

# Surveillance and Eradication of **Salmonella Dublin –** the Danish Way

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SEGES, Danish Agriculture & Food Council

Støtte af

**Kvæg**afgiftsfonden

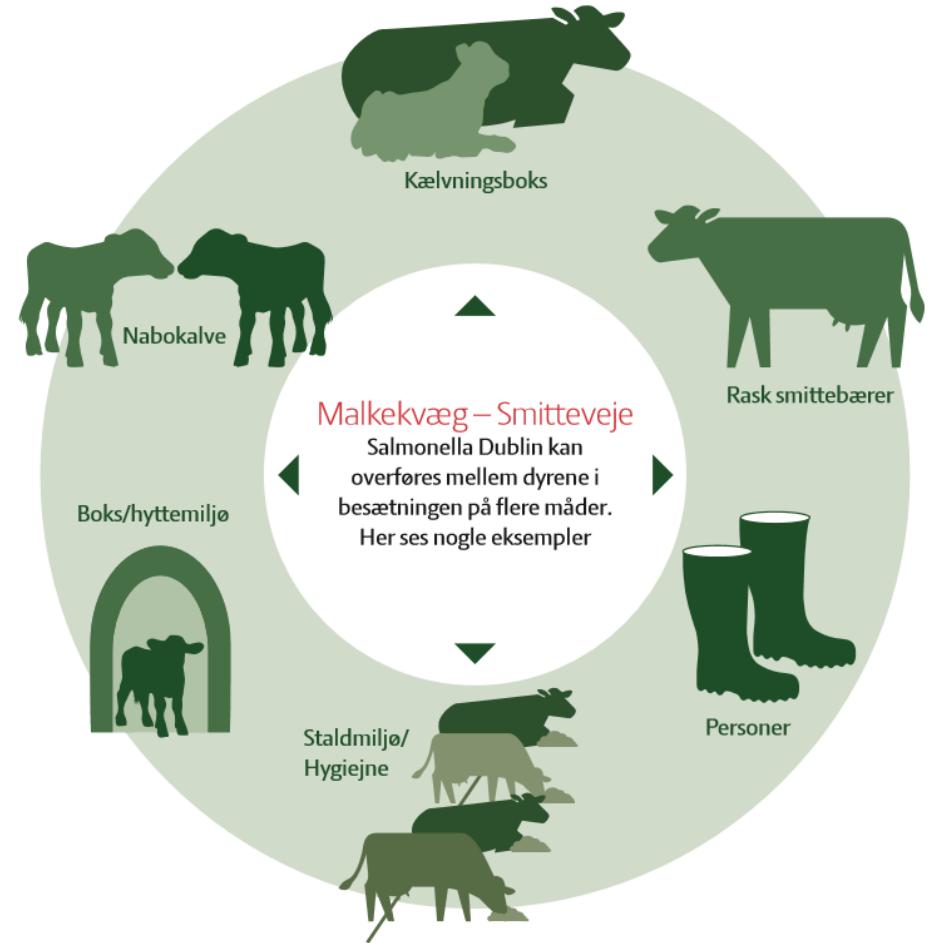
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# Agenda

- Presentation: Me, Denmark and Salmonella
- National surveillance and status
- History and some of the changes in the National Program
- Legislation
- Outbreaks – cases
- Transmission routes
- Eradication – farm level
- Future in Denmark



# Presentation



- Graduated in 2001 from The Royal Veterinary and Agricultural University in Copenhagen with a degree in veterinary Medicine
- 10 years working in private Vet. Practice
- 2010 DVA Certificate in Dairy Herd Health
- 2010-2015 Official vet , the Danish Veterinary and Food Ministry –biosecurity, contingency preparedness and prevention of animal disease
- 2015 – part of a team of veterinarians working for the Danish farmers organisation
- 2019 ICF certified coach

# Denmark



- Population 5.8 million people
- Size 42.924 km<sup>2</sup>
- Herds 15.872
- Dairy herds 2776
- Dairy cows 570.000
- Average herdsize 210
- Cattle 1.530.000

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# Salmonella Dublin - severe zoonosis

- 20-50 Human cases annually
- Septicaemia
- Difficult to treat
- High mortality rate
- Beef-Contaminated
- Unpasteurised Milk Products



Salmonella i hakket oksekød – har du spist det?

17.46 12. okt 2015 | Af Jonathan Lykke Limoës, jl@newsbreak.dk



Hakket oksekød med salmonella-bakterier er solgt til en række spisesteder – holdbarhedsdatoen er overskredet. Foto: Colourbox

Vil vi se et fin 2016?

I denne seneste rapport skribenten og formuefirma, fortæller vi, hvor er på vej hen og hvorfor et mindre antal af de forskellige akademiske fakulteter samt eg analyser, du kan bruge det samme. Ærtnit mull Klik her for at down

FØRER INVENTRUM

Få de seneste nyh

Timelid r

Del på Facebook

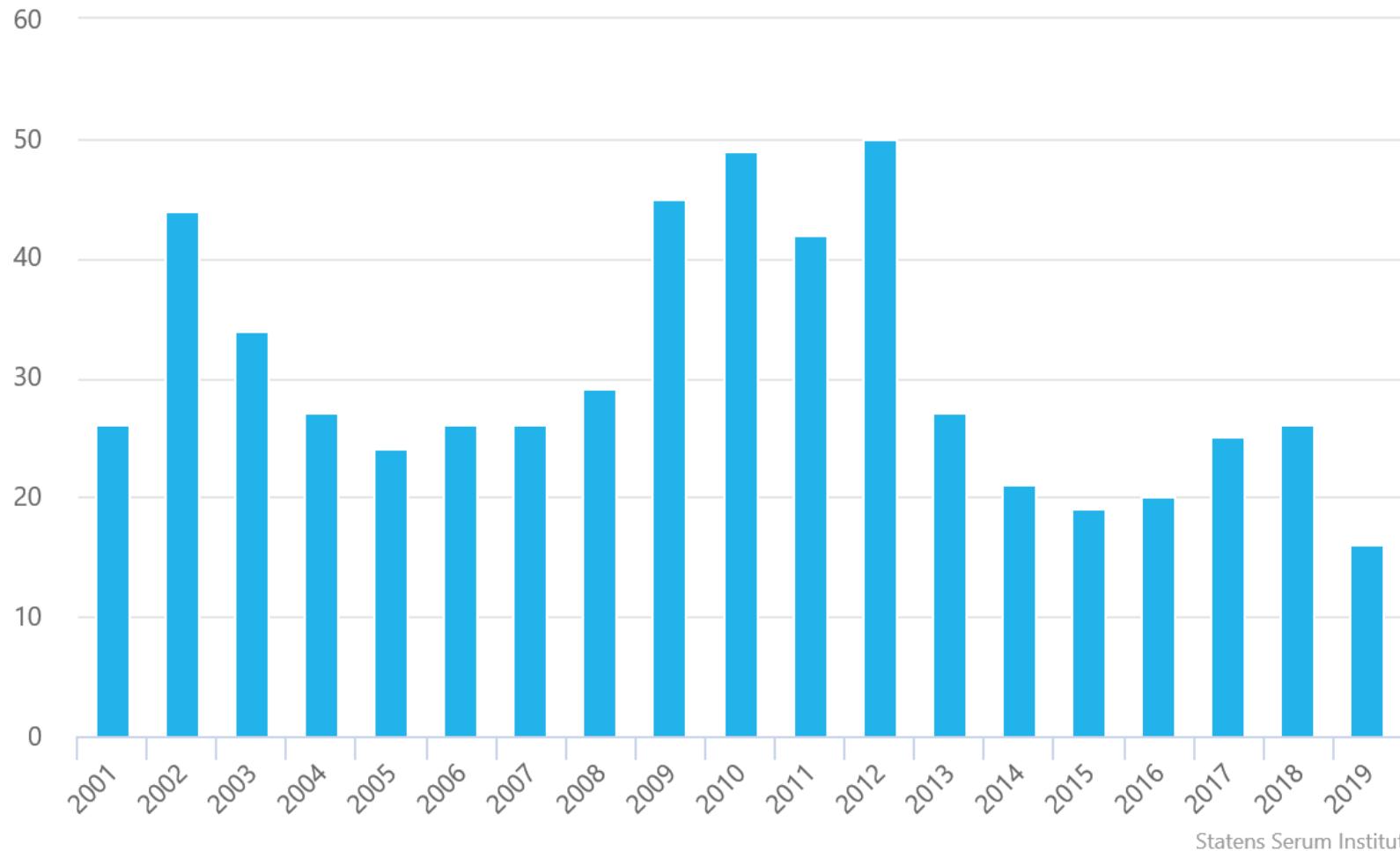
Tjek lige efter en ekstra gang, hvis du for nylig har fået hakket oksekød. Måske har det været inficeret med salmonella.

Fødevarestyrelsen oplyser mandag aften, at et helt parti hakket oksekød trækkes tilbage, fordi der er fundet salmonella bakterier i det.



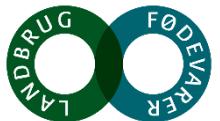
# Humane S. Dublin cases in Denmark

Antal tilfælde af Salmonella, Type: S. Dublin, År: 2001-2019

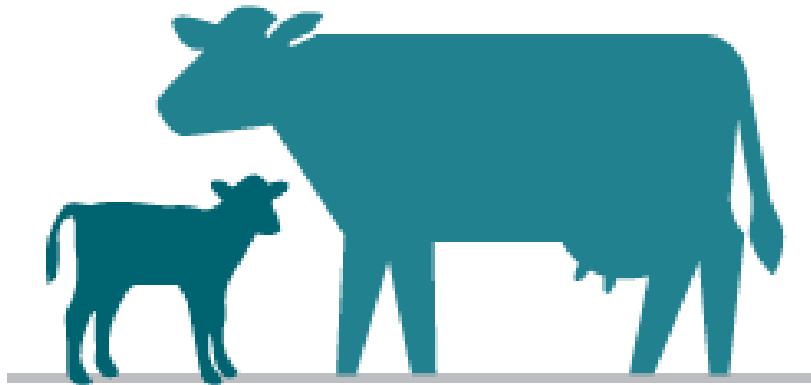


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Statens Serum Institut



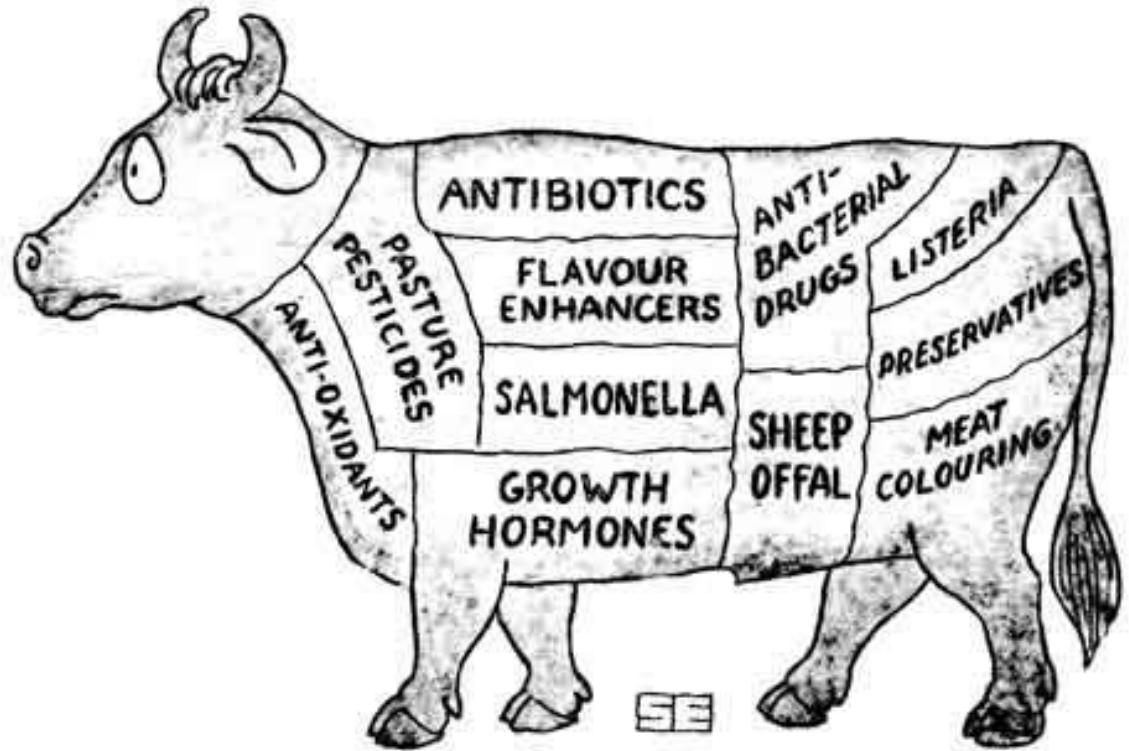
# Why?



- More disease in infected herds.
- Less production in infected herds.
- Risk of salmonella contamination to personnel in infected herds.
- Risk of transmission of salmonella bacteria to beef-food safety.
- Risk of infection to other herds in the immediate vicinity

# Consequence

- What we know:
  - Increased mortality
  - Increased morbidity
  - Reduced milk yield
- What we think:
  - Reduced growth and increased feed consumption
- What we fear:
  - Salmonella in meat at the slaughterhouse – or the consumer



# Surveillance

Bulk tankmilk  
Herd

Blood or milk sample, heifer  
rearing  
Individual Animal

Blood from slaughter  
Herd

Salmonella 4/yearly,

Salmonella 1 – 4/yearly

Salmonella 4/yearly,

# Definition of a Salmonella positive herd



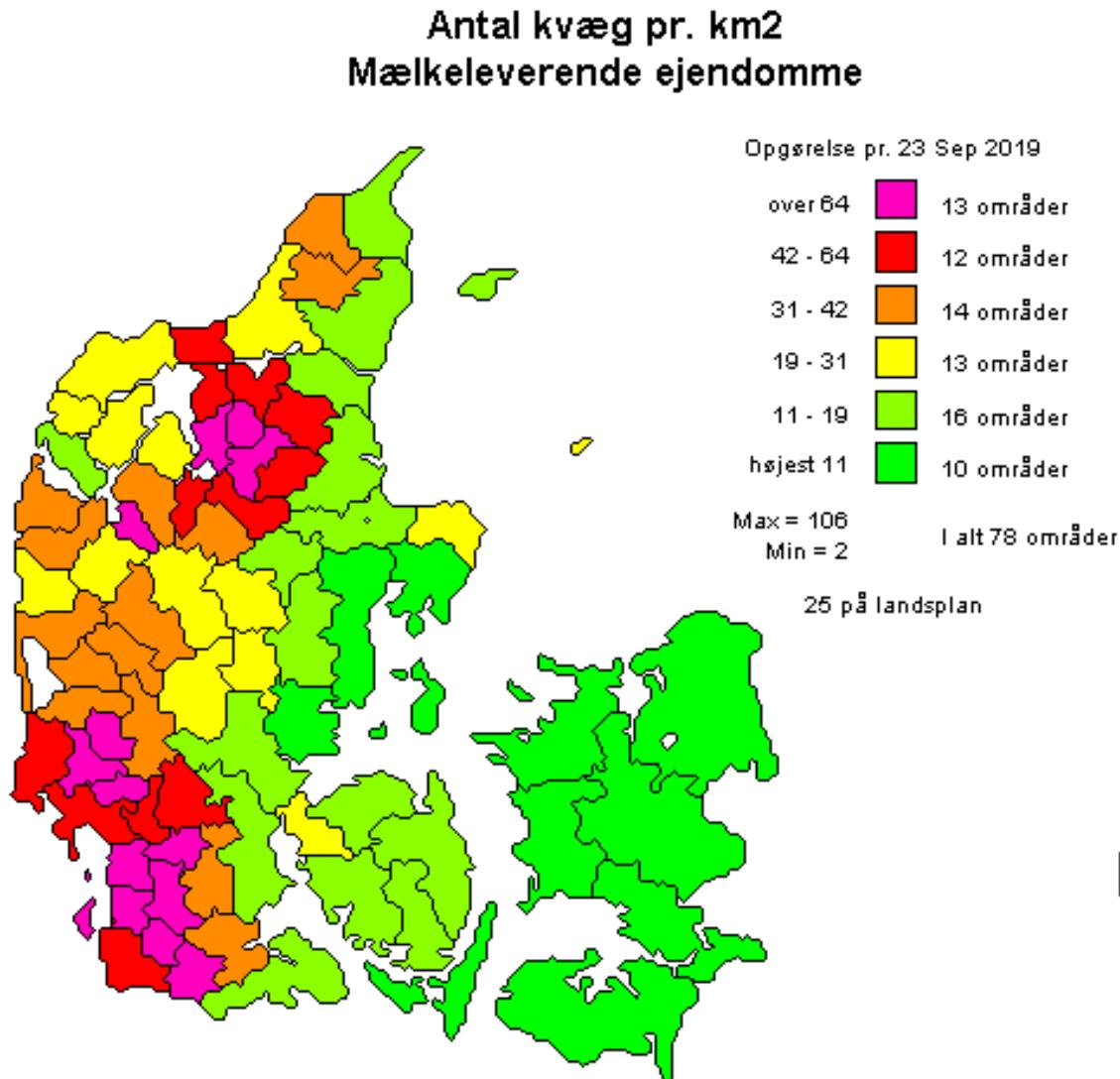
- Bulk tank milk antibody test (ELISA) above 25 ODC %
- Average of the last 4 above 25 ODC %
- A valid test – 21 days since last one
- One positive blood sample – slaughter or test of animals in the herd – cut off value 50 ODC %

## Definition of level

- Salmonella Dublin level 1 – probably free from Salmonella
- Salmonella Dublin level 2 – positive herd, restrictions and demands for eradication etc
- Salmonella Dublin level 3 – positive herd, clinical outbreak with positive findings of bacteria or positive testing because of the Salmonella program



