# Pigs raised without antibiotics (RWA) in Denmark

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# Denmark


- ~2600 family-owned pig farms
- ~ 0,9 mil. sows
- ~ 33 mil. pigs/year
- ~ 16 mil. live pigs exported
- One large cooperative meat company (Danish Crown)
- Pork export to 127 countries (2016)
- Special production brands (organic, free-ranging, UK…)

# Raised without antibiotics - Antibiotic free

Danish Crown
PURE PORK
*Raised without antibiotics*


# Danish Pure Porc production (2015-2023)

- The concept is understandable and does not include additional welfare standards
- Export in 2023 was 70 % to EU and 30 % to US
- Consumers in US, Germany, Italy and Denmark
- Extra production cost around 10%
- In 2021 the number of RWA herds were 49
- Peak number of slaughtering's 350.000/y (3 % of DC)
- Low utilization rate (<30%)

# Pure Pork production (DC) (2015-2023)

**No antibiotics used from birth to slaughter**

**All RWA-pigs ear-tagged at birth**

**Ear-tag removed if the pig needed antibiotic treatment**

**RWA-pigs marked with a separate RWA slap-number**

**RWA and non-RWA pigs were housed together**

**Yearly independent third-party audit**

**Plant based feed – milk and milk products allowed**

# Health management

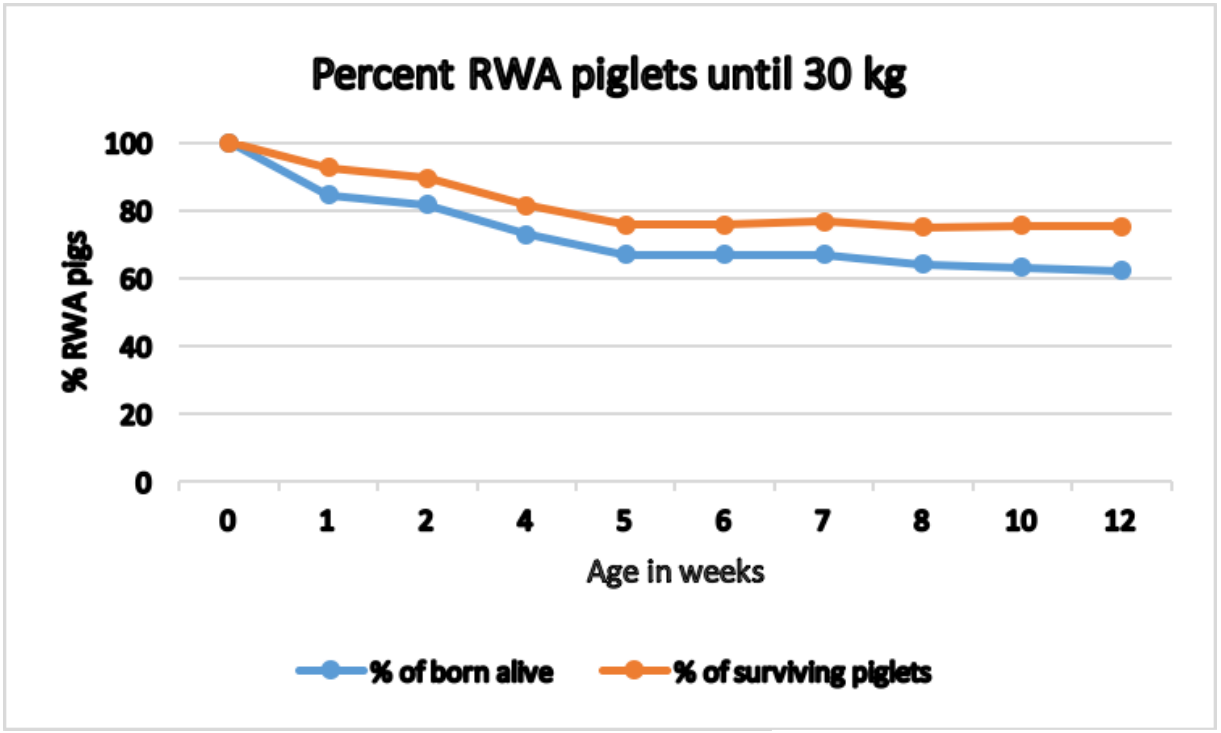
- No antibiotic treatment during the lifetime of a RWA pig
- Early prophylactic measures
- Sow treatment with antibiotics was permitted
- Pain killers were permitted
- Anti-parasitic treatment was permitted
- Vaccination was permitted
- Zink Oxide (3000 ppm) was permitted in weaner diets


