

ROBUST CALVES

Current health & immunity status of Danish dairy calves



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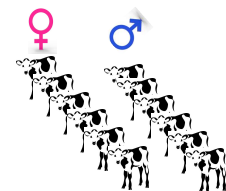
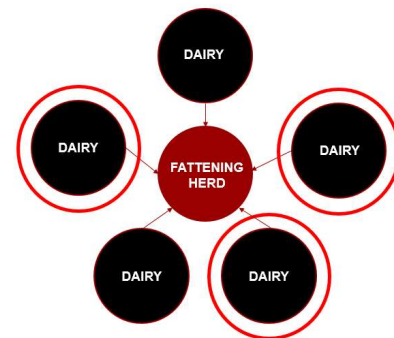


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Study herds

- 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 visit in 17 clusters
 - Cohort study in 9 clusters
 - Objective disease monitoring with six monthly visits in 9 fattening and 9 dairy herds



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

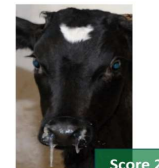
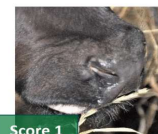
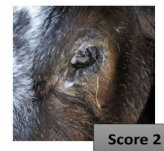
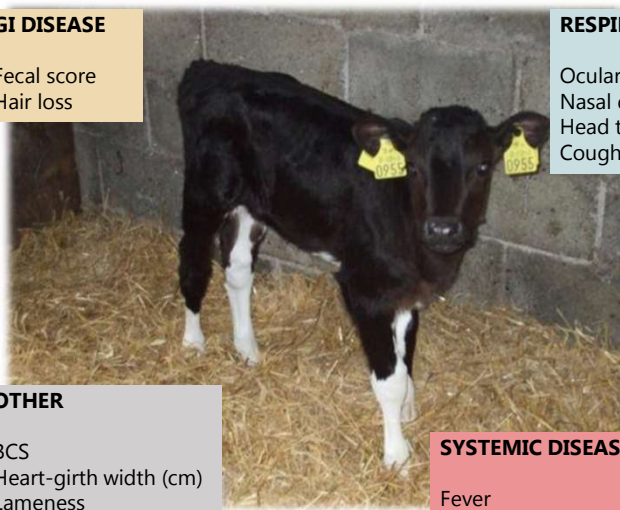
- Blood sample
- Nasal swab
- Fecal sample
- Tracheal lavage

OTHER

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

SYSTEMIC DISEASE

- Fever
- Omphalophlebitis
- Arthritis



Data

RESOURCES & MANAGEMENT

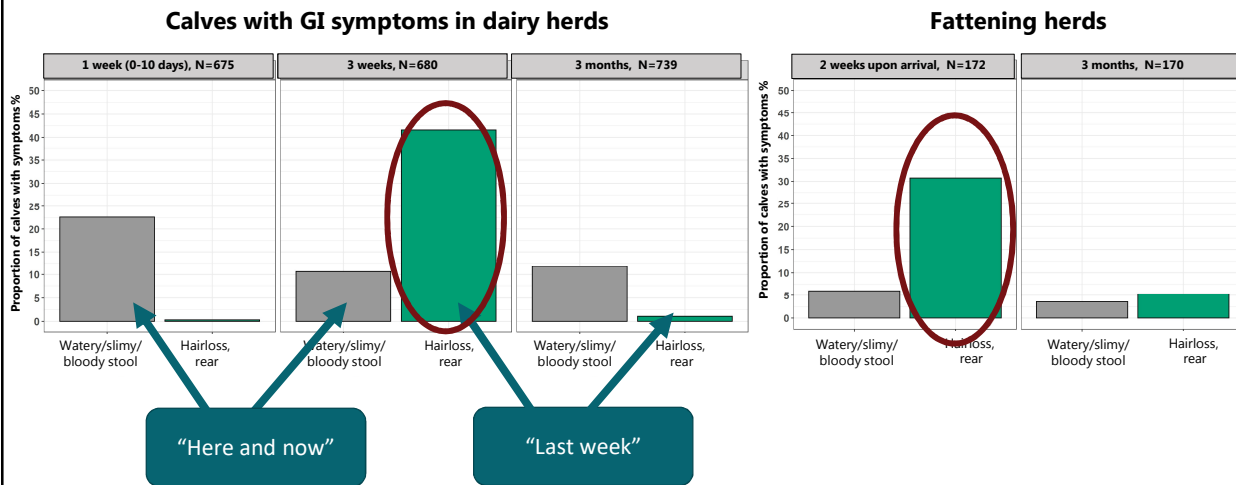
- Housing (in/outside, single/pairwise/group)
- Total area
- Proportion dry area
- Water supply and cleanliness
- Feed bunk/through cleanliness
- BioSecure -> management practices