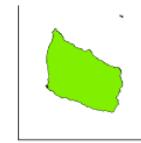
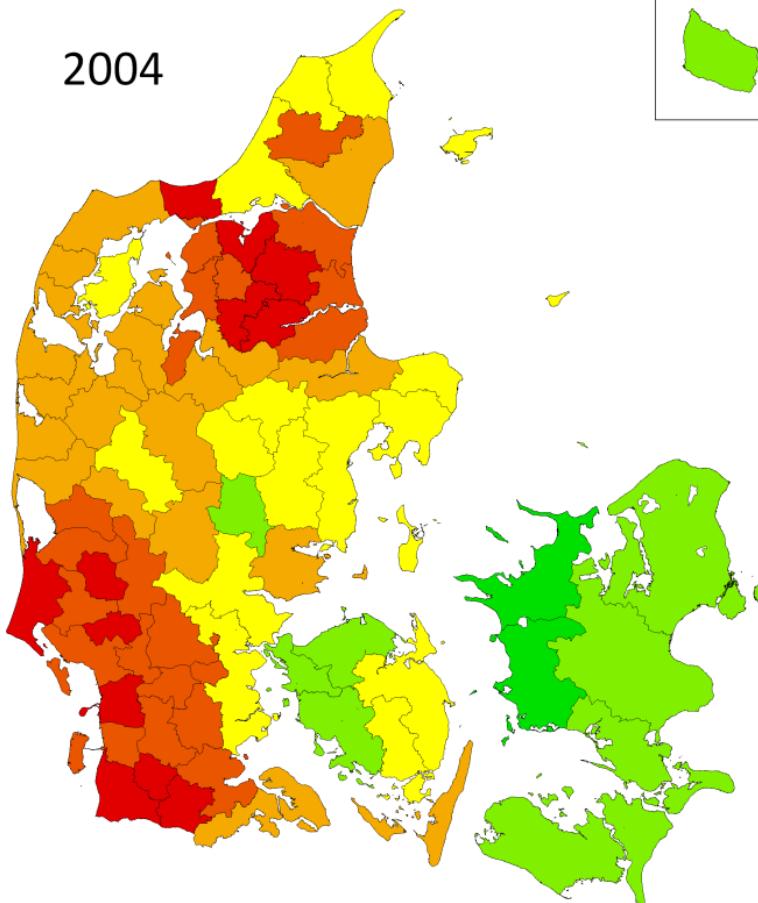
# Cattle density



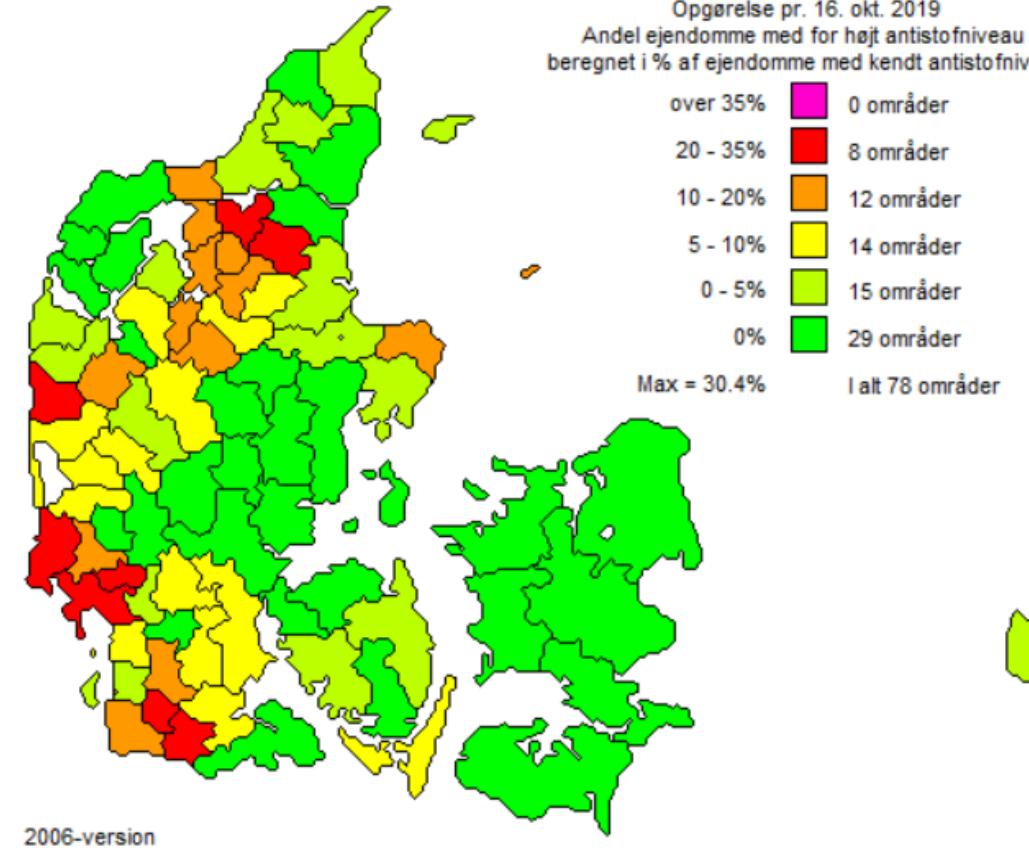
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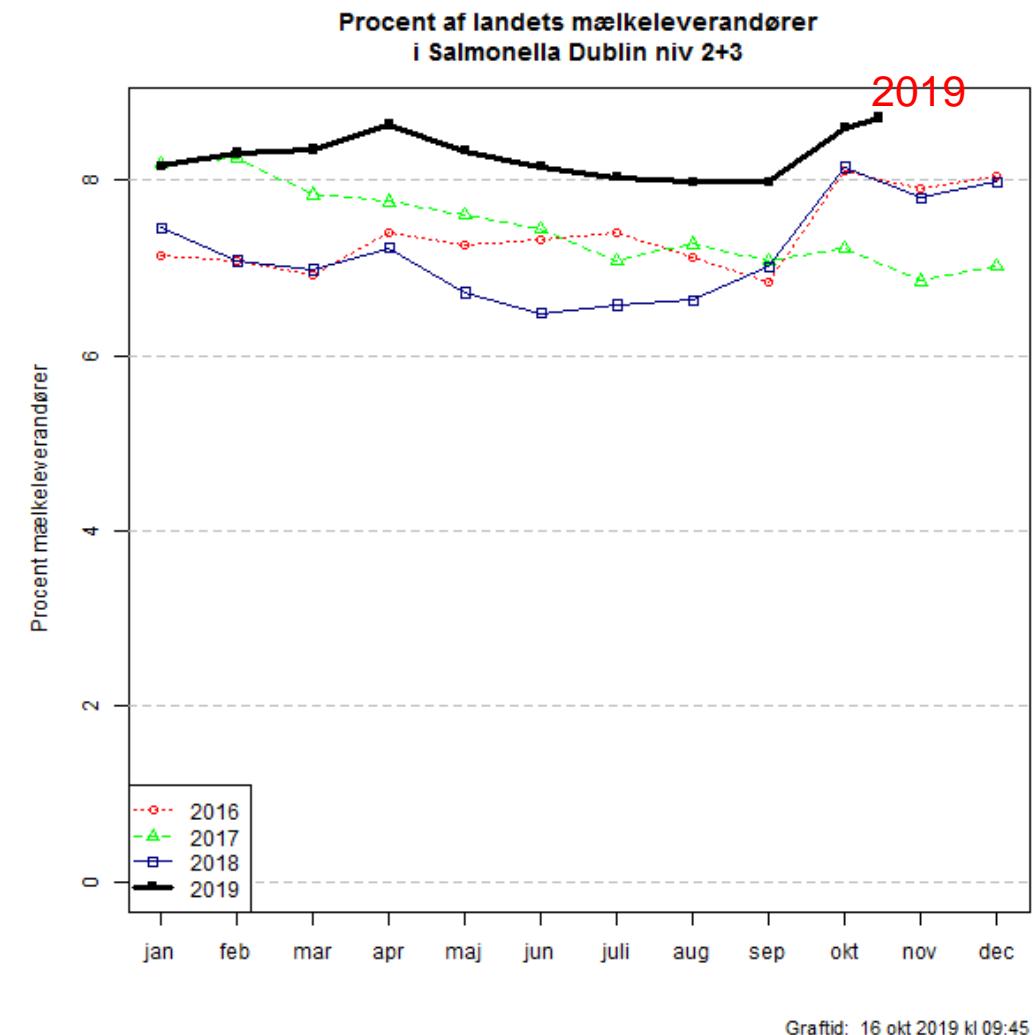
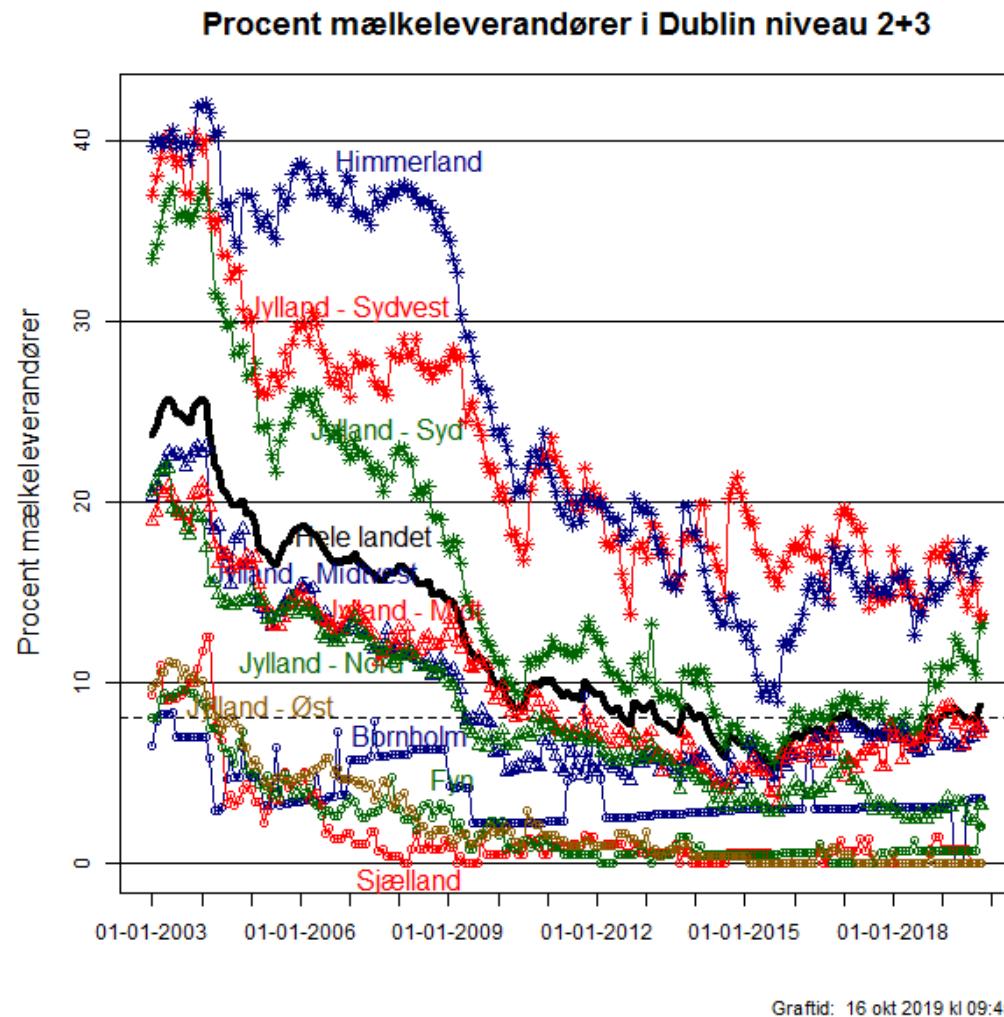
# Development in dairy herds between 2004-2019



Antistoffer - Salmonella Dublin  
Mælkeleverende ejendomme



# Development in Danish Dairy herds



# Eradications of infectious diseases in cattle in Denmark



- Screening
- Voluntary actions



- Surveillance
- Mandatory actions



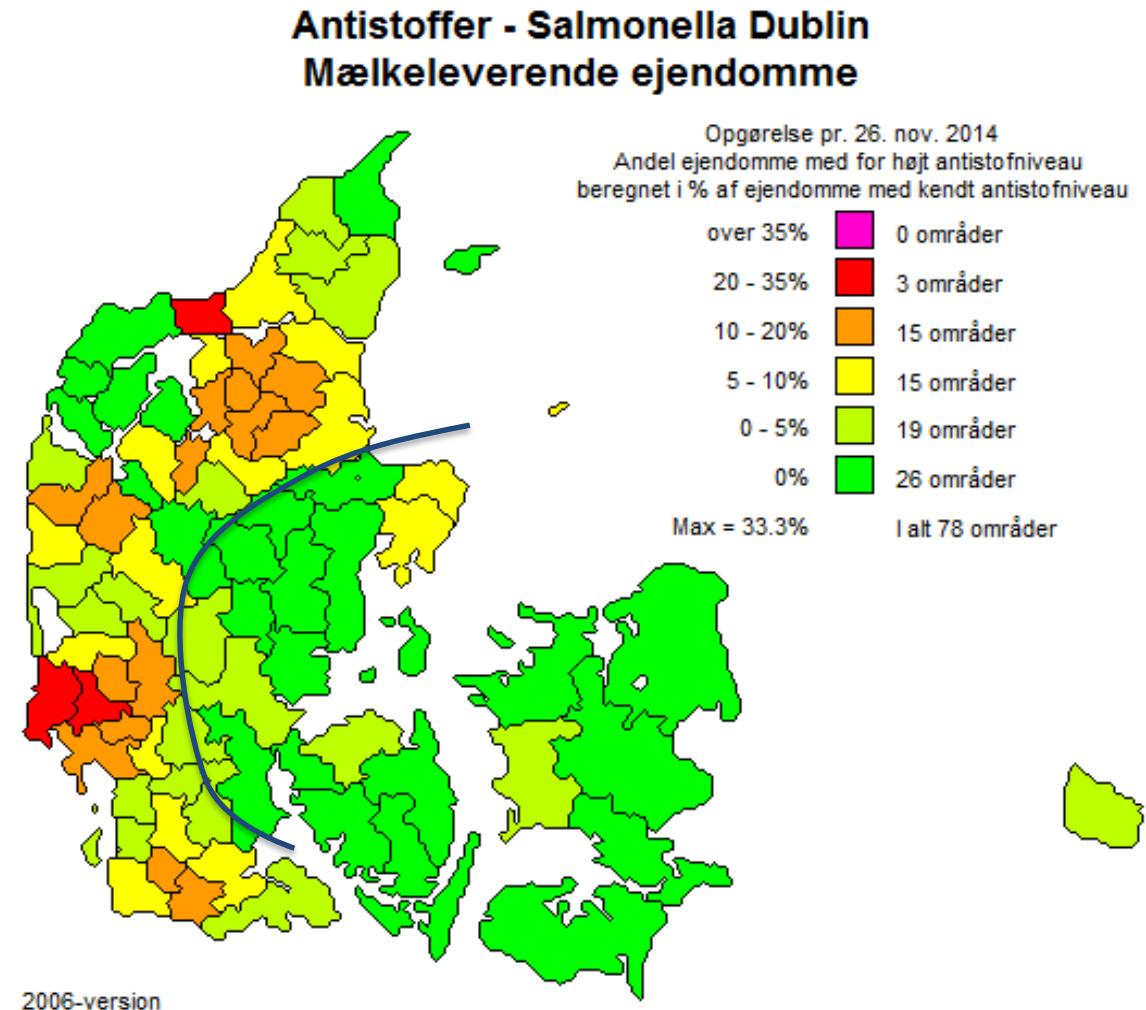
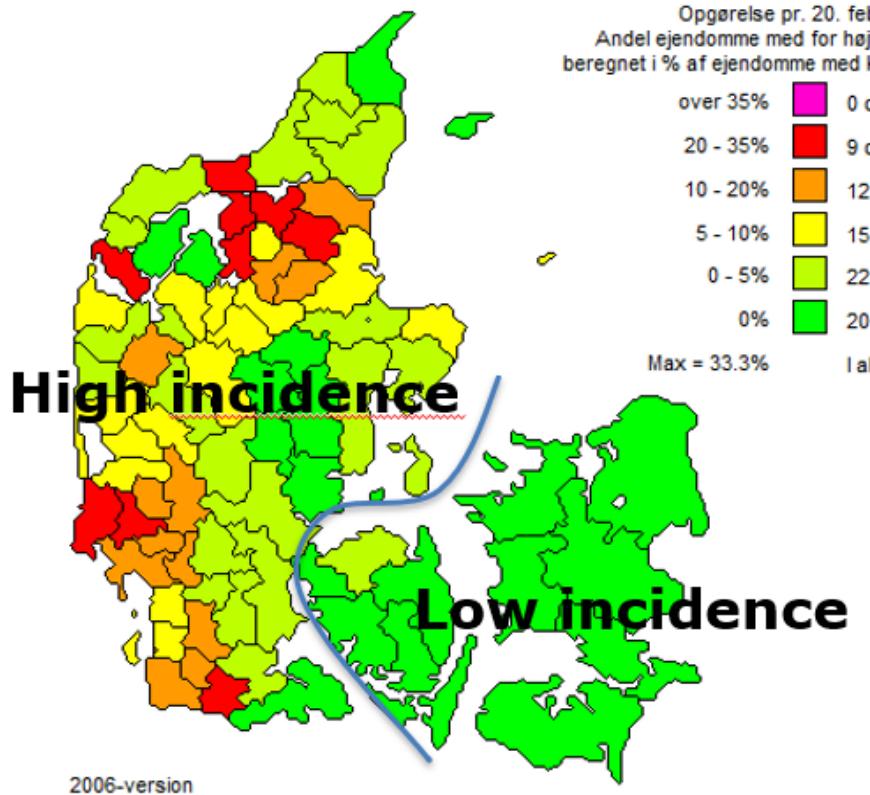
- Surveillance/eradication
- Governmental restrictions in positive herds

