

Notifications of potentially water-borne diseases (campylobacteriosis, giardiasis and cryptosporidiosis), 2001–2016

HIGHLIGHTS

- In 2016, there were 7173 campylobacteriosis notifications, 1379 giardiasis notifications and 962 cryptosporidiosis notifications.
- Notification numbers (and rates) have increased for all three diseases since 2015. In August 2016, a campylobacteriosis outbreak in Havelock North accounted for a substantial increase in notifications.
- In 2016, notification rates were higher for children aged 0–4 years, people of European/Other ethnicity, people living in less deprived areas, and people living in rural areas.
- In 2016, there were much higher notification rates for campylobacteriosis in Hawke's Bay DHB, and for giardiasis in Tairāwhiti DHB. Cryptosporidiosis notification rates were highest in Northland, Wairarapa and Taranaki DHBs.



How water-borne diseases relate to environmental health

Water-borne diseases are, by definition, transmitted by ingesting contaminated water, either as drinking water or through recreational use (eg while swimming). Campylobacteriosis, giardiasis and cryptosporidiosis are gastrointestinal diseases caused by infection with the *Campylobacter* bacteria, *Giardia* parasite and *Cryptosporidium* parasite respectively. These diseases are transmitted through contact with the faeces of infected animals and humans, either through contaminated water, contaminated food, and/or contact with infected animals and humans. Younger children and people who are immune-compromised are more likely to be infected, and to have more severe disease.

Campylobacteriosis is the most common of these diseases. For campylobacteriosis, poultry is considered the main transmission source in New Zealand, with poultry-associated strains of *Campylobacter* more likely to be found in urban than rural areas (Mullner et al, 2010). However, food-related interventions led to more than a 50% decrease in cases in 2008 (Sears et al, 2011; ESR, 2017). Other transmission routes, such as untreated water that is contaminated with *Campylobacter* from animal faeces, are generally a relatively minor source of campylobacteriosis (Gilpin et al, 2013), but may become more significant over time as food-borne campylobacteriosis cases decrease. In August 2016, there was a large campylobacteriosis outbreak due to contamination of the drinking water supply for Havelock North. This outbreak involved 964 notified cases, although it is estimated 5,500 of the town's 14,000 residents became ill with campylobacteriosis (ESR, 2017).

Data for this indicator

This indicator presents campylobacteriosis, cryptosporidiosis and giardiasis notifications from EpiSurv data from ESR, for 2001–2016. Results are presented by year, sex, age group, ethnic group, socioeconomic deprivation (NZDep2013 quintiles), urban/rural classification, and District Health Board (DHB). Rates are presented per 100,000 people. Notifications have excluded cases where the person was overseas during the incubation period. It should be noted that notifications only cover those people who visited a GP or hospital for treatment, and are therefore likely to underestimate the true rate of disease in the population. Risk factor data on cases who reported contact with either untreated drinking water or recreational water are available in separate factsheets.

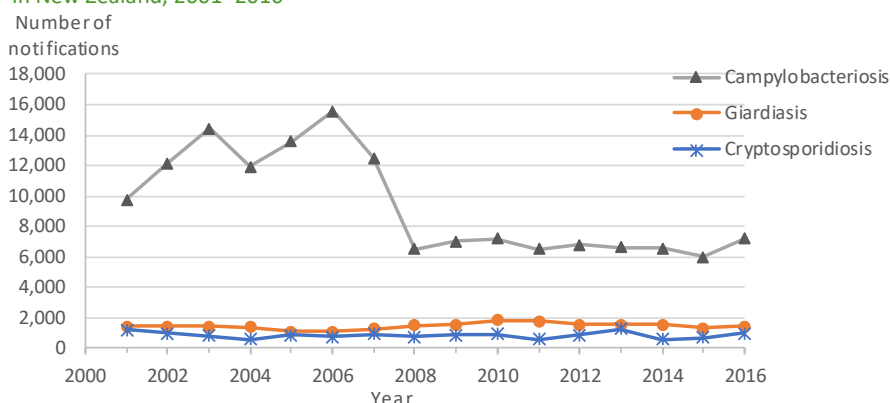
Increases in notifications of campylobacteriosis, giardiasis and cryptosporidiosis from 2015 to 2016

In 2016, there were 9514 notifications for potentially water-borne diseases in New Zealand. This comprised:

- 7173 campylobacteriosis notifications
- 1379 giardiasis notifications
- 962 cryptosporidiosis notifications.

