta blockers, selective serotonin reuptake inhibitors (SSRIs), miscellaneous antihistamines, and miscellaneous antidepressants. Note that Table 18 is sorted by all substances to which a patient was exposed (i.e. a patient exposed to an opioid may have also been exposed to one or more other products) and shows single substance exposures in the right-hand column.

The first ranked substance (Table 21) was a pharmaceutical in 1196 (80.2%) of the 1492 fatalities. These 1196 first ranked pharmaceuticals included

429 analgesics (142 acetaminophen, 38 acetaminophen/hydrocodone, 36 fentanyl, 36 salicylate, 28 oxycodone, 20 hydrocodone, 20 methadone, 19 acetaminophen/oxycodone, 13 tramadol, 11 acetaminophen/diphenhydramine, 10 morphine)

215 cardiovascular drugs (56 amlodipine, 26 diltiazem, 20 metoprolol, 17 verapamil, 14 digoxin, 14 propranolol, 10 carvedilol, 9 diltiazem [extended release], 8 beta blocker)

177 stimulants/street drugs (94 heroin, 39 cocaine, 21 methamphetamine, 5 amphetamine)

124 antidepressants (36 amitriptyline, 27 bupropion, 12 venlafaxine, 11 bupropion [extended release], 7 nortriptyline, 4 doxepin)

71 sedative/hypnotic/antipsychotics (14 quetiapine, 13 alprazolam, 7 zolpidem, 6 lorazepam, 5 benzodiazepine)

The exposure was acute (A) in 842 (56.4%), acute on chronic (A/C) in 318 (21.3%), chronic (C) in 83 (5.6%), and unknown (U) in 249 (16.7%).

A total of 1556 tissue concentrations for 1 or more related analytes were reported in 711 cases. Most of these (1439) involved fatalities with RCF of 1–3, and are listed in Table 21, while all tissue concentrations are available to the PCs through the NPDS Enterprise Reports. These 143 analytes included: 246 acetaminophen, 185 ethanol, 79 salicylate, 49 fentanyl, 39 carboxyhemoglobin, 34 methanol, 30 diphenhydramine, 28 alprazolam, 26 benzoylcegonine, 24 methadone, 23 morphine (free), 22 morphine, 18 digoxin, 18 ethylene glycol, 17 diazepam, 17 7-aminoclonazepam, 17 oxycodone, 16 nortriptyline, 15 nordiazepam, 15 norfentanyl, 15 amphetamine, 14 amitriptyline, 14 bupropion, 13 citalopram, 13 methamphetamine, and 13 hydrocodone.



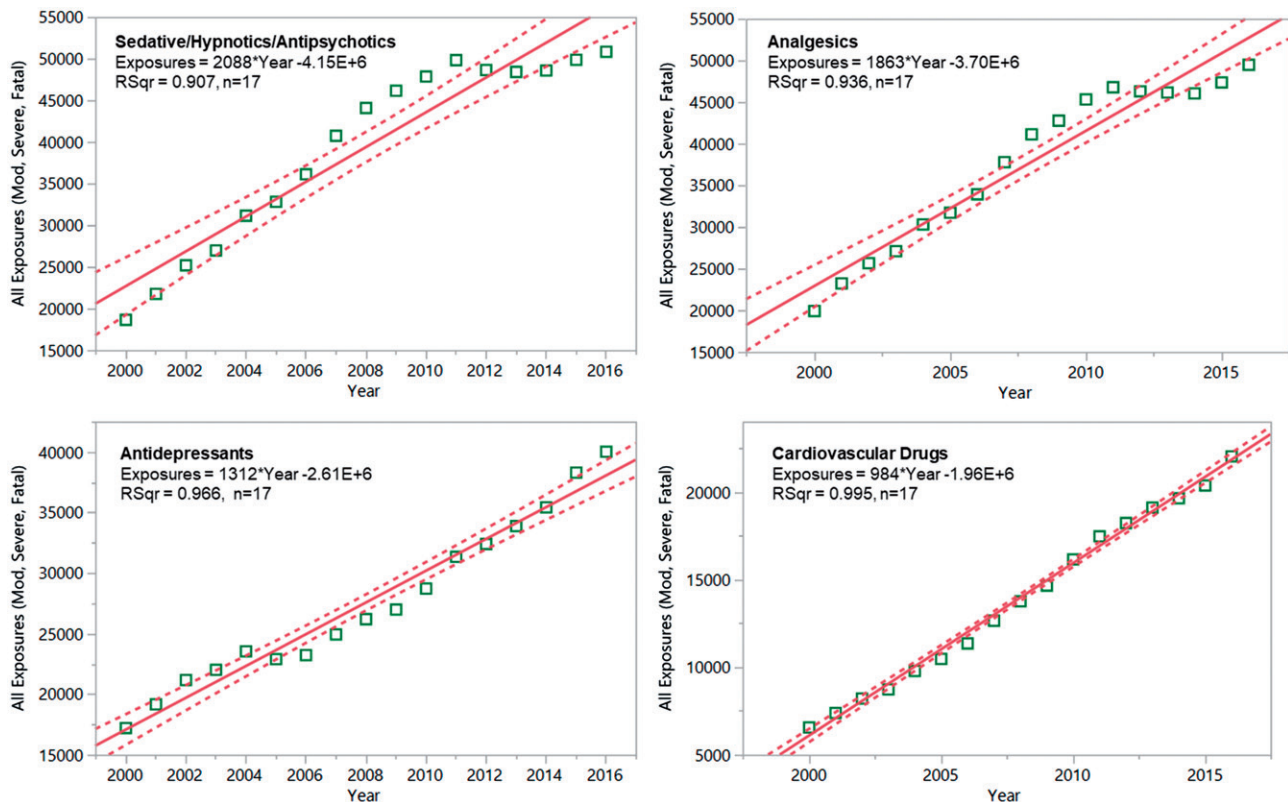
**Table 17G.** Substance categories most frequently involved in pregnant exposures<sup>a</sup> (top 25).

Substance (major generic category)	All substances	% <sup>b</sup>	Single substance exposures	% <sup>c</sup>
Analgesics	980	11.33	589	9.29
Cleaning substances (household)	663	7.67	505	7.97
Pesticides	587	6.79	527	8.31
Bites and envenomations	559	6.46	397	6.26
Fumes/gases/vapors	510	5.90	482	7.60
Infectious and toxin-mediated diseases	315	3.64	191	3.01
Sedative/hypnotics/antipsychotics	313	3.62	133	2.10
Vitamins	307	3.55	234	3.69
Antidepressants	297	3.43	149	2.35
Antihistamines	266	3.08	175	2.76
Other/unknown nondrug substances	229	2.65	155	2.45
Foreign bodies/toys/miscellaneous	214	2.47	204	3.22
Antimicrobials	213	2.46	153	2.41
Cosmetics/personal care products	203	2.35	187	2.95
Stimulants and street drugs	199	2.30	95	1.50
Chemicals	182	2.10	158	2.49
Gastrointestinal preparations	160	1.85	123	1.94
Hydrocarbons	154	1.78	144	2.27
Electrolytes and minerals	148	1.71	107	1.69
Cold and cough preparations	142	1.64	85	1.34
Plants	138	1.60	124	1.96
Hormones and hormone antagonists	136	1.57	106	1.67
Cardiovascular drugs	133	1.54	75	1.18
Alcohols	125	1.45	45	0.71
Information calls	124	1.43	99	1.56

<sup>a</sup>Includes all patient classified as pregnant and all female patients with a "duration of pregnancy" greater than 0.

<sup>b</sup>Percentages are based on the total number of substances reported in pregnant exposures ( $N = 8647$ ).

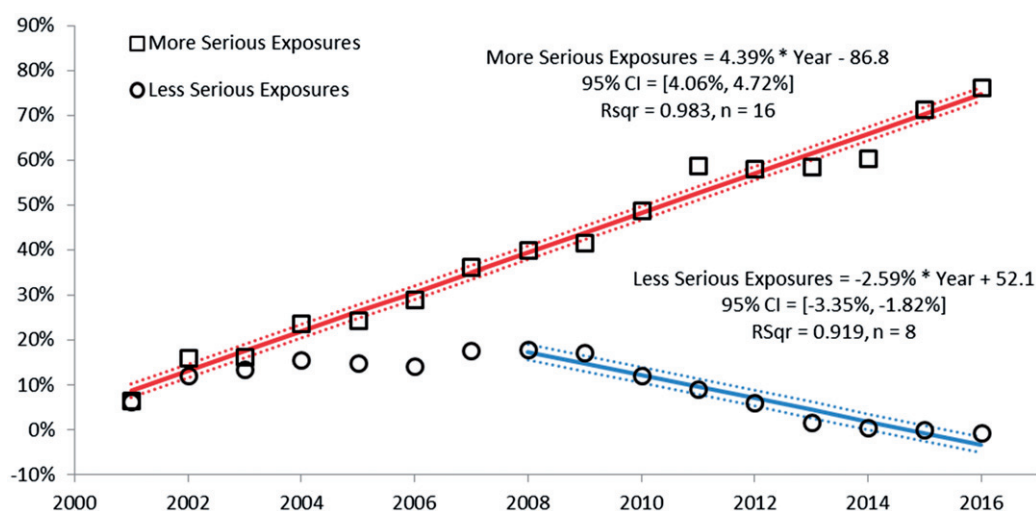
<sup>c</sup>Percentages are based on the total number of single substance pregnant exposures ( $N = 6338$ ).



**Figure 4.** Substance categories with the greatest rate of exposure increase since 1 January 2000 for more severe outcomes (Top 4). Solid lines show least-squares linear regressions for the human exposure cases per year for that category (□). Broken lines show 95% confidence interval on the regression.

Route of exposure was ingestion only in 1054 cases (70.6%), inhalation/nasal in 112 cases (8.04%), and parenteral in 67 cases (4.49%). Parenteral cases decreased by 36.8% from 2015. Most other exposures recorded a combination of routes or an unknown route.

The intentional exposure reason was suspected suicide in 775 cases (51.9%), abuse in 234 cases (15.7%), unknown in 83 cases (5.56%), and misuse in 59 cases (3.95%). Unintentional exposure reasons were environmental in 56 cases (3.75%), general in 31 cases 2.08%), therapeutic error in



**Figure 5.** Change in encounters by outcome from Year 2000. The figure shows the percent change from baseline (year 2000) for human exposure cases divided among the 10 medical outcomes. The more serious exposures (major, moderate, and death) increased. The less serious exposures (no effect, minor effect, not followed (non-toxic), not followed (minimal toxicity possible), unable to follow (potentially toxic) and unrelated effect) decreased after 2008. Solid lines show least-squares linear regressions for the change in more serious exposures per year ( $\square$ ) and less serious exposures ( $\circ$ ). Broken lines show 95% confidence intervals on the regression.

**Table 18.** Categories associated with largest number of fatalities (top 25)<sup>a</sup>.

Substance (minor generic category)	All substances	% <sup>b</sup>	Single substance exposures	% <sup>c</sup>
Miscellaneous sedative/hypnotics/antipsychotics	416	12.20	15	2.53
Opioids	283	8.30	38	6.41
Miscellaneous stimulants and street drugs	260	7.62	68	11.47
Miscellaneous alcohols	237	6.95	17	2.87
Acetaminophen alone	184	5.39	73	12.31
Calcium antagonists	142	4.16	19	3.20
Acetaminophen combinations	129	3.78	36	6.07
Beta blockers	115	3.37	11	1.85
Selective serotonin reuptake inhibitors (SSRI)	102	2.99	1	0.17
Miscellaneous antihistamines	95	2.79	11	1.85
Miscellaneous antidepressants	92	2.70	9	1.52
Miscellaneous unknown drug	89	2.61	23	3.88
Miscellaneous fumes/gases/vapors	80	2.35	47	7.93
Hypoglycemic, single agent	72	2.11	10	1.69
Tricyclic antidepressants (TCA)	66	1.93	20	3.37
Acetylsalicylic acid alone	65	1.91	18	3.04
Miscellaneous anticonvulsants	64	1.88	2	0.34
Nonsteroidal antiinflammatory drugs	64	1.88	9	1.52
Miscellaneous cardiovascular drugs	62	1.82	21	3.54
Miscellaneous muscle relaxants	61	1.79	6	1.01
Anticonvulsants: gamma aminobutyric acid and analogs	60	1.76	3	0.51
Serotonin norepinephrine reuptake inhibitors (SNRI)	51	1.50	3	0.51
Miscellaneous chemicals	47	1.38	17	2.87
Angiotensin converting enzyme inhibitor	39	1.14	0	0.00
Cannabinoids and analogs	32	0.94	0	0.00

<sup>a</sup>Numbers represent total exposures associated with 1415 fatalities (with RCF of 1 – undoubtedly responsible, 2 – probably responsible, or 3 – contributory); each fatality may have had exposure to more than one substance.

<sup>b</sup>Percentages are based on the total number of substances reported in fatal exposures (N = 3411).

<sup>c</sup>Percentages are based on the total number of single substance fatal exposures (N = 593).

27 cases (1.81%), and misuse in 16 cases (1.07%). Adverse drug reaction was the reason in 38 (2.55%).

### Pediatric fatalities – age $\leq 5$ years

Although children younger than 6 years were involved in the majority of exposures, they comprised only 44 of 1977 (2.23%) of fatalities. These numbers are similar to those reported since 1985 (Table 19(A), all RCFs and includes indirect deaths). Table 8 (RCF 1, 2, or 3, excludes indirect deaths) shows the percentage fatalities in children  $\leq 5$  years related to total pediatric exposures was 24/1,002,344 = 0.00239%. By

comparison, 1337/842,034 = 0.159% of all adult exposures involved a fatality. Of these 24 pediatric fatalities, 17 (70.8%) were reported as unintentional, four (16.7%) were reported as unknown, and three (12.5%) were coded as resulting as other – malicious (Table 8).

The 30 fatalities in children  $\leq 5$  years old in Table 21 (includes death, indirect reports and RCF 1–3) included 16 pharmaceuticals and 14 non-pharmaceuticals. The first ranked substances associated with these fatalities included fumes/gases/vapors (10), analgesics (9), batteries (disc/button; 4), stimulants and street drugs (3), antihistamines (2), antidepressants (1), and cardiovascular drugs (1).

**Pediatric fatalities – ages 6–12 years**

In the age range 6–12 years, there were seven reported fatalities: three were intentional suspected suicide, one was unintentional environmental, one was unintentional food poisoning, one was intentional misuse, and one was intentional unknown reason (Table 8). The seven fatalities listed in Table 21 (includes death, indirect reports and RCF 1–3)

**Table 19(A).** Comparisons of death data (1985–2016)<sup>a</sup>.

Year	Total fatalities		Suicides		Pediatric deaths <sup>b</sup>	
	N	% of cases	N	% of deaths	N	% of deaths
1985	328	0.036	174	53.0	20	6.1
1986	406	0.037	223	54.9	15	3.7
1987	398	0.034	227	57.0	22	5.5
1988	544	0.040	296	54.4	30	5.5
1989	590	0.037	323	54.7	24	4.1
1990	553	0.032	320	57.9	21	3.8
1991	764	0.042	408	53.4	44	5.8
1992	705	0.038	395	56.0	29	4.1
1993	626	0.036	338	54.0	27	4.3
1994	766	0.040	410	53.5	26	3.4
1995	724	0.036	405	55.9	20	2.8
1996	726	0.034	358	49.3	29	4.0
1997	786	0.036	418	53.2	25	3.2
1998	775	0.035	421	54.3	16	2.1
1999	873	0.040	472	54.1	24	2.7
2000	921	0.042	477	51.8	20	2.2
2001	1085	0.048	553	51.0	27	2.5
2002	1170	0.049	635	54.3	27	2.3
2003	1109	0.046	592	53.4	35	3.2
2004	1190	0.049	642	53.9	27	2.3
2005	1438	0.059	674	46.9	32	2.2
2006	1515	0.063	705	46.5	39	2.6
2007	1597	0.064	737	46.1	47	2.9
2008	1756	0.070	797	45.4	39	2.2
2009	1544	0.062	779	50.5	37	2.4
2010	1730	0.072	779	45.0	55	3.2
2011	2765	0.118	865	31.3	42	1.5
2012	2937	0.129	890	30.3	46	1.6
2013	2477	0.113	785	31.7	51	2.1
2014	1835	0.085	790	43.1	34	1.9
2015	1831	0.084	814	44.5	42	2.3
2016	1977	0.091	906	45.8	44	2.2

<sup>a</sup>Human exposures with medical outcome of death or death, indirect regardless of RCF.

<sup>b</sup>Includes all children with actual or estimated ages  $\leq 5$  years old. Results do not include “unknown child” or “unknown age”. Includes death and death, indirect regardless of RCF.

included analgesics (2), fumes/gases/vapors (1), infectious and toxin-mediated diseases (1), antidepressants (1), antihistamines (1), and cardiovascular drugs (1).

**Adolescent fatalities – ages 13–19 years**

In the age range 13–19 years, there were 42 reported fatalities, a decrease of 16 (27.6%) from 2015, and included 36 intentional, two unintentional, and four unknown reason (Table 8). The 42 fatalities listed in Table 21 (includes death, indirect reports and RCF 1–3) included 37 pharmaceuticals and 10 non-pharmaceuticals. The first ranked pharmaceuticals associated with these fatalities included: analgesics (14), antidepressants (8), stimulants and street drugs (4), anticonvulsants (2), antihistamines (2) cardiovascular drugs (2), sedative/hypnotics/antipsychotics (2), unknown drug (2), and cold and cough preparations (1). The first ranked non-pharmaceutical associated with these fatalities included: alcohols (2), automotive/aircraft/boat products (2), fumes/gases/vapors (2), chemicals (1), hydrocarbons (1), pesticides (1), and plants (1).

**Pregnancy and fatalities**

There were seven deaths in pregnant women reported to NPDS in 2016. A total of 43 deaths of pregnant women have been reported from the years 2000 through 2016. The majority (35 of 43, 81.4%) were intentional exposures (misuse, abuse, or suspected suicide).

**AAPCC surveillance results**

Key components of the NPDS surveillance system include the automated monitoring tools available to the NPDS user community. In addition to AAPCC national surveillance definitions, 28 PCs utilize NPDS as a part of their surveillance programs. The CDC, six state health departments, one county health department, and one state police department run surveillance definitions in NPDS. Since Surveillance Anomaly 1,

**Table 19(B).** Comparisons of direct and indirect death data (2000–2016)<sup>a</sup>.

Year	All deaths			Suicides				Pediatric deaths					
	Total	Direct	Indirect	Total	% of deaths	Direct	% of direct	Indirect	Total	% of deaths	Direct	% of direct	Indirect
2000	864	845	19	448	51.85	443	52.43	5	18	2.08	18	2.13	0
2001	1,066	952	114	542	50.84	503	52.84	39	26	2.44	24	2.52	2
2002	850	739	111	455	53.53	436	59.00	19	24	2.82	15	2.03	9
2003	867	826	41	464	53.52	454	54.96	10	29	3.34	22	2.66	7
2004	955	898	57	516	54.03	501	55.79	15	25	2.62	21	2.34	4
2005	1423	1332	91	666	46.80	656	49.25	10	32	2.25	26	1.95	6
2006	1515	1415	100	705	46.53	687	48.55	18	39	2.57	32	2.26	7
2007	1597	1502	95	737	46.15	712	47.40	25	47	2.94	41	2.73	6
2008	1756	1535	221	797	45.39	750	48.86	47	39	2.22	32	2.08	7
2009	1544	1452	92	779	50.45	748	51.52	31	37	2.40	31	2.13	6
2010	1730	1455	275	779	45.03	732	50.31	47	55	3.18	47	3.23	8
2011	2765	1503	1262	865	31.28	758	50.43	107	42	1.52	31	2.06	11
2012	2937	1507	1430	890	30.30	759	50.36	131	46	1.57	30	1.99	16
2013	2477	1552	925	785	31.69	698	44.97	87	51	2.06	43	2.77	8
2014	1835	1559	276	790	43.05	757	48.56	33	34	1.85	23	1.48	11
2015	1831	1670	161	814	44.46	784	46.95	30	42	2.29	34	2.04	8
2016	1977	1852	125	906	45.83	885	47.79	21	44	2.23	37	2.00	7

<sup>a</sup>Human exposures with medical outcome of death or death, indirect regardless of RCF.

**Table 20.** Frequency of plant exposures (top 25)<sup>a</sup>.

	Botanical name or category	AAPCC Generic Code Name	N
1	Plants-general-unknown	Unknown Toxic Types or Unknown if Toxic	2213
2	Unknown Botanical Name	Unknown Toxic Types or Unknown if Toxic	1721
3	Plants-toxicodendrol	Skin Irritants (Excluding Oxalate Containing Plants)	1594
4	<i>Phytolacca americana</i> (L.)	Gastrointestinal Irritants (Excluding Oxalate Containing Plants)	1500
5	BOTANICAL TERMS	Unknown Toxic Types or Unknown if Toxic	1423
6	Cherry (Species unspecified)	Amygdalin and/or Cyanogenic Glycosides	1338
7	Plants-pokeweed	Other Toxic Types	1004
8	<i>Spathiphyllum</i> spp.	Oxalates	850
9	Plants-cardiac glycosides	Cardiac Glycosides (Excluding Drugs)	795
10	<i>Ilex</i> spp. (not otherwise specified)	Gastrointestinal Irritants (Excluding Oxalate Containing Plants)	757
11	<i>Philodendron</i> spp.	Oxalates	561
12	<i>Caladium</i> spp.	Oxalates	544
13	Mold, food related	Unknown Toxic Types or Unknown if Toxic	496
14	Plants-oxalates	Oxalates	494
15	Berry (not otherwise specified)	Unknown Toxic Types or Unknown if Toxic	486
16	<i>Malus</i> spp.	Amygdalin and/or Cyanogenic Glycosides	468
17	<i>Zantedeschia aethiopica</i>	Oxalates	443
18	<i>Euphorbia tirucalli</i> (L.)	Skin Irritants (Excluding Oxalate Containing Plants)	440
19	Plants-mitragyna	Hallucinogenics	428
20	<i>Solanum dulcamara</i>	Solanine	404
21	<i>Solanum nigrum</i>	Solanine	394
22	<i>Taxus canadensis</i>	Other Toxic Types	372
23	<i>Epipremnum areum</i>	Oxalates	358
24	Unknown Botanical Name	Non-Toxic	340
25	<i>Begonia argenteo-guttata</i>	Non-Toxic	339

<sup>a</sup>Number of substances related to a human exposure with a Major Generic Category of Plant. Unknown Botanical Name represents substances with a Major Generic Category of Plant and a NULL substance code. Total =47,793.

generated at 2:00pm EDT on 17 September 2006, over 304,000 anomalies have been detected and reported. Over 2100 were confirmed as being of public health significance with PCs working collaboratively with their local and state health departments and, in some instances the CDC, on the public health issues identified.

At the time of this report, 310 surveillance definitions run continuously, monitoring case and clinical effects volume and a variety of case-based definitions from food poisoning to nerve agents. These definitions represent the surveillance work by many PCs, state health departments, the AAPCC, and the Health Studies Branch, Division of Environmental Hazards and Health Effects, National Center for Environmental Health, and CDC. NPDS has also been used for surveillance during mass gathering events, such as the Super Bowl.

The methodology for automating surveillance continues to be improved in efforts to detect the index case of any relevant public health event. Algorithms for identifying the index case vary greatly with regard to the substance to be identified. No individual algorithm works for every application [6]. The magnitude and penetrance of NPDS are critical to epidemiologic surveillance and to the ability to substantiate situational awareness for clinicians, policymakers, and public health officials nationwide. Typically, NPDS surveillance detects the response to an event, rather than predicting an event. This fosters situational awareness and resilience during and after a public health event. Situational awareness is undoubtedly beneficial to public health surveillance [7].

As an illustrative example, the regional pattern and granularity of the opioid epidemic in the United States continue to evolve. Recent implementation of legal and other restrictions on availability of prescription opioid analgesics has curbed the use of licit opioids, while ostensibly driving the market toward illicit opioid use. This is evident in trends toward

increasing exposures to heroin as well as to fentanyl and high potency fentanyl analogs. We examined the more serious (Outcome = Moderate, Major or Death) NPDS single-substance exposures to heroin (generic code 0037702) and to opioid medications (23 generic codes). We compared these exposures with unintentional mortality data from the CDC's National Center for Health Statistics [8] for 2000 through 2016 (Figure 6). Identification of opioid type and search methodology followed from those previously described [1,9].

Both NPDS and CDC prescription opioid cases steadily increased until 2010, after which they plateaued and have decreased in more recent years. In contrast, heroin cases from both data sources show relatively slow increases until 2010, after which the frequency of reported cases is rapidly increasing. This dramatic increase over time suggests that a decrease in prescription opioid morbidity and mortality is overshadowed by the increase in heroin morbidity and mortality. The difference in absolute frequencies between the CDC and NPDS data may reflect voluntary reporting into NPDS compared with the CDC's more comprehensive use of national death certificate data.

Heroin exposures and deaths continue to climb sharply, and this increase in NPDS exposures continues up to the present. Continuing availability of heroin, its low price and high purity are likely contributors to the increase in heroin morbidity and mortality. CDC mortality figures show unintentional heroin overdose (OD) deaths nearly tripling from 2011 to 2015, while those involving synthetic opioids nearly doubled between 2013 and 2014. The rise in heroin consumption and in complications of heroin use has in turn been linked to prescription opioid use, with prior misuse of licit opioids as a major risk factor for heroin initiation. Illicit fentanyl or potent fentanyl derivatives are often sold as heroin or found as adulterants of street heroin. This may be contributing to recent increases in drug OD deaths involving

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
<b>Non-Pharmaceutical Exposures</b>										
<b>Alcohols</b>										
1h	15 y M	Ethanol	2	1	U	Ingst + Inhal	Int-S	2		
		Metformin	1	1						
		Marijuana	3	3						
2ph	18 y F	Ethanol	1	1	A	Ingst + Inhal	Int-U	2	Ethanol	184 mg/dL in serum @ unknown
		Marijuana	2	2						
3ph	25 y F	Ethanol	1	1	A	Ingst	Int-S	2	Ethanol	505 mg/dL in serum @ unknown
		Acetaminophen/dextro-methorphan/doxylamine	2	2						
4	25 y M	Ethanol	1	1	A	Ingst	Int-S	1		
		Cardiac glycoside (bufadienolide)	2	2						
5a	28 y F	Methanol	1	1	A	Ingst	Int-S	1	Methanol	0.238% (wt/vol) in serum @ autopsy
		Methanol	1	1					Methanol	228 mg/dL in blood (unspecified) @ unknown
		Diphenhydramine	2	2					Diphenhydramine	0.3 mg/L in blood (unspecified) @ autopsy
6p	29 y F	Ethanol	1	1	A	Ingst	Int-S	2		
		Alprazolam	2	2						
7h	30 y M	Alcohol, unknown	1	1	A	Ingst	Int-S	3	Ethanol	153 mg/dL in blood (unspecified) @ unknown
8	30 y M	Methanol	1	1	U	Ingst	Int-S	1	Methanol	379 mg/dL in blood (unspecified) @ unknown
		Drug, unknown	2	2						
9ph	32 y M	Isopropanol	1	1	A	Ingst	Int-A	2		
		Ethanol	2	2						
10ph	32 y M	Ethanol	1	1	A	Ingst + Unk	Int-A	2	Ethanol	258 mg/dL in blood (unspecified) @ unknown
		Heroin	2	2						
		THC homolog	3	3						
11ph	35 y M	Ethanol	1	1	U	Ingst	Int-A	1	Ethanol	115 mcg/dL in blood (unspecified) @ unknown
		Lorazepam	2	2						
12	38 y F	Ethanol	1	1	A/C	Ingst	Int-S	1		
		Venlafaxine	2	2						
		Lamotrigine	3	3						
		Topiramate	4	4						
		Diltiazem	5	5						
		Salicylate	6	6						
13h	41 y F	Ethanol	1	1	C	Unk	Int-A	3	Ethanol	59 mg/dL in blood (unspecified) @ unknown
14h	42 y M	Ethanol	1	1	C	Ingst	Oth-W	3	Ethanol	48 mg/dL in blood (unspecified) @ unknown
15pa	42 y F	Ethanol	1	1	A	Unk	Int-A	1	Ethanol	0.3% (wt/vol) in blood (unspecified) @ autopsy
		Ethanol	1	1					Ethanol	0.44% (wt/vol) in blood (unspecified) @ autopsy

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
16p	45 y M	Ethanol	1	1	A	Ingst	Int-S	1	Ethanol	0.46% (wt/vol) in blood (unspecified) @ autopsy
		Ethanol	1	1					Ethanol	0.47% (wt/vol) in urine (quantitative only) @ autopsy
		Ethanol	1	1					Ethanol	0.51% (wt/vol) in vitreous @ autopsy
17a	45 y M	Ethanol	1	1	U	Unk	Unk	1	Methanol	88 mg/dL in blood (unspecified) @ unknown
		Methanol	1	1						
18h	45 y M	Drug, unknown	2	2	C	Ingst	Int-A	2		
		Ethanol	1	1						
19ha	46 y M	Acetaminophen	2	2	A	Unk	Int-U	2	Ethanol	279 mg/dL in blood (unspecified) @ unknown
		Ethanol	1	1						
20h	46 y M	Drug, unknown	2	2	A	Ingst	Unk	3	Ethanol	165 mg/dL in plasma @ unknown
		Ethanol (non-beverage)	1	1						
21ph	47 y F	Ethanol	1	1	A/C	Ingst	Int-A	3	Ethanol	13 mg/dL in blood (unspecified) @ unknown
22h	49 y F	Diphenhydramine	2	2	A	Ingst	Int-S	1		
		Methanol	1	1					Methanol	13 mg/dL in serum @ 17 h (pe)
		Methanol	1	1					Methanol	176 mg/dL in serum @ 0.5 h (pe)
		Methanol	1	1					Methanol	34 mg/dL in serum @ 12 h (pe)
		Methanol	1	1					Methanol	7 mg/dL in serum @ 19 h (pe)
23ha	50 y M	Methanol	1	1	U	Ingst	Unk	1	Methanol	222 mg/dL in blood (unspecified) @ unknown
		Methanol	1	1					Methanol	24 mg/dL in blood (unspecified) @ autopsy
		Methanol	1	1					Methanol	29 mg/dL in vitreous @ autopsy
24h	51 y M	Ethanol	1	1	U	Ingst	Unk	2		
		Substance (non-drug), unknown	2	2						
25h	52 y M	Methanol	1	1	A	Ingst	Int-S	1	Methanol	485 mg/dL in blood (unspecified) @ unknown
26ph	52 y F	Ethanol	1	1	U	Ingst	Int-S	2	Ethanol	187 mg/dL in serum @ 1 m (pe)
27p	53 y F	Hydroxyzine	2	2	A	Ingst	Unk	2	Methanol	10.2 mg/dL in serum @ unknown
		Methanol	1	1						
28h	53 y F	Ethanol	1	1	C	Ingst	Unk	3	Ethanol	16 mg/dL in blood (unspecified) @ unknown
29h	53 y M	Cough syrup	2	2	U	Ingst	Unk	3		
		Ethanol	1	1						
30ha	55 y F	Metformin	2	2	A	Ingst	Oth-C	1	Methanol	0.08 g/dL in blood (unspecified) @ unknown
		Methanol	1	1						
		Methanol	1	1						

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
31ha	57 y F	Ethanol	1	1	A/C	Ingst	Unt-U	1	Ethanol	95 mg/dL in serum @ autopsy
		Benzodiazepine	2	2					Nordiazepam	14 ng/mL in serum @ autopsy
		Benzodiazepine	2	2					Midazolam	28 ng/mL in serum @ autopsy
		Benzodiazepine	2	2					Diazepam	6 ng/mL in serum @ autopsy
32	57 y F	Brodifacoum	3	3						
		Ethanol	1	1	U	Ingst + Unk	Int-S	2	Ethanol	34 mg/dL in blood (unspecified) @ unknown
33h	58 y F	Drug, unknown	2	2						
		Methanol	1	1	A	Ingst	Int-S	1	Methanol	61 mg/dL in blood (unspecified) @ unknown
34h	58 y F				A	Ingst	Int-S	1		
		Methanol	1	1					Methanol	140 mg/dL in blood (unspecified) @ unknown
35	61 y M				A/C	Ingst	Unk	3		
		Ethanol	1	1						
36pha	61 y F				A	Unk	Unk	2		
		Methanol	1	1					Methanol	27 mg/dL in blood (unspecified) @ unknown
37h	63 y M				A	Ingst	Int-S	2		
		Alcohol, unknown	1	1						
		Salicylate	2	2					Salicylate	18 mg/dL in blood (unspecified) @ unknown
38h	66 y M	Acetaminophen	3	3						
		Methanol	1	1	A	Ingst	Int-S	1	Methanol	184 mg/dL in blood (unspecified) @ unknown
		Methanol	1	1					Methanol	33 mg/dL in blood (unspecified) @ 24 h (pe)
39h	79 y M				U	Ingst	Unk	1		
		Methanol	1	1					Methanol	281 mg/dL in blood (unspecified) @ 1 d (pe)
		Methanol	1	1					Methanol	36 mg/dL in blood (unspecified) @ 3 d (pe)
		Methanol	1	1					Methanol	560 mg/dL in blood (unspecified) @ 4 h (pe)
		Methanol	1	1					Methanol	97 mg/dL in blood (unspecified) @ 2 d (pe)
40ph	unknown adult (>=20 yrs) F				A	Ingst	Int-S	2		
		Ethanol	1	1					Ethanol	45 mg/dL in blood (unspecified) @ 1 h (pe)
		Cocaine	2	2					Benzoylcognine	510 ng/mL in blood (unspecified) @ autopsy
		Hydrocodone	3	3					Morphine (free)	29 ng/mL in blood (unspecified) @ autopsy
See also case 45, 48, 50, 55, 60, 80, 83, 84, 92, 94, 96, 100, 114, 133, 143, 160, 163, 167, 172, 179, 186, 193, 198, 249, 250, 259, 284, 308, 309, 314, 338, 339, 348, 350, 351, 352, 358, 359, 361, 363, 365, 369, 381, 382, 390, 391, 398, 411, 413, 415, 417, 419, 420, 423, 433, 436, 439, 445, 446, 459, 462, 468, 482, 483, 484, 487, 490, 494, 496, 497, 514, 516, 520, 521, 523, 529, 532, 533, 535, 538, 546, 549, 550, 554, 556, 560, 562, 567, 572, 578, 600, 609, 611, 614, 617, 619, 643, 650, 729, 734, 737, 738, 748, 749, 767, 768, 773, 780, 783, 792, 795, 797, 800, 806, 811, 812, 816, 820, 821, 832, 838, 839, 850, 853, 861, 862, 873, 884, 890, 891, 892, 901, 919, 922, 925, 928, 941, 946, 956, 976, 977, 978, 993, 996, 1000, 1002, 1011, 1029, 1045, 1047, 1051, 1059, 1087, 1124, 1126, 1127, 1132, 1139, 1152, 1166, 1169, 1184, 1186, 1204, 1207, 1210, 1213, 1214, 1215, 1218, 1219, 1220, 1225, 1228, 1233, 1259, 1269, 1272, 1278, 1305, 1318, 1326, 1337, 1339, 1340, 1350, 1357, 1359, 1360, 1361, 1370, 1375, 1377, 1378, 1390, 1391, 1392, 1400, 1404, 1405, 1408, 1413, 1421, 1422, 1424, 1426, 1427, 1428, 1440, 1444, 1455, 1465, 1480, 1486, 1492										
Automotive/aircraft/boat products										
[41ha]	16 y M	Automotive-aircraft-boat product	1	1	A	Ingst	Int-A	1		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
42phai	16 y U	Automotive-aircraft-boat product	1	1	A	Ingst	Int-A	1	Methanol	110 mg/dL in blood (unspecified) @ autopsy
43h	30 y F	Ethylene glycol (antifreeze)	1	1	A	Ingst	Int-S	2		
44h	31 y M	Methanol	1	1	A	Ingst	Unt-U	1		
45h	32 y M	Methanol	1	1	A	Ingst	Int-S	1	Methanol	205 mg/dL in blood (unspecified) @ unknown
46a	36 y M	Ethanol	2	2	A	Ingst	Int-S	1		
		Ethylene glycol (antifreeze)	1	1					Ethylene glycol	1254 mg/dL in plasma @ unknown
		Butalbital	2	2					Butalbital	11.8 ng/mL in blood (unspecified) @ autopsy
		Marijuana	3	3					Carboxy-thc	13.8 ng/mL in blood (unspecified) @ autopsy
47	36 y M	Methanol	1	1	A	Ingst	Int-A	1		
48	38 y M	Ethylene glycol (antifreeze)	1	1	A	Ingst	Int-S	3		
		Ethanol	2	2						
49h	43 y M	Glycol/methanol	1	1	C	Ingst	Int-A	1	Methanol	461 mg/dL in serum @ unknown
		Chemical, unknown	2	2						
50h	45 y F	Methanol	1	1	A	Ingst	Int-S	1	Methanol	198 mg/dL in blood (unspecified) @ Unspecified
		Methanol	1	1					Methanol	95 mg/dL in blood (unspecified) @ Unspecified
		Ethanol	2	2						
51	47 y F	Glycol/methanol	1	1	A	Ingst	Int-M	1		
52ph	48 y M	Ethylene glycol (antifreeze)	1	1	A	Ingst	Int-S	1	Ethylene glycol	131 mcg/dL in serum @ unknown
53h	49 y M	Methanol	1	1	A	Ingst	Int-U	1	Methanol	166 mg/dL in blood (unspecified) @ unknown
		Ethylene glycol (antifreeze)	2	2						
54h	54 y F	Methanol	1	1	A	Ingst	Int-S	1	Methanol	0 mg/dL in blood (unspecified) @ unknown
		Methanol	1	1					Methanol	80 mg/dL in blood (unspecified) @ unknown
55ha	55 y M	Ethylene glycol (antifreeze)	1	1	A	Ingst	Int-A	2	Ethylene glycol	360 mg/dL in blood (unspecified) @ autopsy
		Isopropanol	2	2					Isopropanol	13 mg/dL in blood (unspecified) @ autopsy
		Isopropanol	2	2					Acetone	18 mg/dL in blood (unspecified) @ autopsy
56	56 y M	Ethylene glycol (antifreeze)	1	1	A/C	Ingst	Int-S	2		
57h	57 y M	Ethylene glycol (antifreeze)	1	1	A	Ingst	Int-S	1	Ethylene glycol	6584.9 mcg/mL in blood (unspecified) @ 2 d (pe)
		Rodenticide, unknown	2	2						
58	62 y M	Methanol	1	1	A	Ingst	Int-S	1	Methanol	340 mg/dL in blood (unspecified) @ unknown

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
59phi	65 y M	Acetaminophen/ diphenhydramine	2	2	A	Ingst	Int-S	2		
		Beta blocker	3	3						
		Ethylene glycol (antifreeze)	1	1						
60	65 y M	Lorazepam	2	2	A	Ingst	Unk	1	Methanol	331 mg/dL in blood (unspecified) @ unknown
		Methanol	1	1						
		Ethanol	2	2						
Batteries										
61ai	2 y F				A	Ingst	Unt-G	1		
		Battery, disc (lithium)	1	1						
62i	4 y F				A	Ingst	Unt-G	1		
		Battery, disc (lithium)	1	1						
63i	3 m F				A	Ingst	Unt-G	1		
		Battery, disc	1	1						
64a	13 m M				A	Ingst	Unt-G	1		
		Battery, disc (lithium)	1	1						
Bites and envenomations										
[65ph]	23 y M				A	B-S	Unt-B	1		
		Sting (hymenoptera)	1	1						
[66ha]	48 y M				A	B-S	Unt-B	1		
		Envenomation (crotalinae)	1	1						
[67ph]	53 y M				A	B-S	Unt-B	1		
		Envenomation (crotalid)	1	1						
68ph	70 y M				A	B-S	Unt-B	1		
		Sting (hymenoptera)	1	1						
69h	91 y M				A	B-S	Unt-B	3		
		Sting (hymenoptera)	1	1						
Chemicals										
70h	16 y M				A	Ingst	Unk	2		
		Potassium nitrate	1	1						
71ha	20 y M				A	Ingst	Int-S	1		
		Ethylene glycol (antifreeze)	1	1						
		Ricin	2	1						
72ha	22 y M				A	Ingst	Int-U	1		
		Ethylene glycol (antifreeze)	1	1					Ethylene glycol	101 mg/dL in blood (unspecified) @ unknown
		Ethylene glycol (antifreeze)	1	1					Ethylene glycol	940 mg/dL in urine (quantitative only) @ unknown
		Cocaine	2	2					Benzoyllecognine	0.055 mg/L in blood (unspecified) @ unknown
		Methamphetamine	3	3						
		Hydrocodone	4	4						
73pi	24 y M				A	Unk	Int-S	1		
		Cyanide	1	1						
74ha	26 y M				A	Ingst	Int-S	2		
		Ethylene glycol (antifreeze)	1	1						
		Doxylamine	2	2						
75	26 y M				A	Inhal	Unt-E	1		
		Cyanide	1	1						
		Carbon monoxide	2	2					Carboxyhemoglobin	19.7% in blood (unspecified) @ 1 h (pe)
76p	27 y F				A	Ingst	Int-S	1		
		Ethylene glycol (antifreeze)	1	1						
77i	27 y F				A	Unk	Int-S	1		
		Cyanide	1	1						
78ph	28 y F				U	Inhal	Int-A	1		
		Chemical (inhalation), unknown	1	1						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
79p	30 y M	Ethylene glycol (antifreeze)	1	1	A	Ingst	Int-U	1	Ethylene glycol	80 mg/dL in serum @ 1 h (pe)
[80pha]	32 y M	Ethyl chloride	1	1	A	Inhal	Int-A	1	Ethanol	110 mg/dL in serum @ 12 h (pe)
		Ethanol	2	2						
81	33 y M	Ethylene glycol (antifreeze)	1	1	A	Ingst	Int-S	1	Ethylene glycol	88 mg/dL in blood (unspecified) @ 1 h (pe)
82h	35 y M	Ethylene glycol (antifreeze)	1	1	A	Ingst + Aspir	Int-S	1	Ethylene glycol	120 mg/dL in blood (unspecified) @ 1 h (pe)
83ph	38 y M	Cyanide	1	1	U	Unk	Int-S	1	Cyanide	16 mcg/mL in blood (unspecified) @ autopsy
		Ethanol	2	2					Ethanol	110 mg/dL in vitreous @ autopsy
		Ethanol	2	2					Ethanol	79 mg/dL in blood (unspecified) @ autopsy
[84ha]	38 y M	Sodium metasilicate	1	1	A	Ingst	Int-S	1	Ethanol	149 mg/dL in serum @ unknown
		Ethanol	2	2						
85ph	40 y F	Cyanide	1	1	A	Inhal	Unt-E	1		
		Carbon monoxide	2	2						
86ha	41 y M	Ethylene glycol (antifreeze)	1	1	A	Ingst	Unk	1	Ethylene glycol	61 mg/dL in plasma @ unknown
		Chemical, unknown	2	2						
87	41 y F	Ethylene glycol (antifreeze)	1	1	A/C	Ingst	Int-S	1		
		Escitalopram	2	2						
		Loratadine	3	3						
		Furosemide	4	4						
		Levothyroxine	5	5						
		Folic acid	6	6						
		Vitamin B-1	7	7						
88ph	43 y M	Cyanide	1	1	A	Inhal	Unt-E	1		
		Carbon monoxide	2	2					Carboxyhemoglobin	43% in plasma @ 0.5 h (pe)
89ph	45 y F	Ethylene glycol (antifreeze)	1	1	A	Ingst	Int-S	2		
		Substance (non-drug), unknown	2	1						
90	47 y M	Ethylene glycol (antifreeze)	1	1	A	Ingst	Int-S	3	Ethylene glycol	3 mg/dL in blood (unspecified) @ unknown
		Vitamins (multiple)/iron	2	2					Iron	318 mcg/dL in serum @ unknown
		Naproxen	3	3						
91	52 y M	Ethylene glycol (antifreeze)	1	1	A	Ingst	Unk	1		
92h	53 y M	Ethylene glycol (antifreeze)	1	1	A	Ingst	Unk	2		
		Acetaminophen	2	2						
		Ethanol	3	3					Ethanol	280 mg/dL in blood (unspecified) @ unknown
[93ha]	54 y M	Hydrochloric acid	1	1	A	Ingst	Int-S	1		
94ha	55 y F	Ethylene glycol (antifreeze)	1	1	U	Ingst	Int-S	1	Ethylene glycol	210 mg/dL in serum @ unknown
		Clonazepam	2	2						
		Lithium	3	3						
		Ethanol	4	4						
		Drug, unknown	5	5						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
95	56 y F	Ammonia	1	1	A	Inhal	Unt-O	2		
		Hypochlorite	2	2						
96	56 y F	Ethylene glycol (antifreeze)	1	1	A	Ingst	Int-S	1	Ethylene glycol	88.63 mg/dL in blood (unspecified) @ autopsy
		Topiramate	2	1						
		Bupropion	3	2						
		Trazodone	4	3						
		Metoprolol	5	4						
		Ethanol	6	5					Ethanol	11 mg/dL in blood (unspecified) @ unknown
97h	57 y F	Ethylene glycol (antifreeze)	1	1	U	Ingst	Int-S	2		
98h	57 y F	Ethylene glycol (antifreeze)	1	1	U	Ingst + Aspir	Int-S	1	Ethylene glycol	436.6 mg/dL in blood (unspecified) @ unknown
99ha	60 y M	Asenapine	2	2	A	Ingst	Unt-M	1		
		Ethylene glycol (antifreeze)	1	1						
100ha	61 y M	Ethylene glycol (antifreeze)	1	1	A	Ingst	Int-U	1		
		Ethanol	2	2						
101p	61 y F	Borate	1	1	A/C	Ingst	Int-U	2		
102ha	62 y M	Hydrofluoric acid	1	1	A	Ingst	Int-S	1		
[103ph]	62 y M	Cyanide	1	1	A	Ingst	Int-S	1		
104ph	65 y M	Strychnine	1	1	A	Ingst	Int-S	2		
105ph	67 y M	Ethylene glycol (antifreeze)	1	1	A	Ingst	Int-S	1	Ethylene glycol	8.6 mg/dL in serum @ 1 d (pe)
106ph	68 y M	Cyanide	1	1	U	Ingst	Int-S	2		
[107]	71 y M	Hydrofluoric acid	1	1	A	Ingst	Unt-O	1		
108p	73 y F	Cyanide	1	1	A	Ingst	Int-S	1		
109pa	75 y M	Ethylene glycol (antifreeze)	1	1	A	Unk	Int-S	1	Ethylene glycol	180 mg/dL in blood (unspecified) @ autopsy
		Diphenhydramine	2	2					Diphenhydramine	0.2 mg/L in blood (unspecified) @ autopsy
[110h]	80 y M				A	Inhal + Oc + Der-Unt-O m		1		
111	92 y F	Ammonia	1	1	A	Ingst	Int-S	2		
112p	unknown adult (>=20 yrs) F	Hydrochloric acid	1	1	A	Unk	Int-S	2		
		cyanide	1	1						
See also case 49, 148, 167, 188, 203, 212, 226, 318, 910, 944										
Cleaning substances (household)										
113p	30 y F				A	Ingst + Inhal + - Aspir + Derm	Unt-O	2		
		Cleaner (household)	1	1						
		Hypochlorite	2	2						
114ph	31 y F	Ammonium hydroxide	1	1	A	Ingst	Int-S	1		
		Hypochlorite	2	2						
		Drain cleaner (alkali)	3	3						
		Ethanol	4	4						
		Ethanol (non-beverage)	5	5						
		Drug, unknown	6	6						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
115p	38 y F	Hypochlorite	1	1	A	Par + Unk	Int-S	2		
		Morphine	2	2						
116h	42 y F	Drain cleaner (alkali)	1	1	A	Ingst	Int-S	1		
117h	45 y M	Sodium hydroxide	1	1	A	Ingst	Int-S	1		
118ha	55 y F	Drain cleaner (alkali)	1	1	A	Ingst + Inhal	Int-S	1		
[119ha]	57 y F	Bleach, peroxide	1	1	U	Ingst	Int-S	1		
120h	57 y F	Cleaner (household)	1	1	A	Ingst	Int-S	2		
121ph	58 y F	Cleaner (anionic/non-ionic)	1	1	A	Ingst	Unt-G	2		
122h	59 y F	Acid toilet bowl cleaner	1	1	A	Ingst	Int-S	2		
123	60 y F	Toilet bowl cleaner (alkali)	1	1	A	Ingst	Int-S	1		
[124h]	64 y F	Drain cleaner (hydrochloric acid)	1	1	A	Ingst	Int-S	2		
125hi	65 y M	Disinfectant (isopropanol/pine oil)	1	1	A	Ingst + Aspir	Unk	1		
126	66 y F	Drain cleaner (alkali)	1	1	A	Ingst	Int-S	1		
127ha	66 y M	Drain cleaner (alkali)	1	1	A	Ingst	Int-S	2		
128h	71 y M	Drain cleaner (alkali)	1	1	A/C	Ingst	Int-S	1		
		Warfarin	2	2						
		Digoxin	3	3					Digoxin	3.8 mcg/mL in blood (unspecified) @ 48 h (pe)
		Digoxin	3	3					Digoxin	4.7 mcg/mL in blood (unspecified) @ 20 h (pe)
		Digoxin	3	3					Digoxin	5.5 mcg/mL in blood (unspecified) @ 8 h (pe)
		Atenolol	4	4						
129	73 y F	Hypochlorite	1	1	A	Ingst	Unt-M	2		
		Drain cleaner (alkali)	2	2						
130h	77 y F	Cleaner (acid)	1	1	A	Ingst	Int-S	1		
		Ethanol (non-beverage)	2	2					Ethanol	130 mg/dL in serum @ 1 h (pe)
131	78 y F	Drain cleaner (alkali)	1	1	A	Ingst	Unt-G	1		
132ha	81 y F	Sodium hydroxide	1	1	A	Ingst	Unt-M	1		
133h	81 y M	Cleaner (isopropanol)	2	1	A	Ingst	Int-U	2		
		Methanol	1	1						
134h	83 y F	Disinfectant (cationic)	1	1	A	Ingst + Aspir	Unt-M	2		
135h	87 y M	Drain cleaner (alkali)	1	1	A	Ingst	Unt-G	1		
136h	87 y F	Phosphoric acid	1	1	A	Ingst	Int-S	2		
137h	89 y M	Cleaner (anionic/non-ionic)	1	1	A	Ingst + Inhal + Aspir	Unt-G	3		
138ha	89 y M	Drain cleaner (alkali)	1	1	A	Ingst	Unt-G	1		
139h	91 y M	Chlorhexidine	1	1	A	Ingst + Aspir	Unt-G	2		

See also case 95, 278, 877, 1049

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
Cosmetics/personal care products										
[140h]	60 y F				A	Ingst	Int-U	1		
141p	72 y M	Hydrogen peroxide	1	1	A	Ingst	Int-A	3		
		Ethanol (non-beverage)	1	1						
See also case 114, 130										
Deodorizers										
142h	74 y F				A	Ingst	Unt-G	3		
143h	78 y F	Septic system deoderizer	1	1	A	Ingst	Unt-M	2		
		Septic system deoderizer	1	1						
		Ethanol	2	2					Ethanol	74 mg/dL in serum @ unknown
144h	82 y M				A	Ingst	Unt-M	3		
145h	95 y M	Caustic	1	1	A	Ingst	Unt-M	2		
		Deodorizer	1	1						
Fumes/gases/vapors										
146	2 y M				A	Inhal	Unt-E	1		
		Carbon monoxide	1	1					Carboxyhemo globin	40% in whole blood @ unknown
[147pa]	3 y M				A	Inhal	Unt-E	1		
		Carbon monoxide	1	1					Carboxyhemo globin	60% in blood (unspecified) @ autopsy
148pha	3 y M				A	Inhal	Unt-E	1		
		Carbon monoxide	1	1					Carboxyhemo globin	54% in blood (unspecified) @ 30 m (pe)
		Cyanide	2	2						
		Carbon monoxide	3	3						
149pha	3 y M				A	Inhal	Unt-E	1		
		Carbon monoxide	1	1					Carboxyhemo globin	30% in whole blood @ unknown
150pha	3 y M				A	Inhal	Unt-E	1		
		Carbon monoxide	1	1					Carboxyhemo globin	34% in whole blood @ unknown
151pha	4 y M				A	Inhal	Unt-E	1		
		Carbon monoxide	1	1					Carboxyhemo globin	50.1% in whole blood @ autopsy
152pi	4 y M				A	Inhal	Unt-E	1		
		Carbon monoxide	1	1						
153ph	5 y M				A	Inhal	Unt-E	1		
		Carbon monoxide	1	1						
154pha	5 y M				A	Inhal	Unt-E	1		
		Carbon monoxide	1	1					Carboxyhemo globin	40% in blood (unspecified) @ autopsy
		Carbon monoxide	2	2						
155p	11 y F				A	Inhal	Unt-E	1		
		Carbon monoxide	1	1					Carboxyhemo globin	56% in whole blood @ 30 m (pe)
156pha	14 y F				A	Inhal	Unt-E	1		
		Carbon monoxide	1	1					Methemoglobin	13% in blood (unspecified) @ unknown
		Carbon monoxide	1	1					Carboxyhemo globin	7.8% in blood (unspecified) @ unknown
157ph	17 y M				A	Inhal	Int-S	1		
		Carbon monoxide	1	1					Carboxyhemo globin	50% in blood (unspecified) @ 10 m (pe)
158pi	20 y F				A	Inhal	Int-S	2		
		Hydrogen sulfide	1	1						
159pa	20 y F				A	Inhal	Unt-E	1		
		Carbon monoxide	1	1					Carboxyhemo globin	60% in blood (unspecified) @ autopsy
160pai	21 y F				A	Inhal	Unt-E	1		
		Carbon monoxide	1	1						
		Ethanol	2	2					Ethanol	0.08 mg/L in blood (unspecified) @ autopsy
		Ethanol	2	2					Ethanol	0.09 mg/L in vitreous @ autopsy

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
161pa	23 y M	Carbon monoxide	1	1	A	Inhal	Unt-E	1	Carboxyhemo- globin	60% in blood (unspecified) @ autopsy
[162ph]	26 y M	Helium	1	1	A	Inhal	Int-A	1		
163pai	29 y M	Carbon monoxide	1	1	A	Inhal	Unt-E	1		
		Ethanol	2	2					Ethanol	0.09 mg/L in muscle @ autopsy
		Ethanol	2	2					Ethanol	0.17 mg/L in blood (unspecified) @ autopsy
		Marijuana	3	3					Delta-9-thc	3 ng/mL in blood (unspecified) @ autopsy
		Marijuana	3	3					11-Oh-thc (11-hydroxy-delta-9-tetrahydrocannabinol)	9.4 ng/mL in blood (unspecified) @ autopsy
164p	30 y F	Carbon monoxide	1	1	A	Inhal	Int-S	2		
165ph	31 y F	Carbon monoxide	1	1	A	Inhal	Unt-E	1		
166pha	32 y F	Carbon monoxide	1	1	A	Inhal	Unt-E	1		
		Carbon monoxide	2	2					Carboxyhemo- globin	50.5% in blood (unspecified) @ autopsy
167ph	32 y M	Carbon monoxide	1	1	A	Inhal	Unt-E	1		
		Cyanide	2	2						
		Ethanol	3	3						
168ph	32 y F	Carbon monoxide	1	1	A	Inhal	Int-S	1		
[169ph]	33 y M	Carbon dioxide	1	1	A	Inhal	Unt-E	1		
170pa	34 y M	Fume-gas-vapor, unknown	1	1	A	Inhal + Derm	Unt-O	1		
[171pha]	34 y M	Carbon dioxide	1	1	A	Inhal	Unt-E	1		
172pha	37 y F	Carbon monoxide	1	1	A	Inhal	Int-S	1	Carboxyhemo- globin	29.9% in whole blood @ 1.5 h (pe)
		Carbon monoxide	1	1					Carboxyhemo- globin	5% in blood (unspecified) @ autopsy
		Oxycodone	2	2					Oxycodone (free)	2600 ng/mL in blood (unspecified) @ autopsy
		Oxycodone	2	2					Oxymorphone	92 ng/mL in blood (unspecified) @ autopsy
		Diazepam	3	3					Nordiazepam	1000 ng/mL in blood (unspecified) @ autopsy
		Diazepam	3	3					Oxazepam	120 ng/mL in blood (unspecified) @ autopsy
		Diazepam	3	3					Temazepam	350 ng/mL in blood (unspecified) @ autopsy
		Diazepam	3	3					Diazepam	4300 ng/mL in blood (unspecified) @ autopsy
		Tapentadol	4	4					Tapentadol	2400 ng/mL in blood (unspecified) @ autopsy
		Diphenhydramine	5	5					Diphenhydramine	380 ng/mL in blood (unspecified) @ autopsy
		Doxylamine	6	6					Doxylamine	340 ng/mL in blood (unspecified) @ autopsy
		Dextromethorphan	7	7					Dextromethorphan	310 ng/mL in blood (unspecified) @ autopsy
		Ethanol	8	8					Ethanol	18 mg/dL in blood (unspecified) @ 1.5 h (pe)
		Acetaminophen	9	9					Acetaminophen	83 mcg/mL in blood (unspecified) @ autopsy
		Acetaminophen	9	9					Acetaminophen	86.8 mg/L in blood (unspecified) @ 1.5 h (pe)
		Amphetamine	10	10						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
173pa	38 y F	Carbon monoxide	1	1	A	Ingst + Inhal	Int-S	3	Carboxyhemo- globin	22% in blood (unspecified) @ autopsy
		Gabapentin	2	2					Gabapentin	4 mg/L in blood (unspecified) @ autopsy
		Sertraline	3	3						
174ph	42 y F	Carbon monoxide	1	1	A	Inhal	Int-S	1		
175phi	43 y M	Carbon monoxide	1	1	A	Inhal	Unt-E	1		
176h	43 y M	Argon gas	1	1	A	Inhal	Unt-O	1		
177ha	44 y M	Hydrogen sulfide	1	1	A	Inhal + Derm	Unt-O	1		
178ph	45 y F	Carbon monoxide	1	1	A	Inhal	Unt-E	1	Carboxyhemo- globin	28% in blood (unspecified) @ unknown
179pha	45 y M	Carbon monoxide	1	1	A	Ingst + Inhal	Unt-E	1	Carboxyhemo- globin	9% in blood (unspecified) @ 1 h (pe)
		Ethanol	2	2					Ethanol	142 mg/dL in blood (unspecified) @ 1 h (pe)
180ph	46 y M	Carbon monoxide	1	1	A	Inhal	Unt-E	1	Carboxyhemo- globin	43.7% in blood (unspecified) @ 15 m (pe)
181p	47 y M	Asphyxiant, simple	1	1	A	Inhal	Int-A	1		
182p	47 y F	Carbon monoxide	1	1	A	Inhal	Unt-E	1		
183p	48 y F	Hydrogen sulfide	1	1	A	Inhal	Unk	2		
184h	49 y M	Carbon monoxide	1	1	A	Inhal	Unt-E	1		
185pai	50 y M	Carbon monoxide	1	1	U	Inhal	Unk	1	Carboxyhemo- globin	60.2% in blood (unspecified) @ autopsy
186p	53 y M	Carbon monoxide	1	1	A	Ingst	Int-S	2	Carboxyhemo- globin	42% in blood (unspecified) @ unknown
		Ethanol	2	2						
187a	54 y F	Carbon monoxide	1	1	A	Inhal	Unt-E	1		
188ph	54 y M	Carbon monoxide	1	1	A	Inhal	Int-S	1	Carboxyhemo- globin	2.5% in blood (unspecified) @ unknown
		Carbon monoxide	1	1					Carboxyhemo- globin	50% in blood (unspecified) @ unknown
		Carbon monoxide	1	1					Carboxyhemo- globin	57% in blood (unspecified) @ unknown
		Cyanide	2	2						
189pa	54 y M	Argon gas	1	1	A	Inhal	Int-S	1		
		Carbon monoxide	2	2					Carboxyhemo- globin	16% in blood (unspecified) @ autopsy
190pa	55 y F	Carbon monoxide	1	1	A	Ingst + Inhal	Int-S	1	Carboxyhemo- globin	8.1% in blood (unspecified) @ unknown
		Benzodiazepine	2	2					Alprazolam	80 ng/mL in blood (unspecified) @ autopsy
		Hydromorphone	3	3					Hydromorphone	6.3 ng/mL in blood (unspecified) @ autopsy
		Hydrocodone	4	4					Hydrocodone (free)	45 ng/mL in blood (unspecified) @ autopsy
		Acetaminophen	5	5					Acetaminophen	24.7 mg/L in blood (unspecified) @ unknown
191pha	56 y M	Hydrogen sulfide	1	1	A	Inhal	Unt-O	1		
[192ph]	57 y M	Carbon monoxide	1	1	A	Ingst	Int-S	1	Carboxyhemo- globin	51.6% in serum @ 30 m (pe)
193ph	58 y M	Carbon monoxide	1	1	A	Inhal	Int-S	1		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
194pha	58 y M	Ethanol	2	2						
		Carbon monoxide	1	1	A	Inhal	Unt-E	1	Carboxyhemo globin	21% in plasma @ 30 m (pe)
195p	58 y M	Carbon monoxide	1	1	A	Inhal	Unt-E	3		
196	59 y M	Carbon monoxide	1	1	A	Ingst	Int-S	2		
		Trazodone	2	2						
197ha	60 y M	Hydrogen sulfide	1	1	A	Inhal + Derm	Unt-O	1		
198pa	60 y F	Carbon monoxide	1	1	A	Ingst + Inhal	Unt-E	1	Carboxyhemo globin	60% in blood (unspecified) @ autopsy
		Ethanol	2	2					Ethanol	260 mg/dL in blood (unspecified) @ autopsy
199p	60 y M	Carbon monoxide	1	1	A	Inhal	Unt-E	1		
200h	61 y F	Carbon monoxide	1	1	A	Ingst + Inhal	Int-S	1		
		Zolpidem	2	2						
201h	61 y F	Carbon monoxide	1	1	A	Inhal	Unt-E	3		
		Carbon monoxide	2	2						
202ph	61 y M	Carbon dioxide	1	1	A	Inhal	Unt-E	1		
203p	64 y F	Carbon monoxide	1	1	A	Inhal	Unt-E	1	Carboxyhemo globin	9% in blood (unspecified) @ 1 h (pe)
		Cyanide	2	2						
204ph	65 y M	Chlorine	1	1	A	Inhal + Derm	Unt-M	1		
205pi	67 y M	Carbon monoxide	1	1	A	Inhal	Unt-E	1		
[206ph]	68 y M	Chlorine gas	1	1	A	Inhal	Unt-O	2		
207pa	69 y F	Carbon monoxide	1	1	A	Inhal	Unt-E	1	Carboxyhemo globin	30% in blood (unspecified) @ autopsy
208ph	73 y F	Carbon monoxide	1	1	A	Inhal	Unt-E	1		
		Carbon monoxide	2	2						
209h	73 y F	Carbon monoxide	1	1	A	Inhal	Unt-E	3	Carboxyhemo globin	0.8% in whole blood @ 20 m (pe)
		Carbon monoxide	2	1						
210ph	75 y F	Carbon monoxide	1	1	A	Inhal	Unt-E	1	Carboxyhemo globin	38% in blood (unspecified) @ autopsy
211pa	75 y M	Carbon monoxide	1	1	A	Inhal	Int-M	3		
		Nicotine	2	2						
212ph	76 y F	Carbon monoxide	1	1	A	Inhal	Unt-E	1	Carboxyhemo globin	40% in blood (unspecified) @ 1 h (pe)
		Cyanide	2	2						
213a	77 y F	Carbon monoxide	1	1	A	Inhal	Unt-E	3	Carboxyhemo globin	45.8% in plasma @ unknown
214ph	82 y M	Carbon monoxide	1	1	A	Inhal	Unt-E	1		
215	85 y F	Carbon monoxide	1	1	A	Ingst	Int-S	2		
		Atenolol	2	2						
		Salicylate	3	3						
		Acetaminophen/ oxycodone	4	4						
216pa	92 y F	Carbon monoxide	1	1	A	Inhal	Unt-E	1	Carboxyhemo globin	60% in blood (unspecified) @ autopsy
217pi	12 m U	Carbon monoxide	1	1	A	Inhal	Unt-E	1		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
218ph	60+ y F				A	Inhal	Unt-E	2		
219pi	unknown adult (>=20 yrs) M	Carbon monoxide	1	1	C	Inhal	Unt-E	1		
220p	unknown adult (>=20 yrs) M	Carbon monoxide	1	1	A	Inhal	Int-S	1		
[221pa]	unknown adult (>=20 yrs) M	Propane	1	1	A	Inhal	Unt-O	1		
222phi	unknown adult (>=20 yrs) U	Argon gas	1	1	A	Inhal	Unt-E	1		
224pi	unknown adult (>=20 yrs) M	Carbon monoxide	1	1	A	Inhal	Unt-E	1		
223pi	unknown adult (>=20 yrs) M	Carbon monoxide	1	1	A	Inhal	Unt-E	1		
225ph	unknown age U	Carbon monoxide	1	1	A	Inhal	Unt-E	2		
226p	unknown age M	Carbon monoxide	1	1	U	Inhal	Int-S	1		
		Carbon monoxide	1	1						
		Formic acid	2	2						
		Sulfuric acid	3	3						
227p	unknown age M				A	Inhal	Int-S	2		
228pi	unknown age U	Hydrogen sulfide	1	1	U	Inhal	Unt-E	2		
		Carbon monoxide	1	1						
See also case 75, 85, 88, 250										
Heavy metals										
229pai	28 y M				A	Inhal	Unt-E	1		
		Mercury (elemental)	1	1						
[230]	55 y M	Nickel carbonyl	1	1	A	Inhal	Unt-O	2	Nickle	335 mcg/24hr in urine (quantitative only) @ unknown
		Nickel carbonyl	1	1					Nickle	57.8 mcg/24hr in urine (quantitative only) @ unknown
231ha	57 y F	Potassium chloride	1	1	A/C	Ingst	Int-S	1	Potassium	7 mmol/L in serum @ unknown
		Potassium chloride	1	1					Potassium	8.5 mmol/L in serum @ unknown
		Baclofen	2	2						
		Rivaroxaban	3	3						
		Metformin	4	4						
		Methylphenidate	5	5						
		Eszopiclone	6	6						
		Furosemide	7	7						
		Clonazepam	8	8						
		Tramadol	9	9						
		Alprazolam	10	10						
		Hydrochlorothiazide	11	11						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
[232h]	68 y F				A	Ingst	Int-S	1		
		Copper	1	1						
[233h]	72 y M	Arsenic	1	1	A	Unk	Unt-U	2	Arsenic	27 mcg/L in whole blood @ unknown
See also case 486, 929, 1016, 1031, 1382										
Hydrocarbons										
[234]	17 y F				A	Ingst + Aspir	Unt-G	1		
		Hydrocarbon	1	1						
235p	21 y F	Fluorinated hydrocarbon	1	1	U	Inhal	Int-A	1		
236ha	25 y M	Fluorinated hydrocarbon	1	1	A	Inhal	Int-A	1		
237ph	25 y F	Fluorinated hydrocarbon	1	1	A	Inhal	Int-A	2		
238	26 y M	Fluorinated hydrocarbon	1	1	A/C	Inhal	Int-A	1		
239h	26 y M	Fluorinated hydrocarbon	1	1	A	Inhal	Int-A	2		
240h	27 y F	Fluorinated hydrocarbon	1	1	A	Inhal	Int-A	1		
241p	28 y M	Fluorinated hydrocarbon	1	1	C	Inhal	Int-A	2		
242	30 y F	Fluorinated hydrocarbon	1	1	A	Inhal	Int-A	2		
243pha	30 y M	Fluorinated hydrocarbon	1	1	A/C	Inhal	Int-A	1	1,1-Difluoroethane	4.5 mg/L in urine (quantitative only) @ unknown
244h	32 y M	Fluorinated hydrocarbon	1	1	A/C	Inhal	Int-A	1		
245ha	34 y M	Hydrocarbon (inhalation)	1	1	A	Inhal + Derm	Int-A	1	1,1-Difluoroethane	93 mcg/mL in blood (unspecified) @ autopsy
246h	34 y M	Hydrocarbon	1	1	A	Ingst	Unk	2		
247	35 y F	Fluorinated hydrocarbon	1	1	C	Inhal	Int-A	2		
248p	38 y M	Fluorinated hydrocarbon	1	1	A	Inhal	Int-A	1		
249h	40 y M	Fluorinated hydrocarbon	1	1	A	Ingst + Inhal + - Aspir	Int-A	1		
250pai	41 y F	Fluorinated hydrocarbon	1	1	A	Ingst + Inhal + P-Int-U ar		1		
		Fluorinated hydrocarbon	1	1						
		Carbon monoxide	2	2					Carboxyhemo globin @ autopsy	20% in blood (unspecified) @ autopsy
		Oxymorphone	3	3					Oxymorphone	21 ng/mL in blood (unspecified) @ autopsy
		Fentanyl	4	4					Fentanyl	11 ng/mL in blood (unspecified) @ autopsy
		Fentanyl	4	4					Norfentanyl	2.2 ng/mL in blood (unspecified) @ autopsy
		Ethanol	5	5					Ethanol	0.12% (wt/vol) in blood (unspecified) @ autopsy
251ha	44 y M	Fluorinated hydrocarbon	1	1	A	Inhal	Int-A	3		
252ph	45 y M	Fluorinated hydrocarbon	1	1	A	Inhal	Int-S	1		
[253ha]	47 y M	Fluorinated hydrocarbon	1	1	U	Ingst + Inhal	Int-S	1	1,1-difluoroethane	47 mcg/mL in whole blood @ autopsy
		Fluorinated hydrocarbon	1	1					1,1-difluoroethane	78 mcg/mL in blood (unspecified) @ unknown
		Sertraline	2	2					Desmethylsertraline	160 ng/mL in blood (unspecified) @ 1 h (pe)
		Sertraline	2	2					Sertraline	45 ng/mL in blood (unspecified) @ 1 h (pe)
254h	47 y F	Fluorinated hydrocarbon	1	1	U	Inhal	Int-A	1	1,1-Difluoroethane	5.9 mcg/mL in blood (unspecified) @ autopsy

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
255pha	49 y M				U	Inhal	Int-A	3		
256	60 y F	Fluorinated hydrocarbon	1	1						
		Lamp oil	1	1	A	Ingst + Aspir	Int-S	1		
		Trazodone	2	2						
		Venlafaxine	3	3						
		Antihistamine, NOS	4	4						
257	unknown adult (>=20 yrs) M				U	Unk	Unk	2		
		Fluorinated hydrocarbon	1	1						
		Morphine	2	2						
Industrial cleaners										
258h	23 y F				A	Ingst + Derm	Int-S	2		
[259ha]	44 y M	Potassium hydroxide	1	1	A	Ingst + Derm	Int-S	1		
		Cleaner (acid)	1	1						
		Ethanol	2	2						
[260ha]	49 y F	Ammonium bifluoride	1	1	A	Ingst	Unt-M	1		
[261ha]	66 y M				A	Inhal	Unt-M	1		
		Chloramine	1	1						
262	73 y F				A	Ingst	Unt-M	1		
		Sodium hydroxide	1	1						
263	73 y F				A	Ingst	Unt-G	1		
		Sodium hydroxide	1	1						
[264]	87 y M				A	Ingst	Unt-M	1		
		Cleaner (acid)	1	1						
Infectious and toxin-mediated diseases										
265p	9 y M				A	Ingst	Unt-F	2		
		Food poisoning, unknown	1	1						
Matches/fireworks/explosives										
266p	unknown adult (>=20 yrs) M				A	Derm	Unk	1		
		Fireworks	1	1						
Mushrooms										
[267]	84 y F				A	Ingst	Unt-F	1		
		Mushroom (cyclopeptides)	1	1						
See Also case 1449										
Other/unknown non-drug substances										
268ph	36 y M				A	Unk	Int-S	2		
		Methanol	1	1						
See also case 24, 89, 853										
Pesticides										
[269h]	19 y M				A	Ingst	Int-S	1		
		Dinitrophenol	1	1						
		Energy drink	2	2						
270h	21 y M				A	Ingst	Unk	2		
		Dinitrophenol	1	1						
271hai	23 y M				A	Ingst	Int-U	2		
		Dinitrophenol	1	1						
[272ha]	24 y M				A	Inhal	Unt-E	1		
		Sulfuryl fluoride	1	1						
		Cocaine	2	2					Benzoyllecognine	0.17 mg/L in blood (unspecified) @ unknown
273a	25 y M				A	Inhal	Int-M	1		
		Sulfuryl fluoride	1	1						
		None	2	2						
		None	3	3						
274h	25 y F				A	Ingst	Int-S	1		
		Paraquat	1	1						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
275ph	35 y M	Paraquat	2	2						
		Herbicide	1	1	A	Ingst	Unk	2		
[276h]	47 y M	Paraquat	1	1	A	Ingst	Int-M	1		
277h	50 y M	Carbamate	1	1	A	Ingst	Int-S	1		
[278pha]	51 y F	chlorophenoxy herbicide	1	1	A	Ingst	Int-S	1		
		Cleaner (anionic/non-ionic)	2	2						
		Sodium hydroxide	3	3						
		Bupropion	4	4						
		Sertraline	5	5						
		Trazodone	6	6						
279p	56 y M	Phosphine	1	1	A	Ingst	Int-S	1		
280	59 y M	Glyphosate	1	1	A	Ingst	Int-S	1		
281	61 y F	Glyphosate	1	1	A	Ingst + Aspir	Int-S	1		
[282h]	72 y M	Carbamate insecticide	1	1	A	Ingst	Int-S	1		
283h	77 y M	Organophosphate	1	1	A	Ingst	Int-S	2		
284ha	81 y M	Glyphosate	1	1	A	Ingst	Int-S	3		
		Ethanol	2	2						
See also case 31, 57, 1143										
Plants										
[285ha]	18 y M	Ricin	1	1	A	Ingst + Par	Int-S	2		
[286h]	22 y M	Cardiac glycoside	1	1	A	Ingst	Int-S	1	Digoxin	1.3 ng/mL in blood (unspecified) @ 10 h (pe)
287p	22 y M	Mitragyna	1	1	U	Ingst	Unk	2		
[288pha]	26 y M	lbogaine	1	1	A	Ingst	Int-U	2		
[289h]	30 y M	Cardiac glycoside	1	1	A	Ingst	Unk	1		
290	30 y F	Nerium oleander	1	1	A	Ingst	Int-S	2		
291	38 y F	Mitragyna speciosa korthals	1	1	A	Ingst	Int-S	2		
		Diphenhydramine	2	2						
292	49 y F	Cardiac glycoside	1	1	A	Ingst	Int-S	1		
293	74 y M	Aleurites moluccana	1	1	A	Ingst	Unt-M	1		
See also case 71, 358, 549, 1440										
Weapons of mass destruction										
294h	25 y F	Non-powder, unknown	1	1	A	Unk	Int-S	2		
Pharmaceutical exposures										
Analgesics										
295h	2 y F	Methadone	1	1	A	Ingst	Unt-G	2		
296pa	2 y M	Oxycodone	1	1	A	Ingst	Oth-M	1	Oxycodone	1700 ng/mL in blood (unspecified) @ autopsy
		Oxycodone	1	1					Oxymorphone	57 ng/mL in blood (unspecified) @ autopsy
[297p]	2 y F	Methadone	1	1	A	Ingst	Oth-M	1	Methadone	78 ng/mL in blood (unspecified) @ unknown
298ph	2 y M	Buprenorphine (sublingual tablet)	1	1	A	Ingst	Unt-G	2		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
[299ha]	3 y M	Acetaminophen	1	1	A/C	Ingst	Unt-G	3	Acetaminophen	15 mcg/mL in blood (unspecified) @ unknown
		Acetaminophen	1	1					Acetaminophen	29 mcg/mL in blood (unspecified) @ unknown
300ph	12 y F	Oxycodone	1	1	A	Ingst	Int-S	1	Oxycodone (total)	2758 ng/mL in blood (unspecified) @ unknown
		Oxycodone	1	1					Oxymorphone	4895 ng/mL in blood (unspecified) @ unknown
		Promethazine	2	2					Promethazine	67 ng/mL in blood (unspecified) @ unknown
[301pha]	12 y F	Fentanyl (transdermal)	1	1	A	Ingst	Int-M	1	Fentanyl	106.5 ng/mL in urine (quantitative only) @ unknown
		Fentanyl (transdermal)	1	1					Fentanyl	15 ng/mL in blood (unspecified) @ autopsy
		Fentanyl (transdermal)	1	1					Norfentanyl	2 ng/mL in blood (unspecified) @ autopsy
		Fentanyl (transdermal)	1	1					Norfentanyl	580.8 ng/mL in urine (quantitative only) @ unknown
302pai	13 y M	U-47700	1	1	A	Unk	Int-A	1		
303pai	13 y M	U-47700	1	1	A	Unk	Unk	1		
		Trazodone	2	2						
[304pha]	13 y F	Tramadol	1	1	A	Ingst	Int-A	1	Tramadol	0.617 mg/L in blood (unspecified) @ 1 h (pe)
305	14 y F	Acetaminophen	1	1	A	Ingst	Int-S	1	Acetaminophen	75 mcg/mL in blood (unspecified) @ 13 h (pe)
306ph	14 y M	Diphenhydramine	2	2						
		Acetaminophen/oxycodone	1	1	U	Ingst	Int-S	1	Acetaminophen	80.5 mcg/mL in blood (unspecified) @ unknown
307h	14 y F	Zolpidem	2	2	A	Ingst	Int-S	1		
308	16 y M	Acetaminophen	1	1	A	Ingst	Int-S	1		
		Acetaminophen/hydrocodone	1	1						
		Acetaminophen/oxycodone	2	2						
		Oxycodone (extended release)	3	3						
		Morphine	4	4						
		Lorazepam	5	5						
		Skeletal muscle relaxant	6	6						
		Ethanol	7	7						
309ph	16 y M	Oxycodone	1	1	A	Ingst	Int-S	1		
		Lorazepam	2	2						
		Ethanol	3	3					Ethanol	112 mg/dL in serum @ unknown
310pha	17 y M	Morphine	1	1	A	Ingst	Int-A	2	Morphine (free)	128 ng/mL in blood (unspecified) @ autopsy
311pha	17 y F	Fentanyl	1	1	U	Ingst + Inhal	Unk	1	Norfentanyl	160 ng/mL in plasma @ unknown
		Fentanyl	1	1					Fentanyl	50 ng/mL in plasma @ unknown
		Methylphenidate (extended release)	2	1						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
312h	17 y F	Salicylate	1	1	A	Ingst	Int-S	2	Salicylate	83.4 mg/dL in blood (unspecified) @ unknown
		Salicylate	1	1					Salicylate	86.8 mg/dL in blood (unspecified) @ unknown
		Diphenhydramine	2	2						
		Alprazolam	3	3						
		Naproxen	4	4						
313ha	17 y F	Morphine	1	1	A	Ingst	Int-A	2		
		Methamphetamine	2	2						
		Alprazolam	3	3						
314ph	18 y M	Acetaminophen/hydrocodone	1	1	A	Ingst	Int-A	2		
		Fentanyl	2	2						
		Lorazepam	3	3						
		Ethanol	4	4						
		Alprazolam	5	5						
315pha	18 y M	Fentanyl	1	1	A	Par	Int-A	1	Fentanyl	0.076 mg/kg in liver @ autopsy
		Fentanyl	1	1					Fentanyl	9.1 ng/mL in blood (unspecified) @ autopsy
		Heroin	2	1					Morphine	0.08 mg/L in blood (unspecified) @ autopsy
		Heroin	2	1					Morphine	0.093 mg/L in urine (quantitative only) @ autopsy
316h	20 y F	Acetaminophen	1	1	A	Ingst	Int-S	1	Acetaminophen	596 mg/L in blood (unspecified) @ unknown
		Acetaminophen	1	1					Acetaminophen	720 mcg/mL in serum @ unknown
		Hydrocodone	2	2					Hydromorphone	15 ng/mL in blood (unspecified) @ unknown
		Hydrocodone	2	2					Hydrocodone	914 ng/mL in blood (unspecified) @ unknown
[317h]	20 y F-Pregnant	Colchicine	1	1	A	Ingst	Int-S	1	Colchicine	7.2 mcg/L in serum @ unknown
318p	20 y F	Acetaminophen	1	1	A	Ingst	Int-S	1	Acetaminophen	418 mcg/mL in blood (unspecified) @ unknown
		Chemical, unknown	2	2						
		Lithium	3	3					Lithium	1.7 mEq/L in blood (unspecified) @ unknown
		Carbamazepine	4	4					Carbamazepine	11.2 mcg/mL in blood (unspecified) @ unknown
319pa	20 y F	Carfentanil	1	1	U	Ingst + Unk	Int-A	1	Carfentanil	0.2 ng/mL in blood (unspecified) @ autopsy
		Furanylfentanyl	2	2					Furanyl fentanyl	2.5 ng/mL in blood (unspecified) @ autopsy
		Alprazolam	3	3					Alprazolam	19 ng/mL in blood (unspecified) @ autopsy
		Cocaine	4	4					Benzoyllecognine	2000 ng/mL in blood (unspecified) @ autopsy
		Cocaine	4	4					Cocaine	84 ng/mL in blood (unspecified) @ autopsy
		Cyclobenzaprine	5	5					Cyclobenzaprine	80 ng/mL in blood (unspecified) @ autopsy
320h	21 y F	Acetaminophen	1	1	A	Ingst	Int-S	1	Acetaminophen	55 mcg/mL in blood (unspecified) @ 10 h (pe)

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
321pa	21 y M	Acetaminophen	1	1					Acetaminophen	69 mcg/mL in blood (unspecified) @ 30 m (pe)
		Opioid	1	1	A	Ingst	Int-A	1		
322	21 y M	Alprazolam	2	2						
		Fentanyl	1	1	U	Unk	Unk	2		
		Benzodiazepine	2	2						
323	21 y F	Acetaminophen	1	1	A	Ingst	Int-S	1	Acetaminophen	66 mcg/mL in blood (unspecified) @ unknown
[324ha]	21 y F-Pregnant				A	Ingst	Int-S	1		
		Acetaminophen	1	1					Acetaminophen	52 mcg/mL in serum @ unknown
325	21 y F	Acetaminophen	1	1	A	Ingst	Int-S	1	Acetaminophen	55 mcg/mL in serum @ unknown
326pa	21 y M				A/C	Ingst + Inhal + P-Int-A ar		1		
		Fentanyl	1	1					Fentanyl	0.13 mcg/g in liver @ autopsy
		Fentanyl	1	1					Fentanyl	6.6 ng/mL in blood (unspecified) @ autopsy
		Oxycodone	2	2					Oxycodone (total)	0.059 mg/L in blood (unspecified) @ autopsy
		Codeine	3	3					Codeine	0.052 mg/L in blood (unspecified) @ autopsy
		Alprazolam	4	4					Alprazolam	0.031 mg/L in blood (unspecified) @ autopsy
327pai	21 y M				U	Unk	Unk	1		
		Carfentanil	1	1					Carfentanil	0.34 ng/mL in blood (unspecified) @ autopsy
		Chlorpheniramine	2	2					Chlorpheniramine	210 ng/mL in blood (unspecified) @ autopsy
		Dextromethorphan	3	3					Dextromethorphan	280 ng/mL in blood (unspecified) @ autopsy
328h	22 y M	Methadone	1	1	U	Ingst	Unk	2		
329pha	22 y M	Hydrocodone	1	1	U	Unk	Unk	2	Morphine	39 ng/mL in blood (unspecified) @ unknown
		Alprazolam	2	2					Alprazolam	51 ng/mL in serum @ unknown
		Amphetamine	3	3						
330	22 y F	Acetaminophen	1	1	A	Ingst	Int-S	1	Acetaminophen	121.8 mcg/mL in blood (unspecified) @ unknown
		Diphenhydramine	2	2						
		6-mercaptopurine	3	3						
331p	23 y M	Fentanyl	1	1	U	Par + Unk	Int-A	2		
		Heroin	2	2						
		Cocaine	3	3						
332ha	23 y M	Oxycodone	1	1	A	Par	Int-A	1	Oxycodone	51 ng/mL in blood (unspecified) @ unknown
		Fentanyl	2	2					Fentanyl	5.2 ng/mL in blood (unspecified) @ unknown
		Alprazolam	3	3					Alprazolam	11 ng/mL in blood (unspecified) @ unknown
		Methamphetamine	4	4					Methamphetamine	740 ng/mL in blood (unspecified) @ unknown
		Methamphetamine	4	4					Amphetamine	78 ng/mL in blood (unspecified) @ unknown

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
333	24 y F	Heroin	5	5						
		Acetaminophen/ diphenhydramine	1	1	A	Ingst	Int-S	2		
334h	24 y F	Acetaminophen	1	1	A	Ingst	Int-S	1	Acetaminophen	23 mcg/mL in blood (unspecified) @ unknown
335pa	24 y M				U	Ingst + Aspir + - Par	Int-U	1		
		U-47700	1	1						
		Flubromazepam	2	2						
		Amitriptyline	3	3					Amitriptyline	410 mcg/L in blood (unspecified) @ autopsy
		Diphenhydramine	4	4					Diphenhydramine	220 mcg/L in blood (unspecified) @ autopsy
336ph	24 y M	Hydrocodone	1	1	A	Unk	Unk	2		
337pa	24 y F				U	Ingst + Inhal	Int-A	2		
		Carfentanil	1	1					Carfentanil	0.53 ng/mL in blood (unspecified) @ autopsy
		Cocaine	2	2					Benzoyllecognine	200 ng/mL in blood (unspecified) @ autopsy
		Chlorpheniramine	3	3					Chlorpheniramine	240 ng/mL in blood (unspecified) @ autopsy
		Dextromethorphan	4	4					Dextromethorphan	2800 ng/mL in blood (unspecified) @ autopsy
338pa	24 y M				A	Par	Int-A	1		
		Hydrocodone	1	1						
		Ethanol	2	2					Ethanol	0.01 g/dL in blood (unspecified) @ 1 h (pe)
339ph	25 y F				U	Ingst	Unk	2		
		Hydrocodone	1	1						
		Ethanol	2	2					Ethanol	184 mg/dL in blood (unspecified) @ unknown
340ph	25 y F				A/C	Ingst	Int-S	1		
		Tramadol	1	1					o-Demethyl tramadol	190 ng/mL in plasma @ 12 h (pe)
		Tramadol	1	1					Tramadol	740 ng/mL in plasma @ 12 h (pe)
[341pha]	25 y M				U	Ingst + Inhal	Unk	1		
		U-47700	1	1					u-47700	0.18 mg/L in blood (unspecified) @ unknown
		Alprazolam	2	2					Alprazolam	0.11 mg/L in blood (unspecified) @ unknown
		Cocaine	3	3						
		Cocaine	4	4					Benzoyllecognine	0.026 mg/L in blood (unspecified) @ unknown
		Marijuana	5	5						
		Benzodiazepine	6	6						
		Caffeine	7	7						
		Levamisole	8	8						
		Nicotine	9	9						
342pha	25 y F				A	Ingst	Int-S	1		
		Methadone	1	1					Methadone	180 ng/mL in blood (unspecified) @ autopsy
		Methadone	1	1					Methadone	270 ng/mL in blood (unspecified) @ 15 m (pe)
		Methadone	1	1					Eddp (2-ethylidene-1,5-dimethyl-3,3-diphenyl pyrrolidine)	31 ng/mL in blood (unspecified) @ 15 m (pe)
		Methadone	1	1					Eddp (2-ethylidene-1,5-dimethyl-3,3-diphenyl pyrrolidine)	82 ng/mL in blood (unspecified) @ autopsy
		Oxycodone	2	2					Oxycodone (free)	17 ng/mL in blood (unspecified) @ 15 m (pe)

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
343ph	25 y M	Lamotrigine	3	3	A/C	Ingst + Inhal	Int-S	2	Lamotrigine	11 mcg/mL in blood (unspecified) @ autopsy
		Lamotrigine	3	3					Lamotrigine	16 mcg/mL in blood (unspecified) @ 15 m (pe)
		Clonazepam	4	4					7-aminoclonazepam	19 ng/mL in blood (unspecified) @ autopsy
		Tramadol	5	5						
		Hydroxyzine	6	6						
		Pregabalin	7	7						
		Quetiapine	8	8						
		Diazepam	9	9						
		Oxycodone	1	1						
		Fentanyl	1	1						
344pi	26 y F	Street drug	2	2	A	Ingst	Int-A	1		
345h	26 y M	Acetaminophen	1	1	A/C	Ingst	Int-S	1		
		Ibuprofen	2	2						
346ph	26 y M	Hydrocodone	1	1	U	Ingst	Int-A	1		
347h	26 y M	Cocaine	2	2	U	Ingst + Inhal	Int-S	1		
		Salicylate	1	1					Salicylate	43.7 mg/dL in blood (unspecified) @ 45 m (pe)
		Salicylate	1	1					Salicylate	66.7 mg/dL in blood (unspecified) @ 3 h (pe)
		Salicylate	1	1					Salicylate	90.4 mg/dL in blood (unspecified) @ 8 h (pe)
		Salicylate	1	1					Salicylate	95.1 mg/dL in blood (unspecified) @ 14 h (pe)
		Quetiapine	2	2						
		Cocaine	3	3						
		Alprazolam	4	4						
		Fentanyl	1	1					Fentanyl	0.025 mg/L in blood (unspecified) @ autopsy
		Ethanol	2	2					Ethanol	0.06% (wt/vol) in blood (unspecified) @ autopsy
348pa	26 y M	Ethanol	2	2	A	Unk	Int-A	1	Ethanol	0.07% (wt/vol) in blood (unspecified) @ autopsy
		Ethanol	2	2					Ethanol	0.08% (wt/vol) in vitreous @ autopsy
		Ethanol	2	2					Ethanol	0.1% (wt/vol) in urine (quantitative only) @ autopsy
349h	26 y F	Oxycodone	1	1	A/C	Ingst	Int-S	2		
350ai	26 y M	Lorazepam	2	2	A	Ingst + Par	Int-A	1		
		Fentanyl	1	1					Fentanyl	5.4 ng/mL in blood (unspecified) @ autopsy
		Morphine	2	2						
		Ethanol	3	3					Ethanol	0.1% (wt/vol) in blood (unspecified) @ autopsy
		Diphenhydramine	4	4					Diphenhydramine	1.1 mcg/mL in blood (unspecified) @ autopsy
351	26 y M				A	Ingst	Int-S	1		
		Ibuprofen	1	1						
		Cyclobenzaprine	2	2						
		Ethanol	3	3						
		Naproxen	4	4						
352ph	26 y M	Melatonin	5	5	U	Ingst + Unk	Int-S	2		
		Oxycodone	1	1					Oxycodone	425 ng/mL in blood (unspecified) @ 1 h (pe)
		Alprazolam	2	2					Alprazolam	36 ng/mL in blood (unspecified) @ 1 h (pe)

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
353h	26 y F	Ethanol	3	2					Ethanol	40 mg/dL in blood (unspecified) @ 1 h (pe)
354p	26 y M	Acetaminophen/opioid	1	1	U	Ingst	Unk	2		
355h	27 y M	Tramadol	1	1	A	Ingst	Int-S	2		
		Benzodiazepine	2	2						
		Acetaminophen	1	1	A	Ingst	Int-S	1	Acetaminophen	309 mcg/mL in blood (unspecified) @ unknown
356pha	27 y M				U	Inhal	Int-A	2		
		Methadone	1	1					Methadone	240 ng/mL in whole blood @ autopsy
		Methadone	1	1					Eddp (2-ethylidene-1,5-dimethyl-3,3-diphenyl pyrrolidine)	34 ng/mL in whole blood @ autopsy
		Diazepam	2	2					Nordiazepam	130 ng/mL in whole blood @ autopsy
		Diazepam	2	2					Diazepam	53 ng/mL in whole blood @ autopsy
357h	27 y M	Salicylate	1	1	A	Ingst	Int-S	1	Salicylate	106.9 mg/dL in blood (unspecified) @ unknown
		Salicylate	1	1					Salicylate	111 mg/dL in plasma @ unknown
358pa	27 y M				A	Unk	Int-A	1		
		U-47700	1	1					u-47700	4.6 mg/kg in liver @ autopsy
		Dextromethorphan	2	2					Dextromethorphan	12 mg/kg in liver @ autopsy
		Diphenhydramine	3	3					Diphenhydramine	3.7 mg/kg in liver @ autopsy
		Ethanol	4	4					Ethanol	70 mg/dL In Brain @ autopsy
		Mitragyna speciosa korthals	5	5						
359p	27 y F	Bupropion	6	6	U	Unk	Unk	1		
		Fentanyl	1	1					Fentanyl	0.008 mg/L in blood (unspecified) @ autopsy
		Heroin	2	2					Morphine (free)	100 mcg/L in blood (unspecified) @ autopsy
		Sertraline	3	3					Sertraline	1 mg/L in blood (unspecified) @ autopsy
		Sertraline	3	3					Desmethylsertraline	1.6 mg/L in blood (unspecified) @ autopsy
		Lamotrigine	4	4					Lamotrigine	3.8 mg/L in blood (unspecified) @ autopsy
		Diphenhydramine	5	5					Diphenhydramine	0.2 mg/L in blood (unspecified) @ autopsy
		Ethanol	6	6					Ethanol	0.09% (wt/vol) in blood (unspecified) @ autopsy
		Ethanol	6	6					Ethanol	0.11% (wt/vol) in vitreous @ autopsy
		Ethanol	6	6					Ethanol	0.14% (wt/vol) in urine (quantitative only) @ autopsy
360	27 y F	Buprenorphine	1	1	A	Par	Int-A	1		
361a	28 y F	Salicylate	1	1	A	Ingst	Int-S	1	Salicylate	57 mg/dL in plasma @ 1 h (pe)
		Salicylate	1	1					Salicylate	81 mg/dL in blood (unspecified) @ autopsy
		Salicylate	1	1					Salicylate	89.7 mcg/dL in plasma @ 4 h (pe)
		Citalopram	2	2					Citalopram	2100 ng/mL in blood (unspecified) @ autopsy

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
362pha	28 y F	Quetiapine	3	3					Quetiapine	2700 ng/mL in blood (unspecified) @ autopsy
		Ethanol	4	4						
		Methadone	1	1	U	Unk	Unk	1	Methadone	130 ng/mL in whole blood @ autopsy
		Oxycodone	2	2						
363h	28 y M	Alprazolam	3	3					Alprazolam	36 ng/mL in blood (unspecified) @ autopsy
		Acetaminophen	1	1	U	Ingst	Int-S	1	Acetaminophen	300 mcg/mL in serum @ unknown
		Ethanol	2	2					Ethanol	81 mg/dL in serum @ unknown
364p	28 y M				A	Ingst	Int-S	2		
365pa	28 y M	Acetaminophen/hydrocodone	1	1						
		Alprazolam	2	2						
		Fentanyl	1	1	U	Inhal	Int-A	1	Fentanyl	0.04 mg/L in blood (unspecified) @ autopsy
		Cocaine	2	2						
		Ethanol (non-beverage)	3	3					Ethanol	0.04% (wt/vol) in blood (unspecified) @ autopsy
366h	28 y F	Ethanol (non-beverage)	3	3					Ethanol	0.06% (wt/vol) in vitreous @ autopsy
		Ethanol (non-beverage)	3	3					Ethanol	0.09% (wt/vol) in urine (quantitative only) @ autopsy
		Salicylate	1	1	A	Ingst	Int-S	1	Salicylate	100 mg/dL in serum @ 12 h (pe)
		Clonazepam	2	2						
367	28 y M	Acetaminophen	1	1	A	Ingst	Int-M	1	Acetaminophen	29 mcg/mL in blood (unspecified) @ unknown
368	28 y M				A	Ingst	Int-S	1		
369pha	28 y F	Acetaminophen	1	1						
		Hydrocodone	1	1	A	Ingst + Inhal	Int-A	2		
		Ethanol	2	2					Ethanol	130 mg/dL in blood (unspecified) @ unknown
370pha	28 y M				A/C	Ingst	Int-A	1		
		Methadone	1	1					Methadone	0.36 mg/L in blood (unspecified) @ autopsy
		Methadone	1	1					Methadone	1.6 mg/kg in liver @ autopsy
		Clonazepam	2	2					Clonazepam	0.006 mg/L in blood (unspecified) @ autopsy
		Clonazepam	2	2					7-Aminoclonazepam	0.2 mg/L in blood (unspecified) @ autopsy
371	28 y M	Alprazolam	3	3						
		Salicylate	1	1	U	Ingst	Int-S	2	Salicylate	61.5 mg/dL in blood (unspecified) @ 1 h (pe)
		Salicylate	1	1					Salicylate	73.4 mg/dL in blood (unspecified) @ 4 h (pe)
		Quetiapine	2	2						
		Cough and cold preparation	3	3						
372a	29 y F				A/C	Ingst	Int-M	2		
373	29 y M	Acetaminophen	1	1						
		Acetaminophen	1	1	A	Ingst	Int-U	1	Acetaminophen	266 mcg/mL in blood (unspecified) @ unknown
374pha	29 y F	Drug, unknown	2	2						
		Morphine	1	1	A	Ingst	Int-S	2	Morphine	778 ng/mL in blood (unspecified) @ autopsy
		Cyclobenzaprine	2	2						
		Venlafaxine	3	3						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
375pa	29 y F	Fentanyl	1	1	A	Ingst + Unk	Int-A	1	Fentanyl	0.012 mg/L in blood (unspecified) @ autopsy
		Alprazolam	2	2					Alprazolam	0.048 mg/L in blood (unspecified) @ autopsy
		Methadone	3	3					Methadone	0.05 mg/L in blood (unspecified) @ autopsy
		Methadone	3	3					Methadone	0.2 mg/kg in liver @ autopsy
		Oxycodone	4	4					Oxycodone	0.4 mg/kg in liver @ autopsy
		Oxycodone	4	4					Oxycodone	0.5 mg/L in blood (unspecified) @ autopsy
		Diazepam	5	5					Nordiazepam	0.09 mg/L in blood (unspecified) @ autopsy
376pha	30 y F	U-47700	1	1	A/C	Par	Int-A	1		
377pa	30 y F-Pregnant				U	Ingst + Par	Unk	1		
		Fentanyl	1	1					Fentanyl	0.077 mg/kg in liver @ autopsy
		Fentanyl	1	1					Fentanyl	8.9 ng/mL in blood (unspecified) @ autopsy
		Buprenorphine	2	2					Buprenorphine	2 ng/mL in blood (unspecified) @ autopsy
		Buprenorphine	2	2					Norbuprenorphine	5.5 ng/mL in blood (unspecified) @ autopsy
		Heroin	3	3					Morphine	0.047 mg/L in vitreous @ autopsy
		Gabapentin	4	4					Gabapentin	12 mg/L in blood (unspecified) @ autopsy
		Meloxicam	5	5						
		Levothyroxin	6	6						
378h	30 y F	Acetaminophen/hydrocodone	1	1	U	Ingst	Int-S	3		
		Amphetamine	2	2						
379ph	30 y F	Acetaminophen/oxycodone	1	1	A	Ingst	Int-S	1	Oxycodone	1610 ng/mL in blood (unspecified) @ unknown
		Acetaminophen/oxycodone	1	1					Acetaminophen	166.9 mcg/mL in blood (unspecified) @ 5 h (pe)
		Tramadol	2	2					Tramadol	0.53 mcg/L in blood (unspecified) @ unknown
		Skeletal muscle relaxant	3	3						
		Duloxetine	4	4						
		Citalopram	5	5						
380ha	30 y M	Tramadol	1	1	A	Ingst	Int-S	2		
		Phencyclidine	2	2						
		Drug, unknown	3	3						
381ai	30 y M				U	Ingst + Unk	Int-A	1		
		Furanyl fentanyl	1	1					Furanyl fentanyl	0.97 ng/mL in blood (unspecified) @ autopsy
		Fentanyl	2	2						
		Ethanol	3	3					Ethanol	62 mg/dL in blood (unspecified) @ autopsy
382ha	31 y F	Acetaminophen	1	1	U	Ingst	Int-S	1	Acetaminophen	466 mcg/mL in blood (unspecified) @ unknown
		Amlodipine	2	2					Amlodipine	73 ng/mL in blood (unspecified) @ autopsy
		Ethanol	3	3					Ethanol	0.03% in blood (unspecified) @ unknown
		Benazepril	4	4						
383h	31 y M	Acetaminophen	1	1	A/C	Ingst	Int-S	2	Acetaminophen	201.1 mcg/mL in serum @ unknown
		Acetaminophen	1	1					Acetaminophen	224.2 mcg/mL in serum @ unknown

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
384ph	31 y F	Acetaminophen	1	1	U	Ingst	Unk	2	Acetaminophen	386 mcg/mL in serum @ unknown
		Baclofen	2	2						
		Bupropion (extended release)	3	3						
		Acetaminophen/oxycodone	1	1						
385p	31 y F	Propranolol	2	2	A	Ingst	Int-S	2	Acetaminophen	15 mcg/mL in serum @ 1 h (pe)
		Oxycodone	1	1						
		Acetaminophen	2	2						
386pha	31 y F	Methadone	3	3	A	Par	Int-A	1	Norfentanyl	1.7 ng/mL in blood (unspecified) @ unknown
		Fentanyl	1	1					Fentanyl	12 ng/mL in blood (unspecified) @ unknown
		Phenobarbital	2	2					Phenobarbital	8.1 mcg/mL in serum @ unknown
		Morphine	3	3					Morphine	190 ng/mL in blood (unspecified) @ unknown
		Codeine	4	4					Codeine	7.9 ng/mL in blood (unspecified) @ unknown
		Acetaminophen	1	1					Acetaminophen	200 mcg/mL in serum @ 42 h (pe)
		Acetaminophen	1	1					Acetaminophen	477 mcg/mL in serum @ 36 h (pe)
387h	31 y F	Acetaminophen	1	1	A	Ingst	Int-S	1	Acetaminophen	503 mcg/mL in serum @ 31 h (pe)
		Acetaminophen	1	1					Acetaminophen	752 mcg/mL in serum @ 4 h (pe)
		Acetaminophen	1	1					Acetaminophen	142 mcg/mL in serum @ 1 h (pe)
		Acetaminophen	1	1					Acetaminophen	0.4 mg/L in blood (unspecified) @ autopsy
388h	31 y F	Acetaminophen	1	1	C	Ingst	Int-M	2	Oxycodone	0.7 mg/L in blood (unspecified) @ autopsy
		Acetaminophen	1	1					Alprazolam	0.06 mg/L in whole blood @ autopsy
		Acetaminophen	1	1					Alprazolam	0.06 mg/L in whole blood @ autopsy
389pai	31 y M	Oxycodone	1	1	A	Ingst	Int-A	1	Oxycodone	0.4 mg/L in blood (unspecified) @ autopsy
		Oxycodone	1	1					Oxycodone	0.7 mg/L in blood (unspecified) @ autopsy
		Alprazolam	2	2					Alprazolam	0.06 mg/L in whole blood @ autopsy
390pa	32 y M	Hydrocodone	1	1	A	Ingst + Inhal	Int-A	1	Alprazolam	0.06 mg/L in whole blood @ autopsy
		Ethanol	2	2					Ethanol	262 mg/dL in blood (unspecified) @ 1 h (pe)
		Benzodiazepine	3	3					Ethanol	262 mg/dL in blood (unspecified) @ 1 h (pe)
391p	32 y F	Tramadol	1	1	U	Ingst	Int-S	1	Acetaminophen	35.8 mcg/mL in blood (unspecified) @ 1 h (pe)
		Hydrocodone	2	2					Acetaminophen	35.8 mcg/mL in blood (unspecified) @ 1 h (pe)
		Alprazolam	3	3					Ethanol	262 mg/dL in blood (unspecified) @ 1 h (pe)
		Ethanol	4	4					Ethanol	262 mg/dL in blood (unspecified) @ 1 h (pe)
392p	32 y F	Tramadol	1	1	A	Ingst	Int-U	2	Acetaminophen	35.8 mcg/mL in blood (unspecified) @ 1 h (pe)
		Methadone	2	2					Acetaminophen	35.8 mcg/mL in blood (unspecified) @ 1 h (pe)
		Alprazolam	3	3					Acetaminophen	35.8 mcg/mL in blood (unspecified) @ 1 h (pe)
393h	32 y F	Acetaminophen/hydrocodone	1	1	A/C	Ingst	Int-U	2	Acetaminophen	62 mcg/mL in plasma @ 8 s (pa)
		Acetaminophen	1	1					Acetaminophen	49 mcg/mL in blood (unspecified) @ 2 h (pe)
394ph	32 y F	Acetaminophen	1	1	A	Ingst	Int-S	1	Acetaminophen	58 mcg/mL in blood (unspecified) @ 1 h (pe)
		Acetaminophen	1	1					Acetaminophen	58 mcg/mL in blood (unspecified) @ 1 h (pe)

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
395h	32 y F	Salicylate	1	1	A	Ingst	Int-S	1	Salicylate	100 mg/dL in serum @ unknown
396ha	33 y F	Acetaminophen	1	1	U	Ingst	Int-U	1	Acetaminophen	52 mg/L in serum @ unknown
397pa	33 y M	Fentanyl	1	1	A/C	Inhal	Int-A	1		
398a	33 y F	Acetaminophen	1	1	A	Ingst	Int-S	1	Acetaminophen	353 mg/L in blood (unspecified) @ unknown
399	33 y F	Cocaine	2	2	A/C	Ingst	Int-S	1		
		Ethanol (non-beverage)	3	3						
		Acetaminophen	1	1					Acetaminophen	400 mg/L in serum @ 12 h (pe)
		Acetaminophen	1	1					Acetaminophen	494 mg/L in serum @ 30 m (pe)
		Codeine	2	2						
400ph	33 y F	Citalopram	3	3	A	Ingst	Int-S	1		
		Acetaminophen/hydrocodone	1	1					Hydromorphone	12.5 ng/mL in blood (unspecified) @ autopsy
		Acetaminophen/hydrocodone	1	1					Hydrocodone	18306 ng/mL in urine (quantitative only) @ autopsy
		Acetaminophen/hydrocodone	1	1					Hydrocodone	327 ng/mL in blood (unspecified) @ autopsy
		Acetaminophen/hydrocodone	1	1					Acetaminophen	491 mcg/mL in blood (unspecified) @ autopsy
		Acetaminophen/hydrocodone	1	1					Hydromorphone	607 ng/mL in urine (quantitative only) @ autopsy
		Acetaminophen/codeine	2	2					Codeine	3.96 mcg/mL in blood (unspecified) @ autopsy
		Acetaminophen/codeine	2	2					Codeine	400 mcg/mL in urine (quantitative only) @ unknown
401a	33 y F	Oxycodone	1	1	U	Ingst	Int-S	1	Oxymorphone	11 ng/mL in blood (unspecified) @ autopsy
		Oxycodone	1	1					Oxycodone	430 ng/mL in blood (unspecified) @ autopsy
		Nortriptyline	2	2						
		Cyclobenzaprine	3	3						
		Amphetamine/dextroamphetamine	4	4					Amphetamine	21 ng/mL in blood (unspecified) @ autopsy
		Duloxetine	5	5						
		Naproxen	6	6						
		Gabapentin	7	7						
		Sulfamethoxazole/trimethoprim	8	8						
		Montelukast	9	9						
402h	33 y M	Acetaminophen	1	1	A	Ingst	Int-S	2	Acetaminophen	338 mcg/mL in serum @ unknown
403pha	33 y M	Salicylate	2	2	U	Unk	Unk	1		
		Fentanyl	1	1					Fentanyl	8.9 ng/mL in blood (unspecified) @ unknown
		Diazepam	2	2					Diazepam	171 ng/mL in blood (unspecified) @ unknown
		Diazepam	2	2					Nordiazepam	194 ng/mL in blood (unspecified) @ unknown
404pai	33 y F	Fentanyl	1	1	A	Ingst	Int-A	1	Fentanyl	4 ng/mL in blood (unspecified) @ autopsy
		Oxycodone	2	2					Oxycodone (free)	60 ng/mL in blood (unspecified) @ autopsy
		Cocaine	3	3					Ecgonine methyl ester	22 ng/mL in blood (unspecified) @ autopsy

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
405pa	33 y F	Cocaine	3	3	A	Unk	Unk	1	Benzoyllecognine	248 ng/mL in blood (unspecified) @ autopsy
		Alprazolam	4	4					Alprazolam	84 ng/mL in blood (unspecified) @ autopsy
		Quetiapine	5	5					Quetiapine	35 ng/mL in blood (unspecified) @ autopsy
		Fentanyl	1	1					Fentanyl	0.023 mg/L in blood (unspecified) @ autopsy
		Diphenhydramine	2	2					Diphenhydramine	0.09 mg/L in blood (unspecified) @ autopsy
		Fluoxetine	3	3					Fluoxetine	1.4 mg/L in blood (unspecified) @ autopsy
406h	34 y F	Acetaminophen/ oxycodone	1	1	C	Ingst	Int-U	3	Acetaminophen	31 mcg/mL in blood (unspecified) @ unknown
407h	34 y F- Pregnant				U	Unk	Int-A	1		
408pha	34 y M	Hydrocodone	1	1	A	Unk	Int-U	1		
		Benzodiazepine	2	2						
		Hydrocodone	1	1						
		Cocaine	2	2						
		Amphetamine	3	3						
409ha	35 y F	Nicotine	4	4	A	Ingst + Par	Int-U	2		
		Salicylate	5	5						
		Oxymorphone	1	1						
		Acetaminophen	2	2					Acetaminophen	54.2 mcg/mL in serum @ unknown
		Amphetamine/ dextroamphetamine	3	3						
		Amphetamine Drug, unknown	4	4						
410h	35 y M	Hydrocodone	5	5	A/C	Ingst	Int-M	2		
		Acetaminophen	6	6						
411pa	35 y F		1	1	A	Ingst	Int-U	1		
		Methadone	1	1					Methadone	0.18 mg/L in blood (unspecified) @ autopsy
		Ethanol	2	2					Ethanol	0.018 g/dL in blood (unspecified) @ autopsy
412h	35 y F				A/C	Ingst	Int-S	1		
		Tramadol	1	1					Tramadol	9.5 mg/L in blood (unspecified) @ unknown
		Venlafaxine	2	2					Venlafaxine	3.6 mg/L in blood (unspecified) @ unknown
413p	35 y M				A	Inhal	Int-A	1		
414i	35 y M	Fentanyl	1	1	A	Ingst	Int-S	1		
		Ethanol	2	2						
415pa	35 y M	Salicylate	1	1	A	Unk	Int-A	1	Salicylate	79 mg/dL in serum @ unknown
		Fentanyl	1	1					Fentanyl	0.004 mg/L in blood (unspecified) @ autopsy
		Alprazolam	2	2					Alprazolam	0.036 mg/L in blood (unspecified) @ autopsy
		Ethanol	3	3					Ethanol	0.06% (wt/vol) in blood (unspecified) @ autopsy
		Ethanol	3	3					Ethanol	0.08% (wt/vol) in blood (unspecified) @ autopsy
		Ethanol	3	3					Ethanol	0.1% (wt/vol) in vitreous @ autopsy
		Ethanol	3	3					Ethanol	0.12% (wt/vol) in urine (quantitative only) @ autopsy
416ha	35 y F	Acetaminophen	1	1	U	Unk	Unk	1	Acetaminophen	4 mcg/mL in serum @ 1 h (pe)
417h	36 y M	Salicylate	1	1	A	Ingst	Int-S	1	Salicylate	75.1 mg/dL in serum @ 5 m (pe)

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
418ph	36 y F	Diphenhydramine	2	2	A	Ingst	Int-S	2		
		Ethanol	3	3						
		Guafensin	4	4						
419	36 y F	Acetaminophen	1	1	C	Ingst	Int-M	2	Acetaminophen	370 mcg/mL in blood (unspecified) @ unknown
420pha	36 y F	Acetaminophen	1	1	A	Ingst + Unk	Int-S	1	Acetaminophen	25 mg/L in blood (unspecified) @ unknown
		Acetaminophen/hydrocodone	2	2						
		Ethanol	3	3						
		Hydrocodone	1	1						
		Hydrocodone	1	1					6-Monoacetyl morphine	200 ng/mL in blood (unspecified) @ unknown
									Morphine (free)	78 ng/mL in blood (unspecified) @ unknown
		Benzodiazepine	2	2					Alprazolam	19 ng/mL in blood (unspecified) @ unknown
		Cocaine	3	3					Benzoyllecognine	1000 ng/mL in blood (unspecified) @ unknown
		Cocaine	3	3					Cocaine	20 ng/mL in blood (unspecified) @ unknown
421h	36 y F	Ethanol	4	4	U	Ingst	Int-U	2		
		Fentanyl	5	5						
		Fentanyl	5	5						
		Fentanyl	6	6						
		Colchicine	1	1						
		Drug, unknown	2	2						
		Quetiapine	3	3						
422	36 y F	Acetaminophen	1	1	A/C	Ingst	Int-S	1	Acetaminophen	85.1 mcg/mL in blood (unspecified) @ unknown
423ha	36 y F	Clonazepam	2	2	A/C	Ingst	Unt-T	1		
		Pregabalin	3	3						
		Carisoprodol	4	4						
424ph	36 y F	Acetaminophen	1	1	A	Ingst	Int-S	2	Acetaminophen	108 mcg/mL in serum @ unknown
		Ethanol	2	2						
		Oxycodone	1	1						
		Oxycodone	1	1					Oxycodone (free)	260 ng/mL in blood (unspecified) @ 1 h (pe)
									Oxymorphone	9.5 ng/mL in blood (unspecified) @ 1 h (pe)
		Acetaminophen	3	2					Acetaminophen	30.3 mcg/mL in blood (unspecified) @ 1 h (pe)
		Clonazepam	2	2					7-aminoclonazepam	160 ng/mL in blood (unspecified) @ 1 h (pe)
		Clonazepam	2	2					Clonazepam	57 ng/mL in blood (unspecified) @ 1 h (pe)
		Marijuana	4	4					Delta-9-thc	0.51 ng/mL in blood (unspecified) @ 1 h (pe)
425a	36 y F	Marijuana	4	4	A	Unk	Int-S	1	Fentanyl	6.2 ng/mL in blood (unspecified) @ 1 h (pe)
426ph	36 y M	Fentanyl	1	1	A	Unk	Unk	1		0.6 ng/mL in blood (unspecified) @ autopsy
		Methamphetamine	2	2						
		Amphetamine	3	3						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
427pa	36 y M				A	Ingst	Int-U	3		
428pha	37 y M	Fentanyl	1	1	A	Unk	Int-A	2		
		Fentanyl	1	1					Norfentanyl	0.62 ng/mL in blood (unspecified) @ 1 h (pe)
		Fentanyl	1	1					Fentanyl	3.6 ng/mL in blood (unspecified) @ 1 h (pe)
		Oxycodone	2	2					Oxycodone (free)	26 ng/mL in blood (unspecified) @ 1 h (pe)
		Lorazepam	3	3					Lorazepam	16 ng/mL in blood (unspecified) @ 1 h (pe)
		Clonazepam	4	4					7-aminoclonazepam	14 ng/mL in blood (unspecified) @ 1 h (pe)
429ha	37 y F	Acetaminophen	1	1	A	Ingst	Int-S	1		
430pha	37 y M	Fentanyl	1	1	A	Unk	Int-A	2		
		Fentanyl	1	1					Norfentanyl	0.46 ng/mL in blood (unspecified) @ autopsy
		Marijuana	2	2					Fentanyl	2 ng/mL in blood (unspecified) @ autopsy
									Delta-9-thc	1.8 ng/mL in blood (unspecified) @ autopsy
431h	37 y F	Acetaminophen	1	1	A	Ingst	Int-S	1		
		Acetaminophen	1	1					Acetaminophen	257 mcg/mL in blood (unspecified) @ 2 h (pe)
									Acetaminophen	62.2 mcg/mL in blood (unspecified) @ 2 d (pe)
432ph	38 y M				A	Ingst	Int-S	2		
		Fentanyl	1	1						
		Tramadol	2	2						
433ha	38 y F	Salicylate	1	1	U	Ingst	Int-S	1		
		Salicylate	1	1					Salicylate	50.1 mg/dL in blood (unspecified) @ unknown
									Salicylate	72 mg/dL in blood (unspecified) @ unknown
		Ethanol	2	2					Ethanol	0.14 g/dL in blood (unspecified) @ unknown
		Ethanol	2	2					Ethanol	0.18 g/dL in blood (unspecified) @ unknown
		Ethanol	2	2					Ethanol	0.18 g/dL in vitreous @ autopsy
		Ethanol	2	2					Ethanol	135 mg/dL in blood (unspecified) @ unknown
434p	38 y F	Acetaminophen	1	1	A	Ingst	Int-U	2		
435pha	38 y F	Fentanyl	1	1	A	Par	Int-A	1		
		Heroin	2	2					Fentanyl	2.9 ng/mL in serum @ 1 h (pe)
		Hydrocodone	3	3						
436ha	38 y F	Acetaminophen	1	1	A	Ingst	Int-S	1		
		Ethanol	2	2						
437h	38 y M	Acetaminophen	1	1	C	Ingst	Unk	1		
									Acetaminophen	55 mcg/mL in serum @ unknown
438h	38 y F	Acetaminophen	1	1	A/C	Ingst	Int-S	1		
		Acetaminophen	1	1					Iron	294 mcg/dL in blood (unspecified) @ 24 h (pe)
		Iron	2	2					Acetaminophen	41.5 mg/L in blood (unspecified) @ 48 h (pe)
		Alprazolam	3	3						
		Lorazepam	4	4						
439ha	38 y F	Acetaminophen	1	1	C	Ingst	Int-M	1		
		Ibuprofen	2	2					Acetaminophen	82 mg/L in serum @ 15 m (pe)

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
440h	38 y M	Ethanol	3	3					Ethanol	12 mg/dL in serum @ 15 m (pe)
		Acetaminophen	1	1	C	Ingst	Int-M	1	Acetaminophen	98 mcg/mL in plasma @ unknown
441	39 y F	Salicylate	1	1	A	Ingst	Unk	1	Salicylate	100.9 mg/dL in serum @ unknown
442h	39 y F	Acetaminophen/ hydrocodone	1	1	A	Ingst	Int-S	2	Acetaminophen	42 mg/L in serum @ unknown
		Lorazepam	2	2					Lorazepam	114 ng/mL in blood (unspecified) @ unknown
443ph	39 y M	Diphenhydramine	3	3						
		Acetaminophen/ hydrocodone	1	1	A	Ingst	Int-S	2	Acetaminophen	3 mcg/mL in blood (unspecified) @ unknown
		Alprazolam	2	2						
		Gabapentin	3	3						
444h	39 y M	Dextroamphetamine	4	4						
		Ibuprofen	1	1	A	Ingst	Int-S	2		
445ha	39 y M	Methadone	1	1	A	Ingst	Int-A	1	Methadone	0.13 mg/L in blood (unspecified) @ unknown
		Hydroxyzine	2	2					Hydroxyzine	0.12 mg/L in blood (unspecified) @ unknown
		THC homolog	3	3						
		Ethanol	4	4					Ethanol	0.01 g/dL in blood (unspecified) @ unknown
446h	39 y M	Ibuprofen	1	1	U	Ingst	Int-S	2		
		Ethanol	2	2						
447	39 y M	Acetaminophen	1	1	U	Ingst	Int-M	1	Acetaminophen	164 mcg/mL in serum @ 4 h (pe)
448h	40 y M	Acetaminophen	1	1	C	Ingst	Int-U	1	Acetaminophen	9 mcg/mL in blood (unspecified) @ unknown
449h	40 y M	Salicylate	1	1	A	Ingst	Int-S	1	Salicylate	21.4 mg/dL in serum @ 30 m (pe)
		Salicylate	1	1					Salicylate	67.8 mg/dL in serum @ 3 h (pe)
		Salicylate	1	1					Salicylate	93.7 mg/dL in serum @ 7 h (pe)
450ha	40 y F	Acetaminophen/ hydrocodone	1	1	A/C	Ingst	Int-S	1		
451h	40 y F	Acetaminophen/ diphenhydramine	1	1	C	Ingst	Int-M	1	Acetaminophen	26 mcg/mL in serum @ unknown
452h	40 y F	Acetaminophen	1	1	A	Ingst	Unt-G	2	Acetaminophen	105.7 mcg/mL in serum @ 1 h (pe)
453h	40 y F	Acetaminophen	1	1	U	Ingst	Int-S	2	Acetaminophen	51.1 mcg/mL in serum @ unknown
454ph	40 y M	Oxycodone	1	1	A	Ingst	Int-S	2		
		Drug, unknown	2	2						
455h	41 y M	Acetaminophen	1	1	C	Ingst	Int-S	1	Acetaminophen	21 mcg/mL in blood (unspecified) @ 48 h (pe)
		Acetaminophen	1	1					Salicylate	6.7 mg/dL in blood (unspecified) @ 48 h (pe)

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
456h	41 y F	Ibuprofen	2	2	A/C	Ingst	Int-S	2	Acetaminophen	55 mcg/mL in serum @ unknown
		Acetaminophen	1	1						
		Drug, unknown	2	2						
457ph	41 y M	Hydrocodone	1	1	A	Par	Int-A	1		
458h	41 y F	Acetaminophen	1	1	U	Ingst	Int-S	1	Acetaminophen	111 mcg/mL in blood (unspecified) @ unknown
		Bismuth subsalicylate	2	2						
		Calcium carbonate	3	3						
459h	41 y F	Ondansetron	4	4	A/C	Ingst	Int-S	3	Acetaminophen	14 mcg/mL in blood (unspecified) @ unknown
		Acetaminophen/hydrocodone	1	1						
		Ethanol	2	2						
460h	41 y F	Acetaminophen	1	1	U	Ingst	Int-S	2	Acetaminophen	101.5 mcg/mL in blood (unspecified) @ unknown
		Drug, unknown	2	1						
		Drug, unknown	2	1						
461ph	41 y M	Fentanyl	1	1	A/C	Par	Int-A	2		
		Heroin	2	1						
462h	41 y F	Acetaminophen	1	1	A	Ingst	Int-S	1	Acetaminophen	50 mcg/mL in serum @ 1 d (pe)
463pa	42 y M	Ethanol (non-beverage)	2	2	A	Ingst	Unk	1	Norfentanyl	1.4 ng/mL in blood (unspecified) @ autopsy
		Fentanyl	1	1						
		Fentanyl	1	1						
		Chlordiazepoxide	2	2						
		Alprazolam	3	3						
464h	42 y M	Acetaminophen	1	1	A/C	Ingst	Int-A	2	Acetaminophen	57 mcg/mL in blood (unspecified) @ unknown
465	42 y F	Acetaminophen	1	1	C	Ingst	Unk	1	Acetaminophen	51 mcg/mL in blood (unspecified) @ unknown
466pha	42 y F	Oxycodone	1	1	A/C	Ingst	Int-S	2	Acetaminophen	54 mcg/mL in blood (unspecified) @ 2 h (pe)
		Trazodone	2	2						
		Acetaminophen/dextromethorphan/doxylamine	3	3						
		Alprazolam	4	4						
467h	42 y F	Acetaminophen/diphenhydramine	1	1	C	Ingst	Int-M	2	Acetaminophen	37 mcg/mL in blood (unspecified) @ unknown
		Acetaminophen	2	2						
		Acetaminophen/hydrocodone	3	3						
		Sertraline	4	4						
		Clonazepam	5	5						
		Mirtazapine	6	6						
		Pantoprazole	7	7						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
468	43 y F	Acetaminophen	1	1	U	Ingst	Unk	1	Acetaminophen	23 mcg/mL in serum @ unknown
469h	43 y F	Ethanol	2	2	U	Ingst	Int-S	2		
		Tramadol	1	1						
470	43 y M	Clonazepam	2	2	A	Ingst	Int-S	1	Acetaminophen	600 mcg/mL in serum @ 0 h (pe)
471	43 y F	Acetaminophen	1	1	A	Ingst	Int-S	1	Acetaminophen	14.3 mcg/mL in serum @ 3 d (pe)
		Acetaminophen	1	1					Acetaminophen	217.2 mcg/mL in serum @ 21 h (pe)
472	43 y M	Hydrocodone	1	1	A	Unk	Int-A	2		
		Drug, unknown	2	2						
473h	43 y F	Acetaminophen/opioid	1	1	A	Ingst	Int-S	2	Acetaminophen	13.3 mcg/mL in serum @ unknown
474	43 y F	Benzodiazepine	2	2	U	Ingst	Unt-G	2		
		Acetaminophen	1	1						
		Hydrocodone	2	2						
475ha	43 y F	Benzodiazepine	3	3	C	Ingst	Int-M	2	Acetaminophen	33 mcg/mL in blood (unspecified) @ autopsy
		Acetaminophen	1	1					Midazolam	218 ng/mL in blood (unspecified) @ autopsy
		Midazolam	2	2						
		Caffeine/salicylamide/salicylate	3	3						
476h	43 y M	Acetaminophen	1	1	A	Ingst	Int-S	1	Acetaminophen	156 mcg/mL in blood (unspecified) @ 14 h (pe)
		Acetaminophen	1	1					Acetaminophen	89.1 mcg/mL in blood (unspecified) @ 21 h (pe)
		Acetaminophen	1	1					Acetaminophen	9.9 mcg/mL in blood (unspecified) @ 79.5 h (pe)
477p	43 y F	Acetaminophen/oxycodone	1	1	A	Ingst	Int-U	2		
		Quetiapine	2	2						
478a	43 y F	Methadone	1	1	A	Ingst	Int-S	1	Methadone	0.1 mg/L in blood (unspecified) @ unknown
479pha	44 y F	Tramadol	1	1	A/C	Ingst	Int-S	1	Tramadol	0.64 mg/L in serum @ 11 h (pe)
		Citalopram	2	2					Citalopram	0.05 mg/L in serum @ 11 h (pe)
		Mirtazapine	3	3					Mirtazapine	0.23 mg/L in serum @ 11 h (pe)
480ph	44 y F	Gabapentin	4	4	A	Ingst + Aspir	Int-U	1		
		Hydrocodone	1	1						
		Benzodiazepine	2	2						
		Amphetamine	3	3						
		Cocaine	4	4						
481h	44 y M	Colchicine	1	1	A	Ingst	Int-S	1		
482pa	44 y F	Methadone	1	1	U	Ingst	Int-A	1	Methadone	0.29 mg/L in blood (unspecified) @ autopsy
		Methadone	1	1					Methadone	1.2 mg/kg in liver @ autopsy
		Morphine	2	2					Morphine	0.1 mg/L in blood (unspecified) @ autopsy
		Morphine	2	2					Morphine	5.2 mg/L in urine (quantitative only) @ autopsy

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
483h	44 y M	Amitriptyline	3	3	A	Ingst	Int-S	1	Amitriptyline	0.61 mg/L in blood (unspecified) @ autopsy
		Amitriptyline	3	3					Nortriptyline	2.5 mg/L in blood (unspecified) @ autopsy
		Amitriptyline	3	3					Nortriptyline	31 mg/kg in liver @ autopsy
		Amitriptyline	3	3					Amitriptyline	7.5 mg/kg in liver @ autopsy
		Ompazole	4	4					Ethanol	20 mg/dL in blood (unspecified) @ autopsy
		Eszopilclone	5	5						
		Valproic acid	6	6						
		Ethanol	7	7						
		Acetaminophen	1	1					Acetaminophen	167 mcg/mL in blood (unspecified) @ 27 h (pe)
		Acetaminophen	1	1					Acetaminophen	368 mcg/mL in blood (unspecified) @ 9.5 h (pe)
		Acetaminophen	1	1					Acetaminophen	370 mcg/mL in blood (unspecified) @ 5.5 h (pe)
		Acetaminophen	1	1					Acetaminophen	433 mcg/mL in blood (unspecified) @ 14 h (pe)
		Acetaminophen	1	1					Acetaminophen	79.9 mcg/mL in blood (unspecified) @ 33 h (pe)
		Ethanol	2	2					Ethanol	102 mg/dL in blood (unspecified) @ 5.5 h (pe)
484ph	44 y M	Hydrocodone	1	1	A/C	Ingst	Int-S	2	Ethanol	71 mg/dL in blood (unspecified) @ unknown
		Cocaine	2	2						
		Marijuana	3	3						
		Ethanol	4	4						
485h	44 y F	Acetaminophen	1	1	C	Ingst	Int-U	3		
486ha	45 y M	Salicylate	2	2	A	Ingst + Par	Int-S	1	Salicylate	59 mg/dL in plasma @ unknown
		Salicylate	1	1					Potassium	5.7 mEq/L in serum @ 3 h (pe)
		Potassium chloride	2	2					Potassium	6.6 mEq/L in serum @ 15 m (pe)
		Acetaminophen	3	3					Acetaminophen	10.7 mcg/mL in plasma @ unknown
487pha	45 y F	Oxycodone	1	1	A	Ingst	Int-S	2	Oxycodone	15 ng/mL in blood (unspecified) @ autopsy
		Cyclobenzaprine	2	2					Cyclobenzaprine	82 ng/mL in blood (unspecified) @ autopsy
		Acetaminophen	3	3					Acetaminophen	68 mcg/mL in blood (unspecified) @ unknown
		Ethanol	4	4					Ethanol	61 mg/dL in blood (unspecified) @ unknown
		Cocaine	5	5					Delta-9-carboxy-thc	0.5 ng/mL in blood (unspecified) @ autopsy
		Marijuana	6	6						
488	45 y F	Salicylate	1	1	A	Ingst	Int-U	2	Salicylate	128 mg/dL in serum @ unknown
		Caffeine/salicylamide/salicylate	2	2						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
489ph	45 y F	Acetaminophen/ hydrocodone	1	1	C	Ingst	Int-U	2	Hydrocodone	260 ng/mL in serum @ unknown
490pai	45 y M	Fentanyl	1	1	A	Unk	Int-A	1	Fentanyl	0.007 mg/L in blood (unspecified) @ autopsy
		Ethanol	2	2					Ethanol	0.2% (wt/vol) in blood (unspecified) @ autopsy
		Ethanol	2	2					Ethanol	0.22% (wt/vol) in blood (unspecified) @ autopsy
		Ethanol	2	2					Ethanol	0.29% (wt/vol) in vitreous @ autopsy
		Ethanol	2	2					Ethanol	0.33% (wt/vol) in urine (quantitative only) @ autopsy
491a	45 y M	Methadone	1	1	A	Ingst + Aspir + - Unk	Int-U	1	Methadone	0.09 mg/L in blood (unspecified) @ 1 h (pe)
		Hydromorphone	2	2					Hydromorphone	0.02 mg/L in blood (unspecified) @ 1 h (pe)
		Morphine	3	3					Morphine (free)	0.11 mg/L in blood (unspecified) @ 1 h (pe)
		Morphine	3	3					Morphine	2.08 mg/L in blood (unspecified) @ 1 h (pe)
		Oxycodone	4	4					Oxycodone	0.04 mg/L in blood (unspecified) @ 1 h (pe)
492h	45 y F	Hydrocodone	1	1	U	Ingst + Unk	Int-S	2		
		Gabapentin	2	2						
		Benzodiazepine	3	3						
493ph	45 y F	Oxycodone	1	1	A/C	Ingst	Int-S	1		
		Acetaminophen	2	2					Acetaminophen	329 mcg/mL in serum @ unknown
		Pregabalin	3	3						
		Pregabalin	4	4						
		Venlafaxine	5	5						
		Omeprazole	6	6						
494h	45 y M	Acetaminophen/ diphenhydramine	1	1	A	Ingst	Int-S	1	Acetaminophen	527 mcg/mL in plasma @ unknown
		Trihexyphenidyl	2	2						
		Paliperidone	3	3						
		Ethanol	4	4						
495pha	45 y F	Oxycodone (extended release)	1	1	A/C	Ingst	Int-U	1	Oxycodone (free)	1100 ng/mL in blood (unspecified) @ autopsy
		Oxycodone (extended release)	1	1					Oxymorphone	57 ng/mL in blood (unspecified) @ autopsy
		Tizanidine	2	2						
		Zolpidem	3	3					Zolpidem	250 ng/mL in blood (unspecified) @ autopsy
496pa	46 y M	Morphine	1	1	A	Ingst	Unk	1	Morphine (free)	23 mcg/L in blood (unspecified) @ autopsy
		Ethanol	2	2					Ethanol	0.14% (wt/vol) in blood (unspecified) @ autopsy
		Quetiapine	3	3						
		Trazodone	4	4					Trazodone	0.1 mg/L in blood (unspecified) @ autopsy
497h	46 y F	Acetaminophen/codeine	1	1	U	Ingst	Int-S	1	Acetaminophen	19.9 mcg/mL in blood (unspecified) @ unknown
		Ethanol	2	2					Ethanol	11 mg/dL in whole blood @ unknown
498	46 y M	Buprenorphine/naloxone (sublingual film)	1	1	U	Ingst	Int-U	3		

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
499h	47 y F	Acetaminophen/ diphenhydramine	1	1	C	Ingst	Int-M	2	Acetaminophen	57 mcg/mL in serum @ 1 d (pe)
		Acetaminophen/ diphenhydramine	1	1					Acetaminophen	64 mcg/mL in serum @ unknown
500h	47 y F	Acetaminophen/ hydrocodone	1	1	C	Ingst	Int-U	3	Acetaminophen	187.9 mcg/mL in serum @ 1 h (pe)
501pa	47 y F	Oxymorphone	1	1	A/C	Ingst	Int-A	1	Oxymorphone	0.069 mg/L in blood (unspecified) @ autopsy
502ph	47 y F	Acetaminophen	1	1	U	Ingst	Int-S	1		
		Paroxetine	2	2						
		Drug, unknown	3	3						
503p	47 y F	Hydrocodone and acetaminophen	1	1	U	Unk	Unk	2		
504ph	47 y M	Acetaminophen/ oxycodone	1	1	A	Ingst	Int-S	2	Acetaminophen	54 mcg/mL in plasma @ unknown
505h	47 y F	Tramadol	1	1	A	Ingst	Unk	2		
		Alprazolam	2	2						
506ph	47 y M	Methadone	1	1	A/C	Ingst	Int-S	2		
		Clonazepam	2	2						
		Drug, unknown	3	3						
507h	47 y M	Acetaminophen	1	1	C	Ingst	Unt-T	3		
508h	48 y F	Colchicine	1	1	A/C	Ingst	Int-S	3		
509h	48 y F	Acetaminophen/ hydrocodone	1	1	A/C	Ingst	Int-S	1		
		Methadone	2	2						
510ha	48 y M	Acetaminophen	1	1	U	Ingst	Int-S	1	Acetaminophen	860 mg/L In unknown @ unknown
		Salicylate	2	2					Salicylate	27 mg/dL in serum @ 1 h (pe)
511h	48 y F	Hydromorphone	1	1	A	Par	Int-S	2	Hydromorphone	110 ng/mL in blood (unspecified) @ unknown
		Cyclobenzaprine	2	2					Cyclobenzaprine	300 ng/mL in blood (unspecified) @ unknown
		Zolpidem	3	3					Zolpidem	245 ng/mL in blood (unspecified) @ unknown
		Fluoxetine	4	4					Norfluoxetine	230 ng/mL in blood (unspecified) @ unknown
		Fluoxetine	4	4					Fluoxetine	310 ng/mL in blood (unspecified) @ unknown
		Diazepam	5	5					Nordiazepam	0.2 mcg/mL in blood (unspecified) @ unknown
		Diazepam	5	5					Diazepam	0.3 mcg/mL in blood (unspecified) @ unknown
		Promethazine	6	6					Promethazine	22 ng/mL in blood (unspecified) @ unknown
		Diphenhydramine	7	7					Diphenhydramine	50 ng/mL in blood (unspecified) @ unknown
512ha	48 y F	Acetaminophen	1	1	U	Ingst	Int-S	1	Acetaminophen	629 mcg/mL in serum @ 5 h (pe)

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
513h	48 y F	Acetaminophen	1	1	C	Ingst	Int-M	1	Acetaminophen	69 mcg/mL in serum @ unknown
514	48 y F	Hydrocodone	1	1	A	Ingst	Int-S	2		
		Propranolol	2	2						
		Lamotrigine	3	3						
		Sertraline	4	4						
		Buspirone	5	5						
		Trazodone	6	6						
		Ethanol	7	7					Ethanol	474 mg/dL in blood (unspecified) @ unknown
515pha	48 y M	Clonazepam	8	8	U	Par	Int-A	1		
		Fentanyl	1	1					Norfentanyl	1.2 ng/mL in blood (unspecified) @ unknown
		Fentanyl	1	1					Fentanyl	3.6 ng/mL in blood (unspecified) @ unknown
516h	49 y M	Acetaminophen	1	1	A	Ingst	Unk	1	Acetaminophen	74 mg/dL in plasma @ unknown
		Ethanol	2	2					Ethanol	81 mg/dL in plasma @ unknown
		Salicylate	3	3					Salicylate	9.6 mg/dL in plasma @ unknown
517	49 y F	Acetaminophen	1	1	A	Ingst	Int-S	1	Acetaminophen	115.8 mcg/mL in blood (unspecified) @ 12 h (pe)
		Acetaminophen	1	1					Acetaminophen	71.7 mcg/mL in blood (unspecified) @ 24 h (pe)
518ha	49 y F	Acetaminophen	1	1	C	Ingst	Int-M	1	Acetaminophen	84.8 mg/L in blood (unspecified) @ unknown
519ph	49 y M	Oxymorphone (extended release)	1	1	A	Ingst + Par	Int-A	1		
520ph	49 y M	Alprazolam	2	2	U	Ingst	Int-U	2		
		Buprenorphine/naloxone (sublingual film)	1	1						
		Clonazepam	2	2						
		Chlordiazepoxide	3	3						
		Amphetamine	4	4						
		Ethanol	5	5					Ethanol	23 mg/dL in serum @ unknown
521	49 y M	Acetaminophen	1	1	C	Ingst	Int-M	1	Acetaminophen	31 mcg/mL in blood (unspecified) @ 1 h (pe)
		Ethanol	2	2						
522ha	50 y F	Acetaminophen	1	1	U	Ingst	Int-S	1	Acetaminophen	1401 mcg/mL in serum @ 20 m (pe)
		Acetaminophen	1	1					Acetaminophen	1655 mcg/mL in serum @ 10 h (pe)
		Acetaminophen	1	1					Acetaminophen	760 mcg/mL in blood (unspecified) @ 10 h (pe)
		Acetaminophen	1	1					Acetaminophen	840 mcg/mL in blood (unspecified) @ 20 m (pe)
		Warfarin	2	2						
		Phenothiazine	3	3						
		Rivaroxaban	4	4						
		Ondansetron	5	5						
		Ibuprofen	6	6						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
523pa	50 y M	Cough and cold preparation	7	7	A	Oth	Int-A	1		
		Lorazepam	8	8						
		Caffeine	9	9						
		Fentanyl	1	1					Fentanyl	0.009 mg/L in blood (unspecified) @ autopsy
		Cocaine	2	2					Cocaine	0.3 mg/L in blood (unspecified) @ autopsy
		Ethanol	3	3					Ethanol	0.02% in blood (unspecified) @ autopsy
524pha	50 y F	Ethanol	3	3	U	Unk	Unk	1	Ethanol	0.04% in vitreous @ autopsy
		Ethanol	3	3					Ethanol	0.06% in urine (quantitative only) @ autopsy
		Fentanyl	1	1						
		Clonazepam	2	2					Clonazepam	33 ng/mL in blood (unspecified) @ unknown
		Diphenhydramine	3	3					Diphenhydramine	84 ng/mL in blood (unspecified) @ unknown
525h	50 y M	Citalopram	4	4	A	Ingst	Int-M	2		
526	50 y F	Ibuprofen	1	1	A/C	Ingst	Int-S	1		
		Acetaminophen	1	1					Acetaminophen	13 mcg/mL in serum @ 43 h (pe)
527ph	50 y F	Clonazepam	3	2	A	Ingst	Int-S	2		
		Paroxetine	2	2						
		Lamotrigine	4	3						
		Levothyroxine	5	4						
		Ibuprofen	1	1						
		Hydroxyzine	2	2						
528	50 y F	Methocarbamol	3	3	A	Ingst	Int-S	1		
		Baclofen	4	4						
		Rosuvastatin	5	5						
		Hydromorphone	6	6						
		Gabapentin	7	7						
		Salicylate	1	1					Salicylate	116 mg/dL in blood (unspecified) @ unknown
529h	50 y M	Gabapentin	2	2	C	Ingst	Int-S	1		
		Acetaminophen/hydrocodone	3	3						
		Acetaminophen	1	1						
530ph	50 y M	Ethanol	2	2	A/C	Ingst	Int-S	2		
		Acetaminophen/oxycodone	1	1					Oxymorphone	1.3 ng/mL in whole blood @ autopsy
		Acetaminophen/oxycodone	1	1					Oxycodone	30 ng/mL in whole blood @ autopsy
531	50 y F	Acetaminophen	1	1	C	Ingst	Int-M	3		
532hi	50 y F				U	Ingst	Int-M	2		
		Acetaminophen	1	1						
		Ethanol	2	2						
		Amphetamine	3	3						
533	51 y M	Cocaine	4	4	U	Ingst	Int-S	2		
		Acetaminophen	1	1					Acetaminophen	592 mcg/mL in blood (unspecified) @ unknown
		Drug, unknown	2	2						
		Ethanol	3	3						

(Continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
534h	51 y F	Morphine	1	1	A	Ingst + Par	Int-A	2		
		Acetaminophen/ oxycodone	2	2					Acetaminophen	12 mcg/mL in blood (unspecified) @ unknown
		Acetaminophen/ oxycodone	2	2					Acetaminophen	45 mcg/mL in blood (unspecified) @ unknown
535ha	51 y F	Acetaminophen	1	1	A	Ingst	Int-S	1	Acetaminophen	20 mcg/mL in blood (unspecified) @ 15 m (pe)
		Ethanol	2	2					Ethanol	12 mg/dL in blood (unspecified) @ 15 m (pe)
		Citalopram	3	3					Citalopram	80 ng/mL in blood (unspecified) @ unknown
536p	51 y F	Methadone	1	1	A	Ingst	Int-S	2		
		Hydromorphone	2	2						
		Clonazepam	3	3						
		Hydroxyzine	4	4						
		Gabapentin	5	5						
537ph	51 y M	Hydrocodone acetaminophen combo	1	1	A	Ingst	Int-S	1	Acetaminophen	28.7 mcg/mL in serum @ unknown
		Drug, unknown	2	2						
		Alprazolam	3	3						
538h	51 y F	Acetaminophen	1	1	A/C	Ingst	Int-M	1		
		Ethanol	2	2						
539a	52 y F	Acetaminophen	1	1	A	Ingst	Int-S	1	Acetaminophen	300 mg/L in blood (unspecified) @ unknown
540h	52 y F	Fentanyl	1	1	U	Derm	Int-A	3		
541	52 y M	Acetaminophen	1	1	A/C	Ingst	Int-M	1		
542h	52 y M	Salicylate	1	1	U	Ingst	Int-S	2		
		Foreign body	2	2						
543ph	52 y M	Acetaminophen	1	1	A	Ingst	Int-S	2	Acetaminophen	72 mcg/mL in serum @ unknown
544	52 y F	Acetaminophen	1	1	A	Ingst	Int-S	1	Acetaminophen	63 mcg/mL in serum @ unknown
		Acetaminophen/ caffeine	2	2						
545	52 y M	Salicylate	1	1	A	Ingst	Int-S	1	Salicylate	108 mg/dL in serum @ unknown
546hi	52 y M	Acetaminophen/ diphenhydramine	1	1	U	Ingst	Int-S	1	Acetaminophen	225 mcg/mL in serum @ 1 h (pe)
		Ethanol	2	2					Ethanol	201 mg/dL in serum @ 1 h (pe)
		Sertraline	3	3						
		Ibuprofen	4	4						
547h	53 y F	Acetaminophen	1	1	A	Ingst	Unk	2	Acetaminophen	4.7 mcg/mL in blood (unspecified) @ unknown
548ph	53 y M	Oxycodone (extended release)	1	1	U	Ingst	Int-A	2		
549	53 y F	Acetaminophen/ diphenhydramine	1	1	C	Ingst	Int-M	1		
		Mitragyna	2	2						
		Ethanol	3	3						
550pha	54 y M	Fentanyl	1	1	A	Par	Int-A	1	Norfentanyl	0 ng/mL in whole blood @ unknown

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
551ha	54 y M	Fentanyl	1	1	C	Ingst	Unt-T	2	Fentanyl	2.8 ng/mL in whole blood @ unknown
		Ethanol	2	2					Ethanol	0.285% (wt/vol) in whole blood @ unknown
		Acetaminophen	1	1					Acetaminophen	227 mcg/mL in blood (unspecified) @ unknown
		Ibuprofen	2	2					Ibuprofen	12.6 mg/L in blood (unspecified) @ unknown
		Naproxen	3	3					Naproxen	13.9 mg/L in blood (unspecified) @ unknown
552h	54 y M	Salicylate	1	1	A	Ingst	Int-S	1	Salicylate	111 mg/dL in blood (unspecified) @ unknown
553	54 y F	Acetaminophen	1	1	A	Ingst	Int-S	3	Acetaminophen	100 mcg/mL in serum @ unknown
554h	54 y F	Acetaminophen	1	1	A	Ingst	Int-M	1	Acetaminophen	49 mg/L in blood (unspecified) @ unknown
		Drug, unknown	2	2						
		Salicylate	3	3					Salicylate	6 mg/dL in blood (unspecified) @ unknown
		Ethanol	4	4					Ethanol	65 mg/dL in blood (unspecified) @ unknown
555a	54 y F				A/C	Ingst	Unk	2		
		Acetaminophen/hydrocodone	1	1					Dihydrocodeine/hydrocodol (free)	110 ng/mL in blood (unspecified) @ autopsy
		Acetaminophen/hydrocodone	1	1					Hydrocodone (free)	310 ng/mL in blood (unspecified) @ autopsy
		Acetaminophen/hydrocodone	1	1					Hydromorphone	4.3 ng/mL in blood (unspecified) @ autopsy
		Baclofen	2	2					Baclofen	0.61 mcg/mL in blood (unspecified) @ autopsy
		Alprazolam	3	3					Alprazolam	53 ng/mL in blood (unspecified) @ autopsy
556h	54 y M	Acetaminophen	1	1	A	Ingst	Int-A	2		
		Ethanol	2	2						
		Ibuprofen	3	3						
		Isopropanol	4	4						
		Atorvastatin	5	5						
557h	54 y F	Acetaminophen	1	1	A	Ingst + Aspir	Int-S	2		
558	54 y F	Salicylate	1	1	A	Ingst	Int-S	1	Salicylate	106.9 mg/dL in blood (unspecified) @ 10 h (pe)
559ha	55 y M				A/C	Ingst	Int-S	2		
		Methadone	1	1					Methadone	1800 ng/mL in blood (unspecified) @ 1 d (pe)
		Methadone	1	1					Methadone metabolite	200 ng/mL in blood (unspecified) @ 1 d (pe)
		Acetaminophen	2	2					Acetaminophen	14.2 mcg/mL in blood (unspecified) @ 1 d (pe)
		Oxycodone	3	3					Oxymorphone	100 ng/mL in blood (unspecified) @ 1 d (pe)
		Oxycodone	3	3					Oxycodone	260 ng/mL in blood (unspecified) @ 1 d (pe)
		Diphenhydramine	4	4					Diphenhydramine	32 ng/mL in blood (unspecified) @ 1 d (pe)
		Aripiprazole	5	5						
		Trazodone	6	6						
		Gabapentin	7	7						
		Duloxetine	8	8						
		Atenolol	9	9						
560	55 y F	Omeprazole	10	10	A	Ingst + Aspir	Int-S	1		
		Acetaminophen	1	1					Acetaminophen	385 mcg/mL in serum @ 1 h (pe)

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
561	55 y M	Ethanol	2	2						
562ha	55 y F	Acetaminophen	1	1	A	Ingst	Int-S	1		
		Acetaminophen	1	1	A	Ingst	Int-S	1	Acetaminophen	692 mcg/mL in serum @ 4 h (pe)
		Ethanol	2	2					Ethanol	368 mg/dL in serum @ unknown
563	55 y F	Acetaminophen/oxycodone	1	1	U	Ingst	Int-S	1		
564h	55 y F	Acetaminophen/hydrocodone	1	1	C	Ingst	Int-A	3		
		Lorazepam	2	2						
565ph	55 y F	Acetaminophen/diphenhydramine	1	1	A	Ingst	Int-S	2	Acetaminophen	61 mcg/mL in blood (unspecified) @ unknown
		Acetaminophen/hydrocodone	2	2						
566	55 y M	Morphine	1	1	A/C	Ingst + Aspir	Int-S	2		
567ha	55 y M	Acetaminophen/hydrocodone	1	1	A/C	Ingst	Int-S	2	Acetaminophen	73 mcg/mL in serum @ 2 h (pe)
		Isopropanol	2	2						
568h	55 y M	Salicylate	1	1	A	Ingst	Int-S	1		
		Alprazolam	2	2						
569h	56 y F	Oxycodone	1	1	C	Ingst	Int-M	3		
		Marijuana	2	2						
570h	56 y F	Acetaminophen	1	1	A/C	Ingst	Int-M	2	Acetaminophen	100 mcg/mL in blood (unspecified) @ unknown
		Amlodipine	2	2					Amlodipine	82.9 ng/mL in blood (unspecified) @ unknown
571ha	56 y F	Acetaminophen	1	1	A	Ingst	Int-S	1	Acetaminophen	127.6 mcg/mL in serum @ unknown
572ph	56 y M	Tramadol	1	1	A	Unk	Unk	2		
		Ethanol	2	2					Ethanol	60 mg/dL in blood (unspecified) @ unknown
573h	56 y F	Acetaminophen	1	1	A	Ingst	Int-S	1	Acetaminophen	15 mcg/mL in serum @ unknown
574	56 y F	Salicylate	1	1	C	Ingst	Int-M	1		
575h	56 y F	Acetaminophen	1	1	A/C	Ingst	Int-M	3	Acetaminophen	25 mcg/mL in serum @ unknown
576	56 y F	Acetaminophen	1	1	U	Ingst	Int-U	2		
		Metformin	2	2						
577ph	56 y F	Acetaminophen	1	1	C	Ingst	Unt-M	2		
578h	57 y F	Acetaminophen	1	1	A	Ingst	Int-S	2	Acetaminophen	290 mcg/mL in blood (unspecified) @ unknown
		Acetaminophen	1	1					Acetaminophen	370 mcg/mL in blood (unspecified) @ unknown
		Acetaminophen	1	1					Acetaminophen	670 mcg/mL in blood (unspecified) @ unknown
		Clonazepam	2	2						
		Ethanol	3	3					Ethanol	152 mg/dL in blood (unspecified) @ unknown

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
579h	57 y M	Acetaminophen/ diphenhydramine	1	1	A/C	Ingst	Unk	2		
580h	57 y M	Hydrocodone	1	1	A	Ingst	Int-S	2		
		Benzodiazepine	2	2						
		Bupropion (extended release)	3	3						
		Venlafaxine	4	4						
		Losartan	5	5						
		Insulin	6	6						
581h	57 y F	Acetaminophen/ oxycodone	1	1	U	Ingst	Int-S	1		
582pha	57 y F	Acetaminophen/ oxycodone	1	1	A/C	Ingst	Unk	1	Oxymorphone	10 ng/mL in blood (unspecified) @ 1 h (pe)
		Acetaminophen/ oxycodone	1	1					Acetaminophen	43.5 mcg/mL in serum @ unknown
		Acetaminophen/ oxycodone	1	1					Oxycodone (free)	970 ng/mL in blood (unspecified) @ 1 h (pe)
583a	57 y M	Morphine	1	1	A/C	Ingst	Int-S	1	Tramadol	0.26 mg/L in blood (unspecified) @ autopsy
		Morphine	1	1					Morphine	0.75 mg/L in blood (unspecified) @ autopsy
584h	57 y F	Eszopiclone	2	2	A	Ingst	Int-S	2		
		Acetaminophen	1	1					Acetaminophen	349 mcg/mL in blood (unspecified) @ unknown
585h	58 y F	Methadone	2	2	A	Ingst	Int-U	1		
		Acetaminophen	1	1						
		Salicylate	2	2						
		Drug, unknown	3	3						
586p	58 y F	Acetaminophen/ hydrocodone	1	1	A	Ingst	Int-S	1	Acetaminophen	7 mcg/mL in blood (unspecified) @ 60 m (pe)
587h	58 y F	Alprazolam	2	2	U	Ingst	Int-S	1		
		Acetaminophen	1	1						
		Drug, unknown	2	2						
588pha	58 y M	Fentanyl	1	1	A	Unk	Int-A	1		
		Heroin	2	2						
		Cocaine	3	3						
589	58 y F	Acetaminophen	1	1	A	Ingst	Int-S	2		
590h	59 y M	Acetaminophen	1	1	C	Ingst	Int-A	3	Acetaminophen	25 mcg/mL in blood (unspecified) @ unknown
591i	59 y M	Acetaminophen/ hydrocodone	1	1	A	Ingst	Int-S	2		
		Clonazepam	2	2						
592ha	59 y M	Acetaminophen	1	1	C	Ingst	Int-U	3		
		Salicylate	2	1						
593ha	59 y F	Acetaminophen	1	1	A	Ingst	Int-S	1		
594h	59 y F	Hydrocodone	1	1	A/C	Ingst	Int-S	1		
		Benzodiazepine	2	2						
		Methadone	3	3						
		Oxycodone	4	4						
		Drug, unknown	5	5						
		Desvenlafaxine	6	6						
595ha	59 y F	Acetaminophen/ oxycodone	1	1	A/C	Ingst + Derm	Int-A	1	Oxycodone (free)	31 ng/mL in blood (unspecified) @ unknown

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
596h	59 y F	Acetaminophen/oxycodone	1	1	A	Ingst	Int-S	3	Acetaminophen	38 mcg/mL in blood (unspecified) @ autopsy
		Oxycodone (extended release)	2	2						
		Fentanyl	3	3					Fentanyl	0.49 ng/mL in blood (unspecified) @ unknown
		Fentanyl	3	3					Norfentanyl	8.6 ng/mL in blood (unspecified) @ unknown
		Promethazine	4	4					Promethazine	13 ng/mL in blood (unspecified) @ unknown
597ph	59 y M	Acetaminophen/oxycodone	1	1	A	Ingst	Unk	2		
		Morphine	2	2						
		Clonazepam	3	3						
598h	59 y M	Oxycodone	1	1	A/C	Ingst	Unk	1		
		Lisinopril	2	2						
		Oxycodone	1	1						
599p	59 y M	Acetaminophen/oxycodone	2	2	A	Ingst	Int-S	2		
		Oxycodone	1	1						
600ha	59 y F	Diazepam	2	2	U	Ingst	Int-S	1		
		Naproxen	1	1					Naproxen	760 mcg/mL in blood (unspecified) @ unknown
601p	60 y M	Ethanol	2	2	U	Ingst	Int-S	3	Ethanol	206 mg/dL in blood (unspecified) @ unknown
		Acetaminophen	3	3					Acetaminophen	43.4 mcg/mL in serum @ 1 m (pe)
		Acetaminophen	3	3					Acetaminophen	44.5 mcg/mL in serum @ 1 d (pe)
		Diphenhydramine	4	4					Diphenhydramine	170 ng/mL in blood (unspecified) @ unknown
		Acetaminophen/opioid	1	1					Acetaminophen	88 mcg/mL in blood (unspecified) @ unknown
		Hydroxyzine	2	2						
602h	60 y M	Gabapentin	3	3	A	Ingst	Unt-T	2		
		Losartan	4	4						
		Hydrochlorothiazide	5	5						
		Furosemide	6	6						
		Bupropion	7	7						
		Warfarin	8	8						
		Simvastatin	9	9						
		Metformin	10	10						
		Colchicine	11	11						
		Colchicine	1	1						
		603h	60 y F	Acetaminophen					1	1
604h	60 y F	Acetaminophen	1	1	A	Ingst	Int-S	1	Acetaminophen	223 mg/mL in blood (unspecified) @ 15 h (pe)
		Acetaminophen	1	1					Acetaminophen	338 mcg/mL in blood (unspecified) @ 10 h (pe)
605ha	60 y F	Acetaminophen/oxycodone	1	1	U	Ingst	Int-S	2	Oxymorphone	233 ng/mL in urine (quantitative only) @ unknown
		Acetaminophen/oxycodone	1	1					Acetaminophen	37.3 mcg/mL in blood (unspecified) @ unknown

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
		Methocarbamol	2	2						
		Lorazepam	3	3					Lorazepam	499 ng/mL in urine (quantitative only) @ unknown
		Clonazepam	4	4					7-Aminoclonazepam	753 ng/mL in urine (quantitative only) @ unknown
		Oxcarbazepine	5	5					Oxcarbazepine	28 mcg/mL in blood (unspecified) @ unknown
		Topiramate	6	6					Topiramate	20.4 mcg/mL in blood (unspecified) @ unknown
606h	60 y F				A/C	Ingst	Int-S	2		
		Oxycodone	1	1						
607h	61 y F	Buprenorphine	2	2	U	Ingst	Int-M	1		
		Acetaminophen	1	1					Acetaminophen	56 mcg/mL in blood (unspecified) @ unknown
608pa	61 y F				A	Ingst	Int-M	1		
		Methadone	1	1					Eddp (2-ethylidene-1,5-dimethyl-3,3-diphenyl pyrrolidine)	33 ng/mL in blood (unspecified) @ autopsy
		Methadone	1	1					Methadone	360 ng/mL in blood (unspecified) @ autopsy
		Diphenhydramine	2	2					Diphenhydramine	360 ng/mL in blood (unspecified) @ autopsy
		Dextromethorphan	3	3					Dextromethorphan	81 ng/mL in blood (unspecified) @ autopsy
		Clonazepam	4	4					Clonazepam	3.2 ng/mL in blood (unspecified) @ autopsy
		Clonazepam	4	4					7-Aminoclonazepam	31 ng/mL in blood (unspecified) @ autopsy
609	61 y F				A	Ingst	Int-S	1		
		Acetaminophen	1	1					Acetaminophen	41.6 mcg/mL in serum @ 1 h (pe)
610h	61 y F	Ethanol (non-beverage)	2	2	A/C	Ingst	Int-M	2		
611ha	61 y M	Hydrocodone	1	1	U	Ingst	Unt-M	3		
		Acetaminophen	1	1					Acetaminophen	54 mcg/mL in blood (unspecified) @ unknown
		Acetaminophen	1	1					Acetaminophen	61 mcg/mL in blood (unspecified) @ unknown
		Ethanol	2	2					Ethanol	16 mg/dL in blood (unspecified) @ unknown
612p	61 y F				A	Ingst	Int-S	2		
		Acetaminophen/oxycodone	1	1						
613	61 y F				A	Ingst	Unk	2		
		Methadone	1	1						
		Diazepam	2	2						
		Temazepam	3	3						
614	61 y M				A	Ingst	Int-M	2		
		Acetaminophen	1	1					Acetaminophen	34.5 mcg/mL in plasma @ unknown
		Ethanol	2	2					Ethanol	168 mg/dL in serum @ unknown
615h	61 y F				A	Ingst	Int-S	2		
		Acetaminophen/hydrocodone	1	1						
616h	61 y M				U	Unk	Int-M	3		
		Hydrocodone	1	1						
617h	62 y M				C	Ingst	Unk	3		
		Acetaminophen	1	1					Ethanol	10 mg/dL in whole blood @ unknown
		Acetaminophen	1	1					Acetaminophen	17 mcg/mL in blood (unspecified) @ unknown
		Ibuprofen	2	2						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
618h	62 y F	Ethanol	3	3						
		Acetaminophen/codeine	1	1	A	Ingst	Int-S	1	Acetaminophen	41 mcg/mL in blood (unspecified) @ unknown
619	62 y F	Acetaminophen	1	1	A	Ingst	Int-S	1	Acetaminophen	112 mcg/mL in blood (unspecified) @ 23 h (pe)
		Asenapine	2	2						
		Alprazolam	3	3						
		Paroxetine	4	4						
		Zolpidem	5	5						
		Quetiapine	6	6						
		Ethanol	7	7						
620h	62 y F	Acetaminophen/oxycodone	1	1	A	Ingst	Int-S	3	Acetaminophen	107 mcg/mL in plasma @ unknown
621pha	62 y F	Acetaminophen/opioid	1	1	A	Ingst	Int-S	1	Hydrocodone	1898 ng/mL in blood (unspecified) @ unknown
		Acetaminophen/opioid	1	1					Acetaminophen	262 mcg/mL in blood (unspecified) @ unknown
		Acetaminophen/opioid	1	1					Hydromorphone	7 ng/mL in blood (unspecified) @ unknown
622	62 y F	Oxycodone	1	1	A	Ingst	Int-S	1		
		Alprazolam	2	2						
623	62 y F	Acetaminophen/hydrocodone	1	1	A/C	Ingst	Int-M	3	Acetaminophen	14 mcg/mL in blood (unspecified) @ 1 h (pe)
624h	62 y F	Acetaminophen/diphenhydramine	1	1	A	Ingst	Int-S	2	Acetaminophen	121 mcg/mL in serum @ unknown
625ph	62 y F	Oxycodone	1	1	U	Unk	Unk	2		
		Heroin	2	2						
		Amphetamine	3	3						
626	63 y F	Oxycodone	1	1	U	Ingst + Derm	Int-M	2		
		Butalbital	2	2						
		Naproxen	3	3						
		Lidocaine	4	4						
627h	63 y F	Acetaminophen	1	1	A/C	Ingst	Int-S	1	Acetaminophen	146 mcg/mL in serum @ unknown
		Quetiapine	2	2						
628	63 y F	Acetaminophen/hydrocodone	1	1	A/C	Ingst	Int-S	2	Acetaminophen	177 mcg/mL in plasma @ unknown
		Lorazepam	2	2						
		Propofol	3	3						
629h	63 y M	Salicylate	1	1	A	Ingst	Int-S	1	Salicylate	44 mg/dL in blood (unspecified) @ 2 h (pe)
		Acetaminophen	2	2					Acetaminophen	128 mcg/mL in blood (unspecified) @ 2 h (pe)
630pi	63 y F	Fentanyl (transdermal)	1	1	A/C	Ingst	Int-A	2		
631h	63 y F	Acetaminophen	1	1	U	Ingst	Int-U	1	Acetaminophen	148 mcg/mL in plasma @ unknown
		Acetaminophen/dextromethorphan/doxylamine	2	2						
632pa	63 y M	Methadone	1	1	A	Oth + Unk	Unk	1	Methadone	0.7 mg/L in blood (unspecified) @ autopsy
		Methadone	1	1					Methadone	2.2 mg/kg in liver @ autopsy
		Hydroxyzine	2	2					Hydroxyzine	0.4 mg/L in blood (unspecified) @ autopsy

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
633	64 y M	Amphetamine	3	3	U	Ingst	Unk	2	Amphetamine	0.08 mg/L in blood (unspecified) @ autopsy
		Alprazolam	4	4					Alprazolam	0.07 mg/L in blood (unspecified) @ autopsy
		Salicylate	1	1					Salicylate	60 mg/dL in serum @ 5 m (pe)
634	64 y F	Acetaminophen/hydrocodone	1	1	U	Ingst	Int-S	2	Acetaminophen	49 mcg/mL in serum @ 1 h (pe)
635h	64 y M	Salicylate	1	1	A	Ingst	Unk	1	Salicylate	100.6 mg/dL in blood (unspecified) @ unknown
		Acetaminophen	1	1					Acetaminophen	32 mcg/mL in blood (unspecified) @ unknown
636	64 y M	Acetaminophen	1	1	A/C	Ingst	Unt-M	1	Acetaminophen	32 mcg/mL in blood (unspecified) @ unknown
637h	64 y M	Acetaminophen/hydrocodone	1	1	A/C	Ingst	Int-S	1	Acetaminophen	430 mcg/mL in blood (unspecified) @ unknown
		Barbiturate	2	2					Barbiturate	
638ph	64 y M	Benzodiazepine	3	3	A/C	Ingst	Int-U	2	Benzodiazepine	
		Morphine	1	1					Morphine	
639h	64 y M	Acetaminophen	1	1	U	Ingst	Int-S	2	Acetaminophen	105.5 mcg/mL in serum @ unknown
		Salicylate	2	2					Salicylate	9.3 mg/dL in serum @ unknown
		Salicylate	2	2					Salicylate	
640h	64 y M				A	Ingst + Aspir + - Derm	Int-S	2		
641pa	65 y M	Droperidol/fentanyl	1	1	U	Ingst	Unk	2	Droperidol/fentanyl	
		Ibuprofen	2	2					Ibuprofen	
		Methadone	1	1					Methadone	
642	65 y F	Methadone	1	1	C	Ingst	Int-M	3	Eddp (2-ethylidene-1,5-dimethyl-3,3-diphenyl pyrrolidine)	1000 ng/mL in blood (unspecified) @ autopsy
		Methadone	1	1					Methadone	4000 ng/mL in blood (unspecified) @ autopsy
643h	65 y F	Ibuprofen	1	1	U	Ingst + Unk	Int-S	1	Acetaminophen	469 mcg/mL in blood (unspecified) @ unknown
644h	66 y F	Hydrocodone	2	2	A	Ingst	Int-S	2	Hydrocodone	
		Ethanol	3	3					Ethanol	
		Oxycodone	1	1					Oxycodone	
645h	66 y M	Acetaminophen	2	2	A	Ingst	Int-S	2	Acetaminophen	
		Acetaminophen/diphenhydramine	1	1					Acetaminophen/diphenhydramine	
646h	66 y F	Morphine (extended release)	1	1	A	Ingst	Int-S	1		
647	66 y M	Diazepam	2	2	A	Ingst	Int-S	2	Diazepam	
		Quetiapine	3	3					Quetiapine	
		Colchicine	1	1					Colchicine	
648ha	66 y F	Salicylate	2	2	A	Ingst	Int-S	1	Salicylate	
		Allopurinol	3	3					Allopurinol	
		Acetaminophen/codeine	4	4					Acetaminophen/codeine	
649a	66 y F	Acetaminophen	1	1	A	Ingst	Int-S	1	Acetaminophen	
		Acetaminophen	1	1	A	Ingst	Int-S	1	Salicylate	5.7 mg/dL in blood (unspecified) @ unknown

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
650h	66 y F	Acetaminophen	1	1					Acetaminophen	510 mg/L in blood (unspecified) @ unknown
		Salicylate	2	2	U	Ingst	Unt-U	2		
		Acetaminophen/hydrocodone	1	1					Acetaminophen	143 mcg/mL in blood (unspecified) @ unknown
		Acetaminophen/hydrocodone	1	1					Acetaminophen	75.8 mcg/mL in blood (unspecified) @ unknown
		Alcohol, unknown	2	2					Ethanol	0.01 mg/dL in blood (unspecified) @ unknown
651pha	67 y F				A	Ingst	Int-S	3		
652	67 y M	Acetaminophen Drug, unknown	1	1						
			2	2						
653	67 y F	Methadone	1	1	A	Ingst	Int-A	3		
654	67 y F	Oxycodone	1	1	U	Ingst	Unk	2		
		Acetaminophen	2	2						
655h	68 y F	Acetaminophen	1	1	A	Ingst	Int-S	1	Acetaminophen	280 mcg/mL in blood (unspecified) @ 4 d (pe)
		Acetaminophen	1	1					Acetaminophen	300 mcg/mL in blood (unspecified) @ 3 d (pe)
		Acetaminophen	1	1					Acetaminophen	381 mcg/mL in blood (unspecified) @ 3 d (pe)
		Acetaminophen	1	1					Acetaminophen	497 mcg/mL in blood (unspecified) @ 3 d (pe)
		Acetaminophen	1	1					Acetaminophen	553 mcg/mL in blood (unspecified) @ 3 d (pe)
		Acetaminophen	1	1					Acetaminophen	690 mcg/mL in blood (unspecified) @ 2 d (pe)
656pha	68 y F	Salicylate	1	1	A	Ingst	Int-A	1		
657h	68 y F	Fentanyl	1	1					Fentanyl	0.033 mg/L in blood (unspecified) @ autopsy
		Fentanyl	1	1					Fentanyl	0.039 mg/L in vitreous @ autopsy
		Fentanyl	1	1					Fentanyl	2.2 mg/L in urine (quantitative only) @ autopsy
		Fentanyl	1	1					Fentanyl	2.87 mg/L In Bile @ autopsy
658h	68 y M	Acetaminophen/hydrocodone	1	1	A/C	Ingst	Int-S	3	Acetaminophen	205 mg/L in serum @ 1 h (pe)
		Benzodiazepine	2	2						
		Gabapentin	3	3						
659p	68 y F	Acetaminophen/hydrocodone	1	1	C	Ingst	Int-M	2	Acetaminophen	50 mg/L in blood (unspecified) @ unknown
660h	68 y F	Acetaminophen Drug, unknown	1	1	U	Ingst + Unk	Int-S	2	Acetaminophen	118 mcg/mL in plasma @ unknown
			2	1						
661	69 y F	Salicylate	1	1	A	Ingst	Int-S	1	Salicylate	115 mg/dL in blood (unspecified) @ unknown
		Salicylate	1	1					Salicylate	69 mg/dL in blood (unspecified) @ unknown
		Salicylate	1	1					Salicylate	95 mg/dL in blood (unspecified) @ unknown
662pha	69 y F	Salicylate	1	1	U	Ingst	Int-S	3		
		Clopidogrel	2	2						
662pha	69 y F	Acetaminophen/oxycodone	1	1	A/C	Ingst	Int-S	1	Oxycodone	174 ng/mL in blood (unspecified) @ unknown

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
663h	69 y M	Acetaminophen/oxycodone	1	1	A/C	Ingst	Int-S	2	Acetaminophen	98 mcg/mL in blood (unspecified) @ unknown
		Diazepam	2	2					Nordiazepam	253 ng/mL in urine (quantitative only) @ unknown
		Diazepam	2	2					Oxazepam	805 ng/mL in urine (quantitative only) @ unknown
		Acetaminophen/hydrocodone	1	1						
		Zolpidem	2	2						
664h	69 y F	Pregabalin	3	3	U	Ingst	Unk	2		
		Drug, unknown	4	4						
		Acetaminophen	1	1					Acetaminophen	18.2 mcg/mL in serum @ unknown
665h	70 y F	Acetaminophen/hydrocodone	1	1	A	Ingst + Aspir	Int-S	1	Acetaminophen	32 mcg/mL in blood (unspecified) @ unknown
		Acetaminophen/hydrocodone	1	1					Hydrocodone	456 ng/mL in blood (unspecified) @ unknown
		Diazepam	2	2					Diazepam	192 ng/mL in blood (unspecified) @ unknown
		Zolpidem	3	3					Zolpidem	1.17 mg/L in blood (unspecified) @ unknown
		Tizanidine	4	4						
666p	70 y F	Oxycodone	1	1	A	Ingst	Int-S	2		
667hi	70 y F	Acetaminophen	1	1	C	Ingst	Unt-T	1	Acetaminophen	336 mcg/mL in plasma @ unknown
668h	70 y M	Acetaminophen	1	1	A	Ingst	Int-S	1	Acetaminophen	128.1 mcg/mL in serum @ unknown
		Acetaminophen	1	1					Acetaminophen	16.1 mcg/mL in serum @ unknown
		Acetaminophen	1	1					Acetaminophen	37.5 mcg/mL in serum @ unknown
		Acetaminophen	1	1					Acetaminophen	87.8 mcg/mL in serum @ unknown
[669h]	71 y M	Salicylate	1	1	A	Ingst	Int-S	1	Salicylate	67.5 mg/dL in serum @ 8 h (pe)
		Salicylate	1	1					Salicylate	72.4 mg/dL in serum @ 12 h (pe)
670	71 y M				A	Par	Unt-T	3		
671h	71 y F	Droperidol/fentanyl	1	1	A	Ingst + Derm	Int-S	3		
		Fentanyl (transdermal)	1	1						
672ha	71 y F	Benzodiazepine	2	2	C	Ingst	Int-U	1		
		Acetaminophen	1	1					Acetaminophen	36 mcg/mL in blood (unspecified) @ unknown
		Citalopram	2	2					Citalopram	0.18 mcg/mL in blood (unspecified) @ unknown
673	71 y M				A	Ingst	Int-S	1		
		Salicylate	1	1					Salicylate	106.5 mg/dL in serum @ 4.5 h (pe)
		Salicylate	1	1					Salicylate	31 mg/dL in serum @ 30 m (pe)
		Salicylate	1	1					Salicylate	77.5 mg/dL in serum @ 2 h (pe)
		Salicylate	1	1					Salicylate	97.7 mg/dL in serum @ 7 h (pe)
674h	72 y F	Acetaminophen	1	1	A	Ingst	Int-M	1	Acetaminophen	29 mcg/mL in serum @ 10 m (pe)

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time		
675	72 y F	Milk thistle	2	2	A	Ingst	Int-S	2				
		Bismuth subsalicylate	3	3								
		Tramadol	1	1								
		Citalopram	2	2								
		Alprazolam	3	3								
676p	72 y M	Acetaminophen	4	4	U	Ingst	Unk	3				
		Celecoxib	5	5								
		Salicylate	1	1							Salicylate	22 mg/dL in blood (unspecified) @ 3 d (pe)
		Salicylate	1	1							Salicylate	28 mg/dL in blood (unspecified) @ 18 h (pe)
		Salicylate	1	1							Salicylate	32 mg/dL in blood (unspecified) @ 10 h (pe)
		Salicylate	1	1							Salicylate	40 mg/dL in blood (unspecified) @ 3 h (pe)
		Salicylate	1	1							Salicylate	64 mg/dL in blood (unspecified) @ 1 h (pe)
677h	72 y F				A	Ingst	Unt-T	1				
678ha	72 y F	Acetaminophen/hydrocodone	1	1	A	Ingst	Int-S	1				
		Acetaminophen/hydrocodone	1	1							Hydrocodone (free)	0.56 mg/L in blood (unspecified) @ autopsy
		Acetaminophen/hydrocodone	1	1							Acetaminophen	30 mg/L in blood (unspecified) @ unknown
679h	73 y M				A	Ingst	Int-S	3				
680h	73 y M	Acetaminophen	1	1	A	Ingst	Int-S	1				
		Salicylate	1	1							Salicylate	104.4 mg/dL in blood (unspecified) @ 26.5 h (pe)
		Salicylate	1	1							Salicylate	68.8 mg/dL in blood (unspecified) @ 13 h (pe)
		Salicylate	1	1							Salicylate	85.66 mg/dL in blood (unspecified) @ 17 h (pe)
		Salicylate	1	1							Salicylate	94 mg/dL in blood (unspecified) @ 20 h (pe)
		Salicylate	1	1							Salicylate	95 mg/dL in blood (unspecified) @ 23 h (pe)
		Salicylate	1	1							Salicylate	97.6 mg/dL in blood (unspecified) @ 25 h (pe)
681h	73 y M	Atropine/diphenoxylate	2	2	A/C	Ingst	Int-S	1				
		Hydroxychloroquine	3	3								
		Tamsulosin	4	4								
		Ranitidine	5	5								
		Acetaminophen/hydrocodone	1	1								
682a	73 y F	Zolpidem	2	2	A	Ingst	Int-S	1				
		Acetaminophen	1	1							Acetaminophen	270 mg/L in blood (unspecified) @ 8 h (pe)
683h	73 y F				A/C	Ingst	Int-S	3				
684	74 y F	Acetaminophen/hydrocodone	1	1	A	Ingst	Int-S	2				
		Acetaminophen	1	1								
685h	74 y F	Oxycodone	2	2	C	Ingst	Int-U	3				
		Acetaminophen	1	1								
686	75 y M				A	Ingst	Int-S	2				
		Acetaminophen/hydrocodone	1	1					Acetaminophen	59 mcg/mL in blood (unspecified) @ 48 h (pe)		

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
687h	76 y F	Acetaminophen/ hydrocodone Drug, unknown	1 2	1 1	A	Ingst	Unk	1		
688h	76 y F	Salicylate	1	1	A	Ingst	Int-S	2	Salicylate	103.8 mg/dL in blood (unspecified) @ 22 h (pe)
		Salicylate	1	1					Salicylate	108 mg/dL in blood (unspecified) @ unknown
		Salicylate	1	1					Salicylate	37.6 mg/dL in blood (unspecified) @ 14 h (pe)
		Salicylate	1	1					Salicylate	65.9 mg/dL in blood (unspecified) @ 17 h (pe)
		Salicylate	1	1					Salicylate	69.9 mg/dL in blood (unspecified) @ 3.5 h (pe)
		Salicylate	1	1					Salicylate	91 mg/dL in blood (unspecified) @ unknown
		Salicylate	1	1					Salicylate	98 mg/dL in blood (unspecified) @ unknown
		Acetaminophen	2	2					Acetaminophen	178.3 mcg/mL in blood (unspecified) @ 3.5 h (pe)
689h	76 y M	Acetaminophen	1	1	A/C	Ingst	Int-M	1	Acetaminophen	82.6 mcg/mL in serum @ unknown
690ha	77 y F	Acetaminophen	1	1	C	Ingst	Unt-T	3		
691	77 y F	Acetaminophen	1	1	U	Ingst	Unk	2	Acetaminophen	18 mcg/mL in blood (unspecified) @ unknown
692ha	78 y F	Acetaminophen	1	1	A	Ingst	Unt-G	1		
693	78 y M	Colchicine	1	1	A	Ingst	Unt-T	1		
694h	79 y F	Acetaminophen	1	1	C	Ingst	Int-M	2	Acetaminophen	37 mcg/mL in blood (unspecified) @ unknown
695ha	79 y M	Acetaminophen/ oxycodone	1	1	A/C	Ingst	Int-U	3	Oxycodone	0.31 mg/L in serum @ 1 m (pe)
		Acetaminophen/ oxycodone	1	1					Acetaminophen	34 mg/L in serum @ 1 m (pe)
		Acetaminophen/ oxycodone	1	1					Acetaminophen	62 mg/L in serum @ 3 h (pe)
696pha	79 y M	Morphine	1	1	A	Ingst	Int-S	1	Morphine (free)	981 ng/mL in blood (unspecified) @ 1 h (pe)
697h	80 y F	Naproxen	1	1	A	Ingst	Int-U	3		
698	80 y F	Acetaminophen/ oxycodone	1	1	U	Ingst	Int-S	3		
		Valproic acid	2	2						
699	80 y F	Acetaminophen	1	1	A	Ingst	Unk	2		
700	80 y F	Acetaminophen/ hydrocodone	1	1	A	Ingst	Int-S	1	Acetaminophen	109 mcg/mL in blood (unspecified) @ unknown
701h	80 y M	Benzodiazepine	2	2	A	Ingst	Int-S	1		
		Acetaminophen/opioid	1	1					Acetaminophen	338 mg/L in blood (unspecified) @ unknown
		Oxycodone	2	2						
702h	80 y F				C	Ingst	Int-M	1		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
703h	81 y M	Acetaminophen	1	1					Acetaminophen	126 mcg/mL in plasma @ unknown
		Acetaminophen/opioid	1	1	A	Ingst + Aspir	Int-U	2	Acetaminophen	88 mcg/mL in blood (unspecified) @ unknown
704h	82 y F	Salicylate	1	1	U	Ingst	Unk	2	Salicylate	71 mg/dL in serum @ unknown
705h	83 y F	Acetaminophen/hydrocodone	1	1	U	Ingst	Int-U	2		
706a	84 y F	Acetaminophen/oxycodone	1	1	A/C	Ingst	Int-S	2	Acetaminophen	228 mcg/mL in blood (unspecified) @ unknown
		Acetaminophen/oxycodone	1	1					Acetaminophen	235 mcg/mL in blood (unspecified) @ unknown
		Acetaminophen/oxycodone	1	1					Oxycodone	2600 ng/mL in blood (unspecified) @ unknown
		Lorazepam	2	2						
		Clonazepam	3	3						
707p	85 y M	Acetaminophen/hydrocodone	1	1	A	Ingst	Int-S	1	Acetaminophen	126 mcg/mL in blood (unspecified) @ 1 h (pe)
708h	85 y F	Acetaminophen	1	1	A/C	Ingst	Unt-T	1	Acetaminophen	98 mcg/mL in blood (unspecified) @ unknown
709a	86 y F	Salicylate	1	1	A	Ingst	Int-S	1	Salicylate	350 mcg/mL in blood (unspecified) @ unknown
		Salicylate	1	1					Salicylate	62.7 mg/dL in blood (unspecified) @ unknown
		Salicylate	1	1					Salicylate	74.5 mg/dL in blood (unspecified) @ unknown
710ha	87 y F	Alprazolam	2	2	A/C	Ingst	Int-S	2		
		Acetaminophen	1	1					Acetaminophen	370 mcg/mL in serum @ unknown
		Diphenhydramine	2	2					Diphenhydramine	600 ng/mL in blood (unspecified) @ unknown
		Nifedipine	3	3					Nifedipine	26 ng/mL in serum @ unknown
711p	87 y M	Acetaminophen	1	1	A	Ingst	Int-S	1		
712	88 y F	Acetaminophen/hydrocodone	1	1	A	Ingst	Int-S	2	Acetaminophen	192 mg/dL in blood (unspecified) @ unknown
713ha	88 y F	Oxymorphone	1	1	U	Ingst	Int-M	1		
714	88 y F	Acetaminophen	1	1	A	Ingst	Int-S	2	Acetaminophen	600 mcg/mL in blood (unspecified) @ unknown
715	89 y F	Tramadol	1	1	A/C	Ingst	Int-S	2		
		Gabapentin	2	2						
716a	90 y M	Acetaminophen/hydrocodone	1	1	A	Ingst	Int-S	2	Hydrocodone	32.1 ng/mL in blood (unspecified) @ autopsy
717	91 y F	Salicylate	1	1	A	Ingst	Unk	1	Salicylate	111 mg/dL in blood (unspecified) @ 3 h (pe)
718pa	93 y M	Morphine	1	1	A	Ingst	Unt-G	3		
719ph	10 m F	Oxycodone	1	1	A	Ingst	Unk	2		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
[720]	13 m M	Salicylate	1	1	A	Ingst	Unt-G	1	Salicylate	94 mg/dL in blood (unspecified) @ unknown
721p	14 m M	Oxycodone	1	1	U	Unk	Unk	2		
[722ph]	15 m F	Buprenorphine/naloxone (sublingual film)	1	1	A	Ingst	Unt-G	1	Buprenorphine	5.6 ng/mL in blood (unspecified) @ autopsy
		Buprenorphine/naloxone (sublingual film)	1	1					Norbuprenorphine	6.8 ng/mL in blood (unspecified) @ autopsy
723h	unknown adult (>=20 yrs) F				U	Unk	Int-U	2		
		Acetaminophen	1	1						
		Drug, unknown	2	2						
See also case 12, 18, 37, 40, 58, 72, 90, 92, 115, 172, 190, 215, 231, 250, 257, 730, 731, 735, 775, 780, 782, 784, 790, 794, 796, 797, 803, 805, 806, 812, 819, 825, 829, 831, 835, 839, 840, 841, 845, 847, 852, 854, 855, 867, 875, 883, 884, 893, 922, 929, 930, 931, 932, 934, 935, 937, 938, 939, 943, 946, 951, 957, 958, 969, 972, 973, 974, 976, 979, 991, 992, 996, 997, 1002, 1003, 1006, 1007, 1008, 1010, 1022, 1026, 1032, 1036, 1037, 1041, 1049, 1050, 1055, 1065, 1069, 1079, 1082, 1085, 1093, 1094, 1103, 1109, 1110, 1113, 1123, 1128, 1130, 1132, 1135, 1141, 1145, 1146, 1147, 1153, 1158, 1161, 1168, 1174, 1179, 1182, 1183, 1184, 1186, 1187, 1189, 1192, 1195, 1197, 1200, 1204, 1207, 1217, 1219, 1221, 1224, 1230, 1234, 1237, 1242, 1244, 1245, 1247, 1250, 1254, 1255, 1257, 1259, 1260, 1266, 1300, 1301, 1305, 1306, 1308, 1309, 1315, 1318, 1323, 1326, 1327, 1336, 1339, 1350, 1353, 1356, 1357, 1358, 1361, 1367, 1374, 1382, 1385, 1388, 1390, 1397, 1408, 1410, 1411, 1412, 1413, 1419, 1420, 1428, 1433, 1436, 1456, 1459, 1465, 1469, 1475, 1476, 1477, 1480, 1485, 1489										
Anesthetics										
724pai	39 y F	Lidocaine	1	1	A	Par	AR-D	3		
[725h]	55 y F	Lidocaine	1	1	A	Par	Unt-T	1		
726	69 y F	Lidocaine	1	1	A	Par	Unt-T	2		
See also case 626, 1357, 1457										
Anticoagulants										
727	50 y F	Enoxaparin	1	1	C	Par	AR-D	3		
728h	83 y F	Rivaroxaban	1	1	C	Ingst	AR-D	1		
		Linezolid	2	2						
		Carbidopa/levodopa	3	3						
See also case 128, 231, 522, 601, 661, 929, 930, 946, 974, 997, 1026, 1036, 1052, 1063, 1085, 1091, 1103, 1115, 1122, 1158										
Anticonvulsants										
729ha	17 y F	Lamotrigine	1	1	A/C	Ingst	Int-S	1		
		Olanzapine	2	1						
		Citalopram	3	3						
		Ethanol	4	4						
730h	18 y M	Gabapentin	1	1	A	Ingst	Int-S	2		
		Diclofenac	2	2						
		Acetaminophen/dextromethorphan/pseudoephedrine	3	3						
		Levothyroxine	4	4						
731ha	21 y M	Lamotrigine	1	1	A	Ingst	Int-S	3	Lamotrigine	7 mcg/mL in blood (unspecified) @ unknown
		Diphenhydramine	2	2					Diphenhydramine	630 ng/mL in blood (unspecified) @ unknown
		Marijuana	3	3					Delta-9-thc	0.59 ng/mL in blood (unspecified) @ unknown
		Marijuana	3	3					Delta-9-carboxy-thc	7.6 ng/mL in blood (unspecified) @ unknown
		Vortioxetine	4	4						
		Fexofenadine	5	5						
		Naproxen	6	6						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
732h	22 y F	Levothyroxine	7	7	A/C	Ingst	Int-S	2		
		Cetirizine	8	8						
		Doxycycline	9	9						
733h	28 y M	Pregabalin	1	1	A/C	Ingst	Int-S	1	Valproic acid	458 mcg/mL in serum @ unknown
		Valproic acid (extended release)	1	1						
		Lithium (extended release)	2	2						
734pha	28 y M	Risperidone	3	3	A	Ingst	Int-U	2	Lithium	1.45 mEq/L in serum @ unknown
		Hydroxyzine	4	4						
		Quetiapine	5	5						
		Oxcarbazepine	1	1						
		Ethanol	2	2						
735	29 y M				A	Ingst	Int-S	2	10-Hydroxycarbazepine	27 mcg/mL in serum @ unknown
736ph	34 y F	Gabapentin	1	1	C	Ingst	Int-S	3		
		Acetaminophen/hydrocodone	2	2						
		Quetiapine	3	3						
737	38 y M	Valproic acid	1	1	A	Ingst	Int-S	1	Ethanol	155 mg/dL in serum @ 5 h (pe)
		Lamotrigine	1	1						
		Ethanol	2	2						
738p	38 y F	Metoprolol	3	3	A	Ingst	Int-U	2		
		Lisinopril	4	4						
		Trazodone	5	5						
		Diphenhydramine	6	6						
		Valproic acid	7	7						
		Eszopiclone	8	8						
		Oxybutynin	9	9						
		Gabapentin	1	1						
		Ethanol	2	2						
739p	39 y F	Drug, unknown	3	3	U	Ingst	Int-U	3		
740ha	40 y F	Gabapentin	1	1	A	Ingst	Int-S	1	Valproic acid	220 mcg/mL in blood (unspecified) @ 555 h (pe)
		Valproic acid	1	1						
741p	41 y F	Zolpidem	2	2	C	Ingst	Int-A	1		
		Ziprasidone	3	3						
		Alprazolam	4	4						
742h	45 y M	Gabapentin	1	1	U	Ingst	AR-D	2		
		Phenytoin	1	1						
[743h]	46 y F				U	Ingst	Int-S	1	Valproic acid	195 mg/L in serum @ 4 d (pe)
		Valproic acid	1	1						
744h	47 y F	Valproic acid	1	1	A/C	Ingst	Int-S	1	Valproic acid	311 mg/L in serum @ 3 d (pe)
745h	51 y F	Valproic acid (extended release)	1	1	A/C	Ingst	Int-S	1	Valproic acid	202.3 mg/L in blood (unspecified) @ 4 d (pe)
		Valproic acid (extended release)	1	1						
		Valproic acid (extended release)	1	1						
		Valproic acid (extended release)	1	1						
		Carvedilol	3	2						
		Quetiapine	2	2						
		Lisinopril	4	3						
		Valproic acid	1	1						
		Lamotrigine	2	2						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
746	52 y F	Haloperidol	3	3	U	Ingst	Int-S	1		
		Donepezil	4	4						
		Olanzapine	5	5						
		Hydroxyzine	6	6						
		Benztropine	7	7						
		Duloxetine	8	8						
747ha	53 y F	Carbamazepine	1	1	A/C	Ingst	Int-S	1	Carbamazepine	35.7 mg/L in serum @ 7 h (pe)
		Fluoxetine	2	2						
748h	54 y F	Carbamazepine	1	1	A	Ingst	Int-S	2	Carbamazepine	44 mg/L in serum @ 2 d (pe)
		Hydroxyzine	2	2						
		Carbamazepine	1	1						
749h	56 y M	Clonazepam	2	2	A/C	Ingst	Unk	2	Phenytoin	40 mcg/mL in serum @ unknown
		Gabapentin	3	3						
		Alcohol, unknown	4	4						
		Phenytoin	1	1						
750ha	59 y F	Ethanol	2	2	U	Ingst	Int-S	2	Ethanol	323 mg/dL in serum @ unknown
		Carbamazepine	1	1						
751h	61 y F	Carbamazepine	1	1	A/C	Ingst	Int-S	3	Phenytoin	54.1 mcg/mL in blood (unspecified) @ 3 d (pe)
		Carbamazepine	1	1						
		Metoprolol	2	2						
		Alprazolam	3	3						
		Donepezil	4	4						
		Quetiapine	5	5						
752a	62 y M	Fluoxetine	6	6	C	Ingst	AR-D	3	Phenytoin	58.1 mcg/mL in blood (unspecified) @ 2 d (pe)
		Phenytoin	1	1						
		Phenytoin	1	1						
753	67 y M	Phenytoin	1	1	A/C	Ingst	Int-S	2	Phenytoin	76 mcg/mL in blood (unspecified) @ unknown
		Alprazolam	2	2						
		Oxcarbazepine	1	1						
754	81 y F	Cyclobenzaprine	2	2	A/C	Ingst	Int-S	2	Phenytoin	52 mg/L in serum @ unknown
		Methocarbamol	3	3						
		Lacosamide	1	1						
[755p]	2 y M	Alprazolam	2	2	A	Ingst	Unt-G	1	Amitriptyline	373 ng/mL in serum @ unknown
		Levetiracetam	3	3						
		Amitriptyline	1	1						
756a	8 y F	Amitriptyline	1	1	C	Ingst	Int-U	2	Nortriptyline	80 ng/mL in serum @ unknown
		Amitriptyline	1	1						
		Amitriptyline	1	1					Amitriptyline	500 ng/mL in blood (unspecified) @ unknown
		Amitriptyline	1	1					Amitriptyline	520 ng/mL in blood (unspecified) @ unknown

