

Research & Development

PM3.1 Session 14 High health pig systems

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High Health Pig Systems

The Danish approach



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The National Committee for Pig Production DANISH BACON & MEAT COUNCIL





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Plan for presentation



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1. The Danish Pig Production



- 2. Eradication of Diseases
- 3. The Salmonella control program

The Danish Pig Production



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- 1,1 million sows
- 24 million pigs per year
- 85 % exported = 1.7 million kg of pork
- The top exporter of the world

Structure of Danish pig farms



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Family farms

Average size 290 sows

Total of 10,000 farms

- Farrow-to-finish: 4,300

- Farrow-to-weaner: 1,100

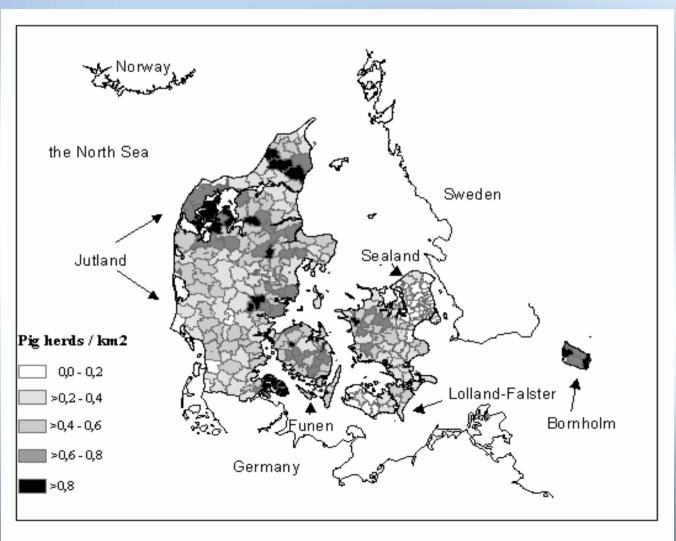
- Weaner: 500

- Finishing: 4,100

Geographic distribution of the Danish pig population



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Structure of the Danish pig production



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VERTICAL INTEGRATION

- Farmers own the slaughterhouses (coops)
- Farmers own the breeding system (DANBRED)
- Farmers own the AI -stations



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- R&D in pig production & meat technology
- Export marketing
- Contact to national authorities

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- 1. The Danish Pig Production
- 2. Eradication of Disease



3. The Salmonella control program

Control of diseases



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- Changes in management
- Changes in production system
- Vaccination
- Antibiotic medication
- ELIMINATION OF PATHOGENS
 - Eradication
 - On herd level

Why elimination on herd level?



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- Higher productivity
- Higher price on pigs
- Less variation in production costs
- Less work
- Less use of antibiotic
- Lower risk of resistance
- Higher animal welfare

Elimination of diseases



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Three different principles

- 1. Total depopulation/repopulation (SPF)
- 2. Test and removal
- 3. Partial depopulation



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1. The Danish Pig Production

- 2. Eradication of Disease
 - Bio security
 - The Danish SPF program
 - Partial depopulation





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Before eradication

- Consider the level of bio-security
- Re-introduction of pathogen
 - Visitors and trucks
 - Infected replacement stock
 - Airborne transmission

Airborne transmission



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Risk increases by

- 1. Size and number of neighbour farms
- 2. Size of own farm

Safe distance

- Enzootic pneumonia (M hyo): 2-3 km
- Pleuropneumonia : ½-1 km

Between-farm transmission: M. hyo



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Danish risk study (Thomsen-92)

- 1. Buying replacement stock from more than one herd
- 2. Distance & size of infected neighbour herd



Calculation of the probability of staying non-infected

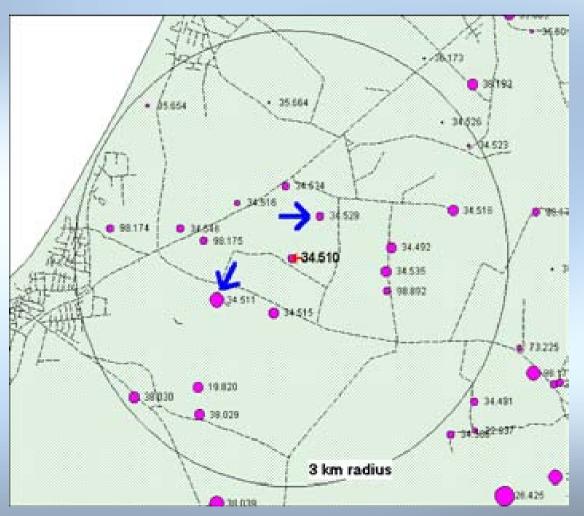


GIS report available from DBMC

Mycoplasma risk assessment by GIS



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- Distance to nearest infected herd: 670 m
- Distance to nearest large infected herd: 1,200 m
- One-year mycoplasma survival probability: 91%



