

Mosquito-Borne Disease in New Zealand

This surveillance report presents information on how the health of New Zealanders is affected by exotic mosquito-borne diseases such as dengue, malaria, chikungunya, Zika, and Ross River virus between 2004 and 2023.

Key facts

- Mosquito-borne disease notifications increased from 46 in 2022 to 122 in 2023, driven mainly by rises in dengue and malaria cases.
- Asian and Southeast Asian countries were common travel destinations for individuals returning to New Zealand with dengue in 2023. Those with malaria had travelled to Africa and the Pacific.
- Higher mosquito-borne disease rates were observed for males and Pacific peoples.
- In 2019–23, the Auckland district had a high mosquito-borne disease rate that was nearly twice the national rate.

Mosquito-borne and other exotic diseases pose a threat to New Zealand's health

Certain exotic diseases pose a greater risk to the public health of Aotearoa New Zealand because:

- People are not immune, as these diseases do not occur naturally in New Zealand, and vaccines are not readily available.
- They can spread easily and are often difficult to detect.
- They can cause serious illness and can be hard to treat.

High-risk exotic diseases include:

- **Vector-borne diseases** (eg, dengue, malaria, chikungunya, Zika virus, and Ross River virus), which can cause chronic illness and disability (WHO 2020), often with mild or no symptoms, making it difficult to determine the true burden of disease (Duffy et al 2009; Lau et al 2012).
- **Public Health Emergency of International Concern diseases** as classified by the World Health Organisation (see [Overseas infectious diseases of concern](#) for more information).
- **Respiratory diseases** which can cause serious lung infections (eg, influenza, COVID-19).

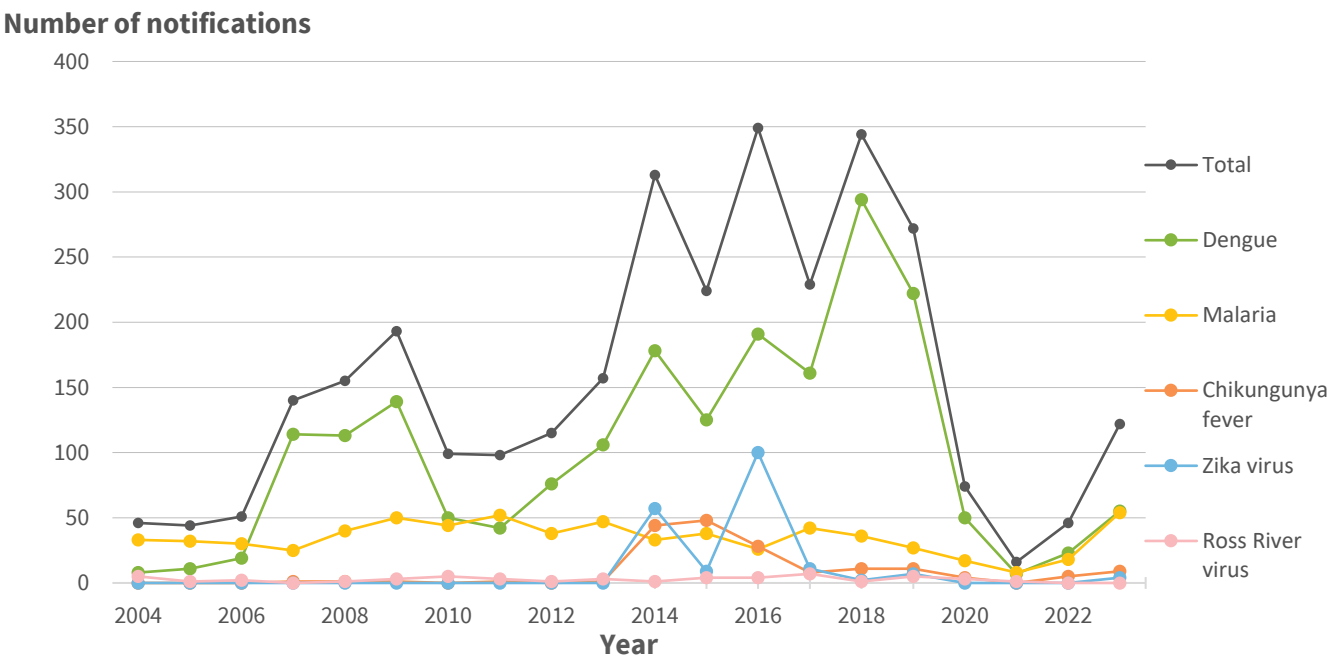
This report focuses on **mosquito-borne diseases (MBD)**, a subset of exotic diseases that pose a growing risk to New Zealand. Although New Zealand currently has no established populations of disease-carrying mosquitoes such as *Aedes aegypti*, *Aedes albopictus*, or *Culex annulirostris* (see Appendix 1), there is still a real risk that these mosquitoes could become established. While the current climate in New Zealand limits their survival, rising temperatures due to [climate change](#) may allow these mosquitoes to establish and

