Robust Calves in Robust Systems?

Current health & immunity status of Danish calves

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Projektet Robuste kalve er et samarbejde mellem:
SEGES INNOVATION
KØBENHAVNS UNIVERSITET
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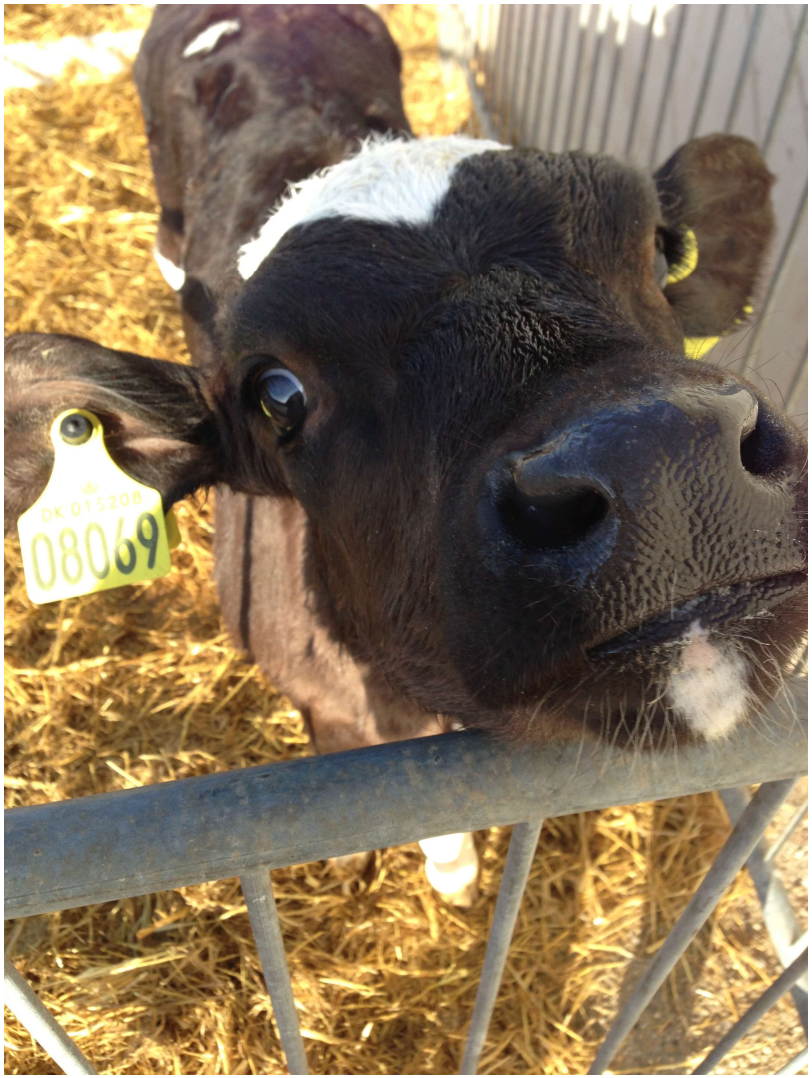

WHAT IS ROBUSTNESS???

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PURPOSE: Robust Calves in Robust Systems

Immunization

Clinical signs

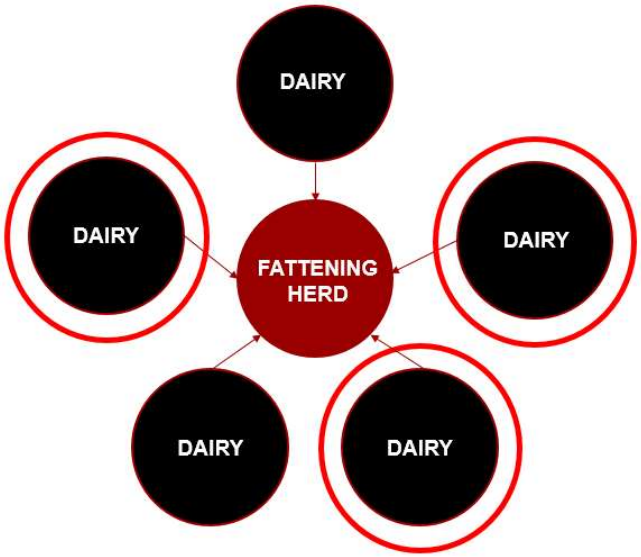
Diagnostics

Management

Study herds

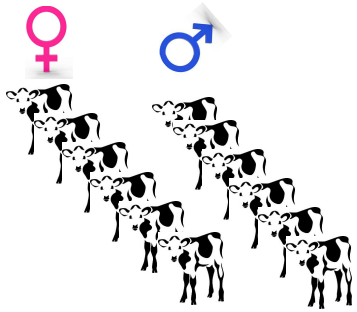
- Cluster structure
  - 17 rosé veal producers
  - All conventional
  - Avg. 1548 animals slaughtered per year (min 618/max 3599)

  - 83 Dairy herds
  - 10 organic/73 conventional
  - Avg. 319 cows (min 91 – max 976)

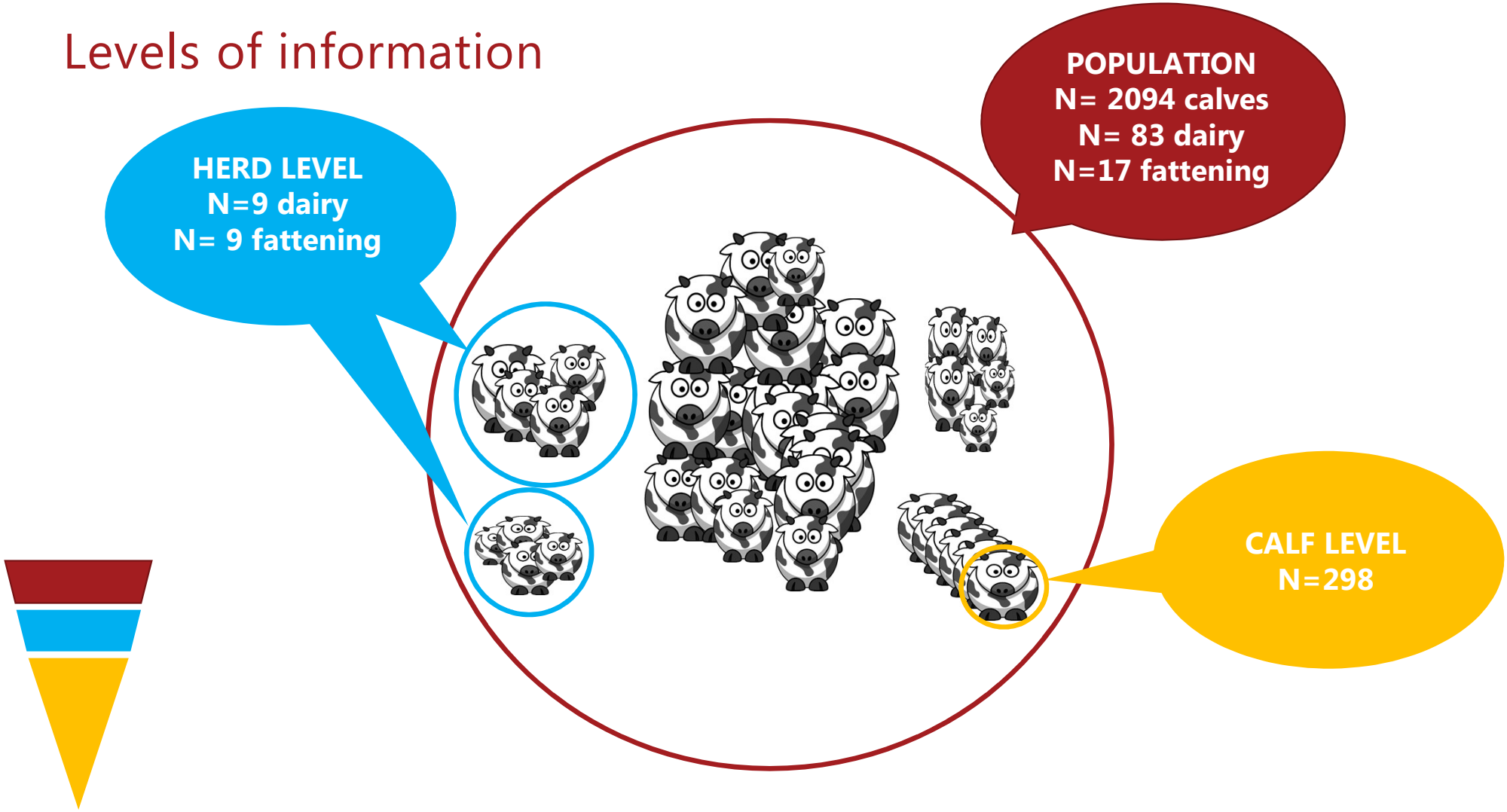


- Study period from September 2018 – October 2020

- Data collected for three studies
  - Cross-sectional single baseline visit in 17 clusters
  - Cohort study in 9 clusters (10 heifers/10 bulls)
  - Objective monitoring with six monthly visits in 9 fattening and 9 dairy herds



Levels of information



On farm data collection

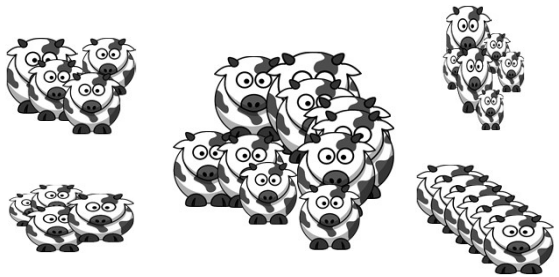
DAIRY HERDS

- Age groups:
  - 1st week (0-10 days)
  - 3rd week (14-28 days)
  - 12th week (90-110 days)

FATTENING HERDS

- Age groups:
  - 2 weeks upon arrival
  - 12th week (90-110 days)

Ten randomly sampled animals from each age group or
all animals in age group (≤ 10 calves)



