

Important viral infections in Danish calves - Influenza D virus

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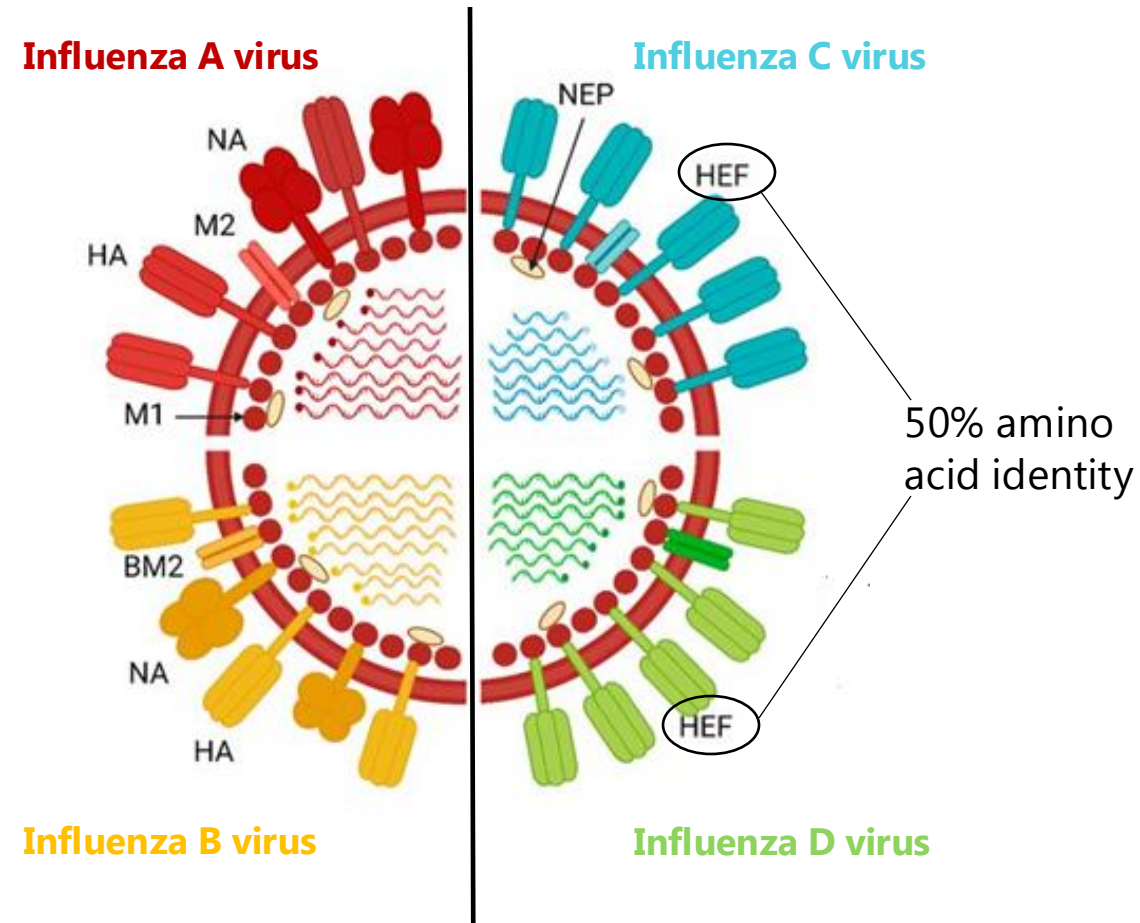


Main focus

- Influenza D Virus (IDV)
 - Respiratory virus
 - Symptoms - fever, coughing, eye and nasal discharge
 - Clinical relevance?



Structure of Influenza viruses (A, B, C, D)

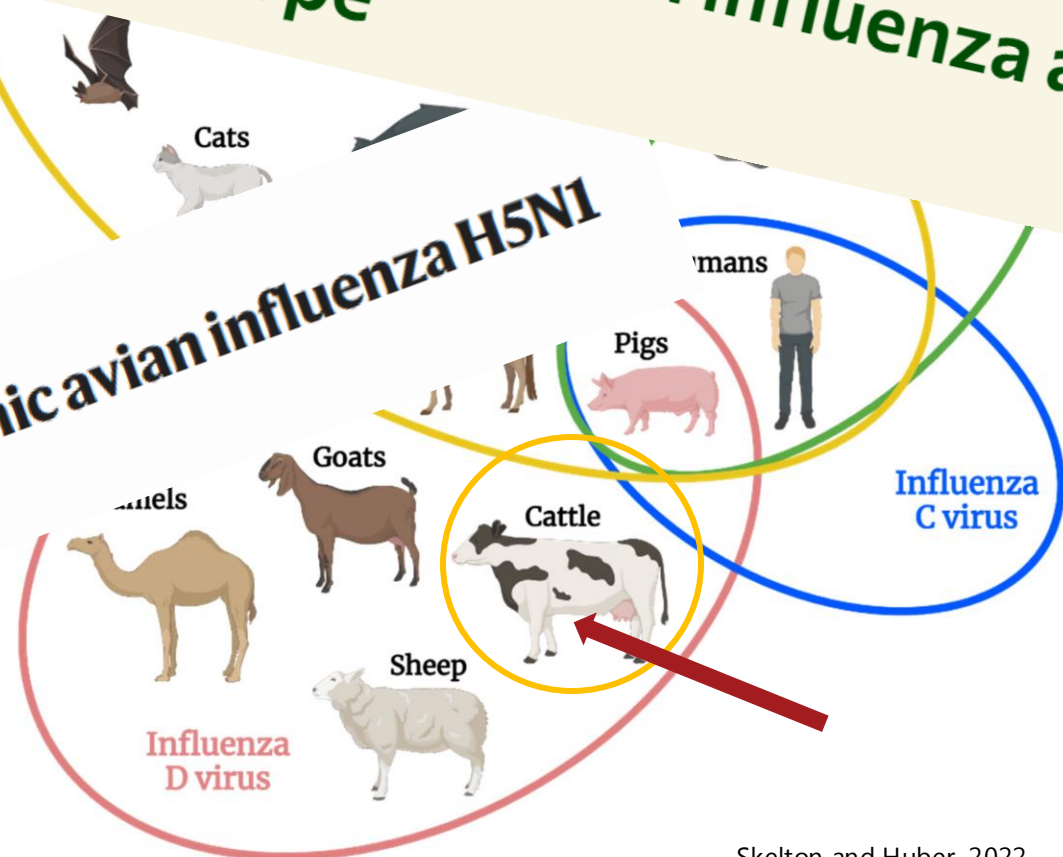


Host ranges of Influenza viruses

NEWS PUBLICATION DATE: JANUARY 23, 2026
First case of avian influenza antibodies in cow

Article | [Open access](#) | Published: 25 July 2024

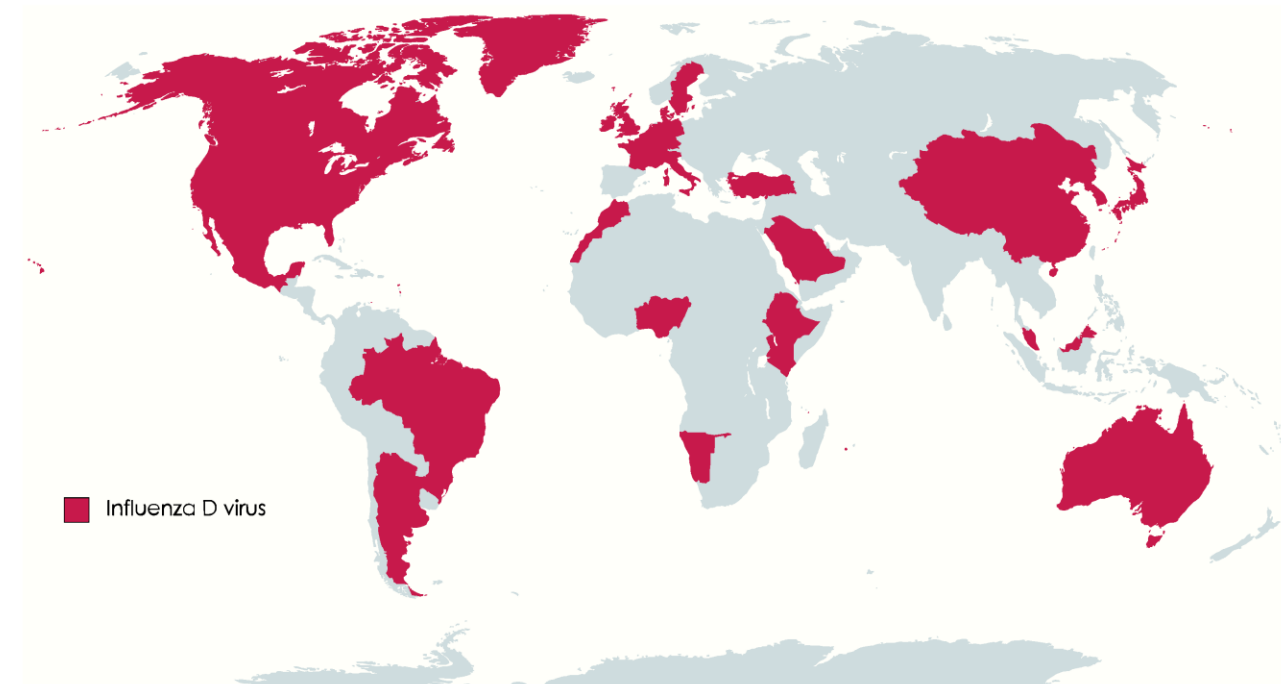
Spillover of highly pathogenic avian influenza H5N1 virus to dairy cattle



Occurrence and role of Influenza D virus

- Global distribution
- Bovine respiratory disease complex (BRDC)
 - A multifactorial disease
 - Is IDV a part of BRDC?