increase the risk of outbreaks, especially in the Auckland and Northland regions (Derraik and Slaney 2007).

Increase in mosquito-borne diseases following a decline in 2021

The number of MBD notifications in New Zealand increased from 46 in 2022 (0.9 per 100,000; 95%CI 0.7–1.2) to 122 in 2023 (2.3 per 100,000; 95%CI 1.9–2.8). Of the 2023 notifications, 55 were dengue fever, 54 malaria, 9 chikungunya, and 4 Zika virus cases (Figure 1). This marks a renewed increase in MBD notifications following a decline in 2021, which was largely due to COVID-19 border restrictions. Dengue and malaria, in particular, have shown a notable increase.

Figure 1: Number of notifications of mosquito-borne diseases, 2004–2023

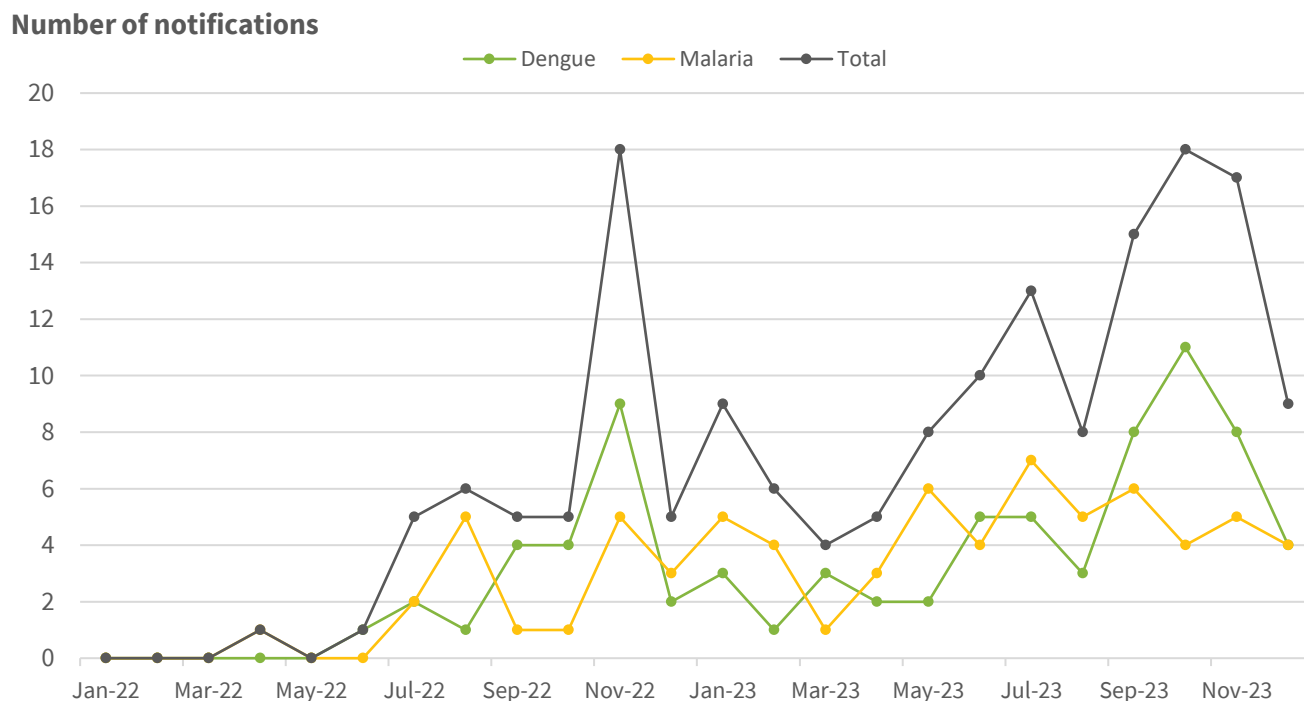


Source: PHF Science 2024

Gradual rise in mosquito-borne disease cases with late-year peaks in 2022 and 2023

