

Leptospirosis notifications

This surveillance report presents information on notifications of leptospirosis, a bacterial infection originating in animals. Leptospirosis can be passed from animals to humans through direct contact with infected urine, contact with urine-contaminated water or food, or through contaminated floodwaters.

Key facts

- There were 164 notifications of leptospirosis recorded in 2023, the most cases recorded in over 20 years, resulting in a rate of 2.8 notifications per 100,000 people.
- Three in four (73.9%) notifications in 2023 were for people working in high-risk occupations involving contact with animals, such as farmers or meat workers.
- In 2023, Hawke's Bay and Waikato health districts had the highest number of leptospirosis notifications (38 and 30 notifications respectively). These may reflect increased exposure to contaminated waters and soils due to Cyclone Gabrielle.
- Residents of rural areas had a notification rate 40 times higher than people living in major urban areas in the four years from 2020–23.
- The leptospirosis notification rate is highest among people aged 45–64 years and has also increased among older adults (aged 65+ years) over time.

Leptospirosis may occur due to occupational exposure and/or flooding

Leptospirosis is a serious bacterial infection that causes flu-like symptoms (eg, fever, headache, muscle aches) that can last for months and, for a proportion of patients, results in a long-term chronic fatigue. 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.

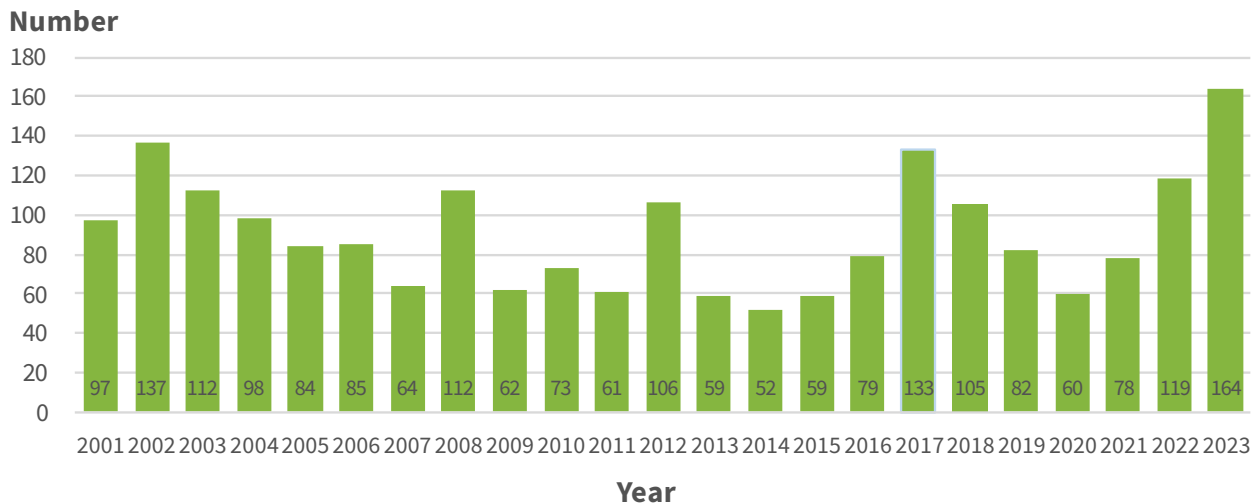
Leptospirosis can be transmitted to humans from animals, including possums, rats, mice and livestock infected with the bacteria. Human infection occurs through contact of damaged skin or mucous membranes (of the eyes, nose or mouth) with infected urine: directly (eg, farm or meat workers), or indirectly, 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, leptospirosis management strategies include the vaccination of livestock, rodent control, and work practices that minimise contact with animal urine (WorkSafe New Zealand 2019).

The climate is one of several factors that may also influence the transmission of the infection. *Leptospira* can survive in moist soil or water for weeks to months and spread rapidly after heavy rain or flooding. Outbreaks have been reported overseas following extended periods of hot, dry weather followed by flooding (Levett 2001). Due to climate change, flooding is expected to become more common in New Zealand. With flooding as a more common transmission route, leptospirosis may start to occur in previously unaffected groups of people such as women, the young and old, and those living in more urban areas.

