Creating the cash cow

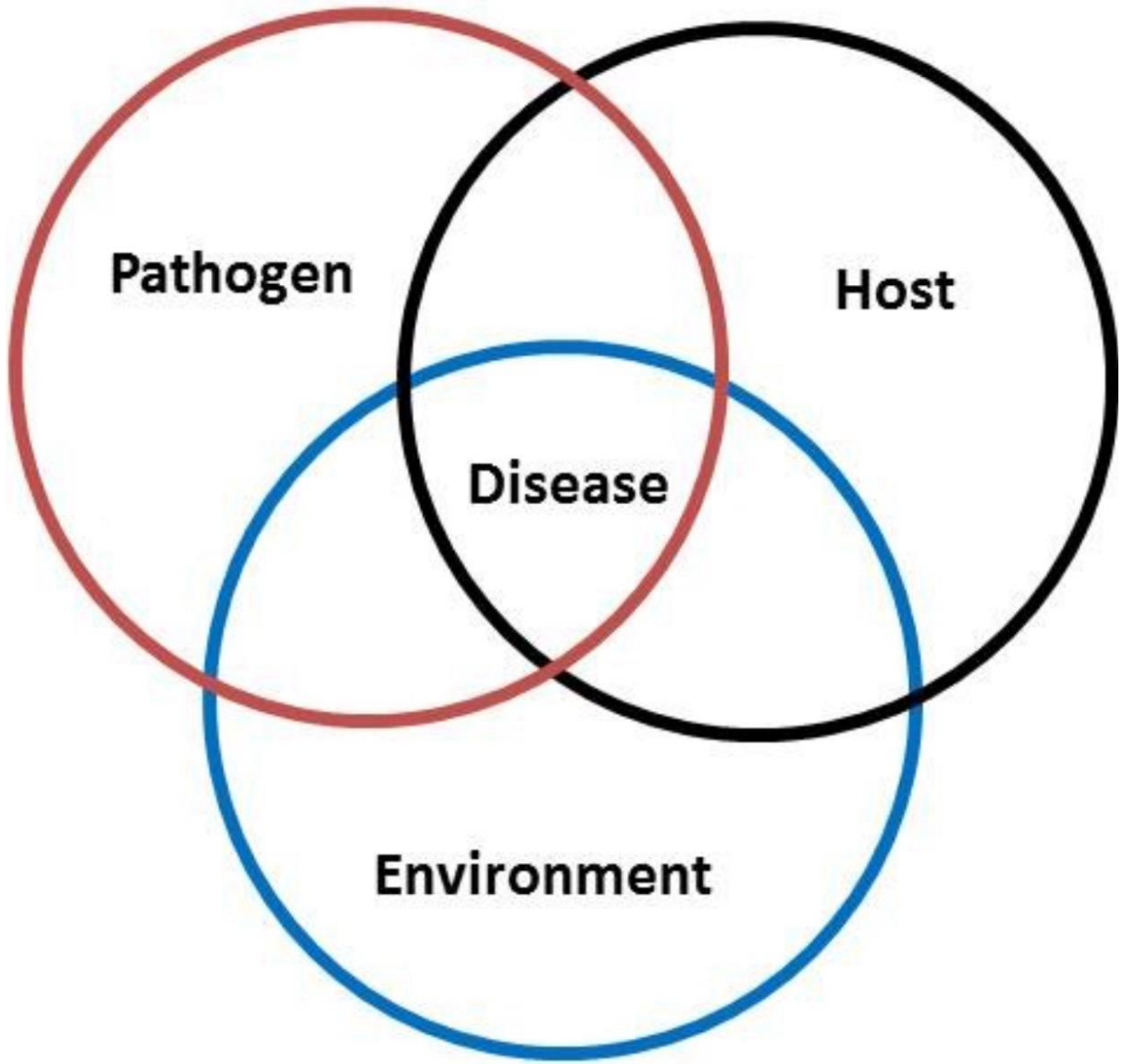
Pathogens, diseases, and calf health programs

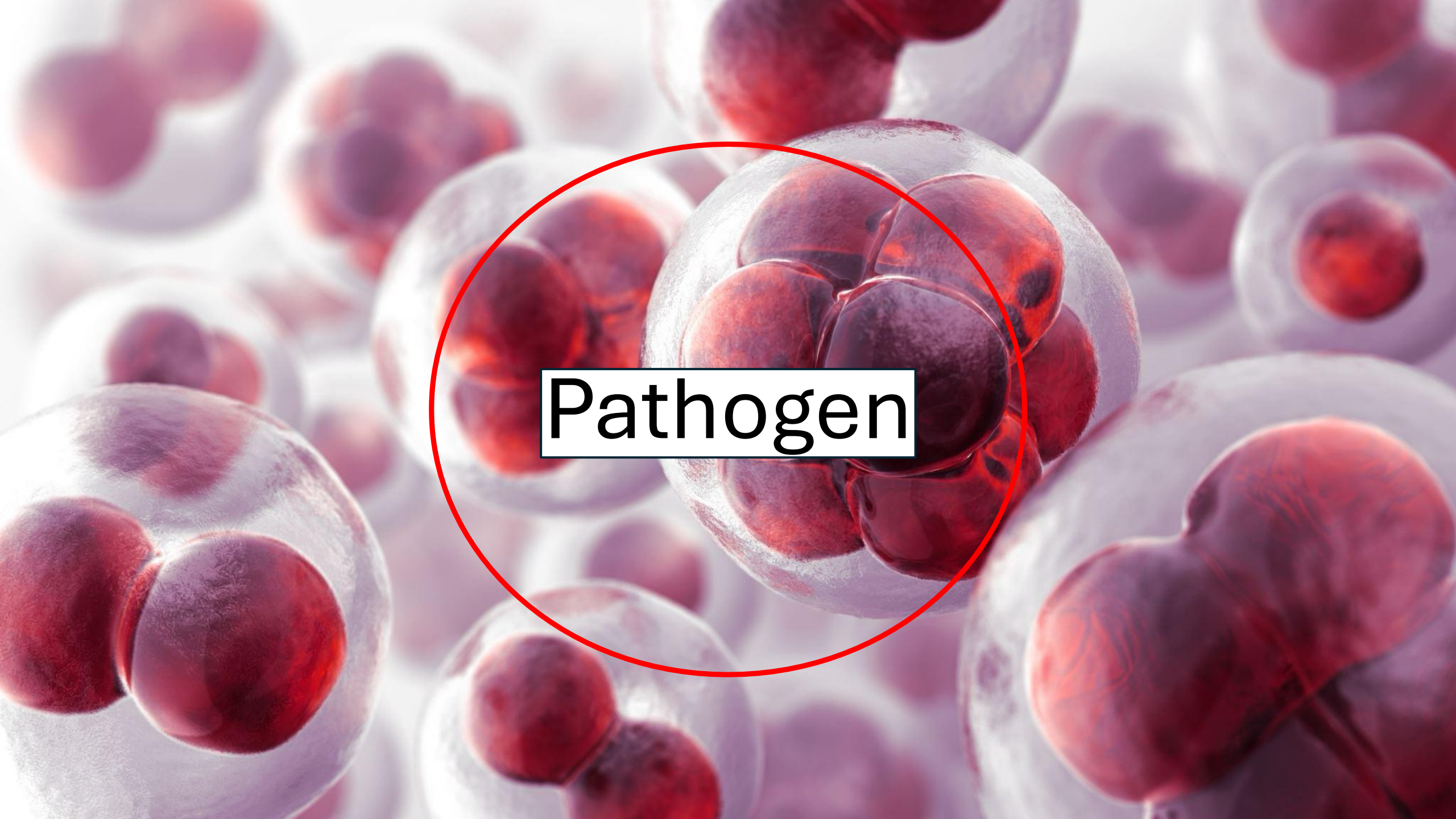
Kristen Edwards, DVM
kristen.edwards.dvm@gmail.com

VVMA
August 19, 2024

Overview

1) Pathogens
2) Preweaning diseases
3) Problems with collecting calf health data
4) Calf health programs
5) Building your own calf health program
6) Questions


Pathogen
Host
Disease
Environment


Pathogen

Pathogens - respiratory

Bacteria

Mannheimia hemolytica
Bibersteinia trehalose
Histophilus somni
Mycoplasma bovis
Pasteurella multocida

Viruses

Bovine herpesvirus 1 (IBR)
Bovine respiratory syncytial virus
Parainfluenza-3 virus
Bovine adenovirus
Bovine coronavirus

Pathogens - enteric

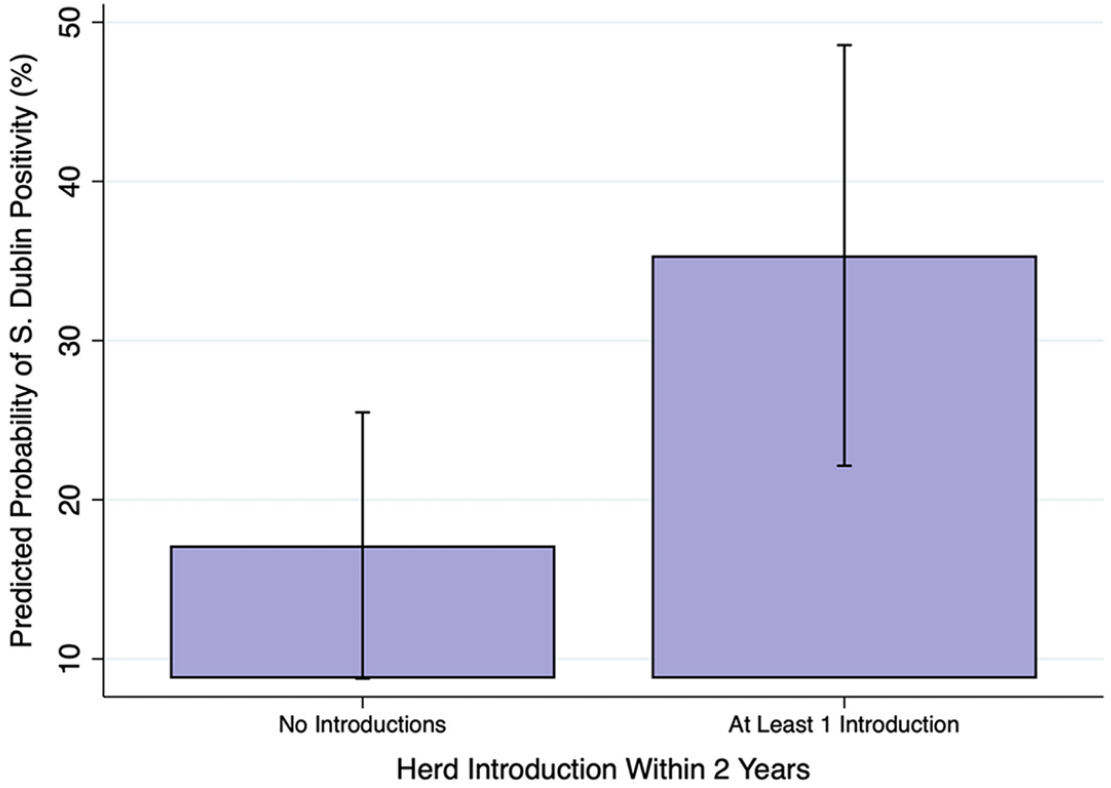
Protozoa
Cryptosporidium parvum

Bacteria
Salmonella enterica (serovars typhimurium and Dublin are the most common)
E. coli
C. perfringens

Viruses
Rotavirus
Coronavirus
BVDV
Torovirus

Salmonella dublin

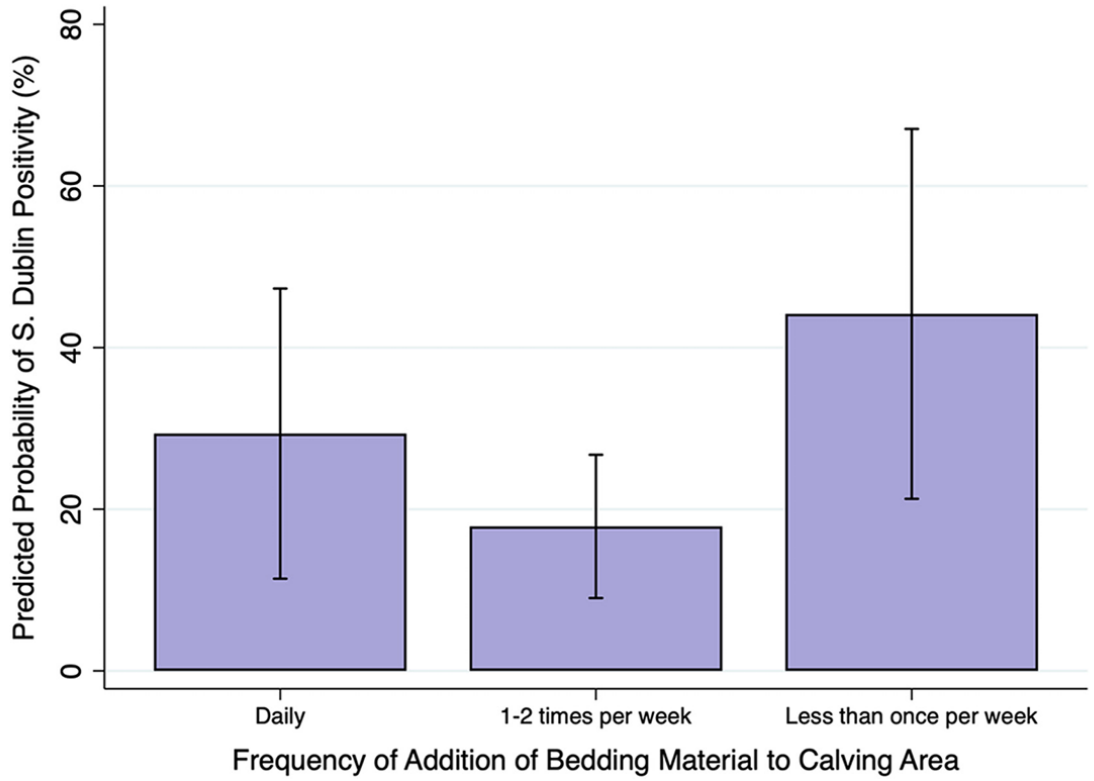
Farms that purchased or introduced animals within 2 years of the study sampling day had 4.6 times higher odds for S. Dublin detection ($P = 0.04$)



Perry et al. 2023

Salmonella dublin

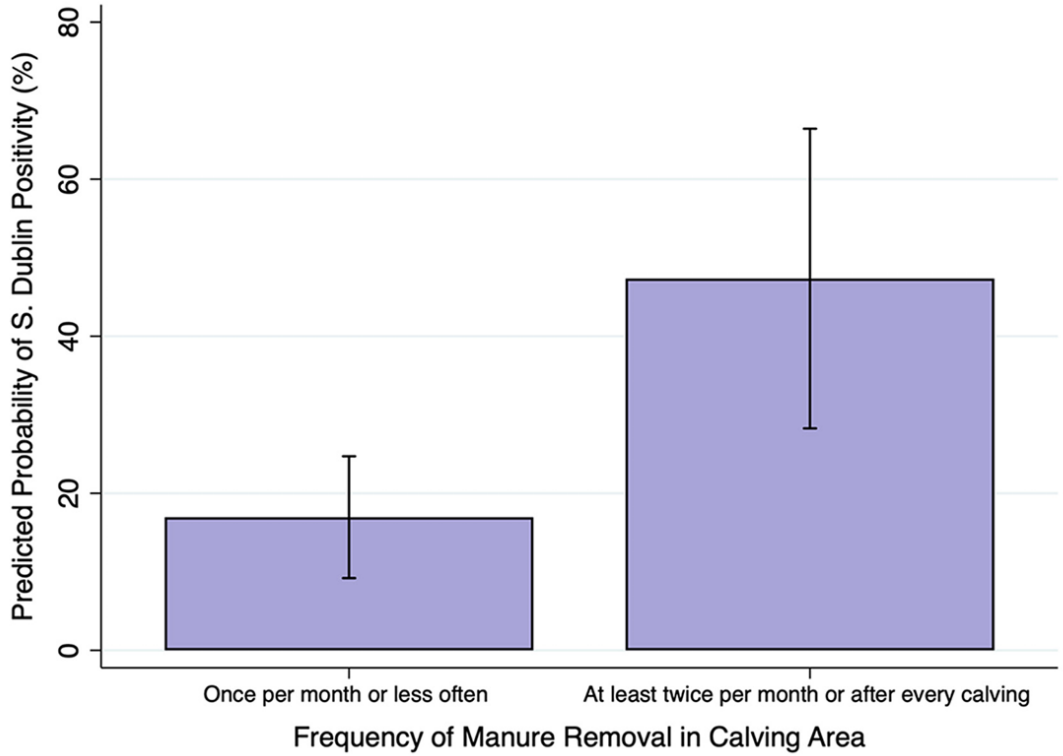
Farms that added, without removing, bedding material to the calving area 1 to 2 times per week had 10 times lower odds of Salmonella Dublin identification, compared with farms that added bedding material less than once per week (P = 0.03)



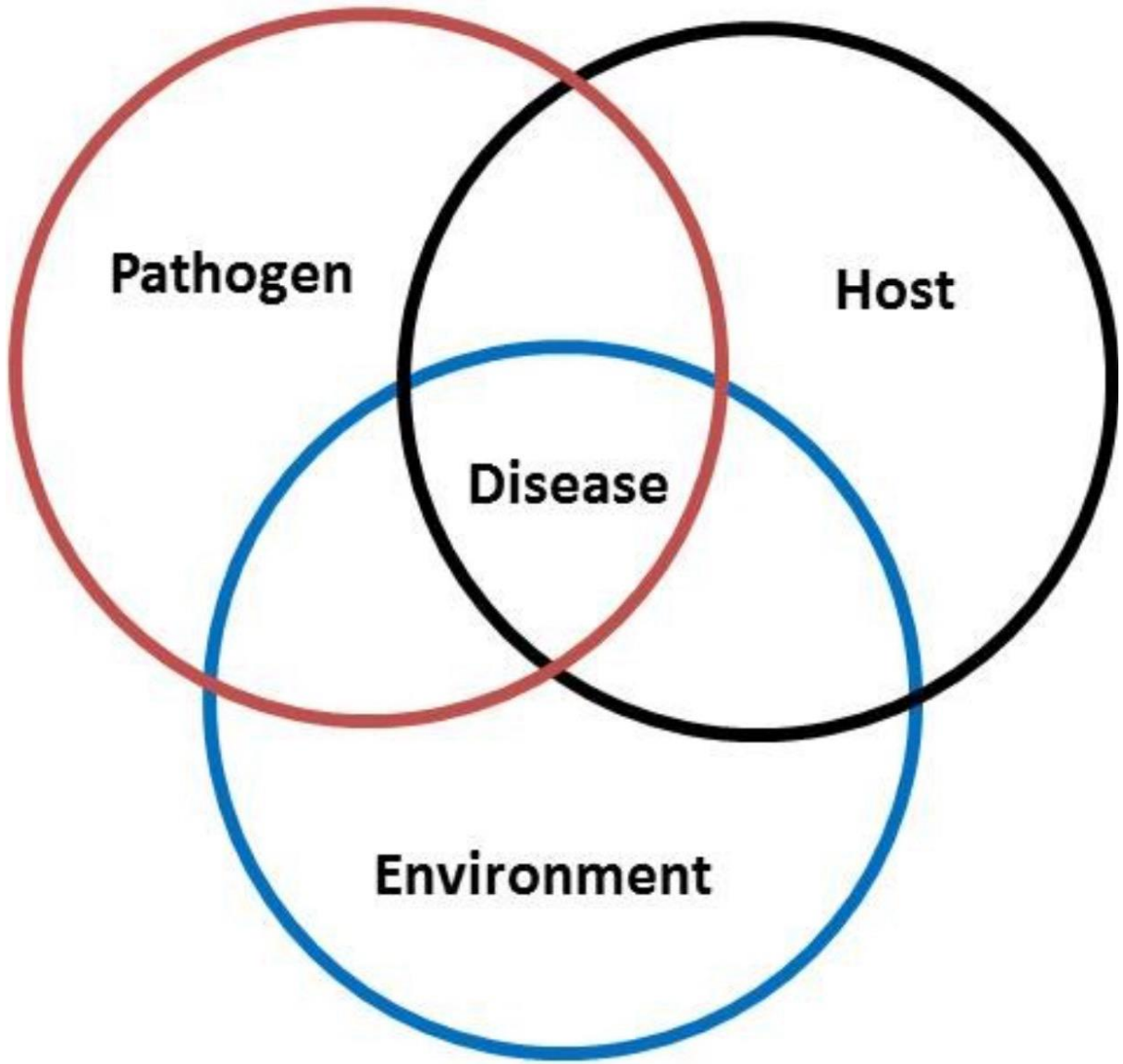
Perry et al. 2023

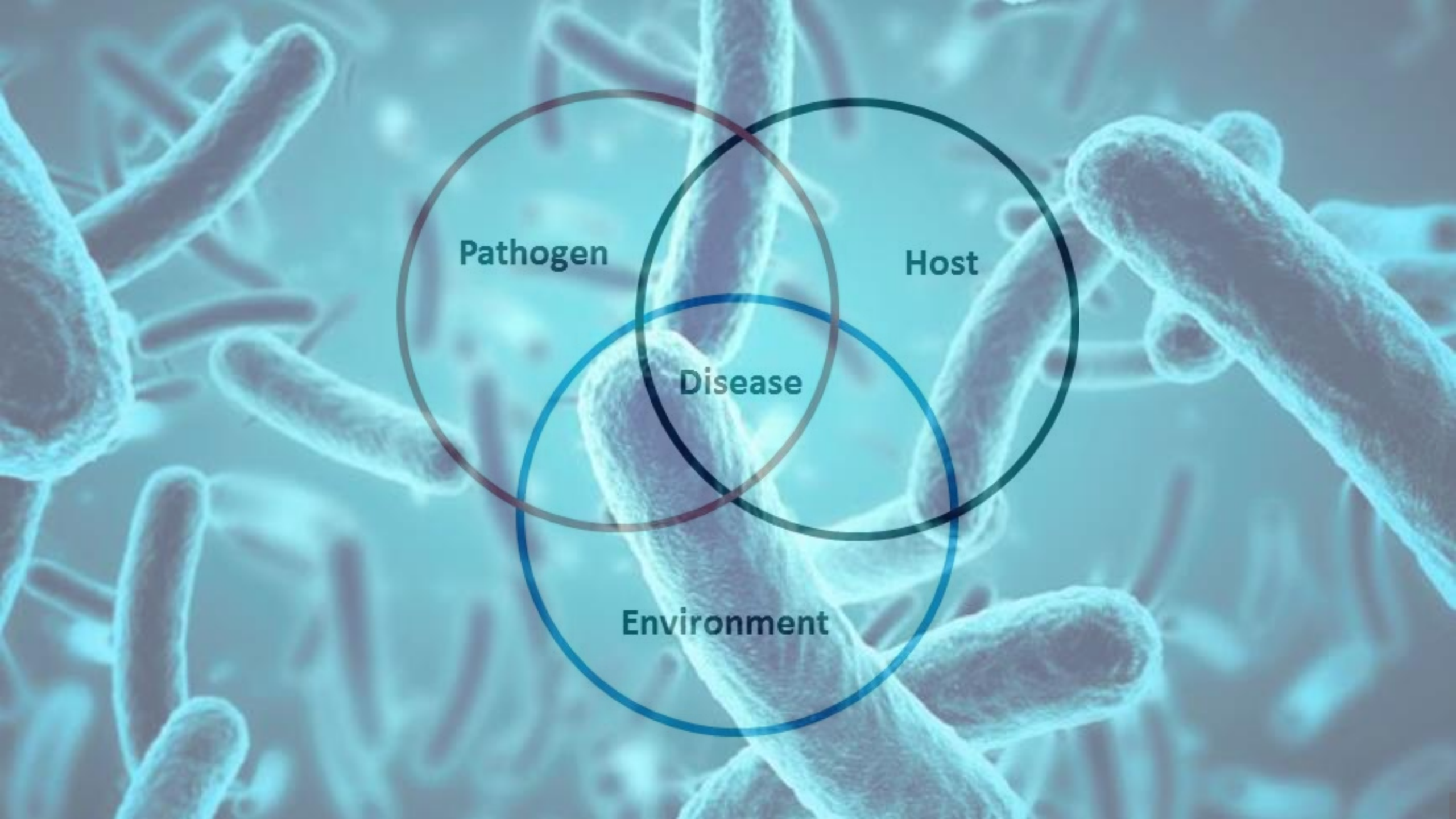
Salmonella dublin

Farms that removed manure from the surface of bedding in the calving area at least twice per month or after every calving had 8.5 times greater odds for S. Dublin identification compared to farms that removed less often ($P = 0.006$)



Perry et al. 2023


Pathogen
Host
Disease
Environment


Pathogen
Host
Disease
Environment


Disease

DIARRHEA

50 g/d less ADG preweaning

325 kg (715 lb) less milk in first lactation

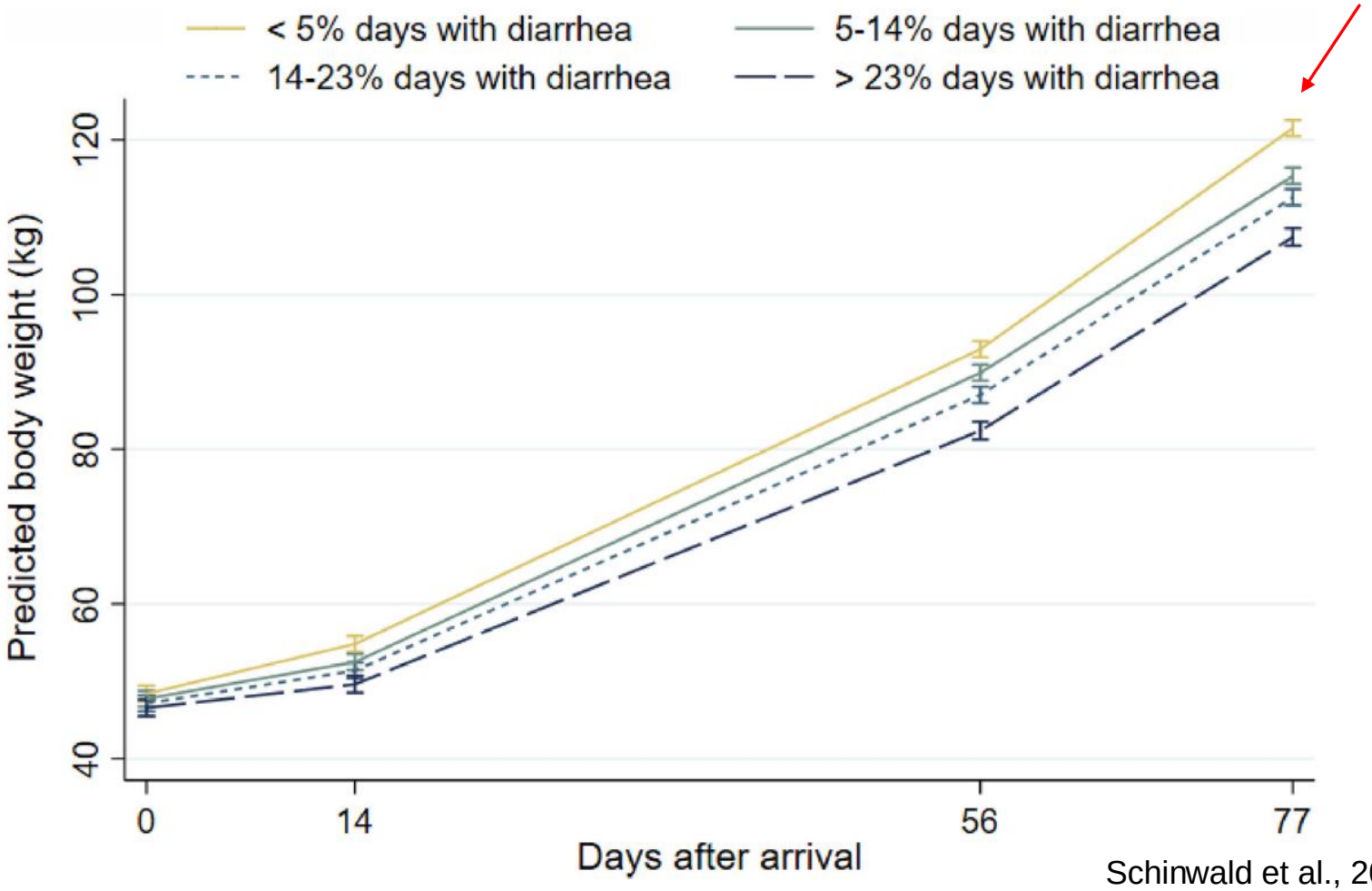
$113/case in labor and treatment costs (USD)

$256/case

Roche et al., 2020
Abuelo et al., 2021

Diarrhea

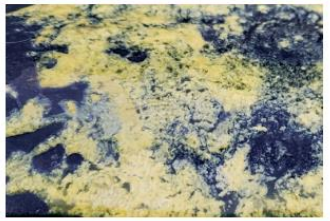
- Fecal score ≥ 2 = diarrhea
- Scored 2616 calves twice daily for 28 days



Schinwald et al., 2022

Diarrhea

- Scoring system based on Larson et al. (1977)

Score		Description
0		**NORMAL** • firm but not hard • original form is distorted slightly after dropping to the floor and settling
1		**SOFT** • does not hold form • piles but spreads slightly
2		**RUNNY** • spreads readily
3		**WATERY** • liquid consistency • splatters