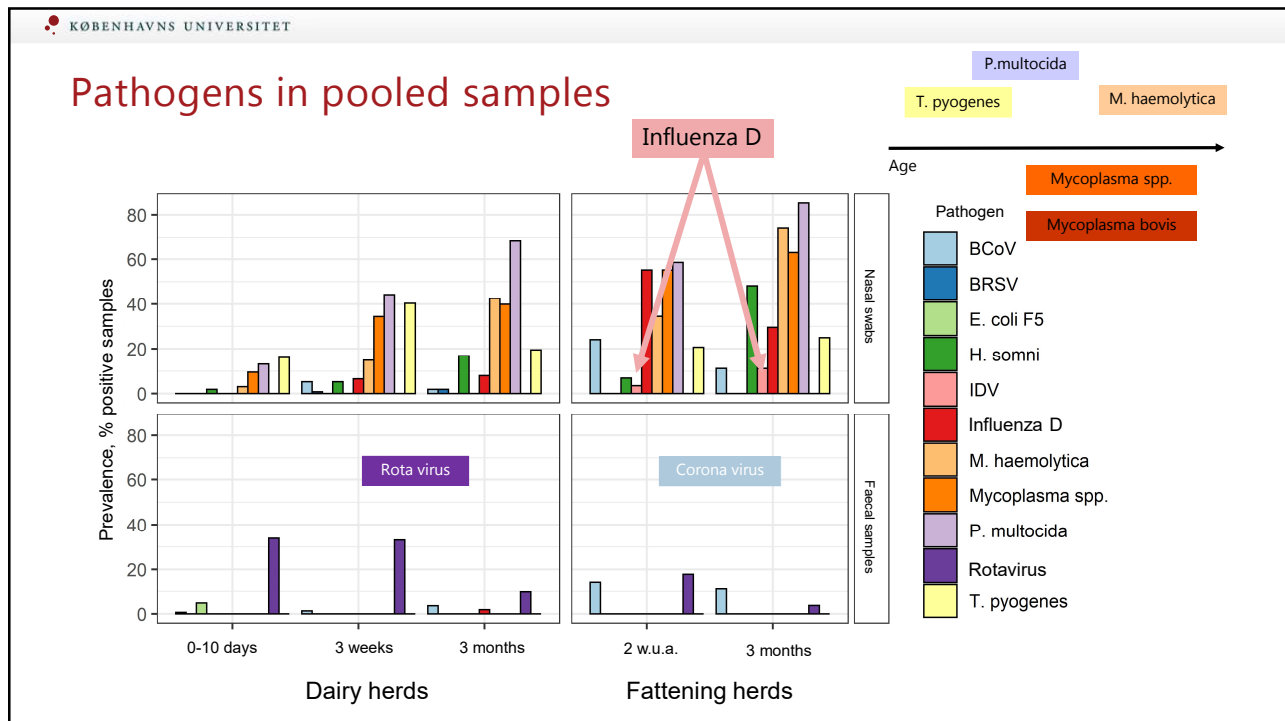
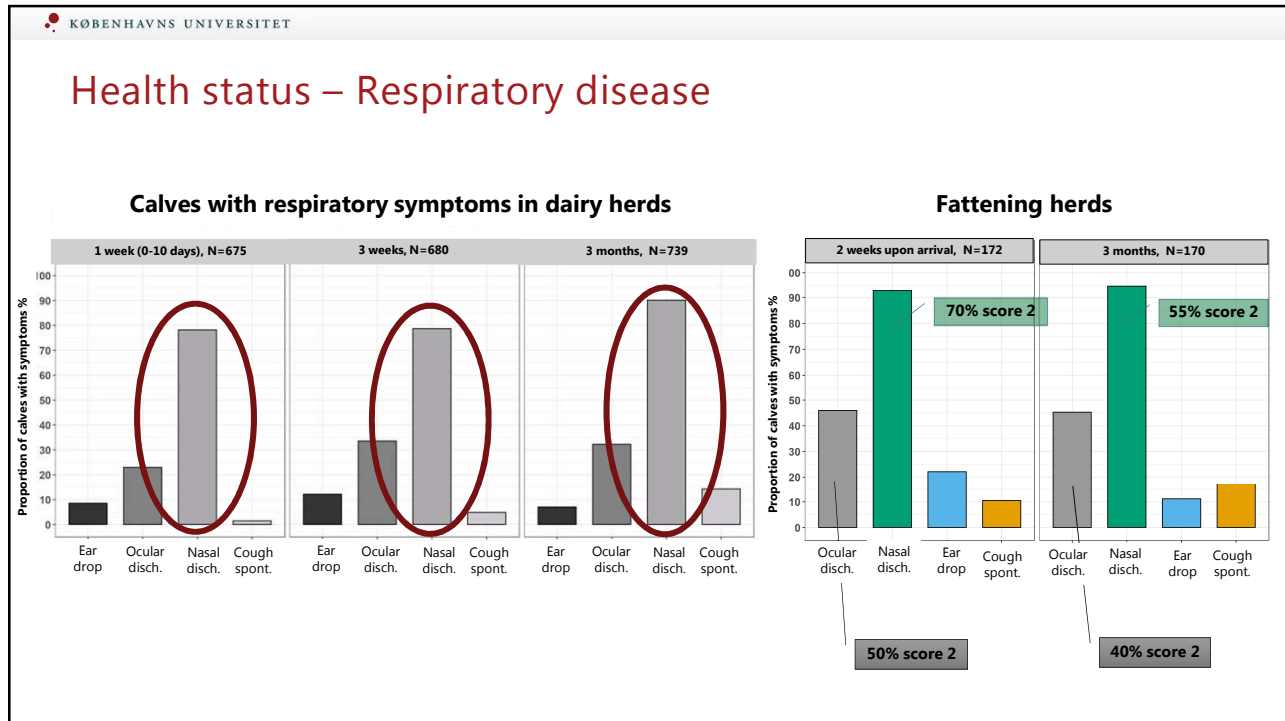