Elevated notifications in 2023 may be linked to extreme weather

In 2023, there were 164 notified cases of leptospirosis in New Zealand (excluding cases known to be overseas during the incubation period for infection) (Figure 1). This was a major increase from the number of cases reported in 2021 (77 cases) and 2022 (119 cases). The crude rate in 2023 was 2.8 cases per 100,000 people, more than twice the rate at the start of the 2020s.

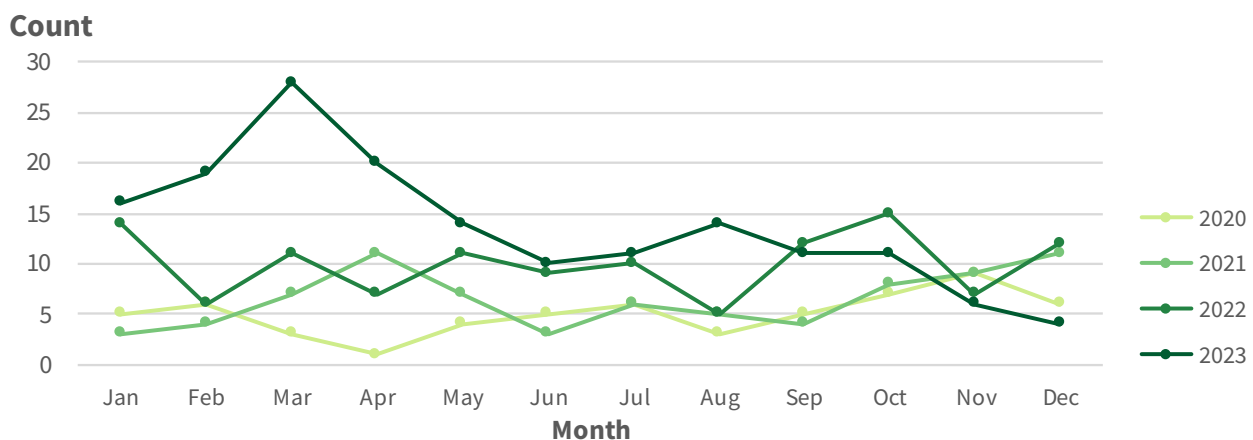
Figure 1: Number of leptospirosis notifications, 2001–23



Source: ESR 2024

Further analysis shows that a large proportion (67 of 164, 40%) of the leptospirosis cases in 2023 were notified from February to April (Figure 2). Almost all cases notified that year were in the North Island (150 out of 164, 91.5%), particularly Hawke’s Bay (where one in every four cases originated). The 2023 results are, therefore likely to reflect an increase in notifications following Cyclone Gabrielle in mid-February 2023, as has been previously suggested (ESR 2023).

Figure 2: Number of leptospirosis notifications, by month, 2020–23



Source: ESR 2024

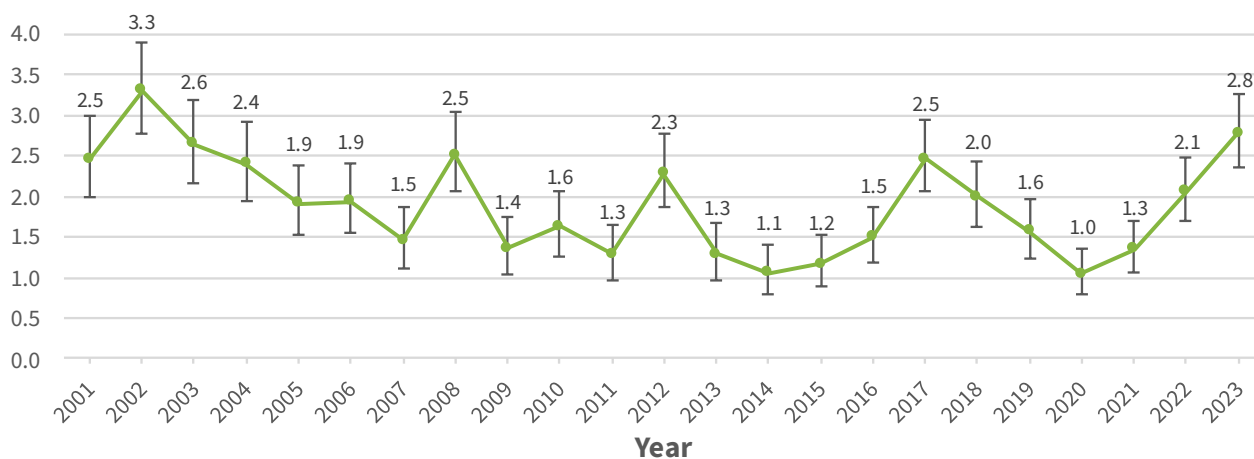
Notification rates follow the pattern of the number of cases

