

# Strategies to reduce the use of antimicrobials in livestock – Case studies

Lis Alban

DVM, Ph.D. DipECVPH, DipECPHM  
Chief Scientist, Danish Agric. & Food Council  
Adjunct Professor, University of Copenhagen



## Concern about use of antimicrobials (AM)



### Risk mitigation needed

- In livestock, pets and humans

**In this presentation, focus will be on livestock**

# Actions are taken in most countries

Movement is in the same direction - prudent use - implying:

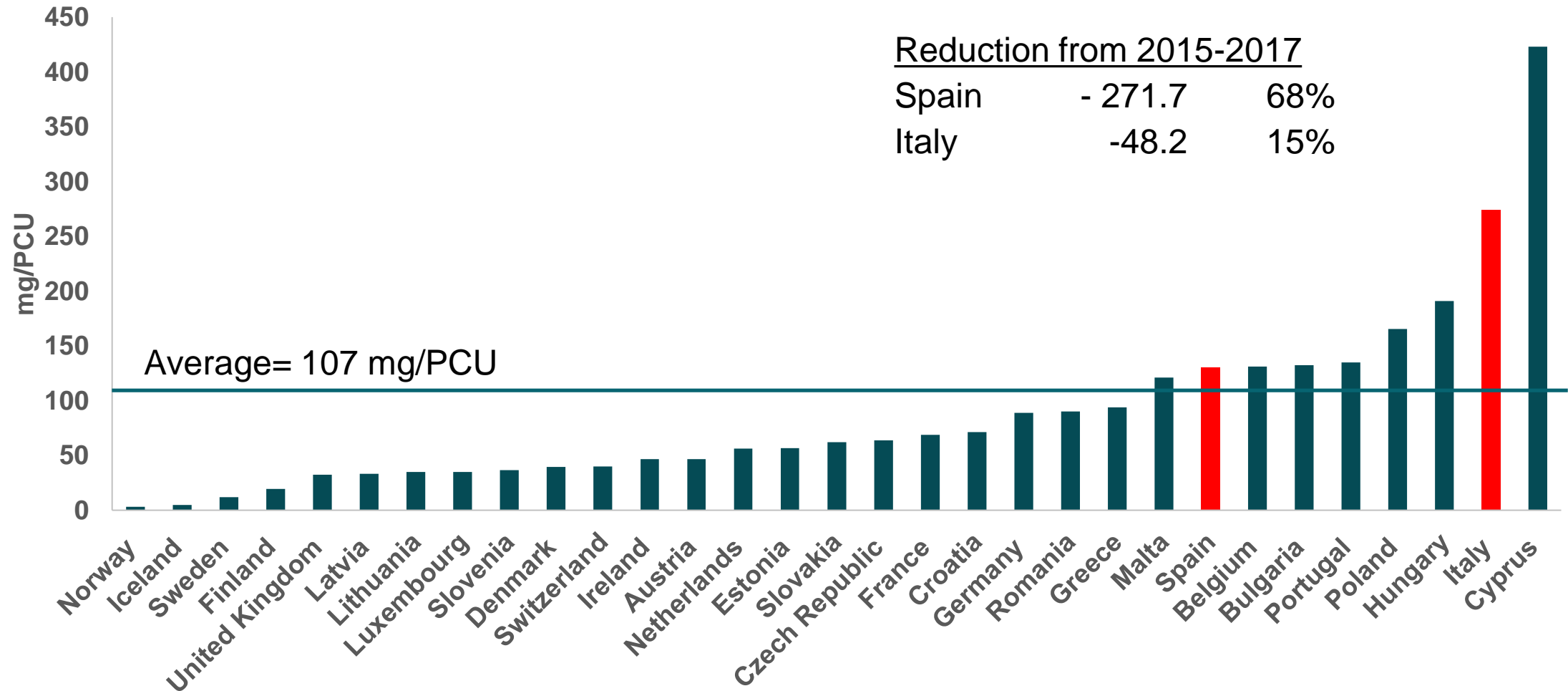
- Not allowing use of AM as a growth promoter
- Limiting/prohibiting preventive use
- Restricting access to the highly critical AM
  - Such as 3rd and 4th generation cephalosporins and fluoroquinolones
- Lowering use for treatment of the other AM