There were increases from 2015 to 2016 for campylobacteriosis (5978 to 7173 notifications), giardiasis (1320 to 1379 notifications) and cryptosporidiosis (646 to 962 notifications) (Figure 1). The overall number of potentially water-borne disease notifications increased from 7944 in 2015 to 9514 in 2016.

Figure 1: Number of notifications for campylobacteriosis, giardiasis and cryptosporidiosis in New Zealand, 2001–2016



Source: EpiSurv data, ESR

Notifications of potentially water-borne diseases

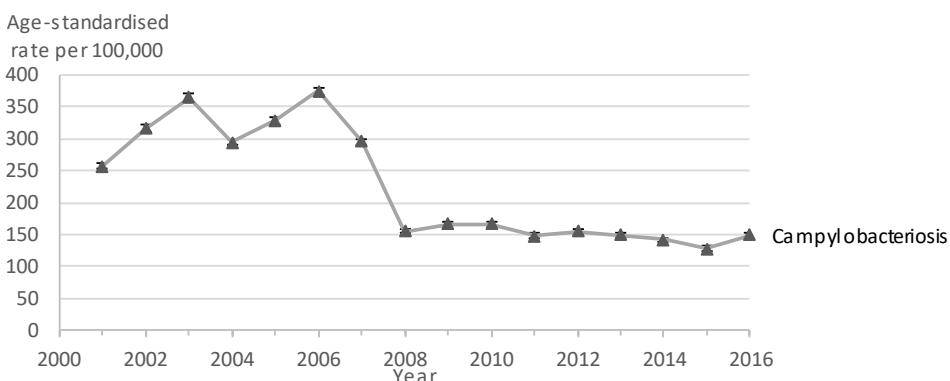
Small increase in campylobacteriosis notification rate from 2015 to 2016

The campylobacteriosis notification rate increased from 128 per 100,000 in 2015, to 148 per 100,000 in 2016, standardising for age (Figure 2). This increase is likely to be explained by the campylobacteriosis outbreak in Havelock North in late 2016. The large decrease in the campylobacteriosis rate since 2006 has been attributed to the introduction of food safety regulation of poultry production in New Zealand (Duncan, 2014).

For giardiasis, the age-standardised notification rate decreased from 45 per 100,000 in 2010 to 32 per 100,000 in 2016 (Figure 3).

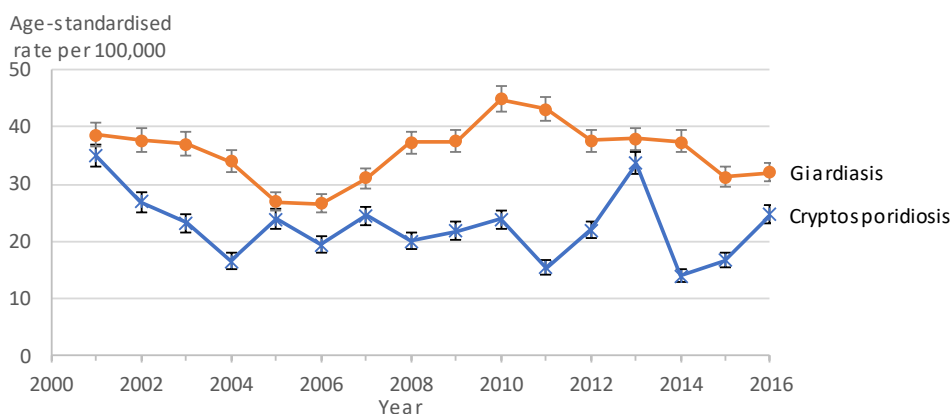
For cryptosporidiosis, the notification rate has fluctuated since 2001, with a high rate in 2013 (34 per 100,000) (Figure 3). The age-standardised rate increased from 14 per 100,000 in 2014 to 25 per 100,000 in 2016.