# RWA-research project, Denmark

Danish Crown, SEGES, Technical University, State Serum Institute, University of Copenhagen

- Practical guideline for RWA production
  - Productivity and AB-consumption
- Health monitoring
  - Multiple pathogen testing by PCR (fluidigm)
- Herd health management
  - Out phasing of ZnO
  - Monitoring of diarrhea prevalence
  - Vaccination against umbilical infection
- Feed interventions
  - Reduced protein
- Effect on microbiome and resistance development

# RWA percentage, 100 pigs, 1 herd




Lynegaard *et al. Porcine Health Management* (2021) 7:18
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Porcine Health Management

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## Performance and risk factors associated with first antibiotic treatment in two herds, raising pigs without antibiotics

J. C. Lynegaard[1], I. Larsen[1], C. F. Hansen[2], J. P. Nielsen[1] and C. Amdi[1*]

# Acceptance rate

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**Table 2** The number of pigs as untreated, antibiotics (AB) treated, dead and missing from day 1 to 12 weeks of age in two Danish Raised without antibiotics (RWA) herds

| | Herd A | | | | | Herd B | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Weeks of age | Untreated | AB treated | Dead (untreated/ treated) | Missing pigs | Never RWA ear-tagged | Untreated | AB treated | Dead (untreated/ treated) | Missing pigs | Never RWA ear-tagged |
| 0 | 518 | – | – | – | – | 436 | – | – | – | – |
| 1 | – | | | | | | | | 3 | 53 |
| 2 | 414 | | | | | | | | 3 | 51 |
| 3 | – | | | | | | | | 7 | 49 |
| 4 | 371 | | | | | | | | 8 | 48 |
| 5 | 359 | | | | | | | | 9 | 48 |
| 6 | 353 | | | | | | | | 9 | 48 |
| 7 | 353 | | | | | | | | 12 | 48 |
| 8 | 343 | 91 | 55 (17/38) | 19 | 10 | 315 | 27 | 33 (6/25) | 13 | 48 |
| 10 | – | – | – | – | – | 307 | 29 | 36 (8/26) | 17 | 47 |
| 12 | 333 | 82 | 57 (18/39) | 36 | 10 | 298 | 31 | 37 (9/26) | 23 | 46 |
| % at 12 weeks | 64 | 16 | 11 | 7 | 2 | 68 | 7 | 8 | 5 | 11 |

Herd A
Acceptance rate of live born: 64 %
Acceptance rate of live pigs at 12 weeks: 78 %
Herd B
Acceptance rate of live born: 68 %
Acceptance rate of live pigs at 12 weeks: 79 %

# Challenges in RWA herds

Questionnaire 2018 by Poul Bækbo, SEGES

- 38 RWA producers
- 29 responders (76 %)

RWA producers - profile

- 52 % Sows and finishers (full line)
- 36 % Finishers (buying from RWA sow herds)
- 12 % Sow herds (selling 30 kg's pigs)

- 56 % had RWA production > 2 years

Miljø- og Fødevareministeriet
gudp

# Challenges in RWA herds

- Biggest challenge of becoming RWA producer?
  1. Increase in prevalence of umbilical hernia
  2. Diarrhoea in piglets or nursery pigs
  3. "When do we initiate AM treatment, and when can we wait?"