# History – The Danish Program

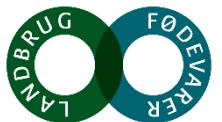
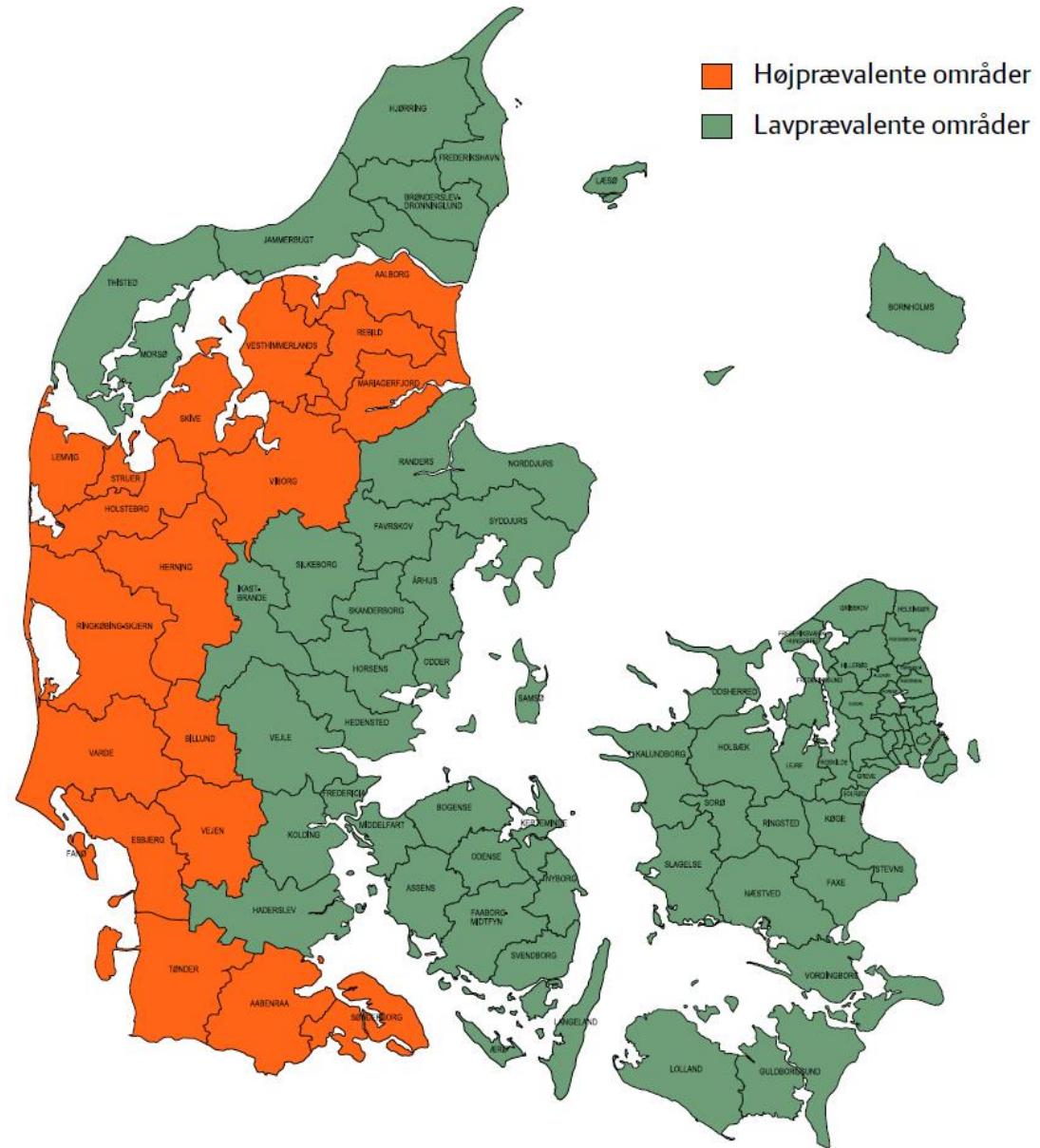
- 2002 – surveillance starts
- 2007 – 2009 Voluntary effort
  - Idea generation and testing, informations campaign
  - Establishing advisory network, manuals, Farmer Fields Schools
- 2010 – 2012 Trading restrictions
- 2013 – 2016 Legislation for positive herds
- 2017 – 2019 Further restrictions for positive herds
- 2020 – GOAL.....



# July 2014 – and again in 2015



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# Regionalisation 2014-2018

- To protect herds in low-incidence areas:
  - Ban on movement of animals from high-incidence country parts to low-incidence areas, except:
    - Male calves from level 1 to rose calfproduction, animals attending animals fairs,
- Level 2 in low-prevalent areas is subject to restriction
- From 2019
  - Level 1 – free trading in all country
  - Level 2 – NO trading – only slaughter or export



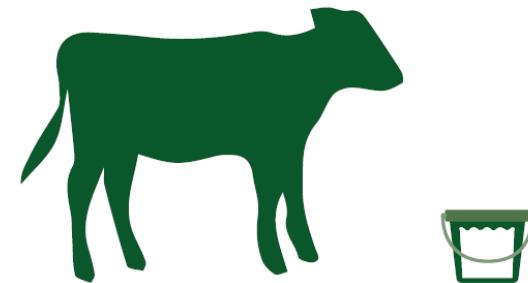
# Salmonella program



- Surveillance program with public access
- Movement restrictions and regionalization
- Mandatory eradication in infected herds – herd-specific systematic action-plans incl. Test strategies
- Later official restrictions in all test-positive herds

# Mandatory control in the Level 2 Herds

- Prohibition on the sale of livestock, excluding animals for slaughter, and animals for export
- The herdowner shall, in cooperation with his veterinarian, prepare a herd-specific, active and time-limited action plan for the control of Salmonella Dublin
- The impact of the action plan shall be documented
  - Quarterly Blood tests of 8 calves older than 3 months and if positive
  - Faeces and slurry/manure samples
  - Public oversight of special slaughtering



# Mandatory control in the Level 2 Herds



- Negative bacteriological tests:
  - Adjustment of the action plan needed
- Positive bacteriological tests:
  - The herd is set in Level 3 (with special slaughter)
  - Further restrictions applicable by the authorities

# Salmonella Dublin – what we do at SEGES?



Ulovlige flytninger fra det højpræiente til det lavpræiente salmonella område og smitterisiko i alle besætninger. Men det har særlige konsekvenser for køber og sæller.

Allé flytninger tjekkes  
Men de ulovlige flytninger opdages. L&F Kvæg tjekker alle flytningerne i Dyregræsning, og de flytninger, som ikke er i orden, sendes videre til Fødevarestyrelsen. Herfra kontakter styrelsen landmænden, og han får en indkærpele.



## Den seje kamp mod Salmonella Dublin

Høste gange har slagtekalveproducenten John Pedersen saneret sin besætning fra Salmonella. Det har på den hårde måde lært ham, hvor vigtig smittebeskyttelse er – og hvye producenter har givet ham en sundre besætning.

Foto: Kvægbrugslærling Betina Tivtholm

Efter et langt unøgneførelseskylde til slaktekalveproducenten John Pedersen er slige af sine Salmonella Dublin- og jern-målinger 2014 blevet besætningen justeret i niveau 1. Men i sommeren 2015 fikslutterne gen op ved på 179.000%. Etter datagøren brøde en værdi af 179.000% i højbygget på aktiv område i besætningen. Han hældede straks døgten, som var 100% priser af de yngste kalve nu var måltor for at se, hvor stor udspredning der i besætningen. Den varimodtiden blev givet op for at få kalve ved at sætte med værdi over 50.000%, tæt kæmpe.

DLBK. DANSK LANDBRUCSDRÅGVINDNING

## Regler for flytning

- Det er forbudt at flytte dyr fra det høj- til det lavpræiente område.
- Kalve til opfødning i slagtedyrsbesætninger må flyttes fra niveau 1-besætninger i det høj- til det lavpræiente område. Mødtager ejeren indommen må kun leve dyret til slagting.
- Man må gerne flytte dyr på tværs høj- og lavpræiente områderne i egne ejendommen.
- Man må gerne flytte dyr på tværs høj- og lavpræiente områderne, hvis man har en græsning- eller pasningsplads, som er indgået inden 1. november i fjor (pasnings- og naturplads). Fødevarestyrelsen skal ligge i enden med en aftalen.

hans besætning pålægges offentlig til således ikke sægte dyr til levebrug- og mælkproduktion i niveau 2.

## Salmonellasanering hos slagtekalveproducenter – nyt værktøj til risikovurdering

Nyt værktøj analyserer risikoen for smitte fra leverandørbesætningen

• Diflyage Betina Tivtholm, SEGES Kvæg

At sanere for Salmonella Dublin i en slagtekalvebesætning kan være udfordrende, fordi der indkøbes sårbarke dyr fra mange leverandører. Desuden kan staldsystemerne have begrænset muligheder for sekcionering. Den væsentligste årsag til smitteudsprængning mellem kvægbesætninger er netop flytning af levedy, og risikoen for introduktion af infektioner hænger sammen med antallet af leverandører.

### Nemt at aflese

Et nyt risiko-analyse værktøj giver hurtigt over-

Besætninger markeret med rødt har henvist besætning indenfor de seneste 3 måneder. Besætninger markeret med lyseblå har henvist besætning indenfor de seneste 10-24 måneder. Besætninger markeret med blått har henvist besætning indenfor over eller lig 25 måneder.

Niveau	Antal dyr indskjede Salmonella niveau dagsdato	Date for næste skifte	Seneste udsprednings dato	Seneste antistof værdi	Gennemsnit af seneste 4 prøver	Kalvedad 1-100 dage
14	24	1	2008-02-16	-	-	14,94%
15	1	2009-01-20	-	-	-	-
16	1	2009-12-09	-	-	-	-
17	2	1	2009-05-28	2016-06-07	3,00	1,50
18	2	1	2006-04-22	-	-	-
19	2	1	2006-09-24	-	-	-
20	12	1	2014-09-24	2016-09-23	11,00	10,72
						3,66%

## Salmonellasanering: Husk at teste ungdyrene

Alt for mange tester kun kalve og glæderende dyr. Men styr på smittespredning blandt ungdyrene er en afgørende brik i en succesfuld sanering.

Når man sanerer for Salmonella Dublin, er det vigtigt at producere salmonellafri dyr gennem hele produktionen. Men ungdyrene bliver ofte overset. Mange bedriver har fokus på de obligatoriske praver af 3-månederskalvene og tester desuden de

når besætningen kun er i risiko for geninfektion inden for stal. Fortsæt med at følge rutinen.

BESTILLING A  
TANKMÆLK'S

## Ny bekendtgørelse for Salmonella Dublin fra 1. juli

Mindre ændringer i salmonellabekendtgørelsen har betydning for mælkevejende besætninger.

1. juli træder en ny bekendtgørelse for Salmonella Dublin hos kvæg i kraft. Der er ikke

## Pakken indeholder

- Vurdering af besætningens handlingsplan
- Vurdering af besætningens salmonellarelevante data
- Besætningensag med fokus på sanering
- Rapport til besætningsejer, dyrlege og vektkonsulent
- Telofisk opfølgning efter ca. to måneder.

Hukke rundt af datamateriet – nemt og hånd

for slagtekalve findes et dokument, der skal udfyldes: 'Afale mellem slagtekalveproducent og leverandør'. Dokumentet skal efterfølgende indsendes til Lene Trier eller Betina Tivtholm, SEGES. Man godt få en liste uden samtykke erklæringen, men så er der kun oplyst niveau 1 med niveau 10 og 25 samt dødedighedstal (hækkelstørrelse mellem 10 og 25) samt dødedighedstal, der kan indikere en risiko for salmonella.

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tid, diflyage Betina Tivtholm, et skrivverbond i Sjælland for tiden, med at køre rundt og besøge besætninger 2. Rigtig mange har SEGES' tilbud om gratis sepåning med fiske øjne.

indmælde dyrstør og døgdevis, i nogle tilfælde hænder det om, sen er gået lidt i stå, så der er brug komme videre, anden tilfælde vil vi sparring', fortæller Betina Tivtholm, der sigter, at det tilbageholder landbrugsmæglerne, og at de efterfølger både landbrugsmæglerne og landbrugsmæglerne.

Det har ikke været et tilfælde, at landbrugsmæglerne har været

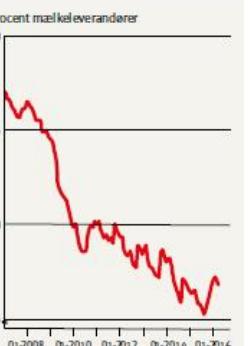


Vi er nægt langt, men der skal en ekstra indsats til for at nå målet om et salmonellafrit kvægbrug ved udgangen af 2016. SEGES Kvæg sætter turbo på processen med nye tiltag.

Vi er glædet i slutfasen af kvægbrugets landsdækkende indsats mod Salmonella Dublin. Inden udgangen af 2016 skal forekomsten af niveau

SEGES Kvæg. Som eksempel nævner hun et projekt med slagtekalveproducenter i efteråret, hvor besøg med nye input bedad, at 26 pct. af de besøgte besætninger nu er i niveau 1. I forbindelse med de kommende besøg tages samtidig kontakt til den praktiserende dyrlege.

## UDVIKLINGEN I ANTAL MALKEKVÆGSBESÆTNINGER MED SALMONELLA DUBLIN



Kurven viser udviklingen over antal mælkekvargsbesætninger med Salmonella Dublin. Kurven startet på den 1. januar 2008.

## teresse for nye øjne på niveau 2-besætninger



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# Important points about Salmonella Dublin in cattle

- Infection is associated with loss
- The more infection - the greater the loss
- Infection is controlled by hygiene and contact patterns
- Large herds = more animals, more susceptible animals and more animals excreting = less chance of accidentally getting rid of the infection
- Large herds are at higher risk of new infection due to potential purchase more stock

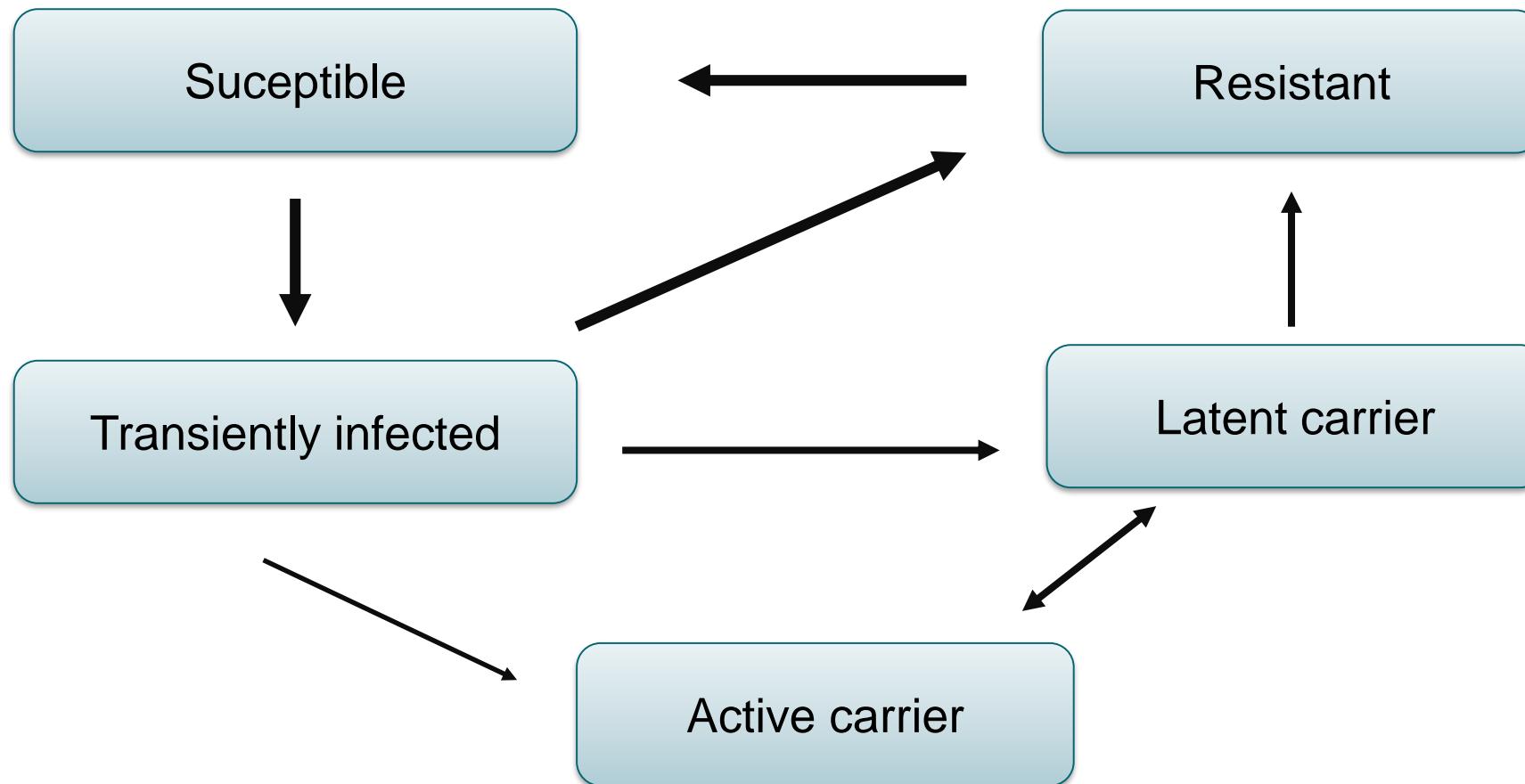


# Salmonella Dublin Facts

- Salmonella Dublin is a bacteria that primarily infects cattle
- The bacteria spreads primarily with faeces
- Small doses of the bacteria leads to an increase in the antibody level in the animal
- Calves under 6 months are most susceptible, but animals of all ages can be infected
- Salmonellosis is difficult to treat with antibiotics
- Salmonella can survive for months or years in the environment



