

Hygiene is part of infection control

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What you will learn today:

- Hygiene – Why is hygiene and proper disinfection important?
- External biosecurity– Which routes of transmission is important and how do you prevent it?
- Internal biosecurity – Can the infection be stopped once it is inside, and how?



Hawthorn was protection against infection

Infectious diseases have been fought with the help of hygienic principles, long before the infectious cause was known.

"The Black Death" (Plague), was eradicated in Denmark in 1711.

"Quarantine period" for ships and villages with deaths or symptoms.

Rinderpest was eradicated by isolation and slaughter.

Hawthorns were planted as a preventive measure at the burial sites.



Worst case today?

Dysentery has up to 90 days of survival in the environment



Why do we need good hygiene?

○ All herds are declared free of certain swine diseases.

○ Re-introduction of diseases will cause:

- Reduced welfare for the pigs
- Reduced productivity
- Increased feed consumption
- Increased work
- Increased use of medication



Hygiene is cleaning and disinfection

Good hygiene

- Promoted by:
 - Neat/tidy conditions
 - Easy-to-clean surfaces
 - Use of soap
- Inhibited by:
 - Cracks and defects in surfaces
 - Porous surfaces that absorb water
 - Mess and things in wrong places
 - Rodents, birds and insects

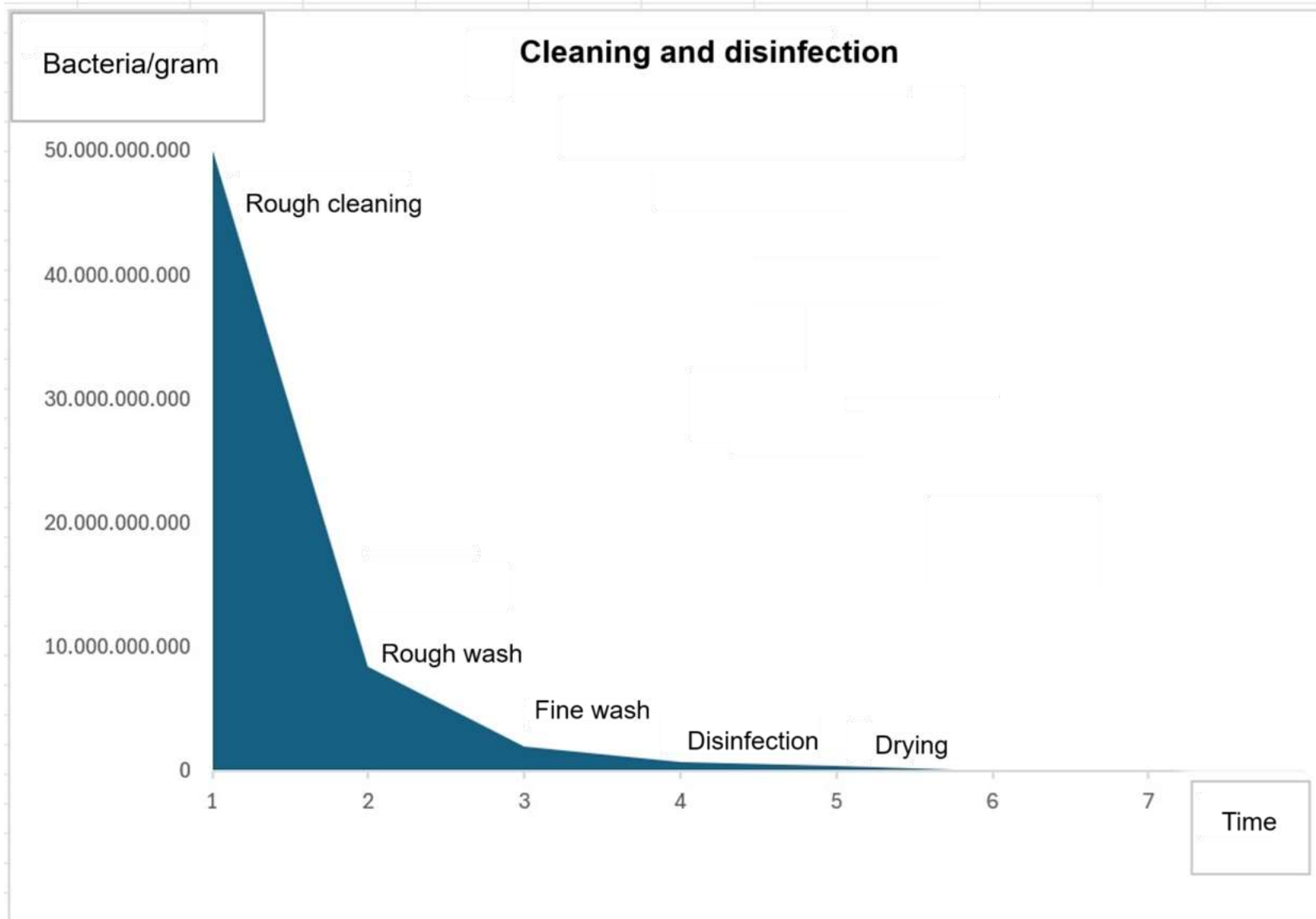
Disinfectants are tested and approved under laboratory conditions on smooth surfaces.