- What was the prevalence of umbilical hernia before and after joining the RWA program?
  - Before: 1.9 %
  - After: 5.1 %

- Biggest economical challenge?
  - Extra work time per piglet
  - Higher quality feed
  - Vaccines

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# Productivity in RWA herds compared with average herds

| | Pure Porc | National average |
|---|---|---|
| **Number of sow herds** | 10 | 862 |
| **Weaned per sow per year** | **33.4** | **34.0** |
| **Pre-weaning mortality** | **13.4** | **15.2** |
| **Number of weaner herds** | 9 | 582 |
| **ADG, weaners** | **451** | **464** |
| **Post-weaning mortality** | **5.1 %** | **3.9%** |
| **Number of finisher herds** | 20 | 985 |
| **ADG, finishers** | **1004** | **1028** |
| **Mortality in finishers** | **3.6** | **3.6** |

# Usage of antibiotics and vaccines in RWA herds compared to conventional

Acknowledgement:
Jan Dahl,
Danish Agriculture and Food Council

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# Data sources (January 2017 to October 2022)

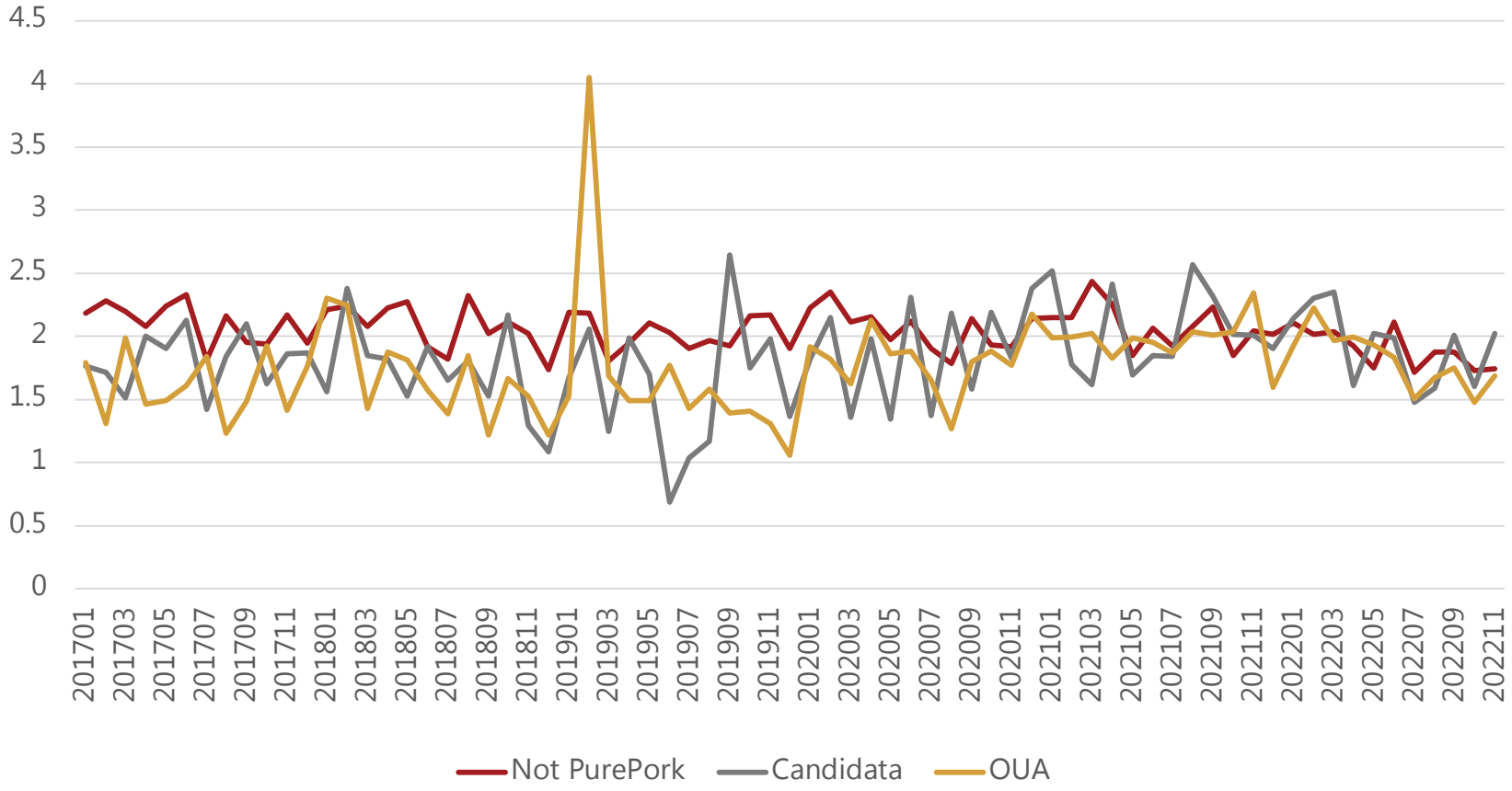
- List of herds enrolled in the Danish Crown Pure Pork Programme
  - Start and end date in the programme
- Antibiotic use recorded in the Vetstat database
  - Antibiotic use per herd and age group
  - (Number of standard treatments per pig/sow per 100 days)
- Vaccine use
  - Active herds submitted data on vaccines
  - National figures from the Vetstat database
- Production data
  - Farm specific productivity records
  - National productivity average  from SEGES