The total number of MBD notifications rose gradually from early 2022 to late 2023, with notable peaks in November 2022 and October 2023, primarily driven by increases in dengue and malaria cases (Figure 2).

Figure 2: Number of notifications of mosquito-borne diseases, by month, 2022–2023



Source: PHF Science 2024

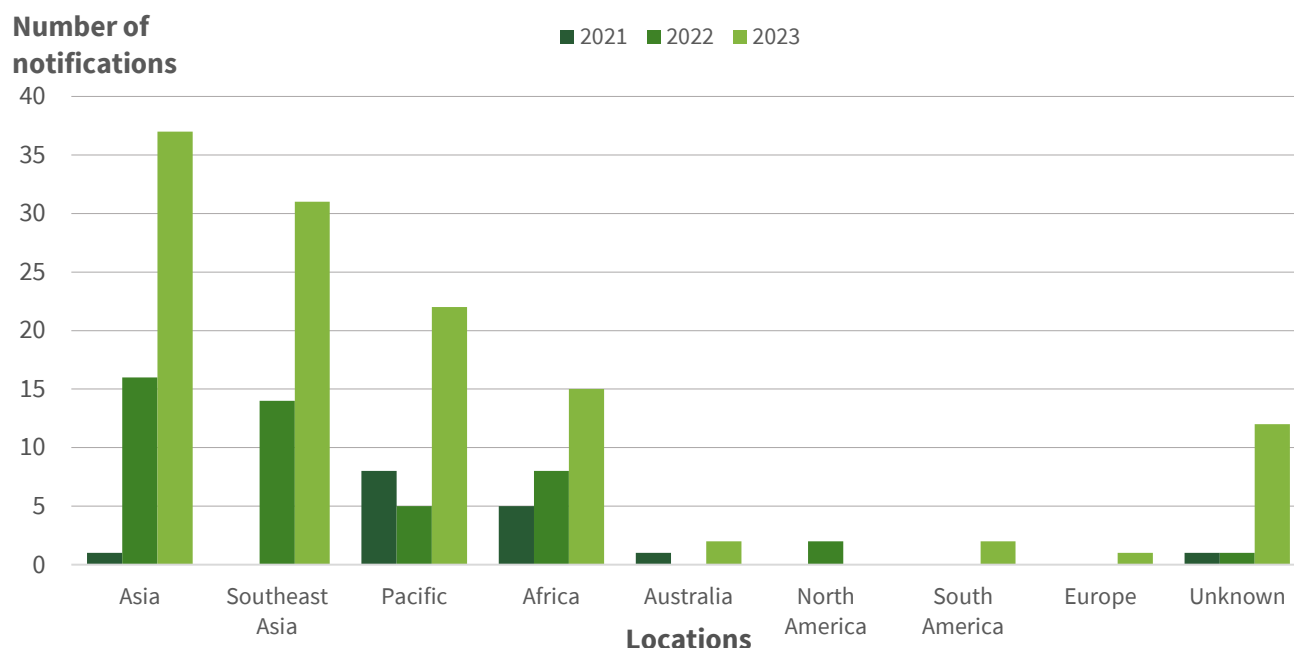
All mosquito-borne disease cases acquired overseas

Between 2021 and 2023, all people diagnosed with a MBD in New Zealand were thought to have acquired it while travelling overseas. Many cases had travelled to multiple countries, making it difficult to determine the exact location of exposure. As a result, all countries visited by travellers prior to diagnosis are included (Figure 3).

The most commonly visited regions prior to diagnosis were:

- Asia (54 cases)
- Southeast Asia (45 cases)
- Pacific (35 cases)
- Africa (28 cases).

