FOOD GROUP

Approaches to reduce antibiotic resistance in the pork supply chain

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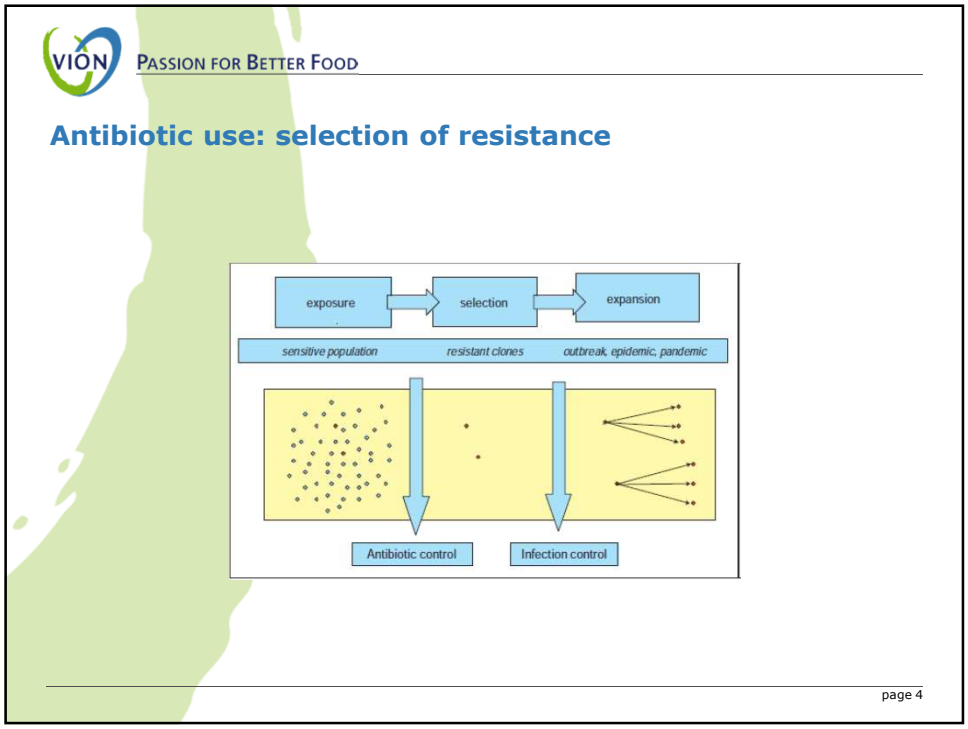
Content

- Can slaughterhouse data be used for the purpose of antibiotic reduction?
- Introduction
  - backgrounds
- Research
  - Serology in slaugherhouse blood
    - Generic: Salmonella, Mycobacterium avium, Toxoplasma
    - Specific: tool for herd health management
- Conclusions


Record-High Antibiotic Sales for Meat and Poultry Production
Antibiotic overuse is breeding new, resistant strains of bacteria that infect people. But industrial farms haven't gotten the message.
In 2011, 29.9 million pounds* of antibiotics were sold in the United States for meat and poultry production.
antibiotics sold
29.9 million lbs
3.9 times greater
Yet, in the same period, only 7.7 million pounds of antibiotics were sold to treat sick people in the United States.
7.7 million lbs
antibiotics sold
ON THE RISE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Antibiotic use: selection of resistance
exposure
selection
expansion
sensitive population
resistant clones
outbreak, epidemic, pandemic
Antibiotic control
Infection control
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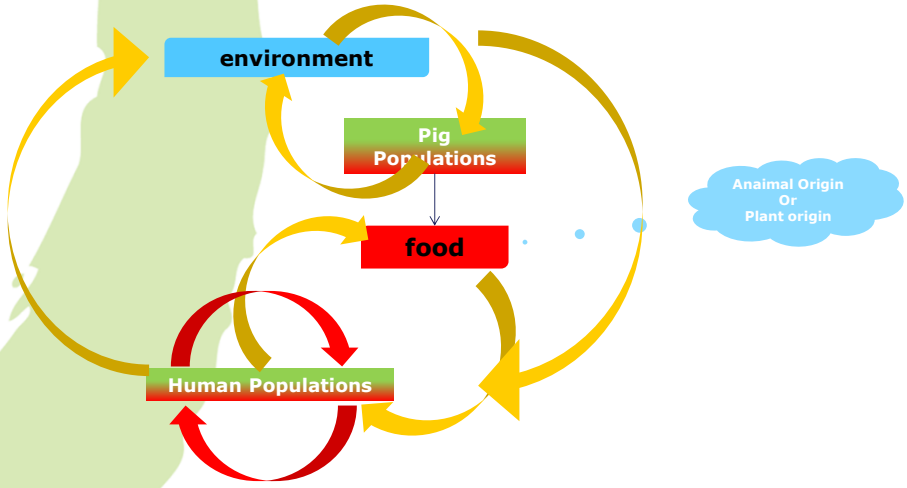
Communicating populations of resistance