DIAGNOSTICS (Fluidigm RT-PCR)

- 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)

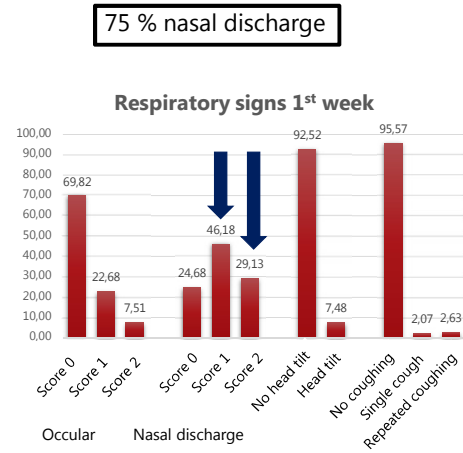
Health status – Gastrointestinal disease





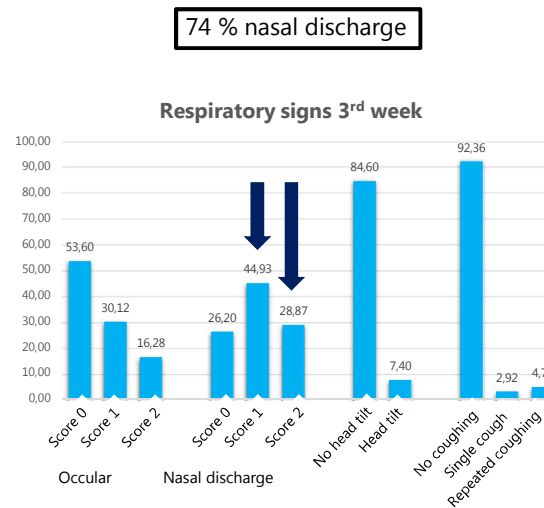
Pathogens & clinical disease 1st week of age

Agens	Calves (N=298)	Herds (N=27)
BRSV	0	0
Parainfluenza	0	0
Coronavirus	0	0
Mycoplasma bovis	1	1
Mycoplasma spp	15 (2/8/5)	7
Manheimia hemolytica	5	4
Histophilus somni	3	1
Pasteurella multocida	14 (2/4/8)	7
Trueperella pyogenes	48 (21/17/10)	18



