

Leptospirosis notifications

This factsheet presents notifications of leptospirosis disease, which is caused by a bacterial infection originating in animals.

The results exclude cases known to have been overseas during the incubation period; about 4.3% of total cases. However, around 24% of notifications in the EpiSurv notifiable disease surveillance database, managed by the Institute of Environmental Science Research (ESR), have missing data about overseas travel from 2001 to 2019. Therefore, the leptospirosis disease statistics in this factsheet possibly overestimate the level of infection caught in New Zealand. However, the possible inclusion of a small number of overseas cases each year in the results is unlikely to influence the observed patterns of disease over time and between groups of people.

Key facts



There were 82 leptospirosis notifications in New Zealand in 2019, a rate of 1.7 per 100,000 people.



A recent increase in leptospirosis rates from 2014 to 2017 was of public health concern but the rates have decreased since then.



Most (69.7%) leptospirosis notifications in 2019 were from people with at-risk occupations, such as farmers and meat workers.



Rural area residents had a leptospirosis rate almost 14 times as high as residents in main urban areas.



Males had a leptospirosis rate about 7 times as high as females.

Leptospirosis and environmental health

Leptospirosis is a serious bacterial infection that causes flu-like symptoms (eg, fever, headache, muscle aches) that can last for months. In some people, it can cause kidney and liver damage, meningitis, and even death. Infection can go unrecognised if symptoms are mild, flu-like or absent.

Leptospirosis can be transmitted to humans from animals, including possums, rats, mice and livestock infected with the bacteria. Human infection occurs through contact of damaged skin or mucous membranes (of the eyes, nose or mouth) with infected urine: directly (eg, farm- or meat-workers), or indirectly, through contact with urine-contaminated water (eg, during water-sports or from flood water) or food (eg, handling animal feed exposed to rat urine). In New Zealand, control of leptospirosis has occurred through control of livestock infection by vaccination, rodent control, and work practices that minimise contact with animal urine (WorkSafe New Zealand 2019).

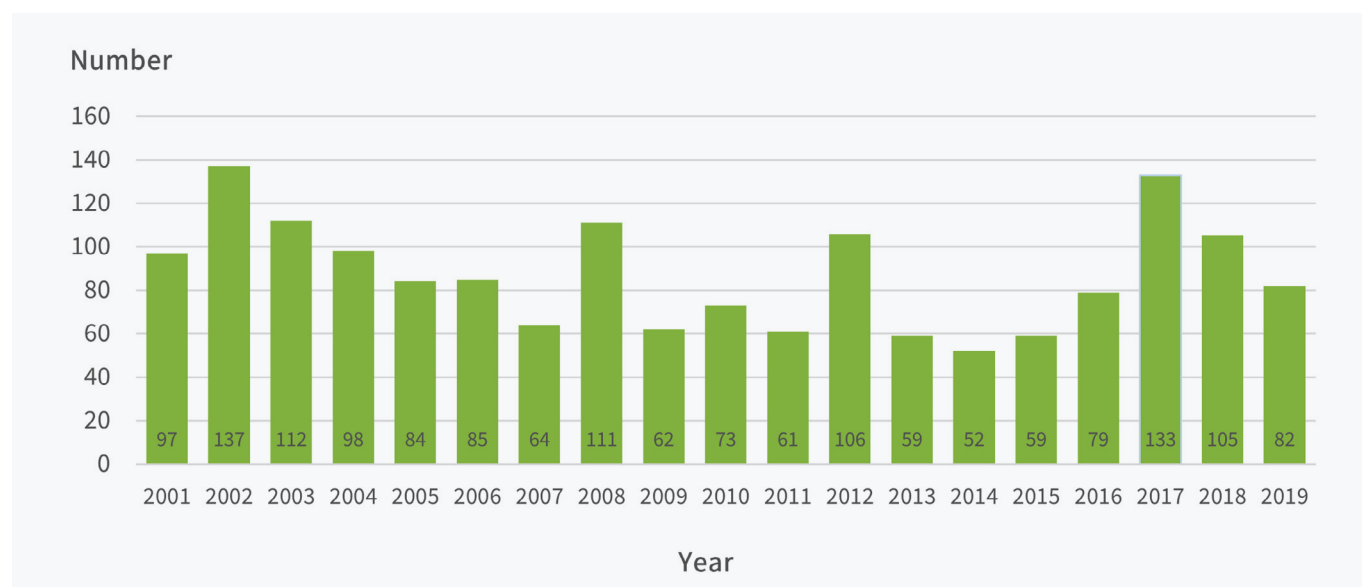
The extent to which infection is transmitted depends on many factors, including climate. *Leptospira* can survive for weeks to months in moist soil or water and spread rapidly after heavy rain or flooding. Outbreaks have been reported overseas following extended periods of hot, dry weather and following flooding (Levett 2001). Flooding is expected to become more common in New Zealand due to climate change. With flooding as a more common transmission route, leptospirosis may start to occur in different groups of people such as women, the young and old, and those living in more urban areas.