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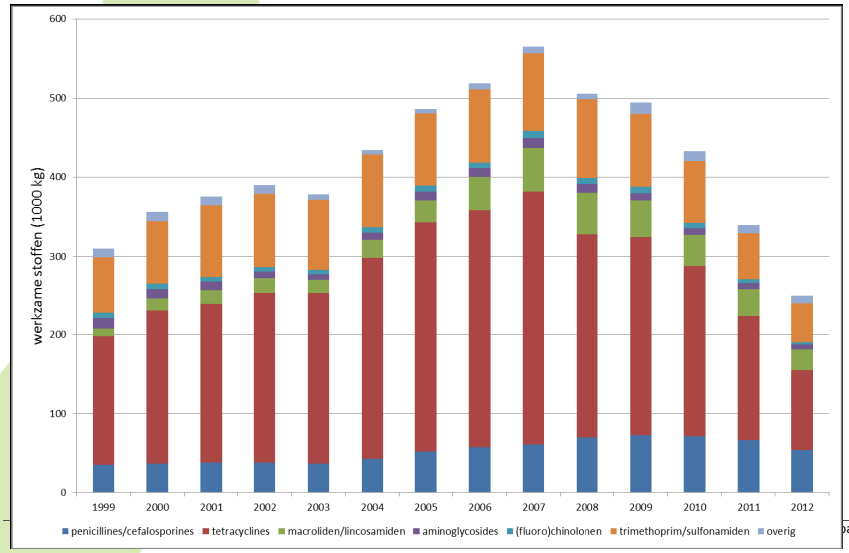
Sales of antibiotics in The Netherlands (1999-2012)



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Succes/Risk factors to reduce

- **Why did usage increase?**
  - Farm health insurance system
  - business model of veterinarians
  - Low costs
  - Simple intervention measure
  - ….
- **Why could it decrease?**
  - Data bases & bench marks
    - e.g. Red/yellow card systems
  - Abolishment critical antibiotics
  - Public debate
  - …..

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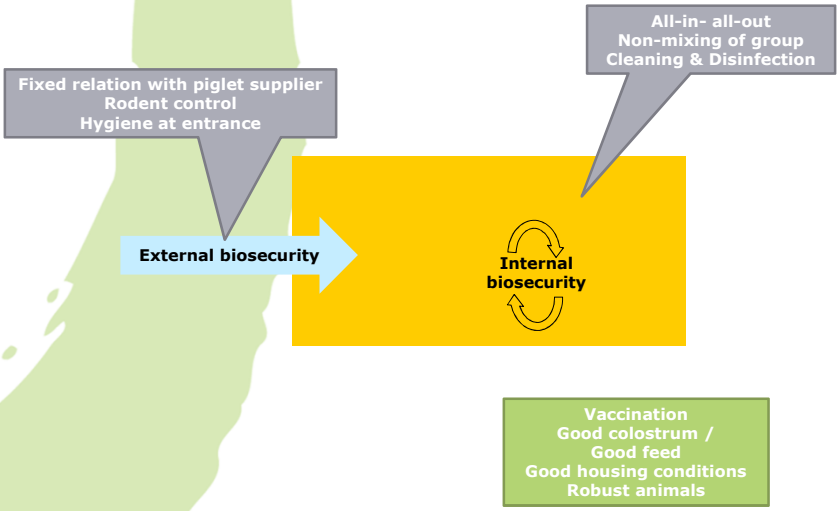
Basic principle: healthy pigs and hygiene



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Study purpose

All pigs end up in the slaugherhouse. Data and materials of these pigs can be and are easily collected.