# Infections stages



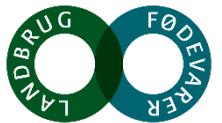
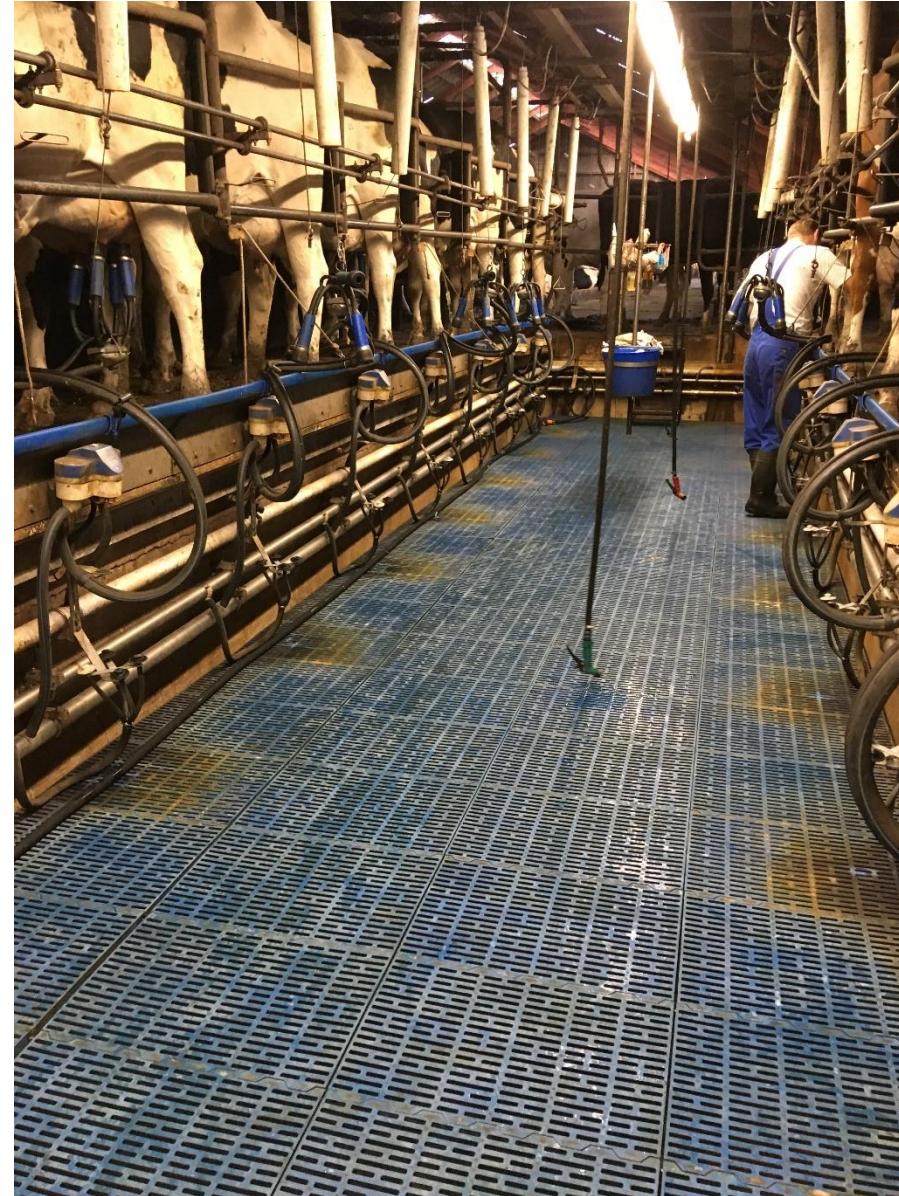
# Clinical signs

- Fever
- Diarrhoea (bloody)
- Pneumonia
- Arthritis
- Death
- Abortion(in utero infection)
- Rarely: necrosis on ear, tail and legs



# Outbreak

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# Outbreak

- High yield organic farm, 14.000 kg/pr cow, 210 cows
- The last 2 weeks in July
  - 5 abortions, high fever, different symptoms
  - Calf disease
- No test, no suspicion, no vet
- Test for Salmonella in bulk milk and animals in june because of cattle show
- Goverment?
- New bulk tank milk, called vet, aborted calf

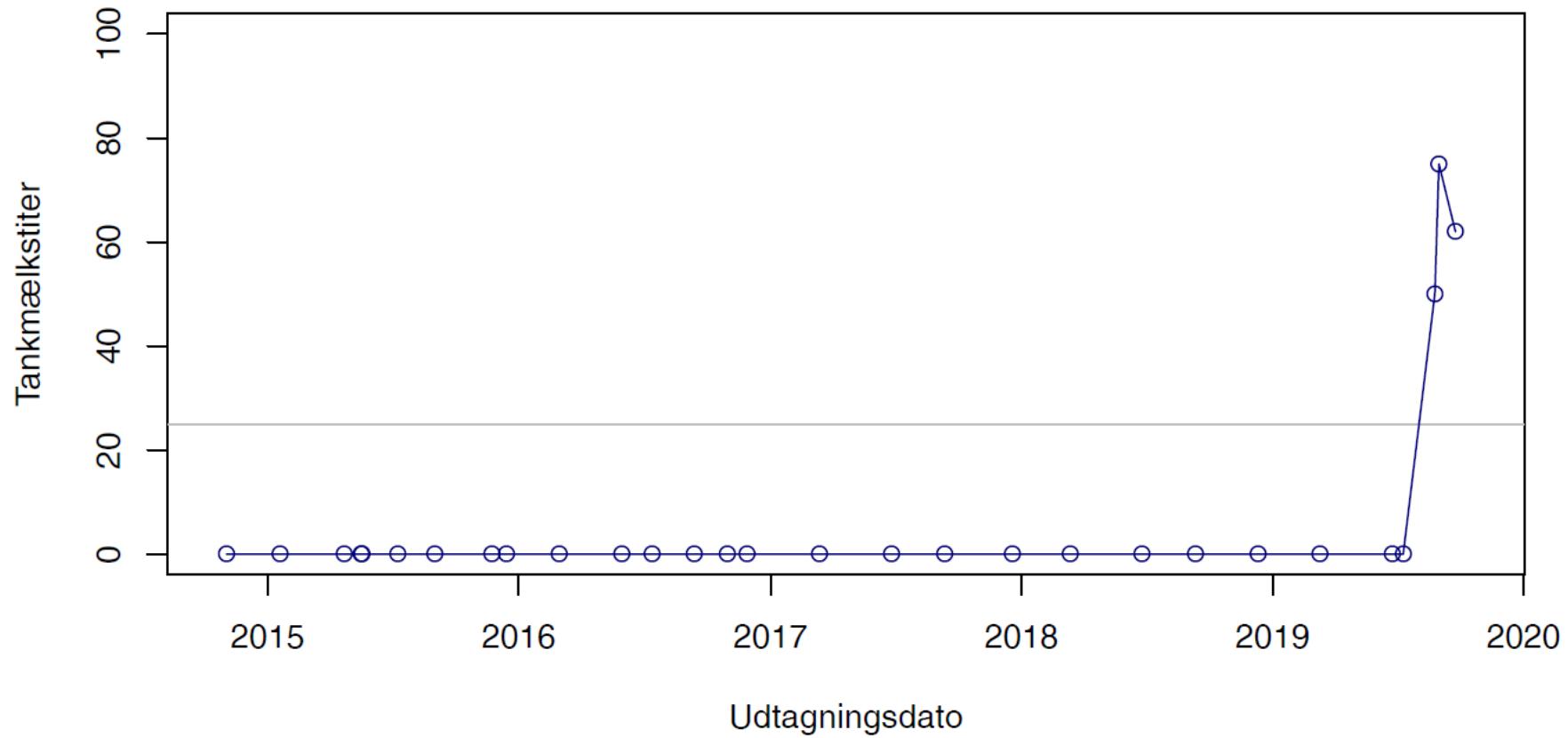


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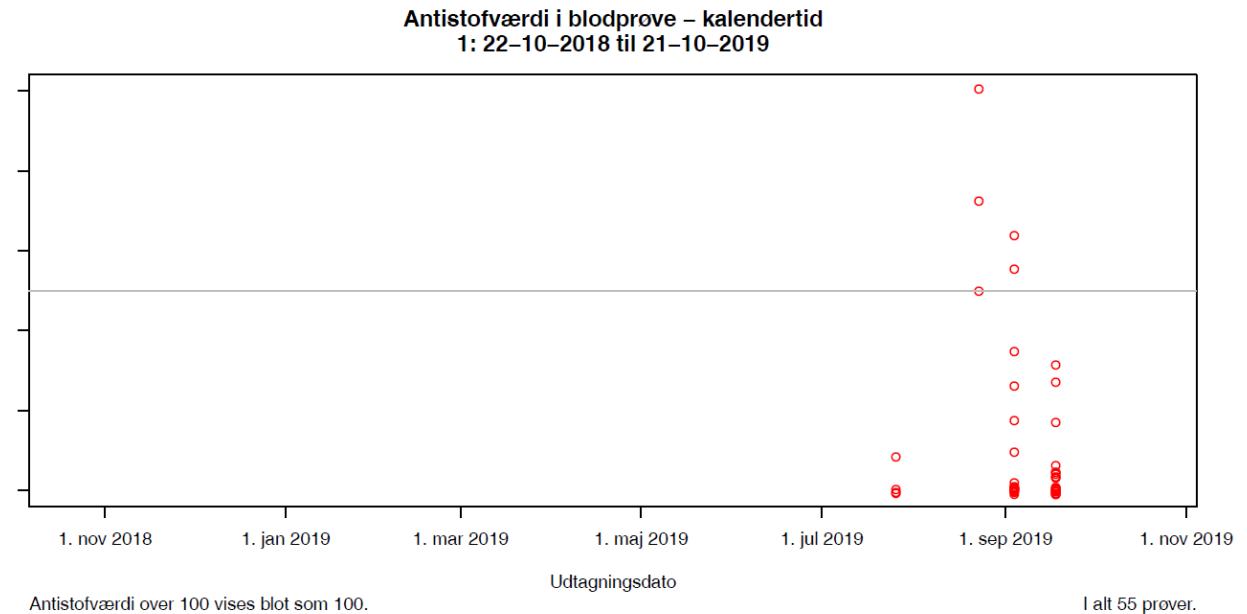
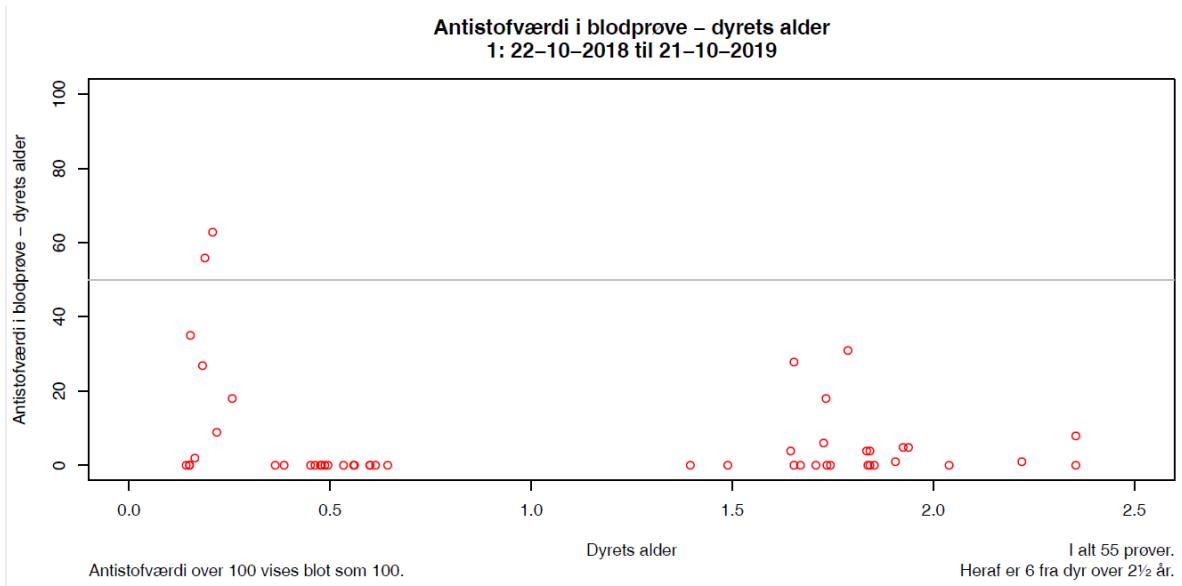


# Outbreak

Tankmælkstitre for CHR-nr.  
de seneste 5 år

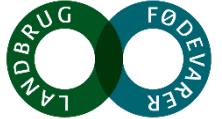


# Blood samples

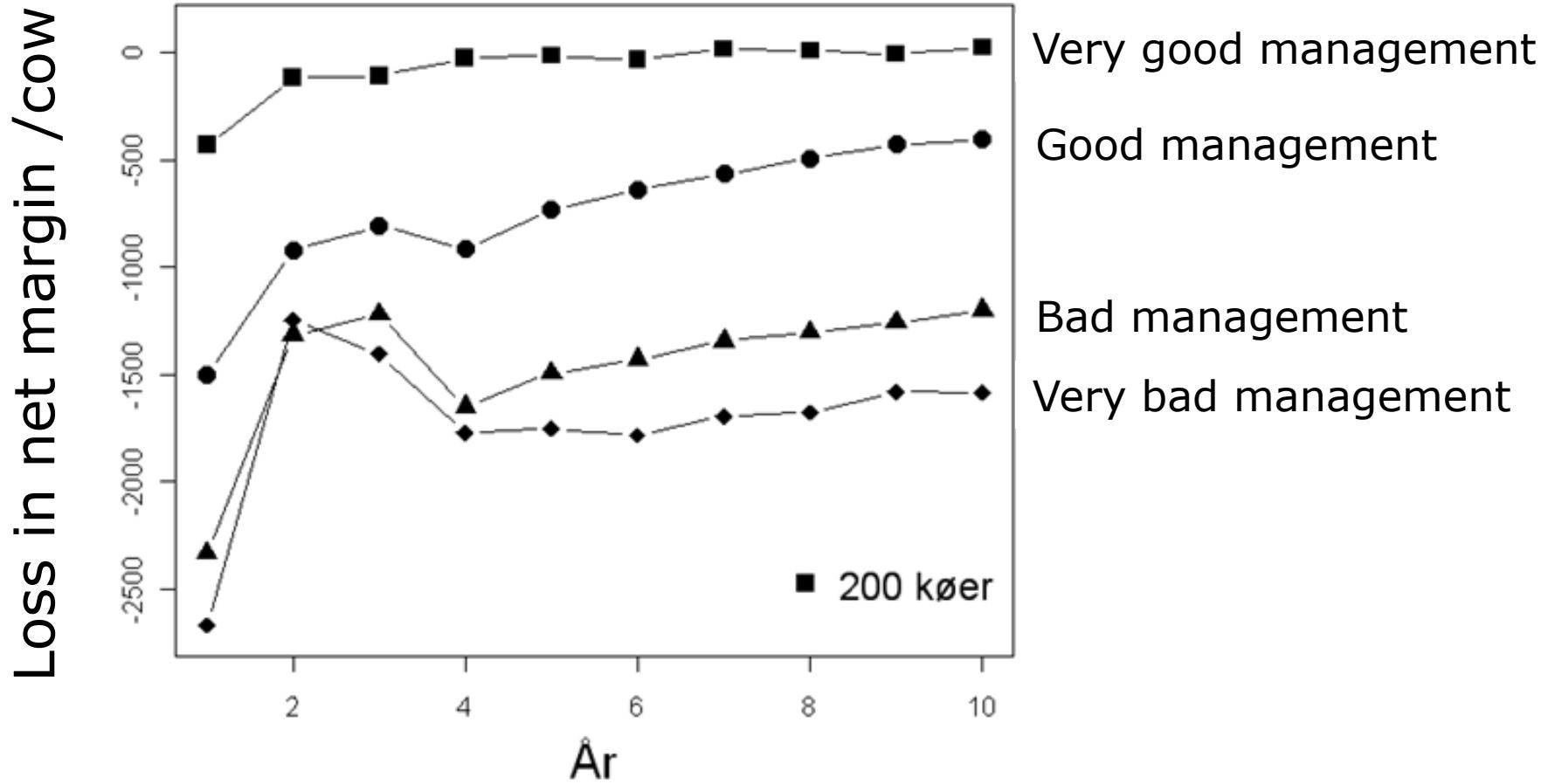


# Action for outbreak farm

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# The cost of salmonella?



# Transmission routes

We only need a few grams of faeces with salmonella from another calf or cow to be infected with Salmonella Dublin!

