Evaluation of the risk assessment based procedures for setting the UK target to reduce campylobacter in chickens

Area of research interest: Foodborne pathogens
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Background

The FSA, working in partnership with industry and Defra as part of a Joint Working Group on *Campylobacter*, developed a Joint Action Plan to help identify and implement interventions to reduce *Campylobacter* in poultry. To measure progress on the effectiveness of the risk management programme, a joint government and industry target to 'reduce *Campylobacter* in UK produced chickens by 2015' was set.

The model used to set the UK target was developed from an earlier UK model. The source of infection was not explicitly modelled and infection was randomly assigned within the flock. The model used a two-stage semi-mechanistic modelling method, which assumed the transmission of infection changed a few days after the initial infection of the flock. The model focused on the mechanistic contamination of the birds at farm level and to a lesser extent during transport.

Data for input into the model were obtained from national published articles, national project reports, and experts' consultation.

The procedures followed in the UK-model were in line with the flow of the CODEX web tool for broiler slaughterhouse processes.

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Research Approach

Results from the UK model were compared with those from the CODEX web tool. It was noted that results would not be directly comparable as the two modelling approaches were variable in their setting and in their scope.

This study evaluated the model used to set the UK target for reduction of *Campylobacter* in chicken for:

- fitness of the risk assessment approach for the intended purpose
- strengths and weaknesses of adopting the CODEX web-based tool for broiler slaughterhouses

- appropriateness and weaknesses of, and gaps in, the input model data
- model robustness
- possibilities for future improvement

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Results

The model was found fit for purpose, however, this model-based approach should be regarded as a starting point for discussion around which practical issues could be overlaid. There was room for improving the present model; especially with regard to the:

- modelling of the source of infection
- sound justification of the time period of which infection does not occur in birds (21 versus 14 days)
- easing the mechanistic pattern of cross-contamination across the slaughter model.

Compared to the CODEX web tool model, the UK model was more detailed, better structured and more transparent. However, limited management options were evaluated in the UK-target model compared to the CODEX web tool model.

The data sources for the UK-target model were found to be very appropriate for the purpose of setting the target. However, a weakness was in defining the interventions distribution parameters. The intervention parameters were based on single study per each management option. Selection of a single study was not well justified. It also did not consider the conflicting results between some of these studies (e.g. on steam effect for instance).

Sensitivity analysis showed that the initial concentration in caeca on entering slaughterhouse (log CFU/g) was of major relative importance, however, more data were needed on this aspect.

Overall, it was concluded that interventions aiming at reducing *Campylobacter*numbers in the gut of the bird, at farm level, should not be overlooked.

Adoption of this target for reducing *Campylobacter* in chicken meat, calls for future research/work on the:

- development of online monitoring tools (e.g. labOnChip)
- searching for hygienic indicator which can act as a surrogate for *Campylobacter*
- industry guide on how to act/what to do with *Campylobacter* positive samples (flocks)
- the impact of this target from a point of public health benefits as this is still lacking (this may be done by extending this model to retail and consumption phases).

Research report

England, Northern Ireland and Wales

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