Some began earlier than others

- Reflected in the large variation in use of AM between countries
- See next slide, showing the ESVAC report results for 2017
  - AM consumption relative to animal production in each country
  - Measured as mg per population correction units (mg/PCU)



# AM consumption relative to animal production in European countries, 2017 (mg/PCU)



# Responsibility?

Unrealistic to expect that farmers or vets will change their habits, unless regulation of the AM area takes place

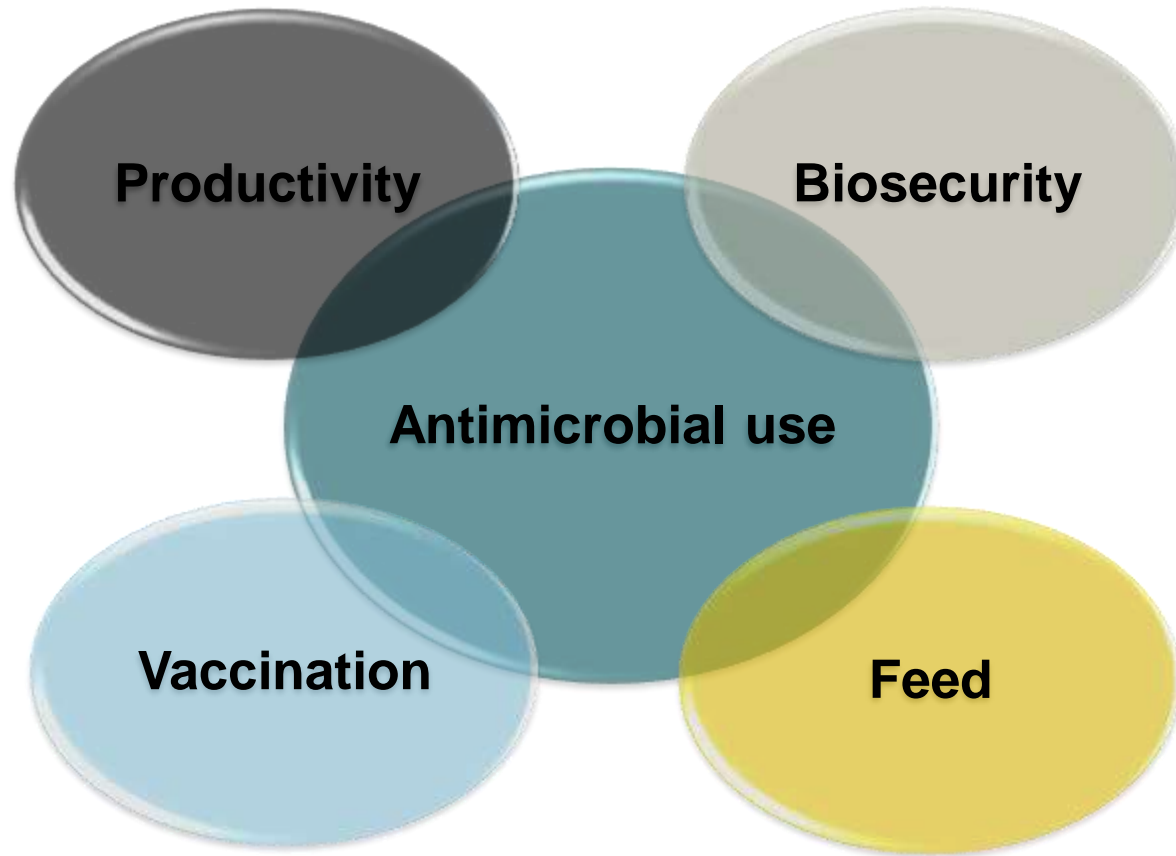
- Because of difficulty in "feeling" the responsibility for the society
- Moreover, the legislative conditions should be the same for all producers
  - If not, problems with competitiveness may arise
  - Important to inform the sector about the usefulness of legislation

Necessary to ensure productivity, if we want livestock producers and their vets to comply with legislation

- Identify cost-effective measures to apply to ensure responsible use at different levels
    - Herd level
    - Sector level
    - National level
- Be inspired by what works in other countries, but adapt to own country