- 1st week N=675
- 3rd week N=680
- 12th week N=739

- 2 weeks u.a. N=172
- 12th week N=170

Clinical observations

GI DISEASE

Fecal score
Hair loss

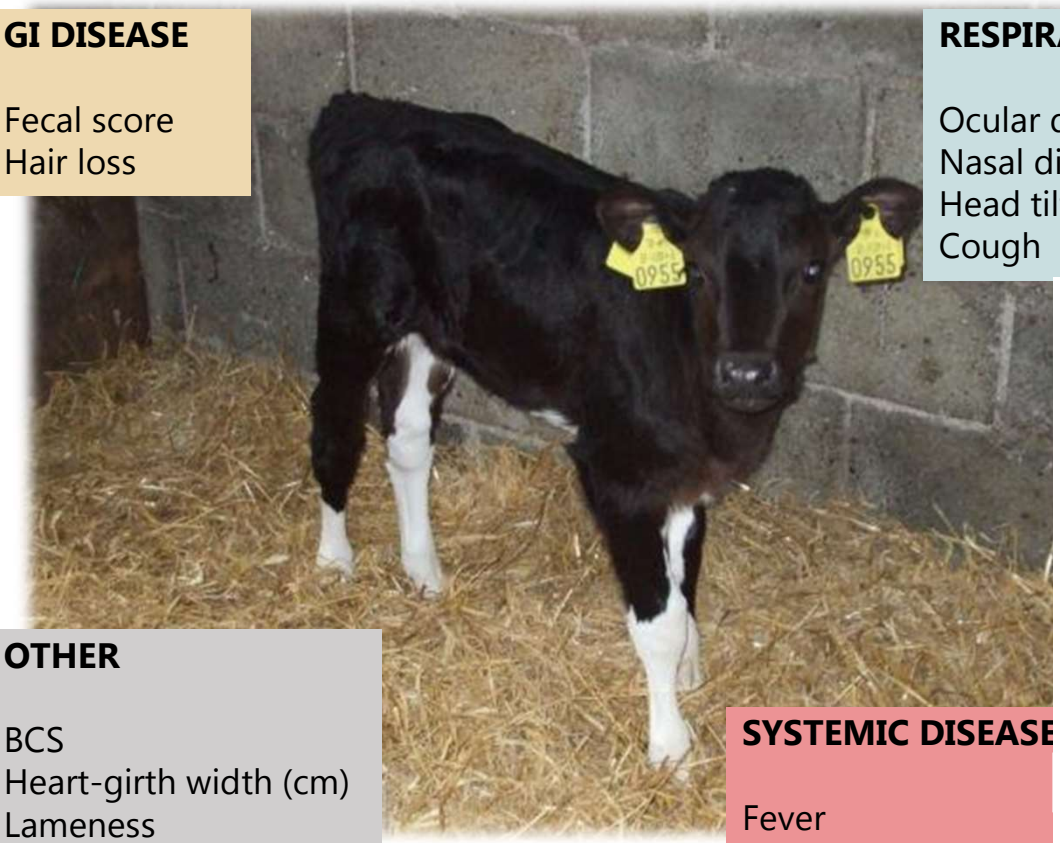
RESPIRATORY DISEASE

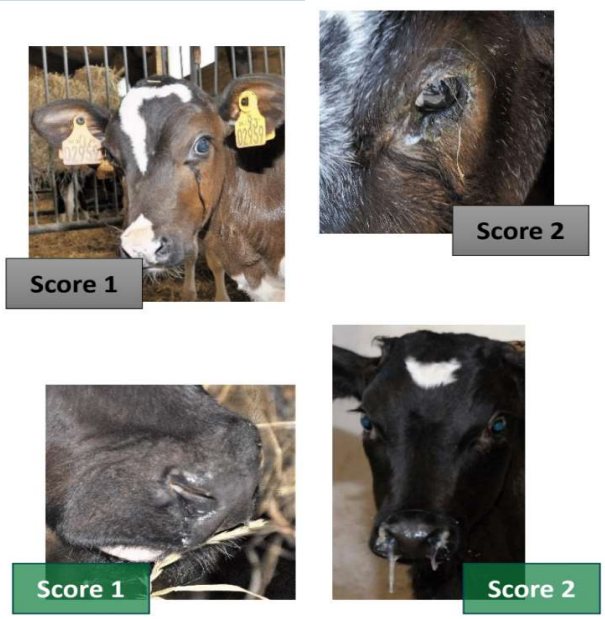
Ocular discharge
Nasal discharge
Head tilt
Cough

DIAGNOSTIC TESTS

Blood sample
Nasal swab
Fecal sample

Tracheal lavage





OTHER

BCS
Heart-girth width (cm)
Lameness
Skin lesions
Cleanliness

SYSTEMIC DISEASE

Fever
Omphalophlebitis
Arthritis

Data

RESOURCES & MANAGEMENT

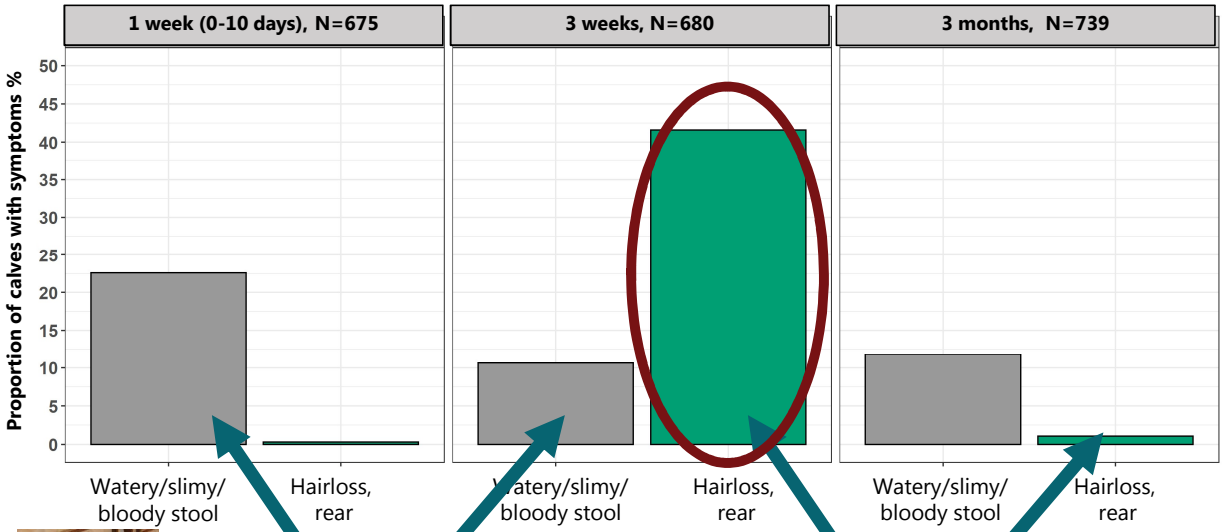
- Housing (in/outside, single/pairwise/group)
- Total area
- Proportion dry area
- Water supply and cleanliness
- Feed bunk/through cleanliness
- BioSecure -> management practices

DIAGNOSTICS (Fluidigm RT-PCR)

- RESPIRATORY: P. multocida, M. haemolytica, H. somni, T. pyogenes, Mycoplasma, BRSV, Corona, Influenza D)
- GI: coccidiosis (Eimeria), cryptosporidiosis, Giardia, Rota, Corona, E. coli
- IMMUNIZATION: IgG (Brix%, Total IgG)

Health status – Gastrointestinal disease

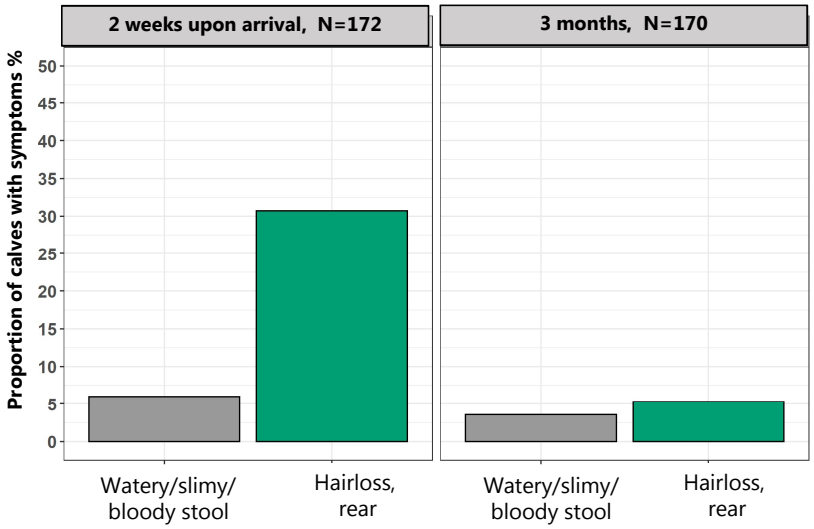
Calves with GI symptoms in dairy herds



"Here and now"

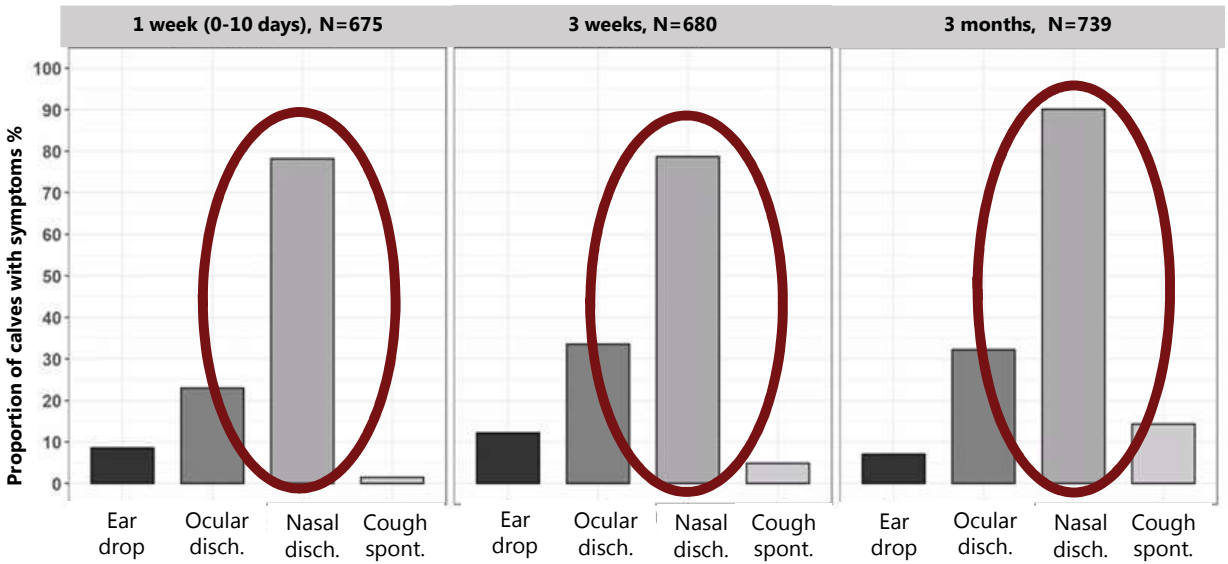
"Last week"