Make it easy to clean



Cleaning phases: from Poop to Plate



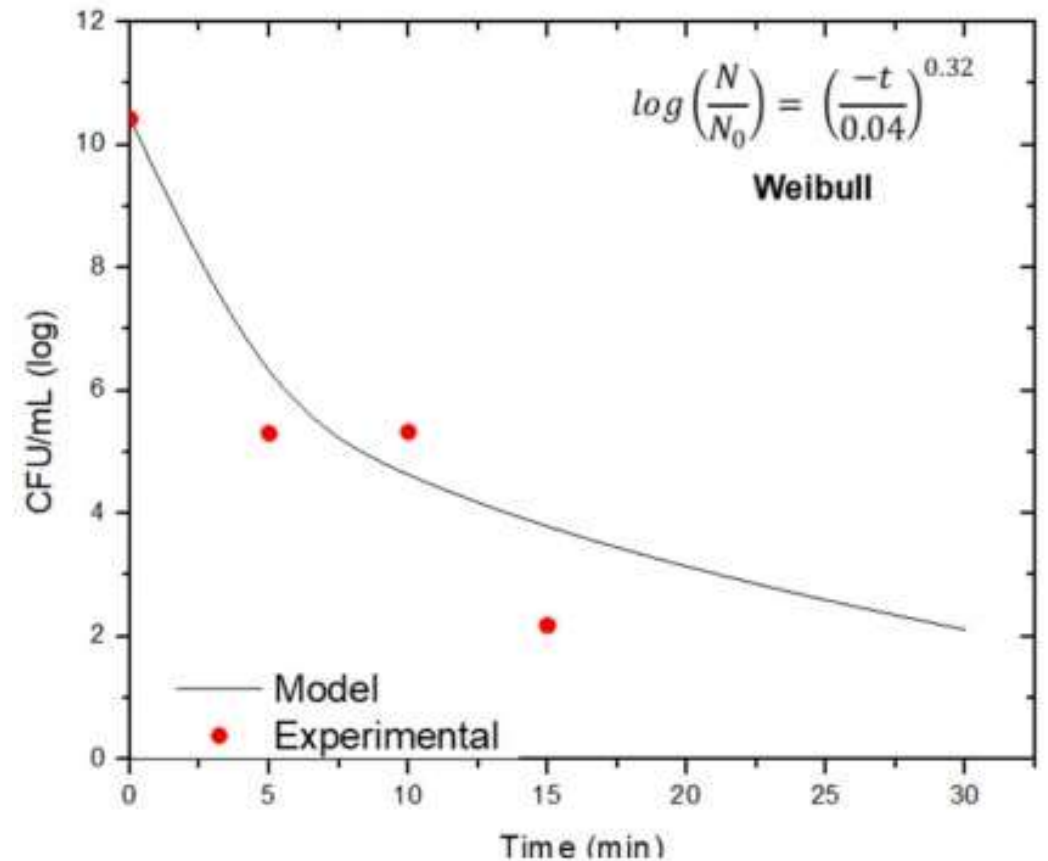
Disinfection kinetics

Chick-Watson Law
In Water 2023 15 2019

