# Findings at slaughter following a reduction in antimicrobial use

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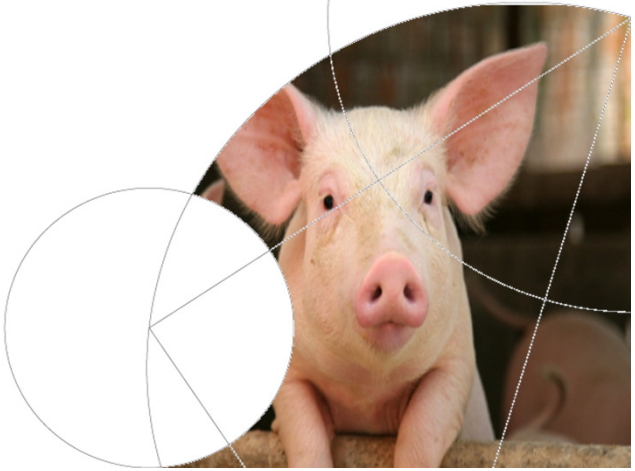
**Acknowledgement**
*All the contributing veterinarians and farmers*

*Mette Fertner,*
*National Veterinary Institute, Technical University of Denmark*



# Background

Increased concern towards antimicrobial (AM) resistance

Focus on veterinary AM use

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”Yellow Card program”

# Brief facts on Denmark

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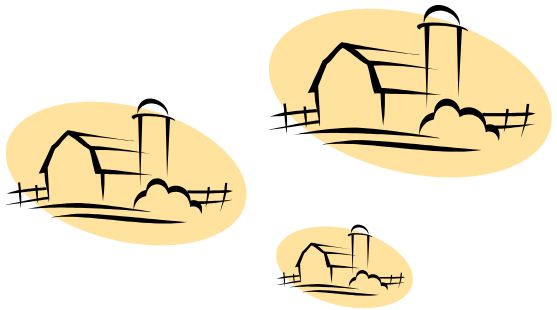
- National herd register