Fattening herds

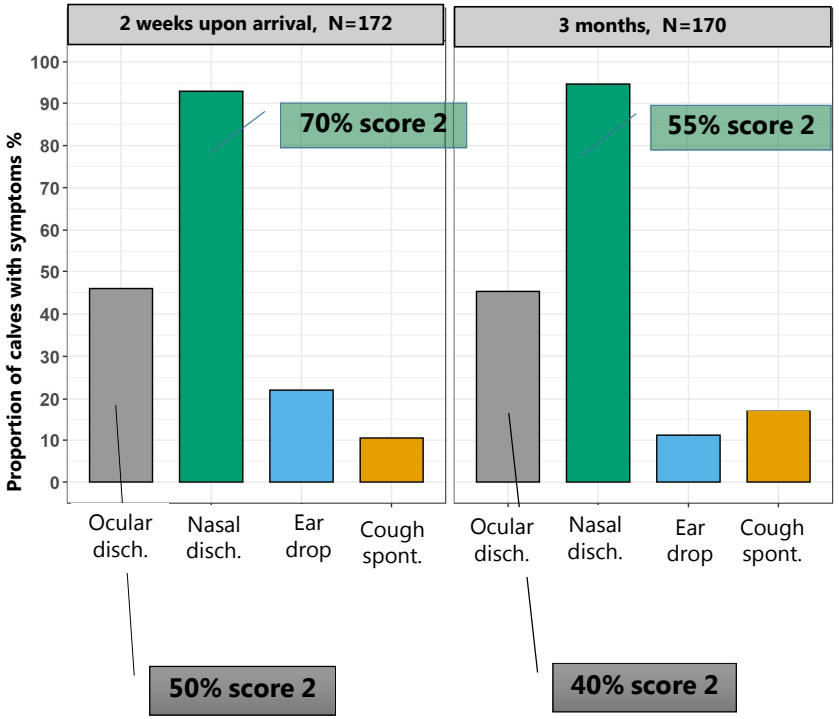


Health status – Respiratory disease

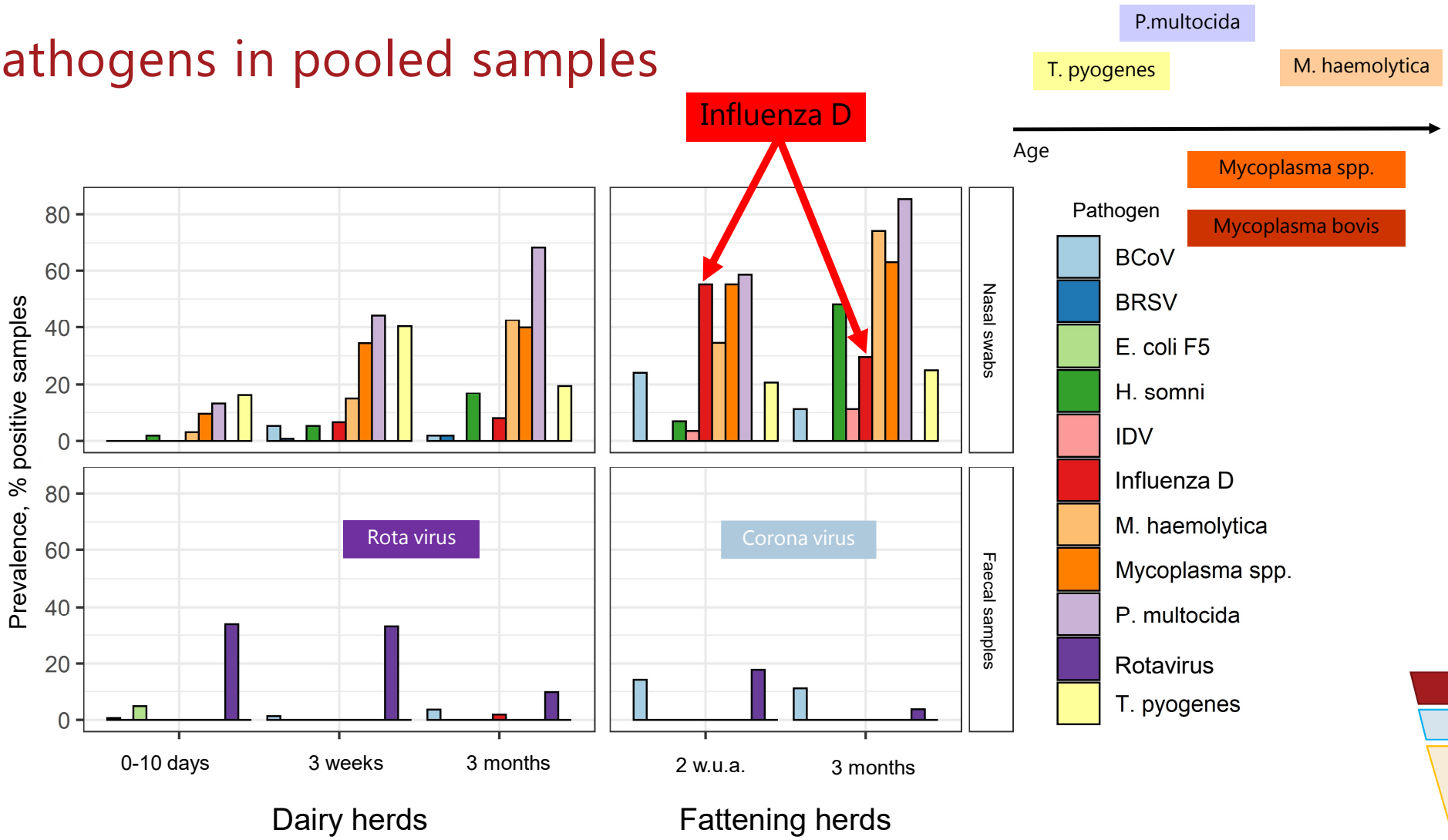
Calves with respiratory symptoms in dairy herds



Fattening herds



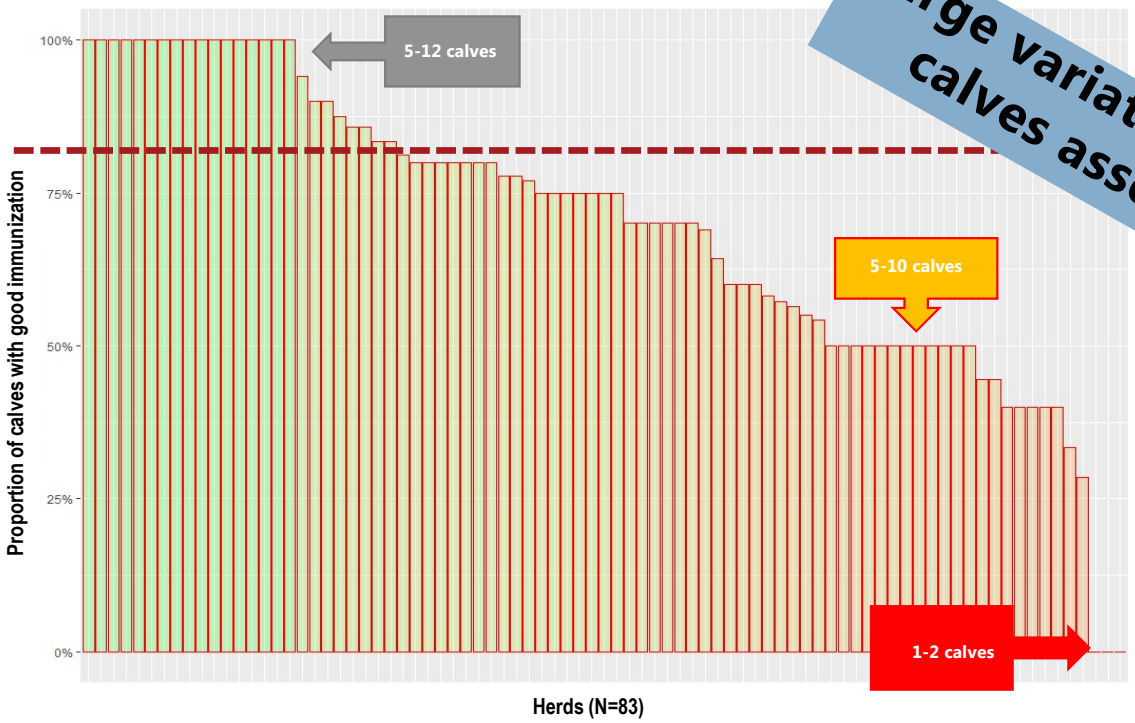
Pathogens in pooled samples



Immune status in Danish dairy calves

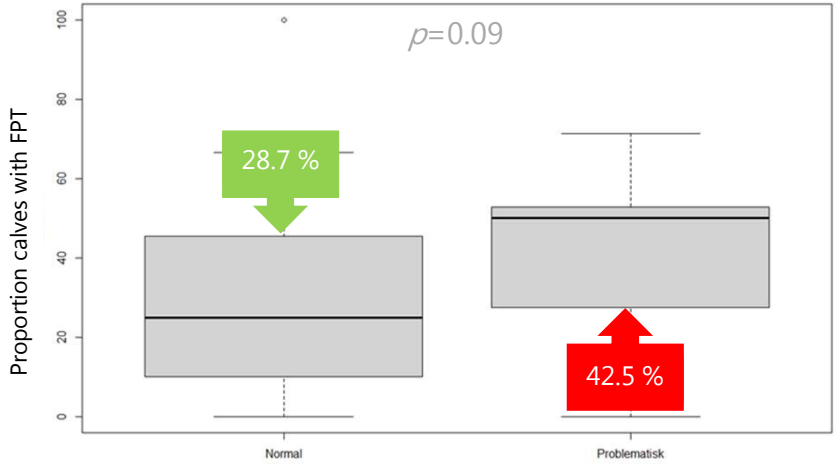
Passive transfer succeeds at IgG in serum min 10 g/L

Max. 20 % of calves with FPT

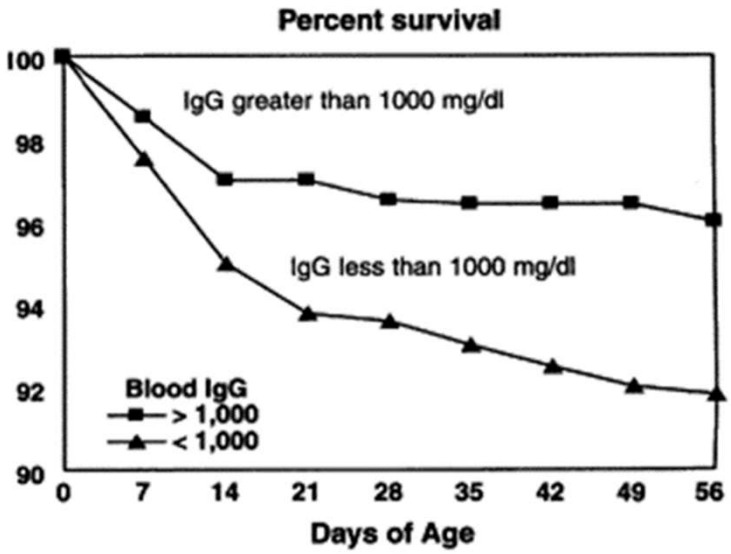


Large variation in the number of calves assessed per herd!!!