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
757ph	14 y F	Amphetamine/dextroamphetamine	2	2	A/C	Ingst	Int-S	2	Amphetamine	170 ng/mL in blood (unspecified) @ unknown
		Mirtazapine	3	3						
		Bupropion	1	1						
		Fluoxetine	2	2						
758h	14 y M	Aripiprazole	3	3	U	Unk	Unk	1	Bupropion	200 ng/mL in blood (unspecified) @ 28 h (pe)
		Bupropion	1	1						
		Bupropion	1	1					Hydroxybupropion	2400 ng/mL in blood (unspecified) @ 28 h (pe)
759h	15 y F	Meclizine	2	2	A	Ingst	Int-S	2		
		Amitriptyline	1	1						
760h	18 y F	Bupropion	1	1	A	Ingst	Int-S	1		
		Duloxetine	2	2						
761ha	18 y M	Bupropion	1	1	A	Ingst	Int-S	1		
		Quetiapine	2	2						
		Oxcarbazepine	3	3						
		Melatonin	4	4					10-hydroxycarbazepine	62 mcg/mL in whole blood @ autopsy
762pha	18 y F	Nortriptyline	1	1	A	Ingst	Int-S	1		
763	19 y F	Venlafaxine	1	1	A	Ingst	Int-S	2		
		Lamotrigine	2	2						
		Doxylamine	3	3						
		Diphenhydramine	4	4						
764pai	19 y M	Bupropion (extended release)	1	1	U	Ingst	Int-S	1	Bupropion	9839 ng/mL in blood (unspecified) @ autopsy
		Mirtazapine	2	2					Mirtazapine	14 ng/mL in blood (unspecified) @ autopsy
		Pregabalin	3	2						
		Aripiprazole	4	3						
765ha	20 y F	Citalopram	1	1	U	Ingst	Int-S	1	Citalopram	7600 ng/mL in blood (unspecified) @ 1 h (pe)
		Clonazepam	2	2					7-Aminoclonazepam	11 ng/mL in blood (unspecified) @ 1 h (pe)
		Clonazepam	2	2					Clonazepam	51 ng/mL in blood (unspecified) @ 1 h (pe)
		Alprazolam	3	3					Alprazolam	92 ng/mL in blood (unspecified) @ 1 h (pe)
		Methylphenidate	4	4					Methylphenidate	5.2 ng/mL in blood (unspecified) @ 1 h (pe)
766h	21 y F	Bupropion	1	1	A/C	Ingst	Int-S	2		
		Lorazepam	2	2						
767	21 y M	Bupropion	1	1	A/C	Ingst	Int-S	1		
768ph	21 y F	Fluoxetine	1	1	A/C	Ingst	Int-S	2		
		Hydroxyzine	2	2						
		Ethanol	3	3						
		Melatonin	4	4					Ethanol	67 mg/dL in serum @ unknown
769p	21 y M	Bupropion	1	1	A	Ingst	Int-S	2		
		Escitalopram	2	2						
770p	23 y F	Venlafaxine	1	1	A	Ingst + Aspir	Int-S	3		
771ha	24 y F	Amitriptyline	1	1	A/C	Ingst	Int-S	1	Amitriptyline	1200 ng/mL in blood (unspecified) @ 6 h (pe)
		Amitriptyline	1	1					Nortriptyline	590 ng/mL in blood (unspecified) @ 6 h (pe)
		Lamotrigine	2	2					Lamotrigine	47 mcg/mL in blood (unspecified) @ unknown

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
772h	24 y F	Alprazolam	3	3	A	Ingst	Int-S	1	Alpha-oh-alprazolam	36 ng/mL in blood (unspecified) @ unknown
		Alprazolam	3	3					Alprazolam	620 ng/mL in blood (unspecified) @ unknown
		Diazepam	4	4					Diazepam	1100 ng/mL in blood (unspecified) @ unknown
		Diazepam	4	4					Nordiazepam	180 ng/mL in blood (unspecified) @ unknown
		Bupropion	1	1						
		Isocarboxazid	2	2						
		Citalopram	3	3						
773ha	24 y M	Lamotrigine	4	4	A	Ingst	Int-S	1		
		Quetiapine	5	5						
		Lurasidone	6	6						
		Diazepam	7	7						
		Bupropion (extended release)	1	1					Bupropion	12 mcg/mL in whole blood @ autopsy
		Bupropion (extended release)	1	1					Bupropion	7.9 mcg/mL in whole blood @ autopsy
		Fluoxetine	2	2					Fluoxetine	3.5 mcg/mL in whole blood @ autopsy
774ha	25 y F	Fluoxetine	2	2	A	Ingst	Int-S	1	Fluoxetine	3.9 mcg/mL in whole blood @ autopsy
		Ethanol	3	3					Ethanol	350 mg/dL in plasma @ unknown
		Nortriptyline	1	1					Nortriptyline	2800 mcg/mL in blood (unspecified) @ unknown
775pa	28 y M	Tetrahydrocannabinol	2	2	A/C	Ingst	Int-U	1		
		Amitriptyline	1	1					Amitriptyline	1100 ng/mL in whole blood @ autopsy
		Amitriptyline	1	1					Nortriptyline	1500 ng/mL in whole blood @ autopsy
		Haloperidol	2	2					Haloperidol	11 ng/mL in whole blood @ autopsy
		Pimozide	3	3						
		Clonazepam	4	4					Clonazepam	4.1 ng/mL in whole blood @ autopsy
		Clonazepam	4	4					7-Aminoclonazepam	83 ng/mL in whole blood @ autopsy
		Valproic acid	5	5						
		Benzotropine	6	6						
		Ranitidine	7	7						
		Ibuprofen	8	8						
776h	29 y M	Sulfamethoxazole/trimethoprim	9	9						
		Loratadine	10	10						
		Gabapentin	11	11						
777h	29 y F	Venlafaxine	1	1	A/C	Ingst	Int-S	2		
778p	29 y M	Bupropion	1	1	U	Ingst	Int-A	2		
		Citalopram	2	2						
779h	29 y F	Etizolam	1	1	A/C	Ingst	Int-S	1		
780h	30 y F	Amitriptyline	1	1	A	Ingst	Int-S	1		
		Benzodiazepine	2	2						
		Amitriptyline	1	1						
		Ethanol	2	2					Ethanol	78 mg/dL in blood (unspecified) @ 6 h (pe)
		Acetaminophen/oxycodone	3	3						
781h	30 y M	Drug, unknown	4	4	A/C	Ingst	Int-S	2		
		Bupropion (extended release)	1	1						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
782h	30 y F	Bupropion	1	1	A/C	Ingst	Int-S	1		
		Trazodone	2	2						
		Venlafaxine	3	3						
		Meloxicam	4	4						
		Lisinopril	5	5						
		Triamterene	6	6						
783	31 y F	Escitalopram	1	1	A/C	Ingst + Aspir	Int-S	2		
		Benzodiazepine	2	2						
		Ethanol	3	3					Ethanol	0 mg/dL in serum @ unknown
784pa	31 y M	Amitriptyline	1	1	A/C	Ingst	Int-S	2	Nortriptyline	37 ng/mL in whole blood @ autopsy
		Amitriptyline	1	1					Amitriptyline	84 ng/mL in whole blood @ autopsy
		Tizanidine	2	2						
		Gabapentin	3	3					Gabapentin	62.1 mcg/mL in whole blood @ autopsy
		Hydrocodone	4	4					Hydromorphone	12 ng/mL in whole blood @ autopsy
		Hydrocodone	4	4					Hydrocodone	143 ng/mL in whole blood @ autopsy
		Hydrocodone	4	4					Dihydrocodeine	30 ng/mL in whole blood @ autopsy
785	31 y M	Bupropion	1	1	A	Ingst	Int-S	2		
786h	31 y F	Bupropion	1	1	A/C	Ingst	Int-S	2		
787ph	32 y M	Bupropion (extended release)	1	1	A	Ingst	Int-S	3		
		Cocaine	2	2						
788h	32 y F	Sertraline	1	1	A	Ingst	Int-S	3		
		Dicyclomine	2	2						
		Benzodiazepine	3	3						
		Zolpidem	4	4						
789h	32 y F	Amitriptyline	1	1	A	Ingst	Int-S	2		
790pa	33 y F	Bupropion	1	1	A/C	Ingst + Par	Int-S	2		
		Heroin	2	2						
		Fentanyl	3	3						
791p	34 y F	Bupropion (extended release)	1	1	A	Ingst	Int-S	1		
		Risperidone	2	2						
		Valproic acid	3	3						
792ha	34 y F	Amitriptyline	1	1	A	Ingst	Int-S	1	amitriptyline	3700 ng/mL in blood (unspecified) @ unknown
		Amitriptyline	1	1					nortriptyline	710 ng/mL in blood (unspecified) @ unknown
		Bupropion	2	2					bupropion	11 ng/mL in blood (unspecified) @ unknown
		Bupropion	2	2					hydroxybupropion	230 ng/mL in blood (unspecified) @ unknown
		Citalopram	3	3					citalopram	230 ng/mL in blood (unspecified) @ unknown
		Ethanol	4	4					ethanol	18 mg/dL in blood (unspecified) @ unknown
793h	34 y M	Bupropion	1	1	A	Ingst	Int-S	2		
		Carbamazepine	2	2					carbamazepine	21.6 mcg/mL in blood (unspecified) @ 14 h (pe)

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
794pha	35 y M	Carbamazepine	2	2	U	Ingst + Unk	Int-S	1	Carbamazepine	22 mcg/mL in blood (unspecified) @ 30 m (pe)
		Terazosin	3	3						
		Bupropion	1	1					Hydroxybupropion	1900 ng/mL in blood (unspecified) @ autopsy
		Bupropion	1	1					Bupropion	3900 ng/mL in blood (unspecified) @ autopsy
		Hydroxyzine	2	2					Hydroxyzine	350 ng/mL in blood (unspecified) @ autopsy
		Diphenhydramine	3	3					Diphenhydramine	160 ng/mL in blood (unspecified) @ autopsy
		Fentanyl	4	4					Norfentanyl	0.39 ng/mL in blood (unspecified) @ autopsy
		Fentanyl	4	4					Fentanyl	3.7 ng/mL in blood (unspecified) @ autopsy
		Olanzapine	5	5					Olanzapine	87 ng/mL in blood (unspecified) @ autopsy
		Levetiracetam	6	6					Levetiracetam	42 mcg/mL in blood (unspecified) @ autopsy
		Methamphetamine	7	7					Methamphetamine	8.7 ng/mL in blood (unspecified) @ autopsy
795ha	35 y F			A/C	Ingst	Int-S	1			
		Nortriptyline	1					1	Nortriptyline	2500 ng/mL in blood (unspecified) @ autopsy
		Ethanol	2					2		
		Diazepam	3					3	Diazepam	21 ng/mL in blood (unspecified) @ autopsy
		Diazepam	3					3	Nordiazepam	40 ng/mL in blood (unspecified) @ autopsy
		Gabapentin	4					4	Gabapentin	64 ng/mL in blood (unspecified) @ autopsy
		Sertraline	5					5	Desmethylsertraline	120 ng/mL in blood (unspecified) @ autopsy
796ha	35 y F	Sertraline	5	5	A	Ingst	Int-S	1	Sertraline	15 ng/mL in blood (unspecified) @ autopsy
		Bupropion	1	1						
		Diphenhydramine	2	2						
		Lamotrigine	3	3					Lamotrigine	40.8 mcg/mL in blood (unspecified) @ autopsy
		Fluoxetine	4	4					Norfluoxetine	0.48 mcg/mL in blood (unspecified) @ unknown
		Fluoxetine	4	4					Fluoxetine	1.5 mcg/mL in blood (unspecified) @ unknown
		Acetaminophen	5	5						
		Alprazolam	6	6						
		Zolpidem	7	7						
		Omeprazole	8	8						
797h	36 y F			A	Ingst	Int-S	3			
		Amitriptyline	1					1		
		Escitaopram	2					2		
		Gabapentin	3					3		
		Ibuprofen	4					4		
		Ethanol	5					5	Ethanol	218 mg/dL in blood (unspecified) @ 1 h (pe)
798	37 y M			U	Ingst	Int-S	2			
		Nortriptyline	1					1		
		Quetiapine	2					2		
		Zolpidem	3					3		
		Alprazolam	4					4		
799pa	37 y M	Gabapentin	5	5	A/C	Ingst	Int-U	2		
		Baclofen	6	6						
		Bupropion	1	1					Hydroxybupropion	3900 ng/mL in blood (unspecified) @ autopsy
		Bupropion	1	1					Bupropion	820 ng/mL in blood (unspecified) @ autopsy
		Venlafaxine	2	2					Venlafaxine	890 ng/mL in blood (unspecified) @ autopsy
800ph	37 y F			A	Ingst	Int-S	2			
		Amitriptyline	1					1		
		Ethanol	2	2						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
801ha	37 y F	Bupropion (extended release)	1	1	A/C	Ingst	Int-S	1		
802h	37 y F	Bupropion (extended release)	1	1	A/C	Ingst	Int-S	2		
803h	38 y F	Venlafaxine	1	1	A/C	Ingst	Int-S	1		
		Alprazolam	2	2						
		Hydrocodone	3	3						
804	38 y F	Bupropion	1	1	A/C	Ingst	Int-S	1		
		Quetiapine	2	2						
		Lamotrigine	3	3						
805h	38 y M	Doxepin	1	1	A	Ingst	Int-S	2		
		Tramadol	2	2						
		Venlafaxine	3	3						
		Clonazepam	4	4						
806ha	39 y M	Bupropion	1	1	A	Ingst	Int-S	1	Bupropion	180 ng/mL in serum @ unknown
		Bupropion	1	1					Hydroxybupropion	490 ng/mL in serum @ unknown
		Amlodipine	2	2						
		Escitalopram	3	3					Escitalopram	1300 ng/mL in serum @ unknown
		Salicylate	4	4					Salicylate	220 mcg/mL in serum @ unknown
		Losartan	5	5						
		Levothyroxine	6	6						
		Ethanol	7	7					Ethanol	42 mg/dL in serum @ unknown
807h	39 y F	Doxepin	1	1	A/C	Ingst	Int-S	2		
808	40 y F	Lithium	1	1	A	Ingst	Int-S	3	Lithium	3.9 mEq/L in blood (unspecified) @ unknown
		Thyroid preparation Drug, unknown	2	2						
			3	3						
809phi	40 y F	Doxepin	1	1	A	Ingst	Int-S	2		
		Alprazolam	2	2						
810p	40 y F	Amitriptyline	1	1	A	Ingst	Int-S	2		
811hai	40 y F	Venlafaxine (extended release)	1	1	A/C	Ingst	Int-S	2	Venlafaxine	39 mg/dL in blood (unspecified) @ 1 h (pe)
		Ethanol	2	2					Ethanol	0.16 g/dL in blood (unspecified) @ 1 h (pe)
812p	40 y M	Venlafaxine	1	1	A	Ingst	Int-S	2		
		Quetiapine	2	2						
		Hydroxyzine	3	3						
		Ethanol	4	4						
		Sertraline	5	5						
		Gabapentin	6	6						
		Zolpidem	7	7						
		Acetaminophen	8	8						
		Acetaminophen	9	9						
813h	41 y F	Amitriptyline	1	1	A/C	Ingst	Int-S	2		
814pha	41 y F	Amitriptyline	1	1	A	Ingst	Int-S	1		
		Clonazepam	2	2						
		Trazodone	3	3					Trazodone	7.4 mcg/mL in blood (unspecified) @ unknown
		Angiotensin converting enzyme inhibitor	4	4						
		Chlordiazepoxide	5	5						
815h	41 y M	Bupropion	1	1	A/C	Ingst	Int-S	1		
		Alpha blocker	2	2						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
816	42 y M	Amitriptyline	1	1	A/C	Ingst	Int-S	2		
		Ethanol	2	2						
817ha	43 y F	Venlafaxine	1	1	U	Ingst	Int-S	1	Venlafaxine	29015 ng/mL in blood (unspecified) @ 1 h (pe)
		Venlafaxine	1	1					o-Desmethyl-venlafaxine	5098 ng/mL in blood (unspecified) @ 1 h (pe)
		Trazodone	2	2					Trazodone	0.68 mcg/mL in blood (unspecified) @ 1 h (pe)
818	43 y F	Amitriptyline	1	1	A/C	Ingst	Int-S	2		
		Escitalopram	2	2						
		Lorazepam	3	3						
		Lithium	4	4					Lithium	2.9 mEq/L in serum @ unknown
819	44 y F	Venlafaxine (extended release)	1	1	A	Ingst	Int-S	2		
		Baclofen	2	2						
		Salicylate	3	3						
		Lamotrigine (extended release)	4	4						
		Clonazepam	5	5						
820pha	44 y F	Venlafaxine	1	1	U	Ingst	Int-S	1	o-Desmethyl-venlafaxine	1900 ng/mL in blood (unspecified) @ autopsy
		Venlafaxine	1	1					Venlafaxine	23,000 ng/mL in blood (unspecified) @ autopsy
		Lamotrigine	2	2					Lamotrigine	58 mcg/mL in blood (unspecified) @ autopsy
		Fluoxetine	3	3						
		Simvastatin	4	4						
		Ethanol	5	5					Ethanol	28 mg/dL in urine (quantitative only) @ autopsy
821h	45 y M	Lithium	1	1	U	Ingst	Oth-W	2	Lithium	2.5 ng/mL in blood (unspecified) @ unknown
822ph	45 y M	Ethanol	2	2	A	Ingst	Int-S	2		
		Bupropion (extended release)	1	1						
		Sertraline	2	2						
		Lamotrigine	3	3						
823pa	46 y F	Venlafaxine	1	1	U	Ingst	Int-S	1	Venlafaxine	247 ng/mL in blood (unspecified) @ autopsy
		Quetiapine	2	2					Quetiapine	5703 ng/mL in blood (unspecified) @ autopsy
		Drug, unknown	3	3					Buprenorphine	0.6 ng/mL in blood (unspecified) @ autopsy
		Drug, unknown	3	3					Methamphetamine	1407 ng/mL in blood (unspecified) @ autopsy
		Drug, unknown	3	3					Diphenhydramine	65.1 ng/mL in blood (unspecified) @ autopsy
824	47 y F	Amitriptyline	1	1	C	Ingst	Int-S	2		
825ph	48 y F	Duloxetine	1	1	A/C	Ingst	Int-S	2		
		Lamotrigine	2	2						
		Lamotrigine	3	3						
		Pregabalin	4	4						
		Cyclooxygenase-2 inhibitor	5	5						
826p	48 y F	Protriptyline	1	1	U	Ingst	Unk	2		
827h	49 y F	Venlafaxine	1	1	A/C	Ingst	Int-S	2		
828h	49 y F	Bupropion (extended release)	1	1	A/C	Ingst	Int-S	1		
		Lisinopril	2	2						
829ph	49 y F				U	Ingst	Unk	2		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
830h	50 y M	Amitriptyline	1	1	A	Ingst	Int-S	2	Amitriptyline	295 ng/mL in blood (unspecified) @ 2 h (pe)
		Amitriptyline	1	1					Nortriptyline	333 ng/mL in blood (unspecified) @ 2 h (pe)
		Methadone	2	2						
		Nicotine	3	3						
		Diphenhydramine	4	4						
		Caffeine	5	5						
831ha	50 y F	Metronidazole	6	6	A/C	Ingst	Int-S	1		
		Citalopram	1	1						
		Duloxetine	2	2						
832h	50 y F	Lamotrigine	3	3	A/C	Ingst	Int-S	2		
		Paroxetine	1	1					Paroxetine	3761 ng/mL in serum @ 1 h (pe)
		Tramadol	2	2					Tramadol	4.084 mg/L in serum @ 1 h (pe)
833	51 y F	Bupropion	1	1	A/C	Ingst	Int-S	1		
		Venlafaxine	2	2						
		Ethanol	3	3					Ethanol	50 mg/dL in blood (unspecified) @ unknown
		Methylenedioxymethamphetamine (MDMA)	4	4						
		Methocarbamol	5	5						
		Drug, unknown	6	6						
		Lamotrigine (extended release)	7	7						
		Benzodiazepine	8	8						
834ph	51 y F	Amitriptyline	1	1	A	Ingst	Int-S	1		
835ph	52 y F	Cyclic antidepressant, unknown	1	1	A/C	Ingst	Int-S	1		
		Beta blocker	2	2						
		Amitriptyline	1	1						
836	52 y F	Tapentadol (extended release)	2	2	A/C	Ingst	Int-S	2		
		Diazepam	3	3						
		Amitriptyline	1	1						
837h	52 y F	Metformin	2	2	A	Ingst	Int-S	2		
838ph	52 y F	Doxepin	1	1	C	Ingst	Int-S	1		
		Amitriptyline	1	1						
		Ethanol	2	2					Ethanol	150 mg/dL in blood (unspecified) @ 2 h (pe)
839h	53 y F	Venlafaxine	1	1	U	Ingst	Int-M	3		
		Ethanol	2	2					Ethanol	0 mg/dL in serum @ unknown
		Acetaminophen/diphenhydramine	3	3					Acetaminophen	0 mcg/mL in serum @ unknown
840	54 y F	Bupropion (extended release)	1	1	A	Ingst	Int-S	1		
		Venlafaxine	2	2						
		Linacotide	3	3						
		Loratadine	4	4						
		Salicylate	5	5					Salicylate	0.5 mg/dL in serum @ 1 h (pe)
		Vitamin D	6	6						
841	54 y F	Bupropion	1	1	A	Ingst	Int-S	2		
842pha	55 y F	Celecoxib	2	2	A	Ingst	Int-S	2		
		Trazodone	1	1						
		Cyclobenzaprine	2	2						
		Alprazolam	3	3						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
843ha	55 y F	Venlafaxine	1	1	A	Ingst	Int-S	1		
		Mirtazapine	2	2						
		Gabapentin	3	3						
844h	55 y F	Amitriptyline	1	1	A/C	Ingst	Int-S	2		
845pha	55 y F	Trazodone	1	1	U	Ingst	Int-S	1	Mcpp (meta-chloro-phenyl piperazine)	230 ng/mL in blood (unspecified) @ unknown
		Trazodone	1	1					Trazodone	6.5 mcg/mL in blood (unspecified) @ unknown
		Clonazepam	2	2					Clonazepam	42 ng/mL in blood (unspecified) @ unknown
		Acetaminophen	3	3					Hydrocodone (free)	370 ng/mL in blood (unspecified) @ unknown
		Acetaminophen	3	3					Acetaminophen	45 mcg/mL in plasma @ unknown
846ha	55 y M	Bupropion (extended release)	1	1	A/C	Ingst	Int-S	1		
		Escitalopram	2	2					Citalopram	0.27 mg/L in blood (unspecified) @ 2.5 h (pe)
		Venlafaxine	3	3					o-Desmethyl-venlafaxine	0.27 mg/L in serum @ 8 h (pe)
		Venlafaxine	3	3					o-Desmethyl-venlafaxine	0.32 mg/L in blood (unspecified) @ 2.5 h (pe)
		Venlafaxine	3	3					Venlafaxine	1.9 mg/L in serum @ 8 h (pe)
		Alpha blocker	4	4						
847pha	56 y F	Amitriptyline	1	1	A	Ingst	Int-S	1	Nortriptyline	0.12 mcg/mL in whole blood @ autopsy
		Amitriptyline	1	1					Amitriptyline	0.49 mcg/mL in whole blood @ autopsy
		Morphine	2	2					Morphine	183 ng/mL in whole blood @ autopsy
		Lorazepam	3	3					Lorazepam	12 ng/mL in whole blood @ autopsy
		Clonazepam	4	4					7-Aminoclonazepam	21 ng/mL in whole blood @ autopsy
		Lisinopril	5	5						
848ha	56 y F	Escitalopram	1	1	U	Ingst	Int-S	2	Citalopram	82 mg/kg in liver @ autopsy
		Escitalopram	1	1					Citalopram	9.6 mg/L in blood (unspecified) @ autopsy
		Drug, unknown	3	2						
		Lamotrigine	2	2					Lamotrigine	150 mg/L in blood (unspecified) @ autopsy
849h	57 y M	Amitriptyline	1	1	A/C	Ingst	Int-S	2		
		Cyclobenzaprine	2	2						
		Zolpidem	3	3						
850	57 y F	Bupropion	1	1	A	Ingst	Int-S	2		
		Mirtazapine	2	2						
		Ethanol	3	3					Ethanol	0.087 g/dL in blood (unspecified) @ unknown
851	58 y F	Phenelzine	1	1	A/C	Ingst	Int-S	1		
		Duloxetine	2	2						
		Drug, unknown	3	3						
852p	60 y F	Amitriptyline	1	1	A/C	Ingst	Int-S	1		
		Baclofen	2	2						
		Tramadol	3	3						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
853h	60 y F	Cyclic antidepressant, unknown	1	1	A	Ingst	Int-S	3		
		Alprazolam	2	2						
		Citalopram	3	3						
		Ethanol	4	4					Ethanol	146 mg/dL in blood (unspecified) @ unknown
		Substance (non-drug), unknown	5	5						
854ph	61 y F	Amitriptyline	1	1	A/C	Ingst	Int-S	2		
		Hydrocodone	2	2						
		Drug, unknown	3	3						
855a	62 y M	Phenelzine	1	1	U	Ingst	AR-D	1	Phenelzine	4.8 ng/mL in blood (unspecified) @ unknown
		Ziprasidone	2	2					Ziprasidone	14 ng/mL in blood (unspecified) @ autopsy
		Meloxicam	3	3						
		Zolpidem	4	4						
		Alprazolam	5	5						
		Losartan	6	6						
856	62 y F	Nortriptyline	1	1	A	Ingst	Int-S	1		
857h	62 y F	Nortriptyline	1	1	A/C	Ingst	Int-S	2		
		Lorazepam	2	2						
858p	62 y F	Cyclic antidepressant, unknown	1	1	U	Ingst	Unk	2		
859	63 y F	Bupropion	1	1	A/C	Ingst	Int-S	2	Bupropion	105.4 ng/mL in blood (unspecified) @ 20 h (pe)
		Bupropion	1	1					Hydroxybupropion	2696.6 ng/mL in blood (unspecified) @ 20 h (pe)
860ha	64 y F	Fluoxetine	1	1	U	Ingst	Int-S	2		
861	64 y M	Amitriptyline	1	1	U	Ingst	Int-S	3		
		Ethanol	2	2						
862	65 y F	Amitriptyline	1	1	U	Ingst	Int-S	1		
		Ethanol	2	2					Ethanol	195 mg/dL in serum @ unknown
863h	66 y F	Amitriptyline	1	1	A	Ingst	Int-S	1		
864p	67 y F	Amitriptyline	1	1	A/C	Ingst	Int-S	2		
865ha	67 y M	Amitriptyline	2	1	A	Ingst	Int-S	1	Amitriptyline	122 ng/mL in blood (unspecified) @ autopsy
		Amitriptyline	2	1					Nortriptyline	94 ng/mL in blood (unspecified) @ autopsy
		Zolpidem	1	1					Zolpidem	1260 ng/mL in blood (unspecified) @ autopsy
866	68 y F	Citalopram	1	1	A/C	Ingst + Unk	Int-S	1		
		Clonazepam	2	2						
		Drug, unknown	3	3						
867ha	68 y F	Bupropion	1	1	A/C	Ingst	Int-S	3		
		Ibuprofen	2	2						
868ph	69 y F	Nortriptyline	1	1	A	Ingst	Int-S	1		
869h	69 y F	Lithium	1	1	C	Ingst	AR-D	3	Lithium	2.89 mEq/L in serum @ 5 d (pe)
870ph	69 y F	Desipramine	1	1	A/C	Ingst	Unk	1	Desipramine	1000 ng/mL in serum @ 10 m (pe)

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
871ha	70 y M	Amitriptyline	1	1	U	Ingst	Int-U	1	Amitriptyline	1300 ng/mL in blood (unspecified) @ unknown
		Amitriptyline	1	1					Nortriptyline	270 ng/mL in blood (unspecified) @ unknown
872h	73 y F	Amitriptyline	1	1	A/C	Ingst	Int-S	1		
873	73 y F	Desipramine	1	1	A	Ingst	Int-S	2		
		Ethanol	2	2						
874h	74 y F	Bupropion	1	1	A/C	Ingst	Int-S	3		
		Amlodipine	2	2						
		Fluoxetine	3	2						
		Diphenhydramine	4	3						
875	79 y M	Trazodone	1	1	A	Ingst	Int-S	3		
		Acetaminophen	2	2						
876h	83 y M	Bupropion	1	1	U	Ingst	Int-S	2		
877h	85 y F	Venlafaxine	1	1	A	Ingst	Int-S	1		
		Hypochlorite	2	2						
878p	unknown adult (>=20 yrs) M				A	Ingst + Par	Int-A	2		
		Amitriptyline	1	1						
		Heroin	2	2						
See also case 12, 87, 94, 96, 173, 196, 253, 256, 278, 303, 318, 335, 358, 359, 361, 374, 379, 383, 399, 401, 405, 412, 466, 467, 479, 482, 493, 496, 502, 511, 514, 524, 526, 535, 546, 559, 571, 580, 594, 601, 619, 672, 675, 729, 731, 733, 737, 745, 746, 750, 881, 890, 893, 897, 909, 915, 916, 917, 922, 923, 925, 926, 933, 935, 938, 949, 952, 954, 956, 958, 960, 969, 972, 975, 978, 981, 987, 996, 997, 999, 1000, 1002, 1003, 1006, 1010, 1013, 1025, 1026, 1035, 1038, 1041, 1049, 1051, 1052, 1053, 1056, 1060, 1061, 1065, 1067, 1068, 1069, 1070, 1077, 1080, 1082, 1093, 1098, 1113, 1115, 1138, 1139, 1146, 1147, 1151, 1154, 1158, 1162, 1168, 1174, 1175, 1179, 1184, 1197, 1217, 1228, 1244, 1246, 1247, 1248, 1249, 1250, 1251, 1252, 1253, 1299, 1323, 1360, 1386, 1400, 1465										
Antihistamines										
879a	5 y M	Diphenhydramine	1	1	A	Ingst	Oth-M	1	Diphenhydramine	1.9 mg/L in whole blood @ autopsy
		Diphenhydramine	1	1					Diphenhydramine	10 mg/kg in liver @ autopsy
		Diphenhydramine	1	1					Diphenhydramine	2.5 mg/L in whole blood @ autopsy
880h	12 y F	Diphenhydramine	1	1	A	Ingst	Int-S	1		
881pha	14 y F	Diphenhydramine	1	1	A	Ingst	Int-S	1	Diphenhydramine	18000 ng/mL in blood (unspecified) @ 1 h (pe)
		Escitalopram	2	2						
882pha	19 y M	Diphenhydramine	1	1	A	Ingst	Int-S	1		
883pa	22 y M	Diphenhydramine	1	1	A	Ingst	Int-A	2		
		Opioid	2	2						
884h	25 y F	Diphenhydramine	1	1	A	Ingst	Int-S	1		
		Ethanol	2	2					Ethanol	197 mg/dL in blood (unspecified) @ unknown
		Ibuprofen	3	2						
885	27 y F	Diphenhydramine	1	1	U	Ingst	Int-S	2		
886h	28 y M	Diphenhydramine	1	1	A	Ingst	Int-S	2		
887ph	28 y M	Diphenhydramine	1	1	A	Ingst	Int-S	1		
888h	28 y M	Diphenhydramine	1	1	A	Ingst	Int-S	1		
889ph	29 y M	Diphenhydramine	1	1	A	Ingst	Int-S	2		
890ha	30 y F	Diphenhydramine	1	1	A	Ingst	Int-S	1	Diphenhydramine	10.6 mg/L in blood (unspecified) @ 8 h (pe)

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
891a	34 y F	Ethanol	2	2	A	Ingst	Int-S	3	Ethanol	0.07 g/dL in blood (unspecified) @ 8 h (pe)
		Fluoxetine	3	3					Fluoxetine	0.14 mg/L in blood (unspecified) @ 8 h (pe)
		Fluoxetine	3	3					Norfluoxetine	0.17 mg/L in blood (unspecified) @ 8 h (pe)
		Benzodiazepine	4	4					Diazepam	0.25 mg/L in blood (unspecified) @ 8 h (pe)
		Benzodiazepine	4	4					Nordiazepam	0.27 mg/L in blood (unspecified) @ 8 h (pe)
892a	35 y F	Diphenhydramine	2	1	A	Ingst	Int-S	1	Diphenhydramine	18000 ng/mL in blood (unspecified) @ autopsy
		Ethanol	1	1						
		Diphenhydramine	1	1						
		Acetaminophen/ chlorpheniramine/ phenylephrine	2	2					Phenylephrine	20 ng/mL in blood (unspecified) @ autopsy
		Acetaminophen/ chlorpheniramine/ phenylephrine	2	2					Acetaminophen	51 mcg/mL in blood (unspecified) @ autopsy
893	43 y M	Ethanol	3	3	A	Ingst	Int-S	2		
		Diphenhydramine	1	1						
		Cyclobenzaprine	2	2						
		Gabapentin	3	3						
		Levothyroxine	4	4						
		Acetaminophen/ diphenhydramine	5	5						
		Fluoxetine	6	6						
		Atorvastatin	7	7						
		Lorazepam	8	8						
		Diphenhydramine	1	1						
894p	45 y M				A/C	Ingst	Int-S	2		
895ha	57 y F	Diphenhydramine	1	1	A	Ingst	Int-S	1	Diphenhydramine	3 mg/kg in blood (unspecified) @ 1.5 h (pe)
		Diphenhydramine	1	1					Diphenhydramine	40 mg/kg in liver @ 2 d (pe)
		Diazepam	2	2					Diazepam	0.65 mg/L in blood (unspecified) @ 1.5 h (pe)
896h	61 y F				A	Ingst	Int-S	2		
		Hydroxyzine	1	1						
		Lamotrigine	2	2						
897ha	63 y F	Drug, unknown	3	3	A/C	Ingst	Int-S	1		
		Diphenhydramine	1	1						
		Fluoxetine	2	2					Norfluoxetine	266 ng/mL in blood (unspecified) @ unknown
		Fluoxetine	2	2					Fluoxetine	670 ng/mL in blood (unspecified) @ unknown
898ph	64 y M	Escitalopram	3	3	A	Ingst	Int-M	2		
		Risperidone	4	4						
		Diphenhydramine	1	1						
899ha	79 y M				U	Ingst	Unk	2		
		Diphenhydramine	1	1						
		Dextromethorphan/ guaifenesin	2	2						
[900pha]	8 m M	Benzodiazepine	3	3	A	Ingst	Unk	1		
		Diphenhydramine	1	1						

See also case 5, 21, 26, 74, 87, 109, 172, 256, 291, 300, 305, 312, 327, 330, 335, 337, 342, 350, 358, 359, 405, 417, 442, 445, 511, 524, 527, 536, 559, 571, 595, 600, 601, 608, 632, 680, 710, 731, 733, 737, 745, 747, 763, 768, 775, 794, 796, 812, 829, 840, 874, 929, 933, 940, 944, 951, 970, 994, 996, 1005, 1069, 1132, 1152, 1168, 1174, 1192, 1211, 1243, 1323, 1391, 1471

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
Antimicrobials										
901pa	36 y M	Tilmicosin	1	1	A	Ingst + Par	Unt-O	2		
		Ethanol	2	2					Ethanol	140 mg/dL in blood (unspecified) @ autopsy
902ph	36 y M	Tilmicosin	1	1	U	Par	Unt-G	2		
903h	49 y F	Hydroxychloroquine	1	1	A	Ingst	Int-S	1		
		Methotrexate	2	2						
See also case 341, 401, 680, 728, 731, 775, 829, 926, 980, 1010, 1323, 1324, 1326, 1327, 1357, 1404, 1418, 1432										
Antineoplastics										
[904h]	59 y M	Antineoplastic drug	1	1	C	Par	AR-D	3		
[905h]	68 y M	Methotrexate	1	1	A/C	Ingst	Unt-T	1		
See also case 330, 903										
Asthma therapies										
906h	68 y M	Theophylline	1	1	C	Ingst	Unt-T	1	Theophylline	43 mcg/mL in blood (unspecified) @ unknown
907h	84 y M	Theophylline	1	1	C	Ingst	AR-D	3	Theophylline	14.9 mcg/mL in blood (unspecified) @ 2 d (pe)
		Theophylline	1	1					Theophylline	16 mcg/mL in blood (unspecified) @ 1 d (pe)
		Theophylline	1	1					Theophylline	19.7 mcg/mL in blood (unspecified) @ 1 d (pe)
		Theophylline	1	1					Theophylline	35.7 mcg/mL in blood (unspecified) @ unknown
See also case 401, 1010, 1139										
Cardiovascular drugs										
908ph	11 y F	Propranolol	1	1	A	Ingst	Int-S	1		
		Beta blocker	2	2						
		Methocarbamol	3	3						
909pa	16 y F	Metoprolol	1	1	A	Ingst	Int-S	1		
		Flecainide	2	2					Flecainide	3.1 mcg/mL in blood (unspecified) @ unknown
		Imipramine	3	3						
		Citalopram	4	4					Citalopram	350 ng/mL in blood (unspecified) @ unknown
		Bupropion	5	5					Bupropion	11 ng/mL in blood (unspecified) @ unknown
		Bupropion	5	5					Hydroxybupropion	150 ng/mL in blood (unspecified) @ unknown
910ha	18 y F	Amlodipine	1	1	A	Ingst	Int-S	1		
		Ethylene glycol (antifreeze)	2	2					Ethylene glycol	112 mg/dL in blood (unspecified) @ 8 h (pe)
		Ethylene glycol (antifreeze)	2	2					Ethylene glycol	34 mg/dL in blood (unspecified) @ 1 d (pe)
		Hydrochlorothiazide	3	3						
911h	21 y F	Labetalol	1	1	U	Ingst	Int-S	2		
		Clonazepam	2	2						
912h	21 y M	Propranolol	1	1	A	Ingst	Int-S	2	Propranolol	12000 ng/mL in blood (unspecified) @ autopsy
		Risperidone	2	2						
		Alpha blocker	3	3						
913h	21 y M	Metoprolol	1	1	A	Ingst	Int-S	1		
		Diltiazem (extended release)	2	2						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
914h	21 y M				A	Ingst	Int-S	1		
915h	22 y M	Verapamil	1	1						
		Diltiazem	1	1	A/C	Ingst	Int-S	1		
		Citalopram	2	2						
916ha	28 y F	Propranolol	1	1	A/C	Ingst + Aspir	Int-S	1	Propranolol	5.5 mg/L in serum @ 7.5 h (pe)
		Escitalopram	2	2					Citalopram	0.76 mg/L in serum @ 7.5 h (pe)
		Lamotrigine	3	3						
		Mirtazapine	4	4						
		Cyclobenzaprine	5	5						
		Buspirone	6	6						
		Clonazepam	7	7						
		Activated charcoal	8	8						
917ha	28 y M	Metoprolol	1	1	A/C	Ingst	Int-S	2		
		Amitriptyline	2	2						
918h	32 y F	Beta blocker	1	1	A	Ingst	Int-S	2		
919	33 y M				A/C	Ingst	Int-S	2		
		Diltiazem	1	1						
		Lisinopril	2	2						
		Ethanol	3	3						
920h	35 y F	Diltiazem	1	1	A	Ingst	Int-S	1		
[921pha]	36 y F	Propranolol	1	1	A/C	Ingst	Int-S	1	Propranolol	5300 ng/mL in blood (unspecified) @ unknown
922h	36 y F				A	Ingst	Int-S	2		
		Propranolol	1	1						
		Escitalopram	2	2						
		Amitriptyline	3	3						
		Alprazolam	4	4						
		Acetaminophen	5	5						
		Ethanol	6	6					Ethanol	177 mg/dL in blood (unspecified) @ 2 h (pe)
		Cocaine	7	7						
923h	36 y F				A/C	Ingst	Int-S	1		
		Amlodipine	1	1						
		Metoprolol	2	2						
		Trazodone	3	3						
		Fluoxetine	4	4						
924h	37 y M	Amlodipine	1	1	A/C	Ingst	Int-S	1		
		Gabapentin	2	2						
925	37 y F				A/C	Ingst	Int-S	1		
		Nebivolol	1	1						
		Lurasidone	2	2						
		Duloxetine	3	3						
		Lisinopril	4	4						
		Bupropion (extended release)	5	5						
		Alprazolam	6	6						
		Ethanol	7	7						
926pa	37 y F	Propranolol	1	1	A/C	Ingst	Int-S	1		
		Duloxetine	2	2						
		Clonazepam	3	3						
		Gabapentin	4	4						
		Thyroid preparation	5	5						
		Valacyclovir	6	6						
		Magnesium oxide	7	7						
		Eszopiclone	8	8						
		Vitamin D	9	9						
		Esomeprazole	10	10						
927a	38 y M	Propranolol	1	1	A/C	Ingst	Int-S	1	Propranolol	3200 ng/mL in blood (unspecified) @ 30 m (pe)
928ha	38 y M	Quetiapine	2	2	A	Ingst	Int-S	1		
		Amlodipine/benazepril	1	1						
		Ethanol	2	2						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
929hi	38 y M	Amlodipine	1	1	U	Ingst	Int-S	1		
		Clopidogrel	2	2						
		Promethazine	3	3						
		Hydrochlorothiazide	4	4						
		Ibuprofen	5	5						
		Potassium chloride	6	6						
930h	38 y M	Amlodipine	1	1	A/C	Ingst	Int-S	1		
		Ranolazine	2	2						
		Prasugrel	3	3						
		Salicylate	4	4						
		Atorvastatin	5	5						
931	39 y F	Amlodipine	1	1	A	Ingst	Int-S	1		
		Metoprolol	2	2						
		Fentanyl (transdermal)	3	3						
		Oxycodone	4	4						
		Diazepam	5	5						
932ha	40 y M	Amlodipine	1	1	A/C	Ingst	Int-S	2		
		Clonidine	2	2					Clonidine	24 ng/mL in blood (unspecified) @ unknown
		Losartan	3	3						
		Hydrochlorothiazide	4	4						
		Indomethacin	5	5						
		Ibuprofen	6	6						
		Fenobibrate	7	7						
		Simvastatin	8	8						
		Norepinephrine	9	9						
		Dopamine	10	10						
		Acetaminophen	11	11					Acetaminophen	59 mcg/mL in plasma @ 2 h (pe)
933ha	40 y F	Verapamil	1	1	A/C	Ingst	Int-S	1	Verapamil	0.223 mg/L in whole blood @ autopsy
		Topiramate	2	2					Topiramate	4.2 mg/L in whole blood @ autopsy
		Venlafaxine	3	3					Venlafaxine	0.104 mg/L in whole blood @ autopsy
		Venlafaxine	3	3					Norvenlafaxine	0.327 mg/L in whole blood @ autopsy
		Diphenhydramine	4	4					Diphenhydramine	0.115 mg/L in whole blood @ autopsy
		Butalbital	5	5					Butalbital	2.5 mg/L in whole blood @ autopsy
934p	40 y F	Propranolol	1	1	A	Ingst	Int-S	2		
		U-47700	2	2						
935ha	40 y F	Amlodipine	1	1	A/C	Ingst	Int-S	1		
		Propranolol	2	2						
		Venlafaxine	3	3						
		Quetiapine	4	4						
		Alpha blocker	5	5						
		Acetaminophen/antihistamine/dextromethorphan	6	6					Acetaminophen	18.9 mcg/mL in plasma @ 2.5 h (pe)
		Acetaminophen/antihistamine/dextromethorphan	6	6					Acetaminophen	9.8 mcg/mL in blood (unspecified) @ 4 h (pe)
		Pantoprazole	8	7						
		Salicylate	7	7						
936h	41 y M	Metoprolol	1	1	A/C	Ingst	Int-S	1		
		Amlodipine	2	2						
		Hydrochlorothiazide	3	3						
937ha	41 y F	Amlodipine	1	1	A	Ingst	Int-S	1		
		Lisinopril	2	2						
		Hydrochlorothiazide	3	3						
		Oxycodone	4	4						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
938h	43 y F	Dextromethorphan	5	5	A/C	Ingst	Int-S	3	Midazolam	0.023 mg/L in blood (unspecified) @ autopsy
		Dextromethorphan	5	5					Dextromethorphan	0.54 mg/L in blood (unspecified) @ autopsy
		Atenolol	1	1						
		Alprazolam	2	2						
		Acetaminophen/hydrocodone	3	3						
		Acetaminophen/butalbital/cafeine	4	4						
		Phenytoin	5	5						
939ai	43 y F	Gabapentin	6	6	A	Ingst	Unk	2		
		Fluoxetine	7	7						
		Clonidine	1	1						
940pa	43 y F	Morphine	2	2	A	Ingst	Int-S	3	Morphine (free)	0.25 mcg/mL in whole blood @ unknown
		Beta blocker	1	1					Propranolol	1600 ng/mL in whole blood @ autopsy
		Diphenhydramine	2	2					Diphenhydramine	210 ng/mL in blood (unspecified) @ autopsy
		Cyclobenzaprine	3	3					Cyclobenzaprine	150 ng/mL in blood (unspecified) @ autopsy
		Benzodiazepine	4	4					Lorazepam	19 ng/mL in blood (unspecified) @ autopsy
941	44 y F	Verapamil	1	1	A/C	Ingst	Int-S	1		
		Ethanol	2	2						
942h	44 y M	Diltiazem	1	1	A/C	Ingst	Int-S	2		
		Metoprolol	2	2						
943h	44 y M	Amlodipine/hydrochlorothiazide/olmesartan	1	1	A	Ingst	Int-S	1		
		Ibuprofen	2	2						
944	44 y F	Verapamil	1	1	A/C	Ingst	Int-S	2		
		Hydroxyzine	2	2						
		Olanzapine	3	3						
		Lorazepam	4	4						
		Chemical, unknown	5	5						
945h	44 y F	Amlodipine	1	1	A	Ingst	Int-S	2		
		Cyclobenzaprine	2	2						
		Gabapentin	3	3						
946	45 y M	Diltiazem (extended release)	1	1	A	Ingst	Int-S	1		
		Antiplatelet drug	2	2						
		Allopurinol	3	3						
		Pantoprazole	4	4						
		Simvastatin	5	5						
		Ibuprofen	6	6						
		Ethanol	7	7					Ethanol	0.17 mg/dL in serum @ 1 h (pe)
947h	45 y M	Amlodipine	1	1	A/C	Ingst	Int-S	2		
		Quetiapine	2	2						
		Aripiprazole	3	3						
		Clonazepam	4	4						
948h	45 y F	Diltiazem	1	1	A	Ingst	Int-S	2		
		Lisinopril	2	2						
949ph	45 y F	Propranolol	1	1	A	Ingst	Int-S	2		
		Valproic acid	2	2						
		Olanzapine	3	3						
		Bupropion	4	4						
950	45 y M	Clonidine	1	1	A/C	Ingst	Int-S	2		
		Gabapentin	2	2						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
951h	45 y M	Amlodipine	1	1	U	Ingst	Int-S	2		
		Hydrocodone	2	2						
		Diphenhydramine	3	3						
		Gabapentin	4	4						
952ph	46 y M	Metoprolol	1	1	A	Ingst	Int-S	1	Metoprolol	5094 ng/mL in blood (unspecified) @ autopsy
		Bupropion	2	2						
953h	46 y M	Amlodipine	1	1	U	Ingst	Oth-M	3	Amlodipine	18 ng/mL in serum @ unknown
954ha	46 y F	Verapamil	1	1	A	Ingst	Int-S	1	Verapamil	2.68 ng/mL in serum @ autopsy
		Propranolol	2	2						
		Citalopram	3	3					Citalopram	0.432 ng/mL in serum @ autopsy
955pha	46 y F	Metoprolol	1	1	A	Ingst	Int-S	1		
		Flecainide	2	2						
		Chlordiazepoxide	3	3						
956h	46 y M	Amlodipine	1	1	A/C	Ingst	Int-S	2		
		Lamotrigine	2	2						
		Metformin	3	3						
		Citalopram	4	4						
		Fenofibrate	5	5						
		Alpha blocker	6	6						
		Quetiapine	7	7						
		Lisinopril	8	8						
		Bupropion (extended release)	9	9						
		Ethanol	10	10						
957h	46 y M	Verapamil	1	1	A	Ingst	Int-S	2		
		Nadolol	2	2						
		Tramadol	3	3						
958h	46 y M	Carvedilol	1	1	A	Ingst	Int-M	2		
		Alprazolam	2	2						
		Bupropion	3	3						
		Lorazepam	4	4						
		Lisinopril	5	5						
		Acetaminophen/hydrocodone	6	6						
959h	46 y M	Diltiazem	1	1	A	Ingst	Unk	2		
960h	46 y F	Propranolol	1	1	A	Ingst	Int-S	2		
		Trazodone	2	2						
		Paroxetine	3	3						
961	47 y M	Beta blocker	1	1	A	Ingst	Int-S	2		
		Gabapentin	2	2						
962h	47 y M	Verapamil	1	1	U	Ingst	Int-S	1		
963	47 y F	Calcium antagonist	1	1	A	Ingst	Int-S	1		
964	47 y M	Amlodipine	1	1	A/C	Ingst	Int-S	1		
965h	47 y F	Amlodipine	1	1	A/C	Ingst	Int-S	2		
		Clonidine	2	2						
		Lisinopril	3	3						
		Hydrochlorothiazide	4	4						
966ha	47 y M	Amlodipine	1	1	A/C	Ingst	Int-U	1	Amlodipine	890 ng/mL in blood (unspecified) @ unknown
967	47 y F	Diltiazem (extended release)	1	1	A	Ingst	Int-S	1		
		Propafenone	2	2						
968	48 y M	Beta blocker	1	1	A/C	Ingst	Unt-T	1		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
969ph	48 y M	Amlodipine	1	1	A	Ingst	Int-S	1		
		Atenolol	2	2						
		Sildenafil	3	3						
		Oxycodone	4	4						
		Duloxetine	5	5						
		Tamsulosin	6	6						
		Clonazepam	7	7						
970	49 y F	Verapamil	1	1	A	Ingst	Int-S	2		
		Diphenhydramine	2	2						
		Clonazepam	3	3						
		Levothyroxin	4	4						
971h	49 y M	Amlodipine	1	1	A	Ingst	Int-M	2		
		Carvedilol	2	2						
		Metoprolol	3	3						
972a	49 y F	Diltiazem	1	1	A/C	Ingst	Int-S	1	Diltiazem	19 mg/L in blood (unspecified) @ autopsy
		Diltiazem	1	1					Diltiazem	20 mg/L in blood (unspecified) @ autopsy
		Acetaminophen/butalbital/caffeine/codeine	2	2						
		Acetaminophen/butalbital/caffeine	3	3						
		Zolpidem (extended release)	4	4					Zolpidem	0.2 mg/L in blood (unspecified) @ autopsy
		Topiramate	5	5						
		Citalopram	6	6					Citalopram	0.2 mg/L in blood (unspecified) @ autopsy
973ha	49 y F	Diltiazem	1	1	A	Ingst	Int-S	1	Diltiazem	4100 ng/mL in serum @ autopsy
		Diltiazem	1	1					Diltiazem	75 ng/mL in serum @ autopsy
		Losartan	2	2						
		Acetaminophen	3	3					Acetaminophen	30 mcg/mL in serum @ autopsy
		Acetaminophen	3	3					Acetaminophen	47 mcg/mL in serum @ 6 h (pe)
		Acetaminophen	3	3					Acetaminophen	48 mcg/mL in serum @ autopsy
		Salicylate	4	4					Salicylate	19 mg/dL in serum @ 6 h (pe)
974ha	49 y M	Metoprolol (extended release)	1	1	A	Ingst	Int-S	1	Metoprolol	5660 ng/mL in blood (unspecified) @ autopsy
		Lisinopril	2	2						
		Rivaroxaban	3	3						
		Furosemide	4	4						
		Diuretics, potassium sparing	5	5						
		Salicylate	6	6						
		Cocaine	7	7					Benzoyllecognine	1240 ng/mL in blood (unspecified) @ autopsy
		Cocaine	7	7					Ecgonine methyl ester	339 ng/mL in blood (unspecified) @ autopsy
975	49 y M	Verapamil	1	1	U	Ingst	Int-S	2		
		Bupropion	2	2						
		Citalopram	3	3						
		Antipsychotic (atypical)	4	4						
		Trazodone	5	5						
		Ziprasidone	6	6						
		Mirtazapine	7	7						
		Antacid (proton pump inhibitor)	8	8						
976pha	50 y F	Metoprolol	1	1	A/C	Ingst	Int-S	1	Metoprolol	44 mcg/mL in blood (unspecified) @ autopsy
		Ethanol	2	2					Ethanol	0.19% (wt/vol) in plasma @ autopsy

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
		Morphine	3	3					Morphine	38 ng/mL in blood (unspecified) @ autopsy
		Marijuana	4	4					11-Oh-thc (11-hydroxy-delta-9-tetrahydrocannabinol)	2.8 ng/mL in blood (unspecified) @ autopsy
977h	50 y F	Diltiazem (extended release)	1	1	A/C	Ingst	Int-S	1		
978ha	50 y F	Ethanol	2	2	A	Ingst	Int-S	1		
		Atenolol	1	1						
		Bupropion	2	2					Bupropion	0.77 mg/L in blood (unspecified) @ unknown
		Sertraline	3	3						
		Ethanol	4	4					Ethanol	0.22% in whole blood @ unknown
979h	50 y F				A/C	Ingst	Int-S	2		
		Nifedipine	1	1						
		Carvedilol	2	2						
		Tramadol	3	3						
		Topiramate	4	4						
		Omeprazole	5	5						
980p	50 y F				A/C	Ingst	Int-S	1		
		Beta blocker	1	1						
		Lorazepam	2	2						
		Corticosteroids	3	3						
		Antibiotic, unknown	4	4						
981	50 y F				A/C	Ingst	Int-S	1		
		Amlodipine	1	1						
		Amitriptyline	2	2						
		Lurasidone	3	3						
982h	51 y F				A	Ingst	Int-S	2		
983h	51 y M	Digoxin	1	1						
					U	Ingst	Int-S	1		
		Carvedilol	1	1						
		Metformin	2	2						
984h	51 y F				U	Ingst	Unk	3		
		Diltiazem (extended release)	1	1						
985a	51 y F				A/C	Ingst	Int-S	1		
		Diltiazem	1	1					Diltiazem	490 ng/mL in blood (unspecified) @ 4 h (pe)
		Metoprolol	2	2						
986h	51 y F				C	Ingst	AR-D	3		
		Digoxin	1	1					Digoxin	3.9 ng/mL in serum @ unknown
987a	52 y F				A	Ingst	Int-S	2		
		Atenolol	1	1						
		Citalopram	2	2					Citalopram	4.7 mg/L in blood (unspecified) @ autopsy
		Citalopram	2	2					Citalopram	9.1 mg/L in blood (unspecified) @ autopsy
988a	52 y F				U	Ingst	Int-S	1		
		Diltiazem	1	1					Diazepam	30 mg/L in blood (unspecified) @ autopsy
989	52 y F				A/C	Ingst	Int-S	1		
		Amlodipine	1	1						
		Beta blocker	2	2						
		Lisinopril	3	3						
		Atorvastatin	4	4						
990ha	53 y F				A/C	Ingst	Int-S	2		
		Nebivolol	1	1						
		Amlodipine	2	2						
		Benazepril	3	3						
991h	53 y F				A/C	Ingst	Int-S	1		
		Hydrochlorothiazide/irbesartan	1	1						
		Salicylate	2	2						
992ha	53 y F				A	Ingst	Int-S	1		
		Diltiazem	1	1					Diltiazem	19.4 mg/L in blood (unspecified) @ unknown

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
993ha	53 y F	Acetaminophen/butalbital/caffeine	2	2	A/C	Ingst	Int-S	1	Acetaminophen	21.9 mg/L in blood (unspecified) @ unknown
		Acetaminophen/butalbital/caffeine	2	2					Butalbital	9 mg/L in blood (unspecified) @ unknown
		Propranolol	3	3					Propranolol	3.1 mg/L in blood (unspecified) @ autopsy
		Gabapentin	4	4					Gabapentin	44.6 mg/L in blood (unspecified) @ autopsy
		Propranolol	1	1					Propranolol	350 ng/mL in whole blood @ unknown
		Diltiazem (extended release)	2	2					Diltiazem	230 ng/mL in blood (unspecified) @ unknown
		Ethanol	3	3					Ethanol	131 mg/dL in blood (unspecified) @ unknown
994ha	53 y F	Amlodipine	1	1	A	Ingst	Int-S	1	Amlodipine	770 ng/mL in blood (unspecified) @ autopsy
		Cocaine	2	2						
995h	53 y F	Diphenhydramine	3	3	A	Ingst	Int-S	2		
		Beta blocker	1	1						
996h	53 y F				U	Ingst + Inhal	Int-S	1		
		Amlodipine	1	1						
		Doxepin	2	1					Doxepin	3.1 mg/kg in blood (unspecified) @ 4 h (pe)
		Lacquer/paint/varnish, unknown	3	3						
		Cyclobenzaprine	4	4						
		Methylphenidate	5	5						
		Meclizine	6	6						
		Clonazepam	7	7						
		Acetaminophen/oxycodone	8	8						
		Paroxetine	9	9						
		Omeprazole	10	10						
		Ethanol	11	11						
		Iron	12	12						
		Promethazine	13	13						
		Morphine	14	14						
		Quetiapine	15	15						
		Almotriptan	16	16						
997h	53 y F	Carisoprodol	17	17	A/C	Ingst	Int-S	1		
		Metoprolol	1	1						
		Bupropion	2	2						
		Ticagrelor	3	3						
		Buspirone	4	4						
		Salicylate	5	5						
		Folic acid	6	6						
998h	54 y F	Atorvastatin	7	7	A	Ingst	Unt-T	2		
		Propranolol	1	1						
999h	54 y F				A/C	Ingst	Int-S	2		
		Metoprolol	1	1						
1000ph	54 y M	Duloxetine	2	2	A	Ingst	Int-S	2		
		Carvedilol	1	1						
		Citalopram	2	2						
		Ethanol	3	3						
		Alprazolam	4	4						
1001h	54 y F				A/C	Ingst	Int-S	1		
1002ha	54 y F	Amlodipine	1	1						
		Amlodipine	1	1	A/C	Ingst + Aspir	Int-S	1		
		Trazodone	2	2					Trazodone	2.2 mcg/mL in blood (unspecified) @ autopsy
		Ethanol	3	3					Ethanol	123 mg/dL in blood (unspecified) @ autopsy
		Ketorolac	4	4						

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1003i	55 y F	Metoprolol	1	1	A/C	Ingst	Int-S	3		
		Hydrochlorothiazide/ lisinopril	2	2						
		Tramadol	3	3						
		Benzonatate	4	4						
		Mirtazapine	5	5						
		Lurasidone	6	6						
		Trazodone	7	7						
		Diphenhydramine/ naproxen	8	8						
		Diphenhydramine/ ibuprofen	9	9						
		Gabapentin	10	10						
		Temazepam	11	11						
		Lorazepam	12	12						
		Melatonin	13	13						
1004	55 y M	Digoxin	1	1	C	Ingst	AR-D	3	Digoxin	3.6 ng/mL in serum @ unknown
1005	55 y F	Verapamil	1	1	A/C	Ingst	Int-S	2		
		Diltiazem	2	2						
		Clonazepam	3	3						
		Hydroxyzine	4	4						
1006h	55 y M	Amlodipine	1	1	C	Ingst	Int-S	1		
		Hydrochlorothiazide/ losartan	2	2						
		Acetaminophen/ oxycodone	3	3					Acetaminophen	23.4 mcg/mL in blood (unspecified) @ unknown
		Mirtazapine	4	4						
		Diazepam	5	5						
1007h	55 y F	Diltiazem	1	1	A/C	Ingst	Int-S	1		
		Acetaminophen/ oxycodone	2	2						
1008h	55 y M	Amlodipine	1	1	C	Ingst	Int-S	1		
		Metformin	2	2						
		Morphine	3	3						
1009h	56 y M	Verapamil	1	1	A	Ingst	Int-S	1		
1010	56 y F	Propranolol	1	1	A/C	Ingst	Int-S	2		
		Escitalopram	2	2						
		Lamotrigine	3	3						
		Acetaminophen/ oxycodone	4	4						
		Ibuprofen	5	5						
		Montelukast	6	6						
		Ondansetron	7	7						
		Acyclovir	8	8						
		Alprazolam	9	9						
1011h	56 y F	Amlodipine	1	1	A	Ingst	Int-U	1		
		Ethanol	2	2					Ethanol	157 mg/dL in blood (unspecified) @ unknown
1012	56 y F	Beta blocker	1	1	A	Ingst	Int-S	2		
1013a	56 y M	Carvedilol	1	1	A	Ingst	Int-S	1		
		Valproic acid	2	2						
		Escitalopram	3	3						
		Sitagliptin	4	4						
		Mirtazapine	5	5						
		Phenytoin	6	6						
		Primidone	7	7						
[1014a]	56 y F	Treprostinil	1	1	A/C	Par	Unt-T	1		
1015h	57 y M				A/C	Ingst	Int-S	1		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1016p	57 y F	Amlodipine	1	1	A/C	Ingst	Int-S	1		
		Carvedilol	2	2						
		Metformin	3	3						
1017h	57 y M	Diltiazem	1	1	A	Ingst	Int-S	3		
		Alprazolam	2	2						
		Potassium chloride	3	3						
1018h	57 y M	Metoprolol	1	1	A	Ingst	AR-D	3		
		Furosemide	2	2						
		Omeprazole	3	3						
1019ha	58 y M	Iron	4	4	A/C	Ingst	Int-S	1		
		Dicyclomine	5	5						
		Lamotrigine	6	6						
1020h	58 y F	Verapamil	1	1	A/C	Ingst	Int-S	2	Metformin	16 mg/L in blood (unspecified) @ 1 h (pe)
		Amlodipine	1	1						
		Metformin	2	2						
1021ha	58 y F	Verapamil	1	1	A/C	Ingst	Int-S	1	Amlodipine	150 ng/mL in blood (unspecified) @ unknown
		Amlodipine	1	1						
		Ziprasidone	2	2						
1022	58 y F	Clonazepam	3	3	U	Ingst	Int-S	2	Clonazepam	0.04 mg/L in blood (unspecified) @ unknown
		Clonazepam	3	3						
		Clonazepam	3	3						
1023	59 y M	Amlodipine	1	1	A/C	Ingst	Int-S	1		
		Tramadol	2	2						
		Alprazolam	3	3						
1024h	59 y M	Quetiapine	4	4	A	Ingst	Int-S	1		
		Levothyroxin	5	5						
		Zolpidem	6	6						
1025a	59 y M	Amlodipine	1	1	A/C	Ingst	Int-S	2		
		Losartan	2	2						
		Amlodipine	1	1						
1026h	60 y M	Amlodipine	1	1	A/C	Ingst	Int-S	1		
		Fluoxetine	2	2						
		Bupropion	3	3						
[1027ha]	60 y M	Carvedilol	1	1	A/C	Ingst	Int-S	2		
		Amlodipine	2	2						
		Hydrochlorothiazide/lisinopril	3	3						
1028	60 y F	Clopidogrel	4	4	A	Ingst	Int-S	1		
		Duloxetine	5	5						
		Acetaminophen/hydrocodone	6	6						
1029ph	60 y F	Dexlansoprazole	7	7	A/C	Ingst	Int-S	2		
		Quetiapine	8	8						
		Metoprolol	1	1						
1030ph	60 y M	Atenolol	1	1	A	Ingst	Int-S	1		
		Amlodipine	1	1						
		Ethanol	2	2						
1030ph	60 y M	Carvedilol	1	1	A/C	Ingst	Int-S	2		
		Nifedipine (extended release)	2	2						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1031h	60 y F	Ace inhibitor	3	3	A	Ingst	Int-S	1		
		Amlodipine	1	1						
		Furosemide	2	2						
		Potassium chloride	3	3						
1032h	60 y M				A/C	Ingst	Int-S	2		
		Carvedilol	1	1					Salicylate	16.1 mg/dL in blood (unspecified) @ 8 h (pe)
		Salicylate	2	2					Salicylate	22 mg/dL in blood (unspecified) @ unknown
		Salicylate	2	2						
		Lisinopril	3	3						
		Atorvastatin	4	4						
		Vitamin D	5	5						
		Benzodiazepine	6	6					Lorazepam	69 ng/mL in blood (unspecified) @ unknown
		Hydrocodone	7	7					Hydrocodone (free)	33 ng/mL in blood (unspecified) @ unknown
		Amphetamine	8	8					Amphetamine	47 ng/mL in blood (unspecified) @ unknown
1033ha	60 y F				A	Ingst	Int-S	1		
		Diltiazem (extended release)	1	1					Diltiazem	1090 ng/mL in blood (unspecified) @ autopsy
1034h	60 y F				A/C	Ingst	Int-S	1		
		Metoprolol	1	1						
		Amlodipine	2	2						
1035pha	60 y M				A	Ingst	Int-S	1		
		Verapamil	1	1					Verapamil	1440 ng/mL in blood (unspecified) @ unknown
		Atenolol	2	2					Atenolol	121 ng/mL in blood (unspecified) @ autopsy
		Gabapentin	3	3						
		Sertraline	4	4						
1036h	61 y F				A/C	Ingst	Int-S	2		
		Propafenone	1	1						
		Tizanidine	2	2						
		Tramadol	3	3						
		Gabapentin	4	4						
		Clonazepam	5	5						
		Rivaroxaban	6	6						
1037	61 y M				A/C	Ingst	Int-S	2		
		Amlodipine	1	1						
		Beta blocker	2	2						
		Metformin	3	3						
		Salicylate	4	4						
		Atorvastatin	5	5						
1038ph	61 y F				A/C	Ingst	Int-S	1		
		Propanolol	1	1						
		Bupropion	2	2						
		Clonazepam	3	3						
1039p	61 y M				A	Ingst	Int-S	2		
		Amlodipine	1	1						
		Losartan	2	2						
1040h	61 y M				A	Ingst	AR-D	2		
		Digoxin	1	1					Digoxin	4.4 ng/mL in serum @ unknown
1041h	62 y M				A/C	Ingst	Int-S	2		
		Amlodipine	1	1						
		Acetaminophen/hydrocodone	2	2					Acetaminophen	40.5 mcg/mL in blood (unspecified) @ unknown
		Quetiapine	3	3						
		Diazepam	4	4						
		Mirtazapine	5	5						
1042h	62 y F				A	Ingst	Int-S	1		
		Diltiazem	1	1						
1043h	62 y M				A/C	Ingst	Int-S	2		
		Amlodipine	1	1						
		Benazepril	2	2						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1044h	62 y F				U	Ingst	Int-S	2		
		Amlodipine	1	1						
		Atenolol	2	2						
1045h	62 y M				A	Ingst	Int-S	1		
		Amlodipine	1	1						
		Carvedilol	2	2						
		Ethanol	3	3						
		Temazepam	4	3						
1046ha	62 y F				A/C	Ingst	Int-S	2		
		Diltiazem	1	1					Diltiazem	400 ng/mL in blood (unspecified) @ 30 m (pe)
		Carvedilol	2	2						
		Alprazolam	3	3					Alprazolam	96 ng/mL in blood (unspecified) @ 30 m (pe)
		Alpha blocker	4	4						
1047h	62 y F				U	Ingst	Int-S	3		
		Diltiazem (extended release)	1	1						
		Topiramate	2	2						
		Cyclobenzaprine	3	3						
		Diazepam	4	4						
		Ethanol	5	5					Ethanol	244 mg/dL in blood (unspecified) @ unknown
		Marijuana	6	6						
1048h	63 y M				A	Ingst	AR-D	2		
		Digoxin	1	1					Digoxin	3.2 ng/mL in blood (unspecified) @ unknown
1049a	63 y M				U	Ingst	Int-S	1		
		Propranolol	1	1						
		Bupropion	2	2						
		Sodium hydroxide	3	3						
		Ibuprofen	4	4						
1050ha	63 y M				A/C	Ingst	Int-S	2		
		Carvedilol	1	1						
		Amlodipine	2	2						
		Clonazepam	3	3					7-Aminoclonazepam	0.02 mg/L in blood (unspecified) @ 15 m (pe)
		Valproic acid	4	4						
		Colchicine	5	5						
		Allopurinol	6	6						
		Vitamin D	7	7						
		Atorvastatin	8	8						
1051h	63 y M				A/C	Ingst	Int-S	2		
		Amlodipine	1	1						
		Fluoxetine	2	2						
		Ethanol	3	3					Ethanol	332 mg/dL in blood (unspecified) @ 2 h (pe)
1052h	63 y F				A/C	Ingst	Int-S	1		
		Carvedilol	1	1						
		Sertraline	2	2						
		Mirtazapine	3	3						
		Antiplatelet drug	4	4						
		Lisinopril	5	5						
		Alprazolam	6	6						
		Atorvastatin	7	7						
		Drug, unknown	8	8						
1053h	64 y F				A/C	Ingst	Int-S	1		
		Diltiazem (extended release)	1	1						
		Primidone	2	2						
		Fluoxetine	3	3						
1054h	65 y F				U	Ingst	Int-S	1		
		Verapamil	1	1						
		Clonidine	2	2						
1055p	65 y M				A/C	Ingst	Int-S	2		
		Losartan	1	1						
		Oxycodone	2	2						
		Lorazepam	3	3						
1056h	65 y F				A	Ingst	Int-S	2		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1057pa	65 y F	Atenolol	1	1	A/C	Ingst	Int-S	1		
		Amitriptyline	2	2						
		Clonazepam	3	3						
1058h	65 y M	Metoprolol (extended release)	1	1	A	Ingst	Int-S	1		
		Drug, unknown	2	2						
		Diltiazem	1	1						
1059h	66 y F	Perindopril	2	2	A/C	Ingst	Int-S	1		
		Allopurinol	3	3						
		Pantoprazole	4	4						
1060h	67 y F	Furosemide	5	5	A	Ingst	Int-S	1		
		Diltiazem	1	1						
		Ethanol	2	2						
1061ha	67 y M	Amlodipine	1	1	A/C	Ingst	Int-S	1		
		Carvedilol	2	2						
		Amitriptyline	3	3						
1062ha	67 y F	Duloxetine	4	4	A/C	Ingst	Int-S	1		
		Flecainide	1	1						
		Verapamil	2	2						
1063ha	67 y M	Escitalopram	3	3	A/C	Ingst	Int-S	1		
		Alprazolam	4	4						
		Verapamil	1	1						
1064h	67 y F	Alprazolam	2	2	A/C	Ingst + Par	Int-S	2		
		Metoprolol	1	1						
		Warfarin	2	2						
1065ph	68 y F	Benzotropine	3	3	A/C	Ingst	Int-S	1		
		Labetalol	1	1						
		Insulin	2	2						
1066h	68 y M	Digoxin	3	3	A	Ingst	AR-O	3		
		Acetaminophen/hydrocodone	4	4						
		Amitriptyline	5	5						
1067	68 y F	Lisinopril	6	6	A	Ingst	Int-S	1		
		Phenothiazine	7	7						
		Oxybutynin	8	8						
1068h	69 y M	Atorvastatin	9	9	A/C	Ingst	Int-S	1		
		Cardiac glycoside	1	1						
		Diltiazem	1	1						
1069h	69 y F	Propranolol	2	2	A/C	Ingst	Int-S	1		
		Metformin	3	3						
		Glyburide	4	4						
1069h	69 y F	Escitalopram	5	5	A/C	Ingst	Int-S	1		
		Losartan	6	6						
		Levothyroxine	7	7						
1069h	69 y F	Lorazepam	8	8	A/C	Ingst	Int-S	1		
		Amlodipine	1	1						
		Metoprolol	2	2						
1069h	69 y F	Hydrochlorothiazide	3	3	A/C	Ingst	Int-S	1		
		Duloxetine	4	4						
		Memantine	5	5						
1069h	69 y F	Amlodipine	1	1	A/C	Ingst	Int-S	1		
		Diltiazem (extended release)	2	2						
		Metoprolol	3	3						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
		Acetaminophen/ oxycodone	3	3					Acetaminophen	14.7 mg/L in blood (unspecified) @ 1 m (pe)
		Lisinopril	4	4						
		Diazepam	5	5						
		Mirtazapine	6	6						
		Famotidine	7	7						
		Esomeprazole	8	8						
1070	69 y M	Amlodipine	1	1	A/C	Ingst	Int-S	2		
		Fluoxetine	2	2						
		Benzodiazepine	3	3						
		Hydrochlorothiazide	4	4						
1071	69 y F	Cardiac glycoside	1	1	C	Ingst	AR-D	3		
1072h	69 y F	Calcium antagonist	1	1	A	Ingst	Int-S	1		
		Oral hypoglycemic (sulfonylurea)	2	2						
		Hydrochlorothiazide/ lisinopril	3	3						
1073	69 y M	Diltiazem	1	1	A	Ingst	Int-S	2		
1074h	70 y F	Diltiazem	1	1	A	Ingst	Int-S	2		
		Charcoal	2	2						
		Polyethylene glycol	3	3						
1075h	70 y F	Digoxin	1	1	A/C	Ingst	AR-D	3	Digoxin	3.07 ng/mL in serum @ 24 h (pe)
		Digoxin	1	1					Digoxin	3.98 ng/mL in serum @ 10 h (pe)
1076ph	70 y F	Diltiazem	1	1	U	Ingst	Int-S	2		
		Zolpidem	2	2						
1077h	70 y M	Diltiazem (extended release)	1	1	A/C	Ingst	Int-S	3		
		Venlafaxine	2	2						
		Donepezil	3	3						
		Lisinopril	4	4						
1078	71 y F	Digoxin	1	1	C	Ingst	AR-D	3	Digoxin	2.3 mcg/mL in blood (unspecified) @ 1 h (pe)
1079ph	72 y F	Amlodipine	1	1	A/C	Ingst	Int-S	2		
		Acetaminophen	2	2					Acetaminophen	50 mcg/mL in serum @ unknown
		Hydrocodone	3	2						
		Temazepam	4	3						
		Diazepam	5	4						
		Levothyroxine	6	5						
1080h	72 y M	Diltiazem	1	1	A/C	Ingst	Int-S	1		
		Losartan	2	2						
		Duloxetine	3	3						
		Lorazepam	4	4						
		Mirtazapine	5	5						
1081	72 y F	Beta blocker	1	1	U	Unk	Unk	2		
		Amlodipine	2	2						
1082h	73 y F	Metoprolol	1	1	A/C	Ingst	Int-S	1		
		Duloxetine	2	2						
		Trazodone	3	3						
		Donepezil	4	4						
		Baclofen	5	5						
		Benzotropine	6	6						
		Lurasidone	7	7						
		Alprazolam	8	8						
		Zolpidem	9	9						
		Meloxicam	10	10						
		Salicylate	11	11						
		Levothyroxine	12	12						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1083	73 y M	Omeprazole	13	13	A/C	Ingst	Unt-T	3		
		Vitamin D	14	14						
		Verapamil	1	1						
1084	74 y F	Metoprolol	2	2	A/C	Ingst	Unt-G	2		
		Nifedipine	1	1						
1085ha	74 y F	Metoprolol	2	2	A/C	Ingst	Int-S	2		
		Amlodipine	1	1						
		Amiodarone	2	2						
		Salicylate	3	3						
		Potassium	4	4						
		Rivaroxaban	5	5						
		Hydralazine	6	6						
		Losartan	7	7						
1086	74 y F	Sotalol	1	1	C	Ingst	AR-D	2		
1087h	75 y M				U	Ingst	Int-S	2		
		Alpha blocker	1	1						
		Nebivolol	2	2						
		Lisinopril	3	3						
		Hydrochlorothiazide	4	4						
		Ethanol	5	5						
		Simvastatin	6	6						
1088h	76 y F	Esomeprazole	7	7	A/C	Ingst	Unt-T	1		
		Diltiazem	1	1						
		Metoprolol	2	2						
		Carvedilol	3	3						
		Nifedipine	4	4						
		Hydralazine	5	5						
		Isosorbide mononitrate	6	6						
		Clonidine	7	7						
		Terazosin	8	8						
		Clorazepate	9	9						
1089	76 y F	Digoxin	1	1	A	Ingst	AR-D	3		
1090	77 y F				A/C	Ingst	AR-D	3	Digoxin	4.8 ng/mL in serum @ 1 h (pe)
		Digoxin	1	1						
1091ha	77 y M				A/C	Ingst	Unt-G	2		
		Metoprolol	1	1						
		Lisinopril	2	2						
		Nitroglycerin	3	3						
1092	77 y F	Rivaroxaban	4	4	A/C	Ingst	Int-S	2		
		Amlodipine	1	1						
		Metoprolol	2	2						
1093h	77 y M				A	Ingst	Int-S	1		
		Metoprolol	1	1						
		Amlodipine	2	2						
		Tramadol	3	3						
		Lorazepam	4	4						
		Ibuprofen	5	5						
1094ph	77 y M	Paroxetine	6	6	A/C	Ingst	Int-S	2		
		Ranolazine	1	1						
		Naproxen	2	2						
1095h	77 y F				A	Ingst	Int-S	2		
		Diltiazem	1	1						
		Metoprolol	2	2						
1096h	78 y F	Alprazolam	3	3	A/C	Ingst	Int-S	2		
		Carvedilol	1	1						
1097h	78 y F				A/C	Ingst	AR-D	3		
1098h	78 y F	Diltiazem	1	1	A/C	Ingst	Int-S	1		
		Amlodipine	1	1						
		Losartan	2	2						
		Fluoxetine	3	3						
		Hydrochlorothiazide	4	4						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1099	80 y F	Diltiazem (extended release)	1	1	A/C	Ingst	Int-S	1		
		Nifedipine	2	2						
1100	80 y F	Cardiac glycoside	1	1	C	Ingst	AR-D	3		
1101h	81 y F	Digoxin	1	1	C	Ingst	AR-D	3	Digoxin	3.9 ng/mL in serum @ unknown
		Metformin	2	2						
1102h	81 y F	Nifedipine	1	1	A	Ingst	Unt-T	2		
		Metoprolol (extended release)	2	2						
		Amio	3	3						
1103ha	82 y M	Diltiazem	1	1	A	Ingst	Int-S	1		
		Lisinopril	2	2						
		Naproxen	3	3					Naproxen	353 mg/L in blood (unspecified) @ unknown
		Warfarin	4	4						
		Levothyroxine	5	5						
1104h	83 y F	Propafenone	1	1	A/C	Ingst	Int-S	2		
1105	83 y F	Sotalol	1	1	A	Ingst	AR-D	3		
1106h	84 y F	Digoxin	1	1	C	Ingst	AR-D	3	Digoxin	4 ng/mL in blood (unspecified) @ unknown
1107p	85 y M	Cardiac glycoside	1	1	U	Unk	Unk	3	Digoxin	2.7 ng/mL in blood (unspecified) @ unknown
1108ha	86 y F	Amlodipine	1	1	A/C	Ingst	Int-S	1	Amlodipine	610 ng/mL in blood (unspecified) @ 3 d (pe)
		Donepezil	2	2					Donepezil	29 ng/mL in blood (unspecified) @ 3 d (pe)
1109	86 y F	Metoprolol	1	1	A/C	Ingst	Int-S	1		
		Amlodipine	2	2						
		Acetaminophen/diphenhydramine	3	3						
		Diazepam	4	4						
1110h	86 y F	Amlodipine/benazepril	1	1	A/C	Ingst	Int-S	2		
		Metoprolol	2	2						
		Hydrochlorothiazide	3	3						
		Ibuprofen	4	4						
1111h	87 y M	Metoprolol	1	1	A/C	Ingst	Int-S	2		
		Amlodipine	2	2						
1112h	87 y F	Flecainide	1	1	C	Ingst	AR-D	2		
1113h	89 y F	Metoprolol	1	1	A	Ingst	Int-U	1		
		Citalopram	2	2					Citalopram	2.45 mg/L in blood (unspecified) @ unknown
		Lisinopril	3	3						
		Trazodone	4	4						
		Prednisone	5	5						
		Oxycodone	6	6					Oxycodone	3 ng/mL in blood (unspecified) @ unknown
[1114ha]	89 y F	Digoxin	1	1	A/C	Ingst	Int-S	1	Digoxin	24 ng/mL in serum @ 5 h (pe)
1115h	89 y M	Nifedipine	1	1	A/C	Ingst	Int-S	2		
		Glipizide	2	2						
		Sitagliptin	3	3						
		Losartan	4	4						
		Warfarin	5	5						
		Quetiapine	6	6						

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1116ha	89 y F	Citalopram	7	7	A/C	Ingst	Int-U	1		
		Amlodipine	1	1						
		Lisinopril	2	2						
1117h	90 y F	Calcium antagonist	1	1	A	Ingst	Int-S	1		
		Levothyroxine	2	2						
1118	93 y F	Digoxin	1	1	C	Ingst	AR-D	1		
1119h	95 y M	Digoxin	1	1	C	Ingst	Unt-T	2		
1120a	96 y F	Digoxin	1	1	A	Ingst	Int-U	1		
		Amlodipine	1	1					Amlodipine	0.2 mg/L in blood (unspecified) @ autopsy
		Metoprolol (extended release)	2	2					Metoprolol	0.3 mg/L in blood (unspecified) @ autopsy
		Metoprolol (extended release)	2	2					Metoprolol	0.7 mg/L in serum @ autopsy
		Hydralazine	3	3						
		Levothyoxin	4	4						
		Thiazide	5	5						
		Omeprazole	6	6						
[1121pha]	22 m M	Propafenone	1	1	A/C	Ingst	Unt-G	1	Propafenone	10 mcg/mL in blood (unspecified) @ autopsy
1122ph	50+ y F	Cardiac glycoside	1	1	A	Ingst	Int-S	1		
		Diltiazem	2	1						
		Warfarin	3	2						
		Alprazolam	4	3						
See also case 4, 12, 58, 96, 128, 215, 382, 384, 514, 527, 556, 559, 570, 571, 580, 597, 601, 680, 710, 737, 744, 750, 782, 793, 806, 814, 815, 820, 828, 834, 846, 847, 855, 874, 893, 1123, 1139, 1145, 1154, 1155, 1158, 1162, 1166, 1168, 1193, 1197, 1227, 1232, 1235, 1244, 1400, 1490										
Cold and cough preparations										
1123ha	16 y F				A	Ingst	Int-S	2		
		Benzonate	1	1						
		Metoprolol (extended release)	2	2						
		Acetaminophen/codeine	3	3						
		Ibuprofen	4	4					Ibuprofen	36 mcg/mL in blood (unspecified) @ unknown
1124	20 y M	Benzonate	1	1	A	Ingst	Int-S	1		
		Ethanol	2	2						
1125ph	30 y M	Dextromethorphan/guaifenesin	1	1	A	Ingst	Int-U	2		
1126pai	31 y F				A	Ingst	Int-S	1		
		Benzonate	1	1						
		Ethanol	2	2						
		Drug, unknown	3	3						
		Methocarbamol	4	3						
1127pha	43 y F	Benzonate	1	1	A/C	Ingst	Int-S	1		
		Ethanol	2	2					Ethanol	260 mg/dL in blood (unspecified) @ unknown
1128	51 y F				A	Ingst	Int-S	1		
		Dextromethorphan	1	1						
		Salicylate	2	2						
		Acetaminophen	3	3						
See also case 3, 172, 327, 337, 358, 371, 417, 466, 522, 608, 631, 730, 758, 892, 899, 935, 937, 996, 1003, 1287, 1308, 1350, 1368, 1420										
Diagnostic agents										
1129h	56 y F	IV contrast	1	1	A	Par	Unt-T	3		
Electrolytes and minerals										
1130	30 y F	Iron	1	1	A	Ingst	Int-S	1	Iron	1457 mcg/dL in blood (unspecified) @ 12 h (pe)

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
[1131h]	39 y M	Iron	1	1	A	Ingst	Int-S	1	Iron	328 mcg/dL in blood (unspecified) @ 48 h (pe)
		Iron	1	1					Iron	501 mcg/dL in blood (unspecified) @ 39 h (pe)
		Iron	1	1					Iron	741 mcg/dL in blood (unspecified) @ 24 h (pe)
		Acetaminophen	2	2					Acetaminophen	144 mcg/mL in blood (unspecified) @ 39 h (pe)
		Acetaminophen	2	2					Acetaminophen	246 mcg/mL in blood (unspecified) @ 24 h (pe)
		Acetaminophen	2	2					Acetaminophen	295 mcg/mL in blood (unspecified) @ 9 h (pe)
		Acetaminophen	2	2					Acetaminophen	32 mcg/mL in blood (unspecified) @ 48 h (pe)
		Acetaminophen	2	2					Acetaminophen	369 mcg/mL in blood (unspecified) @ 5 h (pe)
		Acetaminophen	2	2					Acetaminophen	375 mcg/mL in blood (unspecified) @ 1 h (pe)
		Acetaminophen	2	2					Acetaminophen	382 mcg/mL in blood (unspecified) @ 4 h (pe)
		Salicylate	3	3					Salicylate	14 mg/dL in blood (unspecified) @ 1 h (pe)
		Cocaine	4	4						
		Magnesium sulfate	1	1						
1132ha	41 y F	Iron	1	1	A	Ingst	Int-S	1	Iron	1187 mcg/dL in blood (unspecified) @ 9 h (pe)
		Iron	1	1					Iron	1441 mcg/dL in blood (unspecified) @ unknown
		Iron	1	1					Iron	2200 mcg/dL in blood (unspecified) @ 6 h (pe)
		Iron	1	1					Iron	912 mcg/dL in blood (unspecified) @ 1 h (pe)
		Diphenhydramine	2	2					Diphenhydramine	1500 ng/mL in blood (unspecified) @ unknown
		Ibuprofen	3	3					Ibuprofen	220 mcg/mL in blood (unspecified) @ unknown
		Ethanol	4	4					Ethanol	100 mg/dL in blood (unspecified) @ unknown
[1133ha]	46 y M	Zinc	1	1	A	Ingst	Unt-G	1		
1134h	60 y F	Potassium chloride	1	1	A	Ingst	Int-S	2		
1135hi	63 y F	Iron	1	1	A/C	Ingst	Int-S	2		
		Ibuprofen	2	2						
		Levothyroxine	3	3						
1136h	64 y M	Iron dextran	1	1	A	Ingst	Unk	3	Iron	525 mcg/dL in blood (unspecified) @ 1 h (pe)
See also case 438, 458, 926, 996, 1017, 1085, 1154, 1174										
Gastrointestinal preparations										
[1137ph]	34 y M	Loperamide	1	1	U	Ingst	Int-A	1		
1138ph	34 y M	Loperamide	1	1	U	Ingst	Int-A	2	Desmethyloperamide	120 ng/mL in blood (unspecified) @ unknown
		Loperamide	1	1					Loperamide	18 ng/mL in blood (unspecified) @ unknown
		Bupropion	2	2						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
		Venlafaxine	3	3						
		Mirtazapine	4	4						
		Cyclobenzaprine	5	5						
See also case 458, 467, 482, 493, 559, 571, 674, 680, 737, 788, 796, 840, 926, 935, 946, 975, 979, 996, 1010, 1017, 1026, 1058, 1065, 1069, 1074, 1082, 1087, 1120, 1152, 1162, 1168, 1174, 1197, 1224, 1244										
Hormones and hormone antagonists										
1139a	22 y M				A/C	Ingst	Int-S	1		
		Metformin	1	1						
		Venlafaxine	2	2					o-Desmethyl-venlafaxine	104 ng/mL in blood (unspecified) @ unknown
		Ethanol	3	3					Ethanol	85 mg/dL in blood (unspecified) @ unknown
		Lamotrigine	4	4					Lamotrigine	2.3 mcg/mL in blood (unspecified) @ unknown
		Buspirone	5	5						
		Lisinopril	6	6						
		Montelukast	7	7						
		Simvastatin	8	8						
1140h	27 y M				U	Ingst + Par	Int-S	2		
		Insulin (glargine)	1	1						
		Metformin	2	2						
1141pha	29 y F				A/C	Ingst	Int-S	1		
		Insulin (glargine)	1	1						
		Oxycodone	2	2						
1142ha	34 y M				A	Par	Int-S	1		
		Insulin (glargine)	1	1						
		Drug, unknown	2	2						
1143ph	35 y M				U	Ingst	Int-S	2		
		Glipizide	1	1						
		Insecticide, unknown	2	2						
1144	35 y M				A/C	Ingst	Int-S	1		
		Metformin	1	1						
		Glyburide	2	2						
		Risperidone	3	3						
		Buspirone	4	4						
1145ph	38 y F				A	Ingst	AR-D	2		
		Metformin	1	1						
		Valproic acid	2	2					Valproic acid	26.9 mcg/mL in serum @ unknown
		Clonazepam	3	3						
		Lisinopril	4	4						
		Acetaminophen	5	5					Acetaminophen	17.6 mcg/mL in serum @ unknown
1146ha	40 y F				A/C	Ingst + Aspir + - Par	Int-S	1		
		Insulin (aspart)	1	1						
		Tapentadol	2	2					Tapentadol	0.86 mg/mL in blood (unspecified) @ unknown
		Zolpidem	3	3					Zolpidem	0.59 mg/mL in blood (unspecified) @ unknown
		Clonazepam	4	4					Clonazepam	0.028 mg/mL in blood (unspecified) @ unknown
		Clonazepam	4	4					7-Aminoclonazepam	0.062 mg/mL in blood (unspecified) @ unknown
		Gabapentin	5	5					Gabapentin	1.1 mg/mL in blood (unspecified) @ unknown
		Venlafaxine	6	6					Venlafaxine	0.25 mg/mL in blood (unspecified) @ unknown
		Venlafaxine	6	6					o-Desmethyl-venlafaxine	0.48 mg/mL in blood (unspecified) @ unknown
		Trazodone	7	7						
1147ha	41 y F				A/C	Ingst	Int-S	1		
		Metformin	1	1						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1148h	42 y F	Alprazolam	2	2	A	Unk	Int-S	2	Alprazolam	27 ng/mL in blood (unspecified) @ autopsy
		Escitaopram	3	3					Citalopram	425 ng/mL in blood (unspecified) @ autopsy
		Naproxen	4	4					Naproxen	201 mcg/mL in blood (unspecified) @ autopsy
		Metformin	1	1						
1149h	44 y F	Glipizide	1	1	C	Ingst	AR-D	2		
1150ha	44 y M	Metformin	1	1	A/C	Ingst	Int-S	1	Metformin	280 mcg/mL in blood (unspecified) @ 1 h (pe)
		Glipizide	2	2						
1151h	46 y F	Glipizide	1	1	A	Ingst	Int-S	1		
		Metformin	2	2						
		Insulin	3	3						
		Trazodone	4	4						
		Fluoxetine	5	5						
		Sertraline	6	6						
1152	48 y M	Metformin	1	1	A	Ingst	Int-S	2		
		Ethanol	2	2					Ethanol	126 mg/dL in blood (unspecified) @ unknown
1153h	49 y F	Oxybutynin	3	3	A	Ingst	Unk	2		
		Meclizine	4	4						
		Metformin	1	1						
1154h	53 y F	Acetaminophen	2	2	A	Ingst	Int-S	2		
		Glimepiride	1	1						
1155h	53 y M	Lisinopril	2	2	A/C	Ingst	Int-S	2		
		Pregabalin	3	3						
		Potassium chloride	4	4						
		Oral hypoglycemics	5	5						
		Atorvastain	6	6						
		Mirtazapine	7	7						
		Metformin	1	1						
		Atenolol	2	2						
1156	53 y F	Clonazepam	3	3	A/C	Ingst + Par	Int-S	1		
		Sildenafil	4	4						
1157h	54 y M	Insulin	1	1	A	Ingst	Int-S	1		
		Clonazepam	2	2						
1158pha	55 y F	Metformin	1	1	A/C	Ingst + Par	Int-S	2		
		Ropinirole	2	2						
1158pha	55 y F	Insulin	1	1	A/C	Ingst + Par	Int-S	2		
		Metformin	2	2						
		Diazepam	3	3						
		Rivaroxaban	4	4						
		Ezetimibe	5	5						
		Cyclobenzaprine	6	6						
		Tramadol	7	7						
		Trazodone	8	8						
		Lamotrigine	9	9						
		Furosemide	10	10						
		Risperidone	11	11						
		Bupropion	12	12						
		Acetaminophen/oxycodone	13	13						
		Spiroonolactone	14	14						
		Mirtazapine	15	15						
		Paroxetine	16	16						
		Levothyroxine	17	17						
1159h	56 y M	Insulin	1	1	A	Ingst + Par	Int-S	3		
		Gabapentin	2	2						
		Metformin	3	3						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1160h	57 y M				A	Ingst	Int-S	2		
1161ha	59 y M	Metformin	1	1	A	Ingst	Int-S	2		
		Metformin	1	1					Acetaminophen	170 mcg/mL in blood (unspecified) @ autopsy
		Acetaminophen/hydrocodone	2	2					Hydrocodone (free)	2000 ng/mL in blood (unspecified) @ autopsy
		Acetaminophen/hydrocodone	2	2						
		Benzodiazepine	3	3						
1162h	60 y M				A/C	Ingst	Int-S	1		
		Metformin	1	1						
		Empagliflozin	2	2						
		Tadalafil	3	3						
		Losartan	4	4						
		Omeprazole	5	5						
		Sertraline	6	6						
		Senna alkaloids	7	7						
		Levothyroxine	8	8						
		Hydrochlorothiazide	9	9						
1163h	60 y F				A	Ingst	AR-D	3		
		Glipizide	1	1						
1164ph	60 y M				U	Ingst	Unk	2		
		Metformin	1	1						
1165h	61 y M				C	Ingst	Unt-T	2		
		Dapagliflozin/metformin	1	1						
		Metformin	2	2						
1166h	65 y M				A/C	Ingst	Int-S	1		
		Metformin	1	1						
		Losartan	2	2						
		Hydrochlorothiazide	3	3						
		Levothyroxine	4	3						
		Ethanol	5	4						
1167h	66 y M				A/C	Ingst	Int-S	1		
		Metformin	1	1						
1168h	70 y F				A	Ingst	Int-S	2		
		Glimepiride	1	1						
		Acetaminophen	2	2						
		Metformin	3	3						
		Quetiapine	4	4						
		Omeprazole	5	5						
		Baclofen	6	6						
		Fluoxetine	7	7						
		Fexofenadine	8	8						
		Gabapentin	9	9						
		Diazepam	10	10						
		Pantoprazole	11	11						
		Cetirizine	12	12						
		Rosuvastatin	13	13						
		Levothyroxine	14	14						
1169h	70 y M				A	Ingst	Int-S	1		
		Metformin	1	1						
		Ethanol	2	2						
1170h	72 y F				C	Ingst	AR-D	3		
		Metformin	1	1						
1171h	74 y F				C	Ingst	Unt-T	3		
		Metformin	1	1						
1172	75 y M				C	Ingst	AR-D	3		
		Metformin	1	1						
1173h	76 y F				U	Ingst	Unk	2		
		Metformin	1	1						
1174h	77 y F				A	Ingst	Unt-T	2		
		Glimepiride	1	1						
		Pregabalin	2	2						
		Metformin	3	3						
		Ibuprofen	4	4						
		Furosemide	5	5						
		Paroxetine	6	6						
		Diphenhydramine	7	7						
		Omeprazole	8	8						
		Potassium chloride	9	9						
		Cinnamaldehyde	10	10						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
See also case 1, 29, 87, 231, 377, 526, 576, 580, 601, 730, 731, 806, 808, 836, 893, 926, 956, 970, 980, 983, 1008, 1013, 1015, 1019, 1022, 1037, 1064, 1067, 1072, 1079, 1082, 1101, 1103, 1113, 1115, 1117, 1120, 1135, 1215, 1247, 1257, 1338, 1356										
Miscellaneous drugs										
1175	46 y F				A/C	Ingst	Int-S	3		
		Pramipexole	1	1						
		Sertraline	2	2						
		Lorazepam	3	3						
1176	71 y F				A	Par	AR-D	2		
		Cholinesterase inhibitor	1	1						
1177h	91 y M				A	Par	AR-D	3		
		Rasburicase	1	1						
See also case 233, 522, 647, 728, 745, 750, 832, 946, 1050, 1058, 1068, 1077, 1082, 1108, 1142, 1157										
Muscle relaxants										
1178ha	21 y F				A	Ingst	Int-S	3		
		Baclofen	1	1					Baclofen	0.021 mcg/mL in blood (unspecified) @ 2 d (pe)
1179ph	27 y F				U	Ingst	Int-S	1		
		Carisoprodol	1	1						
		Tramadol	2	2						
		Mirtazapine	3	3						
1180ph	33 y M				A/C	Ingst	Int-S	2		
		Tizanidine	1	1						
1181i	33 y M				A	Ingst	Int-S	1		
		Baclofen	1	1						
1182a	36 y F				A	Ingst	Int-S	1		
		Tizanidine	1	1						
		Risperidone	2	2						
		Methamphetamine	3	3						
		Hydrocodone	4	4						
		Benzodiazepine	5	5						
1183h	46 y F				A/C	Ingst	Unk	2		
		Skeletal muscle relaxant	1	1						
		Oxycodone	2	2						
		Lorazepam	3	3						
1184ha	47 y M				A	Ingst	Int-S	1		
		Baclofen	1	1					Baclofen	3.5 mcg/mL in whole blood @ unknown
		Bupropion	2	2					Bupropion	3.9 mcg/mL in whole blood @ unknown
		Codeine	3	3					Codeine	0.25 mcg/mL in whole blood @ unknown
		Gabapentin	4	4					Gabapentin	44 mcg/mL in whole blood @ unknown
		Ethanol	5	5					Ethanol	79 mg/dL in plasma @ unknown
1185p	51 y F				A	Ingst	Int-S	1		
		Orphenadrine	1	1						
		Alprazolam	2	2						
1186	52 y F				A/C	Ingst + Aspir	Int-S	2		
		Carisoprodol	1	1					Carisoprodol	33 mcg/mL in serum @ 1 h (pe)
		Meprobamate	2	2					Meprobamate	9.3 mcg/mL in serum @ 1 h (pe)
		Tramadol	3	2						
		Lisdexamfetamine	4	3						
		Ethanol	5	4					Ethanol	140 mg/dL in serum @ 1 h (pe)
1187	52 y F				U	Ingst + Aspir	Int-S	3		
		Baclofen	1	1						
		Acetaminophen/codeine	2	2					Acetaminophen	66 mcg/mL in serum @ unknown
		Acetaminophen/codeine	2	2					Acetaminophen	89 mcg/mL in serum @ unknown
1188h	58 y F				A	Oth	Unt-T	2		
		Baclofen	1	1						
1189	61 y M				C	Ingst	Int-M	3		
		Cyclobenzaprine	1	1						
		Morphine (extended release)	2	2						
		Acetaminophen/hydrocodone	3	3						
		Alprazolam	4	4						
1190h	61 y M				A/C	Ingst	Int-S	3		
		Carisoprodol	1	1						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1191	64 y M	Cyclobenzaprine	1	1	A/C	Ingst + Aspir	Int-S	2		
1192h	65 y M	Cyclobenzaprine	1	1	U	Ingst	Int-S	3		
		Diphenhydramine	2	2						
		U-47700	3	3						
		Benzodiazepine	4	4						
1193p	66 y M	Cyclobenzaprine	1	1	A/C	Ingst	Int-S	2		
		Lisinopril	2	2						
1194h	68 y M	Cyclobenzaprine	1	1	A	Ingst	Int-U	3		
1195h	75 y F				A	Ingst	Unk	2		
		Baclofen	1	1						
		Tramadol	2	2						
See also case 231, 308, 319, 351, 374, 379, 383, 401, 422, 487, 495, 511, 527, 555, 571, 605, 665, 753, 784, 798, 819, 832, 842, 849, 852, 893, 908, 916, 940, 945, 996, 1036, 1047, 1082, 1126, 1138, 1158, 1168, 1217, 1224, 1234, 1412, 1450										
Sedative/hypnotics/antipsychotics										
1196	18 y F	Quetiapine	1	1	A/C	Ingst	Int-S	1		
		Lamotrigine	2	2						
1197a	19 y M	Fluphenazine	1	1	A	Ingst	Int-S	2		
		Valproic acid (extended release)	2	2						
		Quetiapine	3	3						
		Oxycodone	4	4						
		Benzotropine	5	5						
		Sertraline	6	6					Sertraline	0.09 mg/L in blood (unspecified) @ autopsy
		Sertraline	6	6					Desmethylertraline	0.2 mg/L in blood (unspecified) @ autopsy
		Hydrochlorothiazide	7	7						
		Lorazepam	8	8						
		Omeprazole	9	9						
		Oxcarbazepine	10	10						
		Levetiracetam	11	11						
		Lisinopril	12	12						
1198p	20 y F	Olanzapine	1	1	U	Ingst	Int-S	1		
1199pha	21 y M	Quetiapine	1	1	A	Ingst	Int-S	1		
		Alprazolam	2	2						
		Lorazepam	3	3						
		Valproic acid	4	4					Valproic acid	200 mcg/mL in blood (unspecified) @ 2 d (pe)
		Valproic acid	4	4					Valproic acid	285 mg/L in blood (unspecified) @ unknown
1200	22 y F	Risperidone	1	1	A	Ingst	Int-S	1		
		Acetaminophen	2	2						
[1201pha]	24 y M	Benzodiazepine	1	1	A	Ingst	Int-A	2		
1202pha	25 y M	Aripiprazole	1	1	U	Unk	Unk	2		
1203pha	26 y M	Sedative/hypnotic/anti-anxiety/anti-psychotic	1	1	A	Unk	Int-A	2		
1204ph	26 y F	Clonazepam	1	1	A/C	Ingst	Int-S	1	Clonazepam	6.3 ng/mL in blood (unspecified) @ 7 h (pe)
		Clonazepam	1	1					7-Aminoclonazepam	71 ng/mL in blood (unspecified) @ 7 h (pe)
		Fentanyl	2	2						
		Drug, unknown	3	3						
		Phenobarbital	4	4					Phenobarbital	4.6 mcg/mL in blood (unspecified) @ 7 h (pe)
		Ethanol	5	5					Ethanol	27 mg/dL in blood (unspecified) @ 30 m (pe)
1205h	28 y F	Zolpidem	1	1	A/C	Ingst	Int-S	2		
		Quetiapine	2	2						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1206a	30 y M				A	Ingst	Int-S	2		
1207ph	31 y M	Quetiapine	1	1	A	Ingst	Int-A	2		
		Alprazolam	1	1						
		Fentanyl	2	2						
		Ethanol	3	3						
1208h	34 y M				U	Ingst	Unk	2		
		Haloperidol	1	1						
		Risperidone	2	2						
		Quetiapine	3	3						
1209ph	35 y F				A/C	Ingst	Int-S	2		
		Alprazolam	1	1						
1210h	35 y M				A/C	Ingst	Int-S	1		
		Quetiapine	1	1						
		Lamotrigine	2	2						
		Gabapentin	3	3						
		Ethanol	4	4					Ethanol	256 mg/dL in blood (unspecified) @ 1.75 h (pe)
1211h	37 y M				A	Par	Unt-U	3		
		Triazolam	1	1						
		Antihistamine	2	2						
1212h	37 y F				A/C	Ingst	Int-S	2		
		Quetiapine	1	1						
		Clonazepam	2	2						
		THC homolog	3	3						
		Cocaine	4	4						
1213pha	38 y F				A	Ingst	Int-S	1		
		Quetiapine	1	1					Quetiapine	3900 ng/mL in blood (unspecified) @ unknown
		Ethanol	2	2					Ethanol	0.108 g/dL in blood (unspecified) @ unknown
		Cocaine	3	3					Benzoyllecognine	754 ng/mL in blood (unspecified) @ unknown
1214h	38 y F				A	Ingst	Int-S	1		
		Doxylamine	1	1						
		Lorazepam	2	2						
		Ethanol	3	3						
1215phi	39 y M				A	Ingst + Inhal + - Unk	Int-A	2		
		Alprazolam	1	1						
		Heroin	2	2						
		Ethanol	3	3					Ethanol	170 mg/dL in serum @ 1 h (pe)
		Androgen	4	4						
1216pi	40 y M				U	Unk	Unk	2		
		Alprazolam	1	1						
1217ph	41 y F				A	Ingst	Int-S	2		
		Lorazepam	1	1						
		Acetaminophen/oxycodone	2	2						
		Carisoprodol	3	3						
		Gabapentin	4	4						
		Acetaminophen	5	5						
		Zolpidem	6	6						
		Duloxetine	7	7						
		Hydrochlorothiazide	8	8						
		Meloxicam	9	9						
1218pha	41 y F				U	Ingst	Int-S	1		
		Quetiapine	1	1					Quetiapine	19.9 mcg/mL in blood (unspecified) @ unknown
		Ethanol	2	2					Ethanol	0.21 g/dL in blood (unspecified) @ unknown
1219ph	43 y M				A	Ingst	Int-S	1		
		Alprazolam	1	1						
		Ethanol	2	2					Ethanol	106 mg/dL in serum @ unknown
		Acetaminophen	3	3						

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1220p	43 y F	Zolpidem (extended release)	1	1	A	Ingst + Unk	Unt-G	2		
		Ethanol	2	2					Ethanol	294 mg/dL in serum @ unknown
1221ph	44 y F	Zolpidem	1	1	A/C	Ingst	Int-S	2		
		Quetiapine	2	2						
		Acetaminophen/butalbital/caffeine/codeine	3	3						
		Gabapentin	4	4						
1222	45 y F	Lorazepam	1	1	A	Ingst	Unt-T	3		
1223	45 y F	Alprazolam	1	1	A/C	Ingst	Unk	2		
		Amphetamine/dextroamphetamine	2	2						
1224ha	45 y F	Clonazepam	1	1	A/C	Ingst	Unk	2		
		Glycopyrrolate	2	2					7-Aminoclonazepam	14 ng/mL in blood (unspecified) @ autopsy
		Baclofen	3	3						
		Hydromorphone	4	4						
1225a	46 y F	Quetiapine	1	1	U	Ingst	Int-U	2		
		Ethanol	2	2					Ethanol	205 mg/dL in blood (unspecified) @ autopsy
		Ethanol	2	2					Ethanol	282 mg/dL in blood (unspecified) @ unknown
1226ph	46 y M	Clozapine	1	1	A	Ingst	Int-S	2		
		Clonazepam	2	2						
1227ha	47 y F	Quetiapine	1	1	U	Ingst	Int-S	1		
		Topiramate	2	2					Quetiapine	16000 ng/mL in blood (unspecified) @ unknown
		Metoprolol	3	3					Topiramate	3900 ng/mL in blood (unspecified) @ unknown
		Alprazolam	4	4						
		Gabapentin	5	5						
1228pa	48 y F	Quetiapine	1	1	U	Ingst	Int-S	1		
		Valproic acid (extended release)	2	2					Quetiapine	19000 ng/mL in blood (unspecified) @ autopsy
		Trazodone	3	3					MCP (meta-chlorophenyl piperazine)	200 mcg/mL in blood (unspecified) @ autopsy
		Trazodone	3	3					Trazodone	3.6 mcg/mL in blood (unspecified) @ autopsy
		Ethanol	4	4					Ethanol	47 mg/dL in vitreous @ autopsy
		Phenobarbital	5	5					Phenobarbital	4.29 mcg/mL in blood (unspecified) @ autopsy
		Sertraline	6	6					Sertraline	140 mcg/mL in blood (unspecified) @ autopsy
		Sertraline	6	6					Desmethylsertraline	520 mcg/mL in blood (unspecified) @ autopsy
1229ph	48 y F	Quetiapine	1	1	A/C	Ingst	Int-S	2		
1230ph	49 y F	Alprazolam	1	1	U	Ingst + Par	Int-U	1		
		Oxycodone	2	2						
1231ph	49 y M	Alprazolam	1	1	U	Unk	Int-A	2		
1232ph	49 y M	Quetiapine	1	1	A/C	Ingst	Int-S	2		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1233h	50 y M	Diazepam	2	2	A	Par	AR-D	2		
		Lisinopril	3	3						
		Drug, unknown	4	4						
		Propofol	1	1						
1234pha	51 y F	Ziprasidone	2	2	U	Ingst	Int-U	2		
		Ethanol	3	3						
		Diazepam	1	1						
		Acetaminophen/butal-bital/caffeine	2	2						
1235ha	52 y M	Buprenorphine	3	3	A/C	Ingst	Int-S	3	Zolpidem	0.326 mg/L in blood (unspecified) @ unknown
		Zolpidem	4	4						
		Carisoprodol	5	5						
		Zolpidem	1	1						
1236pha	53 y F	Caffeine	2	2	A/C	Ingst	Int-S	1	Caffeine	67 mcg/mL in blood (unspecified) @ unknown
		Quetiapine	3	3						
		Gabapentin	4	4						
		Metoprolol (extended release)	5	5						
1237ph	54 y M	Alprazolam	1	1	A	Ingst	Int-S	1	Alprazolam	576 ng/mL in blood (unspecified) @ unknown
		Cocaine	2	2						
		Quetiapine	1	1						
		Acetaminophen/oxycodone	2	2						
1238ha	55 y F	Lorazepam	1	1	U	Ingst	Int-S	2		
		Clonazepam	2	2						
		Haloperidol	1	1						
		Alprazolam	1	1						
1240p	56 y F	Risperidone	1	1	A/C	Ingst	Int-U	1		
		Alprazolam	1	1						
		Risperidone	1	1						
		Zolpidem	1	1						
1241p	56 y M	Acetaminophen/oxycodone	2	2	A	Ingst	Int-S	2	Acetaminophen	81.4 mcg/mL in serum @ unknown
		Zolpidem	1	1						
		Acetaminophen/oxycodone	2	2						
		Alprazolam	1	1						
1242pha	57 y F	Ranitidine	2	2	A	Ingst	Int-S	2		
		Alprazolam	1	1						
		Ranitidine	2	2						
		Olanzapine	1	1						
1243p	58 y F	Gabapentin	2	2	A/C	Ingst	Int-S	2		
		Amphetamine	3	3						
		Sertraline	4	4						
		Alpha blocker	5	5						
1244h	58 y M	Ibuprofen	6	6	A/C	Ingst	Int-S	2		
		Meloxicam	7	7						
		Pravastatin	8	8						
		Melatonin	9	9						
1245h	58 y F	Chenodeoxycholic acid	10	10	A/C	Ingst	Int-S	2		
		Benzodiazepine	1	1						
		Buprenorphine/nalox-one (sublingual film)	2	2						
		Tramadol	3	3						
1246ha	59 y F	Perphenazine	1	1	A/C	Ingst	Int-S	1		
		Fluoxetine	2	2						
		Lamotrigine	3	3						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1247h	59 y F	Benzodiazepine	1	1	A/C	Ingst	Int-S	2		
		Acetaminophen/codeine	2	2						
		Sertraline	3	3						
		Metformin	4	4						
1248h	62 y F	Quetiapine	1	1	A	Ingst	Int-S	2		
		Buspirone	3	2						
		Paroxetine	2	2						
		Lorazepam	4	4						
1249	63 y M	Risperidone	1	1	A/C	Ingst	Int-S	2		
		Bupropion (extended release)	2	2						
1250	63 y M	Alprazolam	1	1	A/C	Ingst	Int-S	3		
		Mirtazapine	2	2						
		Acetaminophen	3	3						
1251a	64 y M	Zolpidem	1	1	C	Ingst	Int-S	1	Zolpidem	670 ng/mL in blood (unspecified) @ 1 h (pe)
		Sertraline	2	2						
1252h	65 y F	Ziprasidone	1	1	A	Ingst	Int-S	2		
		Clonazepam	2	2						
		Trazodone	3	3						
1253ha	67 y F	Alprazolam	1	1	A/C	Ingst	Int-S	1		
		Trazodone	2	1					Trazodone	40 ng/mL in blood (unspecified) @ autopsy
1254h	67 y M	Barbiturate	1	1	A	Ingst	Int-U	1	Phenobarbital	109.8 mcg/mL in blood (unspecified) @ 2 h (pe)
		Acetaminophen	2	2					Acetaminophen	34.8 mcg/mL in blood (unspecified) @ 2 h (pe)
1255pha	69 y F	Lorazepam	1	1	A/C	Ingst	Int-S	2		
		Oxycodone	2	2						
1256h	73 y M	Paliperidone	1	1	C	Ingst + Par	AR-D	3		
		Haloperidol	2	2						
		Quetiapine	3	3						
1257	74 y M	Zolpidem	1	1	A	Ingst	Int-S	2		
		Acetaminophen/hydrocodone	2	2						
		Insulin	3	3						
1258	78 y F	Phenobarbital	1	1	A	Ingst	Int-S	1	Phenobarbital	80.8 mcg/mL in blood (unspecified) @ unknown
1259ph	78 y F	Zolpidem	1	1	A	Ingst	Int-S	3		
		Ethanol (non-beverage)	2	2					Ethanol	180 mg/dL in serum @ unknown
		Salicylate	3	3						
1260ha	80 y M	Barbiturate	1	1	A	Ingst	Int-S	3		
		Morphine	2	2						
1261i	85 y M	Benzodiazepine	1	1	A	Ingst	Int-S	2		
1262h	88 y M	Lorazepam	1	1	A/C	Ingst	Int-S	2		
1263a	88 y M	Secobarbital	1	1	A	Ingst	Int-S	1		
1264ha	88 y F	Lorazepam	1	1	U	Ingst + Aspir	Unk	3		
1265	91 y M	Benzodiazepine	1	1	A/C	Ingst	Unk	2		
1266h	92 y M	Temazepam	1	1	A	Ingst	Int-S	2		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
		Acetaminophen/hydrocodone	2	2					Acetaminophen	55 mcg/mL in serum @ unknown
		Lorazepam	3	3						
See also case 6, 11, 31, 46, 59, 94, 98, 172, 190, 200, 231, 306, 308, 309, 312, 313, 314, 319, 321, 322, 326, 329, 332, 335, 341, 342, 347, 349, 352, 354, 356, 361, 362, 364, 366, 370, 371, 375, 386, 389, 390, 391, 392, 403, 404, 407, 415, 420, 421, 422, 424, 428, 438, 442, 443, 463, 466, 467, 469, 473, 474, 475, 477, 480, 482, 492, 494, 495, 496, 505, 506, 511, 514, 519, 520, 522, 524, 526, 536, 537, 555, 559, 564, 568, 571, 578, 580, 583, 586, 591, 594, 596, 599, 605, 608, 613, 619, 622, 626, 627, 628, 632, 637, 646, 657, 662, 663, 665, 671, 675, 681, 700, 705, 706, 709, 729, 733, 735, 737, 740, 744, 745, 748, 750, 751, 754, 757, 761, 763, 764, 765, 766, 771, 772, 775, 779, 783, 788, 791, 794, 795, 796, 798, 803, 804, 805, 809, 812, 814, 818, 819, 823, 832, 835, 842, 845, 847, 849, 853, 855, 857, 865, 866, 890, 893, 895, 897, 899, 911, 912, 916, 922, 925, 926, 927, 931, 933, 935, 938, 940, 944, 947, 949, 955, 956, 958, 969, 970, 972, 975, 980, 981, 996, 997, 1000, 1003, 1005, 1006, 1010, 1016, 1021, 1022, 1026, 1032, 1036, 1038, 1041, 1045, 1046, 1047, 1050, 1052, 1055, 1056, 1061, 1062, 1065, 1067, 1069, 1070, 1076, 1079, 1080, 1082, 1088, 1093, 1095, 1109, 1115, 1122, 1139, 1144, 1145, 1146, 1147, 1155, 1156, 1158, 1161, 1168, 1175, 1182, 1183, 1185, 1186, 1189, 1192, 1271, 1289, 1293, 1299, 1306, 1309, 1340, 1342, 1354, 1360, 1362, 1368, 1382, 1388, 1400, 1403, 1406, 1411, 1412, 1414, 1419, 1426, 1455, 1459, 1465										
Stimulants and street drugs										
1267	5 y F				A	Unk	Unt-G	1		
		Methamphetamine	1	1						
1268i	17 y M				U	Inhal	Int-A	2		
		THC homolog	1	1						
1269ha	17 y F				U	Unk	Unk	2		
		Cocaine	1	1						
		Isopropanol	2	2					Isopropanol	84 mg/dL in blood (unspecified) @ autopsy
1270h	17 y F				A	Inhal	Int-A	2		
		Methamphetamine	1	1						
		Marijuana	2	2						
1271pa	19 y M				A	Unk	Int-A	1		
		Heroin	1	1					Morphine	771 ng/mL in urine (quantitative only) @ autopsy
		Alprazolam	2	2					Alprazolam	9 ng/mL in serum @ autopsy
		Marijuana	3	3					Carboxy-thc	40 ng/mL in urine (quantitative only) @ autopsy
1272ph	20 y M				A/C	Par	Int-A	2		
		Heroin	1	1						
		Ethanol	2	2						
1273pi	20 y M				A	Par	Int-A	1		
		Heroin	1	1						
1274p	20 y M				U	Par	Int-A	1		
		Heroin	1	1						
1275pi	20 y F				A	Par	Int-A	1		
		Heroin	1	1						
1276p	21 y M				A	Ingst	Int-A	2		
		Amphetamine (hallucinogenic)	1	1						
1277ha	21 y M				A	Ingst	Int-A	1		
		Methamphetamine	1	1						
		Drug, unknown	2	2						
1278pa	21 y F				A	Ingst	Int-A	1		
		Methamphetamine	1	1					MDMA (3,4-methylenedioxymethamphetamine)	1000 ng/mL in blood (unspecified) @ autopsy
		Methamphetamine	1	1					MDA (3,4-methylenedioxymphetamine)	180 ng/mL in blood (unspecified) @ autopsy
		Methamphetamine	1	1					MDA (3,4-methylenedioxymphetamine)	77 ng/mL in blood (unspecified) @ autopsy
		Methamphetamine	1	1					MDMA (3,4-methylenedioxymethamphetamine)	910 ng/mL in blood (unspecified) @ autopsy
		Cocaine	2	2						
		Marijuana	3	3						
		Ethanol	4	4						
1279p	21 y M				A/C	Par	Int-A	1		
		Heroin	1	1						
1280	22 y M				A	Par	Int-U	2		
		Heroin	1	1						
1281a	22 y F				A	Inhal	Int-A	1		
		Methylenedioxymethamphetamine (MDMA)	1	1						
		Methamphetamine	2	2						
1282a	22 y M				U	Ingst	Int-A	1		
		Methamphetamine	1	1					Methamphetamine	10.094 mcg/mL in blood (unspecified) @ autopsy

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1283pa	22 y F	Methamphetamine	1	1	A	Inhal	Int-A	1	Amphetamine	370 ng/mL in blood (unspecified) @ autopsy
		Marijuana	2	2					Carboxy-thc	45.6 mg/mL in blood (unspecified) @ autopsy
		Heroin	1	1					Morphine (free)	36 mcg/L in blood (unspecified) @ autopsy
1284phai	22 y M	Amphetamine (hallucinogenic)	1	1	U	Unk	Int-A	1	MDA (3,4-methylene-dioxyampheta mine)	0.08 mg/L in blood (unspecified) @ 1 h (pe)
		Amphetamine (hallucinogenic)	1	1					MDMA (3,4-methylenedioxy-methamphetamine)	1.2 mg/L in blood (unspecified) @ 1 h (pe)
1285ph	22 y F	Heroin	1	1	A/C	Ingst	Int-A	2		
1286pha	22 y F	Heroin	1	1	A	Ingst	Int-S	2		
1287ph	22 y M	Cocaine	1	1	A/C	Ingst	Int-A	2		
		Dextromethorphan/guaifenesin	2	1						
1288ph	23 y M	Methylenedioxy-mphetamine (MDMA)	1	1	A	Unk	Int-A	2		
1289pha	23 y M	Heroin	1	1	U	Ingst + Par	Int-A	1	Morphine (free)	19 ng/mL in blood (unspecified) @ unknown
		Alprazolam	2	2					Alprazolam	59 ng/mL in blood (unspecified) @ unknown
1290ph	23 y M	Cocaine	1	1	A	Ingst	Int-M	1		
		Cocaine	2	2						
1291ha	23 y M	Methamphetamine	1	1	A	Ingst	Int-A	1	Methamphetamine	230 ng/mL in blood (unspecified) @ 10 m (pe)
		Methamphetamine	1	1					Amphetamine	24 ng/mL in blood (unspecified) @ 10 m (pe)
1292h	23 y M	Methamphetamine	1	1	A	Ingst	Int-S	1		
1293h	24 y M	Amphetamine	1	1	U	Ingst + Unk	Int-A	2		
		Clonazepam	2	2						
1294ha	24 y M	Methamphetamine	1	1	A	Ingst	Int-M	1	Amphetamine	0.06 mcg/mL in blood (unspecified) @ autopsy
		Methamphetamine	1	1					Methamphetamine	5.1 mcg/mL in blood (unspecified) @ 1 h (pe)
		Methamphetamine	1	1					Methamphetamine	5.4 mcg/mL in blood (unspecified) @ autopsy
1295ph	24 y F	Heroin	1	1	U	Unk	Int-U	1		
1296h	24 y M	Methamphetamine	1	1	A	Ingst + Aspir	Int-M	2		
		Methylenedioxy-mphetamine (MDMA)	2	2						
		Carbon	3	3						
1297a	24 y M	Methamphetamine	1	1	U	Par	Int-A	1		
1298	24 y M	Phencyclidine	1	1	A	Ingst	Int-A	1		
1299a	24 y M	THC homolog, AM2201	1	1	A/C	Ingst + Inhal	Int-A	2	am-2201 [1-(5-fluoropentyl)-3-(1-naphthoyl)indole]	3.8 ng/mL in blood (unspecified) @ unknown
		Marijuana	2	2					THC (tetrahydrocannabinol)	3 ng/mL in blood (unspecified) @ unknown

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1300pa	24 y M	Nortriptyline	3	3					Nortriptyline	60 ng/mL in blood (unspecified) @ unknown
		Bupropion	4	4					Bupropion	58.5 ng/mL in blood (unspecified) @ unknown
		Diazepam	5	5					Nordiazepam	58.8 ng/mL in blood (unspecified) @ unknown
		Midazolam	6	6					Midazolam	107 ng/mL in blood (unspecified) @ unknown
		Heroin	1	1	A	Par	Int-A	1		
1301ph	24 y F	Fentanyl	2	2					Fentanyl	12 ng/mL in blood (unspecified) @ autopsy
		Heroin	1	1	A	Unk	Int-A	2		
1302pi	24 y M	Carfentanil	2	2						
		Heroin	1	1	A	Par	Int-A	1		
1303pi	25 y M	Heroin	1	1	A	Unk	Int-A	1		
1304pai	25 y M	Heroin	1	1	A	Unk	Int-A	1		
		Heroin	1	1					Morphine (free)	260 mcg/L in blood (unspecified) @ autopsy
1305ph	25 y F				A	Ingst + Unk	Int-U	2		
		Cocaine	1	1						
		Ethanol	2	2						
		Fentanyl	3	3						
		Oxycodone	4	4						
1306pha	25 y M	Amphetamine	5	5						
		Heroin	1	1	A	Unk	Int-A	1	Morphine	31 ng/mL in blood (unspecified) @ unknown
		Heroin	1	1					6-Monoacetyl morphine	500 ng/mL in blood (unspecified) @ unknown
		Diazepam	2	2					Diazepam	160 ng/mL in blood (unspecified) @ unknown
		Diazepam	2	2					Nordiazepam	180 ng/mL in blood (unspecified) @ unknown
		Acetaminophen/hydrocodone	3	3						
		Marijuana	4	4					Delta-9-thc	2.9 ng/mL in blood (unspecified) @ unknown
		Marijuana	4	4					Delta-9-carboxy-thc	58 ng/mL in blood (unspecified) @ unknown
		Marijuana	4	4					11-OH-thc (11-hydroxy-delta-9-tetrahydrocannabinol)	9 ng/mL in blood (unspecified) @ unknown
		Heroin	1	1	A	Unk	Int-A	2		
1307ph	25 y M	Heroin	1	1	A	Unk	Int-A	2		
1308pa	25 y F	Heroin	1	1	A	Unk	Int-A	2	Morphine (free)	10 mcg/L in blood (unspecified) @ autopsy
		Cocaine	3	2					Benzoylceognine	0.2 mg/L in blood (unspecified) @ autopsy
		Fentanyl	2	2						
		Dextromethorphan	4	3						
		Methamphetamine	5	4					Methamphetamine	0.1 mg/L in blood (unspecified) @ autopsy
1309pha	26 y M	Amphetamine	6	5					Amphetamine	0.06 mg/L in blood (unspecified) @ autopsy
		Heroin	1	1	U	Ingst	Int-U	1	Morphine	16 ng/mL in vitreous @ autopsy

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
		Heroin	1	1					6-monoacetyl morphine	5.5 ng/mL in vitreous @ autopsy
		Fentanyl	2	2					Norfentanyl	0.73 ng/mL in blood (unspecified) @ unknown
		Fentanyl	2	2					Fentanyl	1.7 ng/mL in blood (unspecified) @ unknown
		Cocaine	3	3					Benzoyllecognine	480 ng/mL in blood (unspecified) @ unknown
		Diazepam	4	4					Nordiazepam	110 mg/mL in blood (unspecified) @ unknown
		Diazepam	4	4					Diazepam	79 ng/mL in blood (unspecified) @ unknown
		Lorazepam	5	5					Lorazepam	5.5 ng/mL in blood (unspecified) @ unknown
		Alprazolam	6	6					Alprazolam	9.5 ng/mL in blood (unspecified) @ unknown
1310	26 y M				A	Unk	Int-A	2		
[1311pha]	26 y F	Heroin	1	1	U	Unk	Int-A	2		
		Phencyclidine	1	1					Phencyclidine	340 ng/mL in plasma @ 15 m (pe)
1312	26 y F				A	Ingst	Int-A	1		
1313ha	26 y F	Methamphetamine	1	1	U	Ingst	Int-A	1		
		Methamphetamine	1	1					Methamphetamine	3.5 mg/L in blood (unspecified) @ 15 m (pe)
1314p	26 y M				C	Par	Int-A	1		
1315ph	26 y F	Heroin	1	1	U	Unk	Int-A	1		
		Cocaine	1	1						
		Hydrocodone	2	2						
1316ph	28 y M				A	Unk	Int-A	1		
1317p	28 y F				A/C	Unk	Int-S	2		
1318pi	28 y F	Heroin	1	1	A	Unk	Int-A	1		
		Heroin	1	1					Morphine (free)	74 mcg/L in blood (unspecified) @ autopsy
		Fentanyl	2	2						
		Oxycodone	3	3						
		Ethanol	4	4					Ethanol	0.05% (wt/vol) in vitreous @ autopsy
		Ethanol	4	4					Ethanol	0.06% (wt/vol) in urine (quantitative only) @ autopsy
		Ethanol	4	4					Ethanol	0.07% (wt/vol) in blood (unspecified) @ autopsy
1319p	28 y M				A/C	Par	Int-A	1		
1320h	28 y M	Heroin	1	1	A/C	Ingst	Int-S	2		
		Amphetamine/dextroamphetamine	1	1						
1321ha	28 y M				U	Inhal + Unk	Int-A	1		
		THC homolog	1	1						
		Cocaine	2	2					Benzoyllecognine	0.1 mg/L in blood (unspecified) @ autopsy
1322	28 y M				A	Ingst	Int-A	2		
1323pha	28 y F	Amphetamine (hallucinogenic)	1	1						
		Heroin	1	1	A	Unk	Int-A	1		
									Morphine	0.03 mg/L in blood (unspecified) @ 1 h (pe)
		Methamphetamine	2	2					Amphetamine	0.08 mg/L in blood (unspecified) @ 1 h (pe)
		Methamphetamine	2	2					Methamphetamine	1.49 mg/L in blood (unspecified) @ 1 h (pe)

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1324h	28 y M	Bupropion	3	3	A	Ingst + Unk	Unk	1	Bupropion	12 ng/mL in blood (unspecified) @ 1 h (pe)
		Bupropion	3	3					Hydroxybupropion	130 ng/mL in blood (unspecified) @ 1 h (pe)
		Hydroxyzine	4	4					Hydroxyzine	14 ng/mL in blood (unspecified) @ 1 h (pe)
		Sertraline	5	5					Desmethylsertraline	180 ng/mL in blood (unspecified) @ 1 h (pe)
		Sertraline	5	5					Sertraline	62 ng/mL in blood (unspecified) @ 1 h (pe)
		Ibuprofen	6	6						
		Quinine	7	7						
1325p	28 y M	Cocaine	1	1	A	Par	Int-A	2		
		Levamisole	2	2						
1326pa	29 y F	Heroin	1	1	A	Par	Int-A	1		
		Heroin	1	1					Fentanyl	0.005 mg/L in blood (unspecified) @ autopsy
		Fentanyl	2	2						
		Quinine	3	3						
		Ethanol	4	4					Ethanol	0.06% in blood (unspecified) @ autopsy
		Ethanol	4	4					Ethanol	0.07% in blood (unspecified) @ autopsy
		Ethanol	4	4					Ethanol	0.07% in vitreous @ autopsy
1327h	29 y F	Ethanol	4	4	A	Ingst	Unk	3	Ethanol	0.08% in urine (quantitative only) @ autopsy
		Cocaine	1	1						
		Hydrocodone	2	2						
		Acetaminophen	3	3					Acetaminophen	116 mcg/mL in blood (unspecified) @ 1 h (pe)
		Levamisole	4	4						
		Heroin	1	1						
		Cocaine	2	2						
1329p	30 y F	Heroin	1	1	U	Unk	Int-A	2		
		Cocaine	2	2						
1330ph	30 y F	Heroin	1	1	A	Par	Int-A	1		
		Heroin	1	1						
1331ai	30 y F	Heroin	1	1	A	Unk	Int-A	1	Morphine	488 ng/mL in blood (unspecified) @ unknown
		Heroin	1	1						
1332ph	30 y F	Cocaine	1	1	U	Inhal	Int-A	2		
1333p	31 y F-Pregnant	Heroin	1	1	A/C	Par	Int-A	1		
		Heroin	1	1						
1334pha	31 y F	Heroin	1	1	A/C	Par	Int-A	2	Codeine	15 ng/mL in blood (unspecified) @ unknown
		Heroin	1	1					Morphine (free)	250 ng/mL in blood (unspecified) @ unknown
		Heroin	1	1						
1335pha	31 y M	Heroin	1	1	U	Par	Int-A	1	Codeine	10 ng/mL in blood (unspecified) @ unknown
		Heroin	1	1					6-monoacetyl morphine	12 ng/mL in blood (unspecified) @ unknown
		Heroin	1	1					Morphine (total)	130 ng/mL in blood (unspecified) @ unknown
		Heroin	1	1						
1336pha	31 y M	Methamphetamine	1	1	A	Ingst	Unk	1	Amphetamine	14,010 ng/mL in urine (quantitative only) @ unknown

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1337ph	31 y M	Methamphetamine	1	1	A	Unk	Int-U	1	Methamphetamine	701 ng/mL in blood (unspecified) @ unknown
		Cocaine	2	2					Benzoyllecognine	465 ng/mL in urine (quantitative only) @ unknown
		Heroin	3	3					Morphine	44,942 ng/mL in urine (quantitative only) @ unknown
		Heroin	3	3					6-monoacetylmorphine	995 ng/mL in urine (quantitative only) @ unknown
		Droperidol/fentanyl	4	4					Delta-9-carboxy-thc	62 ng/mL in urine (quantitative only) @ unknown
		Marijuana	5	5						
		Heroin	1	1					Ethanol	126 mg/dL in blood (unspecified) @ unknown
		Ethanol	2	2						
		Heroin	1	1					A	Ingst + Par
		Levothyroxine	2	2						
1338ph	32 y F	Heroin	1	1	A	Ingst + Par	Int-A	1		
		Levothyroxine	2	2						
		Drug, unknown stimulant or street drug	1	1						
		Drug, unknown	2	2						
		Hydrocodone	3	3						
1339pha	32 y M	Ethanol	4	4	A	Ingst + Unk	Int-A	2		
		Heroin	1	1						
		Alprazolam	2	2						
		Ethanol	3	3						
		Heroin	4	4						
1340pai	32 y F	Heroin	1	1	A	Ingst + Inhal + Par	Int-A	1		
		Alprazolam	2	2						
		Ethanol	3	3						
		Heroin	1	1						
		Alprazolam	2	2						
1341pha	32 y F	Ethanol	3	3	C	Par	Int-A	1		
		Heroin	1	1						
		Alprazolam	2	2						
		Ethanol	3	3						
		Heroin	1	1						
1342h	32 y M	Heroin	1	1	U	Par	Unk	1		
		Naltrexone	2	2						
		Cocaine	3	3						
		Diazepam	4	4						
		Heroin	1	1						
1343p	33 y F	Cocaine	2	2	A	Inhal + Par	Int-A	1		
		Heroin	1	1						
		Amphetamine (hallucinogenic), alpha-PDP	1	1						
		Phencyclidine	1	1						
		Heroin	1	1						
1344	33 y M	Amphetamine (hallucinogenic), alpha-PDP	1	1	A	Ingst	Unk	1		
		Phencyclidine	1	1						
		Heroin	1	1						
		Drug, unknown stimulant or street drug	2	2						
		Heroin	1	1						
1345pha	33 y F	Heroin	1	1	A/C	Ingst	Int-A	3		
		Drug, unknown stimulant or street drug	2	2						
		Heroin	1	1						
		Drug, unknown stimulant or street drug	2	2						
		Heroin	1	1						
1346h	33 y M	Heroin	1	1	A	Par	Int-S	2		
		Drug, unknown stimulant or street drug	2	2						
		Heroin	1	1						
		Drug, unknown stimulant or street drug	2	2						
		Heroin	1	1						
1347p	33 y M	Heroin	1	1	A	Ingst	Int-A	1		
		Drug, unknown stimulant or street drug	2	2						
		Heroin	1	1						
		Drug, unknown stimulant or street drug	2	2						
		Heroin	1	1						
1348p	33 y M	Heroin	1	1	A/C	Ingst	Int-A	1		
		Drug, unknown stimulant or street drug	2	2						
		Heroin	1	1						
		Drug, unknown stimulant or street drug	2	2						
		Heroin	1	1						
1349	33 y M	Heroin	1	1	A	Ingst + Par	Int-S	1		
		Drug, unknown stimulant or street drug	2	2						
		Heroin	1	1						
		Drug, unknown stimulant or street drug	2	2						
		Heroin	1	1						
1350p	33 y F	Heroin	1	1	A	Ingst + Par	Int-S	1		
		Benzonatate	2	2						
		Acetaminophen	3	3						
		Heroin	1	1						
		Ethanol	4	4						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1351ph	34 y M				U	Par	Int-A	1		
1352pa	34 y M	Heroin	1	1						
		Cocaine	1	1	A/C	Unk	Int-A	1		
		Marijuana	2	2						
1353pa	34 y F	Heroin	1	1	A	Unk	Int-A	1		
		Fentanyl	2	2					Fentanyl	0.03 mg/L in blood (unspecified) @ autopsy
1354pha	34 y F				A	Ingst + Inhal	Int-U	1		
		Cocaine	1	1					Benzoyllecognine	217 ng/mL in blood (unspecified) @ autopsy
		Cocaine	1	1					Benzoyllecognine	607 ng/mL in blood (unspecified) @ 1 h (pe)
		Benzodiazepine	2	2					Diazepam	146 ng/mL in blood (unspecified) @ 1 h (pe)
		Benzodiazepine	2	2					Nordiazepam	61 ng/mL in blood (unspecified) @ autopsy
		Benzodiazepine	2	2					Diazepam	86 ng/mL in blood (unspecified) @ autopsy
1355pai	34 y M				A	Unk	Int-A	1		
		Cocaine	1	1						
1356ph	34 y M				A/C	Ingst + Inhal + Aspir	Int-S	2		
		Cocaine	1	1						
		Metformin	2	2						
		Oxycodone	3	3						
1357pai	35 y M				A	Unk	Int-A	1		
		Heroin	1	1					Morphine (free)	44 mcg/L in blood (unspecified) @ autopsy
		Fentanyl	2	2					Fentanyl	0.065 mg/L in blood (unspecified) @ autopsy
		Codeine	3	3						
		Quinine	4	4						
		Ethanol	5	5					Ethanol	0.01% in blood (unspecified) @ autopsy
		Procaine	6	6						
1358h	35 y M				A	Ingst + Inhal + P-Int-A ar		2		
		Cocaine	1	1						
		Heroin	2	2						
		Acetaminophen/hydrocodone	3	3						
1359a	35 y F				A	Ingst	Int-M	1		
		Methamphetamine	1	1						
		Ethanol	2	2					Ethanol	99 mg/dL in blood (unspecified) @ 0 h (pe)
1360ph	36 y F				U	Unk	Int-A	2		
		Cocaine	1	1						
		Escitalopram	2	2						
		Bupropion	3	3						
		Alprazolam	4	4						
		Ethanol	5	5					Ethanol	39 mg/dL in blood (unspecified) @ unknown
		Ethanol	6	6						
1361pai	36 y M				A	Unk	Int-A	1		
		Heroin	1	1					Morphine (free)	10 mcg/L in blood (unspecified) @ autopsy
		Fentanyl	2	2					Fentanyl	0.072 mg/L in blood (unspecified) @ autopsy
		Cocaine	3	3					Benzoyllecognine	0.8 mg/L in blood (unspecified) @ autopsy
		Cocaine	3	3					Cocaine	3.1 mg/L in blood (unspecified) @ autopsy
		Ethanol	4	4					Ethanol	0.16% in blood (unspecified) @ autopsy
		Ethanol	4	4					Ethanol	0.21% in vitreous @ autopsy
		Ethanol	4	4					Ethanol	0.26% in urine (quantitative only) @ autopsy
1362pha	36 y M				A	Ingst	Int-U	1		
		Methamphetamine	1	1					Amphetamine	0.2 mg/L in serum @ 1 h (pe)

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1363h	36 y M	Methamphetamine	1	1	A	Ingst + Inhal	Int-A	2	Methamphetamine	3.06 mg/L in serum @ 1 h (pe)
		Clonazepam	2	2						
		Amphetamine/ dextroamphetamine	1	1						
		Heroin	2	2						
		Marijuana	3	3						
1364	36 y M	Cocaine	4	4	U	Unk	Unk	1		
1365p	36 y M	Methamphetamine	1	1	U	Unk	Int-A	2		
1366p	36 y M	Heroin	1	1	A	Par	Int-A	2		
1367pha	36 y F	Heroin	1	1	U	Unk	Unk	1	Norfentanyl	0.001 mg/L in blood (unspecified) @ unknown
		Droperidol/fentanyl	2	2						
1368pa	36 y M	Droperidol/fentanyl	2	2	U	Ingst + Par	Int-A	1	Fentanyl	0.007 mg/L in blood (unspecified) @ unknown
		Acetyl fentanyl	3	3						
1369ph	36 y M	Heroin	1	1	U	Ingst	Unk	2	Acetyl fentanyl	0.001 mg/L in blood (unspecified) @ unknown
		Clonazepam	2	2						
		Cocaine	3	3						
		Dextromethorphan	4	4						
		Doxylamine	5	5						
1370pha	37 y M	Cocaine	1	1	U	Ingst + Unk	Int-A	2		
1371ha	37 y M	Cocaine	1	1	A	Ingst	Unk	2	Ethanol	26 mg/dL in blood (unspecified) @ 1 h (pe)
		Street drug	2	2						
		Ethanol	3	3						
1372h	37 y F	Cocaine	1	1	U	Ingst	Unk	2		
1373	37 y M	Cocaine	1	1	U	Ingst + Unk	Int-S	2	Benzoyllecognine	385 ng/mL in blood (unspecified) @ unknown
		Drug, unknown	2	1						
		Amphetamine	1	1						
		Cocaine	2	2						
		Marijuana	3	3						
1374pa	37 y F				A	Ingst + Par	Int-A	1	Fentanyl	18.1 ng/mL in blood (unspecified) @ autopsy
		Heroin	1	1						
		Heroin	1	1						
		Hydrocodone	2	2						
		Drug, unknown	3	3						
		Drug, unknown	3	3						
		Drug, unknown	3	3						
		Drug, unknown	3	3						
1375ph	37 y M	Heroin	1	1	A	Ingst + Par	Int-A	1		
1376h	38 y F	Ethanol	2	2	A	Par	Int-A	3	Morphine	63.7 ng/mL in blood (unspecified) @ autopsy
		Heroin	1	1						
1377pha	38 y M	Cocaine	1	1	A	Ingst	Int-A	1		
									Cocaine	0.21 mg/dL In Gastric (stomach content) @ autopsy

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
		Ethanol	2	2					Ethanol	127 mg/dL in blood (unspecified) @ 30 m (pe)
1378pha	38 y M				A/C	Inhal + Par	Unk	2		
		Cocaine	1	1						
		Ethanol	2	2					Ethanol	0.123 g/dL in blood (unspecified) @ 1 h (pe)
1379pa	38 y M				A	Par	Int-A	1		
		Heroin	1	1						
1380h	38 y M				A	Ingst	Unk	1		
		Cocaine	1	1						
1381p	38 y M				A/C	Unk	Int-A	1		
		Heroin	1	1						
1382a	39 y F				A	Ingst + Unk	Int-A	1		
		Methamphetamine	1	1						
		Heroin	2	2						
		Potassium chloride	3	3						
		Diazepam	4	4					Diazepam	35 ng/mL in plasma @ unknown
		Acetaminophen/hydrocodone	5	5					Hydrocodone	27 ng/mL in plasma @ unknown
1383pi	39 y M				A	Unk	Int-A	1		
		Heroin	1	1						
1384h	39 y M				A	Unk	Int-M	1		
		Amphetamine (hallucinogenic)	2	1						
		Cocaine	1	1						
		Methylenedioxymethamphetamine (MDMA)	3	2						
1385pha	39 y M				U	Unk	Unk	1		
		Heroin	1	1						
		Carfentanil	2	2						
		Cocaine	3	3						
									Benzoyllecognine	1193 ng/mL in whole blood @ autopsy
1386pa	39 y F				A	Par	Int-A	1		
		Heroin	1	1					Morphine (free)	38 mcg/mL in blood (unspecified) @ autopsy
		Amitriptyline	2	2					Amitriptyline	0.3 mg/L in blood (unspecified) @ autopsy
		Nortriptyline	3	3					Nortriptyline	0.2 mg/L in blood (unspecified) @ autopsy
		Trazodone	4	4					Trazodone	0.2 mg/L in blood (unspecified) @ autopsy
1387h	39 y M				U	Ingst	Int-M	2		
		Methamphetamine	1	1						
1388pa	40 y M				A	Unk	Int-A	1		
		Heroin	1	1						
		Alprazolam	2	2						
		Methadone	3	3					Methadone	0.6 mg/L in blood (unspecified) @ autopsy
		Methadone	3	3					Methadone	0.8 mg/L in blood (unspecified) @ autopsy
		Amphetamine	4	4					Amphetamine	0.6 mg/L in blood (unspecified) @ autopsy
1389p	40 y M				A	Par	Int-A	2		
		Heroin	1	1						
1390ph	40 y M				U	Unk	Int-A	2		
		Cocaine	1	1						
		Hydrocodone	2	2						
		Marijuana	3	3						
		Ethanol	4	4						
1391ph	41 y M				A	Ingst	Int-A	1		
		Cocaine	1	1						
		Diphenhydramine	2	2						
		Ethanol	3	3						
1392ha	41 y M				U	Ingst + Inhal	Int-A	2		
		Amphetamine (hallucinogenic)	1	1						
		Ethanol	2	2					Ethanol	112 mg/dL in serum @ unknown
1393pa	42 y F				A/C	Par	Int-A	1		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1394ph	42 y F	Heroin	1	1	A	Inhal	Int-A	1	Cocaine	0.599 mcg/mL in urine (quantitative only) @ unknown
		Cocaine	2	2						
		Cocaine	1	1						
1395pha	44 y F	Cocaine	1	1	U	Unk	Unk	1		
		Drug, unknown	2	2						
1396p	44 y F	Heroin	1	1	A	Par	Unk	2		
1397h	44 y M	Heroin	1	1	A	Ingst + Par	Int-S	3		
1398p	45 y M	Methylphenidate	1	1	A	Ingst	Int-U	2		
		Lisdexamfetamine	2	2						
		Hydrocodone	3	3						
1399p	46 y M	Cocaine	1	1	A	Par	Int-A	2		
1400pa	46 y M	Heroin	1	1	U	Ingst + Inhal	Int-A	1		
		THC homolog, K2	1	1					Citalopram	810 ng/mL in blood (unspecified) @ autopsy
		Citalopram	2	2					Propranolol	432 ng/mL in blood (unspecified) @ autopsy
		Propranolol	3	3					7-Aminoclonazepam	288 ng/mL in blood (unspecified) @ autopsy
		Benzodiazepine	4	4					Clonazepam	7.5 ng/mL in blood (unspecified) @ autopsy
		Benzodiazepine	4	4					Ethanol	0.122 g/dL in blood (unspecified) @ autopsy
		Ethanol	5	5					Carboxy-thc	3.6 ng/mL in blood (unspecified) @ autopsy
		Marijuana	6	6						
1401	46 y F	Heroin	1	1	A	Inhal	Int-A	3		
1402h	47 y F	Methamphetamine	1	1	A	Ingst	Int-M	1		
1403h	47 y M	Cocaine	1	1	A	Ingst	Int-S	2		
[1404pha]	48 y M	Benzodiazepine	2	2	A	Ingst + Aspir	Int-U	1	Cocaine	0.79 mg/L in blood (unspecified) @ 10 m (pe)
		Cocaine	1	1						
		Cocaine	1	1					Benzoyllecognine	3.55 mg/L in blood (unspecified) @ 10 m (pe)
1405ph	49 y M	Tropacocaine	2	2	A/C	Unk	Int-A	1		
		Levamisole	3	3						
		Ethanol	4	4						
1406h	49 y F	Heroin	1	1	A	Unk	Int-A	2		
		Ethanol	2	2						
1407p	49 y F	Cocaine	1	1	A	Ingst + Aspir	Int-A	2		
		Benzodiazepine	2	2						
1408pa	49 y M	Heroin	1	1	A	Unk	Int-A	1		
		Heroin	1	1					Morphine (free)	50 mcg/L in blood (unspecified) @ autopsy
		Fentanyl	2	2					Fentanyl	0.001 mg/L in blood (unspecified) @ autopsy
		Ethanol	3	3					Ethanol	0.07% (wt/vol) in blood (unspecified) @ autopsy
		Ethanol	3	3					Ethanol	0.07% (wt/vol) in vitreous @ autopsy
		Ethanol	3	3					Ethanol	0.08% (wt/vol) in urine (quantitative only) @ autopsy
1409pha	49 y M	Heroin	1	1	U	Par	Unk	1	Codeine (free)	11 ng/mL in blood (unspecified) @ unknown

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1410h	49 y M	Heroin	1	1	U	Unk	Int-A	2	Morphine (free)	160 ng/mL in blood (unspecified) @ unknown
		Heroin	1	1					6-Monoacetyl morphine	5.8 ng/mL in blood (unspecified) @ unknown
		Cocaine	1	1						
1411h	50 y M	Hydrocodone	2	2	A	Unk	Int-A	2		
		Heroin	1	1						
1412pha	50 y M	Methadone	2	2	U	Unk	Unk	1		
		Benzodiazepine	3	3						
		Lisdexamfetamine	1	1					Amphetamine	29 ng/mL in blood (unspecified) @ 1 h (pe)
		Clonazepam	2	2					7-Aminoclonazepam	36 ng/mL in blood (unspecified) @ 1 h (pe)
		Cocaine	3	3					Benzoyllecognine	1915 ng/mL in blood (unspecified) @ 1 h (pe)
		Cocaine	3	3					Cocaine	55 ng/mL in blood (unspecified) @ 1 h (pe)
		Hydrocodone	4	4					Hydrocodone	31 ng/mL in blood (unspecified) @ 1 h (pe)
		Cyclobenzaprine	5	5					Cyclobenzaprine	13 ng/mL in blood (unspecified) @ 1 h (pe)
		Hydrocodone	6	6						
		Pregabalin	7	7					Pregabalin	10 ng/mL in blood (unspecified) @ 1 h (pe)
1413ph	50 y M	Fentanyl	8	8	A	Ingst + Par	Int-A	2	Fentanyl	1.5 ng/mL in blood (unspecified) @ 1 h (pe)
		Heroin	1	1						
		Methadone	2	2					Methadone	36 ng/mL in blood (unspecified) @ unknown
		Ethanol	3	3					Ethanol	81 mg/dL in blood (unspecified) @ unknown
1414pa	51 y F				A	Ingst	Int-S	1		
		Heroin	1	1						
		Quetiapine	2	2						
1415pai	53 y M	Alprazolam	3	3	A	Par	Int-A	1		
		Cocaine	1	1						
		Heroin	2	2					Morphine	50 ng/mL in blood (unspecified) @ autopsy
1416ph	55 y F	Heroin	1	1	A	Unk	Int-A	3		
1417p	55 y F	Heroin	1	1	A	Inhal	Int-A	1		
1418ha	56 y M				A	Unk	Int-A	2		
		Cocaine	1	1						
1419pai	56 y M	Levamisole	2	2	A	Par	Int-A	1		
		Cocaine	1	1						
		Methadone	2	2					Methadone	0.72 mcg/mL in blood (unspecified) @ autopsy
		Diazepam	3	3					Diazepam	466 ng/mL in blood (unspecified) @ autopsy
		Diazepam	3	3					Nordiazepam	467 ng/mL in blood (unspecified) @ autopsy
		Diazepam	3	3					Temazepam	65 ng/mL in blood (unspecified) @ autopsy
1420pa	57 y M				A	Par	Int-A	1		
		Heroin	1	1						
		Fentanyl	2	2					Fentanyl	0.018 mg/L in blood (unspecified) @ autopsy
1421p	57 y M	Doxylamine	3	3	A	Ingst + Unk	Int-A	1	Doxylamine	0.05 mg/L in blood (unspecified) @ autopsy
		Heroin	1	1					6-Monoacetyl morphine	11 ng/mL In unknown @ unknown
		Cocaine	2	2						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1422pai	57 y M	Ethanol	3	3	A/C	Ingst + Unk	Int-A	1	Ethanol	175 mg/dL in serum @ unknown
		Cocaine	1	1					Cocaethylene	0.08 mcg/mL in blood (unspecified) @ autopsy
		Heroin	2	2					Ethanol	0.18 mg/L in blood (unspecified) @ autopsy
		Ethanol	3	3					Ethanol	0.23 mg/L in vitreous @ autopsy
1423	57 y M				A	Ingst	Int-M	1		
1424p	58 y M	Methamphetamine	1	1	A	Ingst + Unk	Unk	3		
		Heroin	1	1						
1425h	59 y M	Ethanol	2	2	U	Ingst	Int-S	2		
		Methamphetamine	1	1						
1426pha	61 y F				A/C	Ingst + Unk	Int-A	1		
		Heroin	1	1					Morphine	220 ng/mL in blood (unspecified) @ autopsy
		Heroin	1	1					6-Monoacetylmorphine	56 ng/mL in blood (unspecified) @ autopsy
		Heroin	1	1					Codeine	9.3 ng/mL in blood (unspecified) @ autopsy
		Alprazolam	2	2					Alprazolam	51 ng/mL in blood (unspecified) @ autopsy
		Ethanol	3	3					Ethanol	121 mg/dL in blood (unspecified) @ autopsy
		Cocaine	4	4					Cocaethylene	29 ng/mL in blood (unspecified) @ autopsy
		Cocaine	4	4					Benzoyllecognine	460 ng/mL in blood (unspecified) @ autopsy
1427ph	63 y M				U	Ingst + Par	Unk	2		
		Heroin	1	1						
1428ha	64 y M	Ethanol	2	2	U	Ingst	Int-U	2		
		Heroin	1	1						
		Acetaminophen/oxycodone	2	2						
1429p	65 y M	Ethanol	3	3	A	Par	Int-A	1		
		Heroin	1	1						
1430h	69 y M				A	Inhal	Int-A	2		
		Heroin	1	1						
1431ph	69 y M	Naloxone	2	2	A	Inhal	Int-M	2		
		Heroin	1	1						
1432pa	9 m F	Naloxone	2	2	U	Unk	Unk	2		
		Cocaine	1	1					Benzoyllecognine	5246 ng/mL in blood (unspecified) @ autopsy
		Cocaine	1	1					Cocaine	6092 ng/mL in blood (unspecified) @ autopsy
1433phai	12 m F	Levamisole	2	2	A	Ingst	Unk	1		
		Heroin	1	1						
									6-Monoacetylmorphine	1900 ng/mL In Gastric (stomach content) @ autopsy
		Heroin	1	1					Morphine (free)	300 ng/mL in whole blood @ autopsy
		Heroin	1	1					6-Monoacetylmorphine	5.4 ng/mL in whole blood @ autopsy
		Heroin	1	1					Morphine (free)	6900 ng/mL In Gastric (stomach content) @ autopsy
		Codeine	2	2					Codeine (free)	26 ng/mL in whole blood @ autopsy
		Codeine	2	2					Morphine (free)	300 ng/mL in whole blood @ autopsy
1434pi	Unknown	Codeine	2	2	U	Unk	Unk	2		
									Morphine (free)	6900 ng/mL In Gastric (stomach content) @ autopsy

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1435	adult (>=20 yrs) M	Heroin	1	1						
		Drug, unknown	2	2						
	Unknown adult (>=20 yrs) M				A	Unk	Int-A	2		
1436	Unknown adult (>=20 yrs) M	Heroin	1	1	A	Ingst	Int-A	2		
		Cocaine	1	1						
		Hydrocodone	2	2						
1437p	Unknown adult (>=20 yrs) M				U	Unk	Int-A	1		
1438pi	Unknown adult (>=20 yrs) F	Heroin	1	1	A/C	Par	Int-A	1		
1439pi	Unknown adult (>=20 yrs) F	Heroin	1	1	A	Unk	Int-U	2		
1440pai	Unknown age M	Cocaine	1	1	U	Unk	Int-A	1		
		Cocaine	1	1					Benzoyllecognine	1090 ng/mL in blood (unspecified) @ autopsy
		Cocaine	1	1					Cocaine	139 ng/mL in blood (unspecified) @ autopsy
		Cocaine	1	1					Benzoyllecognine	57343 ng/mL in urine (quantitative only) @ autopsy
		Cocaine	1	1					Cocaethylene	66.9 ng/mL in blood (unspecified) @ autopsy
		Ethanol	2	2					Ethanol	47 mg/dL in blood (unspecified) @ autopsy
		Ethanol	2	2					Ethanol	96 mg/dL in urine (quantitative only) @ autopsy
1441p	Unknown age U	Pedicularis striata	3	3	U	Par	Int-A	2		
1442phi	Unknown age U	Heroin	1	1	A	Inhal	Int-A	2		
1443p	Unknown age F	Cocaine	1	1	A	Par	Int-A	1		
		Heroin	1	1						
See also case 1, 2, 10, 40, 46, 72, 163, 172, 231, 272, 311, 313, 315, 319, 329, 331, 332, 337, 341, 344, 346, 347, 359, 365, 377, 378, 380, 398, 401, 404, 408, 409, 420, 424, 426, 430, 435, 443, 445, 461, 480, 484, 487, 520, 522, 523, 532, 569, 588, 625, 632, 731, 756, 765, 774, 787, 790, 794, 829, 832, 878, 922, 974, 976, 994, 996, 1032, 1047, 1130, 1182, 1186, 1212, 1213, 1215, 1223, 1235, 1236, 1244, 1446, 1452, 1478, 1479										
Topical preparations										
[1444]	32 y M				A	Ingst	Unk	1		
		Camphor	1	1						
		Ethanol	2	2						
[1445h]	42 y F	Cantharidin	1	1	A	Ingst	AR-D	2		
Unknown drug										
1446	18 y M				A	Unk	Int-S	2		
		Drug, unknown	1	1						
		Cocaine	2	2						
1447ph	18 y M				A/C	Ingst + Inhal	Int-A	2		
		Drug, unknown	1	1						
1448ph	20 y M				U	Unk	Unk	2		
		Drug, unknown	1	1						

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1449h	22 y M				A	Ingst	Int-U	2		
		Drug, unknown	2	1						
		Mushroom	1	1						
1450a	22 y M				A	Ingst + Inhal	Int-U	3		
		Heroin	1	1						
		Tizanidine	2	2						
1451p	23 y F				U	Unk	Int-A	2		
		Drug, unknown	1	1						
1452h	24 y M				U	Unk	Int-A	2		
		Drug, unknown	1	1						
		Marijuana	2	2						
1453ha	25 y M				A	Ingst	Int-S	2		
		Drug, unknown	1	1						
1454p	26 y F				A	Par	Unt-O	2		
		Drug, unknown	1	1						
1455ph	27 y M				U	Unk	Int-U	2		
		Drug, unknown	1	1						
		Benzodiazepine	2	2						
		Ethanol	3	3					Ethanol	289 mg/dL in blood (unspecified) @ unknown
1456h	27 y M				A/C	Ingst	Int-S	2		
		Drug, unknown	1	1						
		Acetaminophen	2	2					Acetaminophen	13.3 mcg/mL in blood (unspecified) @ unknown
1457pha	27 y F				A	Unk	Int-S	3		
		Drug, unknown	1	1						
		Ketamine	2	2					Ketamine	0.59 mcg/mL in blood (unspecified) @ autopsy
1458p	27 y M				U	Ingst	Unt-G	2		
		Drug, unknown	1	1						
1459	28 y M				A	Ingst	Int-S	1		
		Drug, unknown	1	1						
		Zolpidem	2	2						
		Gabapentin	3	3						
		Naproxen	4	4						
1460phi	30 y M				A	Par	Int-A	2		
		Drug, unknown	1	1						
1461ph	31 y M				A	Ingst	Int-A	2		
		Drug, unknown	1	1						
1462pa	31 y M				A	Ingst	Unk	1		
		Drug, unknown	1	1						
1463ph	31 y M				U	Unk	Int-A	2		
		Drug, unknown	1	1						
1464p	31 y M				A	Unk	Int-A	2		
		Drug, unknown	1	1						
1465pa	34 y M				A	Ingst + Inhal	Int-A	1		
		Drug, unknown	1	1						
		Alprazolam	2	2						
		Duloxetine	3	3						
		Gabapentin	4	4						
		Ethanol (non-beverage)	5	5					Ethanol	0.06% in blood (unspecified) @ autopsy
		Fentanyl	6	6					Fentanyl	0.007 mg/L in blood (unspecified) @ autopsy
1466p	35 y M				A	Ingst	Int-U	2		
		Drug, unknown	1	1						
1467h	35 y M				A	Ingst	Int-S	2		
		Drug, unknown	1	1						
1468h	36 y F				U	Unk	Int-A	2		
		Drug, unknown	1	1						
1469a	36 y F				U	Ingst	Int-S	1		
		Drug, unknown	1	1					Diphenhydramine	1859 ng/mL in blood (unspecified) @ autopsy
		Drug, unknown	1	1					Promethazine	32.2 ng/mL in blood (unspecified) @ autopsy
		Drug, unknown	1	1					Metoprolol	43.3 ng/mL in blood (unspecified) @ autopsy
		Acetaminophen	2	2						
1470p	37 y M				U	Unk	Unk	2		
		Drug, unknown	1	1						
1471ph	38 y M				U	Ingst	Unk	2		
		Drug, unknown	1	1						
		Gabapentin	2	2						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1472pa	38 y F	Hydroxyzine	3	3						
		Drug, unknown	1	1	A	Unk	Unk	2		
1473p	38 y F	Drug, unknown	1	1	U	Unk	Unk	1	Hydrocodone	25.7 ng/mL in blood (unspecified) @ unknown
		Drug, unknown	1	1					Hydrocodone	4511 ng/mL in urine (quantitative only) @ unknown
		Drug, unknown	1	1					Hydromorphone	552 ng/mL in urine (quantitative only) @ unknown
1474ph	39 y F	Drug, unknown	1	1	A	Ingst	Unk	2		
1475	40 y F	Drug, unknown	1	1	A	Ingst	Int-S	2		
		Acetaminophen	2	2					Acetaminophen	102 mcg/mL in blood (unspecified) @ unknown
1476	41 y M	Drug, unknown	1	1	A	Ingst	Int-S	2		
		Acetaminophen/butalbital/caffeine	2	2					Acetaminophen	91 mcg/mL in serum @ unknown
1477h	42 y F	Drug, unknown	1	1	U	Ingst	Int-S	2	Acetaminophen	113 mcg/mL in serum @ unknown
		Drug, unknown	1	1					Salicylate	6.9 mg/dL in serum @ unknown
		Drug, unknown	1	1					Iron	78 mcg/mL in serum @ unknown
		Acetaminophen	2	2						
1478ph	46 y F	Drug, unknown	1	1	A	Ingst	Int-S	1		
		Heroin	2	2						
1479ph	47 y F	Drug, unknown	1	1	A	Unk	Unk	2		
		Methamphetamine	2	1						
1480ph	48 y M	Drug, unknown	1	1	A	Ingst	Unk	2		
		Ethanol	2	2					Ethanol	271 mg/dL in plasma @ unknown
		Hydrocodone	3	3						
1481i	49 y F	Drug, unknown	1	1	A	Ingst	Int-U	2		
1482ph	49 y F	Drug, unknown	1	1	A/C	Ingst	Int-S	3		
1483pa	49 y F	Drug, unknown	1	1	U	Ingst	Int-S	2		
1484	56 y M	Drug, unknown	1	1	A	Ingst	Int-S	1		
1485pha	59 y F	Drug, unknown	1	1	A	Unk	Unk	2		
		Acetaminophen	2	2						
1486	59 y M	Drug, unknown	1	1	A	Ingst	Int-U	3		
		Ethanol	2	2					Ethanol	193 mg/dL in whole blood @ unknown
1487p	61 y F	Drug, unknown	1	1	U	Ingst	Unk	2		
1488h	63 y M	Drug, unknown	1	1	A	Ingst	Int-S	2		
1489h	73 y F	Drug, unknown	1	1	C	Ingst	Int-S	2		
		Acetaminophen/codeine	2	2					Acetaminophen	10 mcg/mL in serum @ unknown
1490ph	86 y M	Drug, unknown	1	1	A/C	Ingst	Int-S	2		
		Nifedipine (extended release)	2	2						
1491ph	Unknown adult (>=20 yrs) M	Drug, unknown	1	1	U	Unk	Unk	3		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures – Continued

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
See also case 8, 17, 19, 32, 94, 114, 373, 380, 409, 421, 454, 456, 460, 472, 502, 506, 533, 537, 554, 585, 587, 594, 651, 659, 687, 723, 738, 780, 808, 823, 848, 851, 854, 866, 896, 1052, 1057, 1126, 1204, 1232, 1277, 1290, 1339, 1372, 1374, 1395, 1434										
Veterinary drugs										
[1492pa]	25 y M				A	Ingst	Int-S	1		
		Pentobarbital/phenytoin	1	1					Pentobarbital	130 mg/L in blood (unspecified) @ autopsy
		Pentobarbital/phenytoin	1	1					Phenytoin	3.4 mg/L in blood (unspecified) @ autopsy
		Pentobarbital/phenytoin	1	1					Phenytoin	7.5 mg/mL in blood (unspecified) @ 1 h (pe)
		Ethanol	2	2					Ethanol	167 mg/dL in blood (unspecified) @ 1 h (pe)

Listing of 1493 (1415 direct +78 indirect) fatalities classified as RCF category =1 – undoubtedly responsible, 2 – probably responsible, or 3 – contributory).

Annual Report ID: bracketed [case number]=narrative provided for this case in [Appendix C](#) i = indirect case; identified through other sources (news feeds, medical examiner data, or other) about which no inquiry to the PC was made; p: prehospital cardiac and/or respiratory arrest; h: hospital records reviewed; a: autopsy report reviewed.

Age gender: y: years; m: months; d: days; F: female; M: male; F: female; Pregnant: pregnant; U: unknown.

Chronicity: C: chronic exposure; A: acute exposure; A/C: acute on chronic; U: unknown.

Route: Aspir: aspiration (with ingestion); B-S: bite/sting; Derm: dermal; Ingst: ingestion; Inhal: inhalation/nasal; Oc: ocular; Ot: Otic; Oth: other; Par: parenteral; Rec: rectal; Unk: unknown; Vag: vaginal.

Reason: AR-D: adverse reaction – drug; AR-F: AR – food; AR-O: AR – other; Int-A: intentional – abuse; Int-M: Int – misuse; Int-S: Int – suspected suicide; Int-U: Int – unknown; Oth-C: other – contamination/tampering; Oth-M: Oth – malicious; Oth-W: Oth – withdrawal; Unk: unknown reason; Unt-B: unintentional – bite/sting; Unt-E: Unt – environmental; Unt-F: Unt – food poisoning; Unt-G: Unt – general; Unt-M: Unt – misuse; Unt-O: Unt – occupational; Unt-T: Unt – therapeutic error; Unt-U : Unt – unknown

RCF (Relative Contribution to Fatality): 1 – undoubtedly responsible, 2 – probably responsible, 3 – contributory. Provided by the RPC for Indirect cases and the AAPCC Fatality Review Team for the direct (non-indirect) cases.