Effect = reduction in the survival of bacteria/viruses

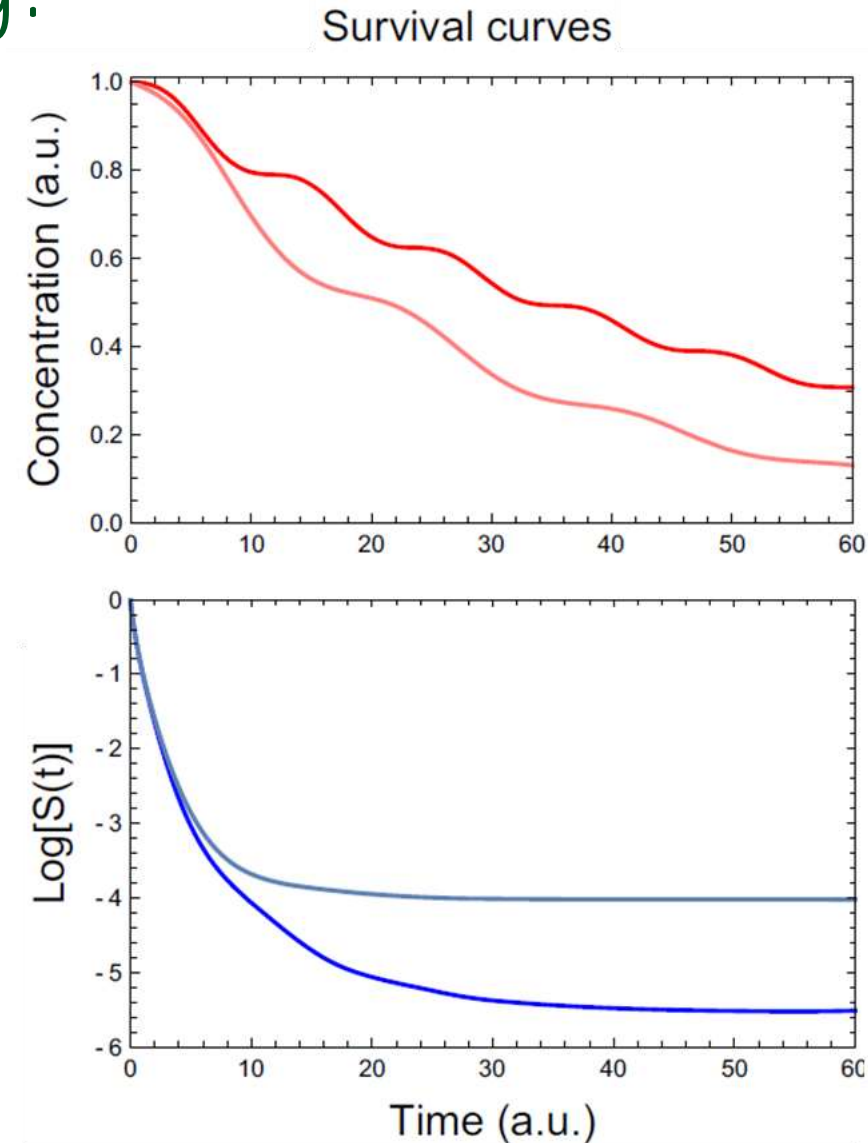
Disinfectant chosen for the task, because k and t depend on disinfectant and agent.