Calf housing



Pen buddies



Aerosoler



Calving pen



People



Carriers



Environment



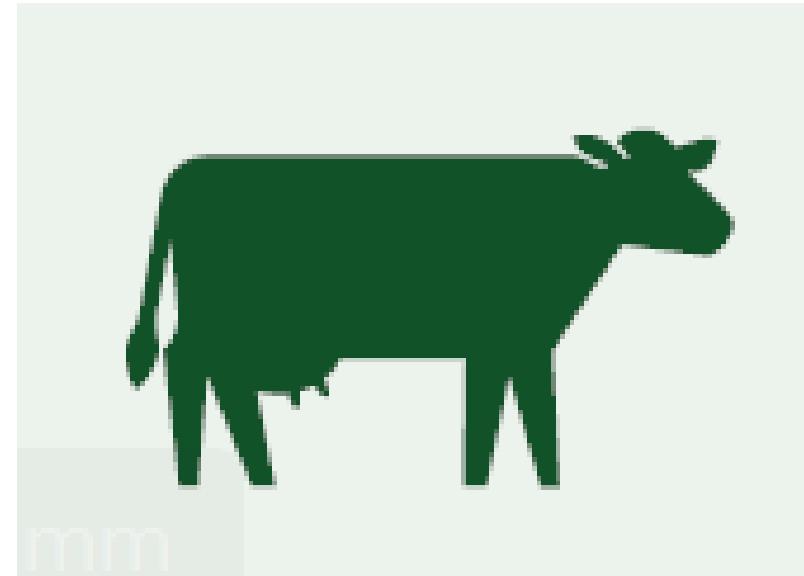
## Possible Pathways - External

- Purchase of animals – twice as high a risk of becoming new-infected
- Direct infection
  - Ensure a good biosecurity plan (visitors, service personnel, machinery, collection of animals, driving routes, etc.) and observe the plan
- Indirect infection
  - Diffuse contamination from nearby properties – the closer the higher the risk
  - Passive transmission via rodent or pest



# Important Pathways - Dairy cattle

- Calving area and management/stocking density
- Pens/huts for newborn calves
- The level of Hygiene
- Purchase of animals from level 2 herds
- Herd size



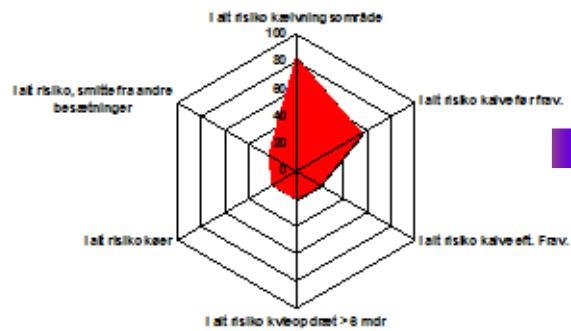
# Eradication of Salmonella in a dairy herd



- A risk assessment of possible pathways
  - Externally and internally
- Get advice from advisors and veterinarians regarding the biosecurity
- Be systematic and look critically at farm routines
- Have requirements – for anyone with access and working within the farm and inform about biosecurity procedure at the farm

# Systematic, step-by-step method

# Find possible pathways



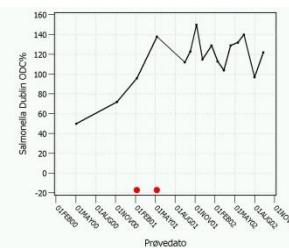
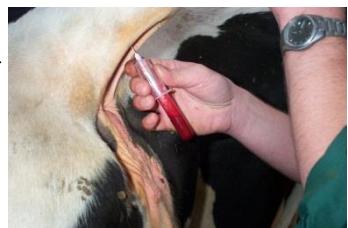
# Make an actionplan



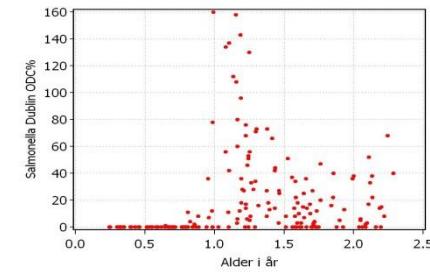
# Make changes



## Use and analyse lab.results

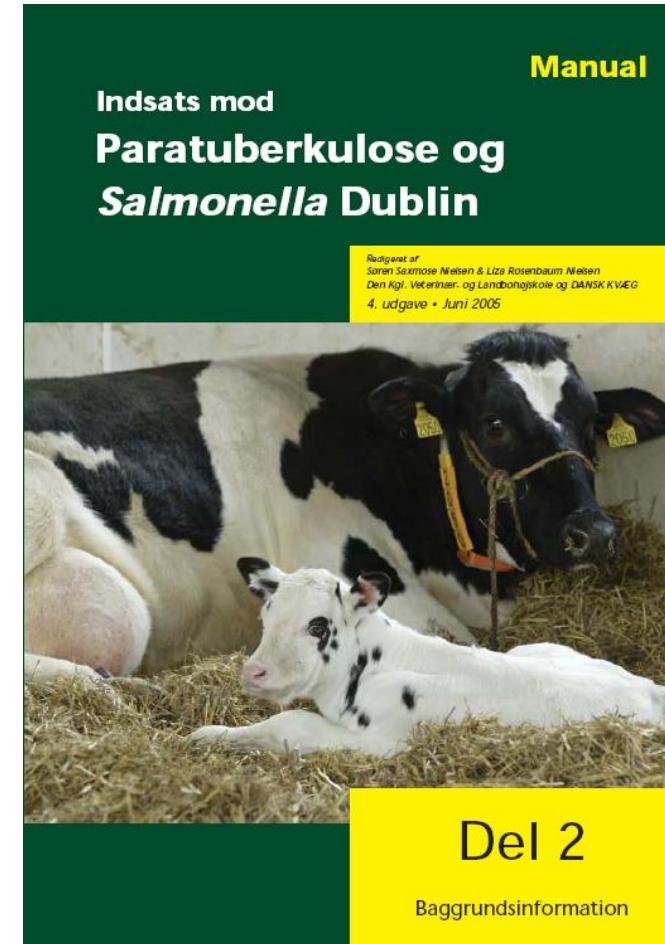
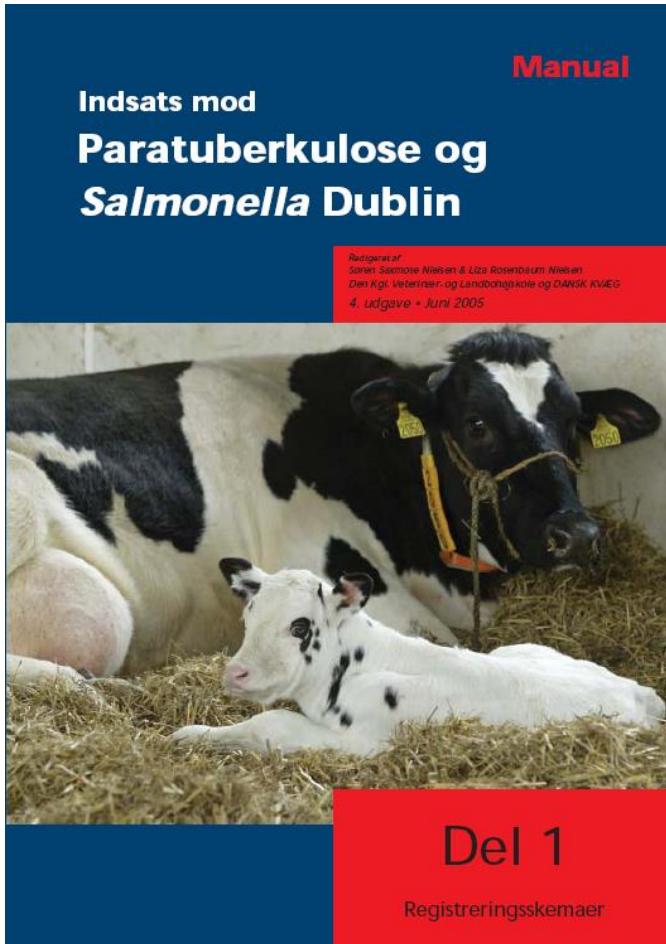


## Evaluate the development in different groups



# Manual for Advisor

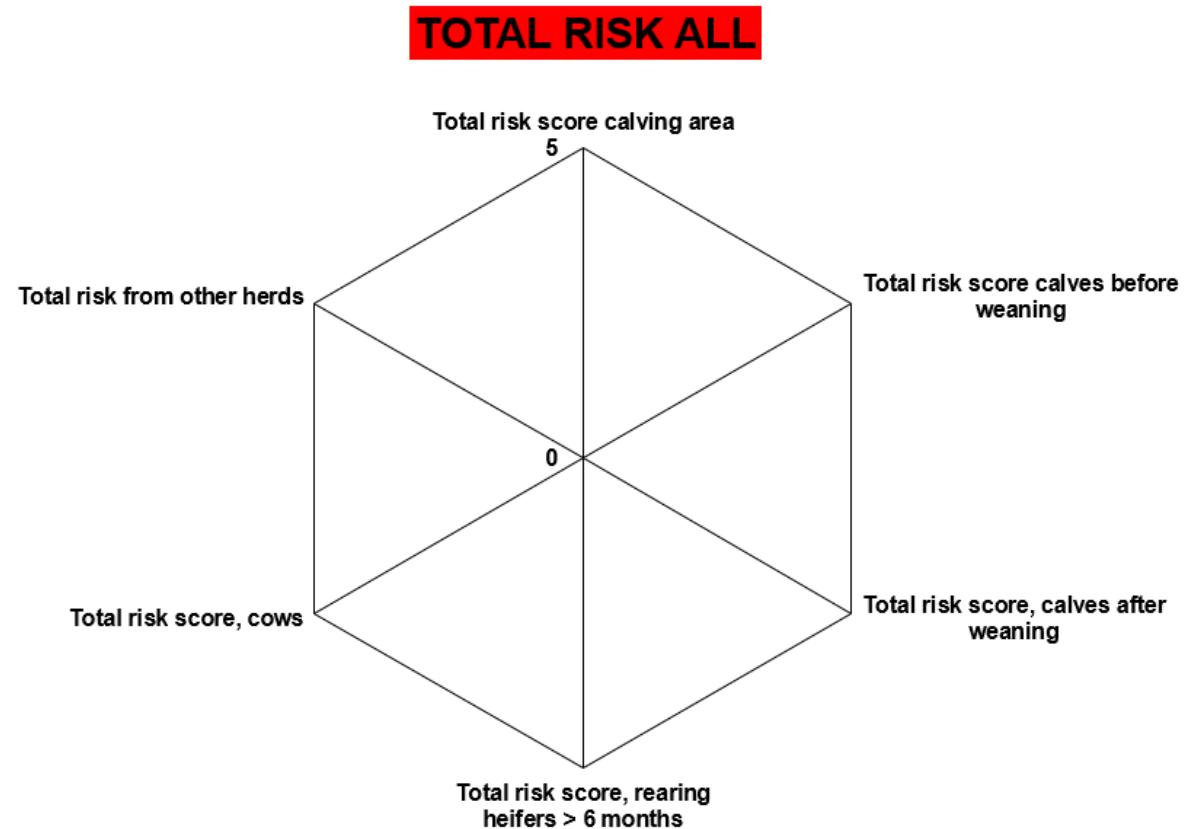
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# Risk scoring forms - Salmonella

Calving area	1.1 Many cows in the calving area	0	0	Never
			5	Occurs rarely, and only when cows are considered low-risk cows based on serological tests
			15	Occurs frequently, but only when cows are considered low-risk cows based on serological tests
			20	Occurs rarely, but regardless of cows' test status
			25	Occurs in about half of the calvings, regardless of the cows' test status
			30	Occurs all the time, regardless of cows' test status
	1.2 Contamination of calving area with manure	0	0	Never
			6	Manure is removed on a daily basis. Only small amounts of manure are visible
			10	Cleaning 1-2 times per week. Only a small part of the area is contaminated with manure
			14	Cleaning 1-2 times per month. Most of the area is contaminated with manure
			20	Cleaning less than once per month. Extensive manure contamination of the area
	1.3 Sick cows in the calving area	0	0	Not used for sick cows
			5	Used for cows with hoof and leg disorders
			10	Used for cows suspected of suffering from ketosis, milk fever or the like
			10	Used for cows that appear weak, but have not been diagnosed
			15	Used for cows with gastrointestinal disorders other than salmonellosis
			20	Used for cows suspected of suffering from salmonellosis
	1.4 Amount of time newborn calves stay with their mothers	0	0	Always removed from the mother less than one hour after birth
			4	Always removed from the mother less than 6 hours after birth and is only housed together with low-risk cows
			6	Removed from the mother more than 6 hours after birth in 1-5 out of 10 calvings and is only housed with low-risk cows
			12	Removed from the mother more than 6 hours after birth in more than half of the cases, but is only housed with low-risk cows
			15	Removed from the mother more than 6 hours after birth in 1-5 out of 10 calvings, and has been housed together with high-risk cows or cows of unknown status
			20	Removed from the mother more than 6 hours after birth in 1-5 out of 10 calvings, and has been housed together with high-risk cows or cows of unknown status

# Risk Scoring – finding most important transmission routes



# Movies

- <https://player.vimeo.com/video/146228968>
- <https://vimeo.com/196829595>
- <https://player.vimeo.com/video/152979416>



## Brug sæbe og opnå stor effekt af rengøringen

**SEGE**

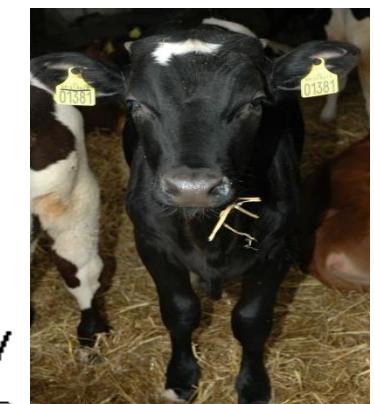
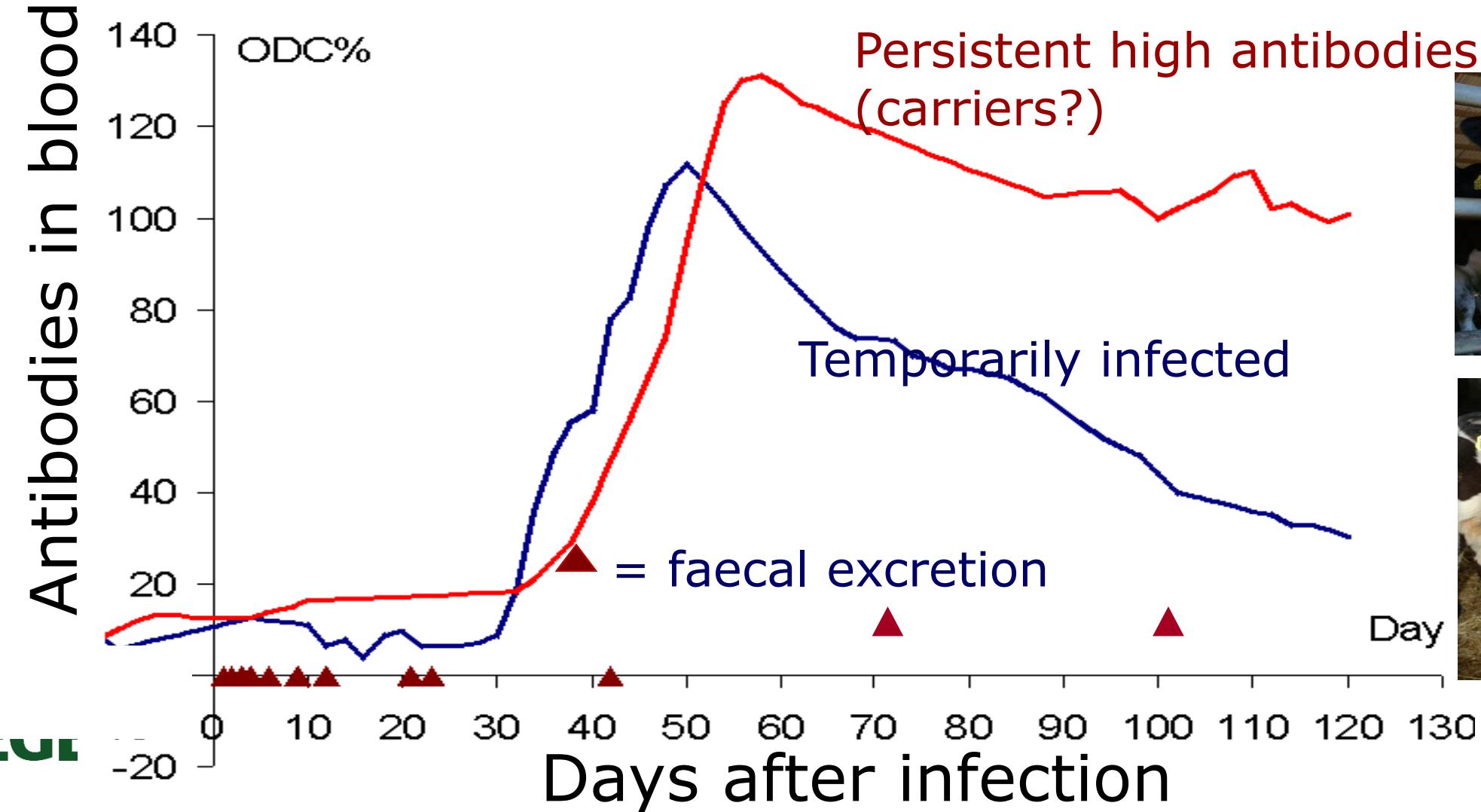
**DESINFEKTION:** Brug sæbe ved rengøring. Det er en lille merindsats, som ikke koster meget i tid og penge. Effekten er til gengæld stor og af afgørende betydning for, om udstyr bliver rent.

faldeaktive stoffer), der 'bygger bro' mellem vaskevand og fedtstofferne, så skidtet forbliver pakket ind i vaskevandet.