Figure 2: Campylobacteriosis notification rate, 2001–2016 (age-standardised rate per 100,000 population)



Source: EpiSurv data, ESR

Figure 3: Giardiasis and cryptosporidiosis notification rates, 2001–2016 (age-standardised rate per 100,000 population)

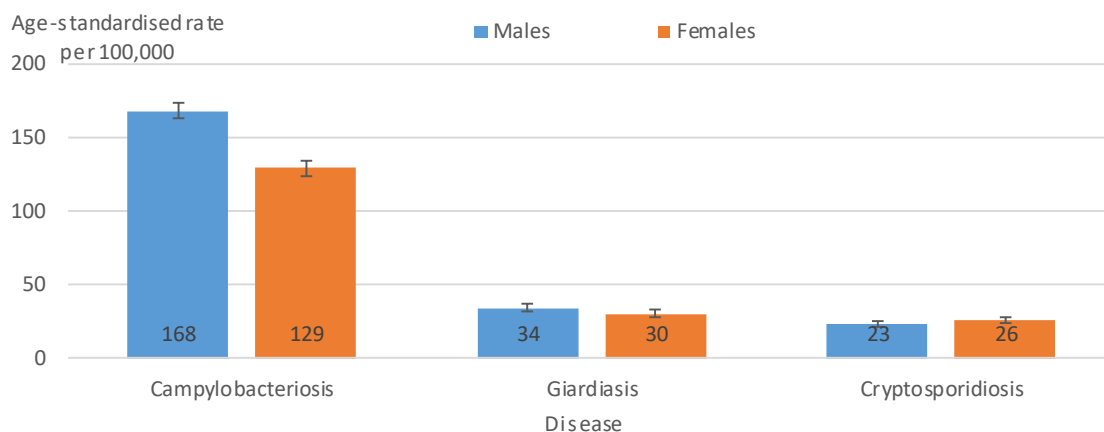


Source: EpiSurv data, ESR

Higher campylobacteriosis notification rates for males

In 2016, notification rates for campylobacteriosis were higher for males than females, standardising for age (Figure 4). There was little difference in the notification rates for males and females for giardiasis and cryptosporidiosis.

Figure 4: Notification rates for campylobacteriosis, giardiasis and cryptosporidiosis, by sex, 2016 (age-standardised rate per 100,000 population)



Source: EpiSurv data, ESR

Notifications of potentially water-borne diseases

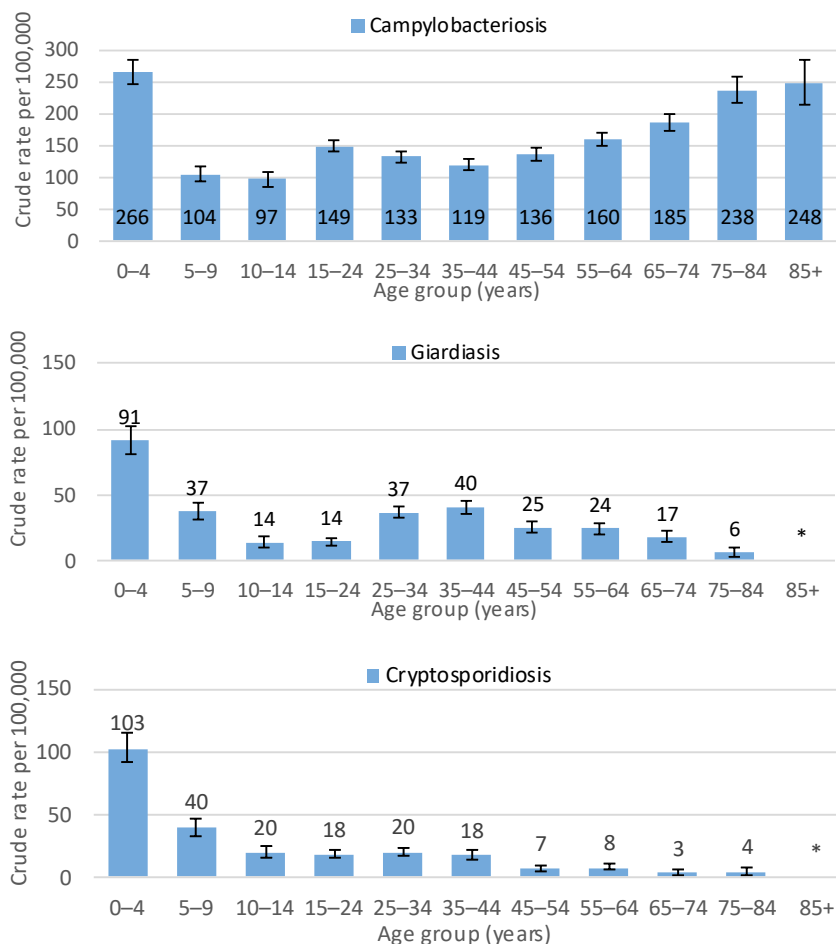
Highest notification rates for young children and older adults

In 2016, children aged 0–4 years had the highest notification rates for campylobacteriosis, giardiasis and cryptosporidiosis (Figure 5).