$\text{Log}_{10} \text{Reduction} = -k * t \text{ Conc.} * \text{Time}$



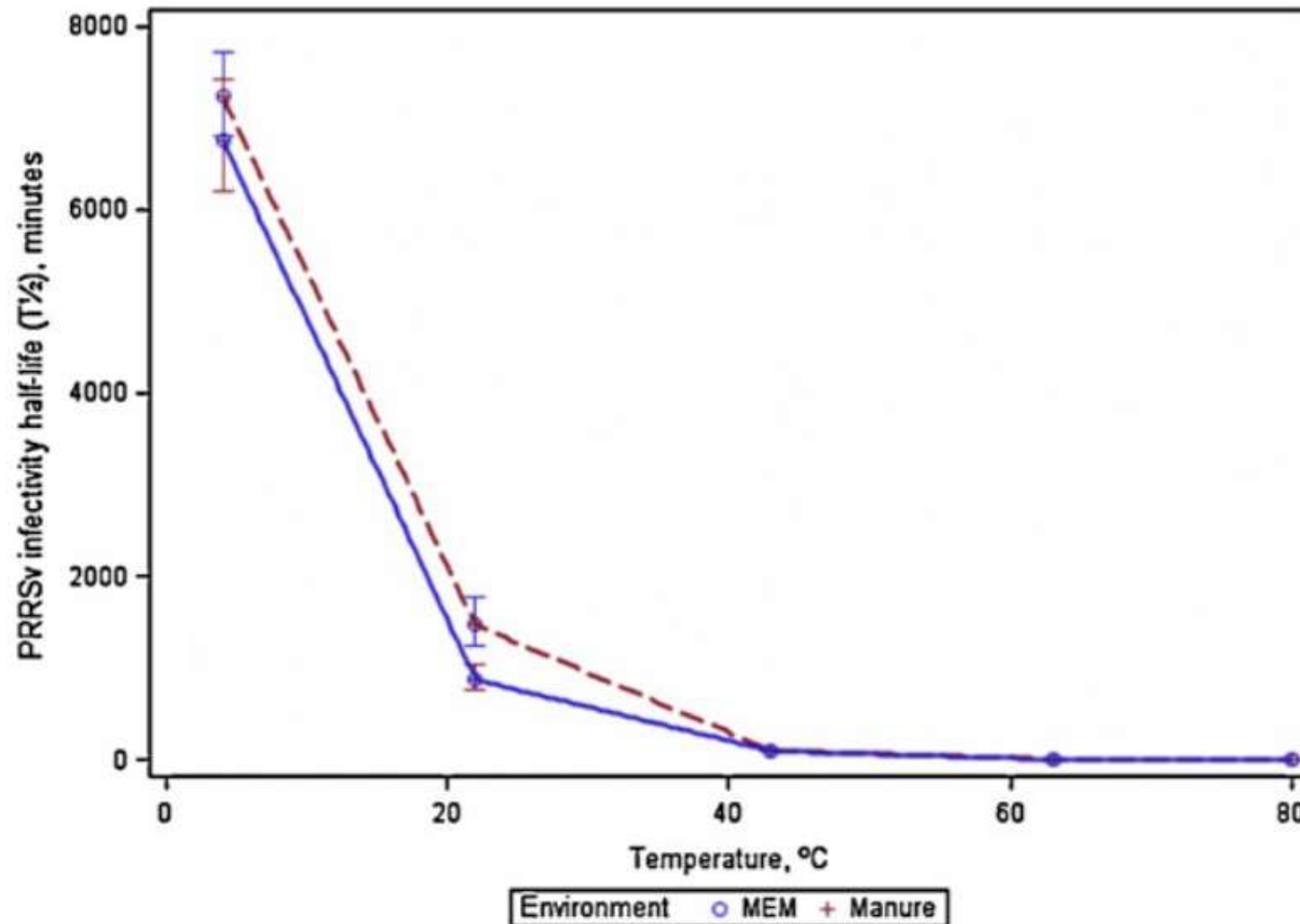
Disinfection kinetics meaning:

- Fluctuating temperatures and concentrations gives fluctuating effects
- Temperatures $< 5\text{ }^{\circ}\text{C}$ = Disinfection works poorly
- Temperatures $< 0\text{ }^{\circ}\text{C}$ = Disinfection does not work at all
- So, what to do in low temperatures?
 - Increase concentration and exposure time of disinfectant
 - Apply heat
 - Do not use salt or antifreeze liquid, has little documentation



Viruses and bacteria survive best < 5°C

David Linares et al. Vet. Mic. 2012



Choice of disinfectant

Table 2. Overview of basic abilities of some disinfectant types used for disinfection in livestock farming.