- Can blood collected at the slaugtherhouse be used to support farm health management?
  - Is there heterogeneity between farms?
  - Does serology predict performance of the farms?
  - Can data be tranformed in information?

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Blood collected in the slaugherhouse

Biosecurity and specific infections

- Serology from other monitoring/surveillance systems
  - Blood collected: for verfication of chain control
  - **Salmonella** → routes: pigs, rodents, flys / interal transmission
  - **Mycobacterium avium** → routes peat, bird droppings, surface water
  - **Toxoplasma** → routes: cats, rodents, whey
- Serology of specific pathogens for the purpose of farm health management

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Important reasons for antibiotic usage in pig: risk factors

- Piglets: streptococci
- **Porcine Respiratory Disease Complex**
  - Bacterial
    - Mycoplasma hyopneumonieae
    - Actinobacillus pleuropneumoniae
  - Viral
    - Porcine Circovirus type 2
    - PRRS - virus
    - Swine Influenze virusses
- Gut Health
  - PIA – Ilietis
  - Swine dysentery

→ Clinical or Sub-clinical

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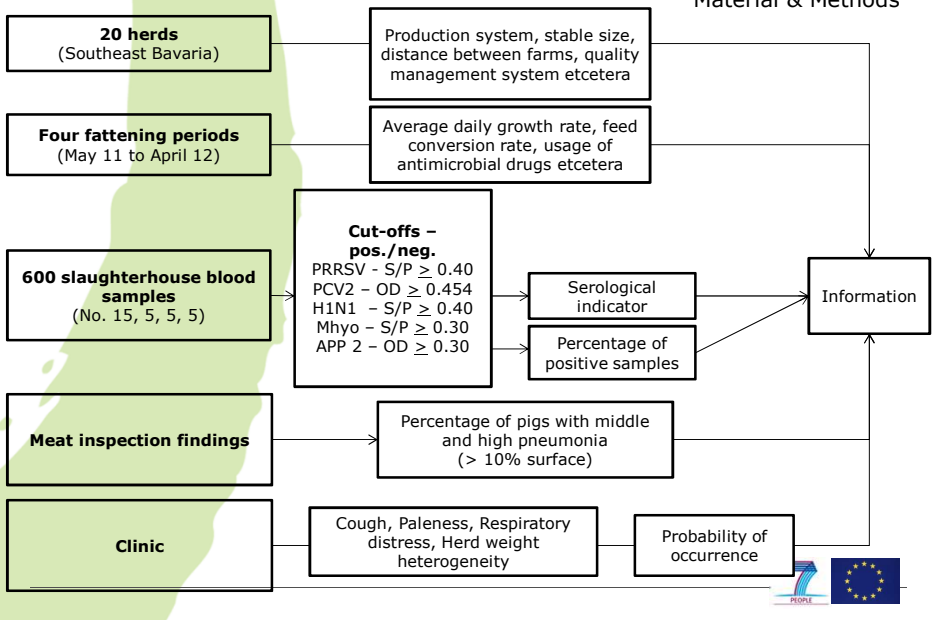
QUARISMA

Material & Methods



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QUARISMA

Results

Sum of percentage of positive samples per parameter and herd

figure showing differences between farms, some with high serology and others with low serological responses