# Brief facts on Denmark

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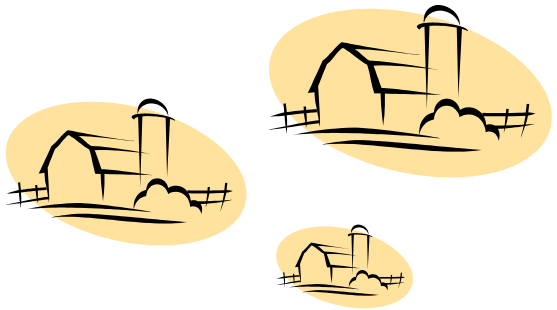
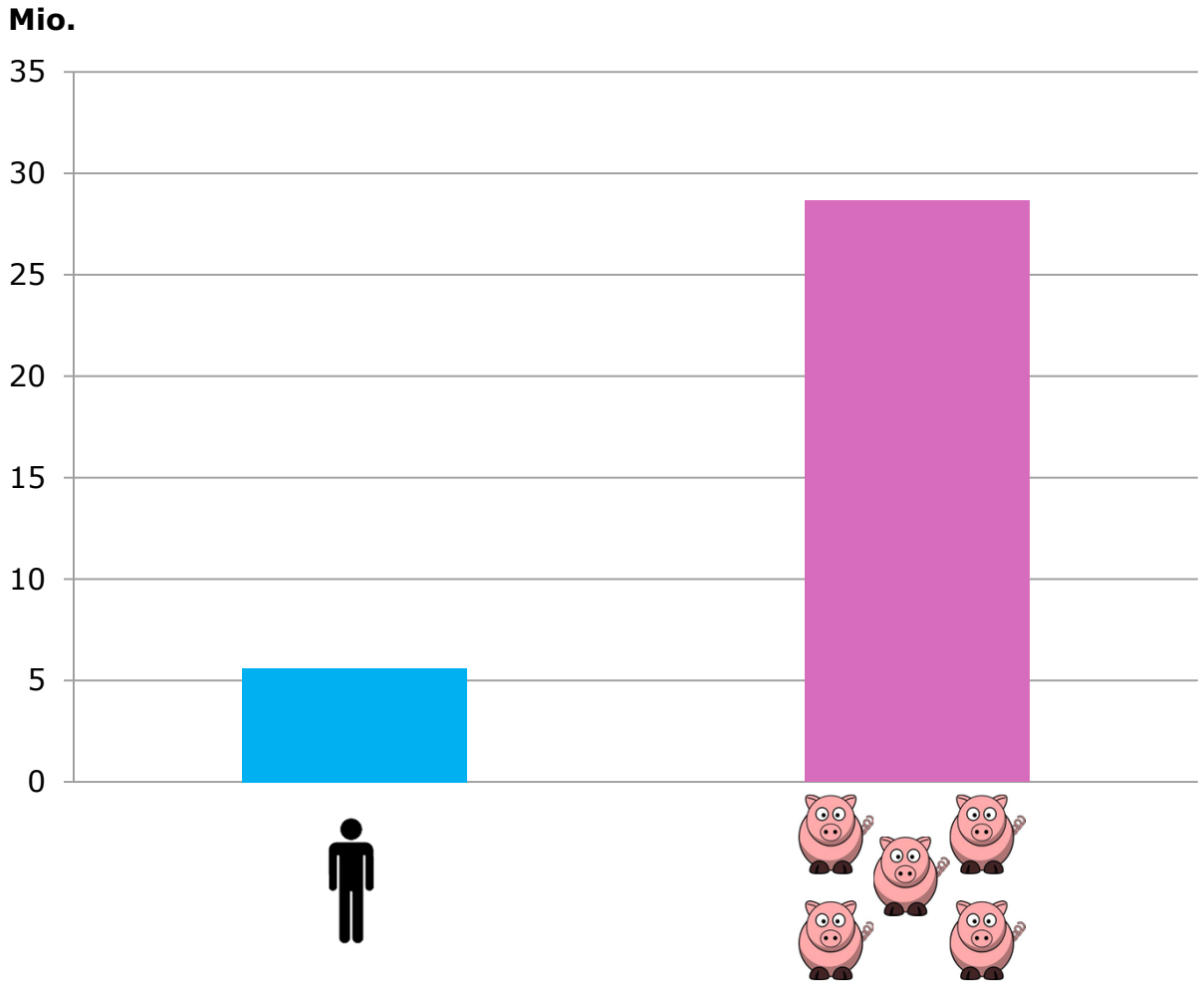
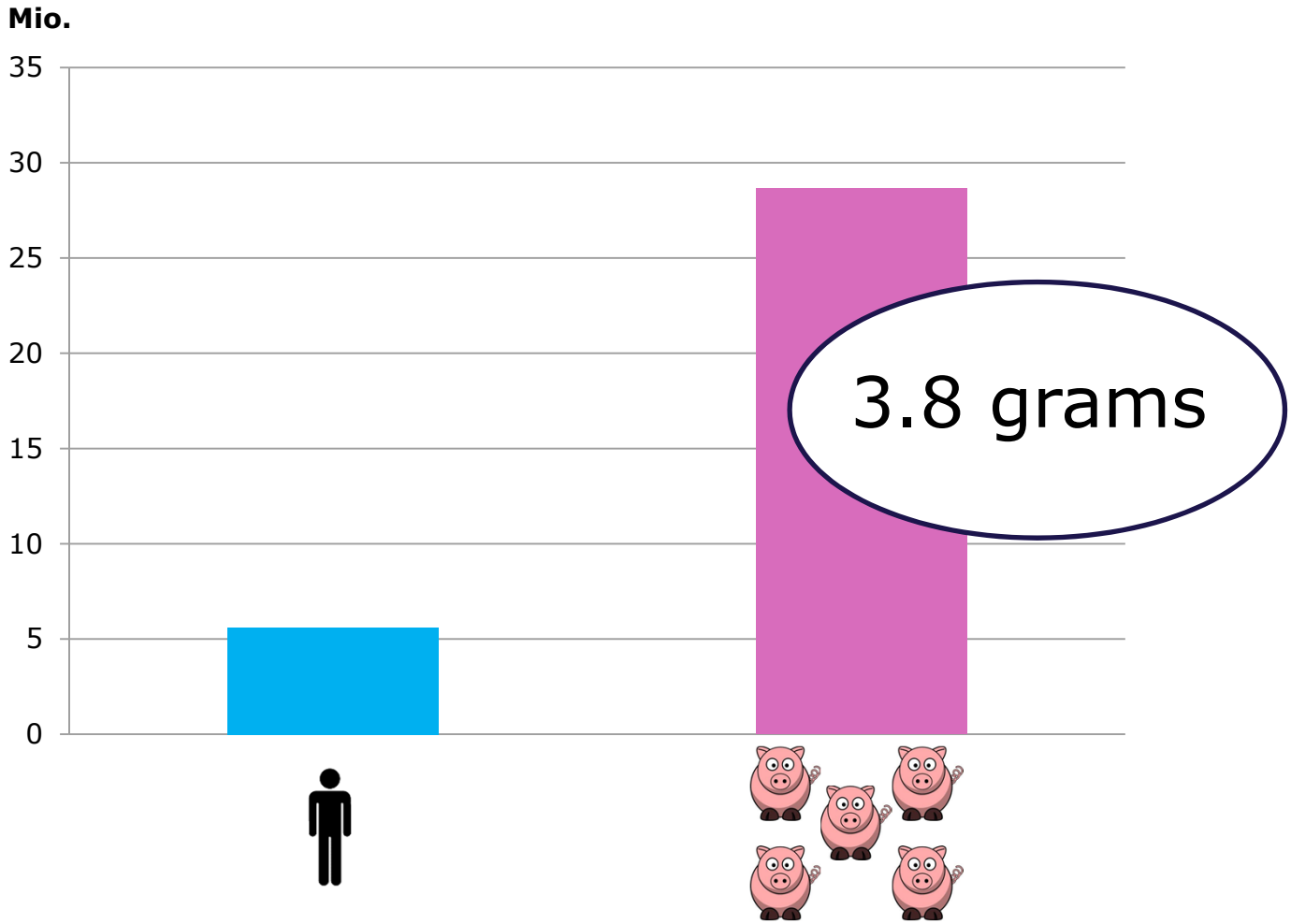
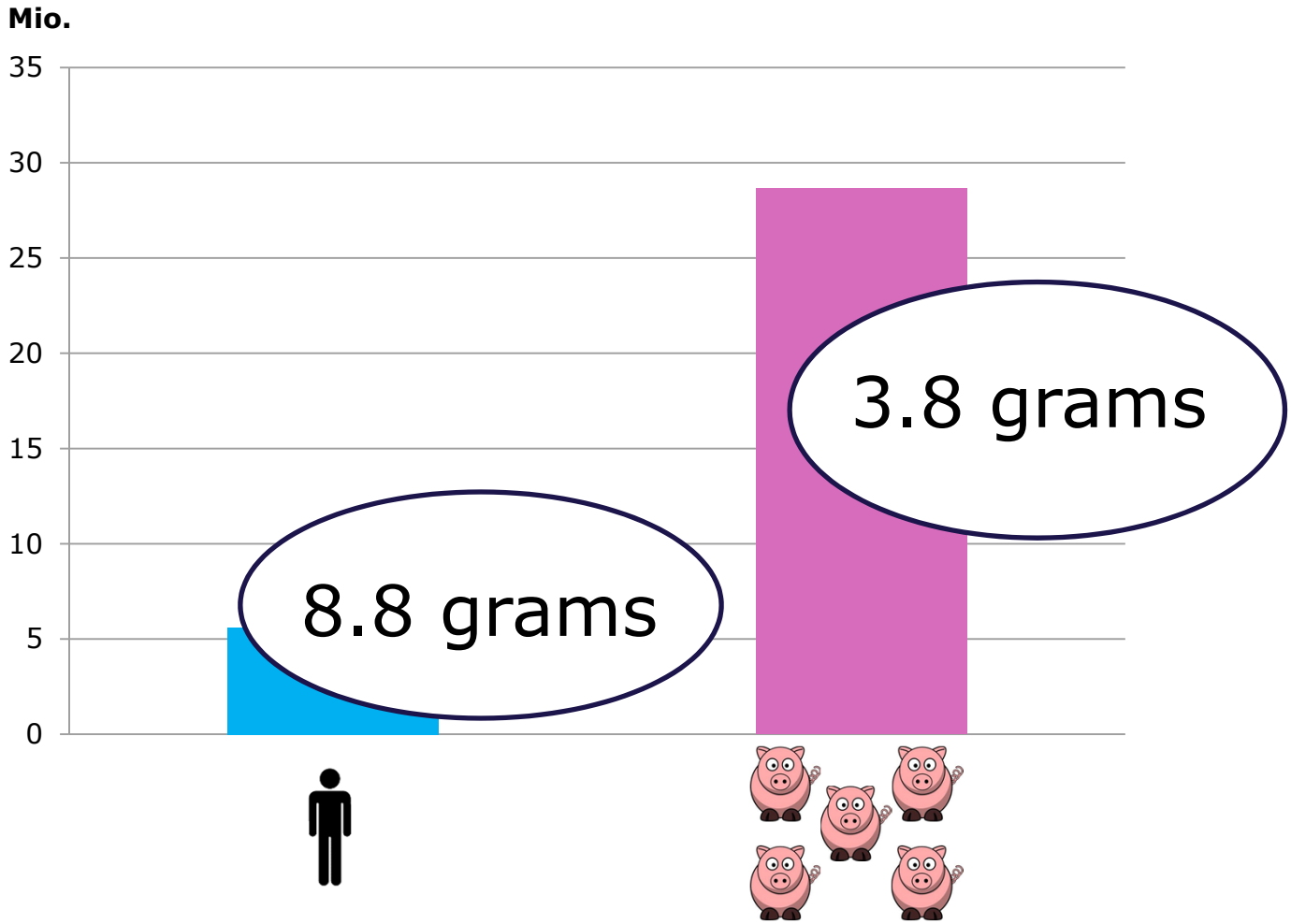