For campylobacteriosis, older adults aged 75+ years also had high notification rates.

However, for giardiasis and cryptosporidiosis, older adults had the lowest notification rates.

Figure 5: Notification rates for campylobacteriosis, giardiasis and cryptosporidiosis, by age group, 2016 (crude rate per 100,000)

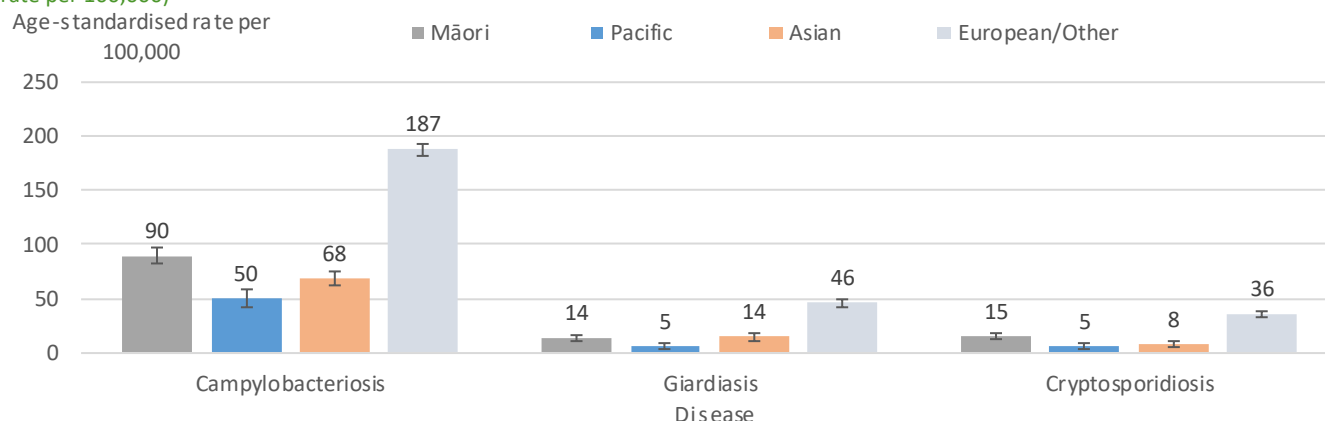


Note: An asterisk (*) shows that the rate was suppressed due to counts less than five.
Source: EpiSurv data, ESR

Highest notification rates among European/Others

People of European/Other ethnicity had the highest notification rate for all three potentially water-borne diseases in 2016 (Figure 6).

Figure 6: Notification rate of campylobacteriosis, giardiasis and cryptosporidiosis, by ethnic group (prioritised), 2016 (age-standardised rate per 100,000)