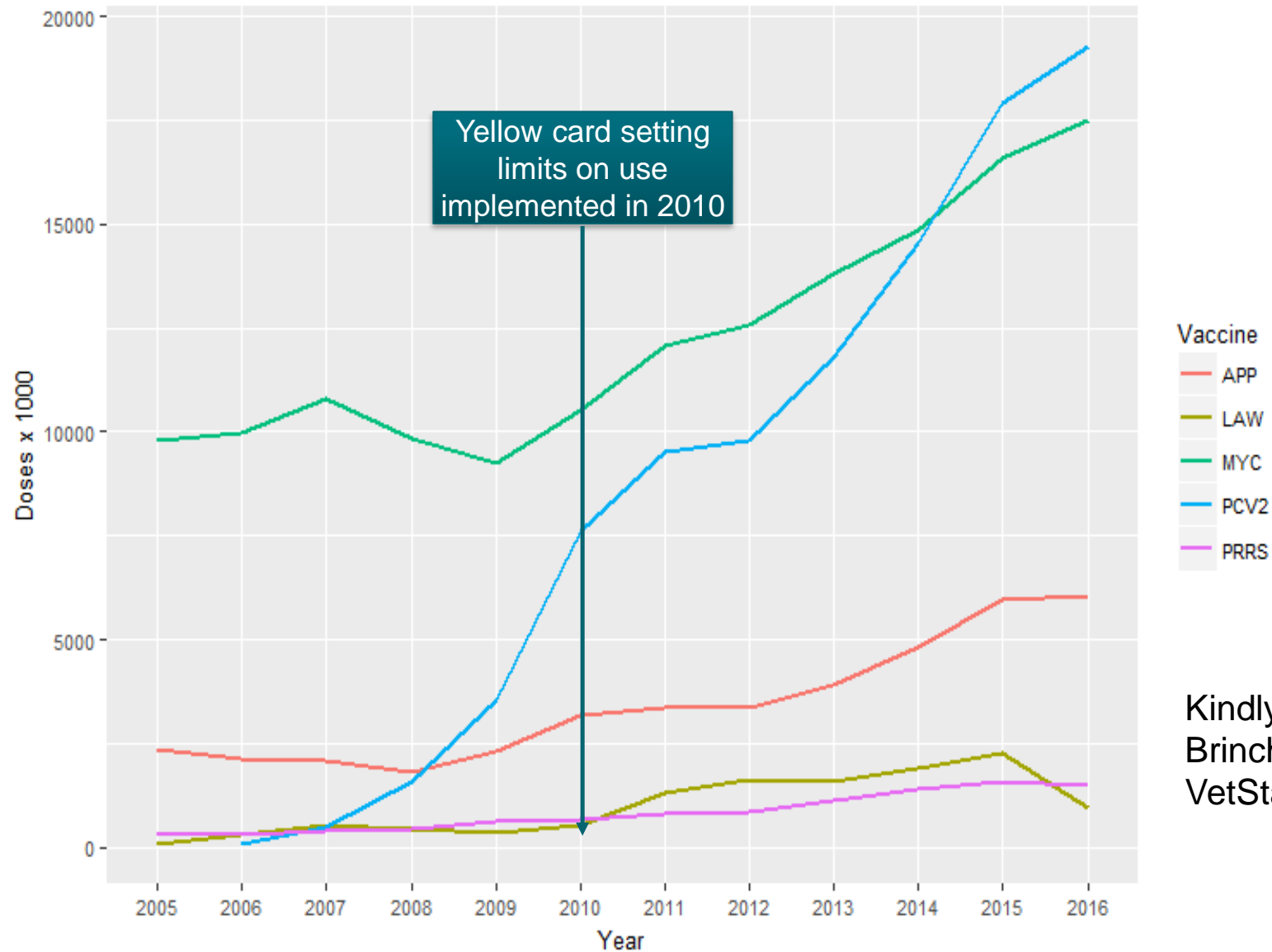


# HERD LEVEL - What can the livestock producers do to lower their consumption of antimicrobials?



**Get assistance  
from the vet!**

# Prevention through use of vaccines - on the increase in Denmark



Kindly provided by Amanda Brinch Kruse - based upon VetStat data

# Danish experience

## Vaccines work

- But mandatory vaccination for production diseases will not necessarily lower use of AM
  - Danish sow herds using vaccines had higher AM use than herds not vaccinating
    - Because vaccines are used in herds with infections
      - Infections may cause disease, although vaccine is used
- = Reverse causality