Since 2001, the age-standardised rate of leptospirosis notifications has fluctuated (Figure 3), rising to 2.8

cases per 100,000 people in 2023. It is not unusual for notification rates to rise and fall from year to year, particularly in response to long periods of wet weather. For example, the higher notification rate in 2017 was possibly due to flooding (Cook 2017), while the higher rate in 2023 was likely driven by cases in the Hawke’s Bay following Cyclone Gabrielle (ESR 2023).

Figure 3: Leptospirosis notifications, 2001–23 (age-standardised rate per 100,000)

Age-standardised rate per 100,000 people



Note: 95% confidence intervals have been presented as error bars.
Source: ESR 2024

Some jobs increase a person’s risk of contracting leptospirosis

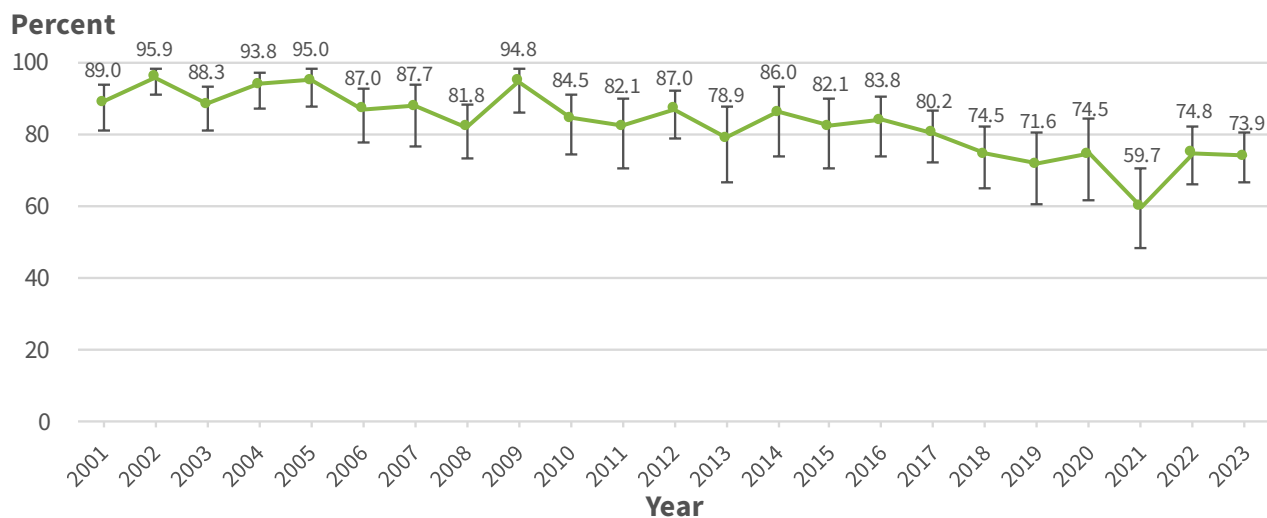
People working directly with animals and/or involved in their slaughter are at increased risk of becoming infected with leptospirosis. These at-risk occupations include farmers, stockyard workers, abattoir workers, butchers, veterinarians, people working in the bush or with animal pelts, plumbers, waste-water workers, fencers, truck drivers, and people working in horticulture, forestry, or mills (WorkSafe New Zealand 2019).

Farmers and farm workers are now also potentially at higher risk of infection due to climate-driven increases in flooding.

Of the 164 leptospirosis notifications in 2023, 153 recorded an occupation and 113 of those (73.9%) were among people working in at-risk occupations (Figure 4). The remaining leptospirosis cases were 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 have decreased over time; however, there has not been a corresponding fall in the number or rate of notifications overall (see above.) This suggests that leptospirosis cases are becoming more common among the population outside of the ‘at-risk’ category.