Table 22(A). Demographic profile of SINGLE SUBSTANCE Nonpharmaceuticals exposure cases by generic category

	No. of Case Mentions	No. of Single Exposures	Age				Reason			Outcome									
			<=5	6-12	13-19	>=20	Unknown Child	Unknown Adult	Unknown Age	Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
Non-Pharmaceuticals																			
Adhesives/glues																			
Miscellaneous adhesives/glues	4562	4506	2182	358	237	1395	9	289	36	4339	107	27	23	1246	676	891	148	1	0
Cyanoacrylates (superglues, etc.)	594	531	144	17	22	289	2	51	6	502	12	4	10	165	75	132	33	1	0
Epoxy	1093	956	597	227	57	54	6	15	0	891	57	6	1	34	129	44	2	0	0
Non-toxic adhesives/glues (white glue, paper glue, etc.)	259	246	126	14	16	73	1	12	4	228	11	0	7	43	60	42	9	0	0
Toluene/xylene (adhesives only)	3618	3383	1643	324	159	984	12	231	30	3140	143	29	61	607	607	511	91	3	0
Unknown types of adhesive, glue, cement or paste																			
Category total:	10,126	9622	4692	940	491	2795	30	598	76	9100	330	66	102	2095	1547	1620	283	5	0
Alcohols																			
Miscellaneous alcohols	53,885	7802	1849	197	1047	4060	10	495	144	2513	4593	309	190	3749	926	1731	1122	229	9
Ethanol (beverages)	3457	2324	1480	96	94	570	5	65	14	1995	277	24	17	349	434	204	91	9	1
Ethanol (non-beverage, non-rubbing)																			
Higher alcohols (butanol, amyl alcohol, propanols, etc.)	115	88	40	9	5	31	0	3	0	80	4	0	1	26	16	19	1	2	0
Isopropanol (excluding rubbing alcohols and cleaning agents)	3088	2633	1091	134	126	1116	4	146	16	1977	580	31	17	769	488	494	232	28	1
Methanol (excluding automotive products and cleaning agents)	647	526	107	17	30	326	1	40	5	430	63	13	1	248	122	86	36	13	11
Other types of alcohol	207	190	124	8	11	38	0	7	2	178	7	0	4	28	41	11	5	0	1
Unknown types of alcohol	817	239	52	4	21	137	1	21	3	104	107	1	5	121	19	52	34	10	2
Rubbing alcohols																			
Rubbing alcohols: ethanol with methyl salicylate	9	8	2	0	0	5	0	1	0	8	0	0	0	0	4	0	0	0	0
Rubbing alcohols: ethanol without methyl salicylate	184	175	115	4	10	42	0	4	0	155	16	1	0	27	45	25	3	0	0
Rubbing alcohols: isopropanol with methyl salicylate	243	227	163	6	2	48	0	7	1	207	18	0	0	55	88	32	7	0	0
Rubbing alcohols: isopropanol without methyl salicylate	8830	8023	4515	265	346	2525	11	314	47	6720	1166	61	32	1723	1584	1260	389	30	1
Rubbing alcohols: unknown	72	54	24	4	2	23	0	1	0	45	9	0	0	18	11	11	5	0	0
Category total:	71,554	22,289	9562	744	1694	8921	32	1104	232	14,412	6840	440	267	7113	3778	3925	1925	321	26
Arts/crafts/office supplies																			
Miscellaneous arts/crafts/office supplies																			
Artist paints (non-water color)	3335	3217	2463	256	89	345	8	54	2	3129	66	5	15	110	433	149	11	0	0
Artist paints (water color)	1578	1545	1313	129	32	59	6	3	3	1514	27	1	3	29	211	11	1	0	0
Chalks	1979	1942	1800	73	27	30	6	3	3	1918	16	4	2	46	268	63	0	0	0
Clays	2237	2188	1857	179	58	68	6	18	2	2157	27	0	2	101	220	90	7	0	0
Crayons	1951	1887	1561	169	45	88	11	12	1	1846	32	1	3	48	194	41	1	0	0
Glazes	112	110	41	24	13	26	1	5	0	102	6	1	1	8	20	16	1	0	0
Office supplies: miscellaneous	104	96	50	9	6	19	0	11	1	86	9	0	1	12	20	6	1	0	0
Other types of arts/crafts/writing products	6460	6124	4523	704	240	488	17	141	11	5883	187	19	24	213	851	243	19	1	0
Pencils	1264	1213	522	497	97	64	8	19	6	1070	115	17	4	58	132	56	2	0	0
Pens or inks	8545	8301	5518	1635	670	333	20	105	20	7761	426	36	62	271	1014	224	11	0	0
Typewriter correction fluids	588	574	363	89	50	50	3	15	4	536	27	5	2	46	124	41	4	0	0
Unknown types of arts/crafts/writing products	127	122	85	16	6	10	1	3	1	118	3	1	0	4	34	6	0	0	0
Category total:	28,280	27,319	20,096	3780	1333	1580	87	389	54	26,120	941	90	119	946	3521	946	58	1	0
Automotive/aircraft/boat products																			
Automotive products																			
Automotive products: brake fluids	898	834	231	14	42	475	2	66	4	792	33	4	1	297	170	206	48	2	0
Automotive products: ethylene glycol (including antifreeze)	6374	5783	495	191	489	4014	13	478	103	4823	726	146	12	2285	1113	934	448	124	7
Automotive products: glycol and methanol mixtures	134	119	34	7	9	60	0	9	0	105	12	1	1	51	32	12	1	0	1
Automotive products: hydrocarbons (transmission fluids, power steering fluids, etc.)	1978	1879	658	60	119	900	3	124	15	1774	65	20	10	574	420	573	95	3	0

Continued

(continued)



Table 22(A). Demographic profile of SINGLE SUBSTANCE Nonpharmaceuticals exposure cases by generic category – Continued

	No. of Case Mentions	No. of Single Exposures	Age						Reason			Outcome							
			<=5	6-12	13-19	>=20	Unknown Child	Unknown Adult	Unknown Age	Unit	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
Automotive products: methanol (dry gas, windshield washing solutions, etc.)	1206	1122	187	40	91	664	2	124	14	989	103	15	2	366	263	254	43	7	4
Automotive products: other glycols	160	151	52	6	9	69	0	15	0	134	8	7	1	41	34	23	3	3	0
Miscellaneous automotive/aircraft/boat products	16	13	7	1	1	4	0	0	0	10	2	1	0	4	1	0	1	0	0
Automotive/aircraft/boat products: non-toxic	1408	1356	521	63	84	581	3	97	7	1301	17	15	20	410	263	357	99	2	0
Automotive/aircraft/boat products: other	201	190	45	8	10	107	1	13	6	162	16	8	1	92	34	53	17	1	3
Automotive/aircraft/boat products: unknown	12,375	11,447	2230	390	854	6874	24	926	149	10,090	982	217	48	4120	2330	2412	755	142	15
Batteries																			
Disc batteries	474	471	292	64	18	81	2	13	1	451	14	1	3	345	247	44	10	0	0
Disc batteries: alkaline (MNO2)	186	137	72	14	9	36	0	5	1	106	15	1	11	124	34	29	32	9	3
Disc batteries: lithium	6	6	3	1	0	2	0	0	0	5	0	1	0	3	4	0	0	1	0
Disc batteries: mercuric oxide	5	5	1	1	0	3	0	0	0	5	0	0	0	2	2	0	0	0	0
Disc batteries: nickel cadmium	5	5	2	1	0	3	0	1	0	5	0	0	0	3	2	0	0	0	0
Disc batteries: other	36	35	19	3	2	10	1	1	0	33	1	1	0	23	18	5	0	0	0
Disc batteries: silver oxide	2702	2638	1712	311	67	468	15	61	4	2513	90	13	9	1914	1269	122	40	15	1
Disc batteries: unknown	235	229	62	13	0	150	0	3	1	225	3	1	0	120	160	8	0	0	0
Disc batteries: zinc-air																			
Miscellaneous batteries	628	614	47	15	27	411	33	70	11	601	8	3	2	172	67	152	48	0	0
Automotive/aircraft/boat batteries	247	226	37	13	31	120	0	23	2	208	9	7	2	58	40	35	17	0	0
Other types of battery	5370	5230	3215	532	259	959	21	220	24	4697	435	56	19	1010	1375	511	85	3	0
Penlight/flashlight/dry cell batteries	59	55	21	4	2	27	0	1	0	52	2	1	0	7	12	7	0	0	0
Unknown types of battery	9953	9651	5483	972	415	2268	71	398	44	8901	577	85	46	3781	3230	913	232	28	4
Category total:																			
Bites and envenomations																			
Aquatic	520	516	12	19	54	384	0	41	6	502	7	0	7	238	10	166	81	1	0
Fish stings	210	208	20	48	21	95	2	16	6	206	0	1	1	49	1	53	33	0	0
Jellyfish and other coelenterate stings	283	272	140	20	19	76	1	13	3	254	8	6	4	48	44	37	7	0	0
Other or unknown marine animal bites and/or envenomations																			
Exotic snakes	30	30	1	8	5	15	0	1	0	30	0	0	0	21	0	10	5	1	0
Exotic snakes: non-poisonous	50	50	2	4	5	34	0	3	2	48	0	1	1	37	1	13	15	5	0
Exotic snakes: poisonous																			
Insects	618	578	164	61	32	267	0	48	6	547	5	22	4	63	20	168	29	1	0
Ant or fire ant bites	3446	3348	633	315	161	1881	10	307	41	3343	0	0	5	556	24	1173	269	11	3
Bee, wasp, or hornet stings	1609	1599	414	226	144	705	4	92	14	1576	8	1	10	283	43	589	68	0	0
Caterpillars	619	611	133	48	29	364	0	30	7	600	3	6	2	90	27	209	31	0	0
Centipede or millipede bites	930	178	34	8	9	83	1	38	5	171	0	0	7	35	4	47	8	0	0
Mosquito bites	5060	4879	1088	322	298	2568	29	522	52	4706	13	105	39	852	189	1051	286	4	0
Other insect bites and/or stings	13,670	13,645	1508	1443	1117	9021	5	393	158	13,642	0	0	0	1469	81	8925	622	22	0
Scorpion stings	719	695	187	76	32	297	7	87	9	693	0	1	1	137	36	96	11	1	0
Tick bites																			
Mammals	590	587	84	57	52	282	14	84	14	578	1	1	1	367	125	67	2	0	0
Bat bites	581	575	36	49	43	372	5	60	10	573	0	0	2	385	6	218	31	0	0
Cat bites	2295	2289	306	449	230	1168	9	102	25	2289	0	0	0	1799	23	1052	157	5	0
Dog bites	11	11	0	1	1	8	0	0	0	11	0	0	0	8	0	2	1	0	0
Fox bites	14	13	2	1	0	8	0	0	0	12	0	1	0	7	0	5	1	0	0
Human bites	646	640	58	77	63	346	9	65	22	619	0	4	4	344	60	142	18	0	0
Other mammal bites	136	136	7	13	17	80	0	18	1	134	0	1	0	77	16	34	8	0	0
Raccoon bites	840	821	202	119	67	333	8	83	9	779	3	30	5	264	45	199	12	0	0
Rodent or lagomorph bites (squirrels, rats, mice, gerbils, hamsters, rabbits, etc.)																			
Skunk bites	16	15	2	1	1	6	0	2	3	15	0	0	0	11	0	3	0	0	0
Miscellaneous bites and envenomations																			

(continued)

Table 22(A). Demographic profile of SINGLE SUBSTANCE Nonpharmaceuticals exposure cases by generic category – Continued

No. of Case Mentions	No. of Single Exposures	Age							Reason			Outcome						
		<=5	6-12	13-19	>=20	Unknown Child	Unknown Adult	Unknown Age	Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
Other or unknown animal bites	250	245	22	31	19	135	0	6	239	4	0	0	91	9	82	29	1	0
Other or unknown reptile bites	341	335	145	45	30	87	3	5	319	5	3	5	67	40	96	15	0	0
Unknown types of insect or spider bite and/or envenomation	2350	2290	593	150	118	1135	6	87	2264	4	12	7	346	57	567	119	1	0
Miscellaneous snake bites and envenomations																		
Unknown or known non-poisonous snake bites	680	672	48	105	90	392	1	5	670	1	0	1	415	36	344	46	2	0
Unknown types of snake envenomation	1830	1811	112	209	191	1237	0	15	1808	1	0	0	1620	45	807	566	34	1
Snakes																		
Copperhead envenomations	2048	2019	70	171	163	1587	1	5	2015	4	0	0	1962	16	580	1250	32	0
Coral envenomations	73	69	3	2	5	56	0	1	69	0	0	0	62	4	29	18	2	0
Cottonmouth envenomations	242	239	11	17	21	187	0	1	238	1	0	0	225	2	93	114	5	0
Rattlesnake envenomations	804	790	31	47	61	630	0	5	784	2	1	3	747	14	184	393	78	1
Unknown crotalid envenomations	994	975	58	76	85	738	0	4	968	2	2	2	923	12	234	530	77	2
Spiders																		
Black widow spider bites and/or envenomations	1330	1318	100	61	95	984	0	3	1315	1	0	2	662	38	378	290	5	0
Brown recluse spider bites and/or envenomations	1166	1156	105	70	87	737	3	12	1147	3	2	1	469	15	280	217	14	0
Other necrotizing spider bites and/or envenomations	86	85	17	10	5	46	0	1	85	0	0	0	21	3	21	6	0	0
Other spider bites and/or envenomations	3280	3245	357	189	230	2095	6	33	3228	6	5	1	716	79	851	256	2	0
Tarantula bites and/or envenomations	44	44	3	5	2	31	0	1	43	0	0	1	14	0	14	2	0	0
Category total: Building and construction products	48,411	46,989	6708	4553	3602	28,470	124	577	46,520	82	205	116	15,480	1125	18,819	5546	304	7
Insulation																		
Asbestos	315	272	39	14	19	136	7	6	269	0	1	2	53	47	16	1	1	0
Fiberglass	461	435	194	30	26	146	1	4	407	13	4	8	77	55	70	14	0	0
Other types of insulation	100	91	34	6	1	37	0	0	87	2	1	1	24	9	20	3	0	0
Unknown types of insulation	450	422	262	23	18	90	1	2	409	8	0	2	43	74	41	3	1	0
Urea or formaldehyde insulations	10	8	6	0	0	2	0	0	8	0	0	0	1	4	1	0	0	0
Miscellaneous building and construction products																		
Caulking compounds and construction putties	2458	2375	1623	98	49	443	27	18	2312	36	2	23	177	495	143	26	1	0
Cement or concrete (excluding glues)	1155	1099	345	26	43	601	3	4	1069	18	1	6	449	151	235	185	9	0
Other types of building or construction products	2179	1997	1001	82	66	686	11	17	1931	32	9	19	391	384	327	88	5	0
Soldering flux	171	166	55	4	15	76	1	5	159	4	0	3	49	34	40	16	0	0
Unknown types of building or construction products	99	97	20	2	1	36	1	4	96	0	0	1	22	13	32	5	0	0
Category total: Chemicals	7398	6962	3579	285	238	2253	52	60	6747	113	18	65	1286	1266	925	341	17	0
Acids																		
Hydrochloric acid	1790	1468	73	36	178	1008	4	26	1378	41	18	18	575	150	510	165	14	2
Hydrofluoric acid	681	598	19	7	24	492	0	17	567	17	5	3	479	83	234	119	6	2
Other types of acid	4651	3944	534	189	269	2389	6	52	3732	98	50	40	1444	514	1144	434	26	0
Unknown types of acid	151	126	7	2	10	92	0	2	115	2	5	3	74	7	30	31	1	0
Miscellaneous chemicals																		
Acetone (excluding nail polish removers)	1425	1220	434	51	76	530	1	48	1114	55	30	6	355	189	295	53	4	0
Alkalis (excluding cleaning agents, bleaches, batteries, and detergents)	3840	3403	582	107	286	2014	12	35	3192	90	46	38	1712	325	1021	587	57	1
Ammonia (excluding cleaning agents)	2861	1992	428	97	122	1150	6	22	1857	70	31	22	729	259	585	178	12	1
Borates or boric acid (excluding topical and pesticides)	3875	3467	1693	302	140	1111	1	21	3212	143	62	39	515	648	289	43	1	1
Chlorates (excluding matches)	28	24	8	1	4	10	0	0	23	0	0	0	8	3	7	1	0	0
(continued)																		

(continued)



Table 22(A). Demographic profile of SINGLE SUBSTANCE Nonpharmaceuticals exposure cases by generic category – Continued

	No. of Case Mentions	No. of Single Exposures	Age				Reason				Outcome								
			<=5	6-12	13-19	>=20	Unknown Child	Unknown Adult	Unknown Age	Unit	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
and fireworks)	268	198	10	1	4	136	2	40	5	135	17	34	1	132	51	42	17	7	6
Cyanides (excluding rodenticides)	4	4	1	0	0	3	0	0	0	4	0	0	0	1	0	1	0	0	0
Dioxins	711	542	46	6	26	424	0	36	4	303	179	15	0	387	78	72	93	72	10
Ethylene glycol (excluding automotive, aircraft, or boat products)	679	600	54	26	66	356	1	94	3	539	25	13	22	234	62	172	45	3	0
Formaldehyde or formalin	319	276	73	4	9	162	0	25	3	266	6	2	0	140	42	92	30	1	0
Ketones	154	139	27	13	9	77	0	10	3	135	3	1	0	56	17	33	15	2	0
Methylene chloride (excluding paint strippers)	971	898	272	215	111	241	4	50	5	740	132	8	10	211	178	133	36	5	2
Nitrates and nitrites (excluding medications and substances of abuse)	12,018	10,492	4067	811	636	4020	40	787	131	9538	389	150	351	2333	1610	1985	474	37	0
Other chemicals	733	555	217	26	26	247	1	33	5	483	26	10	26	152	97	85	22	2	0
Other glycols (excluding automotive, aircraft, or boat products)	267	243	21	11	9	153	0	45	4	230	7	0	6	103	50	61	41	1	0
Phenol or cresotes (excluding disinfectants)	34	27	10	3	2	9	0	3	0	18	4	2	2	7	4	2	2	1	1
Strychnine (excluding rodenticides)	502	464	114	16	19	250	1	57	7	443	16	1	1	150	45	107	33	2	0
Toluene diisocyanate	3506	3230	638	179	184	1709	21	430	69	2582	103	349	99	1140	343	685	248	16	1
Unknown chemicals	39,468	33,910	9328	2103	2210	16,583	100	3124	462	30,606	1423	832	687	10,937	4755	7585	2667	270	27
Category total:																			
Cleaning substances (household)																			
Automatic dishwasher detergents	1831	1815	1734	11	10	46	0	14	0	1808	1	5	0	109	487	291	7	0	0
Automatic dishwasher detergents: granules (unit dose)	2056	2020	1713	20	25	204	5	51	2	1981	8	24	2	103	432	235	10	1	0
Automatic dishwasher detergents: granules (various containers)	7281	7234	6851	52	35	240	5	44	7	7209	6	15	3	416	1692	1191	43	1	0
Automatic dishwasher detergents: granules with liquids (unit dose)	553	548	493	8	5	33	0	9	0	545	3	0	0	42	147	64	7	0	0
Automatic dishwasher detergents: liquids (unit dose)	1733	1688	1381	17	27	219	3	39	2	1655	12	17	2	138	396	207	27	1	0
Automatic dishwasher detergents: liquids (various containers)	3074	3045	2857	26	17	116	4	24	1	3024	8	8	2	145	810	380	8	1	0
Automatic dishwasher detergents: tablets	970	926	749	26	11	115	0	25	0	911	9	5	0	94	174	157	23	0	1
Automatic dishwasher rinse agents	1955	1929	1645	23	30	189	2	33	7	1891	21	15	1	126	346	225	13	1	0
Other or unknown types of automatic dishwasher detergent																			
Bleaches																			
Bleaches: borates	379	299	103	9	32	123	1	22	9	258	25	4	10	75	56	101	6	0	0
Bleaches: hypochlorite (liquid and dry)	42,025	35,427	13,632	1400	2929	14,776	68	2273	349	31,396	2955	603	293	9702	5053	10,129	1325	41	2
Bleaches: non-hypochlorite	343	276	107	13	21	107	0	26	2	249	17	2	6	64	51	73	9	0	1
Bleaches: other or unknown (household)	570	480	181	21	45	210	1	17	5	411	39	16	11	152	64	130	17	0	0
Cleaners																			
Anionic or nonionic cleansers	2072	1906	1461	41	40	304	4	50	6	1839	45	14	5	141	425	186	21	1	0
Other or unknown types of household cleanser	2826	2489	1564	85	88	616	10	115	11	2331	88	41	14	490	475	413	63	3	0
Disinfectants																			
Disinfectants: hypochlorite (non-bleach products)	2591	2213	950	84	107	886	6	162	18	2071	91	25	16	567	310	545	88	4	0
Disinfectants: other or unknown	6237	5852	3409	372	272	1460	16	275	48	5387	259	83	106	671	1129	1054	85	3	1
Disinfectants: phenol	743	713	448	71	29	133	0	28	4	655	46	10	1	88	152	100	12	0	0
Disinfectants: pine oil	3926	3417	1858	118	123	1135	8	156	19	3184	166	36	18	643	817	642	62	4	1
Drain cleaners																			
Drain cleaners: acids	139	113	17	6	3	68	1	17	1	99	4	4	4	34	23	22	16	1	0

continued

(continued)

Table 22(A). Demographic profile of SINGLE SUBSTANCE Nonpharmaceuticals exposure cases by generic category – Continued

No. of Case Mentions	No. of Single Exposures	Age										Reason					Outcome				
		<=5	6-12	13-19	>=20	Unknown Child	Unknown Adult	Unknown Age	Unit	Int	Other	Adv Bsn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death			
2771	2366	362	47	101	1556	1	269	30	2202	105	12	36	718	332	640	265	34	7			
29	17	2	0	0	14	0	1	0	13	4	0	0	8	0	0	4	1	1			
850	654	88	20	28	406	1	90	21	591	39	14	5	186	74	148	55	5	0			
498	370	30	18	15	263	0	39	5	352	13	1	4	136	27	104	76	3	0			
32	29	24	0	1	4	0	0	0	27	1	1	0	4	7	1	0	0	0			
109	108	92	3	1	11	0	1	0	106	1	1	0	4	19	10	0	0	0			
7	6	0	0	0	1	0	0	0	7	0	0	0	0	1	0	0	0	0			
24	21	17	1	0	2	0	1	0	18	1	0	1	2	4	1	0	0	0			
15	12	7	0	2	2	0	0	1	11	1	0	0	4	4	1	1	0	0			
902	817	594	25	21	151	1	23	2	783	24	5	4	97	170	99	4	1	0			
5	5	4	0	0	0	0	1	0	5	0	0	0	1	1	3	0	0	0			
686	667	557	21	22	57	1	6	3	645	9	3	8	29	117	31	2	0	0			
1564	1398	1092	45	43	180	2	29	7	1313	66	13	2	127	312	164	14	1	0			
105	92	52	2	7	25	0	6	0	83	8	0	1	11	25	11	3	0	0			
1338	1393	953	71	76	235	2	44	12	1297	72	19	2	151	323	158	14	0	0			
1619	1438	965	80	86	253	3	46	5	1310	105	11	6	191	270	188	18	0	0			
5548	4875	3044	238	125	1192	9	252	15	4622	97	114	28	398	578	839	57	4	1			
2306	1976	1141	87	57	590	4	90	7	1861	44	57	12	139	181	284	15	1	0			
68	61	28	3	2	26	0	2	0	59	0	1	0	17	10	19	3	0	0			
35	30	17	3	2	8	0	0	0	28	0	1	1	4	6	8	0	0	0			
384	355	257	24	4	61	0	7	2	343	7	4	1	37	93	60	4	0	0			
1351	1281	1073	42	30	103	5	27	1	1241	16	17	6	112	271	145	14	0	0			
51	47	27	3	4	11	0	2	0	45	0	2	0	3	10	7	0	0	0			
315	304	243	6	5	43	0	7	0	294	6	3	1	48	90	71	5	0	0			
2646	2509	1877	81	75	392	3	76	5	2405	67	17	12	368	475	492	35	4	0			
308	301	272	10	4	13	1	0	1	297	1	1	2	118	59	123	9	2	0			
12,816	12,474	11,260	520	150	441	24	67	12	12,323	112	12	18	5009	2445	5662	692	16	0			
7706	7408	5663	224	219	1089	5	189	19	7138	196	44	16	1407	1276	1814	191	8	0			
241	226	144	11	12	43	1	13	2	211	12	2	1	65	39	61	8	0	0			
150	135	93	2	4	25	0	11	0	124	4	1	6	22	24	16	8	0	0			
197	189	169	1	2	14	0	2	1	187	2	0	0	16	34	38	5	0	0			

(continued)





Table 22(A). Demographic profile of SINGLE SUBSTANCE Nonpharmaceuticals exposure cases by generic category – Continued

	No. of Case Mentions	No. of Single Exposures	Age					Reason			Outcome									
			<=5	6-12	13-19	>=20	Unknown Child	Unknown Adult	Unknown Age	Unit	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death	
removers: aerosol or spray solvent based	243	230	189	4	5	24	1		7	0	225	3	1	1	26	34	49	4	0	0
Laundry prewash/stain removers: aerosol or spray surfactant based	84	81	62	0	2	15	0	2		0	79	1	0	1	5	9	8	2	0	0
Laundry prewash/stain removers: dry surfactant based	248	241	187	8	5	34	0	0	7	0	237	0	1	2	31	69	36	5	0	0
Laundry prewash/stain removers: liquid solvent based	1598	1535	1318	28	28	130	3	27	1	1497	30	4	3	150	284	265	21	0	0	0
Laundry prewash/stain removers: liquid surfactant based	1957	1862	1420	36	35	312	1	54	4	1822	14	10	15	189	347	314	33	0	0	0
Laundry prewash/stain removers: other or unknown	31	29	25	0	0	3	0	1	1	0	28	1	0	0	5	5	9	0	0	0
Laundry prewash/stain removers: other or unknown solvent based																				
Laundry prewash/stain removers: other or unknown surfactant based	44	42	33	1	1	7	0	0	0	0	42	0	0	0	2	7	8	0	0	0
Miscellaneous cleaners																				
Miscellaneous cleaning agents: acids	1193	1023	412	29	33	456	0	82	11	954	31	19	16	240	197	250	43	1	0	0
Miscellaneous cleaning agents: alkalis	7275	6466	3822	209	245	1822	12	320	36	6102	248	78	26	1313	1241	1288	266	13	2	2
Miscellaneous cleaning agents: anionics or nonionics	5051	4583	2958	171	159	1094	18	169	14	4310	170	56	35	655	783	724	76	2	0	0
Miscellaneous cleaning agents: cationics	2642	2449	1295	107	137	749	23	128	10	2263	122	30	24	453	453	457	77	0	0	0
Miscellaneous cleaning agents: ethanol (excluding automotive products)	527	489	350	27	13	83	0	14	2	470	14	2	1	40	111	61	5	0	0	0
Miscellaneous cleaning agents: glycols (excluding automotive products)	443	399	228	15	21	112	0	21	2	369	19	6	3	73	77	64	6	0	0	0
Miscellaneous cleaning agents: isopropanol (excluding automotive products and glass)	1736	1635	1001	167	99	297	3	63	5	1535	67	22	7	143	278	209	16	2	0	0
Miscellaneous cleaning agents: methanol (excluding automotive products)	29	27	15	0	0	10	0	2	0	26	1	0	0	11	9	7	1	0	0	0
Miscellaneous cleaning agents: other or unknown household cleaning agents	4956	4575	2689	247	209	1141	11	234	44	4241	201	79	35	891	1017	891	128	6	1	0
Miscellaneous cleaning agents: phenol (excluding disinfectants)	10	10	5	0	0	4	0	1	0	10	0	0	0	1	4	0	1	0	0	0
Miscellaneous cleaning substances (household)																				
Ammonia cleaners (all purpose)	736	559	176	29	29	265	2	54	4	524	20	9	5	110	95	155	27	1	0	0
Carpet, upholstery, leather, or vinyl cleaners	3278	3084	2190	96	81	598	6	103	10	2981	50	27	22	361	555	476	34	1	0	0
Hydrofluoric acid or bifluoride wheel cleaners	67	66	11	1	6	46	0	2	0	65	1	0	0	50	5	31	12	2	0	0
Starches, fabric finishes, or sizing	233	213	169	13	2	22	0	7	0	209	3	1	0	10	55	14	0	0	0	0
Oven cleaners																				
Oven cleaners: acids	8	8	0	1	0	6	0	1	0	8	0	0	0	3	1	3	0	0	0	0
Oven cleaners: alkalis	1935	1864	278	63	157	1143	15	191	17	1705	38	88	32	693	177	547	229	14	0	0
Oven cleaners: detergent types	10	7	3	0	0	4	0	0	0	7	0	0	0	4	3	0	2	0	0	0
Oven cleaners: other or unknown	258	245	45	8	9	150	0	30	3	221	3	14	7	89	26	73	20	1	0	0
Rust removers																				
Rust removers: acids other than hydrofluoric acid types	359	299	99	7	8	155	0	30	0	275	12	7	4	76	70	74	21	0	0	0
Rust removers: alkalis	10	9	1	0	1	5	0	1	1	8	1	0	0	7	1	2	1	1	0	0
Rust removers: anionics or nonionics	1	1	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
Rust removers: hydrofluoric acid	228	217	27	8	0	165	0	15	2	202	11	1	1	97	52	66	30	1	0	0
Rust removers: other or unknown	157	133	28	1	5	84	0	13	2	125	6	0	2	28	18	40	9	0	0	0

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Table 22(A). Demographic profile of SINGLE SUBSTANCE Nonpharmaceuticals exposure cases by generic category – Continued

	No. of Case Mentions	No. of Single Exposures	Age					Reason			Outcome								
			<=5	6-12	13-19	>=20	Unknown Child	Unknown Adult	Unknown Age	Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
Spot removers/dry cleaning agents	121	114	81	2	2	23	0	6	0	111	2	0	1	12	20	16	1	0	0
Spot removers/dry cleaning agents: anionics or nonionics	93	85	59	2	1	21	1	0	1	81	1	1	2	7	14	13	2	0	0
Spot removers/dry cleaning agents: glycols	45	44	31	1	2	9	0	1	0	43	0	0	1	3	7	5	1	0	0
Spot removers/dry cleaning agents: isopropanol	23	20	14	0	0	6	0	0	0	20	0	0	0	3	5	5	0	0	0
Spot removers/dry cleaning agents: other halogenated hydrocarbon containing products	375	356	209	7	19	108	1	10	2	350	4	2	0	82	82	69	12	1	0
Spot removers/dry cleaning agents: other hydrocarbon and/or non-halogenated containing	104	97	71	2	3	18	0	3	0	93	4	0	0	19	20	8	1	0	0
Spot removers/dry cleaning agents: other or unknown	9	8	6	0	0	1	0	1	0	8	0	0	0	2	4	0	1	0	0
Spot removers/dry cleaning agents: perchloroethylene																			
Toilet bowl cleaners																			
Toilet bowl cleaners: acids	2794	2258	1265	57	92	694	3	130	17	2148	91	10	6	460	595	557	88	8	1
Toilet bowl cleaners: alkalis	4456	4158	3366	61	83	515	8	109	16	4067	79	3	7	527	1254	595	48	3	1
Toilet bowl cleaners: other or unknown	3640	3410	2957	59	48	273	4	62	7	3351	40	6	10	328	833	287	27	0	0
Wall/floor/file cleaners																			
Wall/floor/file/all-purpose cleaning agents: acids	1565	1315	823	36	50	343	1	57	5	1232	49	11	17	226	310	250	42	3	1
Wall/floor/file/all-purpose cleaning agents: alkalis	6511	5899	3843	170	238	1405	15	208	20	5559	218	55	59	1117	1156	1417	199	7	0
Wall/floor/file/all-purpose cleaning agents: anionics	8596	7683	4862	261	282	1982	8	252	36	7263	275	97	26	1266	1628	1102	119	6	1
Wall/floor/file/all-purpose cleaning agents: anionics or nonionics	2339	2083	1371	83	95	444	4	78	8	1939	102	24	13	290	366	413	35	0	1
Wall/floor/file/all-purpose cleaning agents: cationics	302	277	210	8	5	41	1	10	2	265	4	2	6	20	55	38	3	0	0
Wall/floor/file/all-purpose cleaning agents: ethanol	891	807	610	19	19	129	1	28	1	787	14	3	1	84	178	98	5	1	0
Wall/floor/file/all-purpose cleaning agents: glycols	435	403	320	17	6	50	0	9	1	385	10	5	2	25	97	56	2	0	0
Wall/floor/file/all-purpose cleaning agents: isopropanol	1	1	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0
Wall/floor/file/all-purpose cleaning agents: methanol	1577	1474	1004	44	48	314	4	52	8	1387	56	19	11	241	298	253	29	1	0
Wall/floor/file/all-purpose cleaning agents: other or unknown	195,404	176,828	111,445	6096	7230	43,504	343	7276	934	166,476	6832	1976	1072	33,700	33,223	38,650	5025	217	23
Category total:																			
Cosmetics/personal care products																			
Dental care products																			
False teeth cleaning agents	2436	2415	309	35	46	1830	1	182	12	2331	38	13	26	111	362	181	13	0	0
Other dental care products (excluding fluoride supplements)	1550	1506	553	98	89	627	1	126	12	1361	45	3	90	142	219	166	21	0	0
Toothpastes (with fluoride)	17,337	16,931	14,886	509	271	1026	12	203	24	16,492	196	48	181	300	2895	865	32	0	0
Toothpastes (without fluoride)	1741	1673	1443	35	33	125	4	31	2	1628	13	5	27	27	214	79	4	1	0
Hair care products																			
Curl activators	52	47	36	1	2	6	1	1	0	45	0	0	2	6	12	4	0	0	0
Hair coloring agents (excluding peroxides)	2210	2126	1052	41	111	771	3	127	21	1856	33	10	223	421	368	395	85	4	0
Hair oils	550	534	486	8	7	25	1	7	0	528	4	0	2	80	110	47	8	1	0
Hair relaxers (with other alkalines)	209	209	148	7	5	44	0	5	0	201	1	0	7	95	38	75	17	2	0
Hair relaxers (with other non-alkalines)	51	49	37	0	0	12	0	0	0	48	0	0	1	13	15	10	1	0	0
Hair relaxers (with sodium hydroxide)	399	393	269	8	13	85	0	14	4	371	4	1	16	194	74	116	45	3	0
Hair rinses, conditioners, relaxers	2130	1973	1677	60	49	146	0	39	2	1908	45	4	16	151	398	185	17	1	0
Hair sprays	1333	1187	782	55	65	240	3	36	6	1037	126	11	8	166	238	167	25	2	0
Other hair care products (excluding peroxides)	2811	2702	2004	95	110	389	3	92	9	2548	55	6	91	374	496	380	61	5	0
Permanent wave solutions	155	151	82	1	2	49	0	15	2	141	2	1	7	56	30	44	11	1	0

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Table 22(A). Demographic profile of SINGLE SUBSTANCE Nonpharmaceuticals exposure cases by generic category – Continued

	No. of Case Mentions	No. of Single Exposures	Age					Reason				Outcome							
			<=5	6-12	13-19	>=20	Unknown Child	Unknown Adult	Unknown Age	Unit	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
Shampoos	5825	5494	4119	283	188	750	10	126	18	5222	167	19	78	501	667	926	70	3	0
Hand sanitizers	20,531	19,949	15,625	1656	589	1816	21	221	21	18,211	1397	274	14	1588	5120	1458	248	20	1
Hand sanitizers: ethanol based	184	179	141	13	4	18	0	1	2	162	15	1	0	11	51	12	2	0	0
Hand sanitizers: non-alcohol based	1865	1826	1465	148	57	128	8	18	2	1754	56	14	1	88	361	106	9	0	0
Hand sanitizers: unknown	651	602	346	105	41	92	4	12	2	490	79	28	0	96	119	85	17	1	0
Miscellaneous cosmetics/personal care products																			
Baby oils	1578	1535	1405	17	20	80	1	11	1	1514	10	2	5	127	315	141	13	0	0
Bath oils and/or bubble baths	2715	2637	2347	133	26	99	6	23	3	2581	29	2	22	120	416	234	7	0	0
Creams, lotions, and make-up	21,839	21,035	17,395	646	461	2024	34	388	87	20,165	244	55	543	681	2788	1126	73	2	0
Deodorants	16,597	16,360	14,665	369	449	716	15	133	13	15,850	279	25	189	538	2172	1032	44	0	1
Depilatories	694	668	211	24	91	268	2	61	11	452	50	7	157	163	81	164	51	2	0
Douches	56	37	3	1	11	0	0	4	0	52	1	0	3	5	12	12	1	0	0
Eye products	1478	1420	1187	43	39	119	0	30	2	1376	11	2	28	67	195	87	17	2	0
Lipsticks and lip balms (with camphor)	875	863	754	42	16	32	1	14	4	842	13	2	6	19	129	37	4	0	0
Lipsticks and lip balms (without camphor)	5174	5029	4465	149	65	239	12	59	40	4706	35	4	281	95	588	360	21	0	0
Perfumes, colognes, and aftershaves	8586	8281	6617	475	371	624	41	138	15	7796	320	126	23	739	1696	1461	54	0	0
Peroxides	6923	6437	2123	272	375	3059	6	537	65	5886	283	44	199	1129	778	1418	238	10	1
Powders made of material other than talc	1773	1737	1536	56	24	98	3	16	4	1685	26	16	8	113	279	304	18	1	0
Powders made of talc	2042	1998	1470	79	59	138	6	40	206	1726	46	212	10	245	537	342	26	0	0
Soaps (bar, hand or complexion)	13,487	12,771	9257	640	421	2071	26	312	44	12,110	393	73	170	812	1,511	1660	103	3	0
Suntan and/or sunscreen products	8960	8831	7712	426	151	430	17	80	15	8629	49	28	124	293	1145	893	39	0	0
Mouthwashes																			
Mouthwashes: ethanol containing	6320	5700	1645	493	392	2733	3	402	32	4630	990	28	25	941	801	586	216	15	2
Mouthwashes: fluoride containing	5471	5415	3690	1010	97	540	2	72	4	5337	59	8	10	83	926	143	3	0	0
Mouthwashes: non ethanol containing	1661	1606	700	156	66	570	3	107	4	1511	66	1	23	64	270	92	9	0	0
Mouthwashes: unknown	207	180	57	13	7	83	1	17	2	152	21	1	4	26	27	16	2	1	0
Nail products																			
Acrylic nail adhesives	932	919	335	161	106	281	4	27	5	881	28	1	6	412	111	258	61	1	0
Acrylic nail primers	211	202	171	3	3	18	0	7	0	200	0	0	2	68	37	49	14	1	0
Acrylic nail removers	12	10	6	0	0	4	0	0	0	10	0	0	0	4	1	4	1	0	0
Miscellaneous nail products	696	675	479	22	14	130	0	26	4	653	7	2	12	123	139	126	15	0	0
Nail polish removers (acetone containing)	2058	2011	1391	99	99	361	4	55	2	1917	67	21	2	245	468	285	25	1	0
Nail polishes	7094	6866	6058	246	150	340	12	53	7	6720	103	19	17	487	1190	691	20	2	0
Other nail polish removers	727	705	538	32	33	82	0	19	1	670	25	6	4	67	187	84	6	0	0
Unknown nail polish removers	6410	6172	4293	325	325	1006	6	199	18	5918	179	44	10	817	1233	914	38	0	0
Category total:	186,596	180,065	136,004	9092	5543	24,335	277	4086	728	170,303	5610	1167	2673	12,903	29,819	17,820	1805	85	5
Deodorizers																			
Air freshener																			
Air fresheners: aerosols	2129	2055	1395	156	66	344	8	78	8	1935	71	24	19	182	379	327	21	0	0
Air fresheners: liquids	8975	8873	7788	260	142	551	13	110	9	8713	90	53	13	624	1746	1159	51	2	0
Air fresheners: solids	2776	2754	2465	86	28	148	7	18	2	2714	21	10	7	208	527	211	8	0	0
Air fresheners: unknown form	1796	1770	1487	64	28	161	2	26	2	1732	24	7	6	144	350	220	10	0	0
Miscellaneous deodorizers																			
Diaper pail deodorizers (excluding moth repellants)	13	13	12	0	0	1	0	0	0	13	0	0	0	0	3	0	0	0	0
Other types of deodorizer (not for personal use)	5463	5237	3778	220	161	905	14	147	12	5039	131	32	31	546	1069	719	53	2	3
Toilet bowl deodorizers	508	500	430	9	5	47	1	6	2	491	5	0	2	62	119	32	2	0	0
Unknown types of deodorizer (not for personal use)	69	64	43	5	1	12	1	0	2	62	1	0	1	16	8	13	0	0	0
Category total:	21,729	21,266	17,398	800	431	2169	46	385	37	20,699	343	126	79	1782	4201	2681	145	4	3
Dyes																			
Miscellaneous dyes																			
Dyes: chlorate containing	1	1	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0
Dyes: fabrics	295	284	199	25	11	40	1	7	1	268	7	2	7	21	62	13	0	0	0
Dyes: foods (including Easter egg)	788	723	584	67	23	39	3	7	0	695	20	0	6	16	101	35	5	0	0

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Table 22(A). Demographic profile of SINGLE SUBSTANCE Nonpharmaceuticals exposure cases by generic category – Continued

No. of Case Mentions	No. of Single Exposures	Age				Reason			Outcome									
		<=5	6-12	13-19	>=20	Unknown Child	Unknown Adult	Unknown Age	Unit	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
Dyes: leathers	59	47	3	1	5	0	3	0	59	0	0	0	5	20	4	0	0	0
Dyes: other	408	375	158	78	59	1	12	1	342	16	1	15	45	69	32	5	1	0
Dyes: unknown	98	59	35	2	4	13	5	0	51	4	0	4	9	14	5	0	0	0
Category total:	1649	1501	1024	117	156	5	34	2	1416	47	3	32	97	266	89	10	1	0
Essential oils																		
Miscellaneous essential oil																		
Cinnamon oil	615	546	359	56	81	4	18	2	445	63	1	35	64	47	181	15	0	0
Clove oil	582	528	359	12	124	3	38	1	490	13	1	23	113	114	133	16	1	0
Eucalyptus oil	1282	1151	714	48	326	2	32	3	1079	24	3	41	231	294	185	14	0	0
Miscellaneous essential oils	13,382	12,754	9690	480	213	37	388	49	12,111	225	41	356	926	2506	2105	124	3	0
Pennyroyal oil	26	25	8	1	13	0	1	0	16	4	1	4	11	3	5	1	1	0
Tea tree oil	4222	3993	2134	159	149	5	249	16	3647	169	20	141	490	976	429	36	3	0
Category total:	20,109	18,997	13,264	756	420	48	716	71	17,788	498	67	600	1835	3940	3038	206	8	0
Fertilizers																		
Miscellaneous fertilizers																		
Household plant foods (generally for indoor plants)	1451	780	112	33	396	16	63	7	1344	26	30	3	84	256	55	4	0	0
Other types of fertilizer	1437	1295	813	102	291	5	54	8	1263	13	8	11	91	260	71	19	2	0
Outdoor fertilizers	1867	1754	1109	106	39	2	80	3	1693	30	15	15	139	359	115	11	0	0
Plant hormones	38	31	12	0	14	0	1	3	29	0	0	2	4	8	5	2	0	0
Unknown types of fertilizer	113	103	45	16	3	1	6	2	99	1	0	1	13	27	10	3	0	0
Category total:	4906	4590	2759	336	98	24	204	23	4428	70	53	32	331	910	256	39	2	0
Fire extinguishers																		
Miscellaneous fire extinguisher																		
Miscellaneous fire extinguishers	2585	197	417	263	1073	97	240	247	2109	74	312	19	635	438	599	101	0	0
Category total:	2585	197	417	263	1073	97	240	247	2109	74	312	19	635	438	599	101	0	0
Foreign bodies/toys/miscellaneous																		
Miscellaneous foreign bodies/toys/miscellaneous																		
Ashes	372	331	252	9	31	1	29	4	327	0	3	0	8	42	21	0	0	0
Bubble blowing solutions	3532	3484	3199	180	52	10	13	0	3448	27	4	2	139	433	510	15	1	0
Charcoals	604	507	389	16	68	1	14	5	470	15	3	16	45	87	24	4	0	0
Christmas ornaments	276	272	209	15	4	32	9	1	268	3	0	1	26	59	17	0	0	0
Coins	3587	3516	2841	574	52	77	9	2	3447	51	9	3	1173	832	327	38	1	0
Desiccants	20,168	20,019	16,713	1192	363	1302	322	50	19,609	277	111	8	958	2446	173	11	0	0
Feces/urine	5631	4851	3873	138	109	536	164	16	4702	25	103	15	182	662	133	10	2	0
Glass	4682	4599	1075	303	255	82	976	82	4452	36	70	27	297	675	195	11	0	0
Glow products	16,916	16,887	12,878	3186	370	298	89	19	16,649	209	9	14	728	1801	3051	46	0	0
Incense (punk)	217	210	165	4	29	1	6	1	202	6	1	1	17	34	21	4	0	0
Other types of foreign body, toy, or miscellaneous substance	24,624	23,332	15,865	2473	769	3046	956	114	22,164	637	334	151	1972	3819	1107	115	9	0
Oxygen absorbers	578	573	238	134	46	112	36	6	495	39	37	1	31	101	19	0	0	0
Soil	2302	2030	1366	94	54	380	120	12	1916	41	17	45	168	267	171	18	0	1
Toys	6972	6839	5432	1030	155	13	49	2	6688	119	20	10	447	992	424	11	1	0
Unknown types of foreign body, toy, or miscellaneous substance	1347	1295	900	180	45	105	39	11	1215	35	17	6	116	209	65	5	1	0
Thermometers																		
Thermometers: mercury	1096	1080	224	134	72	351	246	40	1052	11	11	3	73	205	8	2	0	0
Thermometers: other	683	670	205	102	50	8	99	9	648	12	6	2	36	143	25	1	0	0
Thermometers: unknown	173	172	40	19	7	79	24	3	172	0	0	0	16	12	3	0	0	0
Category total:	93,760	90,667	65,864	9783	2382	8673	3198	377	87,924	1543	755	305	6432	12,819	6294	291	15	1
Fumes/gases/vapors																		
Miscellaneous fumes/gases/vapors																		
Carbon dioxide	406	380	27	49	52	205	43	3	339	25	1	7	91	64	83	17	1	3
Carbon monoxide	13,620	12,239	1656	1049	795	6671	1671	281	11,779	315	22	23	5786	2577	3214	1357	190	48
Chloramine gas	1969	1843	70	35	102	1367	243	19	1756	81	0	3	326	217	555	172	1	0
Chlorine gas	4070	3845	286	291	252	2430	447	111	3650	135	16	35	1175	267	1344	551	10	2
Chlorine gas (when household acid is mixed with hypochlorite)	2266	2178	86	58	112	1597	303	18	2072	95	5	6	498	303	807	225	5	0
Hydrogen sulfide (sewer gas)	792	670	60	35	18	429	102	25	658	8	2	0	308	77	183	79	3	8
Methane and natural gas	4875	4530	948	359	237	2181	675	83	4490	11	10	8	909	1179	849	121	2	0
Other types of fume, gas, or vapor	1611	1341	152	84	144	717	212	23	1229	59	18	32	331	215	342	79	6	0
Polymer fume fever	10	10	0	0	0	6	4	0	9	1	0	0	0	0	2	0	0	0
Simple asphyxiants	2522	2305	274	210	311	1164	303	27	2065	200	10	11	685	446	560	176	9	5
Unknown types of fume, gas, or vapor	2091	1996	114	64	77	972	710	46	1916	24	36	8	407	461	390	114	2	1
Category total:	34,232	31,337	3673	2234	2100	17,739	4713	636	29,963	954	120	133	10,516	5806	8329	2891	229	67
Heavy metals																		

(continued)



Table 22(A). Demographic profile of SINGLE SUBSTANCE Nonpharmaceuticals exposure cases by generic category – Continued

	No. of Case Mentions	No. of Single Exposures	Age				Reason				Outcome								
			<=5	6-12	13-19	>=20	Unknown Child	Unknown Adult	Unknown Age	Unit	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
Miscellaneous heavy metals	797	716	381	41	27	203	5	54	5	672	15	18	8	50	85	37	4	0	0
Aluminum	906	794	172	47	24	433	4	99	15	500	12	130	24	398	133	60	40	4	3
Arsenic (excluding pesticides)	27	18	1	0	8	8	0	1	0	15	0	0	3	4	3	6	0	0	0
Barium, soluble salts	70	42	2	2	0	35	0	3	0	30	0	0	4	23	7	4	5	0	0
Cadmium	657	545	76	44	142	230	2	41	10	472	30	17	20	179	67	168	31	0	1
Copper	18	16	8	2	0	4	0	2	0	15	0	0	1	1	4	1	0	0	0
Fireplace flame colors	4	3	1	0	0	2	0	0	0	1	0	0	0	1	0	0	0	0	0
Gold	2678	2412	1188	216	87	671	13	218	19	2222	50	46	17	1133	666	132	71	8	0
Lead	55	43	2	1	7	21	0	10	2	34	3	0	1	23	4	4	1	0	0
Manganese	145	128	8	8	10	76	0	24	2	90	5	9	18	42	26	10	3	1	1
Mercury (other)	1190	1126	90	87	67	553	34	265	30	960	32	50	46	300	288	48	22	4	1
Mercury, elemental (excluding thermometer)	311	276	9	2	26	211	1	25	2	263	3	2	8	104	13	80	39	1	0
Metal fume fever	3445	2247	864	136	109	932	14	174	18	1802	173	38	205	469	352	235	61	9	3
Other types of heavy metal	35	29	2	2	1	16	3	4	1	13	0	8	2	17	5	3	2	1	0
Thallium	75	66	3	1	2	37	7	15	1	40	1	8	4	31	4	7	3	0	0
Unknown types of heavy metal	Category total:	8461	2807	589	510	3432	83	935	105	7129	324	327	361	2775	1657	795	282	28	9
Hydrocarbons																			
Miscellaneous hydrocarbons	81	61	3	1	1	52	0	4	0	57	1	2	1	32	7	22	4	0	0
Benzene	37	36	4	6	4	18	0	4	0	35	0	0	1	10	17	4	4	0	0
Carbon tetrachloride	688	654	101	16	33	431	1	63	9	586	53	10	2	187	82	192	36	2	0
Diesel fuels	4827	4563	319	246	377	2997	10	560	54	3457	997	65	23	1803	689	1161	525	30	18
Freon and other propellants	9370	8993	1890	532	714	4857	23	885	92	8336	615	84	15	2152	1216	2866	313	7	0
Gasolines	731	682	318	32	29	247	2	49	5	624	39	12	4	235	104	167	54	3	0
Kerosenes	1176	1160	782	56	29	247	7	35	4	1124	25	8	2	375	271	296	94	15	0
Lamp oils	2064	1940	1085	49	98	592	6	93	17	1802	82	40	9	706	400	548	126	10	0
Lighter fluids and/or naphtha	3622	3283	1832	147	129	988	12	161	14	3141	68	56	10	612	862	518	64	3	0
Lubricating oils and/or motor oils																			
Mineral seal oil	19	18	9	1	0	6	0	2	0	17	0	0	1	2	0	4	1	0	0
Mineral spirits	1534	1385	433	52	69	720	3	99	9	1275	73	20	10	514	226	422	96	8	0
Other types of halogenated hydrocarbon	188	170	32	7	11	103	0	17	0	157	11	0	2	68	28	50	16	2	0
Other types of hydrocarbon	3992	3642	1744	145	168	1353	5	202	25	3390	151	54	33	955	744	772	167	10	1
Toluene and/or xylene (excluding adhesives)	628	512	58	12	21	359	2	55	5	471	18	13	7	245	50	200	55	4	0
Turpentine	312	276	63	16	20	146	0	29	2	220	38	7	9	89	43	66	12	0	0
Unknown types of hydrocarbon	497	432	148	15	27	201	3	33	5	370	43	7	8	164	83	93	37	3	2
Category total:	29,766	27,807	8821	1333	1730	13,317	74	2291	241	24,962	2214	378	137	8149	4822	7381	1604	97	21
Industrial cleaners																			
Miscellaneous industrial cleaners	2198	2046	141	72	152	1387	12	256	26	1854	146	24	17	649	201	671	147	7	1
Industrial cleaner: disinfectants	1543	1427	403	50	94	749	2	117	12	1310	43	49	17	542	204	445	121	10	1
Industrial cleaner: other or unknown	1713	1493	385	30	73	863	0	126	16	1382	55	38	14	494	207	429	122	5	1
Industrial cleaners: acids	2761	2562	494	51	181	1608	8	194	26	2405	88	43	17	1309	301	850	426	21	3
Industrial cleaners: alkalis	629	540	248	33	32	189	4	33	1	499	27	5	7	156	92	123	20	1	0
Industrial cleaners: anionics or nonionics	Category total:	688	632	94	21	54	395	3	63	550	62	13	4	242	58	209	37	3	0
Industrial cleaners: cationics	9532	8700	1765	257	586	5191	29	789	83	8000	421	172	76	3392	1063	2727	873	47	6
Infectious and toxin-mediated diseases																			
Botulinum toxins																			
Botulism	269	249	48	6	5	165	0	21	4	129	30	5	75	116	34	14	27	21	0
Ichthyosarcotoxins																			
Ciguatera poisoning	143	141	4	4	4	112	0	14	3	122	0	0	19	74	2	36	43	2	0
Ciguatera fish poisoning	16	16	1	0	1	11	0	2	1	12	0	0	4	3	1	2	0	0	0
Other types of seafood poisoning	238	228	6	9	16	159	0	36	2	186	5	1	34	78	8	69	44	2	0
Paralytic shellfish poisoning	123	116	5	6	5	77	0	18	5	96	4	1	12	29	2	26	17	1	0
Scombroid fish poisoning	175	165	10	3	6	121	0	25	0	130	1	2	32	43	6	34	33	1	0
Tetrodotoxin poisoning	146	144	36	22	13	64	0	9	0	127	7	3	6	21	30	15	5	1	0
Infectious diseases																			
Bacterial diseases	581	538	104	48	30	276	4	66	10	468	3	27	39	86	48	94	38	0	0
Fungal diseases	2494	2436	706	227	170	1074	6	240	13	2157	3	150	123	73	299	116	11	1	0
Other types of bacterial food poisoning (salmonella, shigella, vibrio, staphylococcus, streptococcus, etc.)	89	83	14	6	10	42	0	11	0	80	0	1	1	10	9	9	19	0	0

(continued)

Table 22(A). Demographic profile of SINGLE SUBSTANCE Nonpharmaceuticals exposure cases by generic category – Continued

	No. of Case Mentions	No. of Single Exposures	Age					Reason				Outcome							
			<=5	6-12	13-19	>=20	Unknown Child	Unknown Adult	Unknown Age	Unit	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
Parasitic diseases	22	20	5	1	0	9	0	5	0	17	0	2	1	5	1	2	1	0	0
Unknown types of bacterial food poisoning	258	254	25	15	14	178	0	20	2	248	0	2	3	15	1	28	4	0	0
Unknown types of suspected food poisoning	12,007	11,772	1852	724	804	6808	81	1357	146	10,989	29	163	558	1246	610	2015	512	5	1
Viral diseases	756	145	18	7	6	78	2	30	4	128	1	7	4	59	13	16	4	6	0
Category total: Information calls	17,317	16,307	2834	1078	1084	9174	93	1854	190	14,889	83	364	911	1858	1064	2476	758	40	1
Food information calls	7542	5726	2951	451	230	1614	20	417	43	4734	280	330	350	563	776	738	113	6	0
Information calls about food products, additives or supplements	6086	5955	1379	570	353	2823	42	725	63	5459	21	181	276	267	560	475	127	0	0
Information calls about possibly spoiled foods	13,628	11,681	4330	1021	583	4437	62	1142	106	10,193	301	511	626	830	1336	1213	240	6	0
Category total: Lacrimators																			
Miscellaneous lacrimators	2868	2843	595	603	434	886	27	252	46	2307	91	309	24	673	60	1373	112	4	0
Lacrimators: capsicum defense sprays	554	541	105	95	100	162	2	67	10	386	15	116	8	146	33	268	40	1	0
Lacrimators: CN (chloroacetophenone)	27	20	4	4	6	5	0	1	0	14	0	0	0	5	5	4	3	0	0
Lacrimators: CS (O-chlorobenzylidene malonitrile)	69	24	1	1	0	18	0	4	0	23	0	0	1	8	1	8	0	0	0
Lacrimators: other	127	116	8	24	7	35	30	8	4	97	1	13	3	74	14	68	3	0	0
Lacrimators: unknown	3645	3544	713	727	547	1106	59	332	60	2827	107	438	36	906	113	1721	158	5	0
Category total: Matches/fireworks/explosives																			
Miscellaneous matches/fireworks/explosives	159	151	85	19	10	30	0	7	0	140	6	2	2	49	32	34	7	0	0
Explosives	852	843	731	54	14	38	0	5	1	832	6	3	1	95	270	66	8	1	2
Fireworks	419	415	375	5	5	18	2	8	2	404	7	3	0	10	94	5	0	0	0
Matches	83	81	51	15	2	11	0	2	0	75	3	2	0	10	21	14	4	0	0
Other types of match, firework, or explosive																			
Unknown types of match, firework, or explosive	11	11	7	1	0	2	0	0	1	11	0	0	0	1	3	0	1	0	0
Category total: Miscellaneous foods	1524	1501	1249	94	31	99	2	22	4	1462	22	10	3	165	420	119	20	1	2
Foods																			
Capsicum peppers	2418	2343	525	253	389	899	42	215	20	1778	157	46	355	216	52	996	99	0	0
Food additives	455	396	130	36	49	127	1	44	9	292	18	3	80	58	59	46	17	0	0
Food products	8293	7604	3735	565	355	2165	39	618	127	6207	209	183	972	552	913	646	164	8	0
Monosodium glutamate (MSG)	1	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	1	0	0
Other adverse reactions to food	1353	1279	226	91	100	616	6	220	20	570	20	62	617	229	51	224	126	7	0
Category total: Mushrooms	12,520	11,623	4616	945	893	3808	88	1097	176	8848	404	294	2024	1056	1075	1912	407	15	0
Miscellaneous mushrooms																			
Group 1 mushrooms:	72	61	16	1	6	34	0	4	0	36	17	1	7	45	11	10	5	12	1
cyclopeptides																			
Group 1A mushrooms:	8	7	1	1	0	5	0	0	0	4	0	0	1	5	3	2	0	0	0
orellanine																			
Group 2 mushrooms: muscimol (ibotenic acid)	45	37	4	6	0	25	0	2	0	14	14	1	5	29	8	8	13	2	0
Group 3 mushrooms: monomethylhydrazine (MMH)	39	33	0	5	0	24	0	4	0	19	1	0	12	14	13	8	6	0	0
Group 4 mushrooms: muscarine and histamine	29	26	1	2	0	22	0	1	0	15	4	0	7	16	2	12	5	0	0
Group 5 mushrooms: opine	6	4	2	0	0	2	0	0	0	4	0	0	0	0	2	0	0	0	0
Group 6 mushrooms: hallucinogenics (psilocybin and psilocin)	503	338	18	3	111	183	1	10	12	37	291	4	5	252	21	64	155	3	1
Group 7 mushrooms: gastro-intestinal irritants	241	223	56	23	4	130	0	7	3	157	38	1	27	113	34	102	31	0	0
Mushrooms: miscellaneous, non-toxic	117	93	32	5	4	45	1	6	0	61	6	0	26	24	27	25	3	0	0
Mushrooms: other potentially toxic	130	108	33	13	9	47	0	4	2	75	11	0	22	34	24	28	6	6	0
Mushrooms: unknown	5231	5049	3226	464	258	960	13	92	36	4286	552	4	183	1643	2070	681	254	16	0
Category total: Other/unknown nondrug substances	6421	5979	3389	523	392	1477	15	130	53	4708	934	11	295	2175	2215	940	478	39	2
(continued)																			

(continued)



Table 22(A). Demographic profile of SINGLE SUBSTANCE Nonpharmaceuticals exposure cases by generic category – Continued

	No. of Case Mentions	No. of Single Exposures	Age					Reason			Outcome								
			<=5	6-12	13-19	>=20	Unknown Child	Unknown Adult	Unknown Age	Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
Miscellaneous other/unknown non-drug substances	25,055	22,934	10,982	2060	936	6713	152	1710	381	20,647	747	668	655	3417	4641	4006	537	25	3
Other non-drug substances	4705	4416	1136	260	227	2065	15	600	113	2888	148	815	198	1483	437	641	253	44	3
Unknown substances unlikely to be drug products																			
Category total:	29,760	27,350	12,118	2320	1163	8778	167	2310	494	23,535	895	1483	853	4900	5078	4647	790	69	6
Paints and stripping agents																			
Miscellaneous paints and stripping agents	468	430	192	22	9	167	1	36	3	413	4	4	9	90	63	71	19	0	0
Other types of paint, varnish, or lacquer	5129	4822	3185	219	120	1011	11	253	23	4673	83	12	39	535	704	403	72	3	0
Unknown types of paint, varnish, or lacquer	1013	923	253	64	38	429	23	107	9	872	6	26	17	152	124	204	41	1	0
Varnishes and lacquers																			
Paints	13	11	2	1	2	5	0	1	0	10	0	1	0	5	1	2	0	0	0
Anti-algae paints	34	32	2	0	2	18	0	10	0	29	0	0	3	8	5	4	2	0	0
Anti-corrosion paints	2045	1907	569	181	126	810	5	192	24	1732	108	11	52	394	257	421	89	8	0
Oil-base paints	2679	2604	1987	94	59	367	10	79	8	2549	22	5	23	200	387	168	19	0	0
Water base paints (acrylic, latex, etc.)																			
Wood stains	679	639	258	20	21	259	3	71	7	606	11	1	21	77	121	115	17	1	0
Stripping agents																			
Methylene chloride stripping agents	347	330	43	8	23	220	2	34	0	310	15	0	3	140	19	114	48	5	0
Other types of stripping agent	505	458	105	9	13	278	1	42	10	442	9	0	5	177	46	128	72	4	0
Unknown types of stripping agent	89	82	5	1	5	55	0	13	3	78	2	0	2	37	8	31	6	0	0
Category total:	13,001	12,238	6601	619	418	3619	56	838	87	11,714	260	60	174	1815	1735	1661	385	22	0
Pesticides																			
Fumigants																			
Aluminum phosphide	106	98	2	1	2	74	3	14	2	80	2	11	4	56	34	22	18	0	1
Methyl bromide	37	28	1	0	0	24	0	2	1	24	0	2	1	10	6	5	5	0	0
Other fumigants	35	32	3	2	2	22	0	2	0	32	0	0	0	8	6	6	4	0	0
Sulfuryl fluoride	318	266	36	25	12	169	5	19	5	242	7	6	10	41	38	43	5	0	0
Unknown fumigants	97	85	10	8	6	50	0	10	1	77	6	1	1	26	6	18	8	0	1
Fungicides (non-medical)																			
Carbamate fungicides	79	54	17	0	2	31	0	3	1	52	1	1	0	17	11	14	3	0	0
Copper compound fungicides	90	86	9	1	1	55	0	17	3	82	1	0	3	14	13	19	4	0	0
Other types of non-medical fungicide	537	427	106	14	7	238	3	50	9	392	15	7	10	90	94	89	14	1	0
Other/unknown type of non-medical fungicide	1	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Phthalimide fungicide																			
Phthalimide fungicides	34	22	11	1	0	8	0	2	0	20	0	1	1	2	3	4	0	0	0
Unknown types of non-medical fungicide	35	27	5	3	0	19	0	0	0	24	0	0	3	9	6	6	1	0	0
Wood preservatives																			
Herbicides (including algaecides, defoliants, desiccants, plant growth regulators)	138	133	18	9	2	82	1	14	7	129	1	0	3	31	9	28	8	0	0
Carbamate herbicides (excluding metam sodium)																			
Chlorophenoxy herbicides	15	13	4	1	0	6	0	2	0	12	0	1	0	2	3	1	1	0	0
Diquat	1717	1518	360	61	39	865	8	163	22	1445	18	11	33	261	343	288	48	2	0
Glyphosate	447	401	97	13	9	236	1	40	5	382	8	2	8	59	118	74	11	2	0
Other types of herbicide	3181	2894	660	125	80	1656	3	346	24	2722	59	39	69	513	625	665	68	3	3
Paraquat	1323	1080	230	48	32	650	4	104	12	1034	16	2	25	231	208	250	33	3	2
Paraquat and diquat combinations	100	73	4	1	4	56	0	7	1	62	6	3	0	46	6	16	12	1	1
Triazine herbicides	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Unknown types of herbicide	164	135	24	8	3	84	0	13	3	132	0	0	3	27	23	40	5	0	0
Urea herbicides	451	380	88	39	10	203	2	35	3	359	3	8	6	98	63	79	13	3	1
Insecticides (including insect growth regulators, molluscicides, nematocides)	41	33	10	4	1	14	0	3	1	31	1	0	1	8	7	5	0	0	0
Carbamate insecticides alone																			
Carbamate insecticides in combination with other insecticides	1356	1262	416	48	38	604	4	137	15	1150	57	26	21	279	272	184	50	2	1
Chlorinated hydrocarbon insecticides alone	152	142	22	8	5	86	0	20	1	125	7	5	5	28	19	31	2	1	1
	170	154	56	11	2	68	3	13	1	135	9	4	4	34	28	24	2	2	0

(continued)

(continued)

Table 22(A). Demographic profile of SINGLE SUBSTANCE Nonpharmaceuticals exposure cases by generic category – Continued

	No. of Case Mentions	No. of Single Exposures	Age							Reason					Outcome				
			Age							Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
			<=5	6-12	13-19	>=20	Unknown Child	Unknown Adult	Unknown Age										
Chlorinated hydrocarbon insecticides in combination with other insecticides	203	195	47	13	11	104	0	17	3	181	8	2	4	43	27	46	9	0	0
Insect growth regulators	206	128	57	8	9	46	0	6	2	123	2	1	1	14	20	11	1	0	0
Metalddehyde	26	25	8	1	1	15	0	0	0	23	2	0	0	7	6	5	0	0	0
Nicotine (excluding tobacco products)	28	24	12	1	3	7	0	1	0	23	0	0	1	7	5	7	0	0	0
Organophosphate insecticides alone	2201	1994	582	91	61	1026	4	204	26	1807	103	23	47	560	470	389	113	17	1
Organophosphate insecticides in combination with carbamate insecticides	57	47	15	2	6	21	0	3	0	46	0	1	0	14	10	9	2	0	0
Organophosphate insecticides in combination with non-carbamate insecticides	527	490	94	17	48	272	0	48	11	466	14	1	9	100	49	129	32	2	0
Other types of insecticide	9214	8583	4283	368	181	2993	13	631	114	8198	113	60	192	845	1638	911	118	3	0
Piperonyl butoxide & pyrethrins (without carbamate or O.P.)	1	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Pyrethrins	6079	5743	1790	413	236	2480	15	558	251	5267	175	39	247	1124	860	1474	265	4	0
Pyrethroids	22,796	21,470	5262	989	832	11,842	53	2170	322	19,602	754	236	816	3752	3111	5594	823	34	2
Rotenone	42	40	8	3	1	25	0	3	0	38	2	0	0	5	10	5	2	0	0
Unknown types of insecticide	4923	4431	1026	210	161	2313	42	577	102	3889	145	168	168	1210	501	907	223	7	2
Veterinary insecticide/pesticide product (for pets-flea collars, etc.)	1	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Miscellaneous pesticides	53	20	7	0	0	12	0	1	0	18	0	1	1	5	4	2	0	0	0
Arsenic pesticides	7256	7164	6294	151	49	526	19	102	23	7065	56	26	9	549	1491	201	21	0	0
Borates and/or boric acid pesticides (excluding other uses)	4	4	0	0	0	4	0	0	0	4	0	0	0	2	0	0	0	0	0
Metam sodium	4	4	0	0	0	4	0	0	0	4	0	0	0	2	0	0	0	0	0
Repellents	423	410	104	54	14	194	3	38	3	381	8	10	11	59	60	99	9	0	0
Animal repellents	3990	3904	2028	521	192	939	11	187	26	3558	84	53	195	375	548	1098	73	2	0
Insect repellents with DEET	1470	1420	1017	89	33	238	5	31	7	1359	17	8	34	83	226	225	14	0	0
Insect repellents without DEET	1265	1250	816	69	21	240	13	75	16	1205	37	2	6	239	453	99	17	3	0
Naphthalene moth repellants (excluding deodorizing products)	2	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Other types of moth repellent	120	120	73	2	0	37	0	7	1	114	4	2	0	20	35	10	1	0	0
Paradichlorobenzene moth repellants (excluding deodorizing products)	181	174	94	8	3	55	0	11	3	154	4	6	9	28	22	26	8	1	0
Unknown types of insect repellent	2008	1964	1047	92	38	538	16	209	24	1845	75	14	22	326	453	187	29	1	0
Unknown types of moth repellent																			
Rodenticides	2	2	0	0	1	1	0	0	0	1	1	0	0	1	0	1	0	0	0
ANTU (1-naphthalenylthiourea)	1150	1087	816	31	6	171	6	41	16	1013	45	18	6	480	462	28	7	2	0
Bromethalin rodenticides	7	7	5	0	0	2	0	0	0	6	0	0	1	5	2	0	0	0	0
Cholecalciferol rodenticides	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Cyanide rodenticides	5662	5453	4463	118	61	627	16	132	36	5198	164	53	14	1471	1456	101	13	5	0
Long-acting anticoagulant rodenticides	511	492	325	33	3	103	1	24	3	470	18	2	1	96	101	33	13	1	0
Other types of rodenticide	2	2	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
PNU (n-3-pyridylmethyl-n-1-p-nitrophenyl urea)	44	41	1	2	0	27	0	9	2	18	9	11	0	20	11	6	2	0	1
Strychnine rodenticides	1576	1330	861	37	17	306	12	66	31	1133	109	59	13	500	334	54	15	0	0
Unknown types of rodenticide	150	146	107	1	3	31	0	4	0	134	11	1	0	47	47	5	1	0	0
Warfarin type anticoagulant rodenticides	76	64	23	2	0	35	1	2	1	54	5	2	2	28	23	12	2	0	0
Zinc phosphide rodenticides	82,882	77,573	33,458	3758	2249	30,533	262	6173	1140	72,144	2182	929	2020	13,905	14,376	13,585	2128	102	17
Category total:																			
Photographic products																			
Miscellaneous photographic products	87	72	20	1	15	30	0	6	0	69	0	0	3	16	15	11	5	0	0
Developers, fixing baths, stop baths	184	167	114	6	11	24	1	11	0	157	4	1	4	11	28	13	1	0	0
Other types of photographic product	4	4	4	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0
Photographic coating fluids	5	4	2	0	0	2	0	0	0	4	0	0	0	0	0	0	0	0	0
Unknown types of photographic product																			

(continued)





Table 22(A). Demographic profile of SINGLE SUBSTANCE Nonpharmaceuticals exposure cases by generic category – Continued

	No. of Case Mentions	No. of Single Exposures	Age					Reason				Outcome									
			<=5	6-12	13-19	>=20	Unknown	Child	Adult	Unknown	Age	Unit	Int	Other	Adv Rtn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
Category total:	280	247	140	7	26	56	1	17	0	234	4	1	7	27	43	24	6	0	0		
Plants																					
Miscellaneous plants																					
Plants: amygdalin and/or cyanogenic glycosides	4153	4062	2107	496	156	1046	10	219	28	3677	185	33	156	277	849	165	21	0	0		
Plants: anticholinergics	549	509	294	32	26	128	1	23	5	402	78	5	14	132	125	47	49	3	0		
Plants: cardiac glycosides (excluding drugs)	1566	1529	855	187	50	361	1	67	8	1392	113	0	20	241	383	104	34	5	4		
Plants: colchicine	21	21	15	3	0	3	0	0	0	21	0	0	0	2	8	1	0	0	0		
Plants: depressants	181	137	80	16	1	33	1	6	0	111	18	1	7	17	24	7	6	0	0		
Plants: gastrointestinal irritants (excluding oxalate containing plants)	7012	6720	4688	661	163	981	9	196	22	6218	276	14	197	505	1271	615	80	1	1		
Plants: hallucinogenics (code as street drug unless plant part involved)	832	631	78	13	106	391	1	33	9	184	361	24	53	407	64	121	180	25	1		
Plants: nicotine (excluding tobacco products)	163	154	70	24	8	45	0	7	0	127	23	0	3	37	38	40	9	0	0		
Plants: non-toxic	4937	4517	2938	641	126	604	16	177	15	4031	192	23	260	296	569	394	52	1	0		
Plants: other toxic types	4879	4607	3156	505	124	653	26	125	18	4182	242	9	155	517	1046	355	92	12	0		
Plants: oxalates	5033	4965	3567	616	156	497	20	96	13	4573	312	11	63	376	952	995	61	0	0		
Plants: skin irritants (excluding oxalate containing plants)	6009	5620	2051	533	340	2119	21	508	48	5054	187	25	332	944	500	947	313	4	1		
Plants: solanine	1585	1553	982	115	36	325	4	82	9	1425	44	1	82	105	402	98	15	1	0		
Plants: stimulants	350	327	75	34	15	167	0	34	2	272	36	1	17	52	79	26	12	2	0		
Plants: totalbumins	230	215	85	16	17	73	0	23	1	168	34	6	5	81	34	57	23	1	1		
Plants: unknown toxic types or unknown if toxic	10,116	9583	6524	1238	229	1222	58	269	43	8934	381	30	214	775	1756	790	116	8	3		
Category total:	47,616	45,150	27,565	5130	1553	8648	168	1865	221	40,771	2482	183	1578	4764	8123	4728	1051	63	11		
Polishes and waxes																					
Miscellaneous polishes and waxes	368	341	174	6	13	120	3	24	1	327	6	2	6	74	58	74	6	0	0		
Floor waxes, polishes, or sealers	1501	1450	1206	37	21	151	2	31	2	1404	30	15	1	133	416	180	11	1	0		
Furniture polishes	2062	1987	1457	70	41	344	6	60	9	1921	27	15	24	219	418	208	34	3	0		
Miscellaneous polishes and waxes (excluding mineral seal oils)																					
Category total:	3931	3778	2837	113	75	615	11	115	12	3652	63	32	31	426	892	462	51	4	0		
Radiation																					
Ionizing radiation																					
Gamma radiation	9	8	0	0	0	6	0	1	1	6	0	1	1	7	6	0	0	0	0		
Ionizing radiation: type unknown	43	43	1	1	2	25	1	12	1	31	0	3	9	18	3	2	1	0	0		
Radon	104	86	19	10	4	35	0	18	0	83	0	1	1	28	20	2	0	0	0		
Specific nonpharmaceutical radionuclides	64	56	7	3	2	28	0	10	6	46	3	4	2	27	14	2	2	1	0		
X-ray radiation	11	11	0	0	1	5	0	5	0	3	2	0	4	6	1	2	1	0	0		
Miscellaneous radiation																					
Nonpharmaceutical radiation: type unknown	2	2	0	0	0	1	0	1	0	1	0	0	0	1	0	0	0	0	0		
Non-ionizing radiation																					
Extremely low-frequency radiation	6	6	0	0	0	6	0	0	0	6	0	0	0	6	2	2	1	0	0		
Infrared radiation	4	4	2	0	0	2	0	0	0	4	0	0	0	1	1	0	0	0	0		
Microwave radiation	29	28	1	0	3	12	0	10	2	26	0	2	0	2	3	4	0	0	0		
Non-ionizing radiation: type unknown	8	6	0	0	0	5	0	1	0	5	0	0	0	2	1	0	0	0	0		
Radio frequency radiation	8	8	0	0	0	8	0	0	0	6	0	0	1	6	1	0	0	0	0		
Ultraviolet radiation	11	10	0	0	3	6	0	1	0	8	0	0	2	3	1	2	2	0	0		
Visible light radiation (lasers)	7	7	2	1	0	1	0	3	0	6	0	1	0	0	0	0	1	0	0		
Category total:	306	275	32	15	15	140	1	62	10	231	5	12	20	107	53	17	7	1	0		
Sporting equipment																					
Miscellaneous sporting equipment																					
Fishing baits	38	36	28	4	1	2	0	1	0	35	1	0	0	0	7	1	0	0	0		
Fishing products, miscellaneous	15	15	12	1	0	2	0	0	0	15	0	0	0	1	2	1	0	0	0		
Golf products, miscellaneous	2	2	1	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0		
Gun bluing compounds	33	30	16	0	1	11	0	1	1	30	0	0	0	10	12	9	1	0	0		
Hunting products, miscellaneous	393	378	150	19	128	60	1	18	2	355	11	8	3	76	199	26	6	1	0		
Other types of sporting equipment	12	11	4	1	3	3	0	0	0	10	0	1	0	3	8	0	0	0	0		

(continued)

Table 22(A). Demographic profile of SINGLE SUBSTANCE Nonpharmaceuticals exposure cases by generic category – Continued

	No. of Case Mentions	No. of Single Exposures	Age					Reason			Outcome								
			<=5	6-12	13-19	>=20	Unknown Child	Unknown Adult	Unknown Age	Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
Unknown types of sporting equipment	4	4	1	0	1	1	0	1	2	0	1	1	1	1	1	0	1	0	0
Category total:	497	476	212	25	134	80	1	21	3	449	12	10	4	91	229	37	8	1	0
Swimming pool/aquarium																			
Miscellaneous swimming pool/aquarium																			
Alcicides	1036	996	307	99	54	454	5	71	6	962	20	2	9	210	117	293	95	2	0
Aquarium products, miscellaneous	1082	1030	788	62	27	127	2	23	1	992	17	13	3	90	244	47	8	1	0
Bromine shock treatments	63	60	26	6	4	16	0	6	2	60	0	0	0	10	14	23	0	1	0
Chlorine shock treatments	2784	2679	470	379	184	1355	30	215	46	2563	53	11	50	754	155	1014	283	3	0
Other types of swimming pool or aquarium product	1338	1270	344	186	81	554	8	83	14	1201	26	5	35	250	154	444	84	1	0
Swimming pool and aquarium test kits	103	90	48	13	14	11	0	3	1	86	3	1	0	13	31	9	3	0	0
Category total:	6406	6125	1983	745	364	2517	45	401	70	5864	119	32	97	1327	715	1830	473	8	0
Tobacco/nicotine/ecigarette products																			
Ecigarettes: nicotine containing	276	264	174	3	23	57	1	5	1	239	14	1	10	105	82	54	8	1	0
Ecigarettes: nicotine device flavor unknown	116	115	91	0	5	17	0	2	0	104	5	2	3	41	51	24	5	0	0
Ecigarettes: nicotine device with added flavors	1297	1267	900	31	58	238	0	36	4	1162	53	8	39	490	458	232	47	4	0
Ecigarettes: nicotine device without added flavors	642	623	466	10	26	98	3	17	3	591	21	2	8	238	256	140	15	2	0
Ecigarettes: nicotine liquid flavor unknown	382	377	312	9	7	46	0	2	1	364	10	2	1	132	194	80	11	0	0
Ecigarettes: nicotine liquid with added flavors	188	181	132	0	8	30	0	8	3	172	7	1	1	69	73	34	2	0	0
Ecigarettes: nicotine liquid without added flavors																			
Miscellaneous tobacco products																			
Chewing tobacco	1388	1357	1220	26	31	74	1	4	1	1321	25	4	6	341	419	361	30	0	0
Cigarettes	6871	6699	6331	51	42	222	13	33	7	6563	73	27	31	862	2191	951	55	1	0
Cigars	158	148	114	0	6	23	0	4	1	128	11	1	7	24	32	30	6	0	0
Dissolvable tobacco	8	8	6	0	0	2	0	0	0	2	0	0	0	3	2	3	1	0	0
Filter tips only (i.e. Butts)	50	48	41	1	0	5	0	1	0	47	1	0	0	5	21	10	0	0	0
Other types of tobacco product	144	133	86	3	8	31	0	4	1	109	19	1	3	38	30	31	8	1	0
Snuff	507	493	427	11	8	38	1	8	0	470	14	4	4	105	131	137	22	1	0
Unknown types of tobacco product	1695	1606	1058	66	57	359	3	57	6	1374	129	13	77	517	448	321	65	0	0
Category total:	13,772	13,319	11,358	211	279	1240	22	181	28	12,652	382	66	190	2970	4388	2408	275	10	0
Waterproofers/sealants																			
Miscellaneous waterproofers/sealants																			
Waterproofers/sealants: aerosols	168	165	84	6	10	57	0	8	0	157	3	0	5	41	37	43	10	1	0
Waterproofers/sealants: liquids	82	79	43	4	3	24	0	5	0	76	2	0	1	19	17	15	6	0	0
Waterproofers/sealants: solids	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waterproofers/sealants: unknown form	27	24	9	1	0	11	0	1	2	23	1	0	0	4	4	4	1	0	0
Category total:	278	268	136	11	13	92	0	14	2	256	6	0	6	64	58	62	17	1	0
Weapons of mass destruction																			
Miscellaneous weapons of mass destruction																			
Anthrax	2	2	0	0	0	0	0	2	0	1	0	1	0	1	0	0	0	0	0
Nerve gases	2	2	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0
Other biological weapons	2	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Other chemical weapons	14	13	0	0	0	9	0	3	0	12	0	0	1	10	1	5	1	0	0
Other suspicious powders	192	169	40	4	13	83	3	21	5	120	16	28	2	71	22	36	12	0	0
Other suspicious substances (non-powder)	2089	1937	454	99	109	906	15	308	46	1194	98	366	59	799	218	347	172	40	3
Suspicious powders in envelope or package	54	50	12	0	3	30	0	5	0	28	7	13	0	28	13	11	3	1	0
Category total:	2355	2174	507	103	126	1030	18	339	51	1357	121	409	62	909	255	399	188	41	3
Non-pharmaceuticals total:	1,094,335	980,550	540,777	63,068	42,192	271,650	3249	51,769	7845	909,479	38,600	12,254	15,906	166,600	162,684	164,045	32,519	2249	256



Table 22(B). Demographic profile of SINGLE SUBSTANCE Pharmaceuticals exposure cases by generic category

	No. of Case Mentions	No. of Single Exposures	Age				Reason				Outcome																												
			<=5	6-12	13-19	>=20	Unknown	Child	Adult	Unknown	Age	Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death																		
Analgesics	37,084 21,095 19,426 9956	24,005 19,426 5986	6492	1034	5699	10,025	8	622	125	11,865	11,550	25	298	14,191	6567	3577	2038	513	57																				
			17,787	1338	117	143	22	12	19,134	204	4	57	2614	4160	283	46	6	1																					
			1906	255	1263	2359	7	147	3063	2715	4	86	3566	1596	812	583	161	34																					
			Acetaminophen alone, unknown if adult or pediatric																																				
	6218 36	3537	951	92	1179	1233	0	71	11	1389	2016	10	84	2342	932	926	454	42	1																				
																						Acetaminophen in combination with other drugs, adult formulations																	
																						Acetaminophen in combination with other drugs, pediatric formulations																	
																						Acetaminophen with codeine diphenhydramine																	
	17,801 476	7780 226	1271	223	842	5059	5	324	56	3601	3588	20	419	4325	1905	1600	759	167	22																				
																						Acetaminophen with other narcotics or narcotic analogs																	
Acetaminophen with oxycodone																																							
Acetaminophen with propoxyphene																																							
5288 549	2990	1305	162	532	938	0	44	9	1709	1201	1	56	1568	772	401	445	26	5																					
																					Acetylsalicylic acid alone, adult formulations																		
																					Acetylsalicylic acid alone, pediatric formulations																		
																					Acetylsalicylic acid alone, unknown if adult or pediatric formulations																		
12,045	5925	1928	257	1191	2402	4	111	32	2774	2851	7	116	3691	1310	978	1182	128	17																					
																					Acetylsalicylic acid combinations																		
																					Acetylsalicylic acid in combination with other drugs, adult formulations																		
																					Acetylsalicylic acid with carisoprodol																		
12 43 9	9 24 5	2 3 0	0 0 0	1 2 1	5 19 4	0 0 0	1 0 0	0 0 0	3 6 0	15 5 0	0 0 0	1 1 0	20 5 5	1 2 1	9 6 1	3 0 0	1 0 0	0 0 0																					
																					Acetylsalicylic acid with other narcotics or narcotic analogs																		
																					Acetylsalicylic acid with oxycodone																		
																					Miscellaneous analgesics																		
211	163	104	8	11	36	0	4	0	136	18	0	8	43	48	18	5	0	0																					
																					Non-aspirin salicylates (excluding topicals and/or gastrointestinal drugs)																		
																					Other analgesics																		
																					Phenacetin																		
896 3 1003	626 3 806	251 2 528	20 0 26	70 0 38	264 1 192	0 0 1	19 0 18	2 0 3	397 3 701	200 0 57	0 0 0	28 0 47	249 0 177	124 0 239	120 0 72	83 0 30	5 0 4	0 0 0																					
																					Phenazopyridine																		
																					Salicylamide																		
																					Unknown analgesics																		
202	84	22	3	22	32	0	3	2	31	50	0	2	57	18	15	10	3																						
																				Nonsteroidal antiinflammatory drugs																			
																				Colchicine																			
																				Cyclooxygenase-2 inhibitors																			
386 740 81,179	253 397 62,284	46 139 42,208	5 13 3452	3 14 7640	185 202 8022	0 0 62	13 28 732	1 1 168	191 344 50,393	30 29 11,109	0 1 18	28 21 595	140 56 13,599	57 87 14,137	61 17 3914	24 5 952	7 0 58	5 0 3																					
																					Ibuprofen																		
																					Ibuprofen with diphenhydramine																		
																					Ibuprofen with hydrocodone																		
125 483	65 266	15 72	1 9	40 23	141	0	5 19	0	35 175	25 61	0	4 26	34 86	18 64	17 41	9 11	0 0	0 0																					
																					Indomethacin																		
																					Ketoprofen																		
																					Naproxen																		
13,702 7526	8006 4106	2584 1462	281 209	1882 237	2911 1903	8 6	274 262	66 27	4691 3350	2992 555	7 10	279 176	3182 925	2086 982	1072 349	240 67	11 5	1 0	0																				
																					Other types of nonsteroidal antiinflammatory drug																		
																					Unknown types of nonsteroidal antiinflammatory drug																		
																					Opioids																		
1 3732 56 1753	1 2160 31 1236	0 1004 5 448	0 30 1 162	0 68 0 120	0 891 21 450	0 4 2 3	0 119 2 46	0 44 7	0 1292 983	0 612 201	1 56 0	0 160 1	0 1622 332	0 335 329	0 654 168	0 431 38	1 35 4	5 0																					
																					Alfentanil																		
																					Buprenorphine																		
																					Butorphanol																		
Codeine																																							

(continued)

(continued)

Table 22(B). Demographic profile of SINGLE SUBSTANCE Pharmaceuticals exposure cases by generic category – Continued

	No. of Case Mentions	No. of Single Exposures	Age							Reason				Outcome								
			<=5	6-12	13-19	>=20	Unknown Child	Unknown Adult	Unknown Age	Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death			
Dihydrocodeine	3	1																				
Fentanyl	1409	681	46	3	21	560	1	0	164	408	20	61	0	0	0	0	0	91	119	171	86	0
Hydrocodone alone or in combination (excluding combination products with acetaminophen, acetylsalicylic acid, or ibuprofen)	1826	832	179	38	54	470	0	0	510	229	7	57	0	0	0	0	0	173	162	53	9	2
Hydromorphone	1389	601	56	14	26	459	1	0	289	245	7	41	0	0	0	0	0	100	133	79	25	0
Levorphanol	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Meperidine	106	43	4	2	1	32	4	3	17	12	0	11	0	0	0	0	0	4	12	4	0	0
Methadone	2906	1217	196	19	46	871	0	74	469	582	40	68	0	0	0	0	0	154	233	329	150	8
Morphine	3222	1507	204	12	63	1115	1	86	814	562	11	88	0	0	0	0	0	322	287	227	68	6
Naluphine	11	5	0	0	0	4	0	0	0	0	1	4	0	0	0	0	0	0	1	3	0	0
Other or unknown narcotics	2212	846	73	9	49	666	0	36	134	535	72	43	0	0	0	0	0	42	131	268	197	9
Oxycodone alone or in combination (excluding combination products with acetaminophen or acetylsalicylic acid)	8100	3640	658	144	262	2317	4	213	1932	1426	44	160	0	0	0	0	0	763	828	469	126	8
Oxymorphone	508	220	19	3	9	180	1	7	93	116	3	3	0	0	0	0	0	44	41	53	12	2
Pentazocine	32	17	3	0	1	12	0	0	7	5	0	5	0	0	0	0	0	4	5	1	0	0
Propoxyphene	20	5	1	0	0	3	0	1	3	0	0	1	0	0	0	0	0	1	0	2	0	0
Sufentanil	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tapentadol	334	191	23	1	9	144	0	13	114	56	2	13	0	0	0	0	0	40	48	21	6	0
Tramadol	12,108	5712	1091	152	593	3627	2	214	2526	2793	30	290	0	0	0	0	0	1431	1352	891	134	3
Other acetaminophen and acetylsalicylic acid combinations																						
Acetaminophen and acetylsalicylic acid with other ingredients	7030	4617	1789	139	1160	1422	4	79	2463	1989	3	129	0	0	0	0	0	1133	911	461	13	0
Acetaminophen and acetylsalicylic acid without other ingredients	202	118	33	4	11	66	0	4	55	55	0	6	0	0	0	0	0	21	19	31	1	0
Serotonin 5-HT 1B,1D receptor agonists																						
Serotonin 5-HT 1B,1D receptor agonists: other or unknown	228	125	54	7	15	46	0	2	94	17	1	12	0	0	0	0	0	42	15	8	0	0
Serotonin 5-HT 1B,1D receptor agonists: sumatriptan	730	400	112	29	62	181	0	13	248	86	1	63	0	0	0	0	0	108	67	30	3	0
Category total:	289,444	184,255	87,710	8516	25,334	57,413	149	4228	121,807	56,132	435	4148	0	0	0	0	0	43,214	22,342	12,429	2283	217
Anesthetics																						
Inhalation anesthetics																						
Nitrous oxide	204	142	13	21	8	91	1	6	47	68	3	21	0	0	0	0	0	14	30	35	6	0
Other types of inhalation anesthetic	73	56	0	2	2	44	0	6	41	7	4	3	0	0	0	0	0	5	23	4	1	0
Unknown types of inhalation anesthetic	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Local and/or topical anesthetics																						
Dibucaine	15	15	12	0	0	3	0	0	14	0	1	0	0	0	0	0	0	4	1	0	0	0
Lidocaine	1585	1370	553	79	73	570	2	87	1125	82	2	149	0	0	0	0	0	304	167	71	13	4
Other or unknown local and/or topical anesthetic	3539	3305	2104	129	125	796	4	137	2944	113	13	226	0	0	0	0	0	931	323	72	19	1
Miscellaneous anesthetics																						
Ketamine and analogs	260	140	15	7	14	94	0	6	37	75	6	17	0	0	0	0	0	8	44	42	12	0
Other types of anesthetic	33	26	12	1	3	10	0	0	22	2	0	2	0	0	0	0	0	3	7	0	1	0
Unknown types of anesthetic	7	4	2	1	0	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0
Category total:	5717	5058	2711	240	225	1608	7	243	4231	347	29	421	0	0	0	0	0	1269	595	224	52	5
Anticholinergic drugs																						
Miscellaneous anticholinergic drugs																						
Anticholinergic drugs (excluding cough and cold preparations, and plants)	8595	6231	248	69	97	5056	5	720	5731	311	12	147	0	0	0	0	0	853	239	173	20	1
Category total:	8595	6231	248	69	97	5056	5	720	5731	311	12	147	0	0	0	0	0	853	239	173	20	1
Anticoagulants																						
Miscellaneous anticoagulants																						
Glycoprotein IIa/IIb inhibitors	5	5	0	0	0	4	0	1	4	0	0	1	0	0	0	0	0	1	2	0	1	0
Heparins	285	231	21	5	3	163	0	32	175	30	0	25	0	0	0	0	0	42	24	22	2	1
Other antiplatelets	2857	1058	224	16	6	733	0	77	1002	30	0	25	0	0	0	0	0	239	25	9	1	0
Other types of anticoagulant	3480	2057	315	16	14	1532	3	166	1833	112	0	105	0	0	0	0	0	459	59	64	18	2
Unknown types of anticoagulant	11	8	2	1	1	2	1	1	5	2	0	1	0	0	0	0	0	1	0	0	0	0
Warfarin (excluding rodenticides)	3025	1532	284	18	22	1116	2	84	1326	150	0	46	0	0	0	0	0	260	53	102	11	0

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Table 22(B). Demographic profile of SINGLE SUBSTANCE Pharmaceuticals exposure cases by generic category – Continued

	No. of Case Mentions	No. of Single Exposures	Age					Reason				Outcome								
			<=5	6-12	13-19	>=20	Unknown	Child	Adult	Unknown	Age	Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major
Category total: Anticonvulsants	9663	4891	846	56	46	3550	6	361	26	4345	324	0	203	1167	1002	163	197	33	3	3
Anticonvulsants: carbamazepine and analogs																				
Carbamazepine	3631	1811	213	57	132	1344	1	51	13	688	824	0	218	1337	304	513	448	54	0	0
Oxcarbazepine	3983	1760	391	225	437	678	1	21	7	972	725	0	49	979	369	485	209	17	0	0
Anticonvulsants: gamma aminobuty-ric acid and analogs																				
Gabapentin	20,064	7024	1149	122	491	4895	0	312	55	3199	3443	30	250	4061	1819	1605	660	80	5	5
Other types of gamma aminobuty-ric acid anticonvulsant	3326	1276	269	25	70	831	1	68	12	608	560	5	73	725	317	289	173	23	1	1
Anticonvulsants: hydantoins																				
Fosphenytoin	10	8	0	0	1	6	0	1	0	2	1	0	5	7	0	1	3	0	0	0
Phenytoin	2461	1584	92	13	33	1397	0	40	9	540	369	0	562	1299	201	471	467	45	5	5
Miscellaneous anticonvulsants																				
Felbamate	61	27	13	3	1	10	0	0	0	27	0	0	0	9	6	3	1	0	0	0
Lamotrigine	10,197	4082	584	204	765	2307	1	206	15	2420	1456	2	164	2071	712	932	573	60	1	0
Levetiracetam	4821	2508	919	310	237	971	3	66	2	2029	415	0	53	737	693	329	83	737	8	0
Other types of anticonvulsant (excluding barbiturates)	970	383	74	35	30	233	0	10	1	294	73	0	13	174	82	75	41	6	0	0
Primidone	361	147	20	6	2	113	0	6	0	107	27	0	10	65	34	37	12	2	0	0
Succinimides	179	131	73	39	8	10	0	1	0	120	7	2	2	28	39	14	3	0	0	0
Topiramate	4749	1720	459	154	363	686	2	46	10	1015	623	3	58	945	526	366	163	8	0	0
Unknown types of anticonvulsant (excluding barbiturates)	6	4	0	0	1	2	0	1	0	0	4	0	0	4	1	0	0	0	0	0
Valproic acid	7763	3060	316	176	381	2083	1	85	18	1270	1215	7	435	2059	655	673	557	71	2	2
Zonisamide	660	319	89	29	38	141	0	19	3	258	44	0	15	93	93	40	9	3	0	0
Category total: Antidepressants	63,242	25,844	4661	1398	2990	15,707	10	933	145	13,549	9786	49	1907	14,593	5851	5833	3402	377	14	14
Antidepressants																				
Lithium salts																				
Lithium	6901	3715	132	63	431	2962	1	107	19	865	1281	11	1334	3163	522	873	1341	157	2	2
Miscellaneous antidepressants																				
Antidepressants: type unknown to consumer	76	22	3	2	4	9	0	3	1	4	14	0	2	16	3	4	3	0	0	0
Bupropion	13,439	6303	748	167	1153	3926	3	265	41	3369	2704	4	139	4096	1286	991	1429	381	9	9
Other types of antidepressant	409	162	13	4	29	107	2	5	2	33	110	5	10	135	33	42	35	5	1	1
Trazodone	20,191	7411	563	207	1610	4766	1	207	57	1800	5417	4	117	5828	1559	2498	1385	76	0	0
Monoamine oxidase inhibitors (MAOI)																				
Isocarboxazid	4	1	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0
Other types of monoamine oxidase inhibitor (MAOI)	85	36	4	0	0	28	0	3	1	28	3	0	5	12	7	4	1	1	0	0
Phenelzine	33	13	0	0	0	13	0	0	0	5	5	0	3	7	1	2	4	0	0	0
Selegiline	45	19	5	0	0	12	0	2	0	16	1	0	2	6	2	2	3	0	0	0
Tranylcypromine	39	19	1	0	0	16	0	2	0	6	7	0	6	15	3	0	9	2	0	0
Selective serotonin reuptake inhibitors (SSRI)																				
Citalopram	8922	3530	868	211	876	1455	0	104	16	1802	1596	9	95	1892	1043	641	408	45	1	1
Escitalopram	8186	3574	637	252	1277	1299	2	88	19	1585	1856	4	110	2089	1038	699	458	12	0	0
Fluoxetine	12,207	4973	841	355	2092	1536	3	103	43	1967	2867	6	97	3126	1702	996	406	25	1	1
Fluvoxamine	468	181	24	14	36	97	1	9	0	101	63	1	15	83	28	34	23	1	0	0
Other types of selective serotonin reuptake inhibitor (SSRI)	4037	1691	388	72	484	699	1	35	12	771	834	5	65	1087	500	393	172	12	0	0
Paroxetine	3738	1474	315	55	269	778	0	50	7	746	649	11	59	780	391	275	145	6	0	0
Sertraline	16,852	8006	1880	493	2783	2631	7	182	30	3657	4037	11	262	4683	2185	1810	962	42	0	0
Serotonin norepinephrine reuptake inhibitors (SNRI)																				
Duloxetine	4951	1714	491	46	201	888	0	80	8	1053	521	15	112	808	475	319	193	6	1	1
Nefazodone	38	20	3	1	0	16	0	0	0	16	2	0	2	4	3	3	0	0	0	0
Other types of serotonin norepinephrine reuptake inhibitor (SNRI)	698	271	79	9	43	126	0	11	3	180	68	3	19	121	76	40	26	2	0	0
Venlafaxine	6487	2532	522	88	369	1444	1	91	17	1376	979	22	131	1492	683	480	384	59	3	3
Tetracyclic antidepressants																				
Maprotiline	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mirtazapine	4621	1472	230	60	213	929	1	34	5	563	836	2	58	983	338	451	173	14	0	0
Tricyclic antidepressants (TCA)																				
Amitriptyline	6019	2704	308	93	475	1746	0	67	15	862	1699	8	73	2089	377	670	765	268	13	13
Anoxapine	13	5	1	0	1	3	0	0	0	2	3	0	0	4	1	1	2	0	0	0
Clomipramine	255	130	18	2	11	91	0	8	0	88	27	0	14	55	33	30	15	3	0	0
Desipramine	59	26	7	0	3	16	0	0	0	13	9	1	2	17	4	4	5	2	1	1
Doxepin	1531	570	43	19	60	426	0	16	6	156	392	0	14	457	73	146	163	44	3	3

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(continued)

Table 22(B). Demographic profile of SINGLE SUBSTANCE Pharmaceuticals exposure cases by generic category – Continued

	No. of Case Mentions	No. of Single Exposures	Age						Reason			Outcome							
			<=5	6-12	13-19	>=20	Unknown Child	Unknown Adult	Unknown Age	Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
Other types of tricyclic antidepressant (TCA)	297	135	35	15	15	67	0	1	2	78	49	0	6	76	32	20	27	4	0
	114	33	5	1	1	23	0	3	0	13	15	0	4	21	9	4	9	2	0
	1252	517	61	18	72	350	0	14	2	231	237	3	34	316	91	96	111	22	3
	505	220	14	7	23	169	0	6	1	43	130	11	18	186	14	40	88	32	1
	9	5	2	0	0	2	0	1	0	3	1	0	0	4	2	0	0	0	1
Tricyclic antidepressants (TCA) formulated with a benzodiazepine	9	7	2	0	1	4	0	0	0	4	3	0	0	5	1	2	1	0	0
	28	15	1	0	4	9	0	1	0	2	11	0	0	12	2	3	5	2	0
	12	3	0	0	0	2	0	0	1	0	2	0	0	3	0	0	0	1	0
	122,532	51,509	8244	2254	12,536	26,646	23	1498	308	21,438	26,429	136	2808	33,671	12,518	11,573	8751	1226	40
	Category total: Antihistamines																		
Miscellaneous antihistamines	8713	6372	4737	260	213	999	8	138	17	6031	247	5	84	502	1368	206	20	1	0
	27,855	20,319	11,356	1355	2403	4782	16	340	67	14,287	5573	14	312	7801	4476	2990	2362	241	7
	1364	887	374	55	162	282	0	12	2	492	370	0	21	450	162	165	156	16	0
	16,446	11,210	5377	746	1673	3161	8	186	59	6964	3953	13	186	4939	2289	1921	1625	165	9
	53,143	37,045	21,299	4770	3199	6937	27	712	101	31,663	4805	19	449	6890	8555	2638	1043	49	0
Category total: Antimicrobials	107,521	75,833	43,143	7186	7650	16,161	59	1388	246	59,437	14,948	51	1052	20,582	16,850	7920	5206	472	16
Anthelmintics	30	28	13	1	0	12	0	2	0	26	2	0	0	5	13	0	0	0	0
	40	18	3	0	0	15	0	0	0	11	6	0	1	12	5	3	0	0	0
	1875	1770	962	141	37	514	5	97	14	1622	59	5	81	194	425	149	28	3	0
	220	213	160	13	1	37	0	2	0	198	7	6	1	25	48	14	3	0	0
	25	23	15	1	0	7	0	0	0	23	0	0	0	4	8	2	0	0	0
Antibiotics	31,797	25,450	11,763	2408	1572	8322	32	1243	110	21647	1292	13	2435	3204	4045	1820	371	22	3
	5670	5446	3857	223	125	963	15	240	23	5256	44	9	133	160	797	235	22	1	0
	301	202	116	11	12	54	0	8	1	171	17	0	14	27	34	20	1	0	0
Antifungals	1276	1026	498	71	33	368	2	49	5	914	35	1	76	136	191	76	18	2	0
	7240	6925	4699	201	113	1596	9	291	16	6662	64	16	179	484	1046	501	42	1	1
	16	14	5	0	0	6	0	2	1	13	0	0	1	2	1	4	0	0	0
Antiparasitics	828	485	101	24	54	279	1	25	1	395	47	1	36	168	114	52	35	7	0
	1018	640	163	15	50	353	0	53	6	502	50	1	84	103	105	60	11	1	0
	36	31	12	3	1	11	0	4	0	25	2	0	4	9	5	4	1	0	0
Antituberculars	128	94	20	5	21	43	0	4	1	55	22	0	14	67	21	14	18	10	0
	26	10	1	0	1	5	0	3	0	7	2	0	1	4	3	1	0	0	0
	71	42	13	2	5	18	1	2	1	33	8	0	1	17	9	7	2	0	0
Antivirals	282	107	25	9	13	56	0	4	0	79	18	1	9	39	28	14	12	0	1
	790	485	88	10	17	314	1	50	5	367	82	3	29	142	103	51	13	3	0
	485	434	164	95	31	124	1	16	3	384	6	0	39	52	81	10	1	0	0
	1497	1106	330	23	49	595	2	100	7	953	73	1	74	165	215	53	22	2	0
	135	133	60	10	8	46	1	6	2	127	5	0	1	4	20	11	0	0	0
Category total: Antivirals	546	350	122	16	19	178	0	14	1	292	33	1	23	55	67	26	6	3	0

Continued

(continued)



Table 22(B). Demographic profile of SINGLE SUBSTANCE Pharmaceuticals exposure cases by generic category – Continued

	No. of Case Mentions	No. of Single Exposures	Age					Reason			Outcome											
			<=5	6-12	13-19	>=20	Unknown	Child	Unknown	Adult	Unknown	Age	Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
Miscellaneous antimicrobials	151	143	83	2	4	44	0	0	8	1	2	2	133	4	1	5	15	34	22	2	0	0
Other types of antimicrobial	9	4	0	0	1	2	0	0	1	0	0	0	4	0	0	0	2	0	1	0	0	0
Unknown types of antimicrobial																						
Category total:	54,493	45,180	23,274	3284	2167	13,962	70	2224	199	5095	3241	5095	39,900	1878	59	3241	5095	7419	3171	620	56	5
Antineoplastics																						
Miscellaneous antineoplastics																						
Antineoplastic drugs	2290	1759	295	56	69	1189	0	133	17	1585	64	621	1585	64	2	101	621	404	183	69	12	4
Category total:	2290	1759	295	56	69	1189	0	133	17	1585	64	621	1585	64	2	101	621	404	183	69	12	4
Asthma therapies																						
Miscellaneous asthma therapies																						
Albuterol	4606	4121	2472	630	222	671	5	106	15	3512	430	557	3512	430	9	155	557	847	488	232	6	0
Aminophylline or theophylline	156	104	13	0	5	82	0	4	0	60	11	63	60	11	0	29	63	12	20	27	9	1
Leukotriene antagonist or inhibitor	5929	4268	2957	667	154	419	2	65	4	4085	156	389	4085	156	0	22	389	956	64	6	0	0
Non-selective beta agonists	4680	4626	2121	1244	222	907	7	120	5	4500	100	7	4500	100	7	18	342	2067	365	1	0	0
Other asthma therapeutic agents	340	252	78	22	16	116	3	17	3	213	18	1	213	18	1	18	65	62	14	20	2	1
Terbutaline and other beta-2 agonists	1105	934	158	107	27	571	1	66	4	797	82	3	797	82	3	48	136	147	70	74	4	0
Unknown asthma therapeutic agents	5	1	0	1	0	0	0	0	0	1	0	0	1	0	0	0	1	1	0	0	0	0
Category total:	16,821	14,306	7799	2671	646	2766	15	378	31	13,168	797	20	13,168	797	20	290	2534	2367	2723	724	22	2
Cardiovascular drugs																						
Angiotensin converting enzyme inhibitor	9	4	1	0	2	1	0	0	0	2	2	0	2	2	0	0	3	1	1	0	0	0
Angiotensin converting enzyme inhibitor in combination with diuretic																						
Angiotensin converting enzyme inhibitor, alone	16,522	7078	2869	414	249	3304	2	221	19	6180	773	2	6180	773	2	108	2241	2522	280	217	10	0
Angiotensin receptor blocker																						
Angiotensin receptor blocker in combination with diuretic	11	6	1	0	0	5	0	0	0	6	0	0	6	0	0	0	0	3	0	0	0	0
Angiotensin receptor blocker, alone	8644	3994	903	118	123	2640	0	206	4	3697	241	0	3697	241	0	47	809	1253	169	87	5	0
Antihyperlipidemic																						
Antihyperlipidemic combinations (excluding calcium antagonists)	1	1	0	0	1	0	0	0	0	0	1	0	0	1	0	0	1	0	1	0	0	0
Antihyperlipidemic, alone	12,126	4491	1686	148	111	2265	4	256	21	4223	157	2	4223	157	2	104	511	809	88	30	2	0
Antihypertensives																						
Antihypertensive (excluding diuretics), alone	5059	2819	815	1144	434	391	3	27	5	2353	361	11	2353	361	11	75	1464	914	455	441	17	0
Beta blockers																						
Beta blocker in combination with diuretic	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Beta blocker, alone	26,266	11,010	3076	365	467	6633	0	435	34	9040	1667	5	9040	1667	5	230	4579	4038	631	1003	111	13
Calcium antagonist																						
Calcium antagonist in combination with angiotensin receptor blocker	3	2	1	0	0	1	0	0	0	2	0	0	2	0	0	0	2	2	0	0	0	0
Calcium antagonist in combination with other drugs	2	1	0	0	0	1	0	0	0	1	0	0	1	0	0	0	1	1	0	0	0	0
Category total:	13,345	5493	1268	142	168	3660	3	235	17	4704	595	2	4704	595	2	159	2613	2061	361	440	72	26
Miscellaneous cardiovascular drugs																						
Alpha blockers	4768	1526	253	26	147	1016	0	76	8	1032	418	1	1032	418	1	62	593	393	226	161	6	0
Antiarrhythmics	2128	1205	134	14	15	976	0	63	3	1107	43	1	1107	43	1	48	528	433	79	104	19	5
Cardiac glycosides	1905	1252	89	10	6	1124	0	21	2	540	58	1	540	58	1	582	975	163	129	496	95	26
Clonidine	10,497	5351	1760	1315	891	1315	3	61	6	3504	1656	18	3504	1656	18	106	3858	972	1192	1748	139	0
Hydralazine	1228	444	115	10	20	279	0	18	2	357	67	0	357	67	0	18	188	153	62	37	2	0
Long-acting nitrates	839	265	30	1	6	212	0	16	0	232	25	0	232	25	0	8	81	73	32	15	0	0
Nitroglycerin	1116	647	362	22	16	210	1	30	6	544	78	1	544	78	1	20	241	294	42	19	0	0
Nitroprusside	16	12	0	0	0	12	0	0	0	6	0	0	6	0	0	5	10	2	0	3	0	0
Other types of cardiovascular drug	556	228	74	7	4	132	0	10	1	215	10	0	215	10	0	3	60	74	16	13	1	0
Other types of vasodilator	1204	825	300	32	32	405	2	48	6	602	94	8	602	94	8	111	286	196	116	53	6	1
Unknown types of cardiovascular drug	70	31	10	0	0	16	0	4	1	22	8	0	22	8	0	1	17	5	1	2	0	0
Unknown types of vasodilator	18	14	3	0	0	9	1	1	0	9	1	0	9	1	0	4	6	4	2	3	0	0
Vasopressors	238	191	74	37	7	67	0	6	0	174	7	1	174	7	1	8	81	18	83	25	0	0
Category total:	106,572	46,890	13,824	3805	2699	24,674	19	1734	135	38,552	6262	53	38,552	6262	53	1699	19,148	14,384	3966	4897	488	71

(continued)

(continued)

Table 22(B). Demographic profile of SINGLE SUBSTANCE Pharmaceuticals exposure cases by generic category – Continued

	No. of Case Mentions	No. of Single Exposures	Age				Reason				Outcome								
			<=5	6-12	13-19	>=20	Unknown Child	Unknown Adult	Unknown Age	Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
Cold and cough preparations																			
Acetaminophen and acetylsalicylic acid with decongestant and/or antihistamine	12	3	2	0	0	0	0	0	1	3	0	0	0	0	1	1	0	0	0
Acetaminophen and acetylsalicylic acid with antihistamine without opioids																			
Acetaminophen and acetylsalicylic acid with decongestant and antihistamine without opioids	20	13	9	2	0	1	0	1	0	13	0	0	0	3	1	1	1	0	0
Acetaminophen and acetylsalicylic acid with decongestant without opioids	16	8	6	1	0	1	0	0	0	8	0	0	0	0	2	0	0	0	0
Acetaminophen, acetylsalicylic acid, and dextromethorphan with antihistamine	15	11	7	0	2	1	0	1	0	7	4	0	0	4	3	2	0	0	0
Acetaminophen, acetylsalicylic acid, and dextromethorphan with decongestant	15	11	9	0	2	0	0	0	0	10	1	0	0	3	4	1	1	0	0
Acetaminophen, acetylsalicylic acid, and dextromethorphan with decongestant and antihistamine	14	11	9	0	0	2	0	0	0	11	0	0	0	5	5	1	0	0	0
Acetaminophen, acetylsalicylic acid, and opioid with antihistamine	2	2	0	0	0	2	0	0	0	2	0	0	0	0	0	1	0	0	0
Acetaminophen, acetylsalicylic acid, and opioid with decongestant and antihistamine	1	1	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0
Obsolete: acetaminophen and acetylsalicylic acid with decongestant and/or antihistamine combinations without phenylpropanolamine or opioids	5	3	2	0	0	0	0	1	0	2	1	0	0	1	1	0	0	0	0
Obsolete: acetaminophen, acetylsalicylic acid, and dextromethorphan combinations with decongestant and/or antihistamine without phenylpropanolamine	14	11	6	0	1	4	0	0	0	7	2	0	2	4	0	2	2	0	0
Obsolete: acetaminophen, acetylsalicylic acid, and opioid combinations with decongestant and/or antihistamine without phenylpropanolamine	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acetaminophen with decongestant and/or antihistamine																			
Acetaminophen and codeine with antihistamine	1	1	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0
Acetaminophen and codeine with decongestant	2	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Acetaminophen and codeine with decongestant and antihistamine	10	7	6	0	0	1	0	0	0	7	0	0	0	1	4	0	0	0	0
Acetaminophen and dextromethorphan with antihistamine	4757	2325	892	139	469	751	2	58	14	1306	916	3	74	1083	495	415	205	14	0
Acetaminophen and dextromethorphan with decongestant	3903	2184	1188	172	261	508	2	48	5	1721	342	2	107	508	494	236	58	6	0
Acetaminophen and dextromethorphan with decongestant and antihistamine	2928	1668	842	151	265	371	1	28	10	1141	452	3	53	610	373	225	109	4	0
Acetaminophen and other opioid with antihistamine	2	2	2	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0
Acetaminophen and other opioid with decongestant and antihistamine	6	2	1	0	1	0	0	0	0	1	1	0	0	2	1	0	1	0	0
Acetaminophen with antihistamine	551	357	88	16	95	146	1	9	2	127	219	2	6	234	82	81	82	7	0
Acetaminophen with decongestant and antihistamine without opioids	978	617	364	74	64	109	0	4	2	503	90	0	22	141	138	49	35	3	0

(continued)





Table 22(B). Demographic profile of SINGLE SUBSTANCE Pharmaceuticals exposure cases by generic category – Continued

	No. of Case Mentions	No. of Single Exposures	Age						Reason				Outcome						
			<=5	6-12	13-19	>=20	Unknown Child	Unknown Adult	Unknown Age	Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
Acetaminophen with decongestant without opioids	1080	621	335	47	66	160	0	10	3	487	82	0	49	119	127	38	22	0	0
Obsolete: acetaminophen and codeine combinations with decongestant and/or antihistamine without phenylpropanolamine	10	7	5	1	0	1	0	0	0	6	1	0	0	2	1	1	0	0	0
Obsolete: acetaminophen and dextromethorphan combinations with decongestant and/or antihistamine without phenylpropanolamine	54	33	16	1	4	12	0	0	0	22	8	0	3	10	4	7	3	0	0
Obsolete: acetaminophen and other opioid combinations with decongestant and/or antihistamine without phenylpropanolamine	7	6	1	2	0	3	0	0	0	3	2	0	0	3	1	1	0	0	0
Obsolete: acetaminophen with decongestant and/or antihistamine combinations without phenylpropanolamine or opioids	32	21	7	3	3	8	0	0	0	14	4	0	3	6	3	1	0	0	0
Acetylsalicylic acid with decongestant and/or antihistamine	10	8	7	1	0	0	0	0	0	8	0	0	0	0	5	0	0	0	0
Acetylsalicylic acid and dextromethorphan with antihistamine		6	6	0	0	0	0	0	0	6	0	0	0	0	2	0	0	0	0
Acetylsalicylic acid and dextromethorphan with decongestant		17	10	4	0	3	0	0	0	15	1	0	1	0	5	1	0	0	0
Acetylsalicylic acid and dextromethorphan with decongestant and antihistamine		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acetylsalicylic acid and other opioid with decongestant		11	2	1	3	5	0	0	0	6	5	0	0	0	6	4	1	3	0
Acetylsalicylic acid with antihistamine without opioids	153	115	77	14	7	16	0	1	0	101	7	0	7	18	29	6	1	0	0
Acetylsalicylic acid with decongestant and antihistamine without opioids	2	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Obsolete: acetylsalicylic acid and dextromethorphan combinations with decongestant and/or antihistamine without phenylpropanolamine	5	5	2	0	1	2	0	0	0	4	1	0	0	2	3	1	0	0	0
Obsolete: acetylsalicylic acid with decongestant and/or antihistamine combinations without phenylpropanolamine or opioids	5	4	2	1	1	0	0	0	0	4	0	0	0	0	0	0	0	0	0
Antihistamine and/or decongestant	82	55	22	7	3	21	0	2	0	43	8	0	3	14	7	3	7	0	0
Antihistamine and decongestant with codeine	3144	2714	2054	407	97	138	1	14	3	2560	108	0	40	377	706	288	51	2	1
Antihistamine and decongestant with dextromethorphan	17	13	5	1	2	4	0	1	0	9	4	0	0	5	1	1	1	0	0
Antihistamine and decongestant with other opioid	4453	3587	2296	532	164	540	1	49	5	3325	170	0	85	540	855	314	79	6	0
Antihistamine and decongestant without opioid	683	529	155	70	56	232	0	14	2	402	104	0	10	165	124	89	31	3	0
Antihistamine with codeine	4182	3271	723	254	1018	1229	2	24	21	1196	2010	5	32	2107	493	746	947	40	0
Antihistamine with dextromethorphan	259	209	50	19	17	109	0	10	4	164	41	0	3	82	51	57	17	1	0
Antihistamine with other opioid	1845	1151	613	70	118	321	0	24	5	867	253	0	24	421	357	132	66	8	0
Decongestant without opioid	38	25	9	3	4	7	0	2	0	22	3	0	0	9	5	2	0	0	0
Decongestant with codeine	1855	1462	966	234	78	169	1	11	3	1267	151	1	38	229	326	115	37	3	0
Decongestant with dextromethorphan	40	20	5	3	3	7	0	2	0	12	8	0	0	9	2	2	2	0	0
Decongestant with other opioid	4409	3046	1617	208	239	878	5	91	8	2718	211	0	110	462	738	169	78	2	0
Decongestant without opioid	11	8	5	0	1	2	0	0	0	8	0	0	0	3	5	0	0	0	0
Obsolete: antihistamine and/or																			

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(continued)

Table 22(B). Demographic profile of SINGLE SUBSTANCE Pharmaceuticals exposure cases by generic category – Continued

	No. of Case Mentions	No. of Single Exposures	Age					Reason				Outcome								
			<=5	6-12	13-19	>=20	Unknown	Child	Adult	Unknown	Age	Unint	Int	Other	Adv Rsn	Treated in Health Care Facility	None	Minor	Moderate	Major
decongestant with codeine without phenylpropanolamine	168	126	26	7	26	65	0	2	0	38	84	1	0	91	20	34	37	0	0	0
Obsolete: antihistamine and/or decongestant with dextromethorphan without phenylpropanolamine	1	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Obsolete: antihistamine and/or decongestant with other opiod without phenylpropanolamine	84	73	49	19	0	4	0	1	0	69	3	0	0	9	15	3	1	1	1	0
Obsolete: antihistamine and/or decongestant without phenylpropanolamine and opiod																				
Miscellaneous cold and cough preparations																				
Acetaminophen in combination with dextromethorphan (without decongestants or antihistamines)	134	84	62	7	7	7	0	1	0	74	8	0	2	20	24	5	6	0	0	0
Cough and cold preparations (not otherwise classified)	2876	2051	1417	118	175	296	2	35	8	1666	322	3	47	440	389	200	97	2	0	0
Dextromethorphan preparations (not otherwise classified)	12,077	9223	3576	1202	1348	2871	4	199	23	6128	2778	12	244	3357	1579	1534	1226	45	1	1
Dextromethorphan with expectorants	429	333	192	41	32	63	0	5	0	258	67	0	8	80	67	40	22	1	0	0
Expectorants without dextromethorphan	1872	1332	611	79	91	458	0	85	8	1191	107	1	32	142	209	34	15	0	0	0
Non-narcotic antitussives excluding dextromethorphan	1667	1139	453	59	124	437	3	55	8	895	168	0	71	449	366	186	45	6	0	0
Obsolete: acetylsalicylic acid in combination with dextromethorphan	4	3	2	1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0
Obsolete: expectorants or antitussives (without narcotics or narcotic analogs)	31	22	14	3	1	4	0	0	0	21	0	0	1	9	3	2	5	0	0	0
Obsolete: non-acetylsalicylic acid salicylates in combination with dextromethorphan	2	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Obsolete: unknown types of cough and cold preparation	504	258	89	12	59	85	2	9	2	112	123	1	11	149	44	56	37	0	0	0
Non-acetylsalicylic acid salicylates with decongestant and/or antihistamine																				
Non-acetylsalicylic acid salicylates and dextromethorphan with antihistamine	3	3	2	0	0	1	0	0	0	2	1	0	0	2	0	2	1	0	0	0
Non-acetylsalicylic acid salicylates and dextromethorphan with decongestant	7	6	4	2	0	0	0	0	0	6	0	0	0	2	1	0	0	0	0	0
Non-acetylsalicylic acid salicylates and dextromethorphan with decongestant and antihistamine	1	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Non-acetylsalicylic acid salicylates and antihistamine	1	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Non-acetylsalicylic acid salicylates and opiod with decongestant	2	2	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Non-acetylsalicylic acid salicylates and opiod with decongestant and antihistamine	4	4	4	0	0	0	0	0	0	4	0	0	0	1	3	0	0	0	0	0
Non-acetylsalicylic acid salicylates with antihistamine without opiod	7	6	5	1	0	0	0	0	0	5	0	0	1	0	2	0	0	0	0	0
Non-acetylsalicylic acid salicylates with decongestant and antihistamine without opiod	7	7	4	1	1	1	0	0	0	7	0	0	0	0	1	0	0	0	0	0
Non-acetylsalicylic acid salicylates with decongestant without opiod	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Obsolete: non-acetylsalicylic acid salicylates and opiod combinations with decongestant and/or antihistamine without phenylpropanolamine																				

(continued)

(continued)



Table 22(B). Demographic profile of SINGLE SUBSTANCE Pharmaceuticals exposure cases by generic category – Continued

	No. of Case Mentions	No. of Single Exposures	Age						Reason				Outcome						
			<=5	6-12	13-19	>=20	Unknown Child	Unknown Adult	Unknown Age	Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
Obsolete: non-acetylsalicylic acid salicylates with decongestant and/or antihistamine without phenylpropanolamine and opioid	2	2	1	1	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0
Phenylpropanolamine containing preparations																			
Acetaminophen and phenylpropanolamine combinations with decongestant and/or antihistamine without opioid	59	41	28	4	3	4	0	0	2	36	5	0	0	9	15	4	0	0	0
Acetaminophen, acetylsalicylic acid, and phenylpropanolamine combinations with decongestant and/or antihistamine without opioid	12	12	4	0	0	8	0	0	0	8	3	0	1	4	2	1	1	0	0
Acetaminophen, acetylsalicylic acid, phenylpropanolamine, and dextromethorphan combinations with decongestant and/or antihistamine	30	24	14	3	2	5	0	0	0	18	6	0	0	6	3	1	2	0	0
Acetaminophen, phenylpropanolamine, and codeine combinations with decongestant and/or antihistamine	2	1	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0
Acetaminophen, phenylpropanolamine, and dextromethorphan combinations with decongestant and/or antihistamine	37	22	9	0	4	8	0	0	0	15	6	0	1	9	4	3	2	1	0
Acetaminophen, phenylpropanolamine, and other opioid combinations with decongestant and/or antihistamine	3	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Acetylsalicylic acid and phenylpropanolamine combinations with decongestant and/or antihistamine	23	14	8	1	1	4	0	0	0	12	1	0	1	3	2	1	1	1	0
Acetylsalicylic acid, phenylpropanolamine, and dextromethorphan combinations with decongestant and/or antihistamine	10	7	2	2	0	3	0	0	0	5	1	0	1	2	1	2	0	0	0
Antihistamine and/or decongestant with phenylpropanolamine and codeine	6	4	2	0	1	1	0	0	0	4	0	0	0	1	1	1	0	0	0
Antihistamine and/or decongestant with phenylpropanolamine and dextromethorphan	151	130	90	18	6	13	1	2	0	118	9	0	2	21	36	8	4	0	0
Antihistamine and/or decongestant with phenylpropanolamine and other opioid	3	3	0	1	0	2	0	0	0	3	0	0	0	1	0	3	0	0	0
Antihistamine and/or decongestant with phenylpropanolamine without opioid	166	115	79	12	10	12	0	2	0	103	10	0	1	23	30	8	3	0	0
Non-acetylsalicylic acid salicylates and phenylpropanolamine combinations with decongestant and/or antihistamine without opioid	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other phenylpropanolamine preparations (excluding street drugs and diet aids)	223	200	91	2	2	92	0	13	0	198	1	0	1	20	62	2	1	0	0
Category total:	56,291	39,435	19,267	4036	4938	10,212	28	816	138	29,151	8915	34	1097	12,038	8341	5121	3345	156	2
Diagnostic agents																			
Miscellaneous diagnostic agents	332	298	53	6	10	190	0	32	7	259	1	1	37	91	49	47	14	1	2
Other types of diagnostic agent	9	6	1	0	0	5	0	0	0	4	0	0	2	2	0	0	1	0	0
Category total:	341	304	54	6	10	195	0	32	7	263	1	1	39	93	49	47	15	1	2
Dietary supplements/herbals/homeopathic																			

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Table 22(B). Demographic profile of SINGLE SUBSTANCE Pharmaceuticals exposure cases by generic category – Continued

	No. of Case Mentions	No. of Single Exposures	Age				Reason				Outcome								
			<=5	6-12	13-19	>=20	Unknown Child	Unknown Adult	Unknown Age	Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
Amino acids																			
Creatine	243	203	112	14	31	40	0	153	21	0	25	34	32	18	7	0	0	0	0
Other amino acid dietary supplements	657	456	260	30	27	126	0	353	42	1	57	96	90	38	12	0	0	0	0
Botanical products																			
Blue cohosh	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Citrus aurantium (single ingredient)	15	5	4	0	0	1	0	5	0	0	0	0	1	0	0	0	0	0	0
Echinacea	143	101	67	16	4	12	1	93	3	0	5	10	25	4	1	0	0	0	0
Ginkgo biloba	100	56	31	2	2	18	0	45	3	0	8	11	10	2	0	0	0	0	0
Ginseng	94	57	28	3	3	19	0	38	5	0	14	20	8	7	5	0	0	0	0
Kava kava	88	48	8	0	6	30	1	16	19	0	12	27	5	10	11	0	0	0	0
Ma huang/ephedra (single ingredient)	20	13	7	0	0	6	0	10	1	0	2	7	4	1	2	0	0	0	0
Multi-botanicals with citrus aurantium	58	44	17	1	6	19	0	20	15	0	9	22	12	10	6	0	0	0	0
Multi-botanicals with ma huang	60	43	25	2	3	10	0	30	10	0	3	18	16	8	5	0	1	0	1
Multi-botanicals without ma huang or citrus aurantium	1661	1329	828	65	77	322	1	1006	110	3	206	326	255	139	71	1	0	0	0
Other single ingredient botanicals	3032	1396	80	80	95	615	4	123	10	1909	6	252	324	416	213	55	6	1	0
St. John's wort	212	138	89	6	14	27	1	109	14	2	13	21	37	4	1	0	0	0	0
Valerian	264	117	50	4	9	44	0	65	31	0	20	47	34	16	3	0	0	0	0
Yohimbe	162	129	13	1	7	100	0	36	31	1	59	75	6	28	43	3	0	0	0
Cultural medicines																			
Asian medicines	138	118	43	10	6	43	7	90	7	2	18	35	26	15	5	3	1	0	0
Ayurvedic medicines	12	9	6	0	0	2	0	8	0	0	1	0	2	2	0	0	0	0	0
Hispanic medicines	7	5	0	0	0	2	0	6	0	0	1	3	2	1	0	0	0	0	0
Other cultural medicines	103	83	42	4	4	30	0	59	7	0	17	27	13	9	7	0	0	0	0
Energy products																			
Energy drinks: caffeine containing (from any source including guarana, kola nut, tea, yerba mate, cocoa, etc.)	1122	893	480	68	142	186	1	590	144	9	147	188	174	163	87	5	0	0	0
Energy drinks: caffeine only (without guarana, kola nut, tea, yerba mate, cocoa, etc.)	972	706	451	54	69	117	0	526	99	1	76	95	151	102	39	1	0	0	0
Energy drinks: ethanol and caffeine containing (from any source including guarana, kola nut, tea, yerba mate, cocoa, etc.)	123	36	10	1	15	8	0	12	19	1	4	15	4	6	6	1	0	0	0
Energy drinks: ethanol and caffeine only (without guarana, kola nut, tea, yerba mate, cocoa, etc.)	4	3	1	0	1	1	0	1	2	0	0	2	1	1	0	0	0	0	0
Energy drinks: ethanol containing without caffeine (from any source)	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Energy drinks: no caffeine (from any source)	37	31	23	3	1	3	0	27	0	0	3	5	9	3	0	0	0	0	0
Energy drinks: unknown	477	342	187	40	44	62	0	241	59	4	37	59	72	53	19	1	0	0	0
Energy products: other	353	276	140	5	23	96	0	175	38	1	61	101	61	56	31	1	0	0	0
Hormonal products																			
Androgen or androgen precursor dietary supplements	123	79	53	2	3	18	0	61	9	0	9	16	15	4	3	0	0	0	0
Glandular dietary supplements	54	39	26	2	0	9	0	33	3	0	3	3	6	1	0	0	0	0	0
Melatonin	24,159	20,443	15,973	2098	1322	891	34	18,373	1870	11	131	2910	4428	2065	70	1	0	0	0
Phytoestrogen dietary supplements	57	46	26	0	3	11	0	33	4	0	9	8	10	2	0	0	0	0	0
Miscellaneous dietary supplements/herbals/homeopathic																			
Homeopathic agents	11,116	10,452	9503	342	86	432	16	10,133	84	8	218	620	1840	251	29	3	0	0	0
Unknown dietary supplements or homeopathic agents	2046	1650	1050	106	51	386	2	1291	121	2	228	329	276	135	80	5	0	0	0
Other dietary supplements																			
Blue-green algae	887	872	144	129	117	318	20	857	1	10	3	114	348	200	17	2	0	0	0
Glucosamine (with or without chondroitin)	528	364	278	4	9	68	0	341	10	0	13	29	76	8	1	0	0	0	0
Other single ingredient non-botanical dietary supplements	1844	1012	683	55	42	194	0	876	65	3	62	118	175	43	16	0	0	0	0
Category total:	50,975	42,523	32,059	3147	2222	4266	88	37,621	2990	65	1726	5715	8640	3618	632	33	3	0	0
Diuretics																			

(continued)

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Table 22(B). Demographic profile of SINGLE SUBSTANCE Pharmaceuticals exposure cases by generic category – Continued

	No. of Case Mentions	No. of Single Exposures	Age					Reason				Outcome										
			<=5	6-12	13-19	>=20	Unknown	Child	Unknown	Adult	Unknown	Age	Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
Miscellaneous diuretics	3347	1086	427	36	29	553	0	0	40	67	12	10,145	993	66	2	23	277	247	115	57	0	0
Furosemide	2482	1021	388	57	62	461	0	0	47	17	2	6	890	82	0	43	216	245	76	25	4	1
Other types of diuretic	4305	1520	610	100	73	672	1	1	58	30	6	13,366	1336	154	1	22	390	423	90	30	1	0
Thiazide	247	90	28	5	1	53	0	0	3	5	0	0	80	7	0	3	25	24	9	4	0	0
Unknown types of diuretic	10,381	3717	1453	198	165	1739	1	1	148	19	3	13	3299	309	3	91	908	939	290	116	5	1
Category total:																						
Electrolytes and minerals																						
Miscellaneous electrolytes and minerals																						
Calcium and calcium salts	11,861	10,407	9278	482	129	429	10	10	67	142	20	34,24	10,145	194	8	51	345	1701	169	21	0	0
Chromium, trivalent	204	176	64	15	3	75	0	0	17	5	2	6	164	5	1	5	17	26	12	0	0	0
Colloidal silver	107	94	38	11	2	37	0	0	5	5	1	54	54	15	2	22	35	18	10	2	0	0
Fluoride (excluding vitamins, hydrofluoric acid, & mouthwashes)	1509	1435	1158	145	30	77	3	3	19	19	3	13,48	1348	15	2	67	64	255	96	7	0	0
Iron and iron salts (excluding vitamins with iron)	5910	4295	2204	119	475	1332	3	3	142	142	20	34,24	3424	581	3	257	1225	999	563	128	5	1
Magnesium and magnesium salts	1681	1313	586	61	40	545	2	2	72	72	7	10,77	1077	98	9	120	189	218	151	21	1	1
Multi-mineral and multi-herbal dietary supplement	833	661	378	28	72	171	1	1	10	10	1	459	459	133	2	64	251	183	88	61	5	0
Multi-mineral dietary supplements	204	149	94	6	8	34	0	0	6	6	1	124	7	0	17	23	33	16	4	0	0	
Other types of electrolyte or mineral	45	33	10	2	1	18	0	0	2	2	0	29	29	1	0	3	6	5	6	0	1	0
Potassium and potassium salts	1226	507	177	9	22	257	1	1	38	38	3	411	411	63	1	31	112	116	32	19	0	1
Selenium and selenium salts	98	65	28	0	5	28	0	0	4	4	0	53	53	3	0	7	12	11	8	2	0	0
Sodium and sodium salts	4611	3774	2147	361	167	905	12	12	155	155	27	32,11	3211	431	21	95	554	738	508	60	1	0
Unknown types of electrolyte or mineral	19	10	5	1	0	3	0	0	1	1	0	9	9	0	0	0	1	3	1	1	0	0
Zinc and zinc salts	1172	1001	533	27	33	342	1	1	52	52	13	842	842	38	0	116	96	118	108	20	1	1
Category total:	29,480	23,920	16,700	1267	987	4253	33	33	590	590	90	21,350	21,350	1584	49	855	2930	4424	1768	354	16	4
Eye/ear/nose/throat preparations																						
Miscellaneous eye/ear/nose/throat preparations																						
Topical steroids for eye/nose/throat	1990	1692	816	285	54	441	3	3	85	85	8	15,85	1585	49	1	56	67	262	118	8	0	0
Nasal preparations																						
Other nasal decongestants or sympathomimetics (excluding tetrahydrozoline)	2096	1991	814	82	120	820	3	3	137	137	15	17,23	1723	97	9	158	269	454	222	46	7	0
Other types of nasal preparation	556	532	331	14	18	136	4	4	28	28	1	503	503	9	1	17	22	64	58	3	0	0
Tetrahydrozoline, nasal preparations	24	24	14	1	0	5	0	0	4	4	0	21	21	2	1	0	7	9	4	1	0	0
Unknown types of nasal preparation	15	14	6	0	0	5	0	0	2	2	1	13	13	0	0	1	2	1	1	1	0	0
Ophthalmic preparations																						
Contact lens products	2234	2185	1047	45	136	826	4	4	119	119	8	21,21	2121	28	5	29	447	209	460	88	1	0
Glaucoma medications	381	326	80	6	3	208	1	1	25	25	3	296	296	6	0	24	53	57	35	14	0	0
Other ophthalmic sympathomimetics	1121	1063	667	28	67	226	2	2	66	66	7	919	919	47	65	25	232	405	66	22	2	0
Other types of ophthalmic preparation	2035	1942	1089	64	68	596	5	5	108	108	12	18,25	1825	33	17	62	136	316	77	26	0	0
Tetrahydrozoline, ophthalmic preparations	859	832	557	20	32	188	0	0	33	33	2	730	730	26	63	10	192	322	59	16	2	0
Unknown types of ophthalmic preparation	61	51	21	0	7	13	1	1	8	8	1	39	39	2	9	1	15	10	4	3	0	0
Otic preparations																						
Combination products	1171	1158	505	109	45	426	3	3	66	66	4	11,44	1144	5	0	9	109	160	316	18	0	0
Other types of otic preparation	2223	2202	701	110	71	1118	5	5	181	181	16	21,60	2160	7	0	33	289	221	685	43	0	0
Unknown types of otic preparation	44	43	12	2	2	21	2	2	3	3	1	42	42	0	1	0	10	3	15	3	0	0
Throat preparations																						
Other types of throat preparation	450	425	118	30	49	189	1	1	34	34	4	368	368	35	2	17	49	92	48	7	0	0
Throat lozenges with local anesthetics	275	253	103	13	27	84	0	0	22	22	4	223	223	19	1	7	17	56	17	1	0	0
Throat lozenges without local anesthetics	962	884	705	71	24	62	1	1	20	20	1	825	825	32	0	26	29	161	41	3	0	0
Unknown types of throat preparation	4	4	3	1	0	0	0	0	0	0	0	3	3	1	0	0	0	1	0	0	0	0
Category total:	16,501	15,621	7589	881	723	5364	35	35	941	941	88	14,540	14,540	398	175	475	1945	2803	2226	303	12	0
Gastrointestinal preparations																						
Antacids																						

(continued)

Table 22(B). Demographic profile of SINGLE SUBSTANCE Pharmaceuticals exposure cases by generic category – Continued

	No. of Case Mentions	No. of Single Exposures	Age					Reason					Outcome						
			<=5	6-12	13-19	>=20	Unknown Child	Unknown Adult	Unknown Age	Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
Antacids: other types	3903	3608	3184	185	22	174	4	32	7	3505	68	3	30	96	462	37	8	0	0
Antacids: proton pump inhibitors	10,268	4897	2305	181	236	1895	4	249	27	4397	344	1	146	506	917	182	18	1	0
Antacids: salicylate-containing	2509	2225	1735	203	40	211	3	26	7	2050	106	1	61	193	474	61	14	1	1
Antidiarrheals	246	126	36	6	11	68	0	2	3	82	30	1	9	75	37	22	15	4	0
Antidiarrheals: diphenoxylate and atropine containing	1378	1010	413	28	34	486	0	42	7	628	330	6	36	443	276	103	104	43	1
Antidiarrheals: loperamide	23	16	10	1	1	3	0	1	0	13	2	0	1	1	1	1	0	0	0
Antidiarrheals: non-narcotic containing (excluding salicyl containing)	2	2	0	0	0	1	0	1	0	2	0	0	0	1	0	0	0	0	0
Antidiarrheals: paregoric containing																			
Antispasmodics	2957	1336	490	91	129	564	2	48	12	983	239	3	94	497	386	182	114	2	0
Antispasmodics: anticholinergic containing	232	108	13	1	3	82	0	8	1	98	2	0	7	24	23	6	1	0	0
Antispasmodics: other types																			
Miscellaneous gastrointestinal preparations																			
Laxatives	15,343	13,212	9305	732	448	2298	15	371	43	12,036	610	78	462	1290	1841	1317	159	3	0
Other types of gastrointestinal preparation	9858	8237	6502	367	170	996	20	169	13	7720	249	11	235	671	1429	282	61	5	2
Unknown types of gastrointestinal preparation	32	13	9	0	1	3	0	0	0	11	2	0	0	3	3	1	2	0	0
Serotonin 5-HT3 receptor antagonists																			
Serotonin 5-HT3 receptor antagonists: ondansetron	2269	1365	930	99	67	241	0	25	3	1210	97	1	50	377	450	96	31	1	0
Serotonin 5-HT3 receptor antagonists: other or unknown	5	3	1	1	0	1	0	0	0	3	0	0	0	0	1	0	0	0	0
Category total:	49,025	36,158	24,933	1895	1162	7023	48	974	123	32,738	2079	105	1131	4177	6300	2290	527	60	4
Hormones and hormone antagonists																			
Hypoglycemic, combination																			
Hypoglycemic: biguanide combinations (excluding sulfonylurea)	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hypoglycemic: sulfonylurea combinations	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hypoglycemic, single agent																			
Hypoglycemics: glucagon-like peptide-1 (GLP-1) receptor agonists	272	241	9	3	2	209	0	16	2	204	8	1	25	55	64	22	20	1	0
Hypoglycemics: other or unknown	668	345	89	10	4	212	1	27	2	308	18	0	19	115	131	18	25	1	1
Insulin	6609	5566	151	89	155	4779	2	359	31	4832	611	9	82	2357	2361	312	902	41	2
Oral hypoglycemics: alpha-glucosidase inhibitors	29	12	12	0	0	0	0	0	0	12	0	0	0	2	6	0	0	0	0
Oral hypoglycemics: biguanides	9393	4223	830	125	305	2723	2	220	18	3374	713	3	105	1200	962	370	236	42	8
Oral hypoglycemics: dipeptidyl peptidase-4 (DPP-4) inhibitors	689	249	84	6	3	142	0	14	0	226	13	0	10	60	92	8	5	1	0
Oral hypoglycemics: meglitinides	42	21	10	1	1	8	0	1	0	16	3	0	2	13	10	1	4	0	0
Oral hypoglycemics: sodium glucose co-transporter 2 inhibitor (SGLT2) inhibitors	334	176	73	1	2	86	0	14	0	156	7	0	12	68	68	4	6	2	0
Oral hypoglycemics: sulfonylureas	3851	1582	677	60	60	740	0	40	5	1295	163	1	96	1183	565	75	449	46	2
Oral hypoglycemics: thiazolidinediones	313	106	45	6	4	45	0	5	1	92	12	0	1	32	41	7	3	0	0
Miscellaneous hormones and hormone antagonists																			
Androgens	469	368	83	9	16	218	0	38	4	265	43	1	56	94	59	49	18	5	0
Corticosteroids	11,756	9674	4251	844	339	3613	13	570	44	8945	199	15	498	655	1356	376	65	2	0
Estrogens	1404	915	508	29	68	277	0	29	4	824	61	2	25	70	157	42	4	0	0
Oral contraceptives	3,946	3203	2092	109	418	471	4	88	21	2692	441	3	61	274	454	178	14	1	0
Other hormone antagonists	619	469	135	24	29	257	0	23	1	438	23	0	8	55	22	22	3	0	0
Other hormones	843	619	198	85	40	243	0	45	8	543	38	0	35	164	156	49	26	1	0
Progestins	1273	1037	548	40	59	330	2	48	10	896	39	1	97	120	165	47	8	1	0
Selective estrogen receptor modulators	289	164	45	5	8	93	0	12	1	153	8	0	2	22	38	8	3	0	0
Thyroid preparations (including synthetics and extracts)	13,616	9108	4500	385	263	3508	8	417	27	8659	332	5	98	1267	1714	137	54	5	0
Unknown hormones or hormone antagonists	17	12	6	0	1	3	0	2	0	8	3	0	1	3	2	1	0	0	0
Category total:	56,434	38,090	14,346	1831	1777	17,957	32	1968	179	33,938	2735	41	1233	7809	8483	1726	1845	149	13
Miscellaneous drugs																			
Other miscellaneous drugs																			

(continued)

(continued)

Table 22(B). Demographic profile of SINGLE SUBSTANCE Pharmaceuticals exposure cases by generic category – Continued

	No. of Case Mentions	No. of Single Exposures	Age						Reason			Outcome							
			<=5	6-12	13-19	>=20	Unknown Child	Unknown Adult	Unknown Age	Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
Allopurinol	949	318	142	9	13	136	0	18	0	294	19	0	4	53	96	16	3	0	0
Disulfiram	218	59	7	1	0	45	0	6	0	19	14	1	22	26	8	7	8	1	0
Ergot alkaloids	48	33	15	1	3	12	0	1	1	25	2	0	6	19	7	6	6	0	0
Levo-dopa and related drugs	1358	756	148	6	9	556	0	35	2	679	53	4	14	199	152	99	50	3	0
Neuromuscular blocking agents (succinylcholine, curare, etc.)	27	17	1	0	0	13	0	2	1	11	0	3	2	14	4	2	1	2	0
Nicotine pharmaceuticals	1571	1496	907	168	24	330	2	58	7	1326	72	9	85	303	443	244	29	1	0
Other types of miscellaneous prescription or over the counter drug	15,868	10,197	4099	525	507	4508	12	495	51	8961	572	20	582	2281	2184	1283	422	31	4
Category total: Muscle relaxants	20,039	12,876	5319	710	556	5600	14	615	62	11,315	732	37	715	2895	2894	1657	519	38	4
Miscellaneous muscle relaxants																			
Baclofen	4873	2160	273	69	175	1554	0	74	15	692	1225	31	106	1687	298	472	653	213	3
Carisoprodol (formulated alone)	2925	1180	91	8	50	991	0	34	6	245	876	2	20	987	129	399	325	54	1
Cyclobenzaprine	10,615	4444	1131	266	464	2423	1	128	31	2218	2072	6	78	2756	1017	1079	742	75	4
Metaxalone	459	225	29	2	37	143	0	10	4	127	85	0	10	112	53	42	29	5	0
Methocarbamol	2330	917	139	21	106	599	1	43	8	389	482	0	30	561	225	252	101	12	0
Other types of muscle relaxant	777	330	46	4	30	233	1	13	3	143	164	3	15	211	53	95	64	8	1
Tizanidine	4133	1642	262	36	90	1186	0	54	14	771	769	6	70	1126	257	341	514	43	1
Unknown types of muscle relaxant	245	48	9	0	9	22	2	4	2	11	35	2	0	39	3	13	14	0	0
Category total: Narcotic antagonists	26,357	10,946	1980	406	961	7151	5	360	83	4596	5708	50	329	7479	2035	2693	2442	410	10
Miscellaneous narcotic antagonists																			
Miscellaneous narcotic antagonist	774	330	14	5	16	259	0	27	9	133	74	19	97	186	25	77	70	7	0
Category total: Radiopharmaceuticals	774	330	14	5	16	259	0	27	9	133	74	19	97	186	25	77	70	7	0
Miscellaneous radiopharmaceutical																			
Specific pharmaceutical radionuclides	34	25	3	1	1	15	0	5	0	17	0	0	8	14	2	4	1	0	0
Category total: Sedative/hypnotics/antipsychotics	34	25	3	1	1	15	0	5	0	17	0	0	8	14	2	4	1	0	0
Sedative/hypnotics/antipsychotics																			
Barbiturates																			
Long acting barbiturates	1540	921	201	36	40	600	0	40	4	664	192	0	36	354	199	137	97	29	1
Short or intermediate acting barbiturates	147	63	2	0	4	46	0	10	1	40	19	0	3	35	8	12	4	3	1
Unknown types of barbiturate	25	5	0	0	2	3	0	0	0	0	5	0	0	5	0	1	3	0	0
Miscellaneous sedative/hypnotics/antipsychotics																			
Atypical antipsychotics	43,557	16,774	1743	873	3110	10,432	6	500	110	5547	10,190	39	761	12,676	2913	4980	3873	442	11
Benzodiazepines	74,050	26,868	4619	678	3522	16,810	5	963	271	8250	17,325	347	448	19,925	5207	9694	3469	362	14
Bupropion	5400	1572	239	50	301	918	0	57	7	586	903	1	67	1021	475	422	136	7	0
Chloral hydrate	14	5	3	2	0	0	0	0	0	4	0	0	1	3	1	1	2	0	0
Ethchlorvynol	6	5	0	0	1	4	0	0	0	0	4	0	0	5	0	4	0	0	0
Glutethimide	1	1	0	0	0	1	0	0	0	0	1	0	0	1	0	0	1	0	0
Meprobamate	20	11	0	0	1	10	0	0	0	1	10	0	0	8	0	3	3	1	0
Methaqualone	7	3	0	0	0	3	0	0	0	0	3	0	0	3	0	0	1	1	0
Other types of sedative/hypnotic/anti-anxiety or anti-psychotic drug	15,053	6151	749	310	516	4306	2	208	60	2321	3556	25	132	4238	946	2245	881	67	2
Phenothiazines	4298	1682	172	56	178	1174	0	82	20	681	786	10	172	1195	298	387	440	26	3
Sleep aids over the counter only (excluding diphenhydramine)	1792	1140	384	17	175	534	1	21	8	487	624	2	12	687	257	220	236	23	0
Unknown types of sedative/hypnotic/anti-anxiety or anti-psychotic drug	305	113	7	4	25	62	0	9	6	14	91	1	2	98	17	31	24	0	1
Category total: Serums, toxoids, vaccines	146,215	55,314	8119	2026	7875	34,903	14	1890	487	18,595	33,709	425	1634	40,254	10,321	18,137	9170	961	33
Serums, toxoids, vaccines																			
Miscellaneous serums, toxoids, vaccines																			
Miscellaneous serums, toxoids and vaccines	1577	1400	269	111	117	742	11	130	20	1084	8	5	299	469	145	292	63	4	0
Category total: Stimulants and street drugs	1577	1400	269	111	117	742	11	130	20	1084	8	5	299	469	145	292	63	4	0
Cannabinoids and analogs																			
Ecigarettes: marijuana device flavor	5	4	2	0	2	0	0	0	0	2	2	0	0	2	1	1	0	0	0
unknown																			
Ecigarettes: marijuana device with added flavors	1	1	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0
Ecigarettes: marijuana liquid flavor	4	4	2	0	0	2	0	0	0	2	2	0	0	3	1	3	0	0	0

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Table 22(B). Demographic profile of SINGLE SUBSTANCE Pharmaceuticals exposure cases by generic category – Continued

	No. of Case Mentions	No. of Single Exposures	Age					Reason				Outcome								
			<=5	6-12	13-19	>=20	Unknown Child	Unknown Adult	Unknown Age	Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death	
unknown	1	1	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	1	0	0
E-cigarettes: marijuana liquid with added flavors	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E-cigarettes: marijuana liquid without added flavors	6	5	0	0	3	2	0	0	0	0	4	0	0	1	5	0	4	1	0	0
Marijuana: concentrated extract (including oils and tinctures)	7384	2865	579	163	754	1163	8	137	61	1007	1387	103	249	2022	191	852	733	67	2	2
Marijuana: dried plant	23	19	7	0	2	10	0	0	0	9	5	0	4	12	3	10	2	2	0	0
Marijuana: edible preparation	2	2	1	0	0	1	0	0	0	2	0	0	0	1	0	2	0	0	0	0
Marijuana: oral capsule or pill																				
Marijuana: preparation	7	1	0	0	1	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0
Marijuana: other or unknown preparation	67	48	11	1	7	28	0	1	0	19	22	1	6	33	2	14	15	2	0	0
Marijuana: pharmaceutical preparation	1	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0
Marijuana: topical preparation	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marijuana: undried plant	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marijuana: tetrahydrocannabinol (THC) homologs	2703	1857	15	11	479	1210	1	122	19	84	1658	36	18	1717	96	484	750	180	3	3
Diet aids																				
Diet aids: phenylpropanolamine and caffeine combinations	5	3	1	0	0	2	0	0	0	2	1	0	0	2	1	1	1	1	0	0
Diet aids: caffeine combinations	8	5	3	0	0	2	0	0	0	5	0	0	0	1	1	1	0	0	0	0
Diet aids: phenylpropanolamine only	169	131	60	5	15	48	0	3	0	79	24	0	28	65	31	26	19	1	0	0
Other types of diet aid, over the counter only	25	18	8	0	2	7	0	1	0	10	5	0	3	14	4	4	4	0	0	0
Other types of diet aid, prescription only	57	36	12	1	7	15	0	1	0	17	10	0	9	16	8	6	6	0	0	0
Unknown types of diet aid																				
Miscellaneous stimulants and street drugs																				
Amphetamines and related compounds	16,313	10,147	3625	1807	1736	2726	13	179	61	6971	2674	40	293	5324	2592	1755	1716	102	3	3
Amyl or butyl nitrites (street drugs)	143	128	26	3	8	69	0	18	4	59	63	3	1	64	9	28	21	3	0	0
Caffeine	3702	2779	1107	88	412	1026	0	127	19	1608	714	14	422	846	459	493	351	16	0	0
Cocaine	5374	1261	72	7	68	993	1	89	31	128	1024	33	16	1079	185	226	363	82	10	0
Ephedrine	149	108	53	2	7	41	0	4	1	79	20	0	6	26	20	11	12	1	0	0
Gamma-hydroxybutyric acid including analogs or precursors	541	351	11	1	20	298	0	17	4	70	220	32	10	296	19	76	130	50	0	0
Hallucinogenic amphetamines	2026	1003	25	6	227	653	2	66	24	68	874	29	13	836	51	219	394	48	8	0
Heroin	7841	4319	20	1	182	3873	0	173	70	131	3974	111	26	3929	349	705	1473	986	56	0
Kratom	1	1	0	0	1	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0
Lysergic acid diethylamide (LSD)	981	575	4	7	333	194	1	15	21	22	526	17	3	505	20	116	310	21	0	0
Mescaline/peyote	61	47	6	2	4	31	1	3	0	28	17	0	2	24	2	16	7	1	0	0
Methamphetamine	6576	3343	222	69	208	2505	4	235	100	533	2597	87	28	2866	402	591	1090	233	12	0
Methylphenidate	9290	6350	1582	2587	1236	867	8	63	7	5140	1028	10	123	2145	1583	964	635	21	0	0
Other hallucinogens	92	58	0	1	14	42	0	1	0	6	51	0	1	53	2	13	32	3	0	0
Other stimulants (excluding amphetamines)	437	249	70	5	17	145	0	8	4	155	64	0	25	118	49	51	41	3	0	0
Other street drugs	585	359	10	5	37	283	0	19	5	29	304	12	2	315	16	54	144	41	2	0
Phenylcyclohexylpiperidine (PCP)	604	261	12	8	10	213	0	16	2	33	190	11	1	233	24	60	90	20	4	0
Unknown hallucinogens	9	6	0	0	2	4	0	0	0	0	5	1	0	6	0	0	2	0	0	0
Unknown stimulants or street drugs	227	140	3	2	36	86	0	13	0	10	118	5	2	123	9	22	58	18	4	0
Category total:	65,422	36,486	7549	4782	5830	16,542	39	1311	433	16,311	17,585	545	1292	22,685	6132	6808	8402	1901	104	0
Topical preparations																				
Miscellaneous topical preparations																				
Acne preparations	2086	1993	1087	110	261	425	3	94	13	1830	47	7	106	141	334	220	23	1	0	0
Boric acid or borates (as antiseptics, excluding insecticides)	97	95	28	0	0	53	0	14	0	86	4	1	4	10	19	7	0	1	0	0
Calamine (including all caladryl type products)	2090	2036	1464	73	26	417	4	49	3	2007	17	2	8	134	273	184	9	0	0	0
Camphor	10,600	10,371	8759	206	168	1053	12	160	13	10,137	142	21	60	1099	2889	1088	70	10	0	0
Camphor and methyl salicylate combinations	1358	1336	1060	41	17	191	1	25	1	1306	9	2	18	142	380	167	10	0	0	0
Diaper care and rash products	24,524	24,102	22,753	267	148	760	37	120	17	24,013	45	4	35	436	2963	627	16	0	0	0
Hexachlorophene containing	18	17	8	0	1	7	0	1	0	16	0	0	1	2	0	5	0	0	0	0
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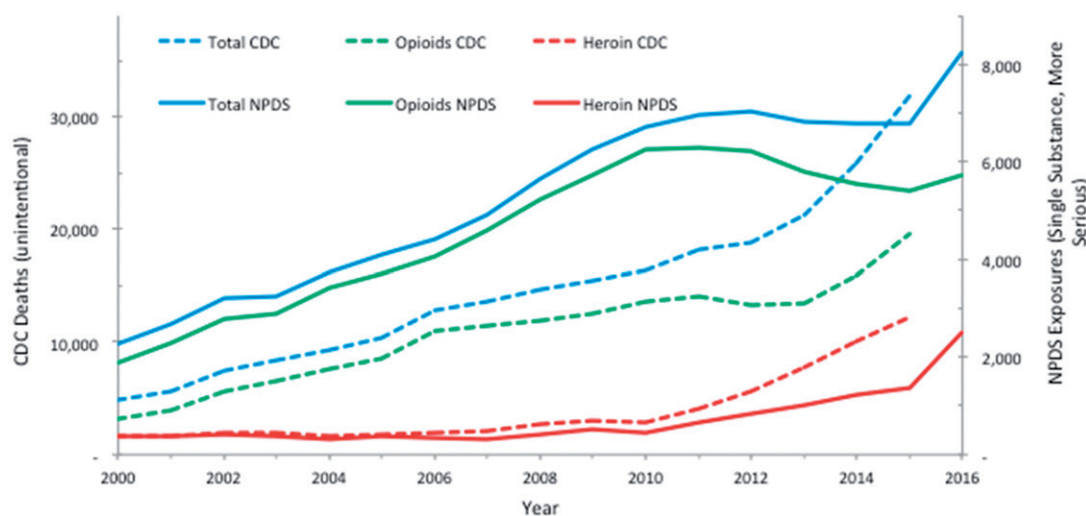
Table 22(B). Demographic profile of SINGLE SUBSTANCE Pharmaceuticals exposure cases by generic category – Continued

	No. of Case Mentions	No. of Single Exposures	Age					Reason				Outcome										
			<=5	6-12	13-19	>=20	Unknown	Child	Unknown	Adult	Unknown	Age	Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
antiseptics	6631	6358	2178	274	341	3120	7	412	26	6071	202	24	50	590	702	1095	64	2	0			
Hydrogen peroxide 3% iodine or iodine containing antiseptics	1004	905	216	51	61	485	2	86	4	752	89	3	57	170	173	140	21	0	0			
Mercury containing antiseptics	41	39	24	0	0	13	0	2	0	33	3	1	2	12	7	2	1	0	0			
Methyl salicylate	6661	6573	4736	279	162	1134	9	240	13	6344	61	17	139	631	1276	903	34	4	0			
Minoxidil, topical	167	162	45	2	1	100	0	13	1	139	4	0	18	37	22	20	13	1	0			
Other types of rubefacient or liniment (excluding camphor and methyl salicylate)	3909	3833	2696	89	76	792	3	169	8	3532	26	6	268	200	606	597	32	1	0			
Other types of topical antiseptic	1947	1893	1023	92	91	596	1	86	4	1768	64	6	45	231	338	231	27	1	0			
Podophyllin	52	49	21	5	0	19	0	4	0	38	1	0	10	12	17	7	4	0	0			
Silver nitrate	103	74	19	2	23	20	1	7	2	59	5	0	9	19	12	19	4	0	0			
Topical steroids (including otc, ophthalmic, and dermal preparations)	8730	8537	4898	620	170	2332	14	470	33	8397	49	4	86	189	1067	287	10	0	0			
Topical steroids in combination with antibiotics (including otc, ophthalmic, and dermal preparations)	865	839	366	58	21	329	2	60	3	805	6	4	24	50	91	119	7	0	0			
Wart preparations and other keratolytics	1152	1140	649	101	42	280	1	63	4	1070	19	7	43	194	212	180	40	0	1			
Category total: Unknown drug	72,035	70,352	52,030	2270	1609	12,126	97	2075	145	68,403	793	109	983	4299	11,381	5898	385	21	1			
Miscellaneous unknown drug	25,027	17,066	4673	698	2181	8322	68	806	318	6579	6446	806	558	12,612	3225	2891	3674	1261	131			
Category total: Veterinary drugs	25,027	17,066	4673	698	2181	8322	68	806	318	6579	6446	806	558	12,612	3225	2891	3674	1261	131			
Miscellaneous veterinary drugs without human equivalent	5048	4703	1113	81	112	2921	5	412	59	4598	52	9	36	455	1150	455	52	7	0			
Category total: Vitamins	5048	4703	1113	81	112	2921	5	412	59	4598	52	9	36	455	1150	455	52	7	0			
Miscellaneous vitamins	768	606	447	52	22	72	0	11	2	552	28	1	25	78	128	29	6	0	0			
Other types of vitamin	726	520	370	51	26	54	4	11	4	465	34	1	14	72	108	19	5	0	0			
Multiple vitamin liquids: adult formulations	10	9	8	0	0	1	0	0	0	9	0	0	0	0	3	0	0	0	0			
Multiple vitamin liquids: adult formulations with fluoride (no iron)	214	176	109	10	8	41	0	7	1	155	7	1	12	19	32	7	1	0	0			
Multiple vitamin liquids: adult formulations with iron (no fluoride)	10	8	7	0	0	1	0	0	0	8	0	0	0	0	3	0	0	0	0			
Multiple vitamin liquids: adult formulations with iron and fluoride	483	372	277	33	18	39	1	4	0	340	26	1	5	26	76	8	5	1	0			
Multiple vitamin liquids: adult formulations without iron or fluoride																						
Multiple vitamin liquids: pediatric formulations																						
Multiple vitamin liquids: pediatric formulations with fluoride (no iron)	82	79	77	1	0	1	0	0	0	78	1	0	0	3	11	2	0	0	0			
Multiple vitamin liquids: pediatric formulations with iron (no fluoride)	501	475	452	16	4	1	1	0	1	462	2	5	5	35	103	19	2	0	0			
Multiple vitamin liquids: pediatric formulations with iron and fluoride	33	33	33	0	0	0	0	0	0	32	0	1	0	2	4	1	0	0	0			
Multiple vitamin liquids: pediatric formulations without iron or fluoride	833	790	679	91	8	6	1	4	1	759	20	2	7	34	119	35	2	0	0			
Multiple vitamin tablets: adult formulations																						
Multiple vitamin tablets: adult formulations with fluoride (no iron)	88	71	64	4	0	3	0	0	0	70	1	0	0	5	12	3	0	0	0			
Multiple vitamin tablets: adult formulations with iron (no fluoride)	5241	4275	3274	108	135	660	3	84	11	4060	151	3	59	403	938	179	13	0	0			
Multiple vitamin tablets: adult formulations with iron (no fluoride)	33	26	16	3	0	6	0	1	0	24	1	0	1	0	7	0	0	0	0			

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**Figure 6.** The change over time for NPDS single substance more serious exposures (solid lines) to heroin, non-heroin opioid medications, and the sum (total NPDS). The broken lines show unintentional fatalities reported in CDC WONDER multiple cause of death reports for the same subsets.

heroin, although this cannot be confirmed by these data. The increases in illicit fentanyl-associated deaths represent an emerging and troubling feature of the rise in illicit opioid overdoses that were heretofore presumed to involve only heroin [8,9].

## Discussion

The exposure cases and information requests reported by PCs in 2016 do not reflect the full extent of PC efforts, which also include poison prevention activities and public and health care professional education programs.

NPDS exposure data may be considered “numerator data” in the absence of a true denominator, that is, we do not know the number of actual exposures that occur in the population. NPDS data cover only those exposures which are reported to PCs since poison exposures and poisoning deaths are not currently reportable events.

NPDS 2000–2016 call volume data clearly demonstrate a continuing decrease in exposure cases. This decline has been apparent and increasing since mid-2007 and reflects the decreasing use of the PC for less serious exposures. However, in contrast, during this same period, exposures with a more serious outcome (death, major, moderate) and HCF cases have continued a consistent increase. Possible contributors to the declining PC access include: declining US birth rate (especially since exposure rates are much higher in children  $\leq 5$  years of age), increasing use of text rather than voice communication, and increasing use of and reliance on internet search engines and web resources. To meet our public health goals, PCs will need to understand and meet the public’s twenty-first century communication preferences. We are concerned that failure to respond to these changes may result in a retro-shift with more people seeking medical care at HCFs for exposures that could have been managed at home by a PC. Likewise minor exposures may progress to more serious morbidity and mortality because of incorrect internet information or no telephone management. The net

effect could be more serious poisoning outcomes because fewer people took advantage of PC services, with a resultant increased burden on the national healthcare infrastructure as may be reflected in the increased number of cases managed in a HCF this year.

NPDS statistical analyses indicate that all analgesic exposures including opioids and sedatives are increasing year over year. This trend is shown in Table 17(B) and Figure 4. NPDS data mirror CDC data that demonstrates similar findings [7]. Thus NPDS provides a real-time view of these public health issues without the need for data source extrapolations.

One of the limitations of NPDS data has been the perceived lack of fatality case volume compared with other reporting sources. However, when change over time is studied, NPDS is clearly consistent with other public health fatality analyses. One of the issues leading to this concern is the fact that medical record systems seldom have common output streams. This is particularly apparent with the various electronic medical record systems available. It is important to build a federated approach similar to the one modeled by NPDS to allow data sharing, for example, between hospital emergency departments and other medical record systems, including medical examiner offices, nationwide. Enhancements to NPDS can promote interoperability between NPDS and electronic medical records systems to better trend poison-related morbidity and mortality in the US and internationally.

## Summary

Unintentional and intentional exposures continue to be a significant cause of morbidity and mortality in the US. The near real-time, always current status of NPDS represents a national public health resource to collect and monitor US exposure cases and information calls.

Changes in 2016 encounters are shown in Figures 1, 3, and 4, and include:

- Total encounters (all exposure and information calls) decreased by 2.94%.
- All information calls decreased 12.5%, Drug ID calls decreased 29.6%, and human exposures decreased 0.431%.
- HCF information requests increased 0.454% and HCF exposure cases *increased* 3.63% in line with the steady increase since 2000.
- Human exposures with less serious outcomes decreased 0.739% while those with more serious outcomes (moderate, major or death) *increased* 2.89% compared to an overall 4.39% yearly increase since 2000.
- The categories of substance exposures in cases with more serious outcomes increasing most rapidly are: sedative/hypnotics/antipsychotics, followed by analgesics, antidepressants, and cardiovascular drugs.

These data support the continued value of PC expertise and need for specialized medical toxicology information to manage the more severe exposures, despite a decrease in cases involving less severe exposures. Poison centers must consider newer communication approaches that match current public communication patterns in addition to the traditional telephone call.

The continuing mission of NPDS is to provide a nationwide infrastructure for public health surveillance for all types of exposures, public health event identification, resilience, response and situational awareness tracking. NPDS is a model system for the nation and global public health.

## Disclaimer

The American Association of Poison Control Centers (AAPCC; <http://www.aapcc.org>) maintains the national database of information logged by the country's regional Poison Centers (PCs) serving all 50 United States, Puerto Rico, and the District of Columbia. Case records in this database are from self-reported calls: they reflect only information provided when the public or healthcare professionals report an actual or potential exposure to a substance (e.g. an ingestion, inhalation, or topical exposure, etc.) or request information/educational materials. Exposures do not necessarily represent a poisoning or overdose. The AAPCC is not able to completely verify the accuracy of every report made to member centers. Additional exposures may go unreported to PCs and data referenced from the AAPCC should not be construed to represent the complete incidence of national exposures to any substance(s).

## Disclosure statement

No potential conflict of interest was reported by the authors.

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## Appendix A: Acknowledgments

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## Poison centers (PCs)

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As in previous years, the initial review of reported fatalities and development of the narratives and case data for NPDS was the responsibility of the staff at the 55 participating PCs. Many individuals at each center participated in the fatality case preparation. These toxicology professionals and their centers are:

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The Lead and Peer review of the 2016 fatalities was carried out by the 47 individuals listed here including 6 who reviewed the pediatric cases [Peds]. The authors and the AAPCC wish to express our appreciation for their volunteerism, dedication, hard work and good will in completing this task in a limited time frame.

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NPDS surveillance anomalies are analyzed daily by a team of 10 medical and clinical toxicologists working across the country in a distributed system. These dedicated professionals interface with the Health Studies Branch, National Center for Environmental Health, Centers for Disease Control and Prevention (HSB/NCEH/CDC) and the PCs on a regular basis to identify anomalies of public health significance and improve NPDS surveillance systems:

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### Regional poison center fatality awards

Each year the AAPCC and the Fatality Review team recognizes several regional PCs for their extra effort in their preparation of fatality reports and prompt responses to reviewer queries during the review process. The awards are presented each year at the North American Congress of Clinical Toxicology Annual meeting.

First Center to Complete all Cases (3 January 2017, 43 cases)  
 Oregon Poison Center (Portland)  
 Largest Number with Autopsy Reports (56 of 87 cases; 64%)  
 Carolinas Poison Center (Charlotte)  
 Highest Percentage with Autopsy Reports (73% of 15 cases)  
 Oklahoma Poison Control Center (Oklahoma City)  
 Largest Number of INDIRECT cases ( $n = 13$ ; 10% of all 2016 cases)  
 Central Ohio Poison Center (Columbus)  
 Highest Overall Quality of Reports (5.24 out of possible 12 for 29 cases)  
 Oklahoma Poison Control Center (Oklahoma City)  
 Greatest improvement in Overall Quality of Reports (1.84 increase from last year)  
 Tennessee Poison Center (Nashville)  
 Most Narratives Published 2016 Annual report (nine of the 69 published narratives)  
 Carolinas Poison Center (Charlotte)  
 Most Helpful Regional Poison Center Staff (based on survey of AAPCC review team)  
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## Appendix B: Data definitions

### Reason for exposure

NPDS classifies all calls as either EXPOSURE (concern about an exposure to a substance) or INFORMATION (no exposed human or animal). A call may provide information about one or more exposed person or animal (receptors).

Specialists in Poison Information (SPIs) coded the reasons for exposure reported by callers to PCs according to the following definitions:

*Unintentional general:* All unintentional exposures not otherwise defined below.

*Environmental:* Any passive, non-occupational exposure that results from contamination of air, water, or soil. Environmental exposures are usually caused by manmade contaminants.

*Occupational:* An exposure that occurs as a direct result of the person being on the job or in the workplace.

*Therapeutic error:* An unintentional deviation from a proper therapeutic regimen that results in the wrong dose, incorrect route of administration, administration to the wrong person, or administration of the wrong substance. Only exposures to medications or products used as medications are included. Drug interactions resulting from unintentional administration of drugs or foods which are known to interact are also included.

*Unintentional misuse:* Unintentional, improper or incorrect use of a non-pharmaceutical substance. Unintentional misuse differs from intentional misuse in that the exposure was unplanned or not foreseen by the patient.

*Bite/sting:* All animal bites and stings, with or without envenomation, are included.

*Food poisoning:* Suspected or confirmed food poisoning; ingestion of food contaminated with micro-organisms is included.

*Unintentional unknown:* An exposure determined to be unintentional, but the exact reason is unknown.

*Suspected suicidal:* An exposure resulting from the inappropriate use of a substance for reasons that are suspected to be self-destructive or manipulative.

*Intentional misuse:* An exposure resulting from the intentional improper or incorrect use for reasons other than the pursuit of a psychotropic effect.

**Intentional abuse:** An exposure resulting from the intentional improper or incorrect use where the patient was likely attempting to gain a high, euphoric effect, or some other psychotropic effect, including recreational use of a substance for any effect.

**Contaminant/tampering:** The patient is an unintentional victim of a substance that has been adulterated (either maliciously or unintentionally) by the introduction of an undesirable substance.

**Malicious:** Patients who are victims of another person's intent to harm them.

**Withdrawal:** Inquiry about or experiencing of symptoms from a decline in blood concentration of a pharmaceutical or other substance after discontinuing therapeutic use or abuse of that substance.

**Adverse reaction drug:** Unwanted effects due to an allergic, hypersensitivity, or idiosyncratic response to the active ingredient(s), inactive ingredient(s) or excipient of a drug, chemical, or other drug substance when the exposure involves the normal, prescribed, labeled or recommended use of the substance.

**Adverse reaction food:** Unwanted effects due to an allergic, hypersensitivity, or idiosyncratic response to a food substance.

**Adverse reaction other:** Unwanted effects due to an allergic, hypersensitivity, or idiosyncratic response to a substance other than drug or food.

**Unknown reason:** Reason for the exposure cannot be determined or no other category is appropriate.

## Medical outcome

**No effect:** The patient did not develop any signs or symptoms as a result of the exposure.

**Minor effect:** The patient developed some signs or symptoms as a result of the exposure, but they were minimally bothersome and generally resolved rapidly with no residual disability or disfigurement. A minor effect is often limited to the skin or mucus membranes (e.g. self-limited gastrointestinal symptoms, drowsiness, skin irritation, first-degree dermal burn, sinus tachycardia without hypotension, and transient cough).

**Moderate effect:** The patient exhibited signs or symptoms as a result of the exposure that were more pronounced, more prolonged, or more systemic in nature than minor symptoms. Usually, some form of treatment is indicated. Symptoms were not life-threatening, and the patient had no residual disability or disfigurement (e.g. corneal abrasion, acid-base disturbance, high fever, disorientation, hypotension that is rapidly responsive to treatment, and isolated brief seizures that respond readily to treatment).

**Major effect:** The patient exhibited signs or symptoms as a result of the exposure that were life-threatening or resulted in significant residual disability or disfigurement (e.g. repeated seizures or status epilepticus, respiratory compromise requiring intubation, ventricular tachycardia with hypotension, cardiac or respiratory arrest, esophageal stricture, and disseminated intravascular coagulation).

**Death:** The patient died as a result of the exposure or as a direct complication of the exposure.

**Not followed, judged as non-toxic exposure:** No follow-up calls were made to determine the outcome of the exposure because the substance implicated was non-toxic, the amount implicated was insignificant, or the route of exposure was unlikely to result in a clinical effect.

**Not followed, minimal clinical effects possible:** No follow-up calls were made to determine the patient's outcome because the exposure was likely to result in only minimal toxicity of a trivial nature. (The patient was expected to experience no more than a minor effect.)

**Unable to follow, judged as a potentially toxic exposure:** The patient was lost to follow-up, refused follow-up, or was not followed, but the exposure was significant and may have resulted in a moderate, major, or fatal outcome.

**Unrelated effect:** The exposure was probably not responsible for the effect.

**Confirmed non-exposure:** This outcome option was coded to designate cases where there was reliable and objective evidence that an exposure initially believed to have occurred actually never occurred (e.g. all

missing pills are later located). All cases coded as confirmed non-exposure are excluded from this report.

**Death, indirect report:** Death, indirect report are deaths that the poison center acquired from medical examiner or media, but did not manage nor answer any questions about the death.

## Relative contribution to fatality (RCF)

The case review team (CRT) includes the author and reviewer from the RPC, The AAPCC lead reviewer, peer reviewer and manager.

The definitions used for the RCF classification were as follows:

1. **Undoubtedly responsible:** In the opinion of the CRT the Clinical Case Evidence establishes beyond a reasonable doubt that the SUBSTANCES actually caused the death.
2. **Probably responsible:** In the opinion of the CRT the Clinical Case Evidence suggests that the SUBSTANCES caused the death, but some reasonable doubt remained.
3. **Contributory:** In the opinion of the CRT the Clinical Case Evidence establishes that the SUBSTANCES contributed to the death, but did not solely cause the death. That is, the SUBSTANCES alone would not have caused the death, but combined with other factors, were partially responsible for the death.
4. **Probably not responsible:** In the opinion of the CRT the Clinical Case Evidence establishes to a reasonable probability, but not conclusively, that the SUBSTANCES associated with the death did not cause the death.
5. **Clearly not responsible:** In the opinion of the CRT the Clinical Case Evidence establishes beyond a reasonable doubt that the SUBSTANCES did not cause this death.
6. **Unknown:** In the opinion of the CRT the Clinical Case Evidence is insufficient to impute or refute a causative relationship for the SUBSTANCES in this death.

## Appendix C

### Narratives of Selected Cases

**Selection of Narratives for Publication.** The narratives included in Appendix C were selected for publication in a 3-stage process consisting of qualifying, ranking, and reading. Changes in place since the 2014 report for the selection of the top 200 cases: include all pregnant subjects, include all children (0–2 year old) subjects, increase (double) the weight on the autopsy report, add a weighting for Age of subject (1/age in years), add a weighting for infrequency of substance category (Generic Code).

Qualifying cases were thus age 0–2 year old, Pregnant, or RCF = 1 – undoubtedly responsible, 2 – probably responsible, or 3 – contributory. Fatalities by indirect report were excluded beginning with the 2008 annual report. The ranking was based on Final Case Weighting (FCW).

FCW =

$$f \left[ \frac{1}{(\text{num substances in this case})}, \text{WCS}, \frac{1}{\text{age (years)}}, \frac{1}{(\text{num cases in that generic code this year})} \right]$$

where

Weighted case score (WCS) =

$$\begin{aligned} & \text{hospital records} * 8.8 + \text{postmortem} * 15.2 \\ & + \text{blood levels} * 6.9 + \text{quality/completeness} * 6.4 \\ & + \text{novelty/educational value} * 13.2 \end{aligned}$$

WCS scores were normalized (z-score) within each AAPCC reviewer before the final weighting: 25% for each (1/NumSubstances, WCS, 1/Age, 1/NumCodes). The WCS weighting factors were the averages of review team recommendations gathered in 2006.

The top ranked narratives (200 + ties) were each read by individual reviewers who volunteered (see Appendix A) and the two managers (D. A. S. and D. E. B.). Each reader judged each narrative as "publish" or "omit" and all narratives receiving eight or more of 12 publish votes were selected, further edited, cross-reviewed by the two managers and JBM, and published in this report.



**Narratives.** Narratives of the cases were selected (see Selection of Narratives for Publication, above) from the human fatalities judged related to an exposure as reported to US PCs in 2016. A structured format for narratives was required in the PC preparation of the narratives and was used in the narratives presented. Abbreviations, units, and normal ranges omitted from the narratives are given at the end of this appendix.

**Case 41. Acute model racing fuel ingestion: undoubtedly responsible**

*Scenario/substances:* A 16 y/o male ingested model racing fuel and developed persistent emesis overnight. The next day he had a seizure and was transported by EMS to the ED.

*Past medical history:* Polysubstance abuse, history of abusing medication and drinking racing fuel with friends.

*Physical exam:* Respiratory failure, seizure, unresponsive with fixed pupils, T 35 °C.

*Laboratory/diagnostic findings:* ABG-pH <6.72/pCO<sub>2</sub> 24/HCO<sub>3</sub> 2. Repeat ABG-pHs: 7.1 then 7.34. Initial methanol concentration was 175 mg/dL, falling to 12 mg/dL on Day 3. Initial AG ~30, repeat was 42, lactate 12.8, then 2.5, BUN 21, Na 151, Cr 1.49.

*Clinical course:* In the ED he developed respiratory failure and seized, he was intubated and transferred to a children's hospital. CxR showed a pneumomediastinum. He received several amps of sodium bicarbonate and his pH improved to 7.1. Fomepizole was initiated, and CRRT was started. He was rewarmed and received folic acid and IVFs, he required a dopamine infusion. His neurological status did not improve and he died on Day 5.

*Autopsy findings:* Cause of Death: methanol toxicity.

**Case 65. Acute hymenoptera sting: undoubtedly responsible**

*Scenario/substances:* A 23 y/o male was hiking in the desert when he was stung >600 times by bees. EMS found the patient unresponsive. ACLS resuscitation was initiated after an estimated 40 min down time.

*Clinical course:* In the ED, CPR and ACLS interventions were continued for asystole. He received epinephrine, methylprednisolone, diphenhydramine, famotidine and IVFs without response. He died <1 h after ED presentation.

*Autopsy findings:* Not available.

**Case 66. Acute rattlesnake bite: undoubtedly responsible**

*Scenario/substances:* A 48 y/o male was bitten on the finger by a Western Diamondback rattlesnake while attempting to relocate the snake. He presented to the ED three days after the envenomation.

*Past medical history:* History of prior snakebite, allergic reaction to Antivenom (Crotalidae) Polyvalent.

*Laboratory/diagnostic findings:* In the ED: Hgb <7, INR 2.0, AST 2,026, ALT 2,701, CK 15,000.

*Clinical course:* In the ED, he received 6 vials of Crotalidae Polyvalent Immune Fab (ovine) with no apparent adverse reaction and was admitted to the ICU. 8 h later he developed hemorrhagic shock requiring vasopressors and 1 unit of PRBC and 2 units of platelets. He developed compartment syndrome of the right arm requiring fasciotomy and a wound vacuum, and antibiotics. He was intubated; renal function declined rapidly and CRRT was initiated. An additional 10 vials of antivenom were administered. Platelets 113, PT 26.3 (INR 2.44), fibrinogen 101, WBC 39.9/Hgb 7.2/Hct 23, AST 5305, ALT 3038, CK 33,000. On Day 2 he became anuric and his LDH, CK and PT/INR continued to rise. He received vasopressors sodium bicarbonate drip, 10 more vials of antivenom, and was transferred to a tertiary care facility. He remained on the ventilator with CRRT. Minimal neurologic activity was noted. He received an additional 10 vials of antivenom, 2 units of PRBCs, 4 units FFP, 10 units cryoprecipitate and 1 unit of platelets. On Day 4 pressor requirements increased, and the envenomated finger was amputated. CRRT and ventilation continued over the next several days. He remained anuric, jaundiced, and exhibited no purposeful movement. Surgery for an acute abdomen revealed a perforated bowel. He died on Day 10.

*Autopsy findings:* Probable cause of death: multisystem organ failure sequelae of snakebite to right hand. Manner of death: accident

**Case 67. Acute envenomation (Crotalidae) bite: undoubtedly responsible**

*Scenario/substances:* A 53 y/o male was bitten in the hand by the decapitated head of a rattlesnake (unknown species) he had just captured and killed. While being airlifted to a HCF, he developed bradycardia, dyspnea and then cardiac arrest.

*Physical exam:* He achieved ROSC prior to ED arrival. At the tertiary care facility: BP 112/56, HR 82, RR "tachypneic" (on ventilator). He was tremulous, bleeding from multiple sites, and had edema to the bite site.

*Laboratory/diagnostic findings:* Initial labs: PT 30.9, INR 1.4, platelets 265, fibrinogen 174, d-dimer > 20 mcg/ml, AST 1210, ALT 607.

*Clinical course:* The patient was transferred to a tertiary care HCF where he was intubated and sedated, anoxic brain injury was suspected. He received 23 vials of Crotalidae Fab antivenom, FFP and cryoprecipitate over his 4-day hospital course. Initial control was achieved with improvement in coagulation parameters and edema, but he failed to improve neurologically. Based on the prognosis, comfort measures were instituted and he died on Day 4.

*Autopsy findings:* Not performed.

**Case 80. Acute ethyl chloride inhalation and ethanol ingestion: undoubtedly responsible**

*Scenario/substances:* A 32 y/o male was found down ~20 min after huffing a chloroethane-containing solvent. EMS found him in PEA and transported him to the ED.

*Physical exam:* BP 100/76, HR 113, RR 14, O<sub>2</sub> sat 99% on FiO<sub>2</sub> 50%, T 39.4°C; comatose, pupils fixed and dilated, no gag reflex.

*Laboratory/diagnostic findings:* ABG-pH 7.16/pCO<sub>2</sub> 40.7/HCO<sub>3</sub> 14.3, CK 6999, troponin 0.096. Serum APAP and salicylate not detected.

*Clinical course:* In the ED he coded, was defibrillated, resuscitated, intubated and placed on a ventilator without sedation. He received IVF and sodium bicarbonate for acidosis. Head CT and MRI showed severe anoxic brain injury; he progressed to herniation. RR decreased and he died less than 24 h after arrival.

*Autopsy findings:* Toxicology results: (hospital peripheral blood): ethanol 110 mg/dL, chloroethane 31 mcg/mL. Cause of death: drug and alcohol intoxication.

**Case 84. Acute sodium metasilicate and ethanol ingestion: undoubtedly responsible**

*Scenario/substances:* A 38 y/o male presented with nausea, vomiting, abdominal pain and bloody oral secretions several h after an intentional ingesting 900 ml bottle of sodium metasilicate solution.

*Past medical history:* Depression. Medications: tramadol and hydromorphone.

*Physical exam:* BP 154/102, HR 108, RR 16, O<sub>2</sub> sat 96% on RA. He was talking normally with benign oral and abdominal examinations.

*Laboratory/diagnostic findings:* ABG-pH 7.25/pCO<sub>2</sub> 43/pO<sub>2</sub> 73/HCO<sub>3</sub> 18.8/BE -8, Na 143/K 3.6/Cl 99/CO<sub>2</sub> 26/BUN 11/Cr 1.1/Glu 194, AG 18, lactate 4.04, Ca 9.9. WBC 35.1/Hgb 20.4/Hct 58.3/platelets 256. Serum APAP and salicylate not detected; serum ethanol 149 mg/dL. EKG: sinus tachycardia.

*Clinical course:* This patient received IVFs and a proton pump inhibitor. About 6 h later he developed throat pain and hematemesis, with persistent HTN requiring anti-hypertensives. On Day 2 he had a complicated intubation due to upper esophageal swelling, he received steroids and started on TPN. He developed a rigid abdomen and bloody stools. CT showed gastric necrosis and a pleural effusion. Bronchoscopy showed extensive airway necrosis with bleeding and sloughing mucosa. He developed hyperkalemia requiring Ca, insulin and D50W. Acidosis was treated with a bicarbonate infusion. His urine output fluctuated during his hospital stay, HD was begun for oliguria. His Hgb fell; he became febrile and septic. Based on the prognosis, the family opted for institution of comfort measures and he died on Day 8.

*Autopsy findings:* Cause of death: caustic ingestion.

**Case 93. Acute hydrochloric acid ingestion: undoubtedly responsible**

*Scenario/substances:* A 54 y/o male ingested ~0.5 liter of 31.5% muriatic acid (HCl) and cut his neck about 40 min prior to being found by family.

*Past medical history:* Psychiatric disease, alcohol abuse.

*Physical exam:* Talking, hoarse voice.

*Laboratory/diagnostic findings:* No data provided.

*Clinical course:* He had an emergent cricothyroidectomy in the ED and was then taken OR for concern of perforation. His internal injuries (necrosis of the esophagus, stomach, duodenum, jejunum, pancreas, left lobe of liver and overlying abdominal wall) were judged incompatible with life. He was hypotensive in the OR, made DNR, and died later that day in the ICU.

*Autopsy findings:* Right-sided neck laceration (3.75-inch) through superficial tissue. Patient's lips were black, dark red/brown fluid drainage. Cause of death: acid chemical ingestion. Manner of death: suicide.

#### **Case 103. Acute cyanide ingestion: undoubtedly responsible**

*Scenario/substances:* A 62 y/o male ingested potassium cyanide during court house proceedings. Police noted "white powder" around his mouth. EMS found him breathing and with a pulse, GCS 3. He arrived in the ED within 20 min.

*Past medical history:* Prior suicide attempts.

*Laboratory/diagnostic findings:* ABG-pH 6.8, lactate 17.

*Clinical course:* In the ED, he was intubated. GCS 3, SBP 70s, bradycardic. He received IVFs, hydroxocobalamin and epinephrine, but developed PEA and died ~40 min after ED arrival.

*Autopsy findings:* Not available.

#### **Case 107. Acute hydrofluoric acid ingestion: undoubtedly responsible**

*Scenario/substances:* A 71 y/o male accidentally drank 1 oz of hydrofluoric acid at work, 30 min prior to ED arrival. He drank milk, but immediately vomited.

*Past medical history:* DM.

*Laboratory/diagnostic findings:* Na 138/K 3.7/Cl 100/CO<sub>2</sub> 22/BUN 25/Cr 0.97/Glu 179, AG 16, Ca 8.3, AST 25, ALT 32. WBC 15.7/Hgb 15.8/Hct 45.1/platelets 284, PT 12.1, INR 0.9, PTT 21.5, ionized Ca 1.01, Mg 1.9.

*Clinical course:* The patient reported no pain, BP 109/72, HR 122, RR 17, T 36.9 °C. He was given IVFs, Ca, Mg, ondansetron and pantoprazole. He coded and was defibrillated 3 times. He went into VF and received amiodarone and Ca. He woke up and followed commands but then coded again. He was then intubated and placed on a Ca infusion. Mg was normal but ionized Ca was low (1.08). He was transferred to a tertiary care center and placed on HD for 3 hours, but died that evening.

*Autopsy findings:* Not available.

#### **Case 110. Acute anhydrous ammonia inhalation, ocular, dermal: undoubtedly responsible**

*Scenario/substances:* An 80 y/o male suffered an anhydrous ammonia exposure (inhalational, ocular and dermal) after an ammonia line leaked into the cabin of his tractor. He had dyspnea during private vehicle transport to an ED, arriving 45 min following the exposure.

*Past medical history:* HTN, glaucoma.

*Physical exam:* Patient was initially alert and oriented, complaining of dyspnea and dysphagia, he had excessive secretions with conjunctival irritation and constricted pupils. Initial BP 187/112, HR 124, RR 24, T 35.8 °C. Ocular pH: right eye = 7.5–8, left eye 6.5 (post-irrigation). Ecchymosis and erythema of right forearm noted.

*Laboratory/diagnostic findings:* CBC "normal", K 2.9, Glu 211, BUN 26, Cr 1.3, lactate 4.5, AG 17. ABG-pH 7.34/pCO<sub>2</sub> 40/pO<sub>2</sub> 309/HCO<sub>3</sub> 22. Initial CxR unremarkable.

*Clinical course:* Patient developed progressive respiratory failure and was intubated and sedated, then transferred to a tertiary care center. He was given IVFs, antibiotics, ascorbic acid and corticosteroids. He initially awoke after sedation wore off, lungs were clear. His head CT and EEG normal. Day 5: bronchoscopy showed erythematous, sloughing mucosa with petechiae; a cryoprobe was used to remove excessive secretions. Day 6: a 2nd bronchoscopy showed healing lesions and thick secretions, which grew *Enterobacter*. The Day 15 bronchoscopy was much improved and he was extubated, but immediately re-intubated. Based on the prognosis, family opted for comfort measure and he died on Day 29.

*Autopsy findings:* Not available.

#### **Case 119. Bleach (peroxide) ingestion: undoubtedly responsible**

*Scenario/substances:* A 57 y/o male intentionally ingested an unknown amount of household bleach. He had multiple episodes of hematemesis at home.

*Past medical history:* Diabetes, HTN, depression.

*Laboratory/diagnostic findings:* After intubation: ABG-pH 7.18/pCO<sub>2</sub> 29/pO<sub>2</sub> 249/HCO<sub>3</sub> 10; Na 158/K 3.8/Cl 122/CO<sub>2</sub> 17/BUN 13/Cr 0.9/Glu 253, AG 19, Ca 4.3, Mg 2.1, lactate 3.9, troponin 0.12. Serum APAP, ethanol and salicylate not detected; UDS was negative. CT of abdomen showed pneumotosis in stomach wall with portal venous gas extending throughout the liver; gastric and bowel distension was seen throughout. Day 2: Na 178/K 2.7/Cl 149/CO<sub>2</sub> 18/BUN 24/Cr 2.0/Glu 317, Ca 6.4, AST 83, ALT 27, lactate 5.6; ABG-pH 7.12; Hgb 10.8/Hct 34.4/platelets 130.

*Clinical course:* He arrived at the ED 1 h after ingestion and was intubated. BP 106/50, HR 125, RR 14.0, O<sub>2</sub> sat 97% on 100.0 % FiO<sub>2</sub>. In the ICU, his mental status was depressed and he had a bloody bowel movement. He received multiple vasopressors and a bicarbonate infusion. On Day 2 he became anuric; albumin and bumetanide were given; hypotension prevented HD. On Day 3 he had repeated seizures, cardiac arrest and died prior to a scheduled gastrectomy.

*Autopsy findings:* Cause of death: gastric perforation and chemical peritonitis as complications from intentional bleach ingestion. Manner of death: suicide.

#### **Case 124. Acute drain cleaner (hydrochloric acid) ingestion: probably responsible**

*Scenario/substances:* A 64 y/o female drank 4 mouthfuls of a drain cleaner (5–15% hydrochloric acid) and then called EMS 3 h later.

*Physical exam:* In the ED, she was awake and alert; no oral burns were apparent. BP 131/72, HR 122, RR 40, O<sub>2</sub> sat 97% on room air.

*Laboratory/diagnostic findings:* VBg-pH 7.03/pCO<sub>2</sub> 21/HCO<sub>3</sub> 5. Serum APAP, ethanol and salicylate not detected.

*Clinical course:* She was admitted with planned endoscopy, but this was deferred. Within 6 h of presentation she became increasingly tachypneic (RR 70) and hypotensive (70/40) despite high-dose vasopressors. She was intubated. Abdominal CT showed intestinal perforation. Based on the prognosis, the family opted for institution of comfort measures and she died within 24 h of presentation.

*Autopsy findings:* Not available.

#### **Case 140. Acute hydrogen peroxide ingestion: undoubtedly responsible**

*Scenario/substances:* A 60 y/o female presented after an acute, intentional ingestion of 35% hydrogen peroxide.

*Past medical history:* Dementia.

*Laboratory/diagnostic findings:* ABG-pH 7.32/pCO<sub>2</sub> 49/pO<sub>2</sub> 70, K 3.4.

*Clinical course:* She was transferred to a tertiary care facility. Initial O<sub>2</sub> sat was 91% on 2L, CT showed massive air emboli throughout portal venous system, mediastinal air and esophageal perforation. Patient refused treatments, including surgery and HBO. Healthcare proxy made patient DNR and she died "several" days later.

*Autopsy findings:* Not available.

#### **Case 147. Acute carbon monoxide inhalation: undoubtedly responsible**

*Scenario/substances:* A 3 y/o male was found inside a home after a house fire. The family had been using the kitchen stove for heat. A smoke detector was not working.

*Past medical history:* Asthma.

*Physical exam:* He had soot on his face, nose, hands, arms and legs, and in his nares and mouth. There were no burns.

*Autopsy findings:* COHb (subclavian blood): >60%. Cause of death: carbon monoxide toxicity due to house fire.

#### **Case 162. Acute helium inhalation: undoubtedly responsible**

*Scenario/substances:* A 26 y/o male was found unconscious in his home, by his father, with a plastic bag tied over his head connected to a helium tank by a hose. EMS found patient asystolic but warm to touch; CPR was initiated.

*Laboratory/diagnostic findings:* Na 154/K 1.6/Cl 132/HCO<sub>3</sub> 12.0/BUN 7/Cr 0.5/Glu 86, Ca 2.8, AST 111, ALT 114, bilirubin 0.1, ALP 18. Hgb 6.0/Hct 18.0/platelets 15, PT 21.2, PTT 111.3, d-dimer 27,360.

**Clinical course:** In the ED, he was intubated and given atropine, anti-dysrhythmics, serum alkalization and vasopressors. He briefly had ROSC but remained hypotensive. He developed additional ventricular dysrhythmias, PEA and asystole from which he could not be resuscitated and died.

**Autopsy findings:** Autopsy not available.

#### **Case 169. Acute carbon dioxide inhalation: undoubtedly responsible**

**Scenario/substances:** A 34 y/o male and his friends were attempting to remove rain water from an underground silo used to store food and survival equipment. He descended a ladder after his friend, who had already entered the silo, became unresponsive. EMS found him in PEA arrest, performed CPR, administered 2 amps of epinephrine and an amp of sodium bicarbonate, and transported him to ED. Testing within the storage container by HazMat crew (>1 h after arrival on scene) was:  $O_2 = 8\%$ ,  $CO_2 = 12\%$ , hydrogen sulfide not detected.

**Laboratory/diagnostic findings:** Pre-intubation ABG-pH 6.99/ $pCO_2$  87/ $HCO_3$  20. Post-intubation on 100%  $O_2$ : pH 7.21/ $pCO_2$  46.9. K 2.8, Cr 1.72, AST 244, ALT 258, lactate 7.0, CK 345.

**Clinical course:** In the ED, he was intubated; pink, frothy sputum observed. BP 90/52, HR 141, RR 22, T 36.4 °C. CxR described as "ground glass appearance" and there was clinical concern for post-emesis aspiration. Patient was transferred for possible ECMO, admitted to ICU and given famotidine, furosemide, sodium nitrite-sodium thiosulfate, midazolam, norepinephrine, vasopressin and sodium bicarbonate. 4 h after arrival he became bradycardic and then coded. He received 100 mg methylene blue, but died 5 h after ED arrival.

**Autopsy findings:** Cause of death: cardiac arrest, severe hypercarbic/hypoxic respiratory failure, bilateral pulmonary infiltrate.

#### **Case 171. Acute carbon dioxide inhalation: undoubtedly responsible**

**Scenario/substances:** A 34 y/o male and his friends were attempting to remove rain water from an underground silo used to store food and survival equipment. He descended a ladder after the pump stopped working and was found unconscious. EMS resuscitated, intubated, and transported him to the ED. Testing within the storage container by HazMat crew (>1 h after arrival on scene):  $O_2 = 8\%$ ,  $CO_2 = 12\%$ , hydrogen sulfide not detected.

**Physical exam:** After resuscitation: BP 148/84, HR 61, RR 22 (ventilated),  $O_2$  sat 100% (40%  $FiO_2$ ), T 36.7 °C; pupils fixed and dilated.

**Laboratory/diagnostic findings:** Initial ABG-pH 7.06/ $pCO_2$  59/ $pO_2$  96/BE 13, Na 140/K 4.3/ $CO_2$  19/Cr 1.5/Glu 293. Day 2: Cr 1.4, AST 199, Glu 270, CK 430.

**Clinical course:** He was admitted to the ICU; head CT was negative for acute injury or edema; CxR was unremarkable. Day 2: BP 183/90, HR 120, EEG showed "poor amplitude" and he had seizure like activity despite midazolam and propofol infusions. He remained comatose with dilated pupils and no spontaneous activity off sedation. On Day 4 he was started on norepinephrine for hypotension. Based on the prognosis, the family opted for institution of comfort measures and he died on Day 6.

**Autopsy findings:** Cause of death: carbon dioxide poisoning. Manner of death: accidental. Blood and vitreous testing was negative for drugs, no hydrogen sulfide found in body tissue.

#### **Case 192. Acute carbon monoxide inhalation: undoubtedly responsible**

**Scenario/substances:** A 57 y/o male was found unresponsive by his sister in the garage with his motorcycle running. EMS found him pulseless; he was intubated with ACLS, and transported to the ED.

**Past medical history:** Depression, HTN.

**Laboratory/diagnostic findings:** Initial COHb 51.6%.

**Clinical course:** After 26 min of ACLS, there was ROSC. BP 144/90, HR 70, RR 16, T 31.8 °C, lungs clear bilaterally, no spontaneous breaths, GCS 3, hyporeflexic, pupils: 6 mm and fixed. He was judged too unstable for HBO therapy (required a 90-min transfer). Head CT showed severe cerebral edema and herniation. He was declared brain dead the following morning, was extubated and died.

**Autopsy findings:** Not available.

#### **Case 206. Acute chlorine gas inhalation: probably responsible**

**Scenario/substances:** A 68 y/o male, working on a dairy farm, was exposed to a cloud of chlorine gas while cleaning a pipe. While driving himself to a HCF, he called his wife saying he was having difficulty breathing and then collapsed outside his car. EMS found him pulseless; CPR was initiated with ROSC during Ed transport.

**Past medical history:** Type II DM, morbid obesity and HTN.

**Physical exam:** SBP 70s, HR 70s. GCS 3, pupils non-reactive.

ECG with prolonged QTc, CxR showed diffuse edema. Head CT showed no acute disease.

**Laboratory/diagnostic findings:** Lactate 4.1, troponin 0.32.

**Clinical course:** In the ED he was intubated, given Mg for QTc prolongation and transferred to a tertiary care center. There, his pupils were equal and reactive and he was following commands. He was started on norepinephrine and dopamine for hypotension. His airway was edematous with yellow fluid, he was treated per ARDS protocol (e.g., paralyzed and placed in prone position). On Day 2 he became more hypotensive and was treated with thrombolytics for suspected pulmonary embolism. Subsequent angiogram showed no PE. He required epinephrine (infusion and push doses), vasopressin and Ca. He became persistently hypoxic despite maximum ventilator support. Based on the prognosis, the family opted for institution of comfort measures and he died on Day 2.

**Autopsy findings:** Not performed.

#### **Case 221. Acute argon gas inhalation: undoubtedly responsible**

**Scenario/substances:** A 43 y/o male (and a co-worker) apparently hooked their respirator lines to argon, instead of oxygen, while working in a grain bin. The 43 y/o saw his colleague having a seizure, tried to remove him from the bin, but blacked out himself. EMS removed both workers. An on-scene  $O_2$  sensor read 5%.

**Clinical course:** This patient, who survived the ED, had seizures starting ~4 h after arrival. Head CT showed anoxic brain injury. He received infusions of propofol, lorazepam and levetiracetam. Head CT on Day 5 showed worsening cerebral edema and the patient died on Day 6.

**Autopsy findings:** Cause of death: simple asphyxia by argon gas. Manner of death: accidental.

#### **Case 230. Acute nickel carbonyl inhalation: probably responsible**

**Scenario/substances:** A 55 y/o male inhaled nickel carbonyl at work.

**Past medical history:** Colon cancer, s/p colectomy.

**Laboratory/diagnostic findings:** Serum APAP, ethanol and salicylate not detected.

**Clinical course:** Patient arrived 1-day post exposure and developed dyspnea. A 24-hr urine nickel concentration was 337.5 mcg/24hr (normal <7). He was started on disulfiram and NAC. On Day 7 he required BiPAP; BP 128/81, HR 90, RR 41. On Day 9: WBC "increased", platelets "dropped", T 38.4 °C. CT chest showed "ground-glass effect" and pulmonary edema. He was started on antibiotics and then BiPAP ( $O_2$  sat 83% on 100%  $O_2$ ). On Day 12 his  $O_2$  sat dropped into the 70s and he was intubated. On Day 15 his 24-hr urine nickel was 57.8 mcg/24hrs. He was started on ECMO; NAC and disulfiram were continued until Day 26. Day 29: he developed a GI bleed; platelets 26. He slowly deteriorated and died on Day 42.

**Autopsy findings:** Not available.

#### **Case 232. Acute copper ingestion: undoubtedly responsible**

**Scenario/substances:** A 69 y/o female had an argument with her husband, dissolved 1–2 tablespoons of copper sulfate in water and drank it to end her life. EMS found her sitting on her front porch complaining of abdominal burning with several episodes of blue emesis. She received ondansetron and was transported to the ED.

**Past medical history:** Schizophrenia, HTN.

**Physical exam:** BP 114/86, HR 89, RR 21,  $O_2$  sat 92%, T 36.3 °C. Her tongue was blue. She had severe abdominal pain.

**Laboratory/diagnostic findings:** Na 139/K 4.1/Cl 101/ $CO_2$  22/BUN 18/Cr 0.98/Glu 129/AG 16, ALT 9, AST 28, ALP 59, bilirubin 1.1, CK 96. WBC 31.4/Hgb 15.5/Hct 48.

**Clinical course:** Initially vitals were stable and labs unremarkable, but she developed hematemesis in the ED and became hypotensive, tachycardic and her urine output dropped. She developed coffee ground emesis and began to hemorrhage profusely from the rectum. SBP 70s.



She was given IVFs, 2 units of blood, high doses norepinephrine, vasopressin and dopamine. Just prior to HD: Cr 1.4, K 6.5, Ca 7.0, and EKG showed peaked T waves. She was given IV Ca, insulin and dextrose, then intubated. Labs showed severe metabolic acidosis, sodium bicarbonate was initiated. An arterial line showed a BP of 200s/80 and the vasopressors were titrated off. Post-HD: K 6.2, lactate 12.1. Based on the prognosis, the family opted for institution of comfort measures and she died on Day 2.

### Case 233. Acute arsenic and BAL exposure: probably responsible

*Scenario/substances:* A 72 y/o male presented to the ED with complaints of 2 weeks of acute bilateral hearing loss, otalgia and ataxia. His PCP reported an elevated spot urine arsenic of >50 mcg/L. He denied consuming well-water, working with metals, recent seafood consumption or known arsenic exposure.

*Past medical history:* HTN, tuberculosis with recent INH treatment.

*Physical exam:* Initial BP 138/76, HR 75, RR 20, T 36.4 °C, O<sub>2</sub> sat 99%. He had an ataxic gait, bilateral hearing loss and otalgia, Mees' line on his fingernails, and keratotic rash on his hands. He was awake, alert and oriented; neurologic exam was normal.

*Laboratory/diagnostic findings:* Whole blood inorganic arsenic concentration was 27 mcg/L and organic arsenic concentration was 10 mcg/L. Arsenic/Cr ratio was 12 mcg/g Cr (normal <55 mcg/g).

*Clinical course:* The patient presented to the ED, but left AMA prior to medical evaluation. He returned 3 days later with worsening symptoms. He was admitted to the hospital and BAL was started on Day 1 as DMSA was not available. On Day 2 he became agitated and refused treatment, but remained alert and oriented. He received antipsychotics and benzodiazepines and agreed to treatment with BAL. He was treated with BAL for 5 days. On Day 6 he became hypoxic, hypotensive, confused and developed respiratory failure requiring intubation; CxR showed pneumonia. He was started on sedation and antibiotics. On Day 12 a 24-hour urine for arsenic was undetectable; whole blood arsenic <5 mcg/L. He remained intubated and confused, MRI on Day 19 was unremarkable. He developed AF and tachycardia on Day 21, requiring antihypertensives. He received a tracheostomy on Day 36 and remained confused. Neurology felt the patient had an anoxic brain injury. The patient developed cardiac arrest and died on Day 42.

*Autopsy findings:* Not available.

### Case 234. Acute hydrocarbon ingestion with aspiration: undoubtedly responsible

*Scenario/substances:* A 17 y/o autistic female was found by her parents with a bottle of kerosene in her hand. EMS was called for repeated emesis, she was tachypneic and hypoxic enroute to the ED.

*Past medical history:* Autism.

*Physical exam:* BP 115/79, HR 160, RR 40, T 37.7 °C, O<sub>2</sub> sat 93% on high flow oxygen. She was dyspneic.

*Laboratory/diagnostic findings:* CxR showed bilateral lower lobe infiltrates consistent with pneumonitis.

*Clinical course:* Upon PICU arrival she was placed on BiPaP and received multiple breathing treatments without overt improvement. On Day 2 she became agitated and was started on dexmedetomidine, remained tachycardic with hypoxia, and developed a fever. He was weaned off sedation and BiPaP, her O<sub>2</sub> sat was 95% on 40% high flow. On Day 3 she developed dyspnea and hypoxia, CxR showed worsening infiltrates. She was intubated, during OR transport for initiation of ECMO she suffered a cardiac arrest. Despite 1.5 h of resuscitation efforts she died on Day 3.

*Autopsy findings:* Not available.

### Case 253. Fluorinated hydrocarbon inhalation and sertraline ingestion: undoubtedly responsible

*Scenario/substances:* A 47 y/o male was initially found unresponsive in his car surrounded by >100 containers of a fluorinated hydrocarbon.

*Physical exam:* BP 137/87, HR 116, RR 20, O<sub>2</sub> sat 100% on room air, T 36.7 °C. He had blisters on his face, right hand and chest.

*Laboratory/diagnostic findings:* Na 134/K 3.9/Cl 101/CO<sub>2</sub> 19/BUN 20/Cr 1.7/Glu 129, AG 14, CK 3,828. Serum ethanol not detected; UDS negative.

*Clinical course:* In the ED he reported using up to 40 canisters per day to mimic a method of suicide seen on TV. He suddenly became dusky and diaphoretic, and then asystolic. CPR was initiated with ACLS and ILE, without ROSC, and he died 3 h after ED arrival.

*Autopsy findings:* Cause of death: difluoroethane toxicity. Manner of death: accident.

### Case 259. Acute cleaner (acid) and ethanol ingestion: undoubtedly responsible

*Scenario/substances:* A 44 y/o male was found with AMS in a ditch with a container of industrial cleaner (hydrofluoric, sulfuric and phosphoric acids). He apparently ingested the product and spilled it over himself. EMS found him covered in diarrhea and emesis; he was decontaminated with Ca gel.

*Past medical history:* HTN, ethanol abuse, PTSD, depression, prior suicide attempts. Medications: quetiapine, prazosin, mirtazapine, gabapentin, lisinopril and duloxetine.

*Physical exam:* He was combative, pupils 2 mm, no dermal or oral burns. HR 189, RR 27, T 34.9 °C.

*Laboratory/diagnostic findings:* ABG-pH 7.12/pCO<sub>2</sub> 49/pO<sub>2</sub> 143/HCO<sub>3</sub> 15; Na 134/K 4.4/Cl 97/CO<sub>2</sub> 17/BUN 18/Cr 1.12/Glu 171, AG 20, Ca 8.2, Mg 2.1, AST 56, ALT 72, bilirubin 1.0, INR 1.18, WBC 25.8/Hct 46/platelets 156. Serum APAP and salicylate not detected. UDS was negative. CxR: patchy right lung opacities consistent with aspiration. ECG: HR 116, QRS 84, QTc 478.

*Clinical course:* In the ED, stomach contents were aspirated. The patient was intubated due to combative behavior, and started on epinephrine for hypotension. Within 4 h his serum Ca dropped to 5.1 and K increased to 5.7. He had a cardiac arrest and received CPR and ACLS resulting in VF but no ROSC. Bedside ECHO showed no cardiac contractility and he was pronounced dead.

*Autopsy findings:* Autopsy showed no evidence of gastrointestinal injury. Postmortem femoral blood ethanol 239 mg/dL, ethylene glycol was not detected. Cause of death: ingestion of aluminum cleaner (sulfuric acid, hydrofluoric acid, phosphoric acid, ethylene glycol).

### Case 260. Acute ammonium bifluoride ingestion: undoubtedly responsible

*Scenario/substances:* A 49 y/o female developed abdominal pain after she accidentally drank 1 cup of air conditioner cleaner that had been poured into a sports drink bottle. The cleaner was identified as containing ammonium bifluoride.

*Past medical history:* Cystic fibrosis, solitary kidney, previous suicide attempts.

*Physical exam:* Initial BP 86/40, HR 128, RR 26, O<sub>2</sub> sat 94% on room air, T 35.9 °C. The abdomen was soft. Day 2: BP 75/47, HR 94, RR 32, HR 94, O<sub>2</sub> sat 89% on 4 L/min nasal cannula.

*Laboratory/diagnostic findings:* Initial labs: Na 137/K 6.2/Cl 100/CO<sub>2</sub> 18/BUN 31/Cr 1.9/Glu 200/AG 17, lactate 4.4, AST 61, ALT 47, Ca 5.2, Mg 1.1, serum osm 288. Serum APAP, ethanol and salicylates not detected. ECG: sinus tachycardia, QRS 96, QTc 419. Abdominal X-ray was unremarkable. Ca 2.9 (4 hr after arrival). Day 2: Na 140/K 4.2/Cl 104/BUN 4/Cr 0.6/AG 9, Ca 10, Mg 1.9, Phos 4.5. ECG: HR 74, QRS 74, QTc 435.

*Clinical course:* In the ED, the patient received IVFs, Ca and Mg, H<sub>2</sub> blocker, antiemetic, and a bicarbonate infusion. 3 hr after arrival, she experienced polymorphic VT and was defibrillated twice, and received 6g IV MgSO<sub>4</sub>. In the IUC she had several more episodes of torsades de pointes. Due to concerns about glycolic acid, HD was initiated; she also received lidocaine, isoproterenol and amiodarone. She developed hypotension and received IVFs, bicarbonate infusion and vasopressors. On Day 3 she was intubated for progressive hypoxia. She experienced bradycardic, then cardiac arrest but recovered after intubation, CPR and atropine. She experienced another cardiac arrest and died on Day 3.

*Autopsy findings:* External exam only.

### Case 261. Acute chloramine inhalation/nasal: undoubtedly responsible

*Scenario/substances:* A 66-y/o male presented with sudden onset of coughing and dyspnea after inhalation of fumes from bleach mixed with ammonia for cleaning his apartment.

**Past medical history:** Congestive heart failure, CAD s/p stents, HTN, AF, chronic kidney disease, recent chemotherapy (salivary gland tumor) and IDDM.

**Physical exam:** BP 142/114, HR 130 (irregularly irregular), RR 42, O<sub>2</sub> sat 80% on room air. He was diaphoretic and dyspneic, with shallow respirations and diffuse wheezing.

**Laboratory/diagnostic findings:** Na 140/K 4.6/Cl 100, CO<sub>2</sub> 30/BUN 36/Cr 2.75/Glu 171, ALP 140, AST 40, ALT 37, Mg 2.6. WBC 11.4/Hgb 16.3/Hct 51/platelets 190. ABG-pH 7.26/pCO<sub>2</sub> 74/pO<sub>2</sub> 212/HCO<sub>3</sub> 33, lactate 2.6 (then 8 on Day 1). Chest X-ray showed pulmonary edema, chest CT suggested ARDS and left basilar atelectasis.

**Clinical course:** Initially able to walk but shortly after arrival was started on BiPAP. He became agitated and rapidly deteriorated, so he was intubated, sedated and started on prednisone, Mg and bronchodilators. After intubation, he became hypotensive necessitating IVFs and vasopressors. He was started on amiodarone and heparin for rapid AF and elevated troponins. He had a prolonged ICU stay complicated by fevers (requiring antibiotics), hypo and hyperglycemia (requiring D10W and insulin), HTN (requiring antihypertensives), hypoxia (requiring intermittent paralytics) and renal failure with hyperkalemia (requiring HD). He also developed heparin-induced thrombocytopenia with bleeding (treated with argatroban). On Day 11, a tracheostomy was placed due to prolonged intubation and he received platelets. On Day 13 he had a bradycardic arrest that resolved after 2 min of CPR; he was then interactive. On Day 25 he suffered cardiac arrest and died.

**Autopsy findings:** Cause of death: ARDS due to toxic inhalation pneumonia. Manner of death: accidental.

#### **Case 264. Acute hydrofluoric and sulfuric acid cleaner ingestion: undoubtedly responsible**

**Scenario/substances:** A 87 y/o male accidentally drank a small amount of a cleaner containing hydrofluoric acid and sulfuric acid (pH <1). EMS was called and transported him to the ED.

**Physical exam:** HR 40s, SBP 180s. Cardiac monitor showed sinus bradycardia with first degree AV block. He had dark-colored vomitus.

**Laboratory/diagnostic findings:** Na 141/Cl 106/K 3.4/HCO<sub>3</sub> 14/Glu 180/AG 21, Ca 9.6, Cr 1.02, Mg 2.6.

**Clinical course:** The patient had persistent emesis and complained of chest pain. He was subsequently intubated in the ED prior to transfer to a tertiary care facility. During transport he had cardiac arrest and diverted to a nearby hospital for resuscitation. He was in torsades de pointes, received 3 g Ca chloride, 2 amps of sodium bicarbonate and 2 g of Mg. He had ROSC with an accelerated junctional rhythm, QRS 114 and QTc 445 msec. A bicarbonate infusion was started. Repeat labs: K 4, CO<sub>2</sub> 20, AG 16, ionized Ca 1.44. He again developed torsades and died 6 hr post ingestion.

**Autopsy findings:** Corrosive upper gastrointestinal injury from ingestion of acidic cleaning solution.

#### **Case 267. Acute cyclopeptide mushroom ingestion: undoubtedly responsible**

**Scenario/substances:** A 84 y/o female was mowing her lawn when she decided to pick mushrooms and eat them. Later, she developed abdominal pain with emesis and presented to a local ED and then transferred to a tertiary care hospital.

**Past medical history:** AF.

**Physical exam:** In the ED: BP 80/50, HR 90, RR and O<sub>2</sub> sat "normal" on room air. Confused but following commands, abdomen with diffuse tenderness.

**Laboratory/diagnostic findings:** ABG-pH 7.0, AST >1000, ALT >1000, INR 5.2, WBC 6.4, Hgb 12.5, platelets 141, lactate 11. Serum APAP, ethanol and salicylate not detected.

**Clinical course:** Upon arrival to a tertiary care center she was intubated for dyspnea and confusion and required vasopressors and CRRT. Despite these interventions she died on Day 1.

**Autopsy findings:** Not available.

#### **Case 269. Acute dinitrophenol and energy drink ingestion: undoubtedly responsible**

**Scenario/substances:** A 19 y/o male ingested 10–15 tabs of 250 mg dinitrophenol diet pills, and 2 energy drinks with suicidal intent. EMS brought him to the ED 2 h later.

**Past medical history:** Mental illness.

**Physical exam:** Alert but agitated and diaphoretic. BP 112/63, HR 160, RR 32, T (rectal) 38.4 °C.

**Laboratory/diagnostic findings:** ABG-pH 6.95/pCO<sub>2</sub> >130/pO<sub>2</sub> 345, Na 141/K 4.0/Cl 108/CO<sub>2</sub> 25/Glu 170, AG 8, Ca 9.8, AST 38, ALT 31, ALP 56, lactate 1.5, CK 1197. Serum APAP, ethanol and salicylate not detected. EKG: HR 154, QRS 74, QTc 416. CxR unremarkable.

**Clinical course:** In the ED, he was intubated and received IVFs, benzodiazepines and cooling measures. While preparing for transfer to a tertiary care center (1.5 h after arrival) he developed VT followed by asystole. He received CPR, bicarbonate, D50W and epinephrine. T(rectal) 40 °C; Glu 338. ECHO revealed no cardiac activity; the patient was pronounced dead ~2 h after ED arrival.

**Autopsy findings:** Cause of death: complications of probable acute dinitrophenol toxicity. Manner of death: suicide.

#### **Case 272. Acute sulfuryl fluoride, cocaine inhalation: undoubtedly responsible**

**Scenario/substances:** A 24 y/o male was seen coming out of an apartment building recently tented for fumigation. He was suspected of attempted burglary, police found him alert but he became confused, diaphoretic, tachycardic and tachypneic, O<sub>2</sub> sat was "low". The fumigation company confirmed that they used sulfuryl fluoride.

**Laboratory/diagnostic findings:** Hgb 17.3, Na 146, K 3.9, Cl 105, Glu 239, Cr 1.4, ionized Ca <0.25, Mg 0.8. ABG-pH 7.05/pCO<sub>2</sub> 56/pO<sub>2</sub> 78/HCO<sub>3</sub> 15. Serum APAP, ethanol and salicylate not detected. ECG showed anterior ST elevation in the anterior leads.

**Clinical course:** In the ED: BP 115/75, HR 110, RR 33, O<sub>2</sub> sat 86% on 100% FiO<sub>2</sub>; he was lethargic with dyspnea, pupils midpoint. He was intubated and then had cardiac arrest. He received Ca, Mg, sodium bicarbonate, atropine, epinephrine and amiodarone. He had recurrent pulseless VT and was coded for >30 min without ROSC. He died ~1 hr after arrival.

**Autopsy findings:** Autopsy showed marked pulmonary edema. Hospital blood was positive for benzoylcegonine 0.17 mg/L. The cause of death: acute sulfuryl fluoride poisoning.

#### **Case 276. Acute paraquat ingestion: undoubtedly responsible**

**Scenario/substances:** A 47 y/o male accidentally ingested a mouthful of paraquat, went to the ED but was then discharged. The following day his clinical condition worsened and he returned to the ED.

**Past medical history:** None.

**Laboratory/diagnostic findings:** In the ED (2nd time): HR 104, RR 23, T 37 °C, O<sub>2</sub> sat 89%. He was awake but not alert, pupils equal and reactive to light. He was dyspneic with coarse breath sounds with rhonchi throughout; abdomen was distended and tender. Cr 8.0, AST 231, ALT 223, bilirubin 2.2. After admission: K 4.6, Cr 8.9, BUN 72, WBC 13.2, INR 1.32.