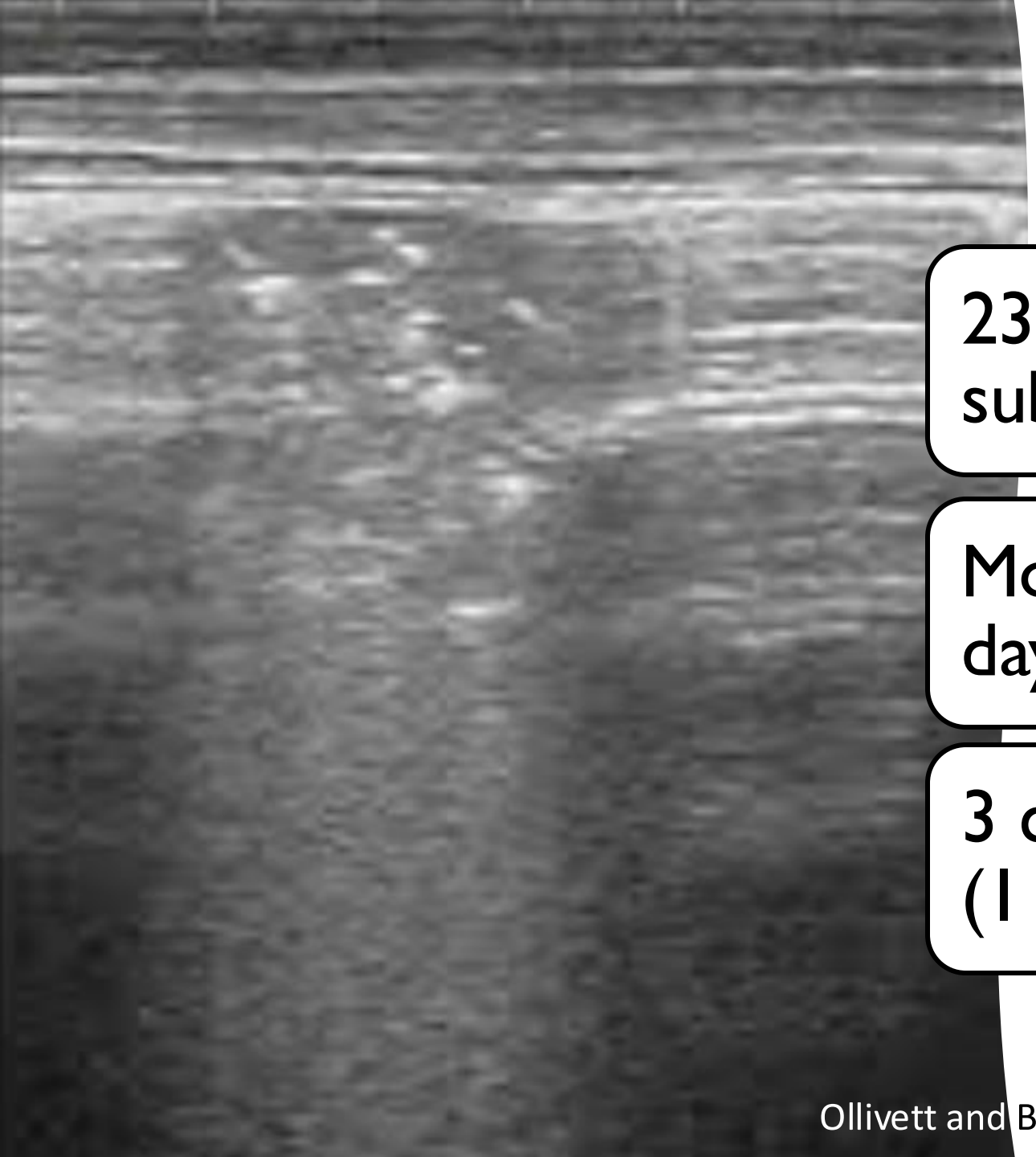
Source: Veal Farmers of Ontario

RESPIRATORY DISEASE

Increased risk for culling

233 kg (512 lb) less milk in first lactation

Schaffer et al., 2016
Abuelo et al., 2021



THORACIC ULTRASOUND

23-67% within-herd prevalence of subclinical pneumonia

Most calves will have lesions 10 days before clinical signs

3 cm^2 consolidation = 525 kg (1155 lb) less milk in first lactation

Ollivett and Buczinski, 2016; Dunn et al., 2018; Cuevas-Gómez et al., 2021

THORACIC ULTRASOUND 101

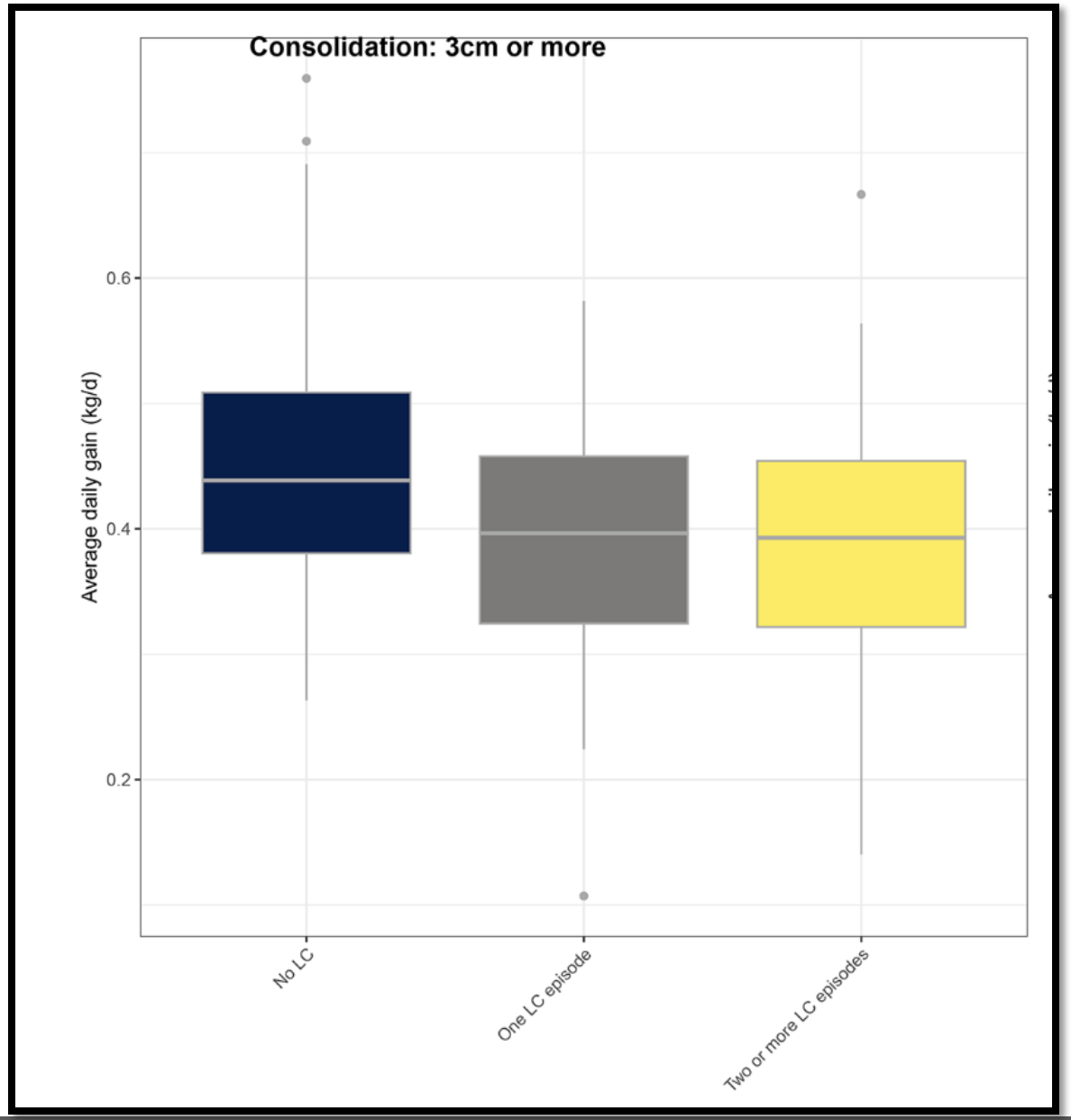
Ultrasound basics

- Images are generated when the ultrasound waves are reflected/echoed back to the transducer
  - Grey or white
  - The denser the tissue, the whiter the image
  - Bone (brightest), tissue
- But if there is no reflection of ultrasound waves (waves get absorbed)
  - Black
  - Fluid, air

Production consequences

1) Lung consolidation reduces growth, reproduction, and production outcomes
2) Lung lesions 1 cm^2 or greater at d 21-50 result in lower ADG (120 g/d)
3) Lung lesions 3 cm^2 or greater seen at least once before 56 days of age resulted in 525 kg less milk in first lactation
4) Consolidation after weaning:
   - ❖ Reduced reproductive performance
   - ❖ Increased hazard for removal

Teixeira et al., 2017; Dunn et al., 2018; Cramer and Ollivett, 2019



Sáadatnia et al., 2023

When to scan

Depends on the question you want to answer

1) Evaluate weaning:
   - At start of weaning
   - At end of weaning
2) Treatment efficacy:
   - 7 days after treatment
3) To find high-risk groups:
   - Scan at 7 days of age every 7 days
   - Scan ~10-12 calves this way

Anatomy

1) Cattle have 13 ribs, 12 intercostal spaces (ICS)
2) Calf lung fields:
   - Right side: 10th to 1st ICS
   - Left side: 10th to 2nd ICS
3) Lung areas most commonly affected (in order):
   1) Cranial aspect of right cranial lung lobe
   2) Right middle lung lobe
   3) Caudal aspect of the left cranial lung lobe
4) Most pneumonia lesions develop cranial to the 6th ICS

Anatomy – Lung field

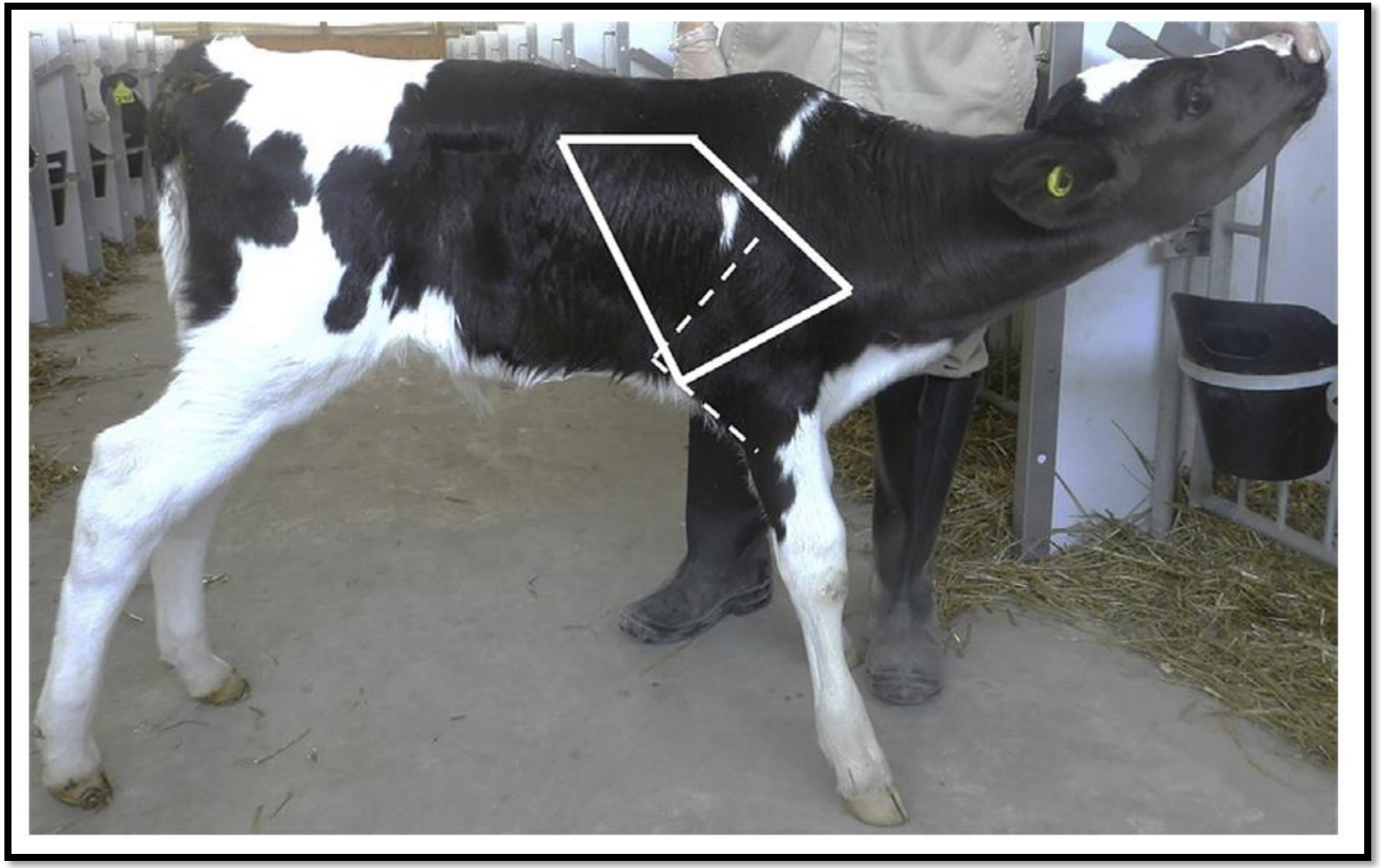


Image: Ollivett and Buczinski, 2016

Anatomy – Right lung lobes

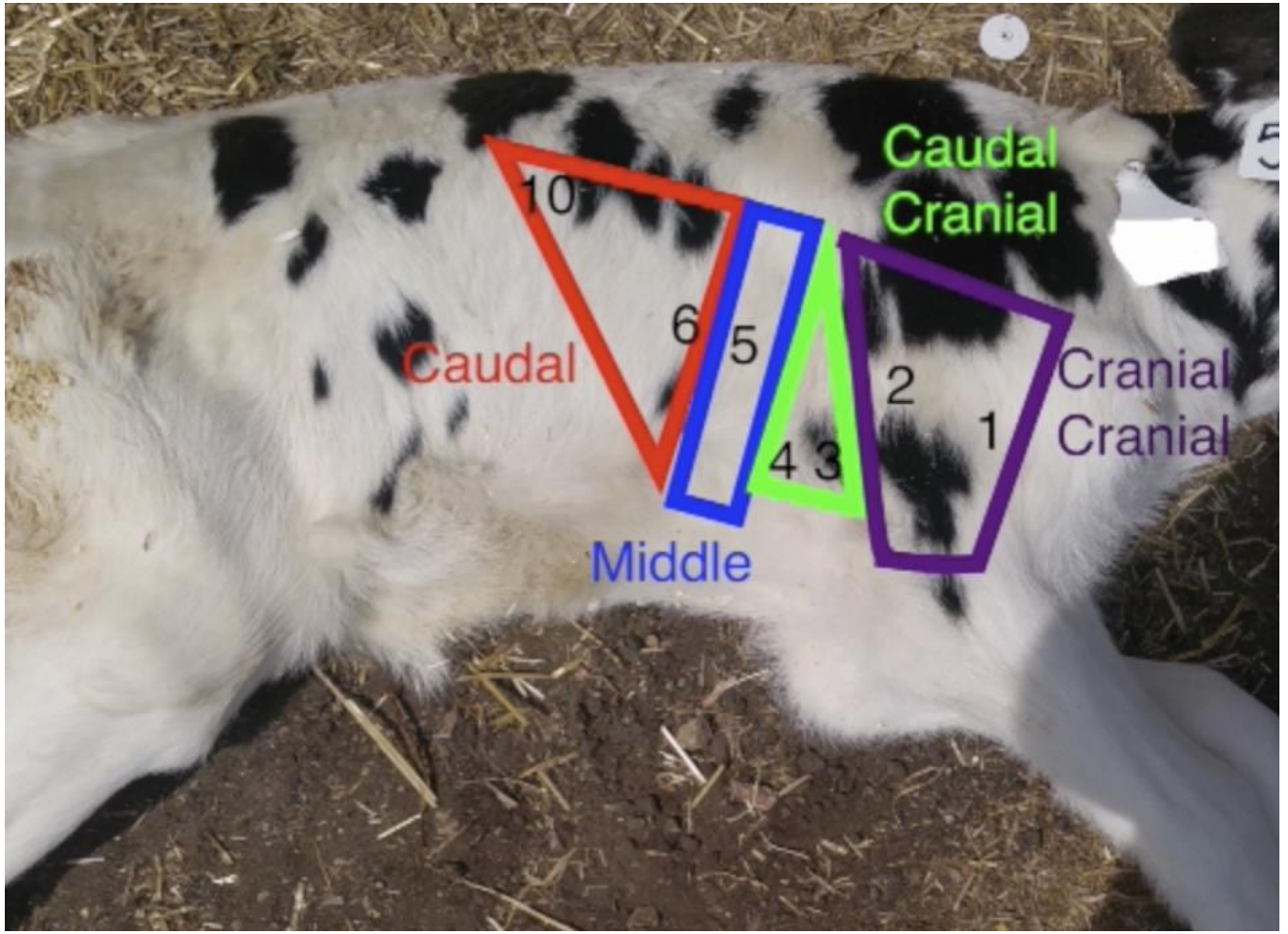


Image: Dairyland Initiative

Anatomy – Left lung lobes

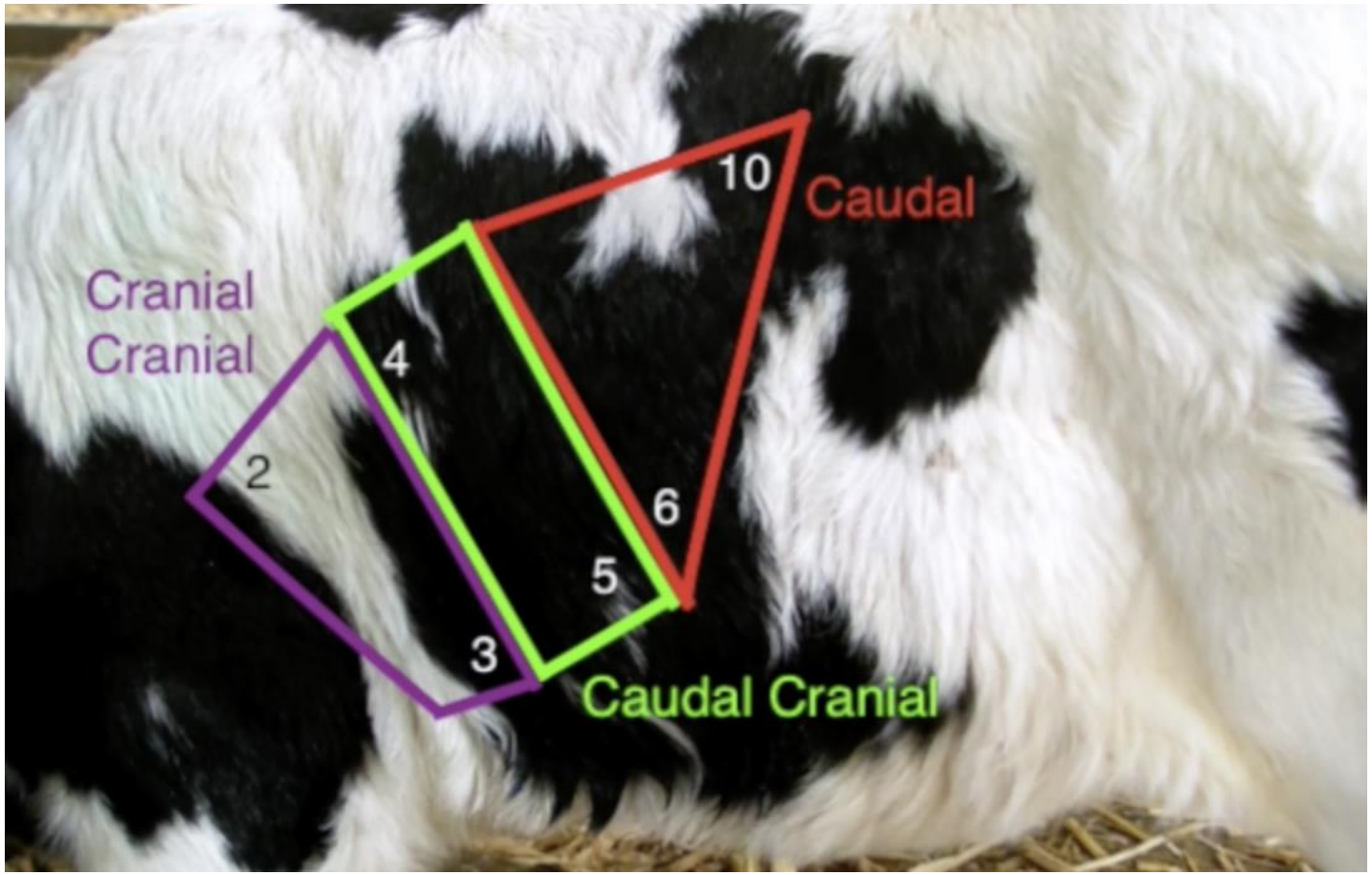


Image: Dairyland Initiative

Anatomy

Other anatomical structures to consider:

- Liver (right, ICS 5-12)
- Spleen (left, ICS 5-12)
- Thymus (left, ICS 2)
- Heart (left and right, ICS 2-3)

Non-lung anatomy

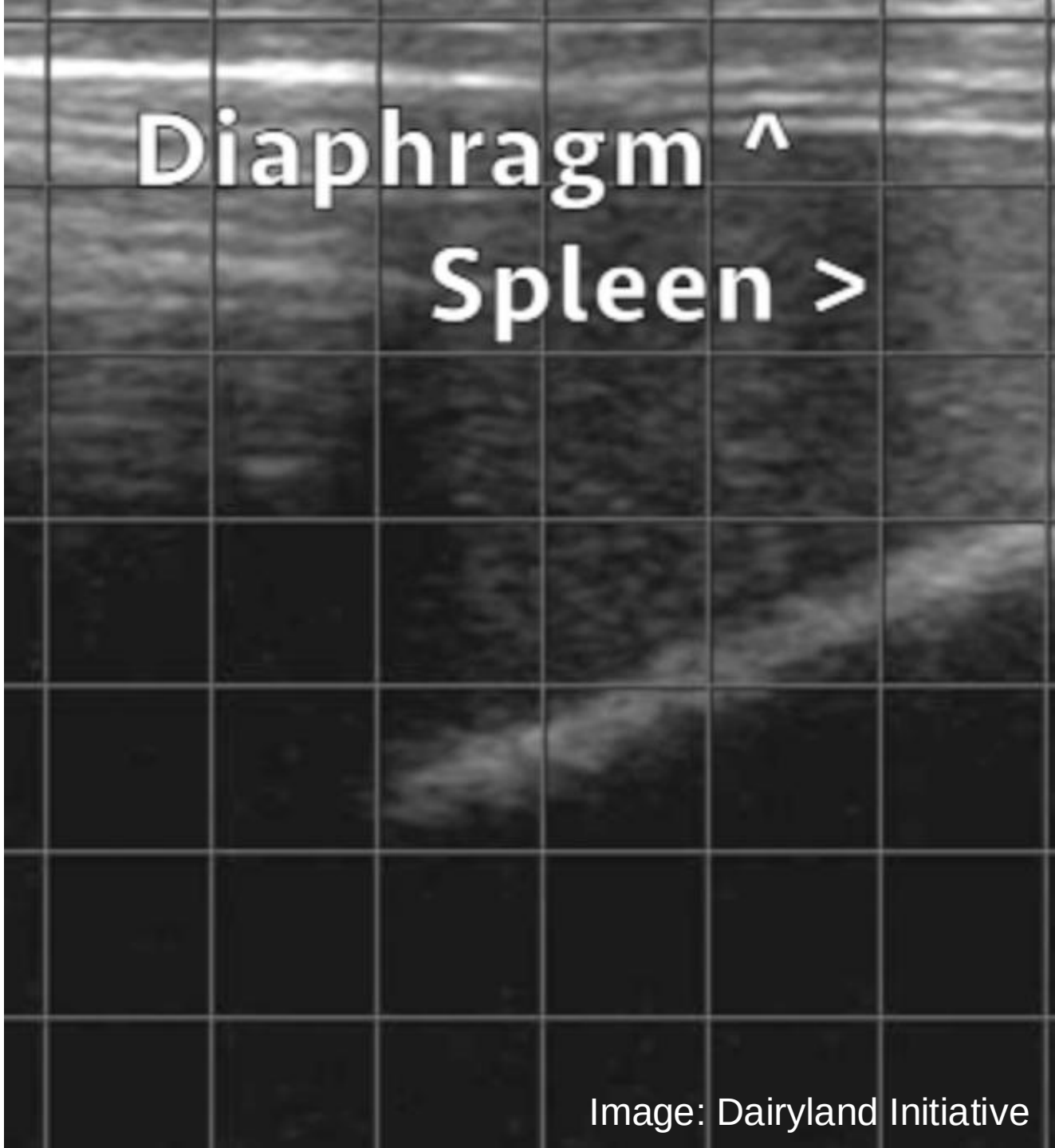


Image: Dairyland Initiative

Non-lung anatomy

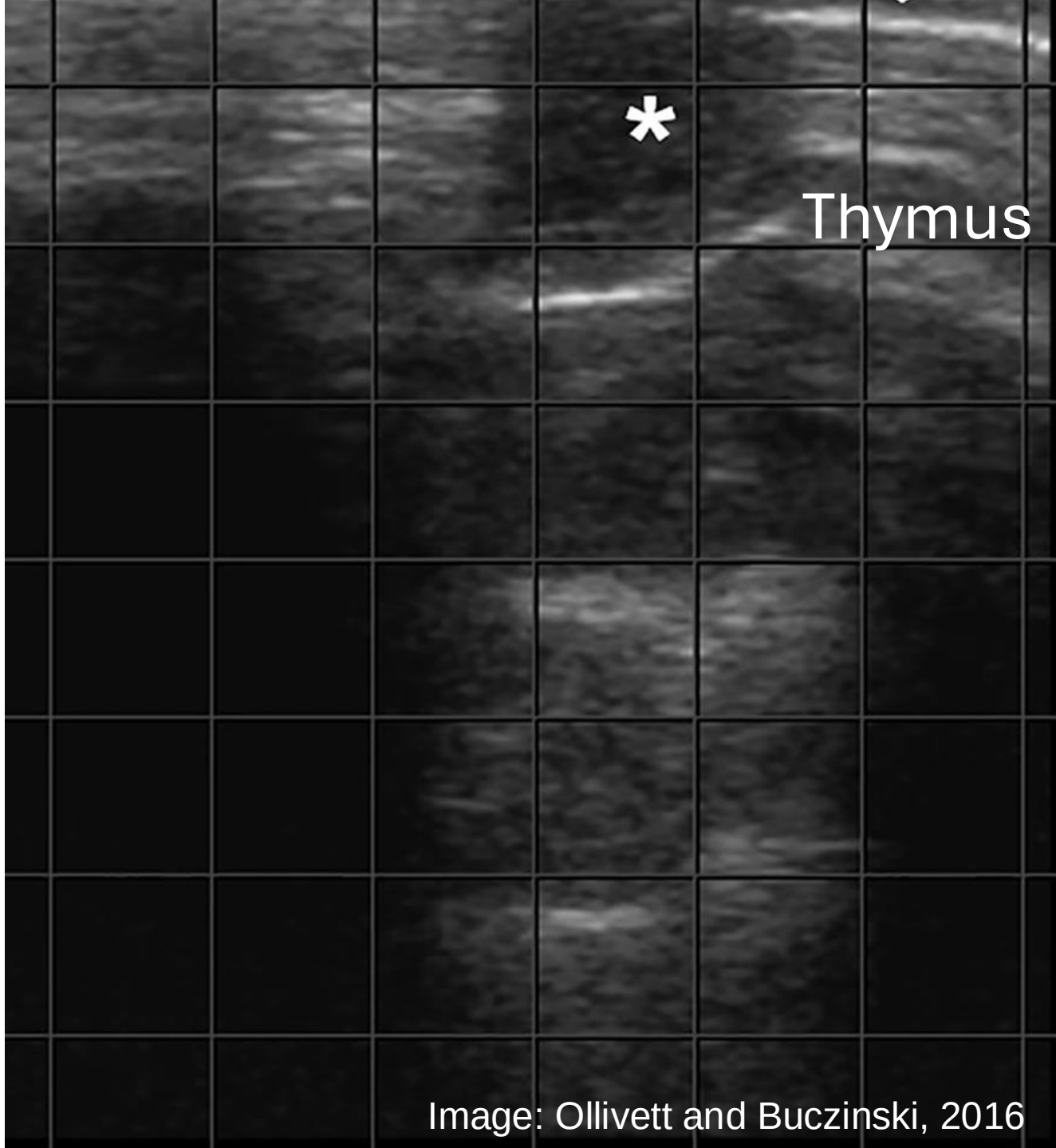


Image: Ollivett and Buczinski, 2016

Tools and settings

1) Halter
2) 70% isopropyl alcohol
   - Mineral oil if desperate
3) Spray bottle or regular bottle
4) Linear probe ultrasound
   a. Set to depth of 8 cm and a frequency of 6.5-8.5 mHz
   b. “Fetal sexing” mode on EasyScan
   c. “Lung” setting on exam type with Ibex
   d. Set grid to be 1 cm x 1 cm

How to scan

1) Saturate thorax with 70% isopropyl alcohol
2) Begin on right side at ICS 1
3) Move probe from dorsal to ventral
4) Move caudally and repeat for ICS 2-10
5) Repeat on left side starting at ICS 2 and moving caudally to 10

How to scan

Image: Ollivett and Buczinski, 2016

How to score

Up to you! But here is what I do…

- 0 = normal, no or few comet-tails and less than 1cm consolidation
- 1 = lesion patches totalling at least 1 cm^2 but less than 2 cm^2
- 2 = lesion patches totalling at least 2 cm^2 but less than 3 cm^2
- 3 = lesion patches totalling at least 3 cm^2 but less than 4 cm^2
- 4 = lesion patches totalling at least 4 cm^2 but less than 5 cm^2
- 5 = lesion patches totalling ≥ 5 cm^2 of consolidation

In the literature…

Score	Comet tailing	Lobular	Lobar
0		Healthy	
1	Yes		
2	Yes	Yes	
3	Yes	Yes	1 lobe
4	Yes	Yes	2 lobes
5	Yes	Yes	3 or more lobes

But the literature is based on cm^2 of consolidation, not number of lobes affected… so I find this scoring system less useful

In the literature…

How it is scored at academic institutions:

Score 0 to 1 are considered normal

Score 3 or greater are consistent with bacterial bronchopneumonia

Abnormalities (pneumothorax, pleural fluid, abscesses, necrosis) are not in the scoring system

Normal lung

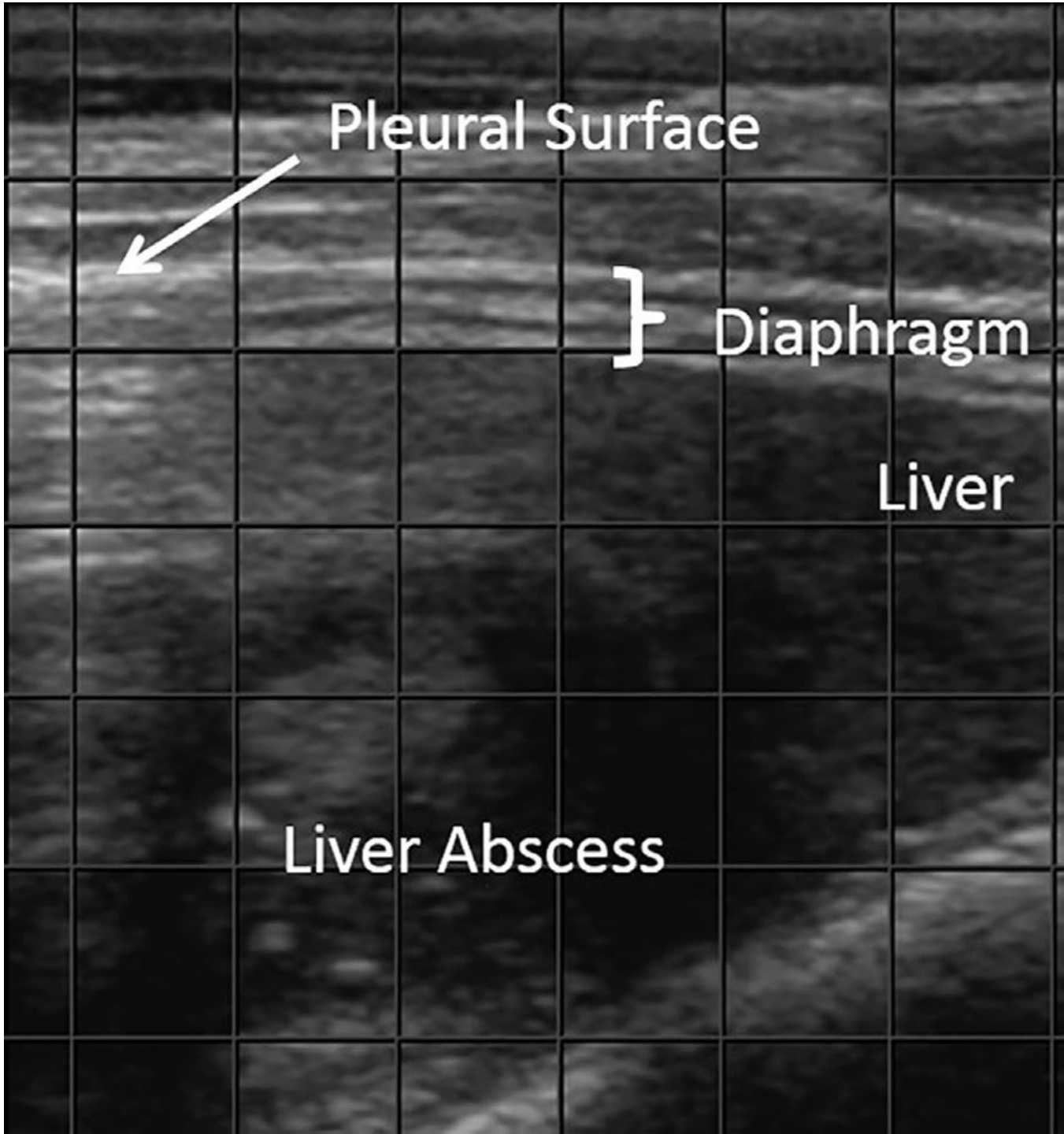
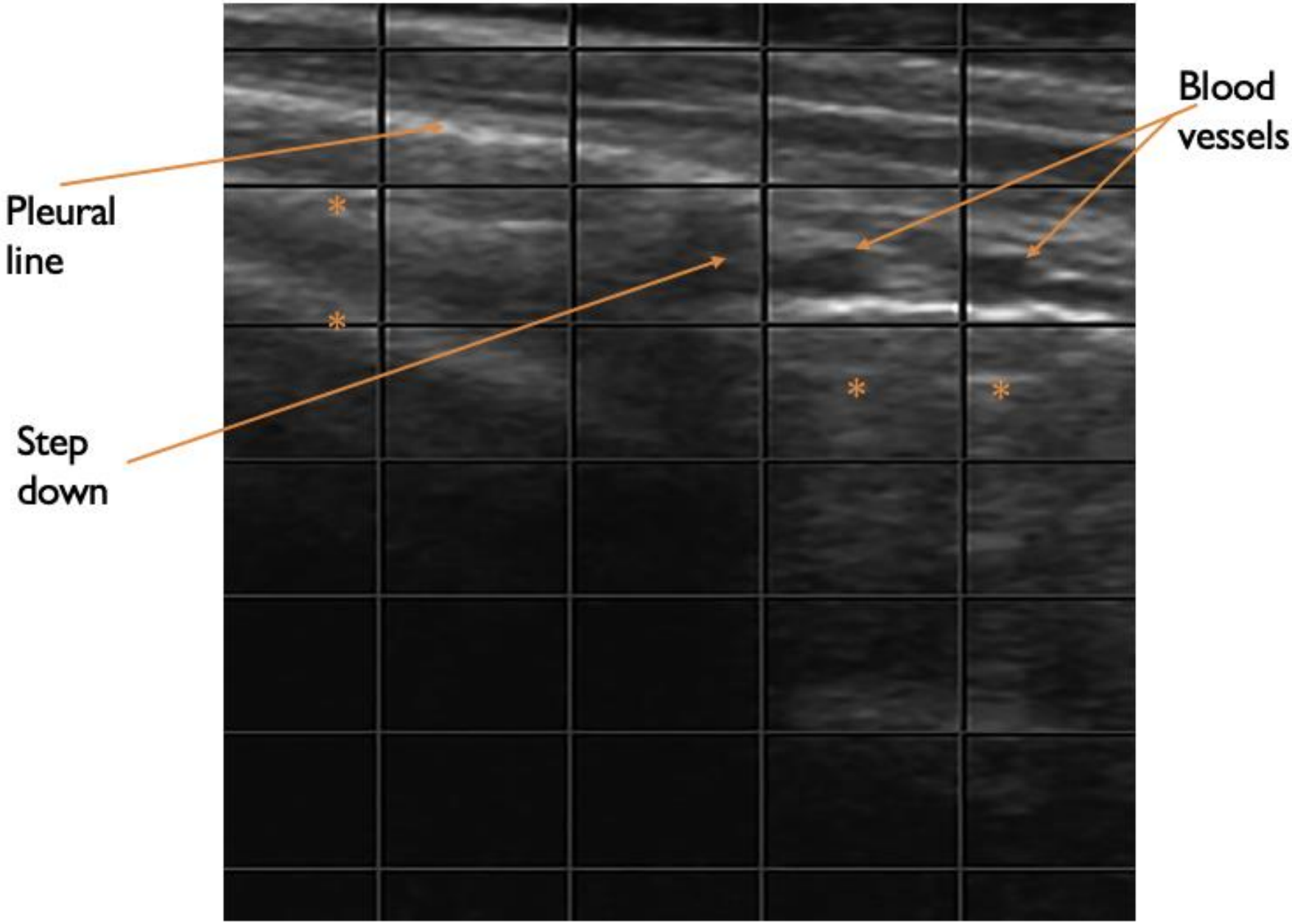