Figure 4: Percentage of leptospirosis cases working in at-risk occupations, 2001–23



Note: 95% confidence intervals have been presented as error bars.
Source: ESR 2024

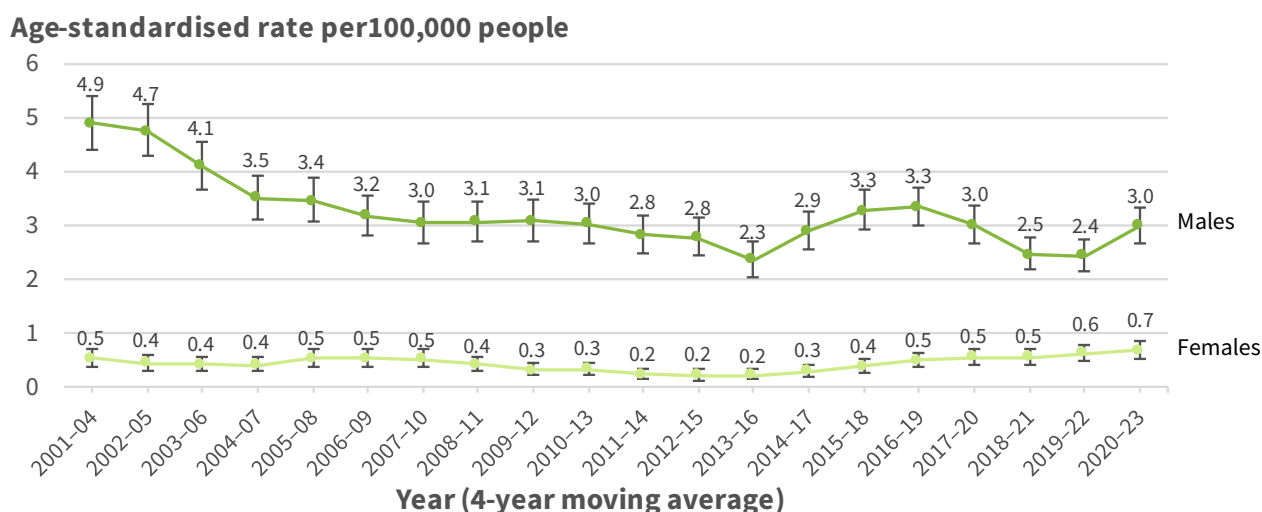
Men have much higher notification rates than women

In 2023, males had far more leptospirosis cases (138 notifications) than females (28 notifications). Males consistently have much higher rates of leptospirosis than females (Figure 5).

In the four-year period 2020–23, the leptospirosis notification rate was approximately four times as high for males (3.0 per 100,000) as for females (0.7 per 100,000), after standardising for age.

This likely reflects the increased risk among certain high-risk occupations, which tend to be strongly oriented towards male workers.

Figure 5: Leptospirosis notifications, by sex, 2001–23 (age-standardised rate per 100,000, 4-year moving average)



Note: 95% confidence intervals have been presented as error bars.
Source: ESR 2024