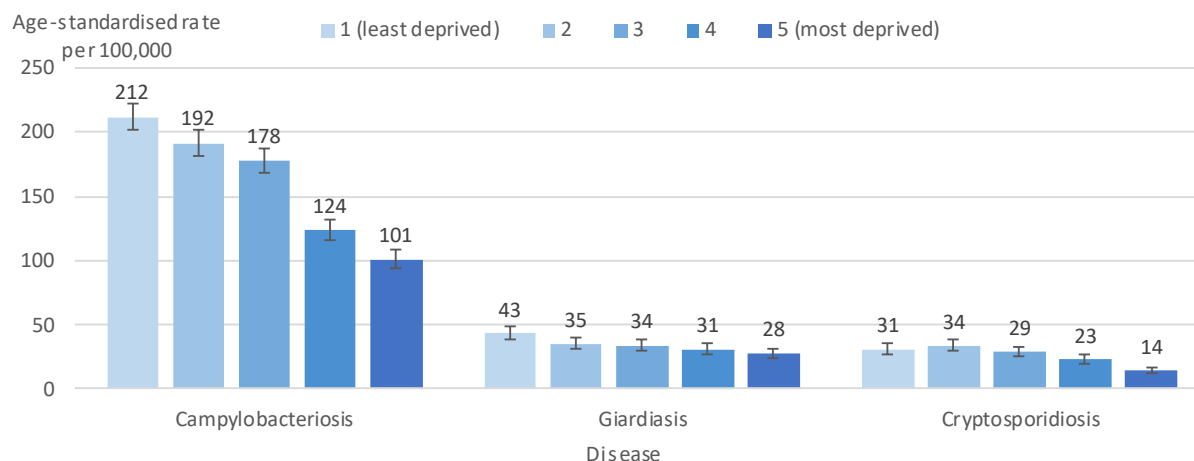
Source: EpiSurv data, ESR

Notifications of potentially water-borne diseases

Highest notification rates in the least deprived areas

In 2016, people living in less deprived areas had higher notification rates for campylobacteriosis, giardiasis and cryptosporidiosis than people living in the more deprived areas (Figure 7). It is unclear whether this reflects the true pattern of disease, or merely differences in accessing health care when sick.

Figure 7: Notification rates for campylobacteriosis, giardiasis and cryptosporidiosis, by NZDep2013 quintiles, 2016 (age-standardised rate per 100,000)

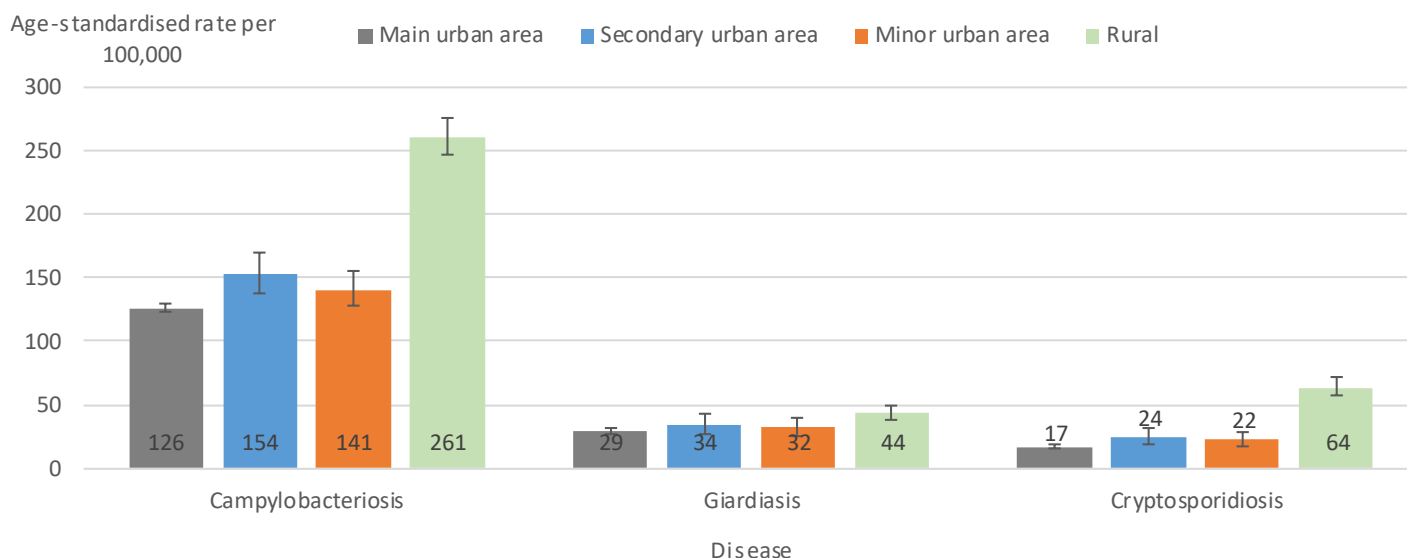


Source: EpiSurv data, ESR

People living in rural areas have the highest notification rates of potentially water-borne diseases

For all three diseases, people living in rural areas had the highest notification rates (Figure 8). In particular, the campylobacteriosis notification rate was twice as high in rural areas than in main urban areas, standardising for age (standardised rate ratio (SRR) = 2.1, 1.9–2.2). The giardiasis notification rate was 1.5 times as high in rural areas than in main urban areas, standardising for age (SRR=1.5, 1.3–1.7), while the cryptosporidiosis notification rate was 3.7 times as high in rural areas than in main urban areas, standardising for age (SRR = 3.7, 3.2–4.3).

Figure 8: Notification rates for campylobacteriosis, giardiasis and cryptosporidiosis, by urban/rural classification, 2016 (age-standardised rate per 100,000)



Note: Urban/rural classification is for 2013. Main urban areas refer to major towns and cities with a population of 30,000 or more. Secondary urban areas are smaller towns with a population of 10,000–29,999 people. Minor urban areas are towns with a population of 1,000–9,999 people. Rural areas include rural centres, and rural areas outside of these.

