

# Mosquito-Borne Disease in New Zealand

This factsheet presents information on how the health of New Zealanders is affected by exotic mosquito-borne diseases such as Dengue fever or Malaria. There were no known cases contracted locally, all cases were caught overseas before returning to New Zealand.

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## Key facts



In 2019, five different mosquito-borne diseases totalling 272 notifications were recorded in New Zealand, roughly 5 times greater than a low seen in 2005, 43 notifications.



Dengue fever remained the most common mosquito-borne disease in 2019 with 222 cases (83% of total cases).



In 2018–19, the Pacific was most frequently visited by individuals returning with Dengue fever. Those with Malaria had returned from either Africa, Asia or the Pacific.



In 2019, mosquito-borne disease rates in Pacific peoples dropped to the lowest rate in 8 years.



In 2019, rates of mosquito-borne disease were lower in more deprived quintiles, this trend is the reverse of those seen in previous years.



In 2017–19, the mosquito-borne disease rates in Auckland and Counties Manukau districts were almost double the national rate.

## Background information

Certain exotic diseases pose a greater risk to New Zealanders because:

- individuals are not immune as the disease is not found naturally in New Zealand and no vaccines are readily available
- they spread easily and are often difficult to identify
- they can cause serious illness and can be difficult to treat.

High-risk exotic diseases include:

- specific vector-borne diseases, particularly those spread by mosquitoes such as Dengue fever or Malaria, which can cause chronic suffering and life-long morbidity and disability (WHO 2020).
- diseases classified as a 'Public Health Emergency of International Concern' by the World Health Organisation (see [Overseas infectious diseases of concern](#) for more information)
- respiratory diseases which can cause serious lung infections (eg, influenza or COVID-19).

Emerging and known international diseases of concern to New Zealand require ongoing monitoring and evaluation. This process reduces the risk associated with the ever-changing infectious disease environment seen globally (Bloom and Cadarette 2019). Mosquito-borne disease is a primary concern to New Zealand public health. To date, mosquito-borne diseases are the only notifiable vector-borne diseases that have been detected in New Zealand.

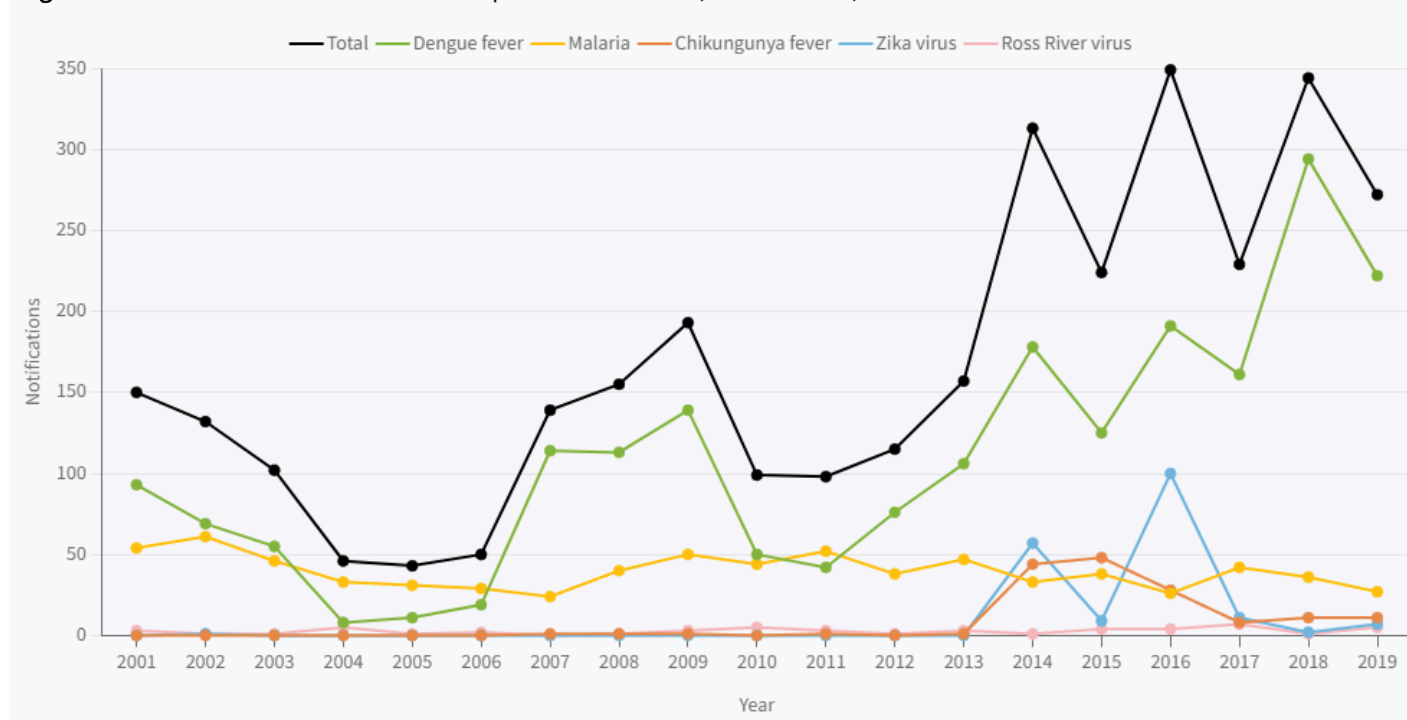
## Five mosquito-borne diseases entered New Zealand in 2019