Associations with mortality

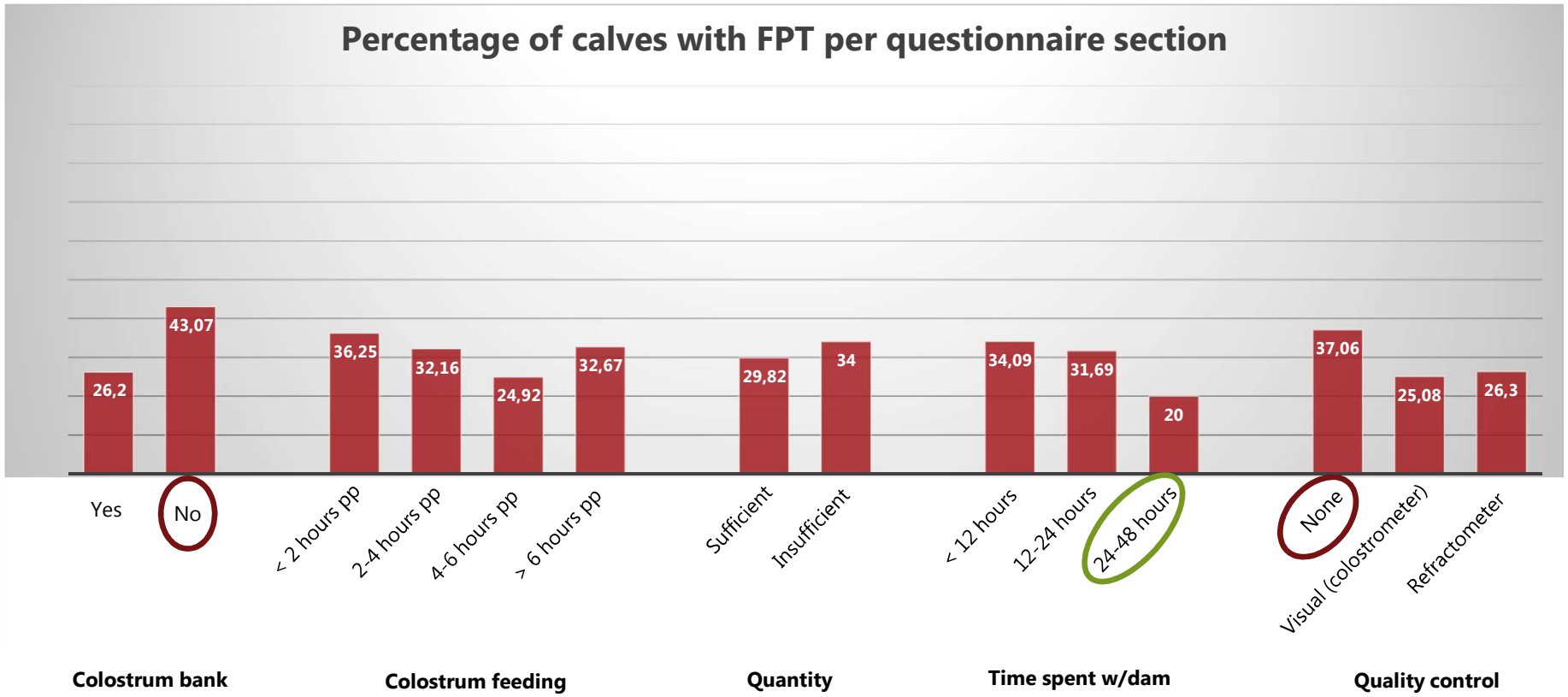


Mortality 0-14 days



Grouped by Danish mean calf mortality (0-14 days)
> or < 3.7 %

Colostrum management (BioSecure)



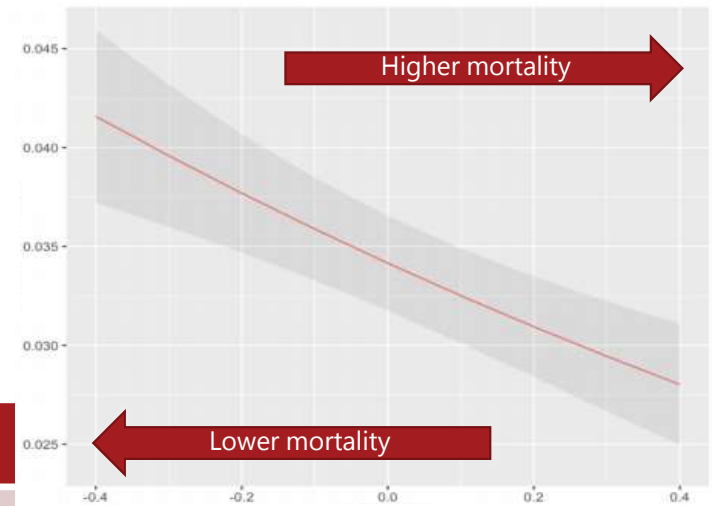
Calf mortality & management

- Associations between BioSecure answers and calf mortality 0-14 days in 81 Danish dairy herds

- Multi component analysis (MCA)

Question	Low vs. high mortality
Colostrum control	None >< Brix %
Use of low quality colostrum	No control >< only fed to bull calves
Time of colostrum feeding	None, feeding after more than 4 hours >< max 4 hours pp
Disease control/handling of sick animals	No measures >< Disease control measures
Protective gloves	Never, rarely >< Frequently, always
Washing of boots	Rarely (only when dirty) >< Frequently (between calves)

Probability of calf mortality



Clustering of herds - Colostrum & hygiene

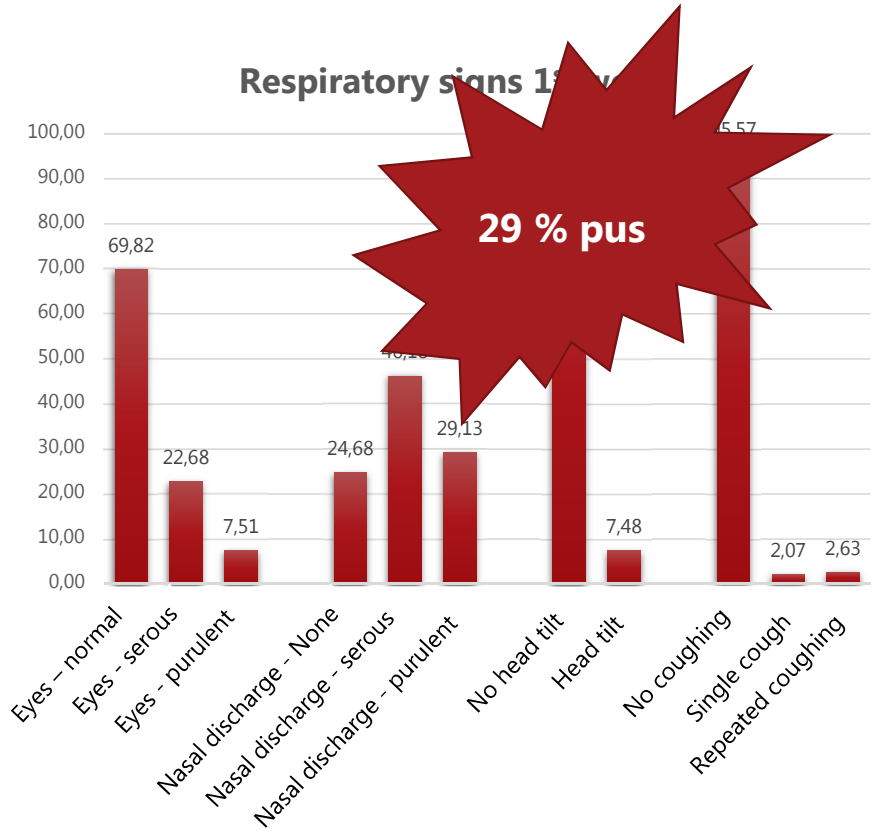
Conclusions

The better the disease control is, the lower calf mortality

Basic hygiene and dairy keeping recommendations do have an effect on calf mortality

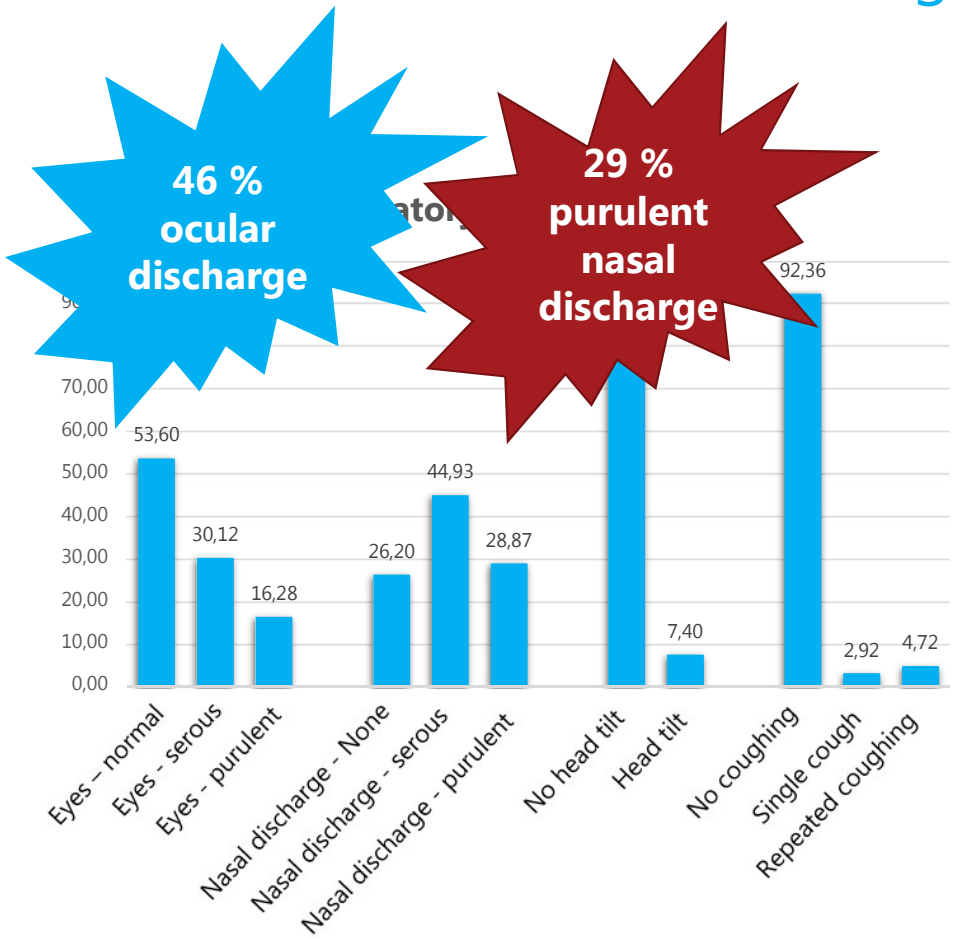
“WHAT ABOUT THE ROBUST CALF?”