| Middel | Detergent (rensevirkning) | Virksom mod | | | Hurtigt virkende | Hæmmes af urenheder | Anbefalet | | Korrosiv virkning | Belastende for ydre miljø ** |
|----------------------------|---------------------------|-------------|--------|-------|------------------|---------------------|-----------|------------|-------------------|------------------------------|
| | | bakterier | sporer | virus | | | pH-værdi | temperatur | | |
| Syrer | nej | ++ | - | + | ++ | ++ | <2 | >5°C | +++ | nej |
| Stærke baser | ja | ++ | (+) | +++ | + | - | >11 | - | ++ | nej |
| Hypokloritpræp. | nej | +++ | - | +++ | +++ | +++ | >7 | <35°C | +++ | nej |
| Kloraminpræp. | nej | +++ | - | +++ | ++ | ++ | ca. 7 | - | +++ | nej |
| Jodoformer | ja | +++ | + | + | +++ | ++ | ≤6 | <35°C | + | ? |
| Fenol derivater | ja | ++(+) | - | (+) | ++ | ++ | >8 | <40°C | - | ja |
| Kvat. ammoniumforbindelser | ja | ++ | - | - | +++ | +++ | ca. 8 | - | + | ja |
| Formaldehyd | nej | +++ | +++ | +++ | - | - | - | >16°C | - | nej |
| Glutaraldehyd | nej | +++ | +++ | +++ | + | - | ≥7 | >5°C | - | nej |
| Pereddikesyreholdig | nej | +++ | +++ | +++ | ++ | + | <6 | >5°C | ++ | nej |
| Øvrige oxyderende * | nej | +++ | ++ | +++ | ++ | + | <6 | >5°C | + | nej |

* Gælder ikke for brintoverilte der er et mildt desinfektionsmiddel

** Se også kommentarer til de enkelte midler i afsnit 1.3

- = ingen
- + = mindre
- ++ = middel
- +++ = meget

Choice of disinfectant

Select product according to the task:

- Stables and wagons with animals and people: Oxidizing agents
- Empty stables and outdoors: Glutaraldehyde
- Empty barns, slurry container and use of protective equipment: Bases

Be aware in winter and cold weather:

- Increase concentration: Double concentration 2% glutaraldehyde.
- Add heat: Hot water cleaner, heated disinfectant solution.



How about in the winter?



Wash and disinfect in winter

- **Problem:**

- Bacteria and viruses are preserved in freezing weather.
- The effect of water and disinfectants is reduced.

- **Solutions:**

- Create easy-to-clean surfaces without cracks and porosity before the frost hits.
- Cover or build a permanent covered ramp.
- Remove snow before disinfection and use of ramp.
- Wash with hot water cleaner or other heat source.
- Disinfect with Glutaraldehyde in an increased concentration and in heated solution.

Indoors: Delivery room or lock



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 - Use the right active substances for the specific task!
 - In winter: change the disinfectant, increase the concentration, apply heat!
- **External biosecurity– Which routes of transmission is important and how do you prevent it?**
- Internal biosecurity – Can the infection be stopped once it is inside, and how?