Image: Ollivett and Buczinski, 2016

Normal lung



* = reverberation artifact (aka “A lines”, normal)

Image: Ollivett and Buczinski, 2016

Normal lung

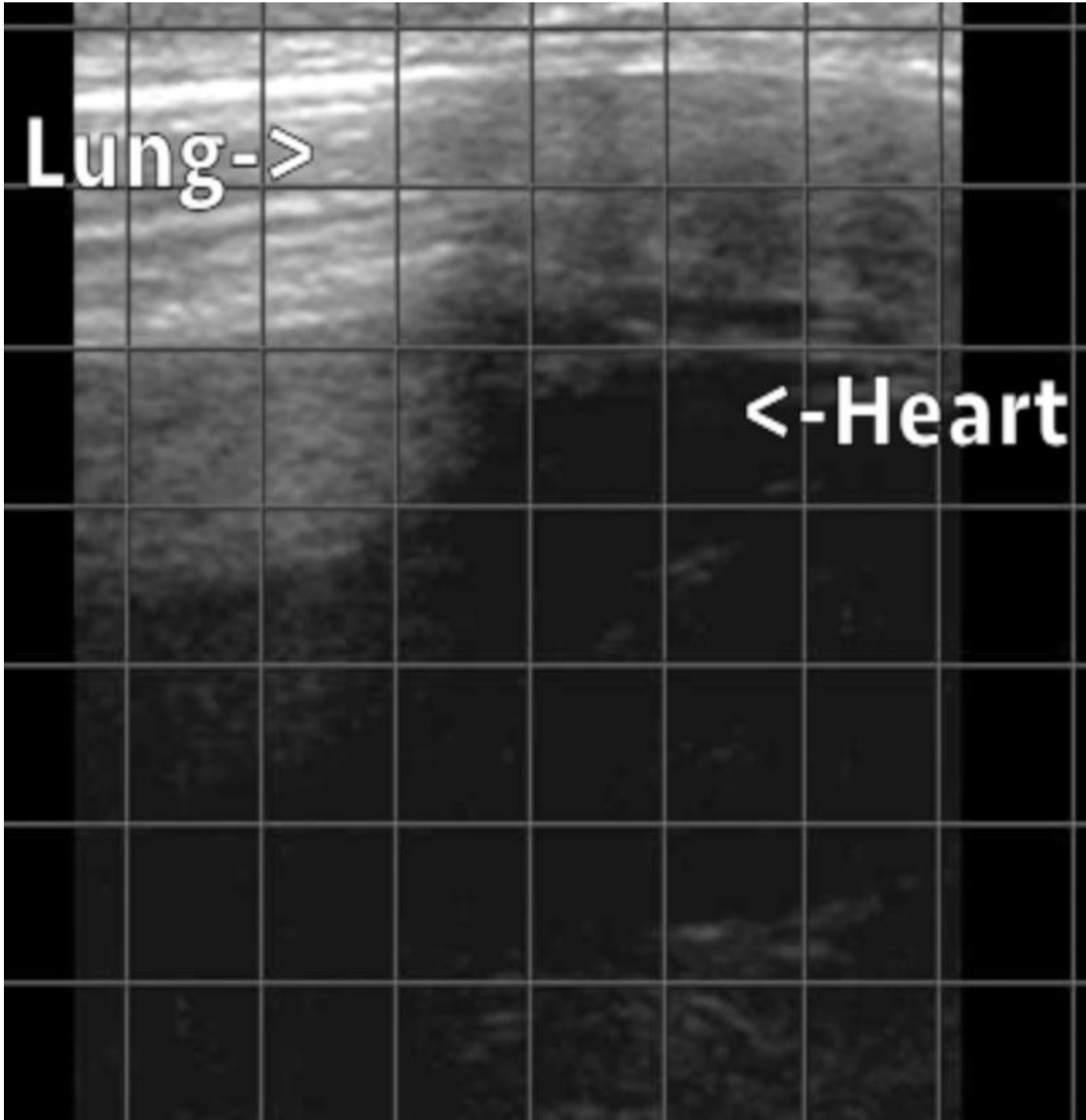


Image: Dairyland Initiative

Normal lung

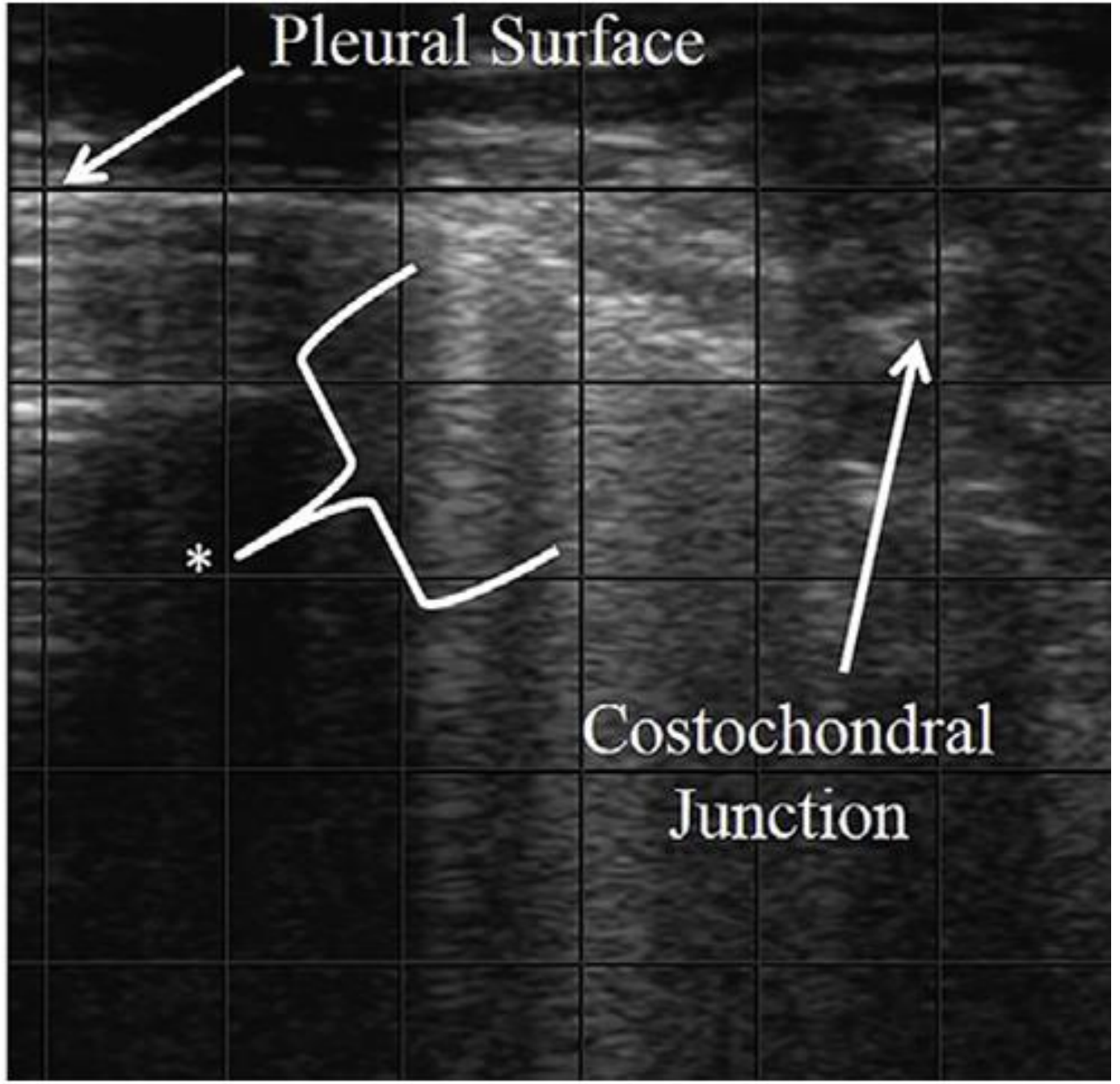
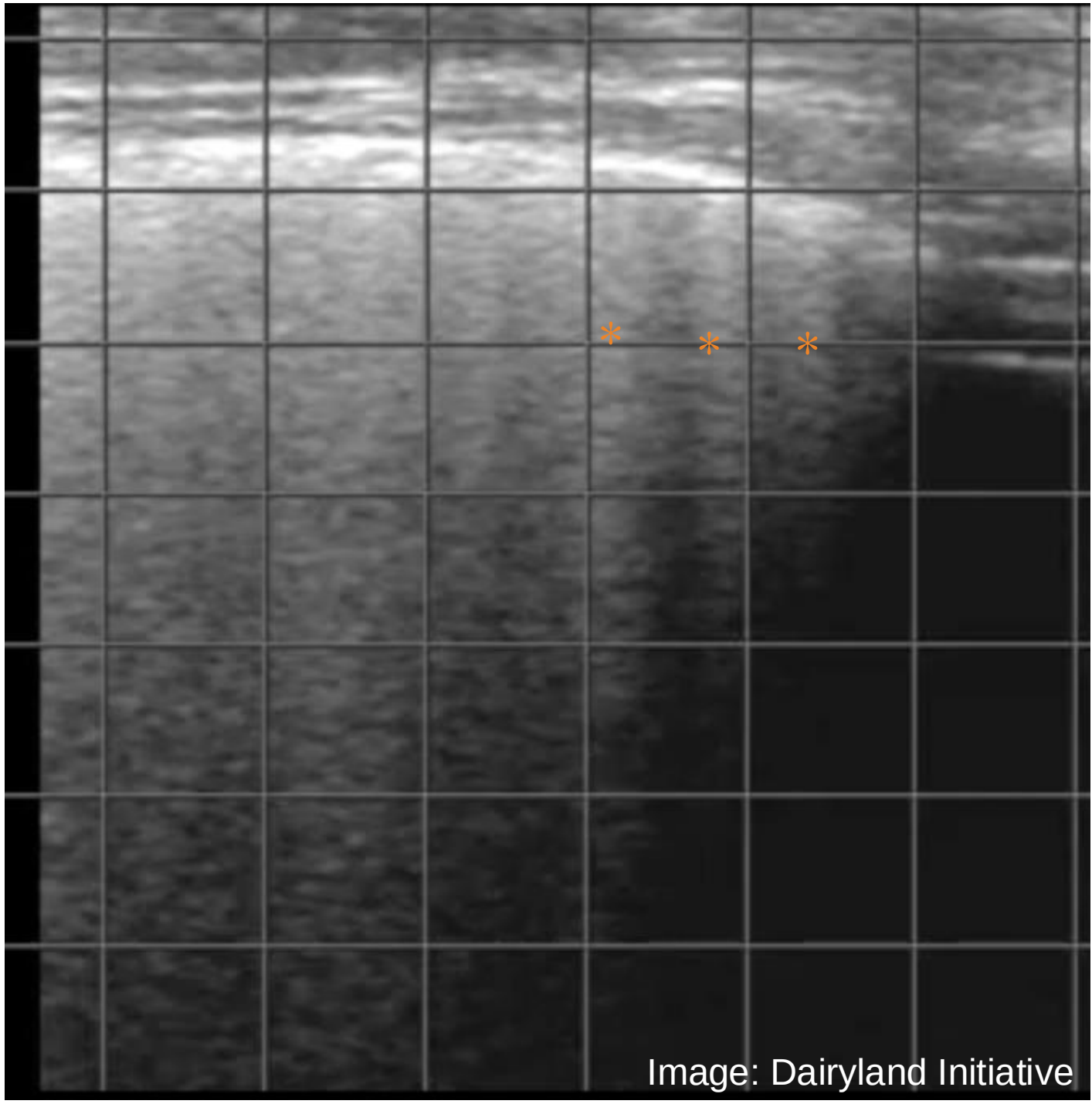


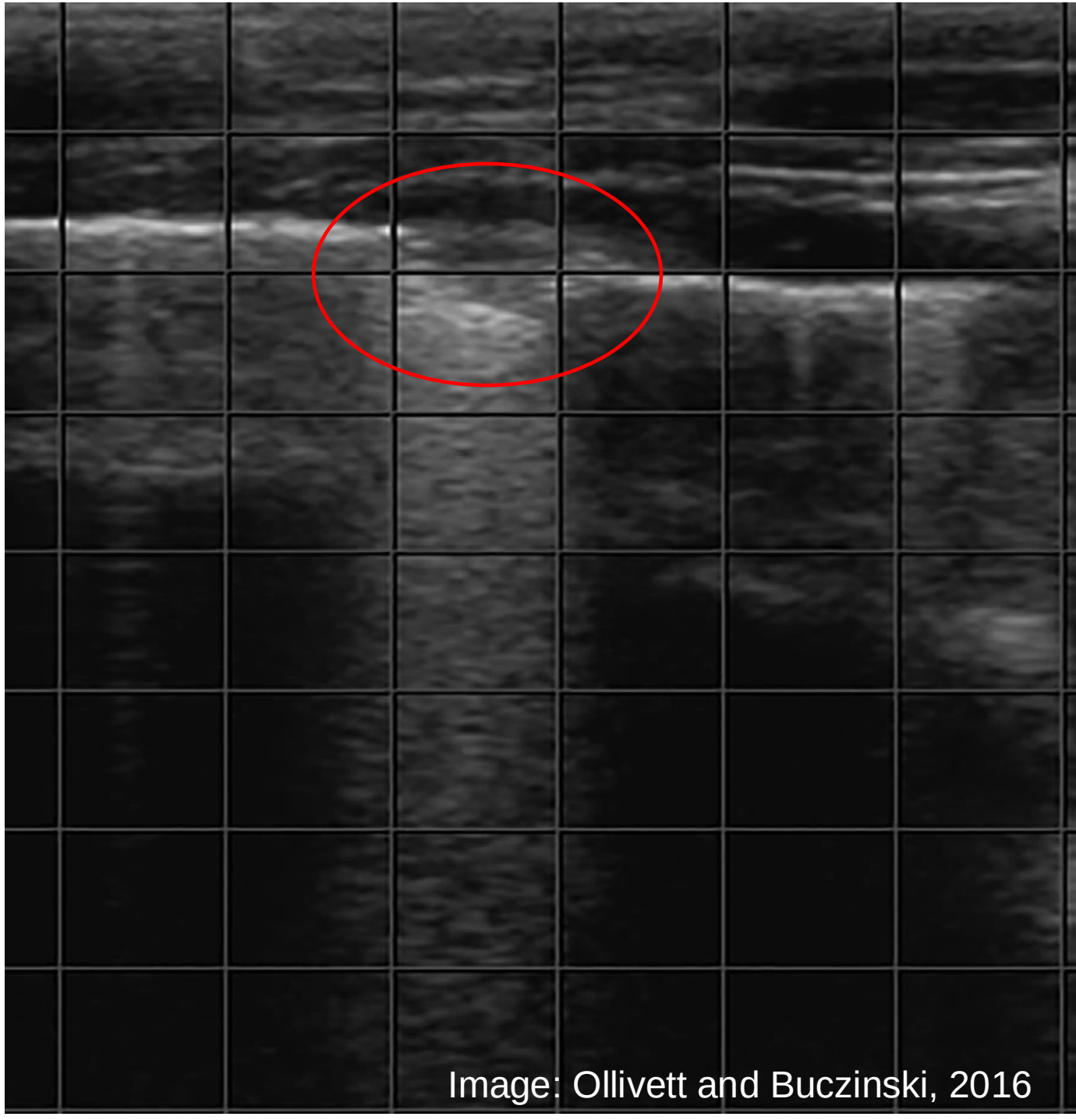
Image: Ollivett and Buczinski, 2016

* = comet tail artifact, abnormal but common

Comet tails



Abnormal lung



Abnormal lung

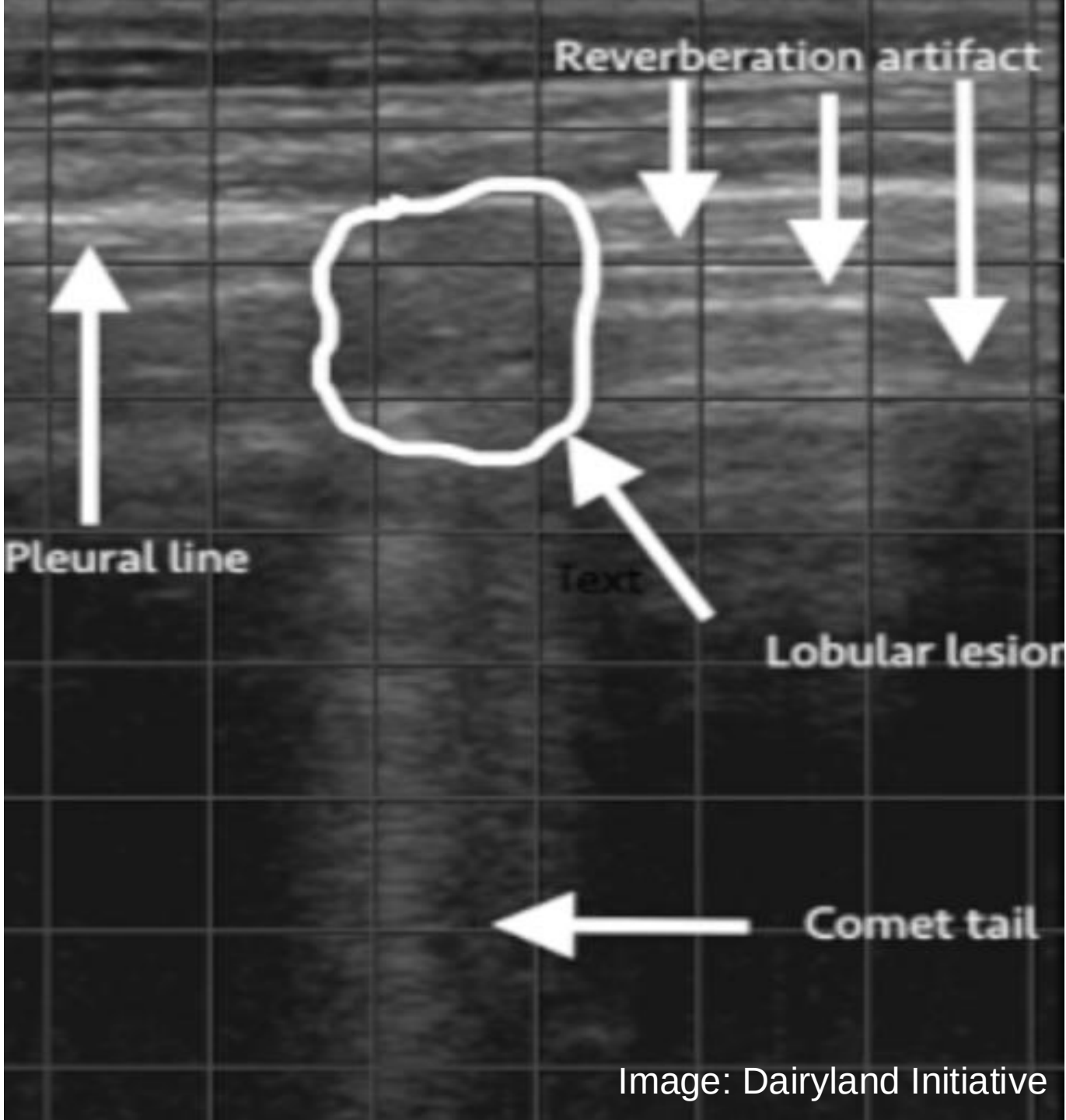


Image: Dairyland Initiative

Abnormal lung

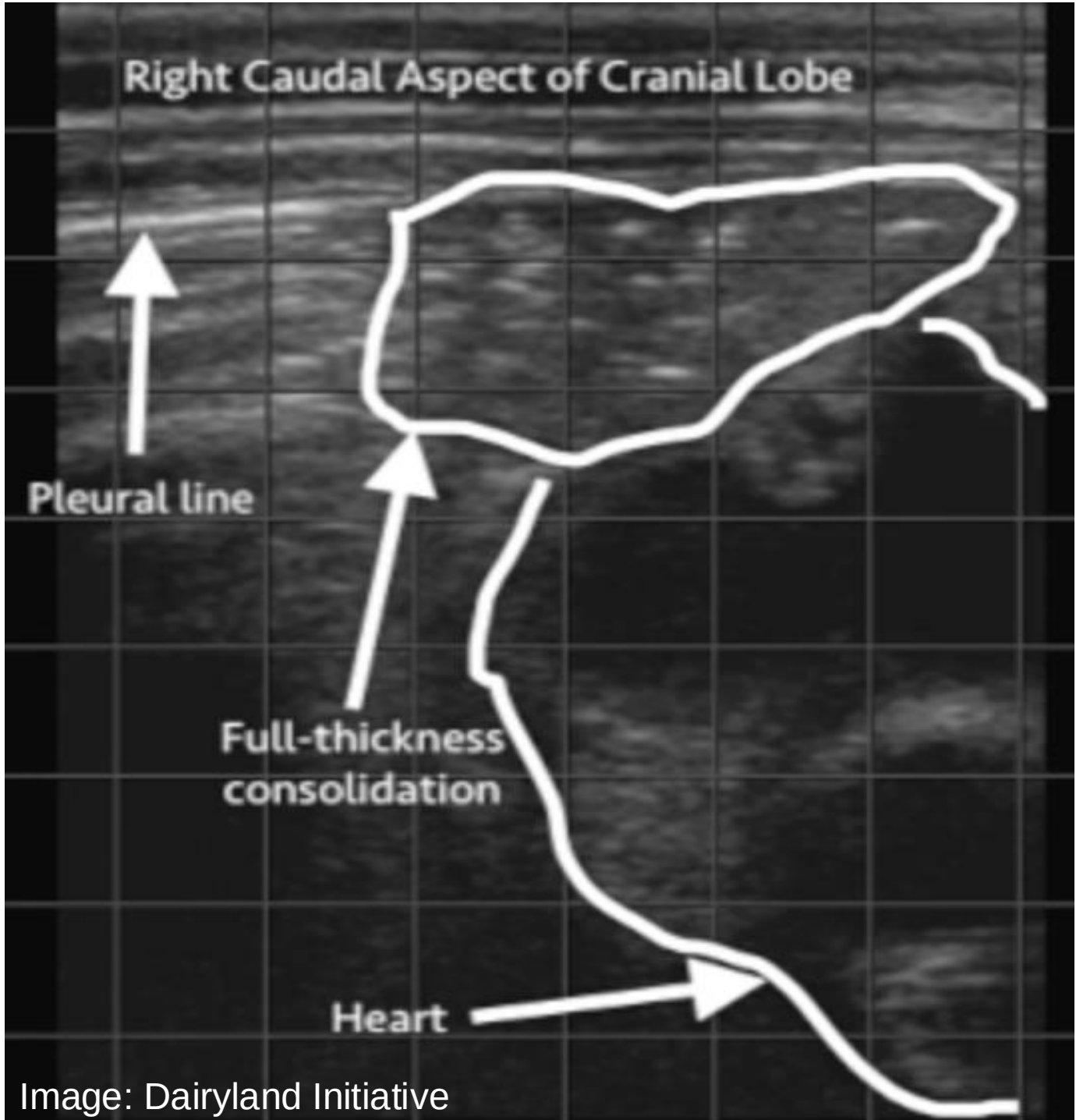


Image: Dairyland Initiative

Abnormal lung

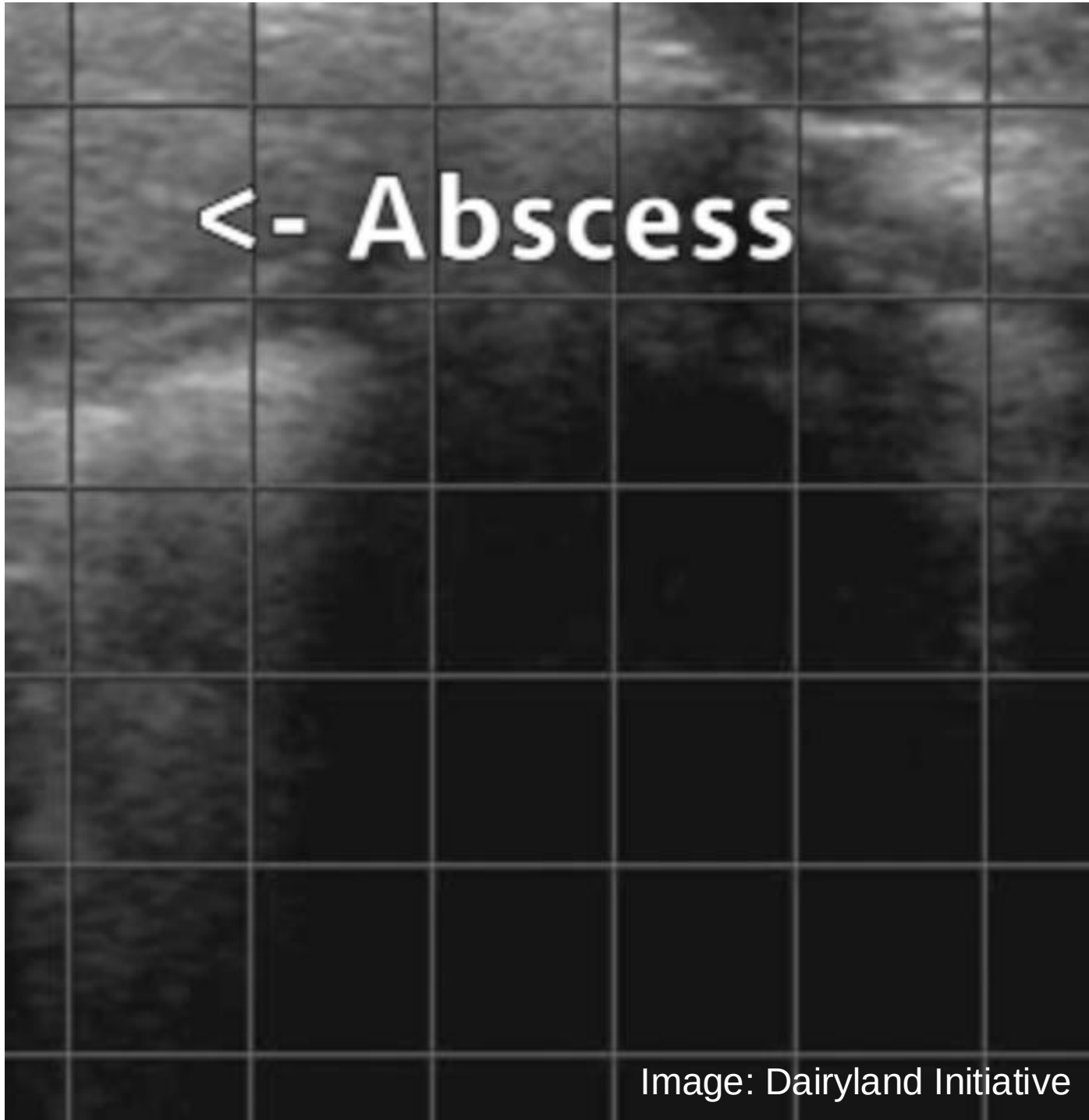


Image: Dairyland Initiative

Abnormal lung

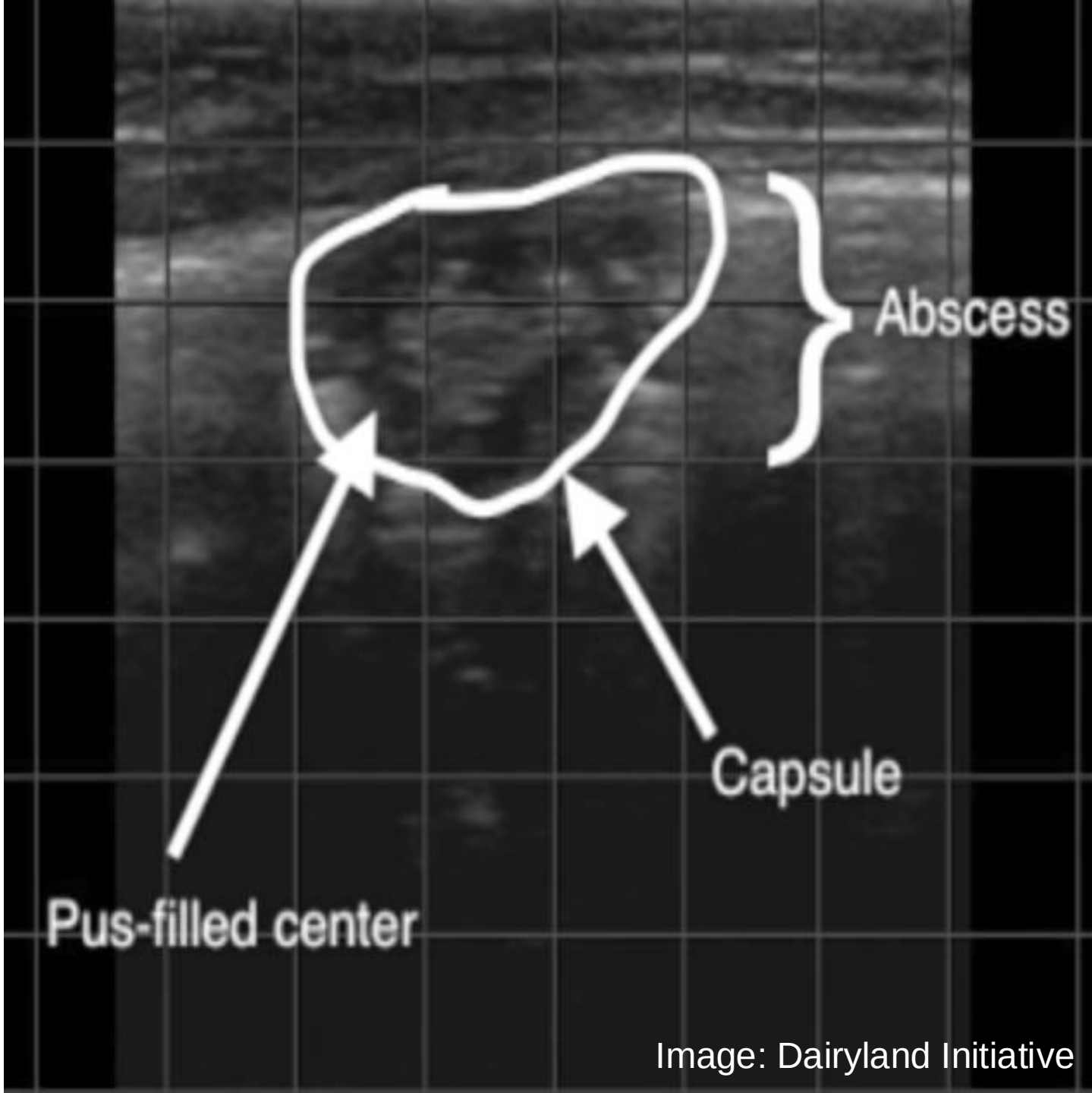


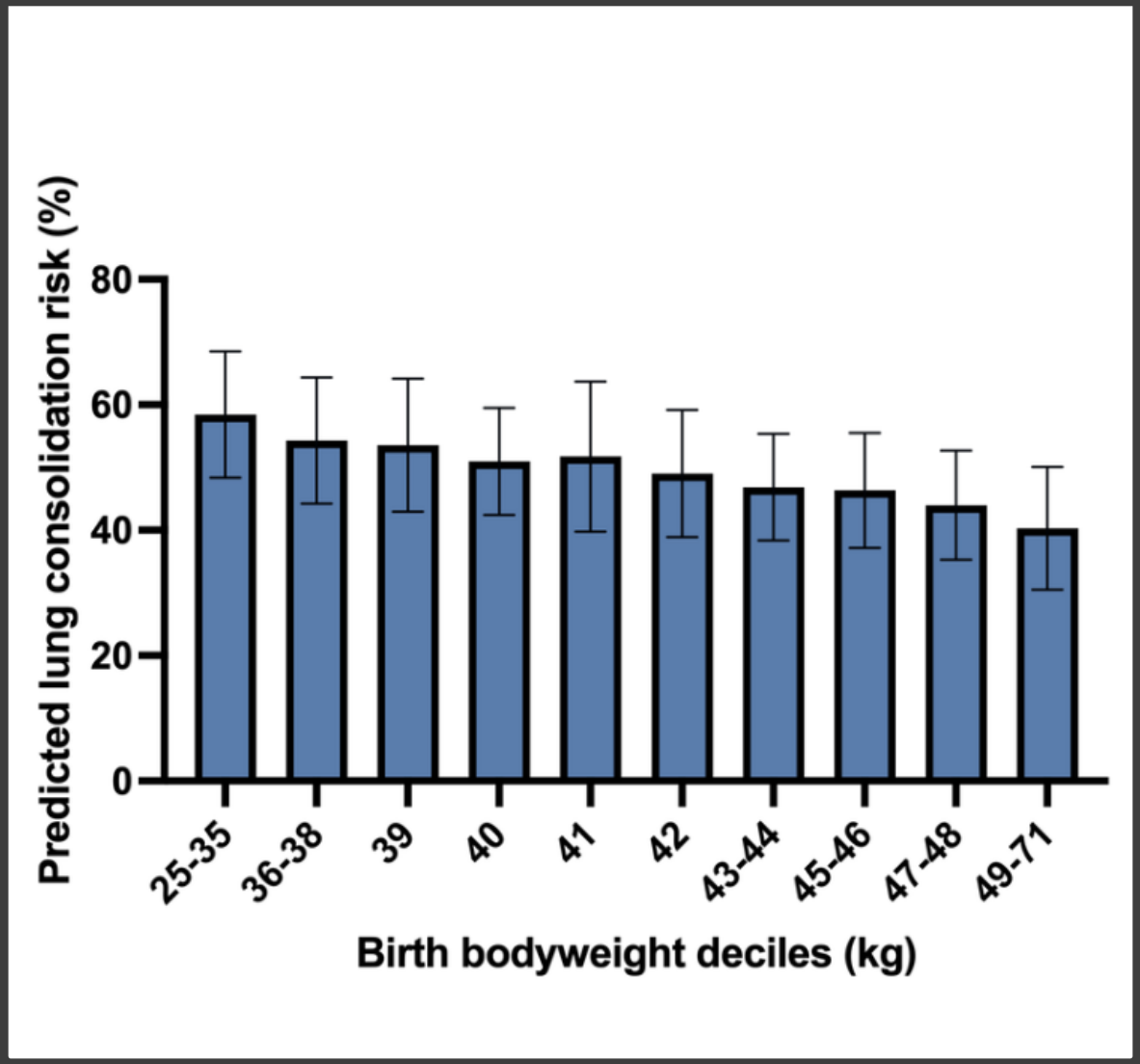
Image: Dairyland Initiative

Abnormal lung

What preweaning factors are associated with lung consolidation?

