Scientific Colloquium Series

EFSA Scientific Colloquium n°12

Assessing health benefits of controlling *Campylobacter* in the food chain

Rome, Italy, 4-5 December 2008

BRIEFING NOTES FOR DISCUSSION GROUPS

These briefing notes are prepared to provide participants with the relevant background information so as to be prepared for an interactive exchange of views and expertise, during the Colloquium.

Background

Over the past years *Campylobacter* has overtaken *Salmonella* as the most frequently reported zoonoses in the EU and also in many countries worldwide. *Campylobacter* is also the second most common causative agent of food-borne outbreaks in 2006, even though most reported cases of campylobacteriosis are considered to be sporadic in nature. In their Review of the Community Summary Report on Trends and Sources of Zoonoses the BIOHAZ and AHAW Panels stated that these data indicate that *Campylobacter* control should be addressed as a high priority for food safety policy in Europe.

In *Campylobacter* isolates from poultry meat, increasingly high levels of resistance to ciprofloxacin are observed. The resistance to this antimicrobial, which is used clinically in human and veterinary medicine, is also high in isolates from fowl (*Gallus gallus*), pigs, and cattle. Such resistance is of concern, as animals and food constitute a reservoir for *Campylobacter* infections in humans.

Across the Member States, the reported incidence varies widely. It is not known how far these differences reflect true differences in human illness rates, or arise as limitations of national surveillance and notification systems. Risk assessment studies, supported by targeted observational studies are essential for the further evaluation of possible options to reduce consumer exposure to *Campylobacter*.

In 2005 the Scientific Panel on biological hazards (BIOHAZ) issued a scientific opinion assessing food-borne routes of *Campylobacter* infections, and identifying possible control options as well as data gaps that require attention. The European Commission has requested EFSA to update the 2005 opinion with particular reference to the contribution of broiler meat to human campylobacteriosis, the possible control options, and potential performance objectives or targets. This Colloquium will assess the latest scientific information and formulate recommendations on risk assessment of *Campylobacter* and effectiveness of control measures.

The objectives of this Colloquium are to:

- Discuss in an open scientific debate the current issues and future challenges concerning the risk assessment of *Campylobacter* in the food chain in the EU. Focus on best approaches for data collection and quantitative risk assessment within the EU, determine its impact on human health, fluoroquinolone resistance, and assess what are likely to be the most effective control measures.
- Identify what data are needed in order to assess the benefits of controlling *Campylobacter* (*e.g.* impact on human health, disease burden and costs).
- Discuss the risk to human health of fluoroquinolone resitant *Campylobacter* and its relation to antimicrobial usage in animal husbandry?
- Identify options to control the prevalence, concentration and distribution of *Campylobacter* infections and contamination throughout the food chain, and evaluate the current information on the effectiveness of these control options.

Organizing Committee
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General background documents

- Opinion of the Scientific Panel on Biological Hazards on *Campylobacter* in animals and foodstuffs, The EFSA Journal (2005) 173; 1-10. Available at: http://www.efsa.europa.eu/EFSA/efsa_locale-1178620753812_1178620776955.htm

- The Community Summary Report on Trends and Sources of Zoonoses, Zoonotic Agents, Antimicrobial Resistance and Foodborne Outbreaks in the European Union in 2006, The EFSA Journal (2007), 130:1-352. Available at: http://www.efsa.eu.int/EFSA/efsa_locale-1178620753812_1178671312912.htm

DISCUSSION GROUP 1 - *Health impact and attribution of Campylobacter*

INTRODUCTION

The Community Summary Report on Zoonoses is published annually by EFSA jointly with ECDC. Over the past years, campylobacteriosis has become the most frequently reported zoonotic illness in the European Union. The reported cases are likely to represent only a fraction of the total cases and this fraction varies between Member States (MS) and possibly between years. Recent serological evidence indicates that exposure to *Campylobacter* and asymptomatic infections are more common than previously thought.