- Data on all veterinary medicine

# Why pig herds?


Mio.
35
30
25
20
15
10
5
0


Mio.
35
30
25
20
15
10
5
0
3.8 grams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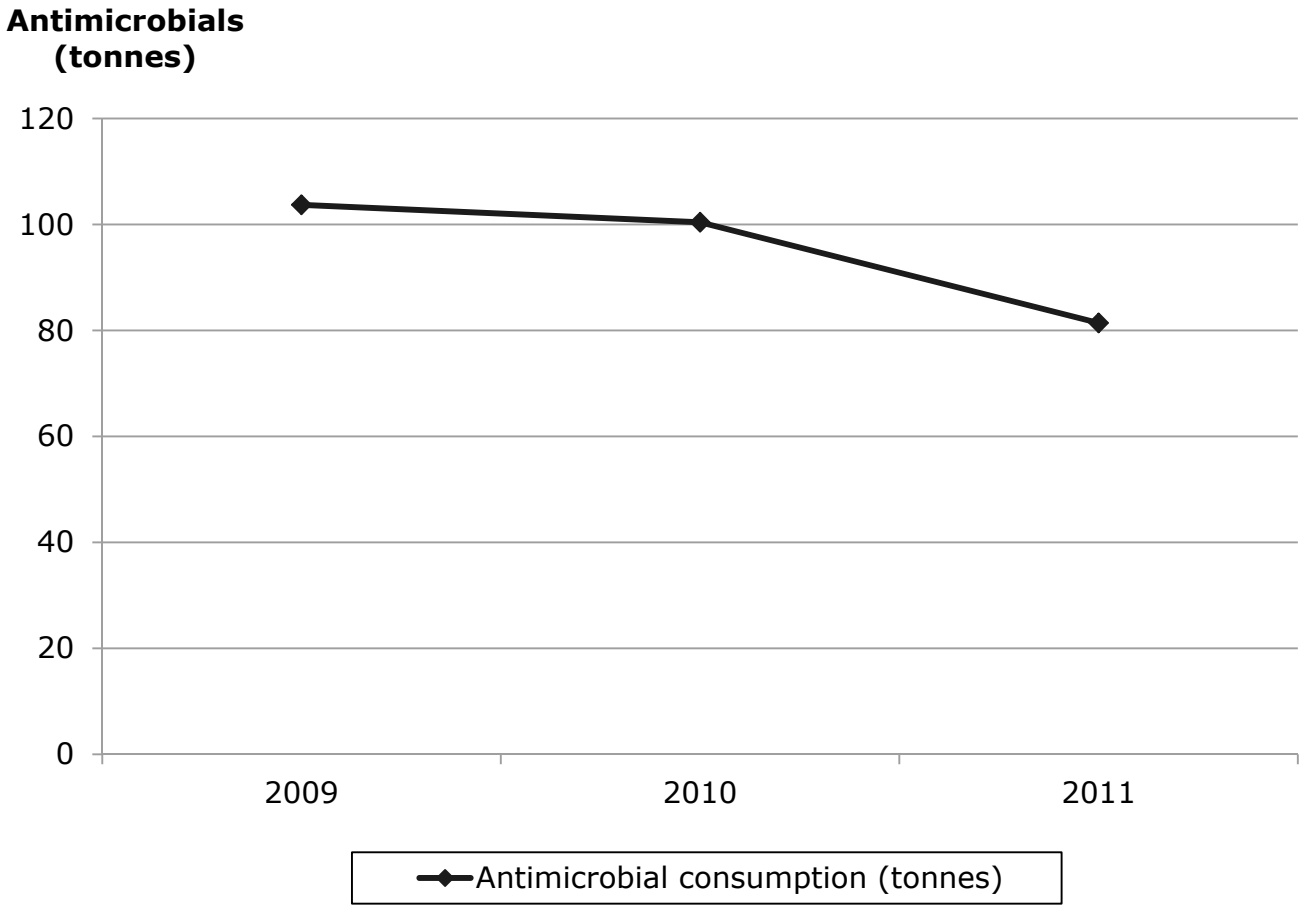
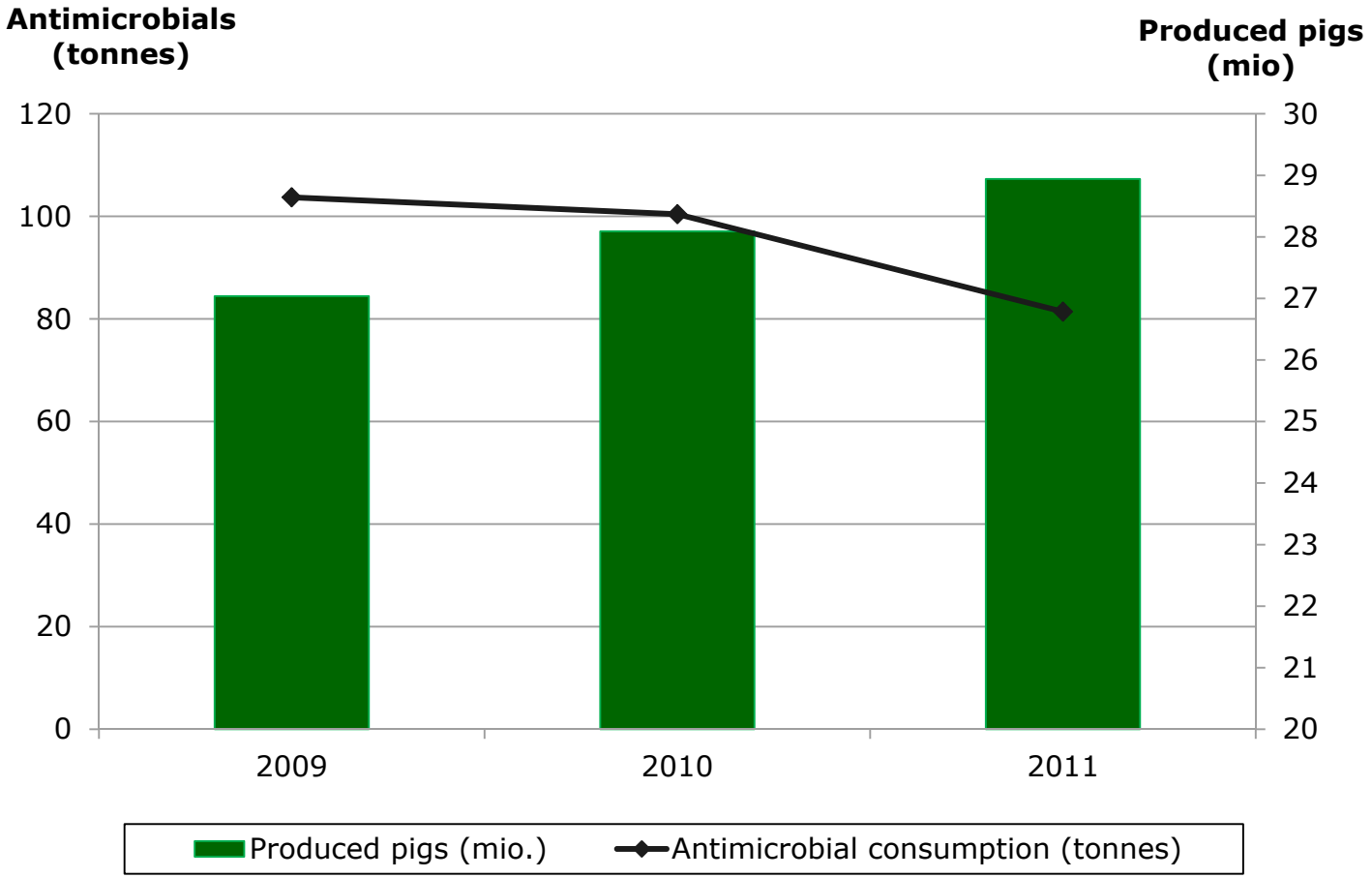