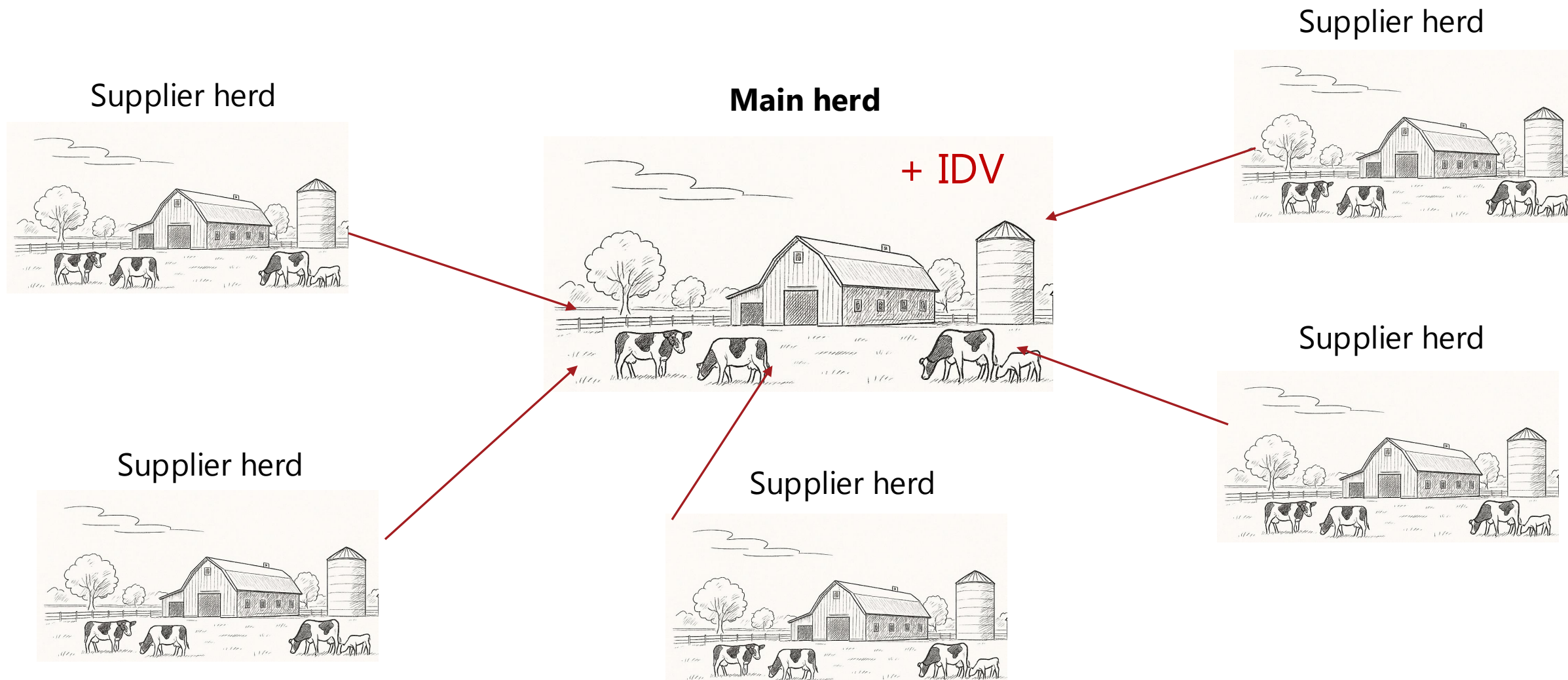
Influenza D virus in domestic and wild animals



Aims

- Investigate how long IDV remains in a herd
- Investigate whether calves can be infected multiple times
- Investigate which strain(s) is circulating
- Investigate the impact of IDV infection on health and productivity

Study design

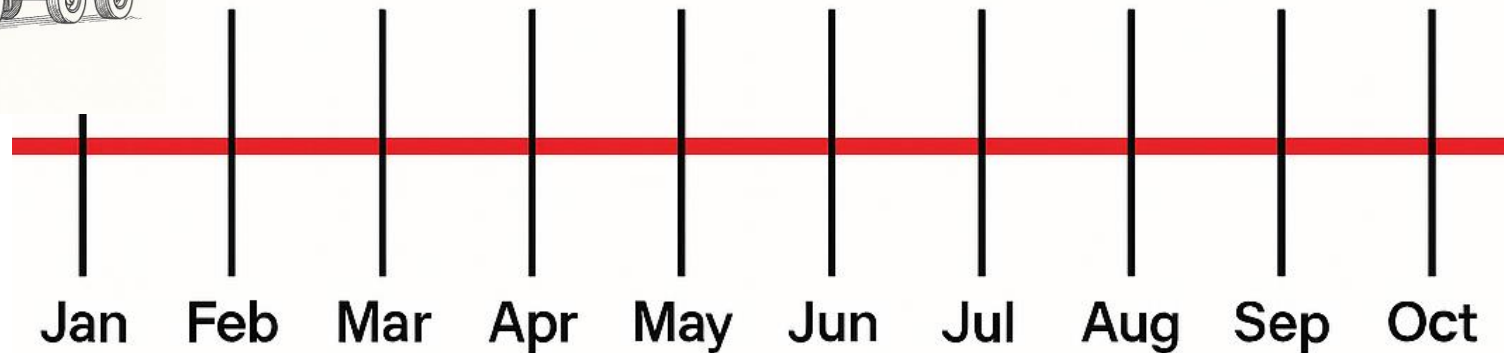
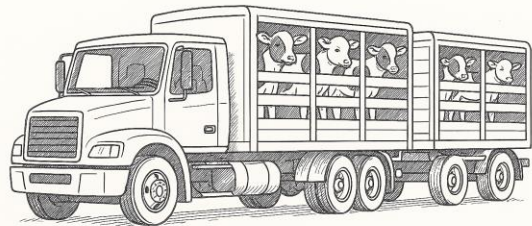


Study design

Main herd

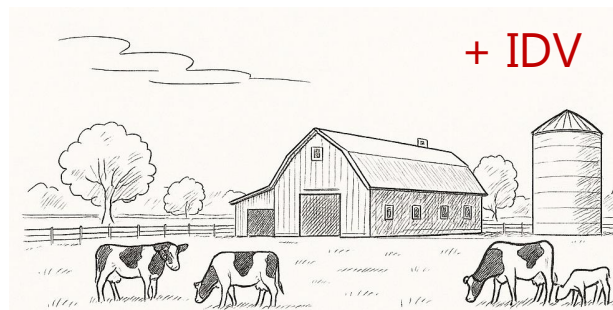


100 calves from
15 supplier herds

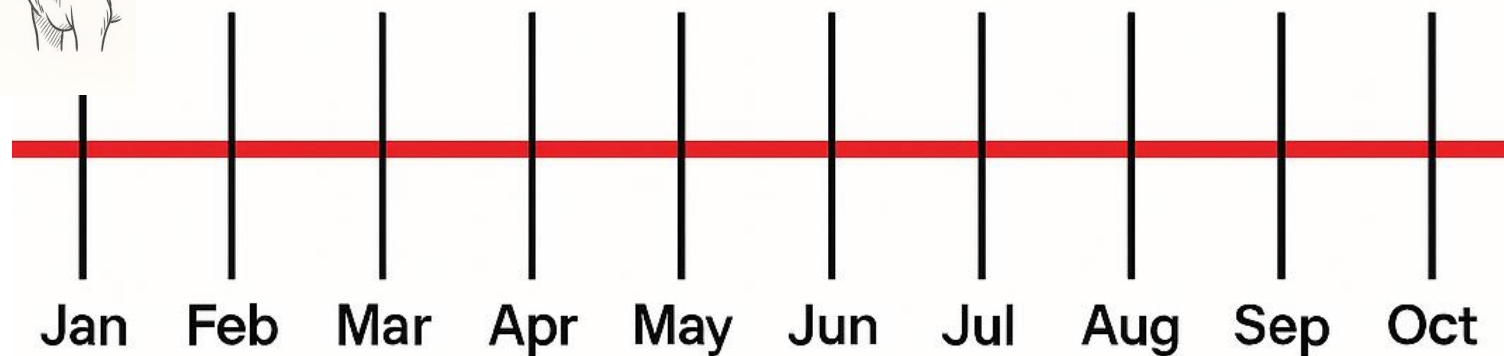
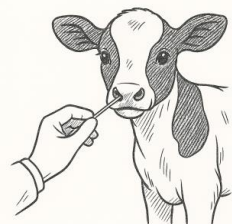
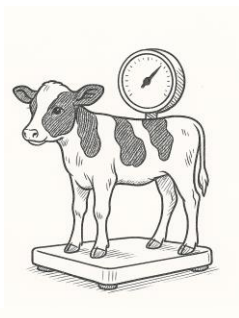