Routes of transmission to the farm



Feed



Crossing roads



Breeding animals



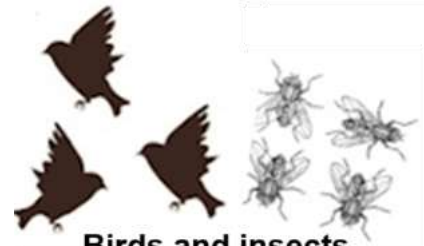
Neighboring herds



Transports



Straw and Shavings



Birds and insects



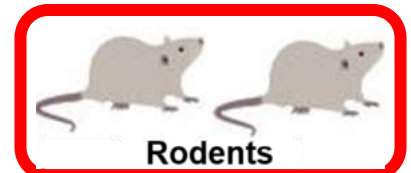
Goods



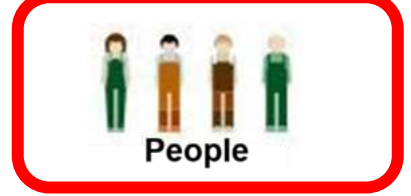
Dead animals



Slurry



Rodents



People

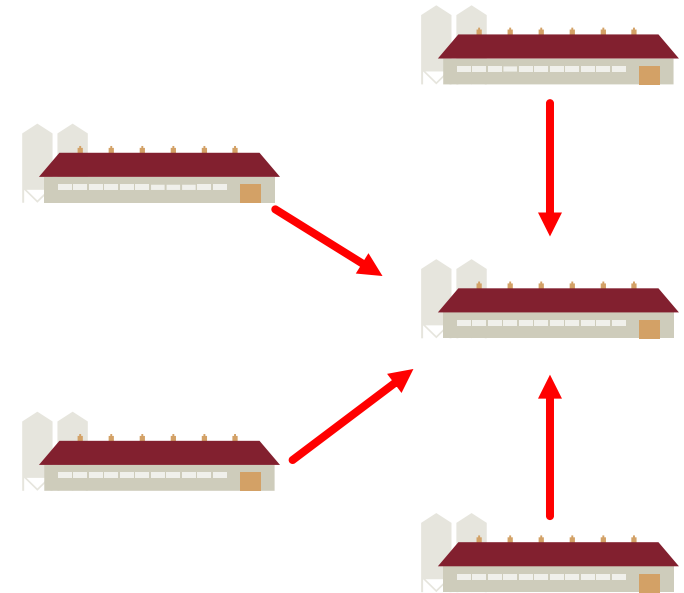


Food

Breeding animals/ Incoming animals

| Status informations | | |
|--|--------------|--|
| Health status | Blå SPF +Myc | |
| Conditional statuses | | |
| Introduced | Type | Disease |
| 07.10.2024 | Primary | mistanke om PRRS, (klinik). Dårlig ædelyst, dødsfald blandt søer, feber ved pattegrise |
| 07.10.2024 | Primary | Uafklaret status pga. klinisk mistanke for PRRS1 og PRRS2 |
| Supplementary status | | |
| Blå-Blå, Ejertransport, Direkte udlevering åben vogn | | |

- Search knowledge about the animals:
 - On SPF-sund's website: www.spfsus.dk
 - At your supplier, blood test results
- Limit the number of suppliers.
- Slaughter pig production should have "All in, all out".
- Sow herds should use quarantine section for breeding animals.



Contact with pig transports



Slaughter trucks and export trucks:

- Make mobile deliveries with your own livestock truck or slaughter truck!!
- Use delivery room/lock/sectional delivery – avoid backflow of pigs!!
- Never make a direct delivery!!
- Delivery to an empty, washed and disinfected truck.

Certified SPF trucks:

- Not our biggest concern. They arrive empty, washed and disinfected.



But REMEMBER!!! 🍌
The ramp is your responsibility



Clean means clean!!!



Contact with people

- Quarantine time min. 12 hours.
- Use a visitor list.
- Only access via the entrance room.
- Thorough hand washing for 15 sec.

Besøgsliste
Sundhedsstatus: www.sgfus.dk
Dagsaktuel status: www.sgfus.dk

Ejer/driftleder erklæring
Bekendt er mistanke eller erklæring herved - under erstatningsansvar - at der ikke mig besætningen er mistanke om eller konstateret smitte med nogen af de sygdomme, som betinget status.
Hvis der er "mistanke" eller "betinget status" underskriver ejer **ikke**, men der skrives "mistanke" eller "betinget status" inden den besøgende skriver under.

Besøgendes erklæring
Undertegnede besøgende erklærer herved - under erstatningsansvar - at jeg sidste 12 timer har været i kontakt med svin af leveret sundhedsstatus, og at jeg kan overholde de karantænetimer og besøgsregler, som er anført på bagsiden. Været i udlandet, så overholder jeg de generelle regler fra SPF-Sund. Jeg har også noteret mig denne besætnings sundhedsstatus på forrumsdøren og supplerende oplysninger overfor.

| Dato | Ejer/driftleders underskrift eller mistanke/betinget status | Sidste besøg i anden besætning | | Den besøgendes | | |
|------|---|--------------------------------|-------------------------|----------------|-----------------|---------|
| | | Dato | Sundhedsstatus / Udland | Stilling | Foto-udstyr J/N | Tlf.nr. |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Underskr



Rodents

- Start by keeping them out!!
- Check walls and that doors/gates are closed.
- Keep it neat/tidy along the buildings.
- Do not leave feed under silos and at gates.
- Be aware after harvest, when they move from the field towards the stable.
- Set up traps, maybe help from a professional pest control company.