Lung consolidation

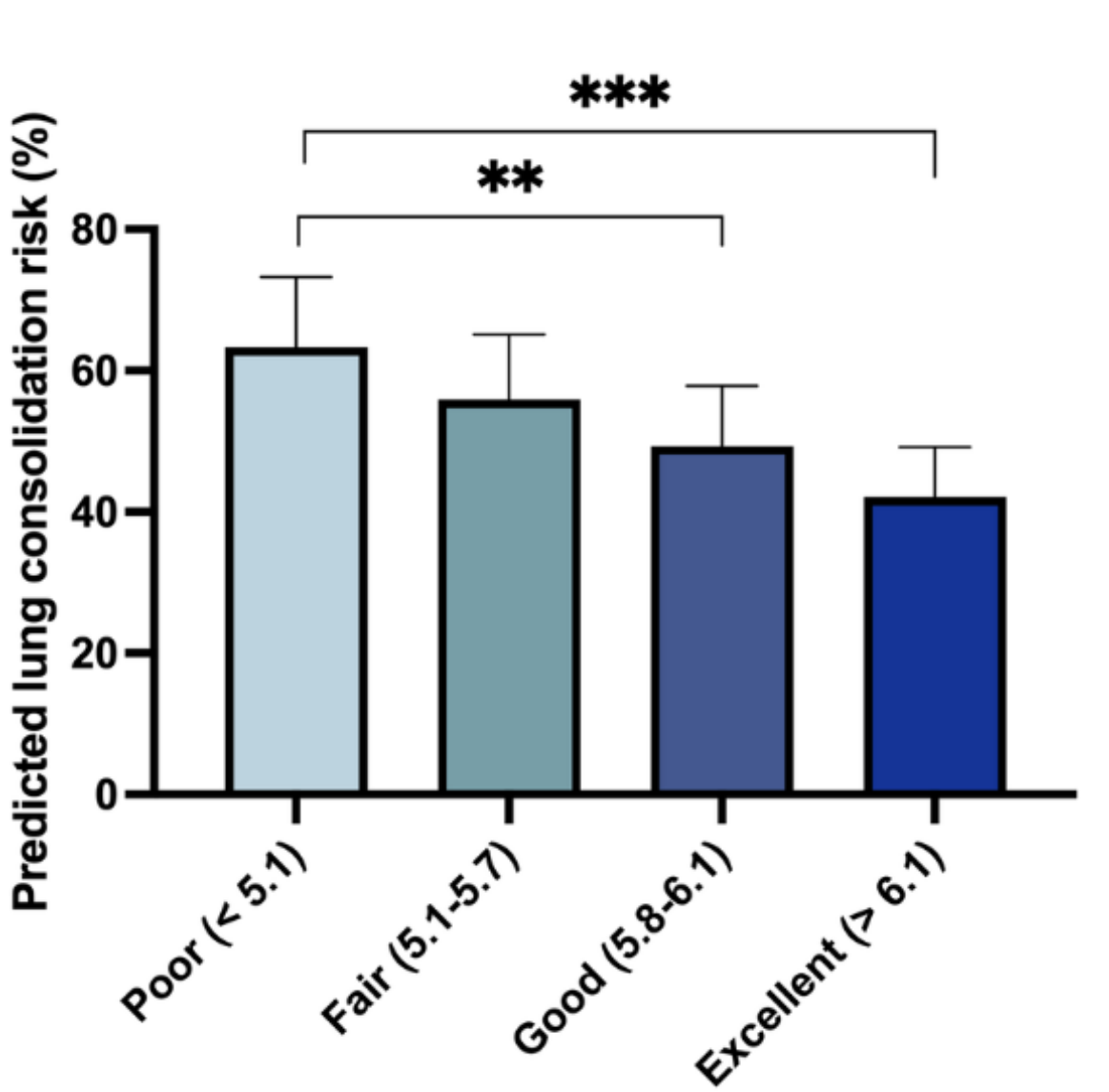
Every 1 kg increase in birth bodyweight was associated with 1.04 times lower odds for lung consolidation ($P < 0.001$)



Edwards et al., *in prep*

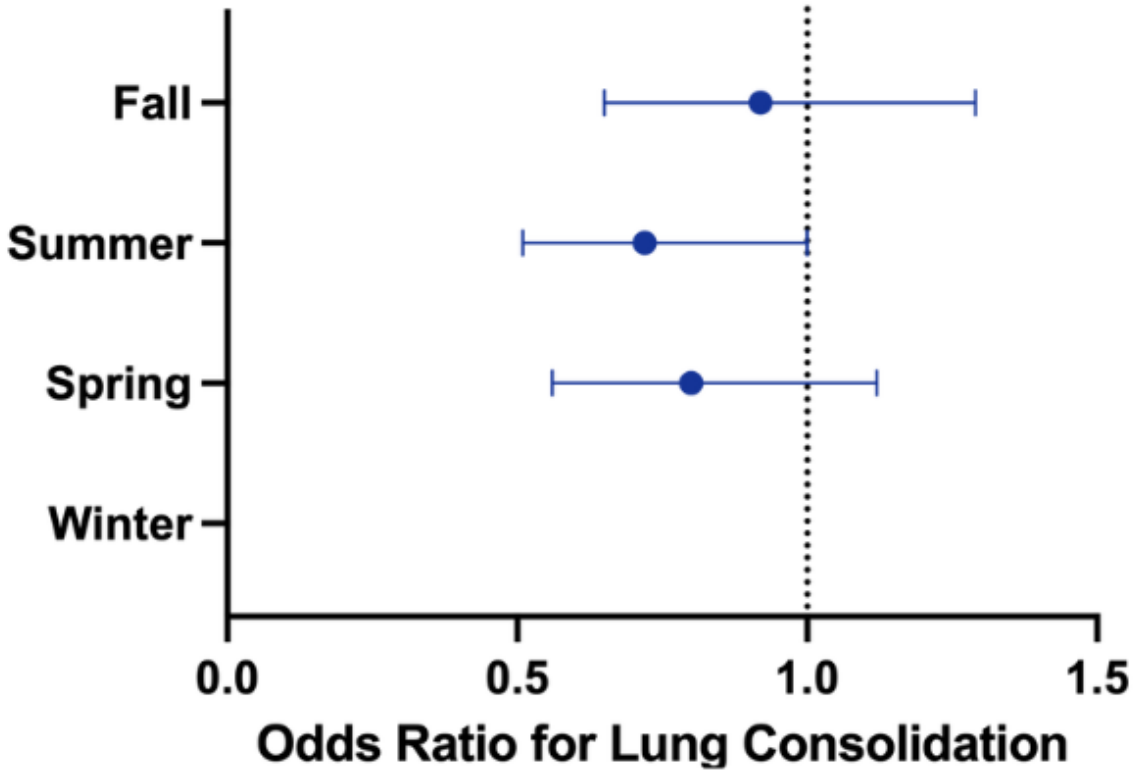
Odds for lung consolidation were 1.79 times lower in calves with good TPI compared to poor TPI ($P < 0.01$)

Odds for lung consolidation were 2.44 times lower in calves with excellent TPI compared to poor TPI ($P < 0.001$)



Edwards et al., *in prep*

Calves born in summer had 1.39 times lower odds for lung consolidation compared to winter (*P* = 0.05)



Edwards et al., *in prep*

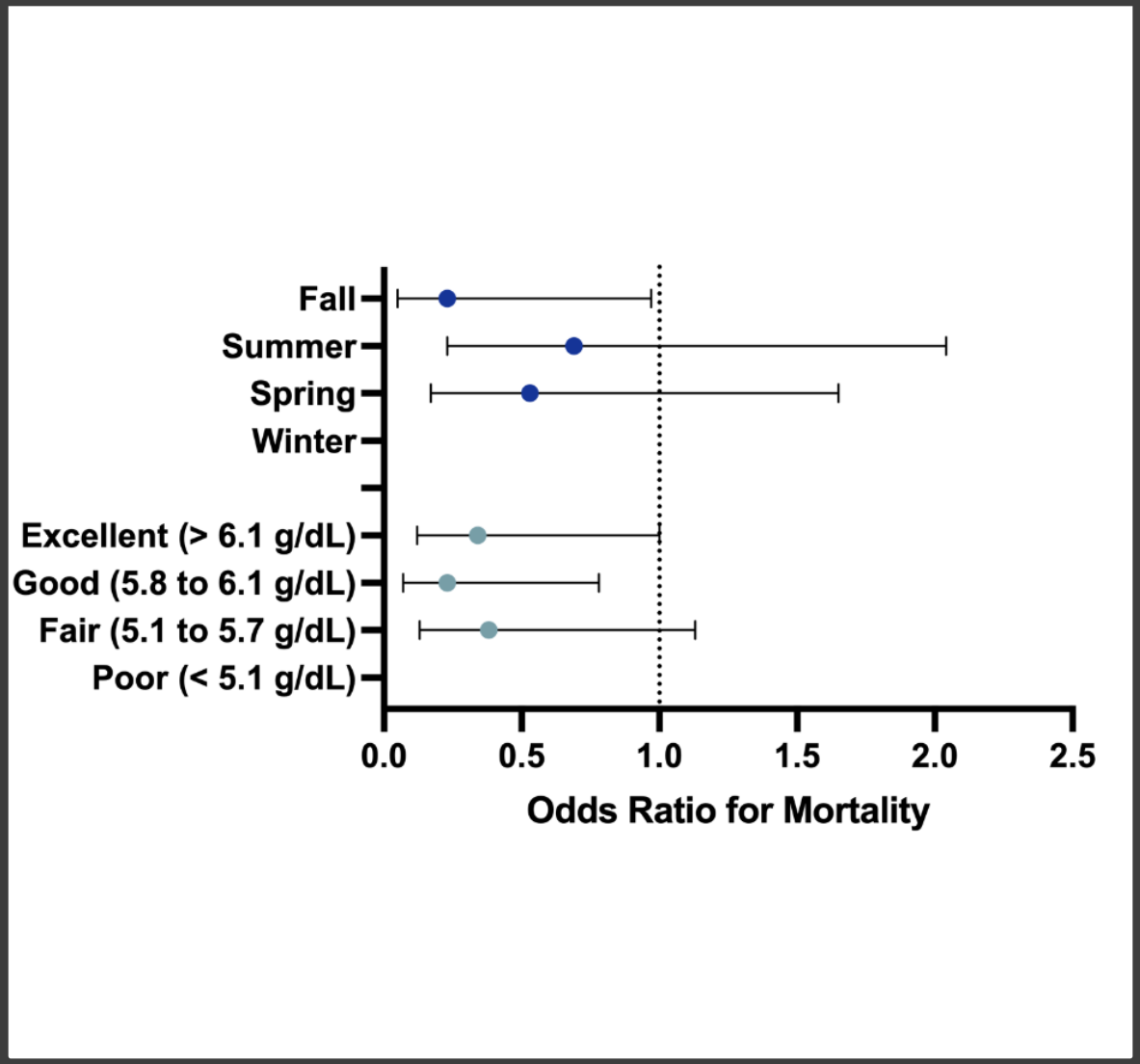
What preweaning factors are associated with morbidity and mortality?

Mortality

Calves born in fall had 4.3 times lower odds for mortality than calves born in winter ($P < 0.05$)

Calves with good TPI had 4.3 times lower odds for mortality than poor TPI ($P < 0.05$)

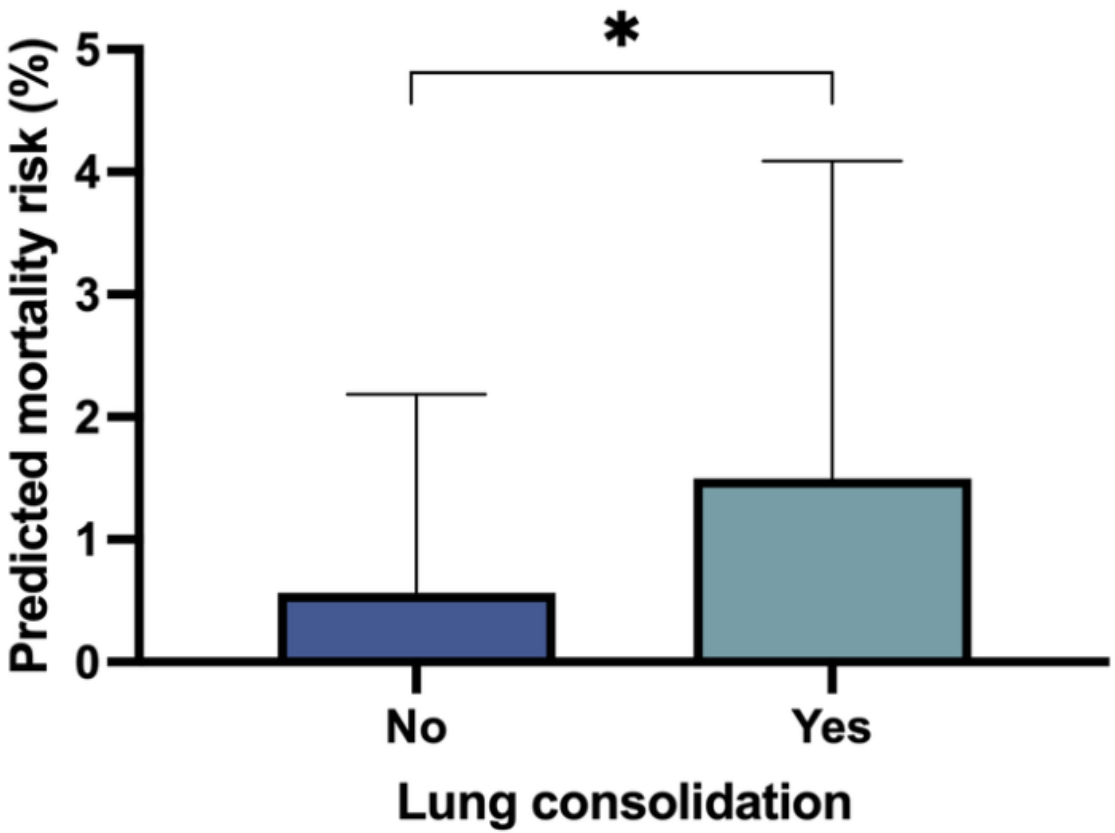
Calves with excellent TPI had 2.9 times lower odds for mortality than poor TPI ($P < 0.05$)



Edwards et al., *in prep*

Mortality

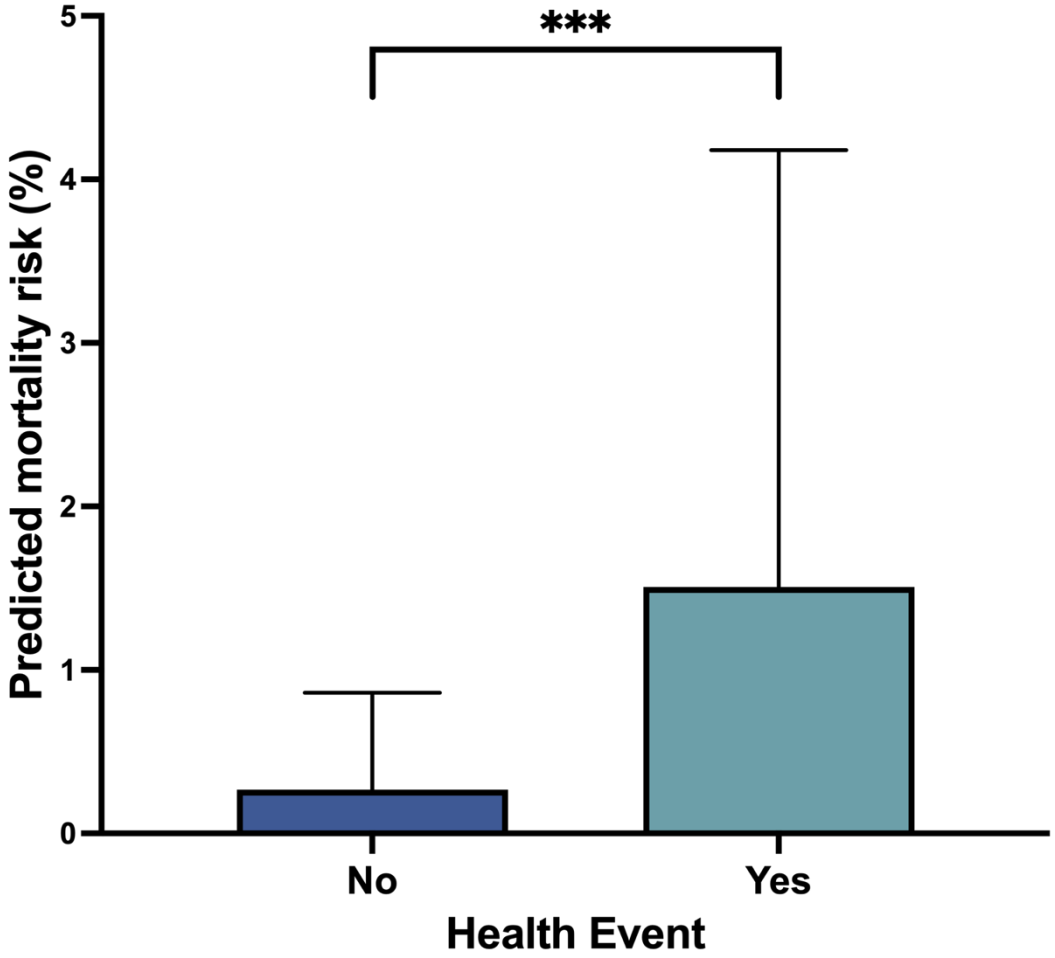
Calves with 1cm^2 lung consolidation at 30 d of age had 2.65 times greater odds for mortality compared to those that did not ($P < 0.05$)



Edwards et al., *in prep*

Mortality

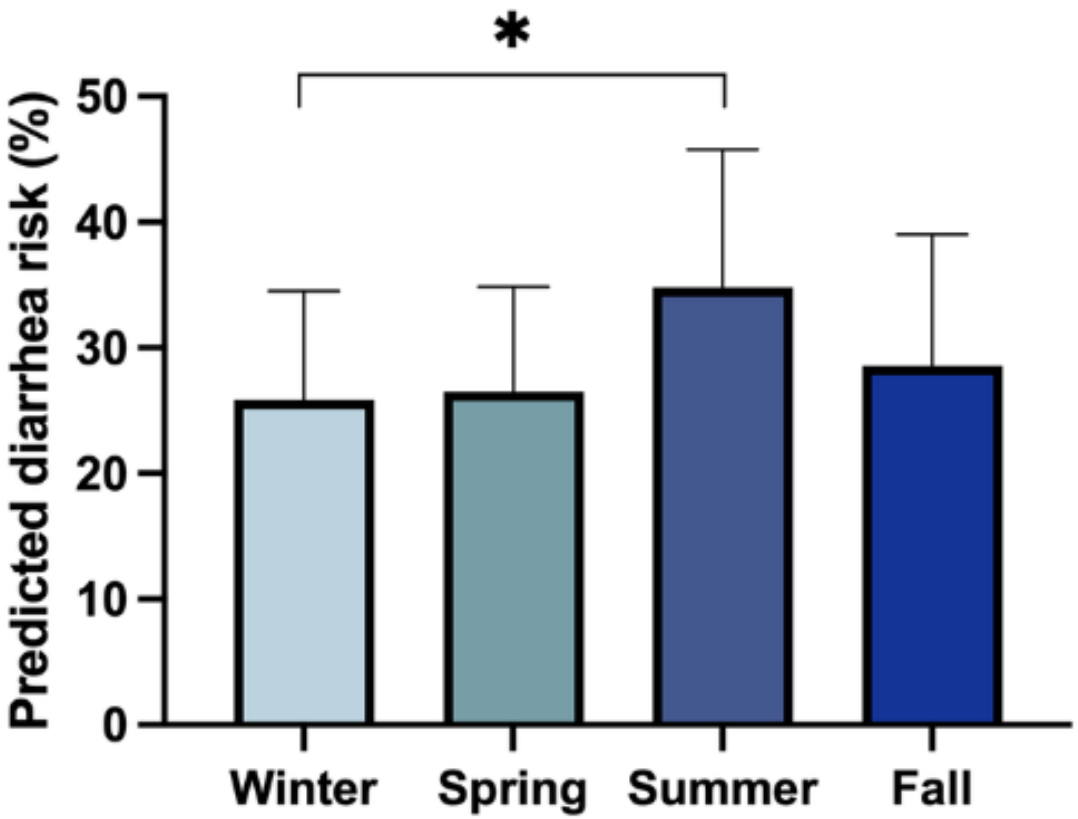
Calves with any health event had 20.18 times greater odds for mortality compared to those that did not ($P < 0.001$)



Edwards et al., *in prep*

Diarrhea

Calves born in summer had 1.54 times greater odds for diarrhea than calves born in winter ($P < 0.05$)



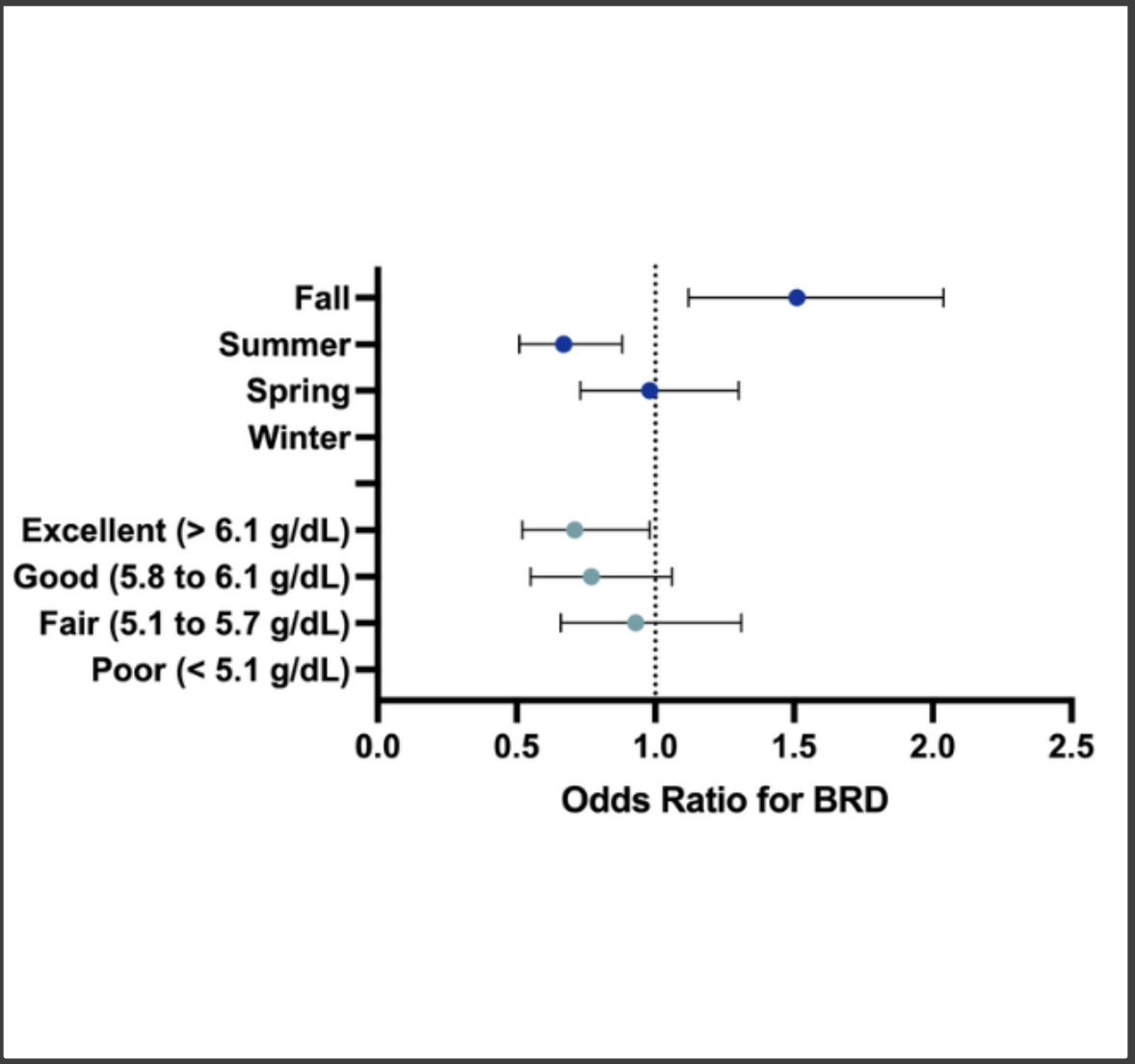
Edwards et al., *in prep*

Respiratory disease

Calves with excellent TPI had 1.4 times lower odds for BRD compared to those with poor TPI ($P < 0.05$)

Calves born in summer had 1.5 times lower odds for BRD than calves born in winter ($P < 0.01$)

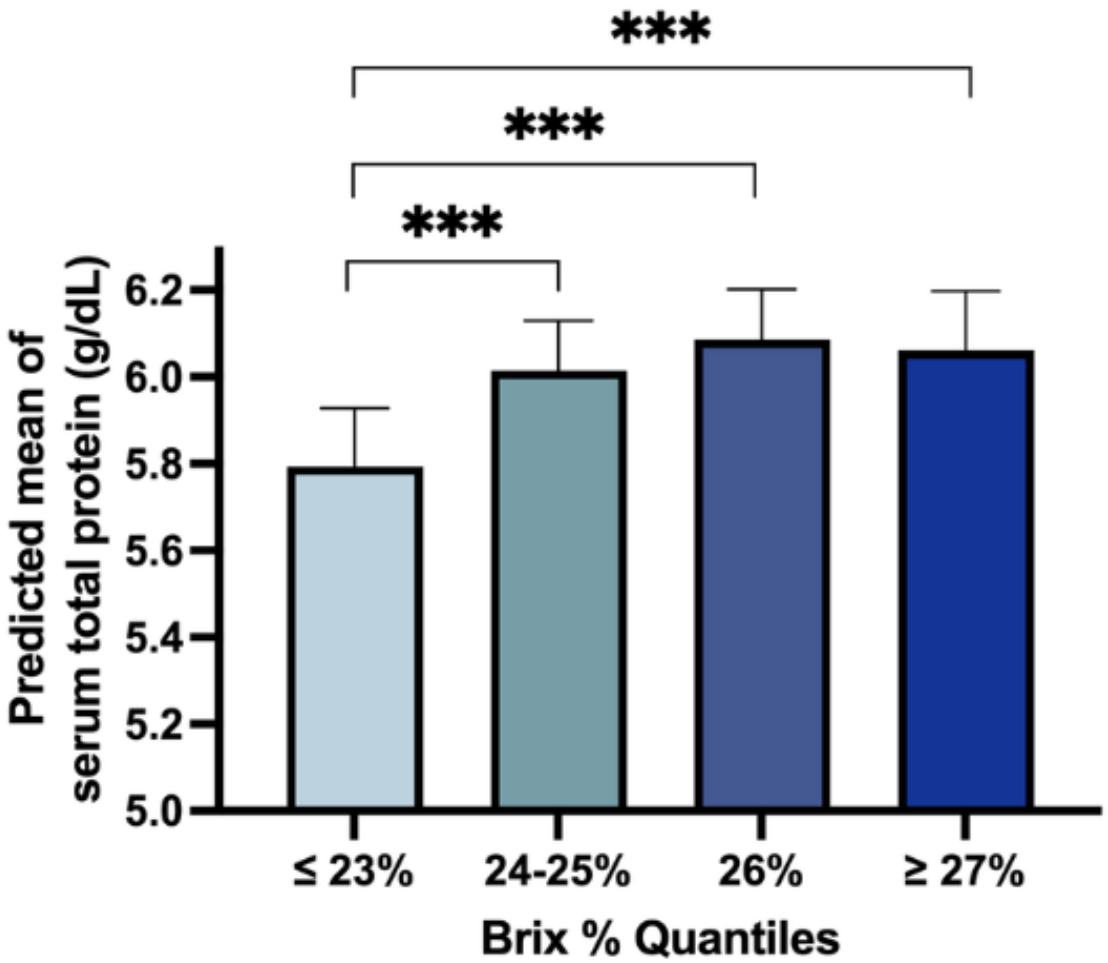
Calves born in fall had 1.5 times greater odds for BRD than winter ($P < 0.01$)



Edwards et al., *in prep*

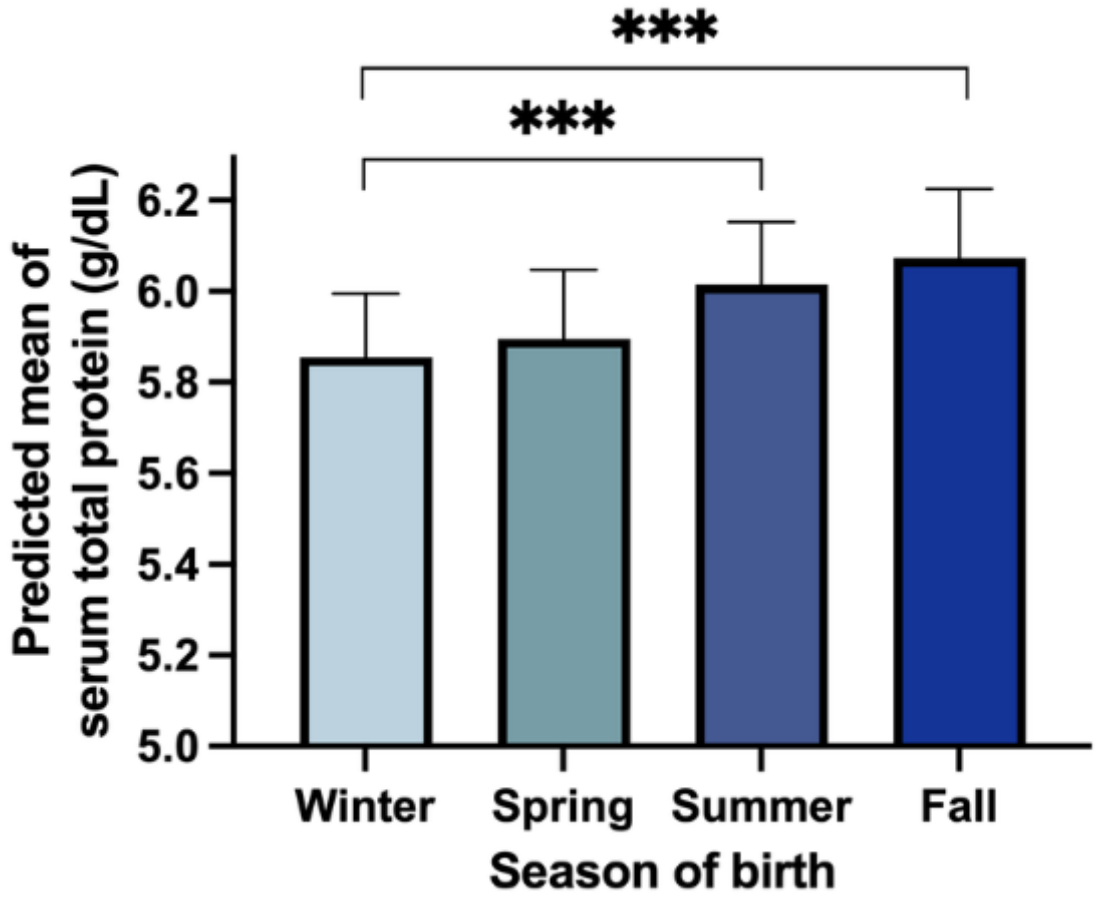
What factors are associated with serum total proteins?