Antimicrobials (tonnes)
120
100
80
60
40
20
0
2009
2010
2011
Antimicrobial consumption (tonnes)


Antimicrobials (tonnes)
Produced pigs (mio)
120
100
80
60
40
20
0
30
29
28
27
26
25
24
23
22
21
20
2009
2010
2011
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Antimicrobial consumption (tonnes)

# Aim of study

Did this decrease affect animal welfare?

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Objectives:

- Changes in the prevalence of pathological findings at slaughter
- Changes in the dispersion lean meat percentage at slaughter

# Materials and methods – *selection of herds*

**Study design**

Retrospective, observational study in randomly chosen Danish finisher herds

Finishers = 30-120 kg pigs

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**Study period**

1st of June 2009 – 31st of May 2011

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**Inclusion criteria**

- >3.5 kg active compound AM consumed in the year before June 2010
- >10% reduction in AM consumption the following year
- ≥500 registered pen places for finishers
- Same slaughter facility during study period

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- Same slaughter facility during study period

**Exclusion criteria**

- Organic and outdoor herds
- Performed eradication programs
- New vet
- New herd owner
- New buildings

# **Materials and methods** – *data collection*

## Data collection

- AM consumption – *Vetstat*

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# **Materials and methods** – *data collection*

**Data collection**

- AM consumption – *Vetstat*
- Number of pen places – *Central Husbandry Register*
- Management and production – *questionnaires*
- Pigs produced, pathological findings and lean meat percentage at slaugther – *IT based reports from slaughterhouses*

# Materials and methods *–calculation routines*

## Quantifying AM consumption

- Gram active compound per pen place per year

# Materials and methods *–calculation routines*

**Quantifying AM consumption**

- Gram active compound per pen place per year
- Percentage animals treated per day/ADD per 100 animals per day
    - Calculated using Vetstat standard procedures

# Materials and methods *–calculation routines*

## Pathological findings at slaughter

- Prevalence for the year before and after June 2010
    - Abcesses
    - Tail bites
    - Osteomyelitis
    - Chronic pneumonitis
    - Chronic pleuritis

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- Weighted average and standard deviation for the year before and after June 2010

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## Lean meat percent

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## Statistics

- $X^2$-test and paired t-test used to test for significant differences between years
- Significance level: P=0.05

# Results

- 65 participating herds - pen places 1600 (530; 5000)