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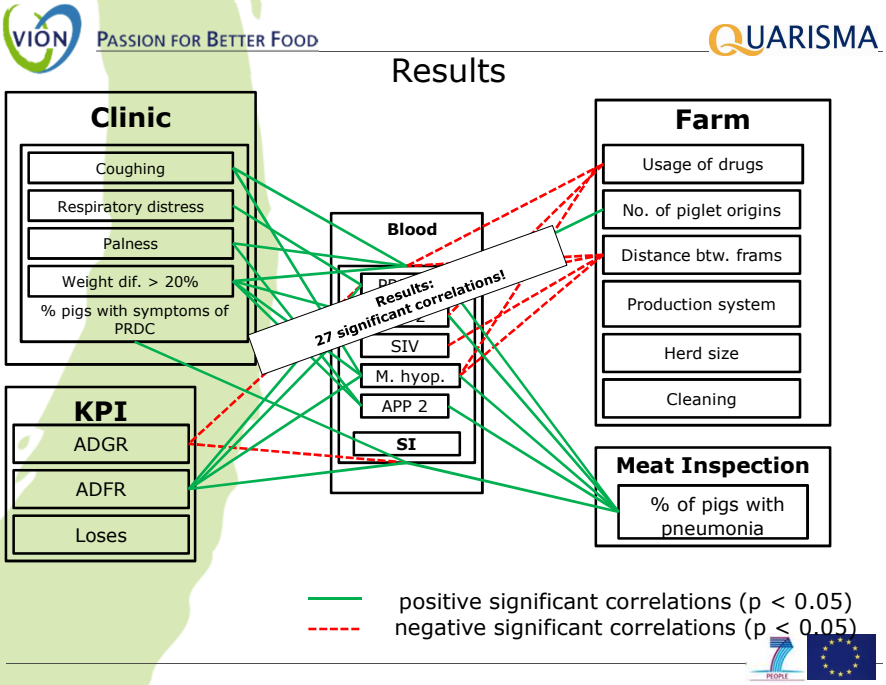
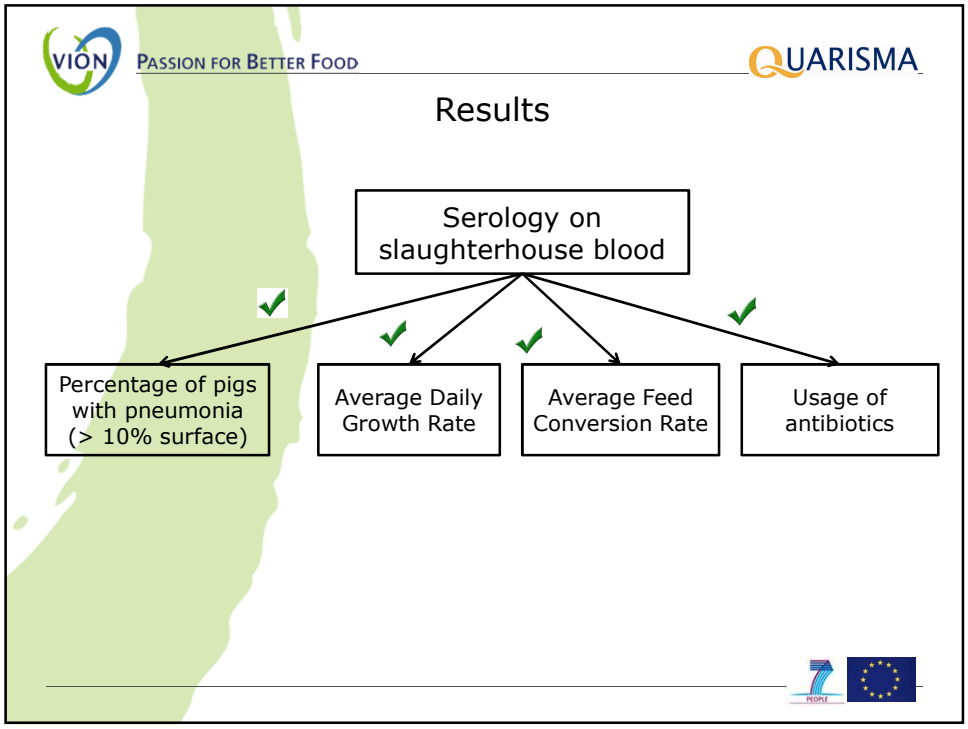
QUARISMA