Cohort calves 1st week of age



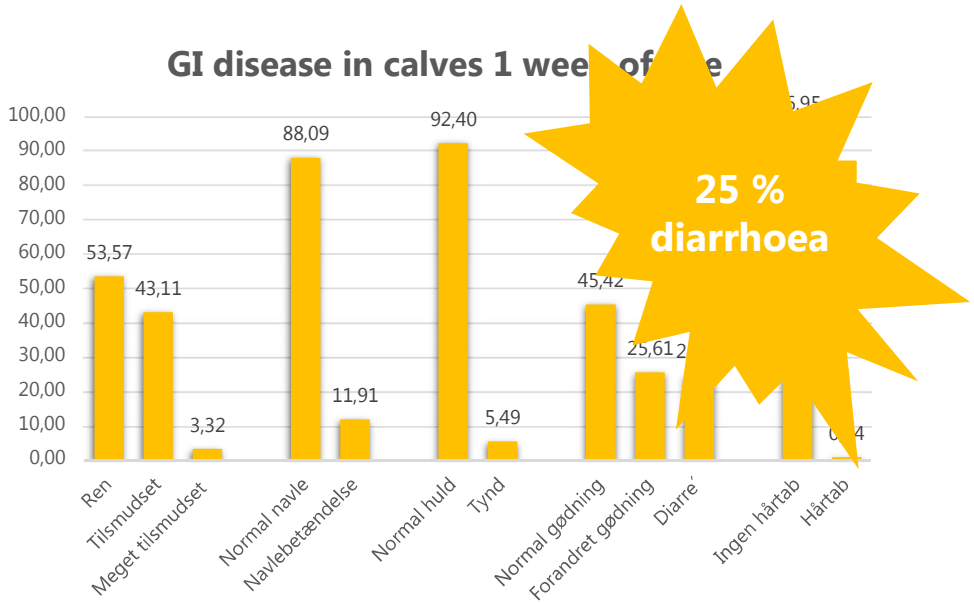
	Positive calves	Positive herds
BRSV	0	0
Parainfluenza	0	0
Coronavirus	0	0
Mycoplasma bovis	1	1
Mycoplasma spp ★	15	7
M. hemolytica	5	4
H. Somni	3	1
P. multocida ★	14	7
T. pyogenes ★	48	18

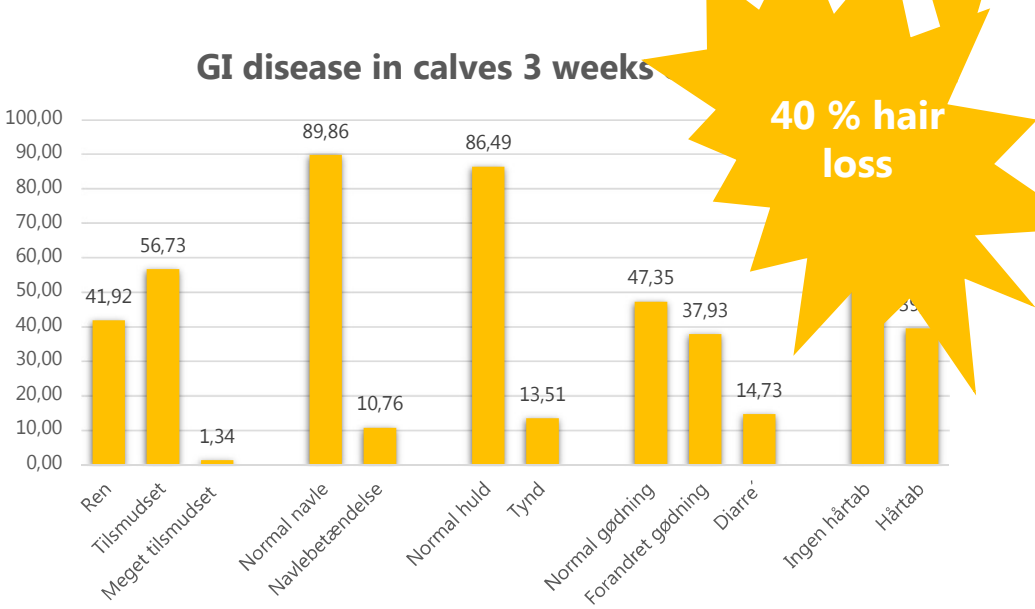
Cohort calves 3rd week of age



	Positive calves	Positive herds
BRSV	1	1
Parainfluenza	0	0
Coronavirus	3	2
Mycoplasma bovis	4	2
Mycoplasma spp ★	29	13
M. hemolytica	7	5
H. somni	8	3
P. multocida ★	35	15
T. pyogenes ★	42	21

Gastrointestinal disease





Etiology	1st week (N=298)	3rd week (N=224)	12th week (N=77)
Rotavirus	65 (22 %) ★	46 (21 %)	1 (0.1 %)
E.coli	14 (5 %)	2 (0.9 %)	0 (0 %)
Cryptosporidiosis	56 (19 %)	72 (32 %) ★	1 (0.1 %)
Coccidiosis	0 (0 %)	1 (0.4 %)	20 (26 %) ★

Associations between FPT & health outcomes

Nasal discharge

FPT = 29 %

Immunized = 23 %

OR: 1.40

Calves with FPT had a 40 % higher risk of purulent nasal discharge

Diarrhoea

FPT = 29 %

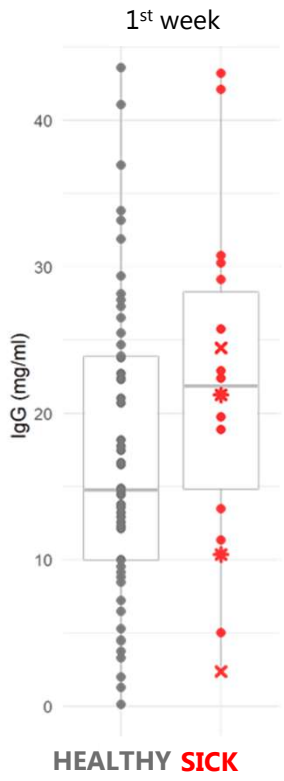
Immunized = 22 %

OR: 1.39

Calves with FPT had a 39 % higher risk of diarrhoea

	Diarrhoea	Normal feces
Purulent nasal discharge	67	162
No nasal discharge	162	546

Consequences for the single calf?



SICK CALVES

- **Diarrhoea**

x Pneumonia

*** Both**

Do robust calves originate in 'Robust systems'?

