

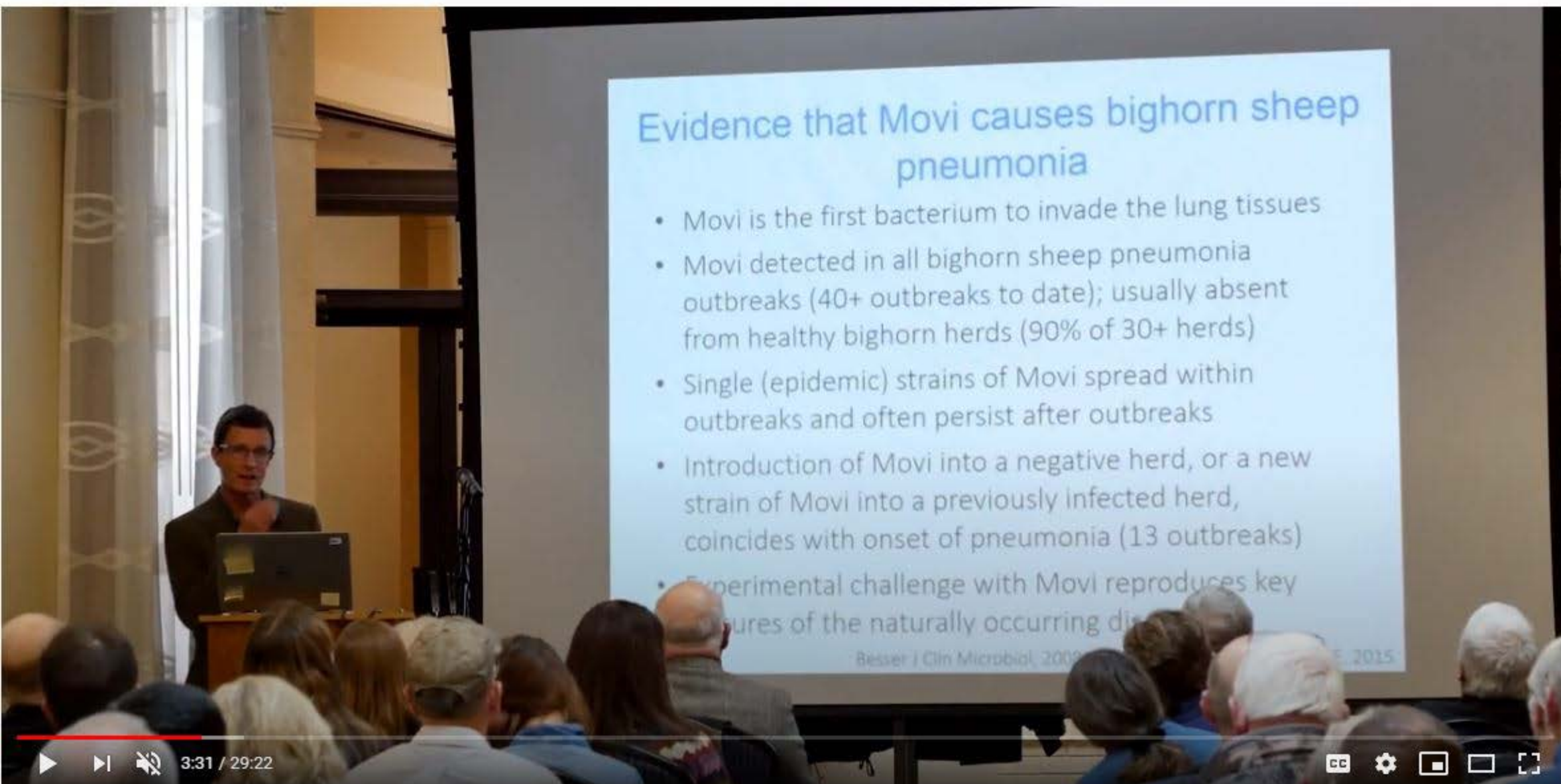
What causes bighorn sheep pneumonia?

- Bighorn sheep dying of pneumonia have lung infections with many diverse bacteria, which result from...
- An initial infection with *Mycoplasma ovipneumoniae* (Movi) that impairs lung defenses.

