Campylobacter Risk Assessment in the EU: Past, present and future.

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Overview

• Past
  - MedVetNet WP 24: a comparison of "Campylobacter in broiler meat risk assessments" in Europe

• Present
  - A consensus framework: CRAF

• Future
  - Challenges of European Campylobacter QMRA
Risk assessment: what do I mean?

• Food chain risk assessment

• Model describes transmission and survival of *Campylobacter* in the broiler meat chain: changes in distribution of concentrations

• Exposure assessment
  + Dose response = risk

• Quantitative Microbiological Risk Assessment (QMRA) is still developing!
Why we need risk assessment

• **Relative** risk estimates
  - The effects of control measures
  - Comparison of interventions all over the food chain

• **Added value**
  - food chain data
  - epidemiology
  - below the detection limit
  - check our understanding

• Indispensable for PO / target setting
**Campylobacter in broiler meat risk assessments in Europe**

<table>
<thead>
<tr>
<th>Country</th>
<th>Author(s)</th>
<th>Year</th>
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<tbody>
<tr>
<td>UK</td>
<td>Hartnett</td>
<td>2001</td>
</tr>
<tr>
<td>Denmark</td>
<td>Rosenquist, Christensen</td>
<td>2003</td>
</tr>
<tr>
<td>Netherlands</td>
<td>Havelaar, Nauta</td>
<td>2005</td>
</tr>
<tr>
<td>Germany</td>
<td>Brynestad</td>
<td>2006</td>
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<td>Belgium</td>
<td>Uyttendaele, Gellynck, Messens</td>
<td>2006</td>
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<tr>
<td>Sweden</td>
<td>Lindqvist, Lindblad</td>
<td>2008</td>
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<td>Italy</td>
<td>Calistri, Giovannini</td>
<td>2008</td>
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MedVetNet Workpackage 24
March 2006 - June 2009

• Objective: consensus on *Campylobacter* QMRA?

• UK, DK, GE, NL models compared
  - Input from New Zealand and FAO/WHO risk assessment

• Differences
  - objectives
  - approach
  - models
  - results

• Similar conclusions
Different objectives

- Gain risk assessment modelling experience
- Human incidence estimation
- Evaluation of risk reduction after intervention and control
  - general
  - specific interventions
  - incl. economic analysis
- Interaction with risk management
Differences between models

- objectives
- expertise of modellers
- national differences
- data and/or expert opinion
- statistical description and/or dynamic model
- details included in the models
- channel assignment
- end product
  - whole carcass
  - specific product
  - side dish
- but all use quantitative risk assessment
  - probabilistic models
Differences between model results

example

Three chicken processing models with the same input
- different dynamics
- similar end results
- similar effects of interventions (?)
Different end results?

- Varying human incidence estimates
  - Differences in models, (national) data and assumptions
  - Risk estimates are uncertain
  - Not easy to decide what is the "main cause" of differences in results

- Evaluation of risk reduction after intervention
  - In general similar, despite quantitative differences
  - Relative risk estimates are less uncertain
Similar conclusions (1)

• Farm models predict many low prevalent flocks at the farm that may not be detected

source: Nauta et al IJFM in press

• False negative flocks occur frequently
Similar conclusions (2)

- "Logistic slaughter" has little effect
  - No growth of *Campylobacter* in processing environment
  - Each model MUST predict that concentrations on carcasses of cross contaminated flocks are lower

- Data:
  - Typing shows *Campylobacters* are transmitted from one flock to the other (e.g. Miwa et al. 2003)
  - Transferred quantities are small (Johannessen et al. 2007)
Similar conclusions (3)

- High concentrations pose the largest risks
  - targeting high concentrations is an effective intervention
  - get data on distributions of concentrations, not just means
  - confirmed by Callicott et al. (2008)

(consumer + DR models)

Nauta et al, unpublished results
Conclusions from WP 24

• QMRA model must be fit for purpose
  - different purposes require different models
  - balance between simple and complex

• Many modelling methods explored
  - try to combine the good qualities of different models

• Similar conclusions!
  - useful insights for risk managers

• No consensus European Risk assessment Model
  - no single purpose, many national differences

• Towards a consensus Approach
  - development of Campylobacter Risk Assessment Framework (CRAF)
Campylobacter Risk Assessment Framework CRAF

- Software tool for risk assessors
- Structured information on five Campy QMRAs
- Compare and link models for modules
- An aid to make your own Campylobacter QMRA

19 February 2009 :
The Final General Meeting of MedVetNet Workpackage 24

20 February 2009 :
Campylobacter Risk Assessment Framework (CRAF)
Training Course

hosted by BfR in Berlin
New *Campylobacter* QMRA in Europe (1)

- Baseline data from caeca and neck skins
- Challenge: how to relate those data to risks?
  - QMRA models don't have either of them as inputs
  - Data don't always show a good link caecal samples - meat products; why not?

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<th></th>
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</tr>
<tr>
<td></td>
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</tr>
<tr>
<td>tot</td>
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source: Nauta, Bolder *et al*., in prep.
New Campylobacter QMRA in Europe (2)

- Target setting: link with human health risks

Data

Process

Risk

Quantitative distribution

Differences between member states

Challenge: How to model the differences for each MS? How important are those?
Take away messages

• Much *Campylobacter* QMRA experience in Europe, but
  - different objectives and approaches
  - different results
still
  - similar and useful conclusions

• European Campylobacter QMRA needs
  - a clear objective
  - further development of QMRA modelling
    • integration of good ideas
    • balance between complexity and simplicity
    • incorporation of differences between MS