- Data from cohort cluster

Herd A: 940 g

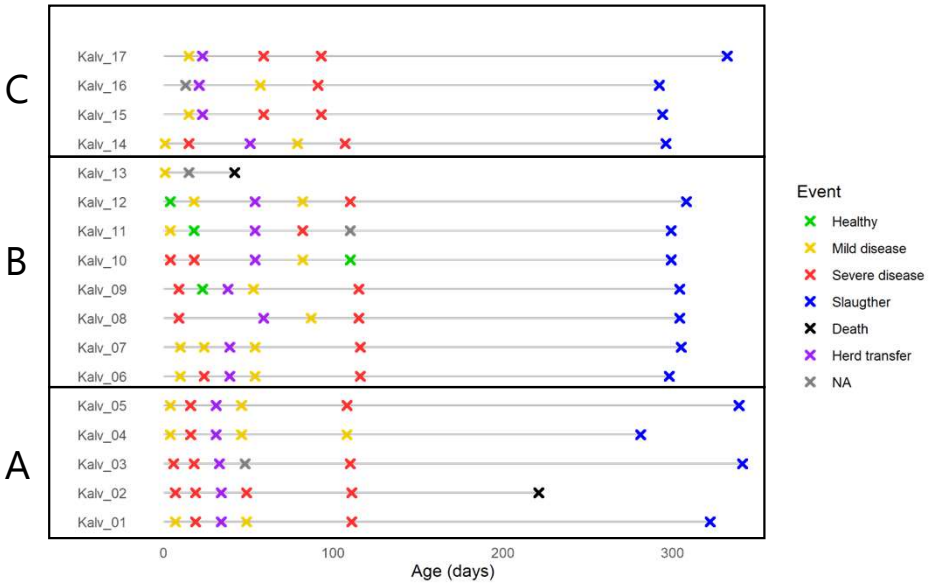
Herd B: 1089 g

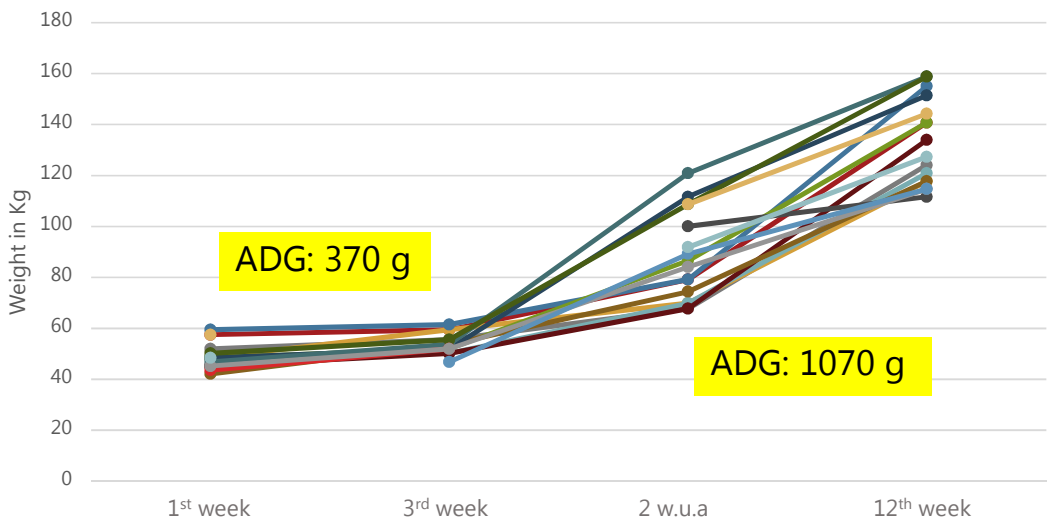
Herd C: 947 g

Herd A: 50 % with FPT

Herd B: 23 % with FPT

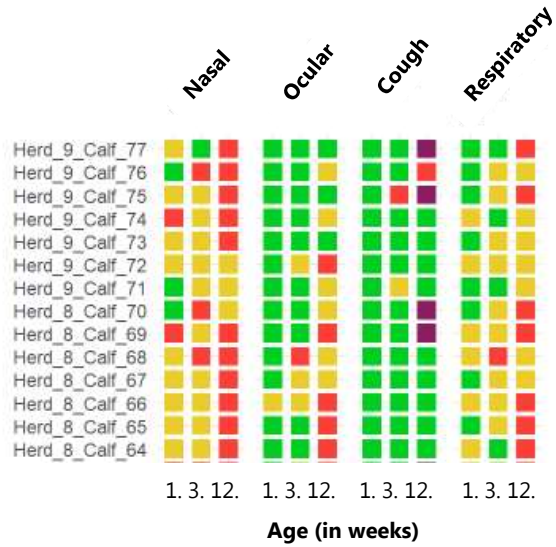
Herd C: 71 % with FPT

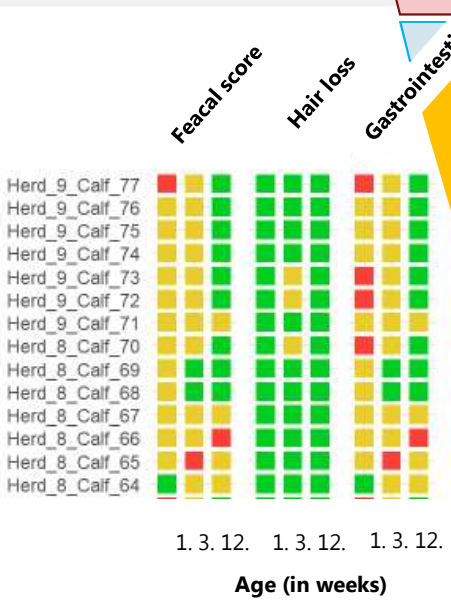


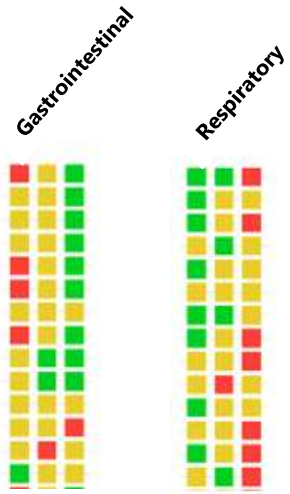


Once sick – always sick???

- Associations found between the proportions of calves with FPT and higher calf mortality (0-14 days)
- Insufficient immunization -> higher probabilities of diarrhoea and respiratory disorders
- Diarrhoea in first weeks-> higher probabilities of respiratory disorders at 12 weeks of age







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Conclusions

- Robustness starts at birth:
  - Immunization & colostrum → Focus on quality & quantity!!!
  - "Sick" calves in robust systems → Immunity, early recognition & interventions
    Systematic health monitoring
  - Identify pathogens → Herd specific profiles & therapeutic plans
  - Coordinated effort → Discuss, learn & inniate changes

Thoughts on taboos

On norms, habits and ways of thinking in the junction between humans, cattle, farming systems and the use of antibiotics

Dorte Bay, DVM, Ph.D., assistant professor,
University of Copenhagen

Why do the Danish cattle farms look and operate the way they do anno 2022?

21. Robust kalveproduktion med lavt a

Mange kalve er dårligt immuniserede og får diarré eller luftvejssymptomer. Hør mere om det og om den store forskel i pasningsniveau og forekomst af sygdomsfremkaldende mikroorganismer, der er mellem bedrifter. Men ikke alt er praktik. Vi kommer også ind på, om vi i kvægbruget spænder ben for os selv med tabuer om dødelighed, hygiejne og antibiotika.

Nina Dam Otten
lektor og dyrlæge, Københ ersitet
Dorte Bay Lastein
adjunkt og dyrlæge, Køben s Universitet

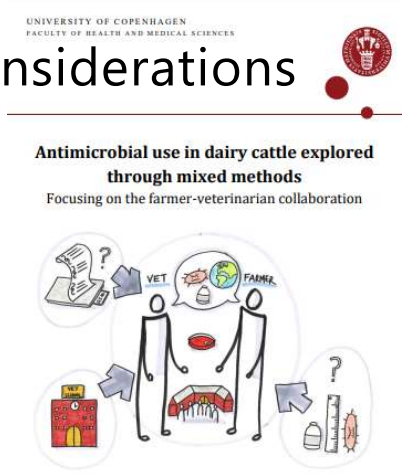
A taboo?

What does TABOO mean? (Wikipedia)

In daily use TABOO means ”things we do not talk about”, perhaps with the intention of not remembering bad things that we try to forget.

We show (often counterproductive) behavoir or misconceived considerations by not talking about taboos.

“One does not want to be a ‘skruebrækker’’
(DA: Do not want to break the norms by talking loud about low AMU)
Quote farmer in stable school


UNIVERSITY OF COPENHAGEN
FACULTY OF HEALTH AND MEDICAL SCIENCES

Antimicrobial use in dairy cattle explored through mixed methods

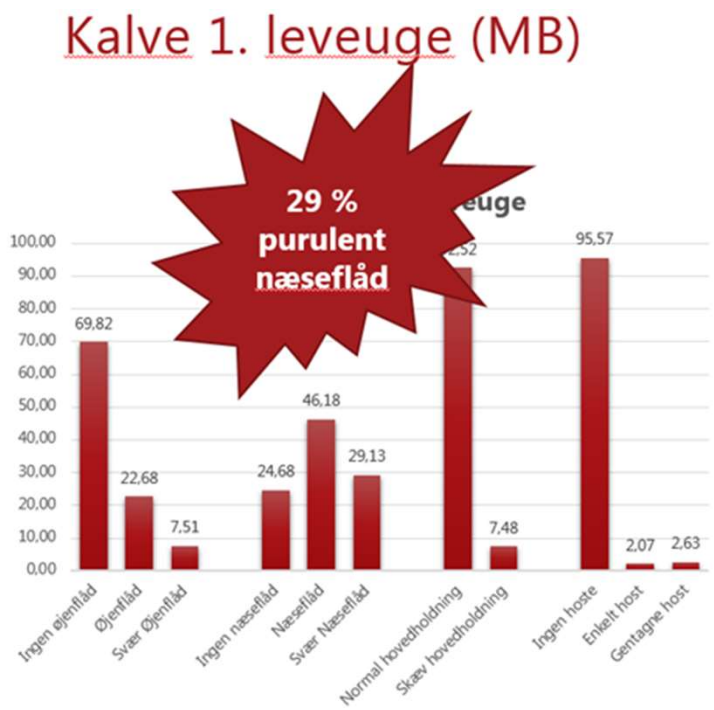
Focusing on the farmer-veterinarian collaboration

PhD Thesis 2021 • Nanna Krogh Skjølstrup

This thesis has been submitted to the Graduate School of Health and Medical Sciences, University of Copenhagen, 30th December 2021

https://cphcattle.ku.dk/publikationer-og-referencer/phd-afhandlinger/Nanna_Krogh_Skj_lstrup__PhD_Thesis__for_sharing.pdf

Does 'Robust calves' exist at all?



298 KALVE UNDERSØGT VED 0-10 DAGE

Are results all the negative effects of present Danish stable systems and calf management?

Actions and attitudes.

Does 'Robust calves' exist at all?

A calf is a newborn animal, hence fragile and vulnerable compared to older animals of same species.

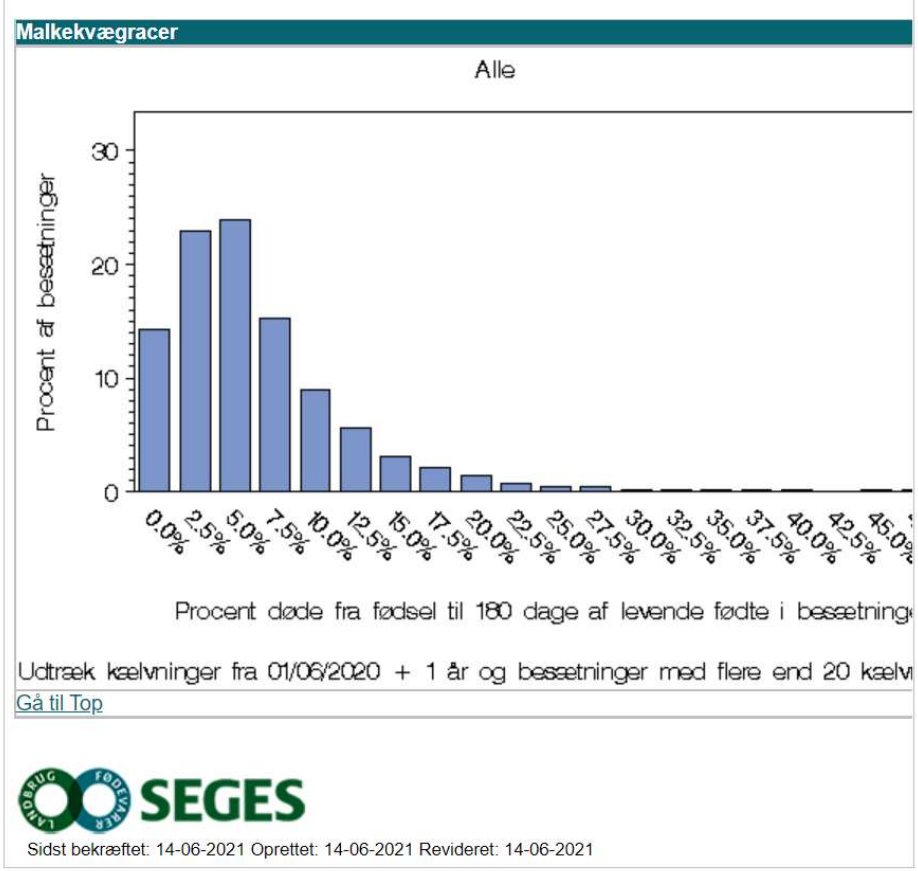
A calf has no active immunesystem at birth.