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 - Partial depopulation



3. The Salmonella control program

Danish SPF system



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Established in 1968 by DBMC

Total depop/repop program

To-day

- Approx. 95% of nucelus & multiplying herds
- Approx. 80 % of replacement stock for sale

The SPF diseases



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Herds declared free from infections

- Mycoplasma hyopneumoniae
- Actinobacillus pleuropneumoniae
- Toxigenic Pasteurella multocida
- Brachyspira hyodysenteriae
- Mange mite & lice
- PRRS
- (Salmonella)

Only approx. 10 % of the herds in 2004 have the highest health status

RE-infections



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Respiratory pathogens

- Mycoplasma hyopneumoniae
- Actinobacillus pleuropneumoniae
- PRRS

Main causes of re-infections (93 %)

The SPF system



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Increasing importance

Most new herds are stocked with SPF pigs!

<u>1992:</u> <u>2002:</u>

Number of herds: 26700 11700

SPF herds: 3500 (13 %) 3500 (30 %)

High level of biosecurity



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- Minimum distance to other farms
 - Nucleus & multiplying herds: 500 m
 - Production herds: 100 m
- Entry room (change of boots/clothes)
- Quarantine for persons (12 hours)
- Special compartment for pigs leaving the farm
- Empty and clean trucks for transportation
 - The SPF Company mandatory

SPF Company



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Cleaning & desinfection



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Microbiological control



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- 1. Semen (A.I.)
- 2. Replacement stock (gilts)
- 3. Gnotobiotic caesarean sections
 - Only for nucelus herds
 - 25-250 sows per year
 - Piglets moved to nursing sow in herd

The operation table at the clinic



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A sleeping sow



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The sterile operation "room"



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The operation



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An overview



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The piglets



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Control of health status in SPF herds



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Nucleus & multiplying herds

- Visit by vet every month
- Clinical signs
- Serological testing every month

Production herds

- Visit by vet every three month
- Clinical signs
- Serological testing once a year



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- 1. The Danish Pig Production
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 - Partial depopulation



3. The Salmonella control program

Partial depopulation



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Frequently used in Denmark in sow herds

Alternative to total depop/repop

- Reduced loss of production
- Genetics preserved

Method

- Temporary changes in production flow
- Strategic medication
- Replacement stock from SPF herds

Partial depopulation in Denmark



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High succes rate

- Enzootic pneumonia (*M.hyo*)
- PRRS
- Dysentery (*B.hyodys*)
- Mange

Low or unknown succes rate

- Pleuropneumonia (A.pp)
- Atrophic rhinitis
- Porcine proliferative enteropathy

Motivation of the farmer



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IF succes

- Select highly motivated farmers
- Carefull explanation of all elements
- The farmer must comply 100 %

Motivators

 Eradication of severel diseases at the same time (M.hyo, PRRS, Dysentery, Mange)

Enzootic pneumonia (M. hyopneumoniae)



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The Swiss method

- All pigs younger that 10 month removed & 14 days farrowing stop
- 2. Medication of all breeding animals
- 3. All units cleaned & disinfected

Also relevant for Dysentery & Mange

Partial depop. for *M.hyo* in Denmark



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Startet in 1990

Number of herds: 20-30 per year

Rate of succes: 80-90%

Partial depop. for *M. hyo*



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Rate of succes in different field studies

Switzerland: 100% (Zimmermann, -90)

• Norway: 100% (Lium, -92)

Denmark: 100% (Bækbo, -94)

• Finland: 89-100% (Heinonen, -99 &

Rautiainen,-01)

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The Salmonella control program



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Pork is a potential source to human Salmonellosis

- 1993: A preliminary Salmonella program
- 1995: Surveillance program established
- 2003: Penalties intensified

Aim: Reduce the prevalence of Salmonella in slaughter pig herds and pigmeat

The Danish Salmonella Surveillance Program



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- Animal feeds controlled for Salmonella
- Breeder and multiplier herds monitored for Salmonella antibodies
- Finishing herds monitored for Salmonella antibodies
- Slaughter process under increased hygiene precautions
- Monitoring of the Salmonella prevalence in pork