A total of 272 cases of five different mosquito-borne diseases were reported in New Zealand in 2019. These included four mosquito-borne viruses; Dengue (222 cases), Chikungunya (11 cases), Zika (7 cases) and Ross River (5 cases) and one mosquito-borne parasitic disease; Malaria (27 cases).

As many as 80% of people infected with some mosquito-borne diseases may have no or mild symptoms (Duffy et al 2009). Therefore, the true burden of disease in New Zealand could be much greater than those who were symptomatic and diagnosed.

Mosquito-borne disease notification counts have increased from a low in 2005, with annual counts remaining elevated from 2014 to 2019 (Figure 1). This trend is the result of an increase in Dengue fever cases as well as the emergence of Zika virus and Chikungunya fever in 2014.

**Figure 1** Number of notifications of mosquito-borne disease, New Zealand, 2001–19

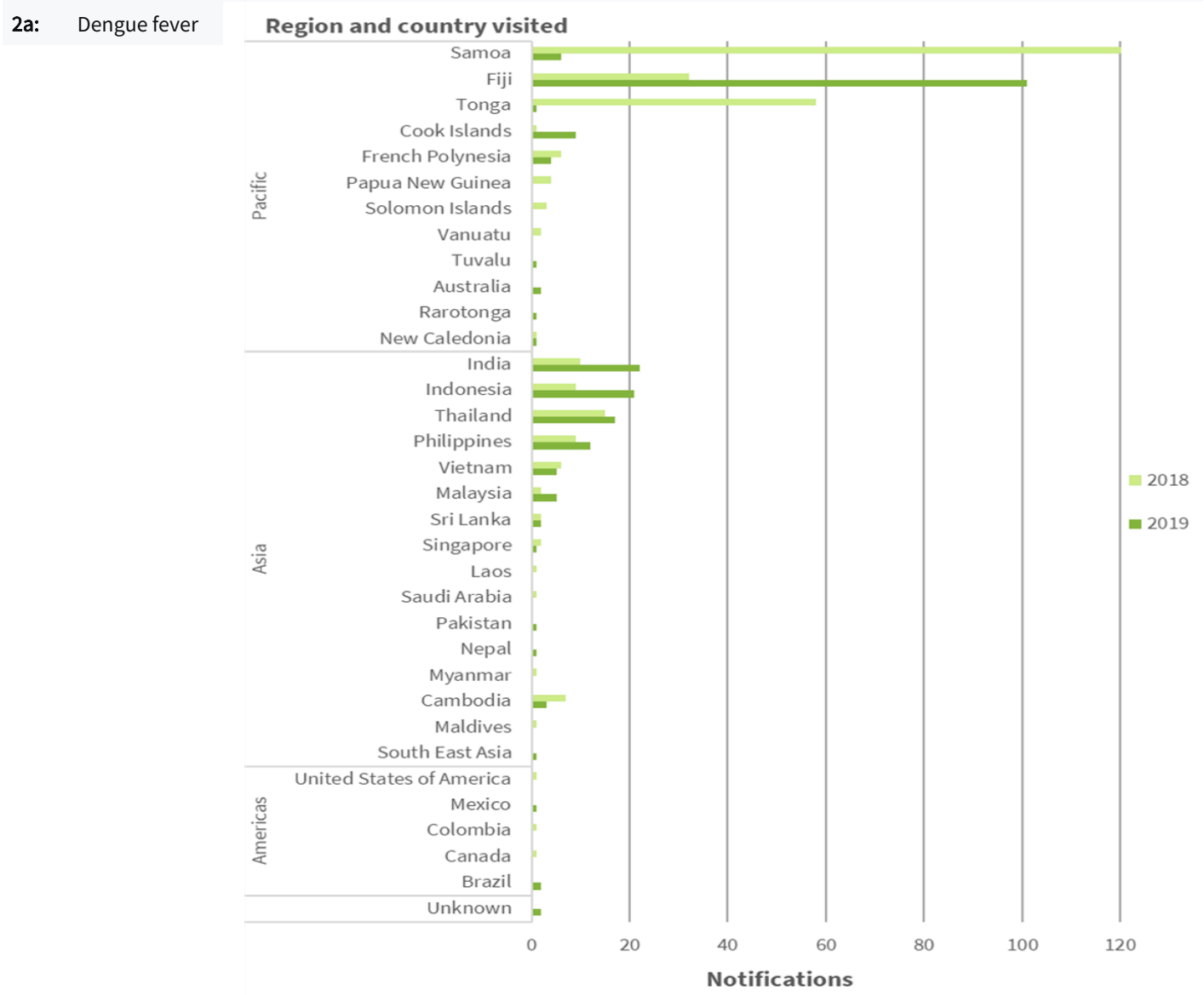