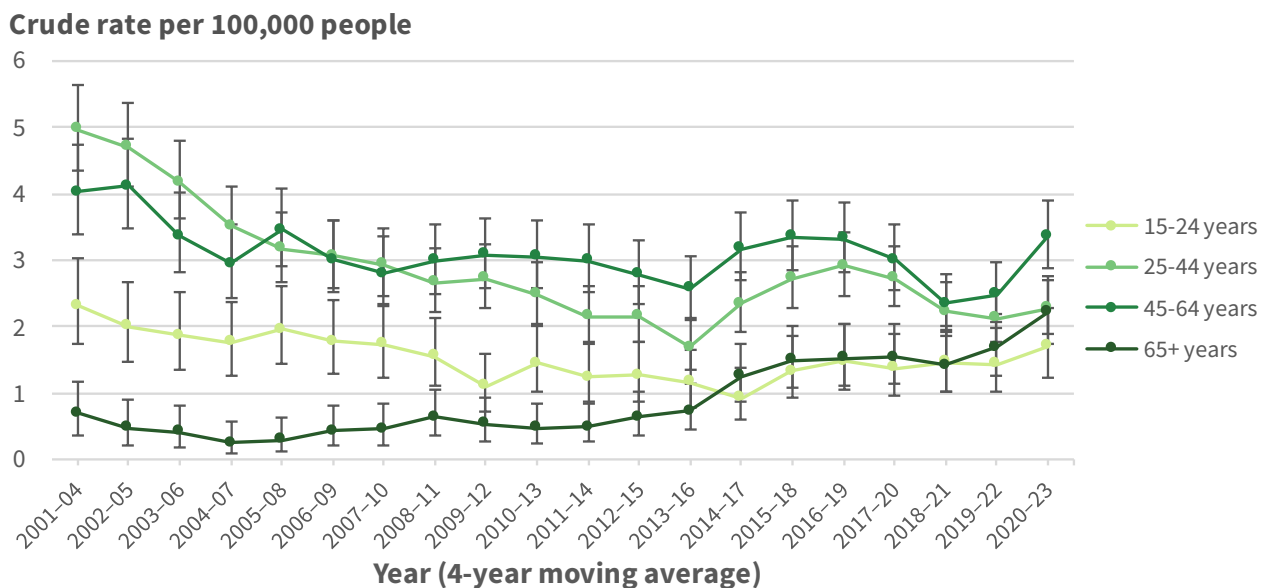
Leptospirosis is becoming more common in older people

In 2023, most leptospirosis cases were among people aged 45–64 years, with 71 notifications (43.3% of the 164 total notifications) in this age bracket. A further 45 notifications (27.4%) were among people aged 25–44 years. There were also 29 notifications in people aged 65+ years, 17 in people aged 15–24 years, and just two in children aged 0–14 years.

Notification rates have been consistently higher among people aged 25 to 64 years (Figure 6), which is consistent with the high percentage of notifications among people working in at-risk occupations. However, while rates in most age groups have declined since 2001–04, the 65+ years age group has instead shown a steady increase.

Given that most leptospirosis cases occur in an occupational setting, this could reflect people in high-risk jobs pushing back retirement past the age of 65, or retirees moving to so-called ‘lifestyle blocks’ in the countryside.

Figure 6: Leptospirosis notifications, by age group, 2001–23 (crude rate per 100,000, 4-year moving average)



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

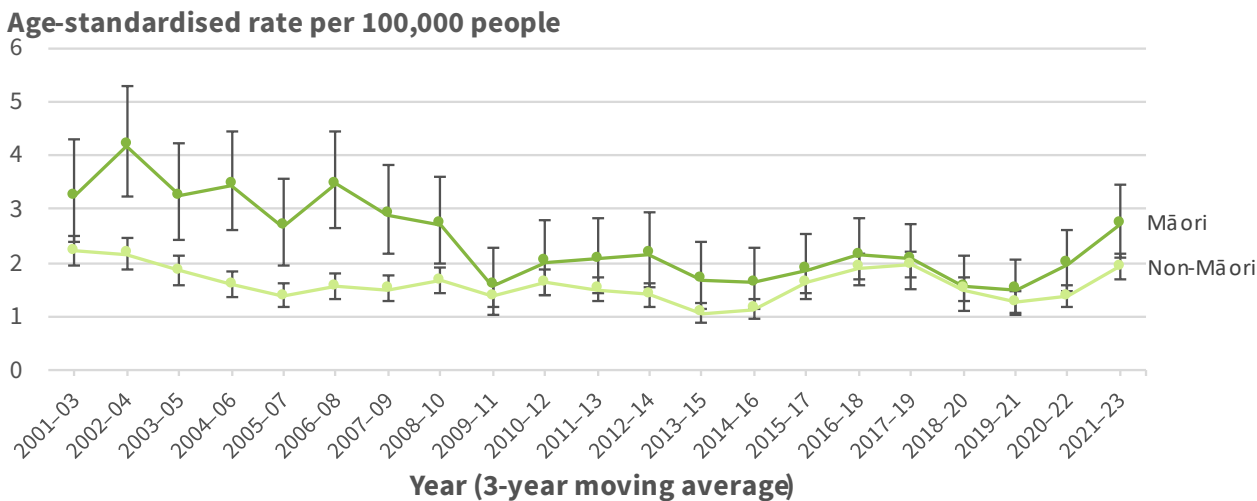
Source: ESR 2024

There is now some difference between leptospirosis rates for Māori and non-Māori

In 2023, most leptospirosis notifications were people from the European/Other ethnic group with 125 cases (76.2% of all notifications) or Māori with 28 cases (17.1% of all notifications). There were only three notifications in both the Asian and Pacific ethnic groups.