Calves fed colostrum with 24-25% Brix, 26% Brix, or > 26% Brix had greater STP than calves fed colostrum with < 24% Brix ($P < 0.001$)



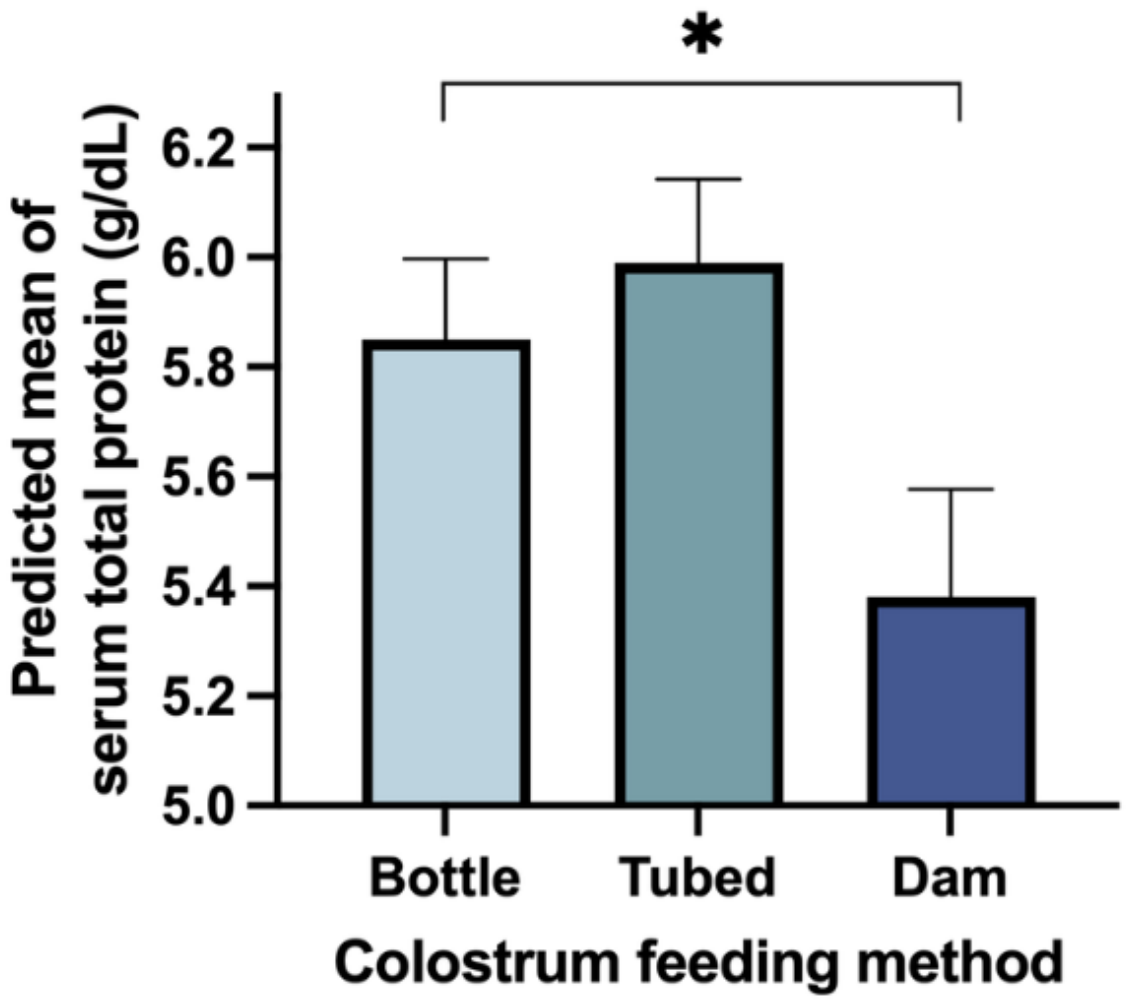
Edwards et al., *in prep*

Calves born in summer or fall had greater STP than calves born in winter ($P < 0.001$)



Edwards et al., *in prep*

Calves recorded as suckling from the dam had lower STP than calves recorded as being bottle fed ($P < 0.05$)



Edwards et al., *in prep*

WHY HEIFERS?

- Minimizing dairy calf illness maximizes future production
- Preweaning illness results in
  - Reduced growth rates
  - Delayed pregnancy
  - Reduced first lactation milk yields

Soberon et al., 2012
Aghakeshmiri et al., 2017
Dunn et al., 2018
Abuelo et al., 2021

ANTIMICROBIAL USAGE

COMPLETE AND ACCURATE CALF HEALTH RECORDS CAN ALLOW FOR

Accurate understanding of extent and nature of antimicrobial use

Data analytics for management changes leading to decreased morbidity and antimicrobial use

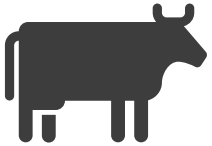
BUT...

Only 15% Ontario DHI herds had accessible calf health records

Only 50% of Canadian dairy farms had complete calf health records

Hyland, 2022
Uyama et al., 2022

RESULTS



19% recorded all calf illness events

43% recorded all antimicrobial treatments

38% recorded all anti-inflammatory treatments

13% recorded all supportive therapies

Edwards et al., 2024 *JDSC*

RESULTS

- When asked about the frequency of receiving actionable recommendations based on calf health records…

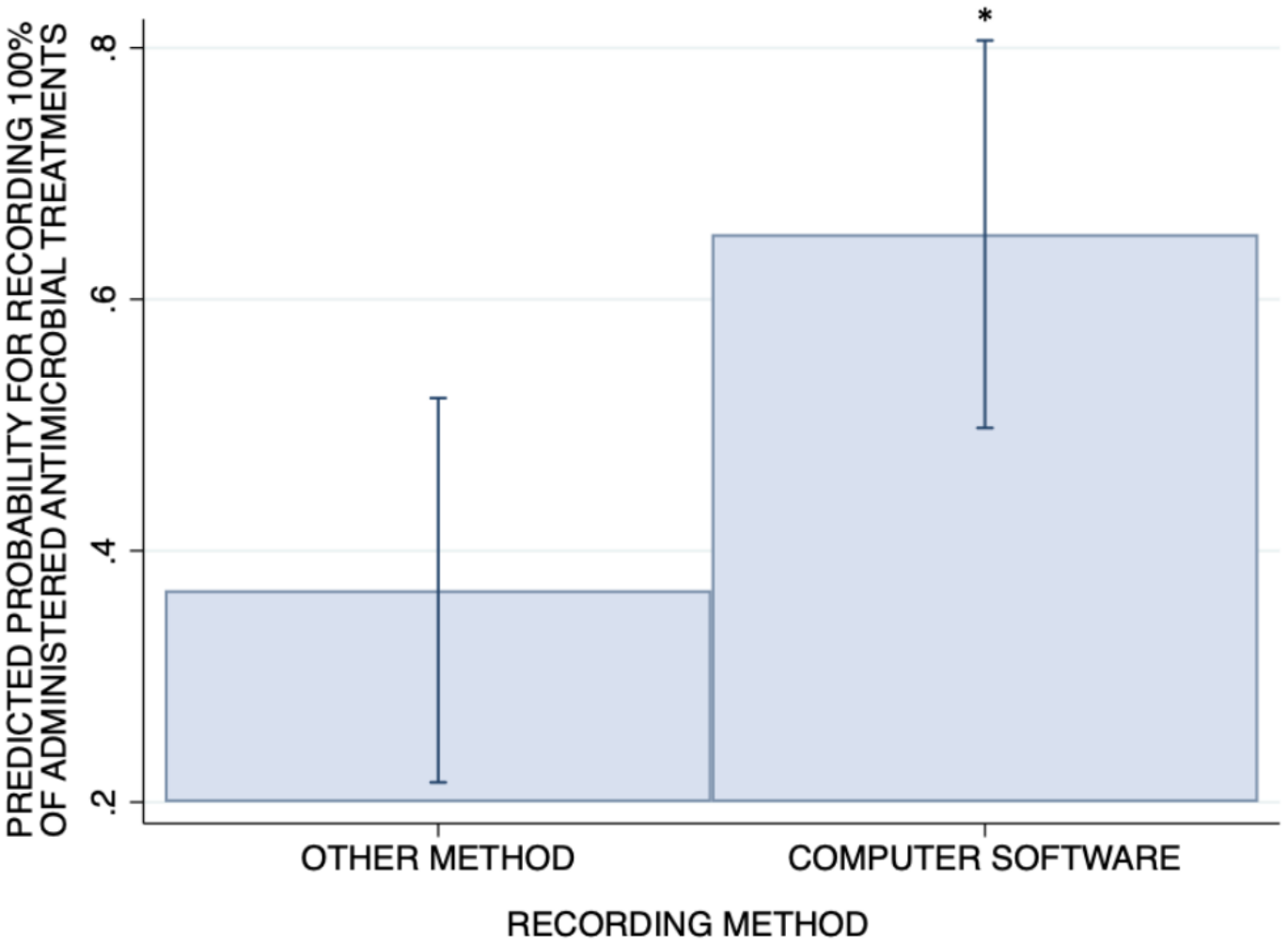
48% of farmers reported seldom or never

Edwards et al., 2024 *JDSC*

RESULTS:

ANTIMICROBIAL TREATMENTS

Predicted probability for recording 100% of administered antimicrobial treatments



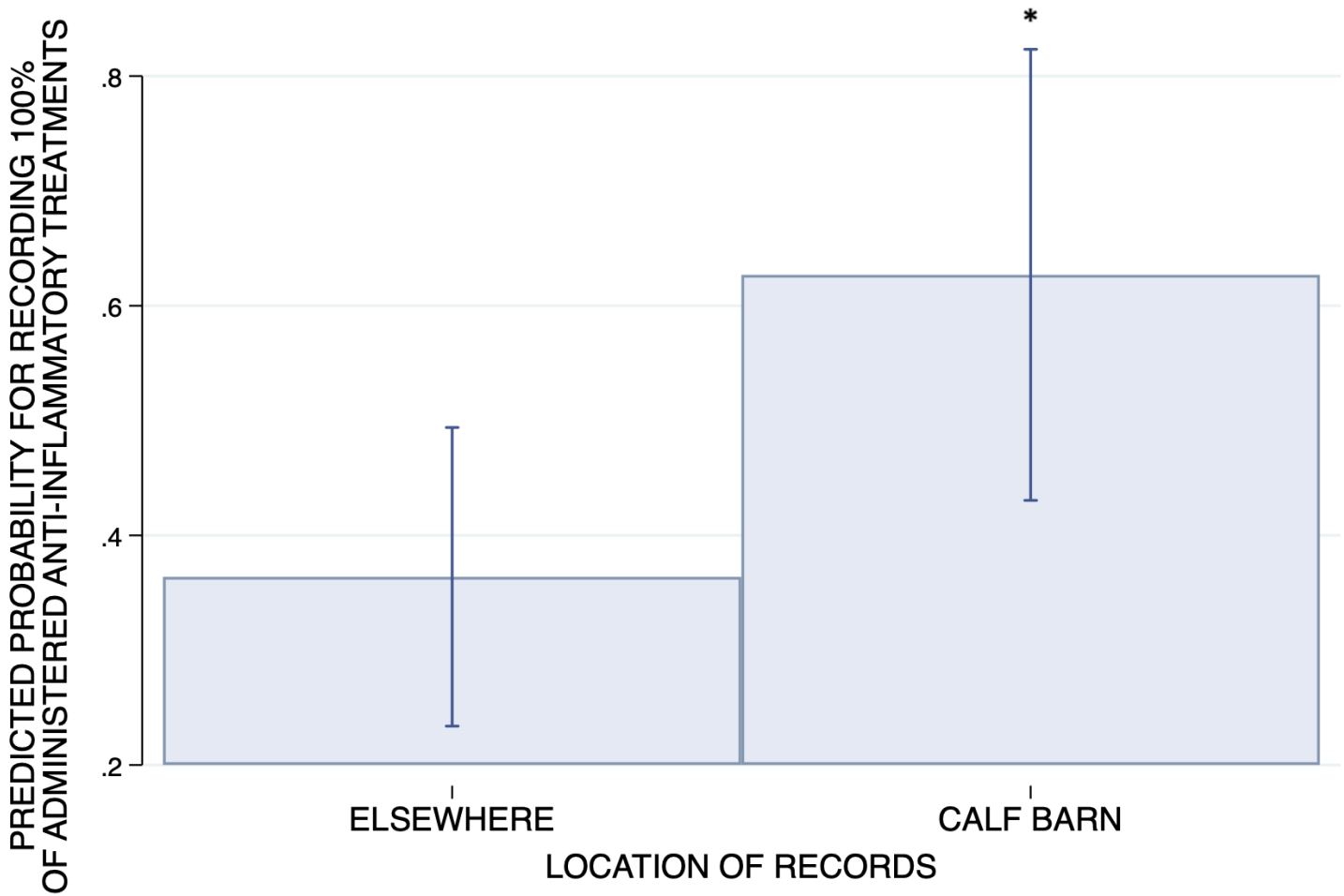
* = $P < 0.05$, whiskers indicate 95% confidence interval

Edwards et al., 2024 *JDSC*

RESULTS:

ANTI-INFLAMMATORY TREATMENTS

Predicted probability for recording 100% of administered anti-inflammatory treatments

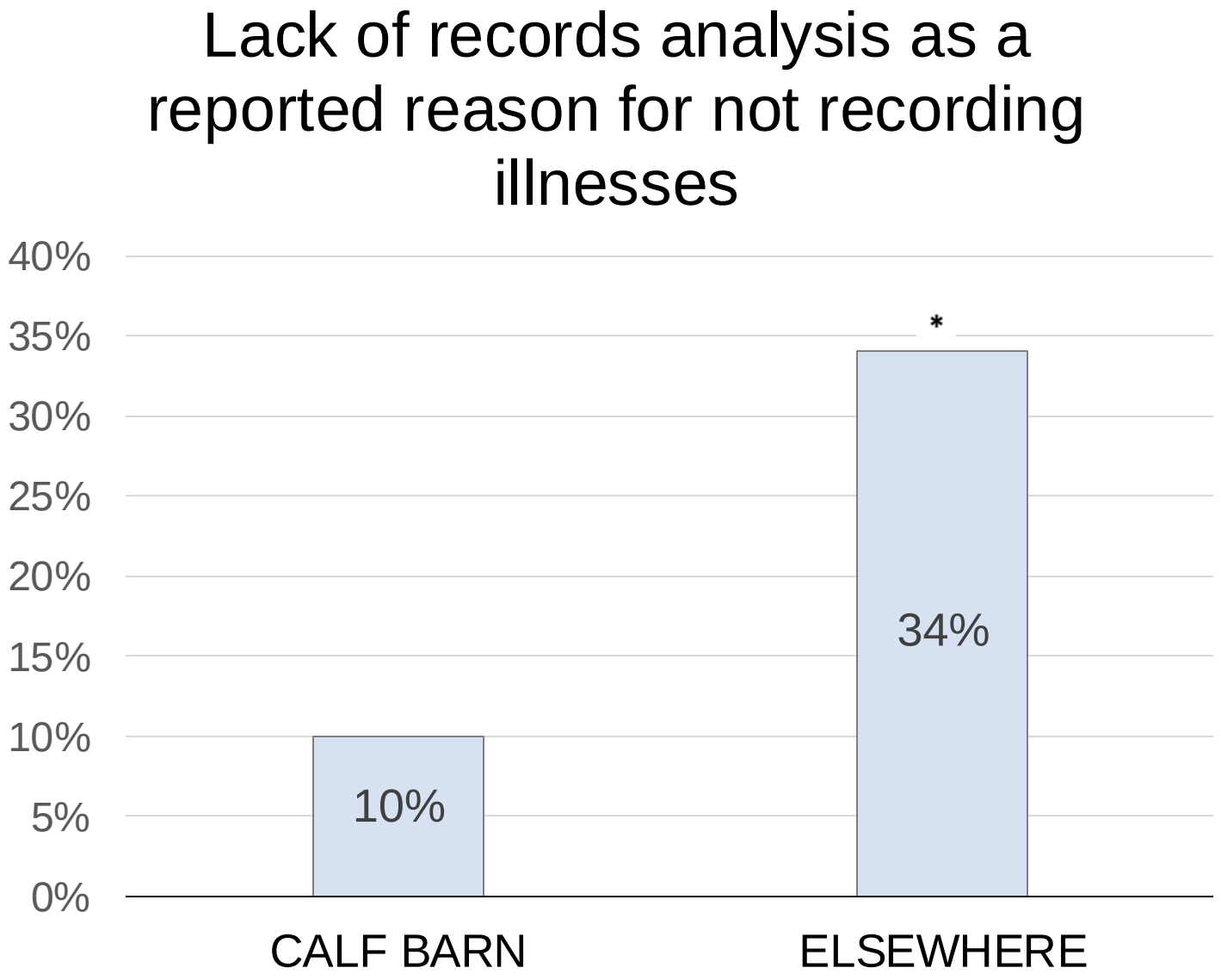


* = $P < 0.05$, whiskers indicate 95% confidence interval

Edwards et al., 2024 *JDSC*

RESULTS:

LOCATION OF RECORDS

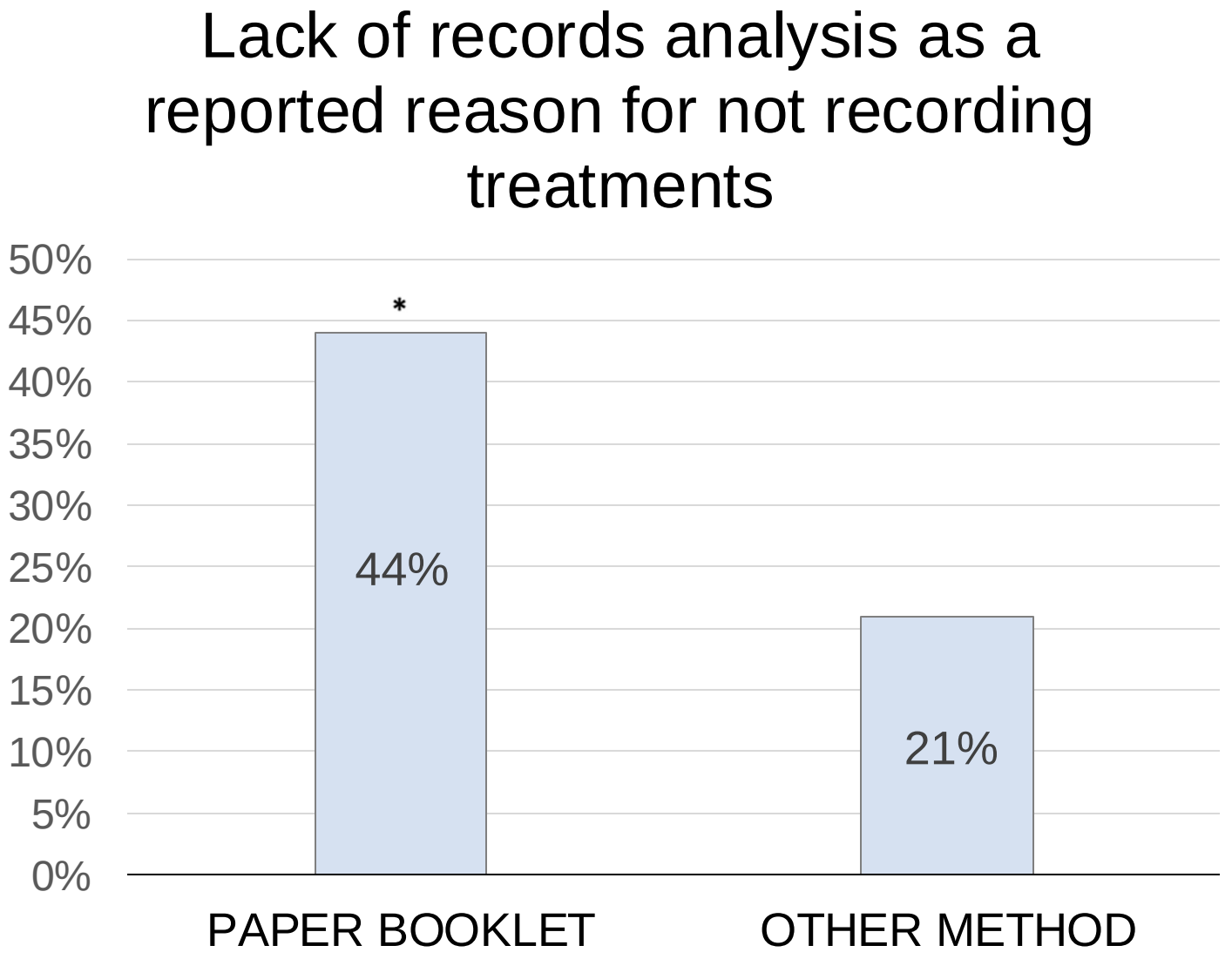


* = *P* < 0.05, whiskers indicate 95% confidence interval

Edwards et al., 2024 *JDSC*

RESULTS:

RECORDING METHOD



* = $P < 0.05$

Edwards et al., 2024 *JDSC*

SUMMARY

- Calf health record completeness was associated with:
  - Computer software records
  - Records located in close proximity to calves
  - Analysis and feedback of records

Edwards et al., 2024 *JDSC*

RESULTS

48% of farmers reported feedback was seldom or never

Edwards et al., 2024 *JDSC*


4 0389
NO
HAZARDOUS
MATERIAL
WM
WASTE MANAGEMENT

CALF HEALTH PROGRAMS

- Computer software records
  - Excel spreadsheets
  - DC305
  - Mobile software
    - HerdLogix (by Vetlogix.io)
- Records in close proximity to calves
  - Facilitate how data is recorded
- Analysis and feedback of records
  - Reporting back to the client

CALF PROGRAM EXAMPLE

CALF HEALTH PROGRAMS

Farmers collect

Birth, colostrum, weights, weaning, death, illness, and treatments

We collect

Serum total proteins, lung ultrasound, hygiene audit

- Technician collected

We report

15-page quarterly reports plus annual “end of year report”

- Benchmarks client farm against others in the program

TAVISTOCK CALF HEALTH PROGRAM

Calf health questionnaire

- Calving area
- Newborn calf care
- Colostrum
- Cleaning
- Calf feeding (milk and starter)
- Weaning

Calf ID: _____

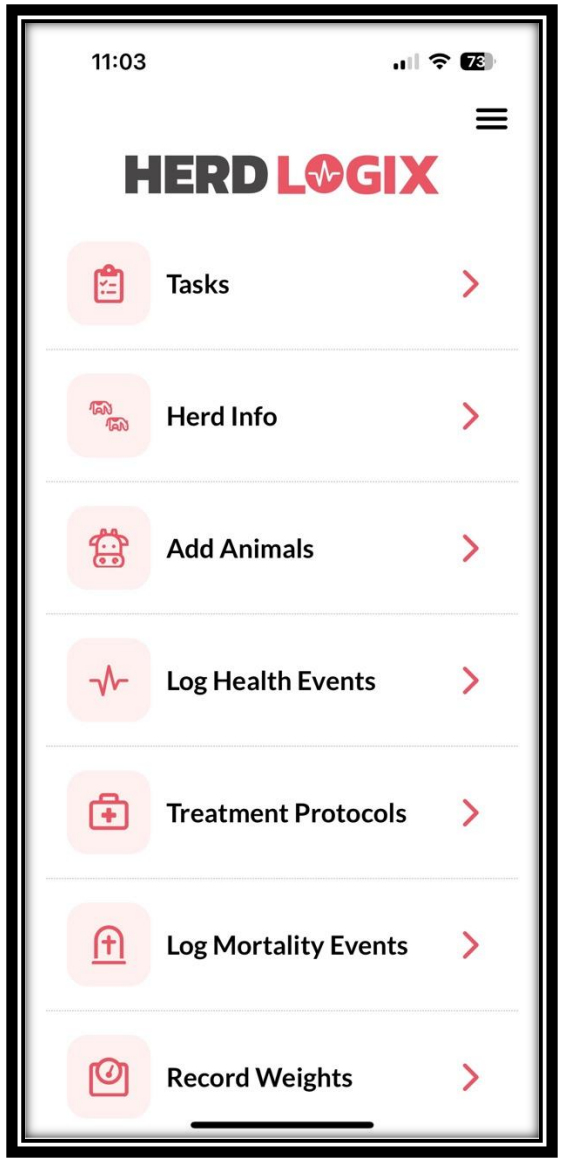
Birth Data		
Date of birth: ___ /___ /___ (mm/dd/yy)	Time of birth: Morning ☐ Afternoon ☐ Evening ☐ Overnight ☐	
Birth weight: _____lb/kg	Was the navel disinfected? Yes ☐ product: _____ No ☐	
Colostrum Data		
Colostrum given?	Yes ☐ By whom: _____	No ☐
Brix reading?	_____%	No ☐
Source of colostrum?	Dam of calf ☐ Other dam ☐ Pooled ☐ Powder ☐	
How many hours after birth until colostrum was given?	_____ hours	
Volume (in litres) of first feeding	_____ litres	
Total colostrum in **first 24 hours (litres)**	_____ litres	
Method of colostrum feeding?	Bottle ☐	Esophageal feeder ☐
Blood drawn for total protein?	Date: ___/___/___	Result: _____ g/dL

Prevention Products/Vaccination Data	
Product Name (Inforce 3, First Defense, etc.)	Date of administration
	___ /___ /___
	___ /___ /___
	___ /___ /___

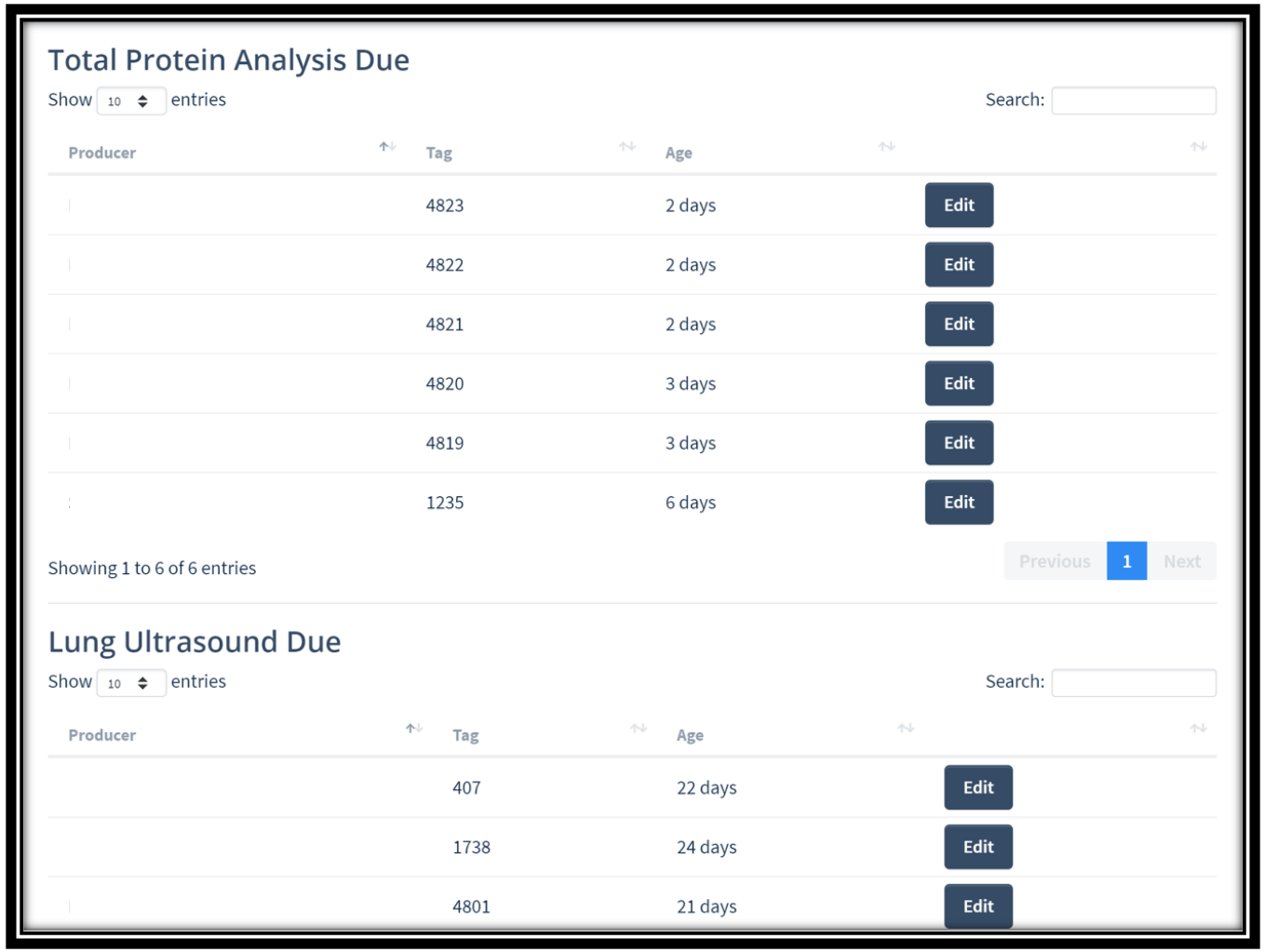
Disease Incidence and Treatment Data				
Date	Clinical signs (dull, off-feed, dehydrated, scours, cough, hard breathing, etc.)	Temperature	Treatment (drug name, amount, route)	Duration
___/___/___				
___/___/___				
___/___/___				
___/___/___				
___/___/___				

Lung Ultrasound Score		
Date	Score	Comments
___/___/___		

Weaning Data		
Weaning date: ___ /___ /___	Weaning weight: _____lb/kg	Weaning height: _____in/cm


11:03
HERD LOGIX
Tasks
Herd Info
Add Animals
Log Health Events
Treatment Protocols
Log Mortality Events
Record Weights

HELPS TECHNICIANS STAY ON TOP OF TASKS



Total Protein Analysis Due

Show 10 entries

Search:

Producer	Tag	Age	
	4823	2 days	Edit
	4822	2 days	Edit
	4821	2 days	Edit
	4820	3 days	Edit
	4819	3 days	Edit
	1235	6 days	Edit