Source: EpiSurv, ESR 2020

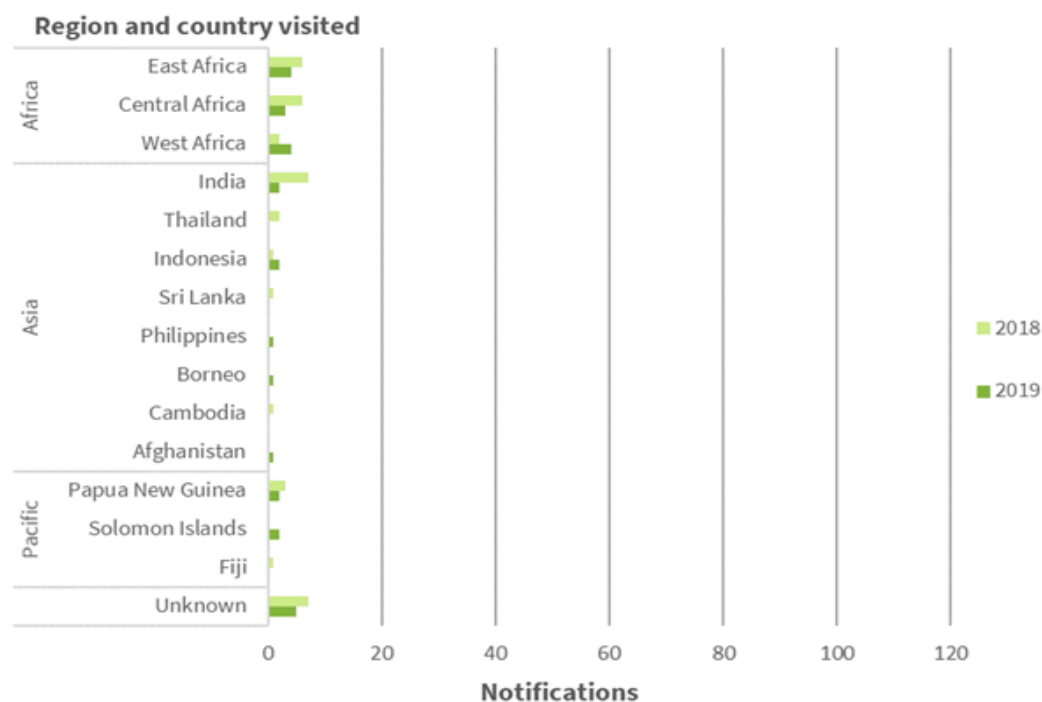
All mosquito-borne cases acquired overseas

In 2018–19, all people diagnosed with a mosquito-borne disease were thought to have acquired it while travelling overseas (ESR 2020, ESR 2021). Dengue fever was the most common mosquito-borne disease (516 cases) entering New Zealand primarily from Samoa and Tonga in 2018 and Fiji in 2019 (Figure 2a). During this time period, Chikungunya fever was primarily contracted in Asian nations, including Thailand and India (Figure 2b), while Malaria cases originated from Pacific, Asian and African regions (Figure 2c). The country of origin was unknown for 17% of all Malaria cases in 2018–19.

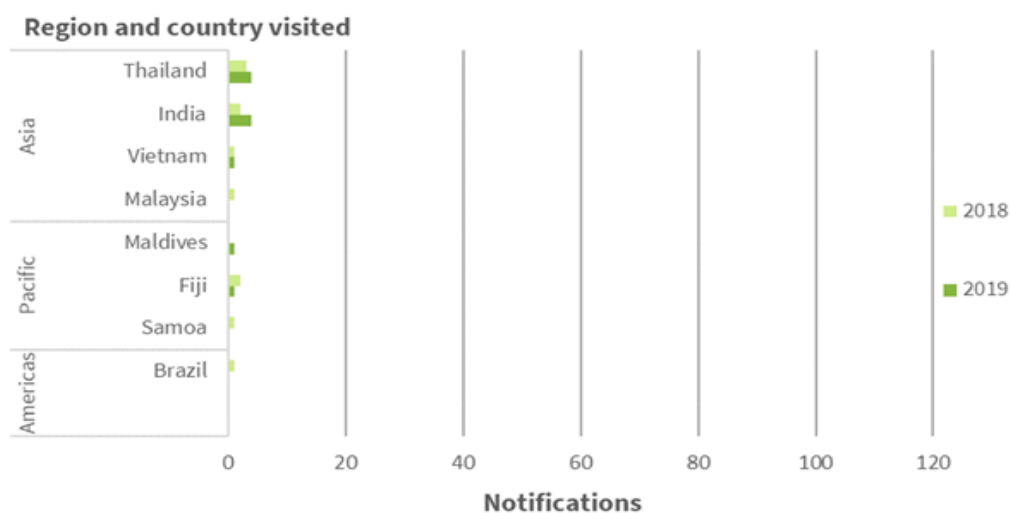
**Figure 2** Countries visited by New Zealand travellers prior to diagnosis of a mosquito-borne disease, 2018–19