# Types of herds

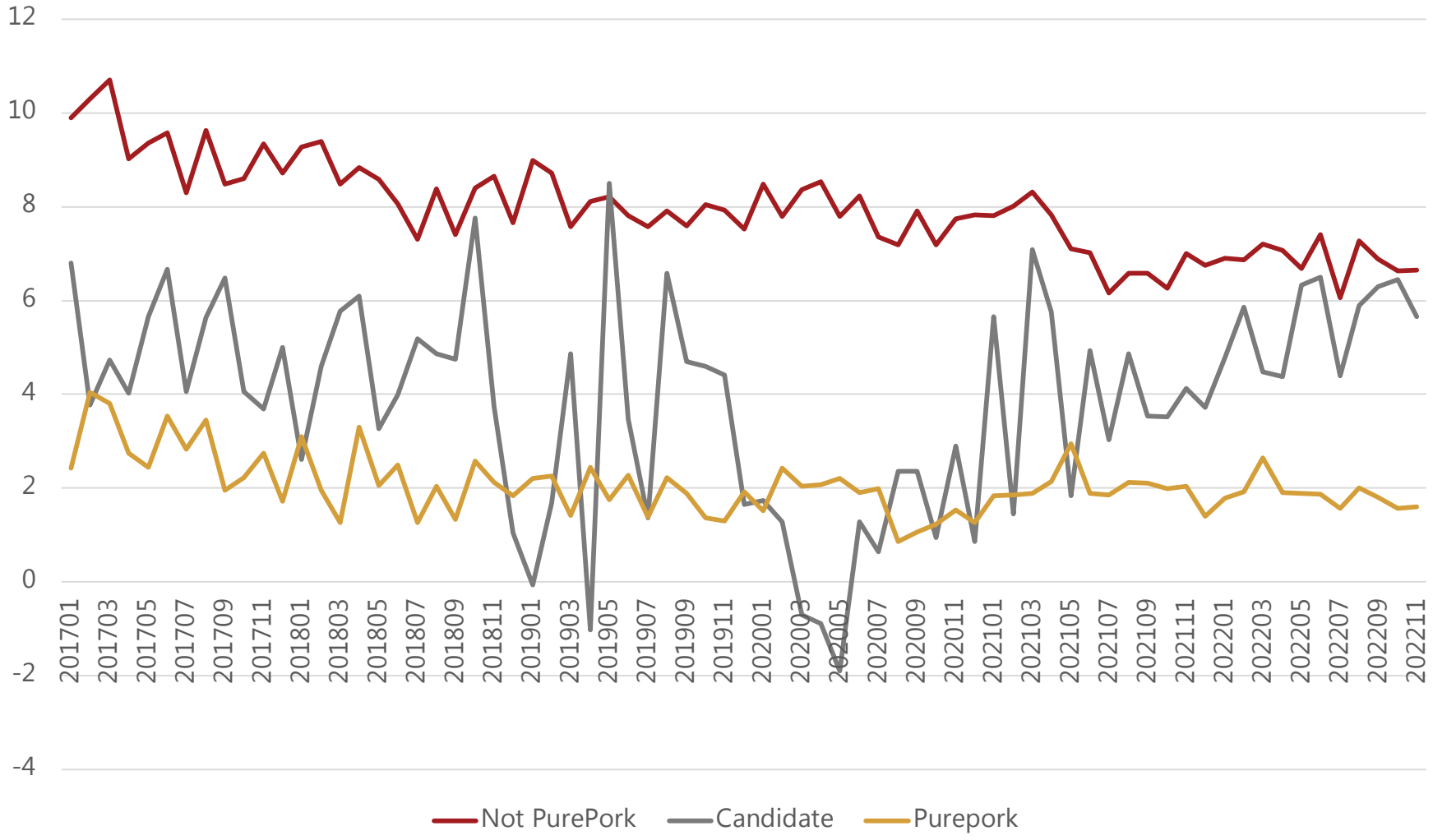
- Pure Pork herds (n=146)*
- Pure Pork candidates (before or after participation)
- Non – Pure Pork (n=4446)