**Clinical course:** He was transferred to a tertiary care center and admitted to the ICU. He began developing shortness of breath and hemoptysis and subsequently developed liver and renal failure. His CxR showed pulmonary fibrosis, and he was intubated. He was started on dexamethasone, Vitamin C, NAC and cyclophosphamide. HD was initiated but he did not improve, his CxR worsened and was consistent with ARDS. Due to his prognosis, family opted for institution of comfort measures and he died on Day 9.

**Autopsy findings:** Not performed.

#### **Case 278. Chlorophenoxy herbicide, cleaner (anionic/nonionic), sodium hydroxide, bupropion, sertraline, and trazodone ingestion: undoubtedly responsible**

**Scenario/substances:** A 51 y/o female ingested a chlorophenoxy herbicide, sodium hydroxide drain cleaner, and a household cleaner in a suicide attempt. She became pulseless and apneic during transport to the ED.

**Past medical history:** Depression, anxiety, hyperlipidemia.

**Laboratory/diagnostic findings:** ABG-pH 6.9/pCO<sub>2</sub> 70/pO<sub>2</sub> 51, K 5.4/CO<sub>2</sub> 16/Cr 1.35/Glu 197/AG 26, Ca 7.5, bilirubin 0.1, AST 305, ALT 401, lactate 18, WBC 16.8. EKG: QTc 482.

**Clinical course:** In the ED, she was resuscitated and intubated. BP 52/36, HR 75, O<sub>2</sub> sat 99% on vent. The patient started bleeding from her mouth and had loose stools. She died 1 hr after arrival.

**Autopsy findings:** Autopsy showed erythematous epiglottis and sloughing esophagus. Multiple pills were found in gastric contents as well as tan/gray caustic floral-smelling fluid. Pulmonary edema with foam in the trachea. Multiple sharp force injuries to the R and L neck which had clean edges and penetrated sternocleidomastoid and thyroid gland; superficial lacerations to wrist. Antemortem blood: chlorophenyl-piperazine 163 ng/ml, bupropion 148 ng/ml, sertraline 542 ng/ml, nortriptyline 375 ng/ml, trazodone 0.54 mcg/ml. Cause of death: acute mixed drug (bupropion, sertraline, trazodone) ingestion with suspected ingestion of caustic agent.

#### **Case 282. Acute carbamate insecticide ingestion: undoubtedly responsible**

**Scenario/substances:** A 72 y/o male drank milk with aldicarb in a suicide attempt and was brought to the ED.

**Clinical course:** In the ED: BP 200/100, HR 118, RR 12, T 37 °C, O<sub>2</sub> sat 98%. He was obtunded with respiratory depression, was intubated, had a seizure, and then transferred to a tertiary care center. He developed fasciculations, hypotension (53/32) and bradycardia (HR 40). He was started on pralidoxime but remained unresponsive. On Day 2: BP 100/63, HR 40. On Day 3 pralidoxime continued. On Day 4 he developed cholinergic findings. On Day 7 he remained on the ventilator, BP 194/93, HR 130, on atropine drip. On Day 13 he remained unresponsive, on ventilator, on norepinephrine; BP 140/91, HR 95, O<sub>2</sub> sat 100%. On Day 18, he responded to painful stimuli but remained intubated. He died on Day 20.

**Autopsy findings:** Not available.

#### **Case 285. Acute ricin injection/ingestion: probably responsible**

**Scenario/substances:** An 18 y/o male presented after injecting and ingesting a slurry castor beans and water. He was found wandering the street and was brought to the ED by EMS after an unknown time interval since injection/ingestion.

**Laboratory/diagnostic findings:** CO<sub>2</sub> 18/BUN 33/Cr 1.9, AST 225, ALP 235, bilirubin 0.9, WBC 22, platelets 125, reticulocyte count "normal", INR 16.2, PTT 250. UDS: negative. Serum APAP, ethanol and salicylate not detected. ABG-pH (after intubation): 7.21.

**Clinical course:** Exam: In the ED he was initially tachycardic. Despite 3L IVFs, Cr increased to 2.8 and he became anuric. He was transferred to a tertiary care hospital and started on CRRT, epinephrine, norepinephrine, vasopressin, hydrocortisone and antibiotics. He was subsequently intubated and received vitamin K (repeat INR 5.9). Head CT showed cerebral edema consistent with anoxic brain injury. The patient died within 24 h of presentation.

**Autopsy findings:** Cause of death: ricin poisoning. Postmortem tissue tested positive for ricin metabolite.

#### **Case 286. Acute cardiac glycoside ingestion: undoubtedly responsible**

**Scenario/substances:** A 22 y/o male ate 1 pong-pong tree (*Cerbera odollam*) seed that he had ordered from the internet.

**Physical exam:** He presented to the ED 8.5 h after the ingestion; alert and interactive. BP 114/54, HR 50.

**Laboratory/diagnostic findings:** K 5.2, serum digoxin 1.3.

**Clinical course:** At Hour 10 he developed 2nd degree heart block and was given 5 vials of digoxin Fab fragments. His HR and BP improved temporarily; 30 min later his HR (40s) and BP (104/50) decreased again, he vomited and syncope. He then had cardiac arrest and CPR was started. The code was continued for about 3 h during which he received a total of 20 vials of digoxin Fab fragments, amiodarone, insulin and dextrose, norepinephrine, dopamine, atropine, ILE, 4L of normal saline, and ~15 doses of epinephrine and sodium bicarbonate without ROSC. He died within 12 h of presentation.

**Autopsy findings:** Not performed.

#### **Case 288. Acute ibogaine ingestion: probably responsible**

**Scenario/substances:** A 26 y/o male was found unresponsive with possible seizure activity 48 h after taking ibogaine to detox from his oxycodone addiction. He was given midazolam by EMS and then found to

be pulseless. He received naloxone, epinephrine and defibrillation with ROSC. He was intubated and transported to the ED.

**Past medical history:** Polysubstance abuse, ibogaine use.

**Physical exam:** SP 50/palp, HR 60, RR 16 (on vent), O<sub>2</sub> sat 98% on 100% FiO<sub>2</sub>, T 36 °C. Pupils fixed and dilated. Exam of heart, lungs and abdomen unremarkable. No spontaneous movements; no response to pain.

**Laboratory/diagnostic findings:** ABG-pH 7.37/pCO<sub>2</sub> 64/HCO<sub>3</sub> 29, Na 156/K 4.5/Cl 84/CO<sub>2</sub> 29/BUN 94.0/Cr 7/Glu 152/AG 46, AS 80, ALT 80, INR 1.5, Hgb 17.0, Hct 52. Serum APAP, ethanol and salicylate not detected. CxR unremarkable; ECG: HR 65, QRS 98, QTc 536.

**Clinical course:** In the ED, he had another cardiac arrest treated with epinephrine, sodium bicarbonate and IVFs, again with ROSC. Exact time that patient was pulseless was not clear but appeared to be prolonged. The patient was transferred to a tertiary care center. The patient's hemodynamics stabilized and kidney function improved. However, the patient was declared brain dead. Based on the prognosis, the family opted for institution of comfort measures and he died on Day 14.

**Autopsy findings:** Not performed.

#### **Case 289. Acute cardiac glycoside ingestion: undoubtedly responsible**

**Scenario/substances:** A 30 y/o male ordered pong-pong tree (*Cerbera odollam*; aka the Suicide Tree) seeds from the internet and ate them. He then called EMS, reported the ingestion and was transported to the ED.

**Past medical history:** Schizophrenia.

**Physical exam:** In the ED, he was alert and talking; HR 37.

**Laboratory/diagnostic findings:** Initial K 10.

**Clinical course:** He received Ca chloride and gluconate, sodium bicarbonate, insulin and digoxin Fab fragments for hyperkalemia. His HR improved, he was transferred to a tertiary care facility, and admitted to the ICU 4 h after initial presentation. He remained awake and interactive; pupils 7 mm and reactive. EKG showed irregular AF with pauses, QRS 72, QTc 368. His HR ranged between 20 and 90; SBP 101. He was started on a dopamine drip and HD. At Hour 15: HR ~100, SBP 90s (on dopamine). He had a run of VT and received 10 vials of digoxin Fab fragments. At Hour 21 he went into cardiac arrest (K 3.8), received 4 additional vials of digoxin Fab fragments and ACLS resuscitation for 1 h without ROSC.

**Autopsy findings:** Not performed.

#### **Case 297. Acute methadone ingestion: undoubtedly responsible**

**Scenario/substances:** A 2 y/o female was seen drinking an unknown liquid from a stray plastic bottle. The next day she was lethargic, later that day her parents found her unresponsive with labored breathing, and transported her to the ED.

**Physical exam:** The child arrived to the ED in cardiac arrest, pupils were fixed and dilated.

**Laboratory/diagnostic findings:** Initial Glu 35.

ABG-pH 6.5, lactate 17, AG 28. UDS was positive for methadone. Head CT was consistent with anoxic brain injury.

**Clinical course:** In the ED, she was intubated, received PALS CPR, epinephrine, dextrose, calcium and sodium bicarbonate with ROSC. In the PICU a naloxone infusion was started, urine was noted to contain many unspecified crystals. Her vital signs normalized but her pupils remained fixed at 7 mm. She had no response to stimuli (no cough or gag reflex) and her EEG was flat. Serum methadone levels were sent: Day 1 = 78 ng/mL, Day 3 = 81 ng/mL, Day 6 = 93 ng/mL, Day 7 = 46 ng/mL. The parents subsequently disclosed that the plastic container contained methadone. She was determined to be brain dead on Day 10 and she died on Day 11 with organ donation.

**Autopsy findings:** Full report was not available. Case was determined to be a homicide.

#### **Case 299. Acute-on-chronic APAP ingestion: contributory**

**Scenario/substances:** A 3 y/o male, with an upper respiratory infection, was receiving alternating doses of ibuprofen and APAP every 4 h for 5 days. Calculations showed his daily APAP dose of 42–105 mg/kg/day. Parents brought him to the ED for nausea, vomiting and diarrhea.

**Past medical history:** Medications: A children's combination medication [chlorpheniramine (1 mg), dextromethorphan (5 mg), phenylephrine 2.5 mg], and APAP (160 mg) in each 5 mL and ibuprofen.



**Physical exam:** He was initially tachypneic and in respiratory distress with abdominal tenderness, but later became lethargic and unresponsive. BP 106/66, HR 123, RR 54, T 36.8 °C.

**Laboratory/diagnostic findings:** ABG-pH 7.35/pCO<sub>2</sub> 41/pO<sub>2</sub> 67; Na 137/K 4.2/Cl 103/CO<sub>2</sub> 10/BUN 7/Cr 0.8/Glu 168, AG 14, AST 4869, ALT 3887, bilirubin 4.2, INR 6.7, ammonia 62 (peak 245). Serum APAP 29.8 (unknown time since last ingestion); repeat APAP 15. Serum salicylate and ethanol not detected. In the ED, CxR showed multilobar right sided pneumonia; abdominal CT showed hepatomegaly.

**Clinical course:** He was admitted and treated with antibiotics. Subsequent tests showed acute liver failure and elevated APAP level so he was transferred to a pediatric liver transplant center. He arrived with a GCS 7; he was intubated, received IV NAC and antibiotics for pneumonia and sepsis. He also received hypertonic saline, rifaximin, vitamin K, FFP and CRRT. Hepatitis serology, CMV and EBV were negative; copper and ceruloplasmin were normal. The child's encephalopathy continued to worsen. He became hypotensive and required epinephrine and norepinephrine. ECMO was considered but not done due to coagulopathy. He had a PEA cardiac arrest, failed to respond to ACLS interventions, and died within 24 h of hospital arrival. APAP-induced acute liver failure was believed contributory to child's death, in addition to a pneumonia with sepsis.

**Autopsy findings:** Report stated that death was from hepatic failure and pneumonia.

### **Case 301. Acute fentanyl (transdermal) ingestion: undoubtedly responsible**

**Scenario/substances:** A 12 y/o female became unresponsive after chewing fentanyl patches on a dare. Police initiated CPR at her home prior to ED transport.

**Past medical history:** Healthy, no known medications.

**Laboratory/diagnostic findings:** lactate 6.6, VBG-pH 7.14, HCO<sub>3</sub> 15, AG 17.

**Clinical course:** Upon ED arrival, she was bradycardic and then lost pulses. She was intubated, received CPR, epinephrine and naloxone with ROSC. BP 130/80, HR 150–170, GCS 3, pupils fixed and dilated. On Day 2 she remained unresponsive and developed a fever, antibiotics were started for presumed aspiration. On Day 4 she was declared brain dead. Based on the prognosis, comfort measures were instituted and she died on Day 4.

**Autopsy findings:** Antemortem blood norfentanyl 2 ng/ml, fentanyl 15 ng/ml. Urine: norfentanyl 581 ng/ml, fentanyl 107 ng/ml. Cause of death: acute fentanyl intoxication.

### **Case 304. Acute tramadol ingestion: undoubtedly responsible**

**Scenario/substances:** A 13 y/o male was found unresponsive and dyspneic by his parents. EMS found him in cardiac arrest, he was intubated and resuscitated prior to ED arrival.

**Past medical history:** No known prescription medications.

**Physical exam:** BP 124/89, HR 136, RR 20, O<sub>2</sub> sat 90% on 100% O<sub>2</sub> via ventilator. Pupils were fixed and dilated, no spontaneous neurological activity.

**Laboratory/diagnostic findings:** VBG pH 7.19/pCO<sub>2</sub> 34/pO<sub>2</sub> 33/HCO<sub>3</sub> 14, Na 147/K 3.3/Cl 111/CO<sub>2</sub> 14/BUN 12/Cr 2.3/Glu 385, AG 22. UDS was positive for methadone. Serum APAP, ethanol and salicylate were not detected. ECG: HR 134, QRS 89, QTc 445. CT brain showed cerebral edema. EEG showed slow waveforms with infrequent bursts consistent with uncal herniation. 10 hours after arrival: Na 156/K 4.2/Cl 121/CO<sub>2</sub> 20/BUN 20/Cr 2.5/Glu 145, AST 489, ALT 927, lactate 12, troponin 1.16.

**Clinical course:** In the ICU, the patient received several vasopressors, bicarbonate and K supplementation. Off sedation he demonstrated no spontaneous neurological activity; clinical evaluation established brain death. Based on the prognosis, the family opted for institution of comfort measures and he died on Day 2.

**Autopsy findings:** Antemortem blood tramadol 0.617 mg/L. The cause of death was pulmonary edema secondary to acute tramadol ingestion.

### **Case 317. Acute colchicine ingestion: undoubtedly responsible**

**Scenario/substances:** A 20 y/o pregnant female presented to an ED with vomiting and diarrhea, attributed to food poisoning. She was

discharged home but returned to a second ED later the same day with worsening symptoms.

**Past medical history:** 20-weeks pregnant, seizure disorder. Medications: levetiracetam.

**Physical exam:** In the 2nd ED she had AMS with dyspnea. She was febrile, tachycardic and tachypneic.

**Laboratory/diagnostic findings:** Initial Labs: WBC 44.3/Hgb 14.5/Hct 41.0/platelets 299, CO<sub>2</sub> 15, Glu 73, Cr 1.28, Mg 1.3, Ca 8.5, albumin 3.2, AST 294, ALT 27, ALP 338, lactate 3.8, lipase 851. UDS positive for benzodiazepines; uHCG positive. CxR unremarkable. Day 2: ABG-pH 7.31/pCO<sub>2</sub> 22.1/pO<sub>2</sub> 164/HCO<sub>3</sub> 14.3/BE -13.4, WBC 36.3, PT 31.6, AST 379, ALP 348, lactate 3.3, CK 587, lipase 1056. CT scans showed: bilateral lung consolidation, and post-operative abdominal changes. Day 4: Cr 1.49, AST 1523, lactate 8.1, WBC 1.7, Hgb 7, platelets 35, PT 27.7, fibrinogen 196, d-dimer >20. Day 5: APAP and ASA were negative. Day 8: WBC 0.1/Hgb 7.8/platelet 53, PT 19.3, Glu 102, bilirubin 2.6, AST 1280, ALT 295 and lactate 7.8. A colchicine level (sent out on Day 4) subsequently came back after death at 7.2 ug/L.

**Clinical course:** She was intubated, her SBP dropped into the 40's and norepinephrine was started. An emergent cesarean section was performed, due to fetal distress, but the baby died shortly after delivery. She was then transferred to a tertiary care center and received IVFs, antibiotics and tube feeding. On Day 3 she developed hypotension, renal failure and pancytopenia, requiring multiple vasopressors, HD and blood transfusion. On Day 4 she developed blanching erythema of the trunk and arms; she was given filgrastim, amphotericin, antibiotics, hydrocortisone and IV immunoglobulin. Cultures were negative. When the family was asked about access to colchicine, a family member discovered pills missing from their prescription. On Day 9 she required norepinephrine, vasopressin and phenylephrine infusions for increasing hypotension. Based on the prognosis, the family opted for institution of comfort measures and she died on Day 10.

**Autopsy findings:** Not available.

### **Case 324. Acute APAP ingestion: undoubtedly responsible**

**Scenario/substances:** A 21 y/o pregnant female presented to an ED with nausea and abdominal pain 2 days after a reported argument with her boyfriend.

**Past medical history:** 5 weeks pregnant with abnormal bleeding, cystitis.

**Laboratory/diagnostic findings:** WBC 5.9, platelets 15, PT 35.1, aPTT 40.6, INR 3.34, AST 960, ALT 900. UDS was negative; urine HCG positive. Repeat labs (12 h later):

ABG-pH 7.06/CO<sub>2</sub> 59/pO<sub>2</sub> 53/HCO<sub>3</sub> 16/BE -12.7. Na 155/K 3.7/CO<sub>2</sub> 23/BUN 10/Cr 1.12/Glu 507, AG 28, WBC 20.4/Hgb 6.3/Hct 20.3/platelets 58. PT >120, AST 4904, ALT 3292, bilirubin 0.8, ammonia 131, lactate 18.7. Serum salicylate not detected; serum APAP 52 mcg/mL (unknown time since last ingestion). EKG: sinus tachycardia, QRS 87, QTc 386.

**Clinical course:** She was admitted with suspected cholecystitis, but during OR preparations developed hypotensive and tachycardic (HR 140s). She was intubated and started on phenylephrine and sodium bicarbonate infusions. Her serum APAP then resulted (52 mcg/mL) and NAC was started. Pelvic ultrasound showed gestational sac without fetal pole or yolk sac. Norepinephrine was started for hypotension and she was transferred to a tertiary care center. En route she became hypoxic (O<sub>2</sub> sat 17% on 100% FIO<sub>2</sub>) and was comatose on arrival with dilated, fixed pupils. She became bradycardic and progressed to PEA; she had ROSC after being coded for 10 min. Sodium bicarbonate, mannitol, blood transfusion, inhaled nitric oxide, epinephrine and vasopressin were started; NAC and phenylephrine continued. She continued to deteriorate and died on Day 2.

**Autopsy findings:** Hospital blood tested positive for: morphine 36 ng/mL, midazolam 30 ng/mL, positive (qualitative only) for APAP. Cause of death: toxic effects of APAP. Manner of death: suicide.

### **Case 341. U-47700, caffeine, levamisole, nicotine, alprazolam, cocaine, cocaine, marijuana and benzodiazepine ingestion/snorting: undoubtedly responsible**

**Scenario/substances:** A 25 y/o male was found in asystole (unknown down time) after snorting an unknown powder. A friend reported it as

being U-47700. The patient was intubated by EMS with CPR, and received naloxone (22 mg without effect), IVFs and vasopressors with ROSC.

**Past medical history:** Anxiety, ADHD, polysubstance abuse and previous drug overdoses.

**Laboratory/diagnostic findings:** ABG-pH 7.1/pCO<sub>2</sub> 59/pO<sub>2</sub> 368/HCO<sub>3</sub> 18.3, Na 144/K 2.6/Cl 112/CO<sub>2</sub> 18/BUN 16/Cr 1.68/Glu 196/AG 14, lactate 4.8, Ca 6.4, Mg 1.2, Phos 4.9, troponin 0.776, CPK 278, WBC 18.5. Serum APAP and ethanol not detected, salicylates 2.9 mg/dL. UDS: positive for cocaine, benzodiazepines and marijuana. ECG: QRS 124, QTc 614.

**Clinical course:** In the ED the patient was intubated and unresponsive with fixed dilated pupils. BP 60s/palp, HR 132, T 33 °C (after cooling). Post cardiac arrest cooling was initiated, sodium bicarbonate and naloxone infusions were started. He remained unresponsive without sedation. Head CT showed complete sulcal effacement with diffuse cerebral edema. On Day 4, the patient was rewarmed, EEG showed no brain activity. He developed diabetes insipidus, hyperkalemia and AKI. Based on the prognosis, comfort measures were instituted and he died on Day 4 with organ donation.

**Autopsy findings:** No autopsy was performed. Antemortem urine: positive for alprazolam, caffeine, cocaine (and metabolite), levamisole, nicotine, and U-47700. Antemortem blood (collected Day 1): alprazolam 0.11 mg/L, benzoylecgonine 0.026 mg/L and U-47700 0.18 mg/L. Cause of death: anoxic brain injury due to cardiac arrest from cocaine, alprazolam and U-47700. Manner of death: accidental.

#### Case 669. Acute salicylate ingestion: undoubtedly responsible

**Scenario/substances:** A 71 y/o male presented to the ED ~8 h after an intentional ingestion of #100 tablets of 325 mg salicylate tablets.

**Past medical history:** Aortic stenosis, HTN, s/p CABG, chronic kidney disease.

**Physical exam:** Awake, but drowsy, complaining of tinnitus, nausea and vomiting. BP 138/68, HR 110, RR 28, O<sub>2</sub> sat 94% on 5L O<sub>2</sub>.

**Laboratory/diagnostic findings:** ABG-pH 7.48/pO<sub>2</sub> 63/pCO<sub>2</sub> <20/HCO<sub>3</sub> 11/BE -10; BUN 29, Cr 2.3, WBC 22.4, lactate 1.8. Serum APAP and ethanol not detected; salicylate 67.5 mg/dL.

**Clinical course:** He was initially treated with 2 amps of sodium bicarbonate and placed on a bicarbonate infusion. He developed progressive pulmonary edema and became somnolent, tachypneic and hyperpnic. BiPAP was initiated, but the salicylate level rose. He was transferred to a tertiary care center for HD, but became asystolic during transport. The patient received ACLS, multiple amps of sodium bicarbonate and epinephrine without ROSC. The patient died ~6 h after initial ED presentation.

**Autopsy findings:** None available.

#### Case 720. Acute salicylate ingestion: undoubtedly responsible

**Scenario/substances:** A 13 m/o male was staying at a family member's home when the father returned and found him vomiting with odd behavior, and an empty aspirin bottle.

**Physical exam:** The child was lethargic, pupils 4 mm, HR 150, RR 40, T 36.7 °C, O<sub>2</sub> sat 99% on room air.

**Laboratory/diagnostic findings:** ABG-pH 7.24, K 4.9, Glu 137; salicylate concentration "too high to quantify".

**Clinical course:** When the child arrived in the ED he had a generalized tonic-clonic seizure. He was transferred to a tertiary care center. On arrival, pH 6.9/pCO<sub>2</sub> 114/BE -6, Ca 6.7, Glu 43, WBC 35, salicylate 94 mg/dL. He was intubated and received dextrose and bicarbonate boluses. Shortly after intubation he rapidly deteriorated and became asystolic. Despite CPR and ALCS the child died.

**Autopsy findings:** Not available.

#### Case 722. Acute buprenorphine/naloxone (sublingual film) ingestion: undoubtedly responsible

**Scenario/substances:** A 15 m/o female was found with a buprenorphine/naloxone film wrapper in her mouth. Her mother removed it and took her to the ED where she remained asymptomatic for 4 hr. UDS was negative for opiates and she was discharged. She was found at home, 5 h later, in cardiac arrest. EMS began CPR and transported to the ED.

**Laboratory/diagnostic findings:** Repeat UDS was negative.

**Clinical course:** In the ED, she was intubated and received naloxone and epinephrine. CPR was continued for 1 h but she died without ROSC.

**Autopsy findings:** Postmortem urine: positive for buprenorphine, caffeine, theobromine and APAP. Postmortem blood: buprenorphine 5.6 ng/mL, norbuprenorphine 6.8 ng/mL. Vitreous fluid: Na 142/K 13/Cl 127/BUN 12/Cr 1.2/Glu 36, Ca 1.6, Mg 1.1, lactate 20. Cause of death: acute buprenorphine intoxication.

#### Case 725. Acute lidocaine parenteral: undoubtedly responsible

**Scenario/substances:** A 55 y/o female, getting placement of an interosseous line, inadvertently received 40 mL of 2% lidocaine IO and had respiratory depression, hypotension and then cardiac arrest.

**Physical exam:** Altered mentation with respiratory depression (requiring intubation). Initial BP 50/30, then VT and asystole. Bright red blood from ETT and broken rib, presumed punctured lung.

**Clinical course:** Patient received 250 mL of ILE with ROSC. Her BP dropped again (49/23), CPR resumed and IVFs, Ca, sodium bicarbonate and more ILE given. Despite resuscitation efforts the patient died about 1 hour after initial event.

**Autopsy findings:** Not available.

#### Case 743. Valproic acid ingestion: undoubtedly responsible

**Scenario/substances:** A 46 y/o female was brought to the ED in a coma following an overdose of an unknown drug.

**Past medical history:** Previous psychiatric admissions, medications included levothyroxine, paliperidone and benztropine.

**Physical exam:** Obtunded. SBP 100, HR 110, O<sub>2</sub> sat 98% on room air.

**Laboratory/diagnostic findings:** BUN 5, Cr 0.6, Glu 89, Mg 1.9, AST and ALT "normal", WBC 3.3. Serum APAP, ethanol and salicylate not detected. ECG: QTc 584. Valproic acid 311 mg/L (Day 4) then 195 (Day 5). Ammonia: 315 (Day 4).

**Clinical course:** In the ED she was intubated for airway protection and received IVFs and norepinephrine for hypotension. On Day 4 it was discovered that she overdosed on valproic acid and she remained unresponsive and had a seizure. She was given benzodiazepines and started on CRRT (Day 5) when her elevated VPA and hyperammonemia were first recognized. An EEG showed diffuse slowing without seizure activity. On Day 6 L-carnitine and lactulose were started; she was made DNR. She remained comatose with spastic movements despite down trending ammonia and valproic acid levels. She would open her eyes and had spastic movements, but did not follow commands. Day 9 she developed a fever, ammonia of 37, valproic acid <10. Based on the prognosis, comfort measures were instituted and she died on Day 12.

**Autopsy findings:** Not available.

#### Case 755. Acute amitriptyline ingestion: undoubtedly responsible

**Scenario/substances:** A 2 y/o male was found unresponsive, seizing with an empty bottle of amitriptyline. Family called EMS, who gave him intranasal midazolam without response.

**Physical exam:** BP 70/30, HR 104, RR 24, O<sub>2</sub> sat 98% on room air, T 36.4 °C.

**Laboratory/diagnostic findings:** ABG-pH 7.1. Serum APAP, ethanol and salicylate not detected, UDS was negative. ECG: HR 104, QRS 160, QTc 552. Blood amitriptyline 373 ng/mL, nortriptyline 80 ng/mL.

**Clinical course:** The patient was transferred to the pediatric tertiary care center where he had status epilepticus for 45 min. He was intubated and given benzodiazepines, levetiracetam and phenytoin before the seizures stopped. His 2nd EKG showed a wide QRS and prominent R in aVr. He developed VT and received IVFs and sodium bicarbonate with improvement in this rhythm and BP. His EEG was unremarkable but MRI showed bilateral infarcts. Based on the prognosis, the family opted for institution of comfort measures and he died on Day 19.

**Autopsy findings:** Not done.

#### Case 900. Acute diphenhydramine ingestion: undoubtedly responsible

**Scenario/substances:** An 8 m/o male was found cyanotic by his babysitter in a bouncy seat. EMS found muscular rigidity consistent with rigor, began ACLS and transported him to the ED. The babysitter admitted to giving the child 50 mg of diphenhydramine for "fussiness".

**Clinical course:** ROSC was not achieved by the time of arrival and the patient was pronounced dead in the ED. He underwent organ donation.

**Autopsy findings:** No evidence of natural disease or congenital anomaly. Vitreous fluid: Na 136/K 27/Cl 130/BUN 14/Cr 0.8/Glu 102, Mg 1.2,



lactate 36. Postmortem urine: positive for diphenhydramine. Postmortem blood: diphenhydramine 8.5 mcg/ml, ethanol not detected. Cause of death: acute intoxication by diphenhydramine. Manner of death: homicide.

#### Case 904. Chronic antineoplastic drug parenteral: contributory

*Scenario/substances:* A 59 y/o male presented to ED for evaluation of hematomas, 23 days after his first infusion of imetelstat (experimental telomerase inhibitor treatment; FDA phase 2 trial) for chronic myelofibrosis. He developed a hematoma on his back, 18 days prior, and then had a second drug infusion and second hematoma 4 days prior to ED arrival.

*Past medical history:* Chronic myelofibrosis, gout, HTN, leukocytosis, chronic renal insufficiency, thrombocytosis and splenomegaly. Medications: allopurinol, ibuprofen, famotidine, prednisone and hydroxyzine.

*Physical exam:* He was alert, in moderate distress from hematoma pain. Initial BP 115/74, HR 99, RR 18, T 37 °C. A grapefruit-sized hematoma on his left scapula, large crescent-shaped hematoma medial to his right scapula, and large right flank ecchymosis. His splenomegaly (~12 cm below the costal margin) was unchanged from baseline, and icteric sclera.

*Laboratory/diagnostic findings:* Initial labs 12 h prior to ED evaluation: WBC 287 (baseline 260), Hgb 8.8 (baseline 10), platelets 65 (previous value 75), INR of 1.1, fibrinogen 346, d-dimer 3.32, factor VIII assay 593% (normal 50–150%), ristocetin cofactor 347% (normal 50–150%), factor VIII related antigen 406% (normal 50–150%). Na 131/K 5.2/CI 102/BUN 21/Cr 0.83, Ca 8.7, total bilirubin 1.8, alkaline phosphatase 428, ALT 55, AST 71. At ED arrival: WBC 316/Hgb 9.0/platelets 100, INR 1.3, fibrinogen 265, Na 132/K 5.0/CI 102/BUN 31/Cr 1.0/Glu 169, LDH 1363.

*Clinical course:* Chest X-ray showed no intrathoracic process. Overnight the patient complained of new abdominal pain. On Day 2 he became confused then unresponsive with weak pulses, CPR was initiated. He was intubated for hypoxia and had central and arterial lines placed. ABG-pH <6.78/pCO<sub>2</sub> 26/pO<sub>2</sub> 273. Repeat WBC 427/Hgb 5.0/platelets 196, INR 3.0, Na 127/K 7.0/CI 97, HCO<sub>3</sub> 5/BUN 45/Cr 2.53/Glu 84, Ca 9.9, LDH 5686, AST 198, ALT 93. He was given sodium bicarbonate (boluses and infusion), insulin, D50W, Ca and blood products. He received norepinephrine, for hypotension, without improvement and then became hypothermic. Due to his prognosis the family opted for comfort measures and he died 18 h after ED presentation.

*Autopsy findings:* Not available.

#### Case 905. Acute-on-chronic methotrexate ingestion: undoubtedly responsible

*Scenario/substances:* A 28 y/o male presented to the hospital with a diffuse, blistering rash due to an adverse drug event from a therapeutic (dosing) error involving methotrexate. He had mistakenly taking methotrexate 10 mg daily (for 10 days) instead of weekly (as prescribed). He presented 3 days after the last dose.

*Physical exam:* Diffuse, erythematous rash with areas of large blisters, excoriated scabbed areas and buccal lesions, involving 45% TBSA.

*Laboratory/diagnostic findings:* Labs on presentation: d-dimer 4811. Day 2: ABG-pH 7.31/pCO<sub>2</sub> 46/pO<sub>2</sub> 125/HCO<sub>3</sub> 22, WBC <0.1/Hgb 7.9/Hct 23.6/platelets 11, INR 1.3, fibrinogen 441. Day 3: WBC <0.1/Hgb 7.4/Hct 22.3/platelets 11, erythrocytes 2.39, BUN 41, Cr 1.16. Day 5: Hct 23, RBC 2.61, BUN 40, Cr 1.04, HCO<sub>3</sub> 30. Day 7: WBC <0.2/Hgb 8.8/Hct 27.7/platelets <5, erythrocytes 2.9, Cr 0.95.

*Clinical course:* The patient was intubated for severe pain and itching, and given leucovorin 25 mg/m<sup>2</sup> for 2 doses, it was stopped after the methotrexate concentration was undetectable. The leucovorin was restarted at 10 mg/m<sup>2</sup> q6h when it was realized that the laboratory level of detection for methotrexate was 0.05 mmol/L. Urine was alkalinized with sodium bicarbonate, and vancomycin was started. On Day 4 he continued to receive leucovorin, sodium bicarbonate, IVFs, ventilatory support and antibiotics. His skin was blistered and weeping and he had oral bleeding. He received transfused platelets and filgrastim. He was afebrile, HR 85, BP 121/48, RR 12. On Day 6 he developed intermittent AF with elevated troponin, and required vasopressors. On Day 7 he regurgitated tube feeds with bleeding of mucous membranes; more platelets were transfused. On Day 8 he developed 1st degree AV block, hyponatremia and pulmonary edema, and died later that day.

*Autopsy findings:* Not available.

#### Case 921. Acute-on-chronic propranolol ingestion: undoubtedly responsible

*Scenario/substances:* A 36 y/o female was found unresponsive and bradycardic in her car with an empty bottle of propranolol. EMS transported her to the hospital and she became hypotensive and coded in route.

*Past medical history:* She had been prescribed propranolol.

*Physical exam:* On arrival to the ED: BP 150/80, HR 62.

*Laboratory/diagnostic findings:* ECG QRS 128.

*Clinical course:* On arrival to the healthcare facility the patient received Ca chloride, atropine and sodium bicarbonate followed by a bicarbonate drip. She had pulseless arrest and underwent CPR 3 times while in the ED. She was started on dopamine, norepinephrine, high dose insulin and ILE. BP 95/56, HR 100 on multiple vasopressors. She was intubated and ventilated prior to transfer to a tertiary care center. She was admitted to the ICU and maintained on epinephrine, norepinephrine, high dose insulin, bicarbonate, IVF and ILE. She also received glucagon and isoproterenol. The patient coded for 1 h and was pronounced dead despite resuscitation efforts.

*Autopsy findings:* Premortem blood propranolol was 5300 ng/mL. Cause of death: suicide by propranolol intoxication.

#### Case 1014. Acute-on-chronic treprostinil parenteral: undoubtedly responsible

*Scenario/substances:* A 56 y/o female had a cardiac arrest after receiving the wrong infusion rate of treprostinil. Instead of the intended rate of 8 ng/kg/min, she inadvertently received a total of 1.2 mg within 1 hour (20,000 ng/min).

*Past medical history:* Pulmonary HTN, rheumatoid arthritis and cardiomegaly.

*Physical exam:* Cardiac arrest, pupils fixed and dilated.

*Clinical course:* She was resuscitated, but remained hypotensive despite infusion of norepinephrine, epinephrine, vasopressin and methylene blue. On the Day 2: HR 170, BP 120/100 (on 4 vasopressors); pulmonary artery pressure was 104/74. She had a tachydysrhythmia requiring cardioversion and amiodarone. She remained unresponsive and died ~26 hr after the iatrogenic overdose.

*Autopsy findings:* Immediate Cause: multisystem organ failure due to or as a consequence of cardiogenic shock and treprostinil overdose complicating medical management of severe pulmonary HTN.

#### Case 1027. Acute-on-chronic metoprolol ingestion: undoubtedly responsible

*Scenario/substances:* A 60 y/o male took ~100 metoprolol 100 mg tablets.

*Past medical history:* HTN, diabetes, COPD, chronic kidney disease, schizo-affective disorder with previous suicide attempt.

*Physical exam:* Lethargic, unable to provide history. HR 60 (then into the 50s), BP 70/50 (then 43/21).

*Laboratory/diagnostic findings:* Day 1: Glu 320 then 400, 99.

*Clinical course:* In the ED, he was given several liters of IVFs for bradycardia and hypotension, and then intubated and started on epinephrine, glucagon and Ca. In the ICU he received ILE, and insulin and dextrose infusions. His HR was 60 and SBP in the 110's. Day 2: HR 57, SBP 80–90, he opened his eyes but did not follow commands. Day 3: more alert off sedation; epinephrine, insulin, D10W and glucagon infusions continued. BP 99/51, HR 73, RR 21, O<sub>2</sub> sat 97%. On Day 4 he was transferred to a tertiary care hospital for CRRT. His hemodynamic status deteriorated and he died on Day 4.

*Autopsy findings:* Antemortem blood metoprolol 55,300 ng/ml, alpha-hydroxymetoprolol 2120 ng/ml. Cause of death: acute metoprolol toxicity. Manner of death: suicide.

#### Case 1114. Acute-on-chronic digoxin ingestion: undoubtedly responsible

*Scenario/substances:* A 90 y/o female intentional ingested 80 of her 1.25 mcg digoxin tablets.

*Past medical history:* Sick sinus syndrome with a pacemaker, breast cancer, depression, DM, HTN, ischemic heart disease. Medications

include: aspirin, carvedilol, furosemide, letrazole, gabapentin, warfarin, and pravastatin, losartan/hydrochlorothiazide, potassium and ranitidine.

**Physical exam:** The patient was lethargic and "hypotensive", BP 140/60, HR 60.

**Laboratory/diagnostic findings:** Na 137/K 4.3/Cl 101/CO<sub>2</sub> 30/BUN 18/Cr 1/Glu 190/AG 6, AST 21, ALT 26, bilirubin 0.9. INR 2.66. Serum APAP and salicylate not detected. ECG: paced at 60 with LBBB, QRS 128, QTc 405. Serum digoxin (5 h post ingestion) 24 ng/ml.

**Clinical course:** About 2.5 h after presentation she received 16 vials of digoxin antibody fragments and IVFs with BP improvement. She had persistent nausea and diarrhea requiring antiemetics and IVFs. On Day 2: K 5.2, she went into cardiac arrest with ROSC after CPR, but died 1 h later.

**Autopsy findings:** Cause of death: digoxin toxicity with contributions from HTN, atherosclerotic cardiovascular disease and DM. Manner of death: suicide.

#### **Case 1121. Acute-on-chronic propafenone ingestion: undoubtedly responsible**

**Scenario/substances:** A 22 m/o male ingested an unknown amount of propafenone liquid (20 mg/mL).

**Past medical history:** Delivery at 32 weeks gestation, SVT and orthodromic AV re-entrant tachycardia.

**Clinical course:** He presented to the ED in cardiac arrest with seizures. He was intubated and had ROSC after ~20 min of resuscitation but went into status epilepticus. He received lorazepam, midazolam, an unknown anticonvulsant and ILE. He had another cardiac arrest during transport to a tertiary care facility and died.

**Autopsy findings:** Cause of death: acute propafenone toxicity. Manner: accidental.

#### **Case 1131. Acute magnesium sulfate ingestion: undoubtedly responsible**

**Scenario/substances:** A 39 y/o male ingested 6 pounds of magnesium sulfate (Epsom Salts). EMS found the patient unresponsive.

**Past medical history:** Daily medications included olanzapine, ziprasidone, and risperidone.

**Laboratory/diagnostic findings:** ABG- pH 7.2/pCO<sub>2</sub> 71/pO<sub>2</sub> 32/HCO<sub>3</sub> 21.2, Na 139/K 7.9/Cl 124/CO<sub>2</sub> 25/BUN 29/Cr 1.3/Glu 198/AG 10, Mg 32.8, AST 26, ALT 34, lactate 3 mg/dL. ECG Normal sinus rhythm with QRS 148, QTc 484.

**Clinical course:** The patient presented to ED with a GCS 3, he was intubated and placed on a ventilator. He did not require rapid sequence medication for intubation or sedation post intubation. BP 110/56, HR 64, RR via ventilator, T 33.3 °C. There was no corneal reflex, pupils were fixed and dilated. ~2 hours after arrival to the ED, his BP dropped to 84 systolic, HR dropped into the 50's and O<sub>2</sub> sat dropped into the 50s. The patient was given IVFs, naloxone, flumazenil, sodium bicarbonate and started on a dopamine infusion. Sepsis workup was initiated and the patient was started on antibiotics. During transfer to a tertiary care center the patient died.

**Autopsy findings:** Not performed.

#### **Case 1133. Acute zinc ingestion: undoubtedly responsible**

**Scenario/substances:** A 46 y/o male was transported to a hospital after complaining of shortness of breath and extreme weakness for 1 day.

**Past medical history:** Medications: dietary supplements, vitamins C and E, zinc and chromium.

**Physical exam:** In the ED, he was dyspneic and tachypneic. BP 117/54, HR 65, RR 26, T 37 °C, O<sub>2</sub> sat 100% on room air.

**Laboratory/diagnostic findings:** ABG-pH 6.9/pCO<sub>2</sub> 49, Na 141/K 5.1/Cl 103/HCO<sub>3</sub> 9/BUN 18/Cr 1.2/Glu 134, WBC 2.6/Hgb 2.7/platelets 169, INR 2.2, lipase 887, LFTs "high". UDS was negative.

**Clinical course:** He had a cardiac arrest ~2 h after ED arrival. He was intubated, received ACLS and IVFs with ROSC. He never regained consciousness, and died 12 h later.

**Autopsy findings:** Postmortem toxicology (blood): mercury, arsenic and lead were non-toxic. Blood zinc was 16,000 mcg/dL. Cause of death: "multiple organ failure, consequence of zinc toxicity". The manner of death: accidental.

#### **Case 1137. Loperamide ingestion: undoubtedly responsible**

**Scenario/substances:** A 34 y/o male was talking with his mother at home when he "contracted all over", his lips turned blue and passed out. She started CPR; EMS found him in VF. He was defibrillated ×3, given 2 mg of naloxone, 3 vials of epinephrine, intubated, and transported to the ED.

**Past medical history:** Opioid, marijuana and ethanol abuse. He had stopped using opioids and substituted 200 mg loperamide daily for ~2 yr. Loperamide was stopped 5 days earlier, after a syncopal episode at work. An ED evaluation for that event identified QT prolongation (547 msec) and he was referred to cardiology. Since then, he had multiple episodes of "contracting" (jerky movements, incontinence, vomiting and syncope).

**Laboratory/diagnostic findings:** ABG-pH 7.38/pCO<sub>2</sub> 32/pO<sub>2</sub> 375/BE -6. Na 138/K 3.6/Cl 110/BUN 10/Cr 0.91/Glu 251, AST 143, ALT 154, bilirubin 1.0, CPK 221, Hgb 13.6, Hct 40, Ca (ionized) 1.14; CxR was unremarkable.

**Clinical course:** In the ED he was unresponsive, with decorticate posturing, his pupils were unequal and sluggish. BP 93/60, HR 87, T 36.7 °C, O<sub>2</sub> sat 99%. He was incontinent of brown diarrhea. In the ICU, ~6 h later, he remained unresponsive, and received enoxaparin, famotidine, hydralazine, lorazepam, potassium chloride and sodium phosphate. He had multiple episodes of polymorphic VT and was started on isoproterenol and Mg infusions; a cooling protocol was initiated. Head CT was unremarkable. Day 2 on hypothermia: T 36 °C, QTc 592. EEG showed diffuse, nonspecific encephalopathy. Day 4: QTc 415, hypothermia was stopped. Day 5: QTc 469. On Day 6 he exhibited posturing, myoclonus, asymmetric sluggish pupils, and no response to painful stimuli. On Day 9 the patient had a short focal seizure and exhibited posturing with autonomic changes; he was treated with levetiracetam, fentanyl and propofol. On Day 11 MRI suggestive anoxic brain injury; he was started on clonazepam for dysautonomia. On Day 12: QTc 468, he had >25 episodes of "autonomic storm". He would open his eyes but not track, and had no cough or gag. On Day 16, based on the prognosis, he was made comfort measures only. He died on Day 22.

**Autopsy findings:** Not performed.

#### **Case 1201. Acute benzodiazepine ingestion: probably responsible**

**Scenario/substances:** A 24 y/o male had flubromazepam (designer drug) mailed to him while in a rehabilitation facility. He was found unresponsive with a "half-empty" container of the drug. EMS intubated him during ED transport.

**Past medical history:** Schizophrenia, alcohol and other substance abuse. Medications: risperidone, alprazolam, zolpidem, propranolol, atomoxetine, disulfiram, lithium, and clozapine.

**Laboratory/diagnostic findings:** Initial ED presentation: ABG-pH 7.31/pCO<sub>2</sub> 45/pO<sub>2</sub> 102/HCO<sub>3</sub> 22, Glu 112, WBC 23/Hgb 13.2/platelets 237, CPK 2168, liver function tests and UA were "unremarkable", troponin "negative". Serum APAP, ethanol and salicylate not detected. UDS was positive for benzodiazepines. ECG: HR 100 with incomplete RBBB.

**Clinical course:** Head CT showed a prominent sella, "otherwise normal". Chest X-ray showed pneumonia, he was treated with antibiotics. He had a fever (38.6 °C) on Day 6 and was started on meropenem and fluconazole. He was transferred to a tertiary care center on Day 12. Day 20 (with no response off sedation): Na 150/K 3.5/Cl 107/HCO<sub>3</sub> 32/BUN 16/Cr 0.6, Hgb 10.6, platelets 312. MR brain: bilateral globus pallidus and subcortical white matter changes consistent with anoxic brain injury; EEG showed diffuse slowing with periods of suppression. Flumazenil was given without response. Day 15: tracheostomy and PEG tube placed; levetiracetam started (without reported seizure activity). He received scheduled scopolamine and albuterol/ipratropium via nebulizer. On Day 19 he was non responsive, posturing with painful stimuli, and had fixed, dilated pupils. On Day 21 he was transferred to a hospice facility and died on Day 30.

**Autopsy findings:** Cause of death: complications of drug overdose. Manner of death: accidental.

#### **Case 1311. Phencyclidine exposure: probably responsible**

**Scenario/substances:** A 26 y/o female was seen exhibiting agitation and bizarre behavior in the street. She suffered a PEA arrest, received naloxone 1.5 mg and 25 min of CPR with ROSC in field.

*Past medical history:* Phencyclidine abuse.

*Physical exam:* BP 139/70, HR 103, RR 30, pupils pinpoint, bleeding from several sites, some oozing from mouth, anuric.

*Laboratory/diagnostic findings:* Na 140/K 8.5/Cl 98/BUN 19/Cr 2.0/AG 36, Ca 8.3, Mg 4.6, Phos 18.1, AST 1160, ALT 627, bilirubin 0.2, INR "elevated", CK 1800, troponin 0.66. Follow up labs K 5.8, AST 1160, ALT 627, CK 6690. Serum APAP, ethanol, methanol, ethylene glycol and salicylate not detected. ECG: wide complex VT with peaked T waves.

*Clinical course:* In the ED, she received additional naloxone with no response and was intubated. She was hemodynamically unstable, admitted to the ICU with a hypothermia protocol. Despite high doses of epinephrine and norepinephrine, her SBP was ~65. A head CT revealed global hypoxic/ischemic injury. She received insulin and Ca gluconate. She was made DNR due to a suspected internal bleed, was rewarmed and sedation stopped to assess for brainstem activity. Vasopressors were continued along with supportive care, but the patient died on Day 1.

*Autopsy findings:* Cause of death: acute phencyclidine intoxication, complicated by acute bronchopneumonia and anoxic ischemic encephalopathy with infarctions of the temporal and occipital lobes and basal ganglia. Ante-mortem blood (ED admission) phencyclidine 340 ng/mL.

#### **Case 1404. Acute cocaine, tropacocaine, levamisole and ethanol ingestion, aspiration (with ingestion): undoubtedly responsible**

*Scenario/substances:* A 48 y/o incarcerated male developed agitated delirium and began throwing his body against his cell walls. He was moved to a restraining chair and then became unresponsive and went into cardiac arrest. CPR was initiated with ROSC after 10 minutes. He was intubated by EMS and transported to the ED. He was reported to have been intoxicated with ethanol at the time of arrest.

*Past medical history:* Arteriosclerotic heart disease, cardiomegaly, history of self-injurious behavior.

*Physical exam:* Intubated and unresponsive, upper extremity swelling and bruising. BP 88/54, HR 135, RR 28, O<sub>2</sub> sat 92%, T (rectal) 38.9 °C.

*Laboratory/diagnostic findings:* VBG-pH 6.62/pCO<sub>2</sub> 102/pO<sub>2</sub> 54/HCO<sub>3</sub> 10, Na 142/K 8.4/Cl 105/CO<sub>2</sub> 10/Cr 1.85/Glu 85/AG 27. CK 2431, troponin 0.102. UDS was positive for acetaminophen, cocaine and cocaine metabolite. Serum APAP and salicylate were not detected.

*Clinical course:* In the ED he remained unresponsive, he was started on propofol, therapeutic hypothermia protocol and norepinephrine. A bedside ECHO showed intact LVEF, EKG was without overt ischemia. In the ICU, he was started on HD for severe acidosis and hyperkalemia. His renal function continued to deteriorate with worsening rhabdomyolysis (CK 32,245). He remained hypotensive and acidotic despite CRRT, multiple vasopressors and bicarbonate infusion. He developed GI bleeding, bowel ischemic bowel and clinical signs of anoxic brain injury. On Day 2 he developed bradyarrhythmia, then asystole and died.

*Autopsy findings:* Blood cocaine 0.79 mg/L, benzoylcocgonine 3.55 mg/L. Large fragment of plastic and 2 fragments of white, rock-like substance (identified as cocaine, tropacocaine, and levamisole) recovered from gastric contents. Cause of death: cocaine toxicity. Complications: hypoxic-ischemic encephalopathy with cerebral edema and cerebellar tonsillar herniation, acute tubular necrosis, geographic hepatic degeneration and early necrosis, colonic mucosal hemorrhage and necrosis, florid pulmonary congestion and edema.

#### **Case 1444. Acute camphor and ethanol ingestion: undoubtedly responsible**

*Scenario/substances:* A 32 y/o male mixed and ingested a vapor solution (camphor 6.2%, ethanol 78%) with soda.

*Physical exam:* BP 156/94, HR 103, O<sub>2</sub> sat 100% (intubated on 70% O<sub>2</sub>).

*Laboratory/diagnostic findings:* Na 139/K 4/Cl 102/CO<sub>2</sub> 10/Cr 1.5/Glu 200, AST 44, ALT 89, CK 261. Serum APAP and salicylate not detected, serum ethanol 217 mg/dL, UDS negative. EKG showed sinus tachycardia.

*Clinical course:* After admission, the patient seized and was given lorazepam, he then went into cardiac arrest. He received CPR, midazolam, intubation and defibrillation (twice) with ROSC. Initial rhythm of narrow complex tachycardia, HR >200. He received IVs, norepinephrine, levetiracetam and valproic acid but remained comatose off sedation. He developed hypertension and received nicardipine. Despite these efforts he died on Day 2.

*Autopsy findings:* Not available.

#### **Case 1445. Acute cantharidin ingestion: probably responsible**

*Scenario/substances:* A 42 y/o female sought an alternative treatment for her stomach cancer, saw an herbalist who gave her cantharis powder in capsule form (Ban Mao). Shortly after ingestion of a teaspoon of the powder in a soup, she developed abdominal pain, hematemesis, vomiting and diarrhea.

*Past medical history:* Stage 4 gastric cancer with a biliary stent placement, last chemotherapy 6 weeks PTA.

*Physical exam:* Upon arrival to the ED BP 70/40, HR 110, tachypneic, O<sub>2</sub> sat 97% on room air. Her mental status was alert and oriented ×3 with no ataxia, motor and sensory intact. She had dried blood in her mouth, cracked lips, and an ulcer on her tongue. Her abdomen was soft with an old ventral hernia easily reducible.

*Laboratory/diagnostic findings:* Initial VBG-pH 7.32/pCO<sub>2</sub> 29/pO<sub>2</sub> 149, lactate 5.57 (repeat 4.5), Na 137/K 2.9/Cl 99/CO<sub>2</sub> 15/BUN 35/Cr 1.7/Glu 230/AG 23 (not a diabetic), WBC 11/Hgb 12.7/Hct 41.6/platelets 327, INR 4, AST 25, ALT 106, bilirubin 1.5, bilirubin (direct) 0.6, lipase 1,160. UA showed large blood, hyaline casts and large protein. CT (without oral or IV contrast) showed no perforation.

*Clinical course:* The patient presented to the ED 5 h after ingestion (Hour 5). She became hypotensive and hypoxic by Hour 10. She was intubated and started on IVs and norepinephrine. Her SBP remained in the 80's with a HR of 110. She later received 2 units PRBC and phenylephrine was added. Repeat labs included Na 137/K 3.0/Cl 99/CO<sub>2</sub> 11/BUN 3/Cr 1.74/Glu 29 (200 after D5W)/AG 27, WBC 29.3, Hgb 15, Hct 47.2, platelets 38, fibrinogen 180, AST 378, ALT 141, LDH 1,093. Hemodynamic instability and hemoptysis from endotracheal tube worsened. She received 8 units FFP, 6 units cryoprecipitate and IV immunoglobulin. Her CxR showed a white out left lung, likely due to alveolar hemorrhage. During bronchoscopy the patient became bradycardic, received atropine, and then had a cardiac arrest. She was coded for 10 min without ROSC.

*Autopsy findings:* Cantharidin and psilocybin were detected in the patient's urine. No formal autopsy done due to patient's religious beliefs.

#### **Case 1492. Acute ethanol, pentobarbital and phenytoin ingestion: undoubtedly responsible**

*Scenario/substances:* A 25 y/o male reported overdosing on a pentobarbital-containing veterinarian product and then became unresponsive. He was found by EMS to be pulseless; ACLS protocol were initiated with ROSC. There was no response to 2 mg of intranasal naloxone.

*Physical exam:* BP 104/56, HR 105, intubated without spontaneous respiration; pupils dilated and fixed.

*Laboratory/diagnostic findings:* Serum ethanol was 167 mg/dL; serum APAP and salicylate not detected. Serum phenytoin 7.5 mg/mL. ECG: QRS 96 msec.

*Clinical course:* In the ED he experienced PEA arrest that responded to ACLS resuscitation. Epinephrine, vasopressin, phenylephrine and norepinephrine were started for hypotension. It was later discovered that he had access to a veterinarian product used for animal euthanasia containing pentobarbital 390 mg/mL and phenytoin 50 mg/mL. Due to severe acidosis, an infusion of sodium bicarbonate was initiated and CRRT was started. On Day 1 he experienced a third cardiac arrest. Based on the prognosis, the family opted for institution of comfort measures and he died on Day 1.

*Autopsy findings:* Heart blood pentobarbital 130 mg/L, phenytoin 3.4 mg/L. Ethanol and other drugs were not detected. Cause of death: pentobarbital and phenytoin intoxication. Manner of death: suicide.

**Abbreviations & normal ranges for narratives.** Disclaimer –All laboratories are different and provide their own normal ranges. Units and normal ranges are provided here for general guidance only. These values were taken from Harrison's (10), Goldfrank's (11) or Dart (12).

#### **Typical laboratory panels.** ABG-pH/pCO<sub>2</sub>/pO<sub>2</sub>/HCO<sub>3</sub>/BE

Basic metabolic panel: Na/K/Cl/CO<sub>2</sub>/BUN/Cr/Glu/AG

Complete blood count: WBC/Hgb/Hct/platelets



## ABBREVIATIONS &amp; NORMAL RANGES

~	Approximately; ABG-pH/pCO <sub>2</sub> /pO <sub>2</sub> /HCO <sub>3</sub> /BE;	CI	chloride [102–109] mEq/L;
ABG	arterial blood gases;	CMV	cytomegalovirus;
pH	hydrogen ion concentration [7.38–7.42 mmHg] ;	CNS	central nervous system;
pCO <sub>2</sub>	partial pressure of carbon dioxide [38–42 mmHg] ;	COHb	carboxyhemoglobin (RR <3%);
pO <sub>2</sub>	partial pressure of oxygen [90–100 mmHg] ;	COPD	chronic obstructive pulmonary disease;
HCO <sub>3</sub>	bicarbonate [22–28 mEq/L] ;	CPAP	continuous positive airway pressure;
BE	base excess [±2mEq/L or mmol/L] ;	CPR	cardio pulmonary resuscitation;
ACLS	advanced cardiac life support, protocol for the provision of cardiac resuscitation;	Cr	creatinine [0.5–0.9] mg/dL females [0.6–1.2] males;
ADHD	attention deficit hyperactivity disorder;	CRRT	continuous renal replacement therapy;
AF	atrial fibrillation;	CSF	cerebrospinal fluid;
AG	anion gap Na – (Cl + HCO <sub>3</sub> ) [12 ± 4 mEq/L or mmol/L];	CT	computed tomography (CAT scan) ;
AICD	automatic implanted cardiofibrillator;	CVA	cerebrovascular accident;
AKI	acute kidney injury;	CVVH	continuous venovenous hemodiafiltration;
ALP	alkaline phosphatase [13–100] U/L;	CxR	chest radiograph, chest x-ray;
ALT	alanine aminotransferase [7–41] U/L = (SGPT) ;	D10W	10% dextrose in water;
AMA	against medical advice;	D50W	50% dextrose in water;
ammonia	[25–80] mcg/dL [15–47] mmol/L;	D5NS	5% dextrose in normal saline;
amp	ampoule;	D5W	5% dextrose in water;
amphetamines	one or more of the products (6-APB, bath salts, plant food, Bliss, Ivory Wave, Purple Wave, Vanilla Sky, et al) or chemicals (3,4 methylenedioxypyrovalerone [MDPV], 6-(2-aminopropyl)benzofuran [6-APB], butylone, desoxypipradrol [2-DPMP], ethylone, flephedrone, naphyrone, mephedrone, methylenedioxypyrovalerone, methylone, methcathinone, etc.) ;	Day	when capitalized;
(hallucinogenic)		Day	hospital day, i.e. days since admission to the initial hospital admission for this exposure;
AMS	altered mental status;	DIC	disseminated intravascular coagulation;
APAP	acetaminophen (acetyl- <i>para</i> -aminophenol), therapeutic [10–20] mcg/mL;	DM	diabetes mellitus;
APLS	advanced pediatric life support, protocol for the provision of cardiac resuscitation;	DNI	do not intubate;
aPTT	activated partial thromboplastin time [30–40] s;	DNR	do not resuscitate;
ARDS	acute respiratory distress syndrome;	Dx	diagnosis;
AST	Aspartate aminotransferase [12–38] U/L = (SGOT);	ECG	electrocardiogram (EKG), leads = I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6;
AV block	atrio-ventricular block;	ECHO	echocardiogram;
BAL	British anti-Lewisite;	ECMO	extracorporeal membrane oxygenation;
BE	base excess: base excess [±2mEq/L or mmol/L];	ED	emergency department, in these narratives refers to the initial health care facility;
bicarbonate	[22–26] mmol/L;	EDDP	principal methadone metabolite, 2-ethylidene-1,5-dimethyl-3,3-diphenylpyrrolidine;
bili (direct)	direct bilirubin [0.1, 0.4] mg/dL;	EEG	electroencephalogram;
bili (indirect)	indirect bilirubin [0.2, 0.9] mg/dL;	ELISA	enzyme-linked immunosorbent assay;
bilirubin	total [0.3–1.3] mg/dL;	EMS	emergency medical services, paramedics, the first responders;
BiPAP	bilevel positive airway pressure, pressure support with 2 levels of continuous positive airway pressure;	ETT	endotracheal tube;
BLQ	below the limit of quantitation;	FFP	fresh frozen plasma;
BMI	body mass index;	FiO <sub>2</sub>	fraction of inspired oxygen (%);
BNPT	prohormone with a 76 amino acid N-terminal inactive protein that is cleaved from the molecule to release brain natriuretic peptide. CHF is likely if BNPT >125 pg/mL (<75 y/o), > 450 pg/mL (>75 y/o) ;	g	grams;
body packing	insertion of drugs into body orifices to evade law enforcement;	g/dL	grams per deciliter;
body stuffing	the ingestion of drugs in order to evade law enforcement;	GCS	Glasgow Coma Score, ranges from 3 to 15;
BP	blood pressure, systolic/diastolic (Torr);	GERD	gastroesophageal reflux disease;
BPH	benign prostatic hypertrophy;	GI	gastrointestinal;
BUN	see Urea nitrogen;	Glu	glucose, fasting [75–110] mg/dL;
C	degrees Centigrade;	h	hours;
Ca (ionized)	ionized calcium [4.5–5.6] mg/dL;	HBO	hyperbaric oxygen treatment/therapy;
Ca	calcium [8.7–10.2] mg/dL;	HCF	health care facility;
CABG	coronary artery bypass graft;	HCG	human chorionic gonadotropin test for pregnancy;
CAD	coronary artery disease;	HCO <sub>3</sub>	bicarbonate [22–28 mEq/L] ;
CHF	congestive heart failure;	HCP	health care provider;
CIWA	Clinical Institute Withdrawal Assessment for Alcohol;	Hct	hematocrit [35.4–44.4] females [38.8–46.4] males;
CK	creatinine kinase (CPK), total: [39–238] U/L females [51–294] U/L males;	HD	hemodialysis;
CKMB	MB fraction of CK [0.0–5.5 mcg/L = 0.0–5.5 ng/mL] Fraction of total CK activity [0–0.04: 0–4.0%];	Hgb	hemoglobin [12.0–15.8] g/dL females [13.3–16.2] g/dL males;
		HIV	human immunodeficiency virus;
		Hour	when capitalized;
		Hour	hours since admission or since exposure as specified in the narrative;
		HR	HR, beats per min;
		IABP	intraortic balloon pump;
		ICP	intracranial pressure;
		ICU	intensive care unit;
		IDDM	insulin dependent diabetes mellitus;
		IgE	immunoglobulin E;
		ILE	intravenous lipid emulsion (20%);
		IM	intramuscular;
		INR	international normalized ratio (PT to control) [0.8–1–2];

IO	intraosseous;	PCC	prothrombin complex concentrate;
IU/L	international units per liter;	PCP	primary care provider;
IV	intravenous;	PEA	pulseless electrical activity;
IVF	intravenous fluid(s) ;	PEEP	positive end expiratory pressure;
K	potassium [3.5–5] mEq/L;	Phos	phosphate (phosphorous) [2.5–4.5] mg/dL;
kg	kilogram;	PICU	pediatric intensive care unit;
L	liter;	platelets	platelet count [150–400] × 10 <sup>9</sup> /L;
lactate	lactic acid [4.5–14.4] mg/dL arterial, [4.5–19.8] mg/dL venous [0.5–1.6] mmol/L arterial [0.5–2.2] mmol/L venous;	PO	per os (“by mouth” in Latin) ;
LBBB	left bundle branch block on ECG;	Ppm	parts per million;
LFT:	liver function tests;	PR	P-R interval [120–200] msec on the ECG;
LVEF	left ventricular ejection fraction;	PRN	as needed;
m/o	months old;	PT	prothrombin time, INR is preferred, but PT may be used if INR is not available;
MAP	mean arterial pressure;	PTA	Prior to admission;
mcg/dL	micrograms per deciliter;	PTSD	post-traumatic stress disorder;
mcg/L	micrograms per liter;	PTT	partial thromboplastin time [26.3–39.4] s;
mcg/min	micrograms per minute;	PVC	premature ventricular contraction;
mcg/mL	micrograms per milliliter;	QRS	ECG QRS complex duration [60–100] ms;
mcmol/L	micromoles per liter;	QT	Q to T interval on the ECG waveform; varies with HR;
MDA	3,4-methylenedioxymphetamine;	QTc	QT interval corrected for HR, usually QTcB = QT/RR <sup>1/2</sup> (Bazett correction) 1–15 y/o [<440] ms, adult male [<430] ms, adult female [<450] ms;
MDMA	methylenedioxymphetamine (ecstasy, molly) ;	RBBB	right bundle branch block on ECG;
ME	medical examiner;	RBC	red blood cell(s) ;
MetHgb	methemoglobin (RR <1%);	ROSC	return of spontaneous circulation;
Mg	magnesium [1.5–2.3] mg/dL;	RPC	regional poison center;
mg	milligrams;	RR	respiratory rate, breaths per minute;
mg/dL	milligrams per deciliter;	s/p	status post;
mg/kg	milligrams per kilogram;	salicylate	aspirin, acetylsalicylic acid, therapeutic [15–30] mg/dL;
mg/L	milligrams per liter;	SBP	systolic blood pressure;
min	minutes;	sec	seconds;
ml	milliliter;	SL	sublingual;
mmol	millimoles;	SVT	supraventricular tachycardia;
mmol/L	millimoles per liter (previously mEq/L) ;	T (oral)	temperature (oral) [36.4, 37.2]°C or;
mmol/L	millimoles per liter;	T (rectal)	temperature (rectal) [36.4, 37.2]°C or;
mosm/kg	milliosmoles per kilogram;	T (tympanic)	temperature (tympanic) [36.4, 37.2]°C;
mosm/L	milliosmoles per liter;	THC	tetrahydrocannabinol;
MRI	magnetic resonance imaging;	THC Homolog	one or more of the products (Blaze, Dawn, herbal incense, K2, Red X, spice, et al) or chemicals (cannabicyclohexanol, CP-47,497, JWH-018, JWH-073, JWH-200, etc.) ;
MRSA	methicillin-resistant <i>Staphylococcus aureus</i> ;	TPN	total parenteral nutrition;
ms	milliseconds;	Tprot	total protein;
Na	sodium [136–146] mEq/L;	troponin	troponin I, normal range [0–0.08] ng/mL, Cut-off for MI >0.04 ng/mL;
NAC	n-acetyl cysteine;	U	units;
Narrative Headers	Scenario/substances: concise narrative of EMS & pre-HCF events Past Medical History: available relevant past medical history. Physical exam: initial physical exam if available Laboratory/diagnostic findings: initial results, give units except for units given in abbreviations Clinical course: concise narrative of HCF & beyond with outcome; Autopsy findings: medical examiner and/or autopsy results;	U/dL	units per deciliter;
NG	nasogastric;	U/L	units per liter;
ng/mL	nanograms per milliliter;	U/mL	units per milliliter;
not detected	analyte below the level of quantitation, negative;	UA	urinalysis;
NPO	nil per os, nothing by mouth;	UDS	urine drug screen;
NRB	non-rebreathing mask for O <sub>2</sub> delivery;	Urea nitrogen	[6–17] mg/dL;
NS	normal saline;	(BUN)	venous blood gases;
NSTEMI	non-ST segment elevation myocardial infarction;	VBG	ventricular fibrillation;
O <sub>2</sub> sat	oxygen percent saturation [94–100]% at sea level;	VF	ventricular septal defect;
OG	serum osmol gap = measured serum osmolality – calculated serum osmolality [0 ± 10 mOsmol/kg] ;	VSD	ventricular tachycardia;
OR	operating room;	VT	white blood cell (leukocyte) count [3.54–9.06] 10 <sup>3</sup> /mm <sup>3</sup> ;
Osm	osmole;	WBC	within normal limits;
PALS	pediatric advanced life support;	WNL	year old;
PC	poison center (= PCC, or Poison Control Center) ;	y/o	

## 2017 Annual Report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 35th Annual Report

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## ABSTRACT

**Introduction:** This is the 35th Annual Report of the American Association of Poison Control Centers' (AAPCC) National Poison Data System (NPDS). As of 1 January 2017, 55 of the nation's poison centers (PCs) uploaded case data automatically to NPDS. The upload interval was 8.07 [7.32, 12.65] (median [25%, 75%]) minutes, creating a near real-time national exposure and information database and surveillance system.

**Methods:** We analyzed the case data tabulating specific indices from NPDS. The methodology was similar to that of previous years. Where changes were introduced, the differences are identified. Cases with medical outcomes of death were evaluated by a team of medical and clinical toxicologist reviewers using an ordinal scale of 1-6 to assess the Relative Contribution to Fatality (RCF) of the exposure.

**Results:** In 2017, 2,607,413 closed encounters were logged by NPDS: 2,115,186 human exposures, 51,164 animal exposures, 435,540 information contacts, 5,424 human confirmed nonexposures, and 99 animal confirmed nonexposures. US PCs also made 2,680,625 follow-up calls in 2017. Total encounters showed a 3.79% decline from 2016, while health care facility (HCF) human exposure cases increased by 3.06%. All information contacts decreased by 11.5%, medication identification (Drug ID) requests decreased by 30.2%, and human exposure cases decreased by 2.03%. Human exposures with less serious outcomes have decreased 2.48% per year since 2008, while those with more serious outcomes (moderate, major or death) have increased 4.44% per year since 2000.

Consistent with the previous year, the top 5 substance classes most frequently involved in all human exposures were analgesics (11.08%), household cleaning substances (7.43%), cosmetics/personal care products (6.76%), sedatives/hypnotics/antipsychotics (5.74%), and antidepressants (5.02%). As a class, sedative/hypnotics/antipsychotics exposures increased most rapidly, by 1962 cases/year (4.91%/year), over the last 17 years for cases with more serious outcomes. The top 5 most common exposures in children age 5 years or less were cosmetics/personal care products (12.59%), household cleaning substances (10.96%), analgesics (9.18%), foreign bodies/toys/miscellaneous (6.39%), and topical preparations (4.84%). Drug identification requests comprised 22.1% of all information contacts. NPDS documented 3,208 human exposures resulting in death; 2,682 (83.6%) of these were judged as related (RCF of 1-Undoubtedly responsible, 2-Probably responsible, or 3-Contributory).

**Conclusions:** These data support the continued value of PC expertise and need for specialized medical toxicology information to manage more serious exposures, despite a decrease in cases involving less serious exposures. Unintentional and intentional exposures continue to be a significant cause of morbidity and mortality in the US. The near real-time status of NPDS represents a national public health resource to collect and monitor US exposure cases and information contacts. The continuing mission of NPDS is to provide a nationwide infrastructure for surveillance for all types of exposures (e.g., foreign body, infectious, venomous, chemical agent, or commercial product), and the identification and tracking of significant public health events. NPDS is a model system for the near real-time surveillance of national and global public health.

**NOTE:** Comparison of exposure or outcome data from previous AAPCC Annual Reports is problematic. In particular, the identification of fatalities (attribution of a death to the exposure) differed from pre-2006 Annual Reports (see Fatality Case Review – Methods). Death cases were described as all cases resulting in death and those determined to be exposure-related fatalities. Likewise, Table 22 (Exposure cases by Generic Category) since year 2006 restricts the breakdown of included deaths to single-substance cases to improve precision and avoid misinterpretation.

## Introduction

This is the 35th Annual Report of the American Association of Poison Control Centers' (AAPCC; <http://www.aapcc.org>) National Poison Data System (NPDS) [1]. Fifty-five regional poison centers (PCs) serving the entire population of the 50 United States, American Samoa, District of Columbia, Federated States of Micronesia, Guam, Puerto Rico, and the US Virgin Islands submitted information and exposure case data collected during the course of providing telephonic patient-specific exposure management and poison information for entire year of 2017.

NPDS is the data warehouse for the nation's PCs. Poison centers place emphasis on exposure management, accurate data collection and coding, and responding to the continuing need for poison-related public and professional education. The PC's healthcare professionals are available free of charge to users, 24 hours a day, every day of the year. Poison centers respond to questions from the public, health care professionals, and public health agencies. The continuous staff dedication at the PCs is manifest as the number of exposure and information encounters averaging close to 3.5 million annually since the year 2000. Poison center encounters involve either an exposed human or animal (EXPOSURE CASE) or a request for information with no person or animal exposed to any foreign body, viral, bacterial, venom, chemical agent or commercial product (INFORMATION CONTACT). A unique feature of PC case management is the use of follow-up calls to monitor case progress, provide ongoing treatment recommendations, and to determine the medical outcome of the case.

### The NPDS products database

The NPDS products database contains over 437,000 products ranging from viral and bacterial agents to commercial chemical and drug products. The products database is maintained and continuously updated by data analysts at the Micromedex Poisindex® System (Micromedex Healthcare Series [Internet database], Greenwood Village, CO: IBM Watson Health). A robust generic coding system categorizes the product data into 1,105 active generic codes. These generic codes collapse into Pharmaceutical (543) and Non-Pharmaceutical (562) groups. These two groups are divided into Major (68) and Minor (184) categories. The generic coding schema undergoes continuous improvement through the work of the AAPCC – Micromedex Joint Coding Group. The group consists of AAPCC members and IBM Watson Health editorial and lexicon staff working to meet best terminology practices. The generic code system provides enhanced report granularity as reflected in Appendix E (Table 22). The following 14 new generic codes were introduced in 2017.

## Methods

### Characterization of participating poison centers and population served

All 55 US PCs are accredited, and all submitted data to AAPCC through 31 December 2017. The entire population of the 50 United States, American Samoa, the District of

### Generic Codes Added in 2017\*

- 1 Bisphosphonates (Including Combinations)
- 2 Decarboxylase Inhibitor, Alone
- 3 Fatty Acid Supplements
- 4 Hematopoietics
- 5 Kratom
- 6 Levodopa and Carbidopa with Other Drugs
- 7 Miscellaneous Alzheimer Drugs
- 8 Miscellaneous Antidote Drugs
- 9 Monoclonal Antibodies (Including Fragments)
- 10 Other Parkinson Drugs (Including Combinations)
- 11 Other Synthetic Street Drugs
- 12 Synthetic Cathinones, Analogs and Precursors
- 13 Synthetic Opioids, Analogs and Precursors (Excluding Pharmaceutical Preparations)
- 14 Synthetic Tryptamines, Analogs and Precursors

\*Because the new codes were added during 2017, the numbers for these generic codes in Appendix E (Table 22) do not reflect the entire year. For completeness, certain categories require customized data retrieval until they have been in place for more than 1 calendar year..

Columbia, Federated States of Micronesia, Guam, Puerto Rico, and the US Virgin Islands was served by the US PC network in 2017 [2].

The average number of human exposure cases managed per day by all US PCs was 5,795. Similar to other years, higher volumes were observed in the warmer months, with a mean of 6,156 cases per day in June compared with 5,222 per day in December. On average, US PCs experienced a new encounter involving an actual human exposure every 14.9 seconds.

### Encounter management – specialized poison exposure emergency providers

Poison center Managing Directors are primarily responsible for patient care/information service operations, clinical education, and staff instruction. Most are PharmDs or RNs with American Board of Applied Toxicology (ABAT) certification in clinical toxicology. Medical direction is provided by Medical Directors who are board-certified physician medical toxicologists. At some PCs, the Managing and Medical Director roles are held by the same individual.

Encounters with US PCs are managed by healthcare professionals who have received specialized training in toxicology to allow for assessment, triage, management and monitoring of toxic exposure emergencies. These providers include medical and clinical toxicologists, registered nurses (RNs), pharmacists (PharmD or BS), physicians and physician assistants. Most commonly, RNs and pharmacists make up the contingent of "Specialists in Poison Information" (SPIs) or "Certified Specialists in Poison Information" (CSPIs) in the US. These (C)SPIs triage lay public callers to the most appropriate level of care and provide health care professionals with the most up-to-date management recommendations to care for their poisoned/overdosed patients. For a SPI to become nationally certified as a CSPI, (s)he must log a minimum of 1,200 hours in a PC and handle 2,000 human exposure cases prior to being considered eligible to take the certification examination. Of note, while the only individuals eligible to sit for the CSPI examination are RNs, pharmacists, physicians and physician assistants, there is a lack of an appropriate, core toxicology training within most graduate medical

education curricula to allow them to be prepared for PC patient management operations. These individuals must receive significant additional training beyond their degree programs to become (C)SPIs. Such training is only offered within the PCs. "Poison Information Providers" (PIPs) are allied healthcare professionals who are allowed to manage information-type and lower acuity (non-hospital) cases while working under the supervision of a CSPI. Poison centers undergo a rigorous accreditation process administered by the AAPCC and must submit an annual accreditation report and an extensive reaccreditation application every 7 years.

### NPDS – near real-time data capture

Extensively enhanced over its predecessor, the Toxic Exposure Surveillance System (TESS), which began collecting data in 1983 and near real-time data since 2003, NPDS was launched on 12 April 2006. NPDS is the data repository for all US PCs and includes all case information collected by its predecessor. In 2017, all 55 US PCs uploaded case data automatically to NPDS in near real-time, making NPDS one of the few operational systems of its kind. Poison center staff record cases contemporaneously in 1 of 4 electronic medical record systems. Each PC uploads case data automatically. The average time to upload data for all PCs is 8.07 [7.32, 12.65] (median [25%, 75%]) minutes creating a near real-time national exposure database and surveillance system.

The web-based NPDS software facilitates the detection, analysis, and reporting of surveillance anomalies. System software offers a myriad of surveillance uses allowing AAPCC, its member centers and public health agencies to utilize NPDS exposure data. Users can access regional data for their own areas and view national aggregate data. Custom surveillance definitions are available, along with ad hoc reporting tools. Information in the NPDS database is dynamic. Each year the database is locked prior to extraction of annual report data to prevent inadvertent changes and ensure consistent, reproducible reports. Additional information including autopsy data on fatalities may be added after the lock date as an addendum to the fatality abstract. The 2017 database was locked on 1 August 2018 at 12:01 EDT.

### Annual report case inclusion criteria

Note: In this and last years' reports, human and animal "EXPOSURE CALLs" have been renamed to human and animal "EXPOSURE CASEs," since a single call may result in multiple cases and the NPDS database contains information about individual exposure cases. The information in this report reflects only those cases that are not duplicates and classified by the PC as CLOSED. A case is closed when the PC has determined that no further follow-up/recommendations are required or no further information is available. Exposure cases are followed to obtain the most precise medical outcome possible. Depending on the case specifics, most cases are "closed" within a few hours of the initial contact. Cases

**Table 1A.** AAPCC population served and reported exposures (1983–2017).

Year	No. of participating centers	Population served (in millions)	Human exposures	Exposures per thousand population
1983	16	43.1	251,012	5.8
1984	47	99.8	730,224	7.3
1985	56	113.6	900,513	7.9
1986	57	132.1	1,098,894	8.3
1987	63	137.5	1,166,940	8.5
1988	64	155.7	1,368,748	8.8
1989	70	182.4	1,581,540	8.7
1990	72	191.7	1,713,462	8.9
1991	73	200.7	1,837,939	9.2
1992	68	196.7	1,864,188	9.5
1993	64	181.3	1,751,476	9.7
1994	65	215.9	1,926,438	8.9
1995	67	218.5	2,023,089	9.3
1996	67	232.3	2,155,952	9.3
1997	66	250.1	2,192,088	8.8
1998	65	257.5	2,241,082	8.7
1999	64	260.9	2,201,156	8.4
2000	63	270.6	2,168,248	8.0
2001	64	281.3	2,267,979	8.1
2002	64	291.6	2,380,028	8.2
2003	64	294.7	2,395,582	8.1
2004	62	293.7	2,438,643	8.3
2005	61	296.4	2,424,180	8.2
2006	61	299.4	2,403,539	8.0
2007	61	305.6	2,482,041	8.1
2008	61	308.5 <sup>b</sup>	2,491,049	8.1
2009	60	310.9 <sup>b</sup>	2,479,355	8.0
2010	60 <sup>a</sup>	313.3 <sup>b</sup>	2,384,825	7.6
2011	57 <sup>c</sup>	315.7 <sup>b</sup>	2,334,004	7.4
2012	57	318.0 <sup>b</sup>	2,275,141	7.2
2013	57 <sup>d</sup>	320.2 <sup>e</sup>	2,188,013	6.8
2014	56 <sup>d</sup>	322.9 <sup>f</sup>	2,165,142	6.7
2015	55 <sup>g</sup>	325.4 <sup>h</sup>	2,168,371	6.7
2016	55	327.0 <sup>i</sup>	2,159,032	6.6
2017	55	330.4 <sup>j</sup>	2,115,186	6.4
Total			66,609,913	

<sup>a</sup>As of 1 July 2010 there were 60 Participating Centers.

<sup>b</sup>AAPCC Total as of 1 July Mid Year US Census (2012 data for 50 United States, District of Columbia and Puerto Rico; 2011 data for Guam; 2010 data for American Samoa, Federated States of Micronesia, and the US Virgin Islands).

<sup>c</sup>As of 1 July 2011 there were 57 Participating Centers.

<sup>d</sup>One Participating Center closed in September 2013. Its data is included in the 2013 totals but not in the 2014 data.

<sup>e</sup>AAPCC Total as of 1 July Mid Year US Census (2013 data for 50 United States, District of Columbia and Puerto Rico, Guam, American Samoa, Federated States of Micronesia, and the US Virgin Islands).

<sup>f</sup>AAPCC Total as of 1 July Mid Year US Census (2014 data for 50 United States, District of Columbia and Puerto Rico, Guam, American Samoa, Federated States of Micronesia, and the US Virgin Islands) [2].

<sup>g</sup>One Participating Center closed in July 2014. Its data is included in the 2014 totals but not in the 2015 data.

<sup>h</sup>AAPCC Total as of 1 July Mid Year US Census (2015 data for 50 United States, District of Columbia and Puerto Rico, Guam, American Samoa, Federated States of Micronesia, and the US Virgin Islands) [2].

<sup>i</sup>AAPCC Total as of 1 July Mid Year US Census (2016 data for 50 United States, District of Columbia and Puerto Rico, Guam, American Samoa, Federated States of Micronesia, and the US Virgin Islands) [2].

<sup>j</sup>AAPCC Total as of 1 July Mid Year US Census (2017 data for 50 United States, District of Columbia and Puerto Rico, Guam, American Samoa, Federated States of Micronesia, and the US Virgin Islands) [2].

involving complex hospitalized patients or resulting in death may remain open for months while data continue to be collected. Follow-up contacts provide a proven mechanism for monitoring the appropriateness of management recommendations, enabling continual updates of case information, augmenting patient guidelines, providing poison prevention education, and obtaining final medical outcomes to make the data collected as accurate and complete as possible.

**Table 1B.** Non-human exposures by animal type.

Animal	N	%
Dog	46,125	90.15
Cat	4,329	8.46
Bird	151	0.30
Rodent/lagomorph	126	0.25
Horse	83	0.16
Sheep/goat	45	0.09
Cow	34	0.07
Aquatic	10	0.02
Other	261	0.51
Total	51,164	100.00

**Statistical methods**

All tables except Tables 3B and 17B were generated directly by the NPDS web-based application and can thus be reproduced by each PC. The analyses for Figures 1-4, Figure 7 and Table 17B were done using SAS JMP® version 12.0.1 (SAS Institute, Cary, NC) and summary counts were generated by the NPDS web-based application. The analysis for Figure 5 was done using Microsoft Excel 2016 (Microsoft, Redmond, WA).

**Table 1C.** Distribution of information calls.

Information call type	N	% of Info. calls
<b>Drug identification</b>		
Public inquiry: Drug sometimes involved in abuse	33,058	7.59
Public inquiry: Drug not known to be abused	19,919	4.57
Public inquiry: Unknown abuse potential	643	0.15
Public inquiry: Unable to identify	8,810	2.02
HCP inquiry: Drug sometimes involved in abuse	797	0.18
HCP inquiry: Drug not known to be abused	1,239	0.28
HCP inquiry: Unknown abuse potential	79	0.02
HCP inquiry: Unable to identify	561	0.13
Law Enf. Inquiry: Drug sometimes involved in abuse	18,238	4.19
Law Enf. Inquiry: Drug not known to be abused	9,446	2.17
Law Enf. Inquiry: Unknown abuse potential	398	0.09
Law Enf. Inquiry: Unable to identify	2,430	0.56
Other drug ID	603	0.14
Subtotal	96,221	22.09
<b>Drug information</b>		
Adverse effects (no known exposure)	7,726	1.77
Brand/generic name clarifications	667	0.15
Calculations	94	0.02
Compatibility of parenteral medications	141	0.03
Compounding	181	0.04
Contraindications	1,244	0.29
Dietary supplement, herbal, and homeopathic	442	0.10
Dosage	10,192	2.34
Dosage form/formulation	1,211	0.28
Drug use during breast-feeding	1,524	0.35
Drug-drug interactions	19,944	4.58
Drug-food interactions	1,390	0.32
Foreign drug	92	0.02
Generic substitution	181	0.04
Indications/therapeutic use	5,178	1.19
Medication administration	4,503	1.03
Medication availability	361	0.08
Medication disposal	1,637	0.38
Pharmacokinetics	1,194	0.27
Pharmacology	639	0.15
Regulatory	1,344	0.31
Stability/storage	1,680	0.39
Therapeutic drug monitoring	299	0.07
Other drug info	14,150	3.25
Subtotal	76,014	17.45
<b>Environmental information</b>		
Air quality	1,458	0.33
Carbon monoxide – no known patient(s)	485	0.11
Carbon monoxide alarm use	313	0.07
Chem/bioterrorism/weapons (suspected or confirmed)	14	0.00
Clarification of media reports of environmental contamination	27	0.01
Clarification of substances involved in a HAZMAT incident – no known victim(s)	53	0.01
General questions about contamination of air and/or soil	262	0.06
HAZMAT planning	94	0.02
Lead – no known patient(s)	376	0.09
Mercury thermometer cleanup	953	0.22
Mercury (excluding thermometers) cleanup	1,524	0.35
Notification of a HAZMAT incident – no known patient(s)	743	0.17
Pesticide application by a professional pest control operator	538	0.12
Pesticides (other)	2,370	0.54
Potential toxicity of chemicals in the environment	1,077	0.25
Radiation	41	0.01
Safe disposal of chemicals	1,023	0.23

(continued)

Table 1C. Continued.

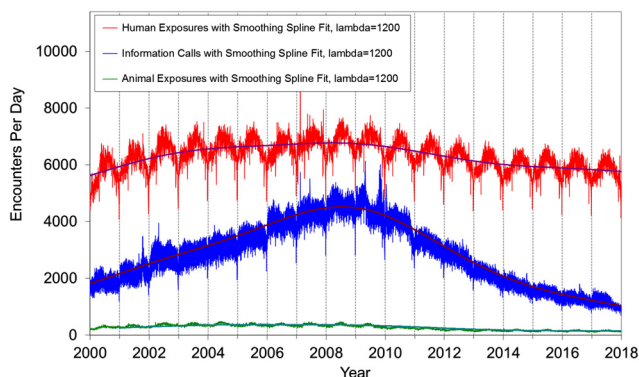
Information call type	N	% of Info. calls
Water purity/contamination	559	0.13
Other environmental	2,789	0.64
Subtotal	14,699	3.37
Medical information		
Dental questions	84	0.02
Diagnostic or treatment recommendations for diseases or conditions – non-toxicology	5,997	1.38
Disease prevention	786	0.18
Explanation of disease states	2,935	0.67
General first-aid	795	0.18
Interpretation of non-toxicology laboratory reports	104	0.02
Medical terminology questions	53	0.01
Rabies – no known patient(s)	268	0.06
Sunburn management	24	0.01
Other medical	44,424	10.20
Subtotal	55,470	12.74
Occupational information		
Occupational treatment/first-aid guidelines – no known patient(s)	27	0.01
Information on chemicals in the workplace	77	0.02
MSDS interpretation	38	0.01
Occupational MSDS requests	351	0.08
Routine toxicity monitoring	13	0.00
Safe handling of workplace chemicals	57	0.01
Other occupational	230	0.05
Subtotal	793	0.18
Poison information		
Analytical toxicology	725	0.17
Carcinogenicity	84	0.02
Food poisoning – no known patient(s)	1,748	0.40
Food preparation/handling practices	5,293	1.22
General toxicity	23,009	5.28
Mutagenicity	50	0.01
Plant toxicity	1,463	0.34
Recalls of non-drug products (including food)	175	0.04
Safe use of household products	3,837	0.88
Toxicology information for legal use/litigation	136	0.03
Other poison	12,985	2.98
Subtotal	49,505	11.37
Prevention/Safety/Education		
Confirmation of poison center number	11,943	2.74
General (non-poison) injury prevention requests	346	0.08
Media requests	162	0.04
Poison prevention material requests	6,353	1.46
Poison prevention week date inquiries	25	0.01
Professional education presentation requests	186	0.04
Public education presentation requests	245	0.06
Other prevention	740	0.17
Subtotal	20,000	4.59
Teratogenicity information		
Teratogenicity	1,711	0.39
Subtotal	1,711	0.39
Other information		
Other	48,986	11.25
Subtotal	48,986	11.25
Substance Abuse		
Drug screen information	2,080	0.48
Effects of illicit substances – no known patient(s)	142	0.03
New trend information	538	0.12
Withdrawal from illicit substances – no known patient(s)	105	0.02
Other substance abuse	431	0.10
Subtotal	3,296	0.76
Administrative		
Expert witness requests	19	0.00
Faculty activities	37	0.01
Funding	9	0.00
Personnel issues	172	0.04
Poison center record request	166	0.04
Product replacement/malfunction (issues intended for the manufacturer)	2,371	0.54
Scheduling of poison center rotations	68	0.02
Other administration	17,403	4.00
Subtotal	20,245	4.65
Caller Referred		
Immediate referral – animal poison center or veterinarian	20,362	4.68
Immediate referral – drug identification	1,102	0.25
Immediate referral – drug information	114	0.03

(continued)



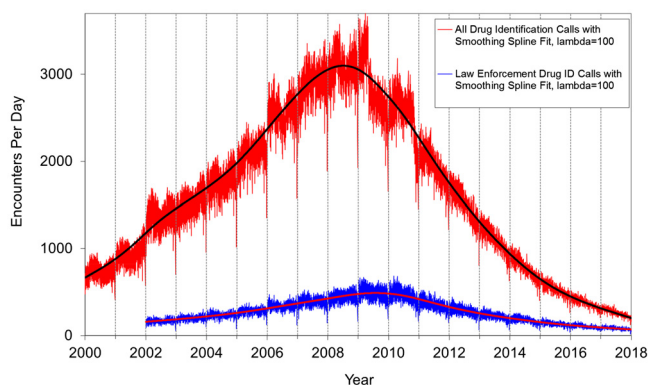
Table 1C. Continued.

Information call type	N	% of Info. calls
Immediate referral – health department	8,107	1.86
Immediate referral – medical advice line	442	0.10
Immediate referral – pediatric triage service	98	0.02
Immediate referral – pesticide hotline	298	0.07
Immediate referral – pharmacy	440	0.10
Immediate referral – poison center	4,217	0.97
Immediate referral – private physician	1,883	0.43
Immediate referral – psychiatric crisis line	92	0.02
Immediate referral – teratology information program	168	0.04
Other call referral	11,277	2.59
Subtotal	48,600	11.16
Total	435,540	100.00



**Figure 1.** Human exposure cases, information contacts and animal exposure cases by day since 1 January 2000.

Smoothing spline fits using  $\lambda = 1200$  for human exposures had associated  $RSqr = 0.447$ , information contacts  $RSqr = 0.904$  and animal exposures  $RSqr = 0.871$ .

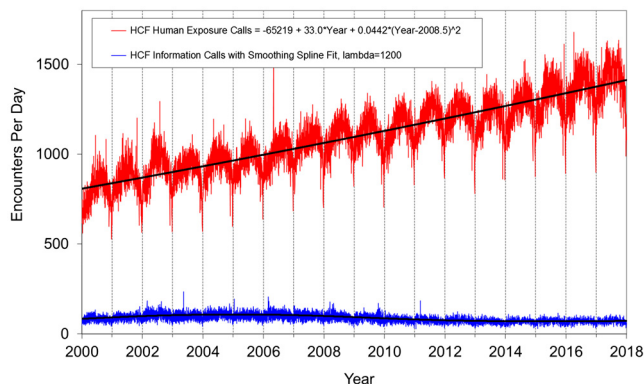


**Figure 2.** All drug identification and law enforcement drug identification contacts by day since 1 January 2000.

Smoothing spline fits used  $\lambda = 100$ , all drug identification contacts had associated  $RSqr = 0.966$  and law enforcement drug ID contacts  $RSqr = 0.868$ .

### NPDS surveillance

As previously noted, all active US PCs upload case data automatically to NPDS. This unique near real-time upload is the foundation of the NPDS surveillance system, making both spatial and temporal case volume and case-based surveillance possible. NPDS software allows creation of volume and case-based definitions. Definitions can be applied to national, regional, state, or ZIP code coverage areas. Geocentric definitions can also be created, which use cases reported from a geographic location regardless of which PC managed the case. This functionality is available to every PC as well as the AAPCC surveillance team. Poison centers also have the ability to share NPDS



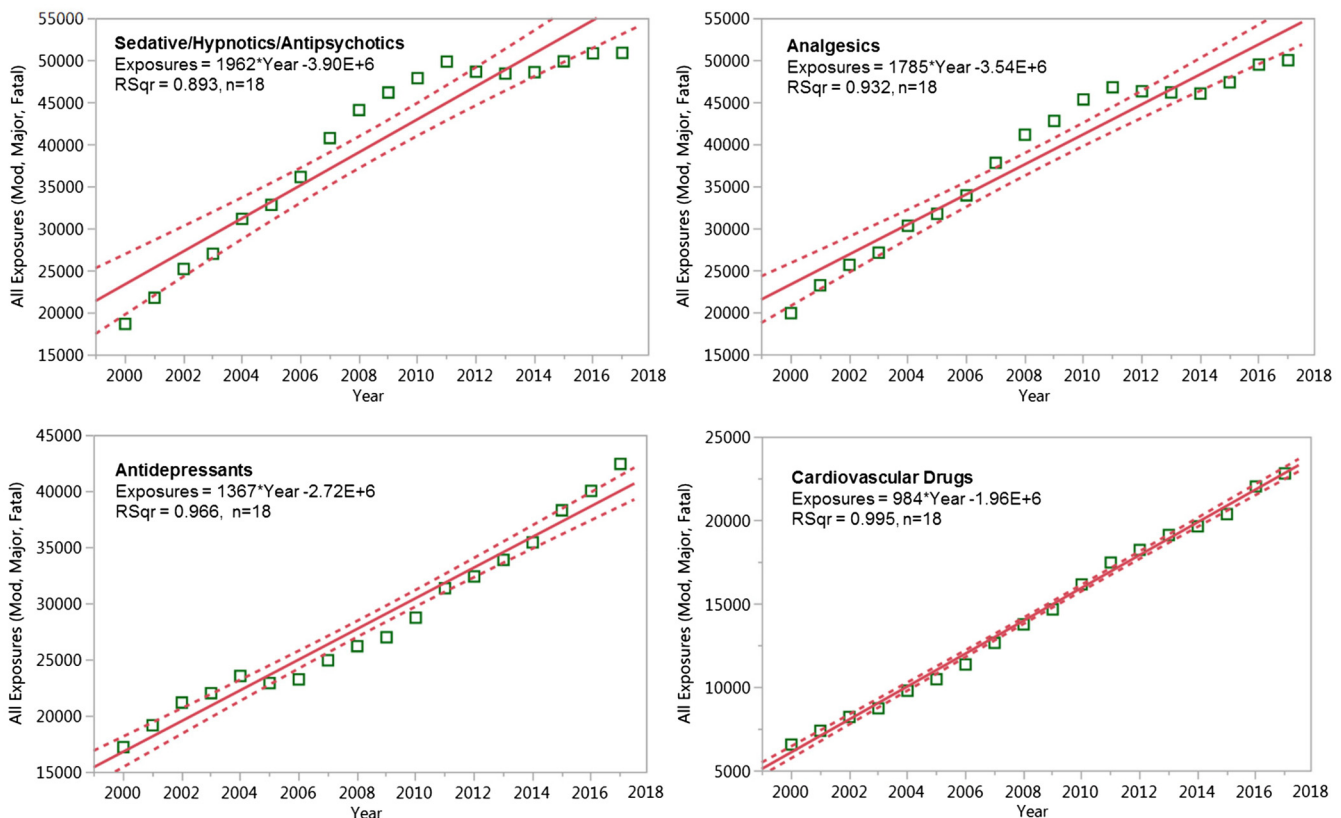
**Figure 3.** Health care facility (HCF) exposure cases and hcf information contacts by day since 1 January 2000.

Both linear and second order (quadratic) terms were statistically significant ( $p < 0.001$ ) for regression of HCF human exposure with associated  $RSqr = 0.766$ . The quadratic coefficient is positive meaning the case counts are increasing faster than linearly. Smoothing spline fit with  $\lambda = 1200$  for HCF information contacts had associated  $RSqr = 0.369$ .

near real-time surveillance technology with external organizations such as their state and local health departments or other regulatory agencies. Another NPDS feature is the ability to generate system alerts on adverse drug events and other drug or commercial products of public health interest such as contaminated food or product recalls. Thus, NPDS can provide near real-time adverse event monitoring, surveillance, response and situational awareness.

Surveillance definitions can be created to monitor a variety of parameters (i.e., volume or case based) on any desired substance or commercial product in the Micromedex Poisindex products database; and/or set of clinical effects or other parameters. The products database contains over 437,000 entries ranging from viral and bacterial agents to commercial chemical and drug products. Surveillance definitions may be constructed using volume or case-based definitions with a variety of mathematical options and historical baseline periods from 1 to 15 years. NPDS surveillance tools include:

- Volume Alert Surveillance Definitions
- Total Encounter Volume
- Human Exposure Case Volume
- Animal Exposure Case Volume
- Information Contact Volume
- Clinical Effects Volume (signs and symptoms, or laboratory abnormalities)



**Figure 4.** Substance categories with the greatest rate of exposure increase since 1 January 2000 for more severe outcomes (Top 4). Solid lines show least-squares linear regressions for the human exposure cases per year for that category (□). Broken lines show 95% confidence interval on the regression.

- Case Based Surveillance Definitions utilizing various NPDS data fields linked in Boolean expressions
  - Substance
  - Clinical Effects
  - Species
  - Medical Outcome and others
- Syndromic Surveillance Definitions allows Boolean based definitions utilizing various NPDS data fields to be run based on historical trends for user defined periods of interest

Incoming data are monitored continuously, and anomalous signals generate an automated email alert to the AAPCC's surveillance team, designated PC or public health agency staff. These anomaly alerts are reviewed daily by the AAPCC surveillance team, the PC, or the public health agency that created the surveillance definition. When reports of potential public health significance are detected, additional information is obtained from reporting PCs via the NPDS surveillance correspondence system or phone. The PC then alerts their respective local or state health departments. Public health issues are brought to the attention of the Health Studies Branch, National Center for Environmental Health, Centers for Disease Control and Prevention (HSB/NCEH/CDC). This near real-time tracking ability is a unique feature offered by NPDS and the PCs.

AAPCC Surveillance Team clinical and medical toxicologists review surveillance definitions on a regular basis to fine-tune the queries. The CDC, as well as state and local health departments with NPDS access granted by their respective PCs, also have the ability to create surveillance definitions for routine surveillance tasks or to respond to emerging public health events.

### Emerging trends

Each year since the 2007 annual report, the authors have selected a topic that exemplifies recent trends in NPDS data. Past trends have compared NPDS data to other sources such as trademark and CDC reports. Two of the last 3 years have focused on the opioid epidemic. The worldwide prevalence of illicit substance use is currently in flux, and the pattern of use in the United States is no exception. An increasing number of individual states within the US have begun to legalize and control the sale and consumption of phytocannabinoids, complicating the definition of "illicit" [3]. The opioid and specifically the heroin epidemic continues to beleague the US and other western nations, but data characterizing patterns of use of other classes of abusable substances, including "novel psychoactive substances" (NPS), remain incomplete. According to federal sources, cocaine consumption in the US fell sharply from 2005-2010, and has only increased in more recent years [3,4]. At least 97% of cocaine trafficked to the US is cultivated in South America, most notably Columbia, Peru, and Bolivia, where production has increased since 2014.

In June, 2017, the AAPCC Board of Directors approved a change in the way that search strategies could be employed in NPDS. The Historical Generic Code (GC) search strategy process allows identification and categorization of substance searches by product code before definition of the GC. Creating this strategy facilitated identification of cases associated with specific substances within the database particularly for novel substances.

We evaluated a broader view of substances of abuse, and examined all closed human single substance exposures, by

week, from 1-Jul-2010 through 30-Jul-2018 by Generic Code (GC) for:

0201127 - Methamphetamines (Active 01/01/1985)  
 0113000 - Cocaine (Active 01/01/1985)  
 0201126 - Hallucinogenic Amphetamines (Active 01/11/1985)  
 0037702 - Heroin (Active 01/01/1985)  
 0310130 - Kratom (Active 03/06/2017)  
 0310140-Synthetic Cathinones, Analogs and Precursors (Active 10/24/2017)  
 0310141 - Synthetic Opioids, Analogs and Precursors (excluding pharmaceutical preparations) (Active 10/24/2017)  
 0310142 - Synthetic Tryptamines, Analogs and Precursors (Active 10/24/2017)

Since 4 of these GCs predate NPDS and 4 were activated in 2017, we utilized the newly defined Historical Generic Code search strategy to map these GCs. We examined changes over time for each GC using flexible (spline) fits. We also examined recent rates of change, by linear regression, for the last 52 weeks of data for each GC. From a public health perspective, changes in both the absolute number

**Table 2.** Site of call and site of exposure, human exposure cases.

Site	Site of caller		Site of exposure	
	N	%	N	%
Residence				
Own	1,399,309	66.16	1,915,044	90.54
Other	28,606	1.35	46,089	2.18
Workplace	23,085	1.09	38,849	1.84
Health care facility	515,962	24.39	7,083	0.33
School	10,493	0.50	30,628	1.45
Restaurant/food service	445	0.02	3,679	0.17
Public area	8,065	0.38	23,005	1.09
Other	123,385	5.83	26,641	1.26
Unknown	5,836	0.28	24,168	1.14

and percentage of exposures may be relevant, so both parameters were calculated and presented.

### Fatality case review and abstract selection

NPDS fatality cases are recorded as DEATH or DEATH (INDIRECT REPORT). Medical outcome of DEATH is by direct report. DEATHS (INDIRECT REPORT) are deaths that the PC acquired from medical examiners or media but did not manage or answer any questions related specifically to that case.

Although PCs may report death as an outcome, the death may not be a direct result of the exposure. We define

**Table 3B.** Population-adjusted exposures by age group.

Age Group	Exposures/ 100 k population	Number of Exposures <sup>a</sup>	Population <sup>b</sup>
Children (<20)			
< 1	2,618	107,126	4,092,273
1	7,542	307,882	4,082,061
2	7,270	296,003	4,071,693
3	3,363	136,479	4,058,295
4	1,664	67,258	4,041,350
5	996	40,375	4,051,951
Child 6-12	456	132,451	29,064,156
Teen 13-19	576	171,303	29,727,838
Subgroup	1,521	1,265,052	83,189,617
Adults (≥20)			
20-29	405	187,428	46,239,807
30-39	351	153,659	43,732,816
40-49	286	117,520	41,148,415
50-59	260	114,528	44,024,966
60-69	232	86,836	37,463,960
70-79	245	53,908	21,975,428
80-89	283	28,344	10,023,916
90+	266	6,936	2,609,019
Subgroup	338	836,306	247,218,327
Overall Total	640	2,115,186	330,407,944

<sup>a</sup>Number of Exposures excludes UNKNOWN ages from the individual age categories, but includes them in the Subtotals and Overall Total (see Table 3A).

<sup>b</sup>AAPCC Total as of 1 July 2017 330,407,944 (see Table 1A) [2].

**Table 3A.** Age and gender distribution of human exposures.

Age (y)	Male		Female		Unknown gender		Total		Cumulative total	
	N	% of age group total	N	% of age group total	N	% of age group total	N	% of total exposures	N	%
Children (<20)										
< 1	55,512	51.82	51,198	47.79	416	0.39	107,126	5.06	107,126	5.06
1	160,303	52.07	147,019	47.75	560	0.18	307,882	14.56	415,008	19.62
2	154,214	52.10	141,193	47.70	596	0.20	296,003	13.99	711,011	33.61
3	74,858	54.85	61,302	44.92	319	0.23	136,479	6.45	847,490	40.07
4	37,919	56.38	29,101	43.27	238	0.35	67,258	3.18	914,748	43.25
5	23,040	57.07	17,128	42.42	207	0.51	40,375	1.91	955,123	45.16
Unknown ≤5	763	43.65	745	42.62	240	13.73	1,748	0.08	956,871	45.24
Child 6-12	74,924	56.57	56,310	42.51	1,217	0.92	132,451	6.26	1,089,322	51.50
Teen 13-19	62,615	36.55	108,000	63.05	688	0.40	171,303	8.10	1,260,625	59.60
Unknown Child	1,710	38.63	1,658	37.45	1,059	23.92	4,427	0.21	1,265,052	59.81
Subtotal	645,858	51.05	613,654	48.51	5,540	0.44	1,265,052	59.81	1,265,052	59.81
Adults (≥20)										
20-29	86,158	45.97	101,064	53.92	206	0.11	187,428	8.86	1,452,480	68.67
30-39	68,350	44.48	85,209	55.45	100	0.07	153,659	7.26	1,606,139	75.93
40-49	48,498	41.27	68,940	58.66	82	0.07	117,520	5.56	1,723,659	81.49
50-59	46,687	40.76	67,759	59.16	82	0.07	114,528	5.41	1,838,187	86.90
60-69	33,429	38.50	53,356	61.44	51	0.06	86,836	4.11	1,925,023	91.01
70-79	20,022	37.14	33,853	62.80	33	0.06	53,908	2.55	1,978,931	93.56
80-89	9,974	35.19	18,358	64.77	12	0.04	28,344	1.34	2,007,275	94.90
≥90	2,185	31.50	4,742	68.37	9	0.13	6,936	0.33	2,014,211	95.23
Unknown adult	33,583	38.54	51,855	59.50	1,709	1.96	87,147	4.12	2,101,358	99.35
Subtotal	348,886	41.72	485,136	58.01	2,284	0.27	836,306	39.54	2,101,358	99.35
Other										
Unknown age	4,577	33.10	6,222	45.00	3,029	21.90	13,828	0.65	2,115,186	100.00
Total	999,321	47.25	1,105,012	52.24	10,853	0.51	2,115,186	100.00	2,115,186	100.00



**Table 4.** Distribution of age<sup>a</sup> and Gender for Fatalities<sup>b</sup>.

Age (y)	Male	Female	Unknown	Total (%)	Cumulative total (%)
< 1 year	2	2	0	4 (0.3%)	4 (0.3%)
1 year	1	0	0	1 (0.1%)	5 (0.4%)
2 years	2	1	0	3 (0.2%)	8 (0.6%)
3 years	1	0	0	1 (0.1%)	9 (0.7%)
4 years	3	0	0	3 (0.2%)	12 (0.9%)
Child 6–12 years	8	4	1	13 (0.9%)	25 (1.8%)
Teen 13–19 years	19	27	0	46 (3.3%)	71 (5.1%)
20–29 years	123	81	1	205 (14.8%)	276 (19.9%)
30–39 years	148	95	0	243 (17.5%)	519 (37.4%)
40–49 years	99	128	0	227 (16.4%)	746 (53.8%)
50–59 years	131	137	0	268 (19.3%)	1,014 (73.1%)
60–69 years	75	114	0	189 (13.6%)	1,203 (86.7%)
70–79 years	43	61	0	104 (7.5%)	1,307 (94.2%)
80–89 years	25	33	0	58 (4.2%)	1,365 (98.3%)
> = 90 years	5	12	0	17 (1.2%)	1,382 (99.6%)
Unknown adult	3	1	0	4 (0.3%)	1,386 (99.9%)
Unknown age	0	1	1	2 (0.1%)	1,388 (100.0%)
Total	688	697	3	1,388 (100.0%)	1,388 (100.0%)

<sup>a</sup>Age includes cases with both actual and estimated ages as shown in Table 21.

<sup>b</sup>Includes cases with RCF of 1–Undoubtedly responsible, 2–Probably responsible, or 3–Contributory. This excludes reports with outcome of Death INDIRECT.

**Table 5.** Number of substances involved in human exposure cases.

No. of Substances	Human exposures		Fatal exposures <sup>a</sup>	
	N	%	N	%
1	1,858,385	87.86	598	43.08
2	159,710	7.55	327	23.56
3	53,855	2.55	214	15.42
4	22,485	1.06	97	6.99
5	9,764	0.46	74	5.33
6	4,814	0.23	24	1.73
7	2,504	0.12	22	1.59
8	1,427	0.07	9	0.65
> =9	2,242	0.11	23	1.66
Total	2,115,186	100.00	1,388	100.00

<sup>a</sup>Includes cases with RCF of 1–Undoubtedly responsible, 2–Probably responsible, or 3–Contributory. This excludes reports with outcome of Death INDIRECT.

exposure-related fatality as a death judged by the AAPCC Fatality Review Team to be at least contributory to the exposure. The definitions used for the Relative Contribution to Fatality (RCF) classification are defined in Appendix B and the methods to select abstracts for publications are described in Appendix C. For details of the AAPCC fatality review process, see the 2008 annual report [1].

### Pediatric fatality case review

A focused Pediatric Fatality Review team comprised of 6 pediatric toxicologists evaluated cases for patients under 19 years of age. The panel reviewed the documentation of all such cases, with specific focus on the conditions behind the poisoning exposure and finding commonalities which might inform efforts at prevention. The reviewed pediatric fatality cases exhibited a bimodal age distribution. Exposures causing death in children  $\leq 5$  years of age were mostly coded as “Unintentional-General,” while those in ages  $> 13$  years were mostly “Intentional.” As has been true for several years, the circumstances of the case are often not captured in the reason code or the narrative. The pediatric fatality review team continues to encourage the procurement of further

**Table 6A.** Reason for human exposure cases.

Reason	N	% Human exposures
Unintentional		
Unintentional – General	1,072,789	50.7
Unintentional – Therapeutic error	271,112	12.8
Unintentional – Misuse	141,330	6.7
Unintentional – Environmental	51,755	2.4
Unintentional – Bite / sting	41,850	2.0
Unintentional – Occupational	29,834	1.4
Unintentional – Food poisoning	16,181	0.8
Unintentional – Unknown	4,525	0.2
Subtotal	1,629,376	77.0
Intentional		
Intentional – Suspected suicide	274,390	13.0
Intentional – Misuse	57,085	2.7
Intentional – Abuse	49,234	2.3
Intentional – Unknown	19,452	0.9
Subtotal	400,161	18.9
Adverse Reaction		
Adverse reaction – Drug	34,896	1.6
Adverse reaction – Other	11,033	0.5
Adverse reaction – Food	5,561	0.3
Subtotal	51,490	2.4
Unknown		
Unknown reason	17,986	0.9
Subtotal	17,986	0.9
Other		
Other – Contamination / tampering	7,262	0.3
Other – Malicious	7,151	0.3
Other – Withdrawal	1,760	0.1
Subtotal	16,173	0.8
Total	2,115,186	100.0

detail regarding law enforcement or child protective services involvement, postmortem investigation, and the means by which the child accessed the substances responsible for the fatality. Poison Centers are encouraged to heed previously published pediatric narrative guidelines to improve the determination of causality, and preventability, wherever possible.

## Results

### Informational contacts with poison centers

Data from 435,540 information contacts to PCs in 2017 (Table 1C) was transmitted to NPDS, including contacts in optional reporting categories such as prevention/safety/education (20,000), administrative (20,245), and caller referral (48,600).

Figure 2 shows that all Drug ID contacts have decreased dramatically since mid-2008. Law enforcement Drug ID contacts also showed a decline. The most frequent information contacts was for Drug ID, comprising 96,221 contacts with PCs during the year. Of these, 52,093 (54.1%) were identified as drugs with known abuse potential. However, these cases were categorized based on the drug’s abuse potential without knowledge of whether abuse was actually intended.

While the number of Drug information contacts decreased 5.98% from 2016 (80,847 contacts) to 2017 (76,014 contacts), the percentage of these slightly increased to 17.45% of all information requests. The most common drug information requests were about drug-drug interactions, followed by other drug information, questions about dosage, inquiries of adverse effects (without a known exposure), and therapeutic use and indications. Environmental inquiries comprised 3.37% of all information contacts. Of these environmental inquiries, specific questions related to pesticides were most

**Table 6B.** Scenarios for therapeutic errors<sup>a</sup> by Age<sup>b</sup>.

Scenario	N	≤5 y (Row %)	6–12 y (Row %)	13–19 y (Row %)	≥20 y (Row %)	Unknown child (Row %)	Unknown adult (Row %)	Unknown age (Row %)
Inadvertently took/given medication twice	82,891	16.56	12.13	5.79	59.41	0.09	5.69	0.32
Wrong medication taken/given	45,212	15.74	11.33	5.91	61.66	0.08	4.93	0.35
Other incorrect dose	39,469	32.26	11.66	6.62	45.27	0.10	3.67	0.42
Medication doses given/taken too close together	30,371	17.33	9.65	6.33	60.28	0.08	6.01	0.32
Inadvertently took/given someone else's medication	24,479	15.39	19.48	6.75	53.72	0.07	4.37	0.22
Other/unknown therapeutic error	17,436	22.38	9.97	6.84	53.90	0.20	6.22	0.48
Incorrect dosing route	10,488	8.39	4.55	3.63	71.97	0.16	10.65	0.65
Confused units of measure	8,407	58.76	17.28	3.69	18.43	0.15	1.64	0.05
Incorrect formulation or concentration given	5,861	48.17	16.65	4.85	27.83	0.05	2.25	0.20
Health professional/iatrogenic error (pharmacist/nurse/physician)	5,748	24.55	10.73	6.89	52.24	0.33	4.24	1.01
Dispensing cup error	4,931	68.02	18.07	2.78	10.06	0.12	0.93	0.02
More than 1 product containing same ingredient	4,625	11.61	15.14	14.31	53.10	0.06	5.36	0.41
Drug interaction	2,806	6.52	7.34	6.56	64.83	0.29	13.93	0.53
Incorrect formulation or concentration dispensed	1,304	44.10	15.87	6.67	29.45	0.08	3.53	0.31
10-fold dosing error	1,268	57.81	9.70	2.68	28.08	0.16	1.42	0.16
Exposure through breast milk	143	92.31	0.00	0.00	4.20	2.80	0.00	0.70

<sup>a</sup>All cases with a scenario category of therapeutic error regardless of reason.<sup>b</sup>Of the human exposure cases reported to U.S. Poison Centers in 2017, 418,629 (19.8%) were coded to 1 or more of 54 scenarios.**Table 7.** Distribution of reason for exposure by age.

Reason	≤5 y		6–12 y		13–19 y		≥20 y		Unknown child		Unknown adult		Unknown age		Total	
	N	Row %	N	Row %	N	Row %	N	Row %	N	Row %	N	Row %	N	Row %	N	%
Unintentional	951,369	61.13	112,399	7.22	55,954	3.60	427,736	27.49	3,858	0.25	69,331	4.46	8,729	0.56	1,629,376	77.03
Intentional	79	0.02	14,632	3.74	107,982	27.61	265,430	67.86	246	0.06	8,785	2.25	3,007	0.77	400,161	18.92
Adverse reaction	3,350	7.37	2,703	5.95	3,612	7.95	34,817	76.64	182	0.40	5,881	12.95	945	2.08	51,490	2.43
Unknown	834	4.96	1,032	6.14	2,021	12.02	12,140	72.21	58	0.34	1,115	6.63	786	4.67	17,986	0.85
Other	1,239	8.82	1,685	11.99	1,734	12.34	9,036	64.29	83	0.59	2,035	14.48	361	2.57	16,173	0.76
Total	956,871	47.29	132,451	6.55	171,303	8.47	749,159	37.02	4,427	0.22	87,147	4.31	13,828	0.68	2,115,186	100.00

**Table 8.** Distribution of reason for exposure and age for fatalities<sup>a</sup>.

Reason	≤5 y	6–12 y	13–19 y	≥20 y	Unknown child	Unknown adult	Unknown age	Total
Unintentional								
Unintentional – General	7	0	0	19	0	1	0	27
Unintentional – Environmental	2	7	2	25	0	0	0	36
Unintentional – Occupational	0	0	0	8	0	0	0	8
Unintentional – Therapeutic error	0	1	0	26	0	0	0	27
Unintentional – Misuse	0	0	0	16	0	0	0	16
Unintentional – Bite/sting	0	0	0	4	0	0	0	4
Unintentional – Food poisoning	0	0	0	1	0	0	0	1
Unintentional – Unknown	0	0	1	7	0	0	0	8
Subtotal	9	8	3	106	0	1	0	127
Intentional								
Intentional – Suspected suicide	0	3	25	671	0	2	1	702
Intentional – Misuse	0	0	1	61	0	0	0	62
Intentional – Abuse	0	0	11	216	0	1	1	229
Intentional – Unknown	0	0	1	79	0	0	0	80
Subtotal	0	3	38	1,027	0	3	2	1,073
Other								
Other – Contamination/tampering	1	0	0	0	0	0	0	1
Other – Malicious	1	0	1	5	0	0	0	7
Other – Withdrawal	0	0	0	1	0	0	0	1
Subtotal	2	0	1	6	0	0	0	9
Adverse reaction								
Adverse reaction – Drug	0	0	1	42	0	0	0	43
Adverse reaction – Other	0	0	0	2	0	0	0	2
Subtotal	0	0	1	44	0	0	0	45
Unknown								
Unknown reason	1	2	3	128	0	0	0	134
Subtotal	1	2	3	128	0	0	0	134
Total	12	13	46	1,311	0	4	2	1,388

<sup>a</sup>Includes cases with RCF of 1–Undoubtedly responsible, 2–Probably responsible, or 3–Contributory. This excludes reports with outcome of Death INDIRECT.

common, followed by cleanup of mercury (thermometers and other), and air quality.

Of all the information contacts, poison information comprised 11.4% of the requests with inquiries involving general toxicity the most common followed by questions involving

**Table 9.** Route of exposure for human exposure cases.

Route	Human exposures			Fatal exposures <sup>a</sup>		
	N	% of All Routes	% of All Cases	N	% of All Routes	% of All Cases
Ingestion	1,764,932	79.19	83.44	1,065	71.09	76.73
Dermal	153,009	6.87	7.23	11	0.73	0.79
Inhalation/nasal	133,867	6.01	6.33	120	8.01	8.65
Ocular	89,313	4.01	4.22	2	0.13	0.14
Bite/sting	41,825	1.88	1.98	4	0.27	0.29
Parenteral	21,365	0.96	1.01	100	6.68	7.20
Unknown	17,185	0.77	0.81	175	11.68	12.61
Other	2,770	0.12	0.13	6	0.40	0.43
Otic	1,657	0.07	0.08	0	0.0	0
Aspiration (with ingestion)	1,110	0.05	0.05	11	0.73	0.79
Vaginal	932	0.04	0.04	1	0.07	0.07
Rectal	827	0.04	0.04	3	0.20	0.22
Total Number of Routes	2,228,792	100.00	105.37	1,498	100.00	107.93 <sup>b</sup>

<sup>a</sup>Includes cases with RCF of 1-Undoubtedly responsible, 2-Probably responsible, or 3-Contributory. This excludes reports with outcome of Death INDIRECT.

<sup>b</sup>Each exposure case may have more than one route.

**Table 10.** Management site of human exposures.

Site of management	N	%
Managed on site, nonhealth care facility	1,385,895	65.5
Managed in healthcare facility		
Treated/evaluated and released	309,330	14.6
Admitted to critical care unit	101,849	4.8
Admitted to psychiatric facility	85,629	4.1
Patient lost to follow-up/left AMA	82,448	3.9
Admitted to noncritical care unit	76,979	3.6
Subtotal (managed in HCF)	656,235	31.0
Other	19,941	0.9
Refused referral	25,734	1.2
Unknown	27,381	1.3
Total	2,115,186	100.0

food preparation handling practices, safe use of household products, and food poisoning.

### Exposure cases logged at poison centers

In 2017, the participating PCs logged 2,607,413 total encounters including 2,115,186 closed human exposure cases (Table 1A), 51,164 animal exposures (Table 1B), 435,540 information contacts (Table 1C), 5,424 human confirmed non-exposures, and 99 animal confirmed non-exposures. An additional 170 cases were still open at the time the database was locked. The cumulative AAPCC database now contains more than 68 million human exposure case records (Table 1A). A total of 19,250,405 information contacts have been logged into the AAPCC database since the year 2000.

Figure 1 shows the human exposures, information contacts and animal exposures by day since 1 January 2000. Smoothing spline fit of these data shows departure from linearity (declining rate of cases since mid-2007) for Human Exposure cases with some flattening over the last 2 years. information contacts are declining more rapidly and are also described by a smoothing spline fit, and Animal Exposure cases have likewise been declining since mid-2005. The 2 May 2006 exposure data spike on Figure 1 was the result of 602 children in a Midwest school reporting a noxious odor which caused anxiety but resolved without sequelae.

A hallmark of PC case management is the use of follow-up contacts to monitor case progress and medical outcome. US PCs made 2,680,625 follow-up contacts in 2017. Follow-

up was performed in 47.0% of human exposure cases. One follow-up contact was made in 21.8% of human exposure cases and multiple follow-ups (range 2-160) were performed in 25.2% of cases. For human exposure cases in which follow-up contacts were documented, an average of 2.62 contacts per case were done.

Figure 3 shows a graphic summary and analyses of Health Care Facility (HCF) exposure and HCF information contacts. HCF exposure cases slightly departs from linearity but continues to increase at a steady rate, while the rate of HCF information contacts has declined since early 2005 but leveled off since late 2013. This increasing use of the PCs for the more serious exposures (HCF cases) is important in the face of the overall decline in exposure and information encounters.

Tables 22A (Nonpharmaceuticals) and 22B (Pharmaceuticals) (in Appendix E) provide summary demographic data on patient age, reason for exposure, medical outcome, and use of an HCF for all 2,115,186 human exposure cases, presented by substance categories. The Pharmaceuticals category includes both licit and illicit drugs.

Column 1: Name of the major, minor generic categories and their associated generic substances (Alternate Names). Note that for pharmaceuticals, the generic category or generic substance listed is for the initial FDA approved indication and may not reflect current indications or uses for the pharmaceutical.

Column 2: Number of Case Mentions (all exposures) in grey shading, displays the number of times the specific generic code was reported in any human exposure case. If a human exposure case has multiple instances of a specific generic code it is only counted once.

Column 3: Number of Single Exposures displays the number of human exposure cases that identified only 1 substance (1 case, 1 substance).

The succeeding columns (Age, Reason, Treatment Site, and Outcome) show selected detail from these single-substance exposure cases. Death cases include both cases that have the outcome of Death or Death (indirect report). These death cases are not limited by the RCF.

Tables 22A and 22B (Appendix E) restrict the breakdown columns to single-substance cases. Prior to 2007, when multi-substance exposures were included, a relatively innocuous substance could be mentioned in a death column when,

**Table 11.** Medical outcome of human exposure cases by patient age<sup>a</sup>.

Outcome	<=5 y		6-12 y		13-19 y		>=20 y		Unknown child		Unknown adult		Unknown age		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
No effect	218,481	22.83	22,520	17.00	33,558	19.59	95,998	12.81	671	15.16	7819	8.97	1,723	12.5	380,770	18.00
Minor effect	78,521	8.21	19,712	14.88	49,175	28.71	176,228	23.52	409	9.24	11,452	13.14	1,998	14.5	337,495	15.96
Moderate effect	9,585	1.00	4,428	3.34	28,969	16.91	121,567	16.23	49	1.11	2,358	2.71	398	2.9	167,354	7.91
Major effect	891	0.09	320	0.24	3,149	1.84	22,382	2.99	4	0.09	161	0.18	42	0.3	26,949	1.27
Death	19	0.00	19	0.01	53	0.03	1,725	0.23	0	0.00	12	0.01	4	0.0	1,832	0.09
No follow-up, nontoxic	159,281	16.65	18,824	14.21	7,069	4.13	40,396	5.39	704	15.90	10,944	12.56	942	6.8	238,160	11.26
No follow-up, minimal toxicity	460,242	48.10	60,567	45.73	34,971	20.41	220,719	29.46	1,930	43.60	40,835	46.86	4,348	31.4	823,612	38.94
No follow-up, potentially toxic	17,213	1.80	3,087	2.33	10,137	5.92	38,490	5.14	545	12.31	9,906	11.37	3,948	28.6	83,326	3.94
Unrelated effect	12,632	1.32	2,970	2.24	4,182	2.44	30,349	4.05	115	2.60	3,648	4.19	416	3.0	54,312	2.57
Death, indirect report	6	0.00	4	0.00	40	0.02	1,305	0.17	0	0.00	12	0.01	9	0.1	1,376	0.07
Total	956,871	100.00	132,451	100.0	171,303	100.00	749,159	100.00	4,427	100.00	87,147	100.00	13,828	100.00	2,115,186	100.00

<sup>a</sup>Total number of cases where Death was an outcome (1,832 + 1,376) is greater than the number of fatalities (1,388) judged to be exposure-related (RCF of 1-Undoubtedly responsible, 2-Probably responsible, or 3-Contributory).

**Table 12.** Medical outcome by reason for exposure in human exposures<sup>a</sup>.

Outcome	Unintentional		Intentional		Other		Adverse reaction		Unknown		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
No effect	305,267	18.74	70,448	17.60	1,858	11.49	1,793	3.48	1,404	7.81	380,770	18.00
Minor effect	200,242	12.29	118,824	29.69	3,092	19.12	12,532	24.34	2,805	15.60	337,495	15.96
Moderate effect	43,298	2.66	110,868	27.71	1,270	7.85	7,248	14.08	4,670	25.96	167,354	7.91
Major effect	2,996	0.18	21,179	5.29	169	1.04	874	1.70	1,731	9.62	26,949	1.27
Death	181	0.01	1,290	0.32	14	0.09	72	0.14	275	1.53	1,832	0.09
Death, indirect report	44	0.00	1,191	0.30	1	0.01	5	0.01	135	0.75	1,376	0.07
No follow-up, nontoxic	231,302	14.20	4,112	1.03	1,172	7.25	1,326	2.58	248	1.38	238,160	11.26
No follow-up, minimal toxicity	769,023	47.20	30,149	7.53	5,845	36.14	16,507	32.06	2,088	11.61	823,612	38.94
No follow-up, potentially toxic	42,552	2.61	33,203	8.30	1,500	9.27	3,143	6.10	2,928	16.28	83,326	3.94
Unrelated effect	34,471	2.12	8,897	2.22	1,252	7.74	7,990	15.52	1,702	9.46	54,312	2.57
Total	1,629,376	100.00	400,161	100.00	16,173	100.00	51,490	100.00	17,986	100.00	2,115,186	100.00

<sup>a</sup>Total number of cases where Death was an outcome (1832 + 1376) is greater than the number of fatalities (1388) judged to be exposure-related (RCF of 1-Undoubtedly responsible, 2-Probably responsible, or 3-Contributory).

**Table 13.** Duration of clinical effects by medical outcome.

Duration of effect	Minor effect		Moderate effect		Major effect	
	N	%	N	%	N	%
<=2 hours	99,733	29.55	7140	4.27	864	3.21
>2 hours, <=8 hours	97,644	28.93	33,495	20.01	1,786	6.63
>8 hours, <=24 hours	65,138	19.30	61,298	36.63	5,897	21.88
>24 hours, <=3 days	20,725	6.14	34,855	20.83	9,171	34.03
>3 days, <=1 week	3,915	1.16	8,236	4.92	5,019	18.62
>1 week, <=1 month	1,134	0.34	1,548	0.92	1,393	5.17
>1 month	332	0.10	352	0.21	147	0.55
Anticipated permanent	422	0.13	166	0.10	453	1.68
Unknown	48,452	14.36	20,264	12.11	2,219	8.23
Total	337,495	100.00	167,354	100.00	26,949	100.00

**Table 14.** Decontamination and therapeutic interventions.

Therapy	N	%
Decontamination Only	1,012,714	47.9
Therapeutic Intervention Only	265,267	12.5
Decontamination and Therapeutic Intervention	118,881	5.6
Not Coded	718,324	34.0
Total	2,115,186	100.0

for example, the death was attributed to an antidepressant, opioid, or cyanide. This subtlety was not always appreciated by the user of this table. The restriction of the breakdowns to single-substance exposures should increase precision and reduce misrepresentation of the results in this unique by-substance table. Single substance cases reflect the majority (87.9%) of all exposures. In contrast, only 43.1% of fatalities are single substance exposures (Table 5).

Tables 22A and 22B (Appendix E) tabulate 2,541,728 substance-exposures, of which 1,858,385 were single-substance exposures, including 954,802 (51.4%) non-pharmaceuticals and 903,583 (48.6 %) pharmaceuticals. In 23.2% of single-substance exposures that involved pharmaceutical substances, the reason for exposure was intentional, compared to only 4.14% when the exposure involved a nonpharmaceutical substance. Correspondingly, treatment in an HCF was provided in a higher percentage of exposures that involved pharmaceutical substances (34.2%) compared with nonpharmaceutical substances (17.4%). Exposures to pharmaceuticals also had more severe outcomes. Of single-substance exposure-related fatal cases, 1,009 (76.2%) were pharmaceuticals compared with 315 (23.8%) nonpharmaceuticals.

### Age and gender distributions

The age and gender distribution of human exposures is outlined in Table 3A. Children younger than 3 years of age were involved in 33.6% of exposures and children ≤5 years accounted for approximately half of all human exposures (45.2%). A male predominance was found among cases involving children ≤12 years, but this gender distribution was reversed in teenagers and adults, with females comprising the majority of reported exposures. The overall rate of poison exposures reported to PCs is 660/100,000 population (Table 3B). The highest rates of poison exposures are in 1-year-old children (8,083/100,000 population) and

**Table 15.** Therapy provided in human exposures by age.

Therapy	<=5 y	6–12 y	13–19 y	>=20 y	Unknown child	Unknown adult	Unknown age	Total
Decontamination								
Cathartic	327	132	1,690	2,966	0	16	3	5,134
Charcoal, multiple doses	55	13	293	626	0	0	0	987
Charcoal, single dose	5,688	914	11,944	20,346	4	83	19	38,998
Dilute/irrigate/wash	460,162	50,594	28,327	180,026	1,344	29,540	2,884	752,877
Food/snack	128,455	12,002	6,599	31,919	303	4,857	366	184,501
Fresh air	6,639	3,978	4,378	41,293	605	11,378	1,599	69,870
Ipecac	12	2	17	31	0	2	0	64
Lavage	26	11	239	774	0	6	1	1,057
Other emetic	6,727	630	1,354	5,328	14	427	54	14,534
Whole bowel irrigation	60	14	298	1,265	0	3	0	1,640
Other Therapies								
2-PAM	2	1	4	30	0	0	0	37
Alkalinization	143	108	2,340	9,714	0	22	4	12,331
Amyl nitrite	0	0	0	4	0	0	0	4
Antiarrhythmic	15	22	344	2,006	0	8	0	2,395
Antibiotics	1,723	775	1,303	14,273	9	449	46	18,578
Anticonvulsants <sup>a</sup>	88	24	222	1,323	1	4	0	1,662
Antiemetics	1,280	727	8,577	16,473	2	76	9	27,144
Antihistamines	1,673	1,207	1,651	9,151	18	789	82	14,571
Antihypertensives	18	16	164	2,909	0	7	1	3,115
Antivenin (fab fragment)	248	217	162	1,662	0	8	2	2,299
Antivenin/antitoxin <sup>b</sup>	31	25	34	272	0	1	0	363
Atropine	100	33	191	1,427	0	7	1	1,759
BAL	9	0	2	7	0	0	0	18
Benzodiazepines	1,131	610	7,469	32,721	0	151	33	42,115
Bronchodilators	381	234	352	4,657	10	146	13	5,793
Calcium	6,251	435	327	3,275	6	67	12	10,373
Cardioversion	7	3	20	284	0	1	0	315
CPR	54	20	129	1,592	0	13	3	1,811
Deferoxamine	8	0	37	38	0	1	0	84
ECMO	4	3	16	50	0	0	0	73
EDTA	22	3	2	11	0	0	0	38
Ethanol	1	0	2	40	0	2	0	45
Extracorp. procedure (other)	2	1	8	143	0	0	0	154
Fab fragments	6	13	20	523	0	0	0	562
Fluids, IV	6,163	2,908	36,870	130,084	7	476	110	176,618
Flumazenil	82	16	168	1,184	0	3	1	1,454
Folate	10	4	39	1,618	0	3	3	1,677
Fomepizole	94	19	86	1,836	2	4	3	2,044
Glucagon	28	8	132	2,122	0	7	0	2,297
Glucose, > 5%	452	49	436	4,325	0	17	4	5,283
Hemodialysis	4	6	125	2,487	2	5	0	2,629
Hemoperfusion	0	1	1	36	0	0	0	38
Hydroxocobalamin	4	9	3	102	0	0	0	118
Hyperbaric oxygen	19	39	31	282	0	11	2	384
Insulin	8	8	159	2,374	0	5	1	2,555
Intubation	499	173	2,077	20,633	3	96	30	23,511
Methylene blue	21	3	12	164	0	0	0	200
NAC, IV	196	287	6,228	16,021	2	47	12	22,793
NAC, PO	30	36	928	2,092	0	4	3	3,093
Nalmefene	0	1	2	22	0	1	0	26
Naloxone	1,152	209	2,135	22,718	1	136	42	26,393
Neuromuscular blocker	51	16	202	1,745	0	5	2	2,021
Octreotide	112	9	48	379	0	1	0	549
Other	24,774	6,394	12,106	72,554	98	3,100	576	119,602
Oxygen	1,416	736	3,875	43,859	12	288	119	50,305
Pacemaker	0	0	0	206	0	1	0	207
Penicillamine	0	0	0	2	0	0	0	2
Physostigmine	5	14	135	263	0	4	0	421
Phytonadione	18	3	76	612	0	2	0	711
Pyridoxine	4	6	32	524	0	0	0	566
Sedation (other)	529	242	2,518	21,426	3	84	22	24,824
Sodium nitrite	1	0	1	24	0	0	0	26
Sodium thiosulfate	0	1	1	31	0	0	0	33
Steroids	608	334	447	4,682	8	286	42	6,407
Succimer	105	14	6	61	2	1	0	189
Transplantation	0	1	4	8	0	0	0	13
Vasopressors	85	53	473	7,073	1	24	4	7,713
Ventilator	468	163	1,937	19,546	3	87	32	22,236

<sup>a</sup>Excludes benzodiazepines.<sup>b</sup>Excludes Fab fragments.



**Table 16A.** Decontamination trends (1985–2017).

Year	Human exposures	Ipecac administered (% of all exposures)	Activated charcoal administered (% of all exposures)	Exposures involving children ≤5 y (% of all exposures)	Ipecac administered (% of child exposures)	Activated charcoal administered (% of child exposures)
1985	886,389	132,947 (14.999)	41,063 (4.6)	568,691 (64.2)	94,919 (16.6908)	14,718 (2.59)
1986	1,095,228	145,516 (13.286)	56,481 (5.2)	690,137 (63.0)	99,688 (14.4447)	18,191 (2.64)
1987	1,164,648	117,840 (10.118)	60,310 (5.2)	730,228 (62.7)	83,443 (11.427)	18,507 (2.53)
1988	1,364,113	114,654 (8.4050)	88,876 (6.5)	843,106 (61.8)	80,749 (9.5776)	26,118 (3.10)
1989	1,578,968	110,545 (7.0011)	101,368 (6.4)	963,924 (61.0)	79,192 (8.2156)	30,345 (3.15)
1990	1,646,946	98,986 (6.0103)	108,341 (6.6)	999,751 (60.7)	73,469 (7.3487)	31,579 (3.16)
1991	1,836,364	94,877 (5.1666)	129,092 (7.0)	1,099,179 (59.9)	73,069 (6.6476)	36,177 (3.29)
1992	1,862,796	79,493 (4.2674)	135,625 (7.3)	1,094,256 (58.7)	63,486 (5.8018)	38,937 (3.56)
1993	1,747,147	65,078 (3.7248)	127,893 (7.3)	978,560 (56.0)	50,834 (5.1948)	35,791 (3.66)
1994	1,926,992	51,356 (2.6651)	138,247 (7.2)	1,042,651 (54.1)	41,489 (3.9792)	35,670 (3.42)
1995	2,023,089	47,359 (2.3409)	155,880 (7.7)	1,070,472 (52.9)	38,372 (3.5846)	38,095 (3.56)
1996	2,155,952	39,376 (1.8264)	157,331 (7.3)	1,137,263 (52.7)	32,622 (2.8685)	37,986 (3.34)
1997	2,192,088	32,098 (1.4643)	156,213 (7.1)	1,150,931 (52.5)	26,536 (2.3056)	35,856 (3.12)
1998	2,241,082	26,653 (1.1893)	152,134 (6.8)	1,180,989 (52.7)	22,247 (1.8838)	34,302 (2.90)
1999	2,201,156	21,942 (0.9968)	145,853 (6.6)	1,154,799 (52.5)	18,326 (1.5869)	33,812 (2.93)
2000	2,168,248	18,177 (0.8383)	145,911 (6.7)	1,142,796 (52.7)	15,239 (1.3335)	31,554 (2.76)
2001	2,267,979	16,058 (0.7080)	149,442 (6.6)	1,169,478 (51.6)	13,389 (1.1449)	30,367 (2.60)
2002	2,380,028	13,555 (0.5695)	149,527 (6.3)	1,227,381 (51.6)	11,163 (0.9095)	30,340 (2.47)
2003	2,395,582	9,284 (0.3875)	140,412 (5.9)	1,245,584 (52.0)	7,310 (0.5869)	28,888 (2.32)
2004	2,438,643	4,701 (0.1928)	135,969 (5.6)	1,250,536 (51.3)	3,366 (0.2692)	28,335 (2.27)
2005	2,424,180	3,027 (0.1249)	123,263 (5.1)	1,233,695 (50.9)	1,999 (0.1620)	26,338 (2.13)
2006	2,403,539	2,176 (0.0905)	111,351 (4.6)	1,223,815 (50.9)	1,337 (0.1092)	23,843 (1.95)
2007	2,482,041	1,740 (0.0701)	106,010 (4.3)	1,271,595 (51.2)	1,052 (0.0827)	22,829 (1.80)
2008	2,491,049	1,205 (0.0484)	97,297 (3.9)	1,292,754 (51.9)	641 (0.0496)	21,286 (1.65)
2009	2,479,355	658 (0.0265)	84,805 (3.4)	1,290,784 (52.1)	330 (0.0256)	19,168 (1.48)
2010	2,384,825	360 (0.0200)	74,431 (3.1)	1,207,575 (50.6)	163 (0.0100)	16,581 (1.37)
2011	2,334,004	262 (0.0100)	66,770 (2.9)	1,144,729 (49.1)	98 (0.010)	13,930 (1.22)
2012	2,275,141	193 (0.0100)	57,888 (2.5)	1,102,307 (48.5)	83 (0.010)	11,284 (1.02)
2013	2,188,013	134 (0.0100)	50,459 (2.3)	1,049,475 (48.0)	42 (0.000)	9,334 (0.89)
2014	2,165,142	132 (0.0061)	46,030 (2.1)	1,031,927 (47.7)	41 (0.004)	7,977 (0.77)
2015	2,168,371	105 (0.0048)	42,712 (2.0)	1,017,369 (46.9)	29 (0.003)	6,965 (0.68)
2016	2,159,032	88 (0.0041)	40,633 (1.9)	1,002,344 (46.4)	22 (0.002)	6,333 (0.63)
2017	2,115,186	64 (0.0030)	39,985 (1.9)	956,871 (45.2)	12 (0.001)	5,743 (0.60)

**Table 16B.** Decontamination trends: Total human and pediatric exposures ≤5 years<sup>a</sup>.

Therapy	Human exposures		Exposures children ≤5 y	
	N	%	N	%
Activated charcoal administered	39,985	1.89	5,743	0.60
Cathartic	5,134	0.24	327	0.03
Ipecac administered	64	0.00	12	0.00
Lavage	1,057	0.05	26	0.00
Other Emetic	14,534	0.69	6,727	0.70
Whole Bowel Irrigation	1,640	0.08	60	0.01
Total	62,414	2.95	12,895	1.35

<sup>a</sup>Human exposures = 2,115,186; Pediatric exposures = 956,871.

2-year-old children (7,675/100,000 population). Rates declined with age from 448/100,000 population in children 6–12 to 345/100,000 population in adults ≥20 years.

### Caller site and exposure site

As shown in Table 2, of the 2,115,186 human exposures reported, 67.5% of these encounters originated from a residence (own or other) but 92.7% actually occurred at a residence (own or other). Another 24.4% were made from an HCF. Beyond residences, exposures occurred in the workplace (1.84% of cases), schools (1.45%), HCF (0.335%), and restaurants or food services (0.174%).

### Exposures in pregnancy

Exposure during pregnancy occurred in 6,795 women (0.321% of all human exposures). Of those with known

pregnancy duration (n=6,331), 37.1% occurred in the first trimester, 34.9% in the second trimester, and 28.0% in the third trimester. Most (72.5%) were unintentional exposures and 21.0% were intentional exposures. There were 2 deaths in pregnant females in 2017.

### Chronicity

Most human exposures, 1,825,251 (86.3%), were acute cases (single, repeated or continuous exposure occurring over 8 hours or less) compared to 1,018 (31.7%) acute cases among the 3,208 fatalities. Chronic exposures (continuous or repeated exposures occurring over >8 hours) comprised 2.20% (46,611) of all human exposures. Acute-on-chronic exposures (single exposure that was preceded by a continuous, repeated, or intermittent exposure occurring over a period greater than 8 hours) numbered 209,778 (9.92%).

### Reason for exposure

The reason category for most human exposures was unintentional (77.0%), including: unintentional general (50.7%), therapeutic error (12.8%), and unintentional misuse (6.68%) (Table 6A).

### Scenarios

Of the total 271,112 therapeutic errors, the most common scenarios for all ages included: inadvertent double-dosing

**Table 16C.** Human exposures to drugs of abuse by generic code.

Drug of Abuse Generic Code	Increase (%/year)	Exposures (last 52 weeks)	Increase (Exposures/year)	95% confidence interval
Synthetic Tryptamines, Analogs and Precursors	316%	20	1.22	[0.578, 1.86]*
Synthetic Cathinones, Analogs and Precursors	312%	105	6.30	[4.38, 8.21]*
Synthetic Opioids, Analogs and Precursors	242%	25	1.17	[0.509, 1.82]*
Kratom	63.3%	529	6.44	[2.91, 9.98]*
Hallucinogenic Amphetamines	26.4%	828	4.20	[−0.195, 8.60]
Heroin	20.9%	4186	16.8	[4.05, 29.57]*
Methamphetamines	13.1%	3766	9.49	[−12.6, 31.5]
Cocaine	0.817%	1371	0.215	[−5.60, 6.03]

\**P*-value for slope <0.05.**Table 17A.** Substance categories most frequently involved in human exposures (Top 25).

Substance (Major Generic Category)	All substances	% <sup>a</sup>	Single substance exposures	% <sup>b</sup>
Analgesics	283,784	11.08	178,069	9.58
Cleaning Substances (Household)	190,319	7.43	170,676	9.18
Cosmetics/Personal Care Products	172,968	6.76	166,145	8.94
Sedative/Hypnotics/Antipsychotics	146,943	5.74	53,419	2.87
Antidepressants	128,546	5.02	53,934	2.90
Antihistamines	111,181	4.34	76,152	4.10
Cardiovascular Drugs	108,614	4.24	46,207	2.49
Foreign Bodies/Toys/Miscellaneous	89,368	3.49	86,290	4.64
Pesticides	84,031	3.28	77,999	4.20
Alcohols	72,090	2.82	22,239	1.20
Stimulants and Street Drugs	69,979	2.73	38,148	2.05
Topical Preparations	66,702	2.61	64,886	3.49
Anticonvulsants	65,941	2.58	26,066	1.40
Vitamins	59,761	2.33	49,937	2.69
Cold and Cough Preparations	56,757	2.22	38,457	2.07
Hormones and Hormone Antagonists	56,673	2.21	36,962	1.99
Antimicrobials	53,667	2.10	42,882	2.31
Dietary Supplements/Herbals/Homeopathic	51,653	2.02	42,645	2.29
Gastrointestinal Preparations	48,714	1.90	35,117	1.89
Plants	46,782	1.83	44,089	2.37
Bites and Envenomations	46,513	1.82	45,688	2.46
Chemicals	43,688	1.71	37,406	2.01
Fumes/Gases/Vapors	33,615	1.31	30,829	1.66
Electrolytes and Minerals	30,446	1.19	24,641	1.33
Other/Unknown Nondrug Substances	30,102	1.18	27,657	1.49

<sup>a</sup>Percentages are based on the total number of substances reported in all exposures (N = 2,560,308).<sup>b</sup>Percentages are based on the total number of single substance exposures (N = 1,858,385).

(30.6%), wrong medication taken or given (16.7%), other incorrect dose (14.6%), doses given/taken too close together (11.2%), and inadvertent exposure to someone else's medication (9.03%). The types of therapeutic errors observed are different for each age group and are summarized in Table 6B.

### Reason by age

Intentional exposures accounted for 18.9% of human exposures. Suicidal intent was suspected in 13.0% of cases, intentional misuse in 2.70%, and intentional abuse in 2.33%. Unintentional exposures outnumbered intentional exposures in all age groups with the exception of ages 13–19 years (Table 7). In contrast, of the 1,388 reported fatalities with RCF 1–3, the major reason reported for children ≤5 years was unintentional, while most fatalities in adults (≥20 years) were intentional (Table 8).

### Route of exposure

Ingestion was the route of exposure in 83.4% of cases (Table 9), followed in frequency by dermal (7.23%), inhalation/nasal (6.33%), and ocular routes (4.22%). For the 1,388 exposure-related fatalities, ingestion (76.7%), unknown (12.6%), inhalation/nasal

(8.65%), and parenteral (7.20%) were the predominant exposure routes. Each exposure case may have more than one route.

### Clinical effects

The NPDS database allows for the coding of up to 131 individual clinical effects (signs, symptoms, or laboratory abnormalities) for each case. Each clinical effect can be further defined as related, not related, or unknown if related. Clinical effects were coded in 813,794 (38.5%) cases (17.7% had 1 effect, 9.88% had 2 effects, 5.32% had 3 effects, 2.56% had 4 effects, 1.26% had 5 effects, and 1.75% had >5 effects coded). Of clinical effects coded, 77.3% were deemed related to the exposure, 9.94% were considered not related, and 12.8% were coded as unknown if related.

### Case management site

The majority of cases reported to PCs were managed outside of a HCF (65.5%), usually at the site of exposure, primarily the patient's own residence (Table 10). Treatment in a HCF was rendered in 31.0% of cases. Only 1.2% of cases were referred to a HCF but refused referral.

**Table 17B.** Substance categories with the greatest rate of exposure increase (Top 25).

Substance (Major Generic Category)	Increase in serious exposures per year <sup>a</sup>		All substances in 2016
	Mean	95% CI <sup>b</sup>	
Sedative/Hypnotics/Antipsychotics	1,962	[1601, 2322]	50,933
Analgesics	1,785	[1528, 2041]	50,064
Antidepressants	1,367	[1230, 1503]	42,476
Cardiovascular Drugs	984	[948, 1020]	22,835
Alcohols	931	[872, 990]	25,003
Stimulants and Street Drugs	913	[660, 1167]	26,499
Anticonvulsants	721	[655, 786]	18,538
Antihistamines	657	[563, 751]	17,301
Muscle Relaxants	423	[365, 481]	10,409
Unknown Drug	405	[337, 473]	9,554
Hormones and Hormone Antagonists	253	[242, 265]	6,944
Cold and Cough Preparations	224	[166, 281]	7,813
Gastrointestinal Preparations	102	[83, 121]	3,495
Miscellaneous Drugs	78.1	[51, 105]	2,227
Diuretics	52.4	[44, 60]	1,546
Anticoagulants	49.3	[44, 55]	1,179
Electrolytes and Minerals	40.0	[35, 45]	1,090
Vitamins	36.3	[30, 42]	1,053
Anticholinergic Drugs	31.1	[23, 40]	1,017
Other/Unknown Nondrug Substances	25.3	[3, 48]	1,158
Weapons of Mass Destruction	19.2	[12, 27]	363
Antimicrobials	13.7	[-4, 31]	2,713
Narcotic Antagonists	11.9	[9, 15]	310
Tobacco/Nicotine/eCigarette Products	11.9	[6, 17]	355
Essential Oils	11.0	[9, 13]	236

<sup>a</sup>Serious exposures have outcomes of Moderate, Major or Death..<sup>b</sup>Increase and confidence intervals are based on least squares linear regression of the number of calls per year for 2000–2017..**Table 17C.** Substance categories most frequently involved in pediatric ( $\leq 5$  years) exposures (Top 25)<sup>a</sup>.

Substance (Major Generic Category)	All substances	% <sup>b</sup>	Single substance exposures	% <sup>c</sup>
Cosmetics/Personal Care Products	125,838	12.59	123,019	13.26
Cleaning Substances (Household)	109,563	10.96	105,275	11.35
Analgesics	91,741	9.18	83,438	8.99
Foreign Bodies/Toys/Miscellaneous	63,916	6.39	62,266	6.71
Topical Preparations	48,342	4.84	47,367	5.11
Antihistamines	46,936	4.70	42,435	4.57
Vitamins	42,553	4.26	38,215	4.12
Pesticides	34,303	3.43	33,211	3.58
Dietary Supplements/Herbals/Homeopathic	34,265	3.43	32,000	3.45
Plants	28,029	2.80	26,889	2.90
Gastrointestinal Preparations	26,808	2.68	24,204	2.61
Antimicrobials	23,090	2.31	21,609	2.33
Cardiovascular Drugs	20,983	2.10	13,318	1.44
Cold and Cough Preparations	20,536	2.05	18,537	2.00
Arts/Crafts/Office Supplies	20,449	2.05	19,779	2.13
Electrolytes and Minerals	18,785	1.88	16,994	1.83
Hormones and Hormone Antagonists	17,646	1.77	13,830	1.49
Deodorizers	17,214	1.72	16,985	1.83
Essential Oils	16,142	1.61	15,249	1.64
Other/Unknown Nondrug Substances	12,524	1.25	11,865	1.28
Antidepressants	11,667	1.17	8,459	0.91
Tobacco/Nicotine/eCigarette Products	11,207	1.12	11,119	1.20
Chemicals	11,026	1.10	10,023	1.08
Sedative/Hypnotics/Antipsychotics	9,825	0.98	7,525	0.81
Alcohols	9,402	0.94	9,153	0.99

<sup>a</sup>Includes all children with actual or estimated ages  $\leq 5$  years old. Results do not include “Unknown Child” or “Unknown Age”..<sup>b</sup>Percentages are based on the total number of substances reported in pediatric exposures (N = 999,529).<sup>c</sup>Percentages are based on the total number of single substance pediatric exposures (N = 927,844).

Of the 656,235 cases managed in a HCF, 309,330 (47.1%) were treated and released, 101,849 (15.5%) were admitted to a critical care unit, 76,979 (11.7%) were admitted to a noncritical unit, and 85,629 (13.0%) were admitted directly to a psychiatric facility.

The percentage of patients treated in a HCF varied considerably with age. Only 12.9% of children  $\leq 5$  years and 18.4% of children between 6 and 12 years were managed in a HCF

compared to 66.7% of teenagers (13–19 years) and 50.2% of adults (age  $\geq 20$  years).

### Medical outcome

Table 11 displays the medical outcome of human exposure cases distributed by age. Older age groups exhibit a greater number of severe medical outcomes. Table 12 compares



**Table 17D.** Substance categories most frequently involved in adult (>20 years) exposures (Top 25)<sup>a</sup>.

Substance (Major Generic Category)	All substances	% <sup>b</sup>	Single substance exposures	% <sup>c</sup>
Analgesics	129,917	11.18	58,799	8.95
Sedative/Hypnotics/Antipsychotics	114,212	9.83	35,663	5.43
Antidepressants	83,753	7.21	29,034	4.42
Cardiovascular Drugs	74,293	6.40	26,036	3.96
Cleaning Substances (Household)	63,329	5.45	50,384	7.67
Alcohols	55,752	4.80	10,449	1.59
Anticonvulsants	49,298	4.24	16,881	2.57
Pesticides	41,807	3.60	37,492	5.71
Stimulants and Street Drugs	41,266	3.55	18,872	2.87
Antihistamines	38,228	3.29	17,761	2.70
Hormones and Hormone Antagonists	33,006	2.84	19,369	2.95
Bites and Envenomations	31,090	2.68	30,547	4.65
Cosmetics/Personal Care Products	30,454	2.62	27,662	4.21
Chemicals	25,213	2.17	20,840	3.17
Fumes/Gases/Vapors	24,378	2.10	22,260	3.39
Antimicrobials	21,769	1.87	15,364	2.34
Cold and Cough Preparations	20,913	1.80	11,171	1.70
Muscle Relaxants	20,550	1.77	7370	1.12
Hydrocarbons	17,304	1.49	15,868	2.42
Gastrointestinal Preparations	16,570	1.43	7,744	1.18
Unknown Drug	15,129	1.30	9,340	1.42
Topical Preparations	14,179	1.22	13,557	2.06
Other/Unknown Nondrug Substances	13,038	1.12	11,604	1.77
Foreign Bodies/Toys/Miscellaneous	12,256	1.06	11,222	1.71
Miscellaneous Drugs	12,235	1.05	6,219	0.95

<sup>a</sup>Includes all adults with actual or estimated ages  $\geq 20$  years old. Results also include "Unknown Adult" but do not include "Unknown Age".

<sup>b</sup>Percentages are based on the total number of substances reported in adult exposures (N = 1,161,585).

<sup>c</sup>Percentages are based on the total number of single substance adult exposures (N = 656,790).

**Table 17E.** Substance categories most frequently involved in pediatric ( $\leq 5$  years) deaths<sup>a</sup>.

Substance (Major Generic Category)	All substances	% <sup>b</sup>	Single substance exposures	% <sup>c</sup>
Analgesics	7	20.59	5	26.32
Unknown Drug	4	11.76	4	21.05
Antihistamines	3	8.82	0	0.00
Fumes/Gases/Vapors	3	8.82	1	5.26
Alcohols	2	5.88	1	5.26
Stimulants and Street Drugs	2	5.88	0	0.00
Anesthetics	1	2.94	0	0.00
Antidepressants	1	2.94	0	0.00
Batteries	1	2.94	1	5.26
Cardiovascular Drugs	1	2.94	1	5.26
Cosmetics/Personal Care Products	1	2.94	1	5.26
Deodorizers	1	2.94	1	5.26
Dietary Supplements/Herbals/Homeopathic	1	2.94	1	5.26
Electrolytes and Minerals	1	2.94	1	5.26
Gastrointestinal Preparations	1	2.94	0	0.00
Hydrocarbons	1	2.94	0	0.00
Pesticides	1	2.94	1	5.26
Sedative/Hypnotics/Antipsychotics	1	2.94	0	0.00
Weapons of Mass Destruction	1	2.94	1	5.26
Total	34	100.00	19	100.00

<sup>a</sup>Includes all children with actual or estimated ages  $\leq 5$  years old. Results do not include "Unknown Child" or "Unknown Age". Includes death and death, indirect regardless of RCF.

<sup>b</sup>Percentages are based on the total number of substances reported in pediatric fatalities (N = 34).

<sup>c</sup>Percentages are based on the total number of single substance pediatric fatalities (N = 19).

medical outcome and reason for exposure and shows a greater frequency of serious outcomes in intentional exposures.

The duration of effect is required for all cases which report at least 1 clinical effect and have a medical outcome of minor, moderate or major effect (n = 531,798; 25.1% of exposures). Table 13 demonstrates an increasing duration of the clinical effects observed with more severe outcomes.

### Decontamination procedures and specific antidotes

Tables 14 and 15 outline the use of decontamination procedures, specific physiological antagonists (antidotes), and

measures to enhance elimination in the treatment of patients reported in the NPDS database. These should be interpreted as minimum frequencies because of the limitations of telephone data gathering.

Ipecac-induced emesis for poisoning continues to decline as shown in Tables 16A and 16B. Ipecac was administered in only 12 (0.00125%) pediatric exposures in 2017. The continued decrease in ipecac syrup use over the last 2 decades was likely a result of ipecac use guidelines issued in 1997 by the American Academy of Clinical Toxicology and the European Association of Poisons Centres and Clinical Toxicologists and updated in 2004 [5,6]. In a separate report,

**Table 17F.** Substance categories most frequently identified in drug identification calls (Top 25).

Substance (Major Generic Category)	All substances	% <sup>a</sup>
Analgesics	38,765	33.78
Sedative/Hypnotics/Antipsychotics	20,449	17.82
Unknown Drug	8,271	7.21
Cardiovascular Drugs	6,916	6.03
Antidepressants	5,704	4.97
Muscle Relaxants	5,069	4.42
Anticonvulsants	4,919	4.29
Stimulants and Street Drugs	4,271	3.72
Antihistamines	4,251	3.70
Antimicrobials	4,028	3.51
Hormones and Hormone Antagonists	2,593	2.26
Information Calls	2,514	2.19
Gastrointestinal Preparations	2,349	2.05
Diuretics	1,351	1.18
Miscellaneous Drugs	927	0.81
Cold and Cough Preparations	525	0.46
Anticholinergic Drugs	293	0.26
Vitamins	267	0.23
Anticoagulants	262	0.23
Asthma Therapies	261	0.23
Electrolytes and Minerals	249	0.22
Dietary Supplements/Herbals/Homeopathic	70	0.06
Other/Unknown Nondrug Substances	69	0.06
Narcotic Antagonists	56	0.05
Antineoplastics	55	0.05

<sup>a</sup>Percentages are based on the total number of substances reported in all drug identification calls (N = 114,760).

the American Academy of Pediatrics concluded not only that ipecac should no longer be used routinely as a home treatment strategy, but also recommended disposal of home ipecac stocks [7]. A decline was also observed since the early 1990s for reported use of activated charcoal. While not as dramatic as the decline in use of ipecac, reported use of activated charcoal decreased from 3.66% of pediatric cases in 1993 to just 0.600% in 2017.

### Top substances in human exposures

Table 17A presents the 25 most common substance categories, listed by frequency of human exposure for cases with more serious outcomes (moderate, severe, and death). This ranking provides an indication where prevention efforts might be focused, as well as the types of serious exposures PCs regularly manage. It is relevant to know whether exposures to these substances are increasing or decreasing.

To better understand these relationships, we examined exposures with more serious outcomes per year over the last 17 years for the change over time for each of the 68 major generic categories via least squares linear regression. The serious outcome exposure cases per year over this period were increasing for 34, static for 5, and decreasing for 29 of the 68 categories with data for the entire time period. The change over time for the 17 yearly values was statistically significant ( $p < 0.05$ ) for 48 of the 68 categories with data for the entire time period. Table 17B shows the 25 categories which were increasing the most rapidly. Statistical significance of the linear regressions can be verified by noting the 95% confidence interval on the rate of increase excludes zero for all but 1 of the 25 categories. Figure 4 shows

the change over time and linear regressions for the top 4 increasing categories in Table 17B.

Tables 17C and 17D present exposure results for children and adults, respectively, and show the differences between substance categories involved in pediatric and adult exposures.

Table 17E reports the 25 categories of substances most frequently involved in pediatric ( $\leq 5$  years) fatalities in 2015.

Table 17F reports the 25 Drug ID categories most frequently queried in 2017, highlighting the value of Drug ID information to the AAPCC, public health, public safety, and regulatory agencies. Internet based resources do not afford the caller the option to speak with a health care professional, if needed. Proper resources to continue this vital public service are essential, especially since the top 10 substance categories include antibiotics and drugs with widespread use and abuse potential, such as opioids and benzodiazepines.

Table 17G reports the 25 substance categories most frequently reported in exposures involving pregnant patients.

### Changes over time

Total encounters peaked in 2008 at 4,333,012 including 2,491,049 human exposure cases and 1,703,762 information contacts. Total encounters decreased 3.79% from 2,710,042 in 2016 to 2,607,413 in 2017. Information contacts decreased by 11.2% from 490,215 in 2016 to 435,540 in 2017, with a 30.2% decrease in drug identification contacts and a 0.264 % decrease in HCF information contacts. Human exposures decreased by 2.03% from 2,159,032 to 2,115,186 cases over the same time period.

Figure 5 shows the year-to-year change through 2017 as a percentage of year 2000 for human exposure cases broken down into cases with more serious outcomes (death, major effect, and moderate effect) and less serious outcomes (minor effect, no effect, not followed (non-toxic), not followed (minimal toxicity possible), unable to follow (potentially toxic), and unrelated effect). Since 2000, cases with more serious outcomes have increased by 4.44% (95% CI [4.15%, 4.73%]) per year from 108,148 cases in 2000 to 196,135 cases in 2017. However, cases with less serious outcomes have decreased since 2008 by 2.48% [−2.96%, −1.99%] per year from 2,339,460 in 2008 to 1,917,675 cases in 2017. This decrease in less serious exposures has driven the overall decrease in human exposures since 2008. Thus we see a consistent increase in exposure cases from HCFs (Figure 3) and for more severe exposures (Figure 5), despite a decrease in cases involving less severe exposures.

### Emerging trends – drugs of abuse

Cocaine-related mortality is increasing in the US. The same appears true for methamphetamine and other stimulants (Figure 6). Likewise, data from NPDS show the recent steady rise in poison center contacts leading up to and throughout 2017 (Figure 7).

Documented exposures to heroin continue to rise in NPDS data. Methamphetamine exposures steadily increased

in recent years, while cocaine dropped quickly and then plateaued. Other hallucinogenic amphetamine exposures appear to be downtrending. Interestingly, despite the creation of an active generic code in March, 2017 the Historical GC search strategy revealed that kratom shows steady activity preceding a marked increase in the number of cases late in this 10-year period. Synthetic cathinones showed early peaks, likely reflecting emergence as abused drugs with secondary peaks during outbreaks involving novel compounds with unique toxicities. Synthetic tryptamines show a very small presence in the NPDS database while synthetic opioids show a subtle increase toward the end of the period (Figure 7).

Table 16C details the increase in exposures for the 52-week period ending 30 Jul 2018 by linear regression. Of the 8 GC's examined over these 52 weeks, all were increasing (5 of 8 with  $p < 0.05$ ), 3 of 8 at  $>100\%$ /year. Trends in these data do not seem to reflect the timing of activation of GCs. Rather, peaks appear to reflect the emergence of new classes of abused drugs directly resulting in the development of new GCs. This highlights the value and timeliness of utilizing NPDS data to identify new trends as they emerge.

Moving forward, the Historical GC search should facilitate the identification of new, potentially harmful substances.

### Distribution of suicides

Table 19A shows a modest variation in the distribution of suicides and pediatric deaths over the past 2 decades as reported to the NPDS national database. Within the last decade, the percent of exposures determined to be suspected suicides ranged from 29.7 to 50.5% and the percent of pediatric cases has ranged from 0.8 to 3.18%. The relatively large changes seen for 2011, 2012 and 2017 reflects the large increase in indirect death reports in those years (e.g. 1,376 in 2017). Analyses of suicides and pediatric deaths for Direct and Indirect reports are shown in Table 19B.

### Plant exposures

Table 20 provides the number of times a specific plant was reported to NPDS ( $N=46,782$ ). The 25 most commonly involved plant species and categories account for 40.6% of all reported plant exposures. Three of the top 5 categories in the table are essentially synonymous for unknown plant and comprise 10.6% (4,951/46,782) of all plant exposures. For a variety of reasons, it was not possible to make a precise identification in these 3 groups. The most frequent plant exposures where positive plant identification was made were (descending order): *Cherry* (species unspecified), *Phytolacca americana*, *Spathiphyllum* species, *Ilex* species, *Malus* species, *Solanum nigrum*, and *Caladium* species.

### Deaths and exposure-related fatalities

A listing of cases (Table 21, Appendix D) and summary of cases (Tables 4, 5, 8, 9, 18, and 22) are provided for fatal cases with reasonable confidence that the death was a result

Table	Fatalities Included	RCF	N
4	Death only	1,2,3	1,388
5	Death only	1,2,3	1,388
8	Death only	1,2,3	1,388
9	Death only	1,2,3	1,388
11	Death and Death (indirect report)	All	3,208
12	Death and Death (indirect report)	All	3,208
17E	Pediatric Death and Death (indirect report)	All	25
18	Death only	1,2,3	1,388
19A	Death and Death (indirect report)	All	3,208
19B	Death and Death (indirect report)	All	3,208
21	Death and Death (indirect report)	1,2,3	2,682
22	Death and Death (indirect report) - Single substance deaths only	All	1,324

of the exposure (exposure-related fatalities). Tables 11, 12, and 19 consider all deaths, irrespective of the RCF. Beginning in 2010, deaths recorded as Indirect Report were no longer reviewed by the AAPCC fatality review team and the RCF was determined by the reporting PC.

There were 1,376 deaths, indirect and 1,832 deaths. Of these 3,208 cases, 2,682 were judged exposure-related fatalities (RCF = 1 - Undoubtedly responsible, 2 - Probably responsible, or 3 - Contributory). The remaining 526 cases were judged as follows: 122 as RCF = 4 - Probably not responsible, 70 as RCF = 5 - Clearly not responsible, and 334 as RCF = 6 - Unknown.

Deaths are sorted in Table 21 (Appendix D) according to the category, then substance deemed most likely responsible for the death (Cause Rank), and then by patient age. The Cause Rank permits the PC to judge 2 or more substances as indistinguishable in terms of cause, for example, 2 substances which appear equally likely to have caused the death could have Substance Rank of 1,2 and Cause Rank of 1,1. Additional agents implicated in the death are listed below the primary agent in the order of their contribution to the fatality.

As shown in Table 5, a single substance was implicated in 87.9% of reported human exposures, and 12.1% of patients were exposed to 2 or more drugs or products. The exposure-related fatalities involved a single substance in 598 cases (43.1%), 2 substances in 327 cases (23.6%), 3 in 214 cases (15.4%), and 4 or more in the balance of cases.

In Table 21 (Appendix D), the Annual Report ID number [bracketed] indicates that the abstract for that case is included in Appendix C. The letters following the Annual Report ID number indicate: i = Death, Indirect report (occurred in 1,294, 48.25% of cases), p = prehospital cardiac and/or respiratory arrest (occurred in 560, 20.9% of cases), h = hospital records reviewed (occurred in 1,007, 37.6% of cases), a = autopsy report reviewed (occurred in 1,690, 63.0% of cases). The distribution of NPDS RCF was: 1 = Undoubtedly responsible in 1,397 cases (52.1%), 2 = Probably responsible in 982 cases (36.6%), 3 = Contributory in 303 cases (11.3%). The denominator for these Table 21 percentages is 2,682.

### All fatalities – all ages

Table 4 presents the age and gender distribution for the 1,388 exposure-related fatalities (excluding death, indirect). The age distribution of reported fatalities showed a slight decrease in deaths among children (<20 years old) compared

**Table 17G.** Substance categories most frequently involved in pregnant exposures<sup>a</sup> (Top 25).

Substance (Major Generic Category)	All substances	% <sup>b</sup>	Single substance exposures	% <sup>c</sup>
Analgesics	846	10.84	514	8.50
Cleaning Substances (Household)	660	8.46	485	8.02
Fumes/Gases/Vapors	539	6.91	503	8.32
Pesticides	505	6.47	479	7.92
Bites and Envenomations	375	4.80	337	5.57
Sedative/Hypnotics/Antipsychotics	296	3.79	139	2.30
Antidepressants	284	3.64	160	2.65
Antihistamines	282	3.61	181	2.99
Vitamins	275	3.52	217	3.59
Cosmetics/Personal Care Products	214	2.74	202	3.34
Chemicals	203	2.60	164	2.71
Foreign Bodies/Toys/Miscellaneous	203	2.60	191	3.16
Antimicrobials	199	2.55	157	2.60
Infectious and Toxin-Mediated Diseases	191	2.45	152	2.51
Hydrocarbons	180	2.31	174	2.88
Stimulants and Street Drugs	174	2.23	96	1.59
Hormones and Hormone Antagonists	155	1.99	139	2.30
Alcohols	132	1.69	53	0.88
Plants	131	1.68	117	1.93
Electrolytes and Minerals	122	1.56	88	1.46
Cold and Cough Preparations	117	1.50	79	1.31
Cardiovascular Drugs	115	1.47	66	1.09
Other/Unknown Nondrug Substances	114	1.46	103	1.70
Gastrointestinal Preparations	105	1.35	79	1.31
Paints and Stripping Agents	97	1.24	93	1.54

<sup>a</sup>Includes all patient classified as pregnant and all female patients with a 'duration of pregnancy' greater than 0.

<sup>b</sup>Percentages are based on the total number of substances reported in pregnant exposures (N = 7,805).

<sup>c</sup>Percentages are based on the total number of single substance pregnant exposures (N = 6,047).

to 2016, with 71 cases representing 5.1% of fatalities. This was an absolute decrease of 2 fatalities (2.74% decrease) in that age group. The age distribution of reported fatalities in adults ( $\geq 20$  years) was similar to prior years with 1,315 of 1,388 (94.7%) fatal cases occurring in that age group actual percent 2 (0.144%) occurring in Unknown Age patients. While children  $\leq 5$  years old were involved in 45.2% of exposures, the 12 deaths in this group comprised just 0.865% of the exposure-related fatalities. The number of deaths in this age group decreased by 12 from 2016. Most (67.9%) of the fatalities occurred in 20 to 59-year-old individuals, a slightly increased percentage from prior years.

Table 21 (Appendix D) lists each of the 2,682 human fatalities (including death, indirect) along with all of the substances involved for each case. Please note, the substance listed in column 3 of Table 21 (alternate name) was chosen to be the most specific generic name based upon the Micromedex Poisindex<sup>®</sup> product name and generic code selected for that substance. Alternate names are maintained in the NPDS for each substance involved in a fatality. The cross-references at the end of each major category section in Table 21 list all cases that identify the substance as other than the primary substance. This alternate name may not agree with the AAPCC generic categories used in the summary tables (including Appendix E (Table 22)).

Table 18 lists the top 25 minor generic substance categories associated with reported fatalities and the number of single substance exposure fatalities for that category. Miscellaneous sedative/hypnotics/antipsychotics, opioids, miscellaneous stimulants and street drugs, and miscellaneous alcohols lead this list, followed by calcium antagonists, acetaminophen combinations, acetaminophen alone, beta blockers, miscellaneous antidepressants, miscellaneous unknown drug and selective serotonin reuptake inhibitors

(SSRIs). Note that Table 18 is sorted by all substances to which a patient was exposed (i.e., a patient exposed to an opioid may have also been exposed to 1 or more other products) and shows single substance exposures in the right-hand column.

The first ranked substance (Appendix D, Table 21) was a pharmaceutical in 2,314 (86.3%) of the 2,682 fatalities. These 2,314 first ranked pharmaceuticals included:

788 stimulants/street drugs (345 methamphetamine, 290 heroin, 90 cocaine, 25 amphetamine, 10 methylenedioxymethamphetamine (MDMA))

778 analgesics (215 fentanyl, 116 acetaminophen, 94 oxycodone, 58 morphine, 56 methadone, 42 acetaminophen/hydrocodone, 30 salicylate, 27 acetaminophen/oxycodone, 25 narcotic, other/unknown, 21 tramadol, 14 carfentanil, 13 acetaminophen/diphenhydramine, 10 hydrocodone, 10 hydromorphone)

254 cardiovascular drugs (80 amlodipine, 28 metoprolol, 21 diltiazem, 17 digoxin, 17 verapamil, 12 diltiazem [extended release], 12 propranolol, 9 calcium antagonist, 8 flecainide)

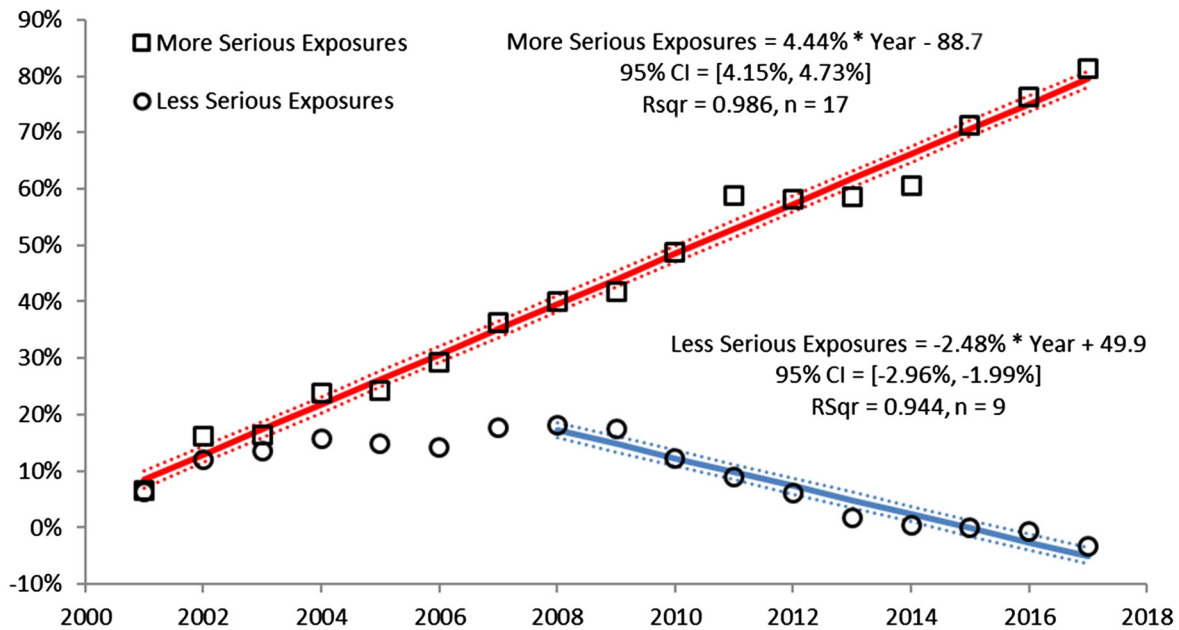
153 antidepressants (32 amitriptyline, 27 bupropion, 20 bupropion [extended release], 11 doxepin, 8 citalopram, 8 lithium, 8 venlafaxine, 7 nortriptyline)

97 sedative/hypnotic/antipsychotics (33 alprazolam, 15 quetiapine, 6 clonazepam, 6 zolpidem, 5 benzodiazepine, 5 diazepam)

The exposure was acute (A) in 783 (29.2%), acute on chronic (A/C) in 339 (12.6%), chronic (C) in 149 (5.56%), and unknown (U) in 1,411 (52.6%) of fatalities.

A total of 1,596 tissue concentrations for 1 or more related analytes were reported in 713 cases. Most of these (1,488) involved fatalities with RCF of 1-3, and are listed in Appendix D (Table 21). Of note, all tissue concentrations are available to the PCs through the NPDS Enterprise Reports. These 1,488 analytes included: 231 acetaminophen, 162 ethanol, 68 fentanyl, 54 salicylate, 39 alprazolam, 37 benzoyllecgonine, 35





**Figure 5.** Change in encounters by outcome from Year 2000.

The figure shows the percent change from baseline (year 2000) for human exposure cases divided among the 10 medical outcomes. The more serious exposures (major, moderate and death) increased. The less serious exposures (no effect, minor effect, not followed (non-toxic), not followed (minimal toxicity possible), unable to follow (potentially toxic) and unrelated effect) decreased after 2008. Solid lines show least-squares linear regressions for the change in more serious exposures per year (□) and less serious exposures (○). Broken lines show 95% confidence intervals on the regression.

**Table 18.** Categories associated with largest number of fatalities (Top 25)<sup>a</sup>.

Substance (Minor Generic Category)	All substances	% <sup>b</sup>	Single substance exposures	% <sup>c</sup>
Miscellaneous Sedative/Hypnotics/Antipsychotics	404	12.38	14	2.34
Opioids	315	9.65	48	8.03
Miscellaneous Stimulants and Street Drugs	299	9.16	71	11.87
Miscellaneous Alcohols	202	6.19	15	2.51
Calcium Antagonist	170	5.21	31	5.18
Acetaminophen Combinations	142	4.35	28	4.68
Acetaminophen Alone	140	4.29	61	10.20
Beta Blockers	118	3.62	12	2.01
Miscellaneous Antidepressants	87	2.67	9	1.51
Miscellaneous Unknown Drug	87	2.67	26	4.35
Selective Serotonin Reuptake Inhibitors (SSRI)	84	2.57	1	0.17
Miscellaneous Antihistamines	82	2.51	14	2.34
Hypoglycemic, Single Agent	74	2.27	14	2.34
Tricyclic Antidepressants (TCA)	73	2.24	9	1.51
Miscellaneous Muscle Relaxants	72	2.21	11	1.84
Anticonvulsants: Gamma Aminobutyric Acid and Analogs	64	1.96	3	0.50
Miscellaneous Cardiovascular Drugs	60	1.84	17	2.84
Miscellaneous Fumes/Gases/Vapors	53	1.62	32	5.35
Acetylsalicylic Acid Alone	47	1.44	20	3.34
Miscellaneous Anticonvulsants	45	1.38	3	0.50
Nonsteroidal Antiinflammatory Drugs	42	1.29	6	1.00
Serotonin Norepinephrine Reuptake Inhibitors (SNRI)	40	1.23	2	0.33
Angiotensin Converting Enzyme Inhibitor	38	1.16	1	0.17
Cannabinoids and Analogs	37	1.13	2	0.33
Miscellaneous Chemicals	35	1.07	20	3.34

<sup>a</sup>Numbers represent total exposures associated with 1,388 fatalities (with RCF of 1-Undoubtedly responsible, 2-Probably responsible, or 3-Contributory); each fatality may have had exposure to more than one substance.

<sup>b</sup>Percentages are based on the total number of substances reported in fatal exposures (N = 3,263).

<sup>c</sup>Percentages are based on the total number of single substance fatal exposures (N = 598).

methamphetamine, 32 methadone, 31 morphine (free), 27 amphetamine, 26 carboxyhemoglobin, 25 oxycodone, 24 amlodipine, 21 7-aminoclonazepam, 20 morphine, 19 gabapentin, 19 ethylene glycol, 18 cocaine, 18 bupropion, 17 diphenhydramine, 17 methanol, 16 nortriptyline, 16 digoxin, and 16 clonazepam.

Route of exposure was: Ingestion only in 1,030 cases (38.4%), Inhalation/nasal in 118 cases (4.40%), and Parenteral in 97 cases (3.62%). Parenteral only cases increased by 22.8% from 2016. Most other exposures recorded a combination of routes or an unknown route.

The Intentional exposure reason was: Abuse in 1206 cases (45.0%), Suspected suicide in 829 cases (30.9%), Misuse

in 97 cases (3.62%), and Unknown in 89 cases (3.32%). Unintentional exposure reasons were: Environmental in 44 cases (1.64%), General in 30 cases (1.12%), Therapeutic error in 28 cases (1.04%), and Misuse in 27 cases (1.01%). Adverse drug reaction was the reason in 45 cases (1.68%).

**Table 19A.** Comparisons of death data (1985–2017)<sup>a</sup>.

Year	Total fatalities		Suicides		Pediatric deaths <sup>b</sup>	
	N	% of cases	N	% of deaths	N	% of deaths
1985	328	0.036	174	53.0	20	6.1
1986	406	0.037	223	54.9	15	3.7
1987	398	0.034	227	57.0	22	5.5
1988	544	0.040	296	54.4	30	5.5
1989	590	0.037	323	54.7	24	4.1
1990	553	0.032	320	57.9	21	3.8
1991	764	0.042	408	53.4	44	5.8
1992	705	0.038	395	56.0	29	4.1
1993	626	0.036	338	54.0	27	4.3
1994	766	0.040	410	53.5	26	3.4
1995	724	0.036	405	55.9	20	2.8
1996	726	0.034	358	49.3	29	4.0
1997	786	0.036	418	53.2	25	3.2
1998	775	0.035	421	54.3	16	2.1
1999	873	0.040	472	54.1	24	2.7
2000	921	0.042	477	51.8	20	2.2
2001	1,085	0.048	553	51.0	27	2.5
2002	1,170	0.049	635	54.3	27	2.3
2003	1,109	0.046	592	53.4	35	3.2
2004	1,190	0.049	642	53.9	27	2.3
2005	1,438	0.059	674	46.9	32	2.2
2006	1,515	0.063	705	46.5	39	2.6
2007	1,597	0.064	737	46.1	47	2.9
2008	1,756	0.070	797	45.4	39	2.2
2009	1,544	0.062	779	50.5	37	2.4
2010	1,730	0.072	779	45.0	55	3.2
2011	2,765	0.118	865	31.3	42	1.5
2012	2,937	0.129	890	30.3	46	1.6
2013	2,477	0.113	785	31.7	51	2.1
2014	1,835	0.085	790	43.1	34	1.9
2015	1,831	0.084	814	44.5	42	2.3
2016	1,977	0.091	906	45.8	44	2.2
2017	3,208	0.151	954	29.7	25	0.8

<sup>a</sup>Human exposures with medical outcome of death or death, indirect regardless of RCF.

<sup>b</sup>Includes all children with actual or estimated ages  $\leq 5$  years old. Results do not include "Unknown Child" or "Unknown Age". Includes death and death, indirect regardless of RCF.

### Pediatric fatalities – age $\leq 5$ years

Although children younger than 6 years were involved in 45.2% of exposures, they comprised only 25 (0.779%) of the 3,208 fatalities. These numbers are similar to those reported since 1985 (Table 19A, all RCFs and includes indirect deaths). Table 8 (RCF 1, 2 or 3, excludes indirect deaths) shows the percentage of fatalities in children  $\leq 5$  years related to total pediatric exposures was 12/956,871 (0.00125%). By comparison, 1,315/836,306 (0.157%) of all adult exposures involved a fatality. Of the 12 pediatric fatalities in which reason for exposure was documented, 9 (75.0%) were reported as unintentional, 1 (8.3%) as unknown, 1 (8.3%) as other – malicious, and 1 was coded as other – contamination/tampering (8.3%) (Table 8).

The 14 fatalities in children  $\leq 5$  years detailed in Appendix D (Table 21) (includes death, indirect reports and RCF 1-3) included 10 pharmaceuticals and 4 nonpharmaceuticals. The first ranked substances associated with these fatalities included: analgesics (4), fumes/gases/vapors (2), batteries (disc/button; 1), deodorizers (1), antihistamines (1), cardiovascular drugs (1), electrolytes and minerals (1), sedative/hypnotics/antipsychotics (1), stimulants and street drugs (1), and unknown drug (1).

### Pediatric fatalities – ages 6–12 years

In the age range 6 to 12 years, 16 fatalities are listed in Appendix D (Table 21) (includes death, indirect reports and RCF 1-3) included: fumes/gases/vapors (7), pesticides (3), antidepressants (2), analgesics (1), anesthetics (1), cardiovascular drugs (1) and sedative/hypnotics/antipsychotics (1). For those in whom reason for exposure was recorded, there were 13 cases: 7 were unintentional – environmental, 3 were intentional – suspected suicide, 2 were unknown reason, and 1 was unintentional – therapeutic error (Table 8).

### Adolescent fatalities – ages 13–19 years

In the age range 13 to 19 years, there were 46 reported fatalities with documented reason for exposure, an increase of 4

**Table 19B.** Comparisons of direct and indirect death data (2000–2017)<sup>a</sup>.

Year	All deaths			Suicides					Pediatric deaths				
	Total	Direct	Indirect	Total	% of deaths	Direct	% of direct	Indirect	Total	% of deaths	Direct	% of direct	Indirect
2000	864	845	19	448	51.85	443	52.43	5	18	2.08	18	2.13	0
2001	1,066	952	114	542	50.84	503	52.84	39	26	2.44	24	2.52	2
2002	850	739	111	455	53.53	436	59.00	19	24	2.82	15	2.03	9
2003	867	826	41	464	53.52	454	54.96	10	29	3.34	22	2.66	7
2004	955	898	57	516	54.03	501	55.79	15	25	2.62	21	2.34	4
2005	1,423	1,332	91	666	46.80	656	49.25	10	32	2.25	26	1.95	6
2006	1,515	1,415	100	705	46.53	687	48.55	18	39	2.57	32	2.26	7
2007	1,597	1,502	95	737	46.15	712	47.40	25	47	2.94	41	2.73	6
2008	1,756	1,535	221	797	45.39	750	48.86	47	39	2.22	32	2.08	7
2009	1,544	1,452	92	779	50.45	748	51.52	31	37	2.40	31	2.13	6
2010	1,730	1,455	275	779	45.03	732	50.31	47	55	3.18	47	3.23	8
2011	2,765	1,503	1,262	865	31.28	758	50.43	107	42	1.52	31	2.06	11
2012	2,937	1,507	1,430	890	30.30	759	50.36	131	46	1.57	30	1.99	16
2013	2,477	1,552	925	785	31.69	698	44.97	87	51	2.06	43	2.77	8
2014	1,835	1,559	276	790	43.05	757	48.56	33	34	1.85	23	1.48	11
2015	1,831	1,670	161	814	44.46	784	46.95	30	42	2.29	34	2.04	8
2016	1,977	1,852	125	906	45.83	885	47.79	21	44	2.23	37	2.00	7
2017	3,208	1,832	1,376	954	29.74	821	44.81	133	25	0.78	19	1.04	6

<sup>a</sup>Human exposures with medical outcome of death or death, indirect regardless of RCF.

**Table 20.** Frequency of plant exposures (Top 25)<sup>a</sup>.

	Botanical name or Category	AAPCC Generic Code Name	N
1	Cherry (Species unspecified)	Amygdalin and/or Cyanogenic Glycosides	2,006
2	Plants-general-unknown	Unknown Toxic Types or Unknown if Toxic	1,986
3	Unknown Botanical Name	Unknown Toxic Types or Unknown if Toxic	1,627
4	BOTANICAL TERMS	Unknown Toxic Types or Unknown if Toxic	1,338
5	<i>Phytolacca americana</i> (L.)	Gastrointestinal Irritants (Excluding Oxalate Containing Plants)	1,300
6	Plants-toxicodendrol	Skin Irritants (Excluding Oxalate Containing Plants)	1,131
7	<i>Spathiphyllum</i> spp.	Oxalates	862
8	Plants-pokeweed	Other Toxic Types	856
9	Plants-cardiac glycosides	Cardiac Glycosides (Excluding Drugs)	832
10	<i>Ilex</i> spp. (not otherwise specified)	Gastrointestinal Irritants (Excluding Oxalate Containing Plants)	745
11	Berry (not otherwise specified)	Unknown Toxic Types or Unknown if Toxic	572
12	<i>Malus</i> spp.	Amygdalin and/or Cyanogenic Glycosides	524
13	<i>Solanum nigrum</i>	Solanine	503
14	Plants-oxalates	Oxalates	472
15	<i>Caladium</i> spp.	Oxalates	461
16	<i>Euphorbia tirucalli</i> (L.)	Skin Irritants (Excluding Oxalate Containing Plants)	458
17	<i>Zantedeschia aethiopica</i>	Oxalates	444
18	<i>Philodendron</i> spp.	Oxalates	433
19	Unknown Botanical Name	Non-Toxic	417
20	<i>Solanum dulcamara</i>	Solanine	405
21	Mold, food related	Unknown Toxic Types or Unknown if Toxic	384
22	<i>Epipremnum areum</i>	Oxalates	381
23	<i>Solanum tuberosum</i>	Solanine	300
24	<i>Crassula argentea</i>	Unknown Toxic Types or Unknown if Toxic	276
25	<i>Taxus canadensis</i>	Other Toxic Types	265

<sup>a</sup>Number of substances related to a human exposure with a Major Generic Category of Plant. Unknown Botanical Name represents substances with a Major Generic Category of Plant and a NULL substance code. Total = 46,782.

(9.52%) from 2016, and included 38 intentional, 3 unintentional, 3 unknown reason, 1 other, and 1 adverse reaction (Table 8). The 84 fatalities listed in Appendix D (Table 21) (includes death, indirect reports and RCF 1-3) included 72 pharmaceuticals and 12 nonpharmaceuticals. The first ranked pharmaceuticals associated with these fatalities included: analgesics (32), stimulants and street drugs (12), antidepressants (9), antihistamines (4), cardiovascular drugs (4), cold and cough preparations (2), hormones and hormone antagonists (2), sedative/hypnotics/antipsychotics (2), antimicrobials (1), dietary supplements/herbals/homeopathic (1), gastrointestinal preparations (1), narcotic antagonists (1) and unknown drug (1). The first ranked nonpharmaceutical associated with these fatalities included: fumes/gases/vapors (4), hydrocarbons (2), pesticides (2), alcohols (1), chemicals (1), plants (1), and tobacco/nicotine/e-cigarette products (1).

### Pregnancy and fatalities

There were 2 deaths in pregnant women reported to NPDS in 2017. A total of 45 deaths of pregnant women have been reported between 2000 and 2017. The majority (37 of 45, 82.2%) were intentional exposures (misuse, abuse or suspected suicide).

### AAPCC surveillance results

Key components of the NPDS surveillance system include the automated monitoring tools available to the NPDS user community. In addition to AAPCC national surveillance definitions, 30 PCs utilize NPDS as part of their surveillance programs. The CDC, FDA, 6 state health departments, 1 county health department and 1 state police department run surveillance definitions in NPDS. Since Surveillance Anomaly 1, generated at 2:00pm EDT on 17 September 2006, over

330,000 anomalies have been detected and reported. Close to 2,300 were confirmed as representing public health significance with PCs working collaboratively with local health departments and, in some instances the CDC, on the identified issues.

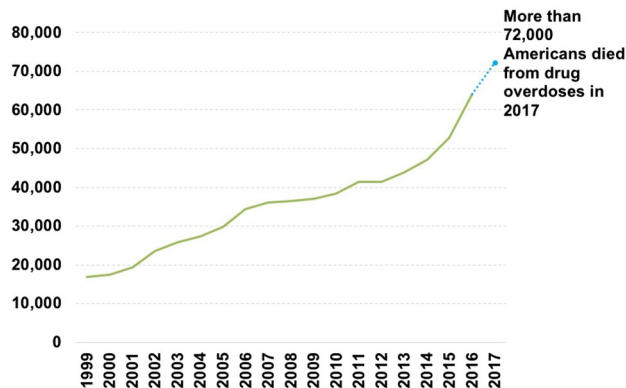
At the time of this report, 583 surveillance definitions run continuously, monitoring case and clinical effects volumes and a variety of case-based definitions from food poisoning to nerve agents. These definitions represent the surveillance work by many PCs, health departments, the AAPCC, the Health Studies Branch (Division of Environmental Hazards and Health Effects, National Center for Environmental Health), and CDC. NPDS has also been used for surveillance during mass gathering events, such as the Super Bowl.

The methodology for automating surveillance continues to be improved in efforts to detect the index case of any relevant public health event. Algorithms for identifying the index case vary greatly regarding the substance to be identified. No individual algorithm works for every application [8]. The magnitude and penetrance of NPDS are critical to epidemiologic surveillance and to the ability to substantiate situational awareness for clinicians, policymakers, and public health officials nationwide. Typically, NPDS surveillance detects the response to an event, rather than predicting an event. This fosters situational awareness and resilience during and after a public health event. Situational awareness is undoubtedly beneficial to public health surveillance.

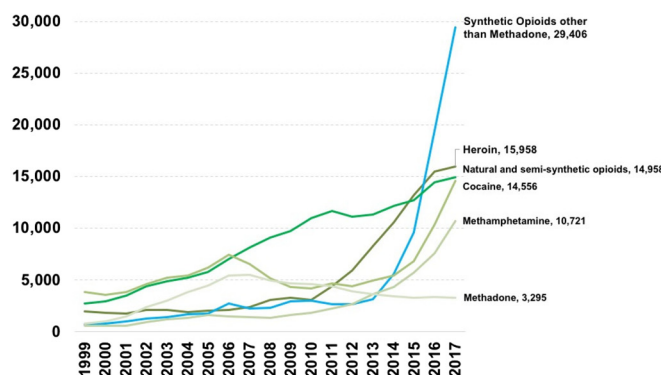
### Discussion

The exposure cases and information requests reported by PCs in 2017 do not reflect the full extent of PC efforts, which also include poison prevention activities and public and health care professional education programs.