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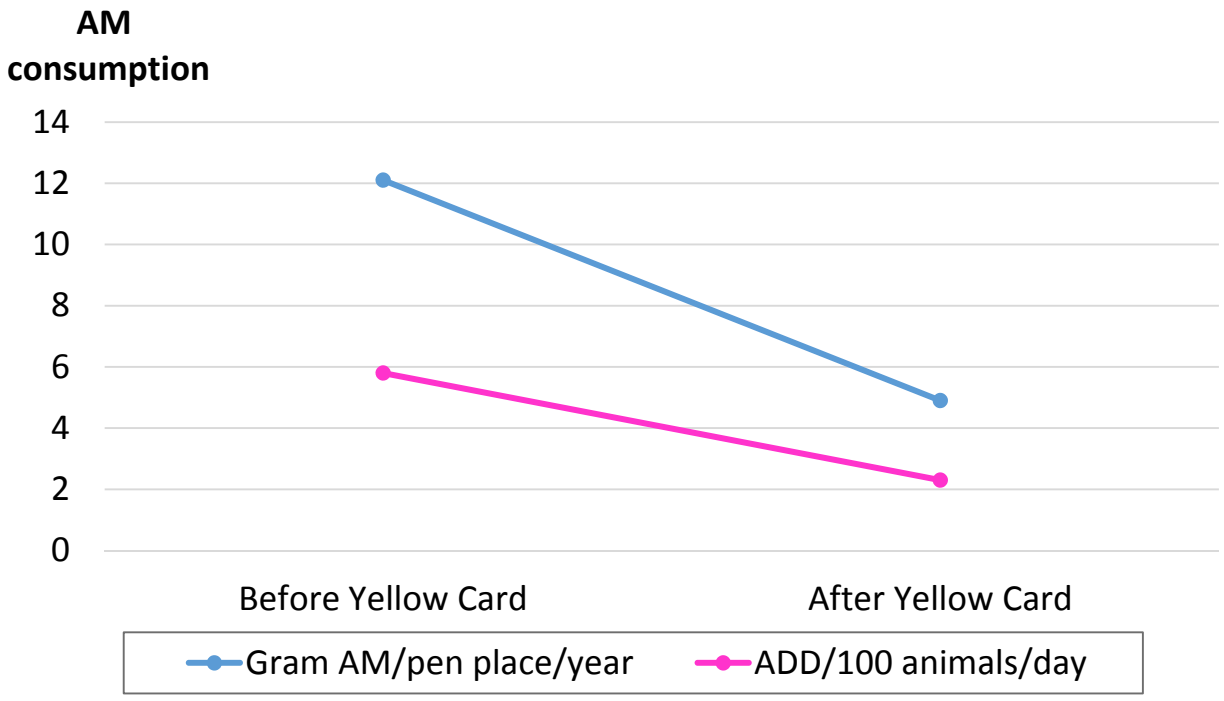