Decrease in notifications in last two years

In 2019, there were 82 notifications of leptospirosis disease in the New Zealand population (excluding cases known to be overseas during the incubation period for infection) (Figure 1). The crude rate in the population was 1.7 notifications per 100,000 people.

The increase in the number of leptospirosis notifications for three consecutive years from 2015 to 2017 has not continued, with the number falling in the last two years (Figure 1). There was public health concern that higher than usual leptospirosis notifications in 2017 were linked to wet weather and flooding (Cook 2017).

Figure 1: Number of leptospirosis notifications, 2001–19

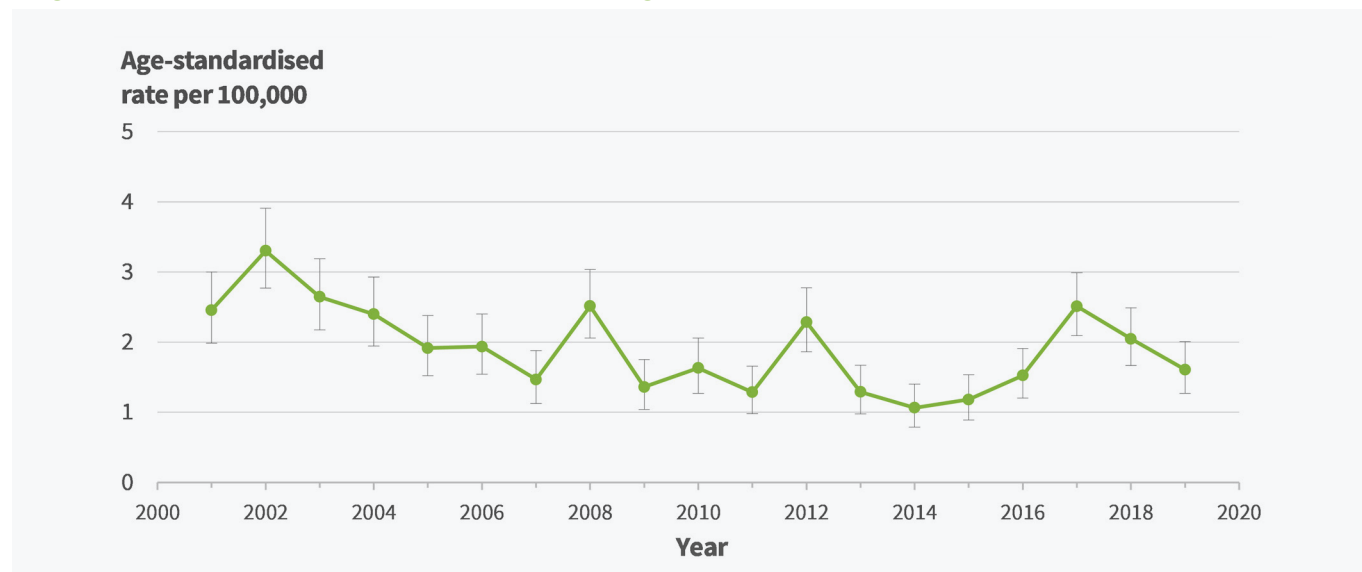


Source: EpiSurv, ESR.

Age-standardised rates of leptospirosis have fluctuated in recent years

Since 2001, the age-standardised rate of leptospirosis notifications has fluctuated (Figure 2). In recent years, there was a consistent yearly increase in the rate from 2014 to 2017, with the high rate in 2017 possibly being due to flooding (Cook 2017). However, this increase in the rate of leptospirosis notifications has now declined.

Figure 2: Leptospirosis notifications, 2001–19 (age-standardised rate per 100,000)



Note: 95% confidence intervals have been presented as error bars.

Source: EpiSurv, ESR.