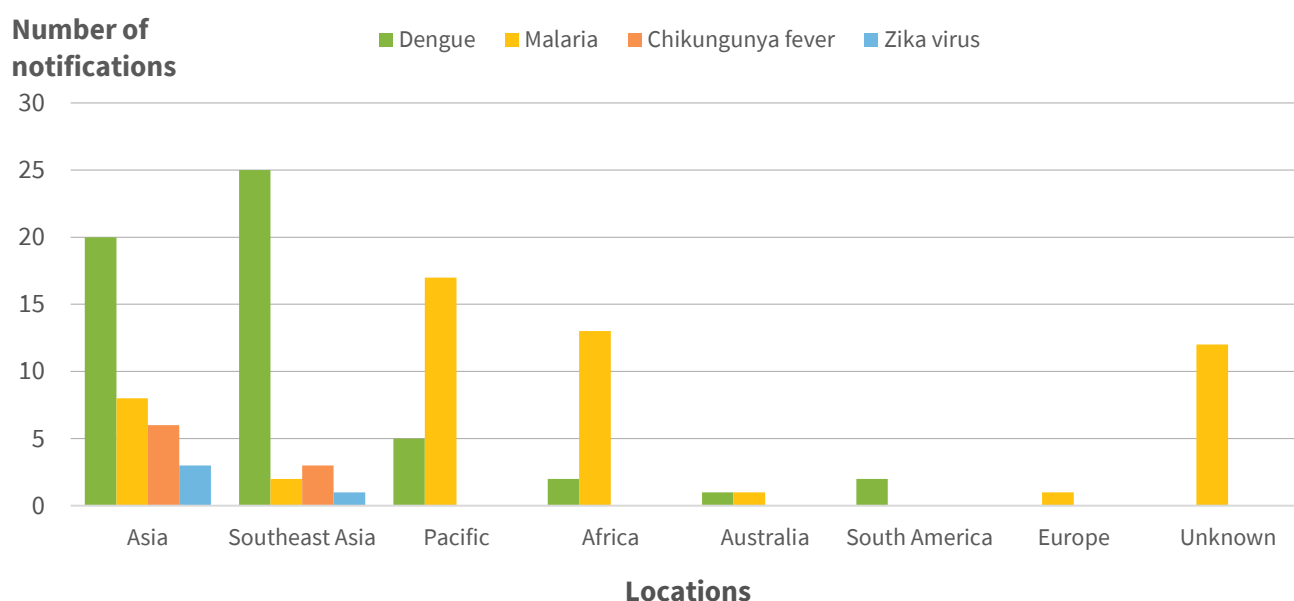
Figure 3: Number of mosquito-borne disease notifications, by locations visited by New Zealand travellers prior to diagnosis, 2021–2023



Source: PHF Science 2024

In 2023, dengue (55 cases) and malaria (54 cases) were the most commonly reported MBDs. For dengue, 25 cases had recently travelled in Southeast Asia (11 from Indonesia and 8 from Thailand) and 20 from Asia (with 18 recently returning from India) (Figure 4).

Figure 4: Number of mosquito-borne disease notifications, by locations visited by New Zealand travellers prior to diagnosis, 2023