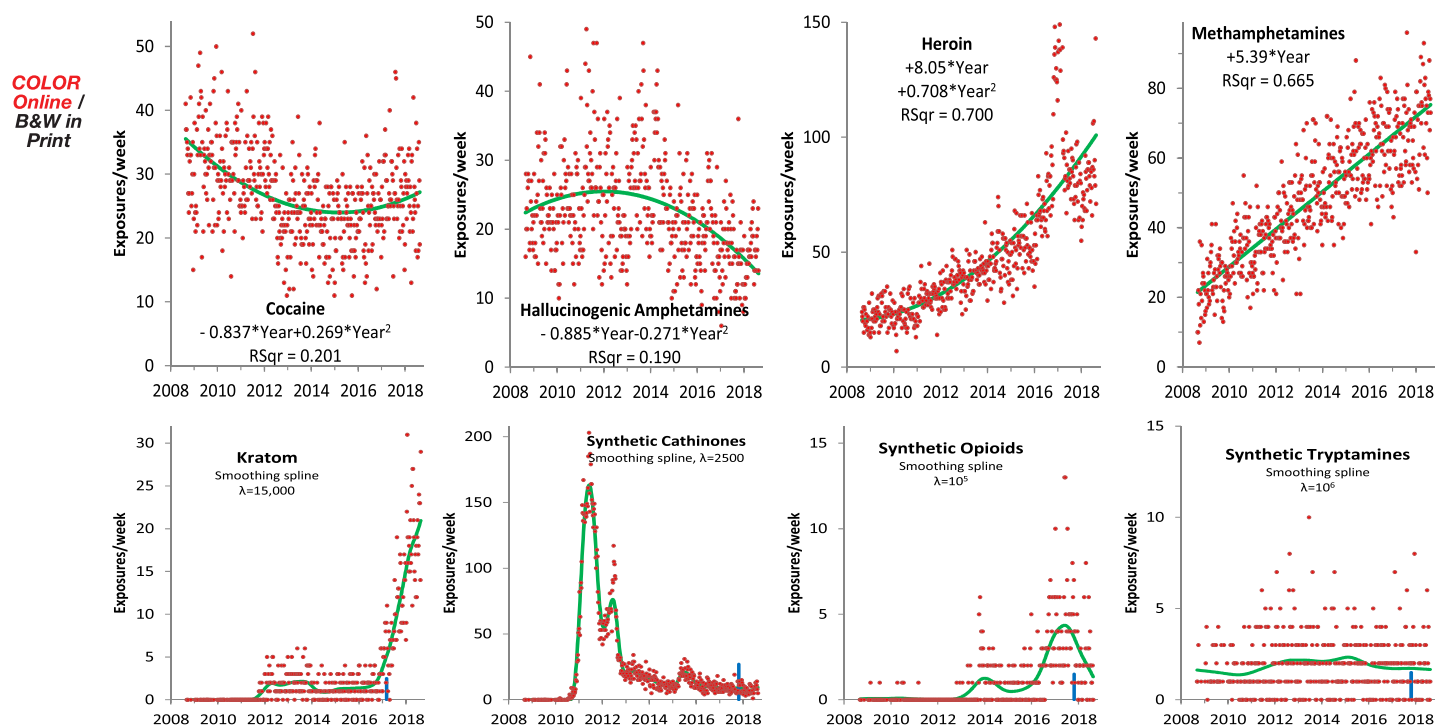
## Total U.S. Drug Deaths



## Drugs Involved in U.S. Overdose Deaths, 1999 to 2017



**Figure 6.** Deaths over time in the United States related to illicit use of drugs of abuse. Source: CDC WONDER [7].



**Figure 7.** NPDS selected drugs of abuse over time.

Cocaine, hallucinogenic amphetamines and heroin were fit to second order (quadratic) regressions and methamphetamines with first order (linear) regression – all parameters had associated  $p < 0.0001$ . Kratom, synthetic cathinones, synthetic opioids, and synthetic tryptamines were fit to smoothing splines. The vertical blue mark indicates the date of the GC establishment for this substance.

NPDS exposure data may be considered “numerator data” in the absence of a true denominator; that is, we do not know the number of actual exposures that occur in the population. NPDS data covers only those exposures which are reported to PCs since poison exposures and poisoning deaths are not currently reportable events.

NPDS 2000–2017 encounter volume data clearly demonstrate a continuing decrease in exposure cases. This decline has been apparent and increasing since mid-2007 and reflects the decreasing use of the PC for less serious exposures. However, during this same period, exposures with a more serious outcome (death, major, moderate) and HCF cases have continued to increase. Possible contributors to the declining PC utilization include: declining US birth rate (especially since exposure rates are much higher in children

$\leq 5$  years of age), increasing use of text rather than voice communication, and increasing use of and reliance on internet resources. To meet our public health goals, PCs will need to understand and provide access via the public’s 21st century communication preferences. We are concerned that failure to respond to these changes may result in a retro-shift with more people seeking medical care at HCFs for exposures that could have been managed on-site by a PC. Likewise, minor exposures may progress to more serious morbidity and mortality because of incorrect internet information or the absence of PC management. The net effect could be more serious poisoning outcomes because fewer people took advantage of PC services, with a resultant increased burden on the national healthcare infrastructure as



may be reflected in the increased number of cases managed in a HCF this year.

NPDS statistical analyses indicate that all analgesic exposures, including opioids, and sedatives are increasing year over year. This trend is shown in [Table 17B](#) and [Figure 4](#). NPDS data mirrors CDC data that demonstrates similar findings [9]. Thus NPDS provides a near real-time view of these public health issues without the need for data source extrapolations.

One of the limitations of NPDS data has been the perceived lack of fatality cases compared to other reporting sources. However, when change over time is studied, NPDS is clearly consistent with other public health fatality analyses. One of the issues leading to this concern is the fact that medical record systems seldom have common output streams. This is particularly apparent with the various electronic medical record systems available. It is important to build a federated approach similar to the one modeled by NPDS to allow data sharing, for example, between hospital emergency departments and other medical record systems, including medical examiner offices, nationwide. Enhancements to NPDS can promote interoperability between NPDS and electronic medical records systems to better trend poison-related morbidity and mortality in the US and internationally.

## Summary

Unintentional and intentional exposures continue to be a significant cause of morbidity and mortality in the US. The near real-time status of NPDS represents a national public health resource to collect and monitor US exposure cases and information contacts.

Changes in 2017 encounters are shown in [Figures 1, 3, and 4](#), and include:

- Total encounters (all exposure and information contacts) decreased by 3.79%.
- All information contacts decreased 11.2%, Drug ID contacts decreased 30.2%, and human exposures decreased 2.03%.
- HCF information requests decreased 0.264% although managed exposure cases reported from an HCF increased 3.06%, consistent with the steady increase since 2000.
- Human exposures with less serious outcomes decreased 2.57% while those with more serious outcomes (moderate, major or death) increased 2.87% compared to an overall 4.44% yearly increase since 2000.
- The categories of substance exposures, resulting in more serious outcomes, most rapidly increasing was sedative/hypnotics/antipsychotics, followed by analgesics, antidepressants, and cardiovascular drugs.
- All 8 of the drugs of abuse examined under emerging trends (cocaine, hallucinogenic amphetamines, heroin, kratom, synthetic cathinones, synthetic opioids, and synthetic tryptamines) showed increases over for the last 52 weeks (ending 30-Jul-2018).

- The Historical GC search, a newly available NPDS tool, should facilitate the identification of new, potentially harmful products.

These data support the continued value of PC expertise and need for specialized medical toxicology information to manage the more severe exposures, despite a decrease in cases involving less severe exposures. In addition to telephonic services, PCs must consider newer communication approaches that match current, and future, public preferences. The continuing mission of NPDS is to provide a nationwide infrastructure for public health surveillance for all types of exposures, public health event identification, resilience, response and situational awareness tracking. NPDS is a model system for the nation and global public health.

## Disclaimer

The American Association of Poison Control Centers (AAPCC; <http://www.aapcc.org>) maintains the national database of information logged by the country's regional Poison Centers (PCs) serving all 50 United States, Puerto Rico, and the District of Columbia. Case records in this database are from self-reported encounters: they reflect only information provided when the public or healthcare professionals report an actual or potential exposure to a substance (e.g., an ingestion, inhalation, or topical exposure, etc.) or request information/educational materials. Exposures do not necessarily represent a poisoning or overdose. The AAPCC is not able to verify the accuracy of every report made to member centers. Additional exposures may go unreported to PCs and data referenced from the AAPCC should not be construed to represent the complete incidence of national exposures to any substance(s).

## Declaration of interest

The authors report no declarations of interest.

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## Appendix A: Acknowledgments

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## Poison centers (PCs)

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As in previous years, the initial review of reported fatalities and development of the abstracts and case data for NPDS was the responsibility of the staff at the 55 participating PCs. Many individuals at each center participated in the fatality case preparation. These toxicology professionals and their centers are:

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The Lead and Peer review of the 2017 fatalities was carried out by the 47 individuals listed here including 6 who reviewed the pediatric cases [Peds]. The authors and the AAPCC wish to express our appreciation for their volunteerism, dedication, hard work and good will in completing this task in a limited time.

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## AAPCC surveillance team

NPDS surveillance anomalies are analyzed daily by a team of 10 medical and clinical toxicologists working across the country in a distributed system. These dedicated professionals interface with the Health Studies Branch, National Center for Environmental Health, Centers for Disease Control and Prevention (HSB/NCEH/CDC) and the PCs on a regular basis to identify anomalies of public health significance and improve NPDS surveillance systems:

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## Regional poison center fatality awards

Each year the AAPCC and the Fatality Review team recognizes several regional PCs for their extra effort in their preparation of fatality reports



and prompt responses to reviewer queries. The awards are presented each year at the North American Congress of Clinical Toxicology Annual meeting.

First Center to Complete all Cases (12/15/17, 21 cases): Utah Poison Control Center (Salt Lake City)  
 Largest Number with Autopsy Reports (52 of 72 cases; 72%): Carolinas Poison Center (Charlotte)  
 Highest Percentage with Autopsy Reports (79% of 39 cases): Banner Poison Control Center (Phoenix)  
 Largest Number of Indirect cases (n = 1226; 96% of all Indirect cases): Banner Poison Control Center (Phoenix)  
 Highest Overall Quality of Reports (5.38 out of possible 12 for 29 cases): Wisconsin Poison Center (Milwaukee)  
 Greatest improvement in Overall Quality of Reports (1.69 increase from last year): West Virginia Poison Center (Charleston)  
 Most Abstracts Published in the 2017 Annual report (5 of the 57 published narratives): Carolinas Poison Center (Charlotte)  
 Most Helpful Regional Poison Center Staff (based on survey of AAPCC review team): Washington Poison Center (Seattle)  
 Honorable mention: Wisconsin Poison Center (Milwaukee)  
 Endurance Award (consistently great cases with the most autopsies and most published abstracts for the last 6 years): Carolinas Poison Center (Charlotte)

## Appendix B: Data definitions

### Reason for exposure

NPDS classifies all encounters as either EXPOSURE (concern about an exposure to a substance) or INFORMATION (no exposed human or animal). A contact may provide information about one or more exposed person or animal (receptors).

SPIs coded the reasons for exposure reported by callers to PCs according to the following definitions:

Unintentional general: All unintentional exposures not otherwise defined below.

Environmental: Any passive, non-occupational exposure that results from contamination of air, water, or soil. Environmental exposures are usually caused by manmade contaminants.

Occupational: An exposure that occurs as a direct result of the person being on the job or in the workplace.

Therapeutic error: An unintentional deviation from a proper therapeutic regimen that results in the wrong dose, incorrect route of administration, administration to the wrong person, or administration of the wrong substance. Only exposures to medications or products used as medications are included. Drug interactions resulting from unintentional administration of drugs or foods which are known to interact are also included.

Unintentional misuse: Unintentional, improper or incorrect use of a nonpharmaceutical substance. Unintentional misuse differs from intentional misuse in that the exposure was unplanned or not foreseen by the patient.

Bite/sting: All animal bites and stings, with or without envenomation, are included.

Food poisoning: Suspected or confirmed food poisoning; ingestion of food contaminated with microorganisms is included.

Unintentional unknown: An exposure determined to be unintentional, but the exact reason is unknown.

Suspected suicidal: An exposure resulting from the inappropriate use of a substance for reasons that are suspected to be self-destructive or manipulative.

Intentional misuse: An exposure resulting from the intentional improper or incorrect use for reasons other than the pursuit of a psychotropic effect.

Intentional abuse: An exposure resulting from the intentional improper or incorrect use where the patient was likely attempting to gain a high, euphoric effect or some other psychotropic effect, including recreational use of a substance for any effect.

Contaminant/tampering: The patient is an unintentional victim of a substance that has been adulterated (either maliciously or unintentionally) by the introduction of an undesirable substance.

Malicious: Patients who are victims of another person's intent to harm them.

Withdrawal: Inquiry about or experiencing of symptoms from a decline in blood concentration of a pharmaceutical or other substance after discontinuing therapeutic use or abuse of that substance.

Adverse Reaction Drug: Unwanted effects due to an allergic, hypersensitivity, or idiosyncratic response to the active ingredient(s), inactive ingredient(s) or excipient of a drug, chemical, or other drug substance when the exposure involves the normal, prescribed, labeled or recommended use of the substance.

Adverse Reaction Food: Unwanted effects due to an allergic, hypersensitivity, or idiosyncratic response to a food substance.

Adverse Reaction Other: Unwanted effects due to an allergic, hypersensitivity, or idiosyncratic response to a substance other than drug or food.

Unknown Reason: Reason for the exposure cannot be determined or no other category is appropriate.

### Medical outcome

No effect: The patient did not develop any signs or symptoms as a result of the exposure.

Minor effect: The patient developed some signs or symptoms as a result of the exposure, but they were minimally bothersome and generally resolved rapidly with no residual disability or disfigurement. A minor effect is often limited to the skin or mucus membranes (e.g., self-limited gastrointestinal symptoms, drowsiness, skin irritation, first-degree dermal burn, sinus tachycardia without hypotension, and transient cough).

Moderate effect: The patient exhibited signs or symptoms as a result of the exposure that were more pronounced, more prolonged, or more systemic in nature than minor symptoms. Usually, some form of treatment is indicated. Symptoms were not life-threatening, and the patient had no residual disability or disfigurement (e.g., corneal abrasion, acid-base disturbance, high fever, disorientation, hypotension that is rapidly responsive to treatment, and isolated brief seizures that respond readily to treatment).

Major effect: The patient exhibited signs or symptoms as a result of the exposure that were life-threatening or resulted in significant residual disability or disfigurement (e.g., repeated seizures or status epilepticus, respiratory compromise requiring intubation, ventricular tachycardia with hypotension, cardiac or respiratory arrest, esophageal stricture, and disseminated intravascular coagulation).

Death: The patient died as a result of the exposure or as a direct complication of the exposure.

Not followed, judged as nontoxic exposure: No follow-up calls were made to determine the outcome of the exposure because the substance implicated was nontoxic, the amount implicated was insignificant, or the route of exposure was unlikely to result in a clinical effect.

Not followed, minimal clinical effects possible: No follow-up calls were made to determine the patient's outcome because the exposure was likely to result in only minimal toxicity of a trivial nature. (The patient was expected to experience no more than a minor effect.).

Unable to follow, judged as a potentially toxic exposure: The patient was lost to follow-up, refused follow-up, or was not followed, but the exposure was significant and may have resulted in a moderate, major, or fatal outcome.

Unrelated effect: The exposure was probably not responsible for the effect.

Confirmed nonexposure: This outcome option was coded to designate cases where there was reliable and objective evidence that an exposure initially believed to have occurred actually never occurred (e.g., all missing pills are later located). All cases coded as confirmed nonexposure are excluded from this report.

Death, indirect report: Death, indirect report are deaths that the poison center acquired from medical examiner or media, but did not manage nor answer any questions about the death.

### Relative contribution to fatality (RCF)

The Case Review Team (CRT) includes the Author and Reviewer from the RPC, The AAPCC Lead Reviewer, Peer Reviewer and Manager.

The definitions used for the Relative Contribution to Fatality (RCF) classification were as follows:

1. *Undoubtedly responsible*: In the opinion of the CRT the Clinical Case Evidence establishes beyond a reasonable doubt that the SUBSTANCES actually caused the death.
2. *Probably responsible*: In the opinion of the CRT the Clinical Case Evidence suggests that the SUBSTANCES caused the death, but some reasonable doubt remained.
3. *Contributory*: In the opinion of the CRT the Clinical Case Evidence establishes that the SUBSTANCES contributed to the death, but did not solely cause the death. That is, the SUBSTANCES alone would not have caused the death, but combined with other factors, were partially responsible for the death.
4. *Probably not responsible*: In the opinion of the CRT the Clinical Case Evidence establishes to a reasonable probability, but not conclusively, that the SUBSTANCES associated with the death did not cause the death.
5. *Clearly not responsible*: In the opinion of the CRT the Clinical Case Evidence establishes beyond a reasonable doubt that the SUBSTANCES did not cause this death.
6. *Unknown*: In the opinion of the CRT the Clinical Case Evidence is insufficient to impute or refute a causative relationship for the SUBSTANCES in this death.

## Appendix C: Abstracts of selected cases

### Selection of abstracts for publication

The abstracts included in Appendix C were selected for publication in a 3-stage process consisting of qualifying, ranking, and reading. Changes in place since the 2014 report for the selection of the top 200 cases: include all pregnant subjects, include all children (0-2 y/o) subjects, increase (double) the weight on the autopsy report, add a weighting for Age of subject (1/age in years), add a weighting for infrequency of substance category (Generic Code).

Qualifying cases were thus: Age 0-2 y/o, Pregnant, or RCF = 1-Undoubtedly Responsible, 2-Probably Responsible or 3-Contributory. Fatalities by Indirect report were excluded beginning with the 2008 annual report. The ranking was based on Final Case Weighting (FCW).

$$FCW = f[1/(\text{num substances in this case}), WCS, 1/\text{Age (years)}, 1/(\text{num cases in that generic code this year})]$$

Where:

Weighted Case Score (WCS) =

$$\begin{aligned} &\text{Hospital records} * 8.8 + \text{Postmortem} * 15.2 \\ &+ \text{Blood levels} * 6.9 + \text{Quality/Completeness} * 6.4 \\ &+ \text{Novelty/Educational value} * 13.2 \end{aligned}$$

WCS Scores were normalized (z-score) within each AAPCC reviewer before the final weighting: 25% for each (1/NumSubstances, WCS, 1/Age, 1/NumCodes).

The WCS weighting factors were the averages of review team recommendations gathered in 2006.

The top ranked abstracts (200+ ties) were each read by individual reviewers who volunteered (See Appendix A) and the 2 managers (DAS and DEB). Each reader judged each abstract as "publish" or "omit" and all abstracts receiving 8 or more of 12 publish votes were selected, further edited, cross-reviewed by the 2 managers and JBM, and published in this report.

### Abstracts

Abstracts of the cases were selected (see Selection of Abstracts for Publication, above) from the human fatalities judged related to an exposure as reported to US PCs in 2017. A structured format for abstracts was required in the PC preparation of the abstracts and was used in the abstracts presented. Abbreviations, units and normal ranges omitted from the abstracts are given at the end of this appendix.

#### Case 133. Acute hydrofluoric acid ingestion: undoubtedly responsible

*Scenario/Substances*: A 53y/o developmentally delayed male was doing glass etching in a workshop when he swallowed ~3 oz of glass etching cream containing ammonium bifluoride and hydrofluoric acid. He vomited within 15 min and was transported to the ED.

*Past Medical History*: Developmental delay, deaf, mute, history of pica, seizures, hypothyroidism.

*Physical Exam*: In the ED he was alert but vomiting; BP 126/91, HR 86, RR 18, T 37°C, O<sub>2</sub> sat 94% (RA).

*Laboratory/Diagnostic Findings*: Na 146/K 5.2/Cl 112/CO<sub>2</sub> 17/BUN 12/Cr 1.68/Glu 215, AG 217. ABG- pH 7.09, Mg 1.7, Ca 6.9, Ca (ionized) 2.1, troponin 2.67 (peak 89.5). ECHO: severely reduced RV systolic function; LV ejection fraction was 25-30%. ECG: new RBBB and prolonged QTc.

*Clinical Course*: Attempt to place an NG failed due to patient agitation. One h later he was sedated with haloperidol, lorazepam and diphenhydramine and an NGT was placed with clear aspirate obtained. He was then intubated for respiratory distress and became hypotensive. EKG: QRS widening with a new RBBB. He received Ca (4 g) and Mg (4 g), sodium bicarbonate and norepinephrine drips; BP 73/56, HR 111. Endoscopy was not performed because of concern for esophageal perforation and hemodynamic instability. Ceftriaxone and omeprazole were administered. CT chest: negative for perforation, airspace disease and multiple air fluid levels in the gut. Patient remained hypotensive at 60/40, HR 122. Ca <5 despite ~12g of Ca. He had a VF cardiac arrest and died, despite resuscitation efforts, 10 h after ED arrival.

*Autopsy Findings*: Cause of death: alkalinizing (barium-containing) toxicity; manner of death: accidental. Esophageal and gastric hemorrhage and perforations; barium staining of the peritoneum and mediastinum; microscopic evidence of myocardial infarction. Toxicologic report: barium in gastric contents and peripheral blood. [MSDS: product contained 1-2% hydrofluoric acid, 21-27% ammonium bifluoride and a small amount of barium sulfate. The PCC contacted the ME office and provided product information and that the death was likely due to hydrofluoric acid/ammonium bifluoride toxicity; their report was not edited.]

#### Case 136. Acute methanol ingestion: undoubtedly responsible

*Scenario/Substances*: A 35 y/o male ingested 1 gallon of windshield deicer over the course of the day.

*Past Medical History*: Alcoholism.

*Physical Exam*: Unresponsive; SBP 170s, HR 120s, T 101°F.

*Laboratory/Diagnostic Findings*: ABG- pH 7.1/pCO<sub>2</sub> 13/pO<sub>2</sub> 227. Na 140/K 4.9/Cl 100/CO<sub>2</sub> < 5/BUN 19/Cr 1.27/Glu 132/AG >35. AST 192, ALT 200, INR 1.0; WBC 4.8/Hgb 16.5. Serum osmolality >500, methanol: 620 mg/dL. Serum ethylene glycol, APAP, ethanol and salicylate not detected. UDS was negative.

*Clinical Course*: He was intubated in the ED, given metoprolol and started on fomepizole. HD was initiated within 4 h; repeat methanol levels were 57, 19 and then 11 mg/dL. CT head showed infarcted basal ganglia and diffuse cerebral edema. EEG showed suppressed brainwave activity. Diabetes insipidus with polyuria developed with hypotension requiring multiple vasopressors. Cerebral perfusion scan showed absent intracranial blood flow. Based on the prognosis, the family opted for institution of comfort measures and he died on Day 7.

*Autopsy Findings*: No autopsy results were provided.

#### Case 150. Acute Disc battery, ingestion: undoubtedly responsible

*Scenario/Substances*: A 2 y/o female ingested a button battery ~36 h prior.

**Clinical Course:** She presented at the ED following an episode of hematemesis at home. CxR: battery was in the esophagus. Endoscopic retrieval was unsuccessful, the child exsanguinated and died.

**Autopsy Findings:** No autopsy results were provided.

#### **Case 151. Acute *Crotalinae* envenomation: undoubtedly responsible**

**Scenario/Substances:** A 29 y/o male was bitten on the forearm by an unknown snake.

**Physical Exam:** 2 noticeable puncture wounds were visible on the forearm with edema to his axilla. He complained of abdominal pain.

**Clinical Course:** At Day 2 he developed rhabdomyolysis and hemoconcentration; INR 1.4, CK 30,000, WBC 50/Hgb 21/PLT 162. Swelling did not improve with the initial 6 vials of Fab antivenom, INR increased to 1.7. Pulses were only detectable on Doppler. Extremity was elevated, corticosteroids and another 6 vials of antivenom were given but the edema progressed into his torso and back. Urine output decreased. WBC 56/Hgb 22/Hct 65.1/PLT 15, CK 6,604, INR 2.3, PTT 38.9, lactate 3.48. CxR: pulmonary edema. The patient was intubated, 12 more vials of antivenom were given and CRRT was initiated. On Day 2: PT 13.3, PTT 43.5, fibrinogen 159, PLT 100, BUN 24, Cr 3.3; FFP was given. On Day 3: INR 2.1, PTT >200, PLT 92, ABG- pH 6.93/pCO<sub>2</sub> 23/HCO<sub>3</sub> 5. He continued to deteriorate and died on Day 3.

**Autopsy Findings:** No autopsy results were provided.

#### **Case 152. Acute *Crotalinae* envenomation: undoubtedly responsible**

**Scenario/Substances:** 31 y/o male was hiking when he was bitten by a rattlesnake on his left leg. He rapidly developed dyspnea with throat swelling and then became unresponsive. Bystander CPR was performed; EMS arrived ~30 min later. He had intermittent ROSC during ED transport.

**Clinical Course:** He arrived at the ED in cardiac arrest, was intubated and ACLS was continued. Ultrasound showed no cardiac activity and he was pronounced dead ~2 h after being envenomated.

**Autopsy Findings:** Two puncture wounds on the left lower leg with marked hemorrhage and edema. Diffuse petechiae and hemorrhage of epicardium and endocardium, visceral pleurae of the lungs, intercostal muscles and diffuse tissues. Cause of death: complications following rattlesnake envenomation.

#### **Case 154. Acute fire ant bite/sting: contributory**

**Scenario/substance:** A 53 y/o male was bitten by fire ants and collapsed soon after. He was given a dose of epinephrine via auto-injector but lost consciousness. EMS found the patient in PEA cardiac arrest; ~40 min resuscitation before ROSC.

**Past Medical History:** *Hymenoptera* (fire ant) hypersensitivity, last reaction 8 y prior.

**Physical Exam:** Unresponsive; bloody NGT fluids. Foot lesions consistent with ant bites. 91/77, HR 104, RR 24, O<sub>2</sub> sat 92%.

**Laboratory/Diagnostic Findings:** ABG- pH 7.04/pCO<sub>2</sub> 62/pO<sub>2</sub> 86/CO<sub>2</sub> 16/BE -13. Na 143/K 3.9/Cl 104/CO<sub>2</sub> 17/BUN 16/Cr 1.48/Glu 254, AG 22, AST 374 (12,700 peak), ALT 237 (5,600 peak), bilirubin 0.8 (peak 3.1). INR 1.9, CK (peak) 6,472, troponin (peak) 14.75. WBC 14.8 (peak 40.8)/Hgb 17.7/Hct 55/PLT 226. CT chest: bilateral aspiration; ECG: HR 117, QRS 84, QTc 477.

**Clinical Course:** In the ED he was intubated, cooled, placed on norepinephrine, vasopressin and epinephrine drips with fentanyl and midazolam for sedation. He had a second cardiac arrest after ICU arrival; antibiotics, bicarbonate, hydrocortisone and albumin were given. On Day 2, CRRT was started for acidosis and renal failure (Cr peaked at 4.46 on Day 6). He developed coagulopathy (fibrinogen <60, INR 2.5) and was given cryoprecipitate and vitamin K. MRI brain (Day 5) was consistent with severe hypoxic injury; he was unresponsive off sedation. Based on the prognosis, comfort measures were instituted and he died on Day 6.

**Autopsy Findings:** No autopsy results were provided.

#### **Case 155. Acute calcium hydroxide dermal: undoubtedly responsible**

**Scenario/Substances:** 59 y/o male sustained 50% TBSA chemical burn after falling into pit filled with fresh cement. He was extricated 2 h later; he was confused and combative. EMS decontaminated him prior to ED transfer.

**Past Medical History:** Alcoholism.

**Physical Exam:** HR 100, RR 18, T 36°C; alert but confused, GCS 14. Full thickness burns to back and all extremities.

**Laboratory/Diagnostic Findings:** WBC 7.4/Hgb 13.9/Hct 41.5%/PLT 117. CT head: unremarkable.

**Clinical Course:** On Day 2 he developed alcohol withdrawal and was treated with benzodiazepines and oral alcohol. Nutrition and burn care were initiated; skin grafts were performed. On Day 14 he developed tachydysrhythmias (ST, AF, SVT) and was treated with adenosine, metoprolol and amiodarone. On Day 29 he required intubation and norepinephrine for presumed sepsis. Based on the prognosis, comfort measures were instituted and he died on Day 40.

**Autopsy Findings:** Not performed.

#### **Case 156. Acute silicone parenteral: undoubtedly responsible**

**Scenario/substance:** A 19 y/o female injected silicone into her buttocks 3 d prior to hospital admission.

**Past Medical History:** Cocaine abuse, transgender on estrogen therapy.

**Physical Exam:** Palpable injection sites. BP 73/46, HR 132, RR 40s.

**Laboratory/Diagnostic Findings:** Na 146/K 4.2/Cl 104/CO<sub>2</sub> 15/BUN 14/Cr 1.7, AST 3,317, ALT 2,741. ECG: HR 136, QRS 79, QTc 440.

**Clinical Course:** Patient was admitted for possible alcohol withdrawal but then had 'bleeding' and two cardiac arrests. She was intubated and developed right ventricular strain, ARDS, diffuse alveolar hemorrhage and multiple seizures. She was treated with levetiracetam and albumin and started on norepinephrine, vasopressin and sodium bicarbonate drips. She remained hypotensive; aminocaproic acid was given for pulmonary hemorrhage. Based on her prognosis, comfort measures were initiated, and she died on Day 2.

**Autopsy Findings:** No autopsy results were provided.

#### **Case 158. Acute parenteral cyanide exposure: undoubtedly responsible**

**Scenario/Substances:** A 35 y/o female was reportedly injected into her gluteal area by her estranged husband. She was flaccid and unresponsive when EMS arrived.

**Physical Exam:** Upon ED arrival she was unresponsive, BP 130/83, HR 102.

**Laboratory/Diagnostic Findings:** ABG- pH 6.95, lactate 7.7.

**Clinical Course:** She was immediately intubated, repeat VS: SBP 72, HR 40s. Norepinephrine, hydroxocobalamin and sodium thiosulfate were given. Repeat ABG- pH 7.37/PCO<sub>2</sub> 25/PO<sub>2</sub> 357/HCO<sub>3</sub> 15.5, lactate 3.3. Vasopressin, sodium bicarbonate drips and CRRT were started. On Day 2 she remained unresponsive with no corneal reflexes. She was declared brain dead and died.

**Autopsy Findings:** Examination revealed dermal puncture in the gluteal area, cerebral ischemia with edema and uncus herniation. Blood cyanide was 3.4 mg/L.

#### **Case 166. Acute tetramethyl ammonium hydroxide inhalation/nasal, ocular: undoubtedly responsible**

**Scenario/Substances:** A 39 y/o male contractor was working on a job site when a pipe containing tetramethyl ammonium hydroxide burst and sprayed on him for 20 sec. He showered immediately but then collapsed with cardiac arrest; he was noted to be apneic in PEA. On site CPR was performed for 5 min. He was intubated and received epinephrine by EMS, with ROSC, and was then transported to the ED.

**Past Medical History:** Healthy, no medical problems.

**Physical Exam:** HR 90, SBP 110, O<sub>2</sub> sats 90%. Pt was initially combative and given midazolam. Skin was slightly red with petechiae and superficial erythema (partial thickness burns) but no blisters. Pupils were minimally reactive without corneal injury.

**Laboratory Data:** Electrolytes, Cr, INR and ABG 'normal.' Lactate 1.2, transaminases in the 100s. EKG: inferior ischemia. CxR: "fluffy" with pulmonary congestion.

**Clinical Course:** The patient was transferred to a tertiary care center and started on cooling protocol for post cardiac arrest. HR varied from 46 to 62, BP 98/60 then 124/88. 24 h later he was rewarmed, and sedation was weaned. He developed jerking motions which raised concern about anoxic



brain injury. Patient developed seizures without neurological improvement on Day 12, placed on comfort care, and died on Day 13.

**Autopsy Findings:** Cause of death: anoxic encephalopathy, hydroxide exposure, burn exposure 16% TBSA. Manner of death: accident; tetra-methyl ammonium hydroxide exposure.

#### Case 174. Acute ethyl methacrylate ingestion: undoubtedly responsible

**Scenario/Substances:** A 52 y/o male, owner of a nail salon, was found unresponsive in his yard with an empty liter bottle of ethyl methacrylate. He was intubated by EMS prior to transport to an ED. Of note, he was recently arrested for a felony charge.

**Physical Exam:** BP 73/49, HR 84, RR 14, O<sub>2</sub>sat 86% (100% FiO<sub>2</sub>). Pupils were fixed and dilated, he had no brainstem reflexes.

**Laboratory/Diagnostic Findings:** ABG- pH 6.74/pCO<sub>2</sub> 51/pO<sub>2</sub> 71/HCO<sub>3</sub> 6/BE -35. Lactate 4.7, Ca 4.3, Na 141/K 5.7/Cl 120/CO<sub>2</sub> 9/BUN 9/Cr 1.2/Glu 197/AG 12. UDS was negative. WBC 22.4; CxR: bilateral infiltrates.

**Clinical Course:** He was treated with IV boluses of lactated ringers and drips of norepinephrine, vasopressin and sodium acetate, but died within 4 h of presentation. Prior to cardiac arrest his BP 30/14, HR 40 and O<sub>2</sub> sat <70% on 100% FiO<sub>2</sub>.

**Autopsy Findings:** No autopsy results were provided.

#### Case 190. Acute hydrochloric acid ingestion: undoubtedly responsible

**Scenario/Substances:** A 68 y/o female intentionally ingested 16 oz of hydrochloric acid-containing toilet bowl cleaner. She arrived in the ED 2 h later with hematemesis and respiratory distress.

**Past Medical History:** Anxiety, bipolar disorder, chronic pain.

**Physical Exam:** In the ED: BP 185/86, HR 71, T 36°C, RR 30 (NRB). She was alert and oriented with bloody secretions in oropharynx. There were coarse wet rales throughout all lung fields; abdomen was diffusely tender.

**Laboratory/Diagnostic Findings:** ABG- pH 6.92/pO<sub>2</sub> 184/pCO<sub>2</sub> 43/HCO<sub>3</sub> 8. Na 143/K 5.1/Cl 118/CO<sub>2</sub> 15/BUN 14/Cr 0.95/Glu 221, AG 22. AST 173, ALT 57, bilirubin 1.6, INR 1.5, WBC 26/Hgb 16.2/Hct 50.7/PLT 186. Serum APAP, ethanol and salicylate not detected. CxR: right lung opacification. ECG: sinus rhythm at 82.

**Clinical Course:** She was intubated in the ED and had dark-brown aspirate from the ETT and NGT. Antibiotics were given. Upper endoscopy demonstrated ulceration in hypopharynx, severe esophagitis with necrosis, diffuse gastric necrosis. She received IVFs, vasopressors and CRRT but died 12 h after admission.

**Autopsy Findings:** Cause of death: complications from cleaning chemical ingestion; manner of death: suicide. Findings included hemorrhage and necrosis of esophagus, stomach and small intestine. Toxicology screens were negative for drugs of abuse.

#### Case 218. Acute deodorizer ingestion: probably responsible

**Scenario/Substances:** A 4 w/o 4 kg male was fed a bottle containing formula accidentally mixed with an industrial deodorizer (containing lemon verbena). He reportedly only took 1 drink and then started crying. MSDS lists nonyl phenol and propylene glycol ether.

**Physical Exam:** In the ED he was lethargic, HR 70s, O<sub>2</sub> sat 70% (RA).

**Laboratory/Diagnostic Findings:** ABG- pH <6.8/pCO<sub>2</sub> 92/pO<sub>2</sub> 31/HCO<sub>3</sub> 2. Na 153/K 5.4/Cl 124/BUN 7/Cr 0.26/Glu 45, AST 137, ALT 45, bilirubin 0.2. WBC 12.9/Hgb 8.5/Hct 30/PLT 118. CxR: atelectasis and lung opacities.

**Clinical Course:** Within 1 h he developed lethargy, hypoxia and periods of apnea. He was intubated and received CPR, epinephrine and atropine with initial improvement. He was reintubated at the tertiary care center and placed on an epinephrine drip but had cardiac arrest and died.

**Autopsy Findings:** No autopsy results were provided.

#### Case 220. Acute carbon monoxide inhalation/nasal: undoubtedly responsible

**Scenario/Substances:** A 4 y/o male was found in cardiac arrest after being extricated from a house fire. He had ROSC after 40 min of ACLS on scene but arrested again prior to ED arrival.

**Physical Exam:** Unresponsive in cardiac arrest. Soot in mouth and nasal passages, coarse lung sounds. Cyanosis of hands and feet; 53%

TBSA (35% partial, 18% full thickness burns). After ROSC: BP 75/40, HR 120, RR 30.

**Laboratory/Diagnostic Findings:** Glu 262, lactate 22.8, CO<sub>2</sub> 10, ALT 885, AST 1285, lipase 244, CK 16,091. VBg-pH <6.8, COHb 26%. CxR: extensive lung opacities, left > right. EKG: NSR with septal ST depression. CT head: diffuse cerebral and cerebellar edema.

**Clinical Course:** ROSC was obtained after 20 min of CPR, intubation, epinephrine and sodium bicarbonate. Sodium thiosulfate was given. On burn center arrival (on epinephrine and norepinephrine) BP 103/91, HR 8, O<sub>2</sub> sat 86%. Escharotomy was performed for pulse less left leg with circumferential burn. His BP and oxygenation decreased, acidosis increased. Based on the prognosis, comfort measures were instituted and he died 7 h after arrival.

**Autopsy Findings:** 50% TBSA burns, cerebral edema, bilateral pulmonary consolidation, airway inhalation injuries. Cause of death: medical complications of thermal and inhalation injuries. COHb 24%.

#### Case 230. Acute carbon monoxide inhalation: undoubtedly responsible

**Scenario/Substances:** A 16 y/o male was found in cardiac arrest inside a mobile home that had a generator running for heat. CPR was initiated with ROSC and he was transported to the ED. Two other adults were also found unconscious but survived.

**Physical Exam:** His pupils fixed and dilated; GCS 3.

**Laboratory/Diagnostic Findings:** Initial COHb 32.6% (then 7.5%), O<sub>2</sub> sat 64.8%. Na 146/K 3.4/Cl 103/CO<sub>2</sub> 14.8/BUN 12/Cr 1.8/Glu 414, AG 28, Ca 9.7, bilirubin 0.4, ALP 105, AST 235, ALT 228, lactate 25.2, troponin 86 (then 30.6), CK 2,700. WBC 17.8/Hgb 15.4/Hct 47.1/PLT 233, PTT 37.1, INR 1.3. Serum APAP, ethanol and salicylate not detected. ABG- (after 6 amps of sodium bicarbonate) pH 7.25/pCO<sub>2</sub> 60.2/HCO<sub>3</sub> 26.2.

**Clinical Course:** He was intubated and placed on 100% FIO<sub>2</sub>, started on norepinephrine, epinephrine (and then amiodarone) drips for hypotension and a hypothermia protocol. He was transferred to a tertiary care center for HBO therapy, but the chamber was malfunctioning. He remained unresponsive with fixed and dilated pupils on Day 1. HR 106, BP 104/67 on vasopressors that were slowly weaned. On Day 2 his pupils were 8mm and fixed; VS with re-warming: HR 83, BP 106/39, RR 29 (breathing slightly over the ventilator rate), O<sub>2</sub> sat 88%. He died on the evening of Day 2.

**Autopsy Findings:** No autopsy results were provided.

#### Case 268. Acute sulfur dioxide inhalation and ocular exposure: undoubtedly responsible

**Scenario/Substances:** 64 y/o male became trapped in a smelting area with high concentrations of sulfur dioxide. He became disoriented, took off his protective mask and was exposed for ~10 min.

**Physical Exam:** In the ED he complained on bilateral eye pain. BP 125/53, HR 82, RR 20, T 36.3°C, O<sub>2</sub> sat 89 % (RA).

**Laboratory/Diagnostic Findings:** ABG- pH 7.26/pCO<sub>2</sub> 47. Na 145/K 3.9/Cl 112/CO<sub>2</sub> 22. CxR: mild infiltrate.

**Clinical Course:** In the ED his eyes were irrigated with 2 L NSS; conjunctival pH after irrigation was 7.0. Eye exam showed mild corneal haziness with diffuse fluorescein uptake. He became progressively short of breath and deteriorated despite albuterol. He was intubated and transported to a burn unit. Bronchoscopy showed friable, edematous and erythematous bronchopulmonary segments. CxR: diffuse patchy consolidation in all lung fields. BP 95/55, HR 120, T 37.4°C, BUN 32, Cr 3.47, lactate 4.0. He was started on veno-venous ECMO and CRRT, received sodium bicarbonate and an esmolol drip. Bedside ECHO showed normal ejection fraction. On Day 2 he developed severe acidosis, hematemesis, and abdominal distension with concern for ischemic bowel; Cr 4.26, BUN 38, lactate 12.7. He developed hypoxia and hypotension; repeat ECHO showed cardiogenic shock. Dobutamine was added. INR 2.1, PTT >150. Based on the prognosis, the family opted for institution of comfort measures and he died on Day 3.

**Autopsy Findings:** Pathologic findings: diffuse alveolar damages, corneal burns bilateral, peritoneal effusion, occlusive CAD 60 - 90 % RCA/LAD/L circumflex. Toxicology (premortem blood): amphetamine 0.146 mcg/mL, ketamine 0.144 mcg/mL (ketamine presumed from hospital anesthetic).

**Case 285. Acute arsenic and ethanol ingestion: probably responsible**

*Scenario/Substance:* A 36 y/o male was brought to the ED after drinking alcohol and an unlabeled bottle with "the appearance of an antique bottle of Clorox." EMS found him confused, vomiting and incontinent of urine and feces. His blood glucose was 60 and he received D50.

*Past Medical History:* Drug abuse, recent suicidal ideation.

*Physical Exam:* BP 56/27, HR 126, RR 40 O<sub>2</sub> sats 72% (on 94% NRB), T 35.1°C rectal. He was lethargic, pupils 3 mm and sluggishly reactive bilaterally.

*Laboratory/Diagnostic Findings:* ABG- pH 7.21/pCO<sub>2</sub> 24/pO<sub>2</sub> 185/HCO<sub>3</sub> 9/BE -17, Na 140/K 2.6/Cl 106/CO<sub>2</sub> 13/BUN 26/Cr 1.75/Glu 255/AG 22. Lactate 8.9, Ca 9.4. Serum ethanol 10 mg/dL. Serum salicylate and APAP not detected. Serum osmolality 312, CK 246, ammonia 190, troponin 0.26, Hgb 14.9, PLT 130. EKG: ST at 125, QRS 109, QTc 485, inferolateral ST depression.

*Clinical Course:* On arrival to the ED he was drowsy but arousable, complained of feeling cold. He was transiently responsive to IVFs and oxygen but remained tachypneic and tachycardic. He was started on norepinephrine and received both bolus doses and drip of sodium bicarbonate. His mental status declined. During intubation, he vomited and went into VF requiring defibrillation and ACLS. Electrolytes (Mg, K Ca) were replaced but he died ~3.5 h after presentation.

*Autopsy Findings:* Not performed. Of note: after death the antique bottle was obtained. Testing of a chalky gray residue, via water distillation and mass spectrometry, revealed 6,755 ppm arsenic.

**Case 288. Acute arsenic, benzene and toluene ingestion: undoubtedly responsible.**

*Scenario/Substances:* A 59 y/o male presented to the ED 19 h after ingesting 4 oz of an arsenic solution in either benzene or toluene. He was reportedly working with chemicals (which he had access to via employment) in his basement and confused the liquid with his orange juice.

*Past Medical History:* No reported depression but admitted to being stressed from caring for his father-in-law.

*Physical Exam:* Anxious with profuse vomiting, flank pain and dizziness. BP 90/73, HR 111, RR 24, O<sub>2</sub> sat 94% (RA), T 36°C.

*Laboratory/Diagnostic Findings:* ABG- pH 7.24/pCO<sub>2</sub> 35/pO<sub>2</sub> 85/HCO<sub>3</sub> 14.9/BE -11.04, Na 134/K 3.8/Cl 93/BUN 44/Cr 3.6/Glu 236, AG 21. AST 52, ALT 43, bilirubin 0.6, INR 0.9, WBC 17.7/Hgb 16.8/Hct 48.3/PLT 321, troponin 0.465. Serum APAP 2, salicylate 1.7. UDS was positive for opiates. ECG: HR 100, QRS 84, QT/QTc 400/516. CxR: unremarkable. Specimens sent on Day 1 showed a 24 h urine arsenic of 19,418 ng/mL and a serum arsenic of 160 ng/mL.

*Clinical Course:* He presented with muscle cramps and emesis, he vomited 1.5 L and had no urine output. On Day 2 he developed 1st degree heart block. DMSA was initiated at 500 mg for arsenic poisoning, but the patient was switched to BAL on Day 3 as his condition continued to deteriorate. NAC was added when AST and ALT increased (378 and 201, respectively). On Day 3 he had several episodes of bloody diarrhea that tested positive for *C. difficile*. The patient developed sepsis with multiple organ dysfunction. His lactate was 5.9 (increasing to 17), troponin 1.22, AST 854, ALT 408. He was given IV metronidazole and vancomycin for suspected abdominal infection. He underwent an emergent open colectomy and acute blood loss post-surgery required treatment with packed RBCs. He developed renal failure, sepsis, GI bleeding and coagulopathy (INR 4.4). He received phenylephrine, norepinephrine, epinephrine and vasopressin. On Day 5 he developed asystole, with ROSC after 1 h of CPR. Based on the prognosis, the family opted for comfort measures and he died on Day 5.

*Autopsy Findings:* No autopsy results were provided.

**Case 311. Acute fluorinated hydrocarbon inhalation: undoubtedly responsible**

*Scenario/Substances:* A 36 y/o female was in a car when there was an explosion. Police found 8 cans of (fluorinated hydrocarbon-containing) keyboard duster, 1 of which exploded, at the scene.

*Past Medical History:* Illicit drug abuse including huffing.

*Physical Exam:* Presented with respiratory difficulty and 30% TBSA burns, including full thickness burns to face. SBP 110, HR 130s.

*Laboratory/Diagnostic Findings:* Arterial pH 7.1. ECG: ST with depressions in inferior leads, QTc 525.

*Clinical Course:* Pt was intubated in the ED and transferred to a burn unit. She had VF arrest during debridement; ACLS was initiated, including defibrillation, with intermittent ROSC. She received epinephrine, amiodarone, esmolol and override pacing. Her QTc remained prolonged (506 ms). She died shortly after burn unit arrival.

*Autopsy Findings:* Postmortem blood toxicology: 1,1-difluoroethane, 35 mcg/mL; hydromorphone free 4.3 ng/mL; COHb 2%. No evidence of thermal injury or acute inflammation to upper and lower airway. Cause of death: complications of inhalant toxicity (cardiac arrhythmia) due to "huffing." Manner of death: accidental.

**Case 323. Acute hydrocarbon, amphetamine, and methylenedioxy-methamphetamine (MDMA) ingestion: undoubtedly responsible**

*Scenario/Substances:* A 27 y/o male was found unconscious next to a truck with a hose inside the fuel tank (apparently siphoning fuel into a container). There was fuel on and around the patient. He was transported to the ED with CNS and respiratory depression.

*Physical Exam:* On arrival in ED: BP 45/33, HR 124, RR 20, O<sub>2</sub> Sat 85% (RA), T 37°C. Pupils 3 mm and reactive, gasping respirations, GCS 7, superficial burns to abdomen and hip.

*Laboratory/Diagnostic Findings:* Na 143/K 3.9/Cl 108/CO<sub>2</sub> 27/BUN 13/Cr 1.4/Glu 185. ABG- pH 7.17/pCO<sub>2</sub> 72.4/pO<sub>2</sub> 62/BE -4.6, COHb 0.3%. AST 25, ALT 27, WBC 12.9/Hgb 14.9/Hct 43.8/PLT 341. Serum APAP, ethanol and salicylate not detected. UDS was positive for amphetamines, MDMA and THC. ECG: unremarkable. CxR: bilateral opacities. CT head: unremarkable.

*Clinical Course:* On arrival in the ED he was intubated and admitted to the ICU. He developed hypotension, acidosis and hypoxia requiring multiple vasopressors, then became difficult to oxygenate (PEEP 24, FIO<sub>2</sub> 1.0) and was paralyzed. His condition deteriorated and he developed renal failure and shock liver. He was started on CRRT. Despite these interventions, he became more hypoxic, went into cardiac arrest and died on Day 2.

*Autopsy Findings:* Postmortem lungs showed evidence of pneumonitis with red-brown parenchyma and copious amounts of blood tinged fluid. Antemortem blood testing: d-methamphetamine 0.30 mg/L and d-amphetamine 0.03 mg/L. Tolmetin was detected. Cause of death: chemical pneumonitis due to inhalation of gasoline

**Case 325. Acute-on-chronic botulism parenteral: contributory**

*Scenario/Substances:* A 52 y/o male developed wound botulism after skin-popping. His initial symptoms included dysphagia, double vision and generalized weakness.

*Past Medical History:* Drug abuse.

*Physical Exam:* Generalized weakness; scab on chest; nodules under skin.

*Clinical Course:* The patient was intubated and admitted to the ICU. He received botulism antitoxin, propofol, fentanyl, benzodiazepines, antibiotics, n-acetylcysteine tablets and corticosteroids. On Day 12, he became agitated, extubated himself and was put on BiPAP. On Day 13, the patient died from respiratory arrest.

*Autopsy Findings:* No autopsy results were provided.

**Case 333. Acute-on-chronic aluminum phosphide exposure: undoubtedly responsible**

*Scenario/Substances:* [See case 10] A 9 y/o male involved in a mass casualty incident after her father placed large quantity of aluminum phosphide tablets under their home as a pesticide. Most household members had developed adverse GI effects and had been scene previously at a local hospital (history of chemical exposure was not provided) and the family members were diagnosed with gastroenteritis. That night the father attempted to get rid of the tablets by dissolving them with water from a garden hose.

*Physical Exam:* He presented to the ED awake but lethargic, initial VS: BP 112/80, HR 90.

*Laboratory/Diagnostic Findings:* ABG- pH of 6.8/pCO<sub>2</sub> 62/pO<sub>2</sub> 25/HCO<sub>3</sub> 10/BE -24. CO<sub>2</sub> 8, Mg 3.5, Glu 405, BUN 30, Cr. 1.64, CPK 48, AST 92, ALT

130, AG 36, troponin 0.14, BNP 196. CxR: (1 h after PICU admission) air bronchograms and densities in both lungs.

**Clinical Course:** In the ED he patient quickly became obtunded and hypotensive (BP 72/60). He was intubated but developed atrial flutter and lost pulses. He received CPR, IVFs and sodium bicarbonate with ROSC. In the PICU, he developed frothy pulmonary secretions and required increased ventilatory support. He developed acidosis (pH <6.5), hypercarbia (pCO<sub>2</sub> > 130), hypoxemia (pO<sub>2</sub> 21) and shock. Despite aggressive resuscitation efforts (IVFs, multiple doses of epinephrine, sodium bicarbonate, Ca, vasopressors and CPR) he died 2h after PICU admission.

**Autopsy Findings:** Pulmonary edema with pleural effusions. Cause of death: accidental phosphine gas poisoning.

### **Case 335. Acute-on-chronic aluminum phosphide inhalation: undoubtedly responsible**

**Scenario/Substances:** A17 y/o female was involved in a mass casualty incident after her father placed large quantity of aluminum phosphide tablets under their home as a pesticide. Most household members developed adverse GI effects and had been seen previously at the ED (history of chemical exposure was not provided) and the family members were diagnosed with gastroenteritis. That night the father attempted to get rid of the tablets by dissolving them with water from a garden hose. Early the next morning, an older sibling awoke and found some family members to be quite ill. EMS was called and found 2 children in cardiac arrest. One was declared dead at the scene; the second failed to respond to ACLS interventions and was pronounced in the ED. A third sibling died 2 h after PICU arrival.

**Physical Exam:** In the ED she was lethargic with nausea, abdominal pain and dyspnea. BP 77/55, HR 107, RR 16, T 36°C, O<sub>2</sub> sat 100% (on oxygen).

**Laboratory/Diagnostic Findings:** K 3.1, CO<sub>2</sub> 14, AG 25, Mg 2.0, PO<sub>4</sub> 7.5, BUN 20, Cr 1.33, bilirubin 1.4, WBC 3.1, BNPT 161, troponin 0.05, ABG- pH 7.22/CO<sub>2</sub> 25/O<sub>2</sub> 49, COHb 0.8%, MetHgb 0.7%. Subsequent ABG- pH 7.0/CO<sub>2</sub> 29.8/O<sub>2</sub> 83 (intubated on 100% FiO<sub>2</sub>).

**Clinical Course:** Ondansetron and IVFs were given, then norepinephrine, phenylephrine and dopamine for hypotension. She was intubated and received potassium, sodium bicarbonate and Mg. CxR: pulmonary edema. EKG: ST at 108, mild ST depression in inferior lateral leads. She went into cardiac arrest and died 3.5 h after arrival.

**Autopsy Findings:** Gastric mucosal hemorrhage and superficial ulceration, focal cerebral subarachnoid hemorrhages, pericardial, pleural and peritoneal effusions.

### **Case 345. Acute sulfuryl fluoride inhalation: undoubtedly responsible**

**Scenario/Substances:** A 36 y/o male was found altered inside a residential structure which had been tented and fumigated with sulfuryl fluoride. Estimated time of exposure was 1-2 h.

**Past Medical History:** Polysubstance abuse.

**Physical Exam:** In the ED, he was alert and conversant; BP 128/9, HR 115-120, RR 29, T 36°C.

**Laboratory/Diagnostic Findings:** Cr 1.24, BUN 13, Ca 4.0, WBC 19.3, Hgb and Hct 'normal.' UDS was positive for methamphetamine.

**Clinical Course:** He gradually developed shortness of breath, was diagnosed with pulmonary edema and treated with BiPAP; he also received calcium. On Day 3, he was intubated after developing pneumonia and ARDS; liver function tests increased. He developed hypotension requiring vasopressors and died on Day 8.

**Autopsy Findings:** Cause of death: complications of ARDS secondary to sulfuryl fluoride fumigant exposure; manner of death: accidental.

### **Case 347. Acute dinitrophenol ingestion: undoubtedly responsible**

**Scenario/Substances:** 42 y/o male took ~30 dinitrophenol (200 mg) tablets. He was found unresponsive by EMS.

**Physical Exam:** In the ED ~3 h after ingestion he was disoriented, anxious, diaphoretic, and became rigid. Initial BP 120/58, HR 117, RR 32, O<sub>2</sub> sat 98% (2 L/min O<sub>2</sub>), T 36.8°C.

**Laboratory/Diagnostic Findings:** Initial blood pH 6.7, K 5, CK 600s.

**Clinical Course:** In the ED he was intubated, developed rigor and hyperthermia (T 38°C), then went into asystole. He received epinephrine,

sodium bicarbonate and Ca. Bedside echo showed no cardiac activity; he died 2 h after presentation.

**Autopsy Findings:** Blood 2, 4 dinitrophenol 91mg/L. Death classified as suicide.

### **Case 356. Acute paraquat ingestion: undoubtedly responsible**

**Scenario/Substances:** A71 y/o male brought paraquat home from work in a drink bottle to spray on his flower. He left the paraquat in his refrigerator and accidentally drank it, vomited and immediately presented to the ED.

**Laboratory/Diagnostic Findings:** In the ICU: Cr 1.7, BUN 11, CO<sub>2</sub> 22. CxR was unremarkable. Repeat labs on Day 2: AST increased from 30 to 175, Cr 3.5, lactate 3.1, CO<sub>2</sub> 19. Solution was confirmed as being 30% paraquat.

**Clinical Course:** In the ED he was diaphoretic with blue/green emesis. He refused activated charcoal or NG tube placement. He was transferred to a tertiary care HCF; cyclophosphamide, methylprednisolone and IV NAC were started. On Day 2 he was alert and oriented; BP 123/62, HR 93, RR 21, O<sub>2</sub> sat >92%. CRRT was started for worsening renal function but complicated by clotting issues. He complained of odynophagia, and became agitated, uncooperative and hypoxic (O<sub>2</sub> sat 85%) He was intubated on Day 3 and started on vasopressin, norepinephrine and phenylephrine drips. Based on the prognosis, the family opted for comfort measures and he died on Day 5.

**Autopsy Findings:** Not performed.

### **Case 360. Acute Curcuma domestica parenteral: undoubtedly responsible**

**Scenario/Substances:** A 30 y/o female received an infusion of turmeric in her naturopathic doctor's office. Within minutes she was unresponsive. The infusion was stopped, CPR was initiated and epinephrine IM administered while awaiting EMS.

**Past Medical History:** Eczema, hypothyroidism, obesity, pre-diabetes, and food allergies to soy protein, lactose and gluten.

**Physical Exam:** In the ED: BP 119/83, HR 58, O<sub>2</sub> sat 100% (intubated), T 35°C.

**Laboratory/Diagnostic Findings:** BMP 'normal', Phos 1.8, Mg 1.8.

**Clinical Course:** In the ED she was intubated with ROSC and placed her on a hypothermia protocol. CT head: edema. In the ICU she exhibited decerebrate posturing. Based on the prognosis, comfort measures were instituted and she died on Day 5.

**Autopsy Findings:** Toxicology (antemortem blood): diphenhydramine 0.22 mg/L, presumptive positive for cannabinoids. Cause of death: anoxic encephalopathy due to prolonged cardiopulmonary arrest due to adverse reaction to tumeric solution. Manner of death: accidental. No turmeric testing was performed on her blood or urine.

### **Case 361. Acute plant (cardiac glycoside) ingestion: undoubtedly responsible**

**Scenario/Substances:** A 33 y/o female ingested an herbal supplement ("pong-pong" a nut from the *Cerbera odollam* tree) purchased on the internet for weight loss. She developed AMS and vomiting, and was transported to the ED.

**Past Medical History:** Depression, eating disorder, no reported suicidal ideation.

**Physical Exam:** In the ED she was diaphoretic and pale with continued nausea and vomiting. She soon became agitated and required restraints. SBP ~90, HR 30-40.

**Laboratory/Diagnostic Findings:** K 8.9, ECG: wide complexes with no p waves. Serum digoxin was 3.1 ng/mL.

**Clinical Course:** She was resuscitated with IVFs and vasopressors, was intubated and receive 10 vials of digoxin Fab fragments. Despite these efforts she died 3 h after presentation.

**Autopsy Findings:** Cause of death: "cardiac glycoside toxicity (cerberin and neriifolin); manner of death: accidental. Post mortem toxicology screening was positive for neriifolin and cerberin (2 cardiac glycosides) but negative for drugs of abuse. "Plants which contain these glycosides include *Cerbera odollam* and *Cerbera manghas*." Liver tissue extract showed 3 peaks on LC/MS suggestive of cardiac glycosides; neriifolin and cerberin were confirmed but no quantification data were reported.



**Case 364. Acute-on-chronic nicotine inhalation/nasal: undoubtedly responsible**

*Scenario/Substances:* A 19 y/o male was vaping at a mall using a 0.3% nicotine solution when he lost consciousness. EMS found patient in VF arrest. He received ACLS with ROSC after a 40-min downtime.

*Physical Exam:* In the ED he was intubated, cyanotic with pupils that were 6mm and sluggish; HR 160, T 38°C.

*Laboratory/Diagnostic Findings:* Na 143/K 3.7/Cl 100/CO<sub>2</sub> 19/BUN 15/ Cr 1.4/Glu 274, Mg 2.4, AST 245, ALT 348. ABG- pH 6.93/pCO<sub>2</sub> 69/pO<sub>2</sub> 98. Lactate 8.9, WBC 5.5/Hct47.9/PLT 223. Serum APAP, ethanol and salicylate not detected. UDS was negative. CxR: right mainstem intubation, complete opacification of left lung, areas of patchy infiltrates. ECG: ST at 124, right axis deviation, possible anterolateral infarct, QRS 96, QTc 459. CT head: anoxic injury. CT chest: ground glass consolidations and patchy infiltrates bilaterally. ECHO: moderate hypokinesis of LV.

*Clinical Course:* Patient was resuscitated and started on pressors and cooling protocol. He rapidly developed evidence of pulmonary edema with difficulty oxygenating; a chest tube was placed. He was resuscitated after a PEA arrest. Metoprolol was given for persistent tachycardia in the 160s. Nitric oxide inhalation was started and he was transferred for ECMO. On arrival at the tertiary care center a bronchoscopy showed inflamed lung with bloody irritation of the mainstem bronchi and sloughed mucosa. He was unresponsive off sedation. On Day 3, CT head: cerebral edema with loss of grey-white matter distinction. On Day 5, he was declared brain dead, died and underwent organ donation.

*Autopsy Findings:* Cause of death: sudden cardiac death while vaping nicotine, acute aspiration pneumonia, pulmonary thrombosis with infarction, splenic infarction; manner of death: accidental. The vaping liquid was analyzed and found to have nicotine and carrier oils. MSDS stated that ingredients were nicotine 0.3%, glycerin and propylene glycol. Excipients for scent and taste were not listed. Because of public health concerns, state public health agency and police were notified.

**Case 365. Acute nicotine parenteral: undoubtedly responsible**

*Scenario/Substances:* 20 y/o female was found by EMS in cardiac arrest after reportedly injecting a liquid nicotine product 50 min prior. She was intubated and received CPR, naloxone (no response) and IVFs prior to ED arrival.

*Past Medical History:* Asthma, thyroid disease, depression.

*Physical Exam:* Unresponsive; incontinent of stool. Pupils fixed and dilated. SBP 112, HR 190.

*Laboratory/Diagnostic Findings:* ABG- pH 7.09/pCO<sub>2</sub> 38/pO<sub>2</sub> 114/HCO<sub>3</sub> 11.2. Na 142/K 3.7/Cl 104/CO<sub>2</sub> 12/BUN 14/Cr 1.6/Glu 129. Mg 2.2, Phos 4.3, AST 140, ALT 102, bilirubin 1.0, INR 1.2, WBC 19/Hgb12.7/Hct 39.2/PLT 400. Serum APAP, ethanol and salicylate not detected. UDS was positive for amphetamine metabolites. Lactate 13.2, CK 200, troponin <0.015. CT brain: unremarkable. Day 3 blood: nicotine 1,000 ng/mL, cotinine 510 ng/mL.

*Clinical Course:* The patient's HR decreased to 109 after more IVFs, she remained unresponsive with posturing and myoclonic jerks. She began cooling protocol. On Day 2 she remained unresponsive with mydriasis and increased muscle tone. Off sedation her pupils were 2mm and unreactive, she received antibiotics for presumed pneumonia. On Day 6 she received benzodiazepines, valproate, levetiracetam and lacosamide for repeated seizures. On Day 8, MRI showed diffuse hypoxia brain injury. Based on the prognosis, the family opted for of comfort measures and she died on Day 20.

*Autopsy Findings:* No autopsy results were provided.

**Case 368. Acute methadone, chlorpheniramine and diphenhydramine ingestion: undoubtedly responsible**

*Scenario/Substances:* A 2 y/o male was put down for a nap and then found unresponsive 5.5 h later. Medications found in the home included: metoprolol, lisinopril, meloxicam, amlodipine, promethazine, tizanidine and baclofen.

*Physical Exam:* Lethargic in respiratory distress at ED arrival.

*Laboratory/Diagnostic Findings:* UDS was positive for methadone. Serum APAP, salicylate and ethanol not detected.

*Clinical Course:* Minimal response to naloxone; he was intubated, then started on IVFs and antibiotics. On Day 2 he became hypotensive (40/20) and started on a naloxone drip. He had multiple episodes of cardiac arrest, received IVF boluses, and dopamine and epinephrine drips. Pupils became fixed and dilated. An exterior ventricular drain was placed and he received 3% saline for cerebral edema, but died on Day 2.

*Autopsy Findings:* Toxicology report: naloxone positive; antemortem peripheral blood: methadone 400 ng/mL, EDDP 83 ng/mL, chlorpheniramine 41 ng/mL, diphenhydramine 180 ng/mL. Cause of Death: diffuse anoxic encephalopathy with diffuse cerebral edema and herniation due to combined effects of methadone, chlorpheniramine and diphenhydramine; manner of death: homicide.

**Case 371. Acute ibuprofen ingestion: undoubtedly responsible**

*Scenario/Substances:* A 13 y/o female intentionally ingested an unknown amount of ibuprofen. She was discovered unresponsive with emesis and bloody stool, ~ 10 h after last being seen at baseline. EMS administered naloxone, without effect, and transported her to the ED.

*Physical Exam:* BP 101/32, HR 91, RR 10.

*Laboratory/Diagnostic Findings:* Arterial pH 7.3, lactate >20, Cr 1.9, Ca <2, K 6.4, HCO<sub>3</sub> 8, AG 30, BUN 22, Cr 1.8, Glu 82, WBC 38, AST 198, ALT 62. Post-transfusion Hgb 9.8/Hct 30. Serum APAP and salicylate not were detected. Repeat labs on Day 2: Na 173/K 2.6/Cl 110/CO<sub>2</sub> 31/BUN 39/Cr 2.3, lactate 15.4. ABG- pH 7.55/pCO<sub>2</sub> 38/pO<sub>2</sub> 43/HCO<sub>3</sub> 33.8/BE 12, Ca (ionized) 2.0, CPK 23,000. Day 3: Arterial pH 7.35, K 4.8, Cr 3.5, AST 999, ALT 240, INR 3.0, PTT 42, CPK 43,123.

*Clinical Course:* In the ED she was intubated and received sodium bicarbonate, calcium, antibiotics and NAC. CT head: unremarkable. She was transferred to a tertiary care center where she became hypotensive, bradycardic and then developed asystole. CPR was performed, and she received dopamine, norepinephrine and epinephrine drips. She received 2 units of FFP and 1 unit of PRBCs for rectal bleeding; BP 90/50, HR 137. On Day 2 she remained unresponsive; BP 99/47 and HR 86 on 3 vasopressors. She was cooled for hyperthermia. On Day 3 she had no purposeful movements, BP 80/30, HR 120, O<sub>2</sub> sat 80%. She died on Day 4 from a reported anoxic brain injury.

*Autopsy Findings:* Cause of death: ibuprofen intoxication; manner of death: suicide. Hospital blood ibuprofen level was 500 mcg/mL. The pulmonary parenchyma was erythematous and congested, brain showed hypoxic ischemia.

**Case 1038. Unknown salicylate ingestion: undoubtedly responsible**

*Scenario/Substances:* A 65 y/o male was brought to the ED by family for altered mental status.

*Past Medical History:* COPD, bipolar disorder, alcohol abuse, and chronic liver disease. Home medications: alprazolam, baclofen, fluticasone, lamotrigine, meloxicam, tamsulosin, tiotropium and zolpidem.

*Physical Exam:* BP 135/75, HR 92, RR 34, O<sub>2</sub> sat 99% (RA), T 37°C. Alert and oriented but was diaphoretic and appeared distressed.

*Laboratory/Diagnostic Findings:* Na 145/K 5.5/Cl 117/CO<sub>2</sub> 15/BUN 25/ Cr 1.43/Glu 117, AG 13, VBG-pH 7.41/pCO<sub>2</sub> 31.8/pO<sub>2</sub> 22/HCO<sub>3</sub> 26.2/BE -4. CK 175, lactate 0.7, AST 29, ALT 11, bilirubin 0.2. WBC 23.4/Hgb 16.7/Hct 50.1/PLT 289. Serum ethanol not detected. UDS was positive for benzodiazepines. CxR: left lower lobe opacity and effusion. CT head: unremarkable. ECG: HR 90, QRS 80, QTc 555.

*Clinical Course:* In the ED the suspected sepsis was treated with broad spectrum antibiotics. After 5 h with RR 30 to 34 he became obtunded and was intubated, then became bradycardic and hypotensive. ~ 45 min later he had a cardiac arrest; resuscitation efforts (CPR, atropine, epinephrine and naloxone) were unsuccessful and he died within 8 h after ED arrival.

*Autopsy Findings:* Premortem serum lamotrigine from the ED was subtherapeutic (1.5 mcg/mL), salicylate was 112 mg/dL. Cause of death: salicylate toxicity with intra-alveolar hemorrhage.

**Case 1063. Acute-on-chronic colchicine ingestion: undoubtedly responsible**

*Scenario/Substances:* A 68 y/o female ingested 86 tabs of colchicine in a suicide attempt. When EMS arrived she was lethargic, vomiting and incontinent.

**Past Medical History:** Anxiety and depression, asthma and HTN. Medications: colchicine, meloxicam, escitalopram, omeprazole, metoprolol, quetiapine, furosemide and fluticasone.

**Physical Exam:** In the ED 4 h after ingestion she was lethargic but arousable. BP 112/100, HR 118, RR 16, O<sub>2</sub> sat 100% (RA), T 37°C.

**Laboratory/Diagnostic Findings:** ABG- pH 7.09/pO<sub>2</sub> 20.8/HCO<sub>3</sub> 9.1/BE -20.3. Na 149/K 3.3/Cl 105/CO<sub>2</sub> 21/BUN 17/Cr 1.5/Glu 172. AST 464, ALT 131; WBC 29.5/Hgb 15.7/Hct 49.6/PLT 256. Serum APAP, salicylate and ethanol not detected. UDS was negative.

**Clinical Course:** In the ED she received activated charcoal and IVFs. Her BP dropped to 96/52 then 49/29, HR 110. ECG: accelerated junctional rhythm, QRS 82, QT 652. She was intubated and started on norepinephrine, and sodium bicarbonate drips. She developed renal dysfunction (Cr 3.5) and worsening hypotension; she died ~24 h after admission.

**Autopsy Findings:** Cardiomegaly, pulmonary edema, hepatomegaly, and nephrosclerosis. Cause of death: colchicine intoxication; manner of death: suicide.

#### Case 1091. Acute salicylate ingestion: undoubtedly responsible

**Scenario/Substances:** A 71 y/o female presented to an ED after taking handfuls of ASA, intermittently, for ~3 h.

**Past Medical History:** Hypertension, diabetes.

**Physical Exam:** In the ED: BP 179/103, HR 107, RR 23, O<sub>2</sub> sat 92% (RA), T 36.3°C.

**Laboratory/Diagnostic Findings:** Initial salicylate level was 70 mg/dL. ABG- pH 7.40/pCO<sub>2</sub> 33/pO<sub>2</sub> 182/HCO<sub>3</sub> 22.2. Na 138/K 4.8/Cl 166/CO<sub>2</sub> 15/BUN 18/Cr 0.9/Glu 186, AG 43, AST 116, ALT 172, bilirubin 0.2, CK 150, WBC 19.9/Hgb 15.8/Hct 47.6. Serum APAP and ethanol not detected. ECG: HR 108, QRS 114, QTc 479. CxR: atelectasis.

**Clinical Course:** In the ED she was alert and diaphoretic, complaining of nausea (with emesis) and fuzzy vision. Within several hours she developed tinnitus and her QTc prolonged to 500; she received IV Mag and K. Salicylate level increased to 105 mg/dL and CRRT was started. Repeat ABG- pH 7.64/pCO<sub>2</sub> 23/pO<sub>2</sub> 91/HCO<sub>3</sub> 28.9, bicarbonate drip was discontinued. ASA level decreased to 75 mg/dL and CRRT was stopped. BP 135/75, HR 121, RR 28, O<sub>2</sub> sat 95% (2 LPM). 4 h after stopping HD: Salicylate was 102, CO<sub>2</sub> 21, Cr 1.34, AG 29. She had increased agitation, confusion, diaphoresis and dry mucus membranes. ASA increased to 104 and HD was resumed; 1 h later she had a ventricular arrhythmia then asystole. She was intubated with CPR (achieved ROSC) and received sodium bicarbonate (boluses and drip), epinephrine, calcium, vasopressin, norepinephrine and mannitol for unequal pupils. CT head: no acute changes, K 5.9, CO<sub>2</sub> 19, Cr 1.81, Ca 7.2, and Glu 212. She was given sodium polystyrene sulfonate. HD was performed 2 more times which decreased salicylate level to 18. She received antibiotics for hyperthermia (T 41.3°C) and pantoprazole for coffee-ground emesis. EEG: no seizure activity. Repeat CT head: diffuse anoxic injury. Based on the prognosis, comfort measures were instituted and she died on Day 3.

**Autopsy Findings:** No autopsy results were provided.

#### Case 1148. Acute lidocaine, cleaner (cationic): undoubtedly responsible

**Scenario/substance:** An 11 y/o male did not have his usual solution to flush his cecal port, so his father asked the pharmacist for a saline solution that was not in stock. The father asked for a wound wash and was referred to topical solutions. He purchased a solution (2.5% lidocaine, 0.013% benzalkonium chloride) and instilled 177 mL into the port. He rapidly developed a seizure; EMS arrived, transported him to the ED, he developed cardiac arrest enroute and they intubated him.

**Past Medical History:** Spina bifida with chronic constipation, with a right lower quadrant cecal port (flushed daily with a combination saline and glycerin solution). Prescribed amphetamines.

**Clinical Course:** He was in cardiac arrest upon ED arrival. PALS was performed, he received naloxone and ILE without response. He was pronounced dead shortly after arrival.

**Autopsy Findings:** Femoral blood contained amphetamine 0.13 mg/L, lidocaine 15 mg/L, MEGX 2.7 mg/L. The cause of death: lidocaine toxicity; manner of death: accidental.

#### Case 1151. Acute lidocaine inhalation: undoubtedly responsible

**Scenario/Substances:** A 33 y/o male was inhaling lidocaine powder (imported from China) to treat GERD. He was found unresponsive surrounded by white powder.

**Past Medical History:** GERD.

**Physical Exam:** He was in cardiac arrest upon ED arrival, pupils 8mm and unresponsive.

**Laboratory/Diagnostic Findings:** ABG- pH < 6.8/pCO<sub>2</sub> 98/pO<sub>2</sub> 181/HCO<sub>3</sub> 8.9. Na 143/K 4.4/Cl 106/CO<sub>2</sub> 14/BUN 17/Cr 1.3/Glu 375. AG 28, AST 334, ALT 204, bilirubin 3.0. INR 0.9/WBC 9.4/Hgb 11.6/Hct 40.1/PLT 205. Serum APAP, ethanol and salicylate not detected. UDS was positive for benzodiazepines. EKG: NSR, QRS 148, QTc 485. CxR: widened mediastinum, distended stomach.

**Clinical Course:** After ROSC: BP 64/34, HR 73, RR 14, O<sub>2</sub> sat 92%. He was intubated and started on norepinephrine and dopamine drips for hypotension. He received sodium bicarbonate for QRS prolongation and ILE. The patient's BP stabilized to 104/52 and QRS narrowed to 120 ms, but he remained unresponsive with fixed and dilated pupils. CT head showed anoxic brain injury with edema and herniation. He was declared brain dead and died on Day 2. The product involved tested positive for lidocaine (via gas chromatography/mass spectroscopy). Serum lidocaine was >12 mcg/mL.

**Autopsy Findings:** Cause of death: lidocaine toxicity; manner of death: accidental. Antemortem blood sample: lidocaine 18 mcg/mL; monoethylglycineylidide (MEGX): 11 mcg/mL.

#### Case 1174. Acute pregabalin and topiramate ingestion: undoubtedly responsible

**Scenario/Substances:** A 63 y/o male who had been taking extra pregabalin to sleep (per family) was found in cardiac arrest and transported to the ED. 90 pregabalin tablets were later found to be missing.

**Past Medical History:** Seizure disorder. Medications: topiramate, pregabalin.

**Physical Exam:** Intubated, sedated, unresponsive. BP 117/70, HR 120, T 37°C.

**Laboratory/Diagnostic Findings:** UDS was positive for opioids. EKG: incomplete RBBB, QRS 98, QTc 407. Day 2: Na 131/K 4.9/Cl 112/CO<sub>2</sub> 19/BUN 13/Cr 0.63/Glu 134, ABG-pH 7.45/pCO<sub>2</sub> 27/pO<sub>2</sub> 124/HCO<sub>3</sub> 18.

**Clinical Course:** BP 105/92, HR 88, RR 20, T 32°C (on hypothermia protocol). Remained intubated in the ICU, opened eyes to external rub and had myoclonic jerking without seizure activity. Day 2: BP 140/84, HR 113, RR 23, T 36.1°C, patient was being rewarmed. Patient went into cardiac arrest and died on Day 3.

**Autopsy Findings:** Cause of death: acute mixed drug intoxication (pregabalin and topiramate). Blood toxicology: pregabalin 43 mcg/mL, topiramate 6,300 ng/mL.

#### Case 1343. Acute diphenhydramine ingestion: undoubtedly responsible

**Scenario/Substances:** A 29 y/o female texted friends saying she wanted to harm herself and was then found unconscious in a car with a bottle diphenhydramine. There were 64 (50 mg) tablets missing. EMS found her to be tachycardic with seizure-like activity. She developed PEA enroute to the ED but had ROSC after CPR and epinephrine.

**Laboratory/Diagnostic Findings:** Glu 274, ABG- pH 6.7 (then 7.4 after 7 amps of sodium bicarbonate); pO<sub>2</sub> 350, Na 130, Hgb 14.4 PLT 326. UDS was negative. Serum salicylate, APAP and ethanol not detected. EKG: QRS 240, QTc 520.

**Clinical Course:** She was intubated upon ED arrival; BP 116/60, HR 120 (then 180). She received calcium and sodium bicarbonate and was then apparently hallucinating and picking at things in the air. QTc increased from 520 to 615. She received a total of 10 amps of sodium bicarbonate, 3 gm MgSO<sub>4</sub> and 280 ml 3% saline; Na 158, 3 h later BP 112/82, HR 99. EKG: QRS 40, QTc 601. Patient received piperacillin/tazobactam, albumin and potassium replacement. Day 2 her pupils were 6 mm and nonreactive. She was weaned from sedation for several hours and her exam became notable for gaze deviation up and to the left, no cough, gag or corneal reflexes, and pupils fixed and dilated. EEG was negative for seizures. Day 3 she was hypertensive, tachycardic and completely flaccid. Day 4 cerebral perfusion study confirmed brain death. She died on Day 5 and underwent organ donation.

*Autopsy Findings:* Cause of death: complications of acute diphenhydramine toxicity. Antemortem blood toxicology: diphenhydramine level: 5400 mcg/L.

#### **Case 1369. Acute tilimicosin parenteral: undoubtedly responsible**

*Scenario/Substances:* A 54 y/o female injected herself with tilimicosin in a suicide attempt. A coworker at a bovine facility reported a dispute with the woman and the saw her holding a syringe and applying a tourniquet on her arm, stating she was going to kill herself. The woman was soon found unresponsive and bystander CPR was started. She was transported to an ED by EMS, but was pronounced dead. Police found bottles of tilimicosin and syringes at the scene.

*Past Medical History:* Depression with suicidal ideation.

*Physical Exam (postmortem):* Tourniquet on right arm with bruising and marks on arm, not consistent with IV attempts by EMS. EMS rhythm strip showed 'dysrhythmia.'

*Autopsy:* Blood positive for tilimicosin (qualitative analysis only); cause of death: Intentional overdose of tilimicosin.

#### **Case 1379. Chronic: methotrexate ingestion: contributory**

*Scenario/Substances:* A 96 y/o female mistakenly received 1 tab (2.5mg) of methotrexate daily for 27 days (instead of 5 tablets once a week) at her nursing home.

*Past Medical History:* Rheumatoid arthritis, Alzheimer's disease, atrial fibrillation, cardiovascular disease.

*Physical Exam:* She presented with generalized weakness, nausea and confusion. Stomatitis with large wounds on her lips and buttocks. HR 62, RR 16, O<sub>2</sub> sat 96% (RA), afebrile.

*Laboratory/Diagnostic Findings:* Glomerular filtration rate 23 ml/min, AST 30, ALT 20, ALP 44, WBC 1.5/Hct 34/PLT 99. Initial methotrexate level 0.08 mmol/L.

*Clinical Course:* Patient received leucovorin, renal support and sodium bicarbonate. MTX level decreased to <0.04 mmol/L over 72 h; WBC nadir was 0.6. Her renal function improved over the next 4 d; bicarbonate drip was stopped, leucovorin was continued. She received antibiotics for a UTI. On Day 6 her WBC increased to 0.8 and PLT 31. She received blood and platelet transfusions. Patient died on Day 16. The chronic MTX toxicity was thought to have contributed to her death along with her pre-existing medical conditions.

*Autopsy Findings:* Per forensic pathologist, clinical symptoms, laboratory findings (myelosuppression) and underlying co-morbidities, the dosing error of methotrexate played a contributing role in the decedent's death. No post-mortem toxicology testing was performed.

#### **Case 1439. Acute-on-chronic: flecainide ingestion: undoubtedly responsible**

*Scenario/Substances:* A 47 y/o female was found with an empty bottle of flecainide. EMS performed cardioversion enroute to the ED.

*Past Medical History:* Atrial fibrillation, mitral valve prolapse and psychiatric disorder (NOS). Medications: flecainide, metoprolol, cyanocobalamin, oxycodone and ranitidine

*Laboratory/Diagnostic Findings:* Na 156/K 2.8/CO<sub>2</sub> 36/BUN 11/Cr 0.9, AG 18, Ca 7.1, AST 416, ALT 195. Serum ethanol 170. Serum APAP and salicylate not were detected. UDS was negative. ECG: multiple PVCs.

*Clinical Course:* In the ED she was responsive to verbal stimuli; SBP 90s, HR 130s with multiple PVCs. She was given multiple amps of sodium bicarbonate, atropine, magnesium, vasopressors, ILE and was transcutaneously paced. She had repeated cardiac arrests. EKG: HR 75, QRS 152 and QTC 625. She was taken to the catheterization lab for pace-maker placement and transferred to the ICU. She continued to have VF/VT and died early on Day 2.

*Autopsy Findings:* Cause of death: flecainide and ethanol intoxication. Hospital blood flecainide 3.82 mcg/mL.

#### **Case 1456. Acute-on-chronic amlodipine ingestion: undoubtedly responsible**

*Scenario/Substances:* A 50 y/o female took 90 (5 mg) tablets of amlodipine over several hours in a suicide attempt. She vomited multiple times and then presented to an ED 45 min later.

*Past Medical History:* Hypertension. Medications: amlodipine 5 mg.

*Physical Exam:* In the ED she was alert, oriented x 3. BP 80/40, HR 110, RR 20, O<sub>2</sub> sat 96% (RA).

*Laboratory/Diagnostic Findings:* Na 133/K 3.4/Cl 98/CO<sub>2</sub> 10/BUN 10/Cr 1.6/Glu 355, AG 25, Ca 9.6, ABG- pH 7.2/pCO<sub>2</sub> 20/pO<sub>2</sub> 64/HCO<sub>3</sub> 8. Lactate 8.6, INR 1.02, WBC 54. Serum APAP, ethanol and salicylate not detected. UDS was negative. CxR: left lower lobe infiltrate, ECG: HR 100, QRS 83, QTc 369. CT head: unremarkable.

*Clinical Course:* ~ 5 h after ED arrival she was started on an epinephrine drip and HIE (D10 and insulin at 104 U/h) for an MAP of 51. Epinephrine and insulin were increased, she developed respiratory distress 15 h after arrival and was intubated. She had persistent lactic acidosis, decreasing urine output, and hypotension (BP 75/39, HR 102). Pulmonary embolus was suspected and heparin was started. Ca, sodium bicarbonate and norepinephrine were administered. On Day 2 CRRT was started for oliguric renal failure and fluid overload; BP 98/59, HR 83. She became hypoglycemic (Glu69) and was started on D50 with HIE. Day 3: BP 95/49, HR 92, lactate ~10, on insulin and D50 drips. She remained unresponsive. Day 10: surgery evaluated her for a possible bowel perforation but due to critical illness did not recommend surgery. Based on the prognosis, comfort measures were instituted and she died on Day 10.

*Autopsy Findings:* Cause of death: amlodipine overdose; manner of death: suicide. Toxicology: amlodipine 840 ng/mL.

#### **Case 1632. Acute nifedipine ingestion: undoubtedly responsible**

*Scenario/Substances:* An 11 m/o female was found with an open bottle of nifedipine (30 mg tabs; at least one partially dissolved pill in her mouth) 1 h prior to ED arrival.

*Clinical Course:* The patient was given a dose of activated charcoal but subsequently vomited (including 1 intact pill). She was asymptomatic for 2 h but then developed atrial block, bradycardia and cardiac arrest. 50 min of resuscitation efforts were unsuccessful and she died.

*Autopsy Findings:* Peripheral blood: nifedipine concentration: 870 ng/mL. Visible pill residue within the stomach, duodenum, and proximal jejunum; petechial hemorrhages of the gastrointestinal mucosa. Cause of death: acute nifedipine toxicity; manner of death: accidental.

#### **Case 1634. Acute benzonatate and meclizine ingestion: undoubtedly responsible**

*Scenario/Substances:* A 17 y/o female was found seizing, several minutes after locking herself in a bathroom. EMS found her drowsy and shaking; benzonatate and meclizine bottles were found at the scene.

*Laboratory/Diagnostic Findings:* K 2.4, HCO<sub>3</sub> 15.6, BUN 11, Cr 1.35, Glu 367, AST 400, ALT 376, bilirubin 0.8.

*Clinical Course:* The patient was pulseless and apneic upon ED arrival; pupils were fixed and dilated. She was intubated, and resuscitated with CPR, defibrillation X 5, and sodium bicarbonate boluses with ROSC. BP 81/47, HR 85, O<sub>2</sub> sat 100% (100% FiO<sub>2</sub>). ILE was given; gastric lavage returned pill fragments and she received activated charcoal and placed on hypothermic protocol. NAC was started for elevated LFTs. On Day 2 hepatic function improved but she remained comatose with decerebrate posturing. Levetiracetam was given for seizure activity on EEG. On Day 3 she received phenobarbital for increased seizure activity but then again showed decerebrate posturing. Based on the poor prognosis, comfort measures and organ donation were instituted, and she died on Day 10.

*Autopsy Findings:* Cause of death: complications of meclizine and benzonatate toxicity; manner of death: suicide. Blood toxicology (pre-mortem, 2.2 h post ingestion): benzonatate 680 mcg/L; meclizine 150 mcg/L.

#### **Case 1643. Acute iron ingestion: undoubtedly responsible**

*Scenario/Substances:* A 47 y/o female ingested a large (unknown) number of iron tablets in a suicide attempt. She began vomiting and presented to the ED.

*Physical Exam:* Initial BP 133/94, HR 102, RR 20, O<sub>2</sub> sat 98% (RA).

*Laboratory/Diagnostic Findings:* Na 138/K 3.9/Cl 103/CO<sub>2</sub> 18.4/BUN 11/Cr 0.68/Glu 98. ABG- pH 7.07/pCO<sub>2</sub> 20/pO<sub>2</sub> 127. WBC 9.2. Serum iron 562 mcg/dL (then >6,000 on Day 2).



**Clinical Course:** She was vomiting on ED arrival. Abdominal radiograph showed a radio-opaque mass but individual tablets were not visualized. She was treated with a sodium bicarbonate drip and deferoxamine (1 g IV then 1.5 g 5 h later). She developed shortness of breath, tachypnea and generalized body pain. The patient unwilling to drink PEG solution for WBI. She became hypotensive, was started on vasopressors, deferoxamine (2 g/h) and WBI. CRRT was initiated for worsening liver and kidney failure. She developed asystole requiring CPR with ROSC. Iron levels were decreasing but lactic acidosis increased and hypotension persisted despite vasopressors. She died in the ICU on Day 3.

**Autopsy Findings:** No autopsy results were provided.

#### Case 1646. Acute iron ingestion: undoubtedly responsible

**Scenario/Substances:** A 10 m/o male was taken by his mother to urgent care after a suspected ingestion of ferrous sulfate tablets; maximum exposure was 79 tablets of 325 mg.

**Physical Exam:** Lethargic, withdrawing to pain. BP 96/72, HR 136, RR 42, O<sub>2</sub> sat 98% (RA), T 35.8 °C.

**Laboratory/Diagnostic Findings:** VBG- pH 7.27/pCO<sub>2</sub> 36/pO<sub>2</sub> 70. Glu 199, fibrinogen 60, INR 4.3. Serum ethanol, APAP and salicylate not detected.

**Clinical Course:** The child was immediately transferred to a PICU where he was intubated. Abdominal x-ray showed 55 visible pills. An NGT was placed for WBI; IV deferoxamine was started at 15 mg/kg/hr. The child was taken for emergent endoscopy; 26 tablets were removed (4 from the esophagus, 22 from the stomach). His pH dropped to 6.81; a central line was placed for fluid resuscitation. ECG showed a bundle branch block. The deferoxamine drip was increased to 45 mg/kg/hr; he was started on exchange transfusion. The first serum iron concentration returned at 931 mcg/mL, repeated level was 7,739 mcg/mL. While preparing for ECMO the child went into cardiac arrest. He was resuscitated with CPR and ACLS, then cooled and started on dopamine (20 mcg/kg/min) and epinephrine (0.4 mcg/min) drips. ECMO was started along with CRRT for anuria; deferoxamine was continued. WBI was stopped due to oral secretions and decreased bowel sounds. He developed coagulopathy (d-dimer 69,000, PTT 70.8, fibrinogen 78) and acidosis (lactate 4.8). Serum iron concentration decreased to 1,175 mcg/mL, and then 475 mcg/mL (after 80 % exchange transfusion). He developed abdominal compartment syndrome and underwent abdominal fasciotomy. On Day 3 his repeat serum iron concentration was 246 mcg/mL; BP 75/40 and HR 145. Visual inspection of bowel and liver showed edema; arterial pH was 6.096. Based on his poor prognosis the family opted for comfort measure and he died.

**Autopsy Findings:** Not performed.

#### Case 1649. Acute loperamide, atropine/diphenoxylate, trazodone ingestion: undoubtedly responsible

**Scenario/Substances:** A 23 y/o female was found unresponsive and cyanotic by her mother who started CPR and called 911. EMS transported to the ED.

**Past Medical History:** Anxiety, depression, hypertension. Patient was in the ED the day before for using high quantities of loperamide and diphenoxylate/atropine for opioid dependency. She was discharged home with clonidine patches.

**Laboratory/Diagnostic Findings:** Na 140/K 4.5/Cl 104/CO<sub>2</sub> 13/Cr 0.9, AG 23, Mg 2.4, ALT 82, bilirubin 0.3. Serum APAP and salicylate not detected. CxR: pulmonary edema. CT head: diffuse ischemic injury with edema. Repeat labs: AST 227, ALT 1188, ALP 169, K 2.5.

**Clinical Course:** She arrived in the ED with a wide complex tachycardia (HR 100s, QRS 120) and "good" BP. She was intubated and received naloxone (no response), 2 amps of sodium bicarbonate, magnesium and amiodarone. She became hypotensive (72/39). Almost 15 h later she remained unstable on epinephrine, norepinephrine and vasopressin drips; she was unresponsive off sedation. On Day 3 the patient was declared brain dead and she was transferred to the OR for organ donation.

**Autopsy Findings:** Cause of death: mixed drug toxicity. Post-mortem blood toxicology: desmethyloperamide 58 ng/mL, mCPP 65 ng/mL, trazodone 2.4 mcg/mL. Post-mortem urine toxicology positive for trazodone. Autopsy: acute transmural myocardial infarction, global hypoxic-ischemic

brain injury, acute bronchopneumonia with diffused alveolar damage, bilateral, intrapulmonary arterial thromboembolism; recent organ/tissue procurement.

#### Case 1657. Acute loperamide ingestion: undoubtedly responsible

**Scenario/Substances:** A 41 y/o female presented to the ED with weakness, dizziness and dyspnea.

**Past Medical History:** Depression, anxiety, opioid and cocaine abuse. Medications: mirtazapine, buspirone and gabapentin.

**Physical Exam:** Unresponsive, pupils 2 mm and sluggish, myoclonus in extremities. BP 97/61, HR 90, RR 20, O<sub>2</sub> sat 94% (100% FiO<sub>2</sub>), T 37 °C.

**Laboratory/Diagnostic Findings:** ABG- pH 7.39/pCO<sub>2</sub> 53/pO<sub>2</sub> 61/HCO<sub>3</sub> 31. Na 144/ K 4.0/Cl 105/CO<sub>2</sub> 31/BUN 23/Cr 1.6/Glu 151. AST 308, ALT 340, CK 11,112, lactate 8.5. Serum APAP, ethanol and salicylate not detected. ECG: HR 108, QRS 176, QTc 477.

**Clinical Course:** She went into cardiac arrest in the ED, had ROSC with ACLS but then lost pulses again, several times, over the next half hour. Thrombolytic was administered for presumptive pulmonary embolus. LE U/S was negative for deep vein thrombosis. Myoclonic jerking was noted, EEG revealed burst suppression. Bicarbonate drip was initiated (for QRS of 214 ms) and antibiotics were started. Her brother then reported that she was recently using 'a laxative' to get high, mother reportedly found empty loperamide boxes at home; a loperamide level was ordered (send out). On Day 2, myoclonus continued, QRS 120, QTc 594. On Day 3 MRI revealed diffuse ischemic injury and cerebral edema. Based on the prognosis, the family opted for comfort measures and she died on Day 11.

**Autopsy Findings:** Cause of death: anoxic encephalopathy due to loperamide intoxication. Loperamide and metabolite concentrations returned 'elevated.'

#### Case 1739. Acute diazepam, gabapentin, citalopram ingestion: undoubtedly responsible

**Scenario/substance:** A 12 y/o female was found unresponsive by family after last being seen normal the previous evening. She received 4 mg naloxone by EMS without response and was intubated on scene. Medications available at home: lorazepam, tramadol, gabapentin, losartan, hydrochlorothiazide, APAP, ibuprofen, atomoxetine, fluoxetine, montelukast and eszopiclone.

**Physical Exam:** BP 68/28, HR 98, RR 21, O<sub>2</sub> sat 31% on BVM, T 36.3 °C. She was unresponsive, pupils were 2 mm and sluggish. She had clonus in lower extremities with normal reflexes.

**Laboratory/Diagnostic Findings:** ABG- pH 7.11/pCO<sub>2</sub> 53/pO<sub>2</sub> 92/HCO<sub>3</sub> 17/BE -13. Na 141/K 3.4/Cl 107/CO<sub>2</sub> 19/BUN 19/Cr 1.72/Glu 243, AG 15. Lactate 7.3, AST 34, ALT 27, bilirubin 1.2. INR 1.3, ammonia 74. WBC 27.7/Hgb 12.5/Hct 37/PLT 424. Serum APAP, ethanol and salicylate not detected, UDS was positive for benzodiazepines. CxR and CT head were unremarkable. ECG: HR 120 with peaked T waves, QRS 84, QTc 497.

**Clinical Course:** The patient presented to the ED unresponsive and hypotensive with the ETT in her esophagus. She was re-intubated and started on vasopressors and IVFs, then transferred to a PICU. On arrival, the patient's HR was in the 140s; she was given sodium bicarbonate and antibiotics and placed on an EEG monitor. On Day 3, she developed episodes of bigeminy, increased oxygen requirements, fevers, acute kidney injury. The EEG was initially abnormal and then showed no brain activity. Brain MRI revealed severe anoxic brain injury. She was declared brain dead and died on Day 4.

**Autopsy Findings:** Urine collected in the ED showed diazepam 20 ng/mL, nordiazepam 68 ng/mL, oxazepam 32 ng/mL and temazepam 410 ng/mL. ED blood demonstrated gabapentin 1.5 mcg/mL. Antemortem peripheral blood drawn ~2 h from being found demonstrated citalopram 0.42 mg/L, diazepam 0.98 mg/L, gabapentin 24 mg/L, nordiazepam 0.067 mg/L; urine demonstrated benzodiazepines, caffeine, citalopram, gabapentin/pregabalin and ondansetron. Autopsy demonstrated cerebral edema with herniation, pulmonary edema and acute pneumonia. Cause of death: hypoxic ischemic encephalopathy due to respiratory failure due to diazepam and gabapentin toxicity.

#### Case 1879. Acute U-47700, para-fluorobutyl fentanyl and psychoactive benzodiazepines ingestion: undoubtedly responsible



**Scenario/Substances:** A 23 y/o male was seen somnolent and intermittently snoring. Later that day he was found apneic and cyanotic. CPR was started; EMS found him to be in PEA arrest. He was intubated, successfully resuscitated, and transported to the ED.

**Past Medical History:** 2 recent ED visits for headaches and back pain; he was discharged with prescriptions for hydrocodone and cyclobenzaprine.

**Physical Exam:** In the ED he was unresponsive, pupils were fixed and dilated. He had a frontal abrasion and hematoma. BP 60/40, HR 84, O<sub>2</sub> sat 100% (intubated), T 34°C.

**Laboratory/Diagnostic Findings:** VBG- pH 7.12/pCO<sub>2</sub> 58/pO<sub>2</sub> 67. Lactate 9.4, NA 146/K 6.7/CL 107/CO<sub>2</sub> 25/BUN 22/Cr 3.14/Glu 85, AG 14, AST 1,192, ALT 1,348, bilirubin 0.4, WBC 12.7/Hgb 11.6/HCT 39.4/PLT 225, troponin 1.9. UDS was positive for opiates, benzodiazepines and tricyclic antidepressants. CxR: aspiration pneumonia. CT head: cerebral edema with herniation.

**Clinical Course:** He was admitted to the ICU and required aggressive fluid resuscitation and vasopressors for hypotension. He was placed on a hypothermia protocol; his brainstem reflexes remained absent and he was declared brain dead. Based on the prognosis, comfort measures were instituted and he died on Day 2.

**Autopsy Findings:** Antemortem blood analysis: U-47700 5.2 ng/mL, flubromazepam 450 ng/mL, etizolam 29 ng/mL, delorazepam 82 ng/mL, diclazepam 33 ng/mL, para-fluorobutyl fentanyl/fluoroisobutyl fentanyl 5.8 ng/mL, oxycodone (free) 15 ng/mL. Cause of death: "U-47700 and para-fluorobutyl fentanyl/FIBF intoxication [and] psycho-active benzodiazepines."

#### **Case 1943. Unknown carfentanil, alprazolam and cocaine exposure: probably responsible**

**Scenario/ Substances:** A 26 y/o female was found in asystole by EMS. CPR, naloxone, epinephrine and bicarbonate were administered with ROSC prior to ED transport.

**Past Medical History:** Bipolar disorder, drug abuse.

**Physical Exam:** She was intubated with no spontaneous activity. Initial VS in the ICU: BP 105/92, HR 83, RR 22, O<sub>2</sub> Sat 100%, (FIO<sub>2</sub> 30%), T 31°C (prior to cooling).

**Laboratory/ Diagnostic Findings:** ABG- pH 7.22/pO<sub>2</sub> 291/pCO<sub>2</sub> 35/HCO<sub>3</sub> 14. Na 142/K 4.8/Cl 97/CO<sub>2</sub> 15/BUN 16/Cr 1.7/Glu 478, AG 30, AST 320, ALT 220, WBC 39/Hgb 10.8/Hct 35/PLT 348. Serum APAP, ethanol and salicylate not detected. UDS was negative. ECG: HR 99, QRS 90, QTc 439. CxR: bilateral pleural effusions and perihilar opacities.

**Clinical Course:** The patient was intubated upon arrival and started on a hypothermia protocol in the ICU. She received IVFs, sodium bicarbonate, analgesics, antibiotics and vasopressors. On Day 3 rewarming was completed. A brain perfusion scan was consistent with brain death. Based on the prognosis, comfort measures were instituted and she died on Day 4.

**Autopsy Findings:** Cause of death: anoxic encephalopathy from carfentanil intoxication; manner of death: accidental. Antemortem urine was positive for alpha-hydroxyalprazolam, benzoylecgonine and carfentanil. Antemortem blood testing was positive for alprazolam 15 ng/mL.

#### **Case 2034. Acute mitragyna speciosa korthals exposure: undoubtedly responsible**

**Scenario/Substances:** A 31 y/o male reportedly purchased Kratom capsules and poured the powder into cups. He was found dead by Sheriff's deputies.

**Autopsy Findings:** Post-mortem toxicology found: mitragynine: 990 ng/mL; positive for cyclobenzaprine, tramadol, quetiapine, 7-aminoclonazepam, morphine/codeine/laudanose.

#### **Case 2060. Acute methamphetamine ingestion: probably responsible**

**Scenario/Substances:** A 33 y/o male swallowed 3 g of methamphetamine to evade police detection. 2 d later he presented to the ED.

**Past Medical History:** Chronic substance abuse, prior overdose.

**Physical Exam:** He presented with paranoid ideation and agitated delirium. BP 128/86, HR 126, RR 24, T 37°C.

**Laboratory/Diagnostic Findings:** WBC 15, lactate 2.9, CK 215. UDS was positive for amphetamines, methamphetamines and benzodiazepines. Serum ethanol, salicylate and APAP were not detected. Subsequent labs: lactate 9.6, troponin 4.87, Cr 3.54, AST 815, ALT 326, CK 45,219, PLTs 43, fibrinogen <60, PTT >250, PT >120. EKG: ST at 128, QTc 580. CT head: negative. CxR: RUL infiltrate.

**Clinical Course:** He was treated with lorazepam 2 mg, haloperidol 8 mg and labetalol 20 mg IV. Just prior to transfer he was intubated with etomidate and rocuronium; received dextrose for a Glu of 7. He was transferred to a tertiary care center where he arrived with T 38.3°C, BP 84/50, HR 148 on norepinephrine drip at 4 mcg/h after 3 L NS. He also received activated charcoal, high dose insulin, methylene blue, Ca, sodium bicarbonate, vasopressin, epinephrine and phenylephrine, cryoprecipitate, fresh frozen plasma, PLTs and antibiotics. He developed acute respiratory failure with persistent hypotension, anuria, rhabdomyolysis and DIC. He was resuscitated from 2 cardiac arrests. Based on the prognosis, the family opted for institution of comfort measures and he died after a third cardiac arrest.

**Autopsy Findings:** A small (empty) plastic bag was found in the stomach. Cerebral and pulmonary edema were noted. Post mortem blood: methamphetamine 5.29 mg/L, amphetamines and etomidate detected, alprazolam 0.016 mg/L, midazolam 0.017 mg/L. Cause of death: methamphetamine toxicity.

#### **Case 2131. Acute-on-chronic: cocaine rectal: undoubtedly responsible**

**Scenario/Substances:** A 37-year-old male placed a bag containing ~1 g of cocaine into his rectum to evade police discovery. 6 h later, he tore the bag upon attempted removal and reported the event to authorities.

**Past Medical History:** Substance abuse.

**Physical Exam:** He was alert, calm and following commands upon ED arrival, with a surgery scar over his abdomen. Initial VS: BP 166/90, HR 86, RR 18, O<sub>2</sub> sat 96%, T 37°C.

**Laboratory/Diagnostic Findings:** Na 146/K 5.0/Cl 100/CO<sub>2</sub> 22/BUN 14/ Cr 1.57/Glu 71 /AG 24, AST 187, ALT 117.

**Clinical Course:** He initially refusal a rectal exam; received Mg citrate and remained asymptomatic. He was sleeping with normal VS 5 h later; no bowel movement. 2 h later, while on the commode, he was noted to be agitated with mumbling speech and spastic movements. He fell, striking his head, and developed repetitive seizures; he was treated with lorazepam. He developed wide complex PEA. He was intubated, received CPR, amiodarone, dextrose, calcium, bicarbonate and epinephrine, with ROSC after 20 minutes. He remained in status epilepticus and was treated with propofol, fosphenytoin and lorazepam. Numerous pieces of while chunky substance was removed from his rectum. He developed pulseless VT and died, ~15 h after insertion, despite resuscitation efforts.

**Autopsy Findings:** Two plastic bag fragments in lower bowel with white material adherent to rectal mucosa were found. Post mortem heart blood demonstrated benzodiazepines, cocaine metabolite, and levamisole. Post mortem iliac vein blood showed cocaine >2 mg/L, benzoylecgonine >4.0 mg/L, and lorazepam 0.067 mg/L. Cause of death: cocaine toxicity; manner of death: accidental.

#### **Case 2141. Unknown methamphetamine ingestion: undoubtedly responsible**

**Scenario/Substances:** A 37 y/o male ingested a large amount of methamphetamine for unknown reasons. Friends called EMS, who found him combative, diaphoretic and hyperthermic.

**Past Medical History:** Bipolar disorder, substance abuse, pancreatitis, GI bleed.

**Physical Exam:** BP 96.57, HR 180, RR 30, O<sub>2</sub> sat 90% (nasal catheter, 4L/min), T 40°C.

**Laboratory/Diagnostic Findings:** ABG- pH 7.24/pCO<sub>2</sub> 50/pO<sub>2</sub> 64/HCO<sub>3</sub> 22. K 7.3, CO<sub>2</sub> 18, BUN 23, Cr 2.88, AST 437, ALT 206, CK >22,000. UDS was positive for amphetamines and benzodiazepines.

**Clinical Course:** In the ED he was intubated and sedated with benzodiazepines, paralyzed and actively cooled, and received IVFs and empiric antibiotics. He developed multiple organ failure, rhabdomyolysis and shock liver (transaminases >1,000) and hypotension requiring vasopressors. CRRT was initiated for renal failure. Brain imaging demonstrated herniation and he died on Day 6.

**Autopsy Findings:** Blood analyses revealed the following: methamphetamine 4,600 ng/mL, amphetamine 170 ng/mL, lorazepam 22 ng/mL and lamotrigine 1.2 mcg/mL. Cause of death: "complications of methamphetamine abuse."

**Case 2615. Acute methamphetamine/amphetamine and hydrocarbon ingestion and aspiration: undoubtedly responsible**

*Scenario/Substances:* A 13 m/o male (7.7 kg) was found agitated and crying, with liquid on his face. Parents reported that he ingested aftershave.

*Physical Exam:* He presented to the ED somnolent with his eyes rolled back into his head. Initial VS: HR 132, RR 20, O<sub>2</sub> sat 98% (RA), T 36°C.

*Laboratory/Diagnostic Findings:* Na 133/K 4/CO<sub>2</sub> 20/BUN 6/Cr 0.2/Glu 194, AST 38, ALT 13, ALP 320. WBC 15/Hgb 11/Hct 33. Serum ethanol not detected. CxR: bilateral infiltrates.

*Clinical Course:* Upon arrival to the ED, he was tachypneic, foaming from his mouth, and developed multiple seizures unresponsive to lorazepam. He was intubated but became hypotensive and then went into cardiac arrest. He received CPR, IVFs, sodium bicarbonate and vasopressors. Resuscitation was unsuccessful and the patient died on Day 1.

*Autopsy Findings:* Blood toxicology: amphetamine 590 ng/mL, methamphetamine >1,000 ng/mL, lorazepam positive. No history of amphetamine prescription or exposure was reported by the parents.

**Abbreviations & normal ranges for narratives.** Disclaimer – all laboratories are different and provide their own normal ranges. Units and normal ranges are provided here for general guidance only. These values were taken from Harrison's [10], Goldfrank [11] or Dart [12].

Typical laboratory panels: ABG-pH/pCO<sub>2</sub>/pO<sub>2</sub>/HCO<sub>3</sub>/BE

Basic metabolic panel: Na/K/Cl/CO<sub>2</sub>/BUN/Cr/Glu/AG,

Complete blood count: WBC/Hgb/Hct/platelets,

**ABBREVIATIONS & NORMAL RANGES**

~	approximately ABG-pH/pCO <sub>2</sub> /pO <sub>2</sub> /HCO <sub>3</sub> /BE	BE	base excess, = base excess [ $\pm 2$ mEq/L or mmol/L]
ABG	arterial blood gases	bicarbonate	[22–26] mmol/L
pH	hydrogen ion concentration [7.38–7.42 mmHg]	bili (direct)	direct bilirubin [0.1, 0.4] mg/dL
pCO <sub>2</sub>	partial pressure of carbon dioxide [38–42 mmHg]	bili (indirect)	indirect bilirubin [0.2, 0.9] mg/dL
pO <sub>2</sub>	partial pressure of oxygen [90–100 mmHg]	bilirubin	total [0.3–1.3] mg/dL
HCO <sub>3</sub>	bicarbonate [22–28 mEq/L]	BIPAP	bilevel positive airway pressure, pressure support with 2 levels of continuous positive airway pressure
BE	base excess [ $\pm 2$ mEq/L or mmol/L]	BLQ	below the limit of quantitation
ACLS	advanced cardiac life support, protocol for the provision of cardiac resuscitation	BMI	body mass index
ADHD	attention deficit hyperactivity disorder	BNPT	prohormone with a 76 amino acid N-terminal inactive protein that is cleaved from the molecule to release brain natriuretic peptide. CHF is likely if BNPT >125 pg/mL (<75 y/o), >450 pg/mL (>75 y/o),
AF	atrial fibrillation	body packing	insertion of drugs into body orifices to evade law enforcement
AG	anion gap Na – (Cl + HCO <sub>3</sub> ) [12 $\pm$ 4 mEq/L or mmol/L]	body stuffing	the ingestion of drugs in order to evade law enforcement
AICD	automatic implanted cardioresuscitator	BP	Blood Pressure, systolic/diastolic, (Torr)
AKI	acute kidney injury	BPH	benign prostatic hypertrophy
ALP	alkaline phosphatase [13–100] U/L	BUN	see Urea nitrogen
ALT	Alanine aminotransferase [7–41] U/L = (SGPT)	C	degrees Centigrade
AMA	against medical advice	Ca (ionized)	ionized calcium, [4.5–5.6] mg/dL
ammonia	[25–80] mcg/dL	Ca	calcium [8.7–10.2] mg/dL
	[15–47] mcmol/L	CABG	coronary artery bypass graft
amp	ampoule	CAD	coronary artery disease
amphetamines		CHF	congestive heart failure
(hallucinogenic)	one or more of the products (6-APB, bath salts, plant food, Bliss, Ivory Wave, Purple Wave, Vanilla Sky, et al) or chemicals (3,4 methylenedioxypyrovalerone [MDPV], 6-(2-aminopropyl)benzofuran [6-APB], butylone, desoxypipradrol [2-DPMP], ethylone, flephedrone, naphyrone, mephedrone, methylenedioxypyrovalerone, methylone, methcathinone, et al)	CIWA	Clinical Institute Withdrawal Assessment for Alcohol
AMS	altered mental status	CK	creatinine kinase (CPK), total: [39–238] U/L females, [51–294] U/L males
APAP	acetaminophen (acetyl-para-aminophenol), therapeutic [10–20] mcg/mL	CKMB	MB fraction of CK [0.0–5.5 mcg/L = 0.0–5.5 ng/mL]
APLS	advanced pediatric life support, protocol for the provision of cardiac resuscitation	CI	Fraction of total CK activity [0–0.04 = 0–4.0%]
aPTT	activated partial thromboplastin time [30–40] sec	CMV	chloride [102–109] mEq/L
ARDS	acute respiratory distress syndrome	CNS	cytomegalovirus
AST	Aspartate aminotransferase [12–38] U/L = (SGOT)	COHb	central nervous system
AV block	atrio-ventricular block	COPD	carboxyhemoglobin (RR < 3%)
BAL	British anti-Lewisite	CPAP	chronic obstructive pulmonary disease
		CPR	continuous positive airway pressure
		Cr	cardio pulmonary resuscitation
		CRRT	creatinine [0.5–0.9] mg/dL females, [0.6–1.2] males,
		CSF	continuous renal replacement therapy
		CT	cerebrospinal fluid
		CVA	computed tomography (CAT scan)
		CVVH	cerebrovascular accident
		CxR	continuous venovenous hemodiafiltration
		D10W	chest radiograph, chest xray
		D50W	10% dextrose in water
		D5NS	50% dextrose in water
		D5W	5% dextrose in normal saline
		Day	5% dextrose in water
		DIC	when capitalized, Day = hospital day, i.e., days since admission to the initial hospital admission for this exposure
		DM	disseminated intravascular coagulation
		DNI	diabetes mellitus
		DNR	do not intubate
		drip	do not resuscitate
		Dx	intravenous infusion
		ECG	diagnosis
		ECHO	electrocardiogram (EKG), leads = I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6
		ECMO	echocardiogram
		ED	extracorporeal membrane oxygenation
		EDDP	emergency department, in these abstracts refers to the initial health care facility
		EEG	principal methadone metabolite, 2-ethylidene-1,5-dimethyl-3,3-diphenylpyrrolidine
		EGD	electroencephalogram
		ELISA	esophagogastroduodenoscopy
		EMS	enzyme-linked immunosorbent assay
			emergency medical services, paramedics, the first responders

ER	extended release medication	MRI	Magnetic Resonance Imaging
ETT	endotracheal tube	MRSA	Methicillin-resistant <i>Staphylococcus aureus</i>
FFP	fresh frozen plasma	ms	milliseconds
FiO <sub>2</sub>	fraction of inspired oxygen (%)	MSDS	material safety data sheet
g	grams	Na	sodium [136–146] mEq/L
g/dL	grams per deciliter	NAC	n-acetyl cysteine
GCS	Glasgow Coma Score, ranges from 3 to 15	Narrative	
GERD	gastroesophageal reflux disease	Headers:	Scenario/Substances: concise narrative of EMS & pre-HCF events
GI	gastrointestinal		Past Medical History: available relevant past medical history
Glu	glucose, fasting [75–110] mg/dL		Physical Exam: initial physical exam if available
h	hours		Laboratory/Diagnostic Findings: initial results, give units except for units given in abbreviations
HBO	hyperbaric oxygen treatment/therapy		Clinical Course: concise narrative of HCF & beyond with outcome Autopsy Findings medical examiner and/or autopsy results
HCF	health care facility		
HCG	human chorionic gonadotropin test for pregnancy		
HCO <sub>3</sub>	bicarbonate [22–28 mEq/L]		
HCP	health care provider		
Hct	hematocrit [35.4–44.4] females, [38.8–46.4] males	NG	nasogastric
HD	hemodialysis	ng/mL	nanograms per milliliter
Hgb	hemoglobin [12.0–15.8] g/dL females, [13.3–16.2] g/dL males	NOS	not otherwise specified
		not detected	analyte below the level of quantitation, negative
HIE	hyperinsulinemia-euglycemia therapy	NPO	nil per os, nothing by mouth
HIV	human immunodeficiency virus	NRB	non rebreathing mask for O <sub>2</sub> delivery
Hour	when capitalized, Hour=hours since admission or since exposure as specified in the narrative	NS	normal saline
		NSTEMI	non-ST segment elevation myocardial infarction
HR	HR, beats per min	O <sub>2</sub> sat	oxygen percent saturation [94–100]% at sea level
IABP	intraortic balloon pump	OG	serum osmol gap=measured serum osmolality – calculated serum osmolality [0 ± 10 mOsmol/kg]
ICP	intracranial pressure		operating room
ICU	intensive care unit	OR	osmole
IDDM	insulin dependent diabetes mellitus	Osm	pediatric advanced life support
IgE	immunoglobulin E	PALS	poison center (=PCC, or Poison Control Center)
ILE	intravenous lipid emulsion (20%)	PC	prothrombin complex concentrate
IM	intramuscular	PCC	primary care provider
INR	international normalized ratio (PT to control) [0.8–1.2]	PCP	pulseless electrical activity
IO	intraosseous	PEA	positive end expiratory pressure
IU/L	international units per Liter	PEEP	phosphate (phosphorous) [2.5–4.5] mg/dL
IV	intravenous	Phos	pediatric intensive care unit
IVF	intravenous fluid(s)	PICU	platelet count [150–400] × 10 <sup>9</sup> /L
K	potassium [3.5–5] mEq/L	PLT	per os (“by mouth” in Latin)
kg	kilogram	PO	parts per million
L	Liter	Ppm	P-R interval [120–200] msec on the ECG
lactate	lactic acid [4.5–14.4] mg/dL arterial, [4.5–19.8] mg/dL venous	PR	as needed
	[0.5–1.6] mmol/L arterial, [0.5–2.2] mmol/L venous	PRN	prothrombin time, INR is preferred, but PT may be used if INR is not available
		PT	Prior to admission
LBBB	left bundle branch block on ECG	PTA	post-traumatic stress disorder
LFT	liver function tests	PTSD	partial thromboplastin time [26.3–39.4] sec
LVEF	left ventricular ejection fraction	PTT	premature ventricular contraction
m/o	months old	PVC	ECG QRS complex duration [60–100] msec
MAP	mean arterial pressure	QRS	Q to T interval on the ECG waveform, varies with HR
mcg/dL	micrograms per deciliter	QT	QT interval corrected for HR, usually QTcB = QT/RR <sup>1/2</sup>
mcg/L	micrograms per Liter	QTc	(Bazett correction) 1–15 y-o [<440] msec, adult male [<430] msec, adult female [<450] msec
mcg/min	micrograms per minute		
mcg/mL	micrograms per milliliter		
mcmol/L	micromoles per liter		
MDA	3,4-methylenedioxymphetamine	RBBB	right bundle branch block on ECG
MDMA	methylenedioxymphetamine (ecstasy, molly)	RBC	red blood cell(s)
ME	medical examiner	ROSC	return of spontaneous circulation
MetHgb	methemoglobin (RR <1%)	RPC	regional poison center
Mg	magnesium [1.5–2.3] mg/dL	RR	respiratory rate, breaths per minute
mg	milligrams	s/p	status post
mg/dL	milligrams per deciliter	salicylate	aspirin, acetylsalicylic acid, therapeutic [15–30] mg/dL
mg/kg	milligrams per kilogram	SBP	systolic blood pressure
mg/L	milligrams per Liter	sec	seconds
min	minutes	SL	sublingual
ml	milliliter	SVT	supraventricular tachycardia
mmol	millimoles	T (oral)	Temperature (oral) [36.4, 37.2]°C or
mmol/L	millimoles per Liter (previously mEq/L)	T (rectal)	Temperature (rectal) [36.4, 37.2]°C or
mmol/L	millimoles per Liter	T (tympenic)	Temperature (tympenic) [36.4, 37.2]°C
mosm/kg	milliosmoles per kilogram	TBSA	total body surface area
mosm/L	milliosmoles per Liter	THC	tetrahydrocannabinol

THC Homolog	one or more of the products (Blaze, Dawn, herbal incense, K2, Red X, spice, et al) or chemicals (cannabicyclohexanol, CP-47,497, JWH-018, JWH-073, JWH-200, et al)	WBI WNL y/o	whole bowel irrigation within normal limits year old
TPN	total parenteral nutrition		
Tprot	total protein		
troponin	troponin I, normal range [0–0.08] ng/mL, Cut-off for MI > 0.04 ng/mL		
TTE	transthoracic echocardiogram		
U	units		
U/dL	units per deciliter		
U/L	units per liter		
U/mL	units per milliliter		
UA	urinalysis		
UDS	urine drug screen		
Urea nitrogen (BUN)	[6–17] mg/dL		
VBG	venous blood gases		
VF	ventricular fibrillation		
VSD	ventricular septal defect		
VT	ventricular tachycardia		
WBC	white blood cell (leukocyte) count [3.54–9.06] $10^3/\text{mm}^3$		

**APPENDIX D**

## APPENDIX E

Table 21. Listing of fatal nonpharmaceutical and pharmaceutical exposures.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
<b>Non-Pharmaceutical Exposures</b>										
<b>Alcohols</b>										
1ai	18 y M	ethanol	1	1	U	Unk	Int-A	1		
2ai	23 y M	ethanol	1	1	U	Unk	Int-A	2		
3ha	24 y F	methanol	1	1	A	Ingst	Int-U	1		
4ai	24 y M	ethanol	1	1	U	Ingst	Int-A	3		
5ha	25 y M	methanol	1	1	U	Ingst + Par	Int-S	1	methanol	132 mg/dL In Plasma @ 33 h (pe)
		methanol	1	1					methanol	172 mg/dL In Plasma @ 24 h (pe)
		methanol	1	1					methanol	500 mg/dL In Plasma @ Unknown
		propofol	2	2						
6ai	25 y M	ethanol	1	1	C	Ingst + Unk	Int-A	1		
		caffeine	2	2						
7ai	26 y M	ethanol	1	1	U	Unk	Int-A	1		
		THC homolog, 5F-AMB-PICA	2	2						
8ai	27 y F	ethanol	1	1	U	Ingst + Unk	Int-A	3		
		methanol	2	2						
		diphenhydramine	3	3						
9ai	27 y F	ethanol	1	1	U	Ingst + Unk	Unk	2		
		oxycodone	2	2						
		hydrocodone	3	3						
10ai	28 y M	ethanol	1	1	U	Ingst + Unk	Int-A	1		
		oxycodone	2	2						
		oxymorphone	3	3						
11h	30 y F	ethanol	1	1	A	Ingst	Int-S	3	ethanol	511 mg/dL In Blood (unspecified) @ Unknown
		drug, unknown	2	2						
12h	31 y F	methanol	1	1	A	Oth	Int-S	1	methanol	11 mg/dL In Blood (unspecified) @ 3 d (pe)
		methanol	1	1					methanol	119 mg/dL In Blood (unspecified) @ 1 d (pe)
		methanol	1	1					methanol	190 mg/dL In Blood (unspecified) @ 26 h (pe)
		methanol	1	1					methanol	573 mg/dL In Blood (unspecified) @ 9 h (pe)
13ph	31 y M	ethanol	1	1	U	Unk	Unk	3		
14h	32 y M	ethanol	1	1	A	Ingst	Unk	3	ethanol	164 mg/dL In Serum @ 1 h (pe)
		drug, unknown	2	2						
15ai	32 y M	ethanol	1	1	U	Unk	Int-A	2		
16ai	32 y F	ethanol	1	1	U	Unk	Int-S	1		
		gabapentin	2	2						
		hydroxyzine	3	3						
17ai	34 y F	ethanol	1	1	U	Unk	Unk	2		
		fluoxetine	2	2						
		dextromethorphan	3	3						
18ai	35 y M	ethanol	1	1	U	Ingst + Unk	Int-A	2		
		methamphetamine	2	2						
		amphetamine	3	3						
21ai	36 y M	ethanol	1	1	U	Unk	Int-A	2		
		sertraline	2	2						
		oxycodone	3	3						
20ai	36 y F	ethanol	1	1	C	Ingst + Unk	Int-A	3		
		diphenhydramine	2	2						
		ibuprofen	3	3						
19ai	36 y F	ethanol	1	1	U	Unk	Int-A	1		
		diazepam	2	2						
		clonidine	3	3						
22ha	37 y M	methanol	1	1	A	Ingst	Int-S	1	methanol	152 mg/dL In Blood (unspecified) @ 10 h (pe)
		methanol	1	1					methanol	32 mg/dL In Blood (unspecified) @ 29 h (pe)

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ③ Time
23ai	37 y M				U	Unk	Int-A	2		
24ai	37 y M	ethanol	1	1	U	Unk	Int-A	1		
		ethanol	1	1						
		cocaine	2	2						
		fentanyl	3	3						
25h	38 y M	ethanol	1	1	C	Ingst	Unk	3		
26h	39 y M	ethanol	1	1	A	Ingst	Int-S	1	methanol	566 mg/dL In Blood (unspecified) ③ Unknown
		methanol	1	1						
27ph	39 y M	ethanol (non-beverage)	2	2	U	Ingst	Int-A	2	ethanol	228 mg/dL In Blood (unspecified) ③ 30 m (pe)
		ethanol	1	1						
		narcotic, other/unknown	2	2						
28h	39 y F	ethanol	1	1	A	Ingst	Int-A	2	ethanol	416 mg/dL In Blood (unspecified) ③ Unknown
		hair spray	2	2						
		ethanol (non-beverage)	3	3						
29ai	39 y M	ethanol	1	1	U	Unk	Int-A	2		
30ai	40 y M	ethanol	1	1	U	Unk	Int-A	2		
31ai	40 y M	ethanol	1	1	U	Ingst	Int-A	3		
32ai	40 y M	ethanol	1	1	U	Unk	Int-A	2		
33pha	41 y F	ethanol	1	1	A/C	Ingst	Unk	2	ethanol	0.117 g/dL In Blood (unspecified) ③ Autopsy
		ethanol	1	1					ethanol	165 mg/dL In Vitreous ③ Autopsy
		ethanol	1	1					ethanol	372 mg/dL In Blood (unspecified) ③ 1 h (pe)
34	42 y M	acetaminophen	2	2	A	Ingst + Inhal	Int-M	2		
		ethanol	1	1						
		cocaine	2	2						
35ai	43 y M	ethanol	1	1	C	Ingst + Unk	Int-A	2		
		chlordiazepoxide	2	2						
		diazepam	3	3						
36ai	43 y M	ethanol	1	1	U	Unk	Int-A	1		
		bupropion	2	2						
		carbamazepine	3	3						
38ai	43 y M	ethanol	1	1	U	Unk	Int-A	1		
		heroin	2	2						
		oxycodone	3	3						
39ai	43 y M	ethanol	1	1	U	Unk	Int-A	2		
		chlordiazepoxide	2	2						
40ai	43 y M	ethanol	1	1	U	Unk	Int-A	1		
37ai	43 y M	ethanol	1	1	U	Unk	Int-M	3		
41ai	44 y M	ethanol	1	1	U	Unk	Int-A	1		
		fentanyl	2	2						
		morphine	3	3						
42i	44 y F	ethanol	1	1	C	Ingst	Int-A	2		
43ai	44 y M	ethanol (non-beverage)	1	1	U	Unk	Int-A	1		
		oxycodone	2	2						
44ai	45 y F	ethanol	1	1	U	Unk	Int-A	2		
		hydrocarbon (fluorinated)	2	2						
46ai	45 y M	ethanol	1	1	U	Unk	Int-A	2		
		hydroxyzine	2	2						
		trazodone	3	3						
45ai	45 y M	ethanol	1	1	U	Unk	Int-A	3		
47ai	46 y F	ethanol	1	1	U	Unk	Int-M	1		
		alprazolam	2	2						
		morphine	3	3						
48ai	46 y M	ethanol	1	1	C	Unk	Int-A	2		
		citalopram	2	2						
49ai	47 y M				U	Unk	Int-A	1		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
50pha	47 y F	ethanol	1	1	A	Ingst	Int-A	1		
		heroin	2	2						
		methamphetamine	3	3						
51ha	48 y M	ethanol	1	1	A	Ingst	Int-U	2	ethanol	380 mg/dL In Blood (unspecified) @ Autopsy
		ethanol	1	1					ethanol	552 mg/dL In Serum @ 5 m (pe)
		ethylene glycol	2	1						498 mcg/dL In Blood (unspecified) @ Unknown
52h	48 y M	ethanol	1	1	C	Ingst	Int-A	3	ethanol	150 mg/dL In Blood (unspecified) @ Unknown
		acetaminophen	2	2						
53ai	48 y M	ethanol	1	1	U	Ingst	Int-A	2		
54ai	48 y M	alcohol, unknown	1	1	U	Ingst	Int-A	1		
55ai	48 y M	ethanol	1	1	U	Unk	Int-A	1		
56ai	48 y M	hydrocodone	2	2						
		alprazolam	3	3						
57ph	49 y F	ethanol	1	1	A/C	Oth	AR-D	3		
		heroin	2	2						
60ai	49 y F	ethanol	1	1	U	Unk	Int-S	1		
		alprazolam	2	2						
59ai	49 y M	ethanol	1	1	C	Unk	Int-A	3		
61ai	49 y M	ethanol	1	1	U	Unk	Int-A	2		
62ai	49 y F	diphenhydramine	1	1	U	Unk	Int-A	3		
		acetaminophen	2	2						
58ai	49 y M	ethanol	1	1	U	Unk	Int-A	2		
63ai	50 y M	ethanol	1	1	U	Unk	Int-A	3		
64ai	51 y F	ethanol	1	1	U	Unk	Unk	2		
65ai	51 y M	methanol	1	1	U	Unk	Int-A	2		
		ethanol	2	2						
		fentanyl	3	3						
66ai	51 y M	ethanol	1	1	C	Unk	Int-A	3		
		diphenhydramine	2	2						
		promethazine	3	3						
67ai	51 y M	ethanol	1	1	U	Unk	Int-A	1		
68ai	51 y F	ethanol	1	1	A	Ingst + Unk	Int-A	1		
		benzodiazepine	2	2						
69pi	52 y M	ethanol	1	1	A	Ingst	Unk	2	ethanol	412 mg/dL In Serum @ Unknown
		fentanyl	2	2						
		oxycodone	3	3						
70ai	52 y M	ethanol	1	1	C	Ingst + Unk	Int-A	3		
71ai	52 y M	alcohol, unknown	1	1	U	Ingst	Int-U	2		
		alprazolam	2	2						
		morphine	3	3						
72ai	52 y F	ethanol	1	1	A	Ingst	Int-A	3		
73ai	52 y M	ethanol	1	1	U	Unk	Int-A	2		
74h	52 y F	isopropanol	1	1	A/C	Ingst	Int-S	3	ethanol	173 mg/dL In Serum @ Unknown
		methamphetamine	2	2						
75h	53 y M	ethanol	1	1	A	Ingst	Int-S	2	ethanol	201 mg/dL In Blood (unspecified) @ Unknown
76ai	53 y M	ethanol	1	1	U	Unk	Int-A	3		
77a	53 y F	ethanol	1	1	A/C	Ingst	Int-S	3	ethanol	135 mg/dL In Blood (unspecified) @ 30 m (pe)
78ai	53 y F				C	Ingst	Int-A	2		

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
80ai	53 y F	ethanol	1	1	U	Unk	Int-A	2		
79ai	53 y M	ethanol	1	1	U	Unk	Int-A	1		
		ethanol	1	1						
		fentanyl	2	2						
		cocaine	3	3						
81ai	53 y M	ethanol	1	1	C	Unk	Int-A	2		
82h	54 y M	methanol	1	1	U	Ingst	Int-S	2		
84ai	54 y M	ethanol	1	1	U	Unk	Int-A	1		
		oxycodone	2	2						
83ai	54 y M	ethanol	1	1	U	Unk	Int-A	2		
85h	55 y M	methanol	1	1	A	Ingst	Int-U	1	methanol	72 mg/dL In Blood (unspecified) @ Unknown
86ai	55 y M	ethanol	1	1	U	Unk	Int-A	3		
87ai	55 y M	ethanol	1	1	U	Unk	Int-A	2		
		fentanyl	2	2						
		oxycodone	3	3						
88ai	56 y M	alcohol, unknown	1	1	U	Ingst	Int-A	1		
89ph	57 y F	methanol	1	1	A	Ingst	Unk	1	methanol	432 mg/dL In Blood (unspecified) @ Unknown
		metformin	2	2						
90h	57 y F	ethanol	1	1	U	Ingst	Int-A	2		
		acetaminophen	2	2						
91ai	57 y M	ethanol	1	1	U	Unk	Int-A	2		
		alprazolam	2	2						
		diazepam	3	3						
94ai	58 y F	ethanol	1	1	C	Unk	Int-A	2		
93ai	58 y M	ethanol	1	1	U	Unk	Int-A	2		
		oxycodone	2	2						
		methadone	3	3						
92hai	58 y M	ethanol	1	1	U	Unk	Int-A	1		
		fentanyl	2	2						
95ai	58 y F	ethanol	1	1	U	Unk	Int-A	3		
96ai	58 y M	ethanol	1	1	U	Unk	Int-S	2		
		oxycodone	2	2						
		methamphetamine	3	3						
97ai	58 y M	ethanol	1	1	U	Unk	Int-A	3		
		alprazolam	2	2						
		trazodone	3	3						
98ai	59 y M	ethanol	1	1	U	Unk	Int-A	3		
99ai	59 y M	ethanol	1	1	U	Unk	Int-A	3		
		methamphetamine	2	2						
100ai	59 y F	ethanol	1	1	U	Ingst	Int-A	1		
101	60 y M	methanol	1	1	A	Ingst	Unk	1	methanol	19 mg/dL In Blood (unspecified) @ 24 h (pe)
		methanol	1	1					methanol	191 mg/dL In Blood (unspecified) @ Unknown
		methanol	1	1					methanol	32 mg/dL In Blood (unspecified) @ 12 h (pe)
102ha	60 y M	ethanol	1	1	A	Ingst	Int-A	3	ethanol	40 mg/dL In Blood (unspecified) @ Unknown
103ph	60 y M	ethanol	1	1	C	Unk	Unk	2		
104ai	60 y F	ethanol	1	1	U	Unk	Int-A	2		
		methamphetamine	2	2						
105ai	61 y M	ethanol	1	1	U	Ingst + Unk	Int-A	2		
		cocaine	2	2						
		tramadol	3	3						
107ai	61 y M				U	Ingst + Unk	Int-A	3		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
106ai	61 y M	ethanol	1	1	C	Ingst	Int-A	3		
		hydromorphone	2	2						
		gabapentin	3	3						
108h	62 y M	ethanol	1	1	U	Unk	Unk	2		
		narcotic, other/unknown	2	2						
109ai	62 y M	ethanol	1	1	U	Unk	Int-A	3		
110ai	62 y F	ethanol	1	1	U	Ingst	Int-A	3		
111ai	62 y F	ethanol	1	1	U	Unk	Int-M	3		
		ethanol	1	1						
112ha	62 y M	ethanol (denatured)	1	1	U	Ingst	Unk	3		
113ai	62 y M	isopropanol	2	2	C	Unk	Unk	3		
		ethanol	1	1						
114ha	63 y F	ethanol	1	1	U	Ingst	Unk	3		
		alcohol, unknown	1	1						
		alcohol, unknown	1	1						
115ai	63 y F	propofol	2	2	U	Unk	Int-A	1		
		drug, anticholinergic	3	3						
		ethanol	1	1						
116ai	63 y M	ethanol	1	1	U	Ingst	Int-A	2		
117ha	64 y M	ethanol	1	1	C	Ingst + Aspir	Int-A	3		
		ethanol	1	1						
118ai	64 y F	hand sanitizer (ethanol)	2	2	U	Unk	Int-S	2		
		ethanol	1	1						
120ai	65 y M	drug, unknown	2	2	C	Unk	Int-A	2		
		ethanol	1	1						
121ai	65 y M	hydromorphone	2	2	U	Unk	Int-A	2		
		carisoprodol	3	3						
		ethanol	1	1						
119ai	65 y F	citalopram	2	2	U	Unk	Unk	2		
		ethanol	1	1						
122ai	66 y M	diazepam	2	2	U	Ingst + Unk	Int-A	2		
		ethanol	1	1						
123ai	66 y M	isopropanol	2	2	C	Ingst	Int-A	3		
		amphetamine	3	3						
		ethanol	1	1						
124ai	69 y F	ethanol	1	1	U	Unk	Int-A	3		
		citalopram	2	2						
125ai	70 y F	ethanol	1	1	U	Ingst + Unk	Int-S	1		
		morphine	2	2						
127ai	71 y M	ethanol	1	1	U	Unk	Int-M	3		
126ai	71 y F	ethanol	1	1	C	Unk	Int-A	3		
		ethanol	1	1						
128ai	73 y F	ethanol	1	1	U	Unk	Int-A	2		
		ethanol	1	1						
		cyclobenzaprine	2	2						
129ai	73 y M	butalbital	3	3	C	Ingst	Int-A	3		
		ethanol	1	1						
131ai	75 y M	ethanol	1	1	U	Unk	Int-A	3		
130ai	75 y M	ethanol	1	1	C	Unk	Int-A	3		
		ethanol	1	1						
132i	Unknown age F	ethanol	1	1	U	Ingst	Oth-M	2		
See Also case 135, 144, 147, 157, 178, 258, 260, 261, 263, 285, 286, 302, 329, 346, 355, 358, 363, 375, 386, 388, 402, 415, 418, 419, 429, 441, 461, 462, 476, 485, 487, 491, 492, 496, 508, 515, 516, 526, 533, 535, 539, 543, 548, 550, 566, 570, 579, 588, 589, 590, 591, 598, 606, 610, 632, 635, 641, 646, 648, 650, 661, 662, 668, 672, 673, 674, 676, 677, 682, 685, 686, 690, 697, 698, 712, 721, 723, 730, 735, 738, 740, 741, 746, 748, 750, 757, 764, 772, 774, 779, 792, 799, 805, 810, 819, 823, 824, 845, 850, 853, 863, 864, 868, 876, 879, 886, 889, 891, 897, 899, 914, 925, 932, 938, 941, 942, 947, 954, 957, 967, 969, 971, 974, 988, 989, 990, 992, 1025, 1043, 1052, 1056, 1057, 1062, 1068, 1076, 1077, 1084, 1090, 1106, 1145, 1153, 1160, 1161, 1162, 1163, 1164, 1191, 1204, 1207, 1215, 1217, 1220, 1227, 1228, 1231, 1235, 1240, 1247, 1252, 1254, 1255, 1257, 1259, 1261, 1274, 1276, 1277, 1279, 1283, 1288, 1293, 1301, 1305, 1312, 1314, 1327, 1335, 1336, 1347, 1354, 1362, 1364, 1365, 1371, 1386, 1389, 1390, 1400, 1412, 1417, 1418, 1423, 1424, 1428, 1435, 1438, 1439, 1443, 1446, 1458, 1462, 1486, 1489, 1494, 1497, 1498, 1499, 1500, 1504, 1507, 1512, 1513, 1530, 1533, 1534, 1536, 1559, 1629, 1642, 1648, 1651, 1654, 1664, 1669, 1686, 1687, 1706, 1711, 1714, 1721, 1723, 1725, 1742, 1744, 1753, 1757, 1759, 1763, 1764, 1767, 1770, 1780, 1783, 1794, 1803, 1808, 1809, 1854, 1855, 1859, 1885, 1890, 1893, 1894, 1898, 1901, 1918, 1920, 1923, 1932, 1937, 1952, 1971, 1972, 1974, 1984, 1999, 2014, 2015, 2032, 2035, 2045, 2046, 2051, 2061, 2081, 2085, 2096, 2097, 2105, 2108, 2111, 2121, 2123, 2126, 2135, 2137, 2146, 2156, 2164, 2166, 2171, 2172, 2182, 2184, 2187, 2190, 2193, 2200, 2202, 2204, 2208, 2215, 2226, 2234, 2236, 2240, 2256, 2259, 2261, 2264, 2266, 2278, 2286, 2287, 2298, 2308, 2314, 2326, 2327, 2329, 2330, 2332, 2336, 2337, 2340, 2351, 2359, 2375, 2389, 2390, 2393, 2396, 2399, 2404, 2405, 2407, 2412, 2414, 2420, 2425, 2430, 2440, 2441, 2444, 2466, 2479, 2487, 2502, 2525, 2529, 2530, 2535, 2537, 2542, 2551, 2558, 2567, 2570, 2587, 2593, 2595, 2596, 2606, 2609, 2611, 2640, 2644, 2647, 2653, 2659, 2662										
Arts/Crafts/Office Supplies										
[133ha]	53 y M				A	Ingst	Unt-G	1		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
		hydrofluoric acid	1	1						
Automotive/Aircraft/Boat Products										
134h	28 y M				A	Ingst	Int-S	1		
		ethylene glycol (antifreeze)	1	1					ethylene glycol	1408 mg/L In Serum @ Unknown
135	32 y M				A	Ingst	Int-S	1		
		ethylene glycol (antifreeze)	1	1					ethylene glycol	1000 mg/dL In Blood (unspecified) @ 34 h (pe)
		ethanol	2	2						
[136h]	35 y M				A	Ingst	Int-A	1		
		ethylene glycol/methanol	1	1					methanol	620 mg/dL In Blood (unspecified) @ Unknown
137pa	36 y M				U	Ingst	Unk	1		
		ethylene glycol (antifreeze)	1	1					ethylene glycol	0 mg/dL In Blood (unspecified) @ 1 h (pe)
138h	44 y M				A	Ingst	Int-S	2		
		ethylene glycol (antifreeze)	1	1						
139pai	48 y F				U	Ingst	Int-S	1		
		ethylene glycol (antifreeze)	1	1						
140ph	50 y M				A	Ingst	Int-S	2		
		ethylene glycol (antifreeze)	1	1						
141h	53 y M				A/C	Ingst	Unk	3		
		ethylene glycol (antifreeze)	1	1					ethylene glycol	13 mg/dL In Serum @ Unknown
		acetaminophen	2	2						
142	54 y F				A	Ingst	Int-S	1		
		ethylene glycol (antifreeze)	1	1					ethylene glycol	36 mg/dL In Blood (unspecified) @ Unknown
143ha	55 y M				A	Ingst	Int-M	1		
		ethylene glycol (antifreeze)	1	1					ethylene glycol	72 mg/dL In Blood (unspecified) @ Unknown
		methanol	2	2					methanol	289 mg/dL In Blood (unspecified) @ Unknown
144	57 y M				C	Ingst	Int-S	2		
		methanol	1	1						
		ethanol (non-beverage)	2	2						
145	65 y M				A	Ingst	Unk	2		
		ethylene glycol (antifreeze)	1	1						
146ha	68 y M				A	Ingst	Int-S	2		
		ethylene glycol (antifreeze)	1	1						
147	68 y M				A	Ingst	Int-S	2		
		ethylene glycol (antifreeze)	1	1						
		venlafaxine	2	2						
		ethanol	3	3					ethanol	236 mg/dL In Serum @ Unknown
		glyphosate	4	4						
		drain cleaner (alkali)	5	5						
148h	69 y F				A	Ingst	Int-S	1		
		ethylene glycol (antifreeze)	1	1					ethylene glycol	225 mg/dL In Blood (unspecified) @ Unknown
149h	91 y F				A	Ingst	Unt-G	3		
		ethylene glycol (antifreeze)	1	1					ethylene glycol	11 mg/dL In Blood (unspecified) @ 1 h (pe)
See Also case 305										
Batteries										
[150h]	2 y F				A	Ingst	Unt-G	1		
		battery, disc	1	1						
Bites and Envenomations										
[151h]	29 y M				A	B-S	Unt-B	1		
		envenomation (crotalinae)	1	1						
[152pha]	31 y M				A	B-S	Unt-B	1		
		envenomation (crotalinae)	1	1						
153p	35 y M				A	B-S	Unt-B	1		
		sting (hymenoptera)	1	1						
[154ph]	53 y M				A	B-S	Unt-B	3		
		ant, fire ant	1	1						
Building and Construction Products										
[155h]	59 y M				A	Derm	Unt-E	1		
		calcium hydroxide	1	1						
Chemicals										
[156ha]	19 y M				A	Par + Oth	Int-M	1		
		silicone	1	1						
157	31 y F				A	Ingst	Int-S	2		
		ethylene glycol	1	1						
		ethanol	2	2						
[158a]	35 y F				A	Par	Oth-M	1		
		cyanide	1	1					cyanide	3.4 mcg/mL In Blood (unspecified) @ 1 h (pe)
		cyanide	1	1					cyanide	4.053 mg/L In Blood (unspecified) @ 4 h (pe)
159ai	35 y M				U	Unk	Int-S	1		
		sodium azide	1	1						
160h	36 y M				A	Ingst	Int-S	1		
		sulfuric acid	1	1						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
161pi	37 y M				U	Ingst	Int-S	2		
162ha	37 y M	sodium azide	1	1	A	Ingst	Int-S	1		
163ph	37 y M	sodium azide	1	1	A	Inhal	Int-A	2		
164h	38 y M	ethyl chloride	1	1	U	Ingst	Int-S	1		
		ethylene glycol	1	1					ethylene glycol	19 mg/dL In Serum @ Unknown
		acetaminophen/hydrocodone	2	2					hydrocodone	1000 ng/mL In Blood (unspecified) @ Unknown
		acetaminophen/hydrocodone	2	2					acetaminophen (apap)	20.7 mcg/mL In Serum @ Unknown
		lorazepam	3	3						
		alprazolam	4	4						
		drug, unknown	5	5						
165h	39 y M				A	Ingst	Int-S	1		
[166pha]	39 y M	sodium hydroxide	1	1	A	Inhal + Oc	Unt-O	1		
		tetramethyl ammonium hydroxide	1	1						
167ph	42 y M				A	Inhal	Unt-E	2		
168h	42 y F	cyanide	1	1	A	Ingst	Int-S	1		
169ai	44 y M	acid, other	1	1	U	Unk	Int-S	1		
170h	44 y F	ethylene glycol	1	1	A	Ingst	Int-S	1		
171ph	47 y M	ethylene glycol	1	1	U	Inhal	Unt-O	2	ethylene glycol	142 mg/dL In Serum @ Unknown
172ai	48 y F	methylene chloride	1	1	U	Unk	Int-S	1		
173h	49 y M	chemical, unknown	1	1	A	Ingst	Int-S	1		
[174]	52 y M	ethylene glycol	1	1	A	Ingst	Int-S	1		
175h	53 y M	ethyl methacrylate	1	1	A	Ingst	Int-S	1		
		ethylene glycol	1	1					ethylene glycol	108 mg/dL In Blood (unspecified) @ Unknown
		barbiturate (short acting)	2	2						
		acetaminophen/butalbital/caffeine	3	3						
176ai	54 y M				U	Inhal	Int-M	1		
177ha	55 y M	ethyl chloride	1	1	A	Ingst	Int-S	1		
		ethylene glycol	1	1					ethylene glycol	180 mg/dL In Blood (unspecified) @ Unknown
178	58 y M				U	Ingst	Int-S	2		
		ethylene glycol	1	1						
		methanol	2	2						
179h	58 y M	hydrochloric acid	1	1	A	Ingst	Int-S	1		
180ph	59 y F				A	Inhal	Unt-E	3		
181ha	60 y F	cyanide	1	1	A	Ingst	Int-S	1		
		ethylene glycol	1	1					ethylene glycol	66 mg/dL In Blood (unspecified) @ Unknown
		acetaminophen/hydrocodone	2	2					hydrocodone	1000 ng/mL In Blood (unspecified) @ Autopsy
		acetaminophen/hydrocodone	2	2					acetaminophen (apap)	110 mcg/mL In Blood (unspecified) @ Autopsy
		acetaminophen/hydrocodone	2	2					hydromorphone	66 ng/mL In Blood (unspecified) @ Autopsy
		acetaminophen/hydrocodone	2	2					acetaminophen (apap)	69.4 mcg/mL In Blood (unspecified) @ Unknown
182ph	60 y M				A	Ingst	Int-S	2		
		ethylene glycol	1	1					ethylene glycol	112 mg/dL In Blood (unspecified) @ Unknown
183h	62 y M				A	Ingst	Unk	1		
		ethylene glycol	1	1						
		alprazolam	2	2						
		buprenorphine/naloxone (sublingual film)	3	3						
184h	62 y F				U	Ingst	Int-S	1		
185h	64 y M	ethylene glycol	1	1	U	Derm + Unk	Unk	3	ethylene glycol	73.5 mg/dL In Serum @ Unknown
186h	65 y F	acid, unknown	1	1	U	Ingst	Unk	1		
		ethylene glycol	1	1					ethylene glycol	42 mg/dL In Blood (unspecified) @ 2 d (pe)
		non-powder, unknown	2	2						
187	66 y M	sulfuric acid	1	1	A	Inhal	Unt-G	2		
188ph	66 y F				A	Inhal	Unt-E	1		
		cyanide	1	1						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
		carbon monoxide	2	2						
		carbon monoxide	3	3						
189p	67 y F	oxalic acid	1	1	A	Ingst	Int-S	1		
[190ha]	68 y F	hydrochloric acid	1	1	A	Ingst	Int-S	1		
191h	68 y M	ethylene glycol	1	1	A	Ingst	Int-S	1	ethylene glycol	290 mg/dL In Blood (unspecified) @ Unknown
192h	73 y M	hydrochloric acid	1	1	A	Ingst	Int-S	1		
193ha	78 y M	propylene glycol borate	1 2	1 2	A	Ingst	Int-S	1		
194	79 y M	ethylene glycol	1	1	U	Ingst	Unk	1	ethylene glycol	65 mg/dL In Blood (unspecified) @ Unknown
195	80 y F	hydrofluoric acid	1	1	A	Ingst	Unt-M	2		
196ha	82 y M	ethylene glycol	1	1	U	Unk	Unk	1	ethylene glycol	678 mg/dL In Serum @ Unknown
197h	89 y F	sodium hydroxide	1	1	A	Ingst	Unt-G	1		
See Also case 51, 279, 2035, 2061, 2098, 2102, 2614 Cleaning Substances (Household)										
198ha	26 y M	hypochlorite	1	1	A	Ingst + Derm	Oth-M	1		
199	46 y F	drain cleaner (sodium hydroxide/sodium hypochlorite/sodium silicate)	1	1	A	Ingst	Int-S	1		
200ha	50 y M	cleaner (cationic)	1	1	A	Ingst	Unt-G	2		
201h	58 y M	drain cleaner	1	1	A	Ingst	Int-S	1		
202h	59 y F	drain cleaner (sulfuric acid)	1	1	A	Ingst	Int-S	1		
203ha	65 y F	drain cleaner (alkali)	1	1	A	Ingst	Int-S	1		
204p	67 y F	cleaner (anionic/nonionic) Hypochlorite	1 2	1 2	A	Inhal	Unt-M	1		
205pha	69 y M	hypochlorite	1	1	A	Inhal	Unt-M	2		
206ha	71 y F	drain cleaner (sodium hydroxide/sodium hypochlorite/sodium silicate)	1	1	A	Ingst	Int-S	1		
207h	72 y F	hypochlorite	1	1	A	Ingst	Int-U	1		
208h	77 y M	laundry detergent (pods)	1	1	A	Ingst	Unt-G	1		
209h	78 y F	drain cleaner (aluminum dust/sodium chloride/sodium hydroxide/sodium nitrate)	1	1	A	Ingst	Unt-T	1		
210h	82 y M	drain cleaner (sodium hydroxide/sodium hypochlorite/sodium silicate)	1	1	A	Ingst	Int-U	1		
211h	84 y F	toilet bowl cleaner (acid) cleaner (anionic/nonionic) salicylate	1 2 3	1 2 3	A	Ingst	Int-S	1		
212	89 y F	cleaner (cationic)	1	1	A	Ingst	Unt-G	2		
213h	91 y F	drain cleaner (sulfuric acid)	1	1	A	Derm	Unt-M	1		
214	93 y M	laundry detergent	1	1	A	Ingst	Unt-G	2		
See Also case 147, 363, 751, 1148, 1452, 2664 Cosmetics/Personal Care Products										
215h	44 y M	hand sanitizer (ethanol)	1	1	U	Ingst	Int-U	3		
216	74 y F	anionic/nonionic/citric acid/ oxone/sodium carbonate/ sodium percarbonate/ sodium sulfate,	1	1	A	Ingst	AR-O	2		
217ha	92 y F	acetone	1	1	A	Ingst	Unt-G	3		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
See Also case 26, 28, 117, 1355										
Deodorizers [218h]	1 m M	deodorizer, unknown	1	1	A	Ingst	Oth-C	2		
Fumes/Gases/Vapors 219pha	4 y M				A	Inhal	Unt-E	1		
		carbon monoxide	1	1						
		carbon monoxide	2	1					ethanol	0 mg/dL In Blood (unspecified) @ Autopsy
		carbon monoxide	2	1					carboxyhemoglobin	46 % In Blood (unspecified) @ Autopsy
[220pha]	4 y M	carbon monoxide	1	1	A	Inhal	Unt-E	1		
221pha	6 y M	carbon monoxide	1	1	A	Inhal	Unt-E	1		
		carbon monoxide	1	1					ethanol	0 mg/dL In Blood (unspecified) @ Autopsy
		carbon monoxide	1	1					carboxyhemoglobin	49 % In Blood (unspecified) @ Autopsy
		carbon monoxide	2	2					carboxyhemoglobin	49 % In Blood (unspecified) @ Autopsy
222pi	6 y M	carbon monoxide	1	1	A	Inhal	Unt-G	2		
223ph	7 y F	carbon monoxide	1	1	A	Inhal	Unt-E	1		
224p	7 y M	carbon monoxide	1	1	A	Inhal	Unt-E	1		
		carbon monoxide	1	1					carboxyhemoglobin	20 % In Whole Blood @ Unknown
225p	7 y M	carbon monoxide	1	1	A	Inhal	Unt-E	2		
226pa	8 y M	carbon monoxide	1	1	A	Inhal	Unt-E	1		
		carbon monoxide	1	1					carboxyhemoglobin	27 % In Blood (unspecified) @ Unknown
227pi	10 y F	carbon monoxide	1	1	C	Inhal	Unt-E	1		
228pi	13 y M	carbon monoxide	1	1	A	Inhal	Unt-E	1		
229pi	16 y M	carbon monoxide	1	1	A	Inhal	Unt-E	1		
[230ph]	16 y M	carbon monoxide	1	1	U	Inhal	Unt-E	1		
		carbon monoxide	1	1					carboxyhemoglobin	0.3 % In Blood (unspecified) @ Unknown
		carbon monoxide	1	1					carboxyhemoglobin	32.6 % In Blood (unspecified) @ Unknown
		carbon monoxide	1	1					carboxyhemoglobin	7.5 % In Blood (unspecified) @ Unknown
231pa	19 y F	carbon monoxide	1	1	A	Inhal	Oth-M	1		
		carbon monoxide	1	1					carboxyhemoglobin	60.001 % In Blood (unspecified) @ Autopsy
232pa	21 y F	carbon monoxide	1	1	A	Inhal	Unt-E	1		
		carbon monoxide	1	1					carboxyhemoglobin	43 % In Blood (unspecified) @ Autopsy
233pi	21 y M	carbon monoxide	1	1	A	Inhal	Unt-G	2		
234pa	23 y M	nitrogen	1	1	A	Ingst	Int-S	1		
		clonazepam	2	2					clonazepam	0.1 mg/L In Blood (unspecified) @ Autopsy
235pi	24 y M	hydrogen sulfide	1	1	A	Inhal	Unt-O	1		
		methane	2	2						
236pha	24 y M	propane	1	1	A	Inhal	Int-S	1		
237p	24 y F	carbon monoxide	1	1	A	Inhal	Unt-E	2		
238p	24 y M	carbon monoxide	1	1	A	Inhal	Unt-E	1		
		hurricane related	2	2						
239pa	25 y F	carbon monoxide	1	1	A	Inhal	Unt-E	1		
		carbon monoxide	1	1					carboxyhemoglobin	54 % In Blood (unspecified) @ Autopsy
240pi	27 y F	carbon monoxide	1	1	A	Inhal	Unt-G	2		
241ph	28 y M	carbon monoxide	1	1	A	Inhal	Unk	2		
242pi	29 y M	carbon monoxide	1	1	U	Inhal	Unt-E	1		
		carbon monoxide	1	1					carboxyhemoglobin	47 % In Blood (unspecified) @ Autopsy
243pi	34 y M	hydrogen sulfide	1	1	A	Inhal	Unt-O	1		
		methane	2	2						
244pi	34 y F	carbon monoxide	1	1	A	Inhal	Unt-E	2		
245pi	34 y F	carbon monoxide	1	1	U	Inhal	Unt-E	1		
246p	35 y M	helium	1	1	A	Inhal	Int-S	1		
247ph	37 y M	carbon monoxide	1	1	A	Inhal	Unt-E	1		
		carbon monoxide	1	1					carboxyhemoglobin	75.4 % In Blood (unspecified) @ Unknown
248pa	40 y M				A	Inhal	Oth-M	1		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
		carbon monoxide	1	1					carboxyhemoglobin	60.001 % In Blood (unspecified) @ Autopsy
249pa	40 y M	hydrogen sulfide	1	1	A	Inhal	Unt-O	1		
250pa	45 y M	carbon monoxide	1	1	A	Inhal	Unt-E	1	carboxyhemoglobin	50 % In Blood (unspecified) @ Autopsy
251ph	46 y F	carbon monoxide	1	1	A	Inhal + Par	Unt-E	1	carboxyhemoglobin	49.8 % In Blood (unspecified) @ Unknown
		sodium chloride	2	2						
252pi	46 y M	carbon monoxide	1	1	A	Inhal	Unt-E	2		
253p	47 y F	carbon monoxide	1	1	A	Inhal	Int-S	1	carboxyhemoglobin	46 % In Blood (unspecified) @ Unknown
254pa	48 y F	carbon monoxide	1	1	A	Ingst + Inhal	Int-S	1	carboxyhemoglobin	45 % In Blood (unspecified) @ Autopsy
		hydrocodone	2	2						
255pi	49 y M	hydrogen sulfide	1	1	A	Inhal	Unt-O	1		
		methane	2	2						
256pa	49 y F	carbon monoxide	1	1	A	Inhal	Oth-M	1	carboxyhemoglobin	60.001 % In Blood (unspecified) @ Autopsy
257p	49 y F	carbon monoxide	1	1	A	Inhal	Unt-E	2		
258ai	51 y F	carbon monoxide	1	1	A	Ingst + Inhal	Int-S	1		
		ethanol	2	2						
259pha	53 y F	carbon monoxide	1	1	A	Ingst	Int-S	1		
		oxycodone	2	2					oxycodone	0.513 mg/L In Serum @ Unknown
		oxycodone	2	2					oxymorphone	0.653 mg/L In Serum @ Unknown
		clonazepam	3	3					clonazepam	0.011 mg/L In Serum @ Unknown
		clonazepam	3	3					7-aminoclonazepam	0.02 mg/L In Serum @ Unknown
		gabapentin	4	4					gabapentin	7.18 mg/L In Serum @ Unknown
261ai	55 y M	carbon monoxide	1	1	A	Ingst + Inhal	Int-S	1		
		ethanol	2	2						
260i	55 y M	carbon monoxide	1	1	A	Inhal + Unk	Unk	1		
		clonazepam	2	2						
		ethanol	3	3						
262pa	55 y M	chlorine gas	1	1	A	Unk	Unk	1		
		carbon monoxide	2	2						
		methamphetamine	3	3					methamphetamine	1182 ng/mL In Blood (unspecified) @ Autopsy
		methamphetamine	3	3					amphetamine	154 ng/mL In Blood (unspecified) @ Autopsy
		pseudoephedrine	4	4					pseudoephedrine	53.2 ng/mL In Blood (unspecified) @ Autopsy
		buprenorphine	5	5					buprenorphine	2.9 ng/mL In Blood (unspecified) @ Autopsy
		buprenorphine	5	5					norbuprenorphine	3.4 ng/mL In Blood (unspecified) @ Autopsy
		gabapentin	6	6					gabapentin	0.7 mcg/mL In Blood (unspecified) @ Autopsy
263ai	58 y F	carbon monoxide	1	1	A	Ingst + Inhal	Int-S	1		
		ethanol	2	2						
264pa	59 y M	carbon monoxide	1	1	A	Inhal	Unt-E	3	carboxyhemoglobin	14 % In Blood (unspecified) @ Autopsy
265ph	60 y F	carbon monoxide	1	1	A	Inhal	Unk	3		
266h	61 y M	propane	1	1	A/C	Inhal + Derm	Unt-O	3		
267ai	62 y F	carbon monoxide	1	1	U	Inhal + Unk	Int-S	1		
		cyclobenzaprine	2	2						
[268ha]	64 y M	sulfur dioxide	1	1	A	Inhal + Oc	Unt-O	1	ketamine	0.144 mcg/mL In Blood (unspecified) @ Unknown
		sulfur dioxide	1	1					amphetamine	0.146 mcg/mL In Blood (unspecified) @ Unknown
269h	64 y M	carbon monoxide	1	1	A	Inhal	Unt-E	3		
270p	66 y M	carbon monoxide	1	1	A	Inhal	Unt-E	2		
271hi	67 y M	carbon monoxide	1	1	A	Inhal	Unt-E	3		
272h	69 y M	carbon monoxide	1	1	A	Ingst + Inhal	Int-S	2	carboxyhemoglobin	19.4 % In Blood (unspecified) @ 1 h (pe)
		acetaminophen/hydrocodone	2	2					acetaminophen (apap)	1 mcg/mL In Serum @ 8 h (pe)
273h	70 y F				A	Inhal	Unt-E	3		

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
		carbon monoxide	1	1					carboxyhemoglobin	16 % In Whole Blood @ 1 h (pe)
274pha	73 y M	carbon monoxide	2	2						
		carbon monoxide	1	1	A	Inhal	Unt-E	3	carboxyhemoglobin	4 % In Blood (unspecified) @ Autopsy
275pa	75 y F	carbon monoxide	1	1	A	Inhal	Oth-M	1	carboxyhemoglobin	60.001 % In Blood (unspecified) @ Autopsy
276h	79 y F	carbon monoxide	1	1	A	Inhal	Unt-E	1		
277ph	81 y F	carbon monoxide	1	1	A	Inhal	Unt-E	3	carboxyhemoglobin	58 % In Blood (unspecified) @ Unknown
278ai	83 y M	helium	1	1	U	Unk	Int-S	1		
		diazepam	2	2						
		temazepam	3	3						
279h	85 y M	carbon monoxide	1	1	A	Inhal	Unt-E	2		
		carbon monoxide	2	2					carboxyhemoglobin	16.8 % In Blood (unspecified) @ 1 h (pe)
		cyanide	3	3						
280pa	96 y F	carbon monoxide	1	1	A	Inhal	Unt-E	1	carboxyhemoglobin	60 % In Blood (unspecified) @ Autopsy
281pi	Unknown age M	carbon monoxide	1	1	A	Inhal	Unt-O	1		
282p	Unknown age F	carbon monoxide	1	1	A	Inhal	Int-S	1		
See Also case 188, 295, 1233, 1783, 1958, 2347 Heavy Metals										
283ha	26 y F	potassium chloride	1	1	U	Ingst	Int-U	1	potassium	7.6 mmol/L In Blood (unspecified) @ 1 h (pe)
		amitriptyline	2	2					amitriptyline	1400 ng/mL In Blood (unspecified) @ 1 h (pe)
		amitriptyline	2	2					nortriptyline	900 ng/mL In Blood (unspecified) @ 1 h (pe)
284	33 y F	lead	1	1	C	Unk	Unt-E	2		
[285ha]	35 y M	arsenic	1	1	A	Ingst + Unk	Int-S	2	lead	123 mcg/dL In Serum @ Unknown
		ethanol	2	2						
286p	40 y F	magnesium	1	1	C	Ingst	Unt-M	1		
		ethanol	2	2						
287h	55 y M	chromium	1	1	A	Inhal	Unt-O	2		
		nickel	2	2						
[288h]	59 y M	arsenic	1	1	A	Ingst	Int-S	1		
		benzene	2	2						
		toluene	3	3						
Hydrocarbons										
289ai	17 y M	hydrocarbon (fluorinated)	1	1	U	Inhal	Int-A	1		
290i	17 y M	hydrocarbon (fluorinated)	1	1	U	Unk	Unt-U	2		
291ai	20 y M	hydrocarbon (fluorinated)	1	1	C	Inhal	Int-A	3		
292h	23 y F	hydrocarbon (fluorinated)	1	1	A	Inhal	Unk	2		
293pha	25 y M	hydrocarbon (fluorinated)	1	1	A	Inhal	Int-A	2		
294ha	26 y M	hydrocarbon (fluorinated)	1	1	C	Inhal	Int-A	1		
295pha	27 y M	hydrocarbon (fluorinated)	1	1	A/C	Unk	Int-S	1	1,1-difluoroethane	19 mcg/mL In Blood (unspecified) @ Autopsy
		cocaine	2	2						
		nitric oxide	3	3						
		alprazolam	4	4						
		acetaminophen/hydrocodone	5	5						
296ph	27 y F	hydrocarbon (fluorinated)	1	1	A/C	Inhal	Int-A	1		
297	30 y F	hydrocarbon (fluorinated)	1	1	A	Inhal	Int-M	1		
298	31 y M	hydrocarbon (fluorinated)	1	1	A	Inhal	Int-A	1		
299pa	32 y M	hydrocarbon (fluorinated)	1	1	C	Inhal	Int-A	1	1,1-difluoroethane	51 mcg/mL In Blood (unspecified) @ Unknown
		hydrocarbon (inhalation)	2	1	A	Inhal	Int-A	1		
300ph	32 y M									

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ③ Time
301	32 y M	hydrocarbon (fluorinated)	1	1	U	Inhal	Int-A	1		
302	32 y F	hydrocarbon (fluorinated)	1	1	A	Ingst + Inhal	Int-S	2		
		ethanol	2	2						
303ai	33 y M	hydrocarbon (fluorinated)	1	1	U	Unk	Unk	1		
		diphenhydramine	2	2						
304	33 y M	hydrocarbon	1	1	U	Inhal	Int-A	2		
305pa	34 y M	hydrocarbon (fluorinated)	1	1	A	Inhal	Int-S	1	1,1-difluoroethane	2.6 mcg/L In Blood (unspecified) ③ Autopsy
306	34 y M	hydrocarbon (fluorinated)	1	1	A	Inhal	Int-A	2		
307ph	34 y M	hydrocarbon (fluorinated)	1	1	A	Inhal	Unt-G	1		
308ai	35 y M	toluene	1	1	U	Unk	Unk	1		
309pha	36 y M	hydrocarbon (fluorinated)	1	1	A	Inhal	Int-S	1	1,1-difluoroethane	4.3 mcg/mL In Blood (unspecified) ③ Unknown
		clonazepam	2	2					7-aminoclonazepam	150 ng/mL In Blood (unspecified) ③ Unknown
		clonazepam	2	2					clonazepam	28 ng/mL In Blood (unspecified) ③ Unknown
		codeine	3	3						
310p	36 y F	hydrocarbon (fluorinated)	1	1	A/C	Inhal	Int-A	1		
[311ha]	36 y F	hydrocarbon (fluorinated)	1	1	A	Inhal	Int-A	1	1,1-difluoroethane	35 mcg/mL In Blood (unspecified) ③ Autopsy
312ha	37 y M	hydrocarbon (fluorinated)	1	1	A	Inhal	Int-S	1	1,1-difluoroethane	0.33 mcg/mL In Blood (unspecified) ③ Autopsy
313ai	37 y M	hydrocarbon (fluorinated)	1	1	U	Inhal + Unk	Int-A	1		
		oxycodone	2	2						
		sertraline	3	3						
314ai	39 y M	hydrocarbon (fluorinated)	1	1	U	Inhal	Int-A	1		
315ph	40 y M	hydrocarbon (fluorinated)	1	1	A	Inhal	Int-A	1		
316ai	41 y F	hydrocarbon (fluorinated)	1	1	U	Inhal + Unk	Int-A	2		
		chlorpheniramine	2	2						
		clonazepam	3	3						
317p	42 y F	hydrocarbon (fluorinated)	1	1	U	Inhal	Int-M	1		
318ph	45 y F	hydrocarbon (fluorinated)	1	1	A	Inhal	Unk	1		
319ph	49 y M	hydrocarbon (fluorinated)	1	1	A	Inhal	Int-A	1		
320ph	51 y F	hydrocarbon (fluorinated)	1	1	A	Inhal	Int-A	1		
321	59 y F	hydrocarbon (fluorinated)	1	1	A/C	Inhal	Int-A	2		
322ha	59 y M	hydrocarbon (fluorinated)	1	1	U	Ingst	Int-A	3		
[323ha]	Unknown adult (> =20 yrs) M	hydrocarbon	1	1	A	Ingst + Aspir	Unt-G	1		
		amphetamine	2	2					amphetamine	0.03 mg/L In Blood (unspecified) ③ Unknown
		amphetamine	2	2					methamphetamine	0.3 mg/L In Blood (unspecified) ③ Unknown
									methylenedioxymethamphetamine (MDMA)	
			3	3						
See Also case 44, 288, 453, 627, 1326, 2285, 2615 Industrial Cleaners										
324a	37 y M	hydrofluoric acid	1	1	A	Ingst	Unt-M	1		
Infectious and Toxin-Mediated Diseases										
[325h]	52 y M	botulism	1	1	A/C	Par	AR-O	3		
326h	64 y F	prion disease	1	1	C	Ingst + Inhal	Unt-F	1		
		melaleuca oil	2	2						
Mushrooms										
327ha	72 y F	mushroom (unknown)	1	1	A	Ingst	Int-S	2		
See Also case 2143										

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
Other/Unknown Nondrug Substances										
328ph	49 y F				A	Unk	AR-D	3		
329ha	50 y M	fluorescein	1	1						
		substance (non-drug), unknown	1	1	U	Unk	Unk	3		
		ethanol	2	2					ethanol	97 mg/dL In Serum @ 0.25 h (pe)
330	72 y M	substance (non-drug), unknown	1	1	A	Ingst	Int-S	1		
See Also case 238, 553, 1923, 2566 Paints and Stripping Agents										
331h	88 y M	paint-Varnish-lacquer	1	1	A	Ingst + Derm	Int-S	2		
Pesticides										
332pa	7 y M				C	Inhal	Unt-E	1		
[333ha]	9 y M	aluminum phosphide	1	1	U	Unk	Unk	1		
334pha	11 y U	aluminum phosphide	1	1	C	Inhal	Unt-E	1		
[335ha]	17 y F	aluminum phosphide	1	1	C	Inhal	Unt-E	1		
336ha	19 y M	dinitrophenol	1	1	A	Ingst	Int-A	1		
337h	20 y M	dinitrophenol	1	1	A	Ingst	Int-S	1		
338p	22 y M	phosphine	1	1	A	Ingst	Int-S	1		
339ha	26 y M	dinitrophenol	1	1	A	Ingst	Int-S	1		
340pha	27 y M	dinitrophenol	1	1	A	Ingst	Int-S	1		
341h	27 y M	dinitrophenol	1	1	U	Ingst	Int-S	2		
342h	30 y M	glyphosate	1	1	A	Ingst + Unk	Unk	2		
		methamphetamine	2	2						
343h	31 y M	methyl bromide	1	1	A	Inhal	Unt-O	2		
344ha	35 y M	glyphosate	1	1	A	Ingst	Int-S	1		
[345ha]	36 y M	sulfuryl fluoride	1	1	A	Inhal	Unt-E	1		
346h	42 y M	chlorfenapyr	1	1	A	Ingst	Int-S	2		
		ethanol	2	2					ethanol	238 mg/dL In Blood (unspecified) @ Unknown
[347ha]	42 y M	dinitrophenol	1	1	A	Ingst	Int-S	1		
348p	47 y M	pesticide, unknown	1	1	C	Inhal + Derm	Unt-E	2		
349h	47 y M	organophosphate	1	1	A	Ingst	Int-S	1		
350pa	50 y M	glyphosate	1	1	A	Ingst	Int-U	3		
		glyphosate	1	1					amphetamine methamphetamine	31 ng/mL In Serum @ Autopsy 407 ng/mL In Serum @ Autopsy
351	55 y M	organophosphate	1	1	A	Ingst	Int-S	2		
352h	59 y M	rodenticide (antocoagulant) drug, unknown	1 2	1 2	U	Ingst	Int-S	2		
353pha	63 y M	cyhalothrin/prallethrin	1	1	A	Ingst	Int-U	3		
354h	69 y M	pesticide, unknown	1	1	A	Ingst	Int-S	2		
355h	70 y M	glyphosate	1	1	A	Ingst	Int-S	2		
		ethanol	2	2						
[356h]	71 y M	paraquat	1	1	A	Ingst	Unt-M	1		
357h	84 y M	organophosphate	1	1	A	Inhal	Unt-E	3		
		phosmet	2	2						
		captan	3	3						
See Also case 147 Plants										
358a	18 y M	plant, cardiac glycoside	1	1	U	Ingst	Int-S	1		
		ethanol	3	2						
		methamphetamine	2	2						
359h	22 y F	plant, cardiac glycoside	1	1	A	Ingst	Int-S	1		
[360pha]	30 y F				A	Par	AR-D	1		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
[361ha]	33 y F	Curcuma domestica	1	1						
362hai	56 y F	plant, cardiac glycoside	1	1	A	Ingst	Unk	1		
363pha	75 y F	aconite	1	1	A	Ingst	Int-S	1	aconitine	5.6 ng/mL In Serum @ Unknown
		Conium maculatum	1	1						
		morphine	2	2					morphine	0.23 mg/L In Blood (unspecified) @ Autopsy
		benzodiazepine	3	3						
		ibuprofen	4	4						
		ethanol	5	5						
		drain cleaner (sodium hydroxide/sodium hypochlorite/sodium silicate)	6	6						
		citalopram	7	7					citalopram	0.11 mg/L In Blood (unspecified) @ Autopsy
		gabapentin	8	8					gabapentin	2.6 mg/L In Blood (unspecified) @ Autopsy
		nortriptyline	9	9					nortriptyline	0.01 mg/L In Blood (unspecified) @ Autopsy
See Also case 984, 1863, 2262 Tobacco/Nicotine/eCigarette Products										
[364pha]	19 y M	nicotine	1	1	A/C	Inhal	Unt-U	1		
[365ph]	20 y F	nicotine	1	1	A	Par	Int-S	1	nicotine	1000 ng/mL In Blood (unspecified) @ 3 d (pe)
		nicotine	1	1					cotinine	509.9 ng/mL In Blood (unspecified) @ 3 d (pe)
See Also case 2128 Weapons of Mass Destruction										
366ph	33 y F-Pregnant	non-powder, unknown	1	1	A	Inhal	Int-S	2		
367ha	51 y M	non-powder, unknown	1	1	U	Unk	Unk	3		
See Also case 186 Pharmaceutical Exposures										
Analgesics										
[368h]	2 y M	methadone	1	1	A	Ingst	Unt-G	1	methadone	400 ng/mL In Serum @ Unknown
		methadone	1	1					eddp (2-ethylidene-1,5-dimethyl-3,3-diphenylpyrrolidine)	83 ng/mL In Serum @ Unknown
		chlorpheniramine	2	2					chlorpheniramine	41 ng/mL In Serum @ Unknown
369p	2 y M	diphenhydramine	3	3	A	Ingst	Unt-G	1	diphenhydramine	180 ng/mL In Serum @ Unknown
		methadone	1	1					methadone	0.2 mg/L In Blood (unspecified) @ Autopsy
		methadone	1	1					methadone	0.5 mg/kg In Liver @ Autopsy
370pai	12 y M	fentanyl	1	1	A	Unk	Int-A	1	fentanyl	3.6 ng/mL In Blood (unspecified) @ Autopsy
		fentanyl analog (acetyl fentanyl)	2	2						
		amphetamine	3	3					amphetamine	47 ng/mL In Blood (unspecified) @ Autopsy
[371ha]	13 y F	ibuprofen	1	1	A	Ingst + Aspir	Int-S	1		
372ph	14 y M	narcotic, other/unknown	1	1	A	Unk	Int-U	2		
373ph	15 y F	narcotic, other/unknown	1	1	A	Ingst	Int-A	1		
374ph	16 y F	oxycodone	1	1	A	Ingst	Int-S	2		
		acetaminophen/hydrocodone	2	2					acetaminophen (apap)	66.7 mcg/mL In Serum @ Unknown
		diazepam	3	3						
375pa	16 y F	fentanyl	1	1	U	Inhal	Int-A	1	fentanyl	0.17 mcg/g In Liver @ Autopsy
		fentanyl	1	1					fentanyl	12 ng/mL In Blood (unspecified) @ Autopsy
		cocaine	2	2					cocaine	0.054 mg/L In Blood (unspecified) @ Autopsy
		cocaine	2	2					cocaethylene	0.13 mg/L In Blood (unspecified) @ Autopsy
		cocaine	2	2					benzoyllecognine	2.3 mg/L In Blood (unspecified) @ Autopsy
		ethanol	3	3					ethanol	60 mg/dL In Blood (unspecified) @ Autopsy
376ai	16 y M	fentanyl	1	1	U	Unk	Int-A	1		
377ai	16 y M	fentanyl	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
378pha	17 y F				A	Ingst	Int-S	1		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ④ Time
379h	17 y F	tramadol	1	1	A	Ingst	Int-S	1		
380pai	17 y M	acetaminophen	1	1	A	Par	Int-A	1		
381pha	17 y F	fentanyl	1	1	A	Ingst + Unk	Int-S	1		
		acetaminophen/oxycodone	1	1					oxycodone	162 ng/mL In Blood (unspecified) ④ Unknown
		acetaminophen/oxycodone	1	1					acetaminophen (apap)	2 mcg/mL In Blood (unspecified) ④ Unknown
		alprazolam	2	2					alprazolam	146 ng/mL In Blood (unspecified) ④ Unknown
		marijuana	3	3						
382ai	17 y M	fentanyl	1	1	A	Unk	Int-A	1		
383ai	17 y M	oxycodone	1	1	U	Unk	Int-S	1		
		alprazolam	2	2						
		marijuana	3	3						
384h	17 y F	acetaminophen	1	1	U	Ingst	Int-A	1		
385ai	18 y M				A/C	Unk	Int-A	1		
		fentanyl	1	1						
		alprazolam	2	2						
		cocaine	3	3						
386ai	18 y M	fentanyl	1	1	U	Unk	Int-A	1		
		ethanol	2	2						
388ai	18 y F	fentanyl	1	1	U	Unk	Int-A	1		
		ethanol	2	2						
389ai	18 y M	fentanyl	1	1	U	Unk	Int-A	1		
		alprazolam	2	2						
		dextromethorphan	3	3						
387ai	18 y M	fentanyl	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
393ai	18 y M	fentanyl	1	1	U	Unk	Int-A	1		
		alprazolam	2	2						
391ai	18 y M	fentanyl	1	1	U	Unk	Int-A	1		
		alprazolam	2	2						
394ai	18 y M	fentanyl	1	1	U	Unk	Int-A	1		
		tramadol	2	2						
		clonazepam	3	3						
392ai	18 y M	fentanyl	1	1	A	Unk	Int-A	1		
		cocaine	2	2						
		alprazolam	3	3						
390ai	18 y M	fentanyl	1	1	A	Unk	Int-A	1		
395ai	18 y M	morphine	1	1	U	Unk	Unk	1		
		diphenhydramine	2	2						
		doxylamine	3	3						
396ph	19 y F	fentanyl	1	1	A	Ingst + Unk	Int-S	1		
		heroin	2	2						
		cocaine	3	3						
		alprazolam	4	4						
		codeine	5	5						
397p	19 y M	carfentanil	1	1	A	Unk	Unk	2		
398a	19 y F	acetaminophen	1	1	A	Ingst	Unk	1		
399pha	19 y M	fentanyl analog (alpha-methylfentanyl)	1	1	U	Unk	Int-A	2		
		marijuana	2	2						
402ai	19 y M	fentanyl	1	1	U	Unk	Int-A	1		
		ethanol	2	2						
401ai	19 y M	fentanyl	1	1	U	Unk	Int-A	1		
		alprazolam	2	2						
		diazepam	3	3						
400ai	19 y M	fentanyl	1	1	U	Unk	Int-A	1		
		cocaine	2	2						
		levetiracetam	3	3						
403h	20 y F				A	Ingst	Int-S	2		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
		salicylate drug, unknown	1 2	1 2					salicylate	87 mg/dL In Serum @ Unknown
404ai	20 y F				U	Unk	Int-A	1		
		oxycodone	1	1						
405ai	20 y M	alprazolam	2	2	U	Unk	Int-A	1		
		fentanyl	1	1						
		cocaine	2	2						
406ai	20 y M	tramadol	3	3	U	Unk	Int-A	1		
		fentanyl	1	1						
		alprazolam	2	2						
408ai	20 y M	hydrocodone	3	3	U	Unk	Int-A	1		
		fentanyl	1	1						
		sertraline	2	2						
407ai	20 y M	alprazolam	3	3	U	Unk	Int-A	1		
		fentanyl	1	1						
		heroin	2	2						
409ai	20 y F	methamphetamine	3	3	U	Unk	Int-A	1		
		fentanyl	1	1						
		cocaine	2	2						
		alprazolam	3	3						
410ai	20 y M				U	Unk	Int-A	1		
		methadone	1	1						
		methamphetamine	2	2						
411pa	21 y F				A	Unk	Int-A	1	fentanyl	0.023 mg/L In Blood (unspecified) @ Autopsy
412pa	21 y M				A	Unk	Int-A	1		
		morphine	1	1					morphine (free)	29 mcg/L In Whole Blood @ Unknown
413pa	21 y F				A	Inhal	Int-A	1		
		fentanyl	1	1					fentanyl	0.001 mg/L In Blood (unspecified) @ Autopsy
414pha	21 y F				A	Ingst	Int-A	1		
		fentanyl	1	1						
		benzodiazepine	2	2						
415p	21 y M				A	Unk	Unk	2		
		methadone	1	1						
		ethanol	2	2					ethanol	134 mg/dL In Serum @ 1 h (pe)
416pai	21 y M				A	Par	Int-A	1		
		fentanyl	1	1					fentanyl	13 ng/mL In Blood (unspecified) @ Autopsy
417ai	21 y M				U	Unk	Int-A	1		
		fentanyl	1	1						
		cocaine	2	2						
		alprazolam	3	3						
418ai	21 y M				U	Ingst + Unk	Int-A	3		
		fentanyl	1	1						
		alprazolam	2	2						
		ethanol	3	3						
419ai	21 y F				U	Unk	Int-S	1		
		morphine	1	1						
		ethanol	2	2						
420pha	22 y M				A/C	Ingst	Int-U	1		
		acetaminophen/oxycodone	1	1						
		antipsychotic (atypical)	2	2						
		hydrocodone	3	3					hydrocodone	0.045 mg/L In Urine (quantitative only) @ Autopsy
		hydromorphone	4	4					hydromorphone	0.031 mg/L In Urine (quantitative only) @ Autopsy
		morphine	5	5					morphine (free)	0.131 mg/L In Whole Blood @ Autopsy
421pi	22 y M				A	Par	Int-A	1		
		carfentanil	1	1						
422p	22 y M				A	Par	Int-A	1		
		fentanyl analog (acrylfentanyl)	1	1					acetyl fentanyl	0.84 ng/mL In Blood (unspecified) @ Autopsy
		fentanyl	2	2					norfentanyl	0.76 ng/mL In Blood (unspecified) @ Autopsy
		fentanyl	2	2					fentanyl	2.7 ng/mL In Blood (unspecified) @ Autopsy
		heroin	3	3					6-mam (6-monoacetylmorphine)	1.3 ng/mL In Blood (unspecified) @ Autopsy
		heroin	3	3					morphine	120 ng/mL In Blood (unspecified) @ Autopsy
		diphenhydramine	4	4					diphenhydramine	450 ng/mL In Blood (unspecified) @ Autopsy
423pa	22 y F				A	Par + Unk	Int-A	1		
		fentanyl	1	1					fentanyl	0.062 mcg/g In Liver @ Autopsy
		fentanyl	1	1					fentanyl	5.6 ng/mL In Blood (unspecified) @ Autopsy
		fentanyl analog (furanylfentanyl)	2	2					furanyl fentanyl	0.37 ng/mL In Blood (unspecified) @ Autopsy

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
424i	22 y M	fentanyl analog (furanylfentanyl)	2	2	U	Unk	Int-U	1	furanyl fentanyl	0.53 ng/mL In Blood (unspecified) @ Autopsy
		heroin	3	2					morphine	0.016 mcg/mL In Blood (unspecified) @ Autopsy
		oxycodone	4	4					oxycodone	0.095 mcg/mL In Blood (unspecified) @ Autopsy
425ai	22 y M	fentanyl	1	1	U	Unk	Int-A	1		
		oxycodone	2	2						
		oxymorphone	3	3						
426ph	22 y F	fentanyl analog (furanylfentanyl)	1	1	A	Par	Int-A	2		
		oxycodone	2	2						
427pa	22 y F	narcotic, other/unknown	1	1	U	Ingst + Par	Int-A	1		
		fentanyl	1	1						
		fentanyl	1	1						
428	22 y M	clozapine	2	2	A	Ingst	Unt-G	2	clozapine	150 ng/mL In Blood (unspecified) @ Unknown
		salicylate	1	1					salicylate	49 mg/dL In Whole Blood @ Unknown
		salicylate	1	1					salicylate	49 mg/dL In Whole Blood @ Unknown
429pa	22 y F	fentanyl	1	1	A	Ingst + Unk	Int-A	1	fentanyl	8.2 ng/mL In Blood (unspecified) @ Autopsy
		alprazolam	2	2					alprazolam	0.038 mg/L In Blood (unspecified) @ Autopsy
		ethanol	3	3					ethanol	140 mg/dL In Blood (unspecified) @ Autopsy
431ai	22 y M	fentanyl	1	1	U	Unk	Int-A	1		
		heroin	2	2						
430ai	22 y M	fentanyl	1	1	U	Unk	Int-A	1		
		heroin	2	2						
432h	22 y F	acetaminophen	1	1	A	Ingst	Int-S	1	acetaminophen (apap)	54 mcg/mL In Blood (unspecified) @ Unknown
		acetaminophen	1	1						
433pha	23 y F	diphenhydramine	2	2	U	Unk	Int-A	1		
		fentanyl	1	1						
		fentanyl	1	1						
		clonazepam	2	2						
		clonazepam	2	2						
		levetiracetam	3	3						
434h	23 y F	acetaminophen	1	1	U	Ingst + Par	Unk	2		
		hydrocodone	2	2						
435ph	23 y M	narcotic, other/unknown	1	1	A	Unk	Int-M	1	morphine	612 ng/mL In Urine (quantitative only) @ 4 h (pe)
		narcotic, other/unknown	1	1						
436h	23 y F	acetaminophen	1	1	U	Ingst	Int-S	1	acetaminophen (apap)	735 mcg/mL In Blood (unspecified) @ Unknown
437pi	23 y M	carfentanil	1	1	A	Unk	Int-A	1		
438pai	23 y M	fentanyl	1	1	A	Par	Int-A	1	norfentanyl	1.2 ng/mL In Blood (unspecified) @ Autopsy
		fentanyl	1	1					fentanyl	24 ng/mL In Blood (unspecified) @ Autopsy
		cocaine	2	2					benzoylecognine	1000 ng/mL In Blood (unspecified) @ Autopsy
		cocaine	2	2					cocaine	107 ng/mL In Blood (unspecified) @ Autopsy
		cocaine	2	2					cocaethylene	152 ng/mL In Blood (unspecified) @ Autopsy
439pai	23 y M	fentanyl	1	1	A	Par	Int-A	1	fentanyl	40 ng/mL In Blood (unspecified) @ Autopsy
		fentanyl analog (acetylfentanyl)	2	2						
440p	23 y F	fentanyl analog (furanylfentanyl)	1	1	A/C	Unk	Int-A	1	furanyl fentanyl	0.34 ng/mL In Blood (unspecified) @ Autopsy
		U-47700	2	2					u-47700	6.7 ng/mL In Blood (unspecified) @ Autopsy
		ketamine	3	3						
		alprazolam	4	4						
		clonazepam	5	5						

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ③ Time
441pa	23 y M	fentanyl	1	1	U	Unk	Int-A	1	fentanyl	0.006 mcg/g In Blood (unspecified) ③ Autopsy
		cocaine	2	2					cocaine	0.033 mg/L In Blood (unspecified) ③ Autopsy
		cocaine	2	2					cocaethylene	0.083 mg/L In Blood (unspecified) ③ Autopsy
		cocaine	2	2					benzoylecognine	1.3 mg/L In Blood (unspecified) ③ Autopsy
		ethanol	3	3					ethanol	140 mg/dL In Blood (unspecified) ③ Autopsy
442pa	23 y F	fentanyl	1	1	U	Unk	Int-U	1	fentanyl	0.001 mg/L In Blood (unspecified) ③ Autopsy
		fentanyl	1	1					fentanyl	0.003 mg/L In Serum ③ Autopsy
443p	23 y F	fentanyl analog (furanylfentanyl)	1	1	A	Par	Int-A	1	furanyl fentanyl	0.34 ng/mL In Blood (unspecified) ③ Autopsy
		U-47700	2	2					u-47700	6.7 ng/mL In Blood (unspecified) ③ Autopsy
444ai	23 y M	fentanyl	1	1	U	Unk	Int-A	1		
		morphine	2	2						
		midazolam	3	3						
445ai	23 y M	oxycodone	1	1	U	Unk	Int-A	1		
		alprazolam	2	2						
446pha	23 y F	fentanyl	1	1	A	Ingst	Int-S	1	fentanyl	6.4 ng/mL In Blood (unspecified) ③ Unknown
452ai	23 y F	fentanyl	1	1	U	Ingst + Unk	Int-A	1		
		alprazolam	2	2						
453ai	23 y M	fentanyl	1	1	U	Unk	Int-S	2		
		hydrocodone	2	2						
		temazepam	3	3						
		gasoline	4	4						
450ai	23 y M	fentanyl	1	1	U	Unk	Int-A	1		
		oxycodone	2	2						
		alprazolam	3	3						
451ai	23 y M	fentanyl	1	1	U	Unk	Int-A	1		
449ai	23 y M	fentanyl	1	1	U	Unk	Int-A	1		
447ai	23 y M	fentanyl	1	1	U	Ingst + Unk	Int-A	2		
		alprazolam	2	2						
448ai	23 y F	fentanyl	1	1	U	Unk	Int-A	1		
		morphine	2	2						
456ai	23 y F	oxycodone	1	1	U	Unk	Int-A	3		
		bupropion	2	2						
		butalbital	3	3						
457ai	23 y F	oxycodone	1	1	U	Unk	Int-A	2		
455ai	23 y F	oxycodone	1	1	U	Unk	Int-A	1		
454ai	23 y F	oxycodone	1	1	U	Unk	Int-A	2		
458	23 y F	acetaminophen/ diphenhydramine	1	1	C	Ingst	Int-S	1		
459pa	24 y F	fentanyl	1	1	A	Ingst + Unk	Int-A	1	fentanyl	14 ng/mL In Blood (unspecified) ③ Autopsy
		heroin	2	2						
		alprazolam	3	3						
460pha	24 y M	fentanyl	1	1	U	Ingst + Inhal	Int-A	1	fentanyl	1.6 ng/mL In Blood (unspecified) ③ Unknown
		alprazolam	2	2					alprazolam	73.6 ng/mL In Blood (unspecified) ③ Unknown
		marijuana	3	3					thc (tetrahydrocannabinol)	8.9 ng/mL In Blood (unspecified) ③ Unknown
461a	24 y M	fentanyl	1	1	A/C	Ingst + Par	Int-A	1	fentanyl	13 ng/mL In Blood (unspecified) ③ 4 h (pe)
		ethanol	2	2					ethanol	40 mg/dL In Blood (unspecified) ③ Autopsy
462pha	24 y M	oxycodone	1	1	U	Ingst	Int-A	2	oxycodone (free)	310 ng/mL In Blood (unspecified) ③ Unknown