- * 93 still enrolled in October 2022

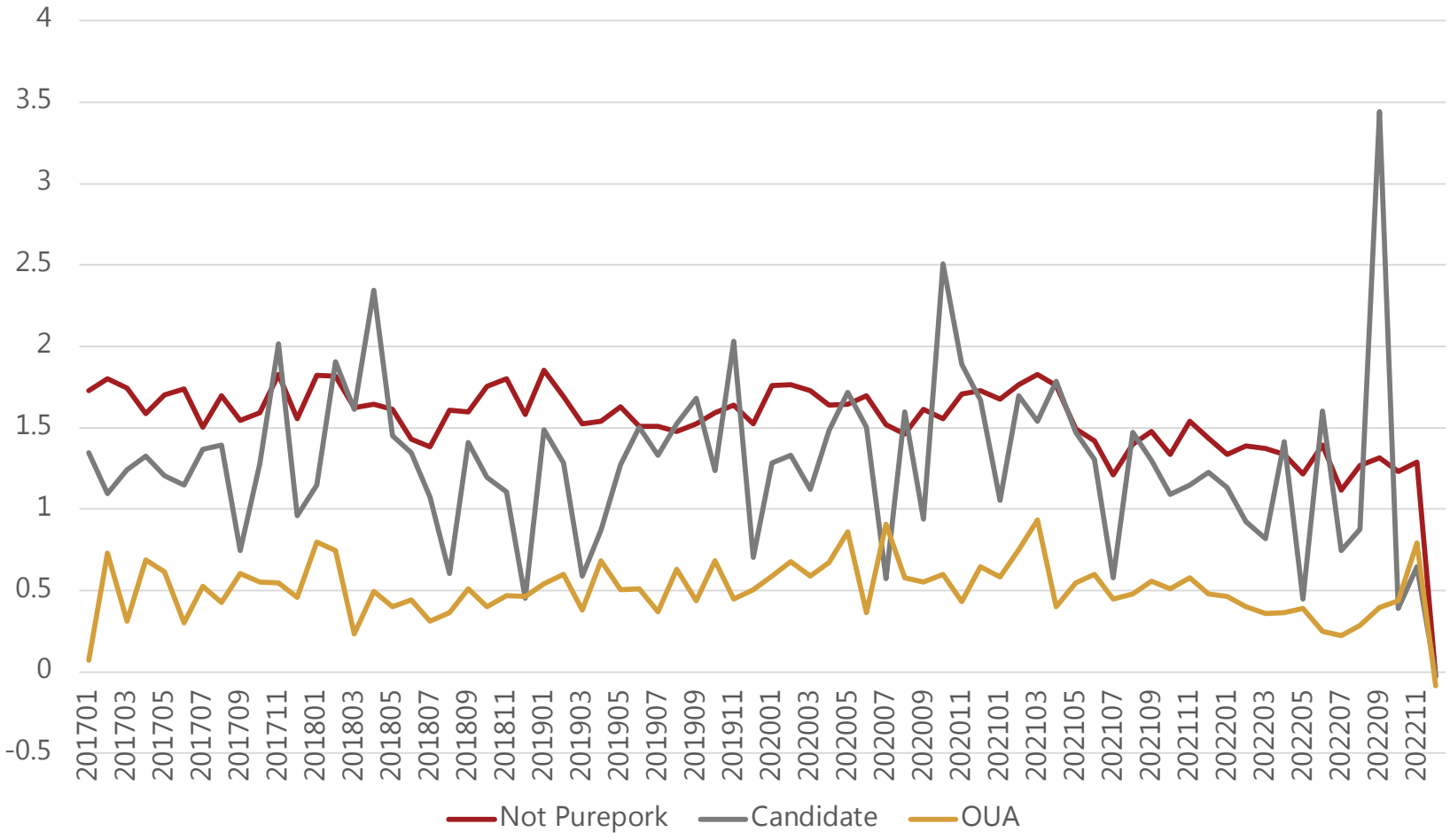
# Percent treated sows per day



# Percent treated weaners per day



# Percent treated finishers per day



# Mean percent treated animals per 100 days

| | Sows | Weaners (7-30 kg) | Finishers (>30 kg) |
|---|---|---|---|
| **Standard body weight** | 200 kg | 15 kg | 50 kg |
| **Not PurePork** | **1.99** | **8.14** | **1.56** |
| **Number of herd months** | 100.853 | 151.301 | 260.502 |
| **PurePork-candidate** | **1.79** | **4.97** | **1.36** |
| **Number of herd months** | 549 | 864 | 2.580 |
| **PurePork** | **1.71** | **1.80** | **0.57** |
| **Number of herd months** | 1.715 | 2.797 | 5.185 |
| **P-value** | 0.10 | <0.0001 | <0.0001 |
| **based on LS-MEANS** | | | |

# Vaccines against enteric infections (percent of herds)

| | | Pure Pork | Non-Pure Pork |
|---|---|---|---|
| E. coli PWD | 2017 | 2 % | 2 % |
| Lawsonia intracellularis, PPE | | 32 % | 6 % |
| E. coli PWD | 2022 | 11 % | 4 % |
| Lawsonia intracellularis, PPE | | 72 % | 16 % |