Results

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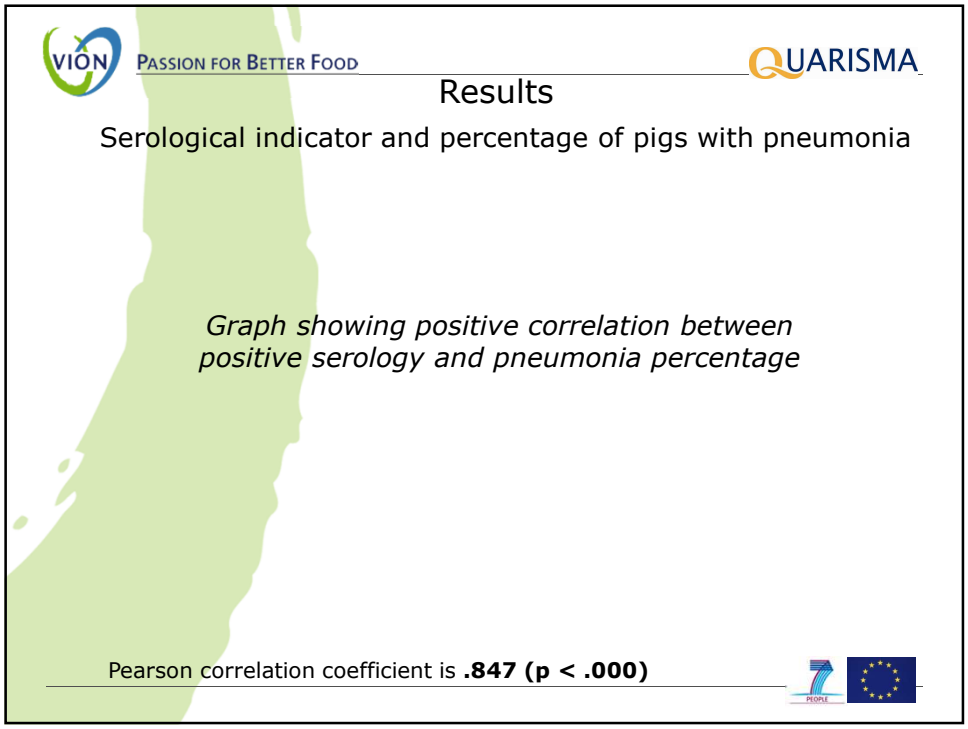
Results
Serology on slaughterhouse blood
Percentage of pigs with pneumonia (> 10% surface)
Average Daily Growth Rate
Average Feed Conversion Rate
Usage of antibiotics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Results
Serological indicator and percentage of pigs with pneumonia
Graph showing positive correlation between positive serology and pneumonia percentage
Pearson correlation coefficient is .847 (p < .000)

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QUARISMA

Results

Serological indicator and average daily growth rate

Graph showing negative correlation between positive serology and daily growth

Pearson correlation coefficient is **-.493 (p = .029)**

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QUARISMA

Results

Serological indicator and average feed conversion rate

R^2 = .470

Serological indicator

Graph showing positive correlation between positive serology and feed conversion ratio

Average Feed conversion rate

Pearson correlation coefficient is **.543 (p = .013)**

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QUARISMA

Results

Serological indicator and antimicrobial drug usage* (Yes = used; No = not used)

Serological indicator

Graph showing negative correlation between positive serology and use of antibiotics

YES No

Antimicrobial drug usage

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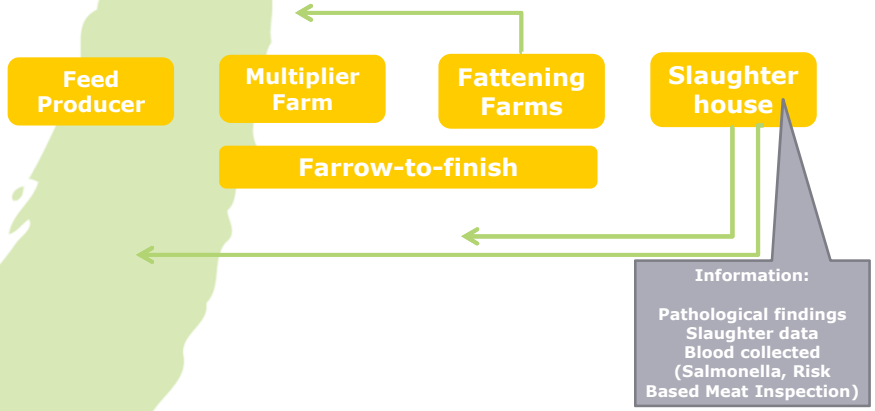
The pork supply chain



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Conclusions: ways to go

- Focus on preventive herd health management on farms
  - Healthy pigs
    - Colostrum, vaccination, feed…….
  - Improved internal- and external biosecurity
- Use data in the chain to make information
  - Use slaughter data
    - To monitor health
    - to verify biosecurity
    - To benchmark against other farms

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