Human campylobacteriosis is a multi-source disease with poultry meat assumed to be a major source across the EU. There are few estimates of the proportion of cases of human illness that can be attributed to poultry meat and other foods, as well as drinking and recreational waters, and direct contact with infected animals and humans. EFSA has recently issued an opinion that describes general principles of source attribution. No specific attempt to apply these general principles to campylobacteriosis has yet been undertaken.

Chronic sequelae and mortality, although rare outcomes of acute campylobacteriosis, add significantly to the disease burden and cost of illness. Few quantifications of these effects are available, however.

DISCUSSION POINTS

1. Assess the epidemiological evidence on human campylobacteriosis in the EU with a view to identify the extent of the contribution of foodborne infection.
2. Consider the applicability of different approaches to source attribution for human campylobacteriosis in the EU (as described in the BIOHAZ opinion *Overview of methods for source attribution for human illness from food borne microbiological hazard*).
3. Consider data availability and propose additional data collection (special studies, surveillance) in humans and in the food chain needed for source attribution, taking into account differences between Member States.
4. Identify possible approaches to establishing the degree of underreporting and discuss their applicability at national and EU level.

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DISCUSSION GROUP 2 – *Quantitative risk assessment of Campylobacter in broiler meat in the EU*

INTRODUCTION

In the last decade, several countries have developed risk assessment models for *Campylobacter* in the broiler meat chain. A project in the Med-Vet-Net Network of Excellence is comparing four European models and one from New Zealand, and proposes further steps to improve the reliability of such models. The risk assessment approach has emphasised the importance of the concentration of bacteria rather than the prevalence alone, in order to assess public health impact and the effectiveness of interventions. Consumer risks appear to be particularly associated with (relatively rare) exposures to high numbers of bacteria. In parallel, more quantitative data on the occurrence and dynamics of *Campylobacter* in the food chain have been produced. Integration of new data in risk assessment models and validation of model predictions has not yet been done extensively. As the European Commission has requested EFSA to provide scientific advice on possible targets in the food chain (*e.g.* primary production or broiler meat) to reduce human campylobacteriosis, the availability of effective models would be an advantage.

DISCUSSION POINTS

1. Consider the state-of-the-art of risk assessment of *Campylobacter* in the broiler meat chain. Discuss to what degree different models have come to the same conclusions or appear to be contradictory. Propose recommendations for further development of risk assessment models.
2. Evaluate current available quantitative data on *Campylobacter* in the broiler meat chain as well as on the cross contamination between broiler meat and other foods. Identify critical data gaps to support risk assessment modelling and validation.
3. Consider quantitative insights from current risk assessment models on the effectiveness of interventions (such as the importance of reducing numbers rather than prevalence, the degree of effectiveness of logistic slaughtering, *etc.*) and evaluate the availability of data to validate such models. Identify areas where model results are disputable or at odds with available data (*e.g.* the impact of partial depopulation) and ways forward to address these issues.
4. Consider the applicability of current models to support decision making on control options at the European level. Assess in particular the effectiveness of interventions across the EU so as to support the setting of targets and/or performance objectives.

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DISCUSSION GROUP 3 – *Fluoroquinolone resistance in Campylobacter*

INTRODUCTION

One of the important findings of the *Community Summary Report on Zoonoses 2006* was that high to extremely high levels of resistance to ciprofloxacin, a fluoroquinolone (FQ) used for treating severe cases of systemic human campylobacteriosis and other severe infections, were reported in *Campylobacter* isolates from broiler meat as well as from poultry, pigs and cattle. Concern was expressed in the report that this resistance is likely to limit the therapeutic options for and effectiveness of the treatment of those human campylobacteriosis cases. However, it is difficult, at present, to quantify the impact of FQ resistance on public health in terms of burden of diseases and costs.

