

# How Should We Raise Pigs in the Future from a Porcine Health Management standpoint?

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In this presentation looking at health in a vacuum

# Goal: Production of pork meat with zero risk to public health



# Goal: Production of pork with zero risk to public health

- No spread from farms via pigs (pork), people or to the environment of:
  - Antimicrobials
  - Antimicrobial resistance genes
  - Zoonoses
  - Pollutants/chemicals



# Production Systems – how to make healthy pigs

- Housing

# Health in different Housing Systems

- Osteochondrosis more frequent in outdoor pigs, *Etterlin et al. 2014*
- Osteochondrosis less frequent in deep straw, *van Grevenhof et al., 2011*
- More tail-bite and lameness in slatted floor versus straw, *Scott et al. 2006*
- More PWMS and respiratory health in straw versus slatted floor, *Scott et al., 2006.*
- Farrowing housing most cases no effect on health, *Vandresen et al. 2024*
- When animals were kept indoors, they were affected with more lameness and treated more frequently against MMA (sows) and had more respiratory problems and diarrhoea (weaners and fatteners). *Leep et al., 2019*

# Health in different Housing Systems

- Outdoor pigs come in contact with bacteria, viruses and parasites
- In an indoor production system increase aerosol transmission of the infectious diseases,
  - *Hyun-Suk Park et al., 2017*
- Pigs in intensive production have not increased risk for bacterial foodborne pathogens
- Pigs in alternative systems have higher risks of exposure to foodborne parasites
  - *Davies 2011.*

# Production Systems – how to make healthy pigs

- Housing
  - Not one conclusion
  - Pros and cons
  - Pig density, quality of housing, air-quality, hygiene



# Production Systems – how to make healthy pigs

- Housing
- What about the animals?
- SPF system – high health animals

# Production Systems – how to make healthy pigs

- Housing
- What about the animals?
- SPF system – high health animals
- Biosecurity

# High External Biosecurity

# External biosecurity standards

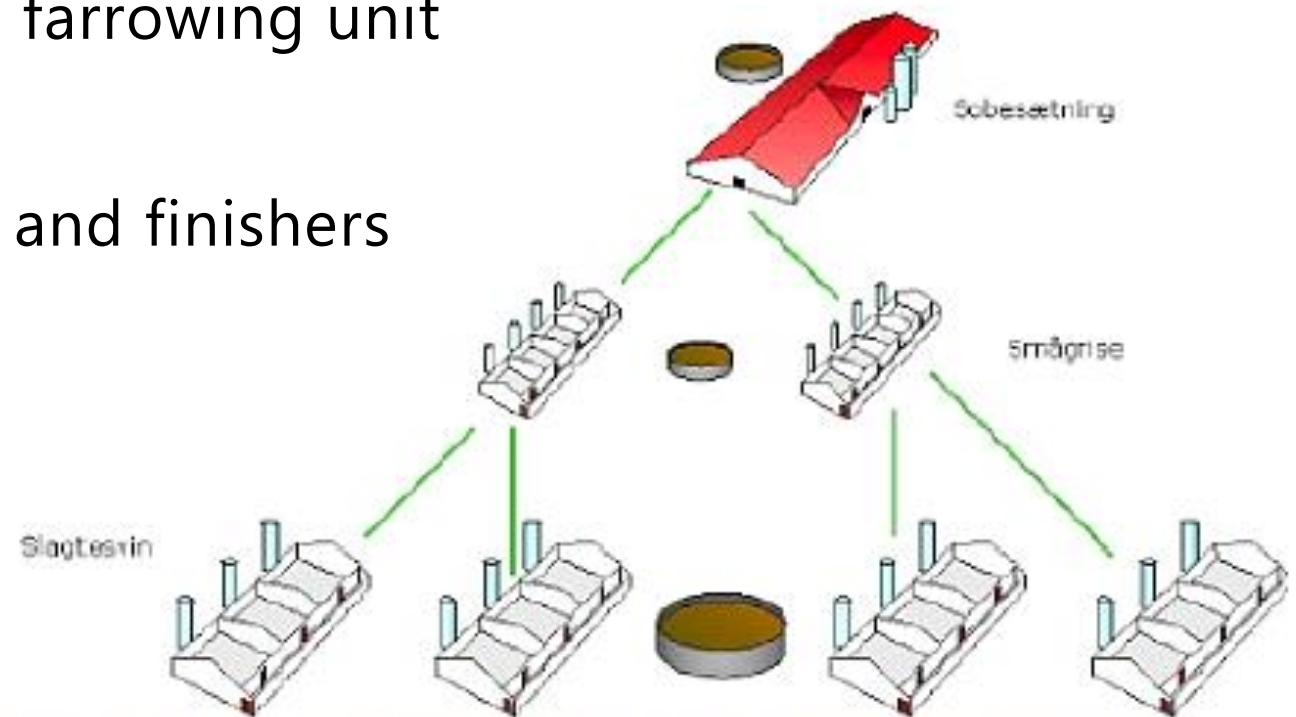
- Depends on region in the world
  - Farms are smallholder pig systems or large pig companies
  - Risk of Wild boar, birds, bats, rodents, cats and dogs
  - ASF and other pathogens in straw, enrichment materials
    - Hygienic status of selected organic enrichment materials, *Wagner et al., 2018*
- Air-filtration (PRRS, *M. hyopneumoniae*)