A calf is totally dependent on colostrum and bovine or human caretaking in suitable environment.

Calves are quite different (size, breed, temperament, sex,…) thus they have different needs.

What is a 'Robust calf' for you?

- A cal
- A cal
- A cal
- A cal



6-10% of calves die across the year dependent on season in Danish dairy herds..

That does not seem 'robust' to me..
It seems fragile.

TABOO? – The present norms of disease and death rates, levels of management practices…

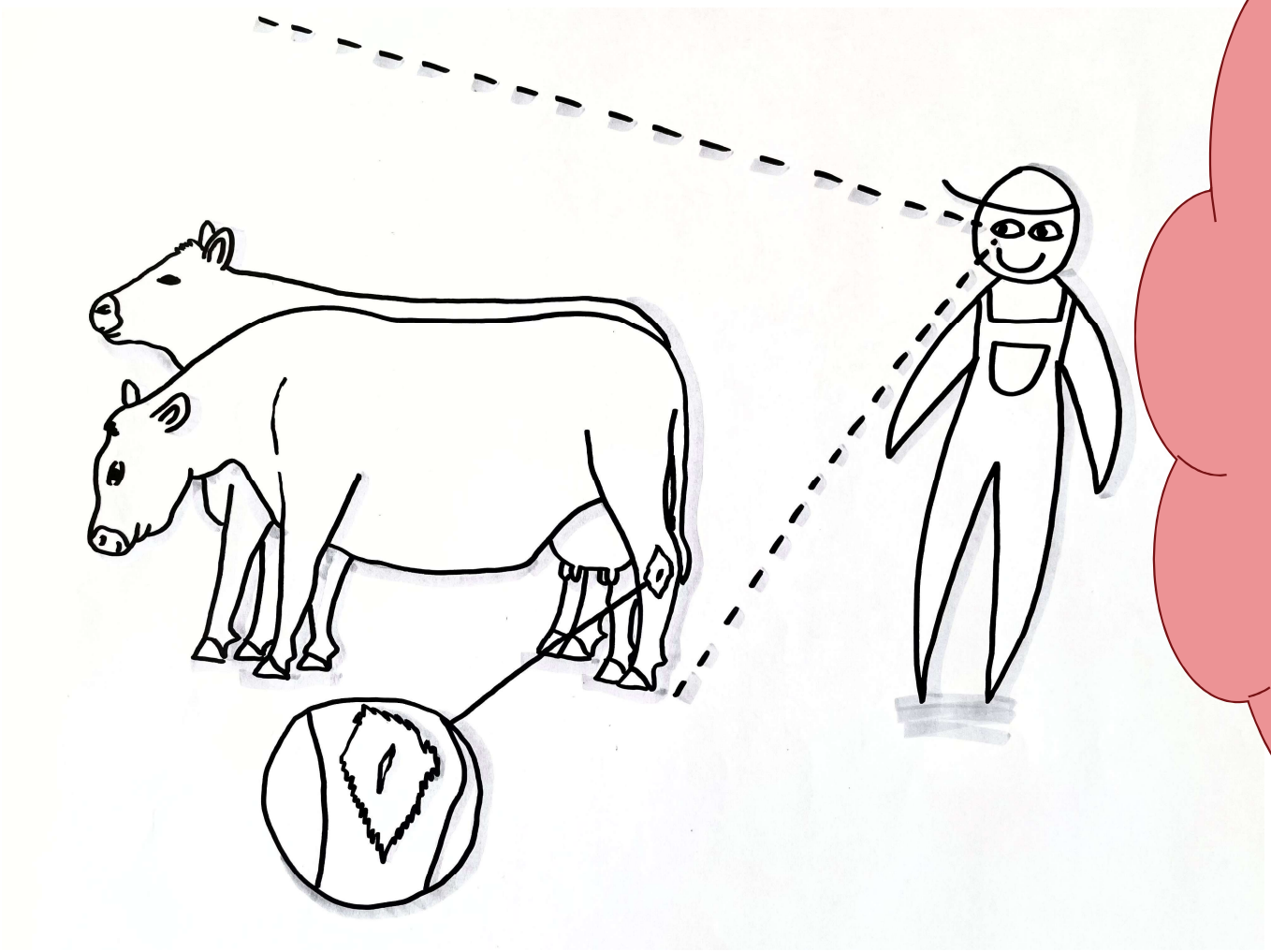
"I am not that typ
of

"The need of milk does
not co
pric
Qu

Can recognition of our own norms and strange habits change attitudes and actions?

Could breaking the taboos change our habits?

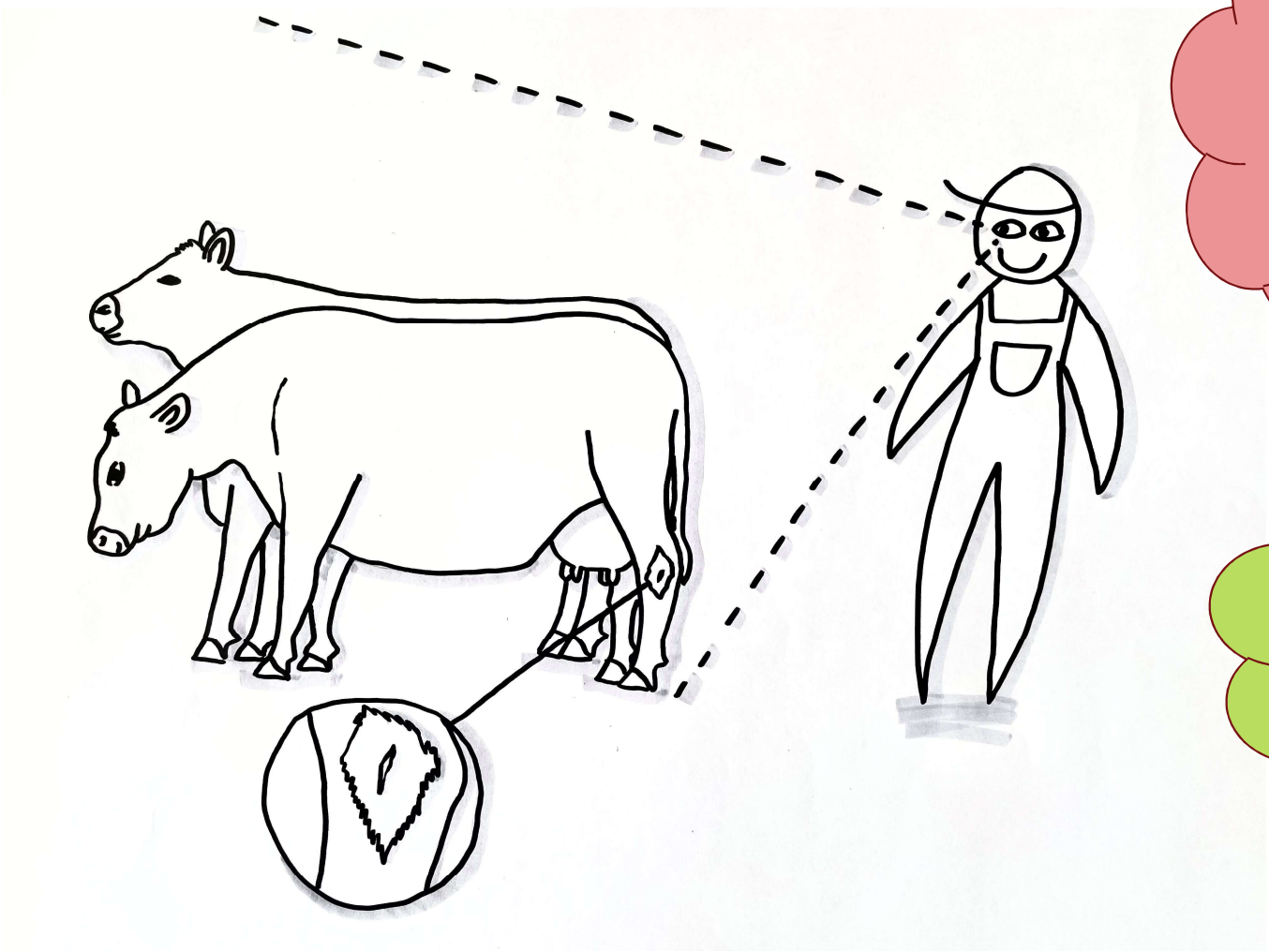
How do we see the animal?



Are normal conditions (fx calf morbidity of 30%, calf mortality of 6-10%) normal at all?

Are normal conditions acceptable just because they are frequent and difficult to avoid?

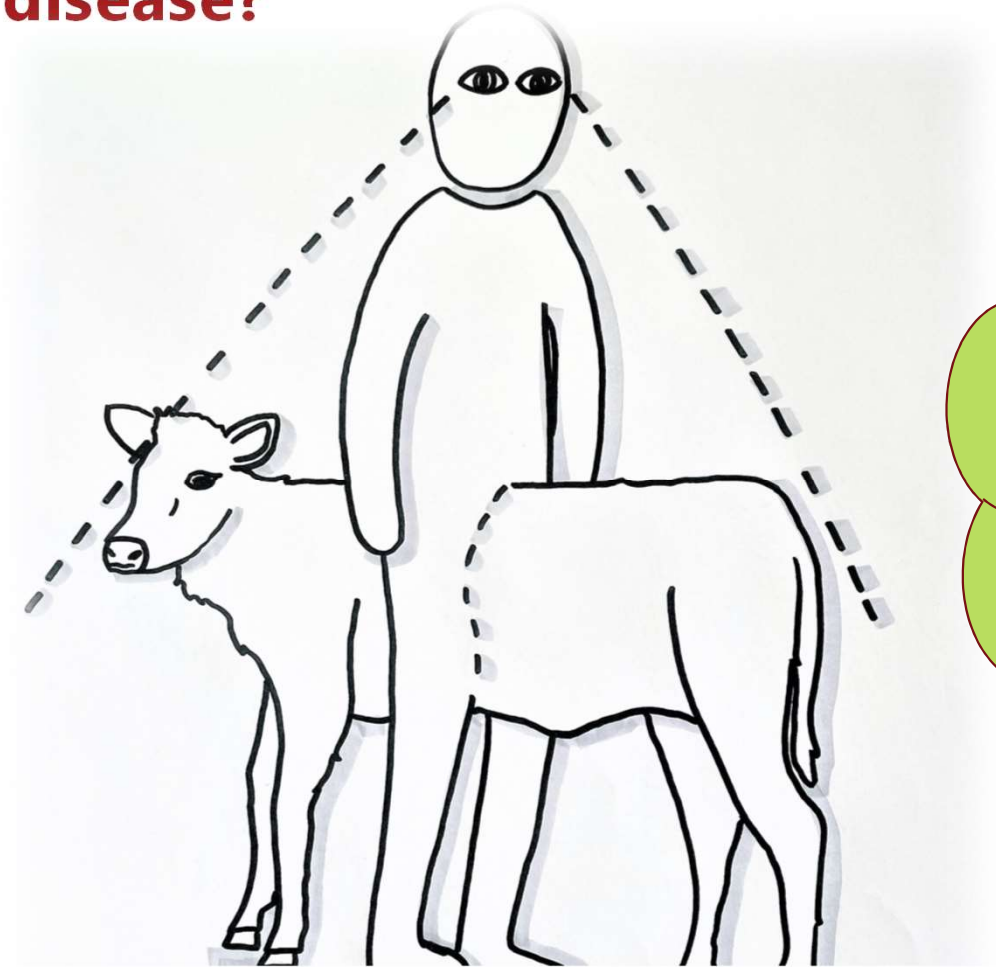
How do we see the animal?