There are few examples of control programmes that are aimed specifically at the control of antimicrobial resistance (AMR) as the hazard, using measures that specifically address food. In terms of impact, controls operated at the pre-harvest phase, for example, those aimed at the control and limitation of antimicrobial usage, are considered to be the most effective and as such are capable of playing a major role in reducing the occurrence of AMR bacteria in food as presented for sale.

In its recent opinion on *foodborne antimicrobial resistance as a biological hazard* the BIOHAZ Panel confirmed that a major source of human exposure to bacterial FQ resistance *via* food appears to be poultry meat and that current food production and processing systems require particular attention to prevent spread of resistant *Campylobacter* and other pathogens.

DISCUSSION POINTS

1. Consider the prevalence of FQ-resistance in poultry flocks, on carcasses and on poultry meat and its relationship to antimicrobial usage in animal production.
2. Evaluate the significance of FQ-resistant *Campylobacter* on broiler meat from a public health perspective. Consider the available evidence and risk assessment models to quantify the proportion of FQ-resistant human cases attributable to broiler meat.
3. Consider the possibilities for and impact of reducing antimicrobial usage in broiler production on the occurrence of resistant *Campylobacters* on broiler meat and the public health impact of such control.
4. Identify critical data gaps and recommend further studies to address these data gaps.

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- Scientific Opinion of the Panel on Biological Hazards on a request from the European Food Safety Authority on foodborne antimicrobial resistance as a biological hazard. *The EFSA Journal* (2008) 765, 1-87. http://www.efsa.eu.int/EFSA/efsa_locale-1178620753812_1211902034881.htm
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DISCUSSION GROUP 4 – *Assessment of effectiveness of control measures in the food chain*

INTRODUCTION

To prevent broiler-associated campylobacteriosis control measures could be addressing different points in the food chain. Control at primary production is the preferred option but until now, hygiene measures have not proved to be sufficiently effective. The importance of breaches in biosecurity, e.g. during partial depopulation of flocks ("thinning"), has already been highlighted. Recent studies, for example in Denmark, have demonstrated that fly control may be an effective intervention, but practical tools are not yet available. While vaccination programmes have not yet been successful, although they are under continuous development. These and other pre-harvest control methods require considerable development and evaluation before they can be considered for full-scale implementation. In the short-term, post-harvest interventions need to be considered. Carcass decontamination has been proposed as a cost-effective option, but there are discussions in relation to its effectiveness under full-scale conditions and its safety. The recent debate about imports of chlorinated chicken is a case in point. Although irradiation is an effective option, its acceptance by consumers is questionable. Some Nordic countries have applied a strategy in which meat from flocks that were tested positive for *Campylobacter* were subjected to freezing before being sold to consumers. Many other alternatives have been tested on lab-scale or sometimes small scale production. There is currently no consensus which post-harvest controls have the best potential for full-scale applications. Consumer education is regarded as a key component of risk management strategies of many MS; however, very few reports exist on its effectiveness. Some risk assessments have assumed a low effectiveness, which is now supported by some observational studies.

The European Commission has requested EFSA to provide scientific advice on the identification and ranking of possible control options of *Campylobacter* within the broiler meat production chain (pre-harvest, at harvest and post-harvest), taking into account the degree of efficiency in reducing human campylobacteriosis to be expected.

DISCUSSION POINTS

1. From the European perspective, consider the effectiveness of current and proposed pre- and at-harvest controls for *Campylobacter* in broiler chicken flocks and propose further studies to develop more effective controls. State the strong and weak points of the control measures identified, considering explicitly the perspective of industry and consumers, and identify possible barriers to their introduction.
2. List and rank the possible post-harvest controls in terms of effectiveness from a European perspective.
3. Consider the evidence on the effectiveness of producer, processor and consumer education to reduce the risk of human campylobacteriosis. Consider the need for new studies aimed at the identification, collection and evaluation of new data on the effectiveness of education and awareness programmes.
4. Consider at which points along the food chain, monitoring, targets, microbiological criteria, and/or performance objectives would be most effective and recommend how best this would be implemented.

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