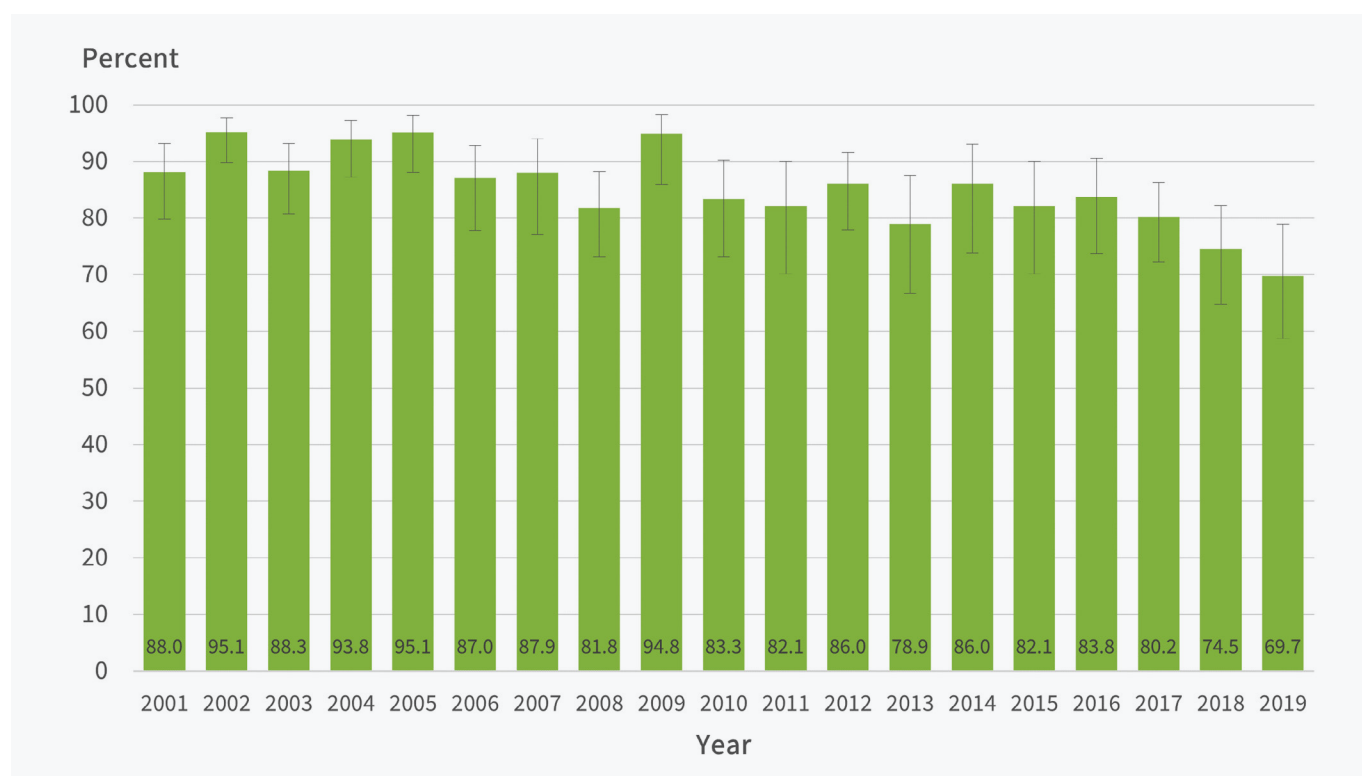
Some jobs increase the risk of leptospirosis

People working directly with animals and/or involved in their slaughter (particularly cattle, sheep, deer, pigs, and possums) are at increased risk of becoming infected with leptospirosis. These at-risk occupations include farmers, stockyard workers, abattoir workers, butchers, veterinarians, people working in the bush or with animal pelts, plumbers, waste-water workers, fencers, truck drivers, and people working in horticulture, forestry or mills (WorkSafe New Zealand 2019). Farmers and farmworkers are now also at a higher risk of infection from increases in flooding.

Of the 82 leptospirosis notifications in 2019, 92% recorded an occupation, with 53 (69.7%) of these notifications from people working in at-risk occupations (Figure 3). The remaining leptospirosis notifications were in people with occupations less likely to bring them into contact with animals or animal urine-contaminated water.

The percentage of notifications with at-risk occupations appears to be decreasing over time, however the majority of notifications still occur in people with high-risk occupations (Figure 3).

Figure 3: Percentage of leptospirosis notifications with at-risk occupations, 2001–19 (crude percent)



Notes: At-risk occupations are defined as farmers, stockyard workers, abattoir workers, butchers, veterinarians, people working in the bush or with animal pelts, plumbers, waste-water workers, fencers, truck drivers, and people working in horticulture, forestry or mills, based on WorkSafe guidelines (WorkSafe New Zealand 2019). Excludes notifications with an unknown occupation. Low-risk occupations include retirees, office workers, and tradespeople. 95% confidence intervals have been presented as error bars.

Source: EpiSurv, ESR.