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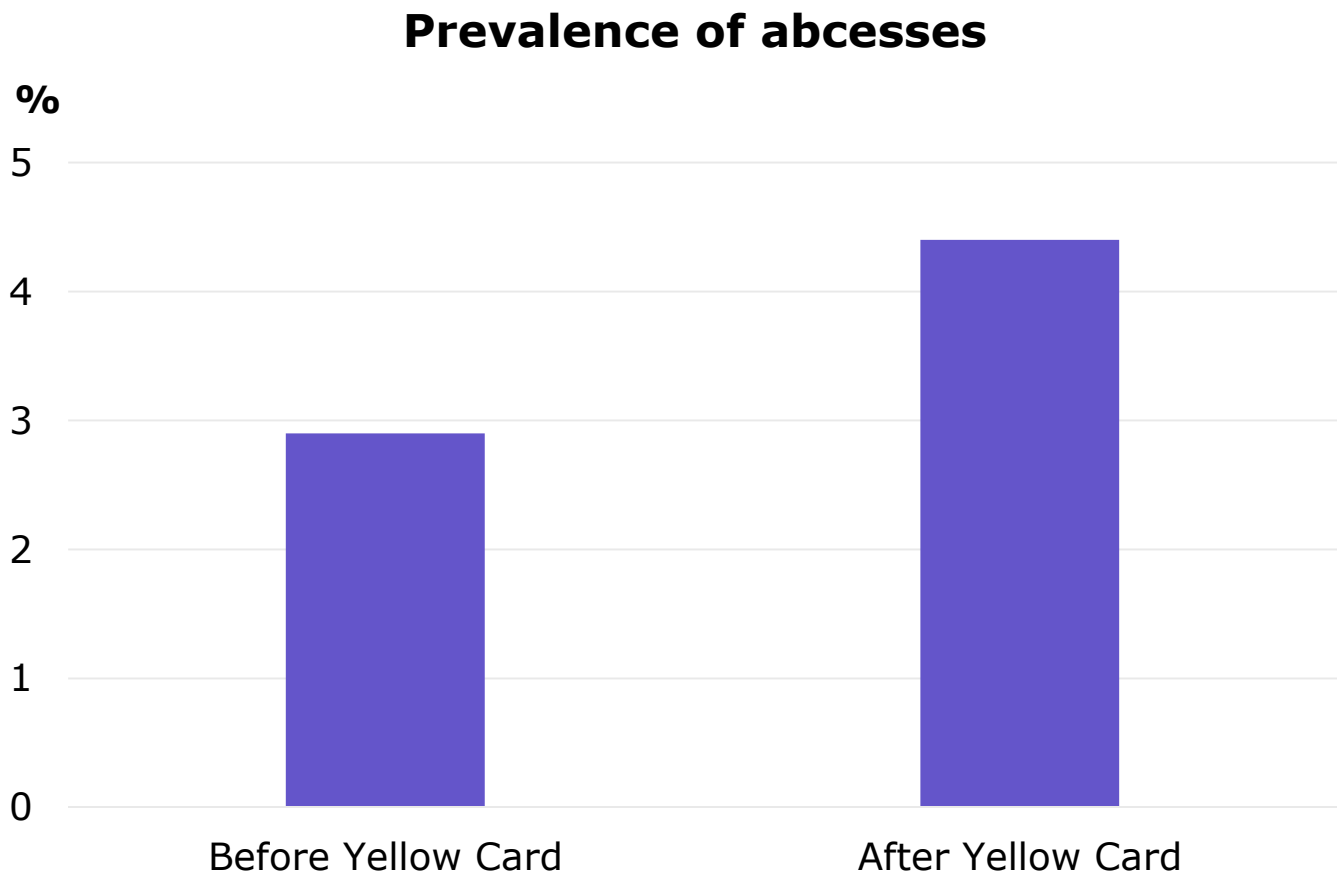
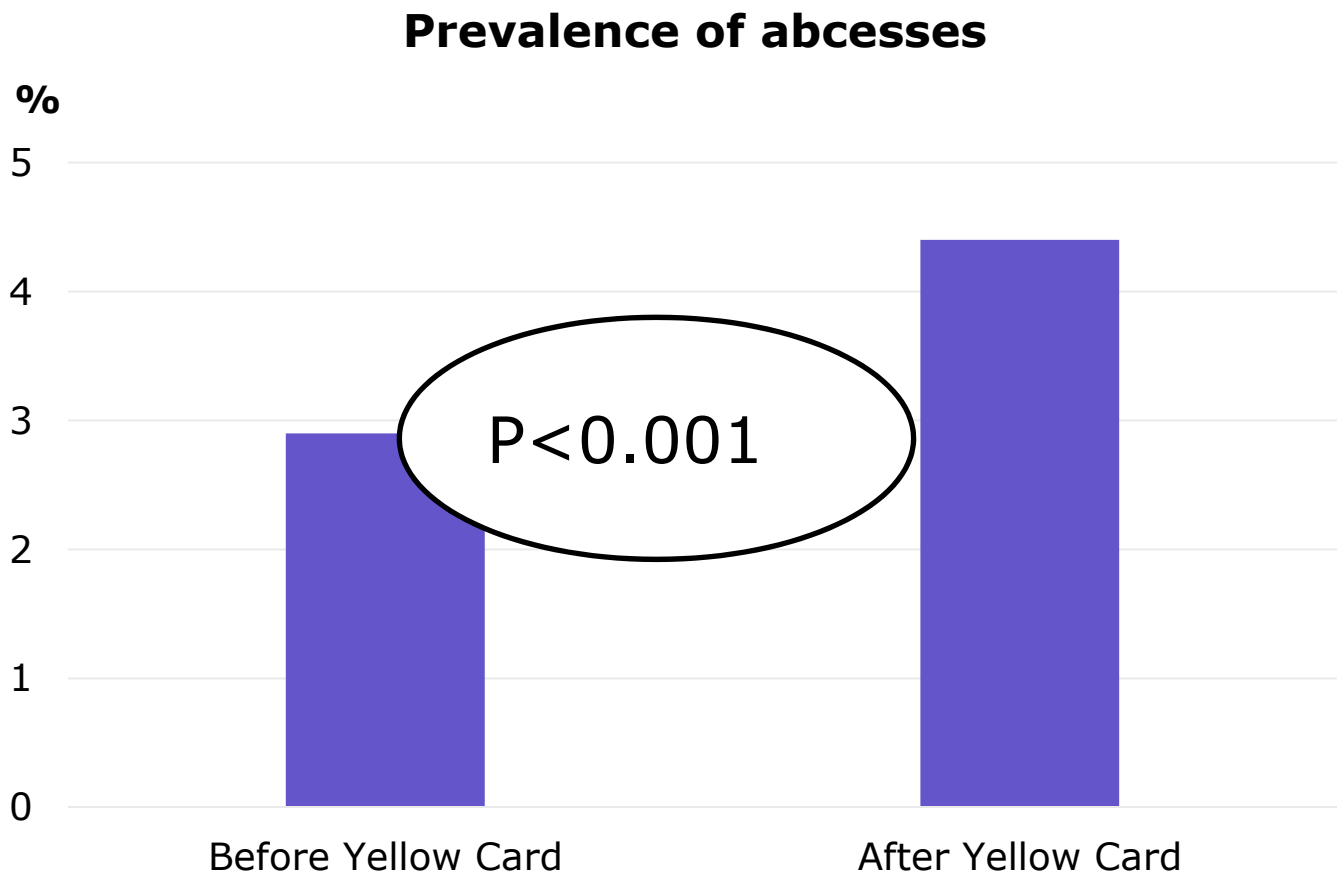