## 2b: Malaria



## 2c: Chikungunya fever



**Note:** Some cases visited more than one country. All countries that are potentially attributable to infection are included. African nations were grouped into three categories. East Africa consists of Kenya, Malawi, Eritrea, Tanzania, Ethiopia, and Mozambique. Central Africa consists of Nigeria, Rwanda, South Sudan, Uganda, Zambia, Democratic Republic of Congo, and Cameroon. West Africa consists of Ghana, Guinea, Mali and Sierra Leone.

**Source:** EpiSurv, ESR 2020

Other mosquito-borne diseases were also detected in smaller numbers over the 2018–19 period. Six cases of Zika virus were believed to originate in Fiji, while single cases were recorded as having previously visited Zimbabwe, Thailand, and Myanmar. Additionally, five cases of Ross River virus were believed to originate in Australia, while a single case was recorded to have visited.

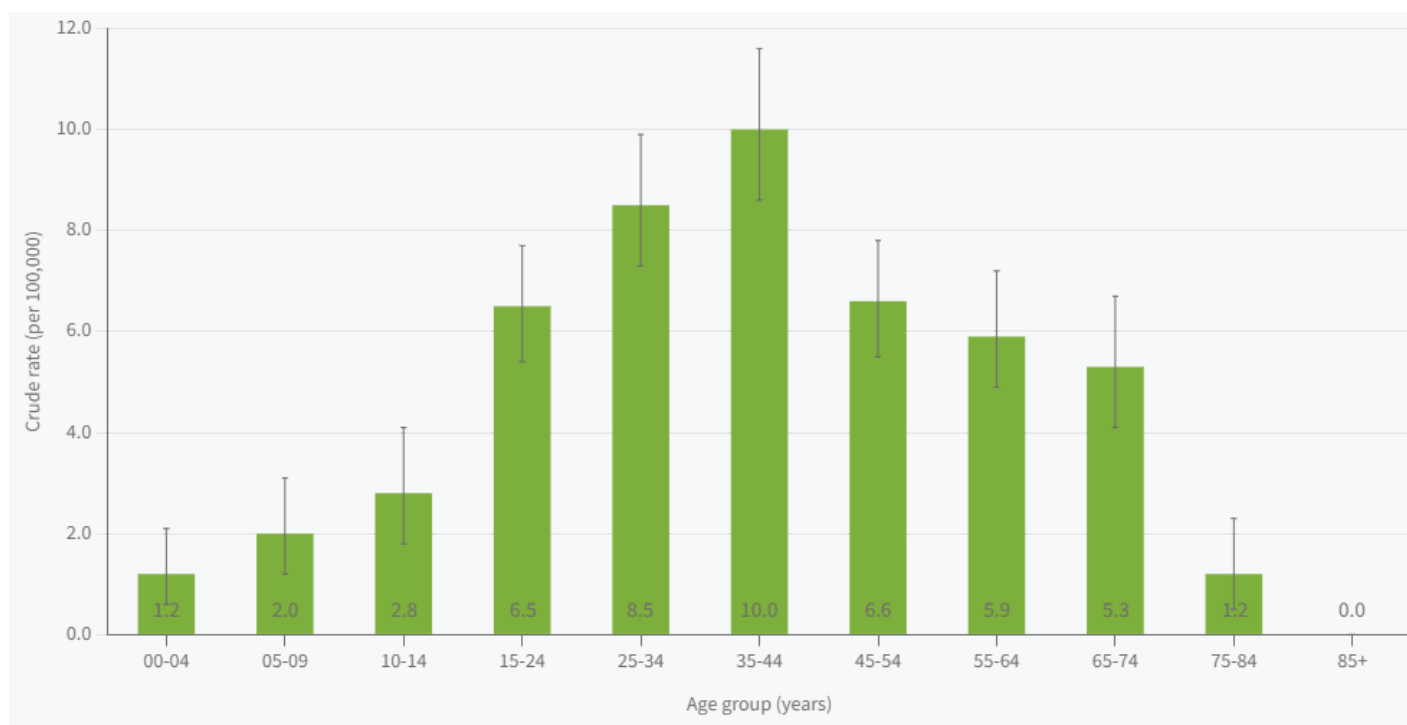
## Males and females have similar rates of mosquito-borne disease

In 2018–19, New Zealand males and females were equally likely to be diagnosed with mosquito-borne diseases (males 6.6 per 100,000 versus females 6 per 100,000). The rate of malaria in males (0.9 per 100,000) was more than double the rate of females (0.4 per 100,000).