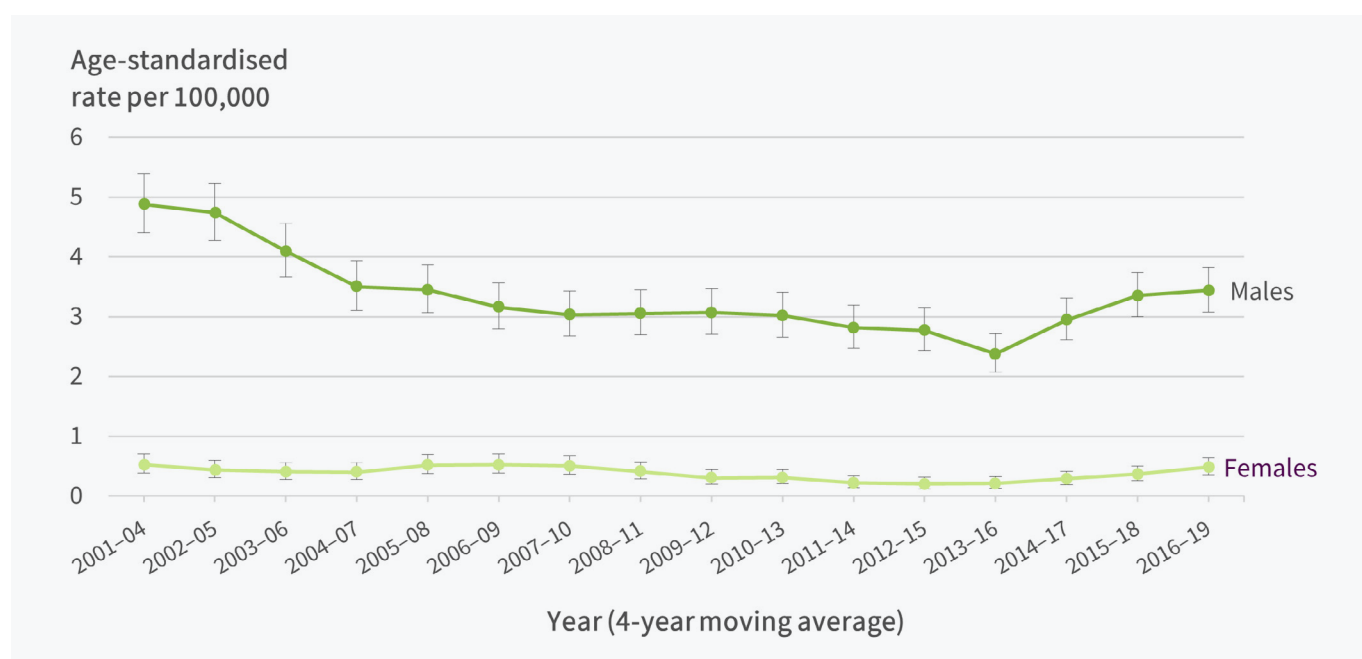
Males have much higher rates than females

In 2019, the majority of leptospirosis notifications were in males (68 notifications), compared with females (14 notifications).

Males consistently have much higher rates of leptospirosis than females (Figure 4). In the four-year period 2016–19, the leptospirosis notification rate was approximately seven times as high for males (3.4 per 100,000) as for females (0.5 per 100,000), standardising for age.

Following a decline in male leptospirosis notification rates from 2001–04 to 2013–16, there has been a recent increase in 4-year rates, reflecting the higher number of notifications in 2017 and 2018. Conversely, leptospirosis rates for females have been relatively stable over this same time period.

Figure 4: Leptospirosis notifications, by sex, 2001–19 (age-standardised rate per 100,000) (4-year moving average)



Note: 95% confidence intervals have been presented as error bars.

Source: EpiSurv, ESR.

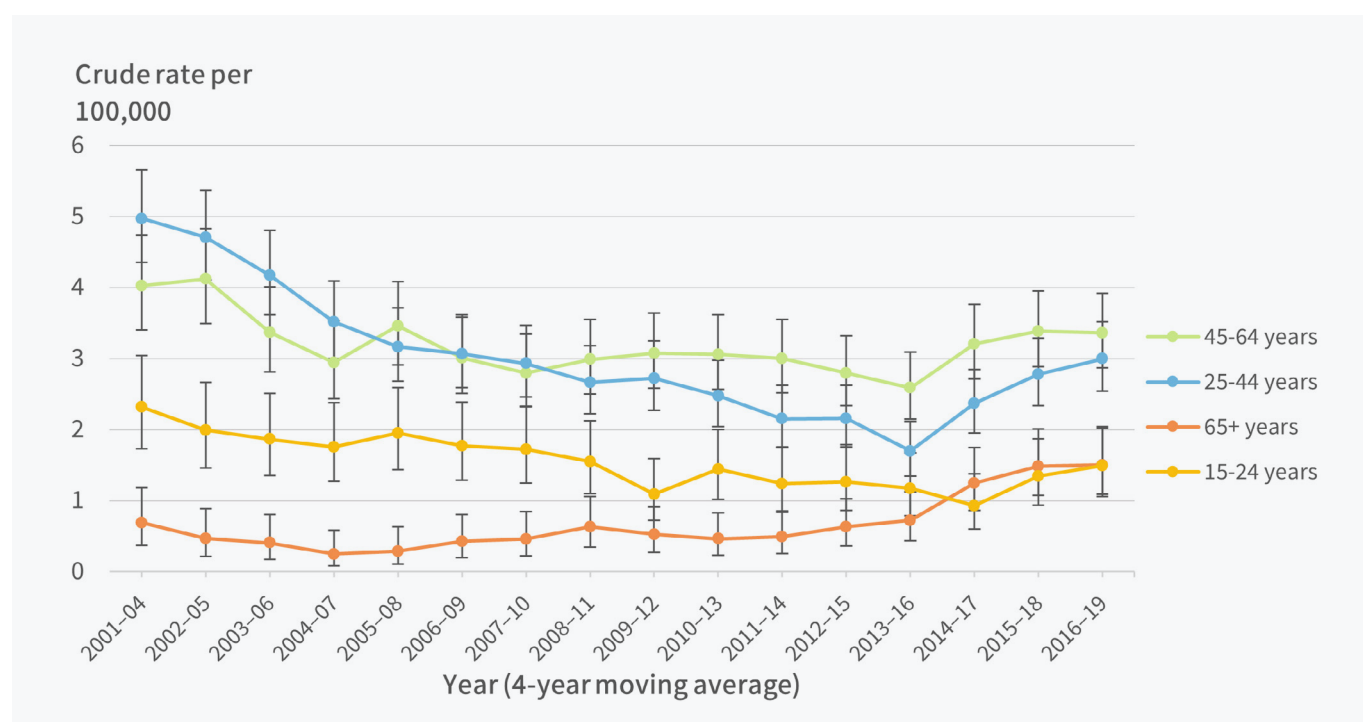
Working-aged people have the highest leptospirosis rates