Study design

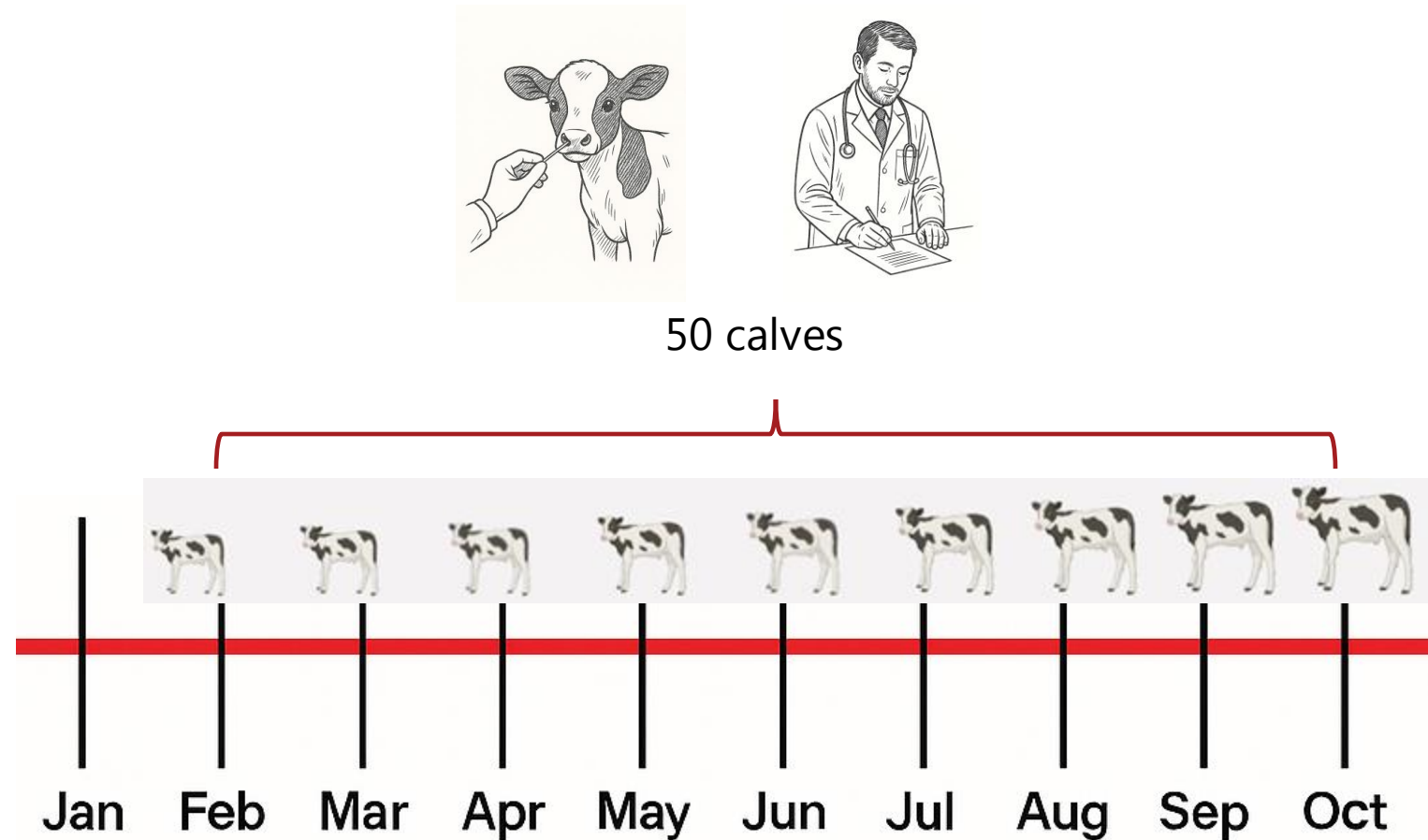
Main herd



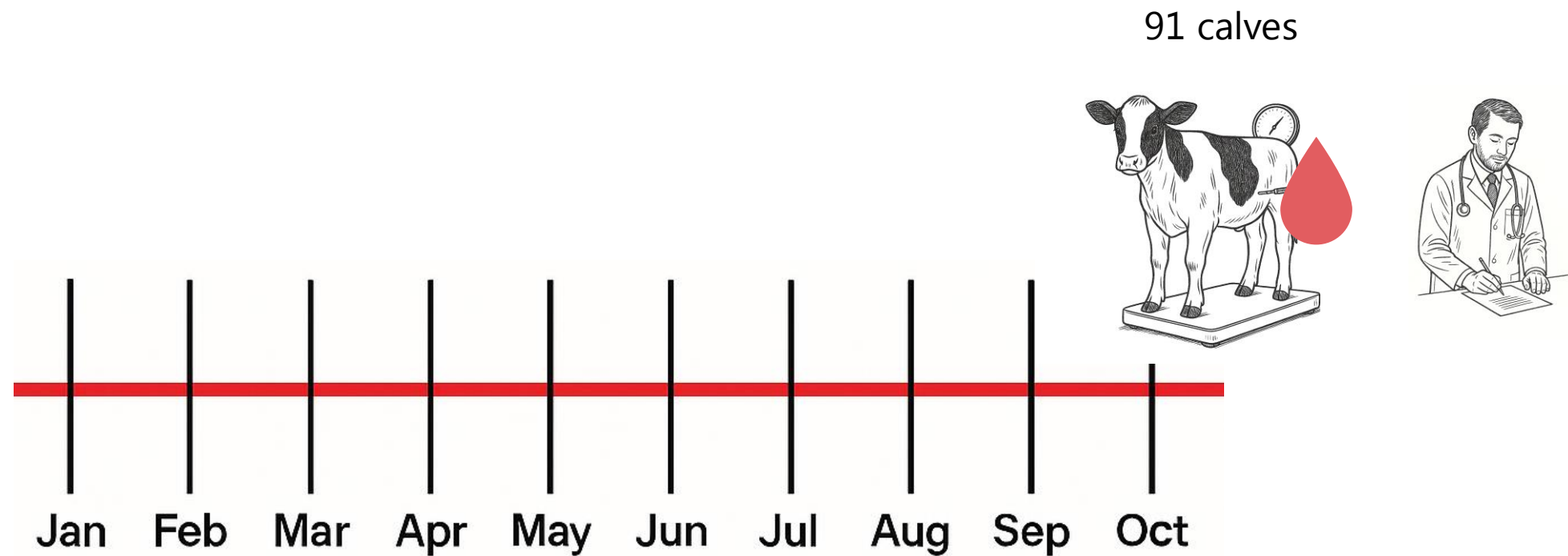
100 calves



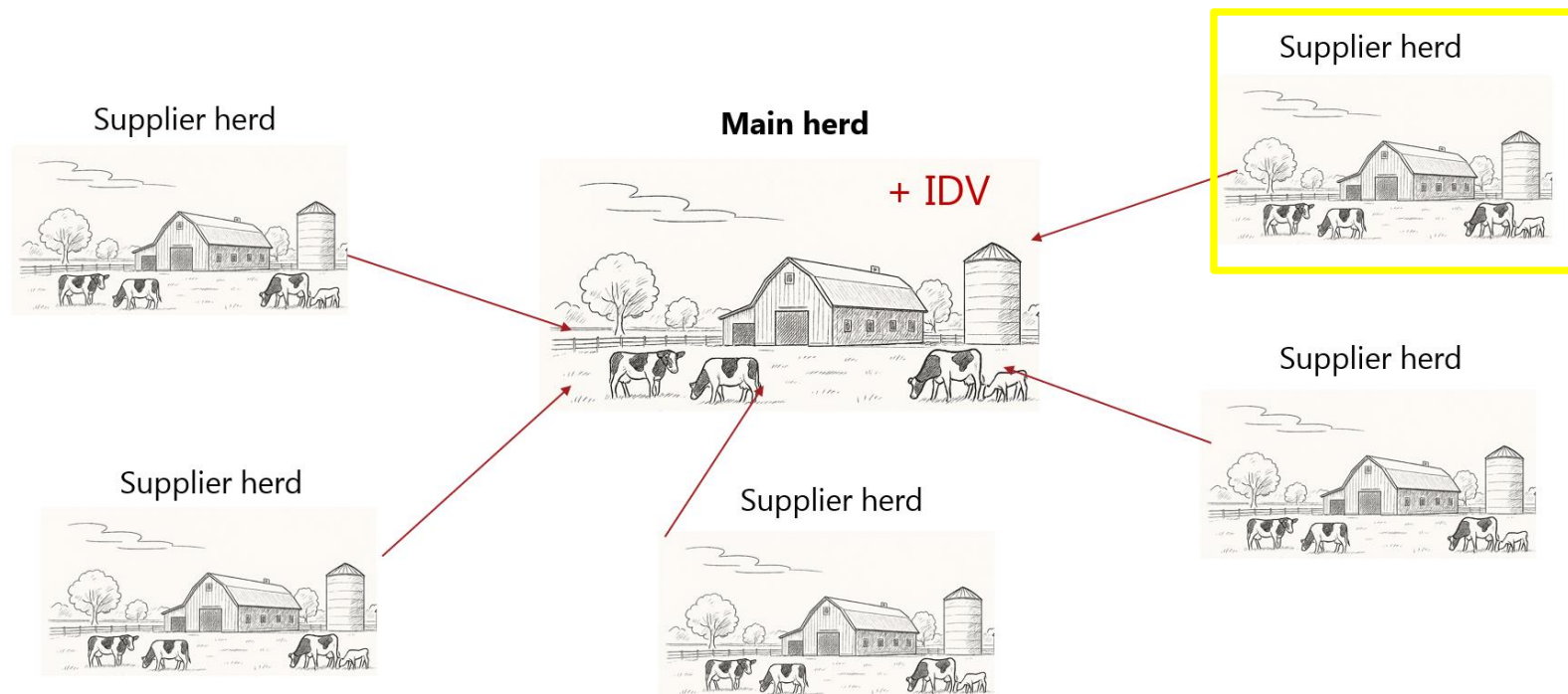
Study design



Study design



How long remains IDV in the herd?