No significant differences for other vaccines

# Conclusions on use of antibiotics, vaccines and productivity

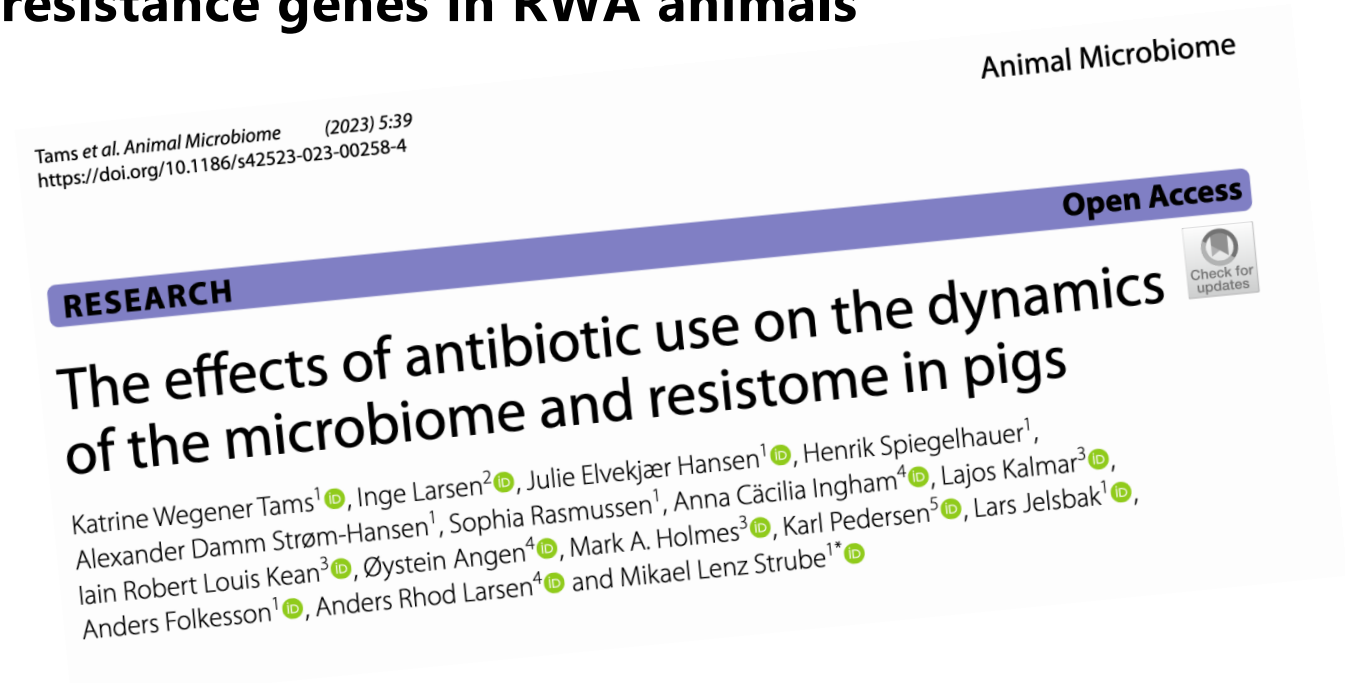
- Antibiotic use for sows was not significantly lower in PP herds
- Antibiotic use for weaners was reduced 75 % in PP herds
- Antibiotic use for finishers was reduced 66 % in PP herds
- Vaccine use was increased for *E. coli* PWD and *Lawsonia intrcellularis* in PP herds
- Productivity was not significantly different
  - Indications of lower pre-weaning mortality and higher post-weaning mortality

# Microbiome and resistome results

- AB treatment markedly changed the fecal microbiome
- At slaughter this change was not detectable

- AB treatment increased the abundance of resistance genes
- At slaughter this increase was not detectable

- **Removal and isolation of AB treated animals reduced the abundance of resistance genes in RWA animals**



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# Current status – Denmark - June 2024

- Danish Crown terminated the RWA production contracts in June 2023
- Organic pig production 2021 ≈ 240.000 slaughtered pigs from 60 herds
  - Official control program
- Other special brands for the home market
- Special brands for export
  - UK, QS

# Why antibiotic-free production ?

Demand from markets

- Perceived “extra” free from residues
- Perceived increased animal health
- Perceived reduced AMR risk

The pig production of tomorrow

- Research “lab”
- From batch treatment to single animal treatment

# Questions from Luca:

Do you foresee the market share of antibiotic-free production to become higher in the future?

What is needed to incentivize this type of production and make it sustainable?

- Broader concepts including animal welfare, climate effect and biodiversity
- Regulation (EU/national) on reduction of AMU
  - Reduced batch medication