Source: EpiSurv data, ESR

Notifications of potentially water-borne diseases

High campylobacteriosis notification rate in Hawke's Bay DHB in 2016

Hawke's Bay District Health Board (DHB) had the highest campylobacteriosis notification rate in 2016 (Figure 9), due to a major outbreak of campylobacteriosis in Havelock North in August 2016 from contaminated drinking-water. South Canterbury and Taranaki DHBs also had relatively high campylobacteriosis notification rates in 2016. For giardiasis, Tairāwhiti DHB had the highest rate, although this rate was likely to be affected by ascertainment bias (personal correspondence with the Public Health Unit) (Figure 10). For cryptosporidiosis, the highest rates were in Northland, Wairarapa and Taranaki DHBs (Figure 11).

Figure 9: Campylobacteriosis notification rate, by District Health Board, 2016 (crude rate per 100,000 population)

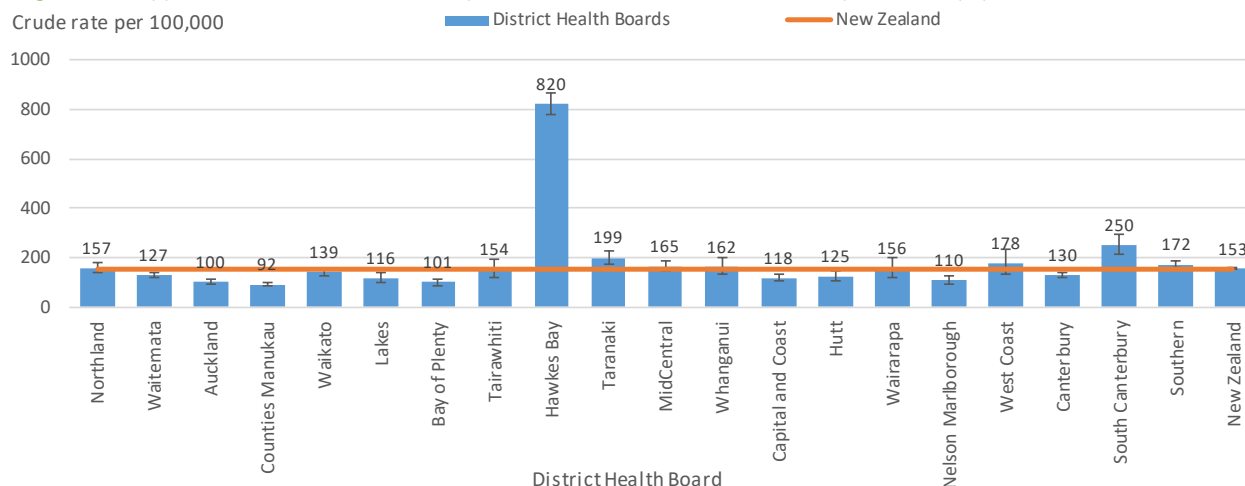


Figure 10: Giardiasis notification rate, by District Health Board, 2016 (crude rate per 100,000 population)