Derved fjerner sæben alt organisk materiale. Er der ikke gjort rent med sæbe først, er der næste-

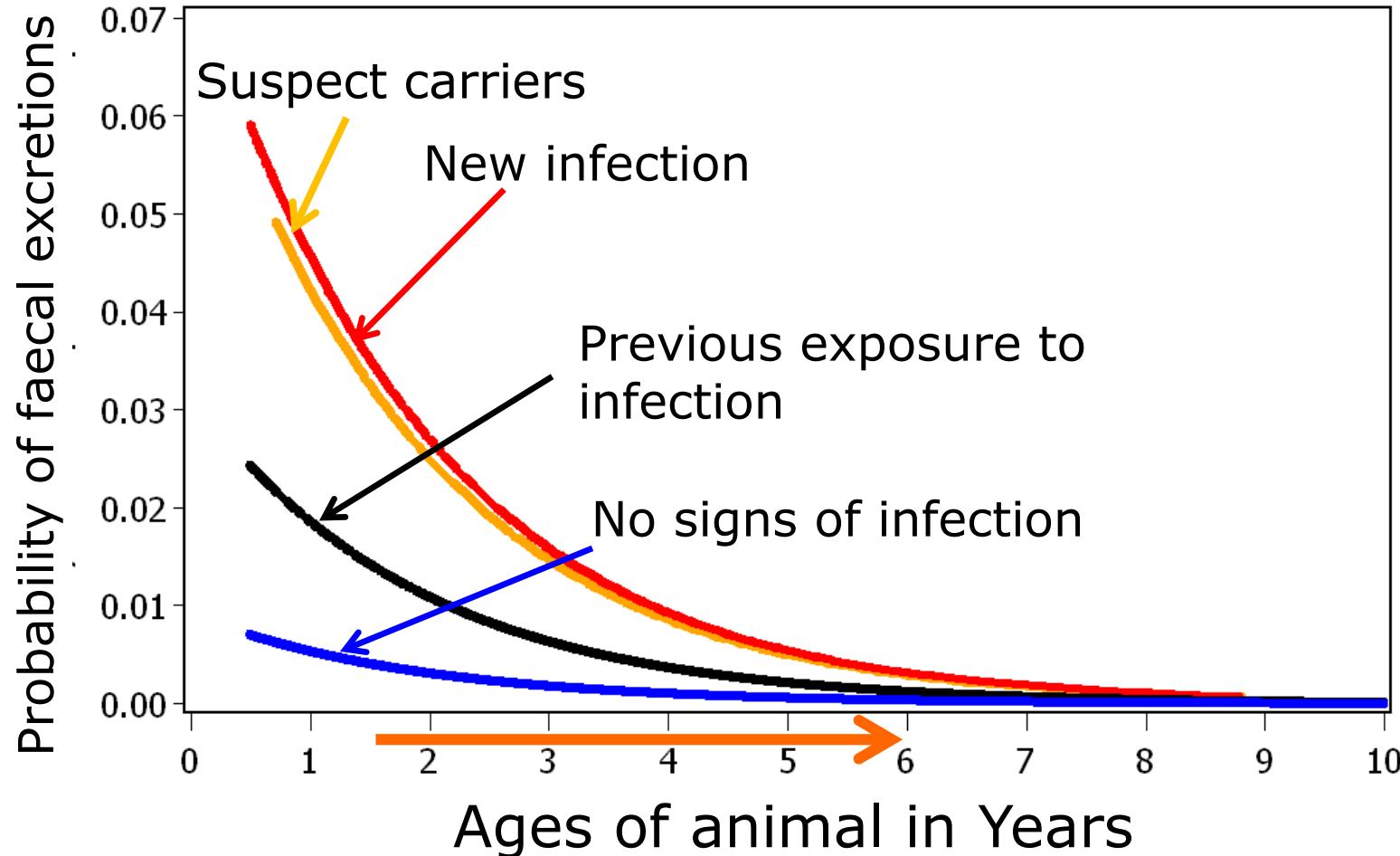


## Faecal excretions and antibody response in 2 calves infected when they are 2 months old

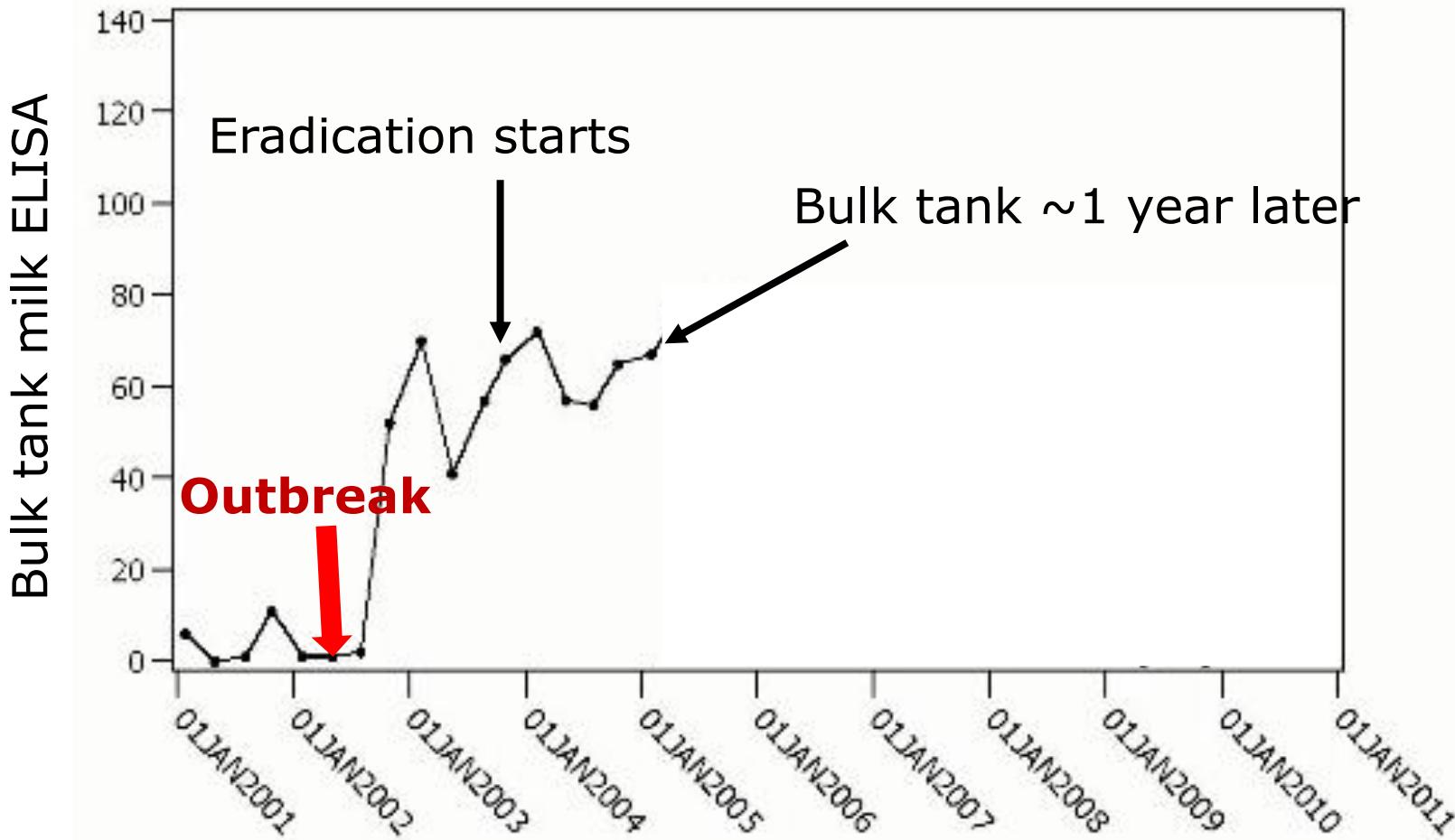


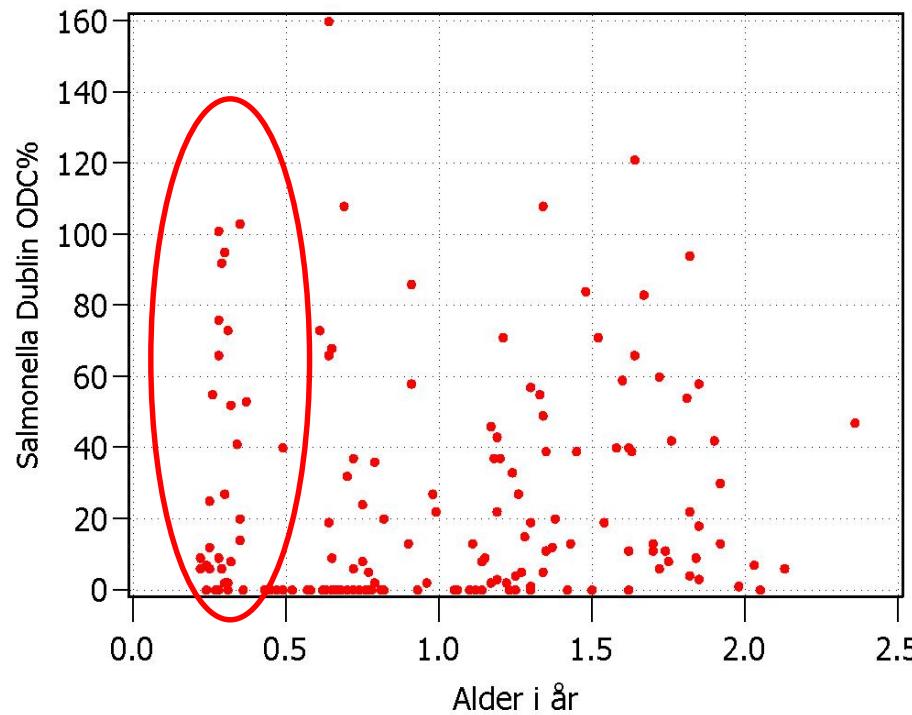
# What are we supposed to do with animal having persistently high antibody response for Salmonella Dublin?