Showing 1 to 6 of 6 entries

Previous 1 Next

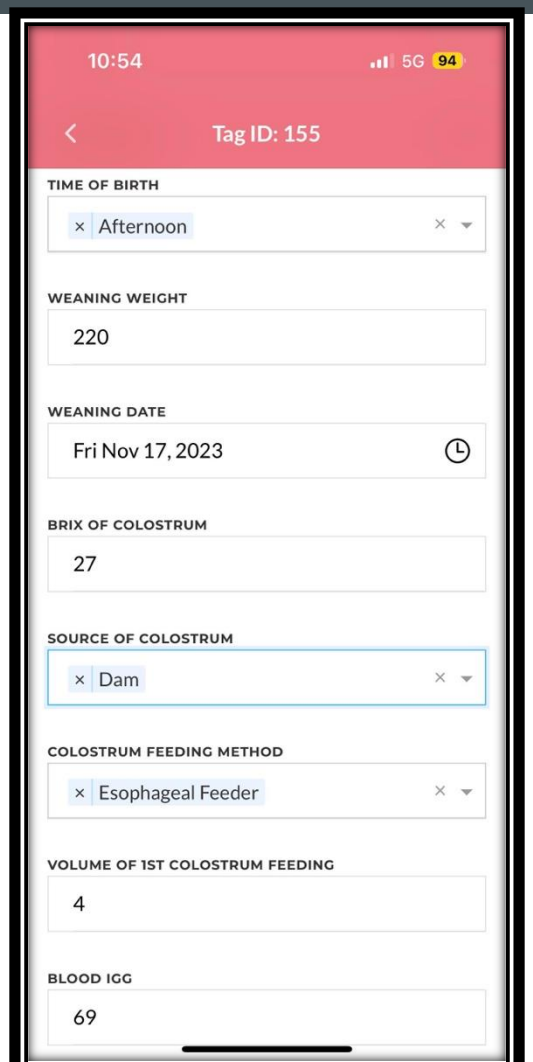
Lung Ultrasound Due

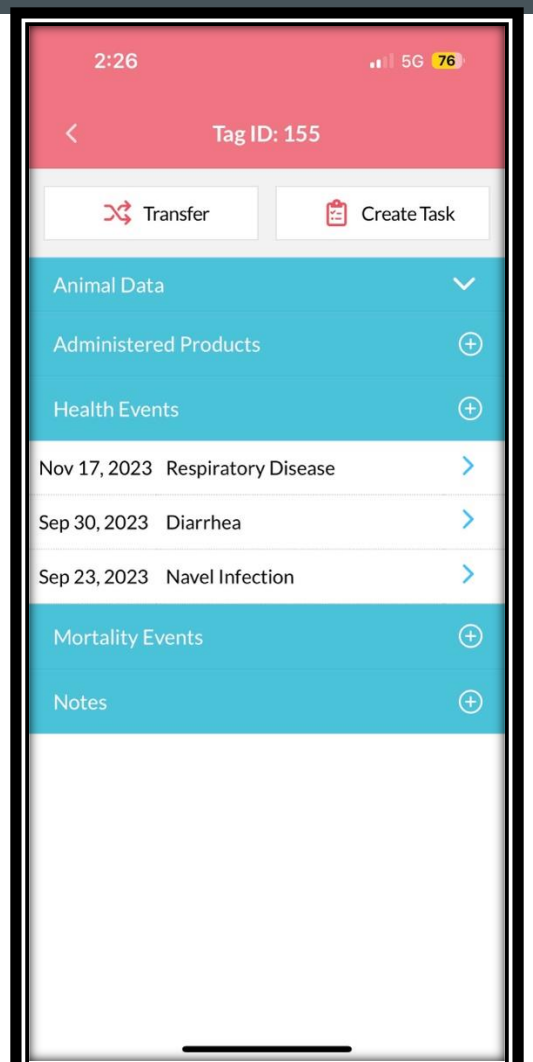
Show 10 entries

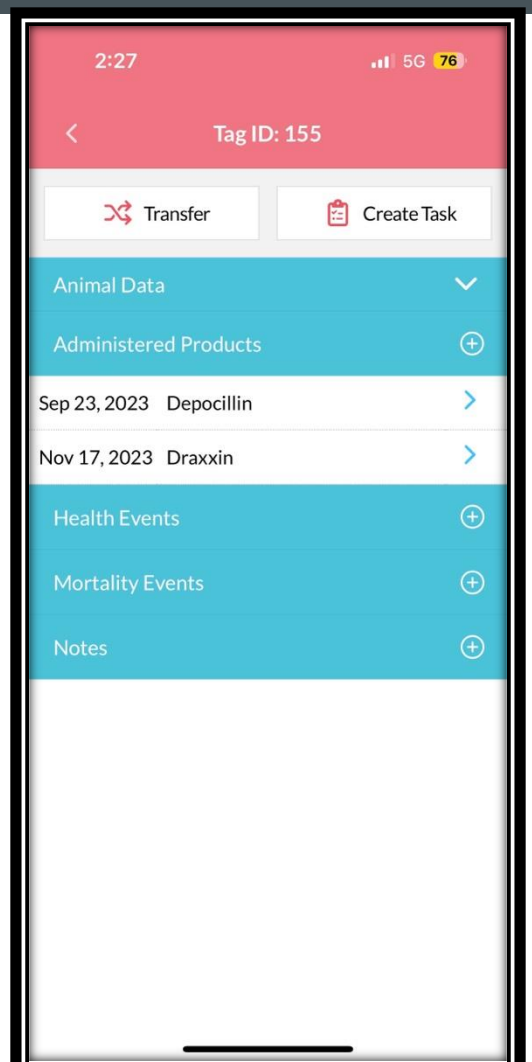
Search:

Producer	Tag	Age	
	407	22 days	Edit
	1738	24 days	Edit
	4801	21 days	Edit

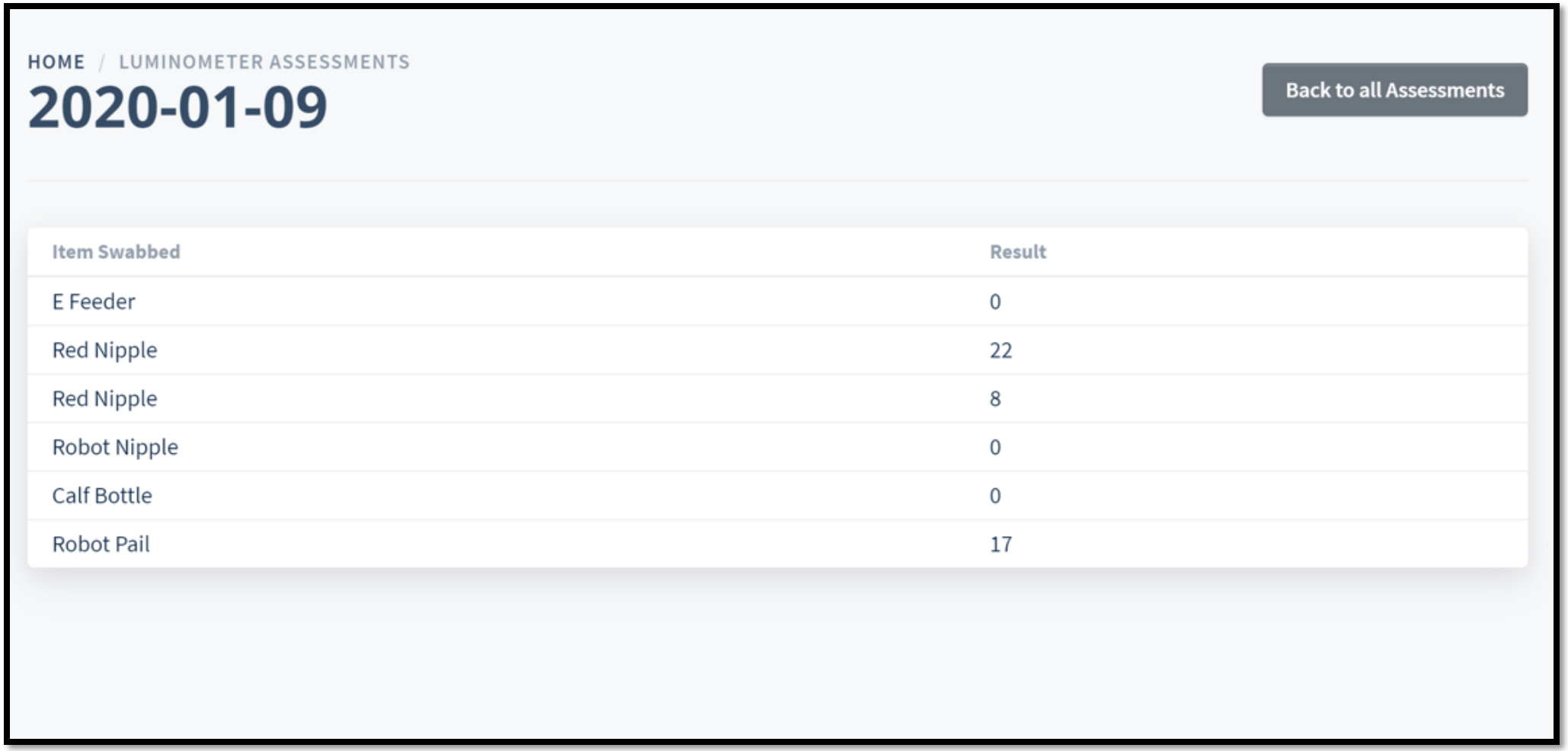
VIEW CALF INFORMATION AND INTERVENTIONS







VIEW HYGIENE INFORMATION



CALF HEALTH PROGRAMS

Strengths and Areas for Improvement

Strengths

1) Improved Average Daily Gain

Average daily gain was improved in Q4 at 1.70 lb/d compared to 1.62 lb/d in Q3 and 1.58lb/d in Q2. Additionally, this is improved from 2021 Q4 where ADG was 1.63 lb/d. Additionally, 42% of calves in Q4 reached the target of 1.76 lb/d or greater, which was increased from Q3 and Q2 where only 23% and 24% of calves reached the target, respectively. Excellent work!

2) Excellent Passive Transfer Status

Your average total protein for Q4 was 6.56 g/dL, which is increased from Q3 and 2021 Q4 which averaged 6.46 g/dL and 5.96 g/dL, respectively. This quarter there were 70% of calves in the top category, which is the highest your calves have ever achieved (compared to Q3 where there were 59%, your previous high score). There were also only 4% of calves calves in the bottom category, which is excellent. This was an excellent quarter for total proteins! Brix was excellent (25%) and volume of colostrum in the first 24 hours is almost 8 L, both factors which contribute to excellent serum total proteins.

3) Low Mortality Rates

There were 0% of calves that died in Q4, which is the same as Q3 and improved compared to 2021 Q4 where 1% of calves died and 2020 Q4 where 4% of calves died.

4) Excellent Lung Scores

There were 1% of calves that had a lung score of 3 or greater in Q4, which is decreased from 2% in Q3 and 3% from 2021 Q4. Excellent work!

Areas for Improvement

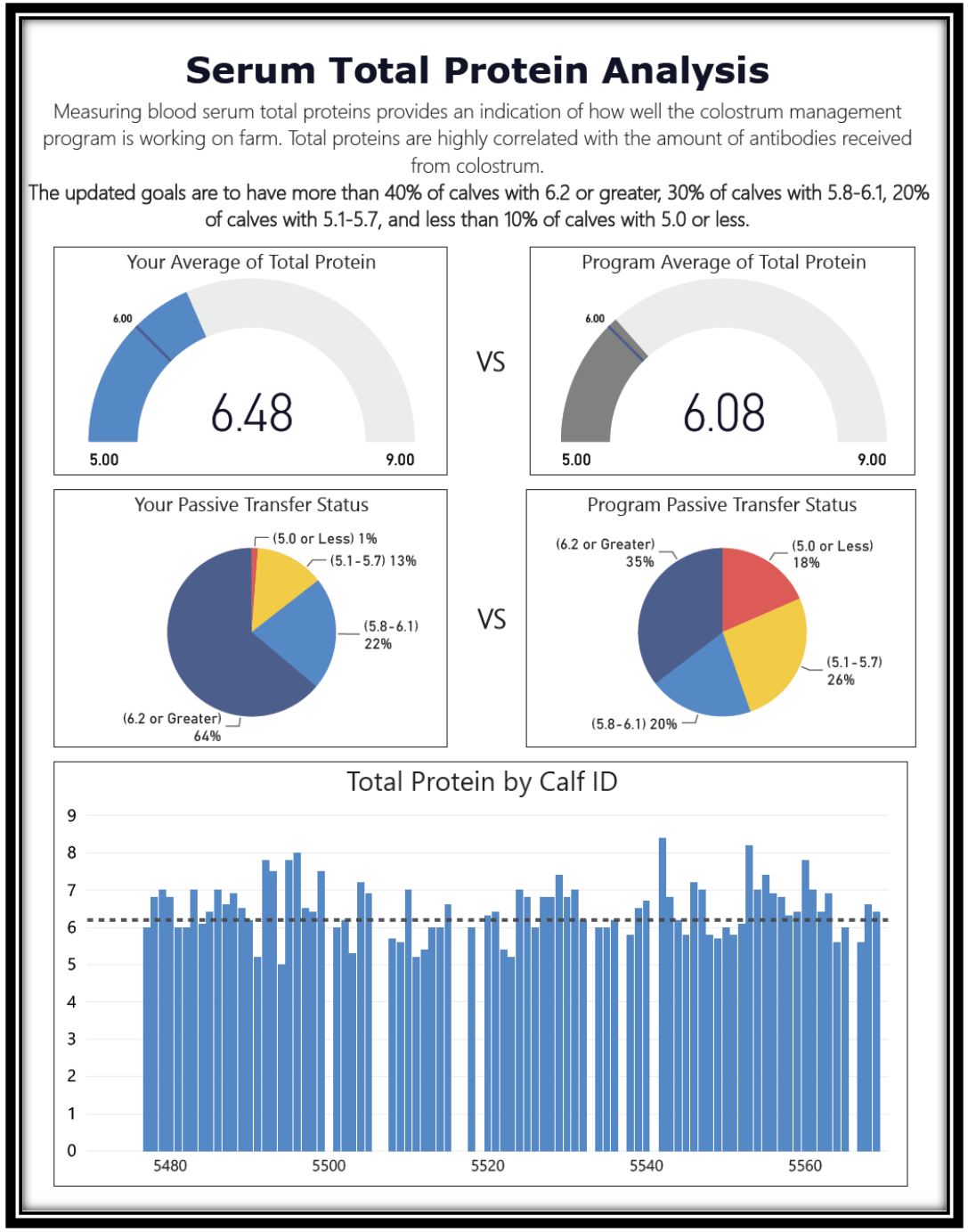
1) High Proportion of Pneumonia Treatments

There are still a high proportion of calves treated for pneumonia at least once (73%) with many being treated multiple times (68%). Excellent lung scores suggest that treatment is effective. However, some potential ways to decrease pneumonia rates are:

1. Ensure that bedding is not dusty. Straw has some dustiness (although less dusty than wood products) but dustiness can be minimized by ensuring long chop lengths and applying it into the stall near the ground rather than throwing it in, which can release dust into the air.

2. Nasalgen 3-PMH at birth would help protect against both viral and bacterial pneumonia. Once PMH was previously used with limited success, as it was given at 14 days of age and only covered bacterial pneumonia.

CALF HEALTH PROGRAMS



CALF HEALTH PROGRAMS

CALF HEALTH PROGRAMS

USING THE DATA

Culling decisions

Protocol changes

Management changes

BUT DO THEY PAY?

CALF HEALTH PROGRAMS

MORTALITY

Mortality Rates

In 2022 you had fewer death losses, 7 fewer than in 2021.

Year	2020	2021	2022
# of Heifer Mortalities	15	11	4
% of Enrolled	5%	3%	1%
YoY Change		-4 (-40%)	-7 (-67%)

Estimated Mortality Expense

The following is an estimate of the direct loss of sale to market. It does not factor in loss of milk production or future earnings, nor does it consider the cost of any preventative products administered to the calf or dam for calf health improvement. The cost is calculated based on an average market rate of $250 for a live calf.

Year	2020	2021	2022
# of Heifer Mortalities	15	11	4
Sale Value	$3,750	$2,750	$1,000
Distributed Cost per Head	**$11.06**	**$8.28**	**$2.87**
YoY Change		- $2.78 (-25%)	- $5.41 (-65%)

CALF HEALTH PROGRAMS

SCOURS

Scours Treatment Rates

In 2022 you had fewer scours events, 1 fewer than in 2021.

Year	2020	2021	2022
# of Scours Events	108	86	85
% of Enrolled	32%	26%	24%
YoY Change		-22 (-18.8%)	-1 (-7.9%)

Scours Events and their Financial Impact

Calves with a pre-weaning scours event have been shown to have reduced pre-weaning average daily gains, require more inseminations to become pregnant, and have lower first lactation milk production (Abuelo et al., 2021). Additionally, it is estimated by Canadian researchers that each case of scours costs approximately $155 in labor and treatment costs alone (Roche et al., 2020).

The following is an estimate of the milk production losses in first lactation alone attributed to scours (325 kg) based on an average milk price of $0.92/kg. This is a conservative estimate as it does not factor in cost of labour, treatments, or risk for increased inseminations.

Year	2020	2021	2022
# of Heifers Treated	108	86	85
Losses from Scours	- $32,544	- $25,896	- $25,500
Distributed Cost per Head	**- $96**	**-$78**	**-$73**
YoY Change		- $18 (-18.75%)	- $5 (-6.41%)

CALF HEALTH PROGRAMS

LUNG ULTRASOUND SCORES

Lung Scores

In 2022 you had fewer calves with a lung score of 3 or greater, 2 fewer than in 2021.

Year	2020	2021	2022
# of Calves with Poor Lung Score	17	7	5
% of Enrolled	5%	2.1%	1.4%
YoY Change		-10 (-58.82%)	-2 (-33.3%)

Lung Scores and their Financial Impact

Calves that have 3 cm or more lung consolidation on ultrasound (denoted as a lung score of 3 or greater in our program) during the preweaning period produce less milk in first lactation alone (Dunn et al., 2018).

The following is an estimate of the milk production losses in first lactation alone attributed to a lung score of 3 or greater (525 kg) based on an average milk price of $0.92/kg. This is a conservative estimate as it does not factor in cost of labour or treatments.

Year	2020	2021	2022
# of Calves with Poor Lung Score	17	7	5
Losses from Poor Lung Score	- $8,187	- $3,381	- $2,415
Distributed Cost per Head	**- $24.15**	**-$10.18**	**-$6.92**
YoY Change		- $13.97 (-58%)	- $3.26 (-32%)

CALF HEALTH PROGRAMS

Total Cost Benefit Analysis

The following is a cost-benefit analysis for each year as compared to your baseline year and accounts for program cost.

Year	2020	2021	2022
Total Enrolled Heifers	Baseline year	332	349
Program Expense		$8,300	$8,725
YoY Mortality Savings		$1,000	$2,750
YoY Scours Savings		$6,648	$7,044
YoY Lung Score Savings		$4,806	$5,772
Total Savings/Program Value Delivered		**$4,154**	**$6,841**

CALF HEALTH PROGRAMS

Total Cost Benefit Analysis

The following is a cost-benefit analysis for each year as compared to your baseline year and accounts for program cost.

Year	2019	2020	2021	2022
Total Enrolled Heifers	Baseline year	97	93	99
Program Expense		$2425	$2325	$2475
YoY Mortality Savings		$1500	$0	$1500
YoY Scours Savings		$2400	$2700	$7200
YoY Lung Score Savings		$7245	$8694	$9660
Total Savings/Program Value Delivered		**$8720**	**$9069**	**$15885**

DID WE DRIVE CHANGE FOR THOSE ENROLLED IN THE CALF PROGRAM?

SERUM TOTAL PROTEINS

Category	Serum IgG (g/L)	Total Protein (g/dL)	% Brix	Target (% calves)	Current Ontario level (% calves)	NAHMS study (% calves)
Excellent	≥ 25.0	≥ 6.2	≥ 9.4	> 40	32%	36%
Good	18.0 to 24.9	5.8 to 6.1	8.9 to 9.3	~ 30	17%	26%
Fair	10.0 to 17.9	5.1 to 5.7	8.1 to 8.8	~ 20	32%	27%
Poor	< 10.0	< 5.1	< 8.1	< 10	19%	12%

Lombard et al., 2020; Renaud et al., 2020

SERUM TOTAL PROTEINS AND HEALTH

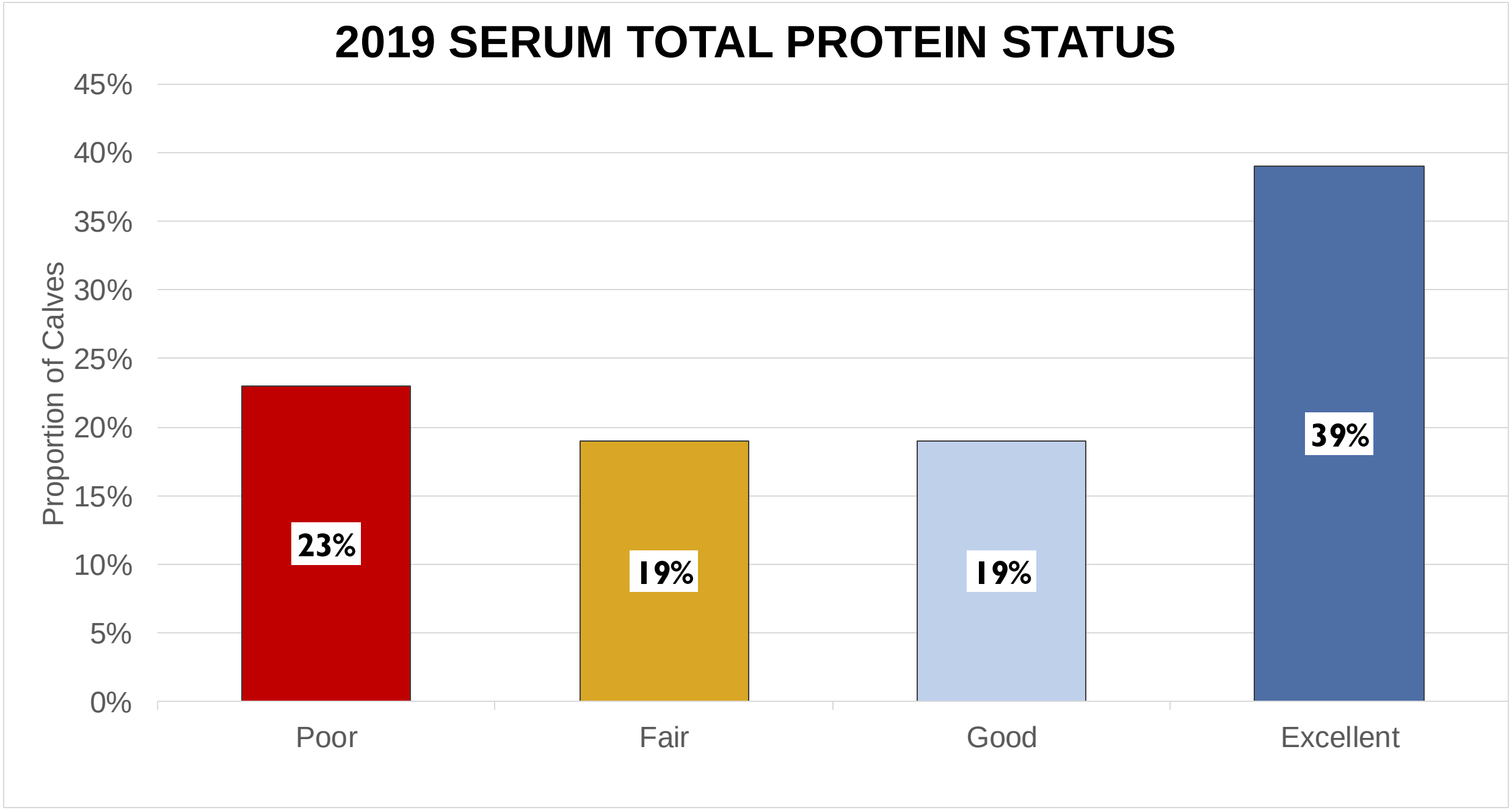
Failure of passive transfer results in:

1.5X increased risk for diarrhea

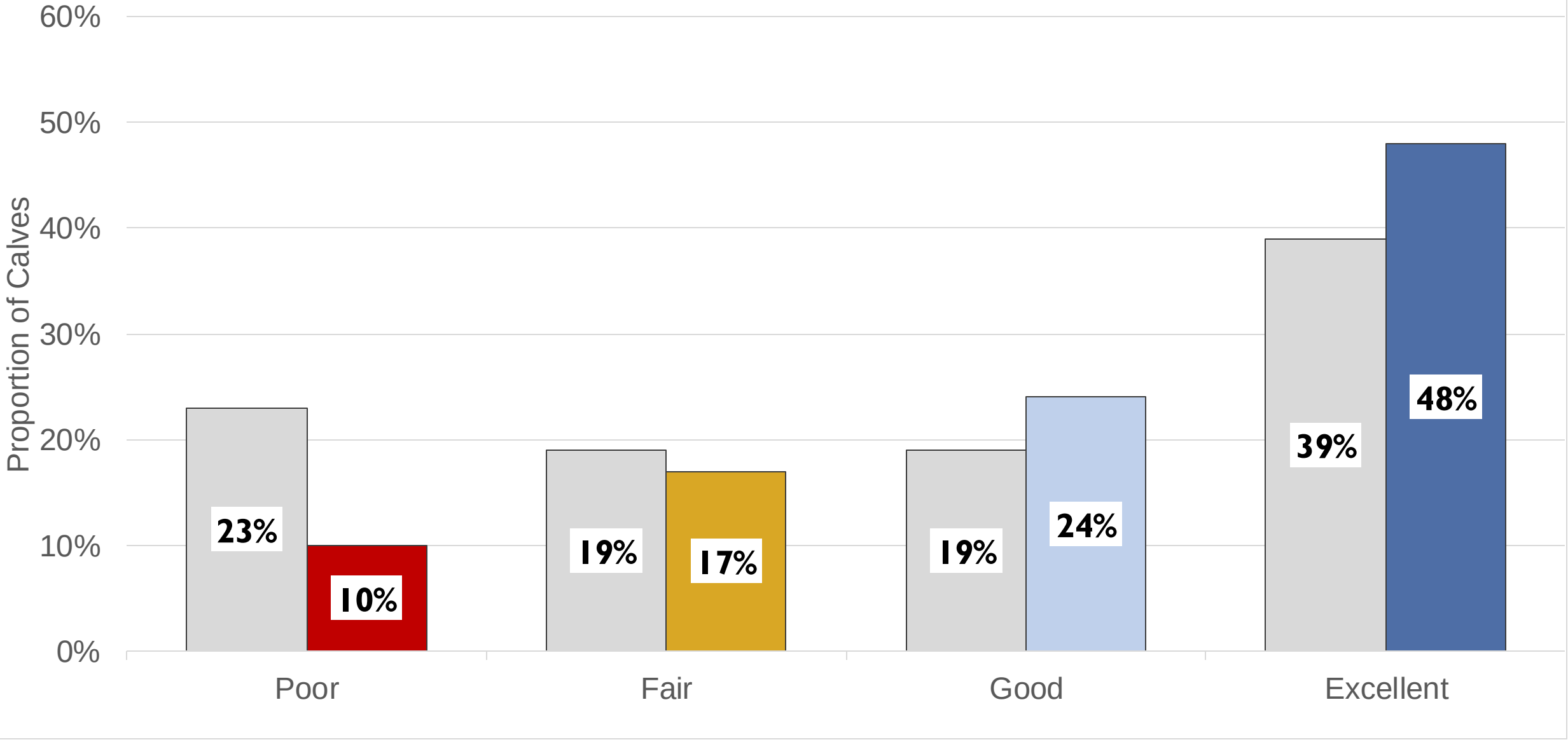
1.75X increased risk for respiratory disease

2X increased risk for mortality

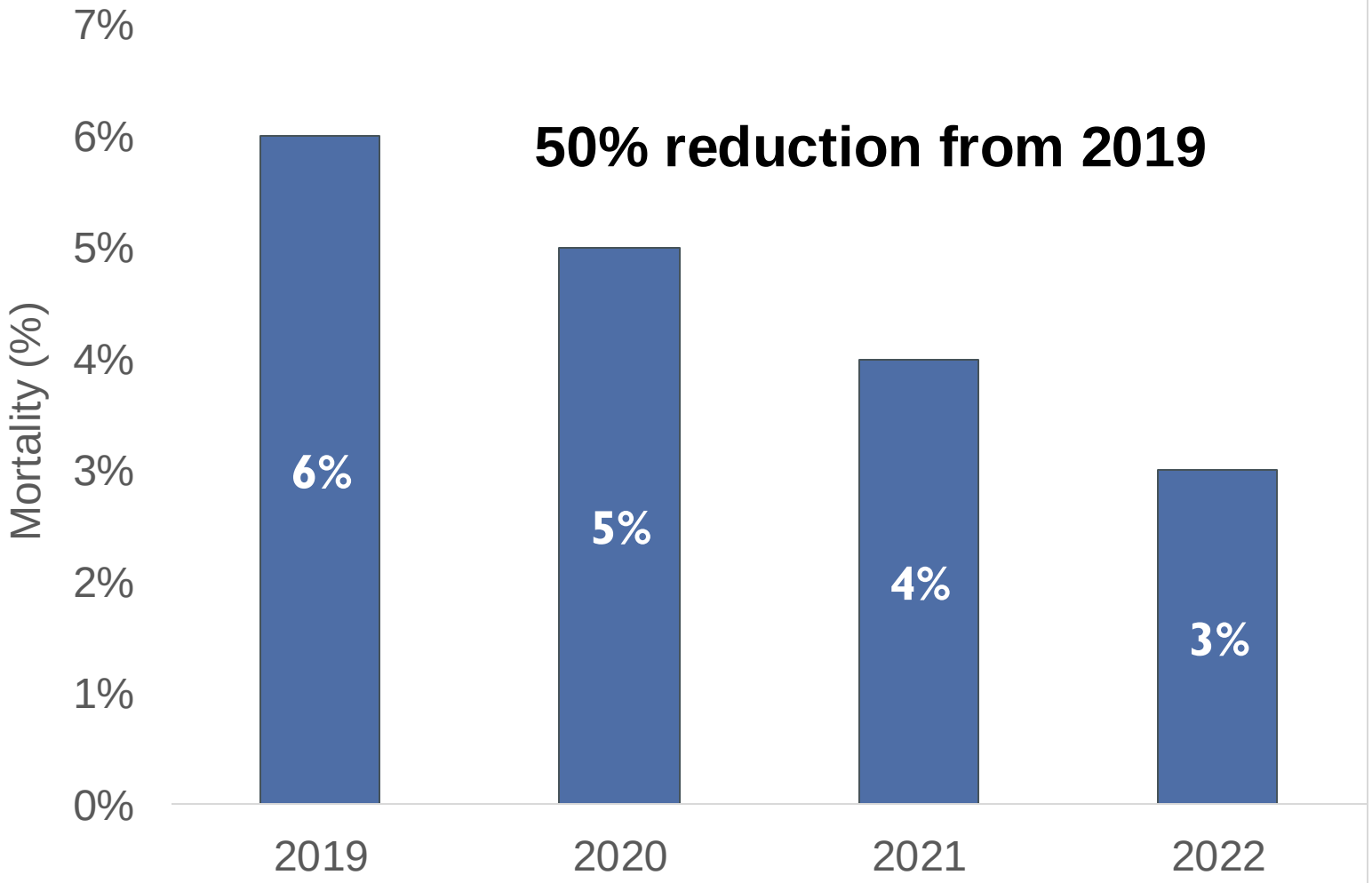
Raboisson et al., 2016


2019 SERUM TOTAL PROTEIN STATUS
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
Proportion of Calves
23%
19%
19%
39%
Poor
Fair
Good
Excellent