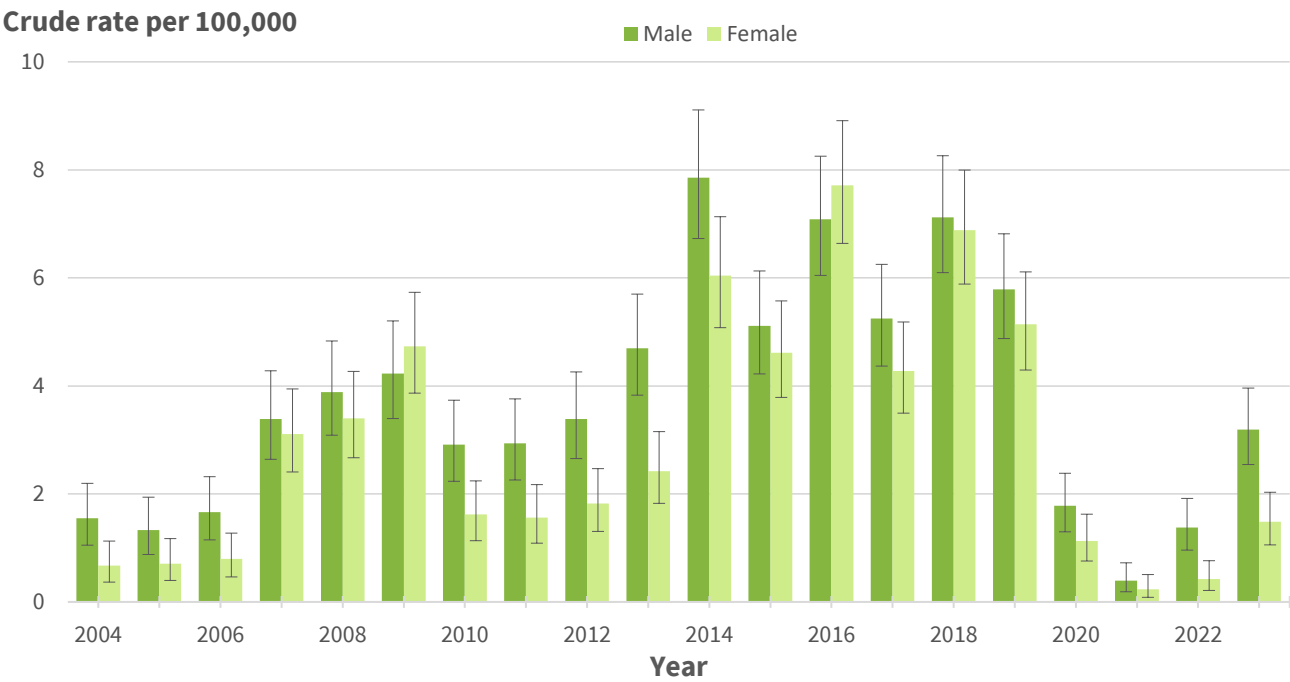
Source: PHF Science 2024

Of the 54 malaria cases, 17 recently returned from the Pacific, including 8 from Papua New Guinea and 7 from the Solomon Islands. There were also 13 cases of malaria in people who had recently travelled in Africa. There were nine cases of chikungunya, with six people having recently returned from India and three from Southeast Asia. Four cases of Zika virus were reported, including two from the Maldives, one from India, and one from Thailand.

Males consistently have higher mosquito-borne disease rates than females

From 2004 to 2023, males consistently had higher rates of MBD than females in New Zealand (Figure 5). After peaking in 2016, rates for both genders declined, reaching their lowest point in 2021. Since then, there has been a slight increase, though rates remain relatively low compared to earlier years. The gender gap persists, with males continuing to show higher rates than females.