Pathogens & clinical disease 3rd week of age

Agens	Calves (N=224)	Herds (N=27)
BRSV	1 (1/0/0)	1
Parainfluenza	0	0
Coronavirus	3 (0/1/2)	2
Mycoplasma bovis	4 (0/1/3)	2
Mycoplasma spp	29 (3/10/16)	13 ↑
Manheimia hemolytica	7 (3/4/0)	5
Histophilus somni	8 (0/3/5)	3
Pasteurella multocida	35 (6/13/16)	15 ↑
Trueperella pyogenes	42 (8/24/10)	21



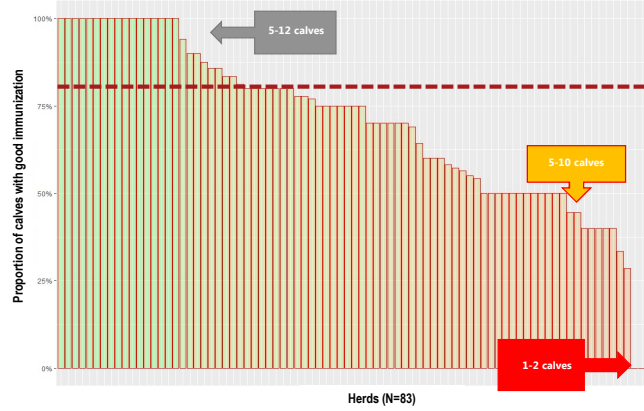
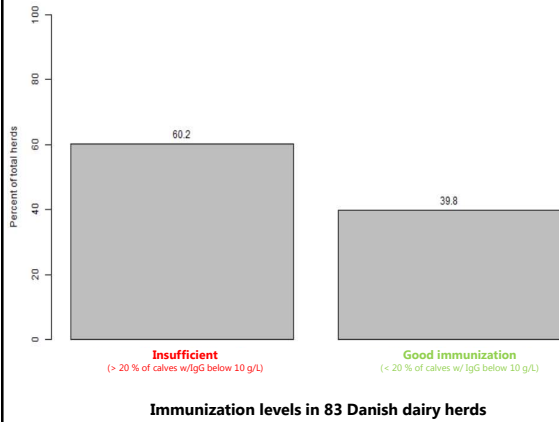
46 % ocular discharge (increase from 30 %)

Immune status in Danish dairy calves

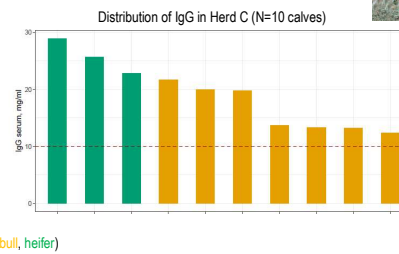
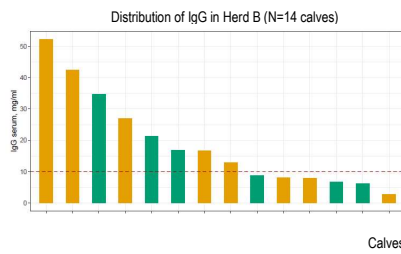


Passive transfer succeeds at IgG in serum min 10 g/L

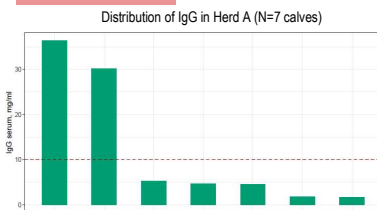
Large variation in the number of calves assessed per herd!!!



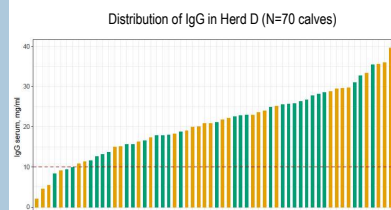
Immune status



Large variations within herds!!!



