A global vision for antimicrobial stewardship in food animals: Preserving antimicrobial effectiveness in the future through ethical practices today.

May 12, 2016
• Group Quality Assurance manager Vion Food
  • Food Safety, Animal Health and Welfare and Product Integrity

• Resident of the European College of Veterinary Public Health

• Chairman Dutch Veterinary Public Health Association GKZ -KNMvD
  • VPH-veterinarians working in government, academia, institutions and industry

• Chairman Technical Committee Livestock GlobalGAP
  • Standard setting for Global Good Agricultural Practises
Vion Food Group

320,000 pigs processed each week

19,000 cattle processed each week

100 million people worldwide consume food produced by Vion, every day
Zwölf Kanadier sterben nach Fleischkonsum

KRANKHEIT Bakterien lösten Listeriose aus. 29 Verdachtsfälle.
Vion’s responsibility to verifiably control food safety

White Paper on Food Safety EU January 2000
+ Hygiene package (EU 852, 853 and 854)

Responsibility (chain of) producers

Show performance of food safety control

1. Design systems and procedures
2. Need for transparent and easy data collection
Meat Supply chain
Food safety – risk analysis

<table>
<thead>
<tr>
<th>Seriousness</th>
<th>Incidence (in human cases)</th>
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<tbody>
<tr>
<td></td>
<td>Low</td>
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<tr>
<td>Low</td>
<td>1</td>
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<tr>
<td>Medium</td>
<td>2</td>
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<tr>
<td>High</td>
<td>3</td>
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</tbody>
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Based on risk assessment >> conclusions on level of control
- Relevant hazards: CCP level
- Hazards: CP level
- Less relevant hazards: re-assessment

Definition of control measures:
- CCP’s and CP’s and most effective place in the process chain,
- limits, performance criteria, monitoring and verification
Hazard categorisation pork

Hazard: estimated relative contribution

Hazard: which need to be addressed?
Estimates of Burden of Antibacterial Resistance

**European Union**
- Population 500m
- 25,000 deaths per year
- 2.5m extra hospital days
- Overall societal costs
  - (€ 900 million, hosp. days)
  - Approx. €1.5 billion per year

**Thailand**
- Population 70m
- >38,000 deaths
- >3.2m hospital days
- Overall societal costs
  - US$ 84.6–202.8 mill. direct
  - >US$1.3 billion indirect

**United States**
- Population 300m
- >23,000 deaths
- >2.0m illnesses
- Overall societal costs
  - Up to $20 billion direct
  - Up to $35 billion indirect

Global information is insufficient to show complete disease burden impact and costs

**Attribution of livestock/food?**
Control of antibiotics in the chain of producers

Integrated quality scheme for the entire chain

**Feed – GMP+**
- HACCP based production
- only AB for curative use on vet’s request
- *NO AB in feed*

**Farmer – GAP**
- high level of bio security (prevention)
- Continuous training/education
- White list (selected AB’s allowed)
- *Excluding 3rd and 4th generation fluoquinolons and cephalosporins*
- Records of use/Identification of animals
- Declaring use in relevant period to slaughter plant
- Independently audited once a year (iso 45011)

**Veterinarian – GVP**
- One on one relation with farmer
- Registration of use in central database of the NL drug authority (SDa)
Antibiotic control

**Feed**
- No growth enhancers
- No AB in feed

**Medication**
- No critical antibiotics
- “prudent use”

**Biosecurity**
- Feedback slaughter info → Continuous Improvement Animal Health
- Better biosecurity control → Less AB necessary

**Hygiène**
- Strict process hygiène
- Monitoring STEC + ESBL + MRSA
Abattoir level

Slaughter phase
  • Part of Food Chain Information for every delivery
    • Declaration of (non) use
    • Relevant period
    • Identification of animals
    • Substances used
  • Monitoring by competent authority
    • Random sampling
  • Verification by VION
    • Risk based sampling

Resulting in a low level of non conformities
Monitoring of residues

- Samples taken based on objective criteria
- Selection on inflammation of respiratory tract
- Differentiation on active substance
- Farmer follow up through official authorities and VION
VION HACCP

CCP preventing contamination during process

HACCP

CCP preventing multiplication (cold chain)

Standard Sanitation Operational Procedures (SSOP)

Pre-requisite program

Pre-SSOP checks before production

SSOP checks during production

Basic Hygiene Program

Pre-SSOP checks before production

SSOP checks during production
Scalding

• To remove dirt
• To make hair removal easier

Dehairing

• Results in smooth and visually clean animal
Flaming - Singeing

- Decontamination by means of high temperatures

- Microbacterial reduction (MRSA)

- Enterobacteriacea non detectable (< 0.48 log per cm2)

- Total viable counts reduced to 2 log per cm2

- **ALARA**: As low as reasonably achievable
Slaughter process; evisceration

- Critical procedures in relation to fecal (cross) contamination.
- Strict hygiene
- No splitting of the heads during slaughter process
- Deviations have to be monitored
Corrections out of line.

- Carcasses hang completely still
- Removal of contaminated parts
- Decontamination of the area with open flame
- Cross contamination of fecal matter under control
Control of fecal contamination

Science based HACCP system
- Strict hygiene during slaughter

Cleaning and disinfection

CCP’s
- Pre-inspection 100% of the carcasses
- Monitoring CCP
- Verification CCP

Intensive monitoring system:
- Salmonella
- Indicator organisms (TVC, Entero’s)
Slaughterhouse study: Goals

• Presence and quantity of AMR within different reservoirs (human, animals, environment)
• Define risk factors for the presence of resistance genes in the slaughterhouse (e.g. location)
• To define exposure-response relationships, assess consumer exposure

Metagenomic analysis of human samples (NL, DE?)
Comprehensive approach, inform qPCR (e.g. meat)
Slaughterhouse sampling (1)

**Carcass sampling**
- After scalding (cork borer)
- Cutting room (cork borer)

**Air sampling**
- A: Sampling head
- B: PVC tube
- C: Pump

After singeing
Slaughterhouse sampling (2)

Human fecal sampling (incl. questionnaire)
+800 packages
10-25 euro/sample
=> +/- 350 samples collected

Total #samples
- Human: +350
- Gloves: 168
- Carcass: 80
- Pig manure: 30
- Air: 16
- Scoring: Hygiene, contact
- General questionnaire: 1

Progress
- NL: Spring 2016 (human: first steps)
- DE: Feb-Mar 2016 (ongoing discussions)

Gloves sampling
Processing in the lab
Slaughterhouse: Metagenomics

**High-risk steps**
- Stables, stunning, bleeding
- Evisceration

**Low-risk steps**
- Cutting room
- Deboning area

**‘Baseline’**
- General population

**Comparison**
Workers + Carcass Pig fecal
Vion’s strategy  
Control all *relevant* hazards

**Class 1:**
Salmonella, Listeria, STEC, Yersinia
Toxoplasma

**Class 2**
Dioxin
Mycobacterium avium
Antibiotic resistant bacteria / genes
Hepatitis E
Vion’s strategy II

Performance hazards-based

e.g. Enterobacteriaceae:

Salmonella: carcass level, trimmings and consumer goods
STEC: process monitoring along the supply chain, negative release for products at risk

Antibiotic resistant bacteria: MRSA and ESBL on trimmings

VHEI: Vion Harmonized Epidemiological Indicators
Control strategy resistant genes / mo

Reduce initial contamination
In animal at farm (AMU / GVP, Biosecurity, Feed)
Slaughter hygiene

Prevent multiplication process / on product
Processing hygiene (Biofilms, etc.)
Cooling < 7°C
Thank you
For your attention!