



FOOD AND AGRICULTURE  
ORGANIZATION  
OF THE UNITED NATIONS



WORLD  
HEALTH  
ORGANIZATION

**E**

**Agenda Item 4.4 b)**

**GF/CRD Denmark-1**

**ORIGINAL LANGUAGE**

## **FAO/WHO GLOBAL FORUM OF FOOD SAFETY REGULATORS**

*Marrakech, Morocco, 28 – 30 January 2002*

### **THE CAMPYLOBACTER RISK ANALYSIS INITIATIVE**

*Country Paper proposed*

*by*

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#### **SUMMARY**

In Denmark, the concept of risk analysis has been used in the control of Campylobacter in chickens. The risk management procedure was initiated by a risk profile on Campylobacter, which was elaborated in cooperation with risk managers, risk assessors, and stakeholders representing both the consumers and the industry. Following the preparation of the riskprofile the risk managers decided to order a formal risk assessment. The responsibility for the risk assessment was placed in the research institute under the Danish Veterinary and Food Administration, and the work was closely followed by the stakeholders. The results were communicated to the risk managers, who subsequently initiated the process identifying possible management options and their efficiency in reducing the number of human Campylobacter cases. This process was carried out in close collaboration with the Consumer Board, the Danish Veterinary Laboratory, the Danish Zoonosis Centre, the broiler industry and the trade organisation. At present (January 2002), the management part of the process is not yet concluded.

Throughout the risk analysis procedure there has been a good and intimate collaboration between risk managers, risk assessors, and involved stakeholders. The procedure has been a very successful and instructive process for all the parts involved.

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## INTRODUCTION

In 1997, as a consequence of an increase in the number of registered human enteric infections in Denmark, risk managers at the Danish Veterinary and Food Administration, decided to initiate a strategy for the control of pathogenic microorganisms in foods based on the principles of Food Safety Risk Analysis.

As stated by the Codex Alimentarius Commission the Risk Management part includes - at a regional or national level - a ranking of the most important hazards. The ranking procedure carried out by the Danish Veterinary and Food Administration stated that special attention should be given to *Campylobacter* species, *E. coli* O157 and *Salmonella* as a consequence of the actual number of registered cases of *Campylobacter* and *Salmonella* infections and the potential threat by *E. coli* O157 to human health.

In 1998 it was decided to initiate the Risk Management procedure on *Campylobacter* and *E. coli* O157 by elaborating Risk Profiles describing the food safety problems related to these organisms. The Risk Profile on *Campylobacter* was prepared by the The Division of Microbiological Safety at the Institute of Food Safety and Toxicology, the Danish Veterinary and Food Administration in co-operation with stakeholders from the Danish Zoonosis Centre, the Danish Veterinary Laboratory, Statens Serum Institut, the Danish Meat Research Institute, Danpo A/S, the Danish Environment Protection Agency, and the Danish Consumer Council in order to ensure transparency and communication between stakeholders. The Risk Profile on *Campylobacter* was finished in September 1998 and published on the Internet [http://www.vfd.dk/publikationer/publikationer/publikationer/campuk/cameng\\_ref.doc](http://www.vfd.dk/publikationer/publikationer/publikationer/campuk/cameng_ref.doc)

The risk profile for pathogenic species of *Campylobacter* in Denmark recommended the Risk Management procedure to be continued by ordering a formal Risk Assessment. It was decided that the Risk Assessment should be carried out according to the principles stated by the Codex Alimentarius Commission.

In commissioning the Risk Assessment, risk managers and risk assessors agreed that the Risk Assessment should focus on thermophilic species of *Campylobacter* in chicken products (from slaughter to consumption). This recommendation was based on the steady increase in the number of registered human cases of campylobacteriosis, the high prevalence of *Campylobacter* in retail chicken products and the fact that several case-control studies had indicated that consuming and/or handling chicken were important risk factors. Additionally, chickens are the most extensively described food item through data from literature and ongoing surveillance programs. It was decided to include other food and environmental items when sufficient data related to these areas have been generated. The responsibility for the Risk Assessment procedure regarding *Campylobacter* in Denmark was placed in The Division of Microbiological Safety at the Institute of Food Safety and Toxicology, the Danish Veterinary and Food Administration.

The aim of the risk assessment was to provide the Danish risk managers with information on the influence of different mitigation strategies on the number of human cases associated with thermophilic *Campylobacter* in Danish retail chickens using quantitative modelling and Monte Carlo simulation.

The purpose was subsequently to pin down initiatives that would contribute considerably to reduce the number of human *Campylobacter* cases on a regulatory and/or voluntary basis.