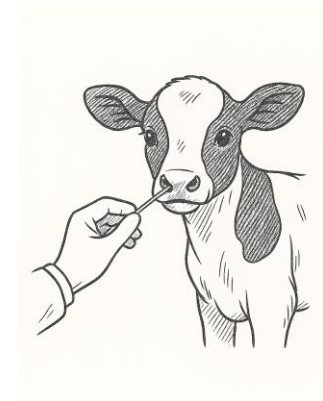


100 calves
73% IDV

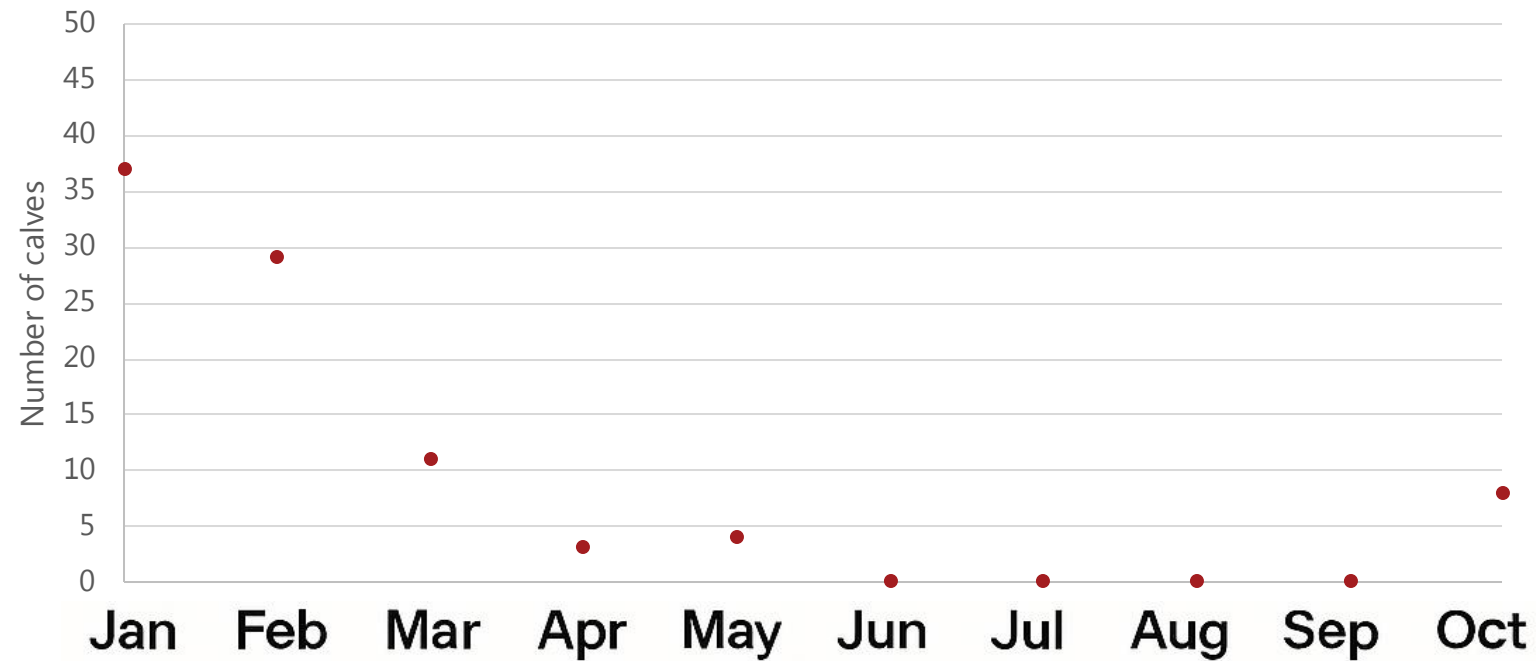
This block contains text and an illustration. The text indicates '100 calves' and '73% IDV'. Below the text is a black and white line drawing of a hand holding a small object, possibly a piece of wood or a stick, near the nose of a cow.

How long remains IDV in the herd?

50 calves

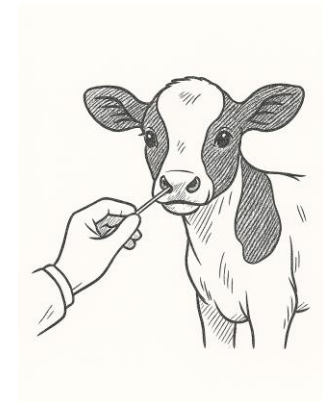


Number of IDV positive calves (n=50)



Can a calve be infected multiple times?

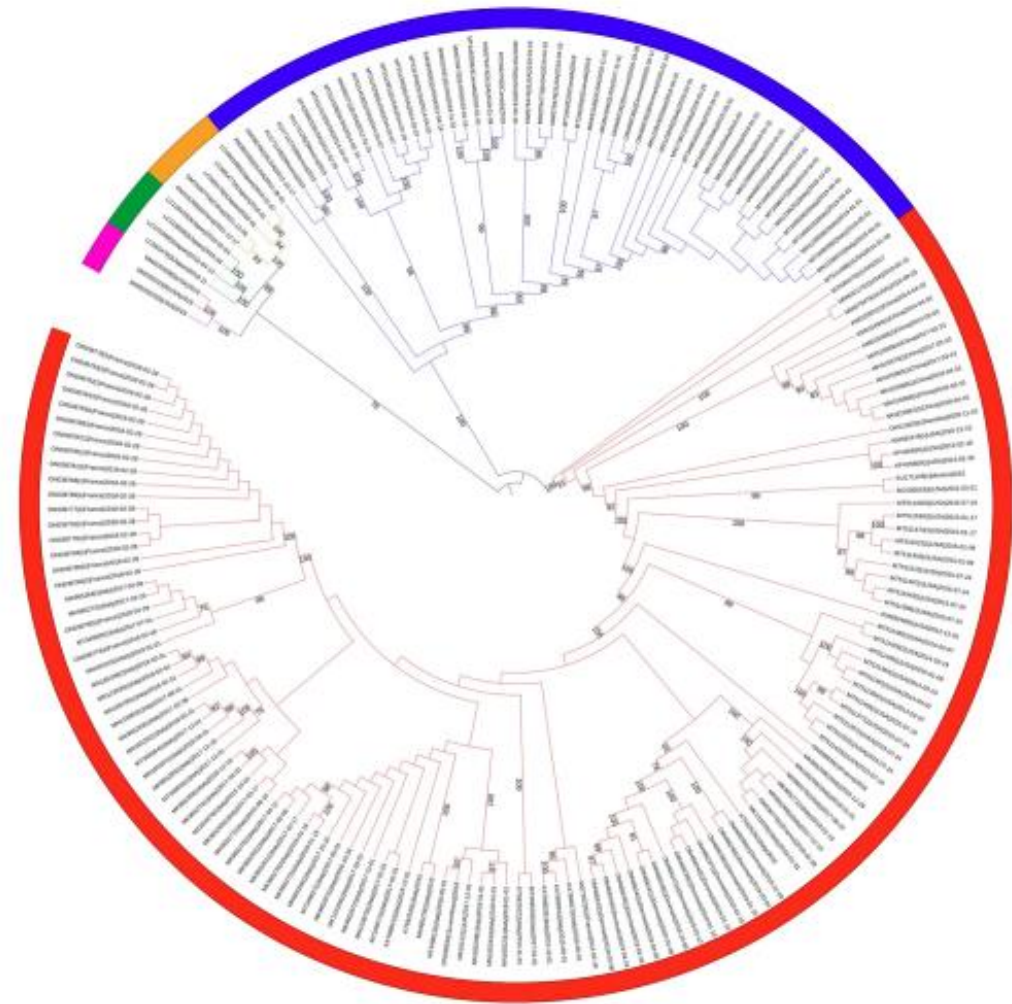
50 calves



Tested negative in all sampling months	8%
Tested positive one time in all sampling months	20%
Tested positive in two consecutive sampling months	38%
Tested positive in three consecutive sampling months	10%
Tested positive in four consecutive sampling months	0%
Tested positive - negative - positive	26%

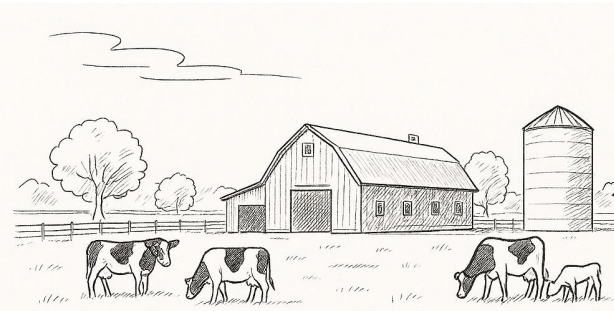
Which IDV strain(s) is circulating in the herd?

Phylogeny of the HEF gene

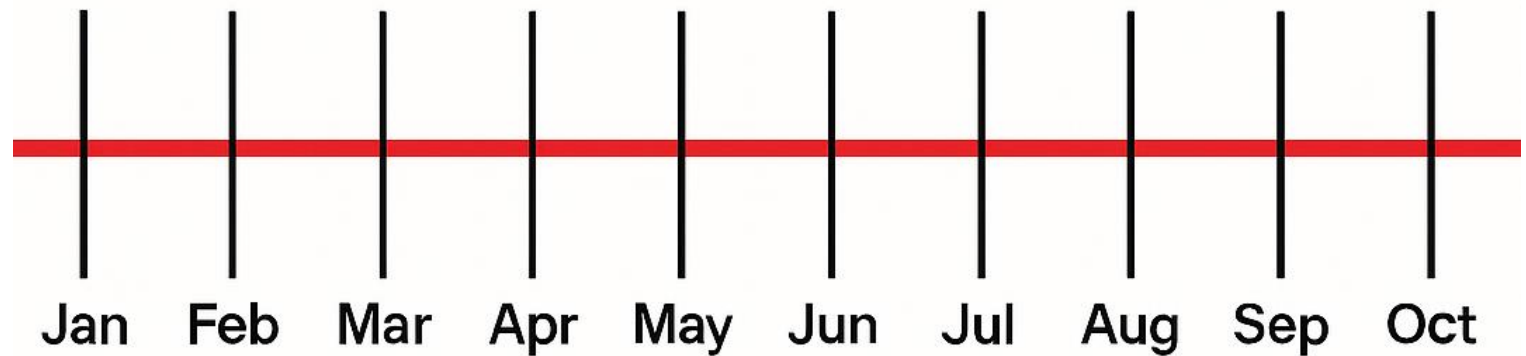


Which IDV strain(s) is circulating in the herd?