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
		cocaine	2	2					benzoylecognine	210 ng/mL In Blood (unspecified) @ Unknown
		ethanol	3	3					ethanol	337 mg/dL In Blood (unspecified) @ Unknown
463ai	24 y M	fenanyl	1	1	U	Unk	Int-A	1		
464ai	24 y M	fenanyl	1	1	U	Unk	Int-A	1		
		heroin	2	2						
		methamphetamine	3	3						
465ph	24 y F	fenanyl analog (acrylfenanyl)	1	1	A	Par	Unk	1		
		heroin	2	2						
466	24 y F	acetaminophen/oxycodone	1	1	C	Ingst	Unk	3		
467ha	24 y M	salicylate	1	1	A	Ingst	Int-A	1	salicylate	110 ng/mL In Serum @ 7 d (pe)
468ai	24 y M	fenanyl	1	1	U	Ingst + Unk	Int-A	1		
		alprazolam	2	2						
		diphenhydramine	3	3						
469ai	24 y M	fenanyl	1	1	U	Unk	Int-A	1		
		marijuana	2	2						
470pha	25 y M	poppy seeds	1	1	A	Ingst	Int-S	2		
471h	25 y M	acetaminophen/ diphenhydramine	1	1	C	Ingst	Int-M	1	acetaminophen (apap)	18.9 mcg/mL In Blood (unspecified) @ Unknown
472ha	25 y F	acetaminophen	1	1	C	Ingst	Int-M	1	acetaminophen (apap)	131 mcg/mL In Serum @ 15 m (pe)
473ph	25 y M	narcotic, other/unknown	1	1	U	Unk	Unk	1		
474pai	25 y M	fenanyl	1	1	A/C	Ingst + Inhal + Par	Int-A	1		
		oxycodone	2	2						
		cocaine	3	3						
475ai	25 y M	fenanyl	1	1	U	Unk	Int-A	1		methylenedioxyamphetamine (MDMA)
		cocaine	2	2						
		salicylate	3	3						
476	25 y F	salicylate	1	1	A	Ingst	Int-S	1	salicylate	118 mg/dL In Blood (unspecified) @ Unknown
		ethanol	2	2					ethanol	141 mg/dL In Blood (unspecified) @ Unknown
479ai	25 y M	fenanyl	1	1	U	Unk	Int-A	1		
		heroin	2	2						
		methamphetamine	3	3						
		THC homolog	4	4						
477ai	25 y F	fenanyl	1	1	U	Unk	Int-A	1		
		heroin	2	2						
478ai	25 y F	fenanyl	1	1	U	Unk	Int-A	1		
		alprazolam	2	2						
		lorazepam	3	3						
480ph	26 y M	methadone	1	1	A/C	Ingst	Int-M	2		
481h	26 y M	acetaminophen	1	1	A/C	Ingst	Unk	3		
482ph	26 y M	fenanyl	1	1	A	Inhal	Int-A	1		
		alprazolam	2	2						
484ai	26 y M	fenanyl	1	1	U	Unk	Int-M	1		
483ai	26 y M	fenanyl	1	1	U	Unk	Int-A	1		
		alprazolam	2	2						
485pai	26 y M	fenanyl	1	1	A	Inhal	Int-A	1	fenanyl	0.028 mg/L In Blood (unspecified) @ Autopsy
		ethanol	2	2					ethanol	0.05 % (wt/Vol) In Blood (unspecified) @ Autopsy
		ethanol	2	2					ethanol	0.08 % (wt/Vol) In Urine (quantitative only) @ Autopsy
		ethanol	2	2					ethanol	0.08 % (wt/Vol) In Vitreous @ Autopsy
486pa	26 y M	fenanyl	1	1	A	Par	Int-A	1	fenanyl	0.044 mg/L In Blood (unspecified) @ Autopsy

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ③ Time
487pai	26 y M	narcotic, other/unknown	2	2	A	Unk	Int-A	1	cocaine	0.2 mg/L In Blood (unspecified) ③ Autopsy
		cocaine	3	3						
		cocaine	3	3					benzoyllecognine	2.4 mg/L In Blood (unspecified) ③ Autopsy
		alprazolam	4	4					alprazolam	0.1 mg/L In Blood (unspecified) ③ Autopsy
		fentanyl	1	1					fentanyl	0.004 mg/L In Blood (unspecified) ③ Autopsy
		fentanyl analog (4-fluoroisobutyrfentanyl)	2	2						
		morphine	3	3					morphine (free)	21 mcg/L In Blood (unspecified) ③ Autopsy
		ethanol	4	4					ethanol	0.14 % (wt/Vol) In Blood (unspecified) ③ Autopsy
		ethanol	4	4					ethanol	0.18 % (wt/Vol) In Vitreous ③ Autopsy
		ethanol	4	4					ethanol	0.21 % (wt/Vol) In Urine (quantitative only) ③ Autopsy
489ai	26 y M	cocaine	5	5	U	Unk	Unk	1	cocaine	0.3 mg/L In Blood (unspecified) ③ Autopsy
		cocaine	5	5					benzoyllecognine	1.9 mg/L In Blood (unspecified) ③ Autopsy
490ai	26 y M	fentanyl	1	1	U	Unk	Int-A	1		
		alprazolam	2	2						
491ai	26 y M	fentanyl	1	1	U	Unk	Int-A	1		
		alprazolam	2	2						
488ai	26 y M	fentanyl	1	1	A/C	Unk	Int-A	1		
		alprazolam	2	2						
		ethanol	3	3						
492ai	26 y M	fentanyl	1	1	U	Unk	Int-A	1		
		alprazolam	2	2						
		ethanol	3	3						
493ai	26 y M	hydromorphone	1	1	U	Unk	Unk	1		
		oxycodone	2	2						
494ai	26 y M	morphine	1	1	U	Unk	Unk	1		
		bupropion	2	2						
		benzodiazepine	3	3						
495ai	26 y M	oxycodone	1	1	U	Unk	Int-S	1		
496ai	26 y M	diazepam	2	2	U	Unk	Unk	3		
			3	3						
		oxycodone	1	1						
497p	27 y M	ethanol	2	2	A	Inhal + Par	Int-A	1		
		carfentanil	1	1					carfentanil	0.16 ng/mL In Blood (unspecified) ③ Autopsy
		diphenhydramine	2	2					diphenhydramine	100 ng/mL In Blood (unspecified) ③ Autopsy
		methamphetamine	3	3					amphetamine	6.9 ng/mL In Blood (unspecified) ③ Autopsy
		methamphetamine	3	3					methamphetamine	7.8 ng/mL In Blood (unspecified) ③ Autopsy
		marijuana	4	4					11-oh-thc (11-hydroxy-delta-9-tetrahydrocannabinol)	1 ng/mL In Blood (unspecified) ③ Autopsy
		marijuana	4	4					delta-9-carboxy-thc	10 ng/mL In Blood (unspecified) ③ Autopsy
		clonazepam	5	5					7-aminoclonazepam	20 ng/mL In Blood (unspecified) ③ Autopsy
498ph	27 y F	buprenorphine	1	1	U	Ingst + Unk	Int-A	1	buprenorphine	0.81 ng/mL In Serum ③ 18 h (pe)
		buprenorphine	1	1					norbuprenorphine	3.15 ng/mL In Serum ③ 18 h (pe)
		bupropion	2	2					hydroxybupropion	916 ng/mL In Serum ③ 18 h (pe)
499h	27 y M	acetaminophen	1	1	A	Ingst	Int-S	2		
		diphenhydramine	2	2						
500pa	27 y M				U	Par + Unk	Int-A	1		
		carfentanil	1	1					carfentanil	517 pg/mL In Blood (unspecified) ③ Autopsy
501pa	27 y M	heroin	2	1	A	Unk	Int-A	1		
		morphine	1	1					morphine (free)	26 mcg/L In Blood (unspecified) ③ Autopsy
		cocaine	2	2					cocaine	0.05 mg/L In Blood (unspecified) ③ Autopsy

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
		cocaine	2	2					benzoylecognine	2.4 mg/L In Blood (unspecified) @ Autopsy
502pai	27 y M	fentanyl	1	1	A	Par	Int-A	1	fentanyl	5.6 ng/mL In Blood (unspecified) @ Autopsy
		fentanyl analog (acetylfentanyl)	2	2						
503	27 y M	fentanyl analog (despropionyl fentanyl)	2	1	U	Ingst + Unk	Int-A	2		
		narcotic, other/unknown	3	1						
		U-47700	1	1						
		drug, unknown stimulant or street drug	4	2						
504h	27 y M	salicylate	1	1	C	Ingst	Int-M	1	salicylate	110.4 mg/dL In Serum @ Unknown
		salicylate	1	1					salicylate	153 mg/dL In Serum @ Unknown
		salicylate	1	1					salicylate	77 mg/dL In Serum @ Unknown
506ai	27 y M	fentanyl	1	1	U	Unk	Int-A	1		
		heroin	2	2						
		methamphetamine	3	3						
		alprazolam	4	4						
505ai	27 y M	fentanyl	1	1	U	Unk	Int-A	1		
		alprazolam	2	2						
507	27 y F	acetaminophen/ diphenhydramine	1	1	A	Ingst	Int-S	1	acetaminophen (apap)	218 mcg/mL In Serum @ 0 m (pe)
		acetaminophen/ diphenhydramine	1	1					acetaminophen (apap)	24 mcg/mL In Serum @ 73 h (pe)
		acetaminophen/ diphenhydramine	1	1					acetaminophen (apap)	64 mcg/mL In Serum @ 15 h (pe)
		diphenhydramine	2	2						
		diphenhydramine	3	3						
508ai	27 y M	fentanyl	1	1	U	Ingst + Unk	Int-A	1		
		ethanol	2	2						
510ai	27 y M	fentanyl	1	1	U	Unk	Int-A	1		
		heroin	2	2						
		cocaine	3	3						
511ai	27 y F	fentanyl	1	1	U	Unk	Int-A	1		
		heroin	2	2						
512ai	27 y M	fentanyl	1	1	U	Unk	Int-A	1		
		oxycodone	2	2						
509ai	27 y M	fentanyl	1	1	U	Unk	Int-A	1		
513ai	27 y F	methadone	1	1	U	Unk	Int-A	1		
		tramadol	2	2						
		clonazepam	3	3						
514h	28 y F	hydromorphone	1	1	A	Par + Vag	Int-A	1	hydromorphone	0.037 mg/L In Blood (unspecified) @ Autopsy
		hydromorphone	1	1					hydromorphone	0.12 mg/L In Vitreous @ Autopsy
		diphenhydramine	2	2						
515pa	28 y M	morphine	1	1	A	Unk	Int-A	1	morphine (free)	13 mcg/L In Blood (unspecified) @ Autopsy
		fentanyl analog	2	2						
		ethanol	3	3					ethanol	0.12 % (wt/Vol) In Blood (unspecified) @ Autopsy
		ethanol	3	3					ethanol	0.12 % (wt/wt) In Blood (unspecified) @ Autopsy
		ethanol	3	3					ethanol	0.15 % (wt/Vol) In Vitreous @ Autopsy
		ethanol	3	3					ethanol	0.17 % (wt/Vol) In Urine (quantitative only) @ Autopsy
		promethazine	4	4					promethazine	0.1 mg/L In Blood (unspecified) @ Autopsy
516pa	28 y F	fentanyl	1	1	U	Unk	Int-A	1	fentanyl	39.3 ng/mL In Blood (unspecified) @ Autopsy
		heroin	2	2					morphine	138 ng/mL In Blood (unspecified) @ Autopsy
		heroin	2	2					6-mam (6-monoacetylmorphine)	7.9 ng/mL In Blood (unspecified) @ Autopsy
		ethanol	3	3					ethanol	111 mg/dL In Vitreous @ Autopsy
		ethanol	3	3					ethanol	92 mg/dL In Blood (unspecified) @ Autopsy
517pha	28 y M	fentanyl	1	1	A	Ingst	Int-A	1	norfentanyl	1.6 ng/mL In Blood (unspecified) @ Unknown
		fentanyl	1	1					fentanyl	8.4 ng/mL In Blood (unspecified) @ Unknown

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ③ Time
518p	28 y F	fenanyl analog (acetyl fenanyl)	2	2	A	Par	Int-U	1	acetyl fenanyl	2.8 ng/mL In Blood (unspecified) ③ Unknown
		cocaine	3	3					benzoyllecognine	197 ng/mL In Blood (unspecified) ③ Autopsy
		buprenorphine/naloxone (sublingual film)	1	1						
520ai	28 y M				U	Unk	Int-A	1		
519ai	28 y F	fenanyl	1	1	U	Unk	Int-A	1		
		cocaine	2	2						
		buspirone	3	3						
521i	28 y F	fenanyl	1	1	U	Ingst + Unk	Int-A	2		
522ai	28 y M	morphine	1	1	U	Unk	Int-S	1		
		acetaminophen/oxycodone	2	2						
		diphenhydramine	3	3						
523ph	28 y F	salicylate	1	1	A	Unk	Int-U	2		
		paroxetine	2	2						
		methamphetamine	3	3						
524pai	28 y M	narcotic, other/unknown	1	1	A	Inhal	Int-A	1		
525pa	28 y M	fenanyl	1	1	A	Par	Int-A	1	fenanyl	0.079 mg/L In Blood (unspecified) ③ Autopsy
		fenanyl analog (acetyl fenanyl)	2	2					acetyl fenanyl	0.006 mg/L In Blood (unspecified) ③ Autopsy
		fenanyl	1	1					fenanyl	0.004 mg/L In Blood (unspecified) ③ Autopsy
		heroin	2	2						
		dextromethorphan	3	3					dextromethorphan	1 mg/L In Blood (unspecified) ③ Autopsy
		dextromethorphan	3	3					dextromethorphan	1.3 mg/L In Blood (unspecified) ③ Autopsy
527ai	28 y M				U	Unk	Int-A	1		
526ai	28 y M	fenanyl	1	1	U	Ingst + Unk	Int-A	1		
		phencyclidine	2	2						
		ethanol	3	3						
528ai	28 y F				U	Unk	Int-A	1		
529ai	28 y M	morphine	1	1	U	Unk	Int-S	1		
		oxycodone	1	1						
		diazepam	2	2						
530i	29 y F				A	Ingst	Int-S	1		
531pha	29 y M	acetaminophen/ diphenhydramine	1	1	A	Ingst	Int-S	3		
		heroin	2	2						
		acetaminophen/hydrocodone	1	1						
532ha	29 y M	benzodiazepine	2	2	C	Ingst + Par	Int-M	3		
		acetaminophen drug, unknown	1	1						
533pha	29 y F				A/C	Ingst	Int-S	2		
		methadone	1	1						
		ethanol	2	2						
		barbiturate (short acting)	3	3						
		amphetamine	4	4						
534pai	29 y M	benzodiazepine	5	5	A	Par	Int-A	1		
		fenanyl	1	1						
		methamphetamine	2	2						
535ha	29 y F				U	Ingst	Unk	1	oxycodone	133 ng/mL In Blood (unspecified) ③ Unknown
		acetaminophen/oxycodone	1	1					acetaminophen (apap)	18 mcg/mL In Blood (unspecified) ③ Unknown
		acetaminophen/oxycodone	1	1					oxymorphone	6 ng/mL In Blood (unspecified) ③ Unknown
		ethanol	2	2					ethanol	305 mg/dL In Blood (unspecified) ③ Unknown
		cyclic antidepressant, unknown	3	3						
538ai	29 y M				U	Unk	Int-A	1		
536ai	29 y M	fenanyl	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
537ai	29 y M	fenanyl	1	1	U	Unk	Int-A	1		
		oxycodone	2	2						
		alprazolam	3	3						
537ai	29 y M				U	Unk	Int-A	1		
		fenanyl	1	1						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ③ Time
539h	29 y M	heroin	2	2	A	Ingst	Int-S	2		
		methamphetamine	3	3						
		salicylate	1	1						
540ph	29 y M	ethanol	2	2	U	Unk	Int-A	1		
		hydrocodone	1	1						
		methamphetamine	2	2						
541pa	29 y F	diphenhydramine	3	3	A	Par	Int-A	2		
		fentanyl analog	1	1						
		methadone	2	2						
542p	29 y F	oxycodone (extended release)	1	1	A	Ingst	Int-S	3		
543h	29 y F	acetaminophen	1	1	A	Ingst	Int-S	1		
		ethanol	2	2						
544h	29 y F	acetaminophen/oxycodone	1	1	A/C	Ingst	Int-S	2		
		acetaminophen/hydrocodone	2	2						
		quetiapine	3	3						
		lisdexamfetamine	4	4						
		zolpidem	5	5						
		alprazolam	6	6						
		colchicine	1	1						
		amlodipine	2	2						
		atenolol	3	3						
		warfarin	4	4						
545h	29 y M	lisinopril	5	5	A	Ingst	Int-S	1		
		benazepril/ hydrochlorothiazide	6	6						
		prednisone	7	7						
		simvastatin	8	8						
		lovastatin	9	9						
		colchicine	1	1						
		amlodipine	2	2						
		atenolol	3	3						
		warfarin	4	4						
		lisinopril	5	5						
548ai	29 y M	benazepril/ hydrochlorothiazide	6	6	U	Ingst + Unk	Int-A	2		
		prednisone	7	7						
		simvastatin	8	8						
546ai	29 y M	lovastatin	9	9	U	Ingst + Unk	Int-A	2		
		fentanyl	1	1						
		methamphetamine	2	2						
547ai	29 y F	ethanol	3	3	U	Unk	Int-A	1		
		fentanyl	1	1						
549ai	29 y M	cocaine	2	2	U	Unk	Int-S	1		
		heroin	1	1						
550ai	29 y F	ibuprofen	2	2	U	Unk	Int-M	1		
		oxycodone	1	1						
		ethanol	2	2						
551a	30 y M	cyclobenzaprine	3	3	A	Ingst	Int-S	1		
		methadone	1	1						
		methadone	1	1						
		fentanyl	2	2						
552h	30 y F	diazepam	3	3	U	Ingst	Int-S	1		
		acetaminophen/ diphenhydramine	1	1						
		acetaminophen/ diphenhydramine	1	1						
553pa	30 y F	acetaminophen/oxycodone	1	1	A	Ingst	Int-S	1		
		acetaminophen/oxycodone	1	1						
		clonazepam	2	2						
		clonazepam	2	2						
		trazodone	3	3						
		ziprasidone	4	4						
		lamotrigine	5	5						
		omeprazole	6	6						
		buspirone	7	7						
		olanzapine	8	8						
		lorazepam	9	9						
		acetaminophen/oxycodone	1	1						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
		substance (non-drug), unknown	10	10						
554a	30 y F	oxycodone	1	1	A	Par	Unk	1	oxycodone	0.5 mg/L In Blood (unspecified) @ Autopsy
		oxycodone	1	1					oxycodone	0.6 mg/L In Blood (unspecified) @ Autopsy
		methadone	2	2					methadone	0.1 mg/L In Blood (unspecified) @ Autopsy
		methadone	2	2					methadone	0.2 mg/L In Blood (unspecified) @ Autopsy
		fentanyl	3	3					fentanyl	0.002 mg/L In Blood (unspecified) @ Autopsy
		alprazolam	4	4					alprazolam	0.036 mg/L In Blood (unspecified) @ Autopsy
		tramadol	5	5					tramadol	0.3 mg/L In Blood (unspecified) @ Autopsy
555h	30 y M	narcotic, other/unknown	1	1	A	Ingst	Int-A	1		
		lorazepam	2	2						
		alprazolam	3	3						
556pa	30 y M	fentanyl	1	1	A	Ingst	Int-A	1		
557ai	30 y M	fentanyl	1	1	U	Unk	Int-A	1		
		cocaine	2	2						
		alprazolam	3	3						
558ai	30 y M	morphine	1	1	U	Unk	Int-A	2		
		diazepam	2	2						
		dextromethorphan	3	3						
559ai	30 y M	oxycodone	1	1	U	Unk	Int-M	1		
		trazodone	2	2						
		sertraline	3	3						
560p	30 y M	narcotic, other/unknown	1	1	A	Unk	Int-M	2		
561ph	30 y M	fentanyl	1	1	A	Par	Int-A	1		
		heroin	2	2						
562ai	30 y M	acetaminophen	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		cocaine	3	3						
563ai	30 y M	fentanyl	1	1	U	Unk	Int-A	1		
		cocaine	2	2						
564ph	31 y M	acetaminophen/ diphenhydramine	1	1	A	Ingst	Int-S	2		
565pha	31 y M				U	Ingst + Unk	Unk	1		
		fentanyl	1	1					norfentanyl	18.6 ng/mL In Blood (unspecified) @ 30 m (pe)
		fentanyl	1	1					fentanyl	6.74 ng/mL In Blood (unspecified) @ 30 m (pe)
		Mitragyna speciosa korthals	2	2					mitragynine	21 ng/mL In Blood (unspecified) @ 30 m (pe)
		clonazepam	3	3					clonazepam	12 ng/mL In Blood (unspecified) @ 30 m (pe)
		clonazepam	3	3					7-aminoclonazepam	83 ng/mL In Blood (unspecified) @ 30 m (pe)
		alprazolam	4	4					alprazolam	0.25 mg/L In Blood (unspecified) @ 30 m (pe)
		cocaine	5	5					ecgonine methyl ester	0.07 mg/L In Blood (unspecified) @ 30 m (pe)
		cocaine	5	5					benzoylecgonine	0.31 mg/L In Blood (unspecified) @ 30 m (pe)
		diphenhydramine	6	6						
566pai	31 y M	carfentanil	1	1	A	Ingst + Unk	Int-A	1		
		ethanol	2	2						
567ha	31 y F	acetaminophen	1	1	C	Ingst	Int-M	1	acetaminophen (apap)	80 mcg/mL In Plasma @ 30 m (pe)
568pa	31 y M	methadone	1	1	A	Unk	Int-U	1	methadone	0.4 mg/L In Blood (unspecified) @ Autopsy
		morphine	2	2					morphine (free)	21 mcg/L In Blood (unspecified) @ Autopsy
		alprazolam	3	3					alprazolam	0.05 mg/L In Blood (unspecified) @ Autopsy
569ai	31 y M	fentanyl	1	1	U	Unk	Int-A	1		
		alprazolam	2	2						
570pa	32 y M	oxycodone	1	1	A	Unk	Int-A	1	oxycodone	0.1 mg/L In Blood (unspecified) @ Autopsy

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
		ethanol	2	2					ethanol	0.07 % (wt/Vol) In Blood (unspecified) @ Autopsy
		ethanol	2	2					ethanol	0.09 % (wt/Vol) In Blood (unspecified) @ Autopsy
		ethanol	2	2					ethanol	0.12 % (wt/Vol) In Vitreous @ Autopsy
		ethanol	2	2					ethanol	0.16 % (wt/Vol) In Urine (quantitative only) @ Autopsy
571ph	32 y F	acetaminophen/hydrocodone benzodiazepine	1 2	1 2	A	Ingst	Int-S	1		
572pha	32 y M	U-47700	1	1	C	Unk	Unk	1	u-47700	0.37 mg/L In Blood (unspecified) @ 1 h (pe)
		alprazolam	2	2					alprazolam	0.025 mg/L In Blood (unspecified) @ 1 h (pe)
		clonazepam	3	3					clonazepam	0.003 mg/L In Blood (unspecified) @ 1 h (pe)
		clonazepam	3	3					7-aminoclonazepam	0.012 mg/L In Blood (unspecified) @ 1 h (pe)
		human chorionic gonadotrophin	4	4						
573	32 y F	acetaminophen	1	1	A	Ingst	Int-S	1		
574pa	32 y F	fentanyl	1	1	A	Unk	Int-A	1	fentanyl	0.007 mg/L In Blood (unspecified) @ Autopsy
575p	32 y M	narcotic, other/unknown	1	1	A	Ingst + Aspir + Par	Int-A	1		
576h	32 y F	carfentanil	1	1	A	Unk	Int-A	2		
577ai	32 y M	fentanyl	1	1	U	Unk	Int-M	2		
		alprazolam	2	2						
578ai	32 y M	methadone	1	1	U	Unk	Int-A	2		
		citalopram	2	2						
579ph	32 y M	methadone	1	1	A	Ingst	Int-A	1		
		ethanol	2	2					ethanol	210 mg/dL In Blood (unspecified) @ Autopsy
580pha	32 y F	carfentanil	1	1	A	Unk	Int-A	1	carfentanil	0.1 ng/mL In Blood (unspecified) @ 1 h (pe)
		fentanyl analog (fentanyl)	2	2					furanyl fentanyl	0.12 ng/mL In Blood (unspecified) @ 1 h (pe)
		narcotic, other/unknown	3	3					despropionyl fentanyl (4-anpp)	0.57 ng/mL In Blood (unspecified) @ 1 h (pe)
		cocaine	4	4					cocaine	0.12 mg/L In Blood (unspecified) @ 1 h (pe)
		cocaine	4	4					benzoyllecognine	2.84 mg/L In Blood (unspecified) @ 1 h (pe)
		trazodone	5	5					trazodone	0.1 mcg/mL In Blood (unspecified) @ 1 h (pe)
581h	32 y F-Pregnant	narcotic, other/unknown	1	1	A/C	Par	Int-S	2		
		alprazolam	2	2						
582ai	32 y M	fentanyl	1	1	U	Unk	Int-A	1		
583ai	32 y M	methadone	1	1	U	Unk	Int-A	1		
		alprazolam	2	2						
585ai	32 y M	methadone	1	1	U	Unk	Int-A	1		
		clonazepam	2	2						
		buprenorphine	3	3						
586ai	32 y M	methadone	1	1	U	Unk	Int-A	1		
584ai	32 y F	methadone	1	1	U	Unk	Int-A	1		
587h	32 y F	acetaminophen	1	1	C	Ingst	Unt-U	2	acetaminophen (apap)	64 mcg/mL In Serum @ 24 h (pe)
588p	33 y M	fentanyl	1	1	A/C	Unk	Int-A	1		
		heroin	2	2						
		ethanol	3	3						
589pai	33 y F	carfentanil	1	1	A	Ingst + Unk	Int-A	1		
		ethanol	2	2						
590pa	33 y M	fentanyl	1	1	U	Unk	Int-A	1	fentanyl	0.024 mg/L In Blood (unspecified) @ Autopsy
		fentanyl analog (4-fluoroisobutyrfentanyl)	2	2						
		ethanol	3	3					ethanol	0.18 % (wt/Vol) In Blood (unspecified) @ Autopsy

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
		ethanol	3	3					ethanol	0.19 % (wt/Vol) In Vitreous @ Autopsy
		ethanol	3	3					ethanol	0.24 % (wt/Vol) In Urine (quantitative only) @ Autopsy
591ai	33 y M				U	Ingst + Unk	Int-A	1		
		fentanyl	1	1						
		alprazolam	2	2						
		ethanol	3	3						
592ai	33 y M				U	Unk	Int-A	2		
		fentanyl	1	1						
		oxycodone	2	2						
		cocaine	3	3						
593pai	33 y M				A	Unk	Int-A	1		
		fentanyl analog	1	1						
594h	33 y F				C	Ingst	Int-M	2		
		acetaminophen	1	1					acetaminophen (apap)	76 mg/L In Blood (unspecified) @ 30 m (pe)
595ai	33 y M				U	Unk	Int-A	1		
		fentanyl	1	1						
		diazepam	2	2						
		cocaine	3	3						
597ai	33 y M				U	Unk	Int-A	1		
		fentanyl	1	1						
		heroin	2	2						
		methamphetamine	3	3						
596ai	33 y M				U	Unk	Int-A	2		
		fentanyl	1	1						
598ph	33 y M				A/C	Ingst	Int-A	2		
		narcotic, other/unknown drug, unknown	1	1						
		ethanol	2	2						
		ethanol	3	3					ethanol	370 mg/dL In Blood (unspecified) @ Unknown
599pai	34 y M				A	Unk	Int-A	3		
		methadone	1	1					methadone	0.7 mg/L In Blood (unspecified) @ Autopsy
		methadone	1	1					methadone	0.8 mg/L In Blood (unspecified) @ Autopsy
600h	34 y F				A	Ingst	Int-S	1		
		acetaminophen	1	1					acetaminophen (apap)	142.8 mcg/mL In Blood (unspecified) @ Unknown
		warfarin	2	2						
		drug, unknown	3	3						
601h	34 y M				U	Ingst	Int-S	2		
		acetaminophen/diphenhydramine	1	1					acetaminophen (apap)	26 mcg/mL In Serum @ Unknown
602pha	34 y F				A/C	Unk	Int-U	1		
		fentanyl	1	1						
		alprazolam	2	2						
603pha	34 y M				A	Ingst	Int-S	1		
		acetaminophen	1	1					acetaminophen (apap)	699 mcg/mL In Blood (unspecified) @ Unknown
		venlafaxine	2	2						
		trazodone	3	3						
		beta blocker	4	4						
		calcium antagonist	5	5						
		phenytoin	6	6						
604pai	34 y F				A	Unk	Int-A	1		
		carfentanil	1	1						
		narcotic, other/unknown	2	2						
		methamphetamine	3	3						
605ph	34 y M				U	Ingst + Unk	Int-A	2		
		narcotic, other/unknown	1	1						
		benzodiazepine	2	2						
		drug, unknown stimulant or street drug	3	3						
		marijuana	4	4						
606ai	34 y M				U	Unk	Int-A	1		
		fentanyl	1	1						
		heroin	2	2						
		ethanol	3	3						
607ai	34 y F				U	Unk	Int-A	1		
		oxycodone	1	1						
		trazodone	2	2						
		gabapentin	3	3						
		promethazine	4	4						
608pha	34 y F				A	Ingst	Int-S	2		
		methadone	1	1					nordiazepam	0.056 mg/L In Plasma @ Autopsy
		diazepam	2	2					oxazepam	0.559 mg/L In Urine (quantitative only) @ Autopsy
		diazepam	2	2						
		tramadol	3	3					tramadol	0.077 mg/L In Blood (unspecified) @ Autopsy
		temazepam	4	4					temazepam	0.102 mg/L In Blood (unspecified) @ Autopsy
609h	34 y F				A	Ingst	Int-S	1		
		acetaminophen/diphenhydramine	1	1					acetaminophen (apap)	168 mcg/mL In Blood (unspecified) @ Unknown

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ③ Time
611ai	34 y M	fentanyl	1	1	U	Unk	Int-A	1		
		heroin	2	2						
		methamphetamine	3	3						
610ai	34 y M	fentanyl	1	1	U	Ingst + Unk	Int-A	1		
		tramadol	2	2						
		ethanol	3	3						
612ai	34 y F	morphine	1	1	U	Unk	Int-A	2		
		fluoxetine	2	2						
		promethazine	3	3						
613ai	34 y M	oxycodone	1	1	U	Unk	Unk	2		
		hydrocodone	2	2						
		alprazolam	3	3						
614pa	35 y F	tramadol	1	1	U	Ingst	Int-S	2	tramadol	2900 ng/mL In Blood (unspecified) ③ Autopsy
		gabapentin	2	2					gabapentin	11.8 mcg/mL In Blood (unspecified) ③ Autopsy
		methadone	3	3						
		pregabalin	4	4						
615ha	35 y M	acetaminophen/hydrocodone	1	1	A	Ingst	Int-S	2	hydrocodone	0.12 mcg/mL In Blood (unspecified) ③ 3 d (pe)
		benzodiazepine	2	2						
		cyclic antidepressant, unknown	3	3						
616h	35 y F	acetaminophen	1	1	A/C	Ingst	Unt-M	1	acetaminophen (apap)	118 mcg/mL In Blood (unspecified) ③ Unknown
617ha	35 y F	acetaminophen	1	1	A	Ingst	Int-S	1	acetaminophen (apap)	143 mg/L In Plasma ③ Unknown
618	35 y F	tramadol	1	1	A/C	Ingst	Int-S	2		
		sodium oxybate	2	2						
619ai	35 y F	fentanyl	1	1	U	Unk	Int-M	1		
		clonazepam	2	2						
620ai	35 y M	fentanyl	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
			3	3						methylenedioxyamphetamine (MDMA)
621ai	35 y M	fentanyl	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		amphetamine	3	3						
622ai	35 y F	morphine	1	1	U	Unk	Int-A	2		
		oxycodone	2	2						
		clonazepam	3	3						
623ai	35 y M	salicylate	1	1	U	Unk	Int-U	1		
		sertraline	2	2						
624pai	35 y M	oxycodone	1	1	A	Unk	Int-A	1	oxycodone	0.9 mg/L In Blood (unspecified) ③ Autopsy
		oxycodone	1	1					oxycodone	1.1 mg/L In Blood (unspecified) ③ Autopsy
		fentanyl	2	2						
		fentanyl analog (4-fluoroisobutyrfentanyl)	3	3						
		amphetamine	4	4					amphetamine	0.2 mg/L In Blood (unspecified) ③ Autopsy
		cyclobenzaprine	5	5					cyclobenzaprine	0.1 mg/L In Blood (unspecified) ③ Autopsy
625pi	35 y M	fentanyl	1	1	A	Par	Int-A	1		
626ai	35 y M	fentanyl	1	1	A	Unk	Int-A	1		
		oxycodone	2	2						
		alprazolam	3	3						
627ai	35 y M	methadone	1	1	U	Unk	Int-A	2		
		hydrocarbon (fluorinated)	2	2						
628ai	35 y F	morphine	1	1	U	Unk	Unk	2		
		gabapentin	2	2						
		cyclobenzaprine	3	3						
629ai	35 y F	oxycodone	1	1	U	Unk	Int-A	2		
		THC homolog	2	2						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ③ Time
630ai	35 y M	oxycodone	1	1	U	Unk	Int-A	1		
		alprazolam	2	2						
		lorazepam	3	3						
631ai	35 y F	salicylate	1	1	U	Unk	Unt-M	2		
		diphenhydramine	2	2						
		trimethoprim	3	3						
632ai	35 y M	tramadol	1	1	U	Ingst + Unk	Int-A	1		
		oxycodone	2	2						
		ethanol	3	3						
633p	36 y F	tramadol	1	1	A	Ingst	Int-S	2	tramadol	251 ng/mL In Blood (unspecified) ③ Autopsy
		clonazepam	3	2					clonazepam	13 ng/mL In Blood (unspecified) ③ Autopsy
		clonazepam	3	2					7-aminoclonazepam	87 ng/mL In Blood (unspecified) ③ Autopsy
		trazodone	2	2					trazodone	971 ng/mL In Blood (unspecified) ③ Autopsy
		lorazepam	4	3						
		buprenorphine	5	4						
634pi	36 y M	fentanyl	1	1	A	Par	Int-A	2		
635ph	36 y M	fentanyl (transdermal)	1	1	A	Ingst	Int-U	1		
		ethanol	2	2					ethanol	245 mg/dL In Serum ③ Unknown
636a	36 y M	fentanyl	1	1	A	Unk	Int-A	1	fentanyl	0.001 mg/L In Blood (unspecified) ③ Autopsy
		fentanyl	1	1					fentanyl	0.002 mg/L In Blood (unspecified) ③ Unknown
		diphenhydramine	2	2					diphenhydramine	0.07 mg/L In Blood (unspecified) ③ Autopsy
637pha	36 y M	acetaminophen/ butalbital/cafeine	1	1	U	Ingst	Unk	3	acetaminophen (apap)	16 mcg/mL In Blood (unspecified) ③ Unknown
		acetaminophen/ butalbital/cafeine	1	1					butalbital	6.3 mcg/mL In Blood (unspecified) ③ Unknown
		buprenorphine/naloxone (sublingual tablet)	2	2						
		marijuana	3	3					delta-9-thc	4.3 ng/mL In Blood (unspecified) ③ Unknown
638	36 y F	acetaminophen	1	1	U	Ingst	Int-S	2	acetaminophen (apap)	33 mcg/mL In Blood (unspecified) ③ Unknown
		bupropion	2	2						
639	36 y F	acetaminophen	1	1	U	Ingst	Unk	2	acetaminophen (apap)	48 mcg/mL In Blood (unspecified) ③ Unknown
640ai	36 y M	fentanyl	1	1	U	Unk	Int-A	1		
		oxycodone	2	2						
		alprazolam	3	3						
641ai	36 y M	methadone	1	1	U	Unk	Int-A	2		
		ethanol	2	2						
642ai	36 y M	morphine	1	1	U	Unk	Int-A	1		
		oxycodone	2	2						
		amitriptyline	3	3						
643h	36 y F	acetaminophen/ diphenhydramine	1	1	U	Ingst	Int-S	2	acetaminophen (apap)	72 mg/L In Serum ③ 1 h (pe)
		drug, unknown	2	2						
644ai	36 y M	fentanyl	1	1	U	Unk	Int-A	2		
		diazepam	2	2						
645ai	36 y M	fentanyl	1	1	U	Unk	Int-A	1		
		oxycodone	2	2						
		zolpidem	3	3						
646ai	36 y M	fentanyl	1	1	U	Unk	Int-A	1		
		ethanol	2	2						
647ai	36 y M	hydromorphone	1	1	U	Unk	Int-A	2		
		oxycodone	2	2						
648ai	36 y F	salicylate	1	1	U	Unk	Unk	1		
		isopropanol	2	2						
649ai	36 y F	salicylate	1	1	U	Unk	Unk	1		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
650h	37 y M	ibuprofen ethanol	1 2	1 2	A	Ingst	Int-S	2		
651	37 y M	acetaminophen/ diphenhydramine	1	1	A	Ingst	Int-S	2	ethanol	13.3 mg/dL In Blood (unspecified) @ Unknown
652h	37 y M	acetaminophen/oxycodone acetaminophen/oxycodone acetaminophen/oxycodone acetaminophen/oxycodone acetaminophen/oxycodone acetaminophen/oxycodone acetaminophen/oxycodone acetaminophen/hydrocodone	1 1 1 1 1 1 1 2	1 1 1 1 1 1 1 2	C	Ingst	Int-U	3	acetaminophen (apap) acetaminophen (apap) acetaminophen (apap) acetaminophen (apap) acetaminophen (apap) acetaminophen (apap) acetaminophen (apap) acetaminophen (apap)	20 mg/dL In Serum @ 26.5 h (pe) 21 mg/dL In Serum @ 32.5 h (pe) 27 mg/dL In Serum @ 22 h (pe) 41 mg/dL In Serum @ 17 h (pe) 44 mg/dL In Serum @ 15 h (pe) 49 mg/dL In Serum @ 12 h (pe) 89 mg/dL In Serum @ 5 m (pe)
653ai	37 y F	oxycodone diazepam baclofen fentanyl	1 2 3 4	1 2 3 4	U	Unk	Int-M	1		
654	37 y M	acetaminophen acetaminophen ibuprofen diphenhydramine	1 1 2 3	1 1 2 3	A	Ingst	Int-S	2	acetaminophen (apap) acetaminophen (apap)	39.5 mcg/mL In Blood (unspecified) @ 16 h (pe) 53 mcg/mL In Blood (unspecified) @ 1 h (pe)
655	37 y F	acetaminophen	1	1	A	Ingst	Int-S	1		
656	37 y F	acetaminophen	1	1	U	Ingst	Int-M	2	acetaminophen (apap)	116 mcg/mL In Blood (unspecified) @ Unknown
657ai	37 y M	fentanyl	1	1	U	Unk	Int-A	1		
658ai	37 y F	alprazolam methadone dextromethorphan doxylamine	2 1 2 3	2 1 2 3	U	Unk	Unk	3		
659ai	37 y F	methadone	1	1	U	Unk	Int-A	1		
660ai	37 y M	oxycodone alprazolam bupropion	1 2 3	1 2 3	U	Unk	Int-A	2		
661h	38 y M	acetaminophen ethanol	1 2	1 2	C	Ingst	Int-M	1	acetaminophen (apap)	64 mcg/mL In Serum @ Unknown
662h	38 y F	acetaminophen	1	1	C	Ingst	Int-M	2	acetaminophen (apap)	54 mcg/mL In Blood (unspecified) @ Unknown
663pa	38 y M	ethanol methadone	2 1	2 1	A	Unk	Unk	2	methadone	0.3 mg/L In Blood (unspecified) @ Autopsy
665ai	38 y M	fentanyl oxycodone gabapentin	1 2 3	1 2 3	U	Ingst + Unk	Int-U	2		
664ai	38 y M	fentanyl	1	1	U	Unk	Int-A	1		
666ai	38 y F	methadone sertraline	1 2	1 2	U	Unk	Int-A	1		
667	38 y F	acetaminophen	1	1	U	Ingst + Unk	Int-U	3	acetaminophen (apap)	28 mcg/mL In Blood (unspecified) @ Unknown
668ai	38 y M	acetaminophen ethanol hydrocodone	1 2 3	1 2 3	U	Unk	Int-A	1		
673ai	38 y M	fentanyl oxycodone ethanol	1 2 3	1 2 3	U	Unk	Int-A	2		
669ai	38 y M	fentanyl heroin	1 2	1 2	U	Unk	Int-A	1		
671ai	38 y F	fentanyl oxycodone dextromethorphan	1 2 3	1 2 3	U	Unk	Int-A	1		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
672ai	38 y M	fentanyl alprazolam alcohol, unknown	1 2 3	1 2 3	U	Ingst + Unk	Int-A	1		
670ai	38 y M	fentanyl oxycodone	1 2	1 2	U	Unk	Int-A	2		
674ai	38 y M	fentanyl benzodiazepine ethanol	1 2 3	1 2 3	U	Unk	Int-A	1		
675ai	38 y F	narcotic, other/unknown benzodiazepine skeletal muscle relaxant	1 2 3	1 2 3	U	Unk	Unk	2		
676ha	39 y M	tramadol acetaminophen/hydrocodone eszopiclone alprazolam ethanol	1 2 3 4 5	1 2 3 4 5	A	Ingst	Int-S	2		
677pha	39 y F	acetaminophen/hydrocodone brompheniramine/ phenylpropanolamine ethanol	1 2 3	1 2 3	A	Ingst	Int-S	1	acetaminophen (apap)  ethanol	247 mcg/mL In Serum @ Unknown  105 mg/dL In Blood (unspecified) @ Autopsy
678ph	39 y F	acetaminophen/oxycodone acetaminophen/hydrocodone alprazolam diphenhydramine diphenhydramine	1 2 3 4 5	1 2 3 4 5	A	Ingst	Unk	2		
679pha	39 y F	morphine  oxycodone  oxymorphone  cocaine cyclic antidepressant, unknown benzodiazepine vortioxetine	1  2  3  4 5  6 7	1  2  3  4 5  6 7	A	Ingst	Int-U	2	morphine  oxycodone  oxymorphone	0.455 mcg/mL In Urine (quantitative only) @ Autopsy 0.991 mcg/mL In Urine (quantitative only) @ Autopsy 0.265 mcg/mL In Urine (quantitative only) @ Autopsy
684ai	39 y M	fentanyl baclofen cyclobenzaprine	1 2 3	1 2 3	U	Unk	Int-A	1		
680ai	39 y M	fentanyl methamphetamine	1 2	1 2	U	Unk	Int-A	1		
683ai	39 y M	fentanyl bupropion ketamine propofol	1 2 3 4	1 2 2 3	U	Unk	Int-S	2		
681ai	39 y M	fentanyl alprazolam	1 2	1 2	U	Unk	Int-A	1		
682ai	39 y M	fentanyl oxycodone ethanol	1 2 3	1 2 3	U	Unk	Unk	1		
685ai	39 y M	fentanyl methamphetamine ethanol	1 2 3	1 2 3	U	Ingst + Unk	Int-A	1		
686h	39 y M	acetaminophen ethanol	1 2	1 2	C	Ingst	Int-M	1	acetaminophen (apap)	120 mcg/mL In Serum @ Unknown
687pha	40 y M	fentanyl  morphine  morphine  codeine	1  2  2  3	1  2  2  3	A	Unk	Int-A	1	fentanyl  morphine (free)  morphine  codeine	9.2 mcg/mL In Blood (unspecified) @ 1 h (pe) 0.05 mg/L In Blood (unspecified) @ 1 h (pe) 0.62 mg/L In Blood (unspecified) @ 1 h (pe) 0.04 mg/L In Blood (unspecified) @ 1 h (pe)
688pa	40 y M	morphine  alprazolam	1  2	1  2	A	Unk	Int-U	1	morphine (free)  alprazolam	380 mcg/L In Blood (unspecified) @ Autopsy 0.09 mg/L In Blood (unspecified) @ Autopsy

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ③ Time
689pai	40 y M	fentanyl	1	1	A	Par	Int-A	1	fentanyl	0.034 mg/L In Blood (unspecified) ③ Autopsy
690h	40 y F	acetaminophen	1	1	U	Ingst	Int-U	2		
691ai	40 y M	ethanol	2	2	U	Unk	Int-A	1		
692i	40 y F	fentanyl	1	1	U	Unk	Int-U	1		
		oxycodone	2	2						
		alprazolam	3	3						
693ai	40 y F	oxycodone	1	1	U	Unk	Int-S	1		
		oxymorphone	2	2						
		quetiapine	3	3						
694ai	40 y F	oxycodone	1	1	U	Unk	Unk	2		
		gabapentin	2	2						
		cyclobenzaprine	3	3						
		bupropion	4	4						
695ai	40 y F	oxymorphone	1	1	U	Unk	Unk	2		
		alprazolam	2	2						
		lorazepam	3	3						
696ai	40 y F	oxycodone	1	1	U	Unk	Int-S	1		
		oxymorphone	2	2						
		clonazepam	3	3						
697ha	41 y M	oxycodone	1	1	C	Ingst	Int-A	1	acetaminophen (apap)	59 mcg/mL In Serum @ 1 h (pe)
		gabapentin	2	2					ethanol	110 mg/dL In Blood (unspecified) ③ Autopsy
		cyclobenzaprine	3	3					ethanol	173 mg/dL In Serum @ 1 h (pe)
698h	41 y M	ethanol	1	1	A	Ingst	Int-S	2	salicylate	9.3 mg/dL In Serum @ 1 h (pe)
		salicylate	3	3					acetaminophen (apap)	145 mcg/mL In Serum @ 2 d (pe)
699pai	41 y F	acetaminophen	1	1	A	Par	Int-A	1		
		salicylate	2	2						
		ethanol	3	3						
700pai	41 y M	fentanyl	1	1	A	Par	Int-A	1		
701ai	41 y M	heroin	2	2	U	Unk	Int-A	1		
702ai	41 y M	fentanyl	1	1	U	Unk	Int-A	1		
703pa	41 y M	methadone	1	1	A	Par	Int-A	1		
		diazepam	2	2						
		oxycodone	3	3						
		fentanyl	1	1					fentanyl	8 ng/mL In Blood (unspecified) ③ Autopsy
		heroin	2	2					6-mam (6-monoacetylmorphine)	4.3 ng/mL In Blood (unspecified) ③ Autopsy
		heroin	2	2					morphine	47.6 ng/mL In Blood (unspecified) ③ Autopsy
		gabapentin	3	3					gabapentin	10.8 mcg/mL In Blood (unspecified) ③ Autopsy
704	41 y M	acetaminophen	1	1	A/C	Ingst	Int-S	1	acetaminophen (apap)	194 mcg/mL In Blood (unspecified) @ 1 d (pe)
705	41 y F	venlafaxine	2	2	U	Unk	Int-S	2		
706ai	41 y F	salicylate	1	1	U	Unk	Int-S	1	salicylate	58 mg/dL In Blood (unspecified) ③ Unknown
707ai	41 y M	fentanyl	1	1	U	Unk	Int-A	1		
		bupropion	2	2						
		fluoxetine	3	3						
708ai	41 y F	fentanyl	1	1	U	Unk	Int-A	2		
		heroin	2	2						
		methamphetamine	3	3						
710ai	41 y F	methadone	1	1	U	Unk	Int-A	1		
711ai	41 y M	morphine	1	1	A	Unk	Unk	1		
		hydromorphone	2	2						
		butalbital	3	3						
		morphine	1	1						
		oxycodone	2	2						
		diphenhydramine	3	3						

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
709ai	41 y F	morphine	1	1	U	Unk	Int-A	1		
		oxycodone	2	2						
		oxymorphone	3	3						
712h	41 y F	acetaminophen/hydrocodone	1	1	C	Ingst	Int-U	1	acetaminophen (apap)	10.1 mcg/mL In Blood (unspecified) @ 1 d (pe)
		acetaminophen/hydrocodone	1	1					acetaminophen (apap)	41 mcg/mL In Blood (unspecified) @ 5.5 h (pe)
		acetaminophen/hydrocodone	1	1					acetaminophen (apap)	54 mcg/mL In Blood (unspecified) @ 15 m (pe)
		ethanol	2	2					ethanol	94 mg/dL In Blood (unspecified) @ Unknown
		salicylate	3	3					salicylate	12.4 mg/dL In Blood (unspecified) @ Unknown
713ha	42 y F	acetaminophen	1	1	C	Ingst	Int-M	1	acetaminophen (apap)	16 mcg/mL In Blood (unspecified) @ Unknown
714	42 y M	salicylate	1	1	A	Ingst	Int-S	1		
715h	42 y F	acetaminophen/oxycodone	1	1	A/C	Ingst	Int-S	2		
		diazepam	2	2						
716	42 y F	acetaminophen	1	1	U	Ingst	Unk	2	acetaminophen (apap)	3.1 mcg/mL In Blood (unspecified) @ Unknown
		warfarin	2	2						
717	42 y M	tramadol	1	1	U	Ingst	Int-S	2		
		oxcarbazepine	2	2						
718ai	42 y M	oxycodone	1	1	U	Unk	Int-A	1		
		diazepam	2	2						
		alprazolam	3	3						
719ai	42 y M	oxycodone	1	1	U	Unk	Int-M	1		
		clonazepam	2	2						
		quetiapine	3	3						
720ha	42 y F	acetaminophen/hydrocodone	1	1	C	Ingst	Unk	3	hydrocodone	24 mcg/mL In Blood (unspecified) @ Unknown
		acetaminophen/hydrocodone	1	1					acetaminophen (apap)	290 mcg/mL In Blood (unspecified) @ Unknown
		acetaminophen/hydrocodone	1	1					acetaminophen (apap)	323 mcg/mL In Blood (unspecified) @ Unknown
721ha	42 y F	tramadol	1	1	A/C	Ingst	Int-S	1		
		propranolol	2	2						
		escitalopram	3	3						
		gabapentin	4	4						
		ethanol	5	5						
722	42 y F	acetaminophen	1	1	U	Ingst	Int-S	2	acetaminophen (apap)	20 mcg/mL In Serum @ Unknown
		sumatriptan	2	2						
		diphenhydramine	3	3						
		benzodiazepine	4	4						
723ai	42 y F	fentanyl	1	1	U	Unk	Int-A	1		
		cocaine	2	2						
		ethanol	3	3						
724	43 y F	acetaminophen	1	1	A	Ingst	Int-S	1	acetaminophen (apap)	21.8 mcg/mL In Blood (unspecified) @ 3 d (pe)
725h	43 y F	oxycodone	1	1	A/C	Ingst	Int-A	2		
726pi	43 y F	carfentanil	1	1	A	Unk	Int-A	1		
727ai	43 y M	methadone	1	1	U	Unk	Unk	2		
		alprazolam	2	2						
		diazepam	3	3						
728ai	43 y M	fentanyl	1	1	U	Unk	Int-A	2		
729ai	43 y M	fentanyl	1	1	U	Unk	Int-A	1		
730ai	43 y M	morphine	1	1	U	Ingst + Unk	Int-A	1		
		methamphetamine	2	2						
		ethanol	3	3						
731pi	44 y F	fentanyl	1	1	A	Par	Int-A	2		
732pai	44 y M	fentanyl	1	1	A	Ingst + Par	Int-A	1	fentanyl	18.5 ng/mL In Blood (unspecified) @ Autopsy
		diazepam	2	2					diazepam	0.47 mg/L In Blood (unspecified) @ Autopsy

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
733pa	44 y M	methadone	1	1	A	Unk	Unk	1	methadone	1.7 mg/L In Blood (unspecified) @ Autopsy
		methadone	1	1					methadone	4.5 mg/L In Blood (unspecified) @ Autopsy
734h	44 y F	acetaminophen	1	1	C	Ingst	Int-M	2	acetaminophen (apap)	0 mcg/mL In Blood (unspecified) @ Unknown
735ph	44 y F	oxycodone	1	1	A	Ingst	Int-S	2		
		methadone	2	2						
		zolpidem	3	3						
		ethanol	4	4						
736ai	44 y M	fentanyl	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		acetaminophen/hydrocodone	3	3						
737pa	44 y F	methadone	1	1	A	Unk	Int-A	1	methadone	0.4 mg/L In Blood (unspecified) @ Autopsy
		methadone	1	1					methadone	0.7 mg/L In Blood (unspecified) @ Autopsy
		hydroxyzine	2	2					hydroxyzine	2.1 mg/L In Blood (unspecified) @ Autopsy
		hydroxyzine	2	2					hydroxyzine	3.3 mg/L In Blood (unspecified) @ Autopsy
		trazodone	3	3					trazodone	3.3 mg/L In Blood (unspecified) @ Autopsy
		trazodone	3	3					trazodone	3.8 mg/L In Blood (unspecified) @ Autopsy
		alprazolam	4	4					alprazolam	0.1 mg/L In Blood (unspecified) @ Autopsy
738h	44 y M	narcotic, other/unknown	1	1	U	Ingst	Int-S	2		
		ethanol	2	2					ethanol	100 mg/dL In Serum @ 30 m (pe)
739h	44 y F	acetaminophen	1	1	A	Ingst	Int-S	1	acetaminophen (apap)	614 mcg/mL In Blood (unspecified) @ Unknown
740ai	44 y M	temazepam	2	2	U	Ingst + Unk	Int-A	1		
		fentanyl	1	1						
		alprazolam	2	2						
		ethanol	3	3						
741ai	44 y F	morphine	1	1	U	Ingst + Unk	Unk	2		
		hydromorphone	2	2						
		ethanol	3	3						
742ai	44 y M	oxycodone	1	1	U	Unk	Unk	1		
		nortriptyline	2	2						
		morphine	3	3						
743ph	45 y M	narcotic, other/unknown	1	1	C	Par	Int-A	1		
744ai	45 y F	codeine	1	1	U	Unk	Int-S	1		
		acetaminophen	2	2						
		alprazolam	3	3						
745ai	45 y M	fentanyl	1	1	U	Unk	Int-A	2		
		oxycodone	2	2						
		methamphetamine	3	3						
746ai	45 y M	oxycodone	1	1	U	Unk	Unk	2		
		oxymorphone	2	2						
		ethanol	3	3						
747ai	45 y M	acetaminophen	1	1	U	Unk	Unk	2		
		citalopram	2	2						
		diphenhydramine	3	3						
748ai	45 y M	fentanyl	1	1	U	Unk	Int-A	1		
		ethanol	2	2						
749ai	45 y F	methadone	1	1	U	Unk	Unk	2		
		fluoxetine	2	2						
		paroxetine	3	3						
750ai	45 y M	oxycodone	1	1	U	Ingst + Unk	Int-A	1		
		alcohol, unknown	2	2						
751a	46 y F	acetaminophen	1	1	U	Ingst + Par	Int-S	1	acetaminophen (apap)	66 mcg/mL In Blood (unspecified) @ 1 h (pe)
		acetaminophen	1	1					acetaminophen (apap)	80 mcg/mL In Blood (unspecified) @ 1 d (pe)

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
752pha	46 y F	venlafaxine	2	2	U	Ingst	Int-S	2	o-desmethyl-venlafaxine	0.21 mcg/mL In Blood (unspecified) @ 1 d (pe)
		venlafaxine	2	2					venlafaxine	0.87 mcg/mL In Blood (unspecified) @ 1 d (pe)
		olanzapine	3	3					olanzapine	0.066 mcg/mL In Blood (unspecified) @ 1 d (pe)
		drain cleaner	4	4						
		insulin	5	5						
753pha	46 y F	acetaminophen/hydrocodone	1	1	U	Ingst	Int-S	1		
		oxycodone	2	2						
		butalbital/cafeine/codeine/salicylate	1	1					salicylate	17 mg/dL In Serum @ Unknown
754p	46 y F	butalbital/cafeine/codeine/salicylate	1	1	A/C	Par	Int-A	1	butalbital	2.6 mcg/mL In Serum @ Unknown
		clonazepam	2	2						
		drug, unknown	3	3						
		carfentanil	1	1					carfentanil	1.2 ng/mL In Blood (unspecified) @ Autopsy
		methadone	2	2					methadone	110 ng/mL In Blood (unspecified) @ Autopsy
755h	46 y M	clonazepam	3	3	A	Ingst	Unk	3		
		methamphetamine	4	4						
756pa	46 y F	acetaminophen	1	1	A	Unk	Unk	1		
		fentanyl	1	1					fentanyl	0.017 mg/L In Blood (unspecified) @ Autopsy
757	46 y F				C	Ingst	Int-M	1		
		acetaminophen	1	1					acetaminophen (apap)	95.2 mcg/mL In Blood (unspecified) @ Unknown
		salicylate	2	2					salicylate	13.2 mg/dL In Blood (unspecified) @ Unknown
		ethanol	3	3					ethanol	26 mg/dL In Blood (unspecified) @ Unknown
758ai	46 y F				U	Unk	Int-A	1		
		acetaminophen	1	1						
		methamphetamine	2	2						
760ai	46 y M	methadone	3	3	U	Unk	Int-A	1		
		fentanyl	1	1						
		tramadol	2	2						
761ai	46 y M	lorazepam	3	3	U	Unk	Int-A	2		
		fentanyl	1	1						
		cocaine	2	2						
759ai	46 y F	alprazolam	3	3	U	Ingst + Unk	Int-M	2		
		fentanyl	1	1						
		oxycodone	2	2						
762ai	46 y M	nortriptyline	3	3	U	Unk	Int-A	2		
		hydrocodone	1	1						
		diazepam	2	2						
763ai	46 y M	hydromorphone	3	3	U	Unk	Int-A	1		
		oxycodone	1	1						
		alprazolam	2	2						
765ai	46 y M	carisoprodol	3	3	U	Unk	Int-A	2		
		oxycodone	1	1						
		alprazolam	2	2						
764ai	46 y F	diazepam	3	3	U	Ingst + Unk	Int-A	1		
		oxycodone	1	1						
		diazepam	2	2						
766h	47 y M	alcohol, unknown	3	3	A	Ingst	Int-S	1		
		acetaminophen	1	1					acetaminophen (apap)	252 mcg/mL In Serum @ Unknown
		clonazepam	2	2						
767h	47 y F	acetaminophen	1	1	A	Ingst	Int-S	2	acetaminophen (apap)	44.4 mcg/mL In Blood (unspecified) @ Unknown
768	47 y F	acetaminophen	1	1	A	Ingst	Int-U	2		
769ph	47 y F				U	Unk	Int-S	2		
		acetaminophen	1	1					acetaminophen (apap)	108 mcg/mL In Blood (unspecified) @ Unknown
770	47 y F	oxycodone	2	2	C	Ingst	Int-U	1		
		acetaminophen	1	1					acetaminophen (apap)	166 mcg/mL In Serum @ Unknown
771pa	47 y F	methadone	1	1	A	Ingst + Unk	Int-A	1	methadone	0.5 mg/L In Blood (unspecified) @ Autopsy

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
772	47 y F	methadone	1	1	A	Ingst	Int-S	1	methadone	0.6 mg/L In Blood (unspecified) @ Autopsy
		cocaine	2	2					benzoyllecognine	1.2 mg/L In Blood (unspecified) @ Autopsy
		cyclobenzaprine	3	3					cyclobenzaprine	0.09 mg/L In Blood (unspecified) @ Autopsy
		acetaminophen ethanol (non-beverage)	1 2	1 2					acetaminophen (apap)	770 mcg/mL In Serum @ Unknown
773h	47 y F	oxycodone	1	1	U	Ingst	Int-S	2		
774pai	47 y M	lorazepam	2	2	A/C	Ingst + Inhal + Par	Int-A	1		
		fentanyl	1	1						
		cocaine	2	2						
		chlordiazepoxide	3	3						
775ai	47 y F	ethanol	4	4	U	Unk	Int-M	2		
		oxycodone	1	1						
		diltiazem	2	2						
		oxycodone	1	1						
776ai	47 y F	diphenhydramine	2	2	U	Unk	Unt-U	3		
		dicyclomine	3	3						
		acetaminophen	1	1						
		nonsteroidal antiinflammatory drug	2	2						
777	47 y F	acetaminophen	1	1	A/C	Ingst	Unt-T	3		
		nonsteroidal antiinflammatory drug	2	2						
		acetaminophen/hydrocodone	1	1					acetaminophen (apap)	37.9 mcg/mL In Plasma @ Unknown
		acetaminophen/hydrocodone	1	1					hydrocodone	81 ng/mL In Whole Blood @ 9 h (pe)
778h	47 y F	lorazepam	2	2	A	Ingst	Int-U	2		
		trazodone	3	3						
		acetaminophen/hydrocodone	1	1						
		acetaminophen/hydrocodone	1	1						
782ai	47 y M	methamphetamine	3	3	U	Unk	Int-A	2		
		fentanyl	1	1						
		oxycodone	2	2						
		methamphetamine	3	3						
779ai	47 y M	methamphetamine	3	3	U	Ingst + Unk	Unk	1		
		fentanyl	1	1						
		oxycodone	2	2						
		sertraline	3	3						
781ai	47 y M	ethanol	4	4	U	Unk	Int-A	2		
		fentanyl	1	1						
		alprazolam	2	2						
		alprazolam	2	2						
780ai	47 y M	dipyrone	2	2	A	Unk	Int-A	1		
		fentanyl	1	1						
		dipyrone	2	2						
		dipyrone	2	2						
783ai	47 y M	methadone	1	1	U	Unk	Int-A	1		
		amphetamines	2	2						
		amphetamines	2	2						
		amphetamines	2	2						
784ai	47 y F	morphine	1	1	U	Unk	Int-A	2		
		cocaine	2	2						
		lorazepam	3	3						
		lorazepam	3	3						
785ai	47 y F	oxycodone	1	1	U	Unk	Unk	2		
		alprazolam	2	2						
		trazodone	3	3						
		trazodone	3	3						
786ph	47 y M	tramadol	1	1	U	Unk	Int-A	2		
787h	48 y F	acetaminophen	1	1	C	Ingst	Int-M	1		
		methadone	2	2						
		methadone	2	2						
		methadone	2	2						
788ha	48 y M	salicylate	1	1	U	Ingst	Int-S	1		
		salicylate	1	1					salicylate	107 mg/dL In Blood (unspecified) @ Unknown
		salicylate	1	1						
		salicylate	1	1						
790	48 y F	morphine (extended release)	1	1	A/C	Ingst	Int-S	2		
791	48 y M	acetaminophen/hydrocodone	1	1	A/C	Ingst	Int-S	2		
792ha	48 y F	acetaminophen	1	1	C	Ingst	Int-M	3	acetaminophen (apap)	17.7 mcg/mL In Serum @ Unknown
		ethanol	2	2						
		ethanol	2	2						
		ethanol	2	2						
793pi	48 y F	carfentanil	1	1	A	Par	Int-A	2		
		amitriptyline	2	2					nortriptyline	147 ng/mL In Blood (unspecified) @ Autopsy
		amitriptyline	2	2					amitriptyline	321 ng/mL In Blood (unspecified) @ Autopsy
		amitriptyline	2	2						
794pai	48 y F	fentanyl	1	1	A	Par	Int-A	1		
		fentanyl	1	1						
		fentanyl	1	1						
		fentanyl	1	1						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
795ai	48 y M				U	Unk	Int-A	1		
		methadone	1	1						
		amphetamine	2	2						
		methamphetamine	3	3						
796ai	48 y M				A	Unk	Int-S	1		
		morphine	1	1						
		oxycodone	2	2						
		clonazepam	3	3						
797h	48 y M				C	Ingst	Unt-T	2	acetaminophen (apap)	45 mcg/mL In Serum @ Unknown
		acetaminophen	1	1						
		nitroglycerin	2	2						
798ph	48 y M				A/C	Ingst	Int-S	2	acetaminophen (apap)	28 mcg/mL In Serum @ 30 m (pe)
		acetaminophen/hydrocodone drug, unknown	1	1						
			2	2						
799h	48 y M				C	Ingst	Int-M	2	acetaminophen (apap)	30 mcg/mL In Blood (unspecified) @ 1 h (pe)
		acetaminophen	1	1						
		ethanol	2	2					ethanol	192.2 mg/dL In Blood (unspecified) @ 1 h (pe)
800ai	48 y F				U	Unk	Int-A	2		
		methadone	1	1						
		sertraline	2	2						
		methamphetamine	3	3						
801ai	48 y M				U	Unk	Int-U	2		
		morphine	1	1						
802ai	48 y F				U	Unk	Unk	1		
		oxycodone	1	1						
		venlafaxine	2	2						
		clonazepam	3	3						
803pha	49 y M				A	Ingst	Int-U	1		
		fentanyl	1	1					fentanyl	18 ng/mL In Bile @ Autopsy
		fentanyl	1	1					fentanyl	3.9 ng/mL In Whole Blood @ Autopsy
		fentanyl	1	1					fentanyl	6.5 ng/mL In Whole Blood @ Autopsy
		hydrocodone	2	2					hydrocodone (free)	60 ng/mL In Bile @ Autopsy
		methamphetamine	3	3					methamphetamine	110 ng/mL In Bile @ Autopsy
804pai	49 y F				A	Par	Int-A	1		
		fentanyl	1	1					fentanyl	1.9 ng/mL In Blood (unspecified) @ Autopsy
805h	49 y M				A/C	Ingst	Int-M	1	acetaminophen (apap)	68 mcg/mL In Blood (unspecified) @ Unknown
		acetaminophen	1	1						
		acetaminophen	1	1					acetaminophen (apap)	80 mcg/mL In Blood (unspecified) @ Unknown
		ethanol	2	2						
806ph	49 y F				A/C	Ingst	Int-S	2		
		oxycodone	1	1						
807ai	49 y M				U	Unk	Int-M	1		
		methadone	1	1						
		alprazolam	2	2						
		venlafaxine	3	3						
808ai	49 y F				U	Unk	Unk	1		
		morphine	1	1						
		oxycodone	2	2						
		gabapentin	3	3						
809ai	49 y M				U	Unk	Int-A	1		
		oxycodone	1	1						
810ha	49 y F				A	Ingst	Unt-M	1	acetaminophen (apap)	22 mcg/mL In Blood (unspecified) @ Unknown
		acetaminophen	1	1					acetaminophen (apap)	27 mg/L In Blood (unspecified) @ Unknown
		acetaminophen	1	1						
		ethanol	2	2					ethanol	48 mg/dL In Blood (unspecified) @ Unknown
		salicylate	3	3					salicylate	7.4 mg/dL In Blood (unspecified) @ Unknown
811pha	49 y M				U	Unk	Int-A	1		
		narcotic, other/unknown	1	1						
812pa	49 y F				A/C	Ingst	Int-S	1		
		methadone	1	1					methadone	130 ng/mL In Serum @ Unknown
		clonazepam	2	2					7-aminoclonazepam	5.5 ng/mL In Serum @ Unknown
		clozapine	3	3					clozapine	800 ng/mL In Serum @ Unknown
		zolpidem	4	4					zolpidem	92 ng/mL In Serum @ Unknown
		mirtazapine	5	5						
		propranolol	6	6						
		benztropine	7	7						
		lithium	8	8						
		loratadine	9	9						
		thiamine	10	10						
		melatonin	11	11						
813ph	49 y F				A/C	Ingst	Int-S	2		
		tramadol	1	1						
814ai	49 y F				U	Unk	Unk	1		
		hydromorphone	1	1						
		diphenhydramine	2	2						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
815ai	49 y F	narcotic, other/unknown benzodiazepine cyclic antidepressant, unknown	1 2 3	1 2 3	U	Unk	Unk	2		
816ai	49 y F	narcotic, other/unknown benzodiazepine cyclic antidepressant, unknown	1 2 3	1 2 3	U	Unk	Int-A	1		
818ai	49 y M	oxycodone cocaine	1 2	1 2	U	Unk	Int-A	2		
817ai	49 y F	oxycodone	1	1	U	Unk	Int-A	2		
819h	50 y M	acetaminophen/oxycodone diazepam ethanol	1 2 3	1 2 3	A/C	Ingst	Int-S	2	acetaminophen (apap)	52.4 mg/L In Serum @ 1 h (pe)
820pa	50 y F	fentanyl methamphetamine citalopram promethazine	1 2 3 4	1 2 3 4	U	Ingst	Int-S	2	ethanol	207 mg/dL In Serum @ 1 h (pe)
821	50 y F	acetaminophen/hydrocodone cyclobenzaprine	1 2	1 2	U	Ingst	Int-U	2	acetaminophen (apap)	83 mcg/mL In Blood (unspecified) @ Unknown
822h	50 y F	acetaminophen/oxycodone zolpidem benzodiazepine	1 2 3	1 2 3	A	Ingst	Int-S	2		
823	50 y M	salicylate salicylate salicylate salicylate ibuprofen ethanol	1 1 1 1 2 3	1 1 1 1 2 3	A	Ingst	Int-S	1	salicylate salicylate salicylate salicylate ethanol	35.8 mg/dL In Blood (unspecified) @ 1 h (pe) 58 mg/dL In Blood (unspecified) @ 6 h (pe) 61.9 mg/dL In Blood (unspecified) @ 10 h (pe) 68.2 mg/dL In Blood (unspecified) @ 3 h (pe) 53 mg/dL In Blood (unspecified) @ 1 h (pe)
824ha	50 y F	acetaminophen ethanol	1 2	1 2	A/C	Ingst	Int-S	1	acetaminophen (apap)	189 mcg/mL In Blood (unspecified) @ Unknown
825	50 y M	acetaminophen/hydrocodone	1	1	A	Ingst	Int-S	1	acetaminophen (apap)	88 mcg/mL In Blood (unspecified) @ 30 m (pe)
826pha	50 y F	oxycodone lorazepam alprazolam acetaminophen	1 2 3 4	1 2 3 4	A	Ingst	Int-S	2	acetaminophen (apap)	74 mcg/mL In Serum @ Unknown
827ai	50 y M	fentanyl hydrocodone diphenhydramine	1 2 3	1 2 3	U	Unk	Int-A	1		
828ai	50 y M	tramadol methamphetamine	1 2	1 2	U	Unk	Int-S	1		
829ha	50 y F	acetaminophen/oxycodone acetaminophen/oxycodone acetaminophen/oxycodone acetaminophen/oxycodone acetaminophen/oxycodone acetaminophen/oxycodone acetaminophen/oxycodone clonazepam nortriptyline	1 1 1 1 1 1 1 2 3	1 1 1 1 1 1 1 2 3	A	Ingst	Int-S	3	oxymorphone clonazepam 7-aminoclonazepam oxycodone (free) nortriptyline acetaminophen (apap) pseudoephedrine	4 ng/mL In Blood (unspecified) @ Unknown 4.1 ng/mL In Blood (unspecified) @ Unknown 44 ng/mL In Blood (unspecified) @ Unknown 440 ng/mL In Blood (unspecified) @ Unknown 45 ng/mL In Blood (unspecified) @ Unknown 52 mcg/mL In Blood (unspecified) @ Unknown 680 ng/mL In Blood (unspecified) @ Unknown
830h	50 y F	tramadol acetaminophen/hydrocodone baclofen	1 2 3	1 2 3	A	Ingst	Int-S	2		
831a	50 y F	morphine	1	1	U	Unk	Unk	2	morphine	28.1 ng/mL In Blood (unspecified) @ Autopsy

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
		gabapentin	2	2					gabapentin	44.2 mcg/mL In Blood (unspecified) @ Autopsy
		alprazolam	3	3					alprazolam	8.9 ng/mL In Blood (unspecified) @ Autopsy
832h	50 y M	acetaminophen	1	1	C	Ingst	Unt-T	3	acetaminophen (apap)	105.6 mcg/mL In Serum @ 15 m (pe)
833h	50 y F	acetaminophen	1	1	U	Ingst	Int-S	1	acetaminophen (apap)	624 mcg/mL In Blood (unspecified) @ Unknown
836ai	50 y M				U	Unk	Unk	1		
		fentanyl	1	1						
		diazepam	2	2						
835ai	50 y M	citalopram	3	3	U	Unk	Unk	1		
		fentanyl	1	1						
		hydrocodone	2	2						
834ai	50 y M	oxycodone	3	3	U	Unk	Int-A	2		
		fentanyl	1	1						
		methamphetamine	2	2						
837ai	50 y F	alprazolam	3	3	U	Unk	Unk	2		
		oxycodone	1	1						
		hydrocodone	2	2						
838ai	50 y M	gabapentin	3	3	U	Unk	Int-S	1		
		tramadol	1	1						
		methamphetamine	2	2						
839p	51 y M	ranolazine	3	3	U	Unk	Int-S	1		
		fentanyl	1	1					fentanyl	0.8 ng/mL In Blood (unspecified) @ Autopsy
		heroin	2	1						
		methamphetamine	3	2					methamphetamine	459 ng/mL In Blood (unspecified) @ Autopsy
		gabapentin	4	3					gabapentin	16 mcg/mL In Blood (unspecified) @ Autopsy
		marijuana	5	4					delta-9-carboxy-thc	3.7 ng/mL In Blood (unspecified) @ Autopsy
840h	51 y M	acetaminophen	1	1	A	Ingst	Int-S	1	acetaminophen (apap)	201 mcg/mL In Blood (unspecified) @ Unknown
		escitalopram	2	2						
		doxepin	3	3						
841ha	51 y F	cough and cold preparation	4	4	U	Unk	Unk	2		
		oxycodone	1	1						
		buprenorphine	2	2						
		potassium chloride	3	3						
		narcotic, other/unknown	4	4						
842h	51 y F	amphetamine	5	5	C	Ingst	Unt-T	2	acetaminophen (apap)	56 mcg/mL In Blood (unspecified) @ Unknown
843ha	51 y M	salicylate	1	1	A	Ingst	Int-S	1	salicylate	42 mg/dL In Blood (unspecified) @ 1 h (pe)
		salicylate	1	1					salicylate	96.6 mg/dL In Blood (unspecified) @ 7 h (pe)
		salicylate	1	1					salicylate	99.6 mg/dL In Blood (unspecified) @ 10 h (pe)
844h	51 y M	oxycodone	1	1	A/C	Ingst	Int-S	3		
845h	51 y F	buprenorphine/naloxone (sublingual tablet)	1	1	C	Ingst	Int-A	2		
		cocaine	2	2						
846h	51 y F	ethanol	3	3	C	Ingst	Int-M	1	ethanol	11 mg/dL In Serum @ Unknown
847ai	51 y F	salicylate	1	1	U	Unk	Int-A	1	salicylate	23 mg/mL In Serum @ Unknown
		morphine	1	1						
		oxycodone	2	2						
848h	51 y F	clonazepam	3	3	A	Unk	Unk	2		
849	51 y M	narcotic, other/unknown	1	1	A/C	Ingst	Int-U	3	acetaminophen (apap)	204 mcg/mL In Blood (unspecified) @ Unknown
850ai	51 y M	acetaminophen	1	1	U	Unk	Int-A	1		
		narcotic, other/unknown	1	1						
		ethanol	2	2						
851ai	51 y M	oxycodone	1	1	U	Unk	Int-A	2		

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
852ai	51 y M	tapentadol	1	1	U	Unk	Unk	2		
		cyclobenzaprine	2	2						
		gabapentin	3	3						
853	51 y F	acetaminophen	1	1	C	Ingst	Int-M	1	acetaminophen (apap)	33 mcg/mL In Blood (unspecified) @ Unknown
		ethanol	2	2					ethanol	33 mg/dL In Blood (unspecified) @ Unknown
854ph	52 y F	acetaminophen/oxycodone	1	1	A/C	Ingst	Int-S	2		
855p	52 y F	oxycodone	1	1	A	Ingst	Int-S	3		
		morphine	2	2						
		tizanidine	3	3						
		quetiapine	4	4						
		acetaminophen/oxycodone	5	5						
		amphetamine	6	6						
		benzodiazepine	7	7						
		tramadol	8	8						
856	52 y F	acetaminophen/diphenhydramine	1	1	A	Ingst	Int-M	2		
		naproxen	2	2						
		drug, unknown	3	3						
857ph	52 y F	acetaminophen/diphenhydramine	1	1	A	Ingst	Int-S	2	acetaminophen (apap)	569 mcg/mL In Serum @ Unknown
858h	52 y M	acetaminophen	1	1	C	Ingst	Int-M	3	acetaminophen (apap)	29.1 mcg/mL In Serum @ Unknown
		ibuprofen	2	2						
859h	52 y F	acetaminophen/diphenhydramine	1	1	A	Ingst	Int-S	2	acetaminophen (apap)	53 mcg/mL In Blood (unspecified) @ 21 h (pe)
		acetaminophen/diphenhydramine	1	1					acetaminophen (apap)	82.3 mcg/mL In Blood (unspecified) @ Unknown
860ha	52 y F	acetaminophen/hydrocodone	1	1	A	Ingst	Int-S	2		
		acetaminophen/dextromethorphan/doxylamine	2	2						
		amitriptyline	3	3						
		alprazolam	4	4						
861ai	52 y M	oxycodone	1	1	U	Unk	Int-A	1		
		oxymorphone	2	2						
		quetiapine	3	3						
862h	52 y F	acetaminophen	1	1	C	Ingst	Int-S	3		
863ai	52 y M	methadone	1	1	U	Unk	Int-A	2		
		ethanol	2	2						
864ai	52 y M	fentanyl	1	1	U	Unk	Int-A	1		
		ethanol	2	2						
865ai	52 y M	methadone	1	1	U	Unk	Int-A	2		
		oxymorphone	2	2						
		alprazolam	3	3						
866ai	52 y F	oxycodone	1	1	U	Unk	Unk	1		
		methadone	2	2						
		clonazepam	3	3						
867	52 y F	acetaminophen/butalbital/caffeine	1	1	U	Ingst	Int-S	2	acetaminophen (apap)	155.3 mcg/mL In Blood (unspecified) @ Unknown
868ai	52 y M	fentanyl	1	1	U	Unk	Int-A	1		
		cocaine	2	2						
		ethanol	3	3						
869p	53 y F	morphine	1	1	A	Ingst	Int-S	2		
870	53 y M	acetaminophen	1	1	A/C	Ingst	Int-M	3	acetaminophen (apap)	103 mcg/mL In Serum @ 6 h (pe)
871a	53 y M	acetaminophen	1	1	A	Ingst	Int-S	1	acetaminophen (apap)	140 mcg/mL In Blood (unspecified) @ Unknown
872ph	53 y F	oxycodone	1	1	A	Ingst	Int-U	1		
		tramadol	2	2						
		morphine	3	3						
873pai	53 y M	fentanyl	1	1	C	Par	Int-A	1		
		heroin	2	2						
		fentanyl analog (acetyl fentanyl)	3	3						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
874ph	53 y F	acetaminophen/hydrocodone	1	1	A/C	Ingst	Int-S	1	acetaminophen (apap)	343 mcg/mL In Blood (unspecified) @ 10.5 h (pe)
		acetaminophen/hydrocodone	1	1					acetaminophen (apap)	92 mcg/mL In Blood (unspecified) @ 6.5 h (pe)
		morphine (extended release)	2	2						
		clonazepam	3	3						
		cyclobenzaprine	4	4						
875ai	53 y F	fentanyl	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		hydroxyzine	3	3						
		clonazepam	4	4						
876ai	53 y F	oxycodone	1	1	U	Ingst + Unk	Int-A	1		
		oxymorphone	2	2						
		ethanol	3	3						
877h	54 y F	acetaminophen/hydrocodone	1	1	A	Ingst	Int-S	1	acetaminophen (apap)	171 mcg/mL In Blood (unspecified) @ 17 h (pe)
		tramadol	2	2						
878	54 y M	acetaminophen	1	1	U	Ingst	Int-S	1	acetaminophen (apap)	118 mcg/mL In Serum @ Unknown
879	54 y M	acetaminophen	1	1	C	Ingst	Int-M	1	acetaminophen (apap)	164 mcg/mL In Blood (unspecified) @ 4 d (pe)
		acetaminophen	1	1					acetaminophen (apap)	195 mcg/mL In Blood (unspecified) @ 3 d (pe)
		ethanol	2	2					ethanol	61 mg/dL In Blood (unspecified) @ 1 d (pe)
		salicylate	3	3						
		acetaminophen/oxycodone	4	4						
880ph	54 y M	acetaminophen/hydrocodone	1	1	A/C	Ingst	Int-S	1	acetaminophen (apap)	162 mcg/mL In Serum @ Unknown
881h	54 y F	salicylate	1	1	A/C	Ingst	Int-S	2	salicylate	65.3 mg/dL In Blood (unspecified) @ 1 h (pe)
		acetaminophen	2	2						
882h	54 y F	tramadol	1	1	A	Ingst	Int-S	2		
		acetaminophen/hydrocodone	2	2					acetaminophen (apap)	30 mg/L In Serum @ 30 m (pe)
883	54 y F	colchicine	1	1	A/C	Ingst	Int-S	1		
884ai	54 y F	fentanyl	1	1	U	Unk	Int-S	2		
		hydrocodone	2	2						
		phenobarbital	3	3						
885ai	54 y M	methadone	1	1	U	Unk	Int-S	1		
		morphine	2	2						
		hydrocodone	3	3						
886ai	54 y F	oxycodone	1	1	U	Unk	Int-A	2		
		quetiapine	2	2						
		ethanol	3	3						
887ai	54 y F	tramadol	1	1	U	Unk	Int-S	1		
		hydromorphone	2	2						
		oxycodone	3	3						
888p	55 y F	fentanyl	1	1	C	Ingst	Int-S	1		
		drug, unknown	2	2						
889pa	55 y M	morphine	1	1	A	Unk	Int-A	1	morphine (free)	78 mcg/L In Blood (unspecified) @ Autopsy
		fentanyl analog	2	2						
		ethanol	3	3					ethanol	0.06 % (wt/Vol) In Serum @ Unknown
890pha	55 y M	acetaminophen/oxycodone	1	1	U	Ingst	Int-M	2		
		benzodiazepine	2	2						
891pa	55 y F	fentanyl	1	1	A	Unk	Unk	1		
		morphine	2	2					morphine (free)	44 mcg/L In Blood (unspecified) @ Autopsy
		oxycodone	3	3					oxycodone	0.4 mg/L In Blood (unspecified) @ Autopsy
		oxycodone	3	3					oxycodone	0.7 mg/L In Blood (unspecified) @ Autopsy
		ethanol	4	4					ethanol	0.01 mg/L In Blood (unspecified) @ Autopsy
		ethanol	4	4					ethanol	0.02 % (wt/Vol) In Blood (unspecified) @ Autopsy
		cyclobenzaprine	5	5					cyclobenzaprine	0.09 mg/L In Blood (unspecified) @ Autopsy

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
892	55 y F	amitriptyline	6	6	A	Ingst	Int-S	1	amitriptyline	1.8 mg/L In Blood (unspecified) @ Autopsy
		amitriptyline	6	6					amitriptyline	2.1 mg/L In Blood (unspecified) @ Autopsy
		nortriptyline	7	7					nortriptyline	0.4 mg/L In Blood (unspecified) @ Autopsy
		nortriptyline	7	7					nortriptyline	0.8 mg/L In Blood (unspecified) @ Autopsy
893pa	55 y F	acetaminophen/codeine	1	1	A	Ingst	Int-S	1	acetaminophen (apap)	140 mcg/mL In Serum @ 10 h (pe)
		acetaminophen/codeine	1	1					acetaminophen (apap)	27 mcg/mL In Serum @ 36 h (pe)
		clonazepam	2	2						
894ai	55 y F	methadone	1	1	U	Unk	Int-M	2	methadone	0.3 mg/L In Blood (unspecified) @ Autopsy
		methadone	1	1					methadone	0.8 mg/L In Blood (unspecified) @ Autopsy
		benzodiazepine	2	2					7-aminoclonazepam	0.18 mg/L In Blood (unspecified) @ Autopsy
895ai	55 y M	hydrocodone	1	1	U	Unk	Unk	2		
		fluoxetine	2	2						
		alprazolam	3	3						
896h	55 y F	morphine	1	1	A	Ingst	Int-S	2		
		oxycodone	2	2						
		cyclobenzaprine	3	3						
897	55 y F	acetaminophen	1	1	A	Ingst	Int-A	2	acetaminophen (apap)	507 mcg/mL In Blood (unspecified) @ Unknown
		acetaminophen	1	1						
		ethanol	2	2					ethanol	355 mg/dL In Serum @ Unknown
898pa	55 y M	acetaminophen	1	1	U	Derm	Int-S	2	acetaminophen (apap)	6 mcg/mL In Serum @ Unknown
		ethanol	2	2					ethanol	355 mg/dL In Serum @ Unknown
		fentanyl (transdermal)	1	1						
899ai	55 y M	hydromorphone	1	1	U	Unk	Int-A	1		
		oxycodone	2	2						
		ethanol	3	3						
900ai	55 y F	methadone	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		cocaine	3	3						
901ai	55 y F	morphine	1	1	U	Unk	Unk	2		
		alprazolam	2	2						
		citalopram	3	3						
902ai	55 y F	opium	1	1	U	Unk	Int-A	2		
		opium	1	1						
		opium	1	1						
903ai	55 y M	oxycodone	1	1	U	Unk	Unk	2		
		fluoxetine	2	2						
		cyclobenzaprine	3	3						
904ai	55 y M	oxycodone	1	1	U	Unk	Int-M	2		
		morphine	2	2						
		diazepam	3	3						
905ai	55 y F	oxycodone	1	1	U	Unk	Unk	1		
		butalbital	2	2						
		gabapentin	3	3						
906ai	55 y F	oxycodone	1	1	U	Unk	Unk	2		
		alprazolam	2	2						
		diphenhydramine	3	3						
907ai	56 y M	morphine	1	1	U	Ingst + Unk	Int-M	3		
		diazepam	2	2						
		carisoprodol	3	3						
908h	56 y F	acetaminophen	1	1	U	Ingst	Int-M	1	acetaminophen (apap)	43.9 mcg/mL In Blood (unspecified) @ Unknown
		acetaminophen	1	1						
		acetaminophen	1	1						
909h	56 y F	acetaminophen	1	1	A/C	Ingst	Int-S	1	acetaminophen (apap)	128 mg/dL In Blood (unspecified) @ Unknown
		acetaminophen	1	1					acetaminophen (apap)	144 mg/dL In Blood (unspecified) @ Unknown
		acetaminophen	1	1					acetaminophen (apap)	177.8 mg/dL In Blood (unspecified) @ Unknown
910i	56 y M	ibuprofen	2	2	U	Unk	Unk	2		
		diphenhydramine/naproxen	3	3						
		narcotic, other/unknown	1	1						
		clonazepam	2	2						
		quetiapine	3	3						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
911ai	56 y M	oxycodone	1	1	U	Unk	Int-M	1		
		hydromorphone	2	2						
		venlafaxine	3	3						
912pha	56 y M	acetaminophen/ diphenhydramine/ salicylate	1	1	A	Ingst	Unt-U	1	acetaminophen (apap)	247 mcg/mL In Blood (unspecified) @ Unknown
		acetaminophen/ diphenhydramine/ salicylate	1	1					salicylate	75 mg/dL In Blood (unspecified) @ Unknown
		hydrocodone	2	2						
		alprazolam	3	3						
913h	56 y M	acetaminophen	1	1	A	Ingst	Unk	2	acetaminophen (apap)	114 mcg/mL In Serum @ Unknown
		acetaminophen	1	1					acetaminophen (apap)	53 mcg/mL In Serum @ Unknown
		narcotic, other/unknown	2	2						
914pa	56 y M	fentanyl analog	1	1	A	Ingst + Unk	Int-A	1		
		ethanol (non-beverage)	2	2					ethanol	0.13 % (wt/Vol) In Blood (unspecified) @ Autopsy
915ha	56 y F	acetaminophen	1	1	U	Ingst	Unk	2	acetaminophen (apap)	127 mcg/mL In Serum @ 30 m (pe)
916h	56 y F	acetaminophen	1	1	C	Ingst	Int-M	2	acetaminophen (apap)	102 mcg/mL In Blood (unspecified) @ 21.5 h (pe)
		acetaminophen	1	1					acetaminophen (apap)	130.5 mcg/mL In Blood (unspecified) @ 18.5 h (pe)
		acetaminophen	1	1					acetaminophen (apap)	149.7 mcg/mL In Blood (unspecified) @ 15.5 h (pe)
		acetaminophen	1	1					acetaminophen (apap)	34.6 mcg/mL In Blood (unspecified) @ 51 h (pe)
		acetaminophen	1	1					acetaminophen (apap)	80.6 mcg/mL In Blood (unspecified) @ 24 h (pe)
917h	56 y M	acetaminophen/oxycodone	1	1	A	Ingst	Int-S	1		
		alprazolam	2	2						
		drug, unknown	3	3						
918h	56 y F	acetaminophen	1	1	U	Ingst	Int-U	1	acetaminophen (apap)	600 mcg/mL In Blood (unspecified) @ Unknown
		benzodiazepine	2	2						
		narcotic, other/unknown	3	3						
921ai	56 y M	fentanyl	1	1	U	Unk	Int-A	1		
920ai	56 y M	fentanyl	1	1	U	Unk	Unk	2		
		methadone	2	2						
		oxycodone	3	3						
919ai	56 y F	fentanyl	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		clonazepam	3	3						
922ai	56 y F	methadone	1	1	U	Unk	Int-A	1		
		diazepam	2	2						
		oxycodone	3	3						
923ai	56 y F	tramadol	1	1	U	Unk	Int-S	1		
		alprazolam	2	2						
		gabapentin	3	3						
924pha	57 y F	acetaminophen/hydrocodone	1	1	U	Ingst + Unk	Int-S	1	acetaminophen (apap)	315 mcg/mL In Serum @ Unknown
		sertraline	2	2						
		diphenhydramine	3	3						
		diazepam	4	4						
		hydroxyzine	5	5						
925ha	57 y M	acetaminophen/hydrocodone	1	1	A/C	Ingst	Int-S	1	acetaminophen (apap)	71 mcg/mL In Blood (unspecified) @ 1 h (pe)
		alprazolam	2	2						
		ethanol	3	3					ethanol	92 mg/dL In Blood (unspecified) @ 1 h (pe)
926ha	57 y F	oxycodone	1	1	U	Unk	Unk	2	oxycodone	39 ng/mL In Blood (unspecified) @ Unknown
		alprazolam	2	2					alprazolam	140 ng/mL In Blood (unspecified) @ Unknown
		amphetamine	3	3					amphetamine	16 ng/mL In Blood (unspecified) @ Unknown
		amitriptyline	4	4					amitriptyline	80 ng/mL In Blood (unspecified) @ Unknown
		amitriptyline	4	4					nortriptyline	91 ng/mL In Blood (unspecified) @ Unknown
		duloxetine	5	5					duloxetine	140 ng/mL In Blood (unspecified) @ Unknown

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
		aripiprazole	6	6					aripiprazole	140 ng/mL In Blood (unspecified) @ Unknown
927ha	57 y F	acetaminophen/hydrocodone	1	1	U	Unk	Unk	1	acetaminophen (apap)	128 mcg/mL In Blood (unspecified) @ Unknown
		acetaminophen/hydrocodone	1	1					acetaminophen (apap)	132.3 mg/L In Serum @ Unknown
		acetaminophen/hydrocodone	1	1					hydromorphone	2 ng/mL In Serum @ Unknown
928ph	57 y M	acetaminophen/hydrocodone	1	1	A	Ingst	Int-S	1	hydrocodone	213 ng/mL In Serum @ Unknown
		acetaminophen/hydrocodone	1	1					acetaminophen (apap)	51 mcg/mL In Blood (unspecified) @ Unknown
929pai	57 y M	benzodiazepine	2	2	A	Par	Int-A	1		
		fentanyl	1	1					fentanyl	12 ng/mL In Blood (unspecified) @ Autopsy
		fentanyl	1	1					norfentanyl	4.4 ng/mL In Blood (unspecified) @ Autopsy
		fentanyl analog (acetylfentanyl)	2	2						
		cocaine	3	3					benzoyllecognine	1000 ng/mL In Blood (unspecified) @ Autopsy
		cocaine	3	3					cocaine	154 ng/mL In Blood (unspecified) @ Autopsy
930h	57 y M	acetaminophen/oxycodone	1	1	A/C	Ingst + Par	Int-S	1	acetaminophen (apap)	16 mcg/mL In Serum @ Unknown
		spironolactone	2	2						
		insulin (detemir)	3	3						
		insulin (aspart)	4	4						
931phi	57 y F	narcotic, other/unknown	1	1	U	Ingst + Unk	Int-S	2		
		temazepam	2	2						
		acetaminophen/chlorpheniramine/dextromethorphan	3	3					acetaminophen (apap)	60.3 mg/L In Blood (unspecified) @ 35 m (pe)
932pha	57 y M	fentanyl	1	1	U	Ingst + Par	Int-A	1	fentanyl	1.2 ng/mL In Blood (unspecified) @ Autopsy
		ethanol	2	2					ethanol	138 mg/dL In Blood (unspecified) @ Autopsy
		heroin	3	3						
		disulfiram	4	4						
933ai	57 y F	acetaminophen/hydrocodone	1	1	U	Unk	Unk	1		
934ai	57 y M	fentanyl	1	1	U	Unk	Int-A	2		
		cocaine	2	2						
		clonazepam	3	3						
935ai	57 y F	fentanyl	1	1	U	Unk	Unk	2		
		alprazolam	2	2						
		oxycodone	3	3						
937ai	57 y M	morphine	1	1	U	Unk	Unk	3		
		oxycodone	2	2						
		hydrocodone	3	3						
936ai	57 y M	morphine	1	1	U	Unk	Int-A	1		
		oxycodone	2	2						
		trazodone	3	3						
938ai	57 y M	narcotic, other/unknown	1	1	U	Ingst + Unk	Int-A	2		
		ethanol	2	2						
939ai	57 y F	oxycodone	1	1	U	Unk	Unk	2		
		cyclobenzaprine	2	2						
		duloxetine	3	3						
940h	57 y F	acetaminophen/hydrocodone	1	1	A	Ingst	Int-S	1	acetaminophen (apap)	149.6 mcg/mL In Serum @ Unknown
941pha	58 y F	oxycodone	1	1	A/C	Ingst	Int-S	1		
		ethanol	2	2					ethanol	11 mg/dL In Blood (unspecified) @ Unknown
942ha	58 y M	acetaminophen	1	1	U	Ingst	Unt-M	1	acetaminophen (apap)	49 mcg/mL In Serum @ 1 d (pe)
		acetaminophen	1	1					acetaminophen (apap)	76 mcg/mL In Serum @ 0.5 h (pe)
		ethanol	2	2						
943h	58 y F	acetaminophen	1	1	A/C	Ingst	Unt-T	3		
944pai	58 y F	fentanyl	1	1	A	Par	Int-A	1	norfentanyl	1 ng/mL In Blood (unspecified) @ Autopsy
		fentanyl	1	1					fentanyl	3.2 ng/mL In Blood (unspecified) @ Autopsy
		cocaine	2	2					benzoyllecognine	1000 ng/mL In Blood (unspecified) @ Autopsy

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
		cocaine	2	2					cocaine	78 ng/mL In Blood (unspecified) @ Autopsy
945ha	58 y M	hydromorphone	1	1	A	Ingst	Unt-G	3	hydromorphone	340 ng/mL In Blood (unspecified) @ Unknown
		acetaminophen/hydrocodone	2	2					dihydrocodeine/hydrocodol (free)	25 ng/mL In Blood (unspecified) @ Autopsy
		acetaminophen/hydrocodone	2	2					acetaminophen (apap)	28 mcg/mL In Blood (unspecified) @ Autopsy
		antihistamine	3	3					hydroxyzine	540 ng/mL In Blood (unspecified) @ Autopsy
		levetiracetam	4	4					levetiracetam	7.1 mcg/mL In Blood (unspecified) @ Unknown
946ha	58 y M	acetaminophen/hydrocodone	1	1	A/C	Ingst	Int-S	2	acetaminophen (apap)	119 mcg/mL In Serum @ Unknown
		zolpidem	2	2						
		tizanadine	3	3						
		clonazepam	4	4						
947ai	58 y M	oxycodone	1	1	U	Unk	Int-S	1		
		alprazolam	2	2						
		ethanol	3	3						
948ha	58 y M	salicylate	1	1	C	Ingst	Unk	1	salicylate	930 mg/L In Blood (unspecified) @ Autopsy
949pa	58 y M	fentanyl	1	1	A	Inhal	Int-A	1	fentanyl	0.009 mg/L In Blood (unspecified) @ Autopsy
		cocaine	2	2					cocaine	0.05 mg/L In Blood (unspecified) @ Autopsy
		cocaine	2	2					benzoylecognine	2.4 mg/L In Blood (unspecified) @ Autopsy
950ai	58 y F	fentanyl	1	1	U	Unk	Unk	1		
		oxycodone	2	2						
		alprazolam	3	3						
951ai	58 y F	hydromorphone	1	1	U	Unk	Int-S	1		
		cyclobenzaprine	2	2						
		gabapentin	3	3						
952ai	58 y M	morphine	1	1	U	Unk	Int-A	1		
		hydrocodone	2	2						
		amitriptyline	3	3						
953ai	58 y F	oxycodone	1	1	U	Unk	Int-A	1		
		morphine	2	2						
		diazepam	3	3						
954pa	59 y M	fentanyl	1	1	A	Unk	Int-A	1	fentanyl	0.01 mg/L In Blood (unspecified) @ Autopsy
		morphine	2	2					morphine (free)	31 mcg/L In Blood (unspecified) @ Autopsy
		ethanol	3	3					ethanol	0.04 % (wt/Vol) In Blood (unspecified) @ Autopsy
		ethanol	3	3					ethanol	0.05 % (wt/Vol) In Vitreous @ Autopsy
		ethanol	3	3					ethanol	0.06 % (wt/Vol) In Urine (quantitative only) @ Autopsy
		lamotrigine	4	4					lamotrigine	5.4 mg/L In Blood (unspecified) @ Autopsy
955	59 y F	acetaminophen	1	1	A	Ingst	Int-S	3	acetaminophen (apap)	23.1 mcg/mL In Blood (unspecified) @ Unknown
956pa	59 y M	methadone	1	1	A	Unk	Int-A	1	methadone	0.7 mg/L In Blood (unspecified) @ Autopsy
957ph	59 y M	acetaminophen/oxycodone	1	1	A/C	Ingst	Int-U	3	acetaminophen (apap)	3 mcg/mL In Blood (unspecified) @ 10 h (pe)
		acetaminophen/oxycodone	1	1					acetaminophen (apap)	8 mcg/mL In Blood (unspecified) @ 1 h (pe)
		ethanol	2	2						
958ai	59 y F	hydromorphone	1	1	U	Unk	Int-M	1		
		hydrocodone	2	2						
		alprazolam	3	3						
959ai	59 y F	morphine	1	1	U	Unk	Unk	2		
		bupropion	2	2						
		diazepam	3	3						
961ai	59 y F	oxycodone	1	1	U	Unk	Int-M	1		
		alprazolam	2	2						
		italopram	3	3						
960ai	59 y M	oxycodone	1	1	U	Unk	Unk	3		
		bupropion	2	2						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
962p	59 y M	acetaminophen	3	3						
		methadone	1	1	A	Ingst	Int-M	3	methadone	117.2 ng/mL In Blood (unspecified) @ Autopsy
963	59 y F	acetaminophen/oxycodone	1	1	C	Ingst	Unk	3		
964h	59 y F	oxycodone	1	1	C	Ingst	Int-A	3		
		acetaminophen/hydrocodone	2	2					acetaminophen (apap)	0 mcg/mL In Blood (unspecified) @ Unknown
		acetaminophen/oxycodone	3	3						
965h	59 y F	acetaminophen/hydrocodone	1	1	A	Ingst	Int-S	2	acetaminophen (apap)	25 mg/L In Serum @ 1 h (pe)
966ph	59 y M	methadone	1	1	A/C	Ingst	Int-A	2		
		doxepin	2	2						
967	59 y M	acetaminophen/hydrocodone	1	1	A	Ingst	Int-S	3	acetaminophen (apap)	111 mcg/mL In Serum @ Unknown
		drug, unknown	3	2						
		ethanol	2	2					ethanol	90 mg/dL In Serum @ Unknown
968ai	59 y M	fentanyl	1	1	A/C	Unk	Int-A	1		
		methamphetamine	2	2						
970ai	59 y F	hydrocodone	1	1	U	Unk	Unk	2		
		hydromorphone	2	2						
		benzodiazepine	3	3						
969ai	59 y M	hydrocodone	1	1	U	Ingst + Unk	Int-A	1		
		alcohol, unknown	2	2						
		isopropanol	3	3						
971ai	59 y F	methadone	1	1	U	Unk	Int-A	2		
		ethanol	2	2						
972ai	59 y F	morphine	1	1	U	Unk	Int-A	1		
		oxycodone	2	2						
973ai	59 y F	oxycodone	1	1	U	Unk	Int-M	1		
		diazepam	2	2						
		temazepam	3	3						
974h	59 y M	acetaminophen	1	1	C	Ingst	Int-M	2		
		salicylate	2	2						
		ethanol	3	3						
975h	60 y F	acetaminophen/hydrocodone	1	1	A	Ingst	Int-U	3		
976h	60 y F	acetaminophen	1	1	U	Ingst	Int-S	1	acetaminophen (apap)	44 mcg/mL In Whole Blood @ Unknown
		salicylate	2	2					salicylate	44 mg/dL In Whole Blood @ Unknown
977	60 y F	acetaminophen/opioid	1	1	C	Ingst	Int-M	1		
978h	60 y F	acetaminophen	1	1	U	Ingst	Int-S	1	acetaminophen (apap)	69 mcg/mL In Serum @ Unknown
979pha	60 y M	fentanyl	1	1	A	Par	AR-D	2		
		propofol	2	2						
		epinephrine/lidocaine	3	3						
980h	60 y F	acetaminophen	1	1	U	Ingst	Int-S	1	acetaminophen (apap)	59.1 mcg/mL In Blood (unspecified) @ 1111.11 m (pe)
981h	60 y F	acetaminophen/hydrocodone	1	1	U	Ingst	Int-S	1	acetaminophen (apap)	47 mcg/mL In Serum @ Unknown
		acetaminophen/hydrocodone	1	1					acetaminophen (apap)	95 mcg/mL In Serum @ Unknown
		alprazolam	2	2						
983ai	60 y F	fentanyl	1	1	U	Unk	Int-M	1		
		hydrocodone	2	2						
		gabapentin	3	3						
982ai	60 y M	fentanyl	1	1	U	Unk	Int-A	1		
		heroin	2	2						
985ai	60 y M	fentanyl	1	1	U	Unk	Int-A	2		
		oxycodone	2	2						
		methamphetamine	3	3						
984ai	60 y F	fentanyl	1	1	U	Unk	Int-A	1		
		mitragyna	2	2						
986ai	60 y M	morphine	1	1	U	Unk	Unk	2		
		trazodone	2	2						
		buspirone	3	3						

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
987ai	60 y F	morphine	1	1	U	Unk	Int-M	2		
		hydromorphone	2	2						
		cyclobenzaprine	3	3						
988ai	60 y F	oxycodone	1	1	U	Unk	Int-S	1		
		ethanol	2	2						
989h	61 y F	oxycodone	1	1	A	Ingst	Int-A	3		
		benzodiazepine	3	2						
		ethanol	2	2						
990h	61 y F	acetaminophen	1	1	U	Ingst	Unk	3	acetaminophen (apap)	0 mmol/L In Blood (unspecified) @ Unknown
		ethanol	2	2						
991ai	61 y F	morphine	1	1	U	Unk	Unk	3		
		cyclobenzaprine	2	2						
		diphenhydramine	3	3						
992ai	61 y M	oxycodone	1	1	U	Unk	Unk	2		
		alprazolam	2	2						
		ethanol	3	3						
993	61 y M	salicylate	1	1	A/C	Ingst	Int-S	1	salicylate	116.1 mg/dL In Serum @ 2.5 h (pe)
		salicylate	1	1					salicylate	120.7 mg/dL In Serum @ 6.5 h (pe)
		sertraline	1	1					salicylate	122 mg/dL In Serum @ 7.333 h (pe)
		amphetamine/ dextroamphetamine	2	2						
			3	3						
994ha	62 y F	acetaminophen	1	1	C	Ingst	Unt-U	1	acetaminophen (apap)	22.8 mg/L In Serum @ 3 d (pe)
		acetaminophen	1	1					acetaminophen (apap)	317 mg/L In Serum @ Unknown
995h	62 y F	methadone	1	1	A/C	Ingst	Unk	2		
		zolpidem	2	2						
		iron	3	3						
996ai	62 y M	fentanyl	1	1	U	Unk	Int-A	2		
		amitriptyline	2	2						
		oxycodone	3	3						
997ai	62 y M	morphine	1	1	U	Unk	Int-A	1		
		oxycodone	2	2						
		diltiazem	3	3						
998ai	62 y M	codeine	1	1	U	Unk	Unk	1		
		dextromethorphan	2	2						
		diphenhydramine	3	3						
999ai	62 y F	methadone	1	1	U	Unk	Int-A	2		
1000ai	62 y M	methadone	1	1	A	Unk	Int-A	2		
		diphenhydramine	2	2						
		cyclobenzaprine	3	3						
1001ai	62 y F	methadone	1	1	U	Unk	Unk	2		
		diazepam	2	2						
		diphenhydramine	3	3						
1002ai	62 y F	oxycodone	1	1	U	Unk	Unk	1		
		oxymorphone	2	2						
		carisoprodol	3	3						
1004ai	62 y F	oxycodone	1	1	U	Unk	Int-A	2		
		hydrocodone	2	2						
1003ai	62 y F	oxycodone	1	1	U	Unk	Unk	2		
		alprazolam	2	2						
1005ai	62 y F	oxymorphone	1	1	U	Unk	Int-A	2		
		paroxetine	2	2						
		tramadol	3	3						
1006ha	63 y F	acetaminophen/hydrocodone	1	1	U	Ingst	Int-S	2		
		alprazolam	2	2						
1007ph	63 y M	hydromorphone	1	1	C	Par	Int-A	2		
1008	63 y F	oxycodone	1	1	A/C	Ingst	Int-U	2		
1009pi	63 y M	carfentanil	1	1	A	Unk	Int-A	1		
		trazodone	2	2						
1010h	63 y M				U	Ingst	Int-M	3		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1011ai	63 y M	ibuprofen	1	1	U	Unk	Int-S	1		
		acetaminophen/oxycodone	1	1						
1012ha	63 y F	lisinopril	2	2	C	Ingst	Unk	2		
		acetaminophen	1	1					acetaminophen (apap)	214 mmol/L In Blood (unspecified) @ Unknown
		beta blocker	2	1						
		lamotrigine	3	3						
		lithium	4	4						
1013hi	63 y M	methadone	1	1	U	Ingst + Aspir	Int-U	3		
1014ai	63 y F	fentanyl	1	1	U	Unk	Int-A	2		
1015ai	63 y M	methadone	1	1	U	Unk	Int-A	2		
		methamphetamine	2	2						
1016ai	63 y F	methadone	1	1	U	Unk	Unk	1		
		morphine	2	2						
		oxycodone	3	3						
1018ai	63 y F	oxycodone	1	1	U	Unk	Int-S	1		
		fluoxetine	2	2						
		clonazepam	3	3						
1017ai	63 y F	oxycodone	1	1	U	Unk	Int-S	1		
		fluoxetine	2	2						
		benzodiazepine	3	3						
1019ha	64 y F	acetaminophen/oxycodone	1	1	A/C	Ingst	Int-U	1		
		acetaminophen/oxycodone	1	1					acetaminophen (apap)	15 mcg/mL In Serum @ 4 h (pe)
		salicylate	2	2					acetaminophen (apap)	17.9 mcg/mL In Serum @ 1 h (pe)
		salicylate	2	2					salicylate	17 mg/dL In Serum @ Unknown
		salicylate	2	2					salicylate	33 mg/dL In Serum @ 4 h (pe)
		salicylate	2	2					salicylate	35.3 mg/dL In Serum @ 1 h (pe)
1020h	64 y F	acetaminophen	1	1	C	Ingst	Int-M	3		
		acetaminophen	1	1					acetaminophen (apap)	35 mcg/mL In Blood (unspecified) @ Unknown
1021h	64 y F	acetaminophen	1	1	A	Ingst	Int-M	1		
		acetaminophen	1	1					acetaminophen (apap)	163.9 mcg/mL In Blood (unspecified) @ 30 m (pe)
		acetaminophen	1	1					acetaminophen (apap)	28.5 mcg/mL In Blood (unspecified) @ 2 d (pe)
		acetaminophen	1	1					acetaminophen (apap)	37.9 mcg/mL In Blood (unspecified) @ 1 d (pe)
		acetaminophen	1	1					acetaminophen (apap)	72.9 mcg/mL In Blood (unspecified) @ 12 h (pe)
1022ai	64 y F	fentanyl	1	1	U	Unk	Unk	1		
		oxycodone	2	2						
1023ai	64 y F	fentanyl	1	1	U	Ingst + Unk	Int-A	2		
		oxycodone	2	2						
		diazepam	3	3						
1026ai	64 y F	hydrocodone	1	1	U	Unk	Int-S	1		
		alprazolam	2	2						
		temazepam	3	3						
1024ai	64 y M	hydrocodone	1	1	A	Unk	Int-M	2		
		quetiapine	2	2						
1025ai	64 y F	hydrocodone	1	1	U	Unk	Int-M	2		
		methocarbamol	2	2						
		ethanol	3	3						
1027ai	64 y M	methadone	1	1	U	Unk	Int-A	2		
1028ai	64 y F	oxycodone	1	1	U	Unk	Int-A	1		
		alprazolam	2	2						
		fluoxetine	3	3						
1029ai	64 y M	oxycodone	1	1	A	Unk	Int-M	3		
1030ha	65 y F	acetaminophen	1	1	A	Ingst	Int-S	2		
1031h	65 y F	acetaminophen	1	1	U	Ingst	Unk	1		
		acetaminophen	1	1					acetaminophen (apap)	195.4 mcg/mL In Serum @ Unknown
1032h	65 y F	colchicine	1	1	C	Ingst	Int-T	2		
		colchicine	1	1					colchicine	1.1 ng/mL In Other @ Unknown
1033h	65 y F	salicylate	1	1	A	Ingst	Int-S	1		
		salicylate	1	1					salicylate	148 mg/dL In Serum @ Unknown
1034	65 y F				A	Ingst	Int-S	1		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1035	65 y F	acetaminophen/hydrocodone	1	1					acetaminophen (apap)	11 mcg/mL In Blood (unspecified) @ Unknown
		acetaminophen/hydrocodone	1	1	A/C	Ingst	Int-S	2	acetaminophen (apap)	47.8 mcg/mL In Blood (unspecified) @ 9.5 h (pe)
		acetaminophen/hydrocodone	1	1					acetaminophen (apap)	67.8 mcg/mL In Blood (unspecified) @ 10 m (pe)
		metoprolol	2	2						
		clonazepam	3	3						
1036h	65 y F	acetaminophen/opioid	1	1	A/C	Ingst	Unk	1	acetaminophen (apap)	39 mcg/mL In Blood (unspecified) @ Unknown
1037	65 y F				C	Ingst	Int-S	1		
		acetaminophen/oxycodone	1	1						
		clonazepam	2	2						
		diphenhydramine	3	3						
		prednisone	4	4						
[1038ha]	65 y M	salicylate	1	1	U	Ingst	Unk	1	salicylate	112 mg/dL In Serum @ Unknown
1039ph	65 y F	acetaminophen/hydrocodone	1	1	A	Ingst	Int-S	2	acetaminophen (apap)	123 mcg/mL In Blood (unspecified) @ Unknown
		mirtazapine	2	2						
1040ai	65 y F	hydrocodone	1	1	U	Unk	Unk	3		
1041a	66 y F	salicylate	1	1	A	Ingst	Int-S	1	salicylate	113.4 mg/dL In Blood (unspecified) @ 1 h (pe)
		salicylate	1	1					salicylate	880 mcg/mL In Whole Blood @ Unknown
1042h	66 y F				U	Ingst + Inhal	Int-U	3		
		acetaminophen/oxycodone	1	1						
		cocaine	2	2						
1043ai	66 y M	methadone	1	1	U	Unk	Int-A	1		
		ethanol	2	2						
1044ha	66 y F	acetaminophen/hydrocodone	1	1	U	Ingst	Int-S	1	acetaminophen (apap)	170 mcg/mL In Blood (unspecified) @ 30 m (pe)
		acetaminophen/hydrocodone	1	1					hydrocodone (free)	300 ng/mL In Blood (unspecified) @ 30 m (pe)
		acetaminophen/hydrocodone	1	1					dihydrocodeine/hydrocodol (free)	78 ng/mL In Blood (unspecified) @ 30 m (pe)
		oxycodone	2	2					hydromorphone	3.5 ng/mL In Blood (unspecified) @ 30 m (pe)
		methadone	3	3					methadone	340 ng/mL In Blood (unspecified) @ 30 m (pe)
		methadone	3	3					eddp (2-ethylidene-1,5-dimethyl-3,3-diphenyl pyrrolidine)	50 ng/mL In Blood (unspecified) @ 30 m (pe)
1045a	66 y F	morphine	1	1	U	Ingst	Int-S	1	morphine	122 ng/mL In Blood (unspecified) @ 2 h (pe)
1046ai	66 y M				U	Unk	Unk	1		
		morphine	1	1						
		codeine	2	2						
		hydromorphone	3	3						
1047ha	67 y M	acetaminophen	1	1	A	Ingst	Unk	1	acetaminophen (apap)	237 mcg/mL In Blood (unspecified) @ Unknown
1048h	67 y F	acetaminophen	1	1	C	Ingst	Int-M	2	acetaminophen (apap)	34 mcg/mL In Blood (unspecified) @ Unknown
1049	67 y F	acetaminophen	1	1	C	Ingst	Int-T	1	acetaminophen (apap)	68 mcg/mL In Blood (unspecified) @ Unknown
1050p	67 y M	acetaminophen/hydrocodone	1	1	U	Ingst	Int-S	2	acetaminophen (apap)	86 mcg/mL In Blood (unspecified) @ Unknown
		cyclobenzaprine	2	2						
1051i	67 y M	fentanyl	1	1	U	Unk	Int-A	2		
		cocaine	2	2						
		methamphetamine	3	3						
1052ai	67 y M	methadone	1	1	U	Unk	Int-M	2		
		fluoxetine	2	2						
		ethanol	3	3						
1053h	67 y F	acetaminophen/hydrocodone	1	1	A	Ingst	Int-S	2	acetaminophen (apap)	221 mcg/mL In Blood (unspecified) @ Unknown
		alprazolam	2	2						
1054h	67 y F	acetaminophen	1	1	C	Ingst	Int-M	2	acetaminophen (apap)	53 mcg/mL In Blood (unspecified) @ Unknown
1055h	67 y F				A/C	Ingst	Int-S	2		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1056ai	67 y M	oxycodone	1	1	U	Ingst + Unk	Int-A	2		
		baclofen	2	2						
		clonazepam	3	3						
		piroxicam	4	4						
1057ai	67 y M	codeine	1	1	U	Ingst + Unk	Int-A	1		
		hydrocodone	2	2						
		lorazepam	3	3						
		ethanol	4	4						
1058ai	67 y F	fentanyl	1	1	U	Unk	Unk	2		
		amitriptyline	2	2						
		duloxetine	3	3						
1059ai	67 y M	methadone	1	1	U	Unk	Int-A	1		
		diphenhydramine	2	2						
		temazepam	3	3						
1061ai	67 y F	morphine	1	1	U	Unk	Int-A	2		
1060ai	67 y F	morphine	1	1	U	Unk	Int-A	2		
1062ai	67 y F	morphine	1	1	C	Ingst + Unk	Int-A	3		
[1063ha]	68 y F	oxycodone	1	1	A/C	Ingst	Int-S	1		
		diazepam	2	2						
		ethanol	3	3						
1064h	68 y M	colchicine	1	1	A	Ingst	Int-S	1		
1065h	68 y M	acetaminophen/tramadol	1	1	A/C	Ingst + Aspir	Int-S	3	acetaminophen (apap)	361 mcg/mL In Blood (unspecified) @ 17 h (pe)
		acetaminophen/tramadol	1	1					acetaminophen (apap)	500 mcg/mL In Blood (unspecified) @ 30 m (pe)
		tramadol	1	1						
1066	68 y F	acetaminophen/hydrocodone	2	2	U	Ingst	Int-S	2		
		clonazepam	3	3						
		morphine	1	1						
		alprazolam	2	2						
1067	68 y M	misoprostol	3	3	C	Ingst	Unt-M	3		
		levothyroxine	4	4						
		acetaminophen	1	1						
1068ha	68 y M	acetaminophen	1	1	A/C	Ingst	Int-S	1	acetaminophen (apap)	32 mcg/mL In Serum @ Unknown
		acetaminophen/oxycodone	1	1					acetaminophen (apap)	145 mcg/mL In Serum @ 1 h (pe)
		metoprolol	2	2						
1069ph	68 y M	ethanol	3	3	A/C	Ingst + Aspir	Int-S	1	ethanol	258 mg/dL In Serum @ 1 h (pe)
		acetaminophen/codeine	1	1						
		clonazepam	2	2						
		lisinopril	3	3						
1070ai	68 y F	hydrochlorothiazide/triamterene	4	4	U	Unk	Int-S	1		
		fentanyl	1	1						
		oxycodone	2	2						
		diazepam	3	3						
1071h	68 y F	acetaminophen	1	1	A	Ingst	Unk	2	acetaminophen (apap)	83 mcg/mL In Blood (unspecified) @ Unknown
1072h	69 y M	acetaminophen	1	1	U	Ingst	Unt-M	2		
1073ai	69 y F	acetaminophen	1	1	U	Unk	Unt-M	3		
1074h	69 y F	fentanyl	1	1	A/C	Ingst	Int-S	2		
		diphenhydramine	2	2						
		oxycodone	3	3						
		acetaminophen/hydrocodone	1	1						
1075h	69 y M	alprazolam	2	2	A	Par	Unt-T	3		
		ondansetron	3	3						
		ibuprofen	4	4						
		fentanyl	1	1						
1076ai	69 y M	morphine	1	1	U	Unk	Int-S	1		
		codeine	2	2						
		ethanol	3	3						
1077ai	69 y F	oxycodone	1	1	U	Unk	Int-S	1		
		citalopram	2	2						
		ethanol	3	3						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1078ai	69 y F	oxycodone	1	1	U	Unk	Int-S	1		
		baclofen	2	2						
		citalopram	3	3						
1079ai	69 y F	oxycodone	1	1	U	Unk	Unt-M	1		
		oxymorphone	2	2						
		hydrocodone	3	3						
1080h	69 y M	acetaminophen/oxycodone	1	1	A/C	Ingst	Unk	3		
1081h	70 y F	acetaminophen	1	1	A	Ingst	Int-S	3	acetaminophen (apap)	342 mcg/mL In Serum @ Unknown
1082	70 y M	acetaminophen	1	1	C	Ingst	Int-M	3	acetaminophen (apap)	43 mcg/mL In Serum @ Unknown
1083ha	70 y F	acetaminophen	1	1	C	Ingst	Unt-T	2	acetaminophen (apap)	140 mcg/mL In Serum @ Unknown
		acetaminophen	1	1					acetaminophen (apap)	181 mg/L In Blood (unspecified) @ Unknown
1084h	70 y M	acetaminophen	1	1	C	Ingst	Int-M	1	acetaminophen (apap)	45 mcg/mL In Blood (unspecified) @ 1 h (pe)
		ethanol	2	2						
1085ai	70 y M	hydromorphone	1	1	U	Unk	Int-A	3		
1086ph	70 y F	tramadol	1	1	A	Ingst	Int-S	2		
		acetaminophen/hydrocodone	2	2						
1087	70 y F	acetaminophen	1	1	U	Ingst	Int-S	1	acetaminophen (apap)	326.6 mg/mL In Blood (unspecified) @ Unknown
1088ha	70 y F	narcotic, other/unknown	1	1	A	Ingst	Int-S	2		
		acetaminophen/diphenhydramine	2	2						
		acetaminophen	3	3					acetaminophen (apap)	29.9 mcg/mL In Serum @ 30 m (pe)
		ibuprofen	4	4						
1089ai	70 y F	acetaminophen	1	1	U	Unk	Int-S	1		
		benzodiazepine	2	2						
		oxycodone	3	3						
1090ph	71 y M	oxycodone	1	1	A/C	Ingst	Int-S	2		
		diazepam	2	2						
		acetaminophen	3	3					acetaminophen (apap)	48 mcg/mL In Serum @ Unknown
		baclofen	4	4						
		ethanol	5	5					ethanol	8 mg/dL In Serum @ Unknown
[1091h]	71 y F	salicylate	1	1	A	Ingst	Int-S	1	salicylate	104 mg/dL In Serum @ 22 h (pe)
1092p	71 y F	acetaminophen/hydrocodone	1	1	U	Ingst	Int-S	2	acetaminophen (apap)	285 mcg/mL In Serum @ Unknown
		lorazepam	2	2						
1093ha	71 y F	acetaminophen/hydrocodone	1	1	A	Ingst	Unt-T	2		
		acetaminophen	2	2						
1094h	71 y F	acetaminophen/hydrocodone	1	1	C	Ingst	AR-D	2		
1095ai	71 y F	acetaminophen	1	1	U	Unk	Unk	2		
1096pa	72 y M	acetaminophen/hydrocodone	1	1	U	Ingst	Int-U	1	hydrocodone	82.5 ng/mL In Blood (unspecified) @ Autopsy
		acetaminophen/diphenhydramine	2	2						
		tizanidine	3	3						
		meloxicam	4	4						
		diazepam	5	5					nordiazepam	369 ng/mL In Blood (unspecified) @ Autopsy
		diazepam	5	5					diazepam	524 ng/mL In Blood (unspecified) @ Autopsy
1097	72 y F	acetaminophen	1	1	U	Unk	Int-S	2	acetaminophen (apap)	156.6 mcg/mL In Blood (unspecified) @ Unknown
1098ai	72 y M	morphine	1	1	U	Unk	Int-S	1		
		alprazolam	2	2						
		lorazepam	3	3						
1099h	72 y M	salicylate	1	1	C	Ingst	Unk	1	salicylate	82.4 mg/dL In Blood (unspecified) @ 1 h (pe)
1100h	72 y F	acetaminophen	1	1	U	Ingst	Unk	1		
1101ai	72 y M	morphine	1	1	U	Unk	Int-S	2		
		alprazolam	2	2						
		lorazepam	3	3						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1102p	73 y M	phenothiazine	4	4	A/C	Ingst	Int-S	2		
		morphine	1	1						
		oxycodone	2	2						
		alprazolam	3	3						
1103ai	73 y F	acetaminophen/oxycodone	1	1	U	Unk	Int-U	2		
		gabapentin	2	2						
		trazodone	3	3						
1104ai	73 y F	morphine	1	1	U	Ingst + Unk	Int-S	1		
		oxycodone	2	2						
		diazepam	3	3						
1105ph	73 y F	oxycodone	1	1	A	Ingst	Int-S	3		
1106ai	73 y F	oxycodone	1	1	U	Unk	Int-M	2		
		ethanol	2	2						
1107h	74 y F	tramadol	1	1	A	Ingst	Int-S	2		
		antiplatelet drug	2	2						
		ropinirole	3	3						
1108h	75 y F	acetaminophen/hydrocodone	1	1	A/C	Ingst	Int-S	1		
		venlafaxine	2	2						
		benzodiazepine	3	3						
1109h	75 y M	acetaminophen/hydrocodone	1	1	A/C	Ingst	Int-S	2	acetaminophen (apap)	155.4 mcg/mL In Blood (unspecified) @ Unknown
		amitriptyline	2	2						
		tramadol	3	3						
		linezolid	4	4						
1110h	75 y M	morphine	1	1	A	Ingst	Int-S	1		
1111h	76 y F	acetaminophen	1	1	U	Ingst	Int-S	2	acetaminophen (apap)	123 mcg/mL In Blood (unspecified) @ Unknown
1112h	76 y F	acetaminophen	1	1	A	Ingst	Int-S	1		
1113ha	76 y M	salicylate	1	1	A	Ingst	Int-S	1	salicylate	1100 mg/L In Serum @ Autopsy
		salicylate	1	1					salicylate	137 mg/dL In Serum @ Unknown
1114	76 y M	oxycodone	1	1	A	Ingst	Int-S	2		
1115ai	76 y F	acetaminophen/hydrocodone	1	1	U	Unk	Int-U	2		
		fentanyl	2	2						
		baclofen	3	3						
1116ai	76 y F	morphine	1	1	U	Unk	Unk	2		
		cyclobenzaprine	2	2						
1117h	76 y F	tramadol	1	1	A	Ingst	Int-S	3		
		drug, unknown	2	2						
1118h	77 y F	acetaminophen	1	1	A	Ingst	Int-S	3	acetaminophen (apap)	181 mcg/mL In Blood (unspecified) @ Unknown
		acetaminophen	1	1					acetaminophen (apap)	20 mcg/mL In Blood (unspecified) @ Unknown
		drug, unknown	2	2						
1119ai	77 y F	oxycodone	1	1	A	Unk	Int-S	1		
		zolpidem	2	2						
		lorazepam	3	3						
1120i	77 y F	acetaminophen/hydrocodone	1	1	A	Ingst	Int-S	2		
1121ha	78 y F	oxycodone	1	1	U	Ingst	Int-S	2	oxycodone	3225 ng/mL In Serum @ Unknown
		zolpidem	2	2						
		acetaminophen	3	3					acetaminophen (apap)	20 mcg/mL In Serum @ Unknown
1122ai	78 y F	acetaminophen/oxycodone	1	1	U	Ingst + Unk	Int-S	1		
		diazepam	2	2						
1123ha	79 y F	salicylate	1	1	A	Ingst	Int-S	1	salicylate	112 mg/dL In Plasma @ Unknown
		acetaminophen	2	2					acetaminophen (apap)	308 mg/L In Plasma @ Unknown
1124	79 y F	salicylate	1	1	U	Ingst	Int-U	1	salicylate	78.8 mg/dL In Blood (unspecified) @ Unknown
1125ai	79 y F	acetaminophen/opioid	1	1	A	Ingst	Int-M	1		
1126h	80 y M	salicylate	1	1	C	Ingst	Int-M	3	salicylate	21.8 mg/dL In Serum @ 22 h (pe)
		salicylate	1	1					salicylate	30.5 mg/dL In Serum @ 7 h (pe)
		salicylate	1	1					salicylate	55.2 mg/dL In Serum @ 2 h (pe)

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1127h	80 y M	salicylate	1	1	A	Ingst	Int-S	1	salicylate	65.4 mg/dL In Serum @ Unknown
1128ai	81 y M	acetaminophen	1	1	U	Ingst + Unk	Int-S	1	acetaminophen (apap)	870 mcg/mL In Serum @ Unknown
		morphine	1	1						
		oxycodone	2	2						
		diazepam	3	3						
1129ai	81 y M	morphine	1	1	U	Unk	Unk	2		
1130	82 y F	naproxen	1	1	A	Ingst	Int-S	3		
1131ai	82 y M	morphine	1	1	U	Unk	Int-M	2		
1132h	82 y M	acetaminophen	1	1	C	Ingst	Unt-T	2		
		ibuprofen	2	2						
1133h	82 y F	acetaminophen	1	1	C	Ingst	Int-A	3	acetaminophen (apap)	25.7 mcg/mL In Plasma @ Unknown
1134ai	82 y M	morphine	1	1	U	Unk	Unk	2		
1135ai	83 y F	hydrocodone	1	1	U	Unk	Int-S	1		
		lorazepam	2	2						
1136ha	88 y M	tramadol	1	1	A	Ingst	Int-S	1	o-demethyl tramadol	200 ng/mL In Blood (unspecified) @ Unknown
		tramadol	1	1					tramadol	4400 ng/mL In Blood (unspecified) @ Unknown
		acetaminophen/hydrocodone	2	2						
1137pa	88 y M	morphine	1	1	A	Ingst	Int-S	1	morphine (free)	400 mcg/L In Blood (unspecified) @ Autopsy
		alprazolam	2	2					alprazolam	0.1 mg/L In Blood (unspecified) @ Autopsy
		amlodipine	3	3					amlodipine	0.05 mg/L In Blood (unspecified) @ Autopsy
1138h	89 y M	acetaminophen	1	1	A	Ingst	Int-S	1	acetaminophen (apap)	136 mcg/mL In Serum @ 21 h (pe)
		acetaminophen	1	1					acetaminophen (apap)	201 mcg/mL In Serum @ 8 h (pe)
		acetaminophen	1	1					acetaminophen (apap)	250 mcg/mL In Serum @ 4 h (pe)
		acetaminophen	1	1					acetaminophen (apap)	282 mcg/mL In Serum @ 1 m (pe)
		acetaminophen	1	1					acetaminophen (apap)	85 mcg/mL In Serum @ 1 d (pe)
		acetaminophen	1	1					acetaminophen (apap)	95 mcg/mL In Serum @ 1 d (pe)
		beta blocker	2	2						
1139a	90 y F	salicylate	1	1	A/C	Ingst	Int-S	3		
1140h	91 y M	salicylate (extended release)	1	1	U	Ingst	Unt-G	3		
1141ai	92 y F	acetaminophen	1	1	U	Unk	Int-S	1		
1142h	94 y M	acetaminophen/oxycodone	1	1	A/C	Ingst	Int-S	2	acetaminophen (apap)	212 mg/dL In Blood (unspecified) @ 15 h (pe)
1143ai	9 m M	morphine	1	1	U	Unk	Unk	2		
1144ha	11 m F	oxycodone	1	1	U	Ingst	Unk	1		
1145pha	30+ y M	fentanyl	1	1	A	Unk	Int-A	1	fentanyl	55 ng/mL In Blood (unspecified) @ Autopsy
		ethanol	2	2						
		buprenorphine	3	3						
1146p	Unknown adult (>=20 yrs) M	droperidol/fentanyl	1	1	A	Inhal	Int-A	2		
		alprazolam	2	2						
1147p	Unknown age U	narcotic, other/unknown	1	1	A	Unk	Int-A	1		
See Also case 9, 10, 20, 21, 24, 27, 33, 38, 41, 43, 47, 52, 55, 62, 64, 68, 70, 79, 84, 87, 90, 92, 93, 96, 105, 107, 108, 120, 125, 141, 164, 175, 181, 183, 211, 254, 259, 262, 272, 295, 309, 313, 363, 1149, 1153, 1161, 1173, 1178, 1182, 1185, 1201, 1202, 1206, 1207, 1222, 1227, 1229, 1232, 1241, 1247, 1249, 1260, 1264, 1265, 1266, 1270, 1272, 1273, 1280, 1284, 1298, 1299, 1300, 1301, 1306, 1307, 1310, 1311, 1315, 1317, 1326, 1355, 1356, 1359, 1370, 1389, 1396, 1406, 1411, 1414, 1419, 1425, 1430, 1431, 1432, 1435, 1438, 1446, 1448, 1465, 1466, 1467, 1479, 1482, 1489, 1490, 1492, 1499, 1503, 1505, 1518, 1521, 1522, 1526, 1530, 1536, 1540, 1542, 1545, 1551, 1552, 1553, 1555, 1578, 1583, 1588, 1591, 1592, 1610, 1620, 1638, 1641, 1642, 1659, 1660, 1662, 1663, 1674, 1675, 1680, 1683, 1686, 1689, 1691, 1698, 1699, 1700, 1704, 1708, 1712, 1714, 1717, 1718, 1722, 1723, 1733, 1735, 1740, 1741, 1742, 1743, 1747, 1750, 1751, 1752, 1760, 1761, 1762, 1765, 1766, 1768, 1769, 1776, 1780, 1785, 1786, 1787, 1788, 1789, 1790, 1792, 1802, 1803, 1806, 1811, 1817, 1818, 1820, 1828, 1831, 1832, 1838, 1851, 1852, 1853, 1857, 1860, 1861, 1863, 1869, 1871, 1872, 1874, 1878, 1879, 1887, 1888, 1889, 1901, 1902, 1903, 1909, 1912, 1914, 1921, 1924, 1925, 1926, 1928, 1942, 1948, 1950, 1956, 1957, 1962, 1969, 1971, 1972, 1974, 1976, 1978, 1984, 1992, 1993, 1996, 1998, 1999, 2002, 2009, 2011, 2021, 2022, 2044, 2046, 2051, 2052, 2053, 2054, 2055, 2061, 2063, 2065, 2070, 2072, 2074, 2075, 2076, 2078, 2079, 2080, 2081, 2091, 2093, 2103, 2104, 2107, 2113, 2114, 2128, 2129, 2133, 2137, 2138, 2140, 2144, 2145, 2146, 2148, 2163, 2166, 2167, 2175, 2176, 2181, 2183, 2185, 2188, 2189, 2198, 2199, 2205, 2206, 2207, 2212, 2213, 2217, 2218, 2219, 2231, 2232, 2234, 2235, 2253, 2254, 2262, 2268, 2281, 2283, 2288, 2291, 2292, 2301, 2310, 2311, 2312, 2313, 2314, 2316, 2318, 2320, 2321, 2322, 2343, 2344, 2345, 2372, 2375, 2376, 2377, 2378, 2379, 2380, 2386, 2387, 2388, 2390, 2394, 2395, 2401, 2422, 2424, 2425, 2432, 2433, 2453, 2458, 2492, 2495, 2503, 2506, 2508, 2513, 2520, 2528, 2531, 2532, 2534, 2540, 2544, 2550, 2552, 2556, 2559, 2560, 2561, 2575, 2577, 2580, 2581, 2583, 2586, 2593, 2598, 2608, 2621, 2641, 2643, 2662, 2667, 2670, 2672, 2676										
Anesthetics [1148pha]	11 y M	lidocaine	1	1	A	Oth	Unt-T	1	lidocaine	15 mg/L In Blood (unspecified) @ Autopsy

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
		lidocaine	1	1					megx (monoethylglycinexylidide)	2.7 mg/L In Blood (unspecified) @ Autopsy
1149ph	22 y M	cleaner (cationic)	2	2	A	Ingst + Inhal	Int-A	3		
		nitrous oxide	1	1						
		codeine	2	2						
		acetaminophen	3	3						
		ibuprofen	4	4						
1150ph	29 y M	sevoflurane	1	1	A	Inhal	Int-S	1		
[1151pha]	33 y M	lidocaine	1	1	A	Inhal	Int-U	1	megx (monoethylglycinexylidide)	11 mcg/mL In Blood (unspecified) @ Unknown
		lidocaine	1	1					lidocaine	18 mcg/mL In Blood (unspecified) @ Unknown
See Also case 440, 683, 979, 1333, 1531, 2345										
Anticholinergic Drugs										
1152h	59 y M				A	Ingst	Int-S	2		
		benztropine	1	1						
		THC homolog	2	2						
		phencyclidine	3	3						
See Also case 114, 812, 1211, 1496, 1599, 2027, 2040, 2110, 2120, 2178, 2180, 2279										
Anticoagulants										
1153ha	48 y F				A/C	Ingst	Int-S	1		
		warfarin	1	1						
		quetiapine	2	2						
		diltiazem	3	3						
		ethanol	4	4					ethanol	30 mg/dL In Serum @ Unknown
		salicylate	5	5					salicylate	1.7 mg/dL In Serum @ Unknown
See Also case 545, 600, 716, 1107, 1280, 1293, 1310, 1411, 1464, 1500, 1509, 1545, 1553, 1563, 1574, 1596, 1610, 1701, 1706, 1722, 1724										
Anticonvulsants										
1154h	21 y M				A/C	Ingst	Int-S	1		
		valproic acid	1	1					valproic acid	300.001 mcg/mL In Serum @ Unknown
		quetiapine	2	2						
		risperidone	3	3						
1155h	22 y M				A	Ingst	Int-S	1		
		valproic acid	1	1					valproic acid	147 mcg/mL In Blood (unspecified) @ 4 d (pe)
		valproic acid	1	1					valproic acid	172.4 mcg/mL In Blood (unspecified) @ 3 h (pe)
		valproic acid	1	1					valproic acid	190.3 mcg/mL In Blood (unspecified) @ 7 h (pe)
		valproic acid	1	1					valproic acid	214 mcg/mL In Blood (unspecified) @ 3 d (pe)
		valproic acid	1	1					valproic acid	589 mcg/mL In Blood (unspecified) @ 36 h (pe)
		valproic acid	1	1					valproic acid	69.9 mcg/mL In Blood (unspecified) @ 15 m (pe)
		lacosamide	2	2						
		sertraline	3	3						
		oxcarbazepine	4	4						
		mirtazapine	5	5						
1156ha	25 y M				A	Ingst	Int-S	1		
		lamotrigine	1	1					lamotrigine	41 mcg/mL In Plasma @ Unknown
		citalopram	2	2					citalopram	0.63 ng/mL In Plasma @ Unknown
		diphenhydramine	3	3					diphenhydramine	0.12 ng/mL In Plasma @ Unknown
1157ph	26 y M				A	Ingst	Int-S	1		
		carbamazepine	1	1					carbamazepine	31 mcg/mL In Blood (unspecified) @ Unknown
1158ph	28 y F				A	Ingst	Int-S	2		
		oxcarbazepine	1	1						
		bupropion	2	2						
		ziprasidone	3	3						
1159	33 y F				A/C	Ingst	Int-S	2		
		lamotrigine	1	1						
1160ph	34 y F				A	Ingst	Unk	2		
		gabapentin	1	1						
		ethanol	2	2						
1161ph	36 y M				A	Ingst	Int-A	2		
		gabapentin	1	1						
		ethanol	2	2						
		narcotic, other/unknown	3	3						
		amphetamine	4	4						
		cocaine	5	5						
1162ai	37 y F				U	Ingst + Unk	Unk	1		
		gabapentin	1	1						
		ethanol	2	2						
1163hai	39 y F				U	Ingst + Unk	Unk	2		
		gabapentin	1	1						
		doxepin	2	2						
		ethanol	3	3						
1164ai	40 y F				U	Unk	Int-S	1		
		valproic acid	1	1						
		ethanol	2	2						
		methamphetamine	3	3						

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ③ Time
1165p	41 y F				A	Ingst	Int-U	2		
1166	45 y F	gabapentin	1	1	A	Ingst	Int-S	3		
		gabapentin	1	1						
		marijuana	2	2						
1167ai	52 y F	amphetamine	3	3	U	Unk	Int-S	1		
		topiramate	1	1						
		quetiapine	2	2						
		clonazepam	3	3						
1168	54 y M	gabapentin	1	1	U	Ingst	Unk	2		
		baclofen	2	2						
1169ha	55 y F	valproic acid	1	1	A/C	Ingst	Int-S	2	valproic acid	300 mcg/mL In Blood (unspecified) ③ Unknown
1170ai	56 y F				U	Unk	Int-A	2		
		gabapentin	1	1						
		methamphetamine	2	2						
		quetiapine	3	3						
1171h	61 y M	gabapentin	1	1	U	Ingst	Int-M	3		
1172ph	61 y M	gabapentin	1	1	A/C	Ingst	Int-S	2		
1173ha	62 y F	gabapentin	1	1	A/C	Ingst + Unk	Int-S	1	gabapentin	58 mg/L In Blood (unspecified) ③ Unknown
		oxycodone	2	2						
		acetaminophen/ diphenhydramine	3	3					acetaminophen (apap)	110 mg/L In Blood (unspecified) ③ Unknown
		acetaminophen/ diphenhydramine	3	3					butalbital	45 mg/L In Blood (unspecified) ③ Unknown
[1174pha]	63 y M	pregabalin	1	1	A	Ingst	Int-M	1	pregabalin	43 mcg/mL In Blood (unspecified) ③ Unknown
		topiramate	2	2					topiramate	6300 ng/mL In Blood (unspecified) ③ Unknown
1175pha	63 y F	gabapentin	1	1	A/C	Ingst	Int-S	2		
		antipsychotic (atypical)	2	2						
1176h	69 y F	phenytoin	1	1	A	Ingst	AR-D	3	phenytoin	55 mcg/mL In Whole Blood ③ Unknown
1177	70 y F	lacosamide	1	1	U	Ingst	Int-M	2		
		gabapentin	2	2						
1178h	72 y F	valproic acid	1	1	A	Ingst	Unk	2		
		acetaminophen	2	2						
1179p	82 y F	valproic acid	1	1	A/C	Ingst	Unk	1	valproic acid	152 mcg/mL In Blood (unspecified) ③ 48 h (pe)
		valproic acid	1	1					valproic acid	192 mcg/mL In Blood (unspecified) ③ 24 h (pe)
		valproic acid	1	1					valproic acid	898 mcg/mL In Blood (unspecified) ③ 1 h (pe)
See Also case 16, 36, 107, 259, 262, 363, 400, 433, 553, 603, 607, 614, 628, 665, 693, 696, 703, 717, 721, 808, 831, 833, 837, 839, 852, 905, 923, 945, 951, 954, 983, 1012, 1038, 1103, 1191, 1193, 1200, 1202, 1203, 1206, 1210, 1220, 1222, 1236, 1244, 1252, 1257, 1260, 1268, 1275, 1282, 1289, 1290, 1299, 1301, 1310, 1321, 1330, 1357, 1358, 1359, 1382, 1383, 1391, 1394, 1396, 1397, 1406, 1411, 1412, 1419, 1424, 1425, 1433, 1435, 1440, 1455, 1461, 1474, 1479, 1483, 1502, 1503, 1510, 1578, 1591, 1615, 1651, 1677, 1708, 1716, 1717, 1718, 1722, 1739, 1760, 1769, 1771, 1778, 1783, 1790, 1793, 1795, 1797, 1802, 1810, 1845, 1902, 1919, 2035, 2049, 2180, 2205, 2206, 2232, 2241, 2319, 2358, 2370, 2417, 2456, 2492, 2676										
Antidepressants										
1180h	12 y M	bupropion	1	1	A	Ingst	Int-S	1		
1181pha	12 y F	amitriptyline	1	1	U	Ingst	Int-S	1	nortriptyline	1.4 mcg/mL In Blood (unspecified) ③ 1 h (pe)
		amitriptyline	1	1					amitriptyline	2.2 mcg/mL In Blood (unspecified) ③ 1 h (pe)
1182ph	13 y F	escitalopram	1	1	A	Ingst	Int-S	2		
		acetaminophen/hydrocodone	2	2						
		acetaminophen/oxycodone	3	3						
		alprazolam	4	4						
1183ph	14 y F	bupropion	1	1	A/C	Ingst	Int-S	1		
		fluoxetine	2	2						
1184ha	15 y M	bupropion (extended release)	1	1	A/C	Ingst	Int-S	1	bupropion	184 ng/mL In Serum ③ Unknown
		quetiapine	2	2					quetiapine	1237 ng/mL In Serum ③ Unknown
1185	16 y F	duloxetine	1	1	U	Ingst	Int-S	2		
		cyclic antidepressant, unknown	2	2						
		acetaminophen	3	3					acetaminophen (apap)	343.9 mcg/mL In Serum ③ Unknown
1186h	17 y F				A/C	Ingst	Int-S	1		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1187ph	18 y M	bupropion (extended release)	1	1	A/C	Ingst	Int-S	1		
		cyanocrylate	2	2						
1188ai	18 y M	bupropion (extended release)	1	1	U	Unk	Int-S	1		
		bupropion	2	2						
1189h	19 y F	bupropion	1	1	A/C	Ingst	Int-S	1		
		citalopram	2	2						
1190ph	19 y M	venlafaxine (extended release)	1	1	A/C	Ingst	Int-S	1		
		escitalopram	2	2						
1191ha	20 y F	bupropion (extended release)	1	1	A/C	Ingst	Int-S	1	bupropion	10.001 mg/L In Blood (unspecified) @ Autopsy
		venlafaxine (extended release)	2	2						
		clonidine	3	3						
		paliperidone	4	4						
		trazodone	5	5						
1192pa	20 y M	bupropion	1	1	U	Ingst	Unk	1	threobupropion	10.001 mg/L In Blood (unspecified) @ Autopsy
		bupropion	1	1						
		topiramate	2	2						
		lisdexamfetamine	3	3						
		amphetamines	4	4						
1193ha	22 y M	alprazolam	4	4	A	Ingst	Int-S	1	bupropion	5865 ng/mL In Blood (unspecified) @ Autopsy
		ethanol	5	5						
		bupropion (extended release)	1	1						
		methamphetamine	2	2						
		venlafaxine	3	3						
1194h	22 y M	citalopram	4	4	A	Ingst	Int-S	1	citalopram	42.2 ng/mL In Blood (unspecified) @ Autopsy
		bupropion	1	1						
		dextromethorphan	2	2						
		chlorpheniramine	3	3						
		lamotrigine	4	4						
1195ph	23 y F	marijuana	5	5	U	Ingst	Int-S	2	11-oh-thc (11-hydroxy-delta-9-tetrahydrocannabinol)	7.6 ng/mL In Blood (unspecified) @ Unknown
		amitriptyline	1	1						
		perphenazine	2	2						
		doxepin	1	1						
		ziprasidone	2	2						
1196ph	23 y M	paroxetine	3	3	A/C	Ingst	Int-U	2		
		alprazolam	4	4						
		hydrochlorothiazide	5	5						
		fluoxetine	6	6						
		olanzapine	7	7						
1197h	23 y M	zolpidem	8	8	A/C	Ingst	Int-S	2		
		methocarbamol	9	9						
		bupropion (extended release)	1	1						
		bupropion (extended release)	1	1						
		escitalopram	2	2						
1198ph	23 y F	methylphenidate	3	3	U	Ingst	Int-U	2		
		doxepin	1	1						
		quetiapine	2	2						
		sertraline	3	3						
		bupropion (extended release)	1	1						
1199h	24 y F	fluoxetine	1	1	A	Ingst	Int-S	2		
		gabapentin	2	2						
		bupropion	3	3						
		lithium	1	1						
		oxycodone	2	2						
1200ai	25 y F	oxycodone	2	2	U	Unk	Int-M	2	oxymorphone	18 ng/mL In Blood (unspecified) @ 1 h (pe)
		trazodone	3	3						
		ondansetron	4	4						
		oxycodone	2	2						
		trazodone	3	3						
1201pa	25 y F	oxycodone	2	2	U	Ingst	Int-S	1	trazodone	480 ng/mL In Blood (unspecified) @ 1 h (pe)
		trazodone	3	3						
		ondansetron	4	4						
		lithium	1	1						
		oxycodone	2	2						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Table 27. Listing of fatal nonpharmaceutical and pharmaceutical exposures. Continued.														
Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time				
1202	25 y F	olanzapine	5	5	A/C	Ingst	Unk	1	olanzapine	130 ng/mL In Blood (unspecified) @ 1 h (pe)				
		amphetamine/dextroamphetamine	6	6					amphetamine	1300 ng/mL In Blood (unspecified) @ 1 h (pe)				
		ibuprofen	7	7					chlorpheniramine	19 ng/mL In Blood (unspecified) @ 1 h (pe)				
		acetaminophen/antihistamine/decongestant/dextromethorphan	8	8										
		sertraline	9	9					sertraline	280 ng/mL In Blood (unspecified) @ 1 h (pe)				
		acetaminophen/salicylate	10	10					acetaminophen (apap)	390 mcg/mL In Blood (unspecified) @ 1 h (pe)				
		acetaminophen/salicylate	10	10					salicylate	430 mcg/mL In Blood (unspecified) @ 1 h (pe)				
		food coloring	11	11					norfluoxetine @ Autopsy	10000 ng/mL In Blood (unspecified) @ Autopsy				
		fluoxetine	1	1										
		fluoxetine	1	1							fluoxetine	13000 ng/mL In Blood (unspecified) @ Autopsy		
		morphine	2	2							morphine (free)	200 ng/mL In Blood (unspecified) @ Autopsy		
		levothyroxine	3	3							lamotrigine @ Autopsy	13 ng/mL In Blood (unspecified) @ Autopsy		
		lamotrigine	4	4										
		levetiracetam	5	5							levetiracetam	70 mcg/mL In Blood (unspecified) @ Autopsy		
		risperidone	6	6							2			
		omeprazole	7	7										
		albuterol	8	8										
1203ph	26 y F	citalopram	1	1	A/C	Ingst	Int-S	2	doxepin	410 ng/mL In Blood (unspecified) @ Unknown				
		olanzapine	2	2										
		lacosamide	3	3										
		alprazolam	4	4										
		temazepam	5	5										
		ondansetron	6	6										
1204pha	27 y M	doxepin	1	1	A/C	Ingst	Int-S	1	bupropion	3200 ng/mL In Blood (unspecified) @ Unknown				
		bupropion	2	2					bupropion	3200 ng/mL In Blood (unspecified) @ Unknown				
		citalopram	3	3					citalopram	160 ng/mL In Blood (unspecified) @ Unknown				
		ethanol	4	4					ethanol	94 mg/dL In Blood (unspecified) @ Unknown				
1205h	28 y M	bupropion (extended release)	1	1	A	Ingst	Int-S	3	lithium @ Unknown	10 mEq/L In Blood (unspecified) @ Unknown				
1206h	29 y F	lithium	1	1	A	Ingst	Int-S	1			lithium	8 mEq/L In Blood (unspecified) @ 30 m (pe)		
		lithium	1	1							lithium	8 mEq/L In Blood (unspecified) @ 30 m (pe)		
		alprazolam	2	2							1			
		lorazepam	3	3										
		acetaminophen	4	4										
gabapentin	5	5												
1207	30 y M	bupropion	1	1	A	Ingst	Int-S	1	ethanol salicylate	115 mg/dL In Serum @ 4 h (pe) 4.6 mg/dL In Serum @ 4 h (pe)				
		ethanol	2	2										
		salicylate	3	3										
1208h	30 y F	amitriptyline	1	1	A	Ingst	Int-S	2	amitriptyline	90 ng/mL In Unknown @ Unknown				
		amitriptyline	1	1							U	Unk	Int-S	1
		trazodone	2	2										
		citalopram	3	3										
1209ai	30 y F	trazodone	2	2	U	Unk	Int-S	1	tca (totall tricyclic concen-tration)	2003 ng/mL In Serum @ Unknown				
		citalopram	3	3										
		cyclic antidepressant, unknown	1	1										
1210ph	32 y F	valproic acid	2	2	U	Ingst	Unk	2	amphetamine methamphetamine	790 ng/mL In Unknown @ Unknown				
		bupropion	1	1										
		methamphetamine	2	2										
		buspirone	3	3										
		haloperidol	4	4										
1211ha	32 y M	benztropine	5	5	A/C	Ingst + Unk	Int-S	1	amitriptyline	90 ng/mL In Unknown @ Unknown				
		amitriptyline	1	1										
1212phi	32 y F	cyclobenzaprine	2	2	A	Ingst	Int-S	1	amitriptyline	90 ng/mL In Unknown @ Unknown				
		amitriptyline	1	1										
1213ai	33 y F	cyclobenzaprine	2	2	U	Unk	Int-S	1	amitriptyline	90 ng/mL In Unknown @ Unknown				
		doxepin	1	1										
		bupropion	2	2										
1214ph	33 y F	trazodone	3	3	A	Ingst	Int-S	2	amitriptyline	90 ng/mL In Unknown @ Unknown				
		doxepin	1	1										

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1215a	34 y M	bupropion (extended release)	1	1	A/C	Ingst	Int-S	1		
		drug, unknown	2	2						
		trazodone	3	3						
		bupropion	1	1					bupropion	0.2 mcg/mL In Blood (unspecified) @ 1 h (pe)
		bupropion	1	1					hydroxybupropion	0.53 mcg/mL In Blood (unspecified) @ 1 h (pe)
		ethanol	2	2					ethanol	0.061 g/dL In Blood (unspecified) @ 1 h (pe)
		risperidone	3	3					risperidone	0.014 mcg/mL In Blood (unspecified) @ 1 h (pe)
1216h	35 y M	risperidone	3	3	U	Ingst	Int-S	1	9-hydroxyrisperidone	0.034 mcg/dL In Blood (unspecified) @ 1 h (pe)
		duloxetine	4	4					duloxetine	0.078 mcg/mL In Blood (unspecified) @ 1 h (pe)
		bupropion	1	1						
1217ha	35 y F	escitalopram	2	2	A/C	Ingst	Int-S	1		
		bupropion (extended release)	1	1					hydroxybupropion	10 mcg/mL In Blood (unspecified) @ Autopsy
		bupropion (extended release)	1	1					bupropion	8 mcg/mL In Blood (unspecified) @ Autopsy
1218ai	35 y F	ethanol	2	2	U	Unk	Unk	1	ethanol	254 mg/dL In Blood (unspecified) @ Unknown
		imipramine	1	1						
		trazodone	2	2						
1219ha	37 y F	clonazepam	3	3	A	Ingst	Int-S	2		
		imipramine	1	1						
		risperidone	2	2						
1220pha	37 y F				A/C	Ingst	Int-S	1		
		doxepin	1	1					doxepin	2.3 mg/L In Blood (unspecified) @ 4 h (pe)
		clonazepam	2	2					clonazepam	0.011 mg/L In Serum @ 4 h (pe)
		clonazepam	2	2					clonazepam	0.04 mg/L In Blood (unspecified) @ 4 h (pe)
		clonazepam	2	2					7-aminoclonazepam	0.066 mg/L In Serum @ 4 h (pe)
		clonazepam	2	2					7-aminoclonazepam	0.16 mg/L In Blood (unspecified) @ 4 h (pe)
		ethanol	3	2					ethanol	136 mg/dL In Serum @ Unknown
		alprazolam	4	4					alprazolam	0.01 mg/L In Blood (unspecified) @ 4 h (pe)
		alprazolam	4	4					alprazolam	0.01 mg/L In Serum @ 4 h (pe)
		gabapentin	5	5					gabapentin	12 mg/L In Blood (unspecified) @ 4 h (pe)
1221h	38 y M	gabapentin	5	5	A/C	Ingst	Int-S	1	gabapentin	15 mg/L In Serum @ 4 h (pe)
		lithium	1	1					lithium	1 mEq/L In Blood (unspecified) @ 11 h (pe)
		lithium	1	1					lithium	1.5 mEq/L In Blood (unspecified) @ 8 h (pe)
		lithium	1	1					lithium	2.3 mEq/L In Blood (unspecified) @ Unknown
1222i	38 y F				U	Ingst	Unk	2		
		venlafaxine	1	1						
		lamotrigine	2	2						
		phenylclidine	3	3						
1223phi	39 y M	diclofenac	4	4	U	Ingst	Int-S	2		
		amitriptyline	1	1						
1224h	40 y M				A	Ingst	Int-S	1		
		lithium	1	1						
		quetiapine	2	2						
		lorazepam	3	3						
1225h	40 y F	zolpidem	4	4	A/C	Ingst	Int-S	2		
		nortriptyline	1	1						
		cyclobenzaprine	2	2						
		acetutolol	3	3						
1226h	41 y M				A/C	Ingst	Int-S	1		
		cyclic antidepressant, unknown	1	1						
1227pha	41 y F				A/C	Ingst	Int-S	2		
		citalopram	1	1					ethanol	0.276 g/dL In Blood (unspecified) @ 3 h (pe)
		citalopram	1	1					morphine (free)	140 mcg/L In Blood (unspecified) @ 3 h (pe)
		citalopram	1	1					benzoylcochine	300 mcg/L In Blood (unspecified) @ 3 h (pe)
		cocaine	2	2						
		ethanol	3	3					ethanol	316 mg/dL In Serum @ Unknown
1228h	41 y F	morphine	4	4	A/C	Ingst	Int-S	2		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1229	41 y F	lithium	1	1	U	Ingst	Int-S	2	lithium	1.77 mEq/L In Serum @ 4 h (pe)
		lithium	1	1					lithium	6 mEq/L In Serum @ Unknown
		lithium	2	2					ethanol	227 mg/dL In Serum @ 4 h (pe)
		quetiapine	3	3						
		ethanol	4	4						
1230pha	41 y F	nortriptyline	1	1	U	Ingst	Int-S	2	nortriptyline	268 ng/mL In Blood (unspecified) @ Unknown
		acetaminophen/ butalbital/caffeine	2	2					amitriptyline	652 ng/mL In Blood (unspecified) @ Unknown
1231ph	41 y M	cyclic antidepressant, unknown	1	1	U	Ingst	Int-S	2	amitriptyline	652 ng/mL In Blood (unspecified) @ Unknown
		cyclic antidepressant, unknown	1	1						
1232ph	41 y F	venlafaxine	1	1	A/C	Ingst	Int-S	2		
		quetiapine	2	2						
		diphenhydramine	3	3						
		ethanol	4	4						
1233h	42 y F	trazodone	1	1	A	Ingst	Int-S	2		
		zolpidem	2	2						
		acetaminophen/oxycodone	3	3						
		clonazepam	4	4						
1234h	42 y M	amitriptyline	2	1	A	Ingst	Int-S	2		
		tizanidine	1	1						
		famotidine	3	3						
		prednisone	4	4						
		natural gas	5	5						
1235ph	42 y M	amitriptyline	1	1	U	Ingst	Int-U	2		
		bupropion (extended release)	1	1						
		citalopram	2	2						
1236ha	42 y M	ethanol	3	3	A/C	Ingst	Int-S	1		
		venlafaxine	1	1					venlafaxine	4000 mcg/L In Blood (unspecified) @ Autopsy
		venlafaxine	1	1					norvenlafaxine	4000 mcg/L In Blood (unspecified) @ Autopsy
1237ai	43 y F	metoprolol (extended release)	2	2	U	Ingst + Unk	Int-S	1		
		gabapentin	3	3						
		atorvastatin	4	4						
		bupropion	1	1						
1238pha	43 y M	citalopram	2	2	U	Ingst	Int-S	2		
		trazodone	3	3						
		venlafaxine	1	1					venlafaxine	7.3 mg/L In Whole Blood @ 30 m (pe)
		doxepin	2	2						
1239ai	43 y M	alprazolam	3	3	U	Unk	Int-M	1	alprazolam	93 ng/mL In Plasma @ 30 m (pe)
		zolpidem	4	4						
		bupropion	1	1						
		doxylamine	2	2						
1240	44 y F	amitriptyline	1	1	U	Ingst	Int-S	3		
		ethanol	2	2					ethanol	51 mg/dL In Blood (unspecified) @ Unknown
1241a	44 y F	sertraline	3	3	A	Ingst	Int-S	1		
		doxepin	1	1					desmethyldoxepin	230 ng/mL In Blood (unspecified) @ Unknown
		doxepin	1	1					doxepin	710 ng/mL In Blood (unspecified) @ Unknown
		quetiapine	2	2					quetiapine	270 ng/mL In Blood (unspecified) @ Unknown
		sertraline	3	3					sertraline	140 ng/mL In Blood (unspecified) @ Unknown
		sertraline	3	3					desmethylsertraline	81 ng/mL In Blood (unspecified) @ Unknown
		mirtazapine	4	4					mirtazapine	190 ng/mL In Blood (unspecified) @ Unknown
		methamphetamine	5	5					methamphetamine	810 ng/mL In Blood (unspecified) @ Unknown
		amphetamine	6	6					amphetamine	48 ng/mL In Blood (unspecified) @ Unknown
		hydrocodone	7	7						
		acetaminophen/ butalbital/caffeine	8	8					acetaminophen (apap)	20 mcg/mL In Blood (unspecified) @ Unknown
		acetaminophen/ butalbital/caffeine	8	8					butalbital	3.4 mcg/mL In Blood (unspecified) @ Unknown
		desvenlafaxine	9	9						
		bupropion	10	10						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1242ph	44 y M	lisinopril	11	11	A/C	Ingst	Int-S	2		
		alprazolam	12	12						
		metoprolol	13	13						
1243h	44 y M	cyclic antidepressant, unknown	1	1	A/C	Ingst	Int-S	2		
		sertraline	1	1						
		tizanidine	2	2						
1244h	45 y F	amitriptyline	1	1	A	Ingst	Int-S	1		
		lithium	2	2						
		gabapentin	3	3						
1245ai	45 y F	melatonin	4	4	U	Unk	Int-S	1		
		topiramate	5	5						
		amitriptyline	1	1						
1246h	46 y F	citalopram	2	2	U	Ingst	Int-S	2		
		duloxetine	3	3						
		bupropion	1	1						
1247pha	46 y F	clonazepam	2	2	A	Ingst	Int-S	2		
		venlafaxine	1	1						
		acetaminophen/diphenhydramine	2	2						
1248h	46 y F	acetaminophen/diphenhydramine	2	2	A/C	Ingst	Int-S	2	diphenhydramine	2100 ng/mL In Blood (unspecified) @ 30 m (pe)
		ethanol	3	3					acetaminophen (apap)	235 mcg/mL In Blood (unspecified) @ 30 m (pe)
									ethanol	325 mg/dL In Whole Blood @ 30 m (pe)
1249ai	46 y F	trazodone	1	1	U	Ingst + Unk	Unk	1		
		amitriptyline	1	1						
		buprenorphine	2	2						
1250a	47 y F	diphenhydramine	3	3	A/C	Ingst	Int-S	1		
		venlafaxine (extended release)	1	1					venlafaxine	110 mg/L In Blood (unspecified) @ Autopsy
		venlafaxine (extended release)	1	1					venlafaxine	120 mg/L In Blood (unspecified) @ Autopsy
1251ai	47 y M	bupropion	1	1	U	Unk	Int-A	1		
		hydroxyzine	2	2						
		bupropion	1	1						
1252h	48 y F	lamotrigine	2	2	A/C	Ingst	Int-S	1		
		ethanol	3	3						
1253h	48 y F	velafaxine	1	1	U	Ingst	Unk	2		
		doxepin	1	1						
		escitalopram	2	2						
1254ha	48 y F	hydroxyzine	3	3	A	Ingst	Int-S	2		
		ethanol	4	4						
1255ai	48 y F	ethanol	1	1	U	Ingst + Unk	Unk	1		
		diazepam	2	2						
			3	3						
1256ai	48 y M	citalopram	1	1	U	Unk	Unk	2		
		propranolol	2	2						
1257h	48 y M	doxepin	1	1	A/C	Ingst + Par	Int-S	1		
		haloperidol	2	2						
		clonazepam	3	3						
1258	48 y F	insulin (glargine)	4	4	A/C	Ingst	Int-S	2		
		glipizide	5	5						
		metformin	6	6						
1259pai	49 y F	ziprasidone	7	7	A	Ingst	Int-A	1		
		ethanol	8	8						
		vortioxetine	9	9						
1258	48 y F	pregabalin	10	10	A/C	Ingst	Int-S	2		
		bupropion (extended release)	1	1						
		carvedilol	2	2						
1259pai	49 y F	clonazepam	3	3	A	Ingst	Int-A	1		
		venlafaxine	1	1					venlafaxine	20 mg/L In Blood (unspecified) @ Autopsy
		venlafaxine	1	1					venlafaxine	45 mg/kg In Liver @ Autopsy
		ethanol (non-beverage)	2	2					ethanol	0.02 % (wt/Vol) In Blood (unspecified) @ Autopsy

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
		ethanol (non-beverage)	2	2					ethanol	0.04 % (wt/Vol) In Vitreous @ Autopsy
		ethanol (non-beverage)	2	2					ethanol	0.12 % (wt/Vol) In Urine (quantitative only) @ Autopsy
1260pha	49 y F	bupropion (extended release)	1	1	A/C	Ingst	Int-S	1	bupropion	2300 ng/mL In Whole Blood @ Unknown
		trazodone	2	1						
		lurasidone	3	2						
		cyclobenzaprine	4	3						
		aripiprazole	5	4						
		gabapentin	6	5						
		amphetamine/ dextroamphetamine (extended release)	7	6						
		acetaminophen/hydrocodone	8	7						
		fluoxetine	9	8						
		cephalexin	10	9						
1261ha	49 y F	bupropion	1	1	A/C	Ingst	Int-S	1	bupropion	12.2 mcg/mL In Blood (unspecified) @ Autopsy
		verapamil	2	2					verapamil	2.3 mcg/mL In Blood (unspecified) @ 1 h (pe)
		escitalopram	3	3						
		ethanol	4	4						
		diphenhydramine	5	5						
		hydrochlorothiazide	6	6						
		lisinopril	7	7						
1262h	49 y M	amitriptyline	1	1	A/C	Ingst	Int-S	3		
		cyclobenzaprine	2	2						
1263pha	49 y F	amitriptyline	1	1	A/C	Ingst + Unk	Int-S	1	amitriptyline	10.001 mg/L In Blood (unspecified) @ Autopsy
		amitriptyline	1	1					nortriptyline	100 mg/kg In Liver @ Autopsy
		amitriptyline	1	1					amitriptyline	160.001 mg/kg In Liver @ Autopsy
		amitriptyline	1	1					nortriptyline	5.7 mg/L In Blood (unspecified) @ Autopsy
		cocaine	2	2					benzoylecognine	0.029 mg/L In Blood (unspecified) @ Autopsy
1264ai	49 y F	amitriptyline	1	1	U	Unk	Unk	3		
		methadone	2	2						
		diphenhydramine	3	3						
1265ai	49 y M	fluvoxamine	1	1	U	Unk	Int-S	1		
		oxycodone	2	2						
		oxymorphone	3	3						
1266ai	49 y M	trazodone	1	1	U	Unk	Unk	1		
		tramadol	2	2						
		morphine	3	3						
1267	50 y F	doxepin	1	1	U	Ingst	Int-S	2		
		hydroxyzine	2	2						
1268h	50 y F	fluoxetine	1	1	U	Ingst	Unk	3		
		trazodone	2	2						
		topiramate	3	3						
		alprazolam	4	4						
1269ph	50 y F	bupropion	1	1	A	Ingst	Int-S	1		
		antidepressant (SNRI)	2	2						
1270ai	50 y F	amitriptyline	1	1	U	Unk	Int-M	2		
		tramadol	2	2						
		bupropion	3	3						
1271p	51 y M	amitriptyline	1	1	A/C	Ingst	Int-S	2		
1272ai	51 y F	amitriptyline	1	1	U	Unk	Unk	1		
		fentanyl	2	2						
		morphine	3	3						
1273p	51 y F	doxepin	1	1	A	Ingst	Int-S	2		
		narcotic, other/unknown	2	2						
		benzodiazepine	3	3						
		cocaine	4	4						
1274a	51 y F	bupropion (extended release)	1	1	A/C	Ingst	Int-S	1	bupropion	13 mg/L In Blood (unspecified) @ Autopsy
		bupropion (extended release)	1	1					bupropion	20 mg/L In Blood (unspecified) @ Autopsy
		ethanol	2	2					ethanol	239 mg/dL In Blood (unspecified) @ Unknown
1275h	52 y F	nortriptyline	1	1	A	Ingst	Unk	2		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1276ai	52 y F	topiramate	2	2	U	Unk	Int-M	1		
		gabapentin	3	3						
		clonazepam	4	4						
		lamotrigine	5	5						
		quetiapine	6	6						
1277ph	52 y F	citalopram	1	1	U	Ingst	Int-S	2		
		ethanol	2	2						
		quetiapine	3	3						
		bupropion	1	1						
		clonazepam	2	2						
1278	52 y F	alcohol, unknown	3	3	A/C	Ingst	Int-S	2	ethanol	267 mg/dL In Blood (unspecified) @ Unknown
		amitriptyline	1	1						
		trazodone	1	1						
		diphenhydramine	2	2						
		alcohol, unknown	3	3						
1279ai	52 y F	alcohol, unknown	3	3	U	Ingst + Unk	Int-S	2		
		amitriptyline	1	1						
		trazodone	1	1						
		diphenhydramine	2	2						
		alcohol, unknown	3	3						
1280	53 y F	lithium	1	1	U	Ingst	Int-S	3	salicylate	6.6 mg/dL In Blood (unspecified) @ Unknown
		sodium citrate	2	2						
		salicylate	3	3						
		lithium	1	1						
		sodium citrate	2	2						
1281pha	54 y F	salicylate	3	3	A/C	Ingst	Int-S	1		
		bupropion	1	1						
		duloxetine	2	2						
		clonazepam	3	3						
		amitriptyline	1	1						
1282ph	54 y F	pregabalin	2	2	A/C	Ingst	Int-U	2		
		diazepam	3	3						
		amitriptyline	1	1						
		pregabalin	2	2						
		diazepam	3	3						
1283ai	54 y M	diazepam	3	3	U	Ingst + Unk	Int-A	1		
		amitriptyline	1	1						
		ethanol	2	2						
		bupropion	1	1						
		oxycodone	2	2						
1284ai	54 y F	trazodone	3	3	U	Unk	Int-M	3		
		bupropion	1	1						
		oxycodone	2	2						
		trazodone	3	3						
		doxepin	1	1						
1285h	54 y M	zolpidem	2	2	A/C	Ingst	Int-S	1		
		doxepin	1	1						
		zolpidem	2	2						
		cyclic antidepressant, unknown	1	1						
		lorazepam	2	2						
1286ha	55 y F	lorazepam	2	2	A	Ingst	Int-S	2		
		cyclic antidepressant, unknown	1	1						
		lorazepam	2	2						
		lithium	1	1						
		drug, unknown	2	2						
1287h	55 y F	drug, unknown	2	2	U	Ingst	Unk	3	lithium	2.39 mEq/L In Serum @ Unknown
		lithium	1	1						
		drug, unknown	2	2						
		bupropion (extended release)	1	1						
		clonazepam	2	2						
1288ha	55 y F	clonazepam	2	2	A	Ingst	Int-S	2	bupropion	49 ng/mL In Blood (unspecified) @ Autopsy
		bupropion (extended release)	1	1						
		clonazepam	2	2						
		clonazepam	2	2						
		ethanol	3	3						
1289pi	56 y F	ethanol	3	3	A/C	Ingst	Int-S	1	ethanol	190 mg/dL In Serum @ Unknown
		bupropion	1	1						
		valproic acid	2	2						
		oxybutynin	3	3						
		clonazepam	4	4						
1290ai	56 y F	clonazepam	4	4	U	Unk	Int-M	1		
		bupropion	1	1						
		gabapentin	2	2						
		venlafaxine	1	1						
		venlafaxine	1	1						
1291h	56 y F	venlafaxine	1	1	A	Ingst	Int-S	2		
		venlafaxine	1	1						
		venlafaxine	1	1						
		venlafaxine	1	1						
		venlafaxine	1	1						
1292ai	57 y M	venlafaxine	1	1	U	Unk	Int-S	1		
		citalopram	1	1						
		trazodone	2	2						
		alprazolam	3	3						
		alprazolam	3	3						
1293h	58 y F	alprazolam	3	3	A/C	Ingst	Int-S	2		
		bupropion	1	1						
		metoprolol	2	2						
		citalopram	3	3						
		lisinopril	4	4						
1294h	59 y F	antiplatelet drug	5	5	U	Ingst	Int-S	2		
		ethanol	6	6						
		nortriptyline	1	1						
		nortriptyline	1	1						
		nortriptyline	1	1						
1295ha	59 y F	nortriptyline	1	1	A	Ingst	Int-S	2		
		venlafaxine	1	1						
		clonazepam	2	2						
		clonazepam	2	2						
		atenolol	3	3						

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1296ai	59 y M	atenolol/chlorthalidone	4	4	U	Unk	Unk	2		
		clomipramine	1	1						
		buspirone	2	2						
		dextromethorphan	3	3						
1297ha	59 y M	amitriptyline	1	1	A/C	Ingst	Int-S	3		
		clonidine	2	2						
1298	59 y F	mirtazapine	1	1	A/C	Ingst	Int-S	2		
		citalopram	2	2						
		oxycodone	3	3						
		clonazepam	4	4						
1299ha	59 y M	nortriptyline	1	1	U	Ingst	Int-U	2		
		morphine	2	2						
		tizanidine	3	3						
		lisinopril	4	4						
		gabapentin	5	5					gabapentin	74 mg/L In Blood (unspecified) @ 2 h (pe)
		alprazolam	6	6					alprazolam	0.037 mg/L In Blood (unspecified) @ 2 h (pe)
		pravastatin	7	7						
1300ai	59 y F	nortriptyline	1	1	U	Unk	Int-S	1		
		fluoxetine	2	2						
		morphine	3	3						
		clonazepam	4	4						
1301ha	60 y F	amitriptyline	1	1	A/C	Ingst	Int-S	1	nortriptyline	180 ng/mL In Gastric (stomach content) @ Autopsy
		amitriptyline	1	1					amitriptyline	71 ng/mL In Gastric (stomach content) @ Autopsy
		bupropion	2	2						
		ethanol	3	3						
		duloxetine	4	4						
		metformin	5	5						
		gabapentin	6	6						
		levothyroxine	7	7						
		zolpidem	8	8						
		salicylate	9	9						
		insulin	10	10						
		marijuana	11	11					delta-9-carboxy-thc	5.9 ng/mL In Gastric (stomach content) @ Autopsy
1302ai	60 y F	citalopram	1	1	U	Unk	Unk	3		
1303	61 y F	bupropion (extended release)	1	1	A	Ingst	Int-S	2		
		lorazepam	2	2						
1304a	61 y M	bupropion	1	1	A/C	Ingst	Int-S	2	bupropion	710 ng/mL In Blood (unspecified) @ Autopsy
		bupropion	1	1					bupropion	800 ng/mL In Serum @ Unknown
		trazodone	2	2						
1305ph	61 y M	amitriptyline	1	1	A/C	Ingst	Int-S	2		
		lisinopril	2	2						
		alprazolam	3	3						
		ethanol	4	4					ethanol	100 mg/dL In Serum @ Unknown
1306ai	61 y F	amitriptyline	1	1	U	Unk	Int-A	1		
		hydrocodone	2	2						
		alprazolam	3	3						
1307i	62 y F	amitriptyline	1	1	U	Unk	Unk	2		
		tramadol	2	2						
		lorazepam	3	3						
1308h	62 y F	bupropion	1	1	A	Ingst	Int-S	2		
1309ai	63 y F	fluoxetine	1	1	U	Unk	Unk	2		
		bupropion	2	2						
		diazepam	3	3						
1310h	64 y M	sertraline	1	1	A	Ingst	Int-S	2		
		sumatriptan	2	2						
		mercaptopurine	3	3						
		adalimumab	4	4						
		cyclobenzaprine	5	5						
		lamotrigine	6	6						
		lisinopril	7	7						
		lorazepam	8	8						
		pregabalin	9	9						
		metoprolol	10	10						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1311p	64 y F	temazepam	11	11	A	Ingst	Int-S	2		
		rivaroxaban	12	12						
		omeprazole	13	13						
		corticosteroids	14	14						
		diuretic, unknown	15	15						
1312ai	64 y M	venlafaxine	1	1	U	Unk	Int-A	3		
		acetaminophen/oxycodone	2	2						
		salicylate	3	3						
		meloxicam	4	4						
		naproxen	5	5						
1313ai	64 y F	ibuprofen	6	6	U	Unk	Int-S	2		
		calcium	7	7						
		sertraline	1	1						
		ethanol	2	2						
		isopropanol	3	3						
1314h	66 y F	venlafaxine	1	1	A	Ingst	Int-S	1		
		mirtazapine	2	2						
		metoprolol	3	3						
		amitriptyline	1	1						
		ethanol	2	2						
1315ai	66 y M	ethanol	2	2	U	Unk	Int-S	1		
		citalopram	1	1						
		carisoprodol	2	2						
		oxycodone	3	3						
		hydrocodone	4	4						
1316h	67 y M	bupropion (extended release)	1	1	A/C	Ingst	Int-S	1		
		risperidone	2	2						
		cyclobenzaprine	3	3						
		temazepam	4	4						
		fluorquinolone	5	5						
1317h	67 y F	amitriptyline	1	1	A	Ingst	Int-S	2		
		acetaminophen/hydrocodone	2	2						
		diazepam	3	3						
		amitriptyline	1	1						
		verapamil	2	2						
1318ai	67 y F	lorazepam	3	3	U	Unk	Int-S	1		
		bupropion	1	1						
		amitriptyline	1	1						
		cyclobenzaprine	2	2						
		amitriptyline	1	1						
1319ai	67 y F	verapamil	2	2	U	Unk	Unk	3		
		lorazepam	3	3						
		bupropion	1	1						
		amitriptyline	1	1						
		cyclobenzaprine	2	2						
1320h	67 y F	amitriptyline	1	1	A	Ingst	Int-U	2		
		cyclobenzaprine	2	2						
		amitriptyline	1	1						
		cyclobenzaprine	2	2						
		amitriptyline	1	1						
1321ha	68 y F	olmesartan	2	2	A/C	Ingst	Int-S	2		
		esopiclone	3	3						
		gabapentin	4	4						
		sertraline	5	5						
		pantoprazole	6	6						
1322pha	68 y M	buspirone	7	7	A	Ingst	Int-S	3		
		metformin	8	8						
		lisinopril	9	9						
		bupropion	1	1						
		alprazolam	2	2						
1323h	69 y M	bupropion	1	1	A	Ingst	Unk	3		
		bethanechol	2	2						
		risperidone	3	3						
		levothyroxine	4	4						
		drug, unknown	5	5						
1324h	70 y F	vitamin D	6	6	A/C	Ingst	Int-S	3		
		bupropion (extended release)	1	1						
		fluoxetine	1	1						
		trazodone	1	1						
		hydrocodone	2	2						
1325ai	70 y F	toluene	3	3	U	Unk	Int-S	1		
		benzene	4	4						
		trazodone	1	1						
		hydrocodone	2	2						
		toluene	3	3						
1326ai	70 y F	benzene	4	4	U	Unk	Int-M	2		
		citalopram	1	1						
		diazepam	2	2						
		ethanol	3	3						
		ethanol	3	3						
1327ai	75 y F	ethanol	3	3	U	Unk	Unk	3		
		ethanol	3	3						
		ethanol	3	3						
		ethanol	3	3						
		ethanol	3	3						
1328ai	75 y M	ethanol	3	3	U	Unk	Unk	3		
		ethanol	3	3						
		ethanol	3	3						
		ethanol	3	3						
		ethanol	3	3						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1329pa	78 y F	cyclic antidepressant, unknown	1	1	A/C	Ingst	Int-S	1		
		cocaine	2	2						
		amphetamine	3	3						
		amitriptyline	1	1					nortriptyline	3.3 mg/L In Blood (unspecified) @ Autopsy
		amitriptyline	1	1					nortriptyline	3.6 mg/L In Blood (unspecified) @ Autopsy
		amitriptyline	1	1					amitriptyline	4.9 mg/L In Blood (unspecified) @ Autopsy
		amitriptyline	1	1					amitriptyline	6.2 mg/L In Blood (unspecified) @ Autopsy
		diazepam	2	2					nordiazepam	0.4 mg/L In Blood (unspecified) @ Autopsy
diazepam	2	2	diazepam	0.7 mg/L In Blood (unspecified) @ Autopsy						
1330	80 y F				A	Ingst	Unt-G	2		
		lithium	1	1					lithium	2.45 mEq/L In Serum @ 1 h (pe)
		valproic acid	2	2						
1331a	84 y M				A/C	Ingst	Int-S	1		
		bupropion (extended release)	1	1					bupropion	1.2 mcg/mL In Blood (unspecified) @ Unknown
1332h	84 y M				A/C	Ingst	Unt-T	3		
See Also case 17, 21, 36, 46, 48, 97, 121, 124, 147, 283, 313, 363, 408, 456, 494, 498, 522, 535, 553, 559, 578, 580, 603, 607, 612, 615, 623, 633, 638, 642, 660, 666, 679, 683, 693, 704, 706, 721, 737, 742, 747, 749, 751, 759, 778, 779, 785, 793, 800, 802, 807, 812, 815, 816, 820, 829, 836, 840, 860, 891, 894, 901, 903, 911, 924, 926, 936, 939, 952, 959, 960, 961, 966, 986, 993, 996, 1005, 1009, 1012, 1017, 1018, 1028, 1052, 1058, 1077, 1078, 1103, 1108, 1109, 1155, 1156, 1158, 1163, 1344, 1357, 1359, 1382, 1384, 1385, 1394, 1396, 1400, 1406, 1409, 1411, 1412, 1413, 1419, 1420, 1423, 1424, 1425, 1426, 1427, 1428, 1432, 1433, 1440, 1443, 1452, 1453, 1455, 1461, 1465, 1468, 1473, 1474, 1479, 1481, 1483, 1489, 1490, 1491, 1501, 1503, 1512, 1514, 1517, 1518, 1524, 1525, 1526, 1531, 1546, 1551, 1552, 1559, 1561, 1566, 1568, 1569, 1571, 1573, 1580, 1591, 1610, 1616, 1622, 1636, 1649, 1660, 1661, 1665, 1667, 1674, 1679, 1680, 1681, 1683, 1710, 1712, 1717, 1720, 1723, 1738, 1739, 1746, 1757, 1758, 1760, 1763, 1768, 1770, 1782, 1786, 1789, 1793, 1799, 1801, 1805, 1806, 1811, 1815, 1832, 1845, 1858, 1879, 1914, 1946, 1972, 2027, 2037, 2050, 2110, 2120, 2135, 2149, 2180, 2221, 2232, 2237, 2296, 2297, 2331, 2358, 2363, 2370, 2374, 2379, 2412, 2452, 2489, 2492, 2517, 2525, 2544, 2546, 2556, 2561, 2599, 2676										
Antihistamines										
1333p	3 y M				A				Ingst + Inhal + Derm	Unt-G
								2		
		hydroxyzine	1	1						
1334	18 y M	lidocaine	2	2						
		diphenhydramine	1	1	A	Ingst	Int-S	1		
1335ai	18 y M				U	Unk	Int-S	1		
		diphenhydramine	1	1						
		ethanol	2	2						
1336ai	18 y M				U	Ingst	Int-S	1		
		diphenhydramine	1	1						
		ethanol	2	2						
1337h	19 y F				A	Ingst	Int-S	1		
		diphenhydramine	1	1						
1338ph	23 y F				A	Ingst	Int-S	1		
		diphenhydramine	1	1						
1339pha	26 y F				A	Ingst	Int-S	1		
		diphenhydramine	1	1						
1340h	27 y M				A/C	Par	Int-U	2		
		diphenhydramine	1	1						
1341pha	29 y F				A	Ingst	Int-S	2		
		hydroxyzine	1	1					hydroxyzine	9.3 mcg/mL In Blood (unspecified) @ Unknown
1342ha	29 y F				A	Ingst	Int-S	1		
		diphenhydramine	1	1						
[1343pha]	29 y F				A	Ingst	Int-S	1		
		diphenhydramine	1	1					diphenhydramine	5400 mcg/L In Blood (unspecified) @ 3 h (pe)
1344ha	30 y F				A	Ingst	Unk	1		
		diphenhydramine	1	1					diphenhydramine	26 mcg/mL In Whole Blood @ Autopsy
		diphenhydramine	1	1					diphenhydramine	38 mcg/mL In Whole Blood @ Autopsy
		quetiapine	2	2					quetiapine	2.3 mcg/mL In Whole Blood @ Autopsy
		quetiapine	2	2					quetiapine	2.4 mcg/mL In Whole Blood @ Autopsy
		fluoxetine	3	3					norfluoxetine	0.69 mcg/mL In Whole Blood @ Autopsy
		fluoxetine	3	3					norfluoxetine	0.94 mcg/mL In Whole Blood @ Autopsy
		bupropion	4	4					bupropion	0.32 mcg/mL In Whole Blood @ Autopsy
1345ai	31 y M				U	Unk	Int-S	1		
		diphenhydramine	1	1						
1346	33 y F				A	Ingst	Int-S	1		
		diphenhydramine	1	1						
1347ai	33 y F				U	Ingst + Unk	Int-S	1		
		diphenhydramine	1	1						
		alprazolam	2	2						
		ethanol	3	3						
1348h	34 y F				A/C	Ingst	Int-S	2		
		hydroxyzine	1	1						
		metoprolol	2	2						
		atorvastatin	3	3						
1349h	36 y M				A	Ingst	Int-S	2		
		diphenhydramine	1	1						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ③ Time
1350hi	37 y M				U	Ingst	Int-S	2		
1351ph	38 y M	diphenhydramine	1	1	A	Ingst	Int-S	1		
1352ai	38 y M	diphenhydramine	1	1	U	Unk	Int-A	2		
		chlorpheniramine	2	1						
		methamphetamine	1	1						
1353h	39 y F	diphenhydramine	1	1	A	Ingst	Int-S	1	diphenhydramine	2.2 mg/L In Blood (unspecified) ③ Unknown
1354pai	42 y M	diphenhydramine	1	1	A	Ingst	Int-S	3	diphenhydramine	6500 ng/mL In Blood (unspecified) ③ Autopsy
		ethanol	2	2					ethanol	440 mg/dL In Blood (unspecified) ③ Autopsy
1355pa	45 y M	diphenhydramine	1	1	A	Ingst	Int-S	1	diphenhydramine	7084 ng/mL In Blood (unspecified) ③ Autopsy
		acetaminophen/ caffeine/salicylate	2	2						
		zolpidem	3	3						
		naproxen	4	4						
		ethanol (non-beverage)	5	5					ethanol	180 mg/dL In Blood (unspecified) ③ Unknown
1356ai	45 y F	diphenhydramine	1	1	U	Unk	Unk	2		
		acetaminophen	2	2						
		diazepam	3	3						
		salicylate	4	4						
1357ai	46 y M	diphenhydramine	1	1	U	Unk	Int-S	1		
		fluoxetine	2	2						
		lamotrigine	3	3						
1358ai	47 y M	hydroxyzine	1	1	U	Ingst	Int-S	1		
		cetirizine	2	2						
		lamotrigine	3	3						
1359ha	48 y F	diphenhydramine	1	1	A	Par	Int-A	1	diphenhydramine	555 ng/mL In Blood (unspecified) ③ Autopsy
		amitriptyline	2	2					amitriptyline	58.6 ng/mL In Blood (unspecified) ③ Autopsy
		gabapentin	3	3					gabapentin	1.9 mcg/mL In Blood (unspecified) ③ Autopsy
		hydromorphone	4	4					hydromorphone	2.8 ng/mL In Blood (unspecified) ③ Autopsy
1360h	51 y F	diphenhydramine	1	1	A	Ingst	Int-S	2		
1361ai	55 y M	diphenhydramine	1	1	U	Unk	Unk	3		
1362ai	57 y M	diphenhydramine	1	1	U	Ingst + Unk	Int-S	1		
		ethanol	2	2						
1363h	58 y M	diphenhydramine	1	1	A	Ingst	Int-S	2		
1364	61 y F	diphenhydramine	1	1	U	Ingst	Unk	2		
		ethanol	2	2					ethanol	381 mg/dL In Whole Blood ③ 30 m (pe)
1365h	66 y F				A/C	Ingst + Unk	Int-S	2		
		hydroxyzine	1	1						
		alcohol, unknown	2	2						
		drug, unknown	3	3						
See Also case 8, 16, 20, 46, 61, 65, 303, 316, 368, 395, 422, 432, 468, 497, 499, 507, 514, 515, 521, 540, 565, 607, 612, 631, 636, 654, 678, 711, 722, 737, 747, 776, 812, 814, 820, 827, 875, 906, 924, 945, 991, 998, 1000, 1001, 1037, 1059, 1073, 1156, 1193, 1231, 1233, 1249, 1251, 1254, 1261, 1264, 1267, 1279, 1380, 1401, 1410, 1411, 1424, 1432, 1440, 1443, 1444, 1465, 1474, 1484, 1489, 1492, 1580, 1634, 1635, 1658, 1660, 1717, 1721, 1776, 1797, 1808, 1816, 1820, 1919, 1972, 2040, 2098, 2128, 2157, 2232, 2246, 2296, 2357, 2404, 2448, 2450, 2492, 2507, 2598, 2599, 2606										
Antimicrobials										
1366h	17 y F	hydroxychloroquine	1	1	C	Ingst	AR-D	2		
1367h	25 y F	sulfamethoxazole/ trimethoprim	1	1	A/C	Ingst	AR-D	2		
1368i	34 y F	cephalexin	1	1	U	Ingst	AR-D	2		
[1369pa]	47 y F	tilmicosin	1	1	A	Par	Unt-O	1		
1370h	52 y F	isoniazid	1	1	A	Ingst	AR-D	2		
		acetaminophen	2	2						
1371pha	59 y M	hydroxychloroquine	1	1	A	Ingst	Int-S	1		
		ethanol	2	2						
		isoniazid	3	3						
1372h	75 y M				A/C	Ingst	Unt-M	2		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
		sulfamethoxazole/trimethoprim	1	1						
		pomalidomide	2	2						
		daratumumab	3	3						
		metformin	4	4						
		thyroxine	5	5						
		furosemide	6	6						
		atorvastatin	7	7						
		acyclovir	8	8						
		pantoprazole	9	9						
See Also case 631, 1109, 1260, 1316, 1413, 1463, 1503, 1661, 1722, 1868, 2260, 2535										
Antineoplastics										
1373h	46 y F				A	Par	Unt-T	1		
		methotrexate	1	1						
1374h	65 y F				A	Ingst	Int-M	2		
		methotrexate	1	1						
1375h	74 y F				A/C	Ingst	Unt-T	2		
		methotrexate	1	1					methotrexate	0.1 mmol/L In Blood (unspecified) @ 6 d (pe)
1376	74 y F				A/C	Ingst	Unk	2		
		methotrexate	1	1						
		metoprolol	2	2						
		drug, unknown	3	3						
1377	80 y F				C	Ingst	AR-D	1		
		methotrexate	1	1					methotrexate	0 mg/mL In Blood (unspecified) @ Unknown
1378h	82 y M				C	Ingst	Unt-T	1		
		methotrexate	1	1						
[1379ha]	96 y F				C	Ingst	Unt-T	3		
		methotrexate	1	1					methotrexate	0.04 mmol/L In Blood (unspecified) @ 36 h (pe)
		methotrexate	1	1					methotrexate	0.08 mmol/L In Blood (unspecified) @ 2 h (pe)
See Also case 1310, 1372										
Cardiovascular Drugs										
1380h	10 y F				A	Ingst	Int-S	2		
		flecainide	1	1						
		diphenhydramine	2	2						
1381	16 y M				A/C	Ingst	Int-S	1		
		amlodipine	1	1						
		hydrochlorothiazide	2	2						
1382ha	17 y M				A	Ingst	Int-S	2		
		clonidine	1	1					clonidine	13 ng/mL In Serum @ Unknown
		topiramate	2	2					topiramate	34000 ng/mL In Serum @ Unknown
		lamotrigine	3	3					lamotrigine	8.4 mcg/mL In Serum @ Unknown
		citalopram	4	4					citalopram	3600 ng/mL In Serum @ Unknown
		olanzapine	5	5					olanzapine	870 ng/mL In Serum @ Unknown
		atomoxetine	6	6						
1383ha	19 y F				U	Ingst	Int-S	1		
		verapamil	1	1					verapamil	1300 ng/mL In Blood (unspecified) @ Unknown
		gabapentin	2	2						
		lorazepam	3	3						
1384	19 y M				A	Ingst	Int-S	2		
		metoprolol	1	1						
		duloxetine	2	2						
		zolpidem	3	3						
1385ha	20 y M				A/C	Ingst	Int-S	1		
		amlodipine/benazpril	1	1					amlodipine	190 ng/mL In Blood (unspecified) @ 17 h (pe)
		amlodipine/benazpril	1	1					amlodipine	36 ng/mL In Blood (unspecified) @ 24 h (pe)
		amlodipine/benazpril	1	1					amlodipine	40 ng/mL In Blood (unspecified) @ 19 h (pe)
		bupropion (extended release)	2	2						
		citalopram	3	3					citalopram	549 ng/mL In Blood (unspecified) @ Unknown
		citalopram	3	3					citalopram	635 ng/mL In Blood (unspecified) @ Unknown
		citalopram	3	3					citalopram	657 ng/mL In Blood (unspecified) @ Unknown
		duloxetine	4	4						
1386	24 y F				A	Ingst	Int-S	1		
		flecainide	1	1						
		beta blocker	2	2						
		ethanol	3	3						
1387h	26 y M				A	Ingst	Int-S	2		
		carvedilol	1	1						
		furosemide	2	2						
1388h	26 y M				A	Ingst	Int-S	1		
		nebivolol	1	1						
		hydrochlorothiazide/losartan	2	2						
1389ph	28 y F				U	Ingst	Int-S	2		
		beta blocker	1	1						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1390ph	29 y F	acetaminophen/caffeine/salicylate	2	2	A/C	Ingst	Int-S	2		
		ibuprofen	3	3						
		ethanol	4	4						
		flecainide	1	1						
1391h	31 y F	alprazolam	2	2	A	Ingst	Int-S	1		
		ethanol	3	3						
		amlodipine	1	1						
		clonidine	2	2						
1392h	32 y M	gabapentin	3	3	A/C	Ingst	Int-S	2		
		lisinopril	4	4						
		metoprolol	1	1						
		drug, unknown	2	2						
1393a	33 y M	propranolol	1	1	U	Ingst	Int-S	1	delta-9-carboxy-thc	18 ng/mL In Blood (unspecified) @ 1 m (pe)
		propranolol	1	1					aripiprazole	280 ng/mL In Blood (unspecified) @ 1 m (pe)
		propranolol	1	1					delta-9-thc	3 ng/mL In Blood (unspecified) @ 1 m (pe)
		propranolol	1	1					propranolol	3100 ng/mL In Blood (unspecified) @ 1 m (pe)
		propranolol	1	1					paroxetine	38 ng/mL In Blood (unspecified) @ 1 m (pe)
		propranolol	1	1					midazolam	70 ng/mL In Blood (unspecified) @ 1 m (pe)
		propranolol	1	1					amphetamine	76 ng/mL In Blood (unspecified) @ 1 m (pe)
1394h	33 y F				A	Ingst	Int-S	2		
		propranolol	1	1						
		escitaopram	2	2						
		methylphenidate (extended release)	3	3						
		lamotrigine	4	4						
		diazepam	5	5						
		melatonin	6	6						
1395h	35 y M	olanzapine	7	7	A	Ingst + Par	Int-S	1		
		diltiazem	1	1					diltiazem	0.041 mg/L In Blood (unspecified) @ 1 h (pe)
		methamphetamine	2	2					methamphetamine	0.29 mg/L In Blood (unspecified) @ 1 h (pe)
1396ha	35 y F				A	Ingst	Int-S	1		
		verapamil	1	1					verapamil	160 ng/mL In Whole Blood @ Unknown
		quetiapine	2	2					quetiapine	380 ng/mL In Whole Blood @ Unknown
		lamotrigine	3	3						
		cyclobenzaprine	4	4					cyclobenzaprine	168 ng/mL In Whole Blood @ Unknown
		tizanidine	5	5						
		fluoxetine	6	6					fluoxetine	1100 ng/mL In Whole Blood @ Unknown
		fluoxetine	6	6					norfluoxetine	520 ng/mL In Whole Blood @ Unknown
		trazodone	7	7					lamotrigine	2.4 ng/mL In Whole Blood @ Unknown
1397a	35 y F	methocarbamol	8	8	A	Ingst	Int-S	1		
		hydrocodone	9	9					hydrocodone	28 ng/mL In Whole Blood @ Unknown
		verapamil	1	1						
		gabapentin	2	2						
1398h	35 y F	amlodipine	1	1	A	Ingst	Int-S	2		
1399a	36 y F				U	Ingst	Int-S	1		
		propranolol	1	1						
1400pha	37 y F	clonazepam	2	2	A/C	Ingst	Int-S	1	7-aminoclonazepam	23.1 ng/mL In Blood (unspecified) @ Autopsy
		propranolol	1	1					propranolol	9800 ng/mL In Whole Blood @ Unknown
		ethanol	2	2					ethanol	129 mg/dL In Whole Blood @ Unknown
		fluoxetine	3	3					fluoxetine	1000 ng/mL In Whole Blood @ Unknown
1401ha	37 y M	fluoxetine	3	3	U	Ingst	Int-S	2	norfluoxetine	900 ng/mL In Whole Blood @ Unknown
		amlodipine	1	1						
		hydroxyzine	2	2						
		meclizine	3	3						
		estradiol	4	4						
1402ha	37 y F	loratadine	5	5	A/C	Ingst	Int-S	2		
		flecainide	1	1					flecainide	6.3 mcg/mL In Blood (unspecified) @ Unknown
1403h	37 y F				A	Ingst	Int-S	1		
1404	38 y M	verapamil	1	1	A/C	Ingst	Int-S	1		
		amlodipine	1	1						
1405ph	38 y M				U	Ingst	Unk	2		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1406h	38 y F	calcium antagonist	1	1	A	Ingst	Int-S	2		
		propranolol	1	1						
		levetiracetam	2	2						
		escitalopram	3	3						
		gabapentin	4	4						
		acetaminophen/chlorzoxazone	5	5						
1407ha	39 y F	diltiazem	1	1	A	Ingst	Unk	1		
		lisinopril	2	2						
1408	39 y F	metoprolol (extended release)	1	1	A/C	Ingst	Int-S	2		
1409h	39 y F	metoprolol (extended release)	1	1	A	Ingst	Int-S	2		
		amlodipine	2	2						
		hydrochlorothiazide	3	3						
		quetiapine	4	4						
		potassium chloride	5	5						
		escitalopram	6	6						
1410h	40 y F	carvedilol	1	1	A	Ingst	Int-S	2		
		amlodipine	2	2						
		bumetanide	3	3						
		diphenhydramine	4	4						
		omeprazole	5	5						
1411ph	40 y M	carvedilol	1	1	A	Ingst	Int-S	2		
		bupropion	2	2						
		lamotrigine	3	3						
		cyclobenzaprine	4	4						
		hydroxyzine	5	5						
		haloperidol	6	6						
		lisinopril	7	7						
		acetaminophen/codeine	8	8						
		atorvastatin	9	9						
		rivaroxaban	10	10						
		omeprazole	11	11						
		metformin	12	12						
		lorazepam	13	13						
		lovastatin	14	14						
		levothyroxine	15	15						
1412ha	40 y F	amlodipine	1	1	U	Ingst	Int-S	1	amlodipine	0.069 mg/L In Serum @ Unknown
		amlodipine	1	1					amlodipine	0.99 mg/L In Blood (unspecified) @ Autopsy
		cyclobenzaprine	2	2					cyclobenzaprine	0.71 mg/L In Blood (unspecified) @ Autopsy
		duloxetine	3	3					duloxetine	0.22 mg/L In Blood (unspecified) @ Autopsy
		duloxetine	3	3					duloxetine	3.7 mg/kg In Liver @ Autopsy
		hydrochlorothiazide	4	4						
		ethanol	5	5					ethanol	224 mg/dL In Serum @ 15 m (pe)
		clonazepam	6	6						
		gabapentin	7	7					gabapentin	3.9 mg/L In Blood (unspecified) @ Autopsy
1413ph	40 y M	amlodipine	1	1	U	Unk	Int-S	3	amlodipine	45 ng/mL In Blood (unspecified) @ Unknown
		antimalarial (chloroquine type)	2	2						
		antidepressant (SSRI)	3	3						
1414h	40 y M	atenolol	1	1	A/C	Ingst	Int-S	2		
		acetaminophen/hydrocodone	2	2						
		clonazepam	3	3						
		zolpidem	4	4						
1415	41 y M	verapamil	1	1	A/C	Ingst	Int-S	2		
		amlodipine	2	2						
		glipizide	3	3						
		glipizide	4	4						
		lisinopril	5	5						
		carvedilol	6	6						
1416h	41 y M	amlodipine	1	1	A/C	Ingst	Int-S	1		
1417ph	41 y F	drotaverine	1	1	A/C	Ingst	Int-S	1		
		ethanol	2	2					ethanol	275 mg/dL In Blood (unspecified) @ 30 m (pe)
1418ph	42 y M	propafenone	1	1	A/C	Ingst	Int-S	1		
		ethanol	2	2						
1419ph	42 y F	amlodipine	1	1	A	Ingst + Aspir	Int-S	2		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1420ha	42 y M	methadone	2	2	A	Ingst	Int-S	1		
		bupropion	3	3						
		gabapentin	4	4						
		salicylate	5	5						
		diltiazem (extended release)	1	1						
1421h	42 y F	hydralazine	2	2	A	Ingst	Int-S	2		
		citalopram	3	3						
		mycophenolate mofetil	4	4						
		tacrolimus	5	5						
		prednisone	6	6						
1422	43 y F	amlodipine	1	1	A	Ingst	Int-S	2		
		metoprolol	2	2						
1423	43 y F	metoprolol	1	1	A/C	Ingst	Int-S	1		
		amlodipine	1	1						
		trazodone	2	2						
		venlafaxine	3	3						
		alprazolam	4	4						
1424a	44 y F	ethanol	5	5	A/C	Ingst	Int-S	1		
		amlodipine	1	1						
		duloxetine	2	2						
		ethanol	3	3						
		lamotrigine	4	4						
1425pi	44 y F	hydroxyzine	5	5	A	Ingst	Int-S	2		
		metoprolol (extended release)	1	1						
		doxepin	2	2						
		antipsychotic (atypical)	3	3						
		alprazolam	4	4						
		bupropion (extended release)	5	5						
		desvenlafaxine	6	6						
		acetaminophen/ butalbital/cafeine	7	7						
		gabapentin	8	8						
		sertraline	9	9						
		lisinopril	10	10						
		mirtazapine	11	11						
		ibuprofen	12	12						
1426hi	44 y M	pantoprazole	13	13	A/C	Ingst	Int-S	2		
		beta blocker	1	1						
		amitriptyline	2	2						
1427a	44 y F	buspirone	3	3	A	Ingst	Int-S	1		
		diltiazem	1	1						
		diltiazem	1	1						
		diazepam	2	2						
		diazepam	2	2						
		diazepam	2	2						
		carisoprodol	3	3						
		carisoprodol	3	3						
		venlafaxine	4	4						
		venlafaxine	4	4						
		fluoxetine	5	5						
		fluoxetine	5	5						
1428a	45 y M	amlodipine	1	1	A	Ingst	Int-S	1		
		metoprolol	2	2						
		sertraline	3	3						
		sertraline	3	3						
		lovastatin	4	4						