Though the difference between Māori and non-Māori rates decreased over time (Figure 7), the two groups show some separation potentially returning between them in the early 2020s. In the three-year period 2021–23, Māori had a 40% higher rate of leptospirosis notifications than non-Māori, standardising for age (standardised rate ratio = 1.4, 95% CI 1.08–1.84).

Figure 7: Leptospirosis notifications, by ethnic group (Māori/non-Māori), 2001–23 (age-standardised rate per 100,000, 3-year moving average)



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

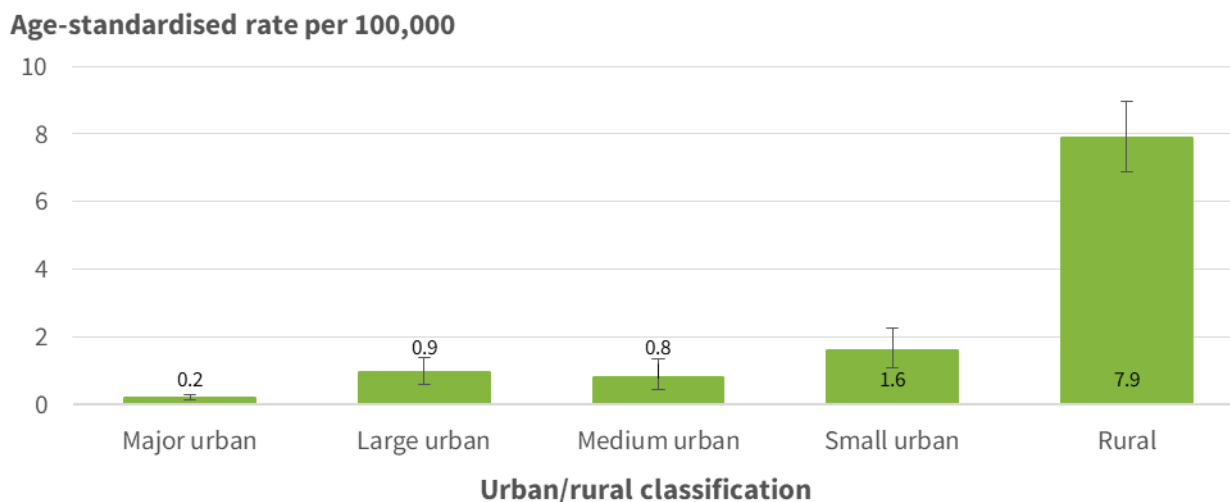
Source: ESR 2024

People living in rural areas have the highest leptospirosis rates

In 2023, most leptospirosis cases were among people living in rural areas (121 out of 164 notifications, 73.8%).

In the four-year period between 2020–23, people living in rural areas had the highest leptospirosis notification rates after standardising for age (7.9 per 100,000 people) (Figure 8). The leptospirosis notification rate in rural areas was 40 times as high as in major urban areas (standardised rate ratio = 39.6, 95%CI 25.8–60.8).

Figure 8: Leptospirosis notifications, by urban-rural indicator, 2020–23 (age-standardised rate per 100,000)



Note: 95% confidence intervals have been presented as error bars. The urban-rural indicator used here is the 2018 classification by Statistics New Zealand. 'Major urban' refers to major towns and cities with a population of 100,000+ residents. 'Large urban' refers to larger towns and cities with a population between 30,000–99,999. 'Medium urban' is for towns with a population of 10,000–29,999 people. 'Small urban' is for towns with a population of 1,000–9,999 people. 'Rural' includes rural centres (less than 1,000 residents) and rural areas outside of these.