Main herd

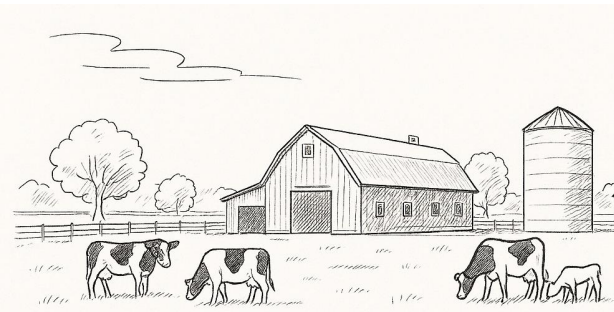


D/660



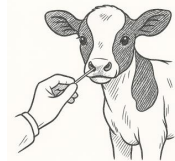
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Main herd



D/660

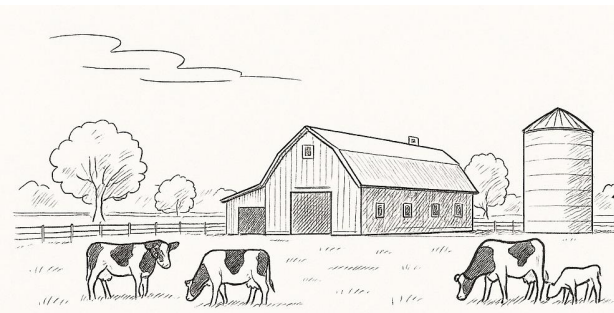
D/660



Jan Feb Mar Apr May Jun Jul Aug Sep Oct

Which IDV strain(s) is circulating in the herd?

Main herd



D/660

98.80%

D/660



Jan

Feb

Mar

Apr

May

Jun

Jul

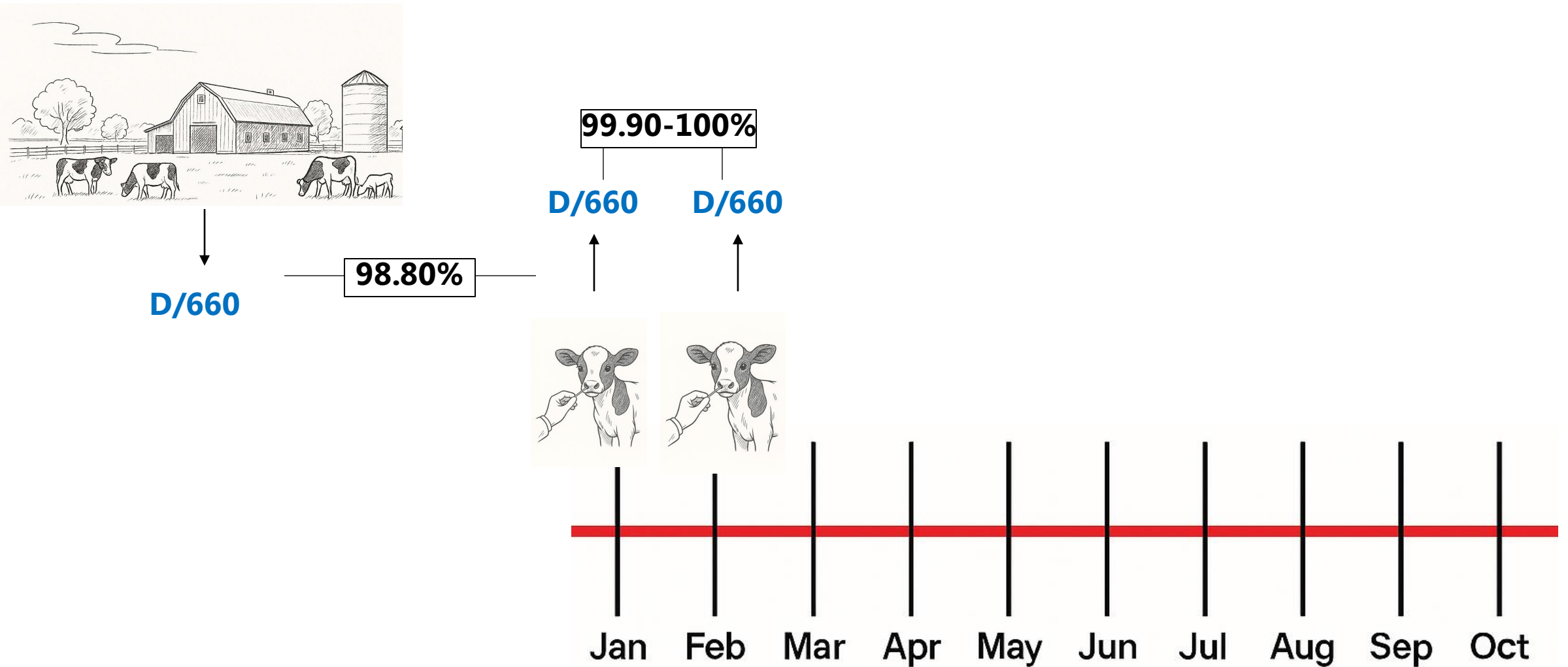
Aug

Sep

Oct

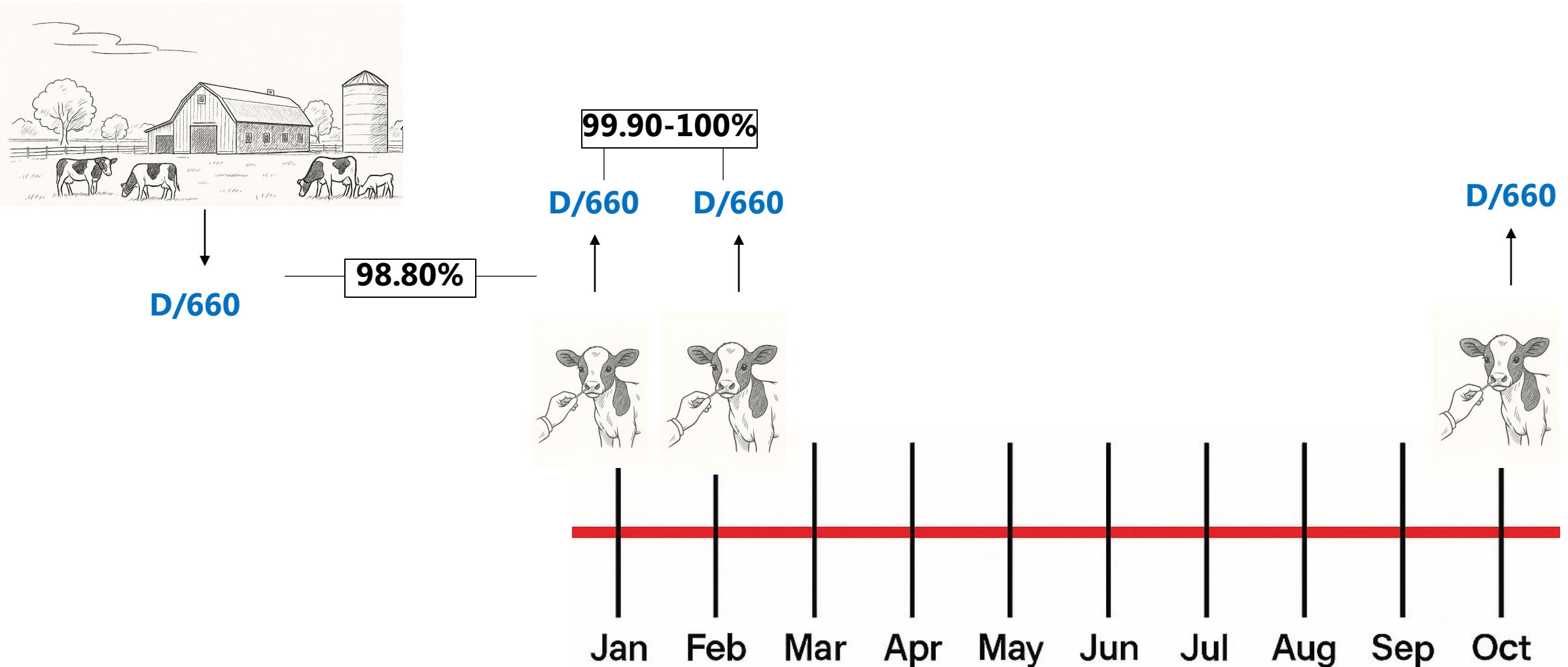
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Main herd