"*M. ovipneumoniae* plays a primary role in causing epidemic pneumonia of bighorn sheep"

... and others, J Clin Microbiol 2008; Emerg Infect

2012



The image shows a man in a dark suit and glasses standing at a podium, presenting to an audience. Behind him is a large projection screen displaying a slide titled "Evidence that Movi causes bighorn sheep pneumonia". The slide lists several bullet points about the bacterium Movi and its association with pneumonia in bighorn sheep. The audience is visible in the foreground, mostly from the back, looking towards the screen. The setting appears to be a lecture hall or conference room with large windows on the left.

Evidence that Movi causes bighorn sheep pneumonia

- Movi is the first bacterium to invade the lung tissues
- Movi detected in all bighorn sheep pneumonia outbreaks (40+ outbreaks to date); usually absent from healthy bighorn herds (90% of 30+ herds)
- Single (epidemic) strains of Movi spread within outbreaks and often persist after outbreaks
- Introduction of Movi into a negative herd, or a new strain of Movi into a previously infected herd, coincides with onset of pneumonia (13 outbreaks)
- Experimental challenge with Movi reproduces key features of the naturally occurring disease

Besser / Clin Microbiol, 2009; 101: 1000-1005. E. 2015

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Other theories...

- *Pasteurella* bacteria
- *Dictyocaulus* and other lungworms
- Environmental stresses such as 'bad winters'
- Nutritional stresses such as Se deficiency
- Etc.

Little or no epidemiologic supporting evidence



6:43 / 29:22



The video shows a man in a dark shirt and glasses standing at a podium, presenting to an audience. A large screen behind him displays a slide with the title "Where does Movi come from?" and a bulleted list of information. The audience is visible in the foreground, mostly from the back. The video player interface at the bottom shows a progress bar at 7:37 / 29:22 and various control icons.

Where does Movi come from?

- Movi can't live in the environment; a live animal source is needed
- Movi infects only sheep and goat species (Caprinae)
 - Rare, unconfirmed reports from other species
- Therefore, the most likely Movi sources include:
 - Infected bighorn sheep
 - Infected domestic sheep
 - Infected domestic goats
 - Infected mountain goats

A woman is presenting at a podium in front of an audience. A large screen behind her displays a table of data and a text box. The table lists the number of premises, packers, others, and total for various states. The text box states: "2 to 26 goats tested on each premises located within 'bighorn sheep states'".

State	# premises	# packers	# others	Total
AZ	3	16	23	39
CA	5	28	31	59
CO	7	27	12	39
ID	25	115	21	136
KS	1	13	51	64
MT	5	15	14	29
NM	1	2	0	2
NV	2	8	0	8
OR	9	35	0	35
UT	5	36	0	36
VT	1	2	0	2
WA	14	79	5	84
WY	5	43	0	43
Total	83	419	157	576

2 to 26 goats tested on each premises located within "bighorn sheep states"

1 premises each)-didn't sample

ADRU-ARS-USDA Laboratory Results (thus far)

- Tested 576 goats total (not all 'non-packers' tested at WADDL)
 - No detected *M.ovi* by PCR in the additional goats tested ('non-packers')
 - 7 of the premises had between 1 and 3 goats with **false positives** - determined by sequencing (false positives based on published PCR assay that we use (McAuliffe 2003))
- Standard PCR and sequencing confirmed positives: 3 premises
 - Positive goats on 2 premises restricted to kids <12 weeks old (adults all negative on each sample; premises had 8 and 25 adults)
 - 7 positive goats on 1 premises: housed adjacent to "open" herd of Boer goats
 - Other 2 premises (1 goat each): **unable to confirm positive** results on these 2 goats

# goats tested	Detected	Not Detected
576 (83 premises)	16 (3 premises)	560 (80 premises)
	2.8% (3.6% premises)	97.2% (96.4% premises)

Mixing of bighorn and domestic sheep

- Mix domestic sheep with bighorn sheep -> pneumonia outbreak
 - Greater than 95% bighorn sheep death loss
 - 88 of 90 BHS within 3 months (14 published reports)
- Mix cattle, llamas, or horses with bighorn sheep: No pneumonia outbreaks (occasional individual disease)
 - Less than 10% death loss
- Mix M_{ovl}-negative sheep or goats with bighorn sheep: No epidemic pneumonia

Winters, J Wildlife Dis, 2012; PLoS ONE submitted; K... 2016



21:22 / 29:22