## Risk of mosquito-borne disease highest in 25–44-year-olds

Over the three-year period, 2017–19, mosquito-borne disease notifications were highest in the 25–44 years age groups (Figure 3). Children (0–14 years) and individuals aged 75+ years had the lowest notification rates.

**Figure 3** Mosquito-borne disease notification rates, New Zealand, by age group, 2017–19



**Note:** \*The rate is suppressed due to an unreliable estimate with small numbers. 95% confidence intervals have been presented as error bars. See [Metadata](#) for more information on how to interpret this graph.

**Source:** Episurv, ESR 2020

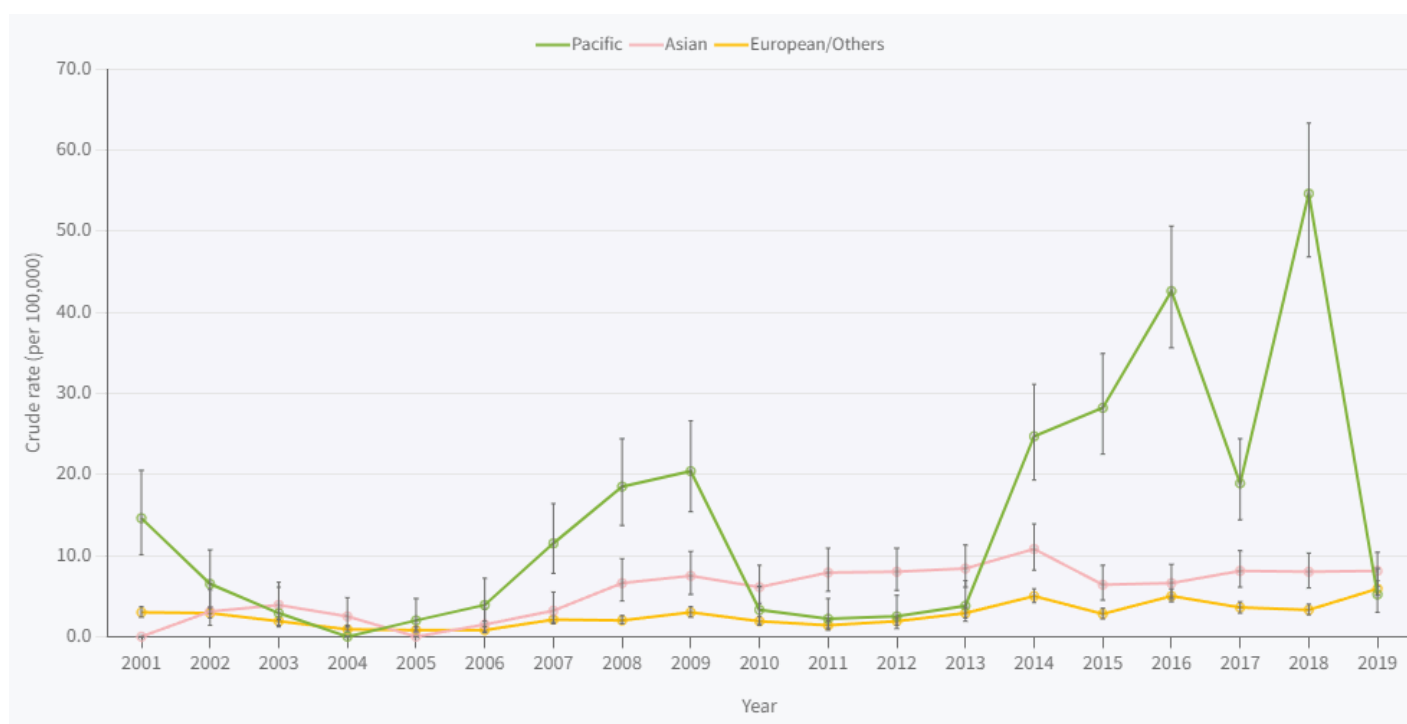
Rates seen in different age groups partially reflect the frequency of international travel by age. New Zealanders aged 0–14 and 75+ years make up 34% of the population, while only 16% of returning travellers fall into these age groups, according to StatsNZ. So, the lower mosquito-borne disease rates in these age groups are consistent with their lower participation in overseas travel. However, rates of international travel in all other 10-year age groups (covering 15–74 years) are similar, so mosquito-borne disease is not a simple reflection of travel frequency.

## Mosquito-borne disease rates often highest among Pacific peoples

Since 2001, Pacific peoples have commonly had the highest rates of mosquito-borne disease in New Zealand. In 2018, cases of mosquito-borne disease among Pacific peoples reached their highest rate (54.6 per 100,000) since 2001, roughly 17 times greater than the European/Other ethnic group rate (3.2 per 100,000).