## Use vaccines where needed

- But do not expect that "extra" use of vaccines will necessarily lead to lower use of AM
  - If infection is not present – effect of a vaccine cannot be expected

Temtem et al. *Porcine Health Management* (2016) 2:23  
DOI 10.1186/s40813-016-0042-1

Porcine Health Management

RESEARCH Open Access

 CrossMark

### Comparison of the antimicrobial consumption in weaning pigs in Danish sow herds with different vaccine purchase patterns during 2013

Carolina Temtem<sup>1</sup>, Amanda Brinch Kruse<sup>2</sup>, Liza Rosenbaum Nielsen<sup>2</sup>, Ken Steen Pedersen<sup>3</sup> and Lis Alban<sup>3\*</sup>


**Abstract**  
**Background:** There is growing concern about development of antimicrobial resistance due to use of antimicrobials (AMs) in livestock production. Identifying efficient alternatives, including vaccination, is a priority. The objective of this study was to compare the herd-level amount of AMs prescribed for weaner pigs, between Danish sow herds using varying combinations of vaccines against Porcine Circovirus Type 2 (PCV2), *Mycoplasma hyopneumoniae* (MYC) and *Lawsonia intracellularis* (LAW). It was hypothesised that herds purchasing vaccines, use these to prevent disease, and hence reduce their AM consumption, compared to herds purchasing fewer or no vaccines against these pathogens.


Data  
VetSt  
and  
divid  
base  
vacci  
num

**Resu**  
respi  
herd  
vacci

**Conc**  
vacci  
just t  
prob  
appl  
vacci  
requ  
confe

**Keyw**

 ORIGINAL RESEARCH  
published: 16 January 2017  
doi: 10.3389/fvets.2016.00120



### No Clear Effect of Initiating Vaccination against Common Endemic Infections on the Amounts of Prescribed Antimicrobials for Danish Weaner and Finishing Pigs during 2007–2013

Amanda Brinch Kruse<sup>1\*</sup>, Leonardo Victor de Knegt<sup>1</sup>, Liza Rosenbaum Nielsen<sup>1</sup> and Lis Alban<sup>2</sup>

