

Notifications of Water-borne Disease in New Zealand

BACKGROUND

Water-borne diseases are transmitted via water, either through drinking-water or through recreational use (ie, ingestion whilst swimming). This section focuses on levels of the following three notifiable gastrointestinal diseases which can be contracted through contaminated water:

- Campylobacteriosis
- Cryptosporidiosis
- Giardiasis.

Campylobacteriosis is caused by the microorganism *Campylobacter* (most commonly the species *Campylobacter jejuni* and *C. coli*). When ingested by humans, the bacterium colonises the gut and damages the tissue in the intestine. The main transmission routes for *Campylobacter* are via food (particularly raw chicken), via water contaminated with excreta or via accidental ingestion of animal excreta. The incubation period for campylobacteriosis is one to ten days from the time of exposure. Symptoms include muscle pain, fever, diarrhoea, abdominal pain and nausea, and generally last one to seven days. Although anyone can become infected, younger children and young adults have higher rates or more severe disease. In a small number of cases, longer-lasting health effects include arthritis and Guillain-Barre syndrome, or even death (Heymann 2004).

Cryptosporidiosis is caused by the organism *Cryptosporidium parvum*, a protozoan parasite that also affects the intestines. The main transmission routes for *Cryptosporidium parvum* include contaminated water, person-to-person transmission, contact with animals, and ingestion of contaminated food (especially raw milk, and raw fruit and vegetables). The incubation period for cryptosporidiosis is three to eleven days after exposure, and symptoms include diarrhoea, vomiting and cramping, which generally last two to four days. The disease is usually self-limiting, but more severe effects can occur in immune-compromised individuals, which can lead to death in a small number of cases. Cryptosporidiosis can affect anyone, but young children and immune-compromised individuals are at increased risk.

Giardiasis is caused by the organism *Giardia intestinalis*, a protozoan parasite that causes gastrointestinal illness in humans. The main transmission routes for *Giardia intestinalis* are water that has been contaminated with faecal matter, food (particularly agricultural products) and person-to-person transmission. The incubation period for giardiasis is one to three weeks after exposure. The main symptoms are diarrhoea and cramps, which may last four to six weeks. Anyone can become infected; however, younger children are more susceptible, and the disease may be more severe among immune-compromised individuals. Giardiasis may cause lactose intolerance among some people and, for those who are immunocompromised, it may cause death.



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The three diseases are notifiable in New Zealand. All cases diagnosed by doctors and/or laboratories are required to be notified to the medical officer of health in the region, who notifies the case to the national data collection (EpiSurv) administered by ESR, or directly to EpiSurv for further investigation.

Notifiable diseases that have a possible contamination route through water but are not covered in this section are:

- salmonellosis
- typhoid/paratyphoid fever
- hepatitis A
- yersiniosis
- Shigellosis
- gastroenteritis.

As part of the notification process of campylobacteriosis, cryptosporidiosis and giardiasis, information is collected on certain risk factors. For enteric disease, these risk factors include whether the individual had, during the incubation period:

- consumed untreated surface water, groundwater or rain water
- participated in water activities in a stream, river and/or beach
- recently travelled overseas.

Data collected on other risk factors but not included in this analysis include whether the individual had:

- consumed water other than regular supply
- consumed food from a food premises
- had contact with other symptomatic people
- had contact with children in nappies, with sewage or with other types of faecal matter or vomit
- had contact with farm animals
- had contact with sick animals
- a history of overseas travel that might account for this infection
- gone swimming in a public swimming pool, spa pool or other pool.

It should be noted that the risk factors are not confirmed as the cause of the disease; several risk factors may be recorded, and for a number of risk factors the majority of responses may be 'unknown'. For this analysis, cases that had been overseas at some point during the incubation period were excluded from the analysis, as they were unlikely to have contracted the disease within New Zealand.



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The analysis by TAs is based on the residential area of the case with no account taken if exposure occurred in another area. The average annual number of cases for 2007–2009 is the numerator, and 2008 population estimates is the denominator population. Crude rates have been used to represent the actual burden of disease.

A limitation of the analysis is that the data only includes reported cases of disease, but studies have shown that there is a notable rate of under-reporting (Ball 2006). Not all people who have an enteric disease will visit a medical practitioner, and not all cases will present a specimen for laboratory testing or will have their case notified.

References

- Ball A. (2006). Estimation of the burden of water-borne disease in New Zealand: Preliminary report. Christchurch: Environmental Science and Research Ltd.
- Heymann DL (ed). (2004). Control of Communicable Diseases Manual (19th edition). Washington, DC: American Public Health Association.