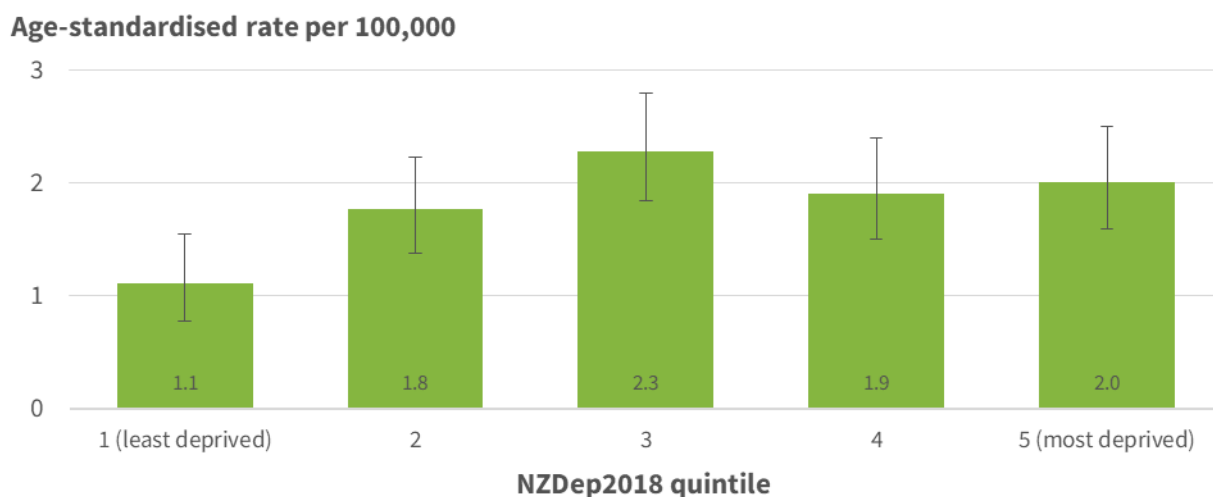
Source: ESR 2024

Leptospirosis occurs more frequently outside the least deprived areas

In 2023, the highest number of leptospirosis cases were people living in the New Zealand Index of Deprivation 2018 (NZDep2018) quintile 3 (44 notifications). Quintiles 2 and 5 both had a similar number of notifications (30 and 38 notifications, respectively). The lowest number of notifications occurred in quintile 1 (least deprived areas) (17 notifications).

In the four-year period 2020–23, there were similar notification rates for leptospirosis across NZDep2018 quintiles 2–5 (Figure 9). Only the rate in the least deprived areas (quintile 1) was somewhat lower (1.1 per 100,000).

Figure 9: Leptospirosis notifications by neighbourhood deprivation, 2020–23 (age-standardised rate per 100,000)



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

Source: ESR 2024

Hawke's Bay had the highest number of leptospirosis notifications in 2023

In 2023, Hawke's Bay district (formerly district health board) had the highest number of notifications of leptospirosis (38 notifications), followed closely by Waikato (30 notifications).

Some districts (such as Hawke's Bay, Waikato, Tairāwhiti and MidCentral) had a higher number of leptospirosis notifications in 2023 than in the previous few years.

In particular, Hawke's Bay had more cases in 2023 than it did in the three prior years combined. Flooding linked to the extreme weather of early 2023 is highly likely to be a contributing factor (ESR 2023).