The first increase, from 2013 to 2016, coincides with the re-emergence of dengue serotype–3 in several Pacific Island countries and territories (Getahun et al 2019). The second increase in 2018 coincides with the re-emergence of dengue serotype–2 in similar regions (Inazin et al 2020).

**Figure 4** Mosquito-borne disease notifications rates, New Zealand, by prioritised ethnicity, 2001–19



**Note:** 95% confidence intervals have been presented as error bars. Due to small numbers, rates for the Māori ethnic group are suppressed with partial suppression for Pacific (2004) and Asian (2001, 2005) ethnic groups. Ethnicity is prioritised. See [Metadata](#) for more information on how to interpret this graph.

**Source:** Episurv, ESR 2020

The notable decline in mosquito borne-disease rates amongst Pacific peoples in 2019 was the result of changes in the number of Dengue fever cases. These changes can be seen in Table 1 below.

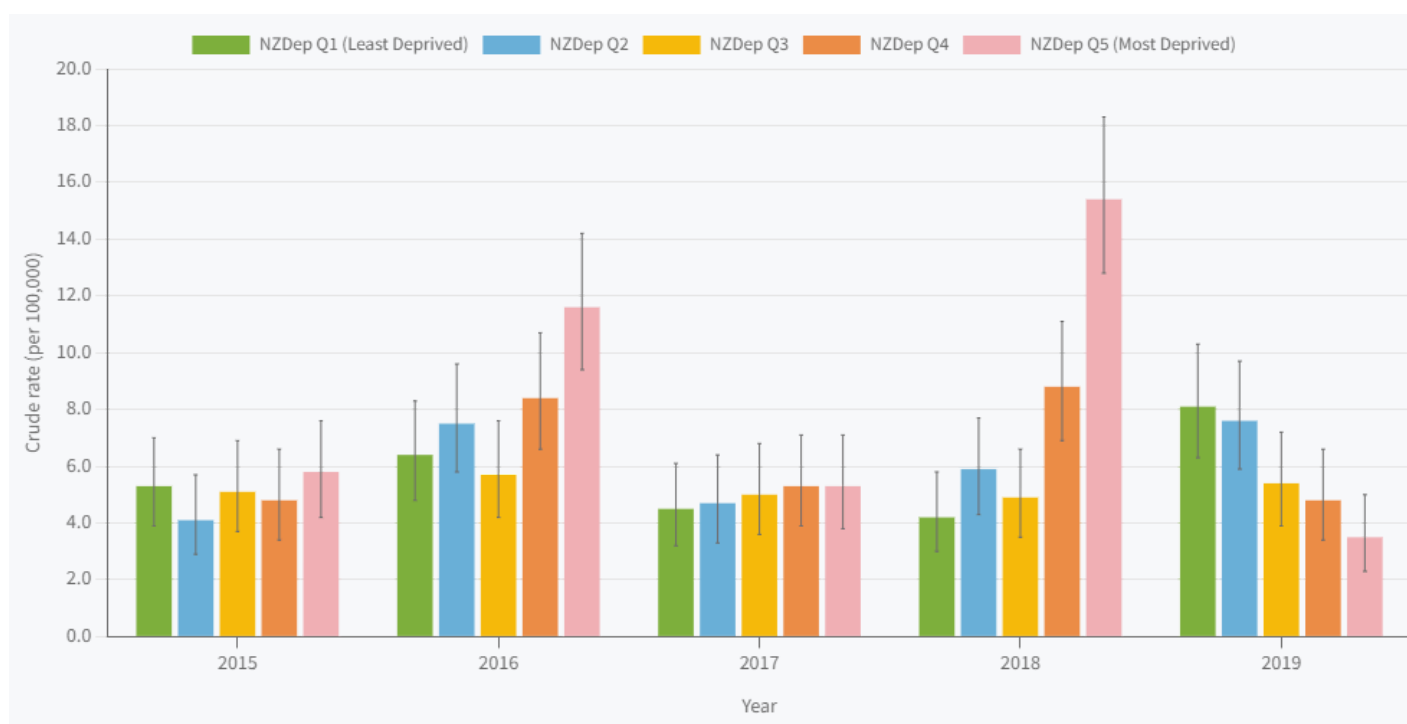
Ethnicity	Dengue fever		Chikungunya fever		Ross River virus		Zika virus		Malaria		Total	
	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019
Māori	6	13	0	1	0	0	0	0	1	0	7	14
Pacific	170	13	1	0	0	0	0	0	3	4	174	17
Asian	41	49	3	2	0	0	0	1	12	8	56	60
European/Other	72	146	7	8	1	5	2	6	17	15	99	180
Unknown	5	1	0	0	0	0	0	0	3	0	8	1
<b>Total</b>	<b>294</b>	<b>222</b>	<b>11</b>	<b>11</b>	<b>1</b>	<b>5</b>	<b>2</b>	<b>7</b>	<b>36</b>	<b>27</b>	<b>344</b>	<b>272</b>

**Source:** Episurv, ESR 2020

## 2019 mosquito-borne disease rates by NZDep reversed from previous years

From 2015–18, notification rates of mosquito-borne disease by level of socioeconomic neighbourhood deprivation (NZDep13) generally trended upwards, increasing in more deprived quintiles (Figure 5). This trend is particularly evident in 2016 and 2018. However, in 2019, this pattern is reversed, with infection rates in the most deprived quintile (3.5 per 100,000) being less than half the rate recorded in the least deprived quintile (8.1 per 100,000).