Figure 5: Mosquito-borne disease notification rate, by sex, 2004–2023

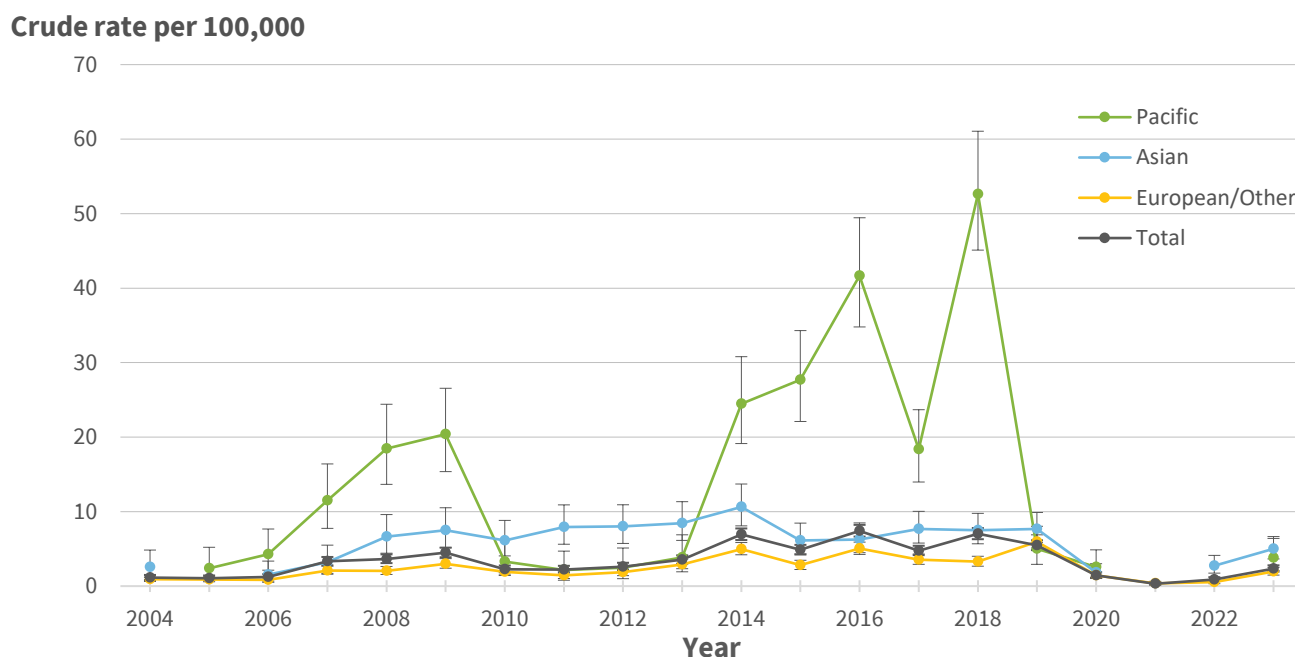


Note: 95% confidence intervals have been shown as vertical bars.
Source: PHF Science 2024

Mosquito-borne disease rates are often highest among Pacific peoples

Since 2004, Pacific peoples have consistently had the highest rates of MBD in New Zealand compared to other ethnic groups (Figure 6). After peaking in earlier years, their rates dropped sharply in 2019, largely due to a decrease in dengue cases (from 170 to 13), and have remained relatively low since. By 2023, however, the Asian population reported a slightly higher rate (5.0 per 100,000; 95%CI 3.7–6.7) than Pacific peoples (3.8 per 100,000; 95%CI 2.1–6.4).

Figure 6: Mosquito-borne disease notification rate, by ethnic group (prioritised), 2004–2023



Note 1: 95% confidence intervals have been presented as vertical bars.

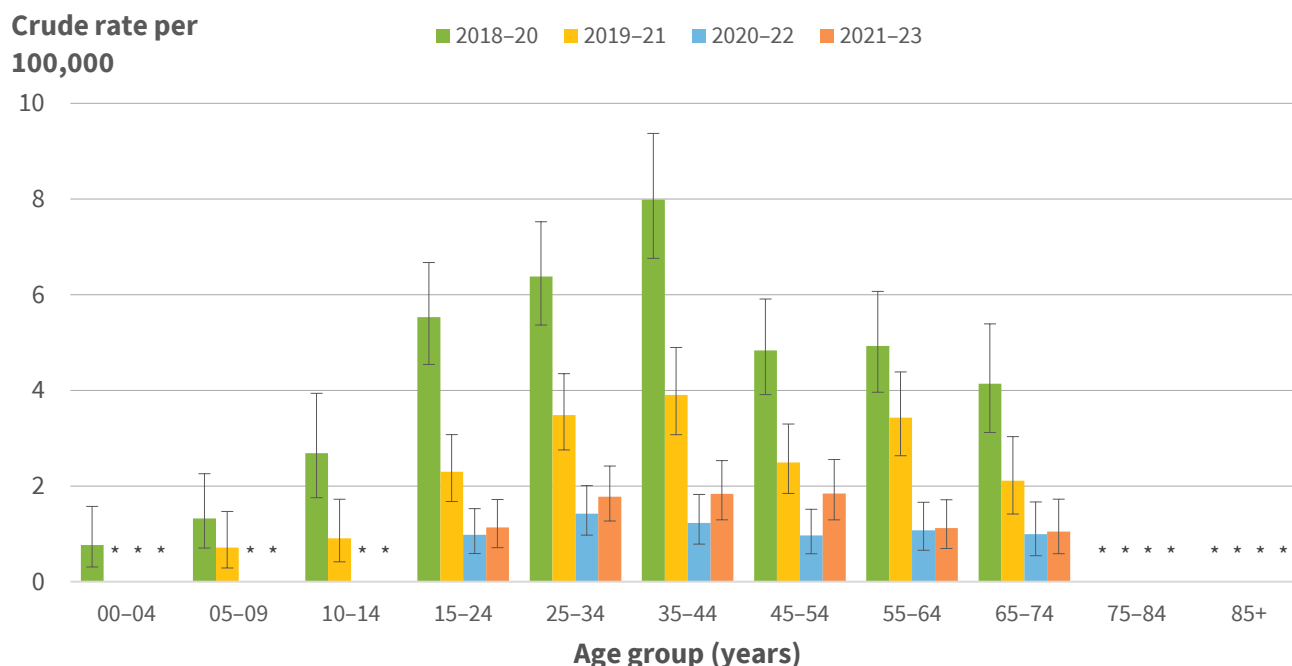
Note 2: Māori rates have been suppressed due to low numbers (count <5).

