

# Scientific Interpretive Summary

Project Title: **Quantifying the proportion of human campylobacteriosis attributable to consumption of poultry meat in New Zealand: a Manawatu case study**

Gaining detailed knowledge on the different food pathways for transmission of *Campylobacter* to humans is an essential input to the NZFSA *Campylobacter* Strategy to reduce the high incidence of campylobacteriosis in this country. This relies on human health surveillance data collected by the Ministry of Health and applied research studies that apportion human cases to particular foods. As such, these studies are an essential element of the monitoring and review component of the NZFSA Risk Management Framework.

This study was undertaken as part of the NZFSA foodborne illness surveillance strategy to further inform the aetiology of human campylobacteriosis, using novel approaches to food source attribution in a particular geographical location. The molecular epidemiology of human campylobacteriosis was studied for a three year period (March 2005 – February 2008) in the Manawatu. Using the advanced molecular genotyping technique of Multi-locus Sequence Typing (MLST), combined with novel statistical modelling tools, the relative contributions of different food and environmental sources to the incidence of human infection with *Campylobacter jejuni* was estimated. Linkage to human surveillance data was used to give new insight into the epidemiology of the disease in New Zealand.

The source attribution modelling identified poultry as the most important source of human infection. The estimated contribution of consumption of poultry using different attribution models was 52% (Dutch model), 67% (modified Hald model) and 75% (Island model). Ruminants contributed 17%, 23% and 17% of human cases respectively when these models were applied and smaller contributions came from wild birds and environmental sources. There was a small decline in the proportion of cases attributable to consumption of poultry meat in year three of the study than previously and an increase in the ruminant proportion.

A single MLST type, (ST-474) accounted for 28%, 34% and 27% of the human cases annually. To find such a dominant strain, and one that is relatively rare internationally, was surprising and unexpected. ST-474 was strongly associated with poultry and was particularly prevalent in the urban areas as were other poultry-associated strains. Other strains were associated with ruminant sources, and were prevalent in the rural areas. There were major age distribution and occupational differences; ruminant-associated cases being more common in young children and adults with occupations that would bring them into contact with ruminant faeces than were found in poultry-associated cases.

Using a sentinel surveillance site, this study has provided essential quantitative evidence on the importance of poultry as a source of human campylobacteriosis in New Zealand, especially in urban areas. It has underlined the importance of ruminants as a source of infection, especially in young children and rural dwellers. These data demonstrate that a hazard reduction programme aimed at significantly decreasing *C. jejuni* contamination of fresh poultry meat has the potential to at least halve the number of cases of human campylobacteriosis in Manawatu, and, given the demonstration of comparable findings in validation studies in Auckland and Christchurch, in New Zealand as a whole.