**Figure 5** Mosquito-borne disease notifications rates, New Zealand, by NZDep13 quintiles, 2015–19



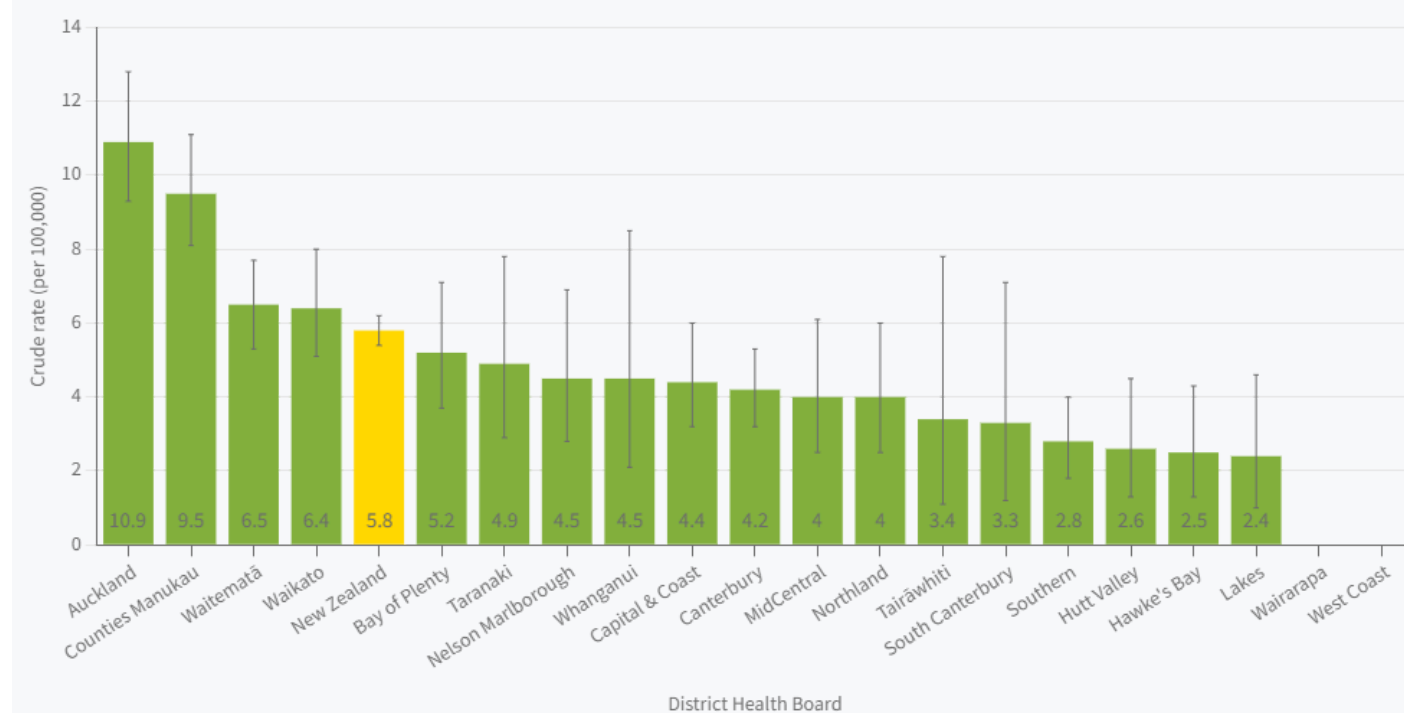
**Note:** 95% confidence intervals have been presented as error bars. See [Metadata](#) for more information on how to interpret this graph.