Prevalence of abcesses
%
5
4
3
2
1
0
Before Yellow Card
After Yellow Card

# Results


Prevalence of abcesses
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P<0.001
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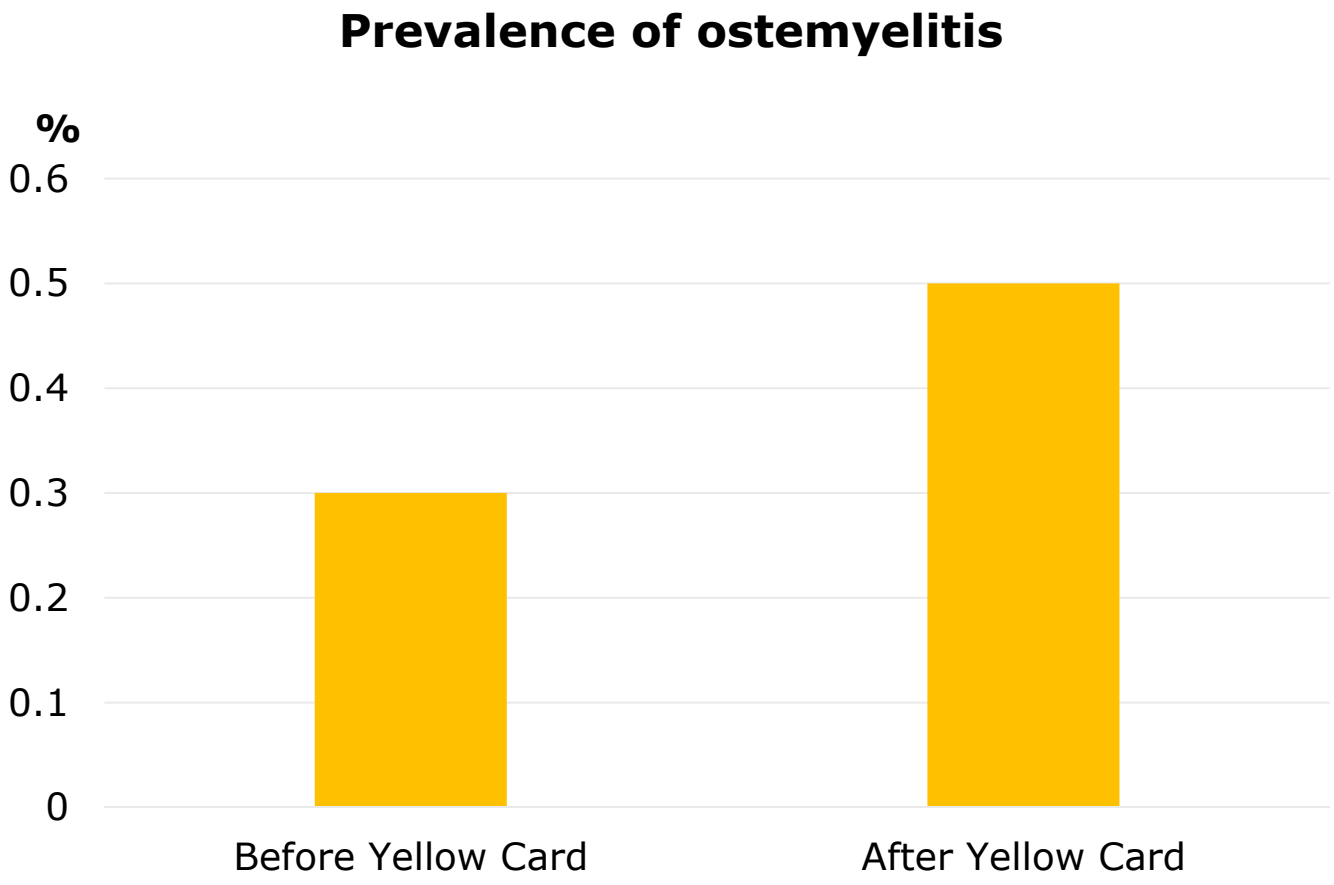
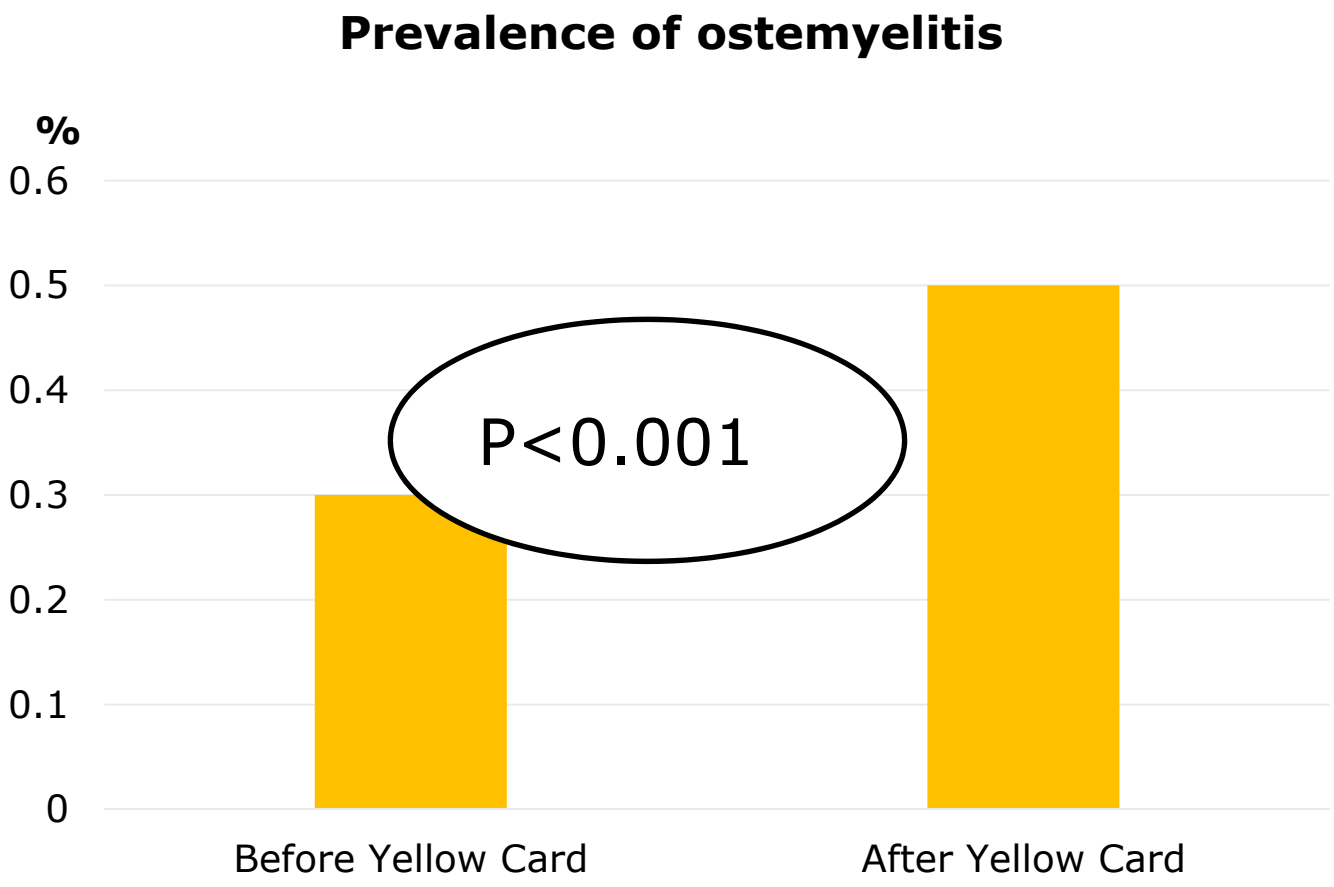
# Results


Prevalence of ostemyelitis
%
0.6
0.5
0.4
0.3
0.2
0.1
0
Before Yellow Card
After Yellow Card

# Results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# Discussion

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- Increase in abscesses and osteomyelitis
  - Changed administration route?

# **Discussion –** *"ADD per 100 animals per day"*

Deviations between

- Actual dosage given and standard dosage value in database
- Number of pen places
- Average weight at treatment

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- Pen places NOT number of produced animals

Penalizing herds with high pig production?