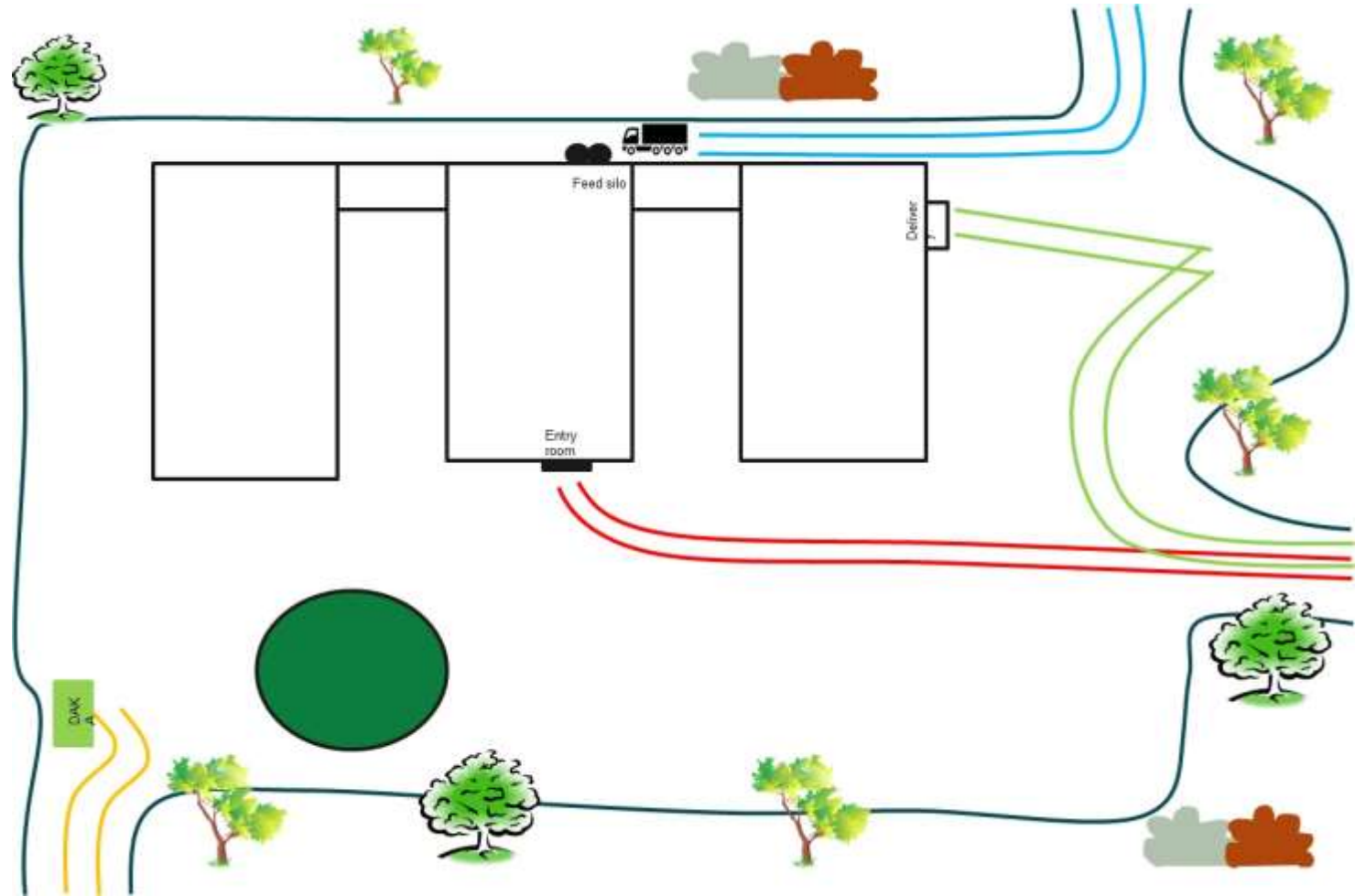
Carcass handling

- Pickup location as far away as possible, min. 50m.
 - Be aware on roads, avoid driving where the DAKA truck is driving.
- The carcasses must be securely covered, e.g. in a container or cooling well.



Crossing roads

- DAKA truck, slaughter truck, slurry trailer.
- Draw a sketch of your farm.