Most leptospirosis notifications were in people aged 25–44 years (34 notifications) and 45–64 years (26 notifications) in 2019. There were 10 notifications in people aged 65+ years, 10 notifications in people aged 15–24 years, and 2 notifications in children aged 0–14 years.

There were consistently higher rates in people aged 25–44 years and 45–64 years from 2001–04 to 2016–19, than in people aged 15–24 years and 65+ years (Figure 5). This age group pattern is consistent with the high percentage of notifications in people working in at-risk occupations.

The difference in rates between people aged 15–24 years and people aged 65+ years has decreased over time from 2001–04 to 2016–19 to being the same rate (1.5 per 100,000) in 2016–19.

Figure 5: Leptospirosis notifications, by age group, 2001–19 (crude rate per 100,000) (4– year moving average)



Note: Rates for children aged 0–14 years have been suppressed due to the number of notifications < 5.

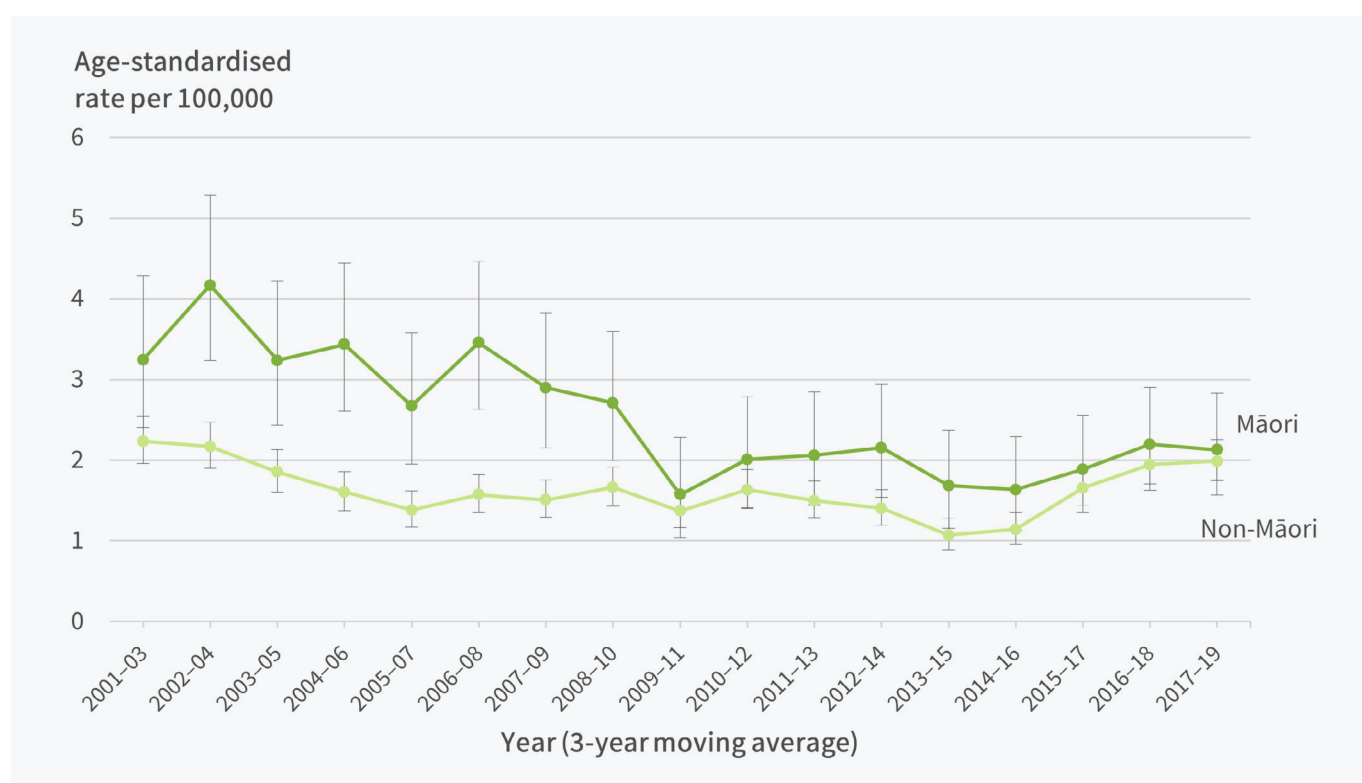
Source: EpiSurv, ESR.