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ③ Time
		ethanol (non-beverage)	5	5					ethanol	0.09 % (wt/Vol) In Blood (unspecified) ③ Unknown
		ethanol (non-beverage)	5	5					ethanol	134 mg/dL In Blood (unspecified) ③ Unknown
1429h	45 y F	metoprolol	1	1	U	Ingst	Int-S	1		
		lorazepam	2	2						
1430ha	45 y F	metoprolol	1	1	A/C	Ingst + Oth + Unk	Int-S	1	metoprolol	3 ng/mL In Blood (unspecified) ③ Unknown
		hydrocodone	2	2					hydrocodone	67 ng/mL In Blood (unspecified) ③ Unknown
		insulin	3	3						
		lorazepam	4	4						
		angiotensin converting enzyme inhibitor	5	5						
1431ai	45 y F	metoprolol	1	1	U	Unk	Unk	2		
		hydrocodone	2	2						
		lorazepam	3	3						
1432h	46 y F	metoprolol	1	1	A/C	Ingst	Int-S	2		
		hydromorphone	2	2						
		ondansetron	3	3						
		hydroxyzine	4	4						
		tamsulosin	5	5						
		venlafaxine	6	6						
1433ha	46 y F	felodipine	1	1	A/C	Ingst	Int-S	2		
		metformin	2	2						
		fluoxetine	3	3						
		gabapentin	4	4						
		allopurinol	5	5						
1434ha	46 y M	metoprolol	1	1	A	Ingst	Int-S	1	metoprolol	5800 ng/mL In Blood (unspecified) ③ Unknown
		calcium antagonist	2	2					nifedipine	420 ng/mL In Blood (unspecified) ③ Unknown
1435pa	46 y F	amlodipine	1	1	A	Ingst	Int-S	2		
		cyclobenzaprine	2	2					cyclobenzaprine	23 ng/mL In Blood (unspecified) ③ 1 h (pe)
		cyclobenzaprine	2	2					cyclobenzaprine	92 ng/mL In Blood (unspecified) ③ Autopsy
		gabapentin	3	3						
		oxycodone	4	4					oxycodone (free)	100 ng/mL In Blood (unspecified) ③ 1 h (pe)
		oxycodone	4	4					morphine (free)	140 ng/mL In Blood (unspecified) ③ Autopsy
		oxycodone	4	4					oxycodone (free)	5.5 ng/mL In Blood (unspecified) ③ Autopsy
		ethanol	5	5					ethanol	191 mg/dL In Blood (unspecified) ③ 1 h (pe)
1436h	46 y F	amlodipine	1	1	A	Ingst	Int-S	1		
		atenolol	2	2						
1437h	46 y M	beta blocker	1	1	A	Ingst	AR-D	3		
1438h	46 y F	diltiazem	1	1	A/C	Ingst	Int-S	1		
		clonidine	2	2						
		acetaminophen/hydrocodone	3	3						
		clonazepam	4	4						
		ethanol	5	5						
		marijuana	6	6						
[1439ha]	47 y F	flecainide	1	1	A/C	Ingst	Int-S	1	flecainide	3.82 mcg/mL In Blood (unspecified) ③ Unknown
		ethanol	2	2					ethanol	170 mg/dL In Blood (unspecified) ③ Unknown
1440ha	47 y M	amlodipine	1	1	A/C	Ingst	Int-S	1		
		trazodone	2	2					trazodone	0.93 mcg/mL In Blood (unspecified) ③ Autopsy
		olanzapine	3	3					olanzapine	330 ng/mL In Blood (unspecified) ③ Autopsy
		hydroxyzine	4	4					hydroxyzine	630 ng/mL In Blood (unspecified) ③ Autopsy
		valproic acid	5	5					valproic acid	181 mcg/mL In Serum ③ Unknown
		fluoxetine	6	6					norfluoxetine	180 ng/mL In Blood (unspecified) ③ Autopsy
		fluoxetine	6	6					fluoxetine	790 ng/mL In Blood (unspecified) ③ Autopsy
1441h	47 y F	amlodipine	1	1	A/C	Ingst	Int-S	2		
		metoprolol (extended release)	2	2						
1442h	48 y M	amlodipine	1	1	A/C	Ingst	Int-S	1		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ③ Time
1443h	48 y M	atenolol	2	2	U	Ingst	Int-S	2		
		lisinopril	3	3						
		simvastatin	4	4						
		amlodipine	1	1						
		hydrochlorothiazide/losartan	2	2						
		mirtazapine	3	3						
		ethanol	4	4						
1444h	48 y F	famotidine	5	5	U	Ingst	Int-S	1		
		vitamin B-1	6	6						
		folic acid	7	7						
		amlodipine	1	1						
		cyclobenzaprine	2	2						
		promethazine	3	3						
1445ai	48 y M				U	Unk	Int-S	1		
		propranolol	1	1						
		lorazepam	2	2						
1446p	49 y F	caffeine	3	3	U	Ingst	Int-S	2		
		metoprolol	1	1						
		acetaminophen/ diphenhydramine	2	2						
1447h	49 y M	ethanol	3	3	A	Ingst	Int-S	2		
		diltiazem	1	1						
1448a	49 y M				A	Ingst	Int-S	1		
		cardiac glycoside	1	1						
		butalbital/caffeine/ codeine/salicylate	2	2						
		butalbital/caffeine/ codeine/salicylate	2	2						
		butalbital/caffeine/ codeine/salicylate	2	2						
		butalbital/caffeine/ codeine/salicylate	2	2						
1449	49 y M	alprazolam	3	3	U	Ingst	Int-S	2		
		nifedipine	1	1						
1450ha	49 y M	metoprolol	2	2	U	Ingst	Int-U	1		
		metoprolol	1	1						
1451a	49 y F	metoprolol	1	1	A/C	Ingst	Int-S	1		
		metoprolol	1	1						
1452a	49 y F	metoprolol	1	1	A	Ingst	Int-S	2		
		metoprolol	1	1						
		toilet bowl cleaner (anionic/ borates/nonionic)	2	2						
		quetiapine	3	3						
		fluoxetine	4	4						
		zolpidem	5	5						
		diazepam	6	6						
1453ph	49 y F	diazepam	6	6	A/C	Ingst	Int-S	2		
		buspirone	7	7						
		propranolol	1	1						
		amitriptyline	2	2						
		benzodiazepine	3	3						
		metoprolol	1	1						
1454ai	49 y M				U	Ingst	Int-S	1		
		metoprolol	1	1						
		amlodipine	1	1						
		metoprolol	2	2						
		venlafaxine	3	3						
[1456ha]	50 y F	clonazepam	4	4	C	Ingst	Int-S	1		
		zolpidem	5	5						
		gabapentin	6	6						
		levothyroxine	7	7						
		Medroxyprogesterone acetate	8	8						
		amlodipine	1	1						
1457ph	50 y M				A/C	Ingst	Int-S	2		
		metoprolol	1	1						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1458	50 y M	drug, unknown	2	2	A	Ingst	Int-S	2		
		diltiazem	1	1						
		clonidine	2	2						
		ethanol	3	3					ethanol	25 mg/dL In Blood (unspecified) @ 1 h (pe)
1459p	50 y F				A/C	Ingst + Aspir	Int-S	1		
		diltiazem	1	1						
		amlodipine	2	2						
		losartan	3	3						
1460ai	50 y M				U	Unk	Int-A	3		
		clonidine	1	1						
		metoprolol	2	2						
1461h	51 y M				A/C	Ingst	Int-U	2		
		propranolol	1	1						
		amlodipine	2	2						
		quetiapine	3	3						
		primidone	4	4						
		trazodone	5	5						
		escitaopram	6	6						
1462ph	51 y M				A/C	Ingst	Int-S	1		
		propranolol	1	1						
		ethanol	2	2						
1463ha	51 y F				A	Ingst	Int-S	1	amlodipine	730 ng/mL In Blood (unspecified) @ Unknown
		amlodipine	1	1						
1464h	51 y F				A/C	Ingst	Int-S	2		
		amlodipine	1	1						
		clopidogrel	2	2						
1465ha	52 y F				A/C	Ingst	Int-S	1		
		calcium antagonist	1	1					amlodipine	890 ng/mL In Whole Blood @ Autopsy
		atenolol	2	2					atenolol	4500 ng/mL In Blood (unspecified) @ Autopsy
		amlodipine	3	3					amlodipine	890 ng/mL In Blood (unspecified) @ Autopsy
		alprazolam	4	4					alprazolam	34 ng/mL In Blood (unspecified) @ Autopsy
		tramadol	5	5					tramadol	1100 ng/mL In Blood (unspecified) @ Autopsy
		tramadol	5	5					o-demethyl tramadol	64 ng/mL In Blood (unspecified) @ Autopsy
		fluoxetine	6	6					norfluoxetine	72 ng/mL In Blood (unspecified) @ Autopsy
		fluoxetine	6	6					fluoxetine	77 ng/mL In Blood (unspecified) @ Autopsy
		diphenhydramine	7	7					diphenhydramine	230 ng/mL In Blood (unspecified) @ Autopsy
1466p	52 y M				A/C	Ingst	Int-S	2		
		verapamil	1	1						
		acetaminophen/oxycodone	2	2						
		oxycodone	3	3						
		zolpidem (extended release)	4	4						
1467	52 y F				A	Ingst	Int-S	2		
		beta blocker	1	1						
		oxycodone	2	2						
1468h	52 y M				A	Ingst	Int-S	2		
		diltiazem (extended release)	1	1						
		glipizide	2	2						
		desipramine	3	3						
		metformin	4	4						
		ramipril	5	5						
		hydrochlorothiazide	6	6						
		temazepam	7	7						
		lorazepam	8	8						
1469ha	52 y F				A	Ingst	Int-S	1		
		labetolol	1	1						
		amlodipine	2	2						
		alprazolam	3	3					alprazolam	160 ng/mL In Blood (unspecified) @ Unknown
1470h	52 y M				A/C	Ingst	Int-S	1		
		verapamil	1	1						
1471	52 y M				A	Ingst	Int-S	3		
		amlodipine	1	1						
		clonazepam	2	2						
1472h	52 y M				A/C	Ingst	Int-S	1		
		amlodipine	1	1						
1473ha	52 y F				A	Ingst + Unk	Int-S	1		
		calcium antagonist	1	1						
		risperidone	2	2					risperidone	75 ng/mL In Blood (unspecified) @ Unknown
		bupropion	3	3						
1474	53 y F				A/C	Ingst	Int-S	2		
		amlodipine	1	1						
		asenapine	2	2						
		valproic acid	3	3					valproic acid	122 mcg/mL In Blood (unspecified) @ Unknown

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1475	53 y F	antidepressant	4	4	A	Ingst	Int-S	2		
		hydroxyzine	5	5						
		omeprazole	6	6						
		alprazolam	7	7						
		metoprolol	1	1						
1476	53 y F	clonidine	2	2	A	Ingst	Int-S	2		
		cyclobenzaprine	3	3						
		benzodiazepine	4	4						
		zolpidem	5	5						
		amlodipine	1	1						
1477ai	53 y M	metoprolol	1	1	U	Unk	Int-S	1		
1478h	53 y F	digoxin	1	1	C	Ingst	AR-D	3		
1479h	53 y M				U	Ingst	Int-S	1		
		calcium antagonist	1	1						
		amitriptyline	2	2						
		lisinopril	3	3						
		acetaminophen/oxycodone	4	4						
1480	53 y M	gabapentin	5	5	A/C	Ingst	Int-S	2		
		hydralazine	1	1						
		prednisone	2	2						
		amlodipine	3	3						
		minoxidil	4	4						
1481h	53 y M	spironolactone	5	5	A/C	Ingst	Int-S	1		
		carvedilol	1	1						
		fluoxetine	2	2						
		sacubitril/valsartan	3	3						
1482h	54 y M	beta blocker	1	1	A/C	Ingst	Int-S	2		
		benzodiazepine	2	2						
		narcotic, other/unknown	3	3						
		acetaminophen	4	4						
1483ha	54 y F				A	Par	Int-S	2		
		diltiazem	1	1						
		insulin (aspart)	2	2						
		bupropion	3	3						
1484ha	54 y M	lithium	4	4	A/C	Ingst	Int-S	1		
		lithium	4	4						
		gabapentin	5	5						
1485h	54 y M	verapamil	1	1	A/C	Ingst	Int-S	2		
		diphenhydramine	2	2						
		amlodipine	1	1						
		carvedilol	2	2						
1486h	54 y M	labetalol	1	1	A/C	Ingst	Int-S	2		
		lisinopril	2	2						
		ethanol	3	3						
1487ha	55 y M				A/C	Ingst	Int-S	2	ethanol	248 mg/dL In Serum @ Unknown
		metoprolol	1	1						
		amlodipine	2	2						
1488h	55 y M	diltiazem	1	1	A/C	Ingst	Int-S	1		
1489ha	55 y F				A/C	Ingst	Int-S	1		
		amlodipine	1	1						
		quetiapine	2	2						
		hydroxyzine	3	3						
		cyclobenzaprine	4	4						
1490	55 y F	ethanol	5	5	A	Ingst	Int-S	2		
		acetaminophen/hydrocodone	6	6						
		duloxetine (extended release)	7	7						
1491ha	56 y F	diltiazem (extended release)	1	1	A	Ingst	Int-S	1		
		amitriptyline	2	2						
		buprenorphine/naloxone (sublingual film)	3	3						
1491ha	56 y F	amlodipine	1	1	A	Ingst	Int-S	1	amlodipine	110 ng/mL In Blood (unspecified) @ Unknown
		bupropion	2	2						
		bupropion	2	2						
1491ha	56 y F	diazepam	3	3	A	Ingst	Int-S	1	oxazepam	0.01 mg/L In Blood (unspecified) @ Unknown

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1492h	56 y M	diazepam	3	3	A/C	Ingst	Int-S	2	diazepam	0.077 mg/L In Blood (unspecified) @ Unknown
		diazepam	3	3					nordiazepam	0.092 mg/L In Blood (unspecified) @ Unknown
		amlodipine/ hydrochlorothiazide/ valsartan	1	1						
		amlodipine	2	2						
		metoprolol (extended release)	3	3						
		diphenhydramine	4	4						
1493ha	56 y M	acetaminophen/hydrocodone	5	5	A	Ingst	Int-S	1		
		atorvastatin	6	6						
1494h	56 y M	amlodipine	1	1	A/C	Ingst	Int-S	2	amlodipine	0.06 mg/L In Blood (unspecified) @ 1 h (pe)
		propranolol	1	1						
		drug, unknown	2	2						
1495h	56 y F	ethanol	3	3	A/C	Ingst	Int-S	1	ethanol	166 mg/dL In Blood (unspecified) @ 30 m (pe)
		diltiazem (extended release)	1	1						
1496h	56 y M	amlodipine	1	1	A/C	Ingst	Unt-G	1		
		benztropine	2	2						
1497h	57 y M	amlodipine	1	1	A	Ingst	Int-S	2		
		ethanol	2	2						
1498h	57 y F	metoprolol	1	1	U	Ingst	Int-S	1		
		nifedipine	2	2						
		amlodipine	3	3						
		clonidine	4	4						
		ethanol	5	5						
1499h	57 y F	amlodipine	1	1	A	Ingst	Int-S	1		
		butalbital/caffeine/salicylate	2	2						
		ethanol	3	3					ethanol	260 mg/dL In Blood (unspecified) @ Unknown
1500h	57 y F	diltiazem (extended release)	1	1	A	Ingst	Int-S	1		
		sotalol	2	2						
		apixaban	3	3						
		losartan	4	4						
		cholecalciferol	5	5						
		folic acid	6	6						
		ethanol	7	7						
1501ha	57 y F	amlodipine	1	1	U	Ingst	Int-S	1	amlodipine	990 ng/mL In Whole Blood @ 1 h (pe)
		mirtazapine	2	2					mirtazapine	630 ng/mL In Whole Blood @ 1 h (pe)
		temazepam	3	3					temazepam	930 ng/mL In Whole Blood @ 1 h (pe)
		cyclobenzaprine	4	4						
1502ha	58 y F	propranolol	1	1	A/C	Ingst	Int-S	1	propranolol	33 ng/mL In Blood (unspecified) @ Unknown
		gabapentin	2	2					gabapentin	47 mcg/mL In Blood (unspecified) @ Unknown
		quetiapine	3	3					quetiapine	340 ng/mL In Blood (unspecified) @ Unknown
1503h	58 y M	amlodipine	1	1	A/C	Ingst	Int-U	2		
		lisinopril	2	2						
		hydralazine	3	3						
		tramadol	4	4						
		acetaminophen/oxycodone	5	5						
		gabapentin	6	6						
		mirtazapine	7	7						
		atorvastatin	8	8						
		ibuprofen	9	9						
		ritonavir	10	10						
		emtricitabine/tenofovir	11	11						
1504h	58 y M	amlodipine	1	1	A/C	Ingst	Int-S	1		
		ethanol	2	2					ethanol	190 mg/dL In Serum @ Unknown
1505h	58 y F	amlodipine	1	1	A	Ingst	Int-S	2		
		salicylate	2	2						
		drug, unknown	3	3						
1506ha	58 y F	amlodipine	1	1	A	Ingst	Int-S	1	amlodipine	770 ng/mL In Blood (unspecified) @ 1 h (pe)
		diltiazem (extended release)	1	1						
1507h	59 y M	ethanol	2	2	A	Ingst	Int-S	1		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1508h	59 y F	digoxin metoprolol	1 2	1 2	C	Ingst + Unk	AR-D	3	digoxin	2.9 ng/mL In Serum @ Unknown
1509h	59 y M	metoprolol dabigatran	1 2	1 2	A/C	Ingst	Int-S	1		
1510ha	59 y M	amlodipine carvedilol hydralazine lamotrigine	1 2 4 3	1 2 3 3	A/C	Ingst	Int-S	1		
1511ai	59 y F	amlodipine cyclobenzaprine	1 2	1 2	U	Unk	Unk	1		
1512	60 y F	diltiazem (extended release) citalopram ethanol	1 2 3	1 2 3	A	Ingst	Int-S	1		
1513	60 y F	carvedilol ethanol	1 2	1 2	A/C	Ingst	Int-S	1	ethanol	258 mg/dL In Serum @ Unknown
1514ph	60 y F	amlodipine amitriptyline	1 2	1 2	A/C	Ingst	Int-S	2		
1515	60 y F	verapamil drug, unknown	1 2	1 2	A/C	Ingst	Int-S	2		
1516h	60 y F	amlodipine drug, unknown lisinopril	1 2 3	1 2 3	A	Ingst	Int-S	2		
1517	60 y F	amlodipine metoprolol hydrochlorothiazide clonazepam escitalopram	1 2 3 4 5	1 2 3 4 5	A/C	Ingst	Int-S	2		
1518	60 y M	amlodipine escitalopram zolpidem naproxen	1 2 3 4	1 2 3 4	U	Ingst	Int-S	2		
1519h	60 y F	digoxin	1	1	C	Ingst	AR-D	2	digoxin	3 ng/mL In Blood (unspecified) @ Unknown
1520hai	60 y M	amlodipine	1	1	A	Ingst	Int-S	1		
1521h	60 y F	amlodipine amphetamine alprazolam narcotic, other/unknown	1 2 3 4	1 2 3 4	U	Ingst	Int-S	2		
1522ha	61 y F	diltiazem (extended release) methadone methadone	1 2 2	1 2 2	A/C	Ingst	Int-S	1	diltiazem methadone eddp (2-ethylidene-1,5-dimethyl-3,3-diphenylpyrrolidine)	950 ng/mL In Whole Blood @ Autopsy 1500 ng/mL In Whole Blood @ Autopsy 450 ng/mL In Whole Blood @ Autopsy
1523h	61 y M	diltiazem alprazolam	1 2	1 2	A/C	Ingst	Int-S	1		
1524h	61 y F	diltiazem fluoxetine	1 2	1 2	A/C	Ingst	Int-S	1		
1525h	61 y M	verapamil beta blocker clonidine fluoxetine	1 2 3 4	1 2 3 3	A/C	Ingst	Int-S	2		
1526ai	61 y M	diltiazem bupropion hydromorphone	1 2 3	1 2 3	U	Unk	Int-S	1		
1527h	61 y M	amlodipine benzodiazepine lisinopril	1 2 3	1 2 3	A/C	Ingst	Unk	2		
1528h	61 y M	metoprolol	1	1	C	Ingst	AR-D	2		
1529h	62 y M	verapamil metoprolol lorazepam	1 2 3	1 2 3	A/C	Ingst	Int-S	1		
1530ha	62 y F				A/C	Ingst	Int-S	1		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1531ha	62 y F	digoxin	1	1	A/C	Ingst	Int-S	1	digoxin	68 ng/mL In Serum @ Unknown
		ethanol	2	2					ethanol	310 g/dL In Blood (unspecified) @ 3.5 h (pe)
		salicylate	3	3					salicylate	5.6 mg/dL In Blood (unspecified) @ 3.5 h (pe)
		flecainide	1	1					flecainide	24.27 mcg/mL In Blood (unspecified) @ Autopsy
		citalopram	2	2						
1532h	62 y F	diazepam	3	3	U	Ingst	Int-S	1		
		furosemide	4	4						
		lidocaine	5	5						
1533h	62 y M	diltiazem (extended release)	1	1	A/C	Ingst	Unt-T	2		
		lisinopril	2	2						
1534ai	62 y F	amlodipine	1	1	U	Unk	Int-S	1	ethanol	190 mg/dL In Serum @ Unknown
		metoprolol	2	2						
		ethanol	3	3						
1535ha	62 y M	digoxin	1	1	A/C	Ingst	Int-S	1		
		ethanol	2	2						
1536ai	62 y F	amlodipine	1	1	U	Ingst + Unk	Int-S	1		
		carvedilol	2	2						
1537h	63 y F	digoxin	1	1	A/C	Ingst	Int-S	1		
		ethanol	2	2						
		salicylate	3	3						
1538ha	63 y F	calcium antagonist	1	1	A	Ingst	Unt-T	1		
		carvedilol	1	1						
		lisinopril	2	2						
1539h	63 y F	furosemide	3	3	A	Ingst	Int-S	1		
		amlodipine	1	1						
		levothyroxine	2	2						
1540ha	63 y F	benzodiazepine	3	3	A/C	Ingst	Int-S	1		
		amlodipine	1	1					amlodipine	0.047 mg/L In Blood (unspecified) @ 24 h (pe)
		acetaminophen/hydrocodone	2	2					hydrocodone	2.4 mg/L In Blood (unspecified) @ 27 h (pe)
1541	63 y F	acetaminophen/hydrocodone	2	2	A/C	Ingst	Int-S	2	acetaminophen (apap)	258 mg/L In Serum @ Unknown
		acetaminophen/hydrocodone	2	2					acetaminophen (apap)	380 mg/L In Blood (unspecified) @ 24 h (pe)
1542ai	63 y M	amlodipine	1	1	U	Ingst + Unk	Int-S	1		
		angiotensin converting enzyme inhibitor	1	1						
		acetaminophen/oxycodone	2	2						
1543h	63 y F	verapamil	1	1	A/C	Ingst	Int-S	2		
1544ha	63 y F	diltiazem	1	1	A/C	Ingst	Int-S	1	diltiazem	870 ng/mL In Blood (unspecified) @ Unknown
1545h	63 y F				A/C	Ingst + Derm	Int-S	1		
		amlodipine	1	1						
		metoprolol	2	2						
		fentanyl	3	3						
		warfarin	4	4						
1546h	63 y F	clonazepam	5	5	A/C	Ingst	Int-S	1		
		nifedipine	1	1						
		clonidine	2	2						
1547h	64 y M	citalopram	3	3	A/C	Ingst	Int-S	2		
		amlodipine	1	1						
		glipizide	2	2						
		metformin/sitagliptin	3	3						
1548a	64 y F	losartan	4	4	U	Ingst	Int-S	1	verapamil	2200 ng/mL In Blood (unspecified) @ Autopsy
		verapamil	1	1						
1549h	65 y F				A	Ingst	Int-S	2		
		verapamil (extended release)	1	1						
1550h	65 y M	spironolactone	2	2	A/C	Ingst	Int-S	3		
		digoxin	1	1					digoxin	3 ng/mL In Blood (unspecified) @ 1 d (pe)
1551ha	66 y F	diltiazem (extended release)	2	2	A/C	Ingst	Int-S	3		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1552ha	67 y F	amlodipine	1	1	A	Ingst	Int-S	1	citalopram	4000 mcg/L In Whole Blood @ 15 m (pe)
		citalopram	2	2						
		solifenacin	3	3						
		lorazepam	4	4						
		cyclobenzaprine	5	5						
		meloxicam	6	6						
		levothyroxine	7	7						
		verapamil	1	1					nortriptyline	130 ng/mL In Blood (unspecified) @ Unknown
		amitriptyline	2	2						
		amitriptyline	2	2						
1553ha	67 y M	benzodiazepine	3	3	A/C	Ingst	Int-S	1	amitriptyline	740 ng/mL In Blood (unspecified) @ Unknown
		acetaminophen	4	4					lorazepam	52 mg/mL In Blood (unspecified) @ Unknown
									acetaminophen (apap)	3 mcg/mL In Blood (unspecified) @ Unknown
1554i	67 y M	diltiazem	1	1	A/C	Ingst	Int-S	1	diltiazem	0.2 mg/L In Serum @ 35 m (pe)
		rivaroxaban	2	2						
		foreign body	3	3						
		narcotic, other/unknown	4	4						
1555h	67 y F	amlodipine	1	1	U	Ingst	Int-S	3		
		tizanidine	2	2						
		lisinopril	3	3						
		eszopiclone	4	4						
1556h	68 y F	metoprolol	1	1	A	Ingst	Unt-G	1		
		tizanidine	2	2						
		acetaminophen/ oxycodone	3	3						
		alprazolam	4	4						
1557h	68 y F	verapamil	1	1	A	Ingst	Unk	2		
		trandolapril/verapamil	1	1						
1558ha	68 y F	calcium antagonist	1	1	A/C	Ingst	Int-S	2		
1559h	68 y F	amlodipine	1	1	A/C	Ingst	Int-S	2		
		hydrochlorothiazide/lisinopril	2	2						
		sertraline	3	3						
		omeprazole	4	4						
		ethanol	5	5						
1560h	68 y F	diltiazem (extended release)	1	1	A	Ingst	Int-S	1		
1561	69 y M	metoprolol	1	1	A/C	Ingst	Int-S	2		
		amlodipine	2	2						
		venlafaxine	3	3						
1562a	69 y M	carvedilol	1	1	A	Ingst	Int-S	2		
1563h	69 y F	diltiazem (extended release)	1	1	A	Ingst	Int-S	1		
		warfarin	2	2						
1564ai	69 y M	amlodipine	1	1	U	Unk	Int-S	1		
1565	70 y F	diltiazem	1	1	A/C	Ingst	Int-S	1		
		digoxin	2	2						
1566h	70 y F	amlodipine	1	1	A	Ingst	Int-S	2	digoxin	4.501 ng/mL In Serum @ 1 h (pe)
		citalopram	2	2						
		lisinopril	3	3						
1567	70 y M	metoprolol (extended release)	1	1	A	Ingst	Int-S	2		
		olanzapine	2	2						
		clonazepam	3	3						
1568h	70 y F	amlodipine	1	1	A/C	Ingst	Int-S	1		
		diltiazem (extended release)	2	2						
		mirtazapine	3	3						
1569	70 y F	atenolol	1	1	A	Ingst	Int-S	2		
		quetiapine	2	2						
		duloxetine	3	3						
		buspirone	4	4						
		lorazepam	5	5						
1570ha	71 y F	diltiazem	1	1	A	Ingst	Int-S	1		
1571	71 y M	diltiazem	1	1	A/C	Ingst	Int-S	1		
		amlodipine	1	1						

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ③ Time
1572ha	71 y F	sertraline	2	2	A	Ingst	Int-S	1		
		mirtazapine	3	3						
		buspirone	4	4						
		calcium antagonist	1	1					diltiazem	1583 ng/mL In Blood (unspecified) ③ Unknown
		risperidone	2	2					risperidone	146 ng/mL In Blood (unspecified) ③ Unknown
1573h	71 y F	risperidone	2	2	A/C	Ingst	Int-S	2	9-hydroxyrisperidone	55.2 ng/mL In Blood (unspecified) ③ Unknown
		amlodipine	1	1						
		citalopram	2	2						
		lorazepam	3	3						
		tamsulosin	1	1						
1574ha	72 y M	cilostazol	2	2	A/C	Ingst	Int-S	2		
1575	72 y F	digoxin	1	1	C	Ingst	Unt-U	2	digoxin	6 ng/mL In Blood (unspecified) ③ Unknown
1576h	72 y M	diltiazem	1	1	A	Ingst	Int-M	1		
1577ha	72 y F	diltiazem (extended release)	1	1	A	Ingst	Int-S	1	diltiazem	360 ng/mL In Blood (unspecified) ③ Unknown
		sitagliptin	2	2						
		allopurinol	3	3						
		alprazolam	4	4					alprazolam	18 ng/mL In Blood (unspecified) ③ Unknown
		lorazepam	5	5					lorazepam	48 ng/mL In Blood (unspecified) ③ Unknown
1578ph	72 y F				A/C	Ingst	Unt-U	2		
		diltiazem	1	1						
		donepezil	2	2						
		morphine	3	3						
		lorazepam	4	4						
1579h	73 y M	gabapentin	5	5	A/C	Ingst	Int-M	3		
1580a	73 y F	amlodipine	1	1	A	Ingst	Int-S	1		
		carvedilol	2	2						
		metoprolol	1	1					metoprolol	1.8 mg/L In Blood (unspecified) ③ Autopsy
		metoprolol	1	1					metoprolol	4 mg/L In Blood (unspecified) ③ Autopsy
		verapamil (extended release)	2	1					verapamil	2.3 mg/L In Blood (unspecified) ③ Autopsy
		verapamil (extended release)	2	1					verapamil	3.2 mg/L In Blood (unspecified) ③ Autopsy
		meclizine	3	2						
		fluoxetine	4	3					fluoxetine	2.7 mg/L In Blood (unspecified) ③ Autopsy
		fluoxetine	4	3					fluoxetine	4.3 mg/L In Blood (unspecified) ③ Autopsy
		dextromethorphan	5	5						
1581h	73 y F	promethazine	6	6					promethazine	0.08 mg/L In Blood (unspecified) ③ Autopsy
1582	74 y F	amlodipine	1	1	U	Ingst	Int-S	1		
1583h	74 y M	metoprolol	1	1	A	Ingst	Int-S	2		
		amlodipine	1	1						
		carvedilol	2	2						
		alprazolam	3	3						
		acetaminophen/hydrocodone	4	4						
1584h	74 y M	amlodipine	1	1	A	Ingst	Int-S	1		
1585h	75 y M	cardiac glycoside	1	1	C	Ingst	AR-D	1		
1586h	75 y F	metoprolol	1	1	A/C	Ingst	Int-S	2		
1587h	75 y M	metoprolol	1	1	A	Ingst	AR-D	3		
		diltiazem	1	1						
		metoprolol	2	2						
1588ai	75 y M	amiodarone	3	3	U	Unk	Int-S	1		
		amlodipine	1	1						
		salicylate	2	2						
1589ha	75 y M	metoprolol	3	3	A/C	Ingst	Int-U	3		
		verapamil	1	1						
		pindolol	2	2						
1590h	76 y F				A/C	Ingst	AR-D	3		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1591ha	76 y M	digoxin	1	1					digoxin	3.1 ng/mL In Blood (unspecified) @ Unknown
		amlodipine	1	1	A/C	Ingst	Int-S	1	amlodipine	0.4 mg/L In Blood (unspecified) @ 5.5 h (pe)
		duloxetine	2	2						
		cyclobenzaprine	3	3						
		cocaine	4	4					benzoyllecognine	2.7 mg/L In Blood (unspecified) @ 5 m (pe)
		gabapentin	5	5						
		acetaminophen	6	6						
		oxybutynin	7	7						
		naproxen	8	8						
		atorvastatin	9	9						
		omeprazole	10	10						
		folic acid	11	11						
		cyanocobalamin	12	12						
1592h	76 y F				U	Ingst	Int-S	1		
		amlodipine	1	1						
		carvedilol	2	2						
		diazepam	3	3						
		acetaminophen/codeine	4	4						
1593h	77 y M				A	Ingst	Int-S	3		
		calcium antagonist	1	1						
1594h	77 y F				C	Ingst	AR-D	3		
		digoxin	1	1					digoxin	2.8 ng/mL In Blood (unspecified) @ Unknown
1595ha	78 y M				A	Ingst	Int-S	1		
		amlodipine	1	1						
		diazepam	2	2						
1596h	78 y F				A	Ingst	Int-S	2		
		calcium antagonist	1	1						
		warfarin	2	2						
1597	79 y M				A/C	Ingst	Int-S	2		
		amlodipine	1	1						
		losartan	2	2						
1598	80 y F				C	Ingst	AR-D	3		
		digoxin	1	1					digoxin	4.4 mcg/mL In Blood (unspecified) @ 1 h (pe)
1599h	80 y M				A/C	Ingst	Unt-G	3		
		metoprolol	1	1						
		benztropine	2	2						
		quetiapine	3	3						
		donepezil/memantine	4	4						
		levothyroxine	5	5						
1600h	80 y F				U	Ingst	Unt-T	1		
		amlodipine	1	1						
		carvedilol	2	2						
1601i	81 y F				A/C	Ingst	Unt-T	1		
		nifedipine (extended release)	1	1						
		metoprolol	2	2						
		simvastatin	3	3						
1602h	82 y M				C	Ingst	AR-D	3		
		propranolol	1	1						
		metoprolol	2	2						
1603h	82 y M				A/C	Ingst	Int-S	2		
		metoprolol	1	1						
		lisinopril	2	2						
1604h	83 y F				U	Ingst	Unk	3		
		flecainide	1	1						
1605h	84 y F				A/C	Ingst	Int-S	2		
		clonidine	1	1						
1606h	84 y F				A/C	Ingst	Int-M	2		
		verapamil	1	1						
1607	84 y F				A/C	Par	AR-D	3		
		flecainide	1	1						
		metoprolol	2	2						
		angiotensin receptor blocker	3	3						
1608ha	84 y M				A/C	Ingst	Unk	1		
		amlodipine	1	1					amlodipine	63 ng/mL In Blood (unspecified) @ Unknown
		carvedilol	2	2						
		triazolam	3	3					triazolam	46 ng/mL In Blood (unspecified) @ Unknown
1609	84 y F				C	Ingst	AR-D	3		
		atenolol	1	1						
1610h	84 y F				A/C	Ingst	Unk	2		
		amiodarone	1	1						
		carvedilol	2	2						
		nifedipine	3	3						
		acetaminophen/tramadol	4	4						
		antiplatelet drug	5	5						
		cilostazol	6	6						
		mirtazapine	7	7						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1611h	85 y F	atorvastatin	8	8	A/C	Ingst	Int-S	2		
		hydrochlorothiazide	9	9						
1612h	85 y F	amlodipine	1	1	A	Ingst	Unt-G	3	digoxin	3.6 ng/mL In Blood (unspecified) @ Unknown
		hydrochlorothiazide/lisinopril	2	2						
1613	85 y F	digoxin	1	1	C	Ingst	AR-D	3		
1614h	85 y F	digoxin	1	1	A	Ingst	Int-S	2		
1615	85 y F	beta blocker	1	1	A	Ingst	Unk	2		
		calcium antagonist	2	2						
1616p	86 y F	amlodipine	1	1	A/C	Ingst	Int-S	2		
		metformin	2	2						
		losartan	3	3						
		gabapentin	4	4						
		atorvastatin	5	5						
1617h	86 y F	nifedipine (extended release)	1	1	C	Ingst	AR-D	3		
		diltiazem (extended release)	2	2						
		bupropion (extended release)	3	3						
		mirtazapine	4	4						
1618h	87 y F	metoprolol	1	1	A/C	Ingst	Int-S	2		
		carvedilol	2	2						
		amiodarone	3	3						
1619	87 y F	amlodipine	1	1	A	Ingst	Unk	3		
		nebivolol	2	2						
		clonazepam	3	3						
		dicyclomine	4	4						
		donepezil	5	5						
		nitroglycerin	6	6						
		linaclotide	7	7						
		quetiapine	8	8						
		valsartan	9	9						
1620a	87 y M	atenolol	1	1	A/C	Ingst	Int-S	1	atenolol	1800 ng/mL In Blood (unspecified) @ Autopsy
1621h	87 y M	amlodipine	2	2	A/C	Ingst	AR-D	3	acetaminophen (apap)	324 mcg/mL In Plasma @ Unknown
		acetaminophen	3	3					digoxin	2.51 ng/mL In Blood (unspecified) @ Unknown
1622	88 y F	digoxin	1	1	A/C	Ingst	Int-S	2		
1623	88 y M	amlodipine	1	1	U	Ingst	Unt-T	3		
		alprazolam	2	2						
		lisinopril	3	3						
		escitalopram	4	4						
1624hi	89 y M	diltiazem	1	1	C	Ingst	AR-D	3	digoxin	3.9 ng/mL In Serum @ Unknown
		metoprolol	2	2						
		lisinopril	3	3						
1625h	89 y F	digoxin	1	1	C	Ingst	AR-D	3	digoxin	4.4 ng/mL In Serum @ 30 m (pe)
1626	90 y F	digoxin	1	1	C	Ingst	AR-D	3	digoxin	2.8 ng/mL In Blood (unspecified) @ Unknown
1627	91 y F	cardiac glycoside	1	1	C	Ingst	AR-D	3	digoxin	5 ng/mL In Serum @ Unknown
1628h	92 y F	digoxin	1	1	A/C	Ingst	AR-D	1	digoxin	100 ng/mL In Serum @ Unknown
1629ha	93 y F	diltiazem	1	1	A	Ingst	Int-S	2	diltiazem	510 ng/mL In Serum @ Unknown
		metoprolol	2	2					metoprolol	
1630	94 y F	amlodipine	1	1	C	Ingst	AR-D	1	amlodipine	0.23 mg/L In Blood (unspecified) @ 2 h (pe)
		ethanol	2	2					ethanol	43 mg/dL In Blood (unspecified) @ 2 h (pe)
1631	94 y M	cardiac glycoside	1	1	C	Ingst	AR-D	1		
[1632ha]	11 m F	lisinopril	1	1	A	Ingst	Unt-G	1		
		nifedipine	1	1						

See Also case 19, 545, 603, 721, 775, 797, 812, 838, 997, 1011, 1012, 1035, 1068, 1069, 1137, 1138, 1153, 1190, 1225, 1236, 1241, 1256, 1258, 1261, 1293, 1295, 1297, 1299, 1305, 1310, 1313, 1318, 1321, 1348, 1372, 1376, 1658, 1661, 1665, 1671, 1672, 1675, 1691, 1700, 1716, 1725, 1732, 1782, 1788, 1793, 1799, 1805, 1826, 1835, 1941, 2180, 2221, 2232, 2286, 2392, 2492, 2590

Cold and Cough Preparations

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1633pa	16 y F				A	Ingst	Int-S	2		
[1634pha]	17 y F	benzonatate	1	1						
		caffeine	2	2						
		benzonatate	1	1	A	Ingst	Int-S	1	benzonatate	680 mcg/L In Blood (unspecified) @ 2 h (pe)
		meclizine	2	2					meclizine	150 mcg/L In Blood (unspecified) @ 2 h (pe)
1635i	20 y M				A	Unk	Int-S	2		
1636h	43 y F	dextromethorphan	1	1						
		diphenhydramine	2	2						
					A/C	Ingst	Int-S	3		
		benzonatate	1	1						
		tizanidine	2	2						
		cyclic antidepressant, unknown	3	3						
1637h	47 y F	acetaminophen/antihistamine	1	1	A	Ingst	Int-A	3		
1638h	60 y F				A	Ingst	Int-M	3		
		acetaminophen/	1	1						
		dextromethorphan/								
		doxylamine								
		ibuprofen	2	2						
See Also case 17, 262, 389, 395, 525, 558, 658, 671, 677, 840, 860, 931, 998, 1193, 1201, 1239, 1296, 1401, 1580, 1797, 1805, 1831, 1869, 1946, 2159, 2175, 2196, 2361, 2413, 2455										
Dietary Supplements/Herbals/Homeopathic										
1639p	16 y M				A	Ingst	Unk	2		
		energy drink	1	1						
See Also case 812, 1244, 1394, 1799										
Diuretics										
1640	26 y M				A	Ingst	Int-A	3		
		diuretic, unknown	1	1						
See Also case 930, 1069, 1195, 1261, 1310, 1372, 1381, 1387, 1409, 1410, 1412, 1468, 1480, 1517, 1531, 1538, 1549, 1610, 1677, 1680, 1686										
Electrolytes and Minerals										
1641h	31 y M				A	Ingst	Int-S	1		
		iron	1	1					iron	356 mcg/dL In Serum @ 0 h (pe)
		iron	1	1					iron	4326 mcg/dL In Serum @ 11 h (pe)
		acetaminophen	2	2					acetaminophen (apap)	231 mcg/mL In Serum @ 11 h (pe)
		acetaminophen	2	2					acetaminophen (apap)	265.7 mcg/mL In Serum @ 255 m (pe)
		acetaminophen	2	2					acetaminophen (apap)	270 mcg/mL In Serum @ 0 m (pe)
1642ha	36 y M				A	Ingst	Int-S	1		
		iron	1	1					iron	671 mcg/dL In Plasma @ Unknown
		acetaminophen	2	2					acetaminophen (apap)	82 mg/L In Plasma @ Unknown
		amphetamine	3	3						
		ethanol	4	4					ethanol	138 mg/dL In Serum @ Unknown
[1643h]	47 y F				A	Ingst	Int-S	1		
		iron	1	1						
1644h	63 y F				C	Ingst	Int-M	3		
		magnesium hydroxide	1	1					magnesium	7.2 mEq/L In Serum @ Unknown
1645h	73 y M				A/C	Ingst	Unt-T	3		
		cesium chloride	1	1						
[1646h]	10 m M				A	Ingst	Unt-G	1		
		iron	1	1					iron	1034 mcg/mL In Blood (unspecified) @ 3 h (pe)
		iron	1	1					iron	246 mcg/mL In Blood (unspecified) @ 72 h (pe)
		iron	1	1					iron	475 mcg/mL In Blood (unspecified) @ 24 h (pe)
		iron	1	1					iron	7739 mcg/mL In Blood (unspecified) @ 16 h (pe)
		iron	1	1					iron	931 mcg/mL In Blood (unspecified) @ 1 h (pe)
See Also case 251, 841, 995, 1112, 1311, 1409										
Eye/Ear/Nose/Throat Preparations										
1647	90 y M				A	Ingst	Unt-T	3		
		atropine	1	1						
Gastrointestinal Preparations										
1648ai	19 y M				U	Ingst + Unk	Int-A	1		
		loperamide	1	1						
		clonazepam	2	2						
		ethanol	3	3						
[1649pha]	23 y F				A	Ingst	Int-U	1		
		loperamide	1	1					desmethylloperamide	56 ng/mL In Blood (unspecified) @ Unknown
		atropine/diphenoxylate	2	2						
		trazodone	3	3					trazodone	2.4 mcg/mL In Blood (unspecified) @ Unknown
		trazodone	3	3					mcpp (meta-chlorophenylpiperazine)	65 ng/mL In Blood (unspecified) @ Unknown
1650ph	30 y F				A	Ingst + Aspir	Int-A	1		
		loperamide	1	1					desmethylloperamide	160 ng/mL In Serum @ Unknown
		loperamide	1	1					loperamide	54 ng/mL In Serum @ Unknown
1651h	30 y M				A	Ingst	Int-S	1		
		loperamide	1	1						
		gabapentin	2	2						
		ethanol	3	3					ethanol	210 mg/dL In Serum @ 1 h (pe)
1652pha	31 y M				A	Ingst	Int-S	2		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ③ Time
		loperamide	1	1						
		alprazolam	2	2					alprazolam	0.143 mg/L In Blood (unspecified) ③ Unknown
1653ai	34 y M				U	Unk	Unk	2		
		loperamide	1	1						
1654ai	36 y M				U	Unk	Int-A	3		
		loperamide	1	1						
		ethanol	2	2						
1655ph	39 y M				A	Ingst	Int-U	2		
		loperamide	1	1						
		dirt	2	2						
1656ph	40 y F				U	Unk	Unk	2		
		loperamide	1	1						
		drug, unknown	2	2						
[1657ha]	41 y F				A	Ingst	Int-A	1		
		loperamide	1	1					loperamide	170 ng/mL In Blood (unspecified) ③ Unknown
		loperamide	1	1					desmethyloperamide	410 ng/mL In Blood (unspecified) ③ Unknown
1658ph	57 y F				U	Ingst + Par	Unt-T	2		
		amiodarone	4	1						
		metoclopramide	1	1						
		ondansetron	2	1						
		promethazine	3	1						
1659h	66 y F				U	Ingst	Int-S	2		
		ondansetron	1	1						
		oxycodone	2	2						
See Also case 553, 776, 1074, 1201, 1202, 1203, 1289, 1310, 1321, 1323, 1372, 1410, 1411, 1425, 1432, 1463, 1474, 1551, 1559, 1591, 1618, 1660, 2098										
Hormones and Hormone Antagonists										
1660h	14 y F				A	Ingst	Int-S	2		
		metformin	1	1						
		acetaminophen	2	2						
		amitriptyline	3	3						
		naproxen	4	4						
		ranitidine	5	5						
		salicylate	6	6						
1661pha	16 y F				U	Ingst	Int-S	2		
		metformin	1	1						
		prazosin	3	1						
		quetiapine	2	1						
		sertraline	4	1						
		minocycline	5	2						
1662p	26 y F				A	Ingst + Par	Int-S	1		
		insulin	1	1						
		alprazolam	2	2						
		tramadol	3	3						
1663h	31 y F				A/C	Ingst	Int-S	2		
		metformin	1	1						
		ibuprofen	2	2						
1664h	33 y M				A	Ingst	Int-S	2		
		glipizide	1	1						
		ethanol	2	2						
1665ha	35 y F				A	Ingst + Par	Int-S	2		
		insulin	1	1						
		trazodone	2	2						
		lisinopril	3	3						
		sertraline	4	4						
		amphetamine	5	5						
1666ai	35 y F				U	Par	Int-S	1		
		insulin	1	1						
1667h	36 y F				A/C	Ingst	Int-S	1		
		metformin	1	1						
		trazodone	2	2					trazodone	2740 ng/mL In Whole Blood ③ Unknown
1668h	38 y M				A	Ingst	Int-S	1		
		metformin	1	1					metformin	260 mcg/mL In Blood (unspecified) ③ 1 d (pe)
		metformin	1	1					metformin	46 mcg/mL In Blood (unspecified) ③ 3 d (pe)
		methylphenidate	2	2						
1669	39 y M				A	Ingst	Int-S	2		
		glipizide	1	1						
		metformin	2	2						
1670h	40 y F				A/C	Ingst	Int-S	2		
		metformin	1	1						
1671h	41 y F				A/C	Ingst	Int-S	2		
		metformin	1	1						
		lisinopril	2	2						
1672ha	41 y F				A	Ingst	Int-S	1		
		metformin	2	1					metformin	100 ng/mL In Blood (unspecified) ③ Unknown
		methamphetamine	1	1					methamphetamine	506 ng/mL In Blood (unspecified) ③ Unknown

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1673h	46 y M	methamphetamine	1	1	U	Ingst	Int-S	2	amphetamine	63 ng/mL In Blood (unspecified) @ Unknown
		alprazolam	3	3					alprazolam	14 ng/mL In Blood (unspecified) @ Unknown
		hydrochlorothiazide/lisinopril	4	4						
		marijuana	5	5						
		metformin	1	1						
1674	46 y M	metformin	1	1	A/C	Ingst	Int-S	2		
		lithium	2	2					lithium	1.6 mEq/L In Blood (unspecified) @ Unknown
		acetaminophen	3	3					acetaminophen (apap)	75 mcg/mL In Blood (unspecified) @ Unknown
1675ha	47 y M				U	Ingst	Int-S	2		
		metformin/sitagliptin	1	1						
		acetaminophen/hydrocodone	2	2					acetaminophen (apap)	14.3 mcg/mL In Blood (unspecified) @ Unknown
		acetaminophen/hydrocodone	2	2					acetaminophen (apap)	38.2 mcg/mL In Blood (unspecified) @ Unknown
		lorazepam	3	3						
		losartan	4	4						
		probenecid	5	5						
1676ph	48 y M	zolidem	6	6	A	Par	Int-S	3		
		simvastatin	7	7						
		insulin (glargine)	1	1						
1677ha	49 y M	insulin (lispro)	2	2	A	Ingst	Int-S	1		
		metformin	1	1					metformin	420 mcg/mL In Blood (unspecified) @ Unknown
		baclofen	2	2						
1678hi	52 y F	gabapentin	3	3	A	Par	Int-S	1		
		hydrochlorothiazide	4	4						
		insulin (glargine)	1	1						
1679h	52 y M				A/C	Ingst	Int-S	1		
		metformin	1	1						
		glipizide	2	2						
		imipramine	3	3						
		quetiapine	4	4						
		duloxetine	5	5						
		alprazolam	6	6						
1680h	53 y F	zolidem	7	7	A	Ingst	Int-S	2		
		metformin	1	1						
		acetaminophen/salicylate	2	2					salicylate	11 mg/dL In Blood (unspecified) @ 1 h (pe)
		acetaminophen/salicylate	2	2					acetaminophen (apap)	34 mcg/mL In Blood (unspecified) @ 1 h (pe)
		ibuprofen	3	3						
		olanzapine	4	4						
		bupropion (extended release)	5	5						
1681h	54 y M	lorazepam	6	6	A/C	Ingst	Int-S	1		
		cyclobenzaprine	7	7						
		hydrochlorothiazide/triamterene	8	8						
		chlorthalidone	9	9						
		metformin	1	1						
		trazodone	2	2						
1682h	56 y F	metformin	1	1	C	Ingst	AR-D	3		
1683h	56 y F				U	Ingst	Int-S	2		
		glipizide	1	1						
		metformin	2	2						
		drug, unknown	3	3						
		amitriptyline	4	4						
		aripiprazole	5	5						
		duloxetine (extended release)	6	6						
1684	57 y F	acetaminophen/codeine	7	7	U	Ingst	Unk	2		
		metformin	1	1						
1685	58 y F	metformin	1	1	A/C	Ingst	Int-S	2		
1686ha	58 y F				A	Ingst	Int-S	1		
		metformin	1	1						
		glipizide	2	2						
		ibuprofen	3	3						
		hydrochlorothiazide	4	4						
1687a	59 y M	ethanol	5	5	A	Ingst	Int-S	2		
		metformin	1	1					metformin	44 mcg/mL In Blood (unspecified) @ Unknown
		methanol	2	2						
1688h	61 y F				C	Ingst	Unk	2		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1689a	61 y M	metformin	1	1	A	Ingst	Int-S	2		
		metformin	1	1						
		acetaminophen	2	2					acetaminophen (apap)	54 mcg/mL In Blood (unspecified) @ Unknown
		drug, unknown	3	3						
1690hi	65 y M	metformin	1	1	A/C	Ingst	Int-M	1		
1691h	67 y F	metformin	1	1	A/C	Ingst	Int-S	1		
		metoprolol	2	2						
		acetaminophen/hydrocodone	3	3					acetaminophen (apap)	45 mcg/mL In Serum @ 4 h (pe)
1692h	68 y F	metformin	1	1	C	Ingst	AR-D	2		
1693h	68 y M	metformin	1	1	C	Ingst	AR-D	3		
1694ph	70 y M	metformin	1	1	C	Ingst	AR-D	2		
		glimepiride	1	1						
1695h	70 y M	metformin	1	1	C	Ingst	AR-D	2		
1696ha	71 y F	metformin	1	1	A/C	Ingst	Int-S	3		
1697h	74 y F	metformin	1	1	C	Ingst	AR-D	3		
1698ha	74 y M	metformin	1	1	A	Ingst + Unk	Int-S	1		
		acetaminophen	2	2						
1699h	75 y F	metformin	1	1	U	Ingst	Int-U	2		
		acetaminophen	2	2					acetaminophen (apap)	48 mg/dL In Serum @ 1 m (pe)
1700h	76 y M	metformin	1	1	C	Ingst	Unt-T	3		
		colchicine	2	2						
		losartan	3	3						
1701h	78 y F	metformin	1	1	C	Ingst	Unk	3		
		warfarin	2	2						
1702h	79 y M	metformin	1	1	A/C	Ingst	Unt-G	3		
1703h	83 y M	metformin	1	1	A/C	Ingst	AR-D	2		
See Also case 89, 545, 572, 751, 930, 1037, 1039, 1066, 1202, 1233, 1257, 1301, 1310, 1321, 1323, 1372, 1401, 1411, 1415, 1420, 1430, 1433, 1455, 1468, 1480, 1483, 1539, 1547, 1551, 1577, 1599, 1615, 1744, 1776, 1793, 1825										
Miscellaneous Drugs										
1704h	28 y M				A	Par	AR-D	1		
		succinylcholine	1	1						
		methamphetamine	2	2						
		haloperidol	3	3						
		tramadol	4	4						
1705ai	40 y M	drug, unknown	1	1	U	Unk	Int-S	1		
1706ph	50 y F				A/C	Ingst	Int-S	1		
		ropinirole	1	1						
		clopidogrel	2	2						
		alprazolam	3	3						
		ethanol	4	4						
1707h	68 y M				A	Par + Unk	AR-D	3		
		rasburicase	1	1						
		drug, unknown	2	2						
See Also case 932, 1066, 1107, 1310, 1382, 1420, 1433, 1577, 1578, 1599, 1618, 1675, 1793, 2180										
Muscle Relaxants										
1708pa	23 y M				A	Ingst	Int-S	2		
		baclofen	1	1						
		homatropine/hydrocodone	2	2						
		gabapentin	3	3						
1709ph	25 y M	carisoprodol	1	1	U	Ingst	Unk	2		
1710h	32 y F				A	Ingst	Int-S	3		
		baclofen	1	1						
		clonazepam	2	2						
		doxepin	3	3						
1711ai	33 y M				U	Unk	Int-A	1		
		baclofen	1	1						
		ethanol	2	2						
1712p	34 y F				U	Ingst	Int-S	2		
		baclofen	1	1					baclofen	3777 ng/mL In Blood (unspecified) @ Unknown
		olanzapine	2	2						
		citalopram	3	3					citalopram	507 ng/mL In Blood (unspecified) @ Unknown
		lithium	4	4					lithium	0.5 mg/L In Blood (unspecified) @ Unknown
		methadone	5	5					methadone	756 ng/mL In Blood (unspecified) @ Unknown

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
		marijuana	6	6					delta-9-carboxy-thc	5 ng/mL In Blood (unspecified) @ Unknown
1713ph	35 y M				A	Ingst	Int-S	2		
		baclofen	1	1						
1714h	36 y F				A/C	Ingst	Int-S	2		
		cyclobenzaprine	1	1						
		ethanol	2	2					ethanol	48 mg/mL In Blood (unspecified) @ Unknown
		acetaminophen/hydrocodone	3	3					acetaminophen (apap)	140 mcg/mL In Serum @ Unknown
1715p	39 y F				A	Ingst	Unk	2		
		baclofen	1	1						
1716ha	42 y M				A/C	Ingst	Int-S	2		
		baclofen	1	1						
		propranolol	2	2						
		topiramate	3	3						
		drug, unknown	4	4						
1717ha	47 y F				U	Ingst	Int-S	3		
		metaxalone	1	1					metaxalone	28 mcg/mL In Serum @ 1 h (pe)
		fluoxetine	2	2					norfluoxetine	210 ng/mL In Serum @ 1 h (pe)
		fluoxetine	2	2					fluoxetine	360 ng/mL In Serum @ 1 h (pe)
		trazodone	3	3					trazodone	0.65 mcg/mL In Serum @ 1 h (pe)
		sumatriptan	4	4						
		oxycodone	5	5						
		carbamazepine	6	6						
		loratadine	7	7						
		cimetidine	8	8						
1718h	48 y M				A	Ingst	Int-S	2		
		baclofen	1	1						
		gabapentin	2	2						
		nonsteroidal antiinflammatory	3	3						
1719h	49 y F				A	Ingst	Int-S	2		
		baclofen	1	1						
1720pha	49 y F				A	Ingst	Int-S	1		
		baclofen	1	1					baclofen	1373 ng/mL In Blood (unspecified) @ 1 d (pe)
		fluoxetine	2	2					norfluoxetine	262 ng/mL In Blood (unspecified) @ 2 d (pe)
		fluoxetine	2	2					fluoxetine	665 ng/mL In Blood (unspecified) @ 2 d (pe)
1721ai	50 y F				U	Unk	Unk	2		
		carisoprodol	1	1						
		diphenhydramine	2	2						
		ethanol	3	3						
1722	51 y M				A/C	Ingst	Int-S	2		
		cyclobenzaprine	1	1						
		tramadol	2	2						
		pregabalin	3	3						
		clopidogrel	4	4						
		acetaminophen/codeine	5	5					acetaminophen (apap)	44 mg/mL In Blood (unspecified) @ 4 h (pe)
		phenytoin	6	6					phenytoin	6.4 mcg/mL In Blood (unspecified) @ 4 h (pe)
		sulfamethoxazole/trimethoprim	7	7						
1723h	53 y F				U	Ingst	Int-S	2		
		baclofen	1	1						
		amitriptyline	2	2						
		ethanol	3	3						
		naproxen	4	4						
1724h	54 y F				A/C	Ingst	Int-S	3		
		cyclobenzaprine	1	1						
		warfarin	2	2						
1725pha	57 y F				A/C	Ingst	Int-S	1		
		baclofen	1	1						
		metoprolol	2	1					hydroxyzine	180 mcg/L In Blood (unspecified) @ Unknown
		metoprolol	2	1					10-hydroxycarbazepine	19 mcg/mL In Blood (unspecified) @ Unknown
		metoprolol	2	1					midazolam	27 mcg/L In Blood (unspecified) @ Unknown
		metoprolol	2	1					fluoxetine	440 mcg/L In Blood (unspecified) @ Unknown
		metoprolol	2	1					norfluoxetine	710 mcg/L In Blood (unspecified) @ Unknown
		metoprolol	2	1					baclofen	9500 mcg/L In Blood (unspecified) @ Unknown
		ethanol	3	2						
1726h	58 y F				A	Ingst + Aspir	Int-S	2		
		cyclobenzaprine	1	1						
1727ha	61 y F				C	Ingst	Int-S	1		
		baclofen	1	1					baclofen	1189 ng/mL In Blood (unspecified) @ Unknown
		lorazepam	2	2					alprazolam	13.5 ng/mL In Blood (unspecified) @ Unknown
		zolpidem	3	3					zolpidem	114 ng/mL In Blood (unspecified) @ Unknown

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ③ Time
1728h	62 y F	alprazolam	4	4	A/C	Ingst	Int-S	1		
		baclofen	1	1					baclofen	11 mg/L In Blood (unspecified) ③ Autopsy
1729h	63 y F	baclofen	1	1	A/C	Ingst	Int-S	2		
1730pha	65 y F	carisoprodol	1	1	A/C	Ingst	Int-S	2		
1731h	68 y F	baclofen	1	1	A/C	Ingst	Unk	3		
1732ph	69 y F	chlorzoxazone	1	1	U	Ingst	Int-S	2		
		quetiapine	2	2						
		zolpidem	3	3						
		lisinopril	4	4						
1733h	70 y M	baclofen	1	1	A/C	Ingst	Oth-W	3		
		salicylate	2	2						
1734ha	71 y M	baclofen	1	1	A/C	Ingst	Int-S	1	baclofen	2.9mg/L In Blood (unspecified) ③ 30 m (pe)
1735h	83 y F	baclofen	1	1	A/C	Ingst + Derm	Int-U	3		
		tapentadol	2	2						
		carisoprodol	3	3						
		fentanyl	4	4						
1736a	90 y F	baclofen	1	1	C	Ingst	Int-M	1		
See Also case 120, 128, 267, 550, 624, 628, 653, 675, 684, 693, 696, 763, 771, 821, 830, 852, 855, 874, 891, 895, 903, 907, 939, 946, 951, 987, 991, 1000, 1002, 1025, 1050, 1055, 1078, 1090, 1096, 1115, 1116, 1168, 1195, 1212, 1225, 1233, 1243, 1260, 1262, 1299, 1310, 1315, 1316, 1320, 1396, 1411, 1412, 1427, 1435, 1444, 1475, 1489, 1501, 1511, 1551, 1554, 1555, 1591, 1636, 1677, 1680, 1760, 1804, 1807, 2117, 2219, 2347, 2355, 2376, 2433, 2492, 2507, 2534, 2538, 2663, 2676										
Narcotic Antagonists										
1737ai	19 y M	nalmexone	1	1	U	Unk	Int-A	1		
See Also case 1955, 2439										
Sedative/Hypnotics/Antipsychotics										
1738pa	4 y M	quetiapine	1	1	A	Ingst	Oth-M	1	quetiapine	0.7 mg/mL In Gastric (stomach content) ③ Autopsy
		quetiapine	1	1					quetiapine	9.4 mg/L In Blood (unspecified) ③ Autopsy
		quetiapine	1	1					quetiapine	9.7 mg/L In Blood (unspecified) ③ Autopsy
		trazodone	2	2					trazodone	0.11 mg/mL In Gastric (stomach content) ③ Autopsy
		trazodone	2	2					trazodone	4 mg/L In Blood (unspecified) ③ Autopsy
[1739ha]	12 y F	diazepam	1	1	A	Ingst	Unk	1	nordiazepam	0.067 mg/L In Blood (unspecified) ③ 2 h (pe)
		diazepam	1	1					diazepam	0.98 mg/L In Blood (unspecified) ③ 2 h (pe)
		diazepam	1	1					diazepam	20 ng/mL In Urine (quantitative only) ③ 1 m (pe)
		diazepam	1	1					oxazepam	32 ng/mL In Urine (quantitative only) ③ 1 m (pe)
		diazepam	1	1					temazepam	410 ng/mL In Urine (quantitative only) ③ 1 m (pe)
		diazepam	1	1					nordiazepam	68 ng/mL In Urine (quantitative only) ③ 1 m (pe)
		gabapentin	2	2					gabapentin	1.5 mcg/mL In Blood (unspecified) ③ 1 m (pe)
		gabapentin	2	2					gabapentin	24 mg/L In Blood (unspecified) ③ 2 h (pe)
		citalopram	3	3					citalopram	0.42 mg/L In Blood (unspecified) ③ 2 h (pe)
1740ai	18 y M	alprazolam	1	1	U	Unk	Int-U	1		
		oxycodone	2	2						
		methadone	3	3						
1741ai	19 y F	alprazolam	1	1	U	Unk	Unk	1		
		oxycodone	2	2						
		estazolam	3	3						
1742ai	22 y M	alprazolam	1	1	U	Unk	Int-A	1		
		ethanol	2	2						
		oxycodone	3	3						
1743ai	22 y M	alprazolam	1	1	U	Unk	Int-A	1		
		cocaine	2	2						
		fentanyl	3	3						
1744p	23 y F	benzodiazepine	1	1	A	Ingst	Int-S	1		
		insulin (aspart)	2	2						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ③ Time
1745p	23 y F	ethanol	3	3	A/C	Ingst	Int-S	3		
1746	24 y F	clonazepam	1	1	A	Ingst	Int-S	2		
		alprazolam	2	2						
		quetiapine	1	1						
1747ai	24 y M	paroxetine	2	2	U	Ingst + Unk	Int-A	1		
		lorazepam	3	3						
		alprazolam	1	1						
1748	25 y M	fentanyl	2	2	U	Ingst	Int-S	2		
1749ph	25 y M	quetiapine	1	1	A	Inhal	Int-A	1		
1750ph	25 y M	alprazolam	1	1	A/C	Unk	Int-U	1		
		heroin	2	2						
		quetiapine	1	1						
1751ai	25 y F	fentanyl	2	2	U	Ingst + Unk	Int-A	1		
		heroin	3	3						
		alprazolam	1	1						
1752ai	27 y M	fentanyl	2	2	U	Unk	Unk	1		
		alprazolam	1	1						
		methadone	2	2						
1753h	27 y F	oxycodone	3	3	A	Ingst	Int-S	1		
		quetiapine	1	1						
		ethanol	2	2						
1754h	28 y F	drug, unknown	3	3	A	Ingst	Int-S	2		
		quetiapine	1	1						
		ethanol	2	2						
1755ai	28 y M	drug, unknown	3	3	U	Unk	Int-A	1		
		quetiapine	1	1						
		ethanol	2	2						
1756p	30 y M	alprazolam	1	1	A	Ingst	Int-S	1		
		methamphetamine	2	2						
		diazepam	3	3						
1757	32 y M	clozapine	1	1	A/C	Ingst	Int-S	2		
1758phi	32 y M	quetiapine	1	1	A	Ingst	Unk	2		
		doxepin	2	2						
		ethanol	3	3						
1759ai	33 y M	asenapine	1	1	U	Unk	Int-A	2		
		quetiapine	2	2						
		trazodone	3	3						
1760a	37 y F	chlordiazepoxide	1	1	A/C	Ingst	Int-S	2		
		diazepam	2	2						
		ethanol	3	3						
		olanzapine	1	1					olanzapine	0.17 mcg/mL In Blood (unspecified) ③ 1 h (pe)
		metaxalone	2	2						
		quetiapine	3	3						
		lamotrigine	4	4					lamotrigine	27 mcg/mL In Blood (unspecified) ③ 1 h (pe)
		vilazodone	5	5						
		triazolam	6	6						
		acetaminophen	7	7					acetaminophen (apap)	22 mcg/mL In Blood (unspecified) ③ 1 h (pe)
		acetaminophen	7	7						
		acetaminophen	7	7						
1761pha	37 y M	alprazolam	1	1	A	Ingst	Int-A	3		
1762ai	37 y M	narcotic, other/unknown	2	2	U	Unk	Int-A	1		
		alprazolam	1	1						
		heroin	2	2						
1763ai	37 y F	fentanyl	3	3	U	Unk	Int-S	1		
		alprazolam	1	1						
		citalopram	2	2						
1764	38 y M	ethanol	3	3	A/C	Ingst	Int-S	3		
		quetiapine	1	1						
		ethanol	2	2						
1765ai	39 y M	ethanol	2	2	U	Unk	Int-A	1	ethanol	207 mg/dL In Serum ③ Unknown
		alprazolam	1	1						
		fentanyl	2	2						
1766phi	40 y M	alprazolam	1	1	U	Ingst + Unk	Int-A	2		
		narcotic, other/unknown	2	2						
		acetaminophen	3	3						
									acetaminophen (apap)	23 mcg/mL In Serum ③ Unknown

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ③ Time
1767pha	44 y F	barbiturate (short or intermediate acting)	1	1	A	Ingst	Int-S	1	pentobarbital	59 mcg/mL In Blood (unspecified) ③ Unknown
		alprazolam	2	2					alprazolam	69 mg/mL In Blood (unspecified) ③ Unknown
1768ai	44 y M	ethanol	3	3	U	Unk	Int-A	1	ethanol	18 mg/dL In Serum ③ Unknown
		alprazolam	1	1						
		citalopram	2	2						
		methadone	3	3						
1769ph	44 y M	ziprasidone	1	1	A/C	Ingst	Int-S	1		
		valproic acid (extended release)	2	2						
		acetaminophen/hydrocodone	3	3						
1770ai	44 y M	benzodiazepine	1	1	U	Unk	Int-M	1		
		ethanol	2	2						
		citalopram	3	3						
1771ai	44 y F	pentobarbital	1	1	U	Unk	Int-S	1		
		phenytoin	2	2						
1772h	45 y M	quetiapine	1	1	A	Ingst	Int-S	1		
1773ha	45 y F	quetiapine (extended release)	1	1	A/C	Ingst	Int-S	2	quetiapine	6800 ng/mL In Blood (unspecified) ③ Unknown
1774h	46 y M	propofol	1	1	A/C	Par	Unt-T	3		
1775h	46 y M	quetiapine (extended release)	1	1	A	Ingst	Int-S	2		
1776ha	48 y F	alprazolam	1	1	A/C	Ingst	Int-S	1	alprazolam	240 ng/mL In Blood (unspecified) ③ Autopsy
		acetaminophen/oxycodone	2	2					acetaminophen (apap)	15 mcg/mL In Blood (unspecified) ③ Unknown
		acetaminophen/oxycodone	2	2					oxycodone	170 ng/mL In Blood (unspecified) ③ Autopsy
		zolpidem	3	3					zolpidem	640 ng/mL In Blood (unspecified) ③ Autopsy
		hydroxyzine	4	4					hydroxyzine	18 ng/mL In Blood (unspecified) ③ Autopsy
		insulin	5	5						
1777ha	48 y F	alprazolam	1	1	A/C	Ingst	Int-S	1	alprazolam	0.47 mg/L In Blood (unspecified) ③ 7 h (pe)
		risperidone	2	2					9-hydroxyrisperidone	0.013 mg/L In Blood (unspecified) ③ 21 h (pe)
		risperidone	2	2					risperidone	0.083 mg/L In Blood (unspecified) ③ 21 h (pe)
		caffeine	3	3						
1778ai	48 y M	alprazolam	1	1	U	Unk	Int-A	1		
		diazepam	2	2						
		gabapentin	3	3						
1779p	48 y M	zolpidem	1	1	A	Ingst	Int-S	2		
1780ai	48 y M	alprazolam	1	1	U	Unk	Int-A	2		
		ethanol	2	2						
		oxycodone	3	3						
1781a	50 y M	midazolam	1	1	A	Ingst	Int-S	1	midazolam	170 ng/mL In Blood (unspecified) ③ Autopsy
		buspirone	2	2						
1782a	51 y M	clonazepam	1	1	A	Ingst	Int-S	2	clonazepam	36 ng/mL In Blood (unspecified) ③ Autopsy
		clonazepam	1	1					7-aminoclonazepam	890 ng/mL In Blood (unspecified) ③ Autopsy
		clonidine	2	2					clonidine	73 ng/mL In Blood (unspecified) ③ Autopsy
		fluoxetine	3	3					fluoxetine	5000 ng/mL In Blood (unspecified) ③ Autopsy
		fluoxetine	3	3					norfluoxetine	73 ng/mL In Blood (unspecified) ③ Autopsy
1783ph	51 y M	diazepam	1	1	A/C	Ingst + Inhal	Int-S	2		
		lorazepam	2	2						
		temazepam	3	3						
		gabapentin	4	4						
		chlordiazepoxide	5	5						
		ethanol	6	6						
		carbon monoxide	7	7						
1784p	52 y F	alprazolam	1	1	U	Unk	Int-U	2		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1785ai	52 y M	alprazolam	1	1	U	Unk	Int-S	2		
		methylenedioxy-methamphetamine (MDMA)	2	2						
1786ph	53 y F	oxycodone	3	3	A/C	Ingst	Unk	2		
		alprazolam	1	1						
		tramadol	2	2						
1787ph	53 y F	fluoxetine	3	3	A	Unk	Unk	2		
		temazepam	1	1						
		codeine	2	2						
1788ai	53 y M	cocaine	3	3	U	Unk	Unk	1		
		alprazolam	1	1						
		methadone	2	2						
1789ai	53 y F	propranolol	3	3	U	Unk	Int-S	1		
		benzodiazepine	1	1						
		oxycodone	2	2						
		paroxetine	3	3						
1790pha	54 y M	zolpidem	1	1	C	Ingst	Unk	2		
		valproic acid	2	2						
		quetiapine	3	3						
		tramadol	4	4						
1791h	54 y M	zolpidem	1	1	A/C	Ingst	Int-S	2		
		clonazepam	2	2						
1792ha	55 y F	clonazepam	1	1	U	Ingst	Int-S	2		
		oxycodone	2	2						
1793h	55 y F	clonazepam	1	1	A/C	Ingst	Int-M	3		
		duloxetine (extended release)	2	2						
		propanolol	3	3						
		oxcarbazepine	4	4						
		quetiapine	5	5						
		dopamine agonist	6	6						
		topiramate	7	7						
		metformin	8	8						
		lisinopril	9	9						
		levothyroxine	10	10						
1794ai	55 y M	alprazolam	1	1	U	Unk	Int-A	1		
		ethanol	2	2						
1795ai	55 y F	buspirone	1	1	U	Unk	Int-S	1		
		gabapentin	2	2						
		lamotrigine	3	3						
		diazepam	4	4						
1796ai	55 y F	quetiapine	1	1	U	Unk	Unk	3		
1797pha	56 y F	clobazam	1	1	U	Ingst	Int-S	1	benzodiazepines	4000 ng/mL In Whole Blood @ Autopsy
		alprazolam	2	2					alprazolam	5 ng/mL In Whole Blood @ Autopsy
		sedative-hypnotic-antianxiety-antipsychotic drug	3	3						
		zolpidem	4	4						
		doxylamine	5	5					doxylamine	190 ng/mL In Whole Blood @ Autopsy
		lacosamide	6	6						
		diphenhydramine	7	7					diphenhydramine	840 ng/mL In Whole Blood @ Autopsy
1798ph	56 y M	quetiapine	1	1	A	Ingst	Int-S	2		
		lorazepam	2	2						
1799ha	56 y F	alprazolam	2	1	U	Ingst	Int-S	1	alprazolam	0.15 mg/L In Blood (unspecified) @ 5 m (pe)
		sertraline	3	1						
		verapamil	1	1						
		melatonin	4	4						
1800h	57 y M	quetiapine	1	1	A/C	Ingst	Int-S	2	quetiapine	840 ng/mL In Serum @ Unknown
		clonazepam	2	2					clonazepam	100 ng/mL In Serum @ Unknown
		clonazepam	2	2					7-aminoclonazepam	980 ng/mL In Serum @ Unknown
1801ai	57 y F	diazepam	1	1	U	Unk	Int-A	1		
		duloxetine (extended release)	2	2						
		heroin	3	3						
		paroxetine	4	4						
1802ai	58 y F	diazepam	1	1	U	Unk	Int-A	2		
		gabapentin	2	2						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1803ai	59 y F	tramadol	3	3	U	Unk	Unk	1		
		diazepam	1	1						
		ethanol	2	2						
		oxycodone	3	3						
1804h	60 y F	zolpidem	1	1	A/C	Ingst	Int-U	2		
		cyclobenzaprine	2	2						
		drug, unknown	3	3						
1805h	60 y M	clonazepam	1	1	A/C	Ingst	Int-S	3		
		hydrochlorothiazide/lisinopril	2	2						
		venlafaxine	3	3						
		loratidine (extended release)	4	4						
1806ha	61 y M	alprazolam	1	1	A/C	Ingst	Int-S	1	alprazolam	0.45 mg/L In Blood (unspecified) @ Autopsy
		oxycodone	2	2					oxycodone	0.15 mg/L In Blood (unspecified) @ Autopsy
		trazodone	3	2					trazodone	1.2 mg/L In Blood (unspecified) @ Autopsy
1807ai	61 y M	zolpidem	1	1	U	Unk	Int-A	1		
		alprazolam	2	2						
		cyclobenzaprine	3	3						
1808ai	63 y F	alprazolam	1	1	U	Ingst	Unt-M	1		
		ethanol	2	2						
		diphenhydramine	3	3						
1809	64 y M	alprazolam	1	1	C	Ingst	Int-M	3	alpha-oh-alprazolam	130 ng/mL In Urine (quantitative only) @ Unknown
		alprazolam	1	1					alprazolam	230 ng/mL In Blood (unspecified) @ Unknown
		alprazolam	1	1					alprazolam	230 ng/mL In Urine (quantitative only) @ Unknown
		ethanol	2	2					ethanol	27 mg/dL In Blood (unspecified) @ Unknown
		ethanol	2	2					ethanol	89 mg/dL In Urine (quantitative only) @ Unknown
1810ha	65 y M	zopiclone	1	1	A	Ingst	Int-S	1	zopiclone	170 ng/mL In Blood (unspecified) @ Unknown
		gabapentin	2	2					gabapentin	85 mg/L In Blood (unspecified) @ Unknown
1811h	66 y F	zolpidem	1	1	U	Ingst	Int-S	3		
		lorazepam	2	2						
		marijuana	3	3						
		narcotic, other/unknown	4	4						
		phencyclidine	5	5						
		cyclic antidepressant, unknown	6	6						
		drug, unknown	7	7						
1812h	66 y M	haloperidol	1	1	A	Ingst	AR-D	3		
1813h	67 y M	lorazepam	1	1	A/C	Ingst	Int-S	3		
		amphetamine	2	2						
1814pha	69 y M	quetiapine	1	1	U	Ingst	Int-S	1	quetiapine	1.8 mg/L In Serum @ 5 h (pe)
1815ha	70 y M	clonazepam	1	1	U	Ingst	Int-S	1	clonazepam	0.043 mg/L In Blood (unspecified) @ 1.5 h (pe)
		clonazepam	1	1					7-aminoclonazepam	0.16 mg/L In Blood (unspecified) @ 1.5 h (pe)
		sertraline	2	2					sertraline	0.27 mg/L In Blood (unspecified) @ 30 m (pe)
		sertraline	2	2					norsertraline	0.28 mg/L In Blood (unspecified) @ 30 m (pe)
		drug, unknown	3	3						
1816p	70 y F	antipsychotic (atypical)	1	1	A/C	Ingst	Int-S	2		
		antihistamine	2	2						
1817ai	72 y F	lorazepam	1	1	U	Unk	Unk	2		
		morphine	2	2						
1818ha	72 y F	quetiapine	1	1	A/C	Ingst	Int-S	2		
		methadone	2	2						
		benzodiazepine	3	3						
1819ha	74 y M	estazolam	1	1	U	Ingst	Int-S	1	etizolam	3500 ng/mL In Serum @ Unknown
		zolpidem	2	2					zolpidem	420 ng/mL In Serum @ Unknown
1820i	74 y F				U	Ingst	Int-S	1		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1821ai	74 y F	quetiapine	1	1	U	Unk	Unk	2		
		diphenhydramine	2	2						
		ibuprofen	3	3						
1822ai	74 y F	benzodiazepine	1	1	U	Unk	Unk	2		
		barbiturate (long acting)	2	2						
1823ai	75 y M	benzodiazepine	1	1	U	Unk	Int-S	1		
		barbiturate (long acting)	2	2						
1824ai	76 y M	phenobarbital	1	1	U	Unk	Int-S	1		
1825h	78 y F	zopiclone	1	1	A/C	Ingst + Unk	Int-S	2		
		alprazolam	1	1						
		metformin	2	2						
1826ha	81 y F	insulin (glargine)	3	3	A/C	Ingst	Int-S	1		
		risperidone	1	1						
		lisinopril	2	2						
1827ai	84 y M	metoprolol	3	3	U	Unk	Int-S	1		
		lorazepam	1	1						
1828h	85 y F	lorazepam	1	1	A	Ingst	Unk	3		
		hydromorphone	2	2						
1829a	87 y M	alprazolam	1	1	A/C	Ingst	Int-S	2	alprazolam	6300 ng/mL In Urine (quantitative only) @ Unknown
		alprazolam	1	1					alpha-oh-alprazolam	6300 ng/mL In Urine (quantitative only) @ Unknown
1830h	87 y M	barbiturate (long acting)	1	1	A/C	Ingst	Int-U	2	phenobarbital	112 mg/L In Blood (unspecified) @ Unknown
		eszopiclone	1	1					eszopiclone	320 ng/mL In Blood (unspecified) @ Autopsy
1831ha	89 y F	morphine	2	2	A	Ingst	Int-S	1	morphine	22.7 ng/mL In Blood (unspecified) @ Autopsy
		alprazolam	3	3					alprazolam	12.9 ng/mL In Blood (unspecified) @ Autopsy
		pseudoephedrine	4	4					pseudoephedrine	259 ng/mL In Blood (unspecified) @ Autopsy
1832pa	30 + y M	alprazolam	1	1	A	Par	Int-A	1	alpha-oh-alprazolam	14 ng/mL In Blood (unspecified) @ Autopsy
		alprazolam	1	1					alprazolam	370 ng/mL In Whole Blood @ Autopsy
		methadone	2	2					methadone	290 ng/mL In Whole Blood @ Autopsy
		clonazepam	3	3					7-aminoclonazepam	6.1 ng/mL In Whole Blood @ Autopsy
		mirtazapine	4	4					mirtazapine	39 ng/mL In Whole Blood @ Autopsy
		marijuana	5	5					11-oh-thc (11-hydroxy-delta-9-tetrahydrocannabinol)	1 ng/mL In Whole Blood @ Autopsy
		marijuana	5	5					delta-9-thc	1.7 ng/mL In Whole Blood @ Autopsy
1833p	40 + y M	marijuana	5	5	A	Ingst	Unk	3	delta-9-carboxy-thc	27 ng/mL In Whole Blood @ Autopsy
		alprazolam	1	1						
1834p	Unknown adult (>=20 yrs) F				U	Ingst	Int-S	2		
See Also case 5, 19, 35, 39, 47, 55, 60, 67, 70, 91, 97, 114, 119, 128, 164, 175, 183, 234, 259, 260, 278, 295, 309, 316, 363, 374, 381, 383, 385, 389, 391, 392, 393, 394, 396, 401, 404, 406, 408, 409, 414, 417, 418, 420, 427, 429, 433, 440, 444, 445, 447, 450, 452, 453, 456, 459, 460, 468, 478, 482, 483, 486, 489, 490, 491, 492, 494, 495, 497, 505, 506, 513, 520, 529, 531, 533, 536, 544, 551, 553, 554, 555, 557, 558, 565, 568, 569, 571, 572, 577, 581, 583, 585, 591, 595, 602, 605, 608, 613, 615, 619, 622, 626, 630, 633, 640, 644, 645, 653, 657, 660, 672, 674, 675, 676, 678, 679, 681, 683, 688, 691, 692, 694, 695, 702, 710, 715, 718, 719, 722, 727, 732, 735, 737, 739, 740, 744, 751, 753, 754, 760, 761, 762, 763, 764, 765, 766, 773, 774, 778, 781, 784, 785, 796, 802, 807, 812, 815, 816, 819, 822, 826, 829, 831, 834, 836, 847, 855, 860, 861, 865, 866, 874, 875, 884, 886, 890, 892, 893, 894, 901, 904, 905, 906, 907, 910, 912, 917, 918, 919, 922, 923, 924, 925, 926, 928, 931, 934, 935, 946, 947, 950, 953, 958, 959, 961, 970, 973, 979, 981, 986, 989, 992, 995, 1001, 1003, 1006, 1017, 1018, 1023, 1024, 1026, 1028, 1035, 1037, 1038, 1053, 1055, 1056, 1059, 1062, 1065, 1066, 1069, 1070, 1074, 1089, 1090, 1092, 1096, 1098, 1101, 1102, 1104, 1108, 1119, 1121, 1122, 1128, 1135, 1137, 1146, 1153, 1154, 1158, 1167, 1170, 1175, 1182, 1184, 1190, 1191, 1194, 1195, 1198, 1201, 1202, 1203, 1206, 1211, 1215, 1218, 1219, 1220, 1224, 1228, 1231, 1232, 1238, 1241, 1246, 1255, 1257, 1258, 1260, 1268, 1273, 1275, 1276, 1277, 1281, 1282, 1285, 1286, 1288, 1289, 1292, 1295, 1296, 1298, 1299, 1300, 1301, 1303, 1305, 1306, 1307, 1309, 1310, 1316, 1317, 1318, 1321, 1322, 1323, 1327, 1329, 1344, 1347, 1355, 1356, 1382, 1383, 1384, 1390, 1394, 1396, 1399, 1409, 1411, 1412, 1414, 1423, 1425, 1426, 1427, 1429, 1430, 1431, 1438, 1440, 1445, 1448, 1452, 1453, 1455, 1461, 1465, 1466, 1468, 1469, 1471, 1473, 1474, 1475, 1482, 1489, 1491, 1501, 1502, 1517, 1518, 1521, 1523, 1527, 1529, 1531, 1539, 1545, 1551, 1552, 1554, 1555, 1567, 1569, 1571, 1572, 1573, 1577, 1578, 1583, 1592, 1595, 1599, 1608, 1618, 1622, 1648, 1652, 1661, 1662, 1672, 1675, 1679, 1680, 1683, 1704, 1706, 1710, 1712, 1727, 1732, 1848, 1849, 1858, 1859, 1860, 1866, 1871, 1878, 1879, 1882, 1894, 1896, 1909, 1912, 1917, 1920, 1921, 1930, 1941, 1943, 1948, 1951, 1953, 1958, 1971, 1976, 2009, 2011, 2017, 2018, 2031, 2035, 2044, 2054, 2071, 2079, 2082, 2083, 2088, 2099, 2110, 2124, 2133, 2136, 2163, 2169, 2176, 2180, 2186, 2200, 2204, 2208, 2213, 2218, 2220, 2232, 2237, 2256, 2261, 2266, 2274, 2287, 2308, 2325, 2343, 2348, 2380, 2389, 2401, 2422, 2431, 2432, 2471, 2473, 2492, 2524, 2560, 2581, 2582, 2586, 2587, 2590, 2618, 2621, 2636, 2648, 2660, 2662										
Stimulants and Street Drugs										
1835ph	16 y M				A	Ingst + Par	Int-A	2		
		heroin	1	1					oxymorphone	
		heroin	1	1					codeine	
		heroin	1	1					morphine	
		methamphetamine	2	2					amphetamine	
		methamphetamine	2	2					methamphetamine	
		clonidine	3	3						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1836ph	17 y F	heroin	1	1	A	Inhal + Par	Int-A	2		
		marijuana	2	2						
1837pha	17 y F	heroin	1	1	U	Unk	Int-A	2		
1838pi	18 y M	heroin	1	1	A	Par	Int-A	2		
		carfentanil	2	2						
1839ph	18 y M	methylenedioxy-methamphetamine (MDMA)	1	1	A	Unk	Int-A	2		
1840ha	18 y F	methamphetamine	1	1	A	Ingst	Int-A	1		
		amphetamine/dextroamphetamine	2	2						
		cocaine	3	3						
1841ph	19 y M	heroin	1	1	A	Unk	Int-A	2		
1842ai	19 y M	heroin	1	1	U	Unk	Int-A	2		
		cocaine	1	1						
		heroin	2	2						
1845ai	19 y F	heroin	1	1	U	Unk	Int-A	1		
		sertraline	2	2						
		gabapentin	3	3						
1843ai	19 y M	heroin	1	1	U	Unk	Int-A	1		
1844ai	19 y F	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
1846ai	19 y M	lysergic acid diethylamide (LSD)	1	1	U	Unk	Int-A	2		
1847ph	20 y M	methylenedioxy-methamphetamine (MDMA)	1	1	A	Unk	Int-S	2		
1848h	20 y F	heroin	1	1	A	Inhal	Int-A	1		
		cocaine	2	2						
		alprazolam	3	3						
1849ph	20 y M	methamphetamine	1	1	U	Unk	Int-A	1	methamphetamine	1600 ng/mL In Serum @ Unknown
		methamphetamine	1	1					amphetamine	95 ng/mL In Serum @ Unknown
		benzodiazepine	2	2						
1850ai	20 y M	cocaine	1	1	U	Unk	Int-A	1		
1851ai	20 y F	cocaine	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		fentanyl	3	3						
1853ai	20 y M	heroin	1	1	U	Unk	Int-A	1		
		codeine	2	2						
1852ai	20 y M	heroin	1	1	A	Unk	Int-A	1		
		cocaine	2	2						
		fentanyl	3	3						
1854ai	20 y M	methylenedioxy-methamphetamine (MDMA)	1	1	U	Unk	Int-A	1		
		isopropanol	2	2						
1855ai	20 y M	methylenedioxy-methamphetamine (MDMA)	1	1	U	Unk	Int-A	1		
		isopropanol	2	2						
1856ph	21 y F	heroin	1	1	U	Unk	Int-A	2		
1857ai	21 y F	heroin	1	1	U	Unk	Int-A	1		
		cocaine	1	1						
		fentanyl	2	2						
		oxycodone	3	3						
1858ai	21 y M	heroin	1	1	U	Unk	Int-A	1		
		alprazolam	2	2						
		diazepam	3	3						
		amitriptyline	4	4						
1861ai	21 y M	heroin	1	1	U	Unk	Int-A	1		
		codeine	2	2						
1859ai	21 y M				U	Ingst + Unk	Int-A	1		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1860i	21 y M	heroin	1	1	U	Unk	Int-A	1		
		alprazolam	2	2						
		ethanol	3	3						
1862ph	21 y M	heroin	1	1	A	Ingst	Int-A	1		
		hydromorphone	2	2						
		alprazolam	3	3						
1863ai	21 y M	3,4-methylenedioxy-amphetamine (MDA)	1	1	U	Unk	Int-A	1		
		fentanyl analog (carfentanil)	1	1						
		oxycodone	2	2						
1864ai	21 y M	mitragyna	3	3	U	Unk	Int-A	1		
		heroin	1	1						
		methamphetamine	2	2						
1865h	21 y M	amphetamine (hallucinogenic)	1	1	A	Ingst	Int-M	2		
1866phi	22 y F	amphetamine (hallucinogenic)	1	1	U	Unk	Int-A	2		
		heroin	1	1						
1867h	22 y M	alprazolam	2	2	A	Ingst	Unk	2		
		methylenedioxy-methamphetamine (MDMA)	1	1						
1868h	22 y F	amphetamine	2	2	C	Inhal + Par	Int-A	2		
		heroin	1	1						
		cocaine	2	2						
1869ai	22 y M	levamisole	3	3	U	Unk	Int-A	1		
		cocaine	1	1						
		fentanyl	2	2						
1870h	22 y M	dextromethorphan	3	3	A	Inhal	Int-A	2		
		methamphetamine	1	1						
		marijuana	2	2						
1871ai	22 y F	drug, unknown	3	3	U	Unk	Int-A	1		
		heroin	1	1						
		methadone	2	2						
1872ai	22 y M	alprazolam	3	3	U	Par	Int-S	1		
		heroin	1	1						
		narcotic, other/unknown	2	2						
1873ph	22 y M	heroin	1	1	A	Par	Int-A	1		
1878ai	22 y M	heroin	1	1	U	Unk	Int-A	1		
		heroin	1	1						
		fentanyl	2	2						
1877ai	22 y F	alprazolam	3	3	U	Unk	Int-A	2		
		heroin	1	1						
		methamphetamine	2	2						
1876ai	22 y F	heroin	1	1	A	Unk	Int-A	1		
1874ai	22 y F	heroin	1	1	U	Unk	Int-A	1		
		heroin	1	1						
		codeine	2	2						
1875ai	22 y F	hydromorphone	3	3	U	Unk	Int-A	2		
		heroin	1	1						
		heroin	1	1						
[1879pha]	23 y M	U-47700	1	1	A	Ingst	Unk	1	u-47700	5.2 ng/mL In Blood (unspecified) @ Unknown
		delorazepam	2	2					delorazepam	82 ng/mL In Blood (unspecified) @ Unknown
		diclazepam	3	3					diclazepam	33 ng/mL In Blood (unspecified) @ Unknown
		flubromazepam	4	4					flubromazepam	450 ng/mL In Blood (unspecified) @ Unknown
		etizolam	5	5					etizolam	29 mg/mL In Blood (unspecified) @ Unknown
		fentanyl analog (4-fluoroisobutyrylfentanyl)	6	6					fluoroisobutyryl fentanyl	5.8 ng/mL In Blood (unspecified) @ Unknown
		oxycodone	7	7					oxycodone (free)	15 ng/mL In Blood (unspecified) @ Unknown
		caffeine	8	8						
		methylenedioxy-methamphetamine (MDMA)	1	1						
		methylenedioxy-methamphetamine (MDMA)	1	1					mdma (3,4-methylenedioxy-methamphetamine)	1900 ng/mL In Blood (unspecified) @ Unknown

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1882pa	23 y M	methylenedioxymethamphetamine (MDMA)	1	1	A	Unk	Int-U	2	mda (3,4-methylenedioxy-amphetamine)	67 ng/mL In Blood (unspecified) @ Unknown
		cocaine	2	2					benzoyllecognine	620 ng/mL In Blood (unspecified) @ Autopsy
		cocaine	1	1						
1883h	23 y M	benzodiazepine drug, unknown	2	2	A	Ingst	Int-M	1		
			3	3						
		methamphetamine	1	1					methamphetamine	12000 ng/mL In Blood (unspecified) @ Autopsy
1884h	23 y M	methamphetamine	1	1	A	Ingst	Int-A	1	amphetamine	150 ng/mL In Blood (unspecified) @ Autopsy
		methamphetamine	1	1					benzoyllecognine	86 ng/mL In Blood (unspecified) @ Autopsy
		cocaine	2	2						
1885ha	23 y M	methamphetamine	1	1	A	Ingst	Int-A	2		
		methylenedioxymethamphetamine (MDMA)	1	1						
		ethanol	2	2						
1886ai	23 y M	amphetamine	1	1	U	Unk	Int-A	3		
		methamphetamine	2	2						
		heroin	1	1						
1887ai	23 y M	oxycodone	2	2	U	Unk	Int-A	1		
		codeine	3	3						
		heroin	1	1						
1889ai	23 y M	codeine	2	2	U	Unk	Int-A	1		
		morphine	3	3						
		heroin	1	1						
1888ai	23 y M	codeine	2	2	U	Unk	Int-A	1		
		heroin	1	1						
		codeine	2	2						
1890ai	23 y F	methamphetamine	1	1	U	Unk	Int-A	3		
		ethanol	2	2						
		heroin	1	1						
1891pa	23 y M	heroin	1	1	A/C	Par	Int-A	1	codeine	0.007 mg/L In Blood (unspecified) @ Autopsy
		heroin	1	1					morphine	0.13 mg/L In Blood (unspecified) @ Autopsy
		heroin	1	1						
1892ai	23 y M	drug, unknown stimulant or street drug	1	1	C	Par	Int-A	3		
		heroin	1	1						
		methamphetamine	2	2						
1897ai	23 y F	heroin	1	1	U	Unk	Int-A	2		
		methamphetamine	2	2						
		heroin	1	1						
1898ai	23 y M	methamphetamine	2	2	U	Unk	Int-A	1		
		heroin	1	1						
		ethanol	2	2						
1894ai	23 y M	heroin	1	1	U	Ingst + Unk	Int-A	1		
		alprazolam	2	2						
		ethanol	3	3						
1895ai	23 y M	heroin	1	1	A	Unk	Int-A	1		
		cocaine	2	2						
		heroin	1	1						
1893ai	23 y M	ethanol	2	2	U	Unk	Int-A	1		
		heroin	1	1						
		ethanol	2	2						
1896ai	23 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		alprazolam	3	3						
1900ai	23 y M	THC homolog	1	1	U	Unk	Int-A	1		
		cocaine	1	1						
		ethanol	2	2						
1901ai	23 y M	fentanyl	3	3	U	Unk	Int-A	1		
		heroin	2	2						
		gabapentin	4	4						
1902pa	24 y U	methamphetamine	1	1	U	Ingst	Int-S	1	methamphetamine	152 ng/mL In Blood (unspecified) @ 30 m (pe)
		heroin	2	2					fentanyl	5.9 ng/mL In Blood (unspecified) @ 30 s (pa)
		fentanyl	3	3					gabapentin	13.7 mcg/mL In Blood (unspecified) @ 30 s (pa)
1903pai	24 y F	gabapentin	4	4	U	Unk	Int-A	1		
		heroin	2	2						
		fentanyl	3	3						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
1904h	24 y M	methamphetamine	1	1	A	Inhal + Unk	Int-A	2	methamphetamine	1244 ng/mL In Blood (unspecified) @ Autopsy
		methamphetamine	1	1					amphetamine	159 ng/mL In Blood (unspecified) @ Autopsy
		fentanyl	2	2					fentanyl	10.6 ng/mL In Blood (unspecified) @ Autopsy
		heroin	3	3						
		methylenedioxy-methamphetamine (MDMA)	1	1					mdma (3,4-methylenedioxy-methamphetamine)	1200 ng/mL In Blood (unspecified) @ Unknown
		methamphetamine	2	2					methamphetamine	120 ng/mL In Blood (unspecified) @ Unknown
1905h	24 y M	marijuana	3	3	A	Ingst	Int-U	2	delta-9-carboxy-thc	9.1 ng/mL In Blood (unspecified) @ Unknown
		cocaine	1	1						
1906	24 y F	drug, unknown	2	2	U	Unk	Unk	2		
		heroin	1	1						
1907ph	24 y F	heroin	1	1	A	Par	Int-A	1		
1908ai	24 y F	heroin	1	1	U	Unk	Int-A	2		
		methamphetamine	2	2						
1909ai	24 y M	heroin	1	1	U	Unk	Int-A	1		
		fentanyl	2	2						
		alprazolam	3	3						
1910	24 y M	cocaine	1	1	A	Ingst	Int-M	1		
1912ai	24 y M	cocaine	1	1	U	Unk	Int-A	1		
		fentanyl	2	2						
		alprazolam	3	3						
1913ai	24 y M	cocaine	1	1	U	Unk	Int-A	1		
		heroin	2	2						
1911ai	24 y M	cocaine	1	1	U	Unk	Int-A	1		
1915ai	24 y M	heroin	1	1	U	Unk	Int-S	1		
1914ai	24 y M	methamphetamine	2	2	U	Unk	Int-A	1		
		heroin	1	1						
		codeine	2	2						
1918ai	24 y M	trazodone	3	3	U	Unk	Int-A	2		
		methamphetamine	1	1						
1916ai	24 y M	ethanol	2	2	U	Unk	Int-A	1		
		methamphetamine	1	1						
1917ai	24 y M	methamphetamine	1	1	U	Unk	Int-A	2		
1919ph	25 y M	risperidone	1	1	A/C	Ingst + Inhal	Int-A	2		
		gabapentin	2	2						
1920ph	25 y M	diphenhydramine	3	3	U	Ingst	Int-A	1		
		heroin	1	1						
		benzodiazepine	2	2						
1921pha	25 y M	marijuana	3	3	A	Unk	Int-A	1		
		ethanol	4	4						
		heroin	1	1					morphine	0.063 mg/L In Plasma @ 45 m (pe)
1922ha	25 y M	benzodiazepine	2	2	U	Ingst	Int-U	1		
		fentanyl	3	2						
1923ha	25 y M	methamphetamine	1	1	U	Ingst + Oth + Unk	Int-A	1	methamphetamine	1000 ng/mL In Blood (unspecified) @ Autopsy
		methamphetamine	1	1					amphetamine	590 ng/mL In Blood (unspecified) @ Autopsy
		lysergic acid diethylamide (LSD)	1	1						
		methamphetamine	2	2						
		phencyclidine	3	3						
		hyperthermia	4	4						
1924ai	25 y M	ethanol	5	5	U	Unk	Int-A	2	ethanol	3 mg/dL In Blood (unspecified) @ Unknown
		heroin	1	1						
		fentanyl	2	2						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ③ Time
1925ai	25 y M	codeine	3	3	U	Unk	Int-A	1		
		heroin	1	1						
		methamphetamine	2	2						
		oxycodone	3	3						
1926ai	25 y M	heroin	1	1	U	Unk	Int-A	2		
		codeine	2	2						
1928ai	25 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		codeine	3	3						
1927ai	25 y F	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
1929pha	25 y M	methamphetamine	1	1	A	Par	Int-A	1		
		heroin	2	2						
1930ph	25 y M	heroin	1	1	A	Ingst + Par	Int-A	2		
		alprazolam	2	2						
1931ai	25 y F	drug, unknown stimulant or street drug	1	1	C	Unk	Int-A	3		
1932ai	25 y M	heroin	1	1	U	Unk	Int-A	1		
		ethanol	2	2						
1933ai	25 y F	heroin	1	1	U	Unk	Int-A	1		
		cocaine	2	2						
1935ai	25 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
1934ai	25 y M	heroin	1	1	U	Unk	Int-A	1		
1938ai	25 y F	methamphetamine	1	1	U	Unk	Int-A	1		
		heroin	2	2						
1936ai	25 y M	methamphetamine	1	1	U	Unk	Int-A	2		
1937ai	25 y M	methamphetamine	1	1	U	Unk	Int-A	1		
		ethanol	2	2						
1939ai	25 y M	methamphetamine	1	1	U	Unk	Int-A	2		
1940ph	26 y M	heroin	1	1	A	Par	Int-A	2		
		methamphetamine	2	2						
1941pha	26 y M	heroin	1	1	U	Par	Int-A	1		
		alprazolam	2	2					alprazolam	0.05 mg/L In Blood (unspecified) ③ Autopsy
		cocaine	3	3						
1942pa	26 y M	heroin	1	1	A	Par	Int-A	1	morphine (free)	50 mcg/mL In Blood (unspecified) ③ Autopsy
		fentanyl analog	2	2						
[1943pha]	26 y F	fentanyl analog (carfentanil)	1	1	U	Unk	Int-U	2		
		alprazolam	2	2					alprazolam	15 ng/mL In Blood (unspecified) ③ Unknown
		cocaine	3	3						
1944h	26 y M	methamphetamine	1	1	A	Unk	Unk	2		
		amphetamine	2	2						
1945ai	26 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
1946ai	26 y F	methamphetamine	1	1	U	Unk	Int-A	1		
		dextromethorphan	2	2						
		fluoxetine	3	3						
1947pha	26 y M	heroin	1	1	A	Par	Int-A	1		
1948pa	26 y M	cocaine	2	1	A/C	Ingst + Inhal + Par	Int-A	1	cocaine	0.023 mg/L In Blood (unspecified) ③ Autopsy
		cocaine	2	1					benzoylecognine	1 mg/L In Blood (unspecified) ③ Autopsy
		fentanyl analog	1	1					4-fibf (4-fluoroisobutyl) fentanyl)	36 ng/mL In Blood (unspecified) ③ Autopsy
		alprazolam	3	2					alprazolam	0.05 mg/L In Blood (unspecified) ③ Autopsy

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ③ Time
1951ai	26 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		alprazolam	3	3						
1950ai	26 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		codeine	3	3						
1952ai	26 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		ethanol	3	3						
1953ai	26 y F	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		alprazolam	3	3						
1949ai	26 y M	heroin	1	1	U	Unk	Int-A	2		
1955ai	26 y M	methamphetamine	1	1	U	Unk	Int-A	1		
		nalmexone	2	2						
1954ai	26 y M	methamphetamine	1	1	U	Unk	Int-A	1		
1956ai	27 y F	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		codeine	3	3						
1957ai	27 y M	heroin	1	1	U	Unk	Int-A	1		
		amphetamine	2	2						
		fentanyl	3	3						
1958ai	27 y M	cocaine	1	1	U	Inhal + Unk	Int-S	1		
		propane	2	2						
		diazepam	3	3						
1960ai	27 y M	heroin	1	1	U	Unk	Int-A	1		
1959ai	27 y F	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
1963ai	27 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
1964ai	27 y F	heroin	1	1	U	Unk	Int-A	1		
1962ai	27 y F	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		hydromorphone	3	3						
1961ai	27 y M	heroin	1	1	U	Unk	Int-A	1		
1965ai	27 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
1966ai	27 y F	heroin	1	1	U	Unk	Int-A	2		
		methamphetamine	2	2						
1969ai	27 y M	methamphetamine	1	1	A	Unk	Int-A	1		
		fentanyl	2	2						
1968ai	27 y M	methamphetamine	1	1	U	Unk	Int-A	1		
1967ai	27 y M	methamphetamine	1	1	U	Unk	Int-A	1		
1970pha	28 y F	heroin	1	1	U	Unk	Unk	3		
		cocaine	2	2						
1971pa	28 y M	heroin	1	1	U	Inhal	Int-A	1	morphine	29.8 ng/mL In Blood (unspecified) ③ Autopsy
		fentanyl	2	2					fentanyl	29.8 ng/mL In Blood (unspecified) ③ Autopsy
		clonazepam	3	3					7-aminoclonazepam	44.7 ng/mL In Blood (unspecified) ③ Autopsy
		ethanol	4	4					ethanol	75 mg/dL In Blood (unspecified) ③ Autopsy
		marijuana	5	5					thc (tetrahydrocannabinol)	2.3 ng/mL In Blood (unspecified) ③ Autopsy
		marijuana	5	5					carboxy-thc	38.1 ng/mL In Blood (unspecified) ③ Autopsy
1972pai	28 y M	heroin	1	1	A	Par	Int-A	1	morphine (free)	80 mcg/L In Blood (unspecified) ③ Autopsy

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
		fentanyl	2	2					fentanyl	0.007 mg/L In Blood (unspecified) @ Autopsy
		cocaine	3	3					benzoylecognine	0.2 mg/L In Blood (unspecified) @ Autopsy
		ethanol	4	4					ethanol	0.01 % (wt/Vol) In Blood (unspecified) @ Autopsy
		ethanol	4	4					ethanol	0.08 % (wt/Vol) In Blood (unspecified) @ Autopsy
		nortriptyline	5	5					nortriptyline	0.7 mg/L In Blood (unspecified) @ Autopsy
		sertraline	6	6					sertraline	0.1 mg/L In Blood (unspecified) @ Autopsy
		sertraline	6	6					desmethylsertraline	0.7 mg/L In Blood (unspecified) @ Autopsy
1973ai	28 y M	hydroxyzine	7	7						
		methamphetamine	1	1	U	Unk	Int-A	1		
1974pha	28 y M	synthetic cathinones	1	1	U	Unk	Int-A	2		
		ethanol	2	2					ethanol	64 mg/dL In Serum @ Unknown
		salicylate	3	3					salicylate	4.6 mg/dL In Serum @ Unknown
1975h	28 y M	methamphetamine	1	1	A	Ingst	Int-U	1		
1976ai	28 y M	cocaine	1	1	U	Unk	Unk	1		
		alprazolam	2	2						
		oxycodone	3	3						
1977ai	28 y M	heroin	1	1	U	Unk	Int-A	2		
1978ai	28 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		codeine	3	3						
1979ph	28 y M	cocaine	1	1	U	Inhal	Int-A	2		
1980p	28 y M	methamphetamine	1	1	A	Unk	Int-M	2		
1981h	28 y M	cocaine	1	1	A	Par	Int-A	3		
1982ph	28 y M	cocaine	1	1	A	Ingst	Int-A	1		
		amphetamine (hallucinogenic)	2	2						
		drug, unknown	3	3						
1983ai	28 y M	cocaine	1	1	U	Unk	Int-A	2		
1984ai	28 y M	cocaine	1	1	U	Unk	Int-A	1		
		ethanol	2	2						
		fentanyl	3	3						
1985ai	28 y M	methamphetamine	1	1	U	Unk	Int-A	2		
1986ph	29 y F	heroin	1	1	U	Par	Int-A	2		
1987ph	29 y M	heroin	1	1	A	Unk	Int-A	2		
1988h	29 y M	methamphetamine	1	1	U	Unk	Int-A	2		
1989ha	29 y M	methamphetamine	1	1	U	Par	Int-A	3		
		methamphetamine	1	1					methamphetamine	0.18 mcg/mL In Blood (unspecified) @ Unknown
		methamphetamine	1	1					methamphetamine	0.22 mcg/mL In Blood (unspecified) @ Unknown
1990ph	29 y F	heroin	1	1	A	Inhal	Int-A	1		
1991ha	29 y M	methamphetamine	1	1	A	Ingst	Int-U	1		
		methamphetamine	1	1					methamphetamine	170 mg/dL In Blood (unspecified) @ Autopsy
		methamphetamine	1	1					methamphetamine	1935 ng/mL In Urine (quantitative only) @ Unknown
1993ai	29 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		salicylate	3	3						
1995ai	29 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
1996i	29 y M	heroin	1	1	U	Unk	Int-A	2		
		methamphetamine	2	2						
		codeine	3	3						
1994ai	29 y F	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
1992ai	29 y M				U	Unk	Int-A	2		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ③ Time
1997ai	29 y F	heroin	1	1	U	Unk	Int-A	1		
		codeine	2	2						
		methamphetamine	3	3						
1998ai	29 y M	methamphetamine	1	1	U	Unk	Int-A	1		
		heroin	2	2						
1999ai	29 y M	heroin	1	1	U	Ingst + Unk	Int-A	1		
		fentanyl	2	2						
		heroin	1	1						
2000ai	29 y M	fentanyl	2	2	U	Unk	Int-A	1		
		ethanol	3	3						
		heroin	1	1						
2002ai	29 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	1	1						
		heroin	2	2						
2003ai	29 y M	fentanyl	3	3	U	Unk	Int-A	3		
		methamphetamine	1	1						
		methamphetamine	1	1						
2001ai	29 y F	methamphetamine	1	1	U	Unk	Int-A	2		
		methamphetamine	1	1						
2004ai	29 y M	heroin	1	1	U	Unk	Int-A	1		
		heroin	1	1						
2005ha	30 y M	amphetamine	1	1	A	Ingst	Int-U	3		
		amphetamine	1	1						
2006pa	30 y M	methamphetamine	1	1	A	Unk	Int-A	2		
		methamphetamine	1	1						
2007pai	30 y F	heroin	1	1	A	Par	Int-A	1		
		cocaine	2	2						
2008ph	30 y M	cocaine	1	1	A	Ingst	Int-U	2		
		cocaine	1	1						
2009ha	30 y F	cocaine	1	1	A	Ingst	Int-A	1	benzoylcoagnine	290 ng/mL In Blood (unspecified) ③ Unknown
		amphetamine	2	2					methamphetamine	24 ng/mL In Blood (unspecified) ③ Unknown
		marijuana	3	3					delta-9-carboxy-thc	24 ng/mL In Blood (unspecified) ③ Unknown
		narcotic, other/unknown	4	4					fentanyl	0.67 ng/mL In Blood (unspecified) ③ Unknown
		narcotic, other/unknown	4	4					norfentanyl	1 ng/mL In Blood (unspecified) ③ Unknown
		acetaminophen	5	5					acetaminophen (apap)	17 mcg/mL In Blood (unspecified) ③ 8 h (pe)
		acetaminophen	5	5					acetaminophen (apap)	9 mcg/mL In Blood (unspecified) ③ 30 m (pe)
		barbiturate	6	6					butalbital	0.74 mcg/mL In Blood (unspecified) ③ Unknown
		cocaine	1	1						
		amphetamine	2	2						
2012ai	30 y F	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		cocaine	3	3						
2011ai	30 y M	heroin	1	1	U	Unk	Int-A	1		
		oxycodone	2	2						
		alprazolam	3	3						
2013p	30 y M	heroin	1	1	A	Unk	Int-A	1		
		heroin	1	1						
2014ai	30 y M	cocaine	1	1	U	Unk	Int-A	1		
		ethanol	2	2						
2016ai	30 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
2020ai	30 y M	heroin	1	1	U	Unk	Int-A	1		
		heroin	1	1						
2018ai	30 y M	heroin	1	1	U	Unk	Int-A	1		
		diazepam	2	2						
		oxazepam	3	3						
2019ai	30 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
2015ai	30 y M	heroin	1	1	U	Unk	Int-A	3		
		methamphetamine	2	2						
		ethanol	3	3						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
2017ai	30 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		butalbital	3	3						
2021ai	30 y M	heroin	1	1	U	Unk	Int-A	1		
		oxycodone	2	2						
		fentanyl	3	3						
2022ai	30 y M	heroin	1	1	U	Unk	Int-A	2		
		methamphetamine	2	2						
		codeine	3	3						
2025ai	30 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2026ai	30 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2024ai	30 y M	methamphetamine	1	1	U	Unk	Int-A	1		
		heroin	2	2						
2027ai	30 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		benztropine	2	2						
		fluoxetine	3	3						
2028ai	30 y F	methamphetamine	1	1	U	Unk	Int-A	1		
2029ai	30 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2023ai	30 y F	methamphetamine	1	1	U	Unk	Int-A	1		
2030ph	31 y M	heroin	1	1	A	Par	Int-A	2		
2031ph	31 y F	heroin	1	1	A	Unk	Int-A	2		
		benzodiazepine	2	2						
		cocaine	3	3						
2032pi	31 y M	amphetamine (hallucinogenic)	1	1	A	Ingst	Int-A	2		
		ethanol	2	2						
2033h	31 y M	methamphetamine	1	1	U	Unk	Int-S	1		
[2034p]	31 y M	Mitragyna speciosa korthals	1	1	A	Unk	Int-A	1	acetone	990 ng/mL In Whole Blood @ Autopsy
2035ha	31 y F	methamphetamine	1	1	U	Ingst + Unk	Int-A	2	methamphetamine	490 ng/mL In Blood (unspecified) @ Unknown
		methamphetamine	1	1					amphetamine	59 ng/mL In Blood (unspecified) @ Unknown
		quetiapine	2	2						
		chemical, unknown	3	3						
		ethanol	4	4						
		gabapentin	5	5						
2036ai	31 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
2038ai	31 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		amphetamine (hallucinogenic)	3	3						
2039ai	31 y M	heroin	1	1	U	Unk	Int-A	1		
2037ai	31 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		amitriptyline	3	3						
2040ai	31 y M	methamphetamine	1	1	U	Unk	Int-A	1		
		benztropine	2	2						
		diphenhydramine	3	3						
2044ai	31 y F	methamphetamine	1	1	U	Unk	Int-S	1		
		methadone	2	2						
		alprazolam	3	3						
2041ai	31 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2043ai	31 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2042ai	31 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2045ai	31 y M	methamphetamine	1	1	U	Ingst + Unk	Int-A	2		
		THC homolog	2	2						
		ethanol	3	3						
2046pa	32 y M				A	Unk	Int-A	1		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
2047pha	32 y F	heroin	1	1	C	Unk	Int-S	1	morphine (free)	300 mcg/L In Blood (unspecified) @ Autopsy
		fentanyl	2	2					fentanyl	0.029 mg/L In Blood (unspecified) @ Autopsy
		oxycodone	3	3					oxycodone	0.05 mg/L In Blood (unspecified) @ Autopsy
		ethanol	4	4					ethanol	0.08 % (wt/Vol) In Blood (unspecified) @ Autopsy
		ethanol	4	4					ethanol	0.09 % (wt/Vol) In Blood (unspecified) @ Autopsy
		ethanol	4	4					ethanol	0.1 % (wt/Vol) In Urine (quantitative only) @ Autopsy
		ethanol cocaine	4 5	4 5					ethanol benzoylecognine	0.1 % (wt/Vol) In Vitreous @ Autopsy 0.3 mg/L In Blood (unspecified) @ Autopsy
2048ph	32 y M	heroin drug, unknown	1 2	1 2	A	Unk	Int-A	2		
2049ai	32 y M	cocaine	1	1						
2050pa	32 y M	amphetamine	1	1	A	Unk	Int-U	2		
		methamphetamine	2	2						
		oxcarbazepine	3	3						
		Mitragyna speciosa korthals	1	1					mitragynine	280 ng/mL In Blood (unspecified) @ Autopsy
2052ai	32 y M	caffeine	2	2	U	Unk	Int-A	1		
		mirtazapine	3	3					mirtazapine	72 ng/mL In Blood (unspecified) @ Autopsy
		citalopram	4	4					citalopram	140 ng/mL In Blood (unspecified) @ Autopsy
2051ai	32 y F	cocaine	1	1	U	Ingst + Unk	Int-A	1		
		ethanol	2	2						
2055ai	32 y M	fentanyl	3	3	U	Unk	Int-A	1		
		heroin	1	1						
		methamphetamine	2	2						
2054ai	32 y M	codeine	3	3	U	Unk	Int-A	1		
		heroin	1	1						
		oxycodone	2	2						
2053ai	32 y M	alprazolam	3	3	U	Unk	Int-A	1		
		heroin	1	1						
		methamphetamine	2	2						
2058ai	32 y M	codeine	3	3	U	Unk	Int-A	1		
2059ai	32 y M	methamphetamine	1	1						
2056ai	32 y F	methamphetamine	1	1	U	Unk	Int-A	1		
2057ai	32 y M	methamphetamine	1	1						
[2060ha]	33 y M	methamphetamine	1	1	A	Ingst	Int-A	2		
2061pai	33 y M	methamphetamine	1	1					methamphetamine	5.29 mg/dL In Whole Blood @ Autopsy
2062pha	33 y M	heroin	1	1	U	Par	Int-A	1	morphine (free)	24 mcg/L In Blood (unspecified) @ Autopsy
		fentanyl analog	2	2						
		ethanol	3	3					ethanol	0.27 % (wt/Vol) In Blood (unspecified) @ Autopsy
		ethanol	3	3					ethanol	0.29 % (wt/Vol) In Blood (unspecified) @ Autopsy
		ethanol	3	3					ethanol	0.35 % (wt/Vol) In Vitreous @ Autopsy
		ethanol	3	3					ethanol	0.36 % (wt/Vol) In Urine (quantitative only) @ Autopsy
		acetone	4	4					acetone	0.011 % (wt/Vol) In Blood (unspecified) @ Autopsy
		acetone	4	4					acetone	0.012 % (wt/Vol) In Blood (unspecified) @ Autopsy
		acetone	4	4					acetone	0.016 % (wt/Vol) In Urine (quantitative only) @ Autopsy
		acetone	4	4					acetone	0.017 % (wt/Vol) In Vitreous @ Autopsy
		methamphetamine	1	1					amphetamine	200 ng/mL In Blood (unspecified) @ Unknown
2063a	33 y M	methamphetamine	1	1	A	Ingst	Unk	2	methamphetamine	8.71 mg/L In Serum @ Unknown

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ③ Time
		cocaine	1	1					benzoylecognine	1800 ng/mL In Blood (unspecified) ③ Autopsy
		cocaine	1	1					cocaine	22 ng/mL In Blood (unspecified) ③ Autopsy
		morphine	2	2					morphine (free)	42 ng/mL In Blood (unspecified) ③ Autopsy
		drug, unknown	3	3						
2064a	33 y M	amphetamine (hallucinogenic)	1	1	A	Ingst	Unk	2		
2065ai	33 y M	methamphetamine	1	1	U	Unk	Int-A	1		
		hydrocodone	2	2						
		amphetamine	3	3						
2066i	33 y M	methamphetamine	1	1	U	Unk	Unk	2		
2067ai	33 y M	cocaine	1	1	U	Unk	Int-A	3		
2071ai	33 y F	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		alprazolam	3	3						
2068ai	33 y M	heroin	1	1	U	Unk	Int-A	2		
2070ai	33 y M	heroin	1	1	U	Unk	Int-A	1		
		methadone	2	2						
		methamphetamine	3	3						
2069ai	33 y F	heroin	1	1	U	Unk	Int-A	2		
2072pha	34 y M	cocaine	1	1	A	Ingst	Int-S	2	benzoylecognine	1161 ng/mL In Blood (unspecified) ③ Autopsy
		morphine	2	2					morphine	21.4 ng/mL In Blood (unspecified) ③ Autopsy
		buprenorphine/naloxone (sublingual film)	3	3						
2073pha	34 y M	heroin	1	1	A	Par	Int-A	1		
2074ai	34 y M	amphetamine	1	1	U	Unk	Int-A	2		
		acetaminophen/opioid	2	2						
2075ai	34 y M	heroin	1	1	U	Unk	Int-A	1		
		oxycodone	2	2						
		methamphetamine	3	3						
2076ai	34 y F	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		morphine	3	3						
2077ai	34 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
2079ai	34 y M	methamphetamine	1	1	U	Unk	Int-A	1		
		alprazolam	2	2						
		oxycodone	3	3						
2078ai	34 y F	methamphetamine	1	1	U	Unk	Int-A	1		
		morphine	2	2						
		oxycodone	3	3						
2080ai	34 y M	cocaine	1	1	U	Unk	Int-A	1		
		narcotic, other/unknown	2	2						
2082ai	34 y M	heroin	1	1	U	Unk	Int-A	1		
		alprazolam	2	2						
		clonazepam	3	3						
2083ai	34 y F	heroin	1	1	U	Unk	Int-A	1		
		amphetamine	2	2						
		temazepam	3	3						
2081ai	34 y M	heroin	1	1	U	Ingst + Unk	Int-A	1		
		codeine	2	2						
		ethanol	3	3						
2085ai	34 y M	methamphetamine	1	1	U	Ingst + Unk	Int-A	2		
		ethanol	2	2						
2084ai	34 y F	methamphetamine	1	1	U	Unk	Int-A	2		
2086ai	34 y M	methamphetamine	1	1	U	Unk	Int-A	1		
		heroin	2	2						
2087ai	34 y M	methamphetamine	1	1	U	Unk	Int-A	2		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration Ⓐ Time
2088pha	35 y M	amphetamine	1	1	A	Par + Unk	Int-A	2		
		benzodiazepine	2	2						
2089h	35 y M	amphetamine (hallucinogenic)	1	1	U	Ingst	Int-S	2		
		cocaine	2	2						
		heroin	3	3						
2090ph	35 y F	heroin	1	1	A	Par	Int-A	2		
2091pha	35 y F	THC homolog	1	1	U	Inhal + Unk	Int-A	2		
		oxycodone	2	2					oxycodone	37 ng/mL In Blood (unspecified) Ⓐ Autopsy
2092p	35 y F	cocaine	1	1	U	Unk	Int-S	2		
		amphetamine	2	2						
2095ai	35 y F	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
2096ai	35 y M	heroin	1	1	U	Unk	Int-A	1		
		ethanol	2	2						
2094ai	35 y M	heroin	1	1	U	Unk	Int-A	1		
2093ai	35 y M	heroin	1	1	U	Unk	Int-A	1		
		codeine	2	2						
		methamphetamine	3	3						
2097ai	35 y F	methamphetamine	1	1	U	Unk	Int-A	2		
		ethanol	2	2						
2098ha	35 y M	heroin	1	1	U	Ingst + Unk	Unk	1	6-mam (6-monoacetylmorphine) morphine	1 ng/mL In Blood (unspecified) Ⓐ Unknown 160 ng/mL In Blood (unspecified) Ⓐ Unknown
		heroin	1	1						
		methamphetamine	2	2						
		nitrites	3	3						
		choline bitartrate	4	4						
		diphenhydramine	5	5						
2099h	35 y M	heroin	1	1	U	Ingst	Unt-U	2		
		benzodiazepine	2	2						
2100p	35 y M	heroin	1	1	U	Par	Int-A	2		
2101h	35 y M	methamphetamine	1	1	A	Ingst	Int-U	1		
2103ai	35 y F	heroin	1	1	U	Unk	Int-A	1		
		hydrocodone	2	2						
		methadone	3	3						
2102ai	35 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		sodium nitrate	3	3						
2105ai	35 y M	methamphetamine	1	1	U	Unk	Int-A	1		
		ethanol	2	2						
2104ai	35 y M	methamphetamine	1	1	U	Unk	Int-A	1		
		heroin	2	2						
		oxycodone	3	3						
2106ai	35 y M	THC homolog, 5F-ADB	1	1	U	Unk	Int-A	2		
2108ai	36 y M	heroin	1	1	U	Ingst + Unk	Int-A	2		
		cocaine	2	2						
		ethanol	3	3						
2107ai	36 y M	heroin	1	1	U	Unk	Int-A	2		
		codeine	2	2						
		amphetamine	3	3						
2110ai	36 y M	methamphetamine	1	1	U	Unk	Int-S	1		
		bupropion	2	2						
		benztropine	3	3						
		buspirone	4	4						
2109ai	36 y M	methamphetamine	1	1	U	Unk	Int-A	3		
		amphetamine	2	2						
2111ai	36 y M	methamphetamine	1	1	U	Unk	Int-A	1		
		ethanol	2	2						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ③ Time
2112h	36 y M	amphetamine	3	3						
		methamphetamine	1	1	A	Unk	Int-A	3		
2113ai	36 y M	amphetamine	1	1	U	Unk	Int-A	2		
		methadone	2	2						
2114ai	36 y M	cocaine	1	1	U	Unk	Int-A	1		
		narcotic, other/unknown	2	2						
2115ai	36 y F	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
2116ai	36 y M	heroin	1	1	U	Unk	Int-A	2		
		methamphetamine	2	2						
2117ai	36 y F	heroin	1	1	U	Unk	Int-S	1		
		methamphetamine	2	2						
		cyclobenzaprine	3	3						
2123ai	36 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		ethanol	2	2						
2125ai	36 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2122ai	36 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2124ai	36 y M	methamphetamine	1	1	A/C	Unk	Int-A	1		
		benzodiazepine	2	2						
2120ai	36 y M	methamphetamine	1	1	U	Unk	Int-S	1		
		bupropion	2	2						
		benztropine	3	3						
2121ai	36 y M	methamphetamine	1	1	U	Ingst + Unk	Int-A	1		
		ethanol	2	2						
2126ai	36 y M	methamphetamine	1	1	U	Ingst + Unk	Int-A	1		
		ethanol	2	2						
2119ai	36 y M	methamphetamine	1	1	U	Unk	Int-A	3		
2118ai	36 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2127p	37 y M	methamphetamine	1	1	A	Inhal	Int-A	2		
2128pha	37 y F	heroin	1	1	A	Par + Unk	Int-A	1		
		heroin	1	1					morphine (free)	21 ng/mL In Blood (unspecified) ③ Autopsy
		fentanyl	2	2					fentanyl	2 ng/mL In Blood (unspecified) ③ Autopsy
		fentanyl	2	2					norfentanyl	2.1 ng/mL In Blood (unspecified) ③ Autopsy
		hydroxyzine	3	3					hydroxyzine	19 ng/mL In Blood (unspecified) ③ Autopsy
		nicotine	4	4						
		caffeine	5	5						
2129pai	37 y M	fentanyl analog (carfentanil)	1	1	A	Ingst + Par	Int-A	1		
		oxycodone	2	2					oxycodone	0.019 mg/L In Blood (unspecified) ③ Autopsy
2130pha	37 y M	cocaine	1	1	A	Ingst	Int-S	3		
		marijuana	2	2						
[2131ha]	37 y M	cocaine	1	1	A/C	Rec	Int-M	1		
		cocaine	1	1					cocaine	2.001 mg/L In Blood (unspecified) ③ Autopsy
									benzoylecognine	4.001 mg/L In Blood (unspecified) ③ Autopsy
2132h	37 y M	methamphetamine	1	1	U	Ingst + Unk	Int-A	2		
2133pa	37 y F	fentanyl analog (carfentanil)	1	1	A	Ingst + Par	Int-U	1		
		fentanyl	2	2					fentanyl	0.8 ng/mL In Blood (unspecified) ③ Autopsy
		oxycodone	3	3					oxycodone	0.026 mg/L In Blood (unspecified) ③ Autopsy
		hydrocodone	4	4					hydrocodone	0.02 mg/L In Blood (unspecified) ③ Autopsy
		clonazepam	5	5					7-aminoclonazepam	0.01 mg/L In Blood (unspecified) ③ Autopsy
2134pai	37 y F	heroin	1	1	A	Par	Int-A	1		
		heroin	1	1					morphine	398 ng/mL In Blood (unspecified) ③ Unknown
									codeine	48 ng/mL In Blood (unspecified) ③ Unknown

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ③ Time
2135ha	37 y M	cocaine	2	2	U	Unk	Unk	1	benzoylecognine	2381 ng/mL In Blood (unspecified) ③ Autopsy
		cocaine	2	2					cocaine	25 ng/mL In Blood (unspecified) ③ Autopsy
		heroin	1	1					morphine (free)	32 ng/mL In Blood (unspecified) ③ Unknown
		ethanol	2	2					ethanol	62 mg/dL In Blood (unspecified) ③ Unknown
		amitriptyline	3	3					amitriptyline	270 ng/mL In Blood (unspecified) ③ Unknown
2136pa	37 y M	heroin	1	1	A	Par	Int-A	1	norfentanyl	0.63 ng/mL In Blood (unspecified) ③ Unknown
		heroin	1	1					morphine (free)	12 ng/mL In Blood (unspecified) ③ Unknown
		heroin	1	1					fentanyl	4.8 ng/mL In Blood (unspecified) ③ Unknown
		heroin	1	1					codeine (free)	69 ng/mL In Blood (unspecified) ③ Unknown
		marijuana	2	2					11-oh-thc (11-hydroxy-delta-9-tetrahydrocannabinol)	3.7 ng/mL In Blood (unspecified) ③ Unknown
		marijuana	2	2					delta-9-thc	5.2 ng/mL In Blood (unspecified) ③ Unknown
		alprazolam	3	3					alprazolam	17 ng/mL In Blood (unspecified) ③ Unknown
2137ai	37 y F	cocaine	1	1	U	Unk	Int-A	1		
		tramadol	2	2						
		ethanol	3	3						
2139ai	37 y M	heroin	1	1	U	Unk	Int-A	1		
2138ai	37 y F	heroin	1	1	U	Unk	Int-A	1		
		codeine	2	2						
		methamphetamine	3	3						
2140ai	37 y M	heroin	1	1	U	Unk	Int-A	1		
		methadone	2	2						
		methamphetamine	3	3						
[2141ha]	37 y M	methamphetamine	1	1	U	Ingst	Int-M	1	methamphetamine	4600 ng/mL In Blood (unspecified) ③ 4 h (pe)
2142pha	37 y F	methamphetamine	1	1	U	Unk	Int-A	2	methamphetamine	1100 ng/mL In Blood (unspecified) ③ 30 m (pe)
		methamphetamine	1	1					amphetamine	65 ng/mL In Blood (unspecified) ③ 30 m (pe)
2143h	37 y M	amphetamine (hallucinogenic)	1	1	U	Ingst	Int-S	2		
		lysergic acid diethylamide (LSD)	2	2						
		mushroom (unknown)	3	3						
2144ai	37 y M	cocaine	1	1	U	Unk	Int-A	1		
		hydromorphone	2	2						
2145ai	37 y F	cocaine	1	1	U	Unk	Int-A	1		
		oxycodone	2	2						
2146ai	37 y M	cocaine	1	1	U	Unk	Int-A	1		
		fentanyl	2	2						
		ethanol	3	3						
2147ai	37 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
2148ai	37 y M	heroin	1	1	U	Unk	Int-A	1		
		fentanyl	2	2						
		methamphetamine	3	3						
2152ai	37 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2153ai	37 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2157ai	37 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2151ai	37 y M	methamphetamine	1	1	U	Unk	Int-A	1		
		diphenhydramine	2	2						
2156ai	37 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		ethanol	2	2						
2150ai	37 y M	methamphetamine	1	1	U	Unk	Int-A	1		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ③ Time
2154ai	37 y M				U	Unk	Int-A	2		
2158i	37 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2155ai	37 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2149ai	37 y F	methamphetamine	1	1	U	Unk	Int-A	1		
2159pa	38 y M	methamphetamine	1	1	A	Unk	Int-A	1		
		bupropion	2	2						
		heroin	1	1					morphine (free)	88 mcg/L In Blood (unspecified) ③ Autopsy
2160p	38 y M	doxylamine	2	2	A	Par	Int-A	2	doxylamine	0.05 mg/L In Blood (unspecified) ③ Autopsy
		heroin	1	1						
2161h	38 y F	heroin	1	1	A	Ingst	Int-A	1		
2162pa	38 y M	methamphetamine	1	1	A	Unk	Int-A	1		
2163ph	38 y M	heroin	1	1	U	Unk	Unk	2	morphine (free)	680 mg/L In Blood (unspecified) ③ Autopsy
		cocaine	1	1						
2164ai	38 y M	narcotic, other/unknown	2	2	U	Ingst + Unk	Int-A	1		
		methamphetamine	3	3						
		marijuana	4	4						
		benzodiazepine	5	5						
		methamphetamine	1	1						
2165ph	38 y M	ethanol	2	2	A/C	Par	Int-A	3		
		amphetamine	3	3						
		heroin	1	1						
2166ph	38 y F	heroin	1	1	A/C	Inhal	Int-A	1		
		methamphetamine	1	1						
		amphetamine	2	2						
		cocaine	3	3						
		fentanyl	4	4						
		morphine	5	5						
		oxycodone	6	6						
		marijuana	7	7						
		ethanol	8	8					ethanol	74 mg/dL In Blood (unspecified) ③ Unknown
2167ai	38 y M	heroin	1	1	U	Unk	Int-A	1		
		cocaine	2	2						
		oxycodone	3	3						
2169ai	38 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		alprazolam	3	3						
2168ai	38 y M	heroin	1	1	U	Unk	Int-A	3		
2173ai	38 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2171ai	38 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		ethanol	2	2						
2170ai	38 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2172ai	38 y M	methamphetamine	1	1	U	Ingst + Unk	Int-A	1		
		ethanol	2	2						
2174ai	38 y M	methamphetamine	1	1	A/C	Unk	Int-A	1		
2175pa	39 y F	methamphetamine	1	1	A	Par	Int-A	1		
		heroin	1	1					morphine (free)	260 mcg/L In Blood (unspecified) ③ Autopsy
		fentanyl analog (fentanyl/fentanyl)	2	2						
		fentanyl analog (4- fluorobutyrfentanyl)	3	3						
		methadone	4	4					methadone	0.1 mg/L In Blood (unspecified) ③ Autopsy
		methadone	4	4					methadone	0.3 mg/L In Blood (unspecified) ③ Autopsy
		cocaine	5	5					cocaine	0.1 mg/L In Blood (unspecified) ③ Autopsy
		cocaine	5	5					benzoyllecognine	2.4 mg/L In Blood (unspecified) ③ Autopsy
		dextromethorphan	6	6					dextromethorphan	0.07 mg/L In Blood (unspecified) ③ Autopsy
2176a	39 y M	amphetamine	1	1	A/C	Ingst	Int-S	2		
		alprazolam	2	2						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
2177p	39 y M	acetaminophen/oxycodone	3	3						
2178ai	39 y M	methamphetamine	1	1	C	Inhal	Int-A	2		
2179ai	39 y F	amphetamine	1	1	U	Unk	Int-A	2		
		methamphetamine	2	2						
		benztropine	3	3						
2180h	39 y M	heroin	1	1	U	Ingst + Par + Unk	Unk	2		
		methamphetamine	2	2						
		methamphetamine	1	1						
		trazodone	2	2						
		benztropine	3	3						
		haloperidol	4	4						
		bupropion	5	5						
		succinylcholine	6	6						
		oxcarbazepine	7	7						
		prazosin	8	8						
2181pa	39 y M	heroin	1	1	A	Par	Int-A	1	morphine	11.1 ng/mL In Blood (unspecified) ④ Autopsy
		fentanyl	2	2					fentanyl	2.9 ng/mL In Blood (unspecified) ④ Autopsy
		cocaine	3	3					benzoylecognine	1513 ng/mL In Blood (unspecified) ④ Autopsy
2182ai	39 y M	cocaine	1	1	U	Ingst + Unk	Int-A	1		
		ethanol	2	2						
2184ai	39 y M	heroin	1	1	U	Ingst + Unk	Int-A	1		
		ethanol	2	2						
2183ai	39 y F	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		methadone	3	3						
2185ai	39 y M	heroin	1	1	U	Unk	Int-A	1		
		codeine	2	2						
2188ai	39 y F	heroin	1	1	U	Unk	Int-A	1		
		oxycodone	2	2						
		methamphetamine	3	3						
2187ai	39 y F	heroin	1	1	U	Unk	Int-A	1		
		phentermine	2	2						
		ethanol	3	3						
2189ai	39 y F	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		codeine	3	3						
2186ai	39 y F	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		lorazepam	3	3						
2191ai	39 y F	methamphetamine	1	1	U	Unk	Int-A	2		
2192ai	39 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2193ai	39 y M	methamphetamine	1	1	U	Unk	Int-A	1		
		ethanol	2	2						
2190ai	39 y M	methamphetamine	1	1	U	Ingst + Unk	Int-A	1		
		ethanol	2	2						
2196ai	39 y F	methamphetamine	1	1	C	Unk	Int-A	3		
		doxylamine	2	2						
2194ai	39 y M	methamphetamine	1	1	U	Unk	Int-A	1		
		caffeine	2	2						
2195ai	39 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2197ph	40 y F	heroin	1	1	A	Par	Int-A	1		
2202ai	40 y M	heroin	1	1	U	Unk	Int-A	1		
		ethanol	2	2						
2198ai	40 y M	heroin	1	1	U	Unk	Int-A	1		
		oxycodone	2	2						
		tramadol	3	3						
2199ai	40 y M	heroin	1	1	U	Unk	Int-A	2		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
2201ai	40 y M	codeine	2	2	U	Unk	Int-A	2		
		hydromorphone	3	3						
		heroin	1	1						
2200ai	40 y M	cocaine	2	2	U	Unk	Int-A	1		
		heroin	1	1						
		alprazolam	2	2						
2203ph	40 y F	ethanol	3	3	A	Ingst	Int-A	1		
		methamphetamine	1	1						
2204ai	40 y M				U	Ingst + Unk	Int-A	1		
		cocaine	1	1						
		zolpidem	2	2						
2205ai	40 y M	alcohol, unknown	3	3	U	Unk	Int-A	2		
		cocaine	1	1						
		gabapentin	2	2						
2206ai	40 y F	oxycodone	3	3	U	Unk	Int-A	2		
		cocaine	1	1						
		oxycodone	2	2						
2208ai	40 y F	gabapentin	3	3	U	Unk	Int-A	1		
		heroin	1	1						
		diazepam	2	2						
2207ai	40 y M	ethanol	3	3	U	Unk	Int-A	2		
		heroin	1	1						
		oxycodone	2	2						
2211ai	40 y M	tramadol	3	3	U	Unk	Int-A	3		
		methamphetamine	1	1						
2210ai	40 y M				U	Unk	Int-A	1		
		methamphetamine	1	1						
2209ai	40 y M				U	Unk	Int-A	2		
		methamphetamine	1	1						
2212ai	40 y F				U	Unk	Int-A	2		
		methamphetamine	1	1						
		narcotic, other/unknown	2	2						
2213a	41 y F				U	Inhal + Unk	Int-A	2		
		methamphetamine	2	1						
		morphine	1	1						
2215ai	41 y M	cocaine	3	3	U	Unk	Int-A	2		
		alprazolam	4	4						
2214ai	41 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		ethanol	2	2						
		isopropanol	3	3						
2216ai	41 y F				U	Unk	Int-A	1		
		methamphetamine	1	1						
		heroin	2	2						
2217ai	41 y F				U	Unk	Int-A	1		
		methamphetamine	1	1						
		oxycodone	2	2						
2218pa	42 y M				A/C	Ingst + Par	Int-A	1		
		heroin	1	1						
		cocaine	2	2						
2219i	42 y F	alprazolam	3	3	U	Unk	Int-A	1		
		fentanyl	4	4						
		fentanyl	4	4						
2220ai	42 y M				U	Unk	Int-A	1		
		heroin	1	1						
		methamphetamine	2	2						
2221ai	42 y F	alprazolam	3	3	U	Unk	Int-S	1		
		methamphetamine	1	1						
		clonidine	2	2						
2222ai	42 y M	citalopram	3	3	U	Unk	Int-A	2		
		methamphetamine	1	1						
		amphetamine	2	2						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
2223ai	42 y F				U	Unk	Int-A	2		
2227ai	42 y M	amphetamine	1	1	U	Unk	Int-A	2		
2224ai	42 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2229ai	42 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2228ai	42 y M	methamphetamine heroin	1 2	1 2	U	Unk	Int-A	3		
2230ai	42 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2225ai	42 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2226ai	42 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2231ha	43 y M	methamphetamine ethanol	1 2	1 2	U	Unk	Int-U	3		
2232pa	43 y M	methamphetamine oxycodone	1 2	1 1	A	Ingst	Int-S	1		
		amphetamine barbiturate (long acting) oxycodone acetaminophen acetaminophen	1 2 3 4 4	1 2 3 4 4					phenobarbital oxycodone acetaminophen (apap) acetaminophen (apap)	0.841 mg/L In Whole Blood @ Autopsy 1.033 mg/L In Whole Blood @ Autopsy 153 mg/L In Whole Blood @ Autopsy 194 mcg/mL In Whole Blood @ Unknown
		clonazepam carbamazepine gabapentin diphenhydramine amlodipine paroxetine	5 6 7 8 9 10	5 6 7 8 9 10					clonazepam carbamazepine gabapentin diphenhydramine amlodipine paroxetine	0.011 mg/L In Whole Blood @ Autopsy 36.8 mg/L In Whole Blood @ Autopsy 178 mg/L In Whole Blood @ Autopsy 6.193 mg/L In Whole Blood @ Autopsy 0.145 mg/L In Whole Blood @ Autopsy 1.49 mg/L In Whole Blood @ Autopsy
2233h	43 y M	phencyclidine methylenedioxy- methamphetamine (MDMA) THC homolog marijuana	1 2 3 4	1 2 3 4	U	Ingst + Inhal	Int-A	2		
2234pa	43 y F	heroin fentanyl ethanol ethanol ethanol ethanol	1 2 3 3 3 3	1 2 3 3 3 3	A	Unk	Int-A	1		
2235ai	43 y M	heroin methamphetamine codeine	1 2 3	1 2 3	U	Unk	Int-A	1		codeine morphine ethanol fentanyl 0.018 mg/L In Serum @ Unknown 0.21 mg/L In Serum @ Unknown 125 mg/dL In Serum @ Unknown 2.1 mcg/L In Serum @ Unknown
2236ai	43 y F	heroin ethanol	1 2	1 2	U	Ingst + Unk	Int-A	1		
2237ai	43 y M	heroin olanzapine sertraline	1 2 3	1 2 3	U	Unk	Int-A	1		
2238ai	43 y F	methamphetamine cocaine	1 2	1 2	U	Unk	Int-A	2		
2239ai	43 y M	amphetamine	1	1	U	Unk	Int-A	2		
2240ai	43 y F	heroin methamphetamine ethanol	1 2 3	1 2 3	U	Unk	Int-A	1		
2241ai	43 y F	heroin methamphetamine gabapentin	1 2 3	1 2 3	U	Unk	Int-A	1		
2243ai	43 y M	methamphetamine cocaine	1 2	1 2	U	Unk	Int-A	1		
2245ai	43 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2244ai	43 y F	methamphetamine	1	1	U	Unk	Int-A	2		
2242ai	43 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2246ai	43 y F	methamphetamine diphenhydramine	1 2	1 2	U	Unk	Int-A	1		

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ③ Time
2248ai	43 y M				U	Unk	Int-A	2		
2249ai	43 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2250ai	43 y M	methamphetamine	1	1	U	Unk	Int-A	3		
2247ai	43 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2251ai	43 y F	methamphetamine	1	1	U	Unk	Int-A	1		
2252ph	44 y M	heroin	1	1	A	Unk	Int-A	2		
2254ai	44 y M	THC homolog	1	1	U	Unk	Int-A	1		
2253ai	44 y M	heroin	1	1	U	Unk	Int-A	1		
		codeine	2	2						
		amphetamine	3	3						
2256ai	44 y F	methamphetamine	1	1	U	Unk	Int-A	1		
		diazepam	2	2						
		ethanol	3	3						
2255ai	44 y M	methamphetamine	1	1	U	Unk	Int-A	1		
		cocaine	2	2						
2257h	44 y M	capsicum/cafeine	1	1	A	Ingst	Int-U	3		
2258	44 y M	methamphetamine	1	1	U	Ingst	Int-M	2		
2260ai	44 y F	methamphetamine	1	1	U	Unk	Int-A	1		
		cocaine	1	1						
2259ai	44 y M	levamisole	2	2	U	Unk	Int-A	1		
		cocaine	1	1						
2262ai	44 y M	ethanol	2	2	U	Unk	Int-A	2		
		heroin	1	1						
2261ai	44 y M	mitragyna	2	2	U	Unk	Int-A	1		
		oxycodone	3	3						
		heroin	1	1						
2263ai	44 y M	diazepam	2	2	U	Unk	Int-A	1		
		ethanol	3	3						
2264ai	44 y M	methamphetamine	1	1	U	Ingst + Unk	Int-A	2		
2265ai	44 y M	methamphetamine	1	1	U	Unk	Int-A	1		
		ethanol	2	2						
2267ai	44 y M	methamphetamine	1	1	U	Unk	Int-M	1		
2266ai	44 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		methamphetamine	1	1						
		ethanol	2	2						
2268a	45 y M	benzodiazepine	3	3	U	Unk	Int-A	1	methamphetamine	251 ng/mL In Blood (unspecified) ③ Unknown
		methamphetamine	1	1						
		acetaminophen/hydrocodone	2	2						
2269pai	45 y M	amphetamine (hallucinogenic), alpha-PDP	3	3	A/C	Inhal + Par	Int-A	1	hydrocodone	12.5 ng/mL In Blood (unspecified) ③ Unknown
		heroin	1	1						
		cocaine	2	2						
2271ai	45 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2270ai	45 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2273ai	45 y F	methamphetamine	1	1	U	Unk	Int-A	1		
		cocaine	1	1						
2272ai	45 y M	methamphetamine	2	2	U	Unk	Int-A	1		
		cocaine	1	1						
2274ai	45 y M	heroin	1	1	U	Unk	Int-A	2		
		benzodiazepine	2	2						
2279ai	45 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		amphetamine	2	2						
		benztropine	3	3						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
2276ai	45 y M				U	Unk	Int-A	2		
2275ai	45 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2277ai	45 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2280ai	45 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2278ai	45 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		cocaine	2	2						
		ethanol	3	3						
2281h	46 y F	heroin	1	1	A/C	Ingst + Par	Int-A	3		
		buprenorphine	2	2						
2283ai	46 y M	heroin	1	1	U	Unk	Int-A	1		
		codeine	2	2						
		methamphetamine	3	3						
2282ai	46 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
2284ai	46 y F	methamphetamine	1	1	U	Unk	Int-A	1		
		amphetamine	2	2						
2285ai	46 y M	methamphetamine	1	1	U	Inhal + Unk	Int-A	1		
		hydrocarbon (fluorinated)	2	2						
		amphetamine	3	3						
2286a	46 y M	cocaine	1	1	A/C	Ingst	Int-U	3	benzoylecognine	0.25 mg/L In Blood (unspecified) @ Unknown
		ethanol	2	2						
		metoprolol	3	3						
2287ai	46 y M	heroin	1	1	U	Ingst + Unk	Int-A	1		
		chlordiazepoxide	2	2						
		ethanol	3	3						
2288ai	46 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		codeine	3	3						
2294ai	46 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2293ai	46 y F	methamphetamine	1	1	U	Unk	Int-A	2		
2300ai	46 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2290ai	46 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2298ai	46 y M	methamphetamine	1	1	U	Ingst + Unk	Int-A	2		
		ethanol	2	2						
2299ai	46 y F	methamphetamine	1	1	U	Unk	Int-A	2		
2296ai	46 y F	methamphetamine	1	1	U	Unk	Int-A	1		
		amitriptyline	2	2						
		diphenhydramine	3	3						
2297ai	46 y F	methamphetamine	1	1	U	Unk	Int-A	3		
		fluoxetine	2	2						
2295ai	46 y F	methamphetamine	1	1	U	Unk	Int-A	2		
2289ai	46 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2291ai	46 y F	methamphetamine	1	1	U	Unk	Int-A	1		
		tramadol	2	2						
2292ai	46 y F	methamphetamine	1	1	U	Unk	Int-A	2		
		heroin	2	2						
		fentanyl	3	3						
2301ai	46 y F	methamphetamine	1	1	U	Unk	Int-A	3		
		amphetamine	2	2						
		naproxen	3	3						
2302ph	47 y M	heroin	1	1	A	Unk	Int-A	2		
2303ph	47 y M	heroin	1	1	U	Par	Int-A	2		
2304pha	47 y F	methamphetamine	1	1	U	Unk	Int-U	2	methamphetamine	0.19 mg/L In Blood (unspecified) @ Unknown
2305ph	47 y M				A	Par	Int-A	1		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
2306ha	47 y F	heroin	1	1	U	Unk	Int-S	2		
		heroin	1	1					morphine	11 ng/mL In Blood (unspecified) ④ Unknown
		methamphetamine	2	2					methamphetamine	200 ng/mL In Blood (unspecified) ④ Unknown
2307ai	47 y M				U	Unk	Int-A	1		
2309ai	47 y M	cocaine	1	1	U	Unk	Int-A	1		
2308ai	47 y M	cocaine	1	1	U	Ingst + Unk	Int-A	1		
		cocaine	1	1						
		ethanol	2	2						
		alprazolam	3	3						
2311ai	47 y F				C	Unk	Int-A	2		
		methamphetamine	1	1						
		narcotic, other/unknown	2	2						
		marijuana	3	3						
2310ai	47 y F				U	Unk	Int-A	3		
		methamphetamine	1	1						
		acetaminophen/opioid	2	2						
		THC homolog	3	3						
2313ai	47 y F				U	Unk	Int-A	2		
		methamphetamine	1	1						
		narcotic, other/unknown	2	2						
		marijuana	3	3						
2312ai	47 y F				U	Unk	Int-A	2		
		methamphetamine	1	1						
		tramadol	2	2						
2314pa	47 y M				A	Unk	Int-A	1		
		heroin	1	1					morphine (free)	150 mcg/L In Blood (unspecified) ④ Autopsy
		fentanyl	2	2					fentanyl	0.036 mg/L In Blood (unspecified) ④ Autopsy
		oxycodone	3	3					oxycodone	0.05 mg/L In Blood (unspecified) ④ Autopsy
		oxycodone	3	3					oxycodone	0.06 mg/L In Blood (unspecified) ④ Autopsy
		ethanol	4	4					ethanol	0.05 % (wt/Vol) In Blood (unspecified) ④ Autopsy
		ethanol	4	4					ethanol	0.07 % (wt/Vol) In Vitreous ④ Autopsy
		ethanol	4	4					ethanol	0.09 % (wt/Vol) In Urine (quantitative only) ④ Autopsy
2315pha	47 y M				A	Inhal	Int-A	1		
		cocaine	1	1					benzoylecognine	2684 ng/mL In Blood (unspecified) ④ Unknown
		cocaine	1	1					cocaine	31 ng/mL In Blood (unspecified) ④ Unknown
2316ai	47 y M				U	Unk	Int-A	1		
		amphetamine	1	1						
		methadone	2	2						
2320ai	47 y F				U	Unk	Int-A	2		
		heroin	1	1						
		methamphetamine	2	2						
		codeine	3	3						
2319ai	47 y M				U	Unk	Int-A	2		
		heroin	1	1						
		methamphetamine	2	2						
		gabapentin	3	3						
2321ai	47 y M				U	Unk	Int-A	1		
		heroin	1	1						
		methamphetamine	2	2						
		codeine	3	3						
2322ai	47 y M				U	Unk	Int-A	1		
		heroin	1	1						
		fentanyl	2	2						
		oxycodone	3	3						
2318ai	47 y F				U	Unk	Int-A	1		
		heroin	1	1						
		methamphetamine	2	2						
		oxycodone	3	3						
2317ai	47 y F				U	Unk	Int-A	1		
		heroin	1	1						
		methamphetamine	2	2						
2327ai	47 y M				U	Ingst + Unk	Int-A	1		
		methamphetamine	1	1						
		ethanol	2	2						
2326ai	47 y M				U	Unk	Int-A	3		
		methamphetamine	1	1						
		ethanol	2	2						
2323ai	47 y M				U	Unk	Int-A	2		
		methamphetamine	1	1						
2324ai	47 y F				U	Unk	Int-A	2		
		methamphetamine	1	1						
2325ai	47 y F				U	Unk	Int-A	1		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
2328pha	48 y M	methamphetamine	1	1	U	Unk	Int-A	2	benzoylecognine	524 ng/mL In Blood (unspecified) @ Unknown
		alprazolam	2	2						
2329ai	48 y F	cocaine	1	1	U	Unk	Int-A	2		
		methamphetamine	1	1						
2330ai	48 y M	isopropanol	2	2	A	Ingst + Unk	Int-A	3		
		cocaine	1	1						
2331ai	48 y F	ethanol	2	2	U	Unk	Int-A	1		
		heroin	1	1						
2332ai	48 y M	methamphetamine	2	2	U	Unk	Int-A	1		
		fluoxetine	3	3						
2336ai	48 y F	heroin	1	1	U	Unk	Int-A	1		
		ethanol	2	2						
2335ai	48 y M	heroin	1	1	A/C	Unk	Int-A	2		
		methamphetamine	2	2						
2333ai	48 y M	ethanol	3	3	U	Unk	Int-A	1		
		heroin	1	1						
2334ai	48 y M	heroin	1	1	U	Unk	Int-A	2		
		heroin	1	1						
2339ai	48 y F	heroin	1	1	U	Unk	Int-A	3		
		methamphetamine	1	1						
2337ai	48 y M	methamphetamine	1	1	A	Ingst + Unk	Int-A	3		
		ethanol	2	2						
2338ai	48 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		methamphetamine	1	1						
2340ai	48 y M	ethanol	2	2	U	Unk	Int-A	2		
		methamphetamine	1	1						
2341pha	49 y F	ethanol	2	2	A	Inhal	Int-A	1	cocaine	0.09 mg/L In Blood (unspecified) @ Autopsy
		cocaine	1	1						
2342ph	49 y F	cocaine	1	1	A	Par + Rec	Int-A	2	benzoylecognine	2.1 mg/L In Blood (unspecified) @ Autopsy
		heroin	1	1						
2343ph	49 y M	heroin	1	1	A	Par + Unk	Int-U	2		
		fentanyl	2	2						
2345ai	49 y M	benzodiazepine	3	3	U	Unk	Int-A	1		
		marijuana	4	4						
2346ai	49 y M	heroin	1	1	U	Unk	Int-A	1		
		fentanyl	2	2						
2344ai	49 y M	pramoxine	3	3	U	Unk	Int-A	1		
		methamphetamine	2	2						
2347ai	49 y M	heroin	1	1	U	Unk	Int-A	2		
		morphine	2	2						
2349ai	49 y F	amphetamine	3	3	U	Unk	Int-S	1		
		methamphetamine	1	1						
2348ai	49 y M	carbon monoxide	2	2	U	Unk	Int-A	2		
		cyclobenzaprine	3	3						
2352ai	49 y M	heroin	1	1	U	Unk	Int-A	2		
		methamphetamine	2	2						
2353ai	49 y M	diazepam	3	3	U	Unk	Int-A	2		
		methamphetamine	1	1						
2351ai	49 y M	methamphetamine	1	1	U	Ingst + Unk	Int-A	1		
		ethanol	2	2						
2350ai	49 y M	methamphetamine	1	1	U	Unk	Int-A	1		
		methamphetamine	1	1						
2354pha	50 y M	amphetamine	2	2	U	Unk	Unk	1	methamphetamine amphetamine	780 ng/mL In Serum @ Unknown 60 ng/mL In Serum @ Unknown
		methamphetamine	1	1						
2357ai	50 y M				U	Unk	Int-A	1		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
2355ai	50 y F	methamphetamine	1	1	U	Unk	Int-A	2		
		diphenhydramine	2	2						
		amphetamine	3	3						
2356ai	50 y M	methamphetamine	1	1	U	Unk	Int-A	1		
		amphetamine	2	2						
		cyclobenzaprine	3	3						
2358ph	50 y F	methamphetamine	1	1	A	Ingst + Unk	Int-S	2		
2359ai	50 y M	cocaine	1	1	U	Unk	Int-A	2		
		methamphetamine	2	2						
		ethanol	3	3						
2360ai	50 y M	heroin	1	1	U	Unk	Int-A	1		
2361ai	50 y F	methamphetamine	2	2	U	Unk	Int-A	2		
		phenylpropanolamine	1	1						
2362ai	50 y F	phenylpropanolamine	2	2	C	Unk	Int-A	2		
2370ai	50 y F	methamphetamine	1	1	U	Unk	Int-M	2		
		methamphetamine	1	1						
		gabapentin	2	2						
2371ai	50 y M	fluoxetine	3	3	U	Unk	Int-A	3		
		methamphetamine	1	1						
2363ai	50 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2364ai	50 y F	bupropion	2	2	U	Unk	Int-A	2		
		methamphetamine	1	1						
2365ai	50 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2367ai	50 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2366ai	50 y M	methamphetamine	1	1	C	Unk	Int-A	3		
2368ai	50 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2372ai	50 y F	methamphetamine	1	1	U	Unk	Int-A	2		
		methamphetamine	1	1						
		hydrocodone	2	2						
2369ai	50 y M	hydromorphone	3	3	U	Unk	Int-A	2		
		methamphetamine	1	1						
2373ph	50 y M	heroin	1	1	A	Unk	Int-A	2		
2374ai	51 y F	heroin	1	1	U	Unk	Int-A	2		
2376ai	51 y F	methamphetamine	1	1	U	Unk	Int-A	1		
		nortriptyline	2	2						
2375ai	51 y M	cocaine	1	1	U	Unk	Int-A	1		
		oxycodone	2	2						
		cyclobenzaprine	3	3						
2379ai	51 y F	cocaine	1	1	U	Unk	Int-A	1		
		ethanol	2	2						
		fentanyl	3	3						
2378ai	51 y M	heroin	1	1	U	Unk	Int-A	1		
		methadone	2	2						
		methamphetamine	3	3						
		nortriptyline	4	4						
2377ai	51 y M	heroin	1	1	U	Unk	Int-A	2		
		codeine	2	2						
2386ai	51 y M	heroin	1	1	U	Unk	Int-A	2		
		methamphetamine	2	2						
		hydromorphone	3	3						
2384ai	51 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		oxycodone	2	2						
2381ai	51 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2385ai	51 y F	methamphetamine	1	1	U	Unk	Int-A	2		
		methamphetamine	1	1						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
2380ai	51 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		quetiapine	2	2						
		hydrocodone	3	3						
2383ai	51 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2382ai	51 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2387ph	52 y M	cocaine	1	1	U	Unk	Int-A	2	benzoylecognine	626 ng/mL In Blood (unspecified) @ Unknown
		narcotic, other/unknown	2	2						
2388ha	52 y F	heroin	1	1	A	Unk	Unk	3		
		fentanyl	2	2					fentanyl	3.1 mcg/mL In Whole Blood @ Autopsy
		codeine	3	3					codeine	0.25 mg/L In Whole Blood @ Autopsy
2389ai	52 y M	cocaine	1	1	U	Ingst + Unk	Int-A	2		
		ethanol	2	2						
		zolpidem	3	3						
2392ai	52 y F	methamphetamine	1	1	U	Ingst + Unk	Int-A	1		
		amphetamine	2	2						
		diltiazem	3	3						
2393ai	52 y M	methamphetamine	1	1	U	Unk	Int-A	3		
		ethanol	2	2						
2391i	52 y F	methamphetamine	1	1	U	Unk	Int-A	1		
		amphetamine	2	2						
2390ai	52 y F	methamphetamine	1	1	U	Unk	Int-A	3		
		ethanol	2	2						
		oxycodone	3	3						
2394ai	52 y F	methamphetamine	1	1	U	Unk	Int-A	1		
		amphetamine	2	2						
		tramadol	3	3						
2395ai	52 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		oxycodone	3	3						
2396ai	52 y M	cocaine	1	1	U	Ingst + Unk	Int-A	2		
		ethanol	2	2						
2398ai	52 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
2397ai	52 y M	heroin	1	1	U	Unk	Int-A	3		
		methamphetamine	2	2						
2399ai	52 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		ethanol	3	3						
2401ai	52 y F	methamphetamine	1	1	U	Unk	Int-A	1		
		oxycodone	2	2						
		diazepam	3	3						
2406ai	52 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2400ai	52 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2404ai	52 y M	methamphetamine	1	1	U	Ingst + Unk	Int-A	1		
		ethanol	2	2						
		diphenhydramine	3	3						
2402ai	52 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2403ai	52 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2405ai	52 y M	methamphetamine	1	1	U	Unk	Int-A	1		
		ethanol	2	2						
2407ai	52 y M	methamphetamine	1	1	U	Ingst + Unk	Int-A	2		
		ethanol	2	2						
2409ai	53 y M	amphetamine	1	1	U	Unk	Int-A	3		
		methamphetamine	2	2						
2408ai	53 y F	amphetamine	1	1	U	Unk	Int-A	3		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
2410ai	53 y F	methamphetamine	2	2	U	Unk	Int-A	1		
		heroin	1	1						
2411ai	53 y F	methamphetamine	2	2	U	Unk	Int-A	1		
		heroin	1	1						
		methamphetamine	2	2						
		amphetamine	3	3						
2412ai	53 y M	heroin	1	1	U	Ingst + Unk	Int-A	1		
		bupropion	2	2						
		ethanol	3	3						
2413ai	53 y F	methamphetamine	1	1	U	Unk	Int-A	2		
		amphetamine	2	2						
		dextromethorphan	3	3						
2414ph	53 y M	cocaine	1	1	U	Ingst + Unk	Int-A	3		
		methylenedioxy-methamphetamine (MDMA)	2	2						
		methamphetamine	3	3						
		lysergic acid diethylamide (LSD)	4	4						
		alcohol, unknown	5	5						
		marijuana	6	6						
2415i	53 y F	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		cocaine	3	3						
2416ai	53 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2419ai	53 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2418ai	53 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2417ai	53 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		gabapentin	2	2						
2420p	53 y M	heroin	1	1	A	Ingst + Unk	Int-A	2		
		ethanol	2	2					ethanol	269 mg/dL In Blood (unspecified) @ Unknown
2421ph	54 y F	heroin	1	1	U	Par	Int-A	1		
2422ph	54 y F	heroin	1	1	A/C	Ingst	Unt-M	2		
		acetaminophen/codeine	2	2						
		zolpidem (extended release)	3	3						
		alprazolam	4	4						
		tramadol	5	5						
2423h	54 y M	methamphetamine	1	1	U	Ingst	Int-A	2		
		amphetamine (hallucinogenic)	2	2						
2424pha	54 y M	heroin	1	1	A	Par	Int-A	1		
		fentanyl	2	2					fentanyl	6.4 ng/mL In Blood (unspecified) @ 30 m (pe)
		methamphetamine	3	3						
2425ai	54 y M	heroin	1	1	U	Unk	Int-A	1		
		ethanol	2	2						
		hydrocodone	3	3						
2426a	54 y M	methamphetamine	1	1	C	Unk	Int-U	1		
2427p	54 y F	methylenedioxy-methamphetamine (MDMA)	1	1	A	Ingst	Int-S	3		
2428ai	54 y M	methamphetamine	1	1	U	Unk	Int-A	3		
2429ai	54 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2430ai	54 y F	methamphetamine	1	1	U	Ingst + Unk	Int-A	2		
		cocaine	1	1						
		ethanol	2	2						
2431ai	54 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		diazepam	3	3						
2432ai	54 y M	heroin	1	1	U	Unk	Int-A	1		
		alprazolam	2	2						
		codeine	3	3						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
2433ai	54 y M	heroin	1	1	A/C	Unk	Int-A	1		
		methadone	2	2						
		baclofen	3	3						
2435ai	54 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2438ai	54 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2437ai	54 y M	methamphetamine	1	1	U	Unk	Int-A	1		
		methamphetamine	1	1						
		heroin	2	2						
		cocaine	3	3						
2436ai	54 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2434ai	54 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2444ai	54 y M	methamphetamine	1	1	U	Unk	Int-A	1		
		methamphetamine	1	1						
		ethanol	2	2						
2445ai	54 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2442ai	54 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2443ai	54 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2441ai	54 y M	methamphetamine	1	1	U	Ingst + Unk	Int-A	2		
		methamphetamine	1	1						
		ethanol	2	2						
2439ai	54 y F	methamphetamine	1	1	U	Unk	Int-A	2		
		nalmexone	2	2						
2440ai	54 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		ethanol	2	2						
2446h	54 y M	methamphetamine	1	1	A	Ingst	Int-S	2		
2447ai	54 y F	methamphetamine	1	1	C	Unk	Int-A	3		
2448ai	55 y M	methamphetamine	1	1	U	Unk	Int-A	1		
		amphetamine	1	1						
		methamphetamine	2	2						
		diphenhydramine	3	3						
2450ai	55 y M	amphetamine	1	1	U	Unk	Int-A	2		
		methamphetamine	2	2						
		hydroxyzine	3	3						
2449ai	55 y M	amphetamine	1	1	U	Unk	Int-A	2		
		methamphetamine	2	2						
2451ai	55 y M	cocaine	1	1	U	Unk	Int-A	1		
2452ai	55 y F	cocaine	1	1	U	Ingst + Unk	Int-A	2		
		methamphetamine	2	2						
		fluoxetine	3	3						
2453i	55 y F	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		oxycodone	3	3						
2454i	55 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		heroin	2	2						
2456ai	55 y F	methamphetamine	1	1	U	Unk	Int-A	1		
		carbamazepine	2	2						
2455ai	55 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		amphetamine	2	2						
		phenylpropanolamine	3	3						
2457ai	55 y M	cocaine	1	1	U	Unk	Int-A	3		
2458ai	55 y M	heroin	1	1	U	Unk	Int-A	2		
		methadone	2	2						
2459ai	55 y M	heroin	1	1	U	Unk	Int-A	1		
2463ai	55 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2460ai	55 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2465ai	55 y M	methamphetamine	1	1	U	Unk	Int-A	1		

(continued)



**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
2462ai	55 y M				U	Unk	Int-A	2		
2461ai	55 y F	methamphetamine	1	1	A	Unk	Int-A	1		
		methamphetamine	1	1						
		heroin	2	2						
2464ai	55 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2466ai	55 y M	methamphetamine	1	1	U	Unk	Int-A	1		
		ethanol	2	2						
2467ai	56 y M	amphetamine	1	1	U	Unk	Int-A	2		
		methamphetamine	2	2						
2468ai	56 y F	methamphetamine	1	1	U	Unk	Int-A	2		
2469ph	56 y M	heroin	1	1	A/C	Unk	Int-U	2		
2470ai	56 y M	cocaine	1	1	U	Unk	Int-A	1		
2471ai	56 y M	heroin	1	1	U	Unk	Int-A	1		
		diazepam	2	2						
2472ai	56 y F	heroin	1	1	U	Unk	Int-A	3		
		methamphetamine	2	2						
2473ai	56 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		alprazolam	3	3						
2477ai	56 y F	methamphetamine	1	1	U	Unk	Int-A	2		
2475ai	56 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2480ai	56 y M	methamphetamine	1	1	U	Unk	Int-A	3		
2481ai	56 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2478ai	56 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2482ai	56 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2483ai	56 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2484ai	56 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		THC homolog	2	2						
2485ai	56 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2476ai	56 y M	methamphetamine	1	1	U	Unk	Int-A	3		
		cocaine	2	2						
2479ai	56 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		ethanol	2	2						
2474ai	56 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2486ai	56 y F	synthetic opiate	1	1	U	Unk	Int-A	1		
2487pi	57 y M	heroin	1	1	A	Par	Int-A	2		
		ethanol	2	2					ethanol	160 mg/dL In Blood (unspecified) Autopsy
2488ai	57 y M	amphetamine	1	1	U	Unk	Int-A	3		
		methamphetamine	2	2						
2489ai	57 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		trazodone	3	3						
2490ai	57 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		amphetamine	3	3						
2491ai	57 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
2492h	57 y M	methamphetamine	1	1	A	Ingst + Unk	Int-S	2		
		alprazolam	2	2						
		duloxetine	3	3						
		imipramine	4	4						
		clonidine	5	5						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
		hydroxyzine	6	6						
		cyclobenzaprine	7	7						
		gabapentin	8	8						
		zolpidem	9	9						
		tamsulosin	10	10						
		meloxicam	11	11						
2493h	57 y M	THC homolog	1	1	A	Ingst	Int-A	2		
2494ai	57 y M	cocaine	1	1	U	Unk	Int-A	1		
2495ai	57 y M	heroin	1	1	U	Unk	Int-A	2		
		methadone	2	2						
		hydrocodone	3	3						
2496ai	57 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2499ai	57 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2498ai	57 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		heroin	2	2						
2500ai	57 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2501ai	57 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2497ai	57 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2502pai	58 y M	heroin	1	1	A	Inhal	Int-A	1	morphine (free)	130 mcg/L In Serum @ Autopsy
		cocaine	2	2						
		ethanol	3	3					ethanol	0.2 % (wt/Vol) In Blood (unspecified) @ Autopsy
		ethanol	3	3					ethanol	0.21 % (wt/Vol) In Blood (unspecified) @ Autopsy
		ethanol	3	3					ethanol	0.21 % (wt/Vol) In Vitreous @ Autopsy
		ethanol	3	3					ethanol	0.27 % (wt/Vol) In Urine (quantitative only) @ Autopsy
2503pi	58 y F	cocaine	1	1	A	Par	Int-A	2		
		fentanyl	2	2						
2504ai	58 y M	cocaine	1	1	U	Unk	Int-A	1		
		phencyclidine	2	2						
2505ai	58 y M	amphetamine	1	1	U	Unk	Int-A	3		
		methamphetamine	2	2						
2506ai	58 y F	cocaine	1	1	U	Unk	Int-A	1		
		fentanyl	2	2						
		hydrocodone	3	3						
2508ai	58 y F	cocaine	1	1	U	Unk	Int-A	1		
		fentanyl	2	2						
		hydrocodone	3	3						
2507ai	58 y F	cocaine	1	1	U	Unk	Int-A	1		
		diphenhydramine	2	2						
		cyclobenzaprine	3	3						
2509ai	58 y F	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
2511ai	58 y M	methamphetamine	1	1	C	Unk	Int-A	3		
2510ai	58 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2512ai	58 y F	cocaine	1	1	U	Unk	Int-A	2		
2513ai	58 y F	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		codeine	3	3						
2514ai	58 y M	heroin	1	1	U	Unk	Int-A	1		
2515ai	58 y M	methamphetamine	1	1	U	Unk	Int-A	3		
2518ai	58 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2517ai	58 y M	methamphetamine	1	1	U	Unk	Int-A	1		
		methamphetamine	1	1						
		venlafaxine	2	2						
		doxepin	3	3						
2516ai	58 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2523ai	58 y M	methamphetamine	1	1	U	Unk	Int-A	3		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
2519ai	58 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2522ai	58 y M	methamphetamine	1	1	U	Unk	Int-A	3		
2520ai	58 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		methamphetamine	1	1						
		oxycodone	2	2						
		codeine	3	3						
2521ai	58 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2524ai	59 y M	heroin	1	1	U	Unk	Int-A	1		
		alprazolam	2	2						
2525ai	59 y F	methamphetamine	1	1	U	Unk	Int-A	1		
		ethanol	2	2						
		citalopram	3	3						
2526pa	59 y F	heroin	1	1	A	Par	Int-A	1	morphine (free)	21 ng/mL In Blood (unspecified) ⓐ Unknown
		methamphetamine	2	2					methamphetamine	110 ng/mL In Blood (unspecified) ⓐ Unknown
		methamphetamine	2	2					amphetamine	26 ng/mL In Blood (unspecified) ⓐ Unknown
2528ai	59 y M	heroin	1	1	U	Unk	Int-A	1		
		codeine	2	2						
2527ai	59 y F	heroin	1	1	U	Unk	Int-A	2		
2533ai	59 y M	methamphetamine	1	1	U	Unk	Int-A	3		
2532ai	59 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		oxycodone	2	2						
2530ai	59 y M	methamphetamine	1	1	U	Ingst + Unk	Int-A	2		
		alcohol, unknown	2	2						
2531ai	59 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		fentanyl	2	2						
		hydromorphone	3	3						
2529ai	59 y M	methamphetamine	1	1	U	Ingst + Unk	Int-A	1		
		ethanol	2	2						
2534ai	60 y F	cocaine	1	1	U	Unk	Int-A	1		
		cyclobenzaprine	2	2						
		oxycodone	3	3						
2535ai	60 y F	heroin	1	1	U	Unk	Int-A	1		
		hydroxychloroquine	2	2						
		ethanol	3	3						
2536i	60 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2537ai	60 y F	methamphetamine	1	1	U	Unk	Int-A	2		
		ethanol	2	2						
2538ai	60 y M	heroin	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
		cyclobenzaprine	3	3						
2539ai	60 y M	heroin	1	1	U	Unk	Int-A	2		
		methamphetamine	2	2						
		cocaine	3	3						
2541ai	60 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2540ai	60 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		oxycodone	2	2						
2542ai	60 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		ethanol	2	2						
2544ai	61 y M	heroin	1	1	U	Unk	Int-A	1		
		sertraline	2	2						
		codeine	3	3						
2543ai	61 y M	heroin	1	1	U	Unk	Int-A	1		
2545ai	61 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2546ai	61 y F	methamphetamine	1	1	U	Unk	Unk	2		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ③ Time
2547ai	61 y M	duloxetine	2	2	C	Unk	Int-A	3		
		amphetamine	3	3						
		methamphetamine	1	1						
2548pa	61 y F	amphetamine	2	2	A	Par	Int-A	1	morphine (free)	1000 mcg/L In Blood (unspecified) ③ Autopsy
		heroin	1	1						
2549ai	61 y M				U	Unk	Int-A	1		
		cocaine	1	1						
2552ai	61 y M	methamphetamine	2	2	U	Unk	Int-A	1		
		heroin	1	1						
		methamphetamine	2	2						
2550ai	61 y M	hydrocodone	3	3	U	Unk	Int-A	2		
		heroin	1	1						
		oxycodone	2	2						
2551ai	61 y F	methamphetamine	3	3	U	Ingst + Unk	Int-S	1		
		heroin	1	1						
		methamphetamine	2	2						
2556ai	61 y F	ethanol	3	3	U	Unk	Int-A	2		
		methamphetamine	1	1						
		methadone	2	2						
2553ai	61 y M	duloxetine	3	3	U	Unk	Int-A	2		
		methamphetamine	1	1						
		methamphetamine	1	1						
2554ai	61 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		methamphetamine	1	1						
2555ai	61 y F	methamphetamine	1	1	U	Unk	Int-A	1		
		methamphetamine	1	1						
2558ai	61 y M	methamphetamine	1	1	U	Unk	Int-A	3		
		ethanol	2	2						
2557ai	61 y M				U	Unk	Int-A	1		
		methamphetamine	1	1						
		cocaine	2	2						
2559ai	62 y M	phencyclidine	3	3	U	Unk	Int-S	1		
		heroin	1	1						
		codeine	2	2						
2560ai	62 y M	amphetamine	3	3	U	Unk	Int-A	1		
		heroin	1	1						
		fentanyl	2	2						
2561ai	62 y M	alprazolam	3	3	U	Unk	Int-A	2		
		methamphetamine	1	1						
		hydrocodone	2	2						
2562ai	62 y M	citalopram	3	3	U	Unk	Int-A	2		
		methamphetamine	1	1						
2563ai	62 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		methamphetamine	1	1						
2564ai	62 y M	methamphetamine	1	1	U	Unk	Int-A	1		
		methamphetamine	1	1						
2565ai	62 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		methamphetamine	1	1						
2566pha	63 y M				A	Ingst + Unk	Unk	2	methamphetamine	1200 ng/mL In Blood (unspecified) ③ Unknown
		methamphetamine	1	1						
		methamphetamine	1	1						
		gamma-hydroxybutyric acid	2	2						
		nondrug, unknown marijuana	3 4	3 4						
2567ai	63 y M				U	Ingst + Unk	Int-A	1		
		cocaine	1	1						
2569ai	63 y M	ethanol	2	2	U	Unk	Int-A	2		
		methamphetamine	1	1						
2568ai	63 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		methamphetamine	1	1						
2570ai	63 y F				U	Ingst + Unk	Int-A	1		
		methamphetamine	1	1						
2571ai	63 y M	ethanol	2	2	U	Unk	Int-A	2		
		amphetamine	1	1						
2572ai	63 y M	heroin	2	2	U	Unk	Int-A	2		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
2574ai	63 y M	cocaine	1	1	U	Unk	Int-A	2		
2573ai	63 y M	heroin	1	1	U	Unk	Int-A	2		
2576ai	63 y M	heroin	1	1	U	Unk	Int-A	2		
		amphetamines	2	2						
2575ai	63 y M	heroin	1	1	U	Unk	Int-A	2		
		methamphetamine	2	2						
2577ai	63 y M	heroin	1	1	U	Unk	Int-A	1		
		oxycodone	2	2						
		methamphetamine	3	3						
2578ai	63 y F	methamphetamine	1	1	C	Unk	Int-A	3		
2579ai	63 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2582ai	64 y M	heroin	1	1	U	Unk	Int-A	3		
		alprazolam	2	2						
2581ai	64 y F	heroin	1	1	U	Unk	Int-S	1		
		oxycodone	2	2						
		alprazolam	3	3						
2580ai	64 y M	heroin	1	1	U	Unk	Int-A	1		
		methadone	2	2						
2583ai	64 y F	amphetamines	1	1	U	Unk	Int-A	2		
		methylenedioxy-methamphetamine (MDMA)	2	2						
		narcotic, other/unknown	3	3						
2584ai	64 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2585ai	64 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2586ai	64 y M	methamphetamine	1	1	A	Unk	Int-A	1		
		oxymorphone	2	2						
		alprazolam	3	3						
2587ai	65 y M	cocaine	1	1	U	Ingst + Unk	Int-A	1		
		diazepam	2	2						
		ethanol	3	3						
2588ai	65 y M	methamphetamine	1	1	U	Unk	Int-A	3		
2589ai	65 y M	cocaine	1	1	U	Unk	Int-A	2		
2590ai	65 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		benzodiazepine	2	2						
		flecainide	3	3						
2591ai	65 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2592ai	66 y M	amphetamines	1	1	U	Unk	Int-A	1		
		methamphetamine	2	2						
2593ai	66 y M	heroin	1	1	U	Unk	Int-A	1		
		codeine	2	2						
		ethanol	3	3						
2594ai	66 y M	methamphetamine	1	1	C	Unk	Int-A	3		
		amphetamines	2	2						
2595ai	66 y M	methamphetamine	1	1	C	Unk	Int-A	2		
		amphetamines	2	2						
		isopropanol	3	3						
2596ai	66 y M	amphetamines	1	1	U	Unk	Int-A	3		
		methamphetamine	2	2						
		methanol	3	3						
2597ai	66 y M	heroin	1	1	U	Unk	Int-A	2		
		methamphetamine	2	2						
2598ai	66 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		diphenhydramine	2	2						
		acetaminophen	3	3						

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
2599ai	67 y F	heroin	1	1	U	Unk	Int-A	1		
		amitriptyline	2	2						
		diphenhydramine	3	3						
2601ai	67 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2600ai	67 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2602ai	67 y M	methamphetamine	1	1	U	Unk	Int-A	1		
2603ai	68 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		cocaine	1	1						
2605ai	68 y M	methamphetamine	2	2	U	Unk	Int-A	2		
		cocaine	1	1						
2604ai	68 y M	cocaine	1	1	U	Unk	Int-A	2		
2606hai	68 y M	cocaine	1	1	U	Unk	Int-A	2		
		methamphetamine	1	1						
		ethanol	2	2						
		diphenhydramine	3	3						
2607ph	69 y M	heroin	1	1	U	Par	Int-A	1		
2608ph	69 y M	heroin	1	1	U	Unk	Unk	2		
		cocaine	1	1						
		narcotic, other/unknown	2	2						
2609ai	70 y M	methamphetamine	1	1	U	Unk	Int-A	1		
		cocaine	2	2						
		ethanol	3	3						
2610ai	71 y M	methamphetamine	1	1	U	Unk	Int-A	2		
2611ai	71 y M	cocaine	1	1	U	Unk	Int-A	2		
		ethanol	2	2						
2612ai	72 y M	methamphetamine	1	1	U	Unk	Int-A	2		
		amphetamine	2	2						
2613ai	73 y F	methamphetamine	1	1	U	Unk	Int-A	3		
		chlorophenhyli-perazine	2	2						
2614ha	82 y M	methamphetamine	1	1	A	Inhal	Int-A	1		
		cocaine	1	1					benzoyllecognine	0.37 mg/L In Serum @ 1 d (pe)
		sulfur	2	2						
[2615ha]	13 m M	amphetamine	1	1	A	Ingst + Aspir	Unt-G	1		
		methamphetamine	2	2					amphetamine	590 ng/mL In Blood (unspecified) @ Autopsy
		hydrocarbon	3	3					methamphetamine	1000 ng/mL In Blood (unspecified) @ Autopsy
2616ph	20 + y M	heroin	1	1	A	Unk	Int-A	2		
2617h	50 + y F	heroin	1	1	A/C	Par	Int-A	3		
		cocaine	2	2						
2618ha	Unknown adult (>=20 yrs) M	phencyclidine	1	1	A	Unk	Int-S	1		
		midazolam	2	2						
		marijuana	3	3						
2619pi	Unknown adult (>=20 yrs) U	heroin	1	1	U	Par	Int-A	1		
2620pi	Unknown age F	heroin	1	1	U	Par	Int-S	1		
2621i	Unknown age M	methamphetamine	1	1	A/C	Ingst + Inhal	Int-A	2		
		cocaine	2	2						
		acetaminophen/oxycodone	3	3						
		alprazolam	4	4						
See Also case 6, 7, 18, 24, 34, 38, 49, 56, 73, 79, 96, 99, 104, 105, 122, 262, 295, 323, 342, 358, 370, 375, 377, 381, 383, 385, 387, 392, 396, 399, 400, 405, 407, 409, 410, 417, 422, 423, 430, 431, 438, 441, 459, 460, 462, 464, 465, 469, 474, 475, 477, 479, 486, 487, 495, 497, 500, 501, 503, 506, 510, 511, 516, 517, 520, 522, 525, 526, 530, 533, 534, 537, 538, 540, 544, 546, 547, 548, 557, 561, 562, 563, 565, 580, 588, 592, 595, 597, 604, 605, 606, 611, 618, 620, 621, 624, 629, 637, 669, 679, 680, 685, 699, 703, 707, 723, 730, 736, 745, 754, 758, 761, 771, 774, 782, 783, 784, 795, 800, 803, 818, 820, 828, 834, 838, 839, 841, 845, 855, 868, 873, 875, 900, 919, 926, 929, 932, 934, 944, 949, 968, 982, 985, 993, 1015, 1042, 1051, 1147, 1152, 1161, 1164, 1166, 1170, 1191, 1192, 1193, 1197, 1201, 1211, 1222, 1227, 1241, 1260, 1263, 1273, 1301, 1328, 1352, 1394, 1395, 1438, 1445, 1521, 1591, 1633, 1642, 1665, 1668, 1672, 1704, 1712, 1743, 1749, 1750, 1755, 1762, 1777, 1785, 1787, 1801, 1811, 1813, 1832, 2625, 2626, 2641, 2647, 2652, 2654, 2669										
Unknown Drug										
2622ai	19 y F	drug, unknown	1	1	U	Unk	Int-A	2		
2623	20 y M	drug, unknown	1	1	U	Unk	Int-S	2		
2624ph	20 y M	drug, unknown	1	1	U	Unk	Unk	2		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration ④ Time
2625ph	21 y F	drug, unknown	1	1	A	Inhal	Int-A	1		
		heroin	2	1						
2626pha	21 y M	drug, unknown	1	1	U	Unk	Unk	1		
		methamphetamine	2	2					methamphetamine	100 ng/mL In Blood (unspecified) ④ Unknown
		methamphetamine	2	2					amphetamine	28 ng/mL In Blood (unspecified) ④ Autopsy
		marijuana	3	3					delta-9-thc	1.6 ng/mL In Blood (unspecified) ④ Autopsy
		marijuana	3	3					delta-9-carboxy-thc	28 ng/mL In Blood (unspecified) ④ Autopsy
2627pha	22 y M				U	Unk	Unk	2		
2628h	24 y F	drug, unknown	1	1	A	Ingst	Unk	2		
2629ph	25 y F	drug, unknown	1	1	A	Par	Int-A	2		
2630a	25 y M	drug, unknown	1	1	A	Unk	Int-A	2		
2631h	25 y M	drug, unknown	1	1	A	Ingst	Int-A	1		
2632p	26 y M	drug, unknown	1	1	A	Ingst	Int-A	2		
2633ai	27 y F	drug, unknown	1	1	U	Unk	Int-A	1		
2634pha	27 y F	drug, unknown	1	1	U	Ingst	Int-U	2		
2635h	28 y M	drug, unknown	1	1	A	Ingst	Int-A	2		
2636	28 y M	drug, unknown	1	1	U	Unk	Unt-U	2		
		benzodiazepine	2	2						
2637ai	29 y F	drug, unknown	1	1	U	Unk	Unk	3		
2638ph	30 y F	drug, unknown	1	1	U	Unk	Unk	2		
2639p	30 y M	drug, unknown	1	1	A	Ingst + Rec	Unk	2		
2640ph	30 y M	drug, unknown	1	1	U	Ingst + Par	Int-U	2		
		ethanol	2	2					ethanol	166 mg/dL In Serum ④ 30 m (pe)
2641	31 y M	drug, unknown	1	1	U	Unk	Int-A	2		
		methylenedioxymethamphetamine (MDMA)	2	2						
		cocaine	3	3						
		amphetamine	4	4						
		methadone	5	5						
2642ph	31 y M	drug, unknown	1	1	A	Par	Int-A	1		
2643p	31 y M	drug, unknown	1	1	U	Ingst	Int-S	2		
		acetaminophen/hydrocodone	2	2					acetaminophen (apap)	297 mcg/mL In Plasma ④ Unknown
2644pha	32 y M	drug, unknown	1	1	U	Ingst	Unk	3		
		ethanol	2	2					ethanol	18 mg/dL In Serum ④ Unknown
2645ha	33 y M	drug, unknown	1	1	A	Ingst	Int-S	2		
2646ph	33 y M	drug, unknown	1	1	A	Par	Int-A	2		
2647pai	34 y F	drug, unknown	1	1	U	Ingst	Int-S	2		
		drug, unknown	1	1					benzoyllecognine	1500 mcg/L In Blood (unspecified) ④ Autopsy
		drug, unknown	1	1					cocaine	260 mcg/L In Blood (unspecified) ④ Autopsy
		drug, unknown	1	1					cocaethylene	40 mcg/L In Blood (unspecified) ④ Autopsy
		cocaine	2	2						
		ethanol	3	3						
2648a	35 y F	drug, unknown	1	1	A	Ingst	Int-S	1		
		zopiclone	2	2						
2649p	36 y M	drug, unknown	1	1	A	Ingst + Unk	Unk	2		
2650ai	36 y M	drug, unknown	1	1	U	Unk	Int-A	3		
2651ph	37 y M	drug, unknown	1	1	A	Par	Int-A	1		
2652p	37 y F	drug, unknown	1	1	A/C	Unk	Int-A	2		
		heroin	2	1						
2653p	38 y M				A/C	Ingst + Unk	Int-A	2		

(continued)

**Table 21.** Listing of fatal nonpharmaceutical and pharmaceutical exposures. – Continued.

Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCF	Analyte	Blood Concentration @ Time
		drug, unknown ethanol	1 2	1 2					ethanol	156 mg/dL In Blood (unspecified) @ 1 h (pe)
2654p	38 y M				A	Inhal	Int-A	2		
		drug, unknown marijuana	1 2	1 2						
2655ai	38 y F				U	Unk	Int-A	3		
2656p	39 y M	drug, unknown	1	1	U	Par	Int-A	2		
2657pi	40 y F	drug, unknown	1	1	A/C	Ingst	Int-S	3		
2658i	40 y M	drug, unknown	1	1	A	Unk	Int-S	2		
2659ph	41 y M	drug, unknown	1	1	A	Ingst	Int-S	2		
		drug, unknown ethanol	1 2	1 2						
2660p	44 y F				U	Ingst	Int-S	2		
		drug, unknown clonazepam	1 2	1 2						
2661h	49 y F				A/C	Ingst	Int-S	2		
2662phi	50 y F	drug, unknown	1	1	U	Unk	Unk	2		
		drug, unknown ethanol	1 2	1 2						
		morphine	3	3						
		benzodiazepine	4	4						
2663p	51 y M				A	Ingst	Int-S	2		
		drug, unknown carisoprodol	1 2	1 2						
2664ha	52 y M				A	Ingst	Int-S	3		
		drug, unknown hypochlorite	1 2	1 2						
2665i	52 y F				U	Ingst	Unk	3		
2666	54 y M	drug, unknown	1	1	A	Ingst	Int-S	2		
2667pi	54 y M	drug, unknown	1	1	U	Ingst + Unk	Int-S	2		
		drug, unknown salicylate	1 2	1 2						
2668p	55 y F				A	Ingst	Int-S	2		
2669ph	57 y M	drug, unknown	1	1	U	Unk	Unk	3		
		drug, unknown methamphetamine	2 1	1 1						
2670h	57 y F				A	Ingst	Int-U	3		
		drug, unknown acetaminophen/diphenhydramine	1 2	1 2					acetaminophen (apap)	35.2 mcg/mL In Blood (unspecified) @ Unknown
2671	58 y M				A	Ingst	AR-D	1		
2672h	59 y M	drug, unknown	1	1	U	Unk	Int-A	3		
		narcotic, other/unknown	2	2						
2673h	60 y M	drug, unknown	1	1	U	Ingst	Int-S	3		
2674ai	62 y M				U	Unk	Int-A	3		
		drug, unknown	1	1						
2675ai	62 y M				C	Unk	Int-A	2		
2676p	62 y M	drug, unknown	1	1	A/C	Ingst	Int-A	2		
		bupropion	2	2						
		gabapentin	3	3						
		oxycodone	4	4						
		meloxicam	5	5						
		citalopram	6	6						
		cyclobenzaprine	7	7						
		naproxen	8	8						
2677p	63 y F				A	Ingst	Int-S	2		
		drug, unknown	1	1						
2678ha	66 y F				A/C	Ingst	Int-S	3		
		drug, unknown	1	1						
2679ai	66 y M				U	Unk	Int-A	3		
		drug, unknown	1	1						
2680ai	1 d M				U	Unk	Unk	3		
2681h	30 + y F	drug, unknown	1	1	U	Unk	Int-S	2		
		drug, unknown	1	1						
See Also case 11, 14, 118, 164, 352, 403, 532, 598, 600, 643, 753, 798, 856, 888, 917, 967, 1117, 1118, 1214, 1287, 1323, 1365, 1376, 1392, 1457, 1494, 1505, 1515, 1516, 1656, 1683, 1689, 1716, 1753, 1804, 1811, 1815, 1870, 1882, 1905, 1982, 2047, 2063										
Vitamins										
2682ha	66 y M	vitamin D	1	1	C	Ingst	AR-D	3		

(continued)



Annual Report ID	Age	Substances	Substance Rank	Cause Rank	Chronicity	Route	Reason	RCE	Analyte	Blood Concentration @ Time
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See Also case 812, 1323, 1443, 1500, 1591

Annual Report ID: Bracketed [case number] = Narrative provided for this case in [Appendix C](#).