Serological surveillance



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The Salmonella surveillance program is based upon the use of a mix-ELISA

- A serological technique
- Detects specific Salmonella antibodies in serum and meat juice
- Detects 90% of the Salmonella serotypes known to occur in Danish pigs

The Serological Surveillance of finishing Herds



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Herds producing > 200 finishers per year

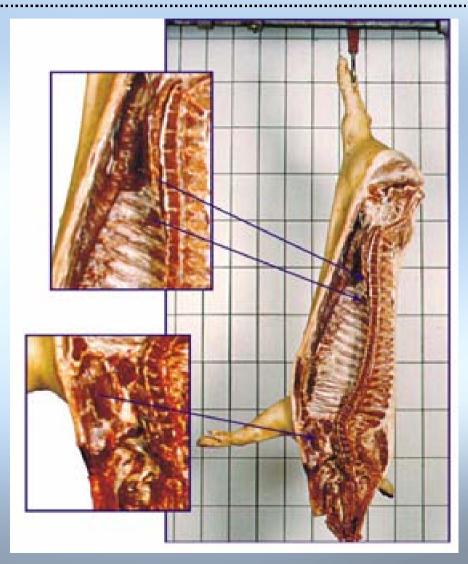
More than 600,000 meat samples are analysed every year

The herds are assigned to one of three levels by a classification scheme

Meat juice sample muscles



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The Danish meat juice container



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Definition of Salmonella levels



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Level 1 No or few reactors

No intervention in the herd

Level 2 A moderate proportion of reactors

Reduction plan recommended

Level 3 A high proportion of reactors

Reduction plan recommended

Slaughter under increased hygiene

precautions

Distribution of herds in level 2 and 3 1995 - August 2003

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Herd prevalence - slaughter pigs



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Number of herds in the three levels (May 2005)

| Level 1 | | Level 2 | | Level 3 | |
|---------|---------|---------|---------|---------|---------|
| No. | Percent | No. | Percent | No. | Percent |
| 12014 | 95,7 | 391 | 3,1 | 150 | 1,2 |

Salmonella deduction



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Salmonella deduction paid by the farmer

% of carcass value:

| Level | % |
|-------|---|
| | |

2

3

6 (> 6 month)

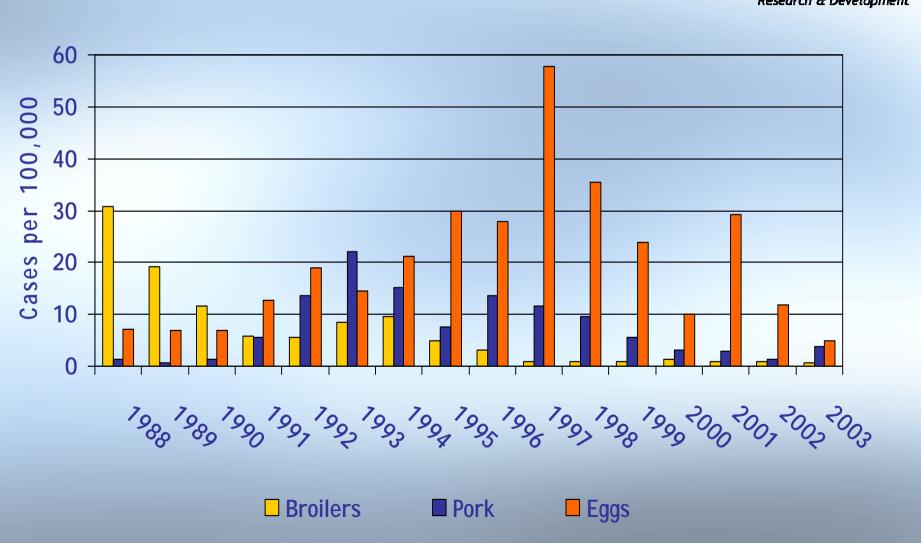
8 (> 12 month)



Main sources of human salmonellosis in Denmark, 1988-2003







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Disease control by elimination of infections plays a major role in the Danish pig production

The health status of herds can be upgraded by partial depopulation

The Salmonella control program has increased the food safety

Thank you for your attention



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...AND see you in Copenhagen!

(International Pig Veterinary Society)



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