Are we trying to avoid or forget the unpleasant?

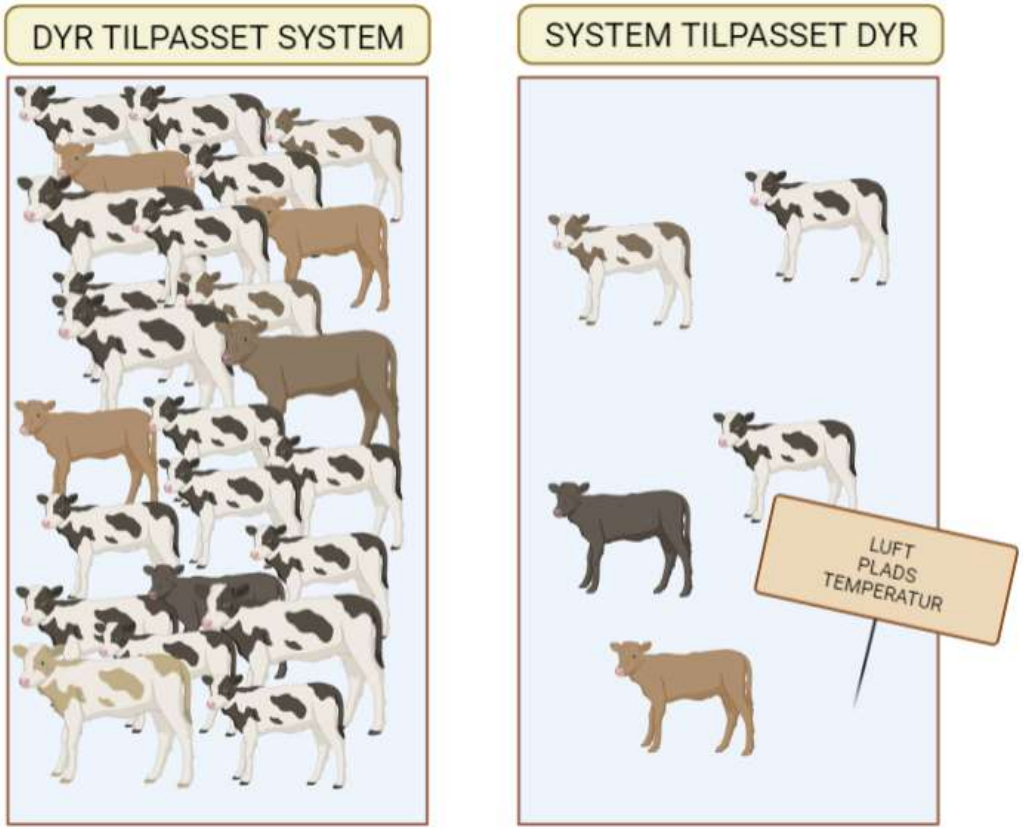
"It hurts the man"
Quote stable school

Do we calf-scan and detect early changes in behaviour as sign of disease?



Do we look at the animal as a whole and take care of it in accordance to it special needs?

Taboo? – lack of care in overstocked systems

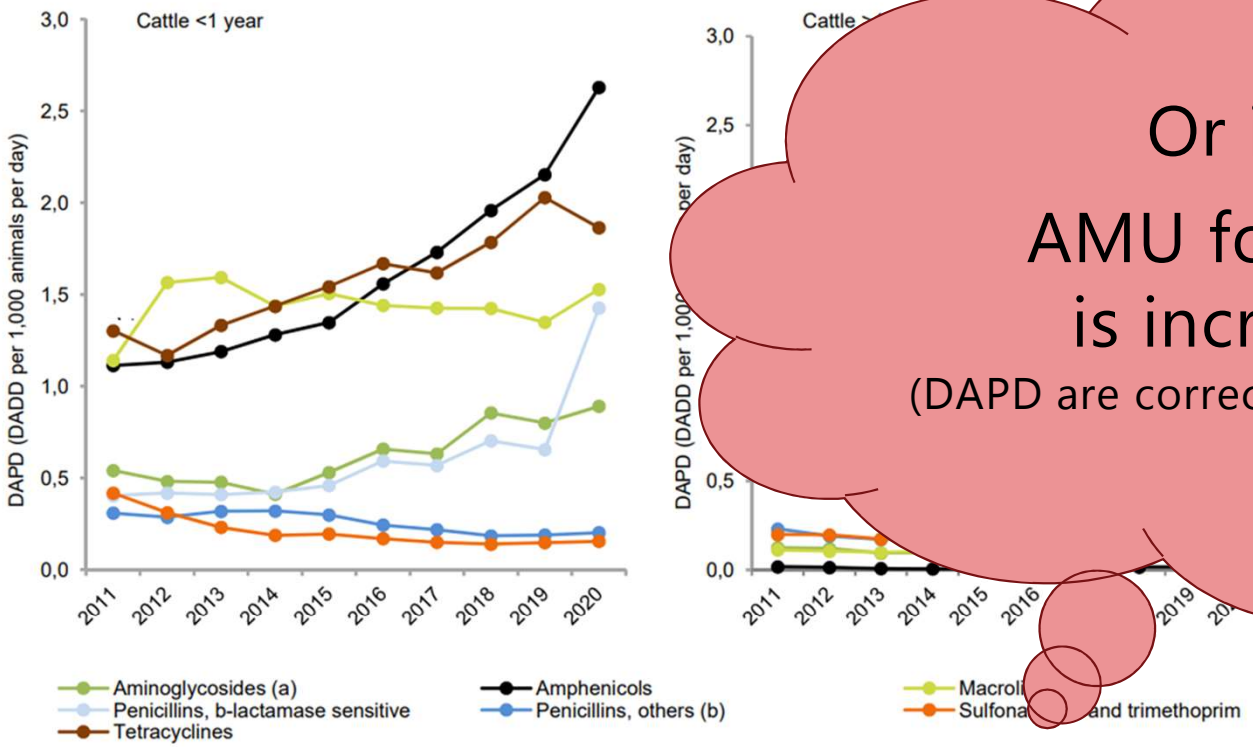


Can we adapt fragile young animals to a harsh and inflexible environment and expect good results?

What is a softer and more flexible element compared to iron and concrete?
Systematic procedures combined with individual caretaking?

But everything is good in Denmark..

Figure 4.7 Use of antimicrobial agents in cattle, DAPD, Denmark

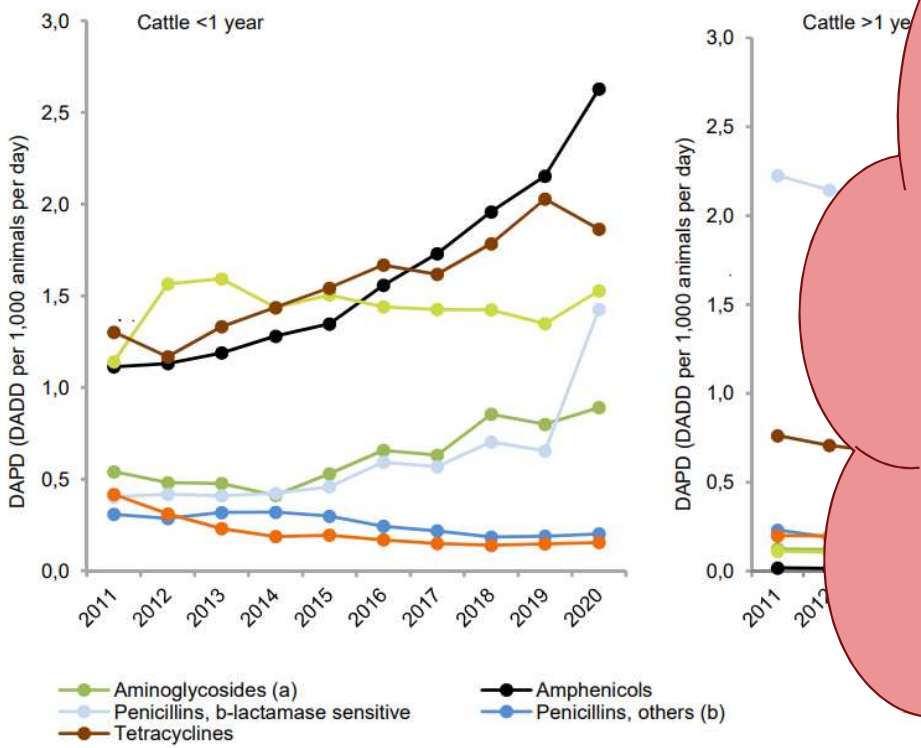


Or is it?

AMU for calves is increasing

(DAPD are corrected for kg animal)

Figure 4.7 Use of antimicrobial agents in cattle, DAPD, Denmark



Are data valid?

Is increase due to few outliers in extremely large herds?

Are animals increasingly ill?

Is the system ill?

Do we overtreat illness?

Has treatment become a habit or an insurance, instead of an exception?

Taboo? – what is prudent use of antibiotics?

"Animals have the right to be treated if diseased"

"Animals have the right to be cared for to reduce disease"

- to reduce antimicrobial usage to a minimum)

Do we make a necessity of a value?

- by claiming animals right to be treated instead of care for?

Barriers for c

- The anim
- The s
- Th
- You

Do you reflect and talk openly about your own challenges and aversions towards change – and do I?

Or are they taboo too?

Thank You for Your time

Contact: dbl@sund.ku.dk

Contact: nio@sund.ku.dk

Foto: M. Durand