# Conclusions

- 52% significant increase in abscesses and 67% increase in prevalence of osteomyelitis at slaughter
- No significant change in lean meat percent

# Take home message

- May be welfare-related consequences of lowering AM consumption
- Biological context when introducing restrictive legislation
- Consider how to pinpoint high-consuming herds

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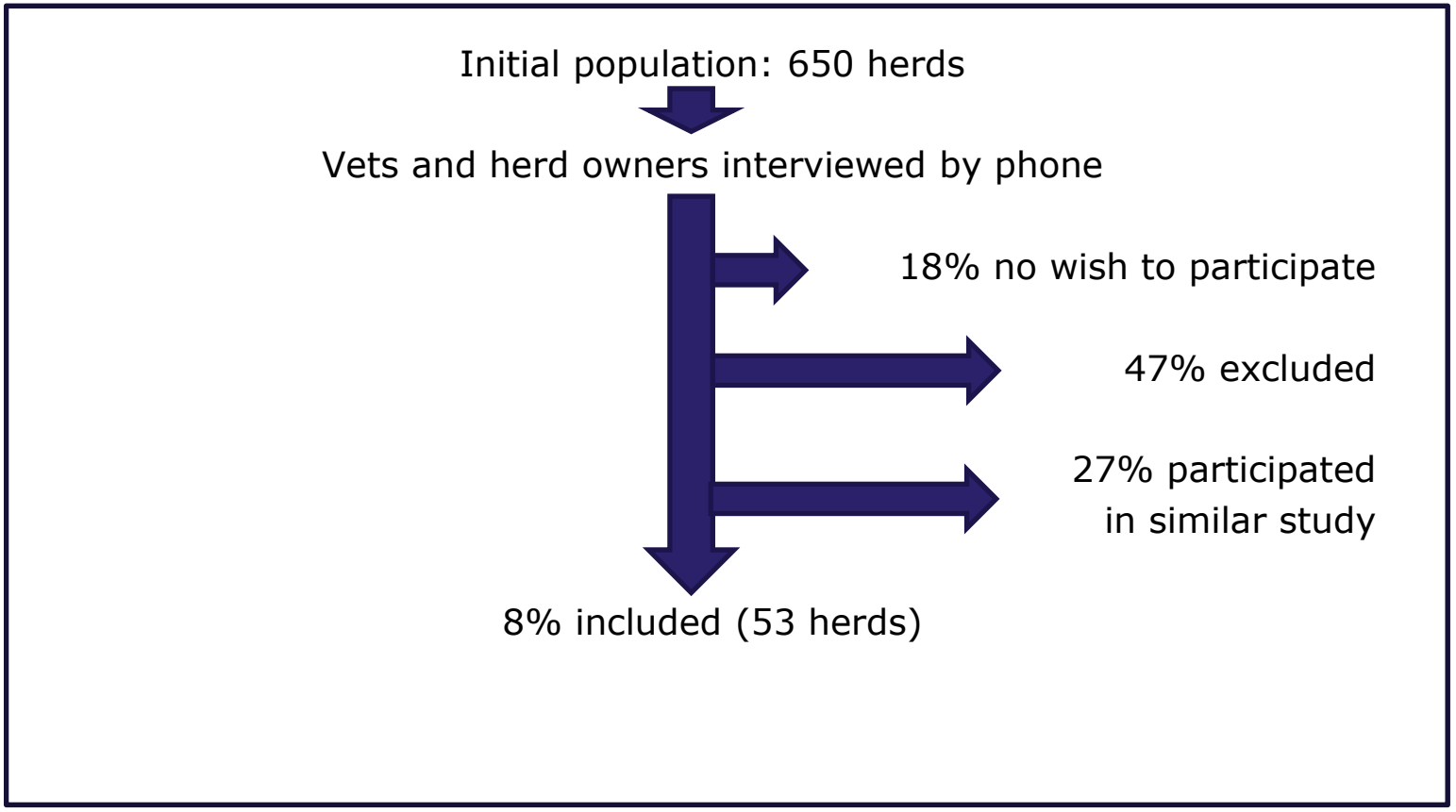
Initial population: 650 herds
Vets and herd owners interviewed by phone
18% no wish to participate
47% excluded
27% participated in similar study
8% included (53 herds)

# Discussion

Misintepretation of “percentage animals treated per day”

Deviations between

- Actual dosage given and standard dosage value in database (Jensen et al., 2004; Timmerman et al., 2006)
- Number of pen places
- Average weight at treatment

# Results

## Daily Weight Gain

- 46 herds

| | Average | Std. Dev between herds | Decrease (%) | P-value |
|---|---|---|---|---|
| Period 1 | 449 g/day | 64 g/day | 2.4 | 0.15 |
| Period 2 | 438 g/day | 66 g/day | | |

# Results

- 53 participating herds

| Number of pen places | | |
|---|---|---|
| N | Average | Min.-max. |
| 53 | 2922 | 600-11.000 |

| Antimicrobial consumption | | | | | |
|---|---|---|---|---|---|
| | | Average | Std. Dev | Reduction | P-value |
| Gram active compound AB/pen place/year | Period 1<br>Period 2 | 13.2<br>6.3 | 7.9<br>3.4 | 52 | <0.001 |
| | | | | | |
| ADD/100 animals/day | Period 1<br>Period 2 | 19.6<br>9.6 | 12<br>4.8 | 51 | <0.001 |

Only 21% of study herds had an AM consumption ≥25 ADD per 100 animals per day (11/53)

# Results

## Mortality

| | Average | Std. Dev | Increase (%) | P-value |
|---|---|---|---|---|
| Period 1 | 2.4% | 1.1 | 25 | <0.001 |
| Period 2 | 3% | 1.5 | | |

# Results

## Difference between high and low-consumer herds?

Antimicrobial consumption

| | | Average | Std. Dev | Decrease (%) |
|---|---|---|---|---|
| >25 ADD | Period 1 | 37.1 | 12.8 | 64% |
| | Period 2 | 13.5 | 4.8 | |
| <25 ADD | Period 1 | 15.1 | 5.9 | 43% |
| | Period 2 | 8.6 | 4.2 | |

Mortality

| | | Average | Std. Dev | Increase (%) |
|---|---|---|---|---|
| ≥25 ADD | Period 1 | 2.0 | 0.5 | 62.4 |
| | Period 2 | 3.2 | 1.1 | |
| | | | | |
| <25 ADD | Period 1 | 2.4 | 1.2 | 26.6 |
| | Period 2 | 3.0 | 1.5 | |