Māori and non-Māori have similar leptospirosis rates

In 2019, the majority of leptospirosis notifications were in people from the European/Other ethnic group (68 notifications) or Māori (11 notifications). There was only one notification each in Pacific peoples and the Asian ethnic group.

The difference between Māori and non-Māori rates has decreased over time. In the three-year period 2017–19, Māori had a similar rate of leptospirosis notifications as non-Māori, standardising for age (standardised rate ratio 1.07, 95% CI 0.78–1.46). The rate for Māori has fallen over time from 3.2 per 100,000 in 2001–03 to 2.1 per 100,000 in 2017–19 (Figure 6).

Figure 6: Leptospirosis notifications, by ethnic group (Māori/non-Māori), 2001–19 (age-standardised rate per 100,000) (3-year moving average)



Note: 95% confidence intervals have been presented as error bars.

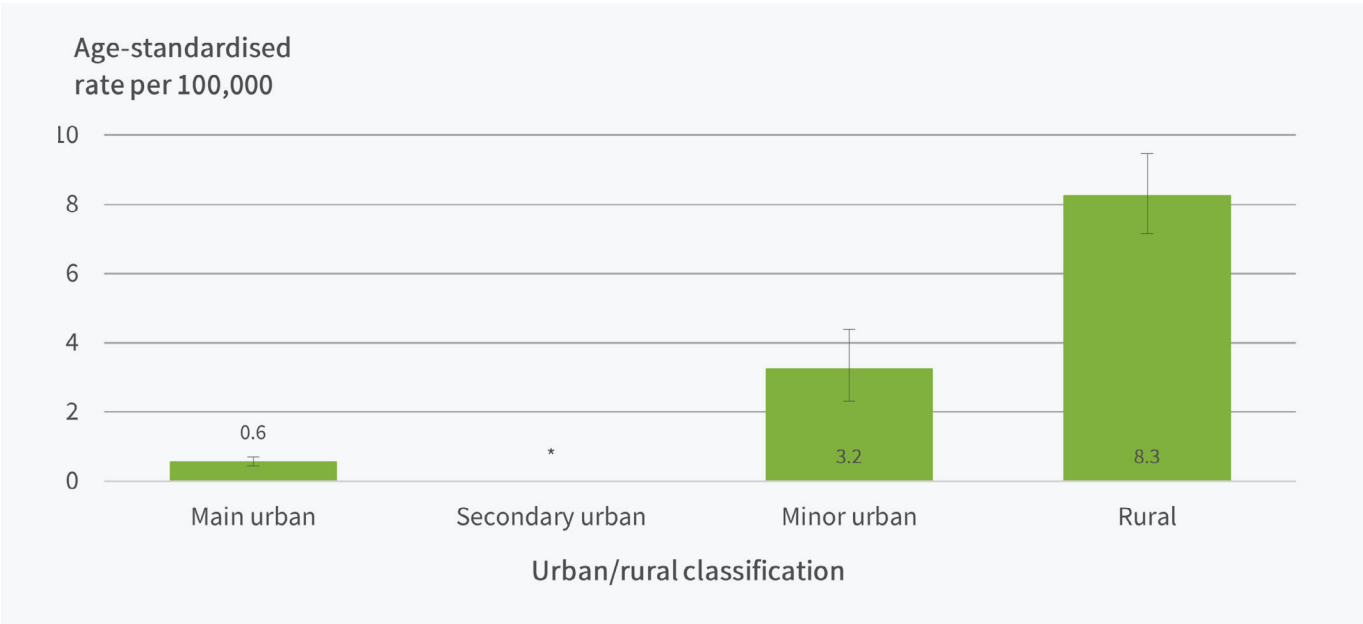
Source: EpiSurv, ESR.

People living in rural areas have the highest leptospirosis notification rates

In 2019, most leptospirosis notifications were in people living in rural areas (53 notifications). A further 17 notifications were for people living in main urban areas, 5 notifications for people living in minor urban areas and 4 for people in secondary urban areas.

In the three-year period 2017–19, people living in rural areas had the highest leptospirosis notification rates, standardising for age (Figure 7). The leptospirosis notification rate in rural areas was almost 14 times as high as in main urban areas (standardised rate ratio = 13.67, 95% CI 10.33–18.09).