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 - In winter: change the disinfectant, increase the concentration, apply heat!
- External biosecurity– Which routes of transmission is important and how do you prevent it?
 - Incoming Pigs – Buy healthy pigs, from few suppliers and use quarantine section!
 - Slaughter trucks/export trucks – Keep them at a distance or secure against backflow. Always clean ramp!
 - Correct use of the entrance room and thorough hand washing!
- **Internal biosecurity – Can the infection be stopped once it is inside, and how?**

Internal biosecurity:

By using sectioning and hygienic procedures, the infection can also be reduced within the herd.

Avoid contamination between 'week-groups'.

Avoid contamination between pins

| Processing-Fluid samples from farrowing section | | | | | | | | | | | | | | |
|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Week-nr | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| PCR-negative | | | | | | | | | | | | | | |
| PCR-positive | | | | | | | | | | | | | | |

The amount of infection a pig is exposed to, has an effect on the occurrence of clinical disease or not.

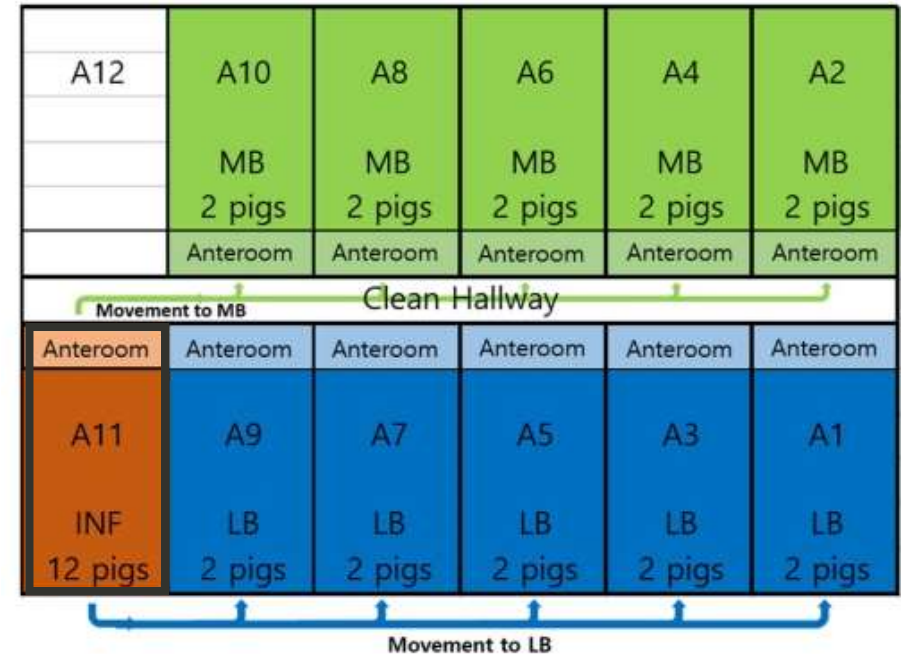
It is therefore particularly important to use sectioning and good hygiene at clinical disease.



Infection by persons CAN be avoided with good hygiene

Forsøg af Montserrat Torremorell et al 2017

- 1 INF: Infected room with highly contagious virus.
 - LB: Without changing clothes or hygiene.
 - MB: Foot and clothes change, and hand washing.
- Result:
- ✚ LB were all infected within 2 days.
 - ✓ MB avoided infection.



Further reading:

- Manuals:
 - Disinfection at livestock farms
 - Eradication Management
- E-learning:
 - SEGES Innovation: Internal biosecurity



GRATIS ONLINE KURSUS: SMITTEBESKYTTELSE I BESÆTNINGER

SEGES Innovation har et gratis online kursus i smittebeskyttelse, der handler om, hvordan du undgår at få smitte ind og ud af besætningen, hvordan du hjælper med at holde influenza ude af besætningen, og hvordan du kan minimere og helst forhindre smitte i at sprede sig i og mellem staldafsnit.

Kurset varer cirka 20 minutter, og du afslutter det med en test.

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 - **Some diseases can be slowed down – Change footwear and clothes, as well as hand washing!**

Thanks. Questions?

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Landbrug & Fødevarer