Dia  
s 45



## Bulk tank – development after outbreak and continuos shedding



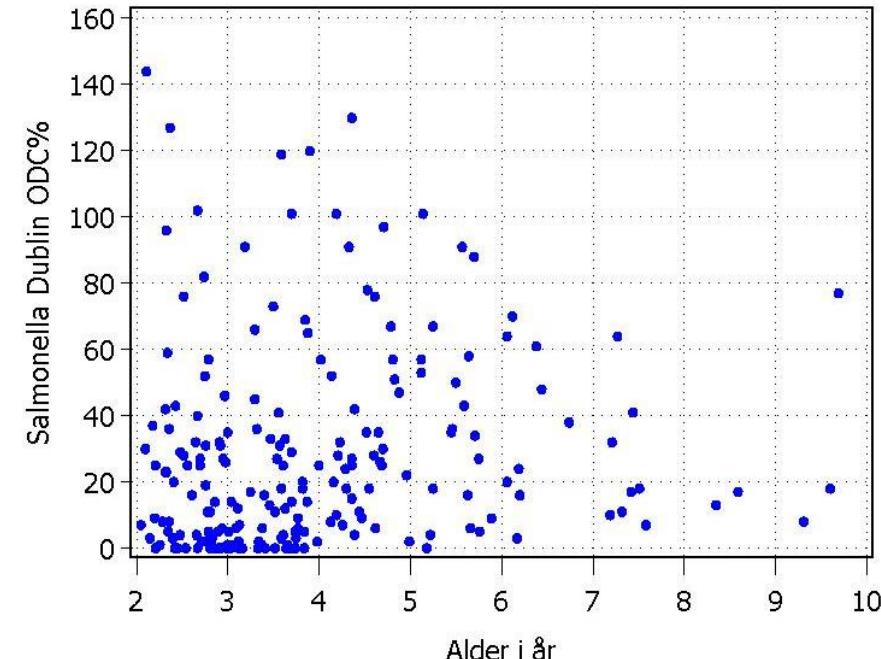


Cows  
- milk samples  
Many cows with high antibody

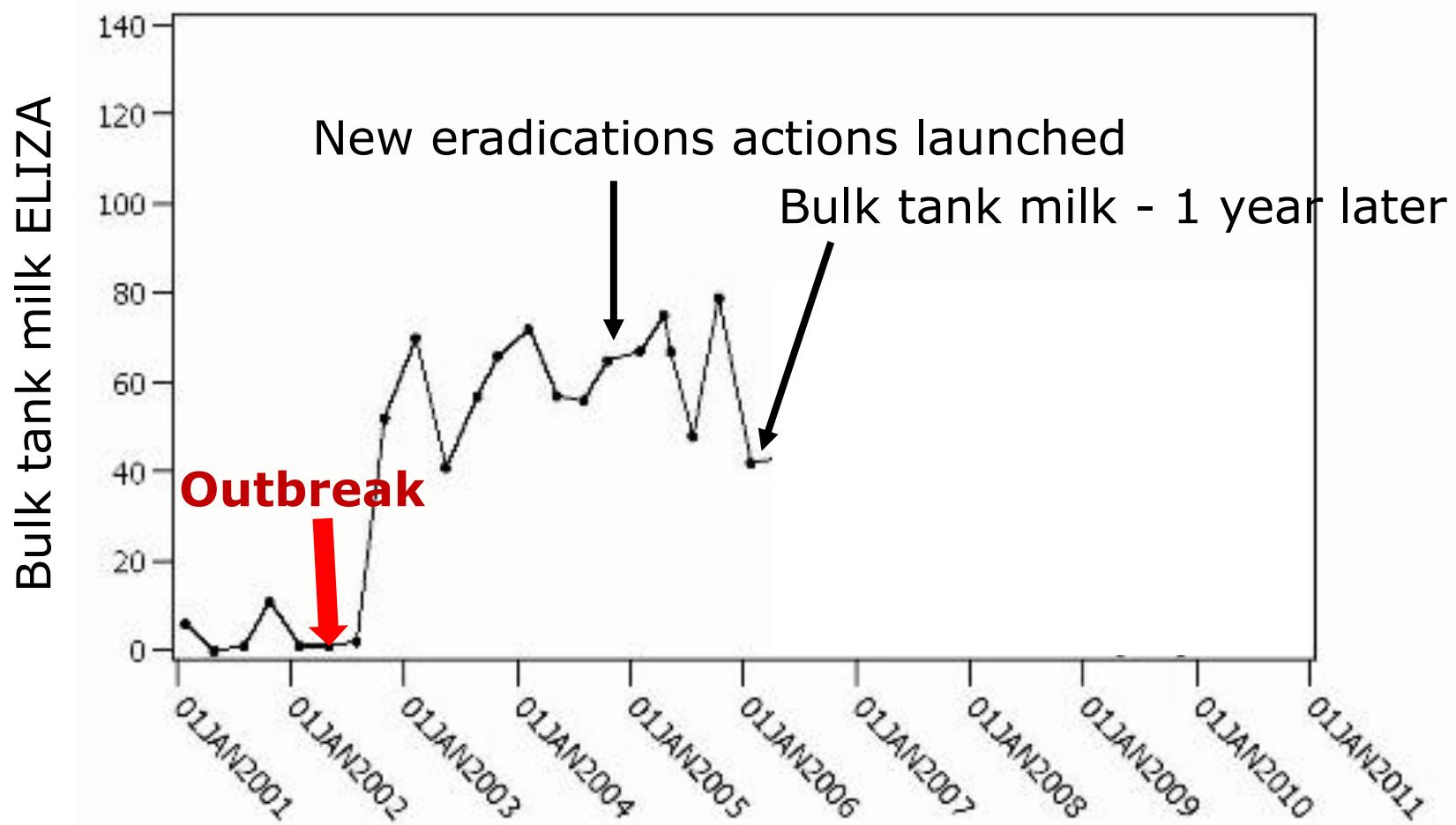
**Massive shedding in the herd**

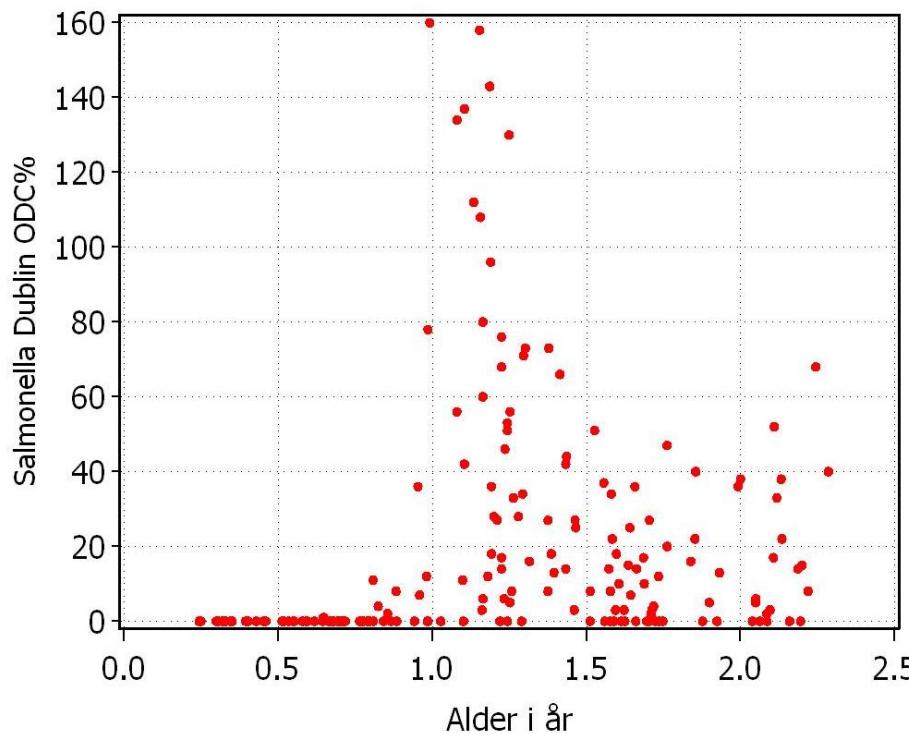
**Focus on the young calves**

Young stock – blood samples



# Bulk tank – development after outbreak and stop of spreading

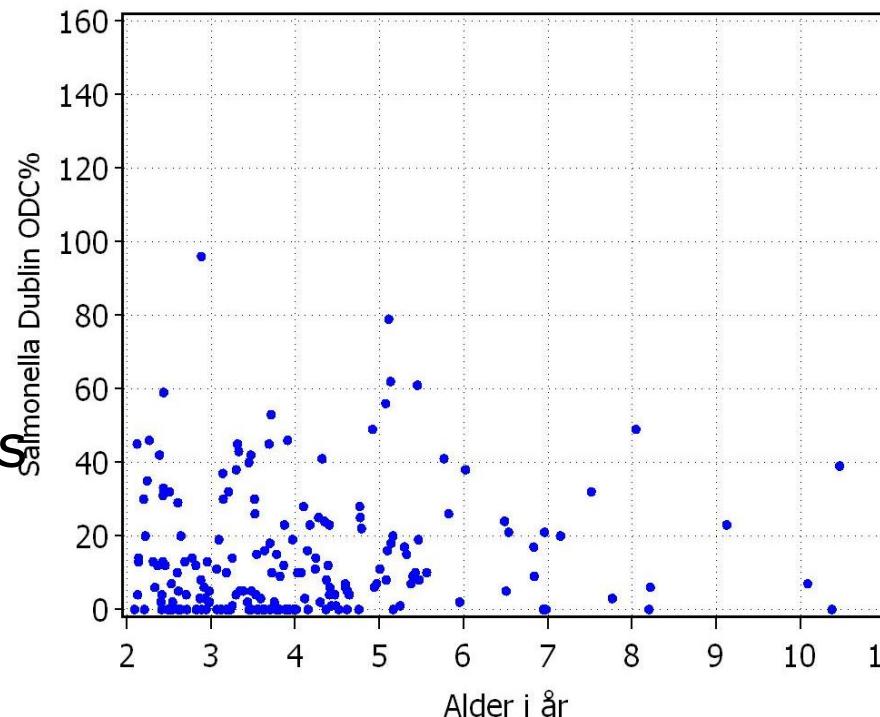




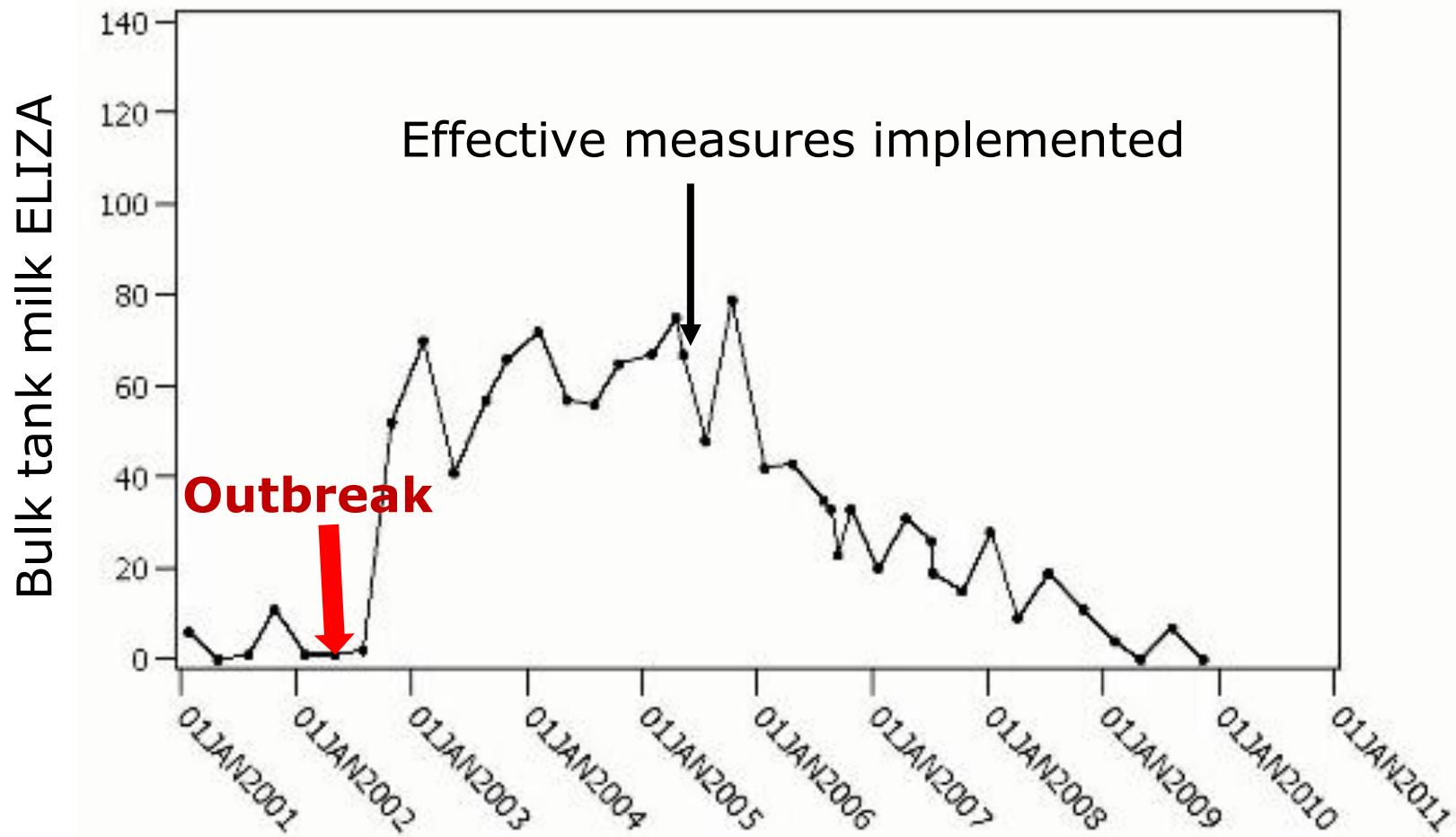
**1 year after eradication actions launched - working**

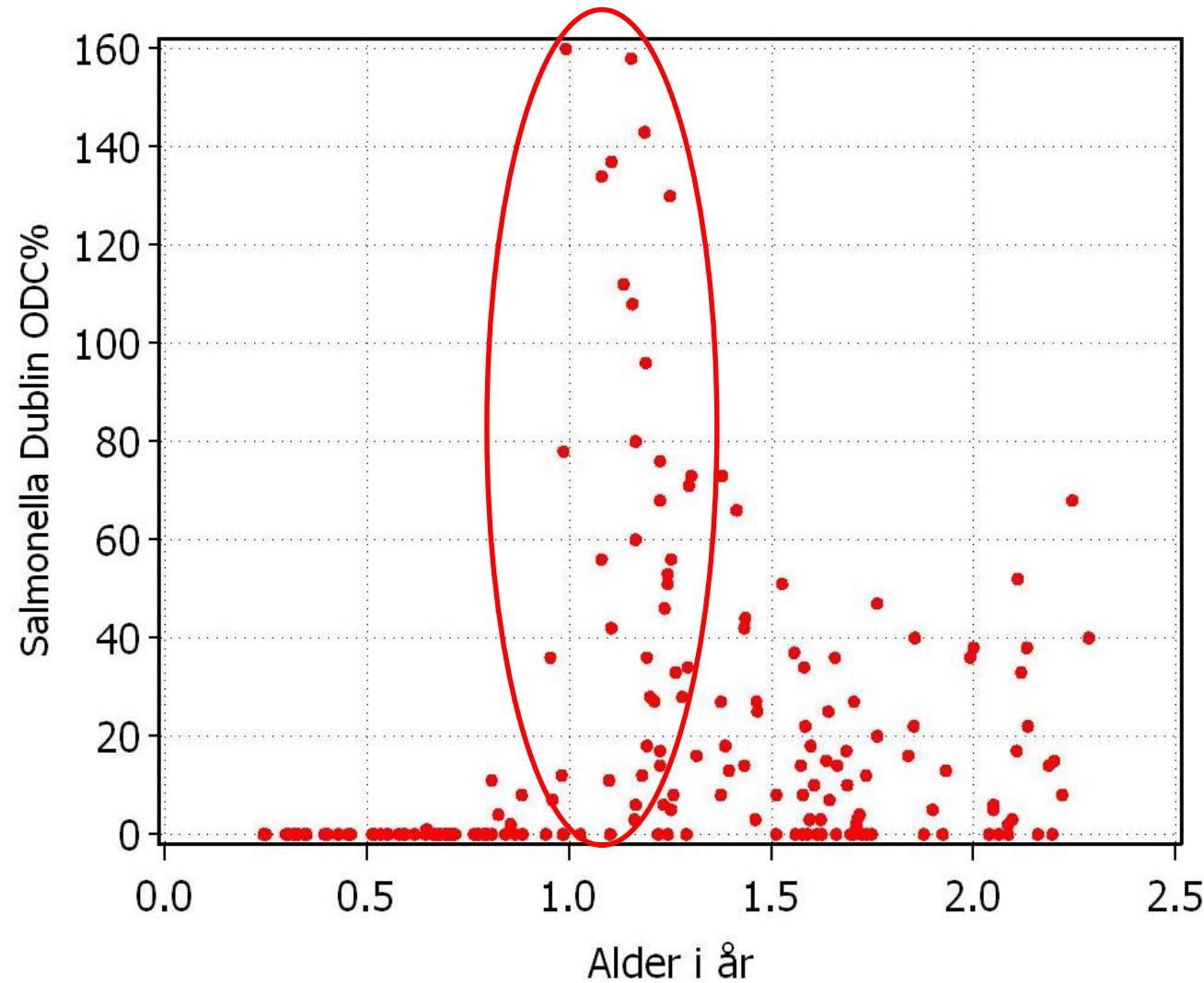
Young stock - blood samples

Cows – milk samples  
Few cows with high antibodies



# Bulk tank – development after outbreak and stop of spreading





# Why young stock is important

- Greater risk of heifers infected between the age of 12-24 months of becoming carriers as well as cows around calving
- Animals with persistently high antibody profile – a few% of these pose a risk of excreting bacteria
- Highest risk is found in animals below 2 years of age
- The animals do excrete more frequent, the younger they are

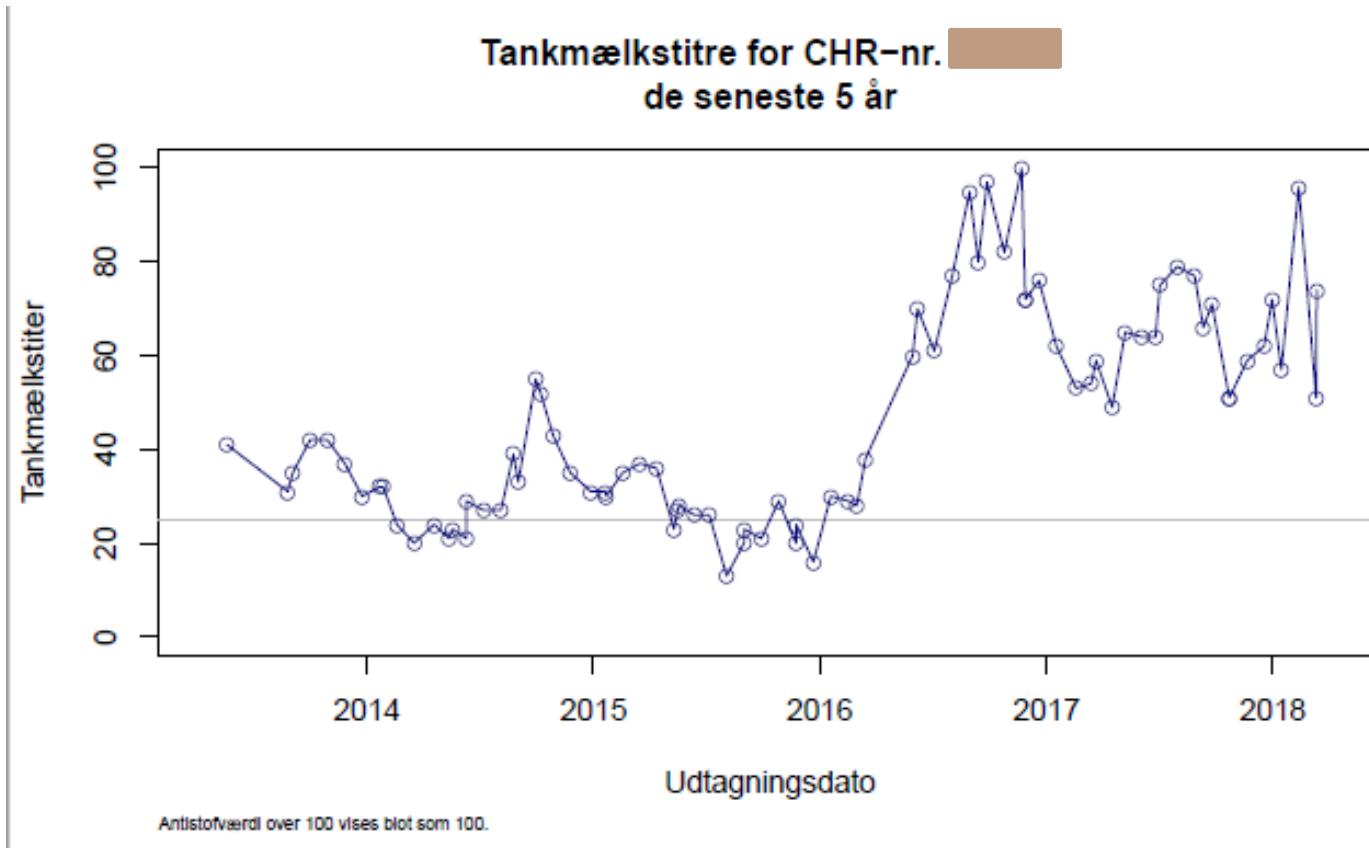


# Tests

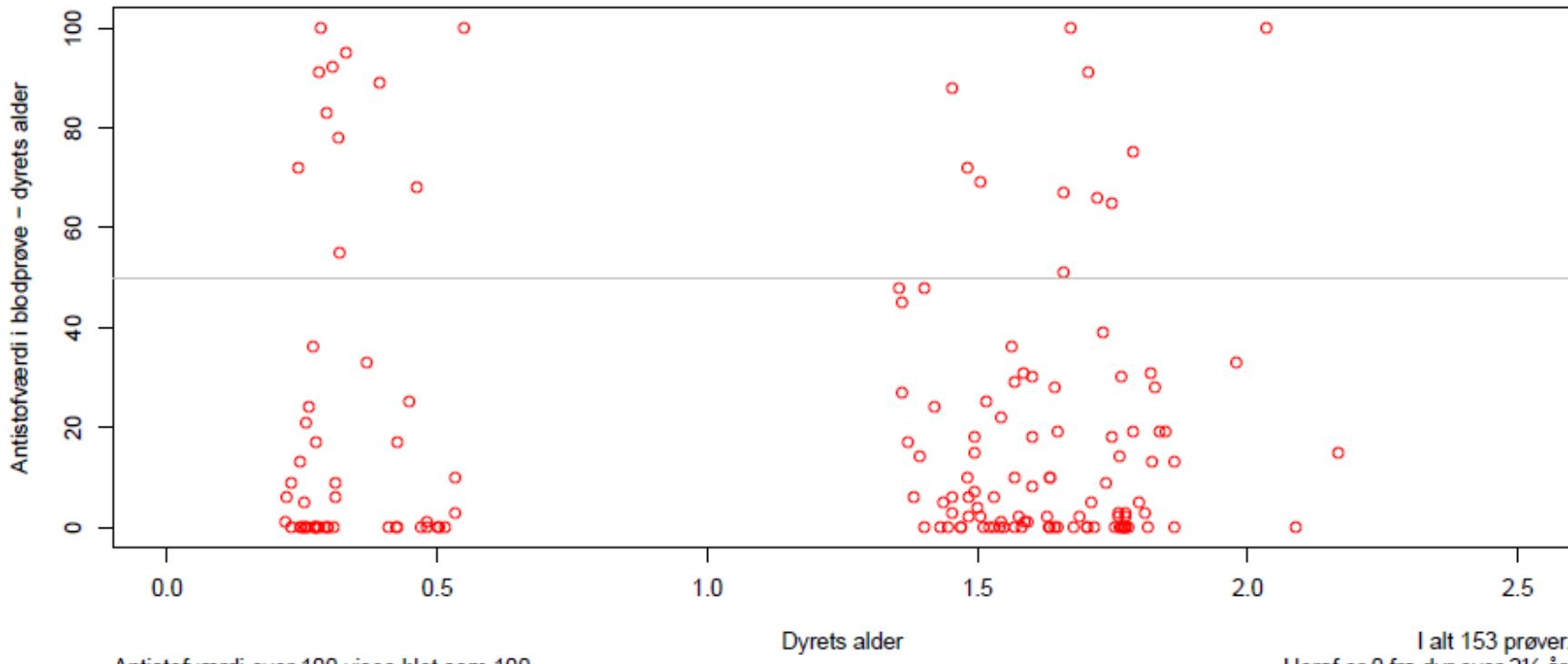
- In general, the perception is that if the calves are free-then the young stock are also - NO
- Most farms test primarily as the legislation prescribes – 8 calves are tested every 3. Month (blood tests)
- The sample size can be small or large – depends on the number of animals
- Few farms testes young animals – many test cows at individual level
- What happens from 3 months of age to when they calves?



