Scientific Interpretive Summary

Attribution of Potentially Foodborne Enteric Diseases: Human salmonellosis – an epidemiological approach

The successful control of foodborne disease requires knowledge about their most significant sources or reservoirs as well as their principal routes. To identify and prioritise food safety interventions it is important to know not only the fraction of the incidence of human illness due to specific hazards that is attributable to particular foods but also what is attributable to other sources like environmental exposure, direct animal contact and human to human exchange. Attribution of human foodborne disease to source can be attempted using different methods – epidemiological, microbiological, and expert elicitation. Within its Surveillance Strategy, NZFSA is carrying out suites of attribution studies.

As part of its *Salmonella* Risk Management Strategy, NZFSA wishes to quantify the proportion of foodborne salmonellosis cases attributable to specific foods, animal feeds, domestically produced versus imported foods, and multi-resistant and virulent *Salmonella* genotypes associated with foods. This study analysed New Zealand human salmonellosis surveillance data with the aim of attributing the proportion of non-typhoid salmonellosis to these (and other) pathways. Risk factor case-case analysis was performed on ten years (2000-09) of salmonellosis notification data and on a similar duration of reported salmonellosis outbreaks.

The risk factors investigated were overseas travel, food consumption from a food premise, consumption of untreated drinking water, contact with recreational water, contact with farm animals, contact with sick animals, and person-to-person transmission factors (contact with symptomatic people, contact with confirmed cases and contact with human faeces).These analyses suggest that the important pathways for *Salmonella* infection in New Zealand are foodborne (as indicated by premises data), consumption of untreated drinking water and contact with sick animals. These are not necessarily mutually exclusive, since cases living in rural environments could be exposed to all of these risk factors. The outbreaks were examined for strength of evidence for transmission by food, person-to-person, animals, water and environmental factors. Outbreaks with multiple transmission routes were also analysed, particularly food/person-to-person and zoonotic/person-to-person. There was evidence for the importance of foodborne transmission in outbreaks where infection was acquired domestically.

Overall the data analysed did not allow quantitative attribution of proportions of non-typhoid salmonellosis to the pathways of importance to the NZFSA. However, all the analyses did provide evidence to show that food is the most important route of *Salmonella* transmission. There were insufficient foods associated with cases or outbreaks and confirmed by laboratory evidence to attribute human salmonellosis cases to specific foods. Salmonellosis was not strongly associated with person-to-person transmission. There was good evidence that contact with farm animals and sick animals can lead to human salmonellosis. Consumption of untreated drinking water and contact with recreational water appeared to be less important transmission routes, but these findings were

confounded by cases having contact with other risk factors, such as contact with farm animals. Salmonellosis was associated with overseas travel, but for only a small proportion of cases and involved less common serotypes

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