Source: PHF Science 2024

Recent years show similar mosquito-borne disease rates across age groups

In 2021–23, MBD rates were relatively similar across age groups (Figure 7). In earlier years, adults aged 25–44 years had the highest rates, indicating a recent shift toward a more even distribution of MBD cases across ages.

Figure 7: Mosquito-borne disease notification rate, by age group, 2018–20 to 2021–23



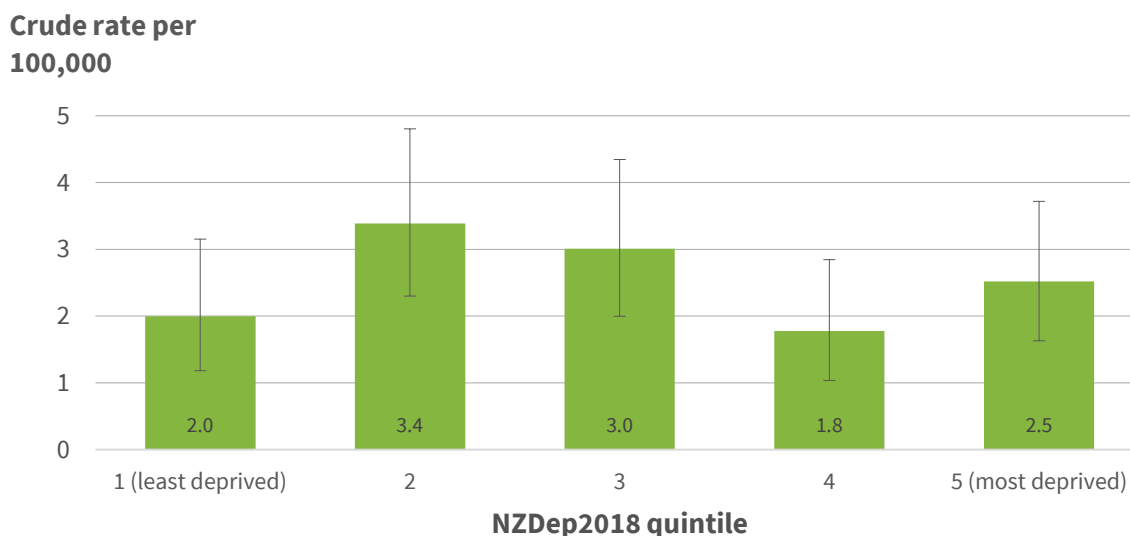
Note: 95% confidence intervals have been presented as vertical bars. An asterisk (*) shows that the rate has been suppressed due to low numbers (count <5).

Source: PHF Science 2024

Mosquito-borne disease rates were similar across deprivation quintiles

In 2023, there were no statistically significant differences in the notification rates for MBD across deprivation quintiles (Figure 8).