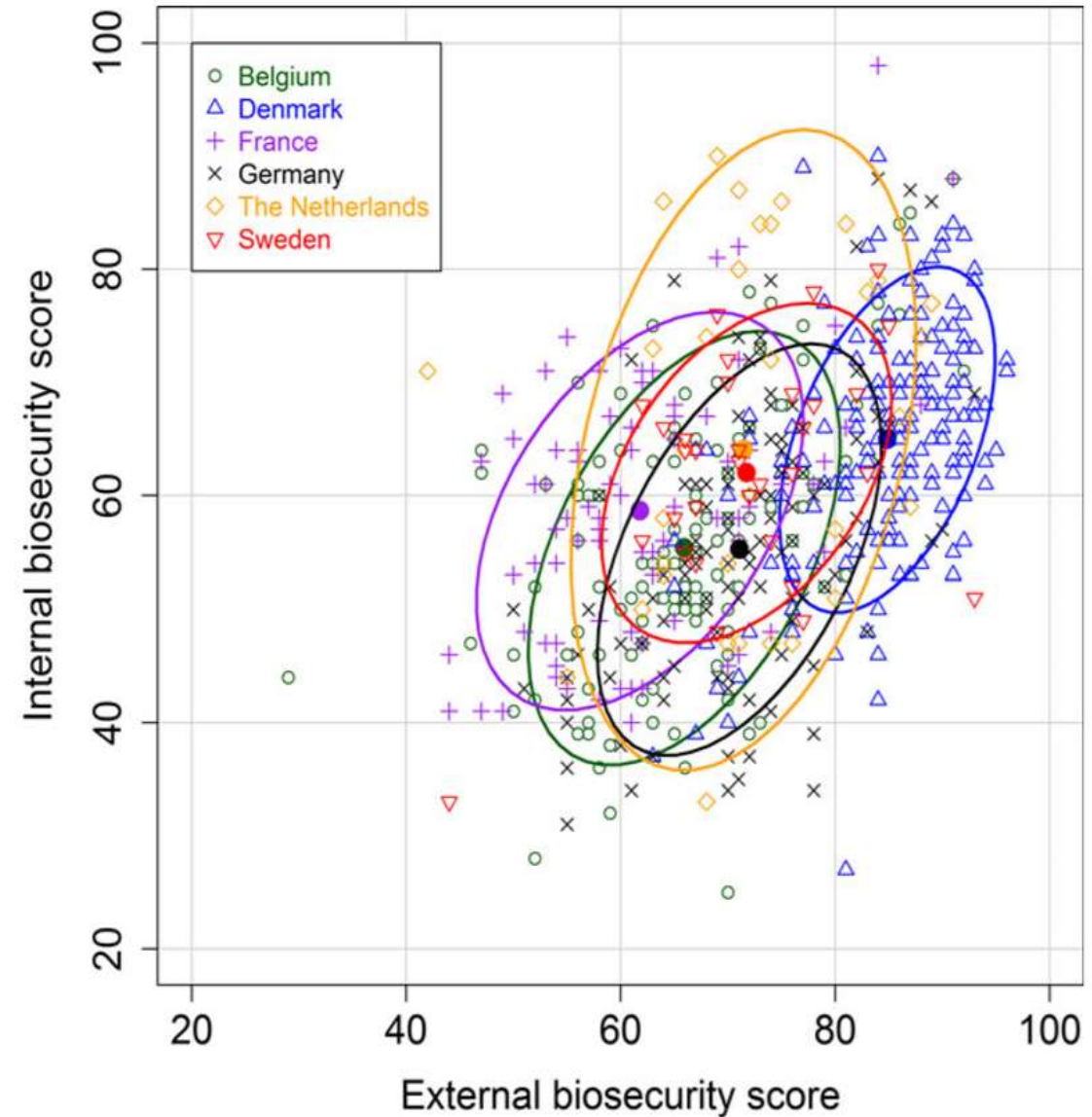


# Biosecurity in pig herds

Necessary to keep infections at bay

Assessment of external vs. internal biosecurity scores

- For examples using Biocheck.UGent
- Results can be used actively for herd health management in dialogue between vet and producer
- Not just of importance to keep AM use low, but also to keep out African Swine Fever!



Source: Filippitzi et al. (2017)

# The role of feed

AM are often put into feed

- Sometimes too much a result of an automatic decision

Recent Spanish regulation allows only one kind of AM put into feed at a time

- AM use in Spain has lowered by 68% from 2015-2017

Proper diagnostics needed regularly to ensure prudent use

- Do not solely look at the piglets – but also the sows

We have not looked sufficiently into the positive role of feed

- Effective measure to ensure high milk production in sows
- Effective against post-weaning diarrhea in weaners
  - Important, when zinc oxide will be phased out in the EU



## SECTOR LEVEL – Knowledge about on-farm infection status

Knowledge of infection status will enable farmer to buy in replacement animals with similar status

- Preferably through a contract with a single supplier only
- Targeted vaccination can then be applied – economic approach

Quarantene needed, when buying in new animals

- Else infections may enter the herd unexpectedly
- Take care of the livestock trucks – assume they are all infected with dysenterea!

Confidence in herd status requires blood testing at least annually

- And open access to results
- In place in the Danish SPF system

Eradication of the most important infections can be the next step

All these initiatives need to be made at the sector level



# The Yellow Card Scheme



Adopted in July 2010 by Danish Veterinary and Food Administration

Makes use of data recordings

- AM consumption in the individual farm (VETSTAT)
- No. of animals in herd (Central Husbandry Register)
  - Divided into age groups

Restrictions imposed on pig farmers who use more than twice the average

- Divided into age groups

Implemented to eliminate very high use seen on individual farms

- Later, limits have been reduced further
  - Do not reduce too much too fast!