The risk assessment was initiated and the framework and the approach of the work were discussed with stakeholders from other organizations and institutions, and the industry. In January 2001 the first edition of the risk assessment was published and presented for stakeholders and risk managers. <http://www.foedevaredirektoratet.dk/kontrolinfo/krapyler/frameset.html>

Following the presentation of the risk assessment, risk managers from the Danish Veterinary and Food Administration initiated the process identifying the available options and their efficiency in reducing the number of human *Campylobacter* cases, which is the overall goal of the risk management

activity. This process is still ongoing (January 2002) and is performed in co-operation with the Consumer Board, the Danish Veterinary Laboratory, the Danish Zoonosis Centre, the broiler industry, and the trade organisation.

The risk managers have acknowledged that sources other than chicken contribute to human cases of campylobacteriosis and future risk assessment initiatives might include beef and pork products as well as environmental sources such as water.

## DISCUSSION

After the risk managers and the risk assessors had defined the purpose and the scope of the risk assessment the Division of Microbiological Safety at the institute carried out the Risk Assessment, according to the principles stated by the Codex Alimentarius Commission.

The quantitative risk assessment comprised the elements hazard identification, hazard characterization, exposure assessment, and risk characterization. To estimate the human exposure to *Campylobacter* from a chicken meal and the number of human cases associated with this exposure, a mathematical risk model was developed detailing the spread and transfer of *Campylobacter* in chickens from slaughter to consumption and the relationship between ingested dose and the probability of developing campylobacteriosis.

Simulations designed to predict the effect of different mitigation strategies showed that the probability of campylobacteriosis associated with consumption of chicken meals could be reduced 25 times by introducing a 2 log reduction of the number of *Campylobacter* on the chicken carcasses. A reduction which can be obtained by e.g. freezing of the carcasses. To obtain a similar reduction of the probability of campylobacteriosis, the flock prevalence should be reduced approximately 25 times and the kitchen hygiene should be improved approximately 25 times. Finally, the simulations showed that people in the age of 18-29 years had the highest risk of developing campylobacteriosis.

The results and conclusions of the risk assessment provided the Danish risk managers with valuable information and made it possible in co-operation with stakeholders to choose the most effective and practical measures to reduce the number of *Campylobacter* cases related to *Campylobacter* in chickens.

After the publishing and the presentation of the risk assessment, the risk managers from the Food Department at the Danish Veterinary and Food Administration invited the Consumer Board, the Danish Veterinary Laboratory, the Danish Zoonosis Centre and the broiler industry and trade organisation to a meeting. The purpose of the meeting was to start the process of identifying the available management options and their efficiency in reducing the number of human *Campylobacter* cases in a cost effective way.

At the first meeting a number of possible initiatives was identified and their efficiency and their practicability in regards of legal obstacles and costs was discussed. It was decided to pursue the *Campylobacter* reducing effect of different slaughter techniques, e.g. different cooling and scalding methods.

The *Campylobacter* reducing effect related to freezing the carcasses is an obvious opportunity to get safer products, and The Danish Veterinary and Food Administration wants to pay attention to this aspect as well.

The industry has started to investigate the measures mentioned above, and subsequently, there have been several additional meetings to follow and evaluate the ongoing investigations.

At present (January 2002), it is not yet decided which risk management options should be chosen. It is suspected though, that a number of initiatives will be settled and put to work before summer 2002. The upcoming initiatives will likely aim at:

- Continuing the strategies to reduce the number of *Campylobacter* infected broiler flocks;
- Directing *Campylobacter* negative flocks to the production of chilled chicken meat;
- Reducing the number of *Campylobacter* on the chicken meat during slaughter;
- Labelling of the meat depending on its *Campylobacter* status (free of *Campylobacter*, *Campylobacter* reduced, risk of *Campylobacter*).

The management part, however, is an ongoing process, which has to be adjusted whenever new information or changes in the overall situation occurs.

As described in the risk management procedure the effect of the upcoming management options will be monitored e.g. by parameters such as the human incidence of campylobacteriosis as well as the prevalence and the concentration of *Campylobacter* in the chicken products.

## CONCLUSION

The risk management part of the risk analysis procedure has not yet been completed, but the overall conclusion is that the process has been very successful and instructive for all the parts involved.

The risk analysis procedure has provided the risk managers with valuable and feasible knowledge, and the co-operation with the stakeholders has been very informative. During the process, it has been very important that all involved parts have agreed that the concept of food safety risk analysis is a valuable process. All stakeholders have realized that the concept has given them the opportunity to influence the decisions. Also the authorities have realized that they can get valuable information from the stakeholders and that practical or economical obstacles must be taken seriously.

The risk management part and the risk assessment part have been to separate processes in order to protect the essential scientific independence and integrity. However, the risk assessment procedure has been carried out in full collaboration between risk managers and risk assessors and the communication between the two parts has been very valuable.

It is important to mention that to achieve optimal alignment between the risk assessment process and the needs of the risk managers it is necessary to clearly define the issues that the assessors should address. Effective communication between the assessors, the decision makers and the stakeholders prior to initiating a microbiological risk assessment is essential and should include a clear statement of the purpose and scope of the assessment. The scope and the purpose of the assessment form the basis of the outcome and the feasibility of the results, and they also determine the limitations.