Figure 8: Mosquito-borne disease notification rate, by NZDep2018 quintiles, 2023



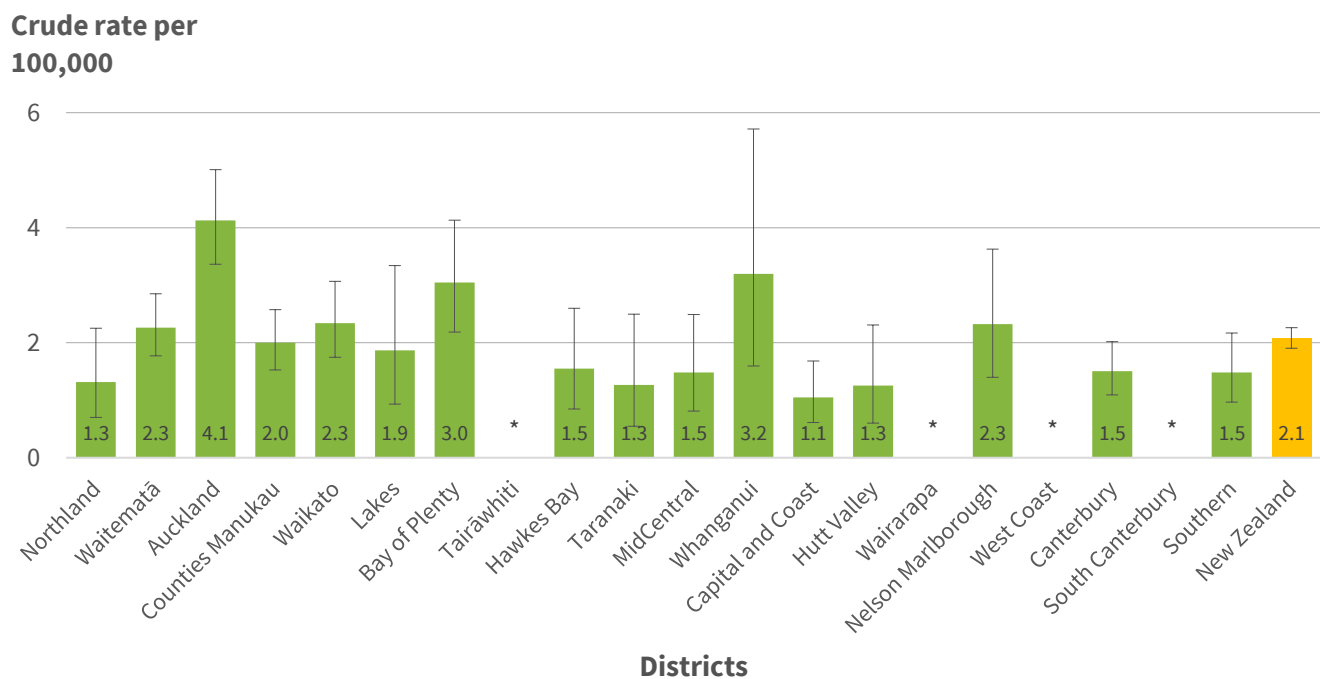
Note: 95% confidence intervals have been presented as vertical bars.

Source: PHF Science 2024

Auckland district had a high mosquito-borne disease rate

In 2019–23, people living in the Auckland district had a high notification rate of MBD (4.1 per 100,000; 95%CI 3.4–5.0). This rate was nearly twice the national average (Figure 9).

Figure 9: Rate of mosquito-borne disease notification, by district, 2019–23



Note 1: The 95% confidence intervals have been presented as error bars. An asterisk (*) shows that the rate has been suppressed due to low numbers (count <5). Note 2: This graph does not represent local transmission, as all mosquito-borne cases were contracted during international travel.
Source: PHF Science 2024

Data for this indicator

This indicator includes the most recent EpiSurv notifications data available, provided to EHINZ by PHF Science in October 2024.

Notifications only cover those people who visited a GP or received hospital treatment, and therefore may underestimate the true rate of disease in the population.

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

References

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Appendix 1: High-risk exotic mosquitoes of concern to New Zealand's public health

Species	Global distribution	Diseases transmitted	Affinity for humans and environment
<i>Aedes aegypti</i>	All major continents, including Australia, Southeast Asia and most Pacific Island countries.	Dengue, yellow fever, Zika and multiple other mosquito-borne diseases (MBDs).	Feeds on humans rather than other animals when possible. Thrives in urban environments.
<i>Aedes albopictus</i>	Many Southeast Asian and Pacific Island countries, the Americas and Europe	Dengue, chikungunya, Japanese encephalitis, Ross River Virus, and yellow fever.	Feeds on humans rather than other animals when possible. Common in urban environments.
<i>Culex annulirostris</i>	Australia, and many Southeast Asian and Pacific Island countries.	Murray Valley encephalitis, Japanese encephalitis. Capable vector for multiple other MBDs.	Opportunistic feeder on mammals. Breeds in urban and rural settings.

Source: NZ Biosecure 2023

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