Age group	Permit limits* Initial / current
Sows and piglets	5.2 / 3.2
Weaners	28 / 17.2
Finishers	8 / 4.4

\* Animal daily doses (ADD) per 100 animal days

# Herd health contracts between farmer and vet

Danish vets are only allowed to profit up to 5% from sales of medicine

- Instead, vet and individual farmer make contracts about veterinary advisory service in the herd

Contracts introduced in 1995 - Became mandatory for large herds in 2010

- $\geq 300$  Sows,  $\geq 3,000$  Finishers and  $\geq 6,000$  Weaners
- Involves frequent visits
  - During visits, vet gives advice with focus on disease prevention, production and responsible use of AM
  - Reports are written after each visit
  - Quarterly report provides details about AM use and productivity

Together, farmer and vet decide on actions to initiate

- Focus on limiting need for treatment
  - Final decision and responsibility lies upon farmer



# Treatment guidelines and risk assessments

Needs to be based on effect of treatment **and** risk of resistance

- Else, the vets will not comply with the guidelines

Risk of resistance should be based upon risk assessment

- European Medicines Agency (EMA) has developed guidelines for how to make risk assessment

Danish experience using EMA guidelines:

- Possible, but cumbersome!



# Categorisation of AM

European Medicines Agency has recently come out with a categorisation of AM

- Dividing AM into 4 groups:
  - A (avoid)
  - B (restrict)
  - C (caution)
  - D (prudence)

Route of administration also important

- Lowest risk: Local treatment of individual animal
- Highest risk: group treatment via feed, premix or water

**EMA** Categorisation of antibiotics for use in animals for prudent and responsible use

**Prudent and responsible use of antibiotics in both animals and humans can lower the risk of bacteria becoming resistant.**

This is particularly important for antibiotics that are used to treat both people and animals and for antibiotics that are the last line of treatment for critical infections in people.

**One Health**  
Antibiotic resistance can spread between animals, humans and the environment

The Antimicrobial Advice Ad Hoc Expert Group (AMEG) has categorised antibiotics based on the potential consequences to public health of increased antimicrobial resistance when used in animals and the need for their use in veterinary medicine.

The categorisation is intended as a tool to support decision-making by veterinarians on which antibiotic to use.

**Veterinarians are encouraged to check the AMEG categorisation before prescribing any antibiotic for animals in their care.** The AMEG categorisation does not replace treatment guidelines, which also need to take account of other factors such as supporting information in the Summary of Product Characteristics for available medicines, constraints around use in food-producing species, regional variations in diseases and antibiotic resistance, and national prescribing policies.

Category A Avoid	Category B Restrict
<ul style="list-style-type: none"><li>• antibiotics in this category are not authorised as veterinary medicines in the EU</li><li>• should not be used in food-producing animals</li><li>• may be given to companion animals under exceptional circumstances</li></ul>	<ul style="list-style-type: none"><li>• antibiotics in this category are critically important in human medicine and use in animals should be restricted to mitigate the risk to public health</li><li>• should be considered only when there are no antibiotics in Categories C or D that could be clinically effective</li><li>• use should be based on antimicrobial susceptibility testing, wherever possible</li></ul>
Category C Caution	Category D Prudence
<ul style="list-style-type: none"><li>• for antibiotics in this category there are alternatives in human medicine</li><li>• for some veterinary indications, there are no alternatives belonging to Category D</li><li>• should be considered only when there are no antibiotics in Category D that could be clinically effective</li></ul>	<ul style="list-style-type: none"><li>• should be used as first line treatments, whenever possible</li><li>• as always, should be used prudently, only when medically needed</li></ul>

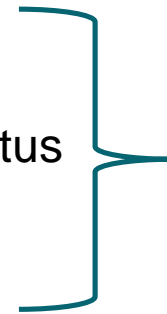
# Summing up

To ensure a change, actions should be taken at individual, sector and national level

- Legislative frames should be set at national level
  - Will ensure equal conditions for all producers
- If targets are set and the frame is given, then producers will be able to act responsibly
  - Through assistance by their vet
- Eradication of disease e.g. dysentheria should be considered and undertaken at sector level
  - Preferably as a public-private partnership

Measures to be taken by the individual farmer

- Biosecurity (also because of African Swine Fever)
- Targeted vaccination / knowledge about infection status
- Feed – we still have a lot to learn



Will ensure that the productivity of production can be maintained, while having prudent use of AM



Thank you for your attention