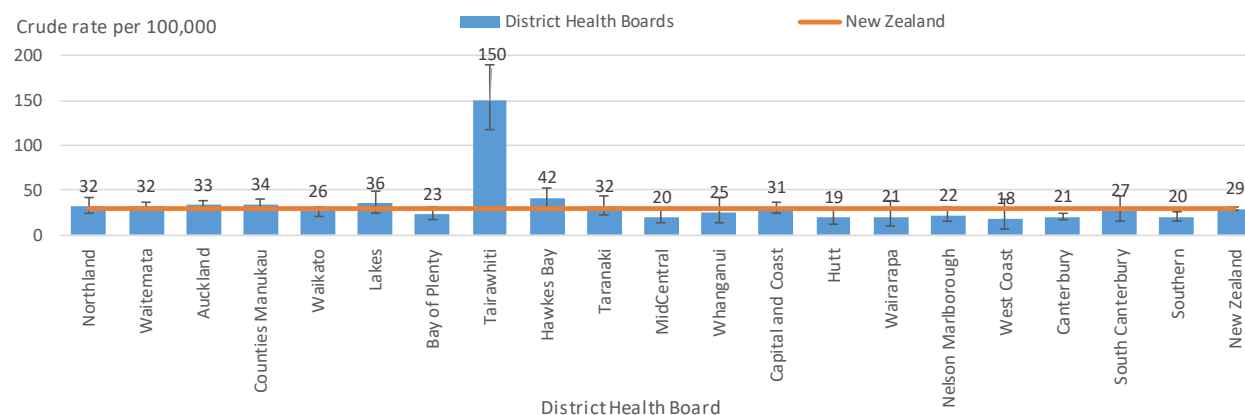
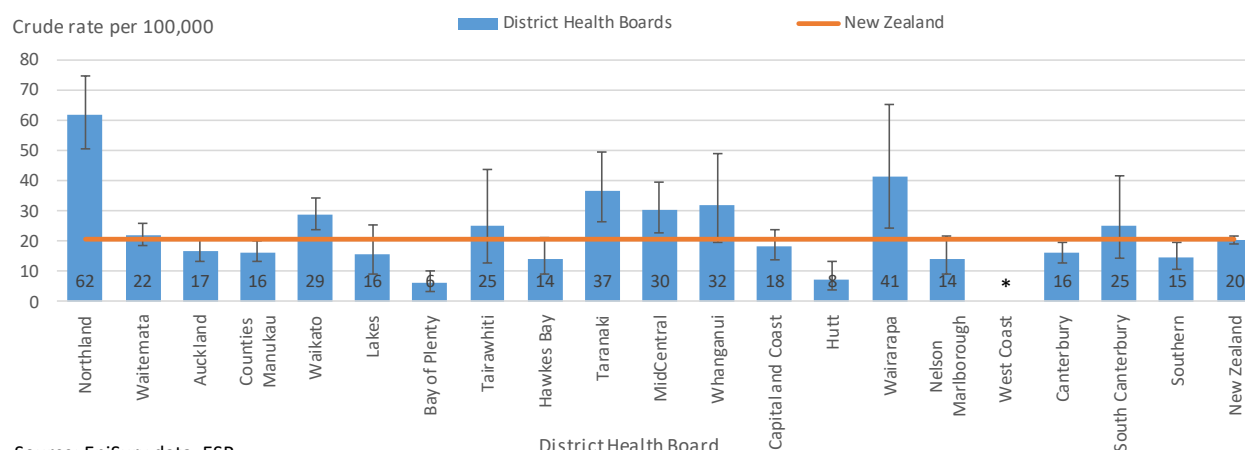


Figure 11: Cryptosporidiosis notification rate, by District Health Board, 2016 (crude rate per 100,000 population)



Source: EpiSurv data, ESR

Notes: An asterisk (*) shows the rate has been suppressed due to counts less than five. The giardiasis rate for Tairāwhiti DHB was affected by ascertainment bias.

Notifications of potentially water-borne diseases

DATA SOURCES

Data for this indicator come from the EpiSurv notifications surveillance database, from ESR. The following diseases were used: campylobacteriosis, giardiasis and cryptosporidiosis. People who were overseas during the incubation period were excluded from analysis.

Age-standardised rates have been presented where possible, to take into account the population age structures of different population groups. 95% confidence intervals have been presented as error bars on graphs. However, it should be noted that notifications only cover those people who visited a GP or hospital for treatment, and are therefore likely to underestimate the true rate of disease in the population.

See the metadata for more information about this indicator.

RELATED INDICATORS

Related environmental health indicators for recreational water and drinking-water quality respectively, available from the EHINZ website (www.ehinz.ac.nz), include:

- Notifications of campylobacteriosis, giardiasis and cryptosporidiosis with untreated drinking water as a risk factor
- Notifications of campylobacteriosis, giardiasis and cryptosporidiosis with recreational water as a risk factor
- Number and density of livestock in New Zealand
- Number and density of dairy cattle in New Zealand
- Suitability for swimming at coastal beaches
- Suitability for swimming at freshwater beaches
- Estimated number of people with access to safe drinking water supplies

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Duncan, G. (2014). Determining the health benefits of poultry industry compliance measures: the case of campylobacteriosis regulation in New Zealand. *New Zealand Medical Journal* 127(1391): 22–37.

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Sears A, Baker MG, Wilson N, Marshall J, et al. (2011). Marked campylobacteriosis decline after interventions aimed at poultry, New Zealand. *Emerg Infect Dis* <http://dx.doi.org/10.3201/eid1706.101272> (Accessed 18 April 2018)

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