Figure 7: Leptospirosis notifications, by urban/rural classification, 2017–19 (age-standardised rate per 100,000)



Notes: An asterisk (*) shows that the rate was suppressed due to the number of notifications < 20. 95% confidence intervals have been presented as error bars. Urban/rural classification is the 2013 classification. ‘Main urban’ refers to major towns and cities with a population of 30,000 or more. ‘Secondary urban’ is for smaller towns with a population of 10,000–29,999 people. ‘Minor urban’ is for towns with a population of 1,000–9,999 people. ‘Rural’ includes rural centres and rural areas outside of these.
Source: EpiSurv, ES.

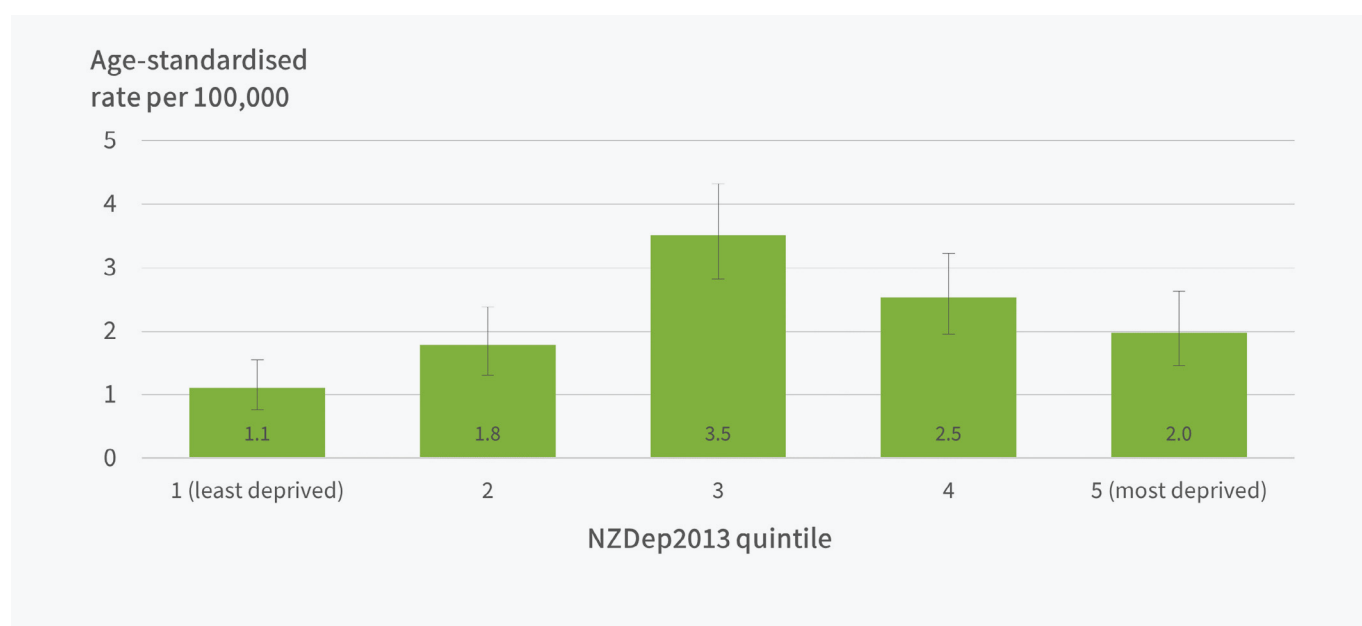
People living in rural areas are likely to be more exposed to leptospirosis infection in several ways, such as contact with animals, soil, and bush, and working in at-risk occupations.

No linear trend by neighbourhood deprivation

In 2019, the highest number of leptospirosis notifications was in people living in NZDep2013 neighbourhood deprivation quintile 3 (22 notifications). There were a similar number of notifications for people living in quintiles 4 and 5 (16 and 20 notifications respectively). The lowest number of notifications were in quintiles 1 and 2 (9 and 10 notifications respectively).

In the three-year period 2017–19, people living in NZDep2013 quintile 3 had a higher leptospirosis notification rate than people living in quintiles 1 and 5, standardising for age (Figure 8). The rate in quintile 3 was three times as high as the rate in quintile 1 (standardised rate ratio 3.17, 95% CI 2.13–4.71).

Figure 8: Leptospirosis notifications, by neighbourhood deprivation (NZDep2013 quintile), 2017–19 (age-standardised rate per 100,000)