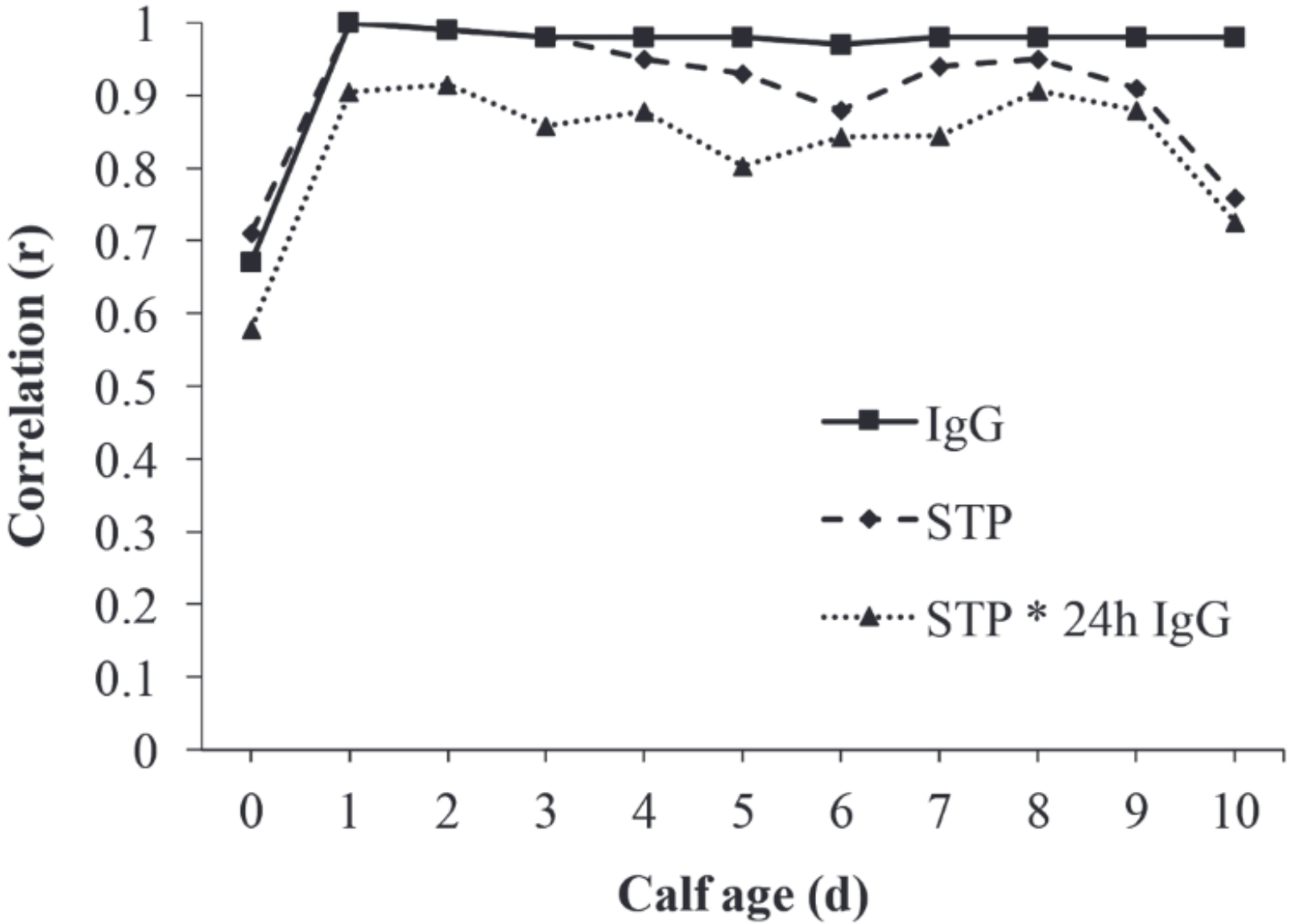
CURRENT VS 2019 SERUM TOTAL PROTEIN STATUS



YEAR OVER YEAR MORTALITY

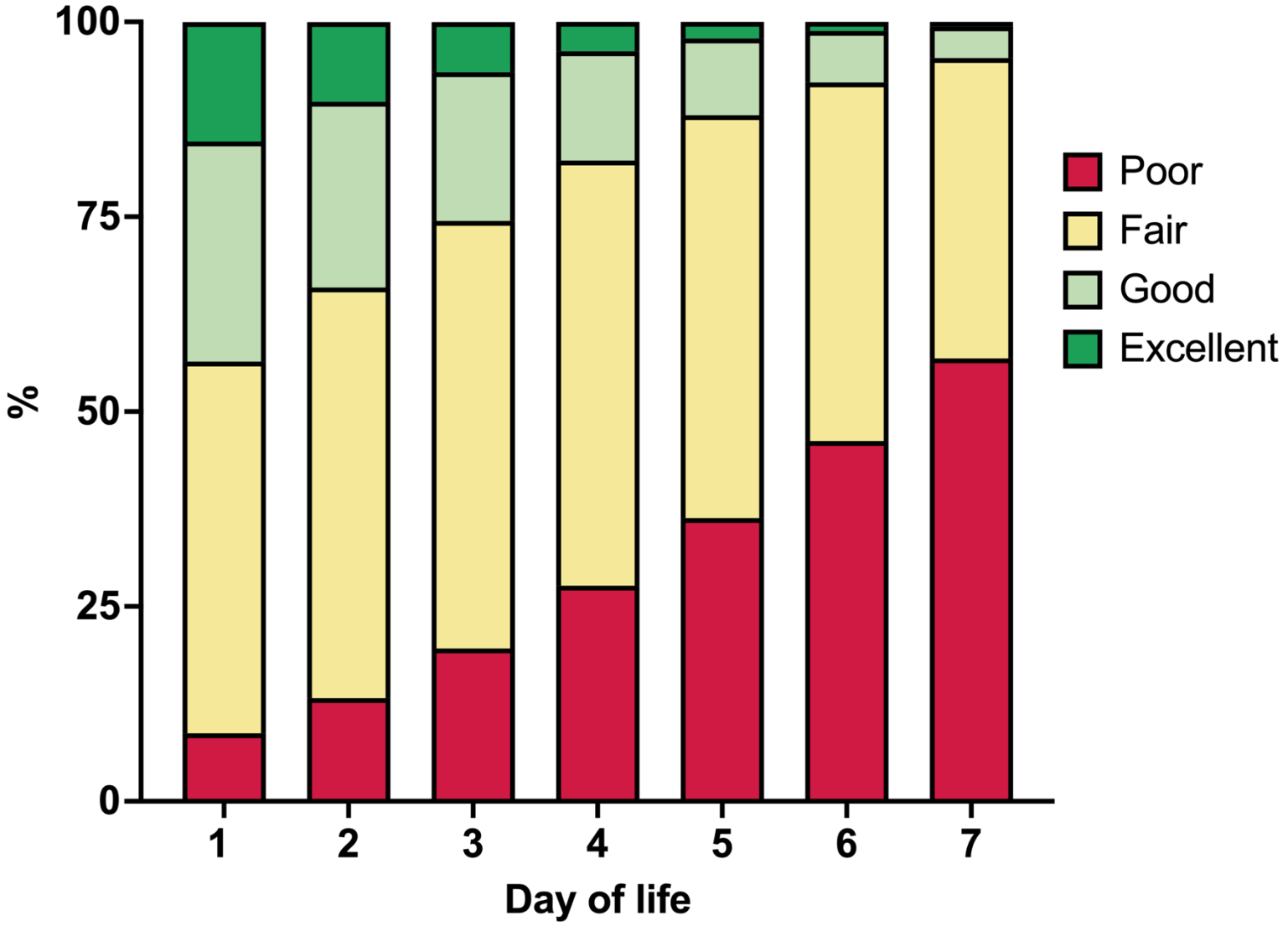


CONSIDERATIONS



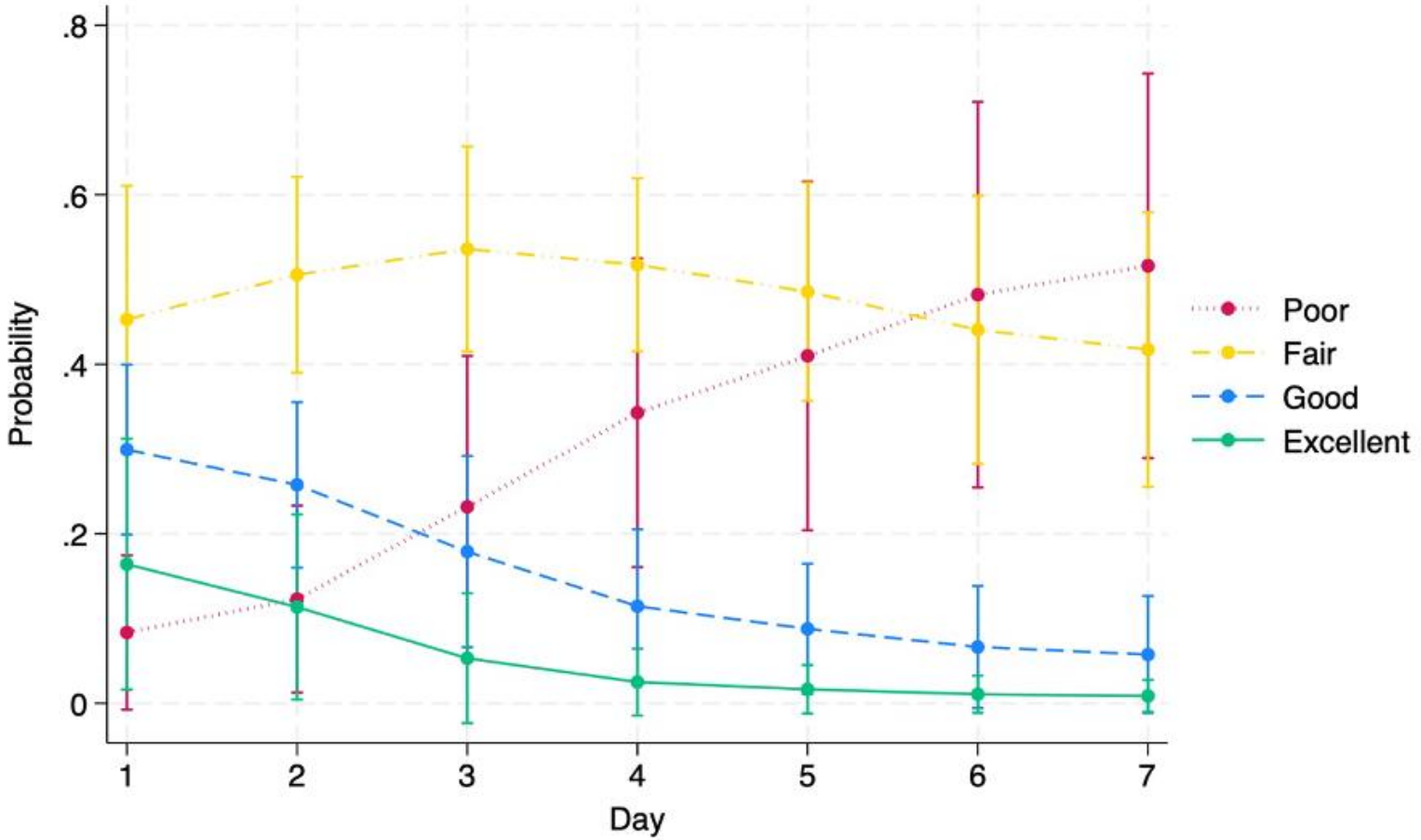
Wilm et al., 2018

CONSIDERATIONS

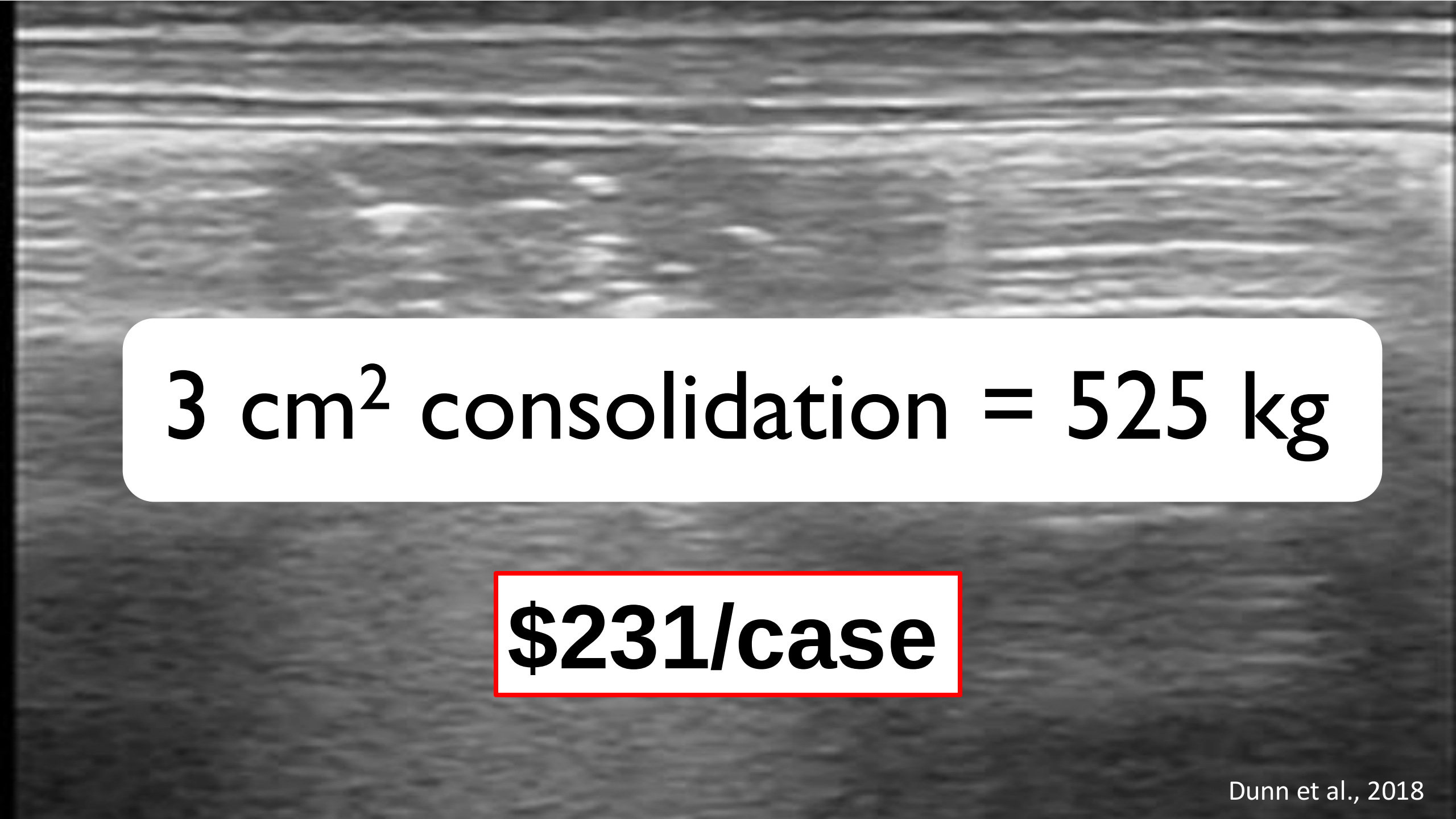


Goetz et al., *in prep*

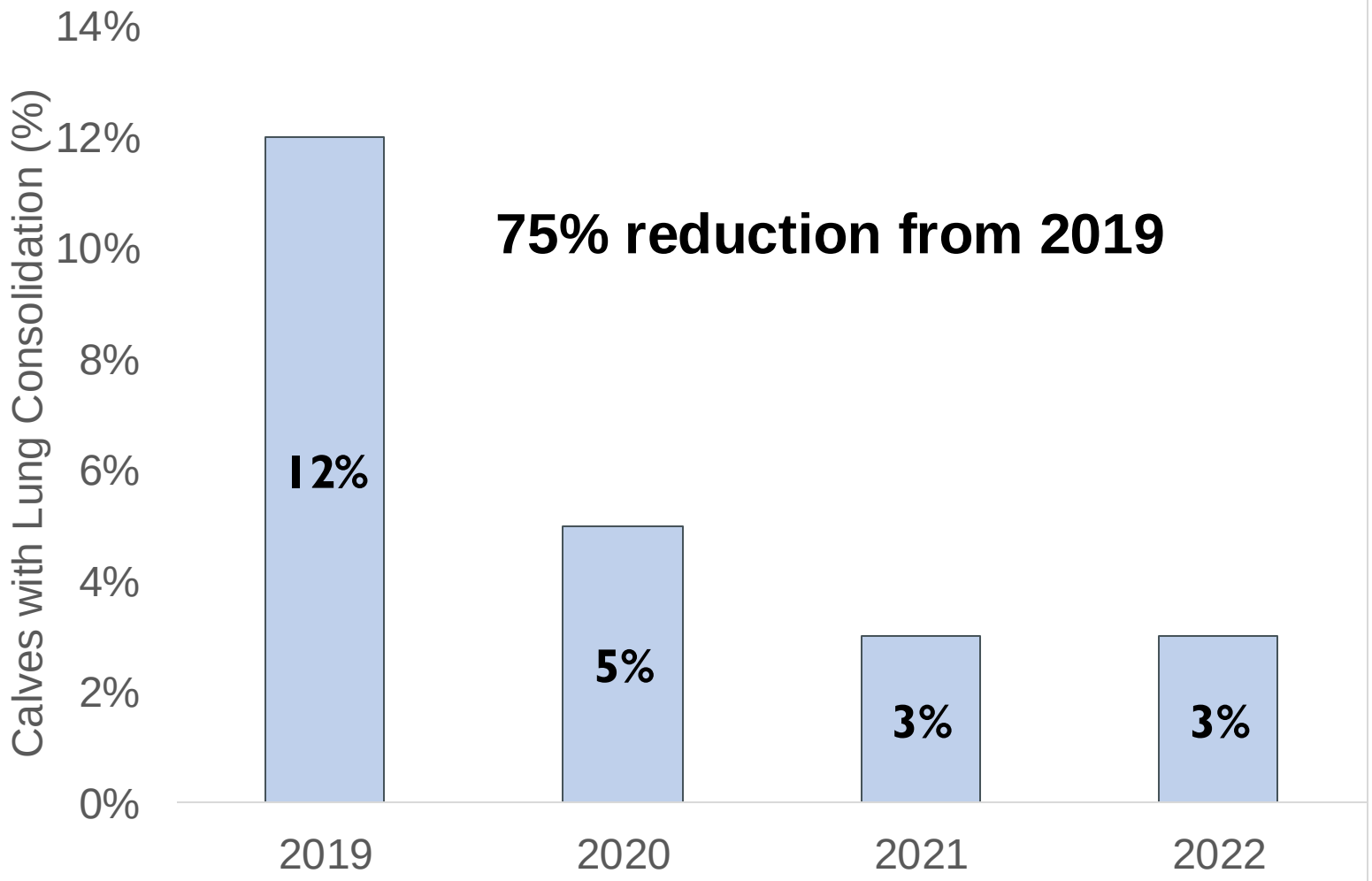
CONSIDERATIONS



Goetz et al., *in prep*


3 cm² consolidation = 525 kg
$231/case
Dunn et al., 2018

YEAR OVER YEAR LUNG CONSOLIDATION



LUNG CONSOLIDATION

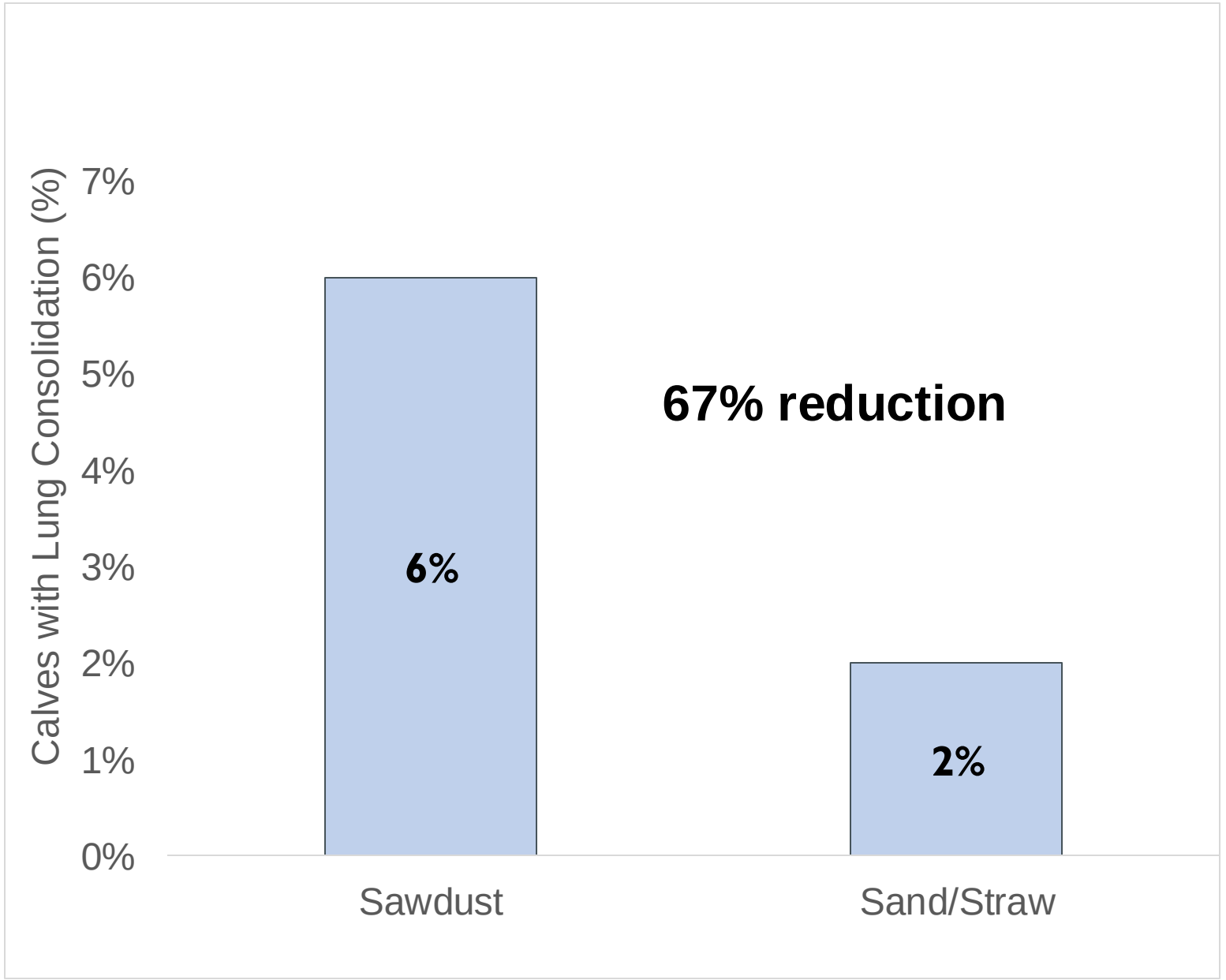
Minimize dust

Choose low-dust beddings → 42% less BRD in calves

Fine particulate matter = increased odds of lung consolidation

Dubrovsky et al., 2019
Van Leenen et al., 2021

LUNG CONSOLIDATION



HYGIENE

Evaluate feeding equipment hygiene with a luminometer

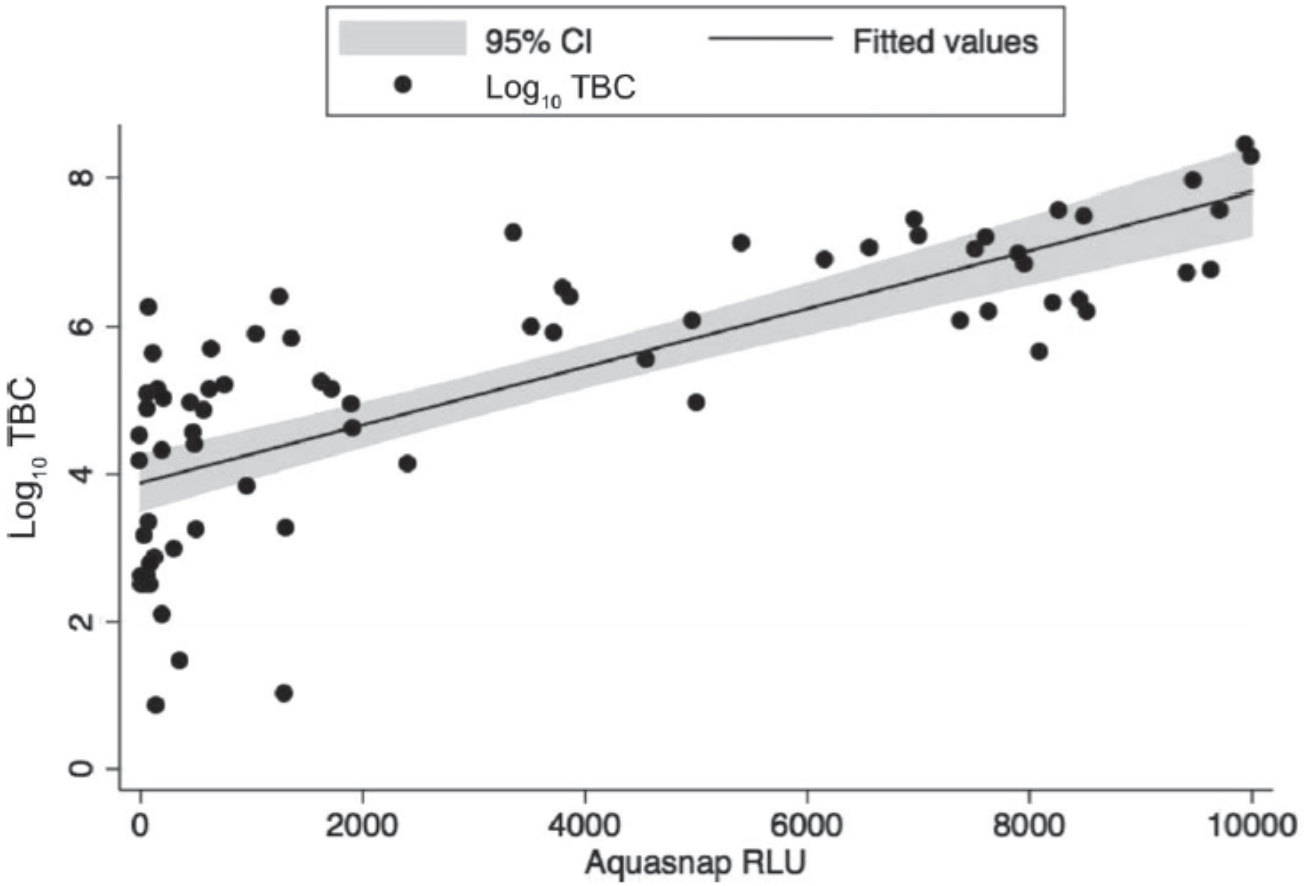
Feeding milk with >100,000 cfu/mL total bacteria and/or >10,000 cfu/mL coliform bacteria increases risk for BRD

Jorgensen et al., 2017

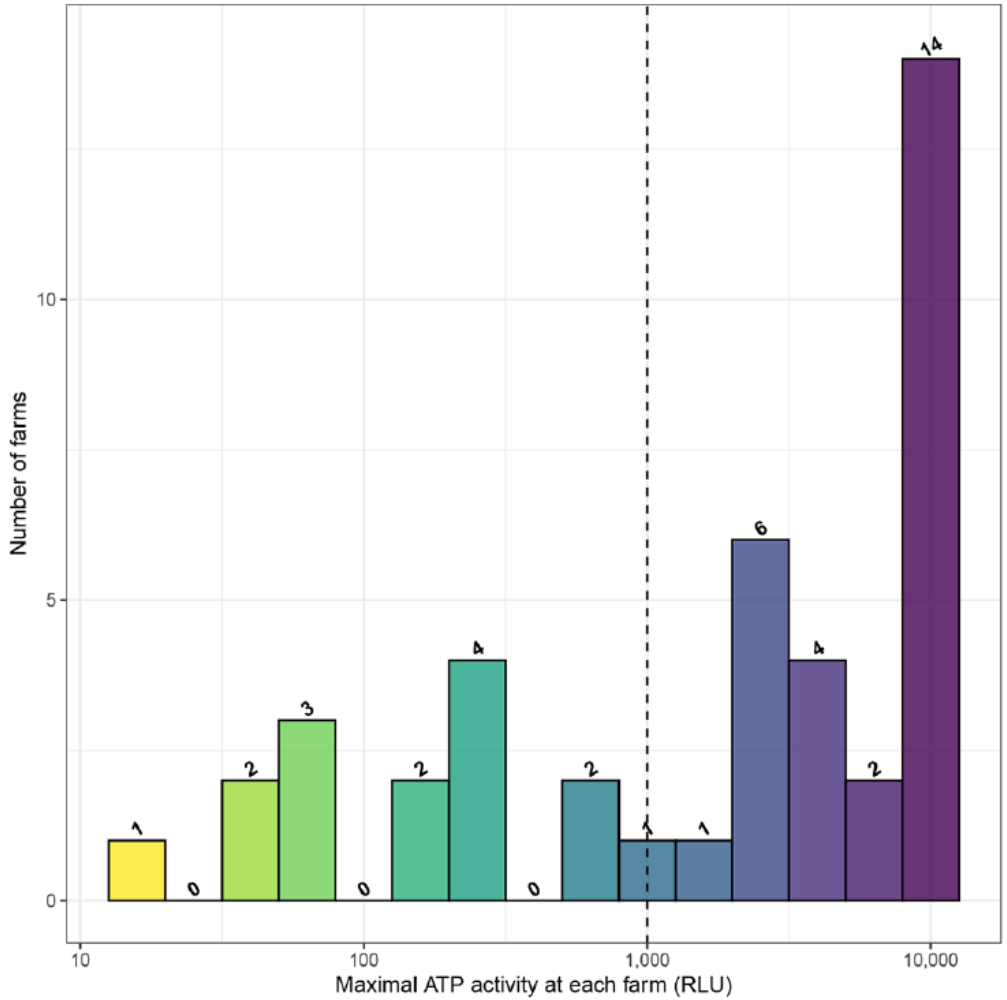
HYGIENE

- Detects organic residues and microbial loads
  - Swab that picks up ATP that then reacts with an enzyme (luciferase) to produces light
- Light is reported in Relative Light Units (RLU)
  - The higher the RLU reading, the more ATP present = the greater the microorganism load
  - Readings take 15 seconds