# Farm visit – second opinion vet visit

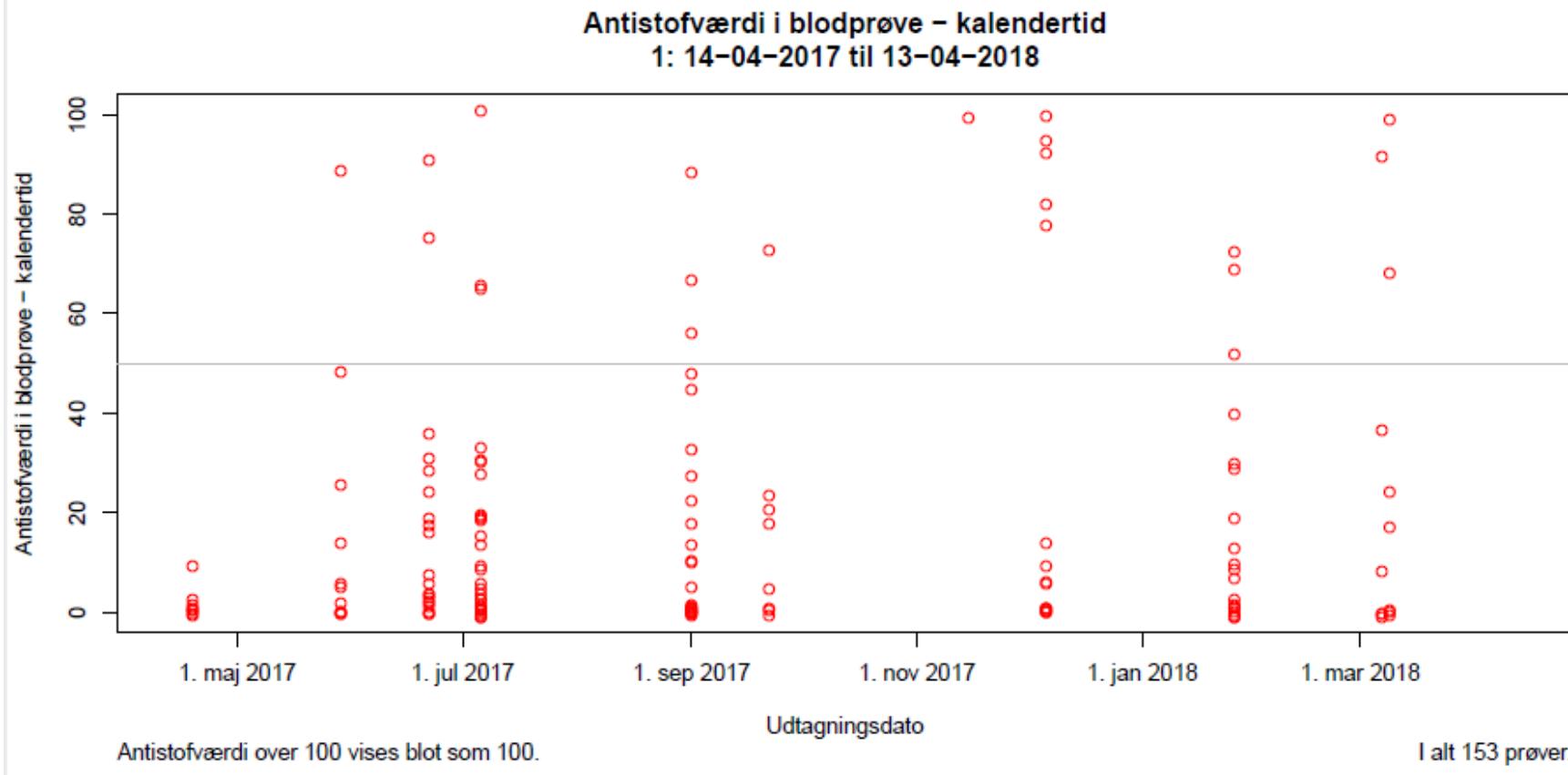


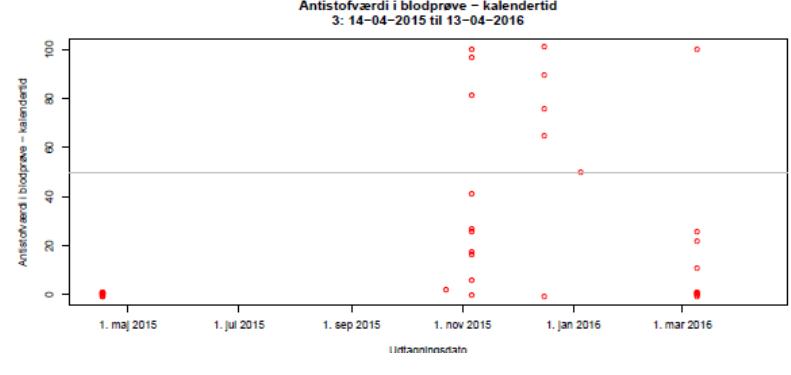
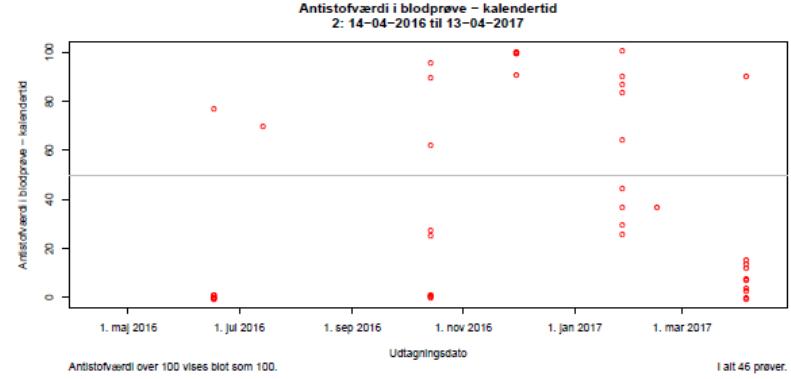
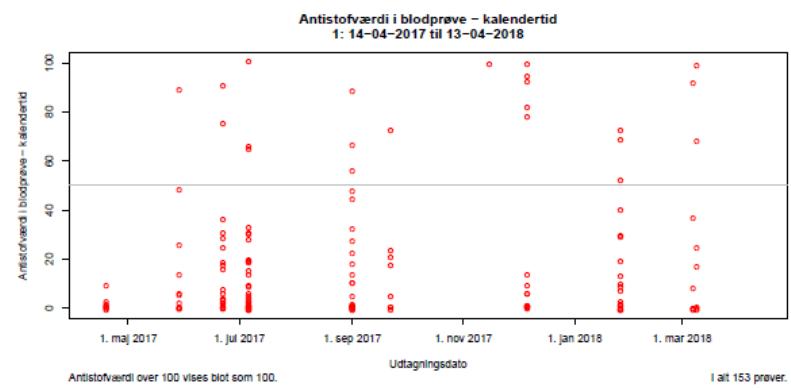
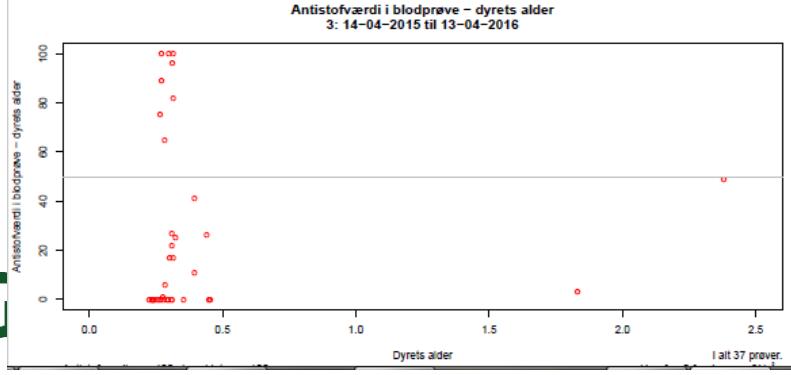
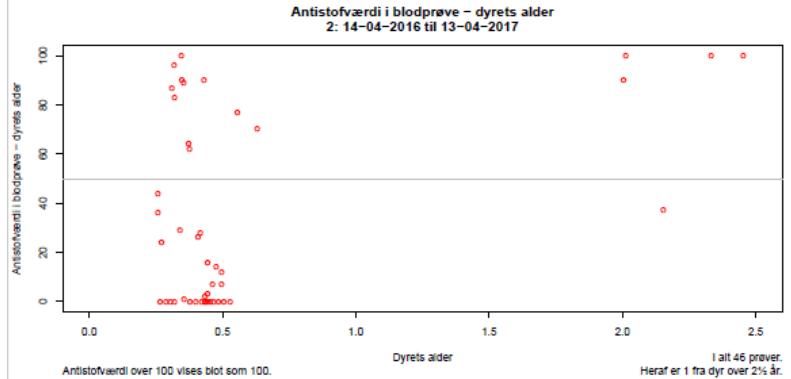
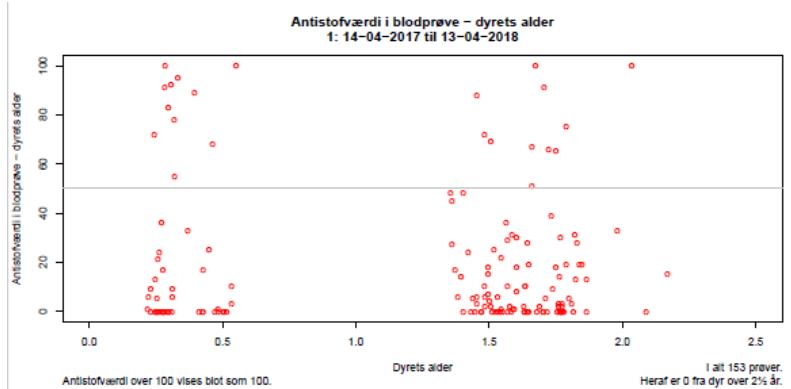
Antistofværdi i blodprøve – dyrets alder  
1: 14-04-2017 til 13-04-2018



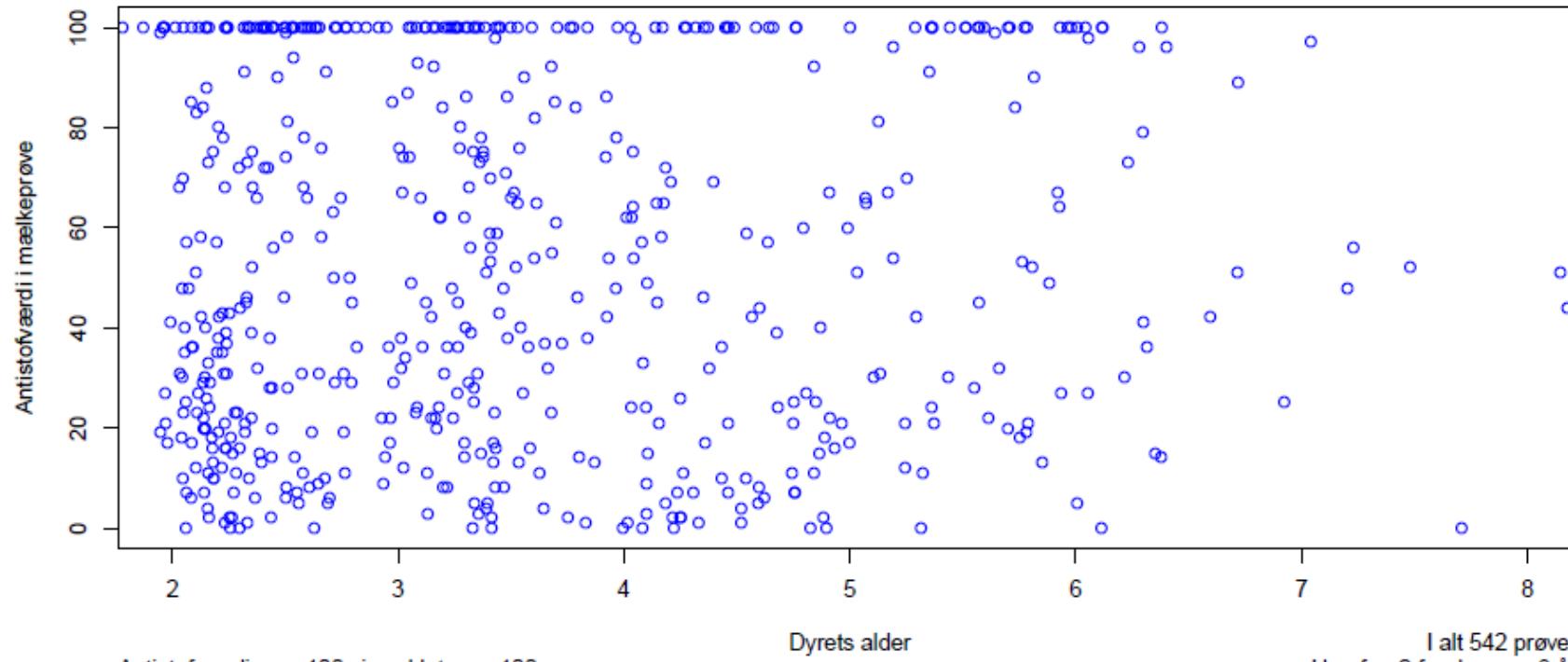
SEGES







Antistofværdi i mælkeprøve  
1: 01-03-2017 til 28-02-2018



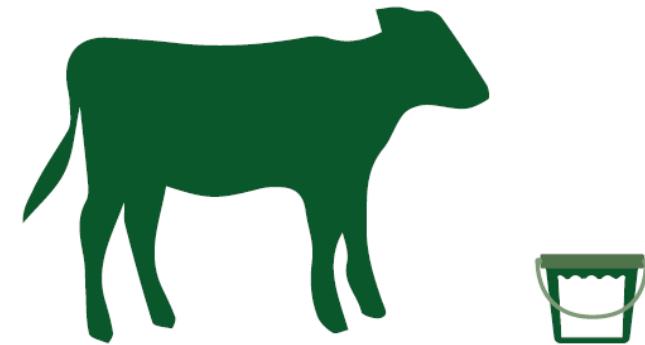
# Visiting a herd with positive calves

- Barn Review – follows the path of the calf
- Calving pen – procedure, hygiene, looking at the cows (cleanliness)
- Duration The calf is in the calving pen – procedures, transportation out of the pen, transportation to calf box/hut, dirty calves, log – asking a lot of questions
- Housing of the newborn calves – procedure for cleaning, boxes/huts construction, pathways, duration, other transport in the area
- Feeding of calves – colostrum, milk feeding, hygiene, testing the procedures
- Moving calves to joint housing
- Joint housing – stocking density, hygiene



# Calves

- Colostrum allocation
- Calves in clean boxes/huts (2 and 2 together)
- Effective cleaning/disinfection of boxes and bowls
  - Wash with alkaline soap
  - Disinfection with effective disinfectant
- Distance between boxes/huts
- Solid partitions



# Cleaning – how and what to use



## Cleaning - procedure



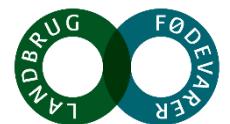
**SEGES**



# Colostrum - procedure

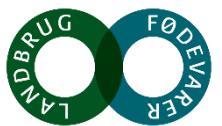


**SEGES**



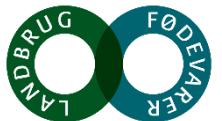


**SEGES**



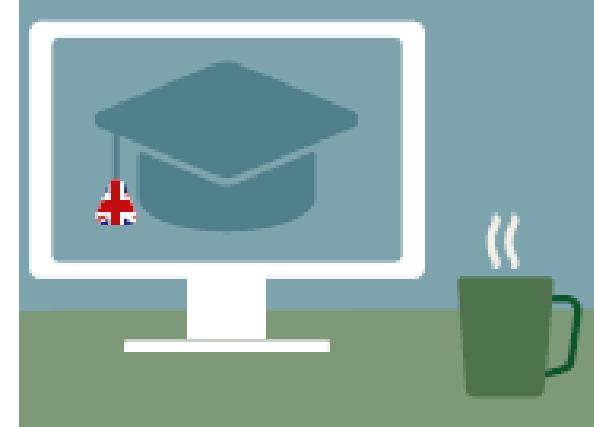
**17 slides with fotos – but not for public use**

**SEGES**



# Management that works against Salmonella Dublin in dairy cattle

- NO PURCHASE of infected animals!!!
- Calving pen – hygiene and handling
  - Prevent the cows calving on the concrete
- Caring for the newborn calf
  - Calf Housing and hygiene
  - Solid partitions/distance between calves 2x2
- Good hygiene in all barn sections – even within cows!
- Boot wash, hygienic feeding facilities, water troughs – Beware of water and high-pressure washer – also In the robots)
- Follow up with Min. 8 calf samples at regular intervals!
- Keep track of development among cows with bulk milk samples.



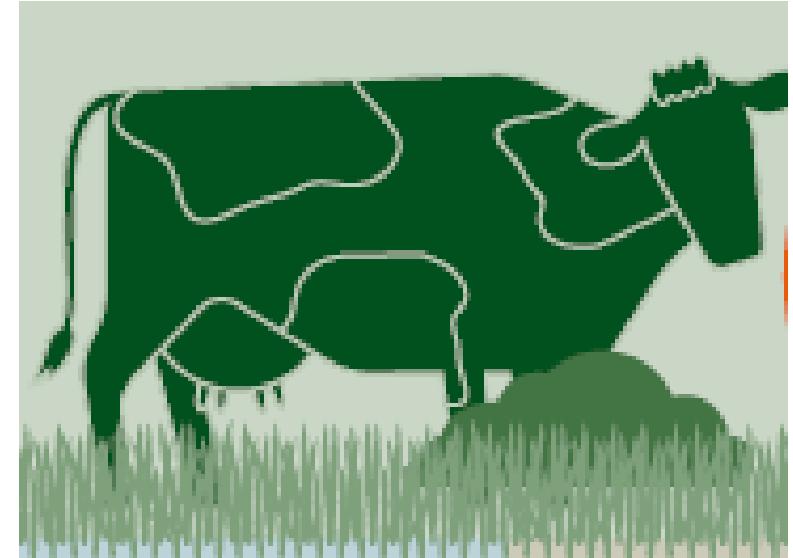
# Action Plans

- Keep it simple
- Set up milestones and put Salmonella on the agenda
- Get cooperation from all stakeholders in development of a realistic action plan – in which areas will the herdowner make an effort?
- The herdowner must own the action plan
- Follow up, follow up, follow up – and plan this from the start
- Ensure that ALL employees are involved



# Challenges

- Multiple infection stages – subclinical, acute, chronic
- Lack of understanding about the pathogenesis
- Lack of sensitive diagnostic test to detect infectious cattle
- Long survival in the environment
- Increasing herd size
- What about the healthy infectious carriers?
- What about the birds and all the other causes...?



# Challenges

- Farmers lack of motivation
  - Lack of willingness to cooperate
  - Lack of support in some areas of the country
  - Lack of knowledge?
  - Lack of systematics



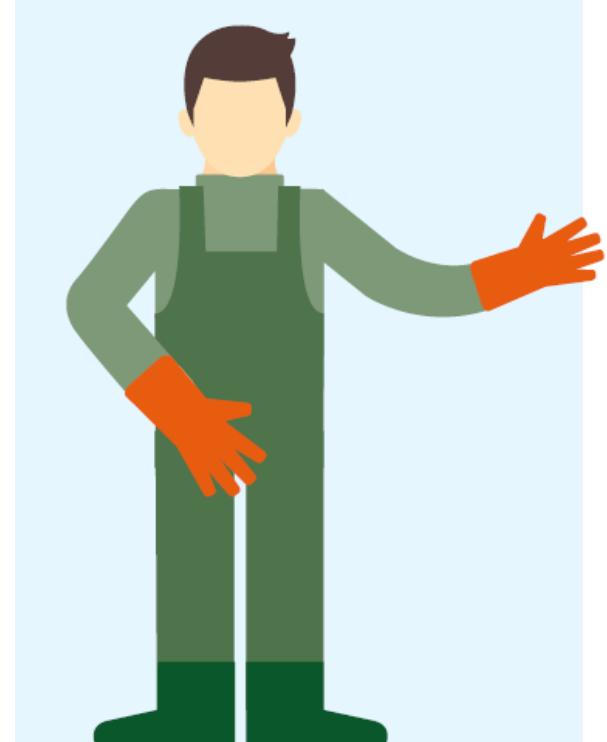
# Future plans

- National restrictions
- Project 2020-2022
  - visits, coaching, follow up
  - Films and education
  - biosecurity, manure and biogas
  - new PCR testing on cow level
  - tool for buying in animal



# Future plans?

- Focus on avoiding infecting other herds and reintroduction
  - All Level 2 herds are placed under official supervision by the Danish Government
  - Routine visit Order: Visit Level 1 first in the day.
  - Better visitor hygiene.
  - Delivery facilities.
  - Double fence around animals on grass.
  - Increased manure handling
  - Signage



A wide-angle photograph of a modern dairy farm barn. The barn has a high ceiling with exposed wooden beams and several bright overhead lights. In the foreground and middle ground, numerous cows of various colors (black, white, brown) are in individual stalls, separated by metal railings. They are all facing towards the left, where a large pile of dry straw is provided for bedding and feeding. In the background, a red and white tractor is parked near the back wall, and more farm equipment is visible through the windows.

Danish Cattle Farms  
Free from **Salmonella Dublin!**