# Internal biosecurity standards: people and equipment



# Internal biosecurity – flow of pigs

- Multisite
- Multi-week batch production in farrowing unit
- All-in/all out by site for nursery and finishers
- Less/no mixing of pigs
- Family weaning



Figur 11. Produktion på flere lokaliteter, hvor stalde til søer, smågrise og slagtesvin er adskilte.  
(Tegning: Nils Krog, billednr. 6281)

# Production Systems – how to make healthy pigs

- Housing
- SPF system – high health animals
- Biosecurity
- Feed – optimal nutrition, safe, feed additives

# Feed and Microbiome

- Shaping the piglet microbiome to resist diseases:
  - Preprogramming the piglet's microbiome by maternal nutrition
  - Postnatal delivery of essential probiotics.
  - *Johnson et al, Journal of Animal Science, 2022, **100**, 1–15*



# Production Systems – how to make healthy pigs

- Housing
- SPF system – high health animals
- Biosecurity
- Feed
- Genetics, the robust pig, weaning age

# Production Systems – how to make healthy pigs

- Housing
- SPF system – high health animals
- Biosecurity
- Feed
- Genetics and the robust pig
- Vaccines
  - Higher use
  - Autovaccines
  - Designer vaccines
  - Easy administration

# Production Systems – how to make healthy pigs

- Housing
- SPF system – high health animals
- Biosecurity
- Feed
- Genetics and the robust pig
- Vaccines – higher use, autovaccines, designer vaccines, administration!
- Strategy for use of antimicrobials and other pharmaceuticals

# Antibiotics

- Only for individual treatment
- Diseased pig:
  - Is antibiotic necessary
  - What active substance
  - Dose and duration
  - Sick-pens and isolation



# Production Systems – how to make healthy pigs

- Housing
- SPF system – high health animals
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- Feed
- Genetics and the Robust pig
- Vaccines
- Strategy for use of antimicrobials and pharmaceuticals
- Technology in Farming

# Technology in Farming

- Monitoring Health with Sensors and AI
  - Early detection of diseases
  - Objective detection/assessment of diseases
  - Detection of risk-factors
- Highlighted as one way to improve productivity health and welfare  
*Racewicz et al., 2021*

# Raising pigs in the future from health standpoint

- Indoor (high external and internal biosecurity), maybe hybrid
- multi-week batch, multisite, SPF farms
- Robust pig (higher birth-weight and weaning age, optimized microbiome)
- Targeted vaccination strategies (commercial, designed)
- Individual prudent antibiotic use
- AI, robots and sensors helping with disease surveillance and caretaking