**Source:** Episurv, ESR 2020

## District trends

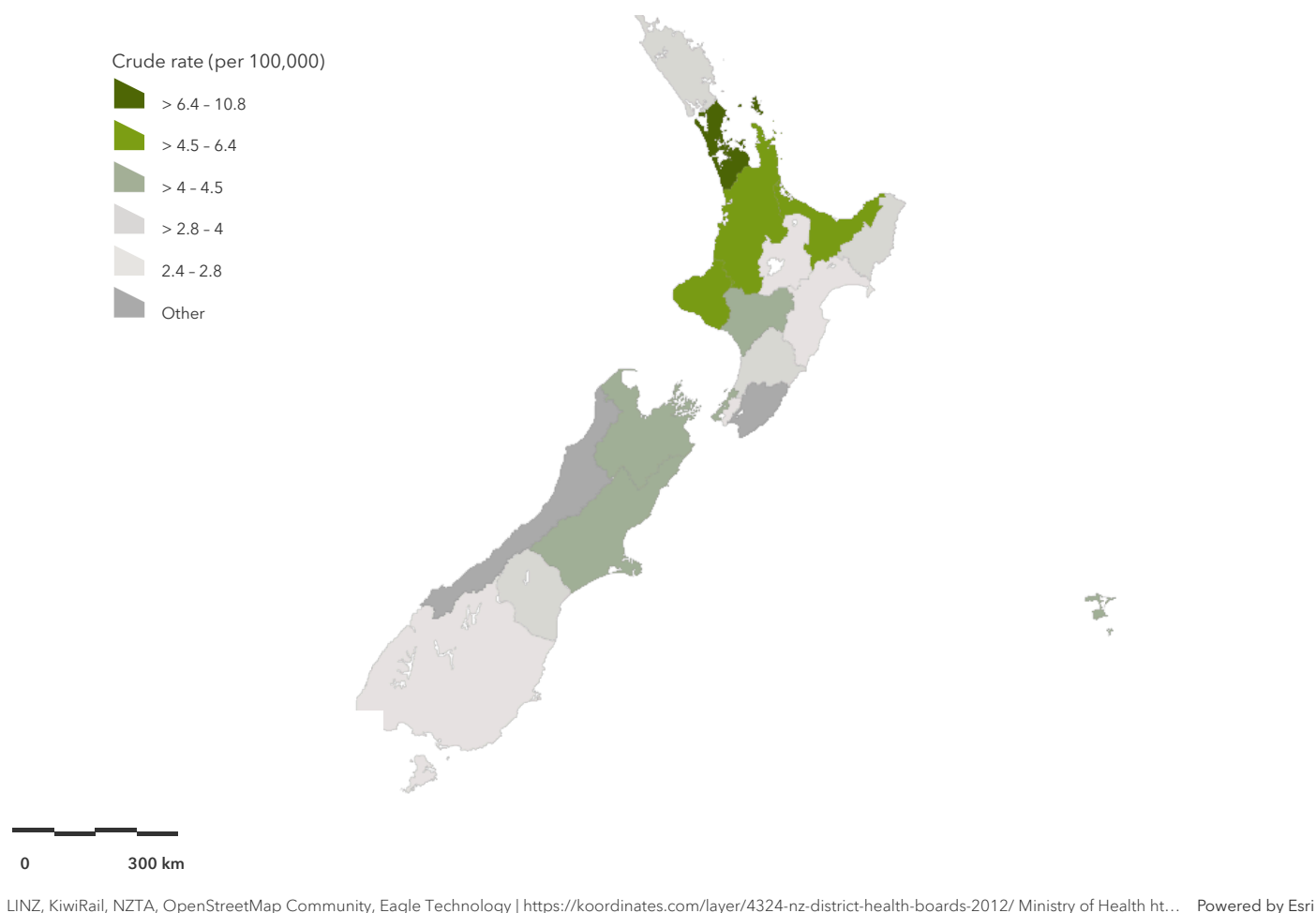
Over the 2017–19 period, the rates of mosquito-borne disease in Auckland and Counties Manukau districts were almost twice the national rate (Figure 1).

**Figure 1** Mosquito-borne disease notification rates, New Zealand, by district, 2017–19



**Note:** 95% confidence intervals have been presented as error bars. The rate is suppressed due to an unreliable estimate with small numbers. See [Metadata](#) for more information on how to interpret this graph.

**Source:** Episurv, ESR 2020



## References

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## Data for this indicator

This indicator includes the most recent data available EpiSurv notifications, provided to EHINZ by ESR in February, 2020.

Crude rates presented in this factsheet do not take into account varying age distributions when comparing between populations.

Unless otherwise stated, all differences mentioned in the text between the two values are statistically significant at the 5% level or less.

In 2016, one case of Zika virus was believed to be sexually contracted locally within New Zealand. For the purpose of consistency, this is not included in the above factsheet, as it was a singular, rare event occurring between individuals, without a mosquito vector.

For additional information, see the metadata link below.

### Other related topics include:

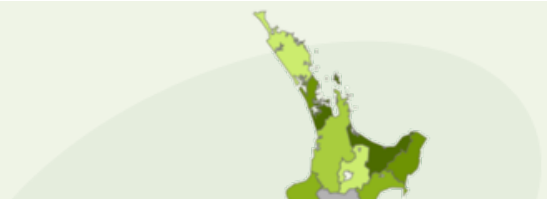
Overseas infectious diseases of priority concern

High-risk pests caught at New Zealand's border

Exotic mosquito species established in New Zealand



## Dashboard - Border health



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Environmental Health Intelligence NZ, 2021. *Mosquito-borne disease in New Zealand - by DHB*. {Factsheet}. Wellington: Environmental Health Intelligence NZ, Massey University.

For descriptive information about the data ⓘ [Metadata Sheet](#)

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