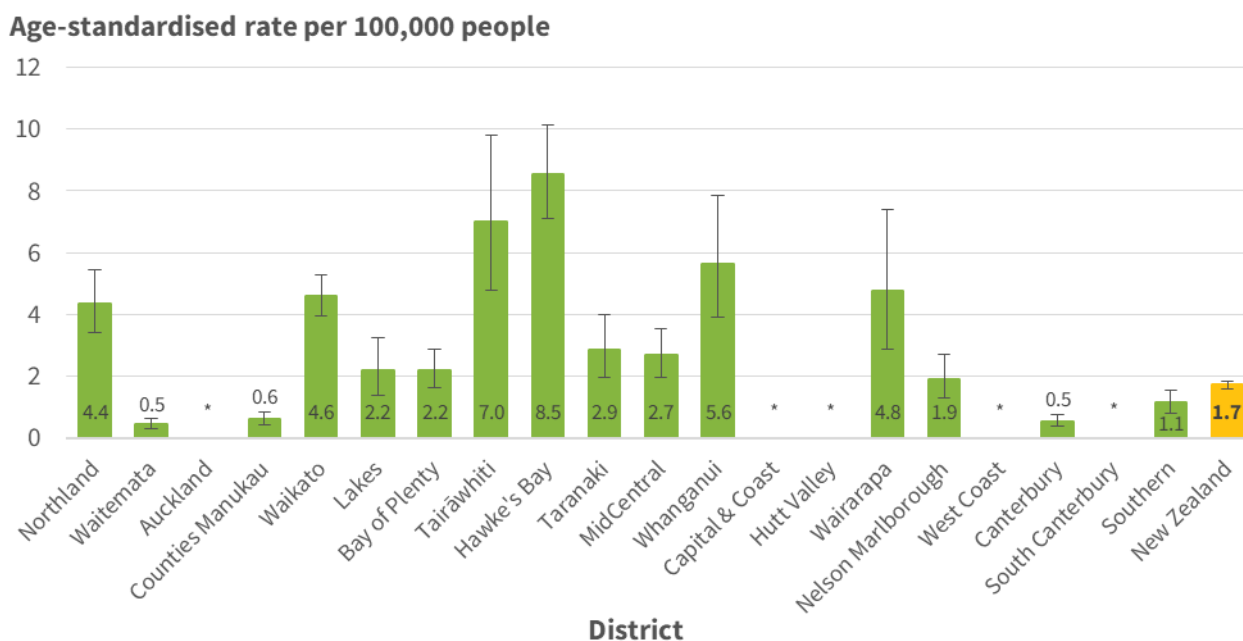
Table 1: Annual leptospirosis notifications by health district, 2020–23

| District | 2020 | 2021 | 2022 | 2023 |
|--------------------|-----------|-----------|------------|------------|
| Northland | 5 | 11 | 12 | 15 |
| Waitemata | 2 | 1 | 3 | 6 |
| Auckland | 0 | 1 | 0 | 3 |
| Counties Manukau | 3 | 5 | 5 | 5 |
| Waikato | 19 | 16 | 22 | 30 |
| Lakes | 3 | 5 | 1 | 5 |
| Bay of Plenty | 4 | 9 | 14 | 9 |
| Tairāwhiti | 2 | 1 | 9 | 11 |
| Hawke's Bay | 7 | 5 | 15 | 38 |
| Taranaki | 2 | 4 | 1 | 7 |
| MidCentral | 3 | 1 | 8 | 10 |
| Whanganui | 1 | 4 | 4 | 5 |
| Capital & Coast | 0 | 1 | 0 | 0 |
| Hutt Valley | 0 | 0 | 0 | 0 |
| Wairarapa | 1 | 2 | 2 | 6 |
| Nelson Marlborough | 0 | 1 | 9 | 4 |
| West Coast | 1 | 0 | 2 | 2 |
| Canterbury | 2 | 4 | 7 | 3 |
| South Canterbury | 0 | 2 | 2 | 1 |
| Southern | 5 | 4 | 3 | 3 |
| New Zealand | 60 | 78 | 119 | 164 |

Source: ESR 2024

In the ten-year period 2014–23, the highest leptospirosis age-standardised rates were in Tairāwhiti, Hawke’s Bay, and Whanganui districts (Figure 10).

Figure 10: Leptospirosis notifications, by health district, 2014–23 (age-standardised rate per 100,000)



Note: 95% confidence intervals have been presented as error bars. An asterisk (*) indicates the rate for that district has been suppressed due to low numbers (<20 over ten years).

Source: ESR 2024

Data for this indicator

This factsheet presents EpiSurv notifications from the Institute for Environmental Science and Research (ESR). Notifications exclude cases where the person was overseas during the incubation period. Notifications only cover those who visited a GP or hospital for treatment and are therefore likely to underestimate the true rate of disease in the population.

There has been an increased use of nucleic acid testing by laboratories for leptospirosis infection since 2016. The use of this method may be improving the detection of leptospirosis, though to date there is no evidence to suggest that rates or figures presented have been artificially inflated by a change in surveillance methodology.

All 95% confidence intervals have been presented as error bars on graphs. Notification rates and confidence intervals also do not account for under-ascertainment; that is, those cases in the community who did not visit a healthcare provider for treatment and, therefore did not get included in the notification statistics. Therefore, the notification rates and confidence intervals should also be interpreted with caution.

For additional information, see the [Metadata](#) sheet.

References

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