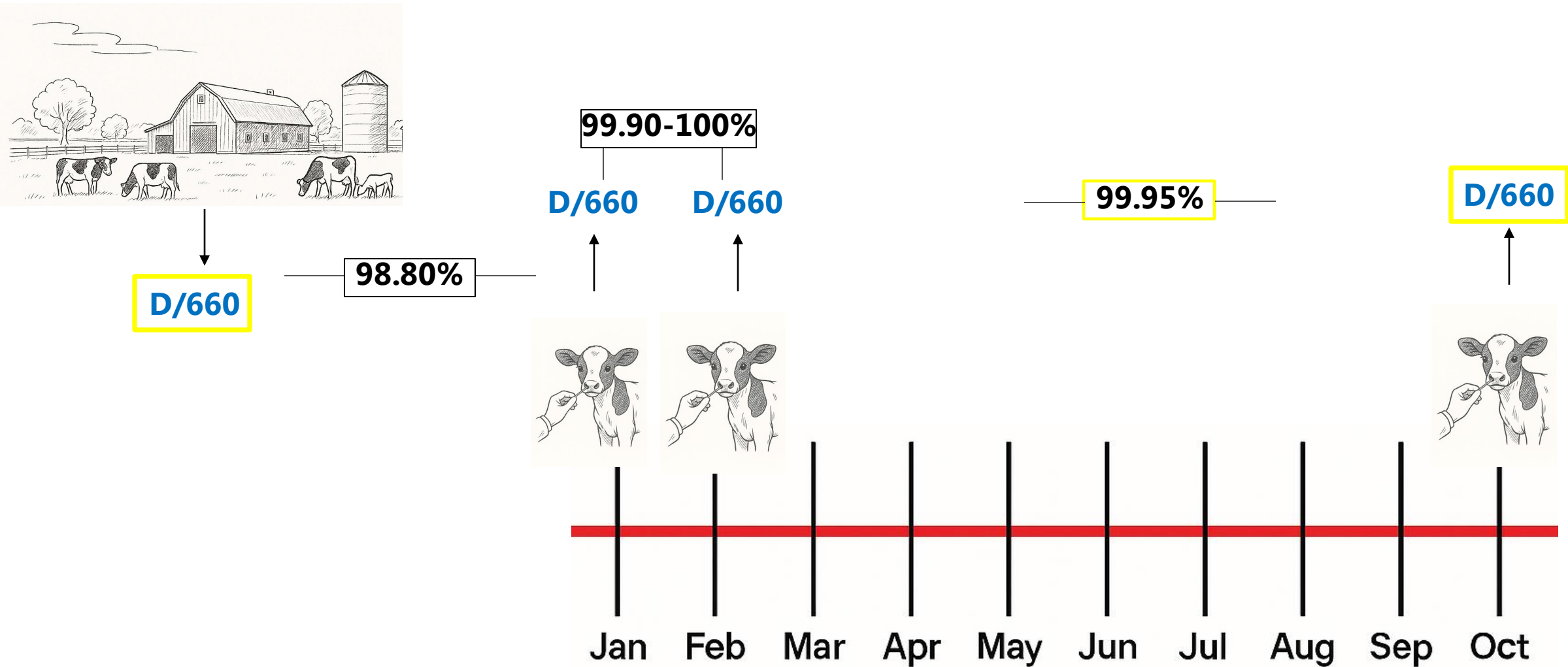
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Main herd



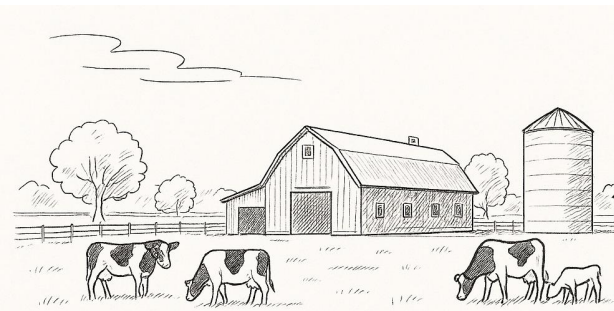
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Main herd



Which IDV strain(s) is circulating in the herd?

Main herd



D/660

98.80%

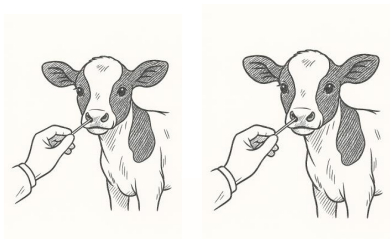
99.90-100%

D/660

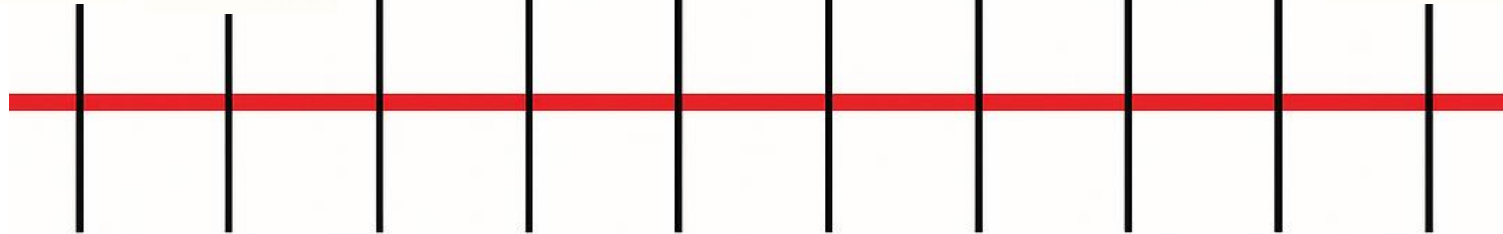
D/660

98.80%

D/660



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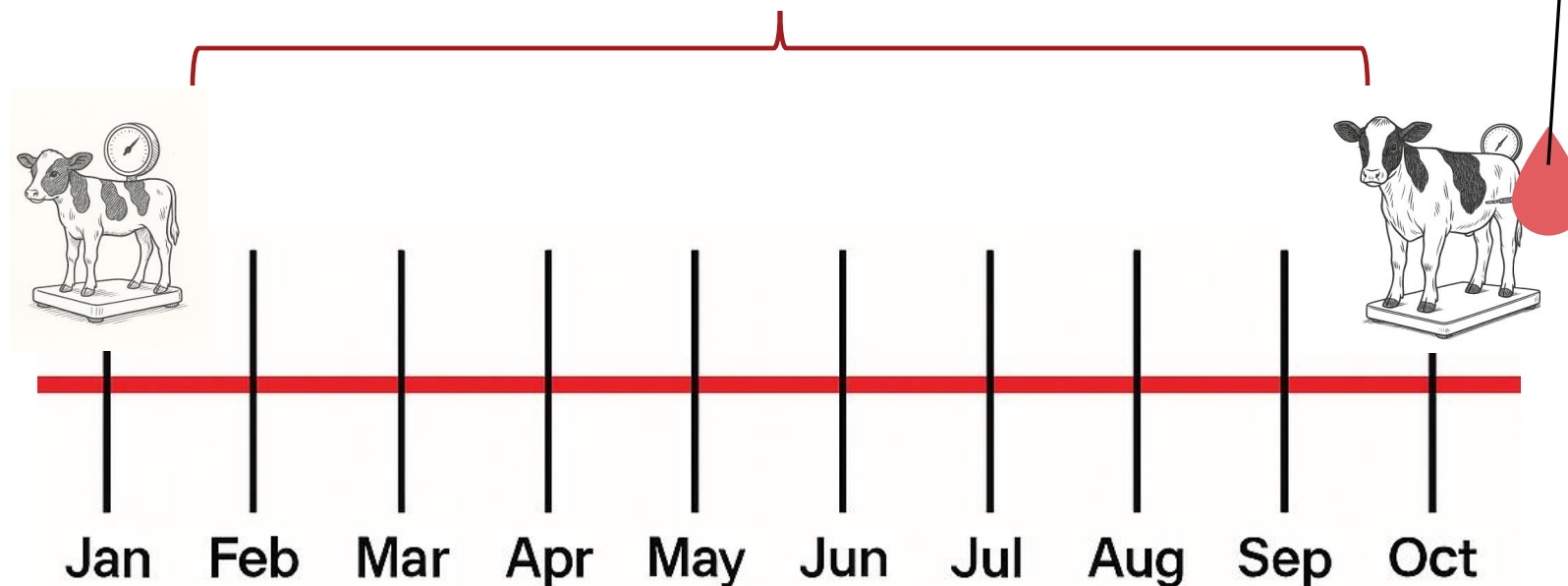


Which impact has IDV on health and productivity?

Preliminary results

Average Daily Weight Gain (ADWG) analysis:

There was no significant difference in ADWG between ELISA-negative and ELISA-positive calves ($p=0.87$)