HYGIENE

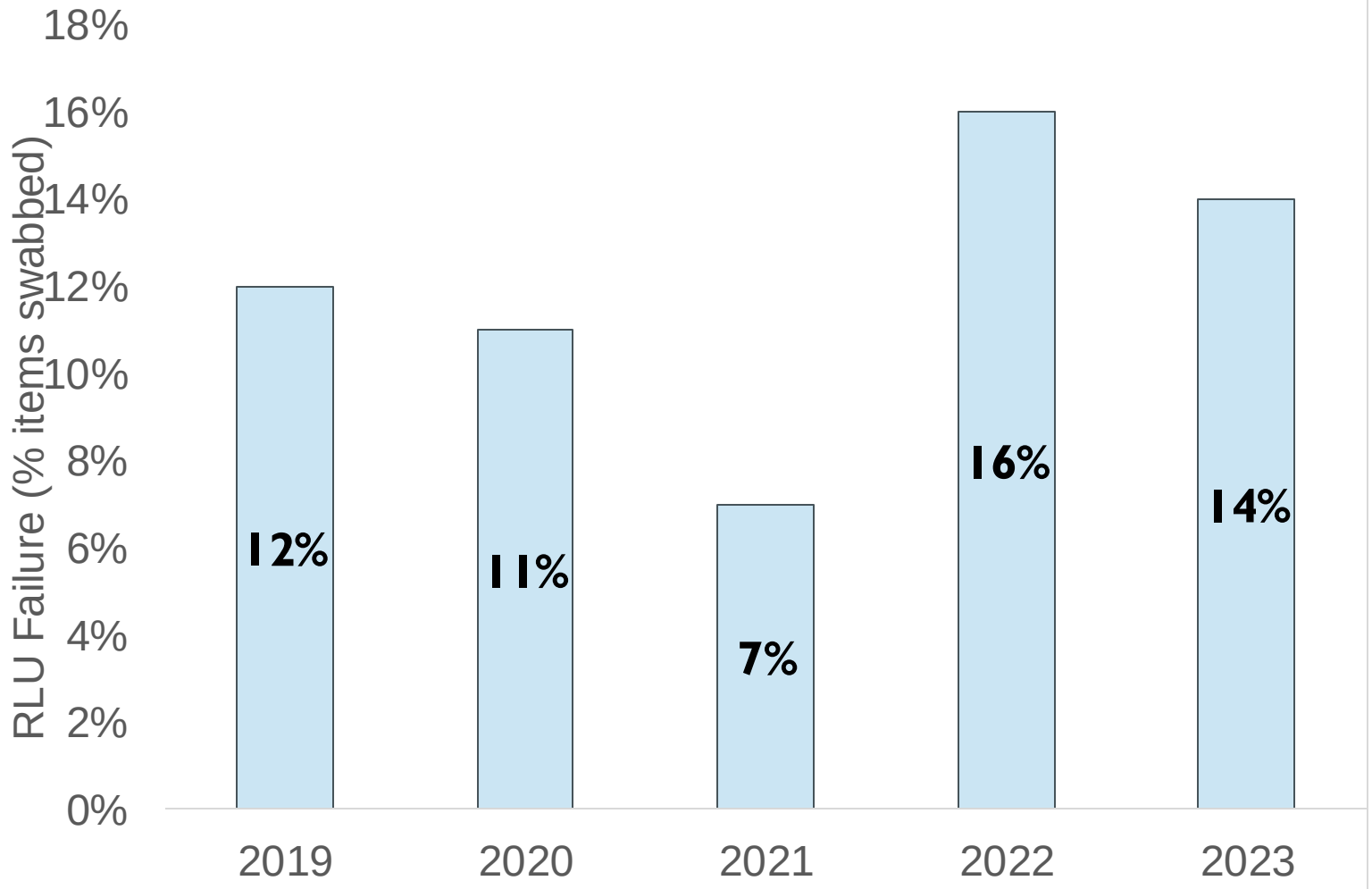


Renaud et al., 2017

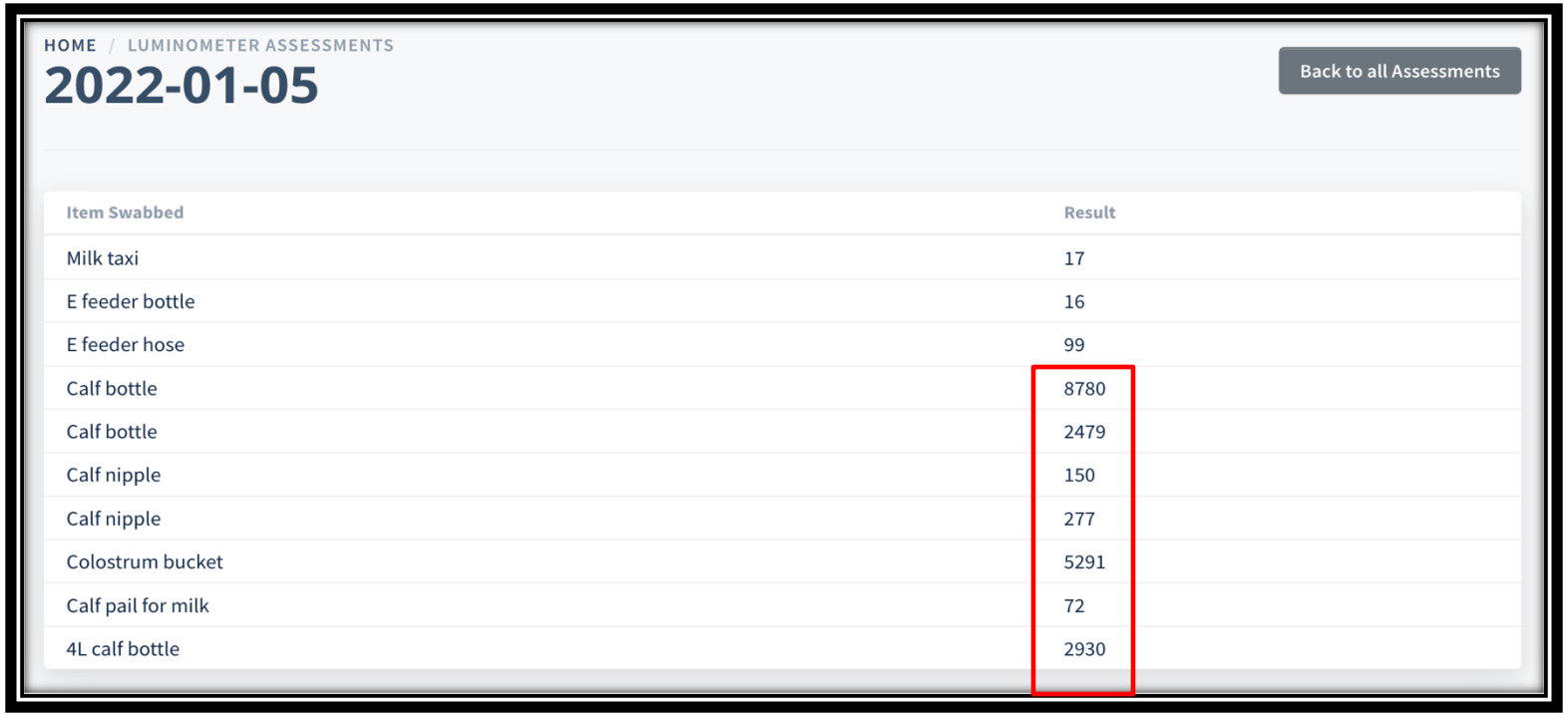


Buczinski et al., 2022

YEAR OVER YEAR HYGIENE



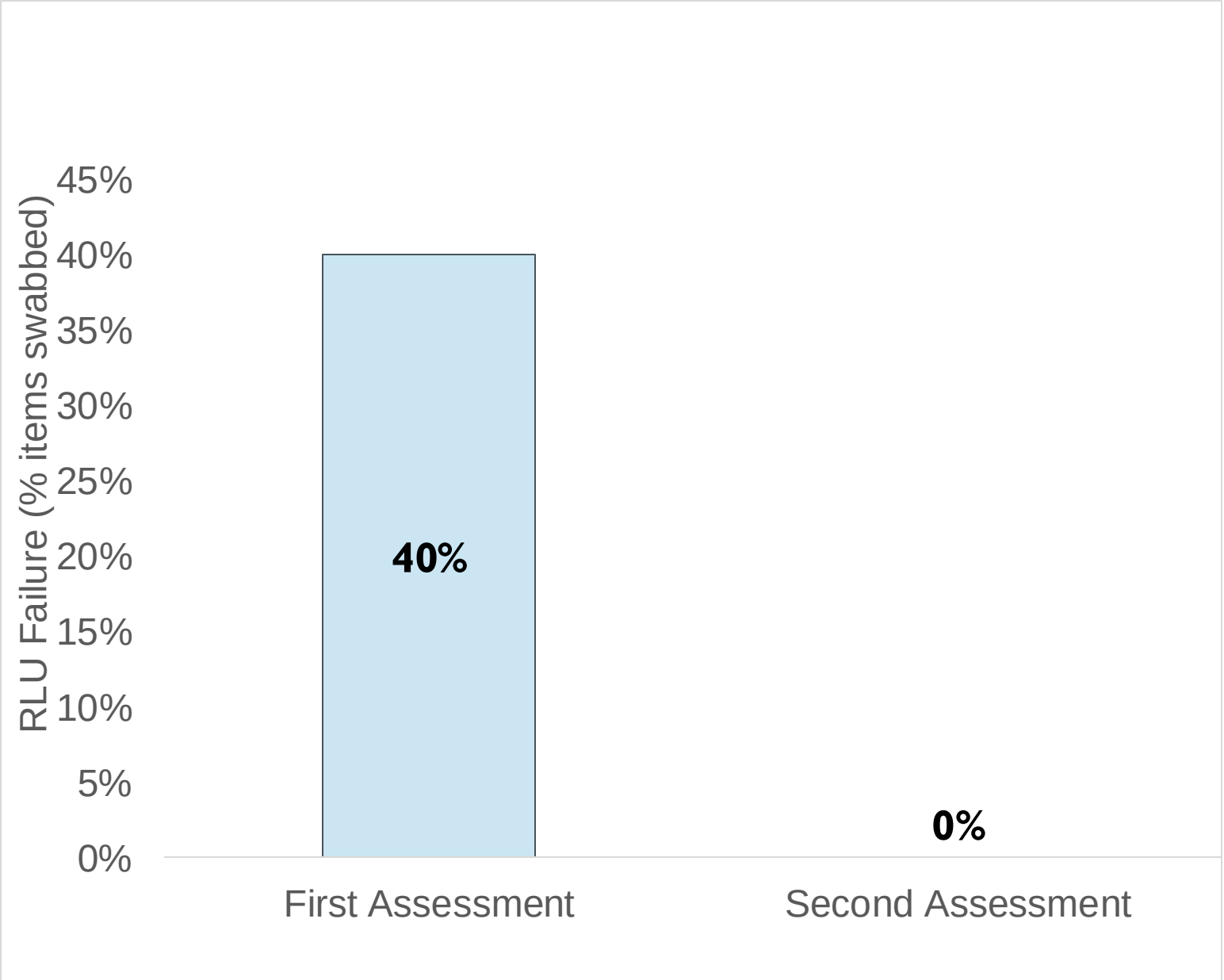
WITHIN FARM HYGIENE



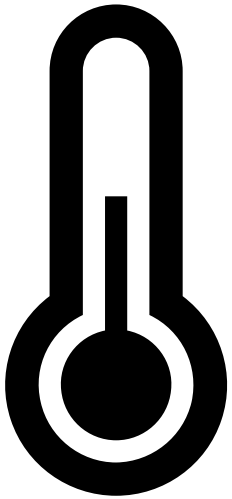
Item Swabbed	Result
Milk taxi	17
E feeder bottle	16
E feeder hose	99
Calf bottle	8780
Calf bottle	2479
Calf nipple	150
Calf nipple	277
Colostrum bucket	5291
Calf pail for milk	72
4L calf bottle	2930

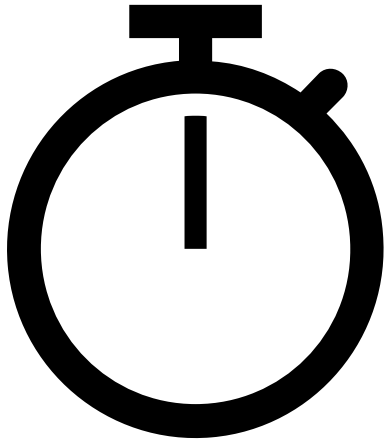
Item Swabbed	Result
Red nipple	118
Red nipple	483
Calf bottle	4
Calf bottle	41
E feeder bottle	177
E feeder hose	317
Milk taxi	231
Colostrum bucket	29
Colostrum hose	56

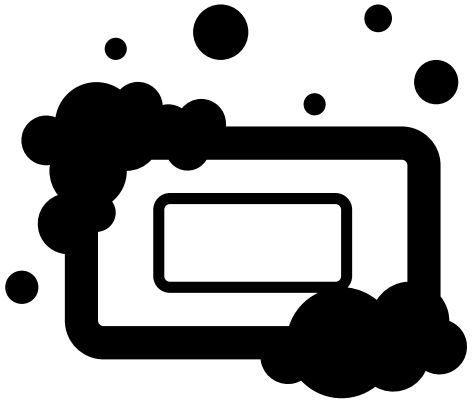
WITHIN FARM HYGIENE




Acepsis
CHLOR-A-FOAM DETERGENT







TAVISTOCK VETERINARIANS
CLEANING PROTOCOLS

Cleaning Colostrum/Milk Harvest and Feeding Equipment

1. Rinse all equipment with cool water at 30°C (90°F) immediately after each use
    - Milk collection bucket and hoses
    - Bottle
    - Nipple
    - Calf feeder tube
    - Any other equipment used in the collection or feeding of colostrum/milk

2. Wearing gloves, soak equipment in hot 75°C (167°F) water with **Chlor-A-Foam Detergent** for **5 minutes**
    - Add 15mL **Chlor-a-Foam Detergent** to every 3.8L water to create desired solution for soak
    - Necessary step to break down biofilm (milk fats and proteins)

3. **Vigorously scrub** equipment inside and outside with a brush, toothbrush, and/or pipe cleaner while wearing gloves
    - Check for visible cracks and signs of wear during wash
        - Replace every 6 months or sooner if visually cracked or damaged
    - Rinse

4. Wearing gloves, apply warm 30°C (86°F) water with **Foam-A-Cid** for **10-15 minutes**
    - Acid is to descale, remove milk minerals, and detergent residues
    - Add 30mL **Foam-A-Cid** to every 3.8L water to create desired solution for soak

5. **Dry** by storing bottles upside-down on a raised grated surface to thoroughly air dry before next use

6. Sanitize the inside and outside of feeding equipment within 2 hours of next use
    - **Acepsis HabiStat chlorine dioxide 50ppm** for **1-2 minutes contact time**
    - Use **Insta-Test** strips to verify concentration

7. Monitor hygiene using the luminometer every 3 months

8. Monitor cleanliness by taking a colostrum/milk sample for culture from the feeding equipment

BUILDING YOUR PROGRAM

CONSIDERATIONS

Who

What

When

Where

How

CONSIDERATIONS

Who

What

When

Where

How

Data collection?

Data reporting?

Technician?
Herd veterinarian?
“Champion vet” ?

CONSIDERATIONS

Who

What

When

Where

How

Colostrum volume
Type of colostrum
Brix
STP
Illness
Treatments
Mortality
Thoracic ultrasound
Hygiene
ADG

CONSIDERATIONS

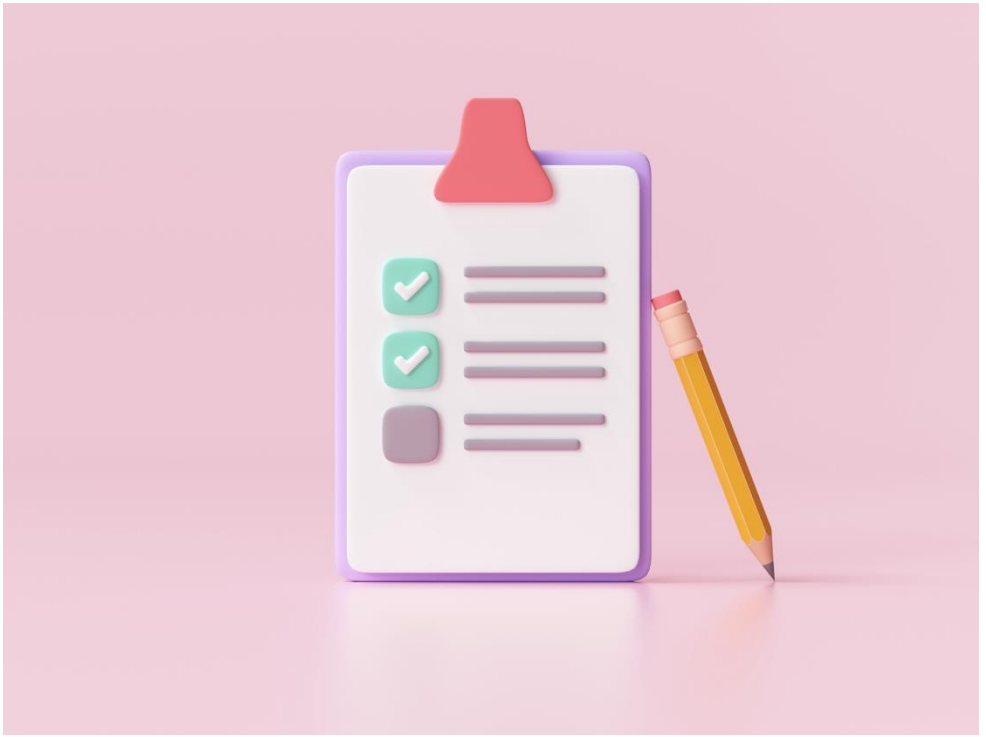
Who

What

When

Where

How



CONSIDERATIONS

Who

What

When

Where

How

Weekly

Twice weekly

Other?

CONSIDERATIONS

Who

What

When

Where

How

Target of your calf program

Which herds will be your early adopters?

CONSIDERATIONS

Who

What

When

Where

How

Data collection method

Reporting → frequency, style, HH, ROI?

Pricing structure

Roll out – promotional materials

CHALLENGES

"Things are going well now, I don't need to stay on"

Technician availability

RESULTS

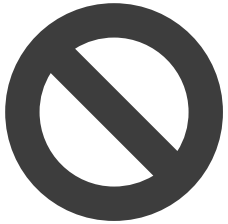
48% of farmers reported feedback was seldom or never

Edwards et al., 2024 *JDSC*

RESULTS

28% regularly reviewed calf health records

44% made actionable recommendations



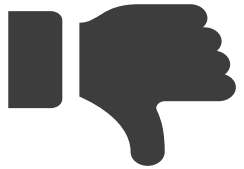
60% reported calf health records are incomplete

Edwards et al., *in prep*

RESULTS

52% were involved in feeding and weaning protocols

94% wanted to be involved in feeding and weaning protocols



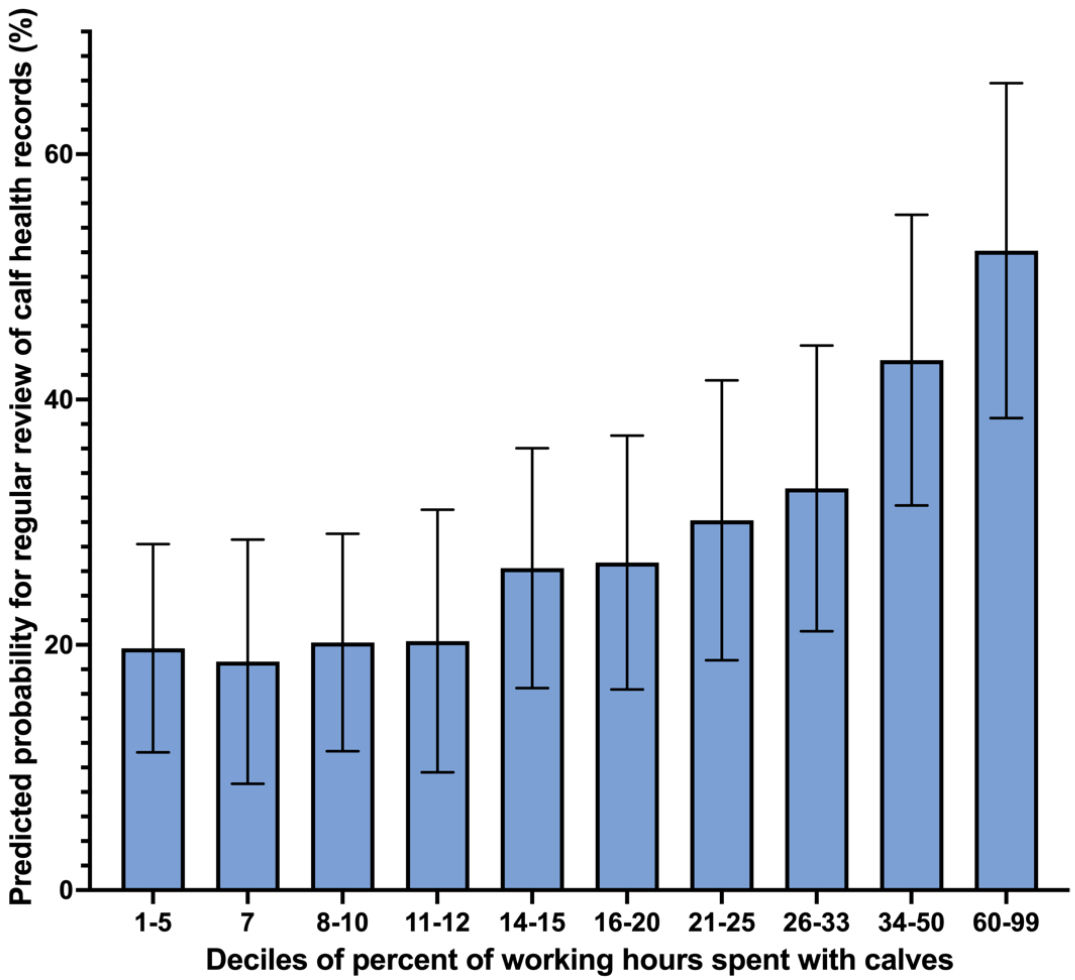
40% felt unsatisfied with their knowledge

72% of veterinarians wanted to learn about AMFs

Edwards et al., *in prep*

What factors are associated with regular review of calf health records?

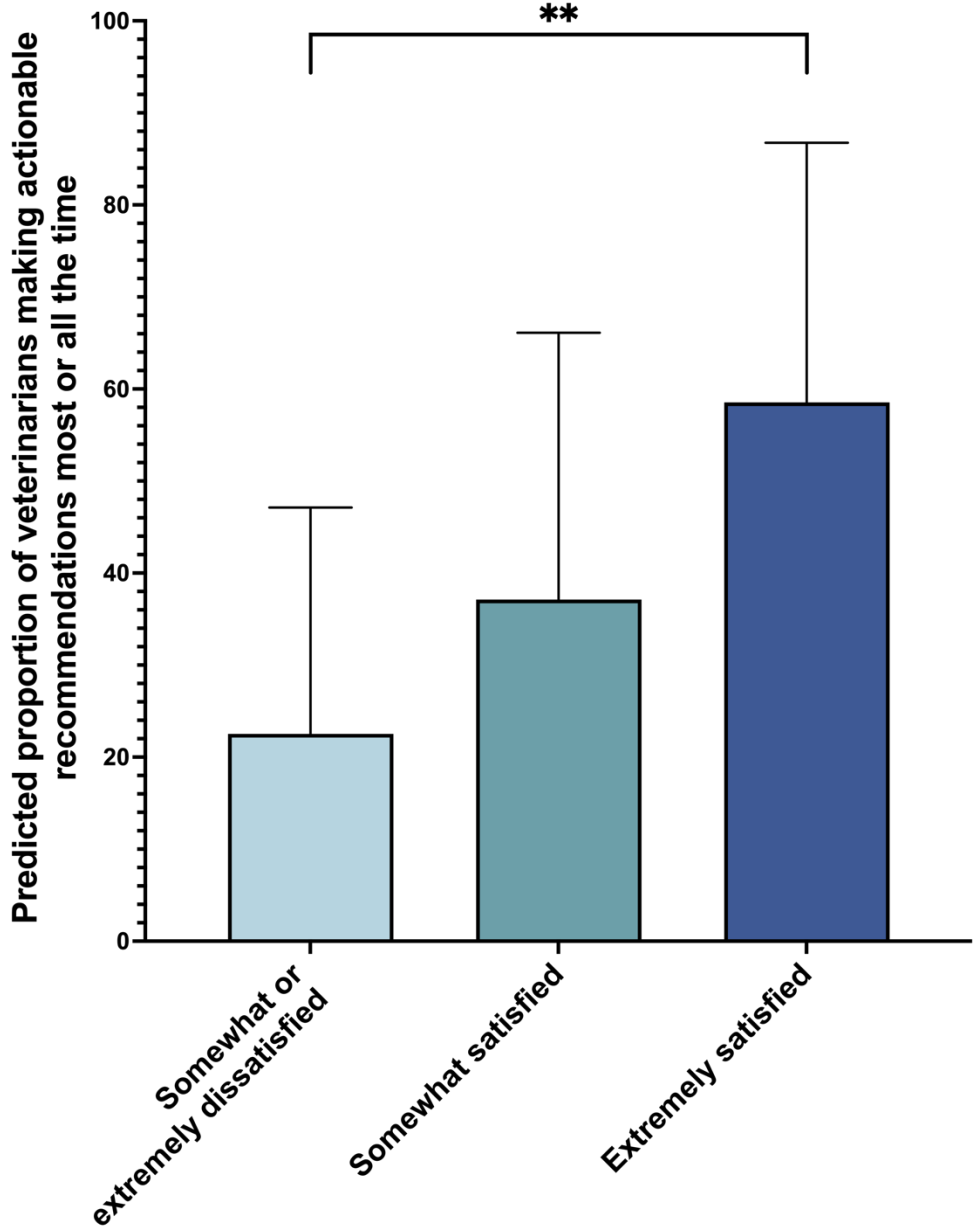
Veterinarians had 1.02 times greater odds for regularly reviewing calf health records for every percent increase in employment hours spent working with calves ($P = 0.02$)



Edwards et al., *in prep*

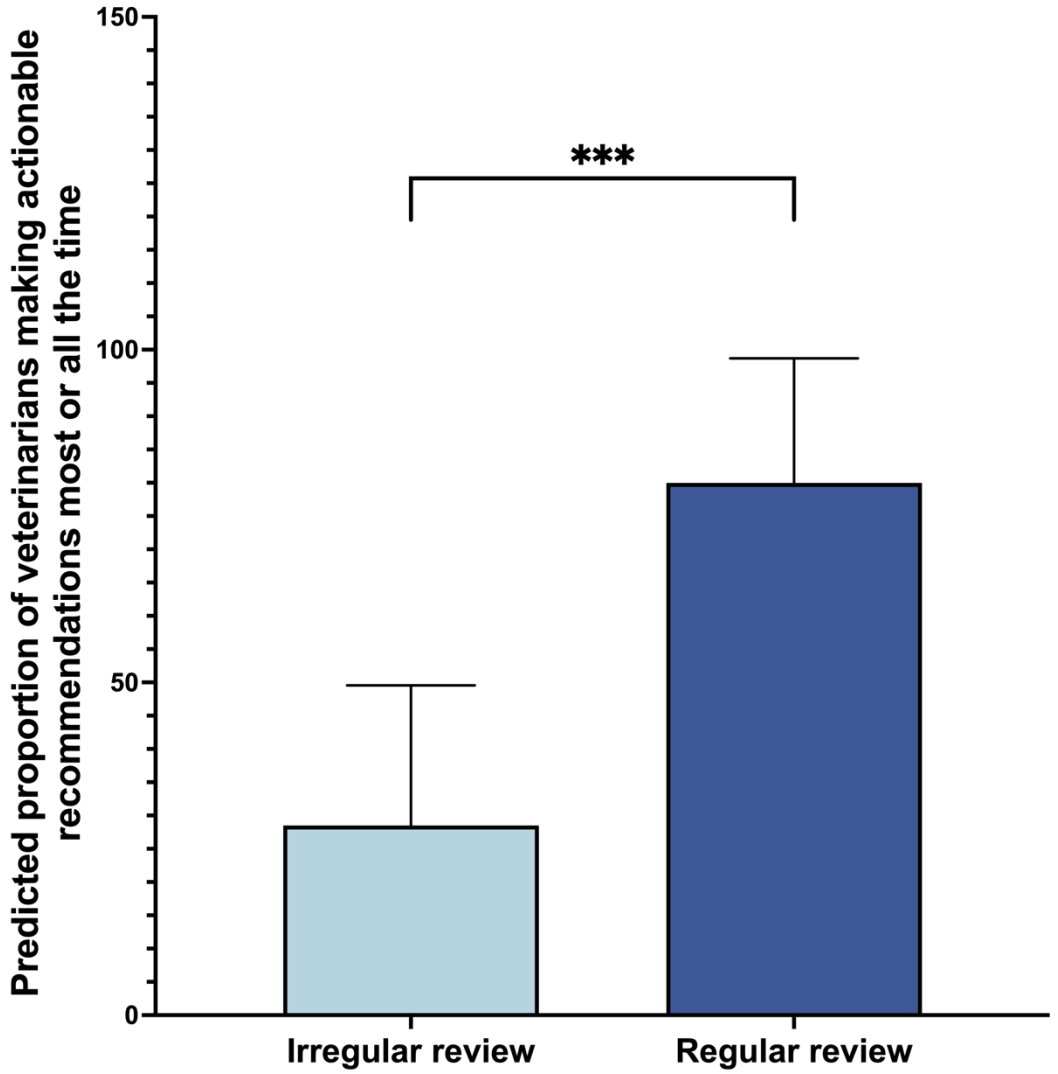
What factors are associated with providing feedback based on records analysis?

Veterinarians that felt extremely satisfied with their neonatal calf diarrhea (NCD) prevention knowledge had 11.6 times greater odds for making actionable recommendations most or all the time compared to those that felt less satisfied with their NCD prevention knowledge (*P* = 0.009)

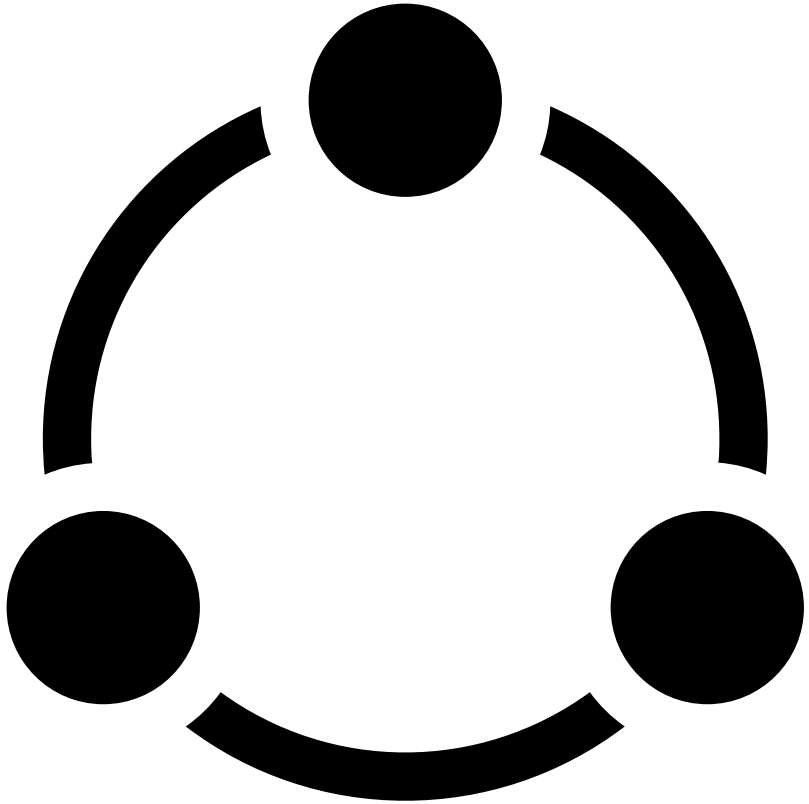


Edwards et al., *in prep*

Veterinarians that regularly reviewed calf health records had 15.5 times greater odds for making actionable recommendations most or all of the time ($P < 0.0001$)

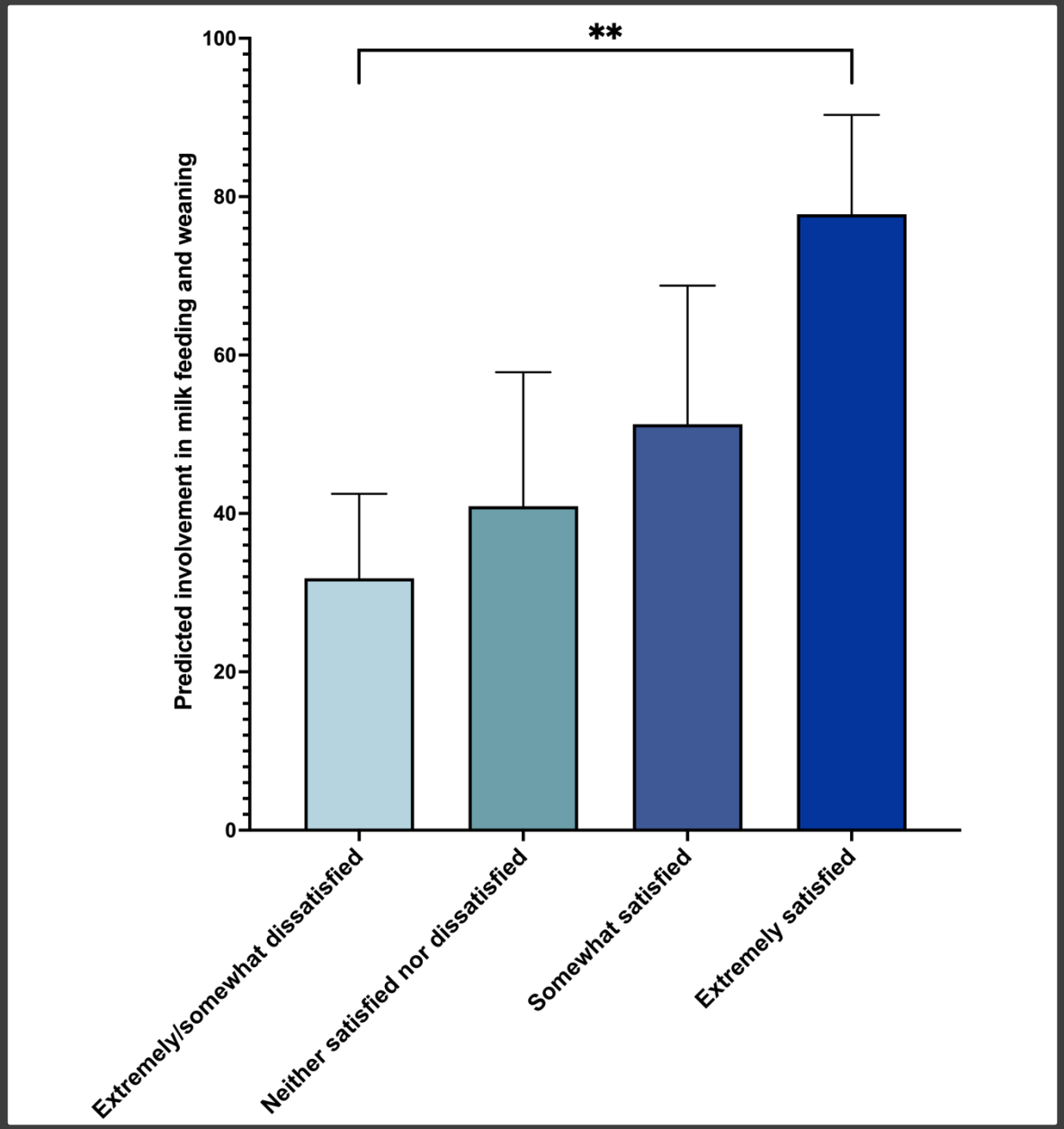


Edwards et al., *in prep*



What factors are associated with involvement in milk feeding and weaning decision making?

Veterinarians that were extremely satisfied with their level of knowledge regarding milk feeding recommendations had 6.27 times greater odds for being involved in milk feeding and weaning protocols ($P = 0.007$) compared to those that were extremely dissatisfied

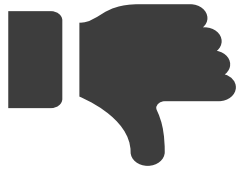


Edwards et al., *in prep*

RESULTS

52% were involved in feeding and weaning protocols

94% wanted to be involved in feeding and weaning protocols



40% felt unsatisfied with their knowledge

72% of veterinarians wanted to learn about AMFs

Edwards et al., *in prep*

TAKE AWAYS

- Calf health record completeness was associated with:
  - Computer software records
  - Records located in close proximity to calves
  - Analysis and feedback of records
- Calf health programs can help facilitate calf health record completeness
  - Gather the data
  - Make management and protocol changes based on the data


QUESTIONS?