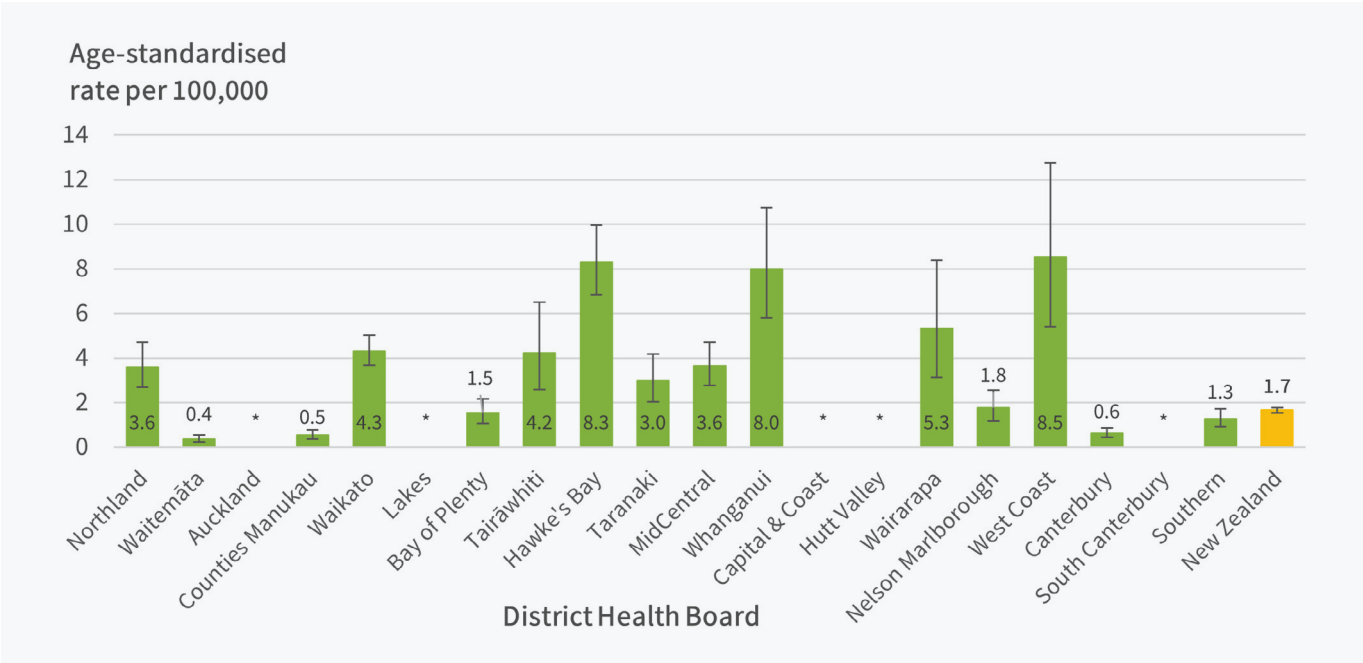
Note: 95% confidence intervals have been presented as error bars.

Source: EpiSurv, ESR.

High leptospirosis rates in West Coast, Hawke’s Bay and Whanganui DHBs

In the ten-year period 2010–19, the highest leptospirosis age-standardised rates were in West Coast, Whanganui and Hawke’s Bay district health boards (DHBs) (Figure 9).

Figure 9: Leptospirosis notifications, by district health board, 2010–19 (age-standardised rate per 100,000)



Note: An asterisk (*) shows that the rate was suppressed due to the number of notifications < 20.
Source: EpiSurv, ESR.

Data for this indicator

Data come from the EpiSurv notifiable disease surveillance database, from the Institute of Environmental Science Research (ESR). This indicator is an analysis of the most recent data available from EpiSurv provided to EHINZ by ESR in February 2020.

The analyses in this factsheet excluded the small number of people who reported being overseas during the infection incubation period from 2001 to 2019 (75 out of 1735) but included notifications where the overseas travel status during the incubation period was unknown. There were 423 notifications with an unknown overseas travel status (24% of all leptospirosis notifications for this time period). Therefore, the leptospirosis disease statistics in this factsheet potentially include people who acquired leptospirosis overseas and possibly overestimate the level of infection caught in New Zealand. However, the possible inclusion of a small number of overseas cases each year is unlikely to have influenced the observed patterns of disease over time and between groups of people.

There has been an increased use in nucleic acid testing by laboratories for leptospirosis infection since 2016. The use of this testing method may be improving the detection of leptospirosis.

All 95% confidence intervals have been presented as error bars on graphs. Age-standardised rates presented in this factsheet take into account varying age distributions when comparing between populations.

For additional information, see the metadata link below.

References

Cook A. 2017, 24 October. Leptospirosis creeping into urban areas. *Radio New Zealand* URL: <https://www.rnz.co.nz/news/country/342245/leptospirosis-creeping-into-urban-areas#:~:text=A%20potentially%20deadly%20farming%2Drelated,picked%20up%20through%20cow%20urine> (accessed 23 July 2021).

Levett PN. 2001. Leptospirosis. *Clinical Microbiology Reviews* 14(2):296-326.

WorkSafe New Zealand. 2019. *Prevention and Control of Leptospirosis*. Wellington: WorkSafe New Zealand. URL: <https://worksafe.govt.nz/topic-and-industry/working-with-animals/prevention-and-control-of-leptospirosis/gpg/> (accessed 3 February 2020).

Other related topics include:

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[Agricultural activity](#)

[Flooding and social vulnerability](#)

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Further information

For descriptive information about the data