

SCIENTIFIC OPINION

Scientific Opinion on Quantification of the risk posed by broiler meat to human campylobacteriosis in the EU¹

EFSA Panel on Biological Hazards (BIOHAZ)^{2,3}

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SUMMARY

Following a request from the European Commission, the Panel on Biological Hazards (BIOHAZ Panel) was asked to deliver a scientific opinion on Quantification of the risk posed by broiler meat to human campylobacteriosis in the EU. In particular, the BIOHAZ Panel was requested to further elaborate a previous EFSA opinion and to assess the extent to which meat derived from broilers contributes to human campylobacteriosis at EU level. The importance may be expressed as a percentage of the total number of human campylobacteriosis cases.

The current scientific opinion gives an overview on the public health significance and burden of campylobacteriosis. There is considerable underascertainment and underreporting of campylobacteriosis and there may be not less than 2 million and possibly as high as 20 million cases of clinical campylobacteriosis per year in the EU27. The known and hypothesised factors that have an impact on the epidemiology of human campylobacteriosis are described (i.e. age, season, travel and food trade, strain variation, host immunity and demographic factors). Travelling outside the country of residence is a reported risk factor for human campylobacteriosis. A large proportion of cases is associated with travelling within the EU and would be preventable by EU-wide control measures.

The human illness source attribution methods currently applied are briefly summarised and the results obtained so far from the application of the different methods to the attribution of human campylobacteriosis cases are analysed. Handling, preparation and consumption of broiler meat may account for 20% to 30% of human cases of campylobacteriosis, while 50% to 80% may be attributed to the chicken reservoir as a whole.

Source attribution based on microbial subtyping has only recently been applied to campylobacteriosis. All subtyping techniques have shown the population structure of *C. jejuni* to be highly diverse and weakly clonal, with multiple subtypes having been described, many of which are rare. Some subtypes

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3 Acknowledgement: The Panel wishes to thank the members of the Working Group on *Campylobacter* in broiler meat – Source attribution for the preparation of this opinion: Arie Hendrik Havelaar, Merete Hofshagen, Hilde Kruse, Noel McCarthy, Sara Monteiro Pires, Diane Newell, Norval Strachan.

have a statistical association with specific reservoirs and there is considerable overlap between subtypes from cases of human disease and subtypes from farm animals, in particular from chicken. Most isolates for which subtyping data are available are not based on representative sampling. Current subtyping techniques do not provide any indication of strain virulence. Available studies from three geographical areas suggest that between 50 and 80% of all human cases of *C. jejuni* can be attributed to chickens as a reservoir.

A meta-analysis of case-control studies suggests a variety of risk factors including travelling, animal contact, food and untreated drinking water. Case-control studies also suggest that risk factors depend on the species of *Campylobacter*. It is noted that recent studies have estimated that between 24-29% of human cases can be attributed to handling, preparation and consumption of chicken meat.

Even though most cases of human campylobacteriosis are sporadic, outbreaks are reported in the EU. Recent source attribution studies based on outbreak investigations suggested that over one quarter of the outbreaks for which a source was identified can be attributed to chicken. For two thirds of the outbreaks the source was unknown.

“Natural experiments” in Belgium and the Netherlands in which the consumption of chicken meat was temporarily reduced supported the importance of chicken as a major reservoir of human infections, and chicken meat as an important pathway. Similarly, intervention studies in Iceland and New Zealand to reduce consumer exposure to highly contaminated chicken meat were accompanied by marked reductions in reported campylobacteriosis cases.

The lower proportion of human cases related to chicken meat identified by case-control studies as compared to microbial subtyping may be explained by several factors. There are differences in the point of attribution (reservoir vs. point of consumption). Strains from the chicken reservoir may reach humans by pathways other than food (e.g. by the environment or by direct contact). Results may be biased by inaccurate exposure assessments, confounding by immunity and incomplete data on reservoirs.

Data for source attribution in the EU are limited and unavailable for the majority of Member States and there are indications that the epidemiology of human campylobacteriosis differs between regions. Hence, the BIOHAZ Panel states that the conclusions of this scientific opinion must be interpreted with care.

The BIOHAZ Panel recommends establishing active surveillance of campylobacteriosis in all Member States, including efforts to quantify the level of underascertainment and underreporting of the disease, in order to more precisely estimate the burden of the disease and allow the evaluation of the human health effects of any interventions. In order to provide a better understanding of the molecular epidemiology of campylobacteriosis and a better basis for source attribution, the BIOHAZ Panel also recommends that a representative collection of isolates from humans and putative reservoirs is obtained, subjected to genotyping in all Member States, and stored. Future research is also recommended in order to identify markers of *Campylobacter* virulence, survival properties and ecology and in order to quantify the impact of acquired protective immunity on the epidemiology of campylobacteriosis in the EU.

KEY WORDS

Broiler meat, chicken, campylobacteriosis, *Campylobacter coli*, *Campylobacter jejuni*, source attribution.