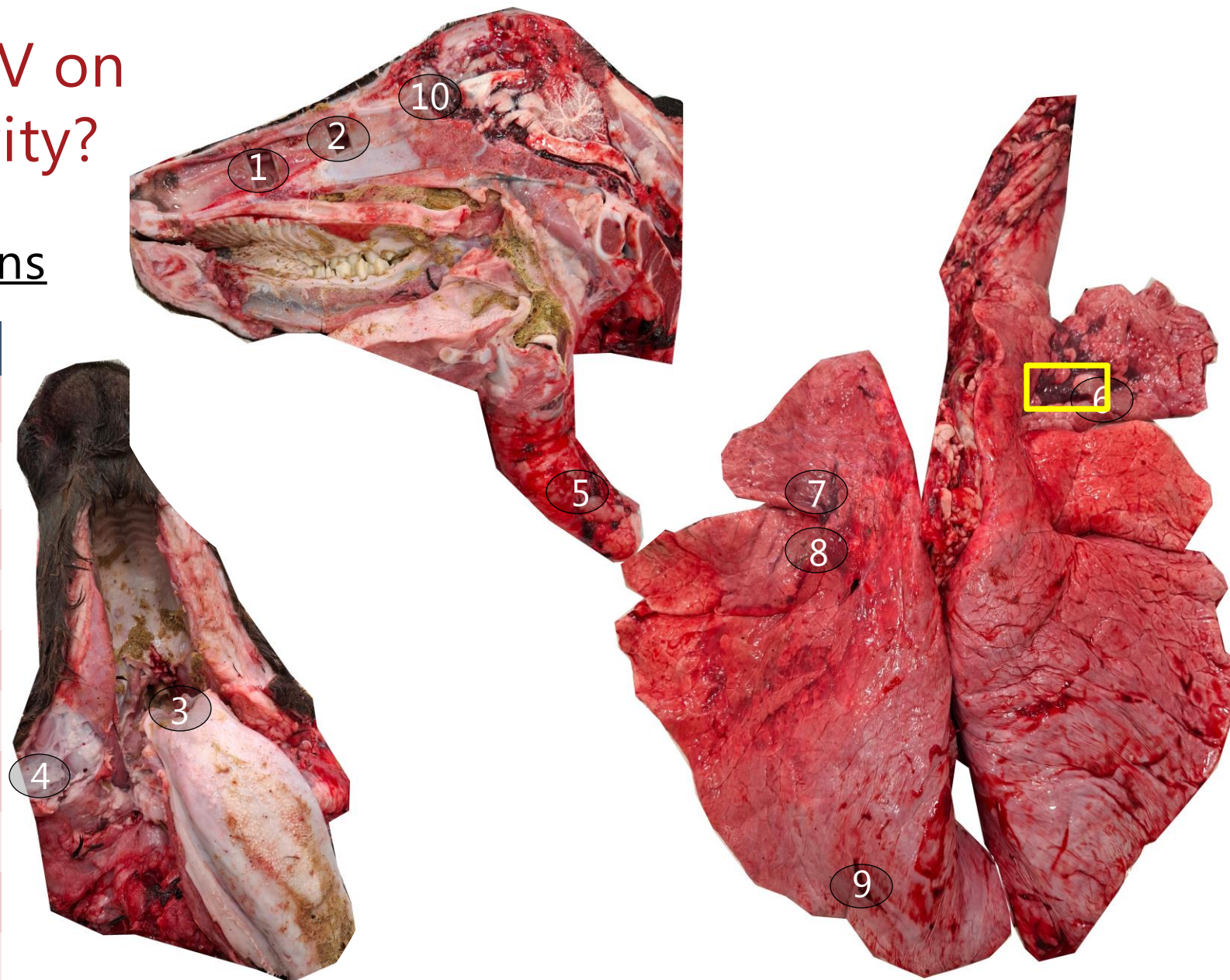
ELISA analysis: 78% antibody positive

There was no significant association between virus positivity and ELISA positivity ($p=0.88$).

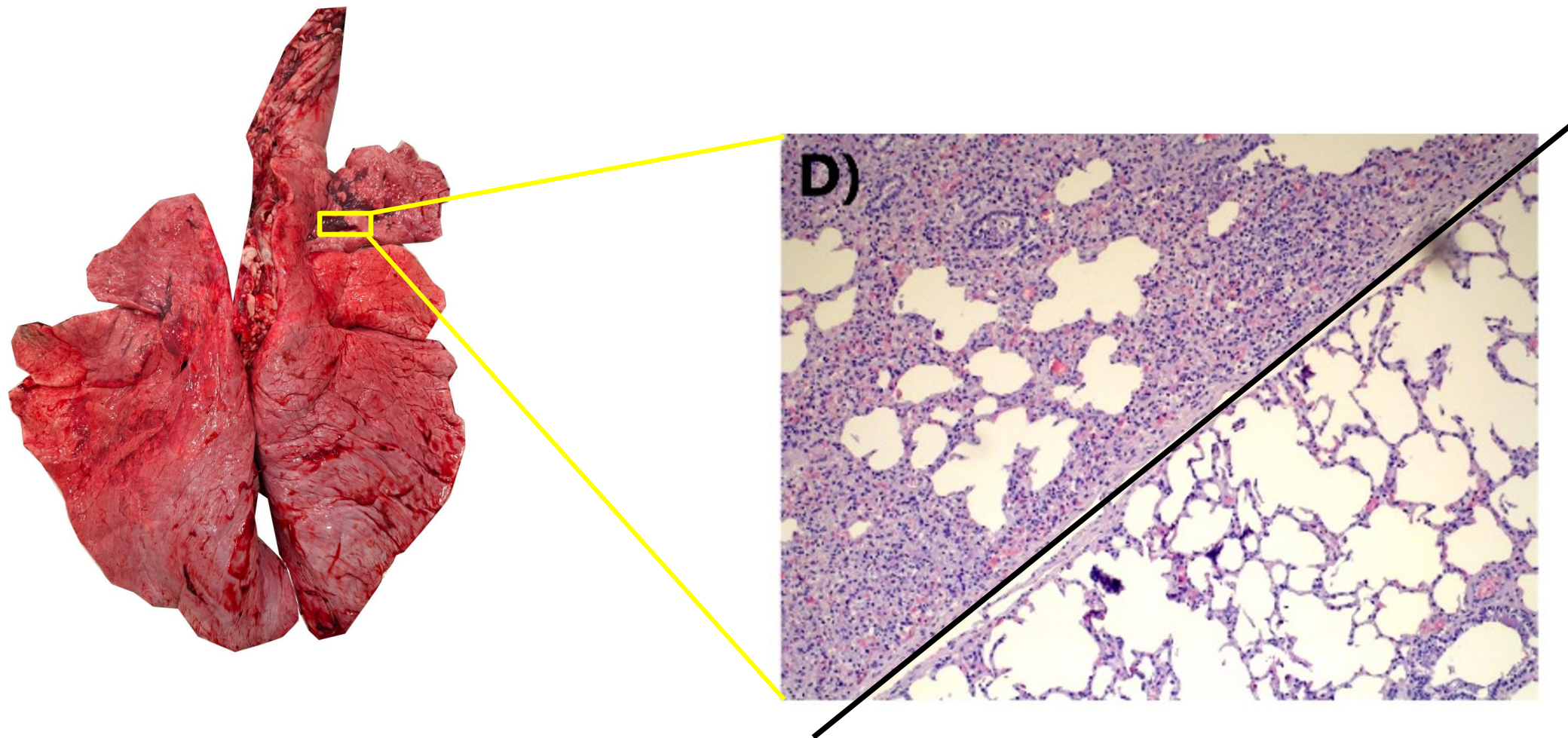
Which impact has IDV on health and productivity?

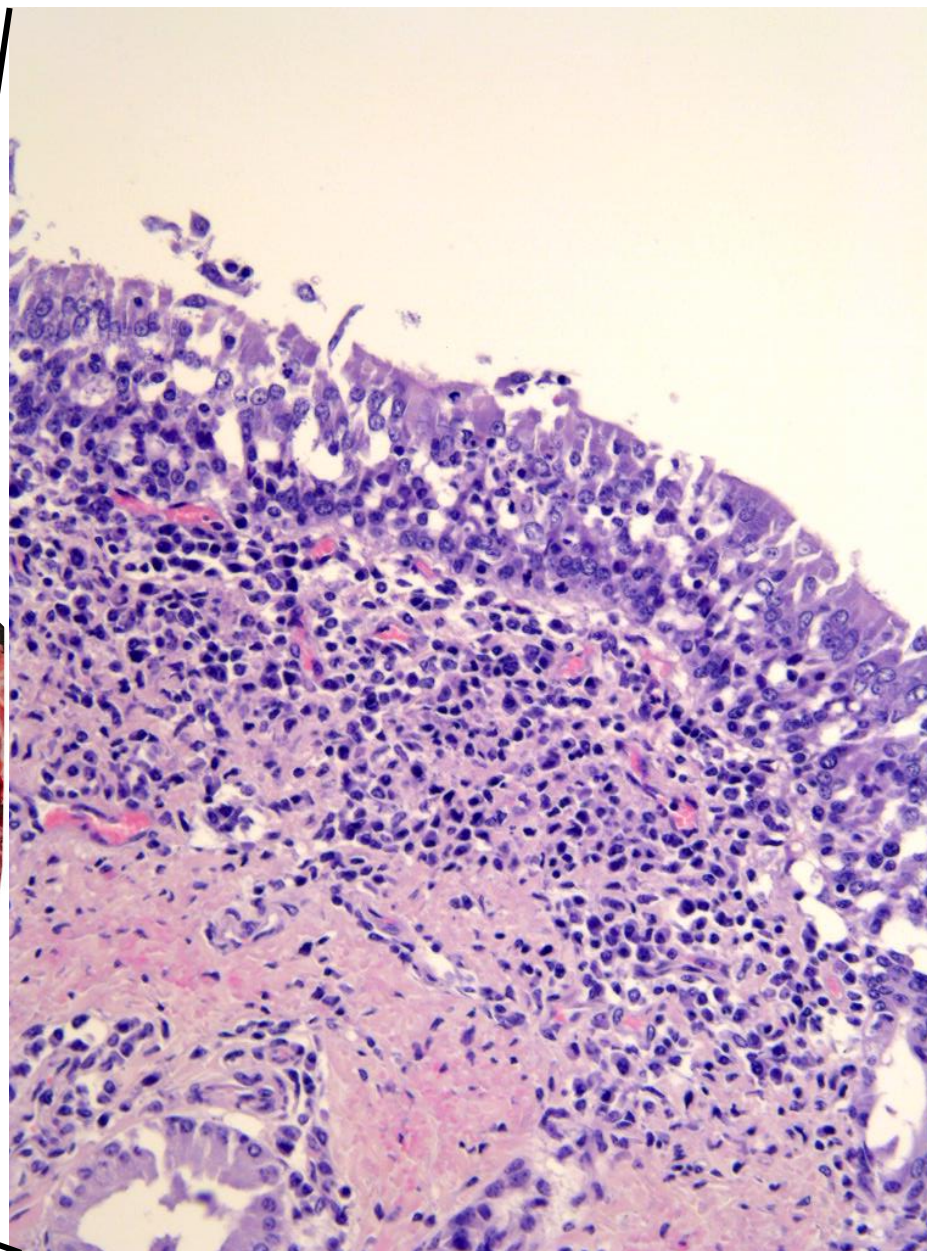
Pathological manifestations

Sample	Cq-value
1) Nasal mucosa (front)	18.17
2) Nasal mucosa (back)	18.54
3) Palatine tonsil	35.99
4) Lymph node	29.67
5) Trachea	22.83
6) Lung 6	25.06
7) Lung 7	25.50
8) Lung 8	28.02
9) Lung 9	29.27
10) Olfactory bulb (connection between respiratory tissue and brain)	31.56