Age Gender: y = years, m = months, d = days, F = female, M = male, F-Pregnant = pregnant, U = unknown.

Route: Aspir = Aspiration (with ingestion), B-S = Bite/sting, Derm = Dermal, Ingst = Ingestion, Inhal = Inhalation/nasal, Oc = Ocular, Ot = Otic, Oth = Other, Par = Parenteral, Rec = Rectal, Unk = Unknown, Vag = Vaginal.

Reason: AR-D = Adverse reaction – Drug, AR-F = AR – Food, AR-O = AR – Other, Int-A = Intentional – Abuse, Int-M = Int – Misuse, Int-S = Int – Suspected Suicide, Int-U = Int – Unknown, Oth-C = Other – Contamination/tampering, Oth-M = Oth – Malicious, Oth-W = Oth – Withdrawal, Unk = Unknown reason, Unt-B = Unintentional – Bite/sting, Unt-E = Unt – Environmental, Unt-F = Unt – Food poisoning, Unt-G = Unt – General, Unt-M = Unt – Misuse, Unt-O = Unt – Occupational, Unt-T = Unt – Therapeutic error, Unt-U = Unt – Unknown.

Occupation; Unit 1 = Unit - Interpersonal error; Unit 2 = Unit - Unknown;  
 RCF (Relative Contribution to Fatality): 1= Undoubtedly responsible, 2= Probably responsible, 3= Contributory. Provided by the RPC for Indirect cases and the AAPCC Fatality Review Team for the direct (non-Indirect) cases.

Table 22A. Demographic profile of SINGLE SUBSTANCE nonpharmaceuticals exposure cases by generic category.

	No. of Case Mentions	No. of Single Exposure	Age					Reason				Outcome									
			≤5		6-12	13-19	≥20	Unknown		Unint	Int	Other	Adv Rtn	Treated in Health Care Facility		None	Minor	Moderate	Major	Death	
			Child	Adult	Unknown	Age															
Nonpharmaceuticals																					
Adhesives/Glues																					
Miscellaneous Adhesives/Glues																					
Cyanoacrylates (Superglues, etc)	4,381	4,316	1,887	354	265	1,424	15	322	49	4,141	117	21	23	1,185	634	858	130	2	0	0	
Epoxy	630	583	164	14	18	317	2	62	6	556	8	4	12	141	87	141	55	1	0	0	
Non-Toxic Adhesives/Glues (White Glue, Paper Glue, etc)	1,224	965	560	247	70	60	4	21	3	890	63	6	3	48	95	51	5	0	0	0	
Toluene/Xylene (Adhesives Only)	253	236	103	7	10	97	0	15	4	219	13	0	3	48	33	45	8	0	0	0	
Unknown Types of Adhesive, Glue, Cement or Paste	4,248	3,868	1,603	407	205	1,207	8	394	44	3,605	163	34	52	583	585	556	101	7	0	0	
Category Total:	10,736	9,968	4,317	1,029	568	3,105	29	814	106	9,411	364	65	93	2,046	1,434	1,651	299	10	0	0	
Alcohols																					
Miscellaneous Alcohols																					
Ethanol (Beverages)	54,446	8,151	1,976	196	941	4,513	13	418	94	2,628	4,850	328	159	4,449	979	2,059	1,300	253	66	66	
Ethanol (Non-Beverage, Non-Rubbing)	3,067	2,244	1,442	119	94	520	2	55	12	1,922	259	33	14	326	402	243	62	14	0	0	
Higher Alcohols (Butanol, Amyl Alcohol, Propanols, etc)	120	92	37	6	3	40	0	6	0	84	6	0	0	30	16	18	10	0	0	0	
Isopropanol (Excluding Rubbing Alcohols and Cleaning Agents)	3,935	3,409	1,439	146	194	1,420	3	187	20	2,557	770	30	25	1,026	626	677	311	40	0	0	
Methanol (Excluding Automotive Products and Cleaning Agents)	675	551	105	8	40	342	1	48	7	477	52	8	4	224	120	97	24	12	7	7	
Other Types of Alcohol	189	168	107	7	7	40	0	5	2	156	9	0	3	31	46	15	4	1	0	0	
Unknown Types of Alcohol	1,032	277	63	9	34	141	3	17	10	112	131	5	7	127	25	56	34	22	5	5	
Rubbing Alcohols																					
Rubbing Alcohols: Ethanol with Methyl Salicylate	5	4	2	0	0	2	0	0	0	4	0	0	0	1	2	1	1	0	0	0	
Rubbing Alcohols: Ethanol without Methyl Salicylate	181	169	105	6	8	48	0	2	0	154	11	1	2	20	43	26	3	0	0	0	
Rubbing Alcohols: Isopropanol with Methyl Salicylate	204	198	148	9	2	36	0	3	0	179	15	3	1	66	65	37	4	0	0	0	
Rubbing Alcohols: Isopropanol without Methyl Salicylate	7,624	6,908	3,703	261	327	2,257	14	314	32	5,692	1,094	64	22	1,578	1,389	1,121	371	28	0	0	
Rubbing Alcohols: Unknown	87	68	26	1	6	31	0	4	0	50	16	0	0	30	10	14	7	2	0	0	
Category Total:	71,565	22,239	9,153	768	1,656	9,390	36	1,059	177	14,015	7,213	472	237	7,908	3,723	4,364	2,131	372	78	78	
Arts/Crafts/Office Supplies																					
Miscellaneous Arts/Crafts/Office Supplies																					
Artist Paints (Non-Water Color)	3,502	3,405	2,549	264	139	370	7	67	9	3,288	77	14	25	116	375	143	13	4	0	0	
Artist Paints (Water Color)	1,578	1,538	1,281	141	41	59	5	9	2	1,494	36	5	2	24	160	26	4	0	0	0	
Chalks	1,662	1,622	1,519	52	19	22	4	5	1	1,601	16	1	2	36	192	37	3	0	0	0	
Clays	2,475	2,415	2,008	238	66	83	12	6	2	2,348	50	4	7	113	228	94	4	2	0	0	
Crayons	1,811	1,733	1,464	137	32	81	11	6	2	1,691	40	1	0	47	137	42	1	0	0	0	
Glazes	106	105	44	22	16	18	0	5	0	93	6	6	0	7	14	9	0	0	0	0	
Other Supplies: Miscellaneous	87	84	48	12	4	18	0	2	0	81	3	0	0	7	13	8	1	0	0	0	
Other Types of Arts/Crafts/ Writing Products	6,702	6,300	4,499	766	249	583	44	139	20	6,001	227	36	25	284	826	265	21	2	1	1	
Pencils	1,229	1,170	541	442	102	54	11	14	6	1,029	111	17	4	42	109	41	3	0	0	0	
Pens or Inks	8,687	8,445	5,442	1,870	649	302	43	108	31	7,907	440	40	41	255	1,018	209	16	2	0	0	
Typewriter Correction Fluids	530	516	319	71	45	64	2	9	6	468	39	6	1	50	111	34	5	0	0	0	
Unknown Types of Arts/Crafts/ Writing Products	113	109	65	31	6	6	0	1	0	106	3	0	0	8	20	8	0	0	0	0	
Category Total:	28,482	27,442	19,779	4,046	1,368	1,660	139	371	79	26,107	1,048	130	107	989	3,203	916	71	10	1	1	
Automotive/Aircraft/Boat Products																					
Automotive Products																					

(continued)

Table 22A. Demographic profile of SINGLE SUBSTANCE nonpharmaceuticals exposure cases by generic category. – Continued.

	No. of Case Mentions	No. of Single Exposure	Age					Reason					Outcome						
			≤5	6–12	13–19	≤20	Unknown Child	Unknown Adult	Unknown Age	Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
Automotive Products: Brake Fluids	922	844	209	10	51	489	3	73	9	784	47	6	1	306	139	240	37	5	1
Automotive Products: Ethylene Glycol (Including Antifreeze)	6,144	5,583	485	120	458	3,968	11	469	72	4,601	772	139	9	2,270	1,086	998	417	112	10
Automotive Products: Glycol and Methanol Mixtures	137	127	33	6	6	71	0	9	2	116	8	1	0	37	35	19	4	1	1
Automotive Products: Hydrocarbons (Transmission Fluids, Power Steering Fluids, etc)	1,980	1,853	573	47	100	966	2	150	15	1,732	88	11	11	616	353	564	103	3	0
Automotive Products: Methanol (Dry Gas, Windshield Washing Solutions, etc)	1,220	1,149	173	32	91	709	2	130	12	1,054	75	13	0	359	286	233	34	7	0
Automotive Products: Other Glycols	161	153	63	8	5	65	1	9	2	147	2	4	0	35	30	21	4	1	0
Miscellaneous Automotive/Aircraft/Boat Products	13	10	5	0	0	4	0	1	0	9	0	1	0	3	2	1	0	0	0
Automotive/Aircraft/Boat Products: Non-Toxic	1,336	1,274	451	43	77	598	0	94	11	1,215	31	8	15	402	227	347	78	3	0
Automotive/Aircraft/Boat Products: Other	194	175	35	8	21	89	0	17	5	161	8	4	1	82	29	51	16	1	0
Automotive/Aircraft/Boat Products: Unknown	12,107	11,168	2,027	274	809	6,959	19	952	128	9,819	1,031	187	37	4,110	2,187	2,474	693	133	12
Batteries																			
Disc Batteries	480	466	266	51	25	101	1	19	3	443	12	2	8	329	221	56	16	0	0
Disc Batteries: Alkaline (MNO2)	255	185	85	22	15	61	0	2	0	133	34	1	13	152	62	33	46	7	0
Disc Batteries: Lithium	4	4	3	0	0	1	0	0	0	4	0	0	0	3	4	0	0	0	0
Disc Batteries: Mercuric Oxide	7	5	3	0	0	2	0	0	0	4	1	0	0	1	1	0	0	0	0
Disc Batteries: Nickel Cadmium	9	7	4	1	1	1	0	0	0	7	0	0	0	5	4	0	0	0	0
Disc Batteries: Other	42	42	20	5	0	15	0	1	1	39	1	1	0	25	25	3	0	0	0
Disc Batteries: Silver Oxide	2,398	2,331	1,487	299	67	424	14	35	5	2,231	72	15	5	1,791	1,101	148	42	7	1
Disc Batteries: Unknown	328	314	127	21	2	158	0	6	0	309	4	1	0	193	208	16	3	5	0
Miscellaneous Batteries																			
Automotive/Aircraft/Boat Batteries	565	556	30	16	32	392	2	76	8	540	8	3	4	208	65	156	52	1	0
Other Types of Battery	358	336	49	12	98	112	3	56	6	309	23	0	4	52	125	40	13	0	0
Penlight/Flashlight/Dry Cell Batteries	5,176	4,989	2,914	494	278	1,014	19	244	26	4,487	414	62	11	1,000	1,233	500	91	2	0
Unknown Types of Battery	87	81	30	11	10	27	0	3	0	67	7	4	1	23	19	14	3	0	0
Category Total:	9,709	9,316	5,018	932	528	2,308	39	442	49	8,573	576	89	46	3,782	3,068	966	266	22	1
Bites and Envenomations																			
Aquatic																			
Fish Stings	572	566	22	41	65	384	1	46	7	553	3	2	8	268	15	197	84	3	0
Jellyfish and Other Coelenterate Stings	189	188	25	46	28	70	1	17	1	187	0	0	1	43	3	66	18	0	0
Other or Unknown Marine Animal Bites and/or Envenomations	259	252	121	30	13	72	1	14	1	239	6	3	2	45	26	34	12	0	0
Exotic Snakes																			
Exotic Snake: Unknown	1	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	1	0	0
If Poisonous																			
Exotic Snakes: Non-Poisonous	19	19	0	0	2	16	0	0	1	19	0	0	0	13	0	6	3	0	0
Exotic Snakes: Poisonous	54	50	2	1	4	39	0	3	1	50	0	0	0	35	3	10	17	2	0
Insects																			
Ant or Fire Ant Bites	534	493	169	39	29	194	0	58	4	476	0	16	1	69	10	116	27	2	1
Bee, Wasp, or Hornet Stings	3,629	3,542	592	342	169	2,018	11	358	52	3,535	3	3	1	628	29	1,172	261	8	1
Caterpillars	2,114	2,110	517	288	154	973	11	141	26	2,064	16	3	24	328	41	660	105	0	0
Centipede or Millipede Bites	497	492	120	31	25	277	0	33	6	491	0	1	0	75	18	160	28	0	0
Mosquito Bites	252	112	27	5	4	65	0	10	1	112	0	0	0	21	2	25	3	0	0
Other Insect Bites and/or Stings	4,810	4,648	1,039	311	246	2,448	16	531	57	4,524	18	73	23	890	157	999	290	2	0
Scorpion Stings	12,669	12,645	1,394	1,380	952	8,319	12	457	131	12,642	1	1	0	1,526	73	8,319	569	26	0
Tick Bites	871	837	210	88	35	367	15	115	7	831	2	1	1	158	36	115	18	2	0
Mammals																			
Bat Bites	685	675	83	81	65	361	5	73	7	672	1	0	0	441	116	83	11	0	0

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Table 22A. Demographic profile of SINGLE SUBSTANCE nonpharmaceuticals exposure cases by generic category. – Continued.

	No. of Case Mentions	No. of Single Exposure	Age					Reason			Outcome										
			≤5	6–12	13–19	≤20	Unknown Child	Unknown Adult	Unknown Age	Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death		
Animal Bites and Envenomations	Cat Bites	687	681	56	60	53	431	3	64	14	680	0	0	1	479	4	306	34	0	0	
	Dog Bites	2,472	2,461	336	467	274	1,229	9	111	35	2,459	1	0	1	1,965	19	1,223	181	6	0	
	Fox Bites	21	21	1	1	2	15	0	1	1	21	0	0	0	13	2	9	0	0	0	
	Human Bites	24	24	4	2	1	11	0	6	0	21	0	2	0	13	0	7	1	0	0	
	Other Mammal Bites	641	636	65	74	46	344	4	84	19	611	6	5	5	359	65	169	14	0	0	
	Raccoon Bites	120	120	9	8	16	71	0	6	10	118	2	0	0	74	14	37	2	0	0	
	Rodent or Lagomorph Bites (Squirrels, Rats, Mice, Gerbils, Hamsters, Rabbits, etc)	925	907	232	132	79	351	11	90	12	841	4	57	3	283	58	179	26	1	0	
	Skunk Bites	8	8	1	1	0	4	0	2	0	8	0	0	0	7	0	4	0	0	0	
	Miscellaneous Bites and Envenomations																				
	Other or Unknown Animal Bites	248	246	35	30	13	127	2	34	5	237	2	0	6	102	6	84	20	0	0	
Insect and Spider Bites and Envenomations	Other or Unknown Reptile Bites	315	311	108	54	29	93	3	18	6	295	11	0	2	68	25	86	12	0	0	
	Unknown Types of Insect or Spider Bite and/or Envenomation	1,902	1,842	463	122	97	940	4	179	37	1,819	3	12	4	364	53	427	89	4	0	
	Miscellaneous Snake Bites and Envenomations																				
	Unknown or Known Non-Poisonous Snake Bites	645	640	55	85	99	377	0	22	2	636	3	0	0	428	32	336	40	1	0	
	Unknown Types of Snake Envenomation	1,922	1,894	138	221	224	1,244	2	50	15	1,889	4	0	0	1,679	45	860	615	28	0	
	Snakes																				
	Copperhead Envenomations	2,035	2,008	67	159	185	1,571	1	22	3	2,003	5	0	0	1,947	16	584	1,214	46	0	
	Coral Envenomations	80	79	2	6	13	53	1	2	2	78	1	0	0	70	5	41	15	2	0	
	Cottonmouth Envenomations	255	251	7	11	22	209	0	2	0	251	0	0	0	242	4	85	122	10	0	
	Rattlesnake Envenomations	753	739	31	39	45	604	0	15	5	732	4	1	1	698	13	199	370	56	1	
Other Bites and Envenomations	Unknown Crotalid Envenomations	1,028	998	51	78	102	753	0	14	0	994	1	2	1	958	15	237	560	79	1	
	Spiders																				
	Black Widow Spider Bites and/or Envenomations	1,346	1,330	95	69	111	977	1	70	7	1,324	0	1	2	739	48	448	289	9	0	
	Brown Recluse Spider Bites and/or Envenomations	898	886	69	52	63	565	3	113	21	882	1	1	1	411	22	194	202	15	1	
	Other Necrotizing Spider Bites and/or Envenomations	85	84	18	7	6	43	0	9	1	83	1	0	0	19	4	16	8	0	0	
	Other Spider Bites and/or Envenomations	2,906	2,873	319	173	195	1,843	6	302	35	2,858	7	3	4	652	53	707	183	3	0	
	Tarantula Bites and/or Envenomations	20	19	0	2	1	14	0	2	0	19	0	0	0	8	0	8	0	0	0	
	Category Total: Building and Construction Products	46,491	45,688	6,483	4,536	3,467	27,473	123	3,074	532	45,255	106	187	92	16,119	1,032	18,208	5,444	305	5	
	Insulation																				
	Construction Products	Asbestos	355	320	41	29	11	173	4	59	3	304	0	9	7	39	63	25	6	1	0
Fiberglass		497	455	196	48	26	144	2	35	4	430	12	2	8	105	55	73	16	0	0	
Other Types of Insulation		122	119	47	6	4	49	0	12	1	113	3	1	2	30	10	17	6	1	0	
Unknown Types of Insulation		412	388	261	12	11	78	1	22	3	375	9	0	2	50	69	38	14	0	0	
Urea or Formaldehyde Insulations		7	7	1	0	0	6	0	0	0	6	1	0	0	0	0	2	1	0	0	
Miscellaneous Building and Construction Products																					
Caulking Compounds and Construction Putties		2,347	2,278	1,471	98	50	525	5	110	19	2,216	29	6	18	191	444	194	21	1	0	
Cement or Concrete (Excluding Glues)		1,175	1,138	348	29	45	624	1	78	13	1,107	9	3	12	438	131	236	167	10	1	
Other Types of Building or Construction Products		2,220	2,056	1,018	74	67	720	3	150	24	1,981	46	8	13	438	351	342	98	12	0	
Soldering Flux		173	170	44	4	12	99	0	6	5	163	3	1	3	54	31	47	15	0	0	
Building and Construction Products	Unknown Types of Building or Construction Products	138	74	25	0	2	36	0	11	0	71	1	1	1	19	13	18	5	0	0	
	Category Total: Chemicals	7,446	7,005	3,452	300	228	2,454	16	483	72	6,766	113	31	66	1,364	1,167	992	349	25	1	
	Acids																				
	Hydrochloric Acid	1,839	1,515	80	54	164	1,056	2	126	33	1,441	41	9	12	686	127	527	193	11	3	
Hydrofluoric Acid	676	579	7	5	37	483	0	41	6	565	6	0	5	456	55	231	136	6	1		
(continued)																					

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Table 22A. Demographic profile of SINGLE SUBSTANCE nonpharmaceuticals exposure cases by generic category. – Continued.

	No. of Case Mentions	No. of Single Exposure	Age					Reason				Outcome							
			≤5	6–12	13–19	≥20	Unknown Child	Unknown Adult	Unknown Age	Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
Other Types of Acid	4,678	3,920	577	244	272	2,321	15	432	59	3,647	165	36	38	1,491	458	1,173	391	26	3
Unknown Types of Acid	154	128	9	7	10	85	0	15	2	119	4	2	0	71	5	35	22	3	1
Miscellaneous Chemicals																			
Acetone (Excluding Nail Polish Removers)	1,352	1,160	400	46	82	550	1	68	13	1,049	70	15	11	336	159	298	49	7	0
Alkalis (Excluding Cleaning Agents, Bleaches, Batteries, and Detergents)	3,671	3,231	487	113	281	1,999	4	318	29	3,029	91	37	51	1,646	281	968	599	42	2
Ammonia (Excluding Cleaning Agents)	2,675	1,846	367	97	137	1,032	10	188	15	1,678	96	43	18	673	230	524	194	15	0
Borates or Boric Acid (Excluding Topicals and Pesticides)	7,333	6,832	2,448	1,247	535	2,113	27	405	57	6,380	214	138	75	862	1,122	639	54	2	1
Chlorates (Excluding Matches and Fireworks)	28	20	2	0	7	8	0	3	0	15	1	4	0	11	2	5	5	1	0
Cyanides (Excluding Rodenticides)	225	154	3	4	6	121	1	16	3	111	12	19	2	99	39	29	18	2	3
Dioxins	8	7	0	0	0	3	0	3	1	4	0	2	1	2	0	3	0	0	0
Ethylene Glycol (Excluding Automotive, Aircraft, or Boat Products)	798	626	52	29	38	454	1	43	9	385	178	19	2	381	117	91	92	61	15
Formaldehyde or Formalin	642	579	43	22	71	357	6	68	12	519	23	12	19	235	69	195	39	3	0
Ketones	333	286	69	3	11	176	1	25	1	276	5	1	2	135	49	97	38	1	0
Methylene Chloride (Excluding Paint Strippers)	164	138	20	3	4	89	0	19	3	134	2	0	1	56	12	34	14	0	1
Nitrates and Nitrites (Excluding Medications and Substances of Abuse)	1,011	934	272	216	107	264	12	56	7	733	166	13	14	222	204	130	36	9	0
Other Chemicals	12,469	10,704	4,125	827	678	4,039	41	818	176	9,765	418	146	332	2,503	1,635	1,927	485	36	9
Other Chemicals-Unknown	1	1	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0
If Toxic																			
Other Glycols (Excluding Automotive, Aircraft, or Boat Products)	743	573	215	37	33	250	1	34	3	507	28	11	24	152	97	105	19	2	1
Phenol or Cresolates (Excluding Disinfectants)	276	261	32	6	17	180	0	24	2	247	8	2	4	127	35	71	49	4	0
Strychnine (Excluding Rodenticides)	31	19	7	1	1	7	0	2	1	11	3	3	2	7	4	2	0	1	0
Toluene Diisocyanate	477	441	102	24	18	248	1	46	2	422	14	1	3	136	61	96	27	0	0
Unknown Chemicals	3,717	3,452	706	195	206	1,771	22	483	69	2,768	126	344	116	1,164	432	771	233	9	2
Category Total:	43,301	37,406	10,023	3,180	2,715	17,606	145	3,234	503	33,806	1,671	857	732	11,452	5,193	7,951	2,693	241	42
Cleaning Substances (Household)																			
Automatic Dishwasher Detergents	2,336	2,326	2,188	25	21	78	0	14	0	2,308	5	13	0	123	539	383	7	0	0
Detergents: Granules (Unit Dose)	2,082	2,044	1,679	33	26	230	7	64	5	2,007	14	17	6	129	363	246	15	2	0
Automatic Dishwasher Detergents: Granules (Various Containers)	6,663	6,624	6,247	55	46	228	4	38	6	6,597	9	14	0	412	1,402	1,092	34	0	0
Automatic Dishwasher Detergents: Granules with Liquids (Unit Dose)																			
Automatic Dishwasher Detergents: Liquids (Unit Dose)	465	458	408	11	4	29	1	5	0	454	1	1	0	45	114	68	10	0	0
Automatic Dishwasher Detergents: Liquids (Various Containers)	1,626	1,587	1,298	28	24	190	2	38	7	1,569	9	9	0	138	351	230	31	1	0
Automatic Dishwasher Detergents: Tablets	3,003	2,980	2,767	32	24	134	2	20	1	2,955	11	11	2	146	730	304	9	0	0
Automatic Dishwasher Rinse Agents	946	915	730	9	9	142	3	21	1	902	6	5	1	90	177	149	17	0	0
Other or Unknown Types of Automatic Dishwasher Detergent	1,695	1,656	1,385	21	26	184	2	33	5	1,626	11	16	3	98	254	190	11	1	0
Bleaches																			
Bleaches: Borates	592	467	191	20	33	183	0	30	10	407	43	9	6	131	82	114	16	0	0
Bleaches: Hypochlorite (Liquid and Dry)	40,302	33,446	12,699	1,375	2,814	13,857	81	2,274	346	29,493	2,903	566	315	9,364	4,822	9,538	1,169	50	3
Bleaches: Non-Hypochlorite	267	226	71	11	22	108	0	10	4	183	30	5	5	57	40	54	9	1	0
Bleaches: Other or Unknown (Household) Cleansers	713	601	202	28	56	281	1	28	5	503	66	26	5	212	62	164	27	1	0

(continued)

Table 22A. Demographic profile of SINGLE SUBSTANCE nonpharmaceuticals exposure cases by generic category. – Continued.

	No. of Case Mentions	No. of Single Exposure	Age					Unknown				Reason				Outcome			
			≤5	6–12	13–19	≥20	Child	Adult	Age	Unint	Int	Other	Adv Rtn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
Antic or Nonionic Cleaners Other or Unknown Types of Household Cleanser	1,984 2,827	1,833 2,522	1,368 1,536	45 78	43 105	310 659	0 5	59 127	8 12	1,760 2,344	43 98	17 51	13 16	177 475	405 426	173 377	15 60	1 2	0 0
Disinfectants																			
Disinfectants: Hypochlorite (Non-Bleach Products)	2,559	2,147	945	83	86	829	9	177	18	1,997	86	22	29	561	257	541	108	3	0
Disinfectants: Other or Unknown	6,007	5,622	3,177	349	250	1,508	7	283	48	5,242	219	61	81	696	1,091	1,054	99	2	1
Disinfectants: Phenol	673	630	357	74	45	123	0	27	4	559	50	14	4	83	126	92	9	1	0
Disinfectants: Pine Oil	3,786	3,251	1,666	120	137	1,140	10	155	23	3,015	152	47	20	596	747	626	55	2	0
Drain Cleaners																			
Drain Cleaners: Acids	95	71	7	4	2	47	0	11	0	64	3	2	2	25	5	16	12	0	0
Drain Cleaners: Alkalis	2,882	2,403	387	57	83	1,532	6	296	42	2,210	143	13	29	770	312	626	246	34	5
Drain Cleaners: Hydrochloric Acid	18	12	3	0	0	8	0	1	0	12	0	0	0	3	3	4	1	0	0
Drain Cleaners: Other or Unknown	933	691	122	16	27	414	1	100	11	632	39	10	5	208	93	150	62	4	1
Drain Cleaners: Sulfuric Acid	442	351	33	17	9	247	1	42	2	340	4	1	5	137	26	102	71	4	2
Fabric Softeners/Antistatic Agents																			
Fabric Softener/Antistatic Agent: Other or Unknown	29	24	22	0	0	2	0	0	0	24	0	0	0	2	6	1	0	0	0
Fabric Softeners/Antistatic Agents: Aerosol or Spray	98	96	79	3	2	8	0	3	1	91	3	1	1	4	23	9	0	0	0
Fabric Softeners/Antistatic Agents: Dry or Powder (Unit Dose)	11	9	9	0	0	0	0	0	0	9	0	0	0	0	2	1	0	0	0
Fabric Softeners/Antistatic Agents: Dry or Powder (Various Containers)	14	13	8	0	1	2	0	2	0	12	1	0	0	0	1	1	0	0	0
Fabric Softeners/Antistatic Agents: Liquid (Unit Dose)	10	8	6	0	1	1	0	0	0	7	1	0	0	1	2	2	0	0	0
Fabric Softeners/Antistatic Agents: Liquid (Various Containers)	899	816	578	33	28	148	2	25	2	759	29	8	19	106	174	88	7	0	0
Fabric Softeners/Antistatic Agents: Powder with Liquid (Unit Dose)	2	2	1	0	1	0	0	0	0	2	0	0	0	1	0	1	0	0	0
Fabric Softeners/Antistatic Agents: Solid or Sheet	683	665	546	25	4	62	1	22	5	635	15	6	9	24	109	30	3	0	0
Glass Cleaners																			
Glass Cleaners: Ammonia Containing	1,513	1,366	1,006	59	89	172	3	32	5	1,252	95	15	2	140	342	167	6	0	0
Glass Cleaners: Anionics or Nonionics	92	79	49	3	1	20	0	6	0	73	4	2	0	6	7	6	1	0	0
Glass Cleaners: Isopropanol	1,516	1,378	988	60	67	215	2	41	5	1,295	58	21	3	134	288	150	17	1	0
Glass Cleaners: Other or Unknown Types of Household	1,524	1,350	888	63	98	238	6	51	6	1,199	123	24	1	186	308	186	19	0	0
Hand Dishwashing																			
Antic or Nonionic Hand Dishwashing Detergents	5,649	4,895	2,935	302	137	1,253	10	243	15	4,618	95	128	47	422	591	890	57	0	0
Other or Unknown Types of Household Hand Dishwashing Detergent	2,233	1,903	1,106	101	75	514	3	94	10	1,815	23	55	7	151	198	263	17	1	0
Laundry Additives																			
Enzyme and/or Microbiological Laundry Additives	64	61	28	0	3	26	1	3	0	55	2	0	1	11	10	7	1	0	0
Laundry Bleaching and/or Brightening Agents (without Detergent)	23	22	12	2	1	4	0	3	0	22	0	0	0	4	6	3	0	0	0
Laundry Detergent Boosters	488	458	230	77	23	114	0	12	2	431	10	16	1	48	112	60	7	2	0
Other or Unknown Laundry Additives or Miscellaneous Products	1,292	1,226	1,041	39	29	93	1	17	6	1,194	19	6	5	119	257	125	16	0	0
Water Softeners																			
Laundry Detergents	53	52	29	8	1	12	0	1	1	45	3	3	1	6	10	10	1	0	0

(continued)

Table 22A. Demographic profile of SINGLE SUBSTANCE nonpharmaceuticals exposure cases by generic category. – Continued.

No. of Case Mentions	No. of Single Exposure	Age					Reason				Outcome								
		≤5	6–12	13–19	≤20	Unknown Child	Unknown Adult	Unknown Age	Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death	
Laundry Detergents: Granules (Unit Dose)	338	326	234	17	5	57	1	12	0	318	6	1	1	61	67	71	8	0	0
Laundry Detergents: Granules (Various Containers)	2,454	2,331	1,645	111	84	393	4	84	10	2,217	76	23	10	349	389	403	27	0	0
Laundry Detergents: Granules with Liquids (Unit Dose)	233	231	207	7	1	11	1	4	0	228	3	0	0	86	42	80	11	1	0
Laundry Detergents: Liquids (Unit Dose)	12,286	12,091	10,431	632	196	652	24	139	17	11,913	132	17	20	4,361	2,332	5,060	664	23	1
Laundry Detergents: Liquids (Various Containers)	6,677	6,287	4,335	269	222	1,228	4	205	24	5,992	219	56	9	1,018	1,047	1,170	124	3	2
Laundry Detergents: Other or Unknown Types of Household Laundry Detergent and/or Fabric Cleaner	248	227	125	12	17	59	1	12	1	208	11	3	5	67	47	41	15	0	0
Laundry Detergents: Soaps	176	151	107	8	7	27	0	2	0	142	5	1	2	29	34	33	5	0	0
Laundry Prewash/Stain Removers	178	169	145	7	0	14	0	2	1	167	1	0	1	18	28	33	1	0	0
Laundry Prewash/Stain Removers: Aerosol or Spray Solvent Based	240	227	192	4	5	19	1	5	1	219	7	0	1	23	37	35	4	0	0
Laundry Prewash/Stain Removers: Aerosol or Spray																			
Surfactant Based																			
Laundry Prewash/Stain Removers: Dry Solvent Based	1	1	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0
Laundry Prewash/Stain Removers: Dry Solvent Based	72	71	65	1	1	4	0	0	0	69	2	0	0	6	17	6	0	0	0
Removers: Dry Surfactant Based																			
Laundry Prewash/Stain Removers: Liquid Solvent Based	189	184	143	3	3	30	0	4	1	180	3	1	0	27	59	28	2	0	0
Laundry Prewash/Stain Removers: Liquid Solvent Based																			
Laundry Prewash/Stain Removers: Liquid Surfactant Based	1,552	1,484	1,270	35	31	120	0	25	3	1,449	25	7	2	124	281	233	25	0	0
Laundry Prewash/Stain Removers: Liquid Surfactant Based																			
Laundry Prewash/Stain Removers: Other or Unknown	1,887	1,790	1,386	39	39	268	1	48	9	1,747	18	10	12	183	329	316	23	0	0
Laundry Prewash/Stain Removers: Other or Unknown																			
Laundry Prewash/Stain Removers: Other or Unknown Solvent Based	32	30	25	0	0	4	0	1	0	30	0	0	0	3	5	4	1	0	0
Laundry Prewash/Stain Removers: Other or Unknown Solvent Based																			
Laundry Prewash/Stain Removers: Other or Unknown Surfactant Based	60	56	44	0	2	8	1	1	0	55	0	0	1	8	7	6	2	0	0
Laundry Prewash/Stain Removers: Other or Unknown Surfactant Based																			
Miscellaneous Cleaners																			
Miscellaneous Cleaning Agents: Acids	1,351	1,181	442	36	44	563	3	85	8	1,106	35	31	9	321	242	300	72	2	0
Miscellaneous Cleaning Agents: Alkalis	7,214	6,316	3,678	198	251	1,802	17	319	51	5,944	240	70	40	1,390	1,222	1,171	288	18	0
Miscellaneous Cleaning Agents: Anionics or Nonionics	5,008	4,523	2,915	183	152	1,038	13	202	20	4,309	131	52	24	622	731	633	76	0	0
Miscellaneous Cleaning Agents: Cationics	2,780	2,553	1,414	112	143	756	3	110	15	2,373	130	19	24	432	425	481	82	2	0
Miscellaneous Cleaning Agents: Ethanol (Excluding Automotive Products)	531	502	358	25	13	89	2	14	1	489	7	3	2	41	103	64	3	0	0
Miscellaneous Cleaning Agents: Glycols (Excluding Automotive Products)	406	371	227	16	15	85	2	25	1	344	17	4	5	59	76	53	4	1	0
Miscellaneous Cleaning Agents: Isopropanol (Excluding Automotive Products and Glass)	1,827	1,710	1,072	176	88	284	5	79	6	1,574	96	26	10	140	280	194	16	2	0
Miscellaneous Cleaning Agents: Methanol (Excluding Automotive Products)	25	23	11	0	2	8	1	1	0	23	0	0	0	4	5	6	1	0	0
Miscellaneous Cleaning Agents: Other or Unknown Household Cleaning Agents	4,714	4,262	2,359	268	193	1,180	14	199	49	3,948	196	72	31	809	767	847	114	7	0
Miscellaneous Cleaning Agents: Phenol (Excluding Disinfectants)	9	8	2	0	0	5	0	1	0	8	0	0	0	4	2	3	1	0	0
Miscellaneous Cleaning Substances (Household)																			
Ammonia Cleaners (All Purpose)	669	489	147	24	25	240	2	42	9	429	45	6	9	126	83	118	25	3	0
Carpet, Upholstery, Leather, or Vinyl Cleaners	3,176	2,954	2,049	86	60	651	1	99	8	2,860	40	17	33	382	528	478	46	4	0

(continued)

Table 22A. Demographic profile of SINGLE SUBSTANCE nonpharmaceuticals exposure cases by generic category. – Continued.

No. of Case Mentions	No. of Single Exposure	Age										Unknown		Treated in Health Care Facility		Outcome				
		≤5	6-12	13-19	≤20	Unknown Child	Unknown Adult	Unknown Age	Unint	Int	Other	Adv Rxn	None	Minor	Moderate	Major	Death			
Hydrofluoric Acid or Bifluoride Wheel Cleaners	51	48	7	1	5	32	0	3	0	45	2	0	1	36	4	21	13	1	0	
Starches, Fabric Finishes, or Sizing	247	233	172	17	6	30	1	6	1	223	5	4	1	13	39	15	3	0	0	
Oven Cleaners	5	5	1	1	0	1	0	2	0	5	0	0	0	0	1	0	0	0	0	
Oven Cleaners: Acids	2,002	1,920	322	58	152	1,120	16	223	29	1,846	26	28	17	691	180	543	261	13	0	
Oven Cleaners: Alkalies	2	2	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	
Oven Cleaners: Detergent Types	296	265	53	5	19	150	2	30	6	245	5	10	4	85	19	71	26	0	0	
Oven Cleaners: Other or Unknown																				
Rust Removers	315	271	80	6	9	147	0	26	3	255	8	4	4	51	51	60	10	0	0	
Rust Removers: Acids Other Than Hydrofluoric Acid Types																				
Rust Removers: Alkalies	12	11	2	0	0	7	0	2	0	10	1	0	0	6	0	2	2	0	0	
Rust Removers: Hydrofluoric Acid	216	209	33	2	6	144	0	24	0	198	7	4	0	106	47	58	23	0	0	
Rust Removers: Other or Unknown	166	150	32	2	5	88	0	20	3	138	3	2	3	29	14	31	11	0	0	
Spot Removers/Dry Cleaning Agents																				
Spot Removers/Dry Cleaning Agents: Anionics or Nonionics	129	121	95	2	2	20	1	1	0	120	1	0	0	15	21	17	2	0	0	
Spot Removers/Dry Cleaning Agents: Glycols	85	82	53	5	4	19	0	1	0	80	1	0	0	11	14	19	2	0	0	
Spot Removers/Dry Cleaning Agents: Isopropanol	44	44	26	3	2	11	0	1	1	42	1	0	1	7	11	9	2	0	0	
Spot Removers/Dry Cleaning Agents: Other Halogenated Hydrocarbon Containing Products	21	21	16	1	0	3	0	0	1	21	0	0	0	2	6	3	1	0	0	
Spot Removers/Dry Cleaning Agents: Other Hydrocarbon and/or Non-Halogenated Containing Products	367	343	184	7	11	113	1	26	1	334	4	2	3	75	66	84	11	0	0	
Spot Removers/Dry Cleaning Agents: Other or Unknown	112	107	76	3	2	19	0	7	0	102	3	1	1	16	16	21	0	0	0	
Spot Removers/Dry Cleaning Agents: Perchloroethylene	5	5	4	0	0	1	0	0	0	5	0	0	0	2	1	1	0	0	0	
Toilet Bowl Cleaners																				
Toilet Bowl Cleaners: Acids	2,658	2,195	1,262	51	67	677	4	122	12	2,089	83	8	12	440	597	517	82	12	0	
Toilet Bowl Cleaners: Alkalies	3,979	3,687	3,036	55	77	427	9	72	11	3,589	77	5	14	517	1,043	524	51	1	0	
Toilet Bowl Cleaners: Other or Unknown	3,941	3,632	3,151	59	49	300	5	64	4	3,573	46	4	8	335	915	284	37	2	0	
Wall/Floor/Tile Cleaners																				
Wall/Floor/Tile/All-Purpose Cleaning Agents: Acids	1,423	1,192	725	31	44	310	1	77	4	1,131	42	7	10	194	262	246	28	1	0	
Wall/Floor/Tile/All-Purpose Cleaning Agents: Alkalies	6,650	5,923	3,769	210	223	1,434	15	238	34	5,586	219	49	56	1,144	1,158	1,416	206	6	0	
Wall/Floor/Tile/All-Purpose Cleaning Agents: Anionics or Nonionics	8,195	7,265	4,502	251	289	1,928	12	255	28	6,854	301	61	22	1,301	1,493	1,104	115	4	1	
Wall/Floor/Tile/All-Purpose Cleaning Agents: Cationics	2,377	2,119	1,433	96	76	429	1	79	5	2,001	84	22	5	289	407	362	44	0	2	
Wall/Floor/Tile/All-Purpose Cleaning Agents: Ethanol	298	270	197	9	13	42	0	7	2	256	2	10	1	24	61	35	1	1	0	
Wall/Floor/Tile/All-Purpose Cleaning Agents: Glycols	906	825	614	20	14	144	2	29	2	794	17	6	6	83	161	96	2	0	0	
Wall/Floor/Tile/All-Purpose Cleaning Agents: Isopropanol	470	438	346	11	17	52	1	11	0	423	7	6	2	25	118	53	1	0	0	
Wall/Floor/Tile/All-Purpose Cleaning Agents: Other or Unknown	1,605	1,459	1,027	42	40	292	2	50	6	1,396	49	3	8	225	320	241	29	2	0	
Category Total: Cosmetics/Personal Care Products	189,999	170,676	105,275	6,484	7,184	42,880	345	7,504	1,004	160,422	6,865	1,870	1,074	32,456	31,084	35,994	4,848	222	18	
Dental Care Products																				
False Teeth Cleaning Agents	2,322	2,298	264	43	36	1,729	0	210	16	2,224	36	7	24	131	380	152	12	0	1	

(continued)



Table 22A. Demographic profile of SINGLE SUBSTANCE nonpharmaceuticals exposure cases by generic category. – Continued.

	No. of Case Mentions	No. of Single Exposure	Age				Reason				Outcome								
			≤5	6–12	13–19	≥20	Unknown Child	Unknown Adult	Unknown Age	Unint	Int	Other	Adv Rtn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
Dental Care Products (Excluding Fluoride Supplements)	1,469	1,402	484	96	66	617	0	128	11	1,257	57	5	80	134	215	163	21	0	0
	15,030	14,636	12,704	445	286	936	18	227	20	14,211	203	51	155	268	2,343	712	16	1	0
	1,695	1,636	1,435	36	25	111	1	26	2	1,601	15	4	16	21	202	47	2	0	0
	42	38	33	0	2	3	0	0	0	36	1	0	1	9	10	6	2	0	0
	2,078	1,994	958	48	114	711	5	140	18	1,735	40	7	205	390	302	389	89	1	0
	572	561	490	12	8	38	4	9	0	554	4	1	1	65	115	51	5	1	0
	196	194	134	2	6	43	1	6	2	182	2	0	9	95	46	58	26	2	0
	38	35	26	3	1	4	0	1	0	35	0	0	0	12	5	8	2	0	0
	335	332	233	7	7	69	0	12	4	315	3	0	13	158	48	99	36	1	0
	2,020	1,885	1,591	63	48	148	3	29	3	1,826	39	3	16	147	329	164	18	0	0
Hair Care Products	1,162	1,058	649	64	52	240	6	41	6	933	107	5	8	137	190	161	27	1	0
	2,607	2,495	1,815	70	83	396	5	113	13	2,352	39	8	93	355	433	335	48	1	0
	133	130	72	1	6	42	0	9	0	115	1	0	14	47	22	35	8	0	0
	5,675	5,318	3,932	298	194	726	13	135	20	5,019	195	16	77	497	592	897	70	4	0
	19,411	18,898	14,393	1,786	715	1,726	37	216	25	16,941	1,555	317	26	1,604	4,567	1,439	220	25	1
	188	184	145	9	3	25	1	1	0	168	14	1	0	21	49	16	3	0	0
	1,948	1,902	1,482	163	67	153	6	25	6	1,802	93	5	0	99	330	109	8	2	0
	602	566	347	90	43	68	6	11	1	483	55	22	3	79	114	66	11	1	1
	1,474	1,412	1,266	31	17	79	1	15	3	1,392	8	2	6	121	278	129	12	0	0
	3,092	3,017	2,663	196	37	104	3	12	2	2,962	27	5	20	140	530	245	7	0	0
Cosmetics/Personal Care Products	20,946	20,089	16,399	680	474	2,033	31	408	64	19,189	273	53	548	735	2,534	1,097	101	2	0
	14,685	14,482	12,855	319	473	659	20	133	23	13,973	336	49	109	498	1,799	890	45	1	0
	691	668	219	15	82	274	1	65	12	453	50	7	153	179	81	167	75	0	0
	43	43	25	2	2	11	1	0	2	38	1	0	3	3	11	6	0	0	0
	1,436	1,371	1,134	31	40	133	1	22	10	1,313	13	2	42	82	177	95	15	0	0
	851	831	722	39	24	35	0	7	4	802	24	0	5	13	142	38	0	0	0
	4,485	4,353	3,843	146	63	223	5	36	37	4,045	63	7	232	86	517	315	21	0	0
	7,547	7,255	5,739	404	352	627	11	98	24	6,830	302	86	17	661	1,449	1,212	51	2	0
	6,863	6,318	2,057	309	357	2,924	10	577	84	5,798	288	50	158	1,162	782	1,477	214	14	0
	1,454	1,414	1,260	36	29	69	3	16	1	1,369	30	4	7	95	202	213	12	2	0
Household Products	1,595	1,558	1,235	49	49	169	5	47	4	1,490	43	14	11	216	273	286	28	3	0
	13,082	12,363	8,731	669	467	2,097	28	312	59	11,632	384	111	209	870	1,452	1,642	102	2	0
	8,216	8,073	6,871	474	126	469	18	102	13	7,870	56	21	122	304	918	785	23	0	0
	5,764	5,158	1,371	394	394	2,576	4	383	36	4,134	963	9	14	951	702	575	198	20	1
	5,195	5,127	3,419	981	97	537	5	81	7	5,026	68	4	22	80	829	152	3	0	0
	1,511	1,461	573	137	66	598	0	86	1	1,358	76	1	23	64	211	70	2	0	0
	208	183	47	12	13	89	0	16	6	147	31	0	2	36	29	19	5	1	0
	915	909	341	147	117	253	7	38	6	883	19	1	5	394	90	254	69	0	0
	219	212	159	2	18	31	0	1	1	207	1	0	4	65	45	51	10	0	0
	10	10	8	0	0	2	0	0	0	10	0	0	0	4	2	2	1	0	0

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(continued)

Table 22A. Demographic profile of SINGLE SUBSTANCE nonpharmaceuticals exposure cases by generic category. – Continued.

	No. of Case Mentions	No. of Single Exposure	Age					Reason					Outcome						
			Age					Reason					Outcome						
			≤5	6-12	13-19	≤20	Unknown Child	Unknown Adult	Unknown Age	Unint	Int	Other	Adv Rtn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
Miscellaneous Nail Products	671	650	443	39	16	124	3	23	2	616	22	3	9	121	147	111	17	1	0
Nail Polish Removers (Acetone Containing)	2,000	1,933	1,332	77	84	369	6	60	5	1,826	76	15	11	231	412	304	19	0	1
Nail Polishes	6,058	5,855	5,121	249	107	288	13	71	6	5,744	87	9	10	424	1,011	644	19	0	0
Other Nail Polish Removers	658	643	483	25	34	80	1	19	1	615	21	3	4	60	161	104	2	0	0
Unknown Nail Polish Removers	5,426	5,195	3,516	280	312	893	11	164	19	4,937	193	44	4	715	968	772	47	2	0
Category Total: Deodorizers	172,618	166,145	123,019	8,979	5,612	23,531	294	4,131	579	156,448	5,914	952	2,491	12,579	26,044	16,562	1,722	90	5
Air Freshener																			
Air Fresheners: Aerosols	2,095	2,053	1,334	165	86	360	5	89	14	1,942	59	23	28	161	378	342	20	4	0
Air Fresheners: Liquids	9,352	9,228	8,126	237	147	571	10	124	13	9,063	91	55	15	615	1,722	1,266	41	0	0
Air Fresheners: Solids	1,968	1,945	1,696	91	31	108	2	16	1	1,912	23	9	0	169	370	120	11	0	0
Air Fresheners: Unknown Form	1,732	1,711	1,451	58	29	139	6	25	3	1,670	20	9	11	168	348	207	12	0	0
Miscellaneous Deodorizers																			
Diaper Pail Deodorizers (Excluding Moth Repellants)	12	11	9	0	0	2	0	0	0	11	0	0	0	0	1	1	0	0	0
Other Types of Deodorizer (Not For Personal Use)	5,703	5,442	3,906	234	156	937	12	174	23	5,230	122	58	23	548	1,105	738	49	5	1
Toilet Bowl Deodorizers	488	473	403	8	7	41	1	10	3	465	7	1	0	52	112	42	6	0	0
Unknown Types of Deodorizer (Not for Personal Use)	80	79	60	4	1	11	0	3	0	76	2	1	0	8	19	9	0	0	0
Category Total: Dyes	21,430	20,942	16,985	797	457	2,169	36	441	57	20,369	324	156	77	1,721	4,055	2,725	139	9	1
Dyes																			
Miscellaneous Dyes																			
Dyes: Fabrics	369	357	246	38	14	49	0	9	1	344	4	3	5	23	90	14	2	0	0
Dyes: Foods (Including Easter Egg)	870	781	639	89	19	27	6	1	0	743	34	0	4	21	122	33	2	0	0
Dyes: Leathers	70	67	44	4	4	9	0	5	1	65	1	0	0	5	17	2	0	0	0
Dyes: Other	488	455	200	90	90	54	2	15	4	423	20	3	8	35	73	23	4	0	0
Dyes: Unknown	53	45	30	4	5	5	0	1	0	40	4	0	1	7	11	3	1	0	0
Category Total: Essential Oils	1,850	1,705	1,159	225	132	144	8	31	6	1,615	63	6	18	91	313	75	9	0	0
Essential Oils																			
Miscellaneous Essential Oil																			
Cinnamon Oil	642	575	374	60	23	95	0	21	2	491	41	5	37	56	55	174	6	0	0
Clove Oil	605	556	356	14	12	146	1	25	2	505	19	0	32	101	109	139	10	1	0
Eucalyptus Oil	1,502	1,341	864	54	27	325	6	56	9	1,274	35	6	18	254	286	207	19	1	0
Miscellaneous Essential Oils	16,020	15,248	11,458	587	283	2,347	29	504	40	14,516	291	80	333	1,113	2,940	2,375	104	2	0
Pennyroyal Oil	24	22	5	2	1	12	0	2	0	15	3	0	4	6	6	2	1	1	0
Tea Tree Oil	4,597	4,326	2,192	136	207	1,478	3	283	27	3,980	208	22	90	530	983	453	38	1	0
Category Total: Fertilizers	23,390	22,068	15,249	853	553	4,403	39	891	80	20,781	597	113	514	2,060	4,379	3,350	178	6	0
Fertilizers																			
Miscellaneous Fertilizers																			
Household Plant Foods (Generally for Indoor Plants)	1,391	1,338	720	91	44	405	4	68	6	1,298	26	12	1	62	214	49	7	1	0
Other Types of Fertilizer	1,502	1,370	853	104	40	291	3	67	12	1,323	19	10	17	124	233	95	16	0	0
Outdoor Fertilizers	1,835	1,722	1,096	114	40	390	7	69	6	1,666	22	8	23	119	315	122	16	0	0
Plant Hormones	59	50	18	1	0	26	0	5	0	47	0	0	3	3	8	4	0	0	0
Unknown Types of Fertilizer	106	97	38	11	4	34	0	8	2	93	2	2	0	10	13	8	0	1	0
Category Total: Fire Extinguishers	4,893	4,577	2,725	321	128	1,146	14	217	26	4,427	69	32	44	318	783	278	39	2	0
Fire Extinguishers																			
Miscellaneous Fire Extinguisher																			
Miscellaneous Fire Extinguishers	2,772	2,701	239	395	325	1,040	95	313	294	2,406	65	195	15	639	562	726	121	0	0
Category Total: Foreign Bodies/Toys/Miscellaneous	2,772	2,701	239	395	325	1,040	95	313	294	2,406	65	195	15	639	562	726	121	0	0
Foreign Bodies/Toys/Miscellaneous																			
Miscellaneous Foreign Bodies/Toys/Miscellaneous																			
Asbes	323	293	236	11	2	31	0	12	1	286	3	2	2	15	45	17	2	0	0
Bubble Blowing Solutions	3,292	3,242	2,928	184	51	61	2	12	4	3,190	45	2	2	157	371	474	16	1	0

(continued)

Table 22A. Demographic profile of SINGLE SUBSTANCE nonpharmaceuticals exposure cases by generic category. – Continued.

	No. of Case Mentions	No. of Single Exposure	Age					Reason				Outcome								
			≤5	6–12	13–19	≥20	Unknown Child	Unknown Adult	Unknown Age	Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death	
Various Categories: Toys, Household Items, Miscellaneous Substances, Metals, etc.	Charcoals	738	616	417	29	30	108	0	24	8	556	21	4	30	53	79	38	10	0	0
	Christmas ornaments	269	265	207	13	5	25	2	13	0	258	6	0	1	19	50	16	1	0	0
	Coins	2,749	2,679	2,182	402	34	41	4	12	4	2,615	57	3	0	960	664	260	27	1	0
	Desiccants	18,718	18,559	15,256	1,248	342	1,265	76	310	62	18,156	245	122	17	924	2,203	162	7	1	0
	Feces/Urine	5,417	4,708	3,687	152	90	540	19	186	34	4,553	30	93	23	184	573	138	14	1	0
	Glass	3,839	3,752	880	209	189	1,514	39	836	85	3,605	40	70	31	251	560	180	13	1	0
	Glow Products	15,491	15,459	11,881	2,829	309	268	52	93	27	15,279	160	9	4	716	1,618	2,838	50	0	0
	Incense (Punk)	191	186	140	4	6	19	1	14	2	178	2	4	1	13	35	11	2	0	0
	Other Types of Foreign Body, Toy, or Miscellaneous Substance	23,875	22,646	15,251	2,519	792	2,904	86	959	135	21,425	663	288	216	1,956	3,563	973	125	6	0
	Oxygen Absorbers	494	488	208	100	38	112	3	26	1	451	28	6	2	33	95	17	0	0	0
	Soil	2,325	2,060	1,379	134	37	398	2	99	11	1,982	27	11	36	176	229	139	24	0	0
	Toys	8,214	8,122	6,213	1,434	201	176	18	68	12	7,845	190	34	47	538	1,226	506	24	1	0
	Unknown Types of Foreign Body, Toy, or Miscellaneous Substance	1,462	1,418	959	224	61	136	4	32	2	1,348	47	9	7	100	179	69	11	3	0
	Thermometers	1,032	1,020	211	127	74	330	17	232	29	996	9	7	4	75	170	14	1	0	0
	Thermometers: Mercury	682	669	211	93	44	204	8	96	13	649	8	8	3	39	128	30	1	0	0
	Thermometers: Other	108	108	20	10	10	48	0	18	2	107	0	1	0	9	12	1	0	0	0
	Thermometers: Unknown	89,219	86,290	62,266	9,722	2,315	8,180	333	3,042	432	83,479	1,581	673	426	6,218	11,800	5,883	328	15	1
	Category Total:																			
	Fumes/Gases/Vapors																			
	Miscellaneous Fumes/Gases/Vapors	425	403	32	34	55	212	3	56	11	367	24	2	7	96	69	101	26	0	0
	Carbon Dioxide	12,846	11,508	1,479	917	852	6,425	148	1,418	269	11,003	341	46	29	5,751	2,273	3,166	1,237	203	44
	Carbon Monoxide	2,230	2,115	80	40	119	1,529	7	316	24	2,000	96	7	11	370	241	664	152	4	0
	Chloramine Gas	4,305	4,039	328	286	275	2,544	36	525	45	3,869	114	10	37	1,130	355	1,331	488	9	1
Chlorine Gas																				
Chlorine Gas (When Household Acid is Mixed with Hypochlorite)	2,284	2,166	102	68	123	1,561	7	293	12	2,074	85	0	3	479	313	816	236	5	0	
Hydrogen Sulfide (Sewer Gas)	739	646	45	29	26	411	3	116	16	632	7	2	2	283	61	197	81	7	1	
Methane and Natural Gas	4,738	4,467	895	361	266	2,129	50	681	85	4,430	15	13	0	973	1,171	804	134	3	3	
Other Types of Fume, Gas or Vapor	1,551	1,426	174	62	83	826	11	249	21	1,325	62	11	22	364	245	307	104	6	1	
Polymer Fume Fever	5	5	0	1	0	2	1	1	0	5	0	0	0	1	0	1	0	0	0	
Simple Asphyxiants	2,618	2,357	221	279	201	1,298	23	305	30	2,104	209	15	13	810	376	615	182	12	3	
Unknown Types of Fume, Gas or Vapor	1,776	1,697	96	56	65	917	21	446	96	1,618	15	34	12	471	154	352	123	5	0	
Category Total:	33,517	30,829	3,452	2,133	2,065	17,854	310	4,406	609	29,427	968	140	136	10,728	5,258	8,354	2,763	254	53	
Heavy Metals																				
Miscellaneous Heavy Metals	762	690	417	33	34	157	0	46	3	647	14	12	13	48	91	44	9	0	0	
Aluminum	837	737	127	21	19	462	1	94	13	467	13	114	19	376	113	58	37	9	1	
Arsenic (Excluding Pesticides)	23	15	0	1	6	7	0	1	0	11	0	2	2	5	3	2	1	0	0	
Barium, Soluble Salts	91	62	3	1	2	48	0	7	1	45	2	4	0	36	5	7	3	1	0	
Cadmium	657	545	85	42	88	244	4	74	8	486	24	16	13	166	62	147	30	1	0	
Fireplace Flame Colors	18	18	7	3	2	5	0	1	0	16	0	2	0	3	1	3	0	0	0	
Gold	2	2	1	0	0	1	0	0	0	2	0	0	0	0	1	0	0	0	0	
Lead	2,397	2,219	1,099	179	97	606	29	184	25	2,032	28	56	13	1,052	585	144	78	4	1	
Manganese	55	38	8	6	3	17	0	4	0	33	0	1	2	17	3	4	1	0	0	
Mercury (Other)	150	136	17	3	7	88	0	16	5	101	6	11	14	41	24	15	2	1	0	
Mercury, Elemental (Excluding Thermometer)	1,045	973	85	75	76	498	8	193	38	827	45	30	46	250	227	39	18	1	0	
Metal Fume Fever	307	279	16	3	16	217	0	25	2	252	11	1	15	112	13	78	36	0	0	
Other Types of Heavy Metal	3,527	2,297	910	143	100	920	5	195	24	1,847	175	51	196	407	335	193	65	6	0	
Thallium	27	18	0	1	0	11	0	6	0	5	0	9	0	10	1	3	1	0	0	
Unknown Types of Heavy Metal	62	59	7	5	5	29	0	11	2	36	2	8	6	4	1	7	0	0	0	
Category Total:	9,960	8,088	2,782	516	455	3,310	47	857	121	6,807	320	317	339	2,559	1,468	738	288	23	2	
Hydrocarbons																				
Miscellaneous Hydrocarbons																				

(continued)

Table 22A. Demographic profile of SINGLE SUBSTANCE nonpharmaceuticals exposure cases by generic category. – Continued.

	No. of Case Mentions	No. of Single Exposure	Age					Unknown			Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	Outcome					
			≤5	6–12	13–19	≥20	Child	Unknown Adult	Unknown Age	None						Minor	Moderate	Major	Death		
Chemicals and Physical Agents	Benzene	66	46	3	1	4	29	0	9	0	39	3	4	0	23	9	6	5	0	0	
	Carbon Tetrachloride	38	36	1	0	1	24	0	9	1	35	0	0	0	0	13	7	0	0	0	
	Diesel Fuels	696	649	120	8	37	399	2	74	9	608	31	6	0	183	103	178	38	0	0	
	Freon and Other Propellants	4,671	4,437	308	219	338	2,917	21	550	84	3,382	969	49	12	1,762	687	1,035	549	39	26	
	Gasolines	9,331	8,891	1,711	531	725	4,941	23	879	81	8,090	640	99	29	2,132	1,192	2,742	352	13	0	
	Kerosenes	719	663	299	31	26	242	2	56	7	626	18	11	4	4	228	140	193	47	4	
	Lamp Oils	1,123	1,096	749	48	26	223	2	44	4	1,055	22	13	4	426	262	263	109	10	0	
	Lighter Fluids and/or Naphtha	2,191	2,038	1,049	58	98	693	11	117	12	1,877	95	48	8	723	387	547	129	10	0	
	Lubricating Oils and/or Motor Oils	3,494	3,267	1,780	161	133	1,023	5	150	15	3,107	90	60	5	625	833	513	79	4	0	
	Mineral Seal Oil	24	24	11	0	3	6	0	3	1	22	1	1	0	5	4	4	1	0	0	
	Mineral Spirits	1,546	1,428	398	35	84	789	4	107	11	1,327	59	27	12	533	233	407	108	7	0	
	Other Types of Halogenated Hydrocarbon	219	187	32	5	13	117	0	19	1	167	13	3	4	81	21	64	13	2	0	
	Other Types of Hydrocarbon	3,984	3,625	1,674	164	146	1,375	12	233	21	3,451	117	30	16	1,010	696	764	178	13	1	
	Toluene and/or Xylene (Excluding Adhesives)	620	525	75	11	16	351	0	46	26	489	21	5	7	230	73	170	49	3	1	
	Turpentine	331	290	46	9	20	172	1	39	3	219	54	10	3	94	52	52	20	1	0	
	Unknown Types of Hydrocarbon	467	411	136	14	22	204	0	28	7	362	35	2	6	141	79	98	38	5	0	
	Category Total:	29,520	27,613	8,392	1,295	1,692	13,505	83	2,363	283	24,856	2,168	368	110	8,209	4,782	7,043	1,715	111	29	
	Household Products and Miscellaneous	Industrial Cleaners																			
		Miscellaneous Industrial Cleaners																			
		Industrial Cleaner: Disinfectants	2,164	1,991	142	81	159	1,306	3	265	35	1,802	149	17	16	634	194	643	171	7	0
Industrial Cleaner: Other or Unknown		1,466	1,337	352	40	93	716	4	119	13	1,227	56	38	12	514	200	415	101	9	0	
Industrial Cleaners: Acids		1,819	1,521	357	28	65	915	2	130	24	1,443	44	22	8	501	188	438	124	9	1	
Industrial Cleaners: Alkalies		2,785	2,609	470	70	164	1,670	2	208	25	2,466	82	39	18	1,409	259	917	452	22	0	
Industrial Cleaners: Anionics or Nonionics		624	550	219	22	32	225	2	45	5	521	26	3	0	134	69	123	19	0	0	
Industrial Cleaners: Cationics		731	691	125	40	64	396	2	55	9	612	60	11	4	258	101	236	32	1	0	
Category Total:		9,589	8,699	1,665	281	577	5,228	15	822	111	8,071	417	130	58	3,450	1,011	2,772	899	48	1	
Infectious and Toxin-Mediated Diseases																					
Botulinum Toxins																					
Botulism		262	241	55	7	2	131	2	37	7	158	4	2	68	88	31	17	15	15	1	
Ichthyosarcotoxins																					
Ciguatera Poisoning		151	145	2	3	6	120	0	8	6	108	1	1	35	69	2	32	27	3	0	
Ciguatera Fish Poisoning		19	17	0	2	0	15	0	0	0	15	0	0	1	2	0	1	1	0	0	
Other Types of Seafood Poisoning		192	171	4	4	12	132	0	17	2	140	2	1	24	65	3	40	23	1	0	
Paralytic Shellfish Poisoning		114	109	4	8	8	75	0	11	3	86	1	0	21	32	11	17	20	3	0	
Scombroid Fish Poisoning		191	181	12	5	8	112	1	37	6	126	0	5	50	48	8	50	26	1	0	
Tetrodon Poisoning		135	130	23	27	9	62	0	7	2	118	7	1	3	17	17	14	4	1	0	
Infectious Diseases																					
Bacterial Diseases	397	376	93	27	23	154	3	70	6	317	1	17	35	66	30	51	26	3	0		
Fungal Diseases	2,445	2,370	674	229	153	1,043	10	240	21	2,076	8	150	135	42	275	87	7	0	0		
Other Types of Bacterial Food Poisoning	49	47	16	4	2	20	0	5	0	40	1	3	3	4	3	4	3	0	0		
(Salmonella, Shigella, Vibrio, Staphylococcus, Streptococcus, etc)																					
Parasitic Diseases	17	13	1	1	0	8	0	3	0	12	1	0	0	1	2	0	0	0	0		
Prion Diseases	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Unknown Types of Bacterial Food Poisoning	171	166	22	7	9	111	0	17	0	155	0	5	5	22	3	19	9	0	0		
Unknown Types of Suspected Food Poisoning	9,700	9,458	1,713	680	611	5,163	32	1,132	127	8,810	41	114	460	848	521	1,460	320	8	0		
Viral Diseases	309	160	16	10	4	95	0	27	8	136	1	11	7	70	7	7	4	0	0		
Category Total:	14,153	13,584	2,635	1,014	847	7,241	48	1,611	188	12,297	68	310	847	1,374	913	1,799	485	35	1		
Information Calls																					
Food Information Calls																					
Information Calls About Food Products, Additives or Supplements	7,485	5,485	2,774	416	257	1,518	25	451	44	4,510	275	309	357	535	732	703	80	5	0		
Information Calls About Possibly Spoiled Foods	4,854	4,737	1,182	433	295	2,198	9	568	52	4,295	18	128	280	184	461	298	66	1	0		
Category Total:	12,339	10,222	3,956	849	552	3,716	34	1,019	96	8,805	293	437	637	719	1,193	1,001	146	6	0		

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(continued)

Table 22A. Demographic profile of SINGLE SUBSTANCE nonpharmaceuticals exposure cases by generic category. – Continued.

	No. of Case Mentions	No. of Single Exposure	Age					Reason				Outcome							
			≤5	6–12	13–19	≤20	Unknown Child	Unknown Adult	Unknown Age	Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
Lacrimators																			
Miscellaneous Lacrimators	3,320	3,277	608	794	608	892	45	231	99	2,615	128	377	31	833	191	1,584	141	4	0
Lacrimators: Capsicum Defense Sprays	497	488	95	104	106	147	3	26	7	381	19	65	9	125	13	226	31	0	0
Lacrimators: CN (Chloroacetophenone)	12	12	2	0	0	10	0	0	0	9	0	2	0	11	0	9	1	1	0
Lacrimators: CS (O-Chlorobenzylidene Malonitrile)																			
Lacrimators: Other	66	36	4	3	1	23	0	5	0	34	1	1	0	13	2	9	3	0	0
Lacrimators: Unknown	112	102	22	12	12	46	0	7	3	75	7	11	3	33	3	48	10	0	0
Category Total:	4,007	3,915	731	913	727	1,118	48	269	109	3,114	155	456	43	1,015	209	1,876	186	5	0
Matches/Fireworks/Explosives																			
Miscellaneous Matches/Fireworks/Explosives	175	162	92	14	16	30	0	9	1	140	16	5	0	47	35	25	7	1	0
Explosives	883	878	756	61	21	27	0	6	7	858	12	3	1	90	257	61	12	0	0
Fireworks	436	433	380	12	6	26	1	7	1	425	7	0	1	23	72	8	1	0	0
Matches	83	82	56	11	5	9	0	1	0	79	2	1	0	12	21	9	6	0	0
Other Types of Match, Firework, or Explosive																			
Unknown Types of Match, Firework, or Explosive	10	10	6	0	0	3	0	0	1	9	1	0	0	1	4	0	1	0	0
Category Total:	1,587	1,565	1,290	98	48	95	1	23	10	1,511	38	9	2	173	389	103	27	1	0
Miscellaneous Foods																			
Foods	2,229	2,121	511	261	367	718	27	205	32	1,516	232	42	300	215	40	858	81	5	0
Capsicum Peppers	441	403	154	35	27	149	1	33	4	298	14	7	81	51	50	55	22	0	0
Food Additives	8,553	7,890	3,723	663	342	2,194	48	781	139	6,210	238	247	1,159	570	831	668	132	1	0
Food Products	1,153	1,078	183	95	84	511	6	177	22	446	18	44	554	182	49	235	93	2	0
Other Adverse Reactions to Food	12,376	11,492	4,571	1,054	820	3,572	82	1,196	197	8,470	502	340	2,094	1,018	970	1,816	328	8	0
Mushrooms																			
Miscellaneous Mushrooms	58	56	16	1	4	31	0	2	2	38	12	0	5	38	18	12	7	3	0
Group 1 Mushrooms:																			
Cyclopeptides	34	31	9	0	3	19	0	0	0	17	12	1	1	23	4	5	12	2	0
Group 2 Mushrooms: Muscimol (Ibotenic Acid)																			
Group 3 Mushrooms: Monomethylhydrazine (MMH)	26	24	2	3	2	16	0	0	1	19	3	0	2	15	7	5	3	1	0
Group 4 Mushrooms: Muscarine and Histamine	36	36	1	0	2	31	0	2	0	25	5	0	6	26	1	24	2	0	0
Group 5 Mushrooms: Coprine	10	9	5	1	0	3	0	0	0	8	1	0	0	5	2	2	0	0	0
Group 6 Mushrooms: Hallucinogenics (Psilocybin and Psilocin)	446	296	23	4	96	151	1	16	5	54	231	1	8	229	10	61	128	6	0
Group 7 Mushrooms: Gastrointestinal Irritants	189	178	64	6	13	90	0	5	0	131	36	1	10	84	36	54	30	0	0
Mushrooms: Miscellaneous, Non-Toxic	119	107	50	12	4	34	0	7	0	85	5	0	16	25	26	16	3	1	0
Mushrooms: Other Potentially Toxic	148	133	45	12	11	52	0	12	1	103	6	0	23	34	37	26	9	2	0
Mushrooms: Unknown	5,070	4,911	3,229	405	226	905	23	96	27	4,187	529	13	148	1,528	1,920	630	254	19	2
Category Total:	6,136	5,781	3,444	444	361	1,332	24	140	36	4,667	840	16	219	2,007	2,061	835	448	34	2
Other/Unknown Nondrug Substances																			
Miscellaneous Other/Unknown Nondrug Substances	23,732	21,666	10,724	2,035	892	5,937	127	1,569	382	19,542	736	645	506	3,180	4,128	3,282	523	32	3
Other Non-Drug Substances	6,243	5,991	1,141	272	230	3,334	30	764	220	4,453	167	858	177	1,577	561	670	250	54	8
Unknown Substances Unlikely to be Drug Products	29,975	27,657	11,865	2,307	1,122	9,271	157	2,333	602	23,995	903	1,503	683	4,757	4,689	3,952	773	86	11
Category Total:																			
Paints and Stripping Agents																			
Miscellaneous Paints and Stripping Agents	435	416	176	19	17	158	4	37	5	391	5	1	19	80	74	74	14	1	1
Other Types of Paint, Varnish or Lacquer	4,894	4,615	3,018	219	151	922	19	254	32	4,445	79	29	50	543	670	319	67	3	0
Unknown Types of Paint, Varnish or Lacquer																			

(continued)

Table 22A. Demographic profile of SINGLE SUBSTANCE nonpharmaceuticals exposure cases by generic category. – Continued.

No. of Case Mentions	No. of Single Exposure	Age					Reason					Outcome																								
		Unknown					Treated in Health Care Facility					None					Minor					Moderate					Major					Death				
		≤5	6-12	13-19	≥20	Child	Adult	Age	Unint	Int	Other	Adv Rtn	Health Care Facility	None	Minor	Moderate	Major	Death																		
Varnishes and Lacquers	869	811	212	26	31	402	4	128	8	778	8	6	17	156	96	190	46	1	0																	
Paints																																				
Anti-Algae Paints	18	16	1	0	2	11	0	2	0	16	0	0	0	4	3	2	1	0	0																	
Anti-Corrosion Paints	49	42	6	1	2	31	0	2	0	42	0	0	0	12	3	16	2	0	0																	
Oil-Base Paints	1,977	1,852	484	153	118	878	10	175	34	1,724	63	13	45	379	253	406	80	3	1																	
Water Base Paints (Acrylic, Latex, etc)	2,608	2,534	1,865	84	70	403	7	86	19	2,466	32	4	32	190	373	194	21	0	0																	
Wood stains	725	681	302	15	21	270	3	68	2	645	10	7	18	101	135	122	17	0	0																	
Stripping Agents																																				
Methylene Chloride Stripping Agents	350	340	51	14	13	231	0	31	0	319	12	2	6	152	24	126	46	5	0																	
Other Types of Stripping Agent	486	445	90	11	19	287	1	35	2	423	8	4	8	191	38	132	78	1	0																	
Unknown Types of Stripping Agent	64	59	7	1	8	41	0	2	0	59	0	0	0	24	3	22	9	0	0																	
Category Total:	12,475	11,811	6,212	543	452	3,634	48	820	102	11,308	217	66	195	1,832	1,672	1,603	381	14	2																	
Pesticides																																				
Fumigants																																				
Aluminum Phosphide	81	74	3	3	9	49	0	10	0	67	3	1	1	55	7	27	7	3	6																	
Methyl Bromide	21	18	1	0	0	17	0	0	0	18	0	0	0	10	1	4	4	0	1																	
Other Fumigants	42	38	4	1	1	22	0	9	1	35	0	0	3	12	5	9	1	0	0																	
Sulfuryl Fluoride	308	278	31	33	16	163	0	28	7	260	1	9	8	38	27	34	4	0	1																	
Unknown Fumigants	112	109	16	2	6	73	0	12	0	97	6	1	3	40	10	29	10	0	0																	
Fungicides (Non-medical)																																				
Carbamate Fungicides	80	54	15	2	4	31	1	1	0	51	1	0	2	21	8	15	5	0	0																	
Copper Compound Fungicides	84	81	6	3	2	59	0	11	0	80	1	0	0	12	13	17	1	0	0																	
Mercurial Fungicides	1	1	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0																	
Other Types of Non-Medical Fungicide	604	474	109	24	14	270	1	50	6	455	8	2	9	72	87	73	19	2	0																	
Phthalimide Fungicides	35	23	8	3	2	9	0	1	0	22	0	0	1	4	5	4	0	0	0																	
Unknown Types of Non-Medical Fungicide	50	31	9	1	0	19	0	2	0	28	1	1	0	9	4	6	3	0	0																	
Medicinal Fungicide																																				
Wood Preservatives	138	132	20	7	2	90	1	11	1	131	1	0	0	24	12	18	3	0	0																	
Herbicides (Including Algaecides, Defoliantes, Desiccants, Plant Growth Regulators)																																				
Carbamate Herbicides (Excluding Metam Sodium)	3	3	0	0	0	3	0	0	0	3	0	0	0	2	0	2	0	0	0																	
Chlorophenoxy Herbicides	1,828	1,557	394	58	27	896	6	157	19	1,484	22	11	35	276	315	349	36	2	0																	
Diquat	447	408	99	8	4	246	2	42	7	382	9	6	11	61	103	73	13	0	1																	
Glyphosate	3,550	3,167	645	110	72	1,954	6	355	25	3,001	40	34	79	561	624	719	82	4	4																	
Other Types of Herbicide	1,430	1,131	249	34	30	694	2	112	10	1,071	19	14	22	224	205	272	28	1	2																	
Paraquat	122	105	2	0	5	80	0	14	4	94	1	3	0	54	20	24	10	3	1																	
Triazine Herbicides	207	145	29	6	3	91	1	13	2	139	2	0	4	41	26	35	7	0	0																	
Unknown Types of Herbicide	492	409	87	30	10	227	2	45	8	369	16	9	11	107	47	83	14	1	1																	
Urea Herbicides	38	22	7	2	0	12	0	1	0	19	3	0	0	3	7	3	0	0	0																	
Insecticides (Including Insect Growth Regulators, Molluscicides, Nematicides)																																				
Carbamate Insecticides Alone	1,485	1,378	425	84	47	654	9	140	19	1,263	63	27	21	310	292	221	50	2	0																	
Carbamate Insecticides in Combination with Other Insecticides	189	181	27	6	9	106	0	26	7	173	2	1	3	27	22	30	6	0	0																	
Chlorinated Hydrocarbon Insecticides Alone	163	147	55	4	2	64	0	19	3	130	10	1	5	44	27	23	2	2	0																	
Chlorinated Hydrocarbon Insecticides in Combination with Other Insecticides	188	183	42	5	10	95	0	27	4	165	3	0	15	37	21	52	11	0	0																	
Insect Growth Regulators	182	91	34	3	1	37	0	13	3	86	2	0	3	12	12	12	1	0	0																	
Metaldehyde	42	41	17	0	1	22	0	1	0	39	0	2	0	6	12	7	1	0	0																	
Nicotine (Excluding Tobacco Products)	32	27	14	0	3	6	0	4	0	24	2	0	0	4	3	7	0	0	0																	
Organophosphate Insecticides Alone	2,326	2,126	623	96	65	1,089	19	208	26	1,954	88	14	50	585	524	374	109	24	4																	
Organophosphate Insecticides in Combination with Carbamate Insecticides	35	28	7	0	0	14	0	6	1	26	0	0	2	5	9	3	1	0	0																	

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Table 22A. Demographic profile of SINGLE SUBSTANCE nonpharmaceuticals exposure cases by generic category. – Continued.

No. of Case Mentions	No. of Single Exposure	Age					Unknown				Reason			Outcome				
		≤5	6-12	13-19	≥20	Child	Adult	Age	Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
493	472	85	21	17	287	3	53	6	448	13	3	6	87	69	125	17	0	0
Organophosphate Insecticides in Combination with Non-Carbamate Insecticides																		
9,717	9,019	4,659	379	205	2,943	22	672	139	8,667	108	42	179	902	1,679	930	95	6	4
2	2	0	0	1	1	0	0	0	2	0	0	0	1	0	0	0	0	0
Other Types of Insecticide																		
Piperonyl Butoxide & Pyrethrins (without Carbamate or O.P.)																		
Pyrethrins	5,493	1,616	387	213	2,654	26	541	56	5,039	178	29	228	1,209	620	1,398	278	9	0
Pyrethroids	21,732	5,487	1,113	764	11,744	80	2,232	312	19,965	715	184	795	4,091	3,014	5,713	814	28	3
32	31	5	0	1	15	0	10	0	28	2	0	1	7	4	9	1	0	0
Rotenone																		
Unknown Types of Insecticide	4,408	1,073	229	164	2,216	20	616	90	3,885	144	174	146	1,238	536	897	206	16	4
Veterinary Insecticide/Pesticide Product (For Pets-Flea Collars, Etc.)	3	1	0	0	2	0	0	0	3	0	0	0	0	0	0	0	0	0
Miscellaneous Pesticides																		
Arsenic Pesticides	17	8	0	1	6	0	2	0	16	0	1	0	0	4	1	0	0	0
Borates and/or Boric Acid	6,805	5,832	155	56	511	9	119	23	6,618	36	24	20	457	1,210	175	23	0	0
Pesticides (Excluding Other Uses)																		
2	2	0	0	0	2	0	0	0	2	0	0	0	2	0	1	1	0	0
Metam Sodium																		
Repellents																		
Animal Repellents	467	121	33	11	218	0	56	7	422	8	4	12	68	52	97	9	0	0
Insect Repellents with DEET	3,960	2,012	535	184	915	13	200	34	3,553	83	43	206	363	532	1,028	76	3	0
Insect Repellents without DEET	1,456	1,034	110	29	1,97	4	33	10	1,362	10	7	38	94	225	239	17	0	0
Naphthalene Moth Repellants (Excluding Deodorizing Products)	1,202	725	63	19	268	5	95	5	1,136	27	3	13	193	307	83	27	1	0
Other Types of Moth Repellent	5	1	0	0	2	0	1	0	4	0	0	0	0	1	2	1	0	0
Paradichlorobenzene Moth Repellants (Excluding Deodorizing Products)	122	76	4	2	28	0	9	3	115	5	0	2	22	30	9	1	1	0
Unknown Types of Insect Repellent	177	98	13	8	34	1	11	2	159	3	1	4	31	19	26	7	0	0
Unknown Types of Moth Repellent	1,965	1,092	69	37	506	11	196	19	1,844	54	9	19	285	473	161	30	0	0
Rodenticides																		
Bromethalin Rodenticides	1,198	856	25	17	172	2	44	16	1,065	49	11	4	446	433	38	4	1	0
Cholecalciferol Rodenticides	4	1	1	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0
Cyanide Rodenticides	2	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
Long-Acting Anticoagulant Rodenticides	4,990	3,850	143	46	575	8	144	44	4,612	106	55	22	1,356	1,260	93	18	2	1
Other Types of Rodenticide	622	599	393	31	8	119	4	38	6	572	17	4	107	115	36	16	0	0
Strychnine Rodenticides	48	43	6	2	3	26	0	4	2	29	4	6	1	15	2	3	1	0
Unknown Types of Rodenticide	1,746	1,602	1,029	42	30	353	7	104	37	1,368	107	89	10	585	422	64	15	2
Warfarin Type Anticoagulant Rodenticides	196	187	143	7	2	28	1	4	2	179	5	3	0	52	54	2	0	0
Zinc Phosphide Rodenticides	124	117	29	7	2	64	0	11	4	108	5	2	1	43	51	18	2	1
Category Total:	83,412	77,999	33,211	3,894	2,165	30,979	266	6,513	971	72,871	1,983	830	1,999	14,317	13,575	13,671	2,088	115
Photographic Products																		
Miscellaneous Photographic Products																		
Developers, Fixing Baths, Stop Baths	93	83	23	0	25	30	4	1	78	3	0	2	16	15	14	2	0	0
Other Types of Photographic Product	274	252	164	25	7	43	0	9	243	8	0	1	16	47	21	3	0	0
Photographic Coating Fluids	6	6	4	1	0	1	0	0	6	0	0	0	1	0	1	0	0	0
Unknown Types of Photographic Product	2	2	0	0	1	0	1	0	2	0	0	0	2	0	0	0	0	0
Category Total:	375	343	191	26	32	75	0	14	329	11	0	3	35	62	36	5	0	0
Plants																		
Miscellaneous Plants																		
Plants: Amygdalin and/or Cyanogenic Glycosides	4,902	4,812	2,428	620	1,223	14	286	46	4,411	169	28	194	316	849	186	22	2	0
Plants: Anticholinergics	563	528	290	43	23	143	3	19	7	431	63	12	19	137	53	38	4	0
Plants: Cardiac Glycosides (Excluding Drugs)	1,691	1,642	854	204	68	423	5	77	11	1,489	105	2	35	270	397	112	26	7
Plants: Colchicine	20	17	7	3	0	6	0	1	13	2	0	2	5	4	4	1	0	0
Plants: Depressants	225	174	113	9	8	38	0	6	0	131	20	2	19	36	43	15	4	0
Plants: Gastrointestinal Irritants (Excluding Oxalate Containing Plants)	6,629	6,335	4,531	608	170	814	12	180	20	5,867	247	14	194	1,231	542	56	4	0

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Table 22A. Demographic profile of SINGLE SUBSTANCE nonpharmaceuticals exposure cases by generic category. – Continued.

	No. of Case Mentions	No. of Single Exposure	Age					Reason					Outcome							
			Age					Reason					Outcome							
			≤5	6-12	13-19	≤20	Unknown Child	Unknown Adult	Unknown Age	Unint	Int	Other	Adv Rtn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death	
Plants: Hallucinogenics (Code as Street Drug Unless Plant Part Involved) Plants: Nicotine (Excluding Tobacco Products) Plants: Non-Toxic Plants: Other Toxic Types Plants: Oxalates Plants: Skin Irritants (Excluding Oxalate Containing Plants) Plants: Solanine Plants: Stimulants Plants: Toxalbumins Plants: Unknown Toxic Types or Unknown if Toxic Category Total: Polishes and Waxes Miscellaneous Polishes and Waxes Floor Waxes, Polishes, or Sealers Furniture Polishes Miscellaneous Polishes and Waxes (Excluding Mineral Seal Oils) Category Total: Radiation Ionizing Radiation Gamma Radiation Ionizing Radiation: Type Unknown Radon Specific Nonpharmaceutical Radionuclides X-ray Radiation Miscellaneous Radiation Nonpharmaceutical Radiation: Type Unknown Non-ionizing Radiation Extremely Low-frequency Radiation Infrared Radiation Microwave Radiation Non-ionizing Radiation: Type Unknown Radio Frequency Radiation Ultraviolet Radiation Visible Light Radiation (Lasers) Category Total: Sporting Equipment Miscellaneous Sporting Equipment Fishing Baits Fishing Products, Miscellaneous Golf Balls (Including Liquid Center of Golf Balls) Gun Bluing Compounds Hunting Products, Miscellaneous Other Types of Sporting Equipment Unknown Types of Sporting Equipment Category Total: Swimming Pool/Aquarium Miscellaneous Swimming Pool/Aquarium Alcicides Aquarium Products, Miscellaneous	447	351	66	20	70	159	2	31	3	157	146	6	36	159	33	81	68	5	0	
	159	147	68	19	4	47	0	9	0	127	10	0	8	49	26	39	15	1	0	
	4,551	4,166	2,697	600	105	558	21	152	33	3,746	165	14	233	254	525	325	33	4	0	
	4,744	4,394	2,767	549	127	781	12	140	18	3,840	340	19	174	640	829	360	147	24	1	
	4,921	4,844	3,557	563	146	467	9	92	10	4,508	277	5	48	398	882	960	46	0	0	
	5,286	4,865	1,893	442	245	1,788	31	423	43	4,379	159	22	288	852	474	807	238	3	1	
	1,787	1,746	1,111	138	33	367	1	90	6	1,578	55	7	103	138	438	109	13	0	0	
	467	436	105	51	18	201	2	53	6	379	45	2	8	105	122	35	7	1	0	
	275	262	92	17	15	119	0	18	1	205	40	10	4	105	72	41	13	2	0	
	9,912	9,370	6,310	1,119	247	1,270	58	301	65	8,656	399	20	260	739	1,670	725	116	5	0	0
	46,579	44,089	26,889	5,005	1,474	8,404	170	1,877	270	39,917	2,242	163	1,625	4,679	7,732	4,394	843	62	5	5
	363	341	201	9	10	92	3	25	1	325	9	2	4	49	63	46	3	1	0	0
	1,307	1,254	1,050	35	19	114	2	32	2	1,224	16	11	3	97	348	163	10	1	0	0
	1,883	1,808	1,272	56	39	340	7	72	22	1,734	40	9	22	185	351	168	28	0	0	0
	3,553	3,403	2,523	100	68	546	12	129	25	3,283	65	22	29	331	762	377	41	2	0	0
	1	1	0	0	0	1	0	0	0	0	1	0	0	0	1	0	1	0	0	0
	59	58	7	1	0	29	0	19	2	49	0	1	5	21	6	3	1	0	0	0
	93	72	9	8	1	38	1	11	4	70	0	1	1	15	14	3	0	0	0	0
	86	56	5	2	1	22	0	21	5	43	4	5	3	30	12	7	0	0	1	0
	17	17	1	1	1	7	0	7	0	14	0	0	3	4	3	1	0	0	0	0
	3	3	0	0	0	1	0	1	1	3	0	0	0	0	2	0	0	0	0	0
	3	3	1	0	1	1	0	0	0	0	3	0	0	0	3	0	0	2	0	0
	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	21	21	0	0	0	0	16	0	3	2	18	3	0	0	0	1	4	1	0	0
	14	14	0	0	0	0	12	0	1	1	12	0	0	1	9	3	0	0	0	0
10	10	0	0	0	0	8	0	2	0	8	0	0	1	8	0	4	1	0	0	
12	11	1	0	0	0	8	0	2	0	10	0	0	1	6	0	4	1	0	0	
7	7	1	1	0	0	5	0	0	0	6	1	0	0	0	2	1	0	0	0	
327	274	26	13	4	148	1	67	15	238	8	7	15	100	44	25	5	0	0	1	
50	50	36	5	4	4	5	0	0	0	46	3	1	0	0	8	0	0	0	0	
25	24	14	4	3	2	2	0	1	0	21	2	1	0	0	1	1	1	0	0	
3	3	0	0	1	2	0	0	0	0	2	1	0	0	0	0	2	0	0	0	
14	13	6	1	0	5	0	1	0	1	12	0	1	0	3	4	2	0	0	0	
284	272	150	22	16	69	2	10	3	238	16	12	3	81	76	34	4	0	0	0	
10	10	3	2	0	3	0	1	1	1	10	0	0	0	3	0	4	0	0	0	
1	1	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	1	0	0	
387	373	209	34	24	87	2	13	4	330	22	15	3	88	89	43	6	0	0	0	
1,073	1,026	300	122	57	458	1	77	11	988	20	3	15	220	116	332	67	0	0	0	
1,029	973	738	48	26	121	3	32	5	950	11	8	4	64	220	57	2	1	0	0	

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Table 22A. Demographic profile of SINGLE SUBSTANCE nonpharmaceuticals exposure cases by generic category. – Continued.

	No. of Case Mentions	No. of Single Exposure	Age					Reason				Outcome							
			≤5	6–12	13–19	≤20	Unknown Child	Unknown Adult	Unknown Age	Unint	Int	Other	Adv Rxn	Treated in Health Care Facility	None	Minor	Moderate	Major	Death
Bromine Shock Treatments	52	47	19	8	2	15	0	3	0	45	1	0	1	6	10	17	1	0	0
Chlorine Shock Treatments	2,608	2,476	490	339	158	1,273	14	188	14	2,379	47	5	42	772	148	880	299	8	0
Other Types of Swimming Pool or Aquarium Product	1,293	1,193	357	152	70	508	3	78	25	1,119	20	3	51	267	171	427	58	4	0
Swimming Pool and Aquarium Test Kits	118	107	53	5	14	31	0	3	1	103	2	2	0	13	21	18	2	0	0
Category Total:	6,173	5,822	1,957	674	327	2,406	21	381	56	5,584	101	21	113	1,342	686	1,731	429	13	0
Tobacco/Nicotine/eCigarette Products																			
eCigarettes: Nicotine Containing Flavor Unknown	255	249	162	10	22	42	0	11	2	208	27	1	13	83	84	39	10	2	0
eCigarettes: Nicotine Device With Added Flavors	105	103	76	3	9	15	0	0	0	94	7	0	1	28	37	21	4	0	0
eCigarettes: Nicotine Device Without Added Flavors	1,029	995	685	46	93	140	0	23	8	885	75	5	28	374	343	188	37	1	0
eCigarettes: Nicotine Liquid Flavor Unknown	628	611	408	14	48	118	2	18	3	551	43	7	10	271	211	142	17	0	0
eCigarettes: Nicotine Liquid With Added Flavors	292	289	216	10	11	47	1	3	1	271	17	0	1	90	121	66	3	1	0
eCigarettes: Nicotine Liquid Without Added Flavors	161	157	109	3	8	30	1	5	1	146	7	2	2	54	60	26	6	0	0
Miscellaneous Tobacco Products																			
Chewing Tobacco	1,535	1,514	1,388	30	24	59	4	9	0	1,482	22	5	5	317	442	415	23	1	0
Cigarettes	6,697	6,536	6,168	43	41	225	15	35	9	6,403	69	28	34	797	2,107	943	45	2	0
Cigars	179	167	130	4	7	22	0	3	1	150	7	0	10	21	52	23	5	0	0
Dissolvable Tobacco	9	7	7	0	0	0	0	0	0	7	0	0	0	2	2	1	0	0	0
Filter Tips Only (i.e. Butts)	63	60	56	0	0	2	0	2	0	60	0	0	0	5	30	4	0	0	0
Other Types of Tobacco Product	152	137	88	1	7	32	0	8	1	113	15	0	9	37	23	30	10	0	0
Snuff	509	498	428	7	12	44	1	6	0	471	18	1	7	88	150	133	6	0	0
Unknown Types of Tobacco Product	1,902	1,801	1,198	55	104	346	5	78	15	1,567	136	9	78	589	492	357	85	6	2
Category Total:	13,516	13,124	11,119	226	386	1,122	29	201	41	12,408	443	58	198	2,756	4,154	2,388	251	13	2
Waterproofers/Sealants																			
Miscellaneous Waterproofers/Sealants																			
Waterproofers/sealants: aerosols	191	182	85	11	15	62	1	8	0	167	3	3	8	33	35	34	11	0	0
Waterproofers/sealants: liquids	81	75	43	1	2	25	0	2	2	71	0	0	4	19	15	17	6	0	0
Waterproofers/sealants: solids	3	3	1	0	0	2	0	0	0	3	0	0	0	0	0	0	0	0	0
Waterproofers/sealants: unknown form	41	38	19	1	1	13	0	4	0	37	1	0	0	10	7	8	0	0	0
Category Total:	316	298	148	13	18	102	1	14	2	278	4	3	12	62	57	59	17	0	0
Weapons of Mass Destruction																			
Miscellaneous Weapons of Mass Destruction																			
Anthrax	6	5	0	0	0	4	0	1	0	4	0	1	0	2	1	0	0	0	0
Nerve Gases	3	2	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0
Other Biological Weapons	4	3	2	0	0	0	0	1	0	3	0	0	0	0	0	0	0	0	0
Other Chemical Weapons	30	29	1	1	2	20	0	0	5	7	0	21	1	27	5	1	21	0	0
Other Suspicious Powders	206	191	30	17	8	107	1	26	2	119	15	48	2	83	35	33	16	2	0
Other Suspicious Substances (Non-Powder)	2,387	2,198	485	126	118	1,018	12	372	67	1,314	119	432	76	868	196	365	185	41	7
Suspicious Powders in Envelope or Package	60	57	7	9	0	28	0	12	1	36	2	14	2	31	23	11	3	0	0
Category Total:	2,696	2,485	525	153	128	1,178	13	413	75	1,483	136	517	81	1,011	260	410	225	43	7
Nonpharmaceuticals Total:	1,068,976	954,802	514,962	64,426	42,389	269,371	3,122	52,480	8,052	883,748	39,504	11,743	15,510	166,414	152,063	158,141	31,679	2,335	315

Table 22B. Demographic profile of SINGLE SUBSTANCE pharmaceuticals exposure cases by generic category

	No. of Case Mentions	No. of Single Exposure	Age					Unknown				Reason			Treated in Health Facility		Outcome			
			≤5	6–12	13–19	≤20	Child	Adult	Unknown	Unint	Int	Other	Adv Rxn	Care	Facility	None	Minor	Moderate	Major	Death
Analgesics																				
Acetaminophen Alone	39,059	25,264	6,487	1,050	6,319	10,621	17	645	125	12,168	12,390	15	374	15,472	7,226	3,940	2,240	625	63	
Acetaminophen Alone, Adult	19,622	17,879	16,320	1,203	158	164	13	15	6	17,525	251	7	70	2,529	3,954	280	54	13	0	
Acetaminophen Alone, Pediatric	10,483	6,211	1,866	274	1,371	2,512	12	139	37	3,059	2,903	6	85	3,824	1,551	917	627	173	24	
Acetaminophen Alone, Unknown if Adult or Pediatric																				
Acetaminophen Combinations	5,812	3,235	794	116	1,223	1,039	1	47	15	1,189	1,928	5	67	2,182	805	845	451	48	2	
Acetaminophen in Combination with Other Drugs, Adult Formulations	42	32	25	6	1	0	0	0	0	31	0	0	1	3	9	1	0	0	0	
Acetaminophen in Combination with Other Drugs, Pediatric Formulations	3,782	1,742	246	68	315	1,024	2	76	11	696	871	0	147	1,045	433	383	172	26	0	
Acetaminophen with Codeine	6,908	4,070	593	93	828	2,412	1	114	29	1,146	2,822	1	43	2,999	772	974	949	136	11	
Acetaminophen with Diphenhydramine	15,202	6,431	1,047	216	837	4,009	12	259	51	2,934	3,064	16	305	3,766	1,696	1,379	659	149	15	
Hydrocodone																				
Acetaminophen with Other Narcotics or Narcotic Analogs	376	183	31	4	15	124	0	8	1	72	94	1	11	124	47	41	27	6	4	
Acetaminophen with Oxycodone	7,611	3,282	519	68	282	2,216	2	165	30	1,334	1,658	14	195	2,150	772	767	509	123	5	
Acetaminophen with Propoxyphene	55	26	5	1	3	14	0	2	1	11	12	1	2	14	8	4	1	1	0	
Acetylsalicylic Acid Alone																				
Acetylsalicylic Acid Alone, Adult Formulations	5,562	3,175	1,355	138	645	982	0	47	8	1,764	1,322	3	50	1,752	809	467	437	47	6	
Acetylsalicylic Acid Alone, Pediatric Formulations	689	372	230	31	36	67	0	8	0	280	82	0	7	131	102	33	22	1	0	
Acetylsalicylic Acid Alone, Unknown if Adult or Pediatric Formulations	11,838	5,596	1,800	258	1,136	2,272	0	101	29	2,557	2,763	6	106	3,521	1,287	918	1,099	152	17	
Acetylsalicylic Acid Combinations																				
Acetylsalicylic Acid in Combination with Other Drugs, Adult Formulations	1,240	840	243	55	85	434	0	19	4	432	362	1	29	458	160	168	138	25	0	
Acetylsalicylic Acid in Combination with Other Drugs, Pediatric Formulations	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Acetylsalicylic Acid with Carisoprodol	10	1	1	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	
Acetylsalicylic Acid with Codeine	49	25	7	0	1	17	0	0	0	7	15	0	2	17	5	3	4	3	0	
Acetylsalicylic Acid with Other Narcotics or Narcotic Analogs	1	1	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	
Acetylsalicylic Acid with Oxycodone	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Acetylsalicylic Acid with Propoxyphene	1	1	0	0	0	1	0	0	0	0	1	0	0	1	0	1	0	0	0	
Miscellaneous Analgesics																				
Non-Aspirin Salicylates (Excluding Topicals and/or Gastrointestinal Drugs)	202	154	88	4	11	47	2	2	0	130	12	0	11	39	31	14	10	0	0	
Other Analgesics	832	578	220	20	65	244	1	23	5	350	202	2	21	231	106	126	52	7	0	
Phenacetin	1	1	0	0	1	0	0	0	0	1	0	0	0	1	0	1	0	0	0	
Phenazopyridine	1,084	897	613	32	31	204	1	16	0	800	47	0	48	225	278	79	32	2	0	
Salicylamide	1	1	1	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	
Unknown Analgesics	179	75	14	1	21	27	0	7	5	24	42	1	6	44	16	12	12	0	1	
Nonsteroidal Antiinflammatory Drugs																				
Cochicine	356	245	50	2	8	168	1	16	0	185	30	1	24	124	61	41	31	3	3	
Cyclooxygenase-2 Inhibitors	772	382	124	9	18	195	1	32	3	341	28	0	12	62	93	13	6	0	0	
Ibuprofen	81,129	61,547	41,138	3,481	8,069	7,924	49	687	199	49,029	11,862	20	490	14,318	14,024	4,258	1,007	88	4	
Ibuprofen with Diphenhydramine	2,737	1,706	374	43	327	898	0	57	7	844	835	0	16	897	347	335	239	22	0	
Ibuprofen with Hydrocodone	86	46	7	5	8	22	1	2	1	25	18	0	2	24	11	12	5	1	0	
Indomethacin	416	230	68	10	19	117	0	14	2	148	56	0	24	82	65	29	5	0	0	
Ketoprofen	39	16	7	1	5	3	0	0	0	11	5	0	0	8	8	2	0	0	0	
Naproxen	13,321	7,501	2,361	270	1,866	2,635	8	309	52	4,326	2,928	2	211	3,092	2,019	1,073	245	9	1	
Other Types of Nonsteroidal Antiinflammatory Drug	7,392	3,913	1,362	180	306	1,814	7	215	29	3,168	576	3	148	902	970	319	54	4	0	

(continued)

Table 22B. Demographic profile of SINGLE SUBSTANCE pharmaceuticals exposure cases by generic category – Continued.

	No. of Case Mentions	No. of Single Exposure	Age					Unknown				Reason				Treated in Health Facility				Outcome			
			≤5	6–12	13–19	≤20	Child	Adult	Age	Unint	Int	Other	Adv Rtn	Health Facility	None	Minor	Moderate	Major	Death				
			6	5	0	0	1	0	0	0	0	0	0	1	2	2	0	0	0				
Unknown Types of Nonsteroidal Antiinflammatory Drug	8	6																					
Opioids																							
Alfentanil	1	0																					
Buprenorphine	3,885	2,243	1,068	36	72	915	3	116	33	1,358	649	58	131	1,742	374	665	442	67	1				
Butorphanol	54	34	8	0	2	20	0	3	1	24	9	0	1	19	3	8	3	0	0				
Codine	1,652	1,107	352	143	109	458	1	39	5	872	183	5	35	304	268	123	38	1	1				
Dihydrocodeine	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Fentanyl	1,780	793	58	6	32	648	0	45	4	225	496	12	38	588	96	116	193	121	41				
Hydrocodone Alone or in Combination (Excluding Combination Products with Acetaminophen, Acetylsalicylic Acid or Ibuprofen)	1,810	740	153	42	67	405	2	59	12	432	231	2	52	311	158	125	66	6	1				
Hydromorphone	1,205	468	41	11	17	358	0	36	5	244	182	3	30	275	90	102	72	16	2				
Levorphanol	10	5	1	0	0	4	0	0	0	3	1	0	1	3	1	1	1	0	0				
Meperidine	85	34	10	0	1	19	0	4	0	17	12	0	5	22	8	8	3	2	0				
Methadone	2,611	1,054	173	19	39	764	2	47	10	426	465	39	69	862	143	178	304	149	16				
Morphine	2,959	1,352	173	11	54	996	0	106	12	755	493	9	66	838	310	211	207	66	16				
Naluphine	17	11	1	1	0	9	0	0	0	4	2	0	5	10	0	2	4	0	0				
Other or Unknown Narcotics	2,525	1,014	65	2	40	815	2	72	18	179	660	72	37	866	72	143	333	215	25				
Oxycodone Alone or in Combination (Excluding Combination Products with Acetaminophen or Acetylsalicylic Acid)	7,437	3,168	595	131	197	2,034	6	172	33	1,576	1,328	31	150	1,974	621	679	491	177	19				
Oxycodone	387	164	16	2	6	123	1	15	1	57	94	2	9	111	29	37	33	11	0				
Pentazocine	24	16	2	0	2	12	0	0	0	7	7	0	2	12	2	5	4	0	0				
Propoxyphene	15	2	1	0	1	0	0	0	0	0	0	0	0	2	0	1	1	0	0				
Remifentanyl	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Tapentadol	274	146	13	5	7	114	0	7	0	81	44	2	13	89	33	32	17	2	0				
Tramadol	10,952	4,903	907	120	525	3,128	4	193	26	2,153	2,390	33	249	3,294	1,249	1,106	765	152	5				
Other Acetaminophen and Acetylsalicylic Acid Combinations																							
Acetaminophen and Acetylsalicylic Acid with Other Ingredients	6,729	4,345	1,547	169	1,162	1,346	3	91	27	2,211	2,000	1	110	2,253	1,030	913	464	18	0				
Acetaminophen and Acetylsalicylic Acid without Other Ingredients	205	136	37	4	13	80	0	2	0	59	67	1	7	80	19	23	34	4	0				
Serotonin 5-HT <sub>1B/1D</sub> Receptor Agonists																							
Serotonin 5-HT <sub>1B/1D</sub> Receptor Agonists: Other or Unknown	338	167	64	18	19	60	0	6	0	130	21	0	15	58	50	26	8	0	0				
Serotonin 5-HT <sub>1B/1D</sub> Receptor Agonists: Sumatriptan	947	503	152	35	66	224	1	21	4	352	84	0	65	194	137	67	48	1	0				
Category Total: Anesthetics	282,784	178,069	83,438	8,394	26,441	54,740	156	4,059	841	115,759	56,598	375	3,598	73,949	42,362	22,006	12,618	2,672	283				
Inhalation Anesthetics																							
Nitrous Oxide	259	205	18	26	34	114	1	11	1	62	110	2	23	141	24	46	47	5	0				
Other Types of Inhalation Anesthetic	98	81	8	2	4	50	1	15	1	70	8	0	3	43	8	23	9	1	1				
Unknown Types of Inhalation Anesthetic	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0				
Local and/or Topical Anesthetics																							
Dibucaine	31	26	23	1	0	2	0	0	0	24	0	0	2	7	10	0	0	0	0				
Lidocaine	1,636	1,410	536	80	82	593	2	99	18	1,135	95	8	157	348	318	197	71	13	1				
Other or Unknown Local and/or Topical Anesthetic	3,450	3,232	1,991	152	112	822	8	137	10	2,838	130	13	244	487	828	362	81	27	0				
Miscellaneous Anesthetics																							
Ketamine and Analogs	250	129	11	3	12	90	0	11	2	40	70	6	11	110	4	24	53	12	0				
Other Types of Anesthetic	27	20	7	0	0	9	0	4	0	17	0	0	3	3	7	3	0	0	0				
Unknown Types of Anesthetic	6	6	2	0	1	1	0	1	1	2	0	2	1	2	1	1	1	0	0				
Category Total: Anticholinergic Drugs	5,758	5,110	2,597	264	245	1,681	12	278	33	4,188	413	31	445	1,141	1,200	656	262	58	2				
Miscellaneous Anticholinergic Drugs																							
Anticholinergic Drugs (Excluding Cough and Cold Preparations, and Plants)	6,761	4,394	232	58	108	3,470	6	487	33	3,958	285	13	110	583	593	216	167	12	0				

(continued)

Table 22B. Demographic profile of SINGLE SUBSTANCE pharmaceuticals exposure cases by generic category – Continued.

No. of Case Mentions	No. of Single Exposure	Age				Unknown				Reason			Treated in Health Facility		Outcome			
		≤5	6–12	13–19	≥20	Child	Adult	Age	Unint	Int	Other	Adv Rtn	Care Facility	None	Minor	Moderate	Major	Death
Category Total:	4,394	232	58	108	3,470	6	487	33	3,958	285	13	110	583	593	216	167	12	0
Anticoagulants																		
Miscellaneous Anticoagulants	6,761																	
Glycoprotein IIa/IIb Inhibitors	5	0	0	0	5	0	0	0	4	0	0	1	4	1	1	1	0	0
Heparins	245	29	7	3	132	1	21	2	165	13	1	15	78	35	10	22	3	0
Other Antiplatelets	2,831	1,051	14	13	1,697	1	81	3	972	48	0	29	198	252	26	16	5	0
Other Types of Anticoagulant	3,965	356	13	12	1,602	4	147	16	1,923	132	2	81	449	439	52	55	11	0
Unknown Types of Anticoagulant	12	3	0	1	4	0	1	0	4	2	1	1	4	1	0	1	0	0
Warfarin (Excluding Rodenticides)	2,604	1,251	9	24	921	2	78	3	1,052	153	0	31	383	206	58	99	12	2
Category Total:	4,661	844	43	53	3,361	8	328	24	4,120	348	4	158	1,116	934	147	194	31	2
Anticonvulsants																		
Anticonvulsants: Carbamazepine and Analogs																		
Carbamazepine	3,447	179	38	109	1,285	0	55	8	643	793	3	172	1,225	299	438	401	59	1
Oxcarbazepine	4,171	359	244	440	736	2	26	6	976	782	1	43	1,057	413	475	234	27	0
Anticonvulsants: Gamma Aminobutyric Acid and Analogs																		
Gabapentin	22,088	1,239	153	528	5,282	2	305	65	3,317	3,860	32	229	4,520	1,929	1,823	726	83	7
Other Types of Gamma Aminobutyric Acid Anticonvulsant	3,280	269	18	89	821	1	53	11	601	579	17	41	751	297	289	184	21	0
Anticonvulsants: Hydantoins																		
Phenytoin	7	1	1	0	3	0	0	0	4	0	0	1	4	1	0	2	1	0
Phenytoin	2,225	67	10	23	1,306	2	38	10	527	351	1	472	1,198	181	438	414	59	2
Miscellaneous Anticonvulsants																		
Felbamate	61	11	3	1	10	0	1	1	26	1	0	0	10	5	3	1	1	0
Lamotrigine	10,243	3,952	544	198	726	1	151	27	2,339	1,427	4	149	2,004	666	930	567	71	1
Levetiracetam	5,128	918	261	248	1,102	2	69	3	2,056	477	2	50	795	705	314	95	10	0
Other Types of Anticonvulsant (Excluding Barbiturates)	1,079	385	31	32	224	0	11	5	301	62	0	16	146	97	49	41	9	0
Primidone	360	117	9	2	100	0	4	0	83	16	1	17	52	19	28	16	0	0
Succinimides	166	121	67	30	14	0	0	0	107	12	0	2	38	45	13	3	0	0
Topiramate	4,870	1,798	452	188	693	1	38	6	971	744	4	66	1,040	529	371	214	17	0
Unknown Types of Anticonvulsant (Excluding Barbiturates)	6	3	1	0	0	0	1	0	2	1	0	0	1	0	0	0	0	0
Valproic Acid	7,923	2,963	142	415	2,022	3	88	17	1,182	1,211	3	413	2,016	612	659	536	81	4
Zonisamide	647	313	98	30	41	0	14	2	264	36	0	9	77	83	37	10	2	0
Category Total:	65,701	26,066	4,572	1,350	3,088	14	854	161	13,399	10,352	68	1,680	14,934	5,881	5,867	3,444	441	15
Antidepressants																		
Lithium Salts																		
Lithium	7,222	3827	110	73	434	6	84	22	948	1,344	9	1,291	3,271	572	906	1,355	180	2
Miscellaneous Antidepressants																		
Antidepressants: Type Unknown to Consumer	68	15	2	0	6	4	0	3	3	9	0	1	12	5	4	1	0	0
Bupropion	14,204	6,531	774	183	1,211	2	250	33	3,421	2,893	6	155	4,382	1,284	1,042	1,619	442	8
Other Types of Antidepressant	365	142	6	3	29	0	1	0	27	100	8	4	121	25	46	36	5	1
Trazodone	21,330	8,027	589	230	1,767	2	204	48	1,842	5,998	8	102	6,358	1,644	2,786	1,625	73	1
Monoamine Oxidase Inhibitors (MAOI)																		
Isocarboxazid	1	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
Other Types of Monoamine Oxidase Inhibitor (MAOI)	87	39	2	0	33	0	3	1	34	2	0	3	10	12	1	5	1	0
Phenelzine	27	12	1	0	0	0	1	0	6	3	0	3	9	2	3	3	0	0
Selegiline	35	15	0	0	14	0	1	0	5	5	0	4	6	1	5	0	1	0
Tranylcypromine	44	19	1	0	16	0	2	0	9	7	0	3	14	1	2	8	0	0
Selective Serotonin Reuptake Inhibitors (SSRI)																		
Citalopram	8,533	3,354	734	161	928	1	101	16	1,531	1,712	7	81	2,000	950	664	460	62	1
Escitalopram	8,172	3,710	663	202	1,384	1	95	20	1,575	1,981	9	124	2,294	1,085	742	511	24	0
Fluoxetine	13,048	5,248	851	371	2,388	2	99	35	2,027	3,109	6	74	3,367	1,788	1,113	445	32	2
Fluvoxamine	490	156	13	7	39	1	6	1	93	48	2	12	63	34	27	14	2	0
Other Types of Selective Serotonin Reuptake Inhibitor (SSRI)	4,757	1,989	494	90	643	3	45	17	921	1,004	0	54	1,236	617	472	208	12	0

(continued)

Table 22B. Demographic profile of SINGLE SUBSTANCE pharmaceuticals exposure cases by generic category – Continued.

	No. of Case Mentions	No. of Single Exposure	Age										Reason				Treated in Health Facility		Outcome			
			≤20				Unknown			Unknown			Unit	Int	Other	Adv Rtn	Care Facility	None	Minor	Moderate	Major	Death
			≤5	6-12	13-19	≤20	Child	Adult	Age	Unknown	Unknown	Age	Age									
Paroxetine	3,514	1,417	317	49	275	709	1	53	13	697	654	11	43	811	368	307	169	4	0			
Sertraline	18,740	8,945	2,115	477	3,128	2,960	6	208	51	3,974	4,656	13	242	5,436	2,376	2,217	1,082	31	2			
Serotonin Norepinephrine Reuptake Inhibitors (SNRI)																						
Duloxetine	5,431	1,887	498	62	242	988	1	82	14	1,090	673	10	105	974	476	396	191	11	0			
Nefazodone	30	13	2	0	0	10	0	1	0	8	3	0	1	3	1	2	1	0	0			
Other Types of Serotonin Norepinephrine Reuptake Inhibitor (SNRI)	624	260	72	16	44	119	0	9	0	168	69	1	18	132	79	45	32	1	0			
Venlafaxine	6,611	2,543	519	64	431	1,423	2	85	19	1,313	1,107	13	96	1,582	667	522	396	54	4			
Tetracyclic Antidepressants																						
Maprotiline	6	3	0	0	1	1	0	0	1	2	1	0	0	1	1	1	0	0	0			
Mirtazapine	4,842	1,462	190	52	238	922	1	47	12	500	890	1	54	1,020	323	452	229	13	0			
Tricyclic Antidepressants (TCA)																						
Amiripiline	6,005	2,732	336	108	511	1,694	4	61	18	928	1,643	4	86	2,075	418	604	819	246	8			
Anoxapine	11	7	0	0	1	6	0	0	0	2	5	0	0	5	0	2	2	1	0			
Clomipramine	216	108	11	2	10	77	0	7	1	64	34	0	9	56	24	17	16	4	0			
Desipramine	50	23	3	1	2	16	0	1	0	10	12	0	1	16	5	5	4	3	0			
Doxepin	1,585	631	50	25	46	494	0	9	7	187	408	1	22	482	91	139	185	58	0			
Imipramine	245	116	29	16	19	47	0	4	1	66	35	1	11	66	26	28	17	3	0			
Loxapine	111	29	0	1	2	26	0	0	0	6	22	0	1	22	3	5	11	3	0			
Nortriptyline	1,192	482	58	11	66	326	0	19	2	223	224	1	26	295	77	110	91	26	1			
Other Types of Tricyclic Antidepressant (TCA)	447	181	17	5	17	138	0	2	2	34	103	10	10	156	21	27	64	21	3			
Protriptyline	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Tricyclic Antidepressants (TCA) Formulated with a Benzodiazepine	9	4	0	0	0	4	0	0	0	2	2	0	0	2	0	1	0	1	0			
Tricyclic Antidepressants (TCA) Formulated with a Phenothiazine	15	2	1	0	0	1	0	0	0	1	1	0	0	2	1	1	0	0	0			
Tricyclic Antidepressants (TCA): Type Unknown to Consumer	14	3	0	0	0	3	0	0	0	0	1	0	0	3	0	0	1	0	0			
Trimipramine	3	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0			
Category Total: Antihistamines	128,088	53,934	8,459	2,209	13,862	27,554	33	1,480	337	21,718	28,758	121	2,637	36,282	12,977	12,695	9,600	1,314	33			
Miscellaneous Antihistamines																						
Cimetidine and Other Histamine-2 Blockers	8,786	6,238	4,647	249	221	954	4	155	8	5,870	266	1	93	520	1,365	224	24	0	0			
Diphenhydramine Alone (Over the Counter)	26,550	19,152	10,459	1,249	2,466	4,619	18	276	65	13,147	5,568	18	275	7,532	4,052	2,759	2,353	262	5			
Diphenhydramine Alone (Prescription)	1,354	838	280	53	160	322	2	15	6	413	393	1	22	464	156	150	176	28	3			
Diphenhydramine Alone (Unknown if Over the Counter or Prescription)	17,526	11,746	5,427	755	1,950	3,373	5	185	51	7,070	4,381	9	183	5,488	2,390	1,966	1,909	240	10			
Other Antihistamines Alone (Excluding Cough and Cold Preparations)	55,617	38,178	21,622	4,971	3,566	7,175	49	687	108	32,138	5,442	19	446	7,442	8,666	2,742	1,110	72	3			
Category Total: Antimicrobials	109,833	76,152	42,435	7,277	8,363	16,443	78	1,318	238	58,638	16,050	48	1,019	21,446	16,629	7,841	5,572	602	21			
Antimicrobials																						
Anthelmintics																						
Diethylcarbamazine	22	20	11	2	1	5	0	1	0	20	0	0	0	0	3	0	0	0	0			
Levamisole	30	17	0	0	1	13	1	1	1	8	6	0	0	11	1	5	2	1	0			
Other Types of Anthelmintic	1,848	1,727	940	161	36	485	7	86	12	1,578	70	4	69	232	430	153	25	1	1			
Piperazine	188	176	113	11	3	40	0	8	1	165	9	0	2	20	47	14	1	0	0			
Unknown Types of Anthelmintic	15	14	7	0	0	5	0	2	0	14	0	0	0	0	1	1	0	0	0			
Antibiotics																						
Systemic Antibiotic Preparations (Oral, Intravenous, Intramuscular)	30,569	24,109	11,034	2,323	1,612	7,794	33	1,179	134	20,384	1,426	14	2,220	3,345	3,894	1,770	324	22	5			
Topical Antibiotic Preparations (Dermal, Otic, Ophthalmic, Nasal)	5,234	5,009	3,497	224	95	923	10	229	31	4,818	60	9	118	170	725	205	13	0	0			
Unknown Types of Antibiotic Preparation	276	193	91	14	14	51	0	18	5	150	14	0	28	24	20	19	1	0	0			
Antifungals																						
Systemic Antifungal Preparations (Oral, Intravenous, Intramuscular)	1,183	936	445	55	46	332	1	50	7	814	28	3	91	125	168	74	9	4	0			
Topical Antifungal Preparations (Dermal, Otic, Ophthalmic, Nasal)	6,875	6,540	4,312	224	112	1,504	16	341	31	6,283	60	14	170	405	948	435	34	0	0			

(continued)

Table 22B. Demographic profile of SINGLE SUBSTANCE pharmaceuticals exposure cases by generic category – Continued.

	No. of Case Mentions	No. of Single Exposure	Age										Reason			Treated in Health Facility		Outcome			
			≤20					≥20					Unint	Int	Other	Adv Rxn	None	Minor	Moderate	Major	Death
			≤5	6-12	13-19	13-19	≤20	Unknown Child	Unknown Adult	Unknown Age											
Unknown Types of Antifungal Preparation	25	22	6	2	1	12	0	1	0	18	1	0	3	6	0	4	2	0	0		
	Antiparasitics																				
	850	499	122	51	43	261	1	19	2	398	57	0	43	197	128	62	50	8	1		
	1,035	609	140	7	52	349	1	53	7	476	50	0	82	105	110	56	17	1	0		
	27	22	10	2	2	8	0	0	0	22	0	0	0	7	6	1	0	0	0		
	Other Types of Antiparasitic Antituberculars																				
	135	93	13	9	19	50	0	1	1	42	21	0	25	59	8	6	20	17	0		
	Isoniazid																				
	Other Types of Antitubercular	24	7	1	0	1	5	0	0	2	5	0	0	2	1	0	2	0	0		
	Rifampin	71	47	11	0	2	30	0	4	0	34	4	0	8	14	8	9	2	1	0	
	Antivirals																				
	311	101	20	14	18	47	0	2	0	76	18	1	6	38	23	6	13	2	1	1	
	Anantadine																				
	Antiretrovirals	793	433	58	4	22	296	0	48	5	339	77	0	16	132	69	47	21	1	0	
	Other Anti-Influenza Agents	846	762	254	187	89	193	2	32	5	673	9	0	77	77	125	48	16	1	0	
	Systemic Antiviral Preparations (Oral, Intravenous, Intramuscular)	1,335	956	262	22	45	550	2	65	10	812	78	0	62	166	199	72	24	4	0	
	Topical Antiviral Preparations (Dermal, Otic, Ophthalmic, Nasal)	139	135	72	10	2	38	0	12	1	129	1	0	4	5	26	7	1	0	0	
	Unknown Types of Antiviral Preparations	496	314	111	15	20	151	1	16	0	265	33	0	16	58	62	21	2	0	0	
	Miscellaneous Antimicrobials																				
	Other Types of Antimicrobial	138	133	76	2	2	40	0	12	1	125	3	0	5	15	37	9	0	1	0	
	Unknown Types of Antimicrobial	13	8	3	0	1	2	0	0	2	5	1	0	2	2	2	0	1	0	0	
	Category Total: Antineoplastics	52,478	42,882	21,609	3,339	2,239	13,184	75	2,180	256	37,653	2,026	45	3,049	5,215	7,041	3,024	580	64	8	
	Miscellaneous Antineoplastics																				
	Antineoplastic Drugs	2,252	1,704	296	50	56	1,136	2	144	20	1,536	57	3	101	581	357	176	69	18	6	
	Category Total: Asthma Therapies	2,252	1,704	296	50	56	1,136	2	144	20	1,536	57	3	101	581	357	176	69	18	6	
Miscellaneous Asthma Therapies																					
Albuterol	4,218	3,781	2,037	627	292	697	5	105	18	3,143	440	8	177	537	712	481	224	5	0		
Aminophylline or Theophylline	109	73	7	0	4	60	0	2	0	45	6	0	20	37	16	13	19	3	0		
Leukotriene Antagonist or Inhibitor	6,557	4,758	3,258	802	190	429	3	71	5	4,519	211	0	17	527	1,070	98	9	1	0		
Non-Selective Beta Agonists	4,531	4,497	2,079	1,134	196	942	11	123	12	4,371	93	6	20	1,210	291	1,988	346	6	0		
Other Asthma Therapeutic Agents	316	223	63	22	6	118	0	13	1	178	14	0	29	65	43	26	17	5	0		
Terbutaline and Other Beta-2 Agonists	1,062	872	141	100	41	509	1	72	8	768	67	2	32	112	140	77	51	2	0		
Unknown Asthma Therapeutic Agents	3	2	0	1	1	0	0	0	0	1	1	0	0	0	0	2	0	0	0		
Category Total: Cardiovascular Drugs	16,796	14,206	7,585	2,686	730	2,755	20	386	44	13,024	832	17	295	2,488	2,272	2,685	666	22	0		
Angiotensin Converting Enzyme Inhibitor																					
Angiotensin Converting Enzyme Inhibitor in Combination with Diuretic	1,283	699	277	43	31	331	0	15	2	624	66	0	9	221	236	38	15	0	0		
Angiotensin Converting Enzyme Inhibitor in Combination with Other Drugs (Excluding Calcium Antagonists)	2	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0		
Angiotensin Converting Enzyme Inhibitor, Alone	15,170	6,111	2,435	310	235	2,914	4	195	18	5,258	764	5	65	1,985	2,183	247	207	5	2		
Angiotensin Receptor Blocker																					
Angiotensin Receptor Blocker in Combination with Diuretic	1,102	605	128	17	24	407	0	26	3	571	27	0	5	110	170	33	7	0	0		
Angiotensin Receptor Blocker in Combination with Other Drugs (Excluding Calcium Antagonists)	77	35	8	2	1	20	0	4	0	33	2	0	0	10	16	0	1	0	0		
Angiotensin Receptor Blocker, Alone	7,830	3,547	862	105	88	2,305	3	172	12	3,249	253	0	42	798	1,062	163	64	2	0		
Antihyperlipidemic																					
Antihyperlipidemic Combinations (Excluding Calcium Antagonists)	31	14	6	0	0	7	0	1	0	14	0	0	0	0	2	0	0	0	0		
Antihyperlipidemic, Alone	12,214	4,411	1,733	144	128	2,138	5	250	13	4,079	225	2	101	566	814	128	26	1	0		
Antihypertensives																					
Antihypertensive (Excluding Diuretics), Alone	4,946	2,757	782	1,144	494	302	1	28	6	2,235	434	4	63	1,505	867	414	484	19	1		
Antihypertensive in Combination with Diuretic	6	5	3	0	0	2	0	0	0	4	0	0	0	3	3	0	0	0	0		

(continued)

(continued)

Table 22B. Demographic profile of SINGLE SUBSTANCE pharmaceuticals exposure cases by generic category – Continued.

	No. of Case Mentions	No. of Single Exposure	Age					Unknown			Reason			Treated in Health Care Facility		Outcome			
			≤5	6–12	13–19	≥20	Child	Adult	Age	Unint	Int	Other	Adv Rxn	None	Minor	Moderate	Major	Death	
Beta Blockers	205	101	23	7	2	61	0	8	0	96	5	0	0	25	36	3	5	0	0
Beta Blocker in Combination with Diuretic	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Beta Blocker in Combination with Other Drugs (Excluding Calcium Antagonists)	26,225	10,552	2,709	370	486	6,523	5	419	40	8,411	1,841	7	229	4,441	3,770	628	1,042	109	18
Calcium Antagonist																			
Calcium Antagonist in Combination with Angiotensin Converting Enzyme Inhibitor	217	101	16	9	6	67	0	3	0	95	6	0	0	35	37	7	4	1	0
Calcium Antagonist in Combination with Angiotensin Receptor Blocker	98	57	11	3	1	38	0	3	1	52	4	0	1	19	17	5	0	0	0
Calcium Antagonist in Combination with Antihypertensive	19	9	4	0	0	4	0	1	0	7	1	0	1	2	3	0	0	0	0
Calcium Antagonist in Combination with Diuretic	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calcium Antagonist in Combination with Other Drugs	58	31	2	1	0	27	0	1	0	29	2	0	0	10	9	2	0	0	0
Calcium Antagonist, Alone	13,468	5,396	1,296	163	200	3,483	2	222	30	4,623	623	2	113	2,720	2,116	367	450	85	37
Miscellaneous Cardiovascular Drugs																			
Alpha Blockers	5,219	1,568	249	31	177	1,016	3	82	10	1,003	497	0	62	668	401	241	140	5	0
Antiarrhythmics	2,086	1,174	146	17	13	945	0	51	2	1,077	35	1	56	548	432	62	114	27	3
Cardiac Glycosides	1,851	1,234	69	14	9	1,124	0	15	3	482	47	0	631	1,010	136	104	519	126	25
Clonidine	10,463	5,295	1,672	1,193	992	1,368	5	50	15	3,361	1,760	19	92	3,805	958	1,063	1,845	160	2
Hydralazine	1,332	468	113	9	27	308	1	10	0	362	91	0	11	225	149	59	55	1	0
Long-Acting Nitrates	856	265	50	3	5	189	1	16	1	233	23	0	9	80	69	25	21	1	0
Nitroglycerin	969	582	317	18	12	207	1	21	6	482	79	2	14	224	237	42	17	1	0
Nitroprusside	18	15	1	0	0	14	0	0	0	7	0	0	8	12	2	0	1	2	0
Other Types of Cardiovascular Drug	563	244	56	6	8	158	0	16	0	219	19	0	6	76	63	16	16	1	0
Other Types of Vasodilator	1,040	688	272	26	24	321	3	34	8	526	80	4	74	273	201	57	51	4	0
Unknown Types of Cardiovascular Drug	46	12	2	0	0	8	0	2	0	5	5	1	0	9	3	0	0	0	0
Unknown Types of Vasodilator	15	8	1	1	0	4	0	1	1	6	1	0	0	4	0	1	1	0	0
Vasopressors	262	222	75	37	12	86	0	12	0	203	8	0	10	87	18	77	29	2	0
Category Total:	107,673	46,207	13,318	3,673	2,975	24,378	34	1,658	171	37,347	6,898	47	1,602	19,471	14,010	3,782	5,114	552	88
Cold and Cough Preparations																			
Acetaminophen and Acetylsalicylic Acid with Decongestant and/or Antihistamine																			
Acetaminophen and Acetylsalicylic Acid with Antihistamine without Opioids	17	8	2	1	3	1	0	1	0	2	5	0	1	5	1	0	3	0	0
Acetaminophen and Acetylsalicylic Acid with Decongestant and Antihistamine without Opioids	22	18	6	2	5	5	0	0	0	12	4	0	2	8	4	1	1	1	0
Acetaminophen, Acetylsalicylic Acid, and with Decongestant without Opioids	6	2	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Acetaminophen, Acetylsalicylic Acid, and Dextromethorphan with Antihistamine	17	11	9	1	0	1	0	0	0	8	2	0	1	5	4	0	1	0	0
Acetaminophen, Acetylsalicylic Acid, and Dextromethorphan with Decongestant	18	13	8	1	2	1	0	1	0	11	2	0	0	2	2	1	0	0	0
Acetaminophen, Acetylsalicylic Acid, and Dextromethorphan with Decongestant and Antihistamine	9	7	5	2	0	0	0	0	0	6	1	0	0	1	1	0	0	0	0
Acetaminophen, Acetylsalicylic Acid, and Opioid with Decongestant	1	1	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0
Acetaminophen, Acetylsalicylic Acid, and Opioid with Decongestant and Antihistamine	2	2	2	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0
Obsolete: Acetaminophen and Acetylsalicylic Acid with Decongestant and/or Antihistamine Combinations without Phenylpropanolamine or Opioids	4	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Obsolete: Acetaminophen, Acetylsalicylic Acid, and Dextromethorphan Combinations with Decongestant and/or Antihistamine without Phenylpropanolamine	5	3	0	2	1	0	0	0	0	3	0	0	0	0	0	0	0	0	0

(continued)

Table 22B. Demographic profile of SINGLE SUBSTANCE pharmaceuticals exposure cases by generic category – Continued.

	No. of Case Mentions	No. of Single Exposure	Age					Unknown				Reason			Treated in Health Care Facility		Outcome			
			≤5	6–12	13–19	≥20	Child	Adult	Age	Unint	Int	Other	Adv Rtn	None	Minor	Moderate	Major	Death		
Obsolete: Acetaminophen, Acetylsalicylic Acid, and Opioid Combinations with Decongestant and/or Antihistamine without Phenylpropanolamine	2	2	0	0	0	2	0	0	0	1	1	0	0	0	1	0	0	0	0	0
Acetaminophen with Decongestant and/or Antihistamine	5	4	3	0	0	1	0	0	0	3	1	0	0	0	1	0	0	0	0	0
Acetaminophen and Codeine with Antihistamine	2	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Decongestant	12	3	1	0	1	1	0	0	0	2	1	0	0	0	2	0	1	0	0	0
Acetaminophen and Codeine with Decongestant and Antihistamine	4,869	2,313	797	152	465	821	2	58	18	1,235	986	1	72	468	408	212	13	0	0	0
Acetaminophen and Dextromethorphan with Antihistamine	4,199	2,220	1,173	175	291	506	2	64	9	1,719	366	1	116	531	230	72	7	0	0	0
Acetaminophen and Dextromethorphan with Decongestant	3,099	1,715	840	169	256	421	2	20	7	1,172	473	1	51	614	227	110	7	0	0	0
Acetaminophen and Dextromethorphan with Decongestant and Antihistamine	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Acetaminophen and Other Opioid with Decongestant	3	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Acetaminophen and Other Opioid with Decongestant and Antihistamine	608	423	92	21	111	190	1	6	2	146	262	1	7	286	91	99	3	1	0	0
Acetaminophen with Antihistamine without Opioids	1,135	709	411	68	77	141	1	10	1	557	112	0	30	187	80	43	8	0	0	0
Acetaminophen with Decongestant and Antihistamine without Opioids	1,037	608	333	52	60	149	0	13	1	482	92	1	29	118	46	24	1	0	0	0
Acetaminophen with Decongestant without Opioids	7	5	3	1	0	1	0	0	0	4	0	0	1	1	0	0	0	0	0	0
Obsolete: Acetaminophen and Codeine Combinations with Decongestant and/or Antihistamine without Phenylpropanolamine	47	38	18	7	7	6	0	0	0	27	10	0	1	13	7	2	0	0	0	0
Obsolete: Acetaminophen and Other Opioid Combinations with Decongestant and/or Antihistamine without Phenylpropanolamine	4	1	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0
Decongestant and/or Antihistamine without Phenylpropanolamine	13	7	4	0	0	3	0	0	0	5	0	0	1	2	1	0	0	0	0	0
Obsolete: Acetaminophen with Decongestant and/or Antihistamine Combinations without Phenylpropanolamine or Opioids	1	1	0	0	0	1	0	0	0	0	1	0	0	1	1	0	0	0	0	0
Acetylsalicylic Acid with Decongestant and/or Antihistamine	1	1	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0
Acetylsalicylic Acid and Codeine with Antihistamine	1	1	1	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0
Acetylsalicylic Acid and Codeine with Decongestant and Antihistamine	4	2	2	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0
Acetylsalicylic Acid and Dextromethorphan with Antihistamine	9	8	5	2	1	0	0	0	0	7	1	0	0	1	0	1	0	0	0	0
Acetylsalicylic Acid and Dextromethorphan with Decongestant	31	19	15	0	1	3	0	0	0	18	0	0	1	1	6	1	0	0	0	0
Acetylsalicylic Acid and Dextromethorphan with Decongestant and Antihistamine	8	6	1	0	2	3	0	0	0	2	4	0	0	5	1	0	3	0	0	0
Acetylsalicylic Acid with Antihistamine without Opioids	143	101	67	13	6	10	0	4	1	88	1	0	10	3	22	8	0	0	0	0
Acetylsalicylic Acid with Decongestant and Antihistamine without Opioids	3	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Acetylsalicylic Acid with Decongestant without Opioids	3	3	0	1	1	1	0	0	0	1	0	0	2	0	1	0	0	0	0	0
Obsolete: Acetylsalicylic Acid and Dextromethorphan Combinations with Decongestant and/or Antihistamine without Phenylpropanolamine																				

(continued)



Table 22B. Demographic profile of SINGLE SUBSTANCE pharmaceuticals exposure cases by generic category – Continued.

	No. of Case Mentions	No. of Single Exposure	Age										Reason			Treated in Health Care Facility		Outcome				
			≤20					Unknown					Unint	Int	Other	Adv Rxn	Care	None	Minor	Moderate	Major	Death
			≤5	6–12	13–19	≤20	Child	Adult	Age	Unint	Int	Other	Adv Rxn	Care	None	Minor	Moderate	Major	Death			
Obsolete: Acetylsalicylic Acid and Other Opioid Combinations with Decongestant and/or Antihistamine without Phenylpropanolamine	1	1	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	
Obsolete: Acetylsalicylic Acid with Decongestant and/or Antihistamine Combinations without Phenylpropanolamine or Opioids	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Antihistamine and/or Decongestant	84	65	29	9	5	21	0	1	0	51	11	0	2	21	17	15	2	1	0	0	0	
Antihistamine and Decongestant with Dextromethorphan	3,040	2,569	1,878	405	99	159	3	18	7	2,400	114	1	49	389	601	261	58	4	0	0	0	
Antihistamine and Decongestant with Other Opioid	15	9	1	1	0	7	0	0	0	7	1	0	1	2	1	1	0	0	0	0	0	
Antihistamine and Decongestant without Opioid	4,141	3,308	2,155	417	181	509	1	40	5	3,058	175	1	65	535	746	293	80	8	0	0	0	
Antihistamine with Codeine	614	441	123	40	53	207	0	16	2	314	105	1	16	141	103	84	32	1	0	0	0	
Antihistamine with Dextromethorphan	3,924	3,051	685	204	867	1,249	2	37	7	1,087	1,892	4	39	1,989	434	686	927	49	1	0	0	
Antihistamine with Other Opioid	172	135	31	10	9	78	1	6	0	99	28	0	7	42	33	27	5	2	0	0	0	
Antihistamine without Opioid	1,799	1,060	590	44	112	293	1	17	3	762	267	2	18	437	327	148	74	12	2	0	0	
Decongestant with Codeine	46	31	11	4	3	11	0	2	0	25	2	1	3	3	5	3	0	0	0	0	0	
Decongestant with Dextromethorphan	1,882	1,471	970	233	71	184	2	10	1	1,295	129	2	33	238	362	103	48	1	0	0	0	
Decongestant with Other Opioid	25	14	7	1	3	3	0	0	0	11	2	0	4	8	4	1	2	0	0	0	0	
Decongestant without Opioid	4,321	2,900	1,509	202	267	810	2	104	6	2,531	254	1	109	427	646	219	75	5	0	0	0	
Obsolete: Antihistamine and/or Decongestant with Codeine without Phenylpropanolamine	4	3	1	1	1	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	
Obsolete: Antihistamine and/or Decongestant with Dextromethorphan without Phenylpropanolamine	108	90	22	6	15	45	0	2	0	32	56	0	0	66	21	25	24	0	0	0	0	
Obsolete: Antihistamine and/or Decongestant without Phenylpropanolamine and Opioid	53	45	31	10	1	3	0	0	0	45	0	0	0	7	18	2	0	0	0	0	0	
Miscellaneous Cold and Cough Preparations	132	78	39	11	11	14	1	2	0	56	20	0	1	23	18	9	6	0	0	0	0	
Acetaminophen in Combination with Dextromethorphan (Without Decongestants or Antihistamines)	3,269	2,263	1,623	116	152	319	1	43	9	1,845	331	5	65	478	425	194	103	9	0	0	0	
Cough and Cold Preparations (Not Otherwise Classified)	11,931	8,986	3,351	1,177	1,274	2,969	5	186	24	5,869	2,743	9	285	3,364	1,457	1,506	1,219	61	0	0	0	
Dextromethorphan Preparations (Not Otherwise Classified)	503	389	226	57	26	78	0	2	0	306	62	0	15	102	85	38	30	0	0	0	0	
Expectorants Without Dextromethorphan	2,069	1,349	574	81	99	489	1	97	8	1,165	132	0	49	154	205	48	18	1	0	0	0	
Non-Narcotic Antitussives Excluding Dextromethorphan	1,824	1,247	486	87	149	470	2	44	9	979	198	0	67	533	412	202	31	6	0	0	0	
Obsolete: Acetylsalicylic Acid in Combination with Dextromethorphan	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	
Obsolete: Expectorants or Antitussives (Without Narcotics or Narcotic Analogs)	14	11	3	1	3	4	0	0	0	10	1	0	0	2	6	1	0	0	0	0	0	
Obsolete: Non-Acetylsalicylic Acid Salicylates in Combination with Dextromethorphan	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	
Obsolete: Unknown Types of Cough and Cold Preparation	244	99	31	5	23	34	0	3	3	40	53	0	4	66	18	23	13	2	0	0	0	
Non-Acetylsalicylic Acid Salicylates with Decongestant and/or Antihistamine	5	5	4	0	0	1	0	0	0	4	1	0	0	1	1	1	0	0	0	0	0	
Non-Acetylsalicylic Acid Salicylates and Dextromethorphan with Antihistamine	4	3	1	0	0	2	0	0	0	2	1	0	0	1	2	0	0	0	0	0	0	
Non-Acetylsalicylic Acid Salicylates and Dextromethorphan with Decongestant	1	1	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	
Non-Acetylsalicylic Acid Salicylates and Dextromethorphan with Decongestant and Antihistamine	1	1	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	
Non-Acetylsalicylic Acid Salicylates and Opioid with Decongestant	1	1	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	

(continued)

Table 22B. Demographic profile of SINGLE SUBSTANCE pharmaceuticals exposure cases by generic category – Continued.

	No. of Case Mentions	No. of Single Exposure	Age						Reason				Treated in			Outcome		
			Age						Unint	Int	Other	Adv Rtn	Health Care Facility	None	Minor	Moderate	Major	Death
			≤5	6–12	13–19	≤20	Unknown Child	Unknown Adult										
Non-Acetylsalicylic Acid Salicylates and Opioid with Decongestant and Antihistamine	1	1	1	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0
Non-Acetylsalicylic Acid Salicylates with Antihistamine without Opioid	5	4	3	1	0	0	0	0	4	0	0	0	0	3	0	0	0	0
Non-Acetylsalicylic Acid Salicylates with Decongestant and Antihistamine without Opioid	4	2	2	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0
Non-Acetylsalicylic Acid Salicylates with Decongestant without Opioid	3	2	2	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0
Obsolete: Non-Acetylsalicylic Acid Salicylates with Decongestant and/or Antihistamine without Phenylpropanolamine and Opioid	1	1	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0
Phenylpropanolamine Containing Preparations	34	25	12	2	5	6	0	0	14	10	0	1	11	7	3	3	1	0
Acetaminophen and Phenylpropanolamine Combinations with Decongestant and/or Antihistamine without Opioid	9	7	6	0	0	0	1	0	7	0	0	0	1	2	0	0	0	0
Acetaminophen, Acetylsalicylic Acid, and Phenylpropanolamine Combinations with Decongestant and/or Antihistamine without Opioid	22	18	7	4	1	6	0	0	13	2	0	3	6	3	1	0	0	0
Acetaminophen, Acetylsalicylic Acid, Phenylpropanolamine, and Dextromethorphan Combinations with Decongestant and/or Antihistamine	37	30	19	4	3	4	0	0	25	3	0	0	3	2	3	1	0	0
Acetaminophen, Phenylpropanolamine, and Dextromethorphan Combinations with Decongestant and/or Antihistamine	1	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0
Acetaminophen, Phenylpropanolamine, and Other Opioid Combinations with Decongestant and/or Antihistamine	17	13	8	1	3	1	0	0	11	2	0	0	3	3	1	1	0	0
Acetylsalicylic Acid and Phenylpropanolamine Combinations with Decongestant and/or Antihistamine without Opioid	4	4	4	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0
Acetylsalicylic Acid, Phenylpropanolamine, and Dextromethorphan Combinations with Decongestant and/or Antihistamine	5	4	2	0	1	1	0	0	4	0	0	0	0	1	0	0	0	0
Phenylpropanolamine and Codeine	164	131	89	21	5	16	0	0	117	11	0	3	22	20	11	2	0	0
Phenylpropanolamine and Dextromethorphan	4	4	3	1	0	0	0	0	4	0	0	0	1	2	0	0	0	0
Phenylpropanolamine and/or Decongestant with Antihistamine and/or Other Opioid	192	129	88	21	11	8	0	1	114	14	0	0	38	41	11	2	0	0
Phenylpropanolamine without Opioid	226	195	100	1	5	80	0	9	194	1	0	0	12	65	2	3	0	0
Other Phenylpropanolamine Preparations (Excluding Street Drugs and Diet Aids)	56,305	38,457	18,537	3,848	4,748	10,353	30	818	28,042	8,948	32	1,160	11,994	7,869	5,027	3,330	203	4
Category Total:																		
Diagnostic Agents																		
Miscellaneous Diagnostic Agents	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Diagnostic Tablets for Glucose or Ketones	353	298	56	15	11	173	2	32	252	4	0	41	125	58	52	12	4	0
Other Types of Diagnostic Agent	6	4	0	0	1	3	0	0	2	0	0	2	3	0	1	0	0	0
Unknown Types of Diagnostic Agent	360	303	57	15	12	176	2	32	255	4	0	43	128	58	53	12	4	0
Category Total:																		
Dietary Supplements/Herbals/Homeopathic Amino Acids																		
Creatine	171	124	75	5	12	30	0	2	98	7	0	19	38	29	11	10	1	0
Other Amino Acid Dietary Supplements	683	464	268	23	21	133	1	15	370	37	1	54	86	86	45	16	2	0
Botanical Products																		
Citrus Aurantium (Single Ingredient)	27	19	8	1	2	6	0	2	16	2	0	1	3	2	2	0	0	0

(continued)

Table 22B. Demographic profile of SINGLE SUBSTANCE pharmaceuticals exposure cases by generic category – Continued.

No. of Case Mentions	No. of Single Exposure	Age										Reason			Treated in Health Facility		Outcome			
		≤20					Unknown					Unint	Int	Other	Adv Rxn	None	Minor	Moderate	Major	Death
		≤5	6–12	13–19	≥20	Child	Adult	Age												
Echinacea	136	102	67	14	2	14	0	4	1	91	6	0	5	13	24	6	0	0	0	0
Ginkgo Biloba	85	52	23	5	2	18	0	4	0	38	8	0	6	6	10	4	3	0	0	0
Ginseng	79	50	27	1	2	18	0	2	2	37	6	0	6	13	12	4	4	0	0	0
Kava Kava	106	75	17	2	4	48	0	2	2	28	26	0	19	40	11	16	9	1	0	0
Ma Huang/Ephedra (Single Ingredient)	16	12	1	0	2	8	0	1	0	3	4	0	4	8	4	4	4	0	0	0
Multi-Botanicals with Citrus Aurantium	48	40	21	2	2	14	0	1	0	27	7	0	6	17	6	6	4	1	0	0
Multi-Botanicals with Ma Huang	66	49	24	0	6	17	0	2	0	29	16	0	3	22	10	9	10	1	0	0
Multi-Botanicals without Ma Huang or Citrus Aurantium	1,584	1,271	766	74	65	335	3	23	5	934	134	5	191	316	239	141	87	4	0	0
Other Single Ingredient Botanicals	3,208	2,465	1,394	101	89	710	7	152	12	2,025	161	7	261	369	418	253	50	5	1	1
St. John's Wort	219	140	84	4	13	34	0	4	1	111	18	0	10	22	35	10	2	0	0	0
Valerian	215	100	28	10	15	44	0	3	0	57	25	0	16	35	22	14	3	0	0	0
Yohimbe	140	99	15	3	4	72	0	5	0	28	18	0	52	70	9	15	41	1	0	0
Cultural Medicines																				
Asian Medicines	107	92	43	8	6	34	0	1	0	61	5	1	23	46	14	15	7	0	0	0
Ayurvedic Medicines	10	7	4	0	0	3	0	0	0	6	0	1	0	3	3	1	1	0	0	0
Hispanic Medicines	8	8	4	2	0	2	0	0	0	4	0	0	4	5	1	1	3	0	0	0
Other Cultural Medicines	83	64	31	5	2	25	0	1	0	44	12	0	8	29	5	10	6	3	0	0
Energy Products																				
Energy Drinks: Caffeine Containing (From Any Source Including Guarana, Kola Nut, Tea, Yerba Mate, Cocoa, etc)	1,193	966	572	79	109	186	0	19	1	708	137	2	118	210	186	167	69	0	0	0
Energy Drinks: Caffeine Only (Without Guarana, Kola Nut, Tea, Yerba Mate, Cocoa, etc)	886	665	427	65	54	108	1	8	2	522	81	4	53	99	118	78	29	0	0	0
Energy Drinks: Ethanol and Caffeine Containing (From Any Source Including Guarana, Kola Nut, Tea, Yerba Mate, Cocoa, etc)	150	39	8	0	10	17	0	4	0	10	18	0	9	15	4	8	9	0	0	0
Energy Drinks: Ethanol Only (Without Guarana, Kola Nut, Tea, Yerba Mate, Cocoa, etc)	2	1	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
Energy Drinks: Ethanol Containing Without Caffeine (From Any Source)	1	1	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
Energy Drinks: No Caffeine (From Any Source)	26	25	17	3	1	4	0	0	0	21	2	0	2	2	5	2	0	0	0	0
Energy Drinks: Unknown	464	335	157	42	56	67	1	10	2	221	64	0	45	91	56	74	28	0	1	1
Energy Products: Other	293	230	110	12	27	75	0	6	0	136	41	0	50	96	46	50	24	2	0	0
Hormonal Products																				
Androgen or Androgen Precursor Dietary Supplements	123	95	62	2	2	27	0	2	0	74	6	1	14	20	20	4	6	0	0	0
Glandular Dietary Supplements	48	40	29	3	1	5	0	1	1	37	1	0	2	4	2	3	1	0	0	0
Melatonin	27,799	23,627	18,611	2,505	1,393	944	25	113	36	21,385	2,022	17	136	3,319	5,071	2,272	52	1	1	1
Phytoestrogen Dietary Supplements	59	48	24	1	3	17	0	2	1	34	5	0	7	9	9	2	2	1	0	0
Miscellaneous Dietary Supplements/Herbals/Homoeopathic																				
Homeopathic Agents	8,603	8,034	7,117	322	86	420	12	66	11	7,758	92	5	166	628	1,393	251	33	7	0	0
Unknown Dietary Supplements or Homeopathic Agents	1,938	1,553	914	92	62	415	1	58	11	1,181	80	4	270	340	285	177	65	13	0	0
Other Dietary Supplements																				
Blue-Green Algae	358	347	73	61	41	126	9	36	1	334	2	3	6	68	69	80	6	0	0	0
Fatty Acid Supplements	2	2	1	1	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0
Glucosamine (with or without Chondroitin)	591	405	302	9	7	71	0	13	3	384	8	1	11	30	83	14	2	0	0	0
Other Single Ingredient Non-Botanical Dietary Supplements	1,834	999	674	63	32	188	2	35	5	871	49	1	71	112	175	59	12	3	0	0
Category Total:	51,361	42,645	32,000	3,520	2,133	4,235	62	595	100	37,687	3,100	53	1,648	6,187	8,462	3,808	598	46	3	3
Diuretics																				
Miscellaneous Diuretics																				
Furosemide	3,324	1,038	380	25	23	571	0	37	2	949	67	1	21	273	238	124	40	1	0	0
Other Types of Diuretic	2,555	940	332	56	53	453	0	40	6	800	97	0	40	244	231	74	35	1	0	0
Thiazide	4,214	1,423	568	80	58	675	0	41	1	1,265	128	2	25	371	367	81	39	1	0	0
Unknown Types of Diuretic	256	92	38	3	10	39	0	1	1	74	14	0	3	30	28	8	3	1	1	1

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(continued)

Table 22B. Demographic profile of SINGLE SUBSTANCE pharmaceuticals exposure cases by generic category – Continued.

No. of Case Mentions	No. of Single Exposure	Age					Unknown				Reason			Treated in Health Facility		Outcome			
		≤5	6–12	13–19	≥20	1,738	Child	Adult	Age	Unint	Int	Other	Adv Rtn	Care Facility	None	Minor	Moderate	Major	Death
Category Total:	10,349	3,493	1,318	164	144	1,738	0	119	10	3,088	306	3	89	918	864	287	117	4	1
<b>Electrolytes and Minerals</b>																			
Miscellaneous Electrolytes and Minerals	11,957	10,502	9,282	516	137	465	12	80	10	10,213	222	4	57	382	1,776	168	30	0	0
Calcium and Calcium Salts	205	171	55	9	7	66	0	28	6	161	7	0	3	29	30	12	3	0	0
Chromium, Trivalent	118	103	31	2	4	55	0	10	1	60	21	0	22	46	16	7	8	0	0
Colloidal Silver	1,474	1,412	1,143	144	24	76	2	19	4	1,326	12	4	67	80	249	81	7	0	0
Fluoride (Excluding Vitamins, Hydrofluoric Acid & Mouthwashes)	6,033	4,400	2,181	142	516	1,387	6	142	26	3,500	601	6	271	1,229	920	566	153	8	2
Iron and Iron Salts (Excluding Vitamins with Iron)	1,843	1,486	673	85	68	567	1	81	11	1,223	132	5	114	212	288	156	28	2	1
Magnesium and Magnesium Salts	696	536	318	25	65	118	0	7	3	369	119	0	46	219	147	64	63	1	1
Multi-Mineral and Multi-Herbal Dietary Supplement	177	129	78	6	4	37	0	4	0	105	8	1	14	13	16	9	4	1	0
Other Types of Electrolyte or Mineral	39	31	10	3	0	16	0	2	0	29	0	0	2	7	5	3	1	1	1
Potassium and Potassium Salts	1,186	480	154	9	9	272	0	33	3	396	57	1	25	95	113	18	17	1	0
Selenium and Selenium Salts	100	77	20	6	0	44	0	6	1	62	4	0	8	24	13	9	5	1	0
Sodium and Sodium Salts	5,298	4,282	2,511	451	181	939	5	182	13	3,673	440	43	111	631	758	598	71	2	0
Unknown Types of Electrolyte or Mineral	7	6	3	0	0	2	0	1	0	6	0	0	0	2	2	1	0	0	0
Vanadium and Vanadium Salts	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zinc and Zinc Salts	1,236	1,026	535	31	52	352	1	49	6	843	63	2	113	113	102	139	15	0	0
Category Total:	30,370	24,641	16,994	1,429	1,067	4,396	27	644	84	21,966	1,686	66	853	3,082	4,435	1,831	405	17	5
<b>Eye/Ear/Nose/Throat Preparations</b>																			
Miscellaneous Eye/Ear/Nose/Throat Preparations	2,069	1,758	821	310	56	462	5	92	12	1,629	65	2	60	52	273	107	7	1	0
Topical Steroids For Eye/Nose/Throat Nasal Preparations	1,966	1,861	763	86	125	770	2	107	8	1,608	95	10	145	255	432	225	44	3	0
Other Nasal Decongestants or Sympathomimetics (Excluding Tetrahydrozoline)	493	471	266	10	15	141	1	31	7	442	5	4	20	23	74	43	2	0	0
Other Types of Nasal Preparation	22	22	13	1	0	5	0	2	1	19	1	1	1	4	2	4	0	0	0
Tetrahydrozoline, Nasal Preparation	12	11	2	0	2	7	0	0	0	8	0	1	2	1	1	3	0	0	0
Unknown Types of Nasal Preparation																			
Ophthalmic Preparations	2,170	2,048	1,003	64	100	748	4	124	5	1,988	25	11	24	388	188	377	85	0	0
Contact Lens Products	424	362	89	10	6	220	1	33	3	326	6	1	28	46	74	30	8	0	0
Glaucoma Medications	1,013	973	608	35	37	234	4	51	4	850	32	61	27	223	352	60	16	1	0
Other Ophthalmic Sympathomimetics	1,906	1,815	996	71	52	542	2	136	16	1,691	31	13	75	128	279	82	14	0	1
Other Types of Ophthalmic Preparation	715	694	428	18	41	169	1	33	4	598	31	49	13	174	258	43	7	2	0
Tetrahydrozoline, Ophthalmic Preparations	50	43	14	2	8	13	0	6	0	26	2	7	5	8	9	8	2	0	0
Unknown Types of Ophthalmic Preparation																			
Otic Preparations	939	929	384	110	39	317	5	69	5	918	4	0	7	90	137	217	13	0	0
Combination Products	2,266	2,245	664	90	68	1,174	4	226	19	2,202	13	1	26	343	208	740	65	1	0
Other Types of Otic Preparation	36	35	6	2	0	22	0	4	1	35	0	0	0	9	3	12	2	0	0
Unknown Types of Otic Preparation																			
Throat Preparations	395	374	89	41	44	156	3	37	4	332	28	3	10	35	64	35	5	0	0
Other Types of Throat Preparation	268	239	107	20	23	67	0	21	1	214	15	0	9	23	52	14	2	0	0
Throat Lozenges with Local Anesthetics	899	827	676	62	17	61	1	10	0	787	32	0	8	15	135	33	1	0	0
Throat Lozenges without Local Anesthetics	5	5	4	0	0	1	0	0	0	4	1	0	0	1	1	0	0	0	0
Unknown Types of Throat Preparation	15,648	14,712	6,933	932	633	5,109	33	982	90	13,677	386	164	460	1,818	2,542	2,033	273	8	1
Category Total:																			
<b>Gastrointestinal Preparations</b>																			
Antacids	3,696	3,418	2,986	167	28	195	3	31	8	3,323	65	1	26	76	419	47	4	0	0
Antacids: Other Types	9,738	4,352	2,132	144	234	1,578	3	239	22	3,911	338	3	89	533	854	134	19	1	0
Antacids: Proton Pump Inhibitors	2,649	2,369	1,889	213	37	193	5	29	3	2,217	90	2	53	207	492	66	13	0	0
Antacids: Salicylate-Containing																			
Antidiarrheals	249	126	45	5	7	68	0	1	0	84	31	0	10	79	50	12	14	3	1
Antidiarrheals: Diphenoxylate and Atropine Containing																			

(continued)

Table 22B. Demographic profile of SINGLE SUBSTANCE pharmaceuticals exposure cases by generic category – Continued.

	No. of Case Mentions	No. of Single Exposure	Age										Reason			Treated in Health Facility		Outcome				
			≤20					Unknown					Unint	Int	Other	Adv Rxn	Care Facility	None	Minor	Moderate	Major	Death
			≤5	6–12	13–19	≤20	Child	Adult	Unknown	Age												
Antidiarrheals: Loperamide	1,583	1,162	483	35	37	556	0	43	8	723	374	6	44	519	329	107	123	56	4			
Antidiarrheals: Non-Narcotic Containing (Excluding Salicyl Containing)	33	23	17	1	1	4	0	0	0	23	0	0	0	1	3	0	0	0	0			
Antidiarrheals: Paregoric Containing	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Antispasmodics	2,845	1,246	474	74	126	508	1	54	9	926	213	2	92	472	353	181	108	9	1			
Antispasmodics: Anticholinergic Containing	262	117	24	7	1	80	0	4	1	104	7	0	6	26	33	8	2	0	0			
Miscellaneous Gastrointestinal Preparations	14,471	12,447	8,746	669	436	2,155	19	383	39	11,379	545	65	433	1,209	1,691	1,256	142	4	0			
Laxatives	9,437	7,912	6,117	331	144	1,044	16	207	53	7,250	196	19	438	575	1,302	404	78	7	0			
Other Types of Gastrointestinal Preparation	29	18	14	1	0	1	0	2	0	16	1	0	1	4	4	0	0	0	0			
Unknown Types of Gastrointestinal Preparation																						
Serotonin 5-HT3 Receptor Antagonists	3,265	1,925	1,275	146	126	338	0	31	9	1,679	166	1	69	554	645	153	61	3	0			
Serotonin 5-HT3 Receptor Antagonists: Ondansetron	5	2	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0			
Serotonin 5-HT3 Receptor Antagonists: Other or Unknown	48,263	35,117	24,204	1,793	1,177	6,720	47	1,024	152	31,637	2,026	99	1,261	4,255	6,175	2,368	564	83	6			
Category Total:																						
Hormones and Hormone Antagonists																						
Hypoglycemic, Combination	260	147	29	2	7	100	0	8	1	138	5	0	3	27	44	10	3	1	0			
Hypoglycemic: Biguanide Combinations (Excluding Sulfonylurea)	20	11	7	0	0	3	0	1	0	11	0	0	0	0	4	0	0	0	0			
Hypoglycemic: Other or Unknown Oral																						
Hypoglycemic Combination																						
Hypoglycemic: Sulfonylurea Combinations	83	41	18	0	2	20	0	1	0	33	6	0	1	27	16	1	10	0	0			
Hypoglycemic, Single Agent																						
Hypoglycemics: Glucagon-Like Peptide-1 (GLP-1) Receptor Agonists	465	394	26	3	2	325	1	35	2	335	19	0	38	98	94	48	23	1	0			
Hypoglycemics: Other or Unknown	126	64	17	1	2	40	0	4	0	57	4	0	3	18	28	4	3	0	0			
Hypoglycemics: Other or Unknown	6,974	5,824	162	74	147	5,028	4	379	30	5,009	684	5	85	2,529	2,417	313	953	47	2			
Insulin	41	24	16	0	0	8	0	0	0	23	1	0	0	8	7	1	1	0	0			
Oral Hypoglycemics: Alpha-Glucosidase Inhibitors																						
Oral Hypoglycemics: Biguanides	9,402	4,061	916	120	361	2,458	2	186	18	3,211	715	2	102	1,244	924	343	250	58	21			
Oral Hypoglycemics: Dipeptidyl Peptidase-4 (DPP-4) Inhibitors	955	352	107	12	5	207	0	19	2	315	21	0	15	91	120	15	10	3	0			
Oral Hypoglycemics: Meglitinides	76	30	13	1	1	15	0	0	0	28	0	0	2	16	9	2	3	0	0			
Oral Hypoglycemics: Sodium Glucose Co-Transporter 2 Inhibitor (SGLT2) Inhibitors	563	277	89	8	10	140	1	29	0	243	12	0	19	69	96	10	13	1	0			
Oral Hypoglycemics: Sulfonylureas	3,642	1,471	693	56	44	645	1	29	3	1,240	134	1	71	1,119	501	69	442	38	2			
Oral Hypoglycemics: Thiazolidinediones	339	101	46	3	2	46	0	4	0	90	6	0	5	38	31	9	6	0	0			
Miscellaneous Hormones and Hormone Antagonists																						
Androgens	427	346	93	14	14	186	0	34	5	264	39	3	39	79	59	46	11	2	1			
Corticosteroids	11,291	9,157	3,889	788	361	3,521	14	545	39	8,493	196	10	446	640	1,234	340	63	1	0			
Estrogens	1,246	828	432	39	65	248	3	33	8	727	65	2	34	71	118	49	5	0	0			
oral Contraceptives	3,523	2,824	1,874	99	352	409	4	71	15	2,409	352	0	54	292	428	159	9	0	0			
Other Hormone Antagonists	588	453	153	20	24	219	1	30	6	415	24	0	12	68	89	14	8	0	0			
Other Hormones	803	562	188	71	49	218	2	32	2	497	42	1	19	143	147	34	17	1	0			
Progestins	1,243	1,016	569	46	56	278	1	56	10	901	35	3	76	97	155	39	7	1	0			
Selective Estrogen Receptor Modulators	290	162	48	13	3	85	0	13	0	154	6	0	2	19	43	5	3	0	0			
Thyroid Preparations (Including Synthetics and Extracts)	13,363	8,807	4,439	388	283	3,270	7	389	31	8,384	328	6	77	1,241	1,593	165	58	4	0			
Unknown Hormones or Hormone Antagonists	13	10	6	0	1	2	0	0	1	10	0	0	0	0	2	1	0	0	0			
Category Total:	55,733	36,962	13,830	1,758	1,791	17,471	41	1,898	173	32,987	2,694	33	1,103	7,934	8,159	1,677	1,898	158	26			
Miscellaneous Drugs																						
Alzheimer Drugs	27	10	1	1	0	8	0	0	0	8	2	0	0	7	4	4	0	0	0			
Miscellaneous Alzheimer Drugs																						
Antidotes																						
Miscellaneous Antidote Drugs	4	3	1	1	0	1	0	0	0	2	1	0	0	1	1	0	0	0	0			
Other Miscellaneous Drugs																						

(continued)

Table 22B. Demographic profile of SINGLE SUBSTANCE pharmaceuticals exposure cases by generic category – Continued.

	No. of Case Mentions	No. of Single Exposure	Age						Reason			Treated in		Outcome					
			≤20			Unknown			Unint	Other	Adv Rxn	Health Care Facility	None	Minor	Moderate	Major	Death		
			≤5	6-12	13-19	≤20	Child	Adult										Age	
Allopurinol	901	310	142	11	7	141	0	8	1	291	9	1	8	41	81	12	4	0	0
Bisphosphonates (Including Combinations)	4	4	0	0	0	4	0	0	0	3	3	0	1	3	0	1	0	0	0
Disulfiram	184	43	6	0	1	27	0	9	0	16	11	1	13	19	1	5	7	1	0
Ergot Alkaloids	46	29	11	1	0	13	0	2	2	22	0	0	6	12	5	1	4	1	0
Monoclonal Antibodies (Including Fragments)	2	2	1	0	0	1	0	0	0	1	0	0	1	1	0	1	0	0	0
Neuromuscular Blocking Agents (Succinylcholine, Curare, etc)	28	17	0	1	0	12	0	4	0	13	0	2	2	10	4	1	0	4	0
Nicotine Pharmaceuticals	1,582	1,496	947	150	27	319	4	45	4	1,357	68	1	60	261	422	203	39	0	0
Other Types of Miscellaneous Prescription or Over the Counter Drug	15,473	9,870	3,761	552	482	4,481	13	513	68	8,552	665	26	566	2,429	2,051	1,208	446	45	7
Parkinson Drugs																			
Decarboxylase Inhibitor, Alone	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Levodopa (Alone or with Decarboxylase Inhibitor)	1,473	809	169	5	6	591	0	35	3	708	67	0	26	245	184	124	54	6	0
Levodopa and Carbidopa with Other Drugs	1	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
Other Parkinson Drugs (Including Combinations)	19	8	4	0	0	4	0	0	0	6	1	0	1	2	1	2	0	0	0
Category Total:	19,745	12,602	5,043	722	523	5,603	17	616	78	10,979	824	31	684	3,032	2,754	1,562	554	57	7
Muscle Relaxants																			
Miscellaneous Muscle Relaxants																			
Baclofen	5,200	2,200	270	55	213	1,613	0	40	9	652	1,301	24	114	1,792	290	457	736	241	12
Carisoprodol (Formulated Alone)	2,236	901	49	3	43	785	0	15	6	145	713	1	12	794	82	347	252	50	2
Cyclobenzaprine	10,429	4,248	1,008	219	472	2,381	4	132	32	2,089	2,034	1	66	2,642	929	1,040	731	97	1
Metaxalone	412	205	27	3	21	135	1	18	0	113	84	0	6	104	37	48	30	3	0
Methocarbamol	2,253	904	116	13	130	610	0	26	9	403	464	0	27	550	214	267	100	8	0
Other Types of Muscle Relaxant	574	228	35	5	20	158	6	4	4	102	110	0	13	141	48	59	31	4	0
Tizanidine	4,577	1,889	274	44	125	1,356	2	74	14	829	921	16	92	1,288	274	413	584	74	0
Unknown Types of Muscle Relaxant	219	30	5	0	3	18	0	3	1	6	22	0	0	22	2	9	5	2	0
Category Total:	25,900	10,605	1,784	342	1,027	7,056	7	314	75	4,339	5,649	42	330	7,333	1,876	2,640	2,469	479	15
Narcotic Antagonists																			
Miscellaneous Narcotic Antagonists																			
Miscellaneous Narcotic Antagonist	991	410	31	14	18	294	1	48	4	203	72	21	105	188	51	74	64	6	2
Category Total:	991	410	31	14	18	294	1	48	4	203	72	21	105	188	51	74	64	6	2
Radiopharmaceuticals																			
Miscellaneous Radiopharmaceutical	47	38	6	3	2	21	0	6	0	29	0	0	9	15	4	5	1	0	0
Specific Pharmaceutical Radionuclides	47	38	6	3	2	21	0	6	0	29	0	0	9	15	4	5	1	0	0
Category Total:																			
Sedative/Hypnotics/Antipsychotics																			
Barbiturates																			
Long Acting Barbiturates	1,462	850	214	30	32	532	2	35	5	631	172	1	25	303	191	119	67	24	2
Short or Intermediate Acting Barbiturates	152	61	3	3	3	43	0	8	1	34	22	0	4	34	6	13	10	3	0
Unknown Types of Barbiturate	31	8	1	0	2	4	0	0	1	1	5	0	0	7	0	0	2	0	0
Miscellaneous Sedative/Hypnotics/Antipsychotics																			
Atypical Antipsychotics	44,251	17,121	1,713	895	3,151	10,781	9	456	116	5,399	10,697	47	724	13,258	2,921	5,001	4,192	547	9
Benzodiazepines	69,506	25,070	3,990	652	3,346	15,898	13	912	259	7,438	16,429	336	395	18,884	4,958	8,929	3,519	416	14
Buprionone	6,218	1,914	329	67	369	1,072	0	62	15	749	1,071	1	74	1,228	597	517	159	6	1
Chloral Hydrate	13	9	7	0	1	1	0	0	0	5	1	1	2	6	2	4	1	0	0
Ethchlorvynol	2	2	0	0	0	2	0	0	0	1	1	0	0	2	0	1	1	0	0
Glutethimide	1	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0
Meprobamate	24	12	0	0	4	8	0	0	0	0	12	0	0	10	1	3	5	0	0
Methaqualone	4	3	0	0	0	3	0	0	0	0	2	0	1	3	0	1	0	0	0
Other Types of Sedative/Hypnotic/Anti-Anxiety or Anti-Psychotic Drug	13,579	5,356	587	270	456	3,836	5	160	42	1,894	3,212	30	113	3,812	814	1,999	813	90	5
Phenothiazines	4,333	1,655	182	44	167	1,172	1	80	9	679	761	5	180	1,168	332	359	439	20	2
Sleep Aids, Over the Counter Only (Excluding Diphenhydramine)	1,939	1,254	494	20	202	515	0	18	5	591	648	0	5	733	319	250	233	22	0
Unknown Types of Sedative/Hypnotic/Anti-Anxiety or Anti-Psychotic Drug	292	103	5	1	28	57	1	7	4	12	86	1	1	89	12	24	30	0	0

(continued)

Table 22B. Demographic profile of SINGLE SUBSTANCE pharmaceuticals exposure cases by generic category – Continued.

	No. of Case Mentions	No. of Single Exposure	Age					Unknown					Reason			Treated in Health Facility		Outcome		
			≤5	6–12	13–19	≤20	Child	Adult	Age	Unint	Int	Other	Adv Rxn	Care Facility	None	Minor	Moderate	Major	Death	
Category Total:	141,807	53,419	7,525	1,982	7,761	33,925	31	1,738	457	17,434	33,120	422	1,524	39,537	10,153	17,219	9,472	1,128	33	
Serums, Toxoids, Vaccines																				
Miscellaneous Serums, Toxoids, Vaccines	1,562	1,389	241	89	108	791	7	128	25	1,104	3	1	277	458	114	302	83	2	0	
Miscellaneous Serums, Toxoids and Vaccines	1,562	1,389	241	89	108	791	7	128	25	1,104	3	1	277	458	114	302	83	2	0	
Category Total:																				
Stimulants and Street Drugs																				
Cannabinoids and Analogs																				
eCigarettes: Marijuana Device Flavor Unknown	15	14	2	0	4	6	0	2	0	6	8	0	0	8	2	7	0	0	0	
eCigarettes: Marijuana Device With Added Flavors	1	1	0	0	1	0	0	0	0	0	1	0	0	1	0	1	0	0	0	
eCigarettes: Marijuana Device Without Added Flavors	1	1	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	
eCigarettes: Marijuana Liquid Flavor Unknown	13	13	7	0	2	3	1	0	0	10	3	0	0	6	2	6	0	0	0	
eCigarettes: Marijuana Liquid With Added Flavors	2	2	2	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	
eCigarettes: Marijuana Liquid Without Added Flavors	2	1	1	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	
Marijuana: Concentrated Extract (Including Oils and Tinctures)	292	216	31	7	65	98	0	14	1	58	105	16	34	149	16	80	54	7	0	
Marijuana: Dried Plant	7,333	2,891	681	166	753	1,108	10	143	30	1,146	1,313	98	237	2,053	237	889	654	59	2	
Marijuana: Edible Preparation	714	624	202	75	99	217	0	22	9	357	182	16	60	417	73	244	107	7	0	
Marijuana: Oral Capsule or Pill Preparation	18	12	2	1	1	8	0	0	0	4	2	0	6	8	1	6	2	0	0	
Marijuana: Other or Unknown Preparation	214	80	18	3	18	37	1	2	1	23	48	1	5	70	4	32	30	1	0	
Marijuana: Pharmaceutical Preparation	68	45	14	1	5	22	0	3	0	23	13	1	8	26	9	14	9	0	0	
Marijuana: Topical Preparation	6	5	2	0	0	3	0	0	0	4	1	0	0	3	2	2	0	0	0	
Marijuana: Undried Plant	26	10	0	0	4	4	0	2	0	4	2	1	2	5	3	5	1	0	0	
Synthetic Cannabinoids, Analogs and Precursors	1,959	1,295	13	12	269	961	2	28	10	60	1,151	19	18	1,183	63	418	500	103	5	
Diet Aids																				
Diet Aids: Phenylpropanolamine and Caffeine Combinations	5	4	1	1	0	1	0	1	0	2	2	0	0	2	0	0	0	0	1	
Diet Aids: Phenylpropanolamine Only	4	2	0	0	0	2	0	0	0	2	0	0	0	1	0	0	1	0	0	
Other Types of Diet Aid, Over the Counter Only	160	118	64	1	11	38	0	3	1	83	14	0	21	48	28	17	14	0	0	
Other Types of Diet Aid, Prescription Only	23	15	6	0	0	7	0	2	0	9	4	0	2	9	3	2	3	1	0	
Unknown Types of Diet Aid	47	30	14	1	5	8	0	2	0	17	9	0	4	13	7	2	3	1	0	
Miscellaneous Stimulants and Street Drugs																				
Amphetamines and Related Compounds	16,569	10,162	3,531	1,835	1,862	2,691	7	184	52	6,926	27,48	46	279	5,274	2,469	1,739	1,756	124	3	
Amphetamine (Street Drugs)	154	130	24	3	4	95	0	3	1	61	68	0	0	63	20	25	21	2	1	
Caffeine	3,765	2,842	1,173	114	399	1,028	1	106	21	1,731	650	14	416	887	451	534	301	11	0	
Cocaine	6,008	1,427	74	15	73	1,130	2	93	40	1,152	1,191	27	10	1,229	224	241	426	94	30	
Ephedrine	149	105	52	5	5	37	0	4	2	71	27	3	2	38	26	13	16	3	0	
gamma-Hydroxybutyric Acid including Analogs or Precursors	519	323	6	3	18	270	0	16	10	56	208	26	7	273	21	55	123	66	0	
Hallucinogenic Amphetamines	1,908	871	35	2	188	594	0	38	14	93	738	20	7	745	60	173	350	68	6	
Heroin	8,784	4,923	23	6	141	4,583	0	119	51	158	4,564	124	18	4,419	377	819	1,828	1,087	66	
Kratom	372	240	9	1	13	210	0	6	1	27	167	15	27	196	18	63	89	20	1	
Lysergic acid diethylamide (LSD)	1,018	594	10	5	343	208	1	18	9	51	513	14	3	518	27	112	323	29	1	
Mescaline/Peyote	48	35	7	4	2	21	0	1	0	22	9	1	3	12	1	7	8	1	0	
Methamphetamines	7,519	3,503	239	50	163	2,779	4	206	62	526	2,770	87	32	2,904	324	645	1,199	256	191	
Methylphenidate	9,589	6,562	1,630	2,602	1,421	820	8	64	17	5,258	1,140	12	106	2,241	1,628	944	689	25	0	
Other Hallucinogens	102	70	0	0	25	43	0	2	0	5	61	1	2	62	2	11	41	4	0	
Other Stimulants (Excluding Amphetamines)	458	258	74	5	16	148	0	15	0	156	55	2	41	117	56	44	36	2	0	
Other Street Drugs	509	294	18	3	27	225	1	15	5	30	243	11	1	248	10	36	137	29	3	
Other Synthetic Street Drugs	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Phencyclidine (PCP)	540	220	11	3	14	172	0	12	8	32	160	5	4	193	11	43	101	16	1	
Synthetic Cathinones, Analogs and Precursors	7	4	0	0	0	4	0	0	0	0	3	1	0	4	1	1	1	0	0	
Synthetic Opioids, Analogs and Precursors (Excluding Pharmaceutical Preparations)	10	3	0	0	0	3	0	0	0	1	2	0	0	2	0	0	0	2	1	
Synthetic Tryptamines, Analogs and Precursors	1	1	0	0	0	1	0	0	0	0	1	0	0	1	0	1	0	0	0	
Unknown Hallucinogens	13	5	0	0	1	3	0	1	0	0	5	0	0	4	0	0	3	0	0	

(continued)

Table 22B. Demographic profile of SINGLE SUBSTANCE pharmaceuticals exposure cases by generic category – Continued.

	No. of Case Mentions	No. of Single Exposure	Age					Reason					Treated in Health Facility		Outcome				
			≤5	6–12	13–19	≤20	Unknown Child	Unknown Adult	Unknown Age	Unint	Int	Other	Adv Rxn	Care	None	Minor	Moderate	Major	Death
Unknown Stimulants or Street Drugs	297	197	3	4	31	139	0	17	3	12	160	9	7	176	8	29	65	38	5
Category Total:	69,243	38,148	7,979	4,928	5,983	17,728	38	1,144	348	17,179	18,342	570	1,362	23,608	6,185	7,262	8,891	2,056	317
Topical Preparations																			
Miscellaneous Topical Preparations																			
Acne Preparations	1,994	1,911	1,005	124	262	410	1	103	6	1,777	49	3	81	129	307	210	18	1	0
Boric Acid or Borates (As Antiseptics, Excluding Insecticides)	120	115	27	3	6	70	0	7	2	105	1	0	9	11	24	10	1	0	0
Calamine (Including All Caladyl Type Products)	1,962	1,901	1,328	63	23	436	7	41	3	1,885	12	0	2	125	259	170	4	0	0
Camphor	10,211	9,975	8,252	229	159	1,107	12	199	17	9,742	135	20	67	1,142	2,635	1,089	65	8	0
Cannaphor and Methyl Salicylate Combinations	1,195	1,175	948	26	15	1,170	1	14	1	1,130	15	1	27	129	323	143	2	1	0
Diaper Care and Rash Products	21,969	21,562	20,475	208	142	585	39	100	13	21,490	19	12	31	472	2,703	591	15	0	0
Hexachlorophene Containing Antiseptics	20	17	10	2	0	3	0	2	0	13	1	0	2	1	2	3	0	0	0
Hydrogen Peroxide 3%	5,879	5,612	1,906	302	272	2,667	7	425	33	5,342	174	32	47	545	575	905	71	0	0
Iodine or Iodine Containing Antiseptics	1,007	888	195	48	62	501	13	59	10	736	79	5	63	179	171	171	26	2	0
Mercury Containing Antiseptics	33	28	14	1	0	10	0	3	0	23	1	0	4	7	5	6	0	0	0
Methyl Salicylate	5,971	5,875	4,118	253	116	1,131	6	240	11	5,668	47	16	135	582	1,175	818	40	3	0
Minoxidil, Topical	166	159	59	2	2	85	0	11	0	141	7	2	8	41	30	12	7	1	0
Other Types of Rubefacient or Liniment (Excluding Camphor and Methyl Salicylate)	3,463	3,385	2,433	94	55	664	7	120	12	3,140	29	8	205	188	532	503	28	1	0
Other Types of Topical Antiseptic	2,001	1,932	945	74	88	688	2	121	14	1,804	70	8	43	265	298	220	33	3	0
Podophyllin	46	41	12	5	0	22	0	2	0	34	2	0	5	7	3	5	0	0	0
Silver Nitrate	103	87	21	3	25	25	0	12	1	65	2	4	15	24	8	20	3	0	0
Topical Steroids (Including Otic, Ophthalmic, and Dermal Preparations)	8,515	8,285	4,573	639	180	2,364	13	481	35	8,159	38	2	82	177	1,002	285	9	1	0
Topical Steroids in Combination with Antibiotics (Including Otic, Ophthalmic, and Dermal Preparations)	798	774	364	55	16	285	4	46	4	738	6	2	27	56	103	120	2	0	0
Wart Preparations and Other Keratolytics	1,179	1,164	682	91	38	288	3	60	2	1,086	17	6	51	177	204	186	32	3	0
Category Total:	66,632	64,886	47,367	2,222	1,461	11,511	115	2,046	164	63,078	704	121	904	4,257	10,359	5,467	356	24	0
Unknown Drug																			
Miscellaneous Unknown Drug																			
Miscellaneous Unknown Drugs	25,411	17,075	4,310	720	2,287	8,536	75	804	343	6,344	6,786	778	575	12,867	3,088	2,843	3,799	1,383	130
Category Total:	25,411	17,075	4,310	720	2,287	8,536	75	804	343	6,344	6,786	778	575	12,867	3,088	2,843	3,799	1,383	130
Veterinary Drugs																			
Miscellaneous Veterinary Drugs	5,792	5,359	1,123	124	132	3,410	4	503	63	5,243	48	9	49	554	1,244	516	82	3	0
Miscellaneous Veterinary Drugs without Human Equivalent	5,792	5,359	1,123	124	132	3,410	4	503	63	5,243	48	9	49	554	1,244	516	82	3	0
Category Total:	5,792	5,359	1,123	124	132	3,410	4	503	63	5,243	48	9	49	554	1,244	516	82	3	0
Vitamins																			
Miscellaneous Vitamins																			
Other Types of Vitamin	699	518	394	40	15	58	2	8	1	479	20	1	16	63	120	20	3	0	0
Unknown Types of Vitamin	700	491	358	63	18	41	3	6	2	451	28	0	10	48	96	19	3	0	0
Multiple Vitamin Liquids: Adult Formulations	10	8	6	1	1	0	0	0	0	7	1	0	0	1	0	0	0	0	0
Multiple Vitamin Liquids: Adult Formulations with Fluoride (No Iron)	172	133	79	7	4	38	0	5	0	116	8	0	9	15	27	11	0	0	0
Multiple Vitamin Liquids: Adult Formulations with Iron (No Fluoride)	8	5	3	0	0	2	0	0	0	5	0	0	0	0	0	1	0	0	0
Multiple Vitamin Liquids: Adult Formulations with Iron and Fluoride	444	349	254	43	10	38	0	2	2	310	31	0	8	34	57	9	3	0	0
Multiple Vitamin Liquids: Adult Formulations without Iron or Fluoride																			
Multiple Vitamin Liquids: Pediatric Formulations	86	83	77	5	0	1	0	0	0	81	1	0	0	1	13	1	0	0	0
Multiple Vitamin Liquids: Pediatric Formulations with Fluoride (No Iron)	431	410	387	16	2	4	0	1	0	397	5	2	6	27	81	19	0	0	0
Multiple Vitamin Liquids: Pediatric Formulations with Iron (No Fluoride)	27	26	26	0	0	0	0	0	0	26	0	0	0	0	5	3	0	0	0
Multiple Vitamin Liquids: Pediatric Formulations with Iron and Fluoride																			

(continued)



**Table 22B.** Demographic profile of SINGLE SUBSTANCE exposure cases by generic category – Continued.

	No. of Case Mentions	No. of Single Exposure	Age										Reason			Treated in Health Care Facility		Outcome									
			≤5				6–12			13–19			≥20			Unknown	Child	Adult	Unknown	Unint	Other	Adv Rxn	None	Minor	Moderate	Major	Death
Multiple Vitamin Liquids: Pediatric Formulations without Iron or Fluoride	808	771	632	116	8	10	1	3	1	742	25	2	1	35	120	19	1	0	0								
Multiple Vitamin Tablets: Adult Formulations with Fluoride (No Iron)	121	111	91	11	2	6	0	1	0	108	3	0	0	7	20	1	1	0	0								
Multiple Vitamin Tablets: Adult Formulations with Iron (No Fluoride)	5,005	4,096	3,156	120	105	613	7	78	17	3,867	167	4	54	396	858	156	17	1	0								
Multiple Vitamin Tablets: Adult Formulations with Iron and Fluoride	24	16	13	1	0	1	0	1	0	15	1	0	0	5	2	0	0	0	0								
Multiple Vitamin Tablets: Adult Formulations with Iron Carbonyl (No Fluoride)	77	64	38	6	4	15	0	0	1	56	6	0	2	14	17	3	0	0	0								
Multiple Vitamin Tablets: Adult Formulations without Iron or Fluoride	6,768	5,527	4,022	660	218	524	10	86	7	5,091	314	5	114	373	1,083	186	13	1	0								
Multiple Vitamin Tablets: Pediatric Formulations with Fluoride (No Iron)	169	163	146	17	0	0	0	0	0	162	0	1	0	11	32	4	0	0	0								
Multiple Vitamin Tablets: Pediatric Formulations with Iron (No Fluoride)	4,076	3,892	3,481	317	50	30	6	5	3	3,823	59	1	7	388	748	243	16	0	0								
Multiple Vitamin Tablets: Pediatric Formulations with Iron and Fluoride	23	23	23	0	0	0	0	0	0	23	0	0	0	4	4	1	0	0	0								
Multiple Vitamin Tablets: Pediatric Formulations with Iron Carbonyl (No Fluoride)	21	20	17	2	1	0	0	0	0	18	2	0	0	1	1	3	0	0	0								
Multiple Vitamin Tablets: Pediatric Formulations without Iron or Fluoride	19,516	18,811	14,824	3,370	367	182	38	25	5	18,027	745	4	20	819	3,001	354	9	0	0								
Multiple Vitamins, Unspecified Adult Formulations	10	9	5	3	0	1	0	0	0	8	0	0	1	1	1	1	0	0	0								
Multiple Vitamins, Unspecified Adult Formulations with Fluoride (No Iron)	1,267	866	623	39	39	135	0	25	5	807	42	0	15	93	149	42	4	0	0								
Multiple Vitamins, Unspecified Adult Formulations with Iron (No Fluoride)	7	4	4	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0								
Multiple Vitamins, Unspecified Adult Formulations with Iron and Fluoride	457	400	306	56	8	27	0	2	1	367	30	0	3	18	65	7	0	0	0								
Multiple Vitamins, Unspecified Pediatric Formulations	15	14	11	3	0	0	0	0	0	14	0	0	0	0	4	0	0	0	0								
Multiple Vitamins, Unspecified Pediatric Formulations with Fluoride (No Iron)	82	77	68	6	0	2	1	0	0	72	3	0	2	8	10	8	0	0	0								
Multiple Vitamins, Unspecified Pediatric Formulations with Iron (No Fluoride)	8	8	8	0	0	0	0	0	0	8	0	0	0	2	4	0	0	0	0								
Multiple Vitamins, Unspecified Pediatric Formulations without Iron or Fluoride	857	824	650	150	18	2	1	1	2	781	38	0	1	23	186	16	1	0	0								
Other B Complex Vitamins	5,901	4,047	3,244	218	101	394	10	70	10	3,815	137	1	88	282	714	63	8	0	0								
Vitamin A	422	343	202	27	6	89	0	17	2	311	15	2	13	35	49	20	5	0	0								
Vitamin B3 (Niacin)	1,188	939	311	28	76	463	0	54	7	268	183	1	268	263	65	299	74	1	0								
Vitamin B6 (Pyridoxine)	377	206	144	12	4	39	0	6	1	183	11	0	11	20	40	6	2	0	0								
Vitamin C	1,505	978	720	106	24	110	2	13	3	886	65	0	26	56	121	54	6	0	0								
Vitamin D	7,544	5,292	3,581	323	171	1,036	9	161	11	5,035	123	2	114	510	843	174	27	3	1								
Vitamin E	622	413	311	16	10	62	0	13	1	380	14	0	15	31	75	9	0	0	0								
Category Total:	59,447	49,937	38,215	5,782	1,262	3,923	90	583	82	46,958	2,077	26	804	3,584	8,611	1,752	193	6	1								
Pharmaceuticals Total:	1,472,752	903,583	412,882	59,730	90,429	307,725	1,065	27,214	4,538	653,569	209,392	3,243	27,934	308,955	187,259	115,821	71,447	11,453	1,009								
Grand Total	25,41,728	18,58,385	927,844	1,24,156	1,32,818	577,096	4,187	79,694	12,590	1,537,317	248,896	14,986	43,444	473,369	339,322	273,962	103,126	13,788	1,324								
(Nonpharmaceuticals + Pharmaceutical)																											