- 476 heifers & 477 bulls
- Failure of passive transfer (FPT): 286 calves
- IgG herd figures:
 - Min 0.04-20
 - Max 4.8-85.9 (?)
 - Mean 4.7- 23.2



Associations between FPT & health outcomes

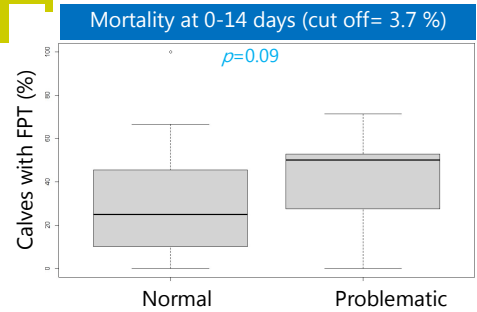


Nasal discharge
 FPT = 29 %
 Immunized = 23 %
OR: 1.40

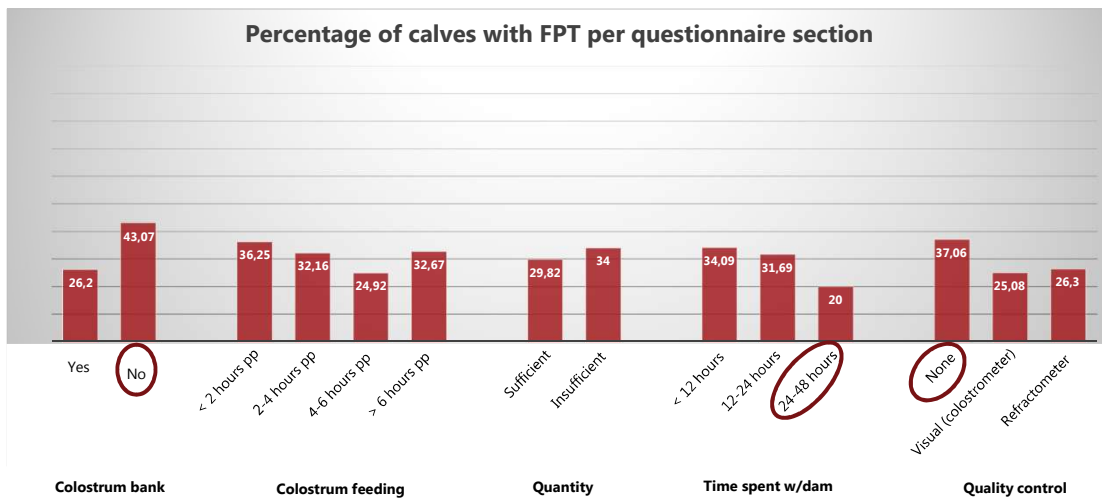


Diarrhoea
 FPT = 29 %
 Immunized = 22 %
OR: 1.39

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



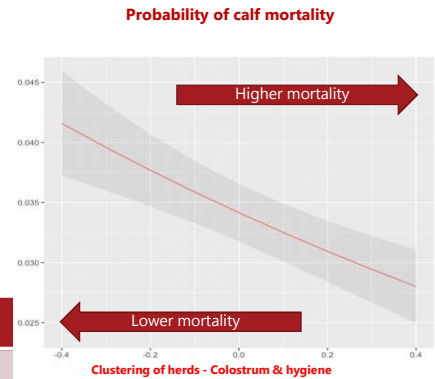
Colostrum management (BioSecure)



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)

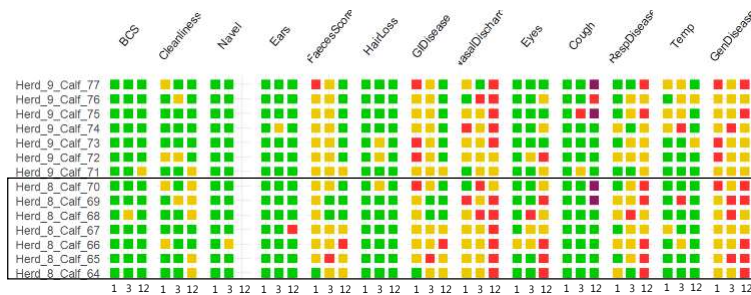


Conclusions

The better the disease control is, the better calf mortality

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

Outcome of the project



Visualization of clinical signs can reveal:

- Seasonal effects
- Possible risk factors
- Pathogen profiles
- Evaluate or lead to interventions

HEALTH MONITORING TOOL

- Calf or group level
- Single signs or disease syndromes



Conclusions



- Robustness starts at birth:

- Immunization & colostrum → Focus on quality & quantity!!!
- "Sick" calves in the first weeks → Immunity, early recognition & interventions
Systematic health monitoring
- Identify pathogens → Herd specific profiles & therapeutic plans
- Coordinated effort → Discuss, learn & initiate changes