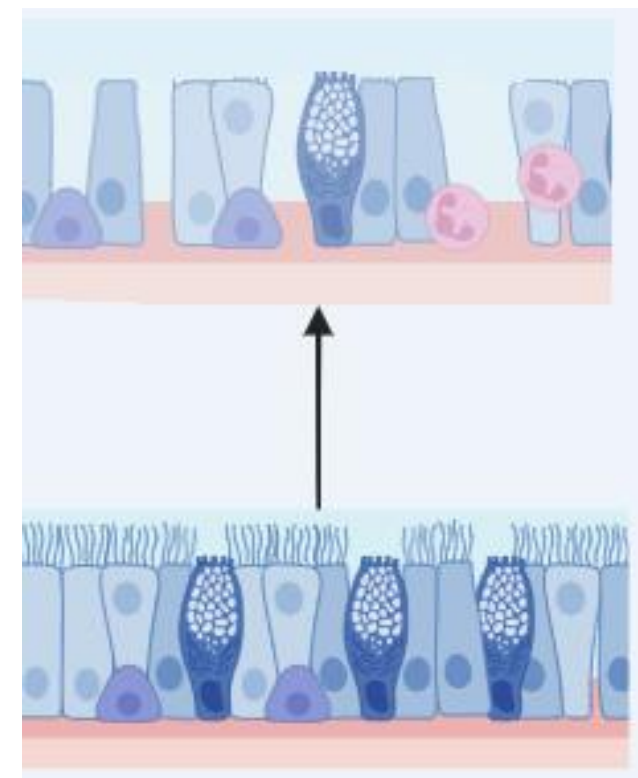


Pathological manifestations





Broken epithelial barrier



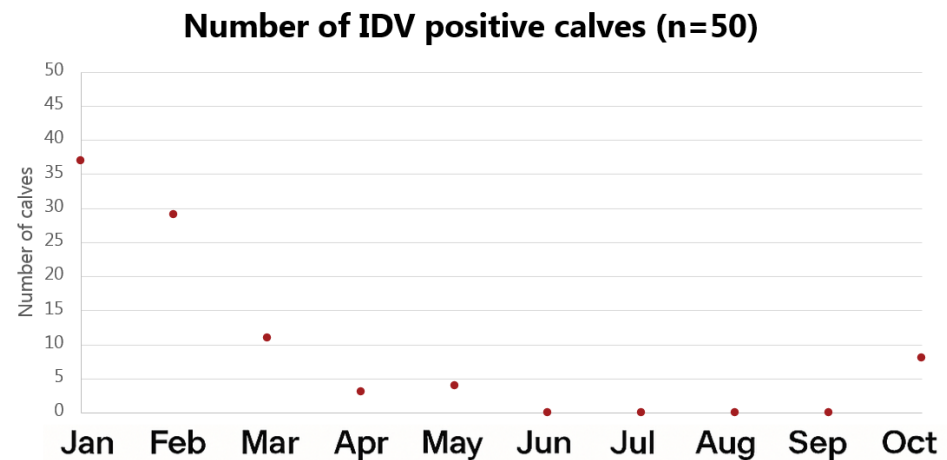
Non-affected

Discussion and Conclusion

- Investigate how long IDV remains in a herd
- Investigate whether calves can be infected multiple times
- Investigate which strain(s) is circulating
- Investigate the impact of IDV infection on health and productivity

Discussion and Conclusion

- Investigate how long IDV remains in a herd
 - Seasonal infection?
- Investigate whether calves can be infected multiple times
- Investigate which strain(s) is circulating
- Investigate the impact of IDV infection on health and productivity



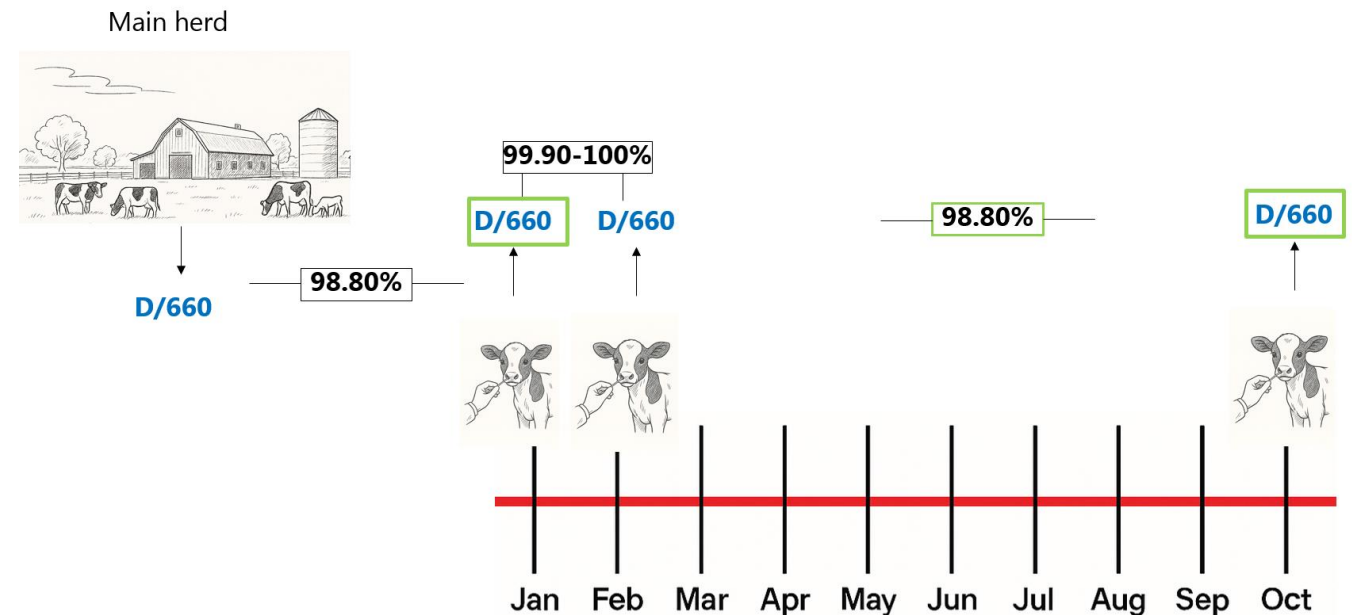
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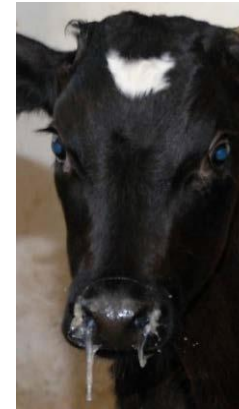
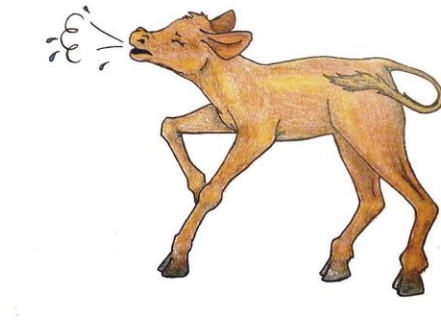
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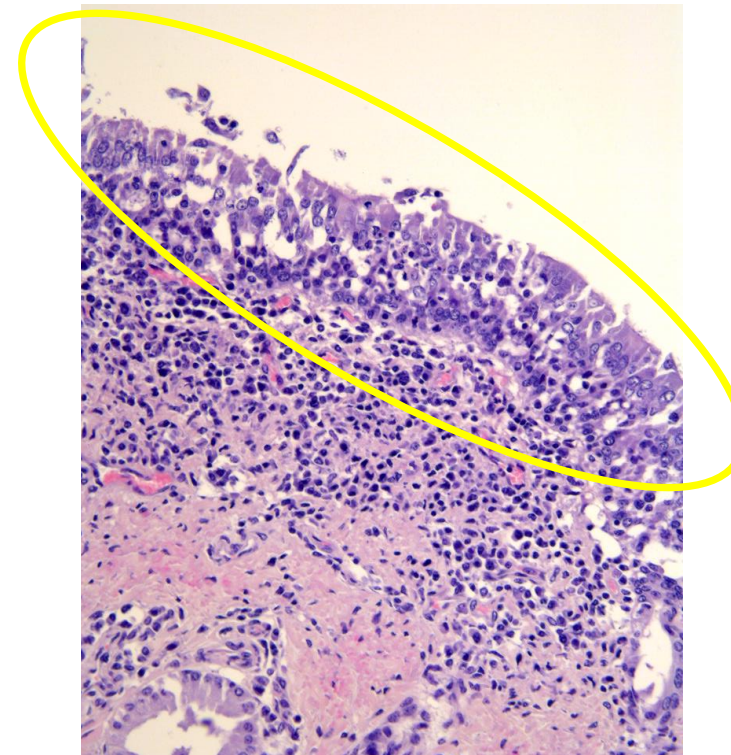
Discussion and Conclusion

- Investigate how long IDV remains in a herd
- Investigate whether calves can be infected multiple times
- Investigate which strain(s) is circulating
- Investigate the impact of IDV infection on health and productivity
 - Few clinical signs
 - Pathological changes



Discussion and Conclusion

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- Investigate whether calves can be infected multiple times
- Investigate which strain(s) is circulating
- Investigate the impact of IDV infection on health and productivity
 - Few clinical signs
 - Pathological changes



Acknowledgments



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Kvægafgiftsfonden



Questions?