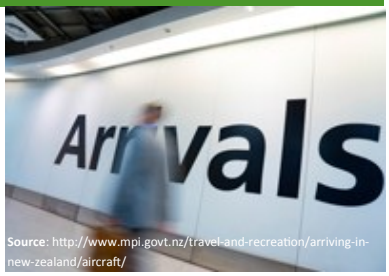
Border Health in New Zealand

HIGHLIGHTS:

- **No cases of any 'Public Health Emergency of International Concern', or severe respiratory disease of priority border health concern, in New Zealand, 2011-15.**
- **Cases of mosquito-borne diseases more than doubled in New Zealand, 2011-15. Dengue Fever was most commonly diagnosed during this period.**
- **All mosquito-borne diseases were diagnosed after cases had travelled overseas, often within the Asia-Pacific region.**
- **There were age, gender, ethnic and regional differences in who acquired these exotic diseases.**



Source: http://www.mpi.govt.nz/travel-and-recreation/arriving-in-new-zealand/aircraft/

Source: https://safetravel.govt.nz/news/health-information

Exotic diseases are bad for border health

This indicator explores how New Zealand health is affected by exotic diseases which cross our international borders. Certain exotic diseases can pose a greater risk because:

- New Zealanders are not immune to them (e.g. disease is not locally acquired, no vaccine exists),
- they spread easily
- they can cause severe illness
- they are difficult to treat.

High-risk exotic diseases include:

- any disease classified as a 'Public Health Emergency of International Concern' by the World Health Organization (WHO) - these pose a high international threat;
- severe respiratory diseases which can cause serious lung infections (e.g. new influenza like 'Bird Flu');
- and specific vector-borne diseases, particularly those spread by mosquitoes (e.g. Dengue Fever, Malaria) - these can cause fever, joint pain, bleeding problems, and can be fatal (WHO 2016).

The list of overseas diseases of priority concern to New Zealand needs regular review due to the fast changing infectious disease environment in the world (Mackenzie 2011).

No 'Public Health Emergency of International Concern' in New Zealand, 2011-15

During 2011-15, there were two serious diseases alerted as a 'Public Health Emergency of International Concern' by the World Health Organization (WHO 2016). These were Ebola Virus Disease and Polio (both in 2014 and 2015). There were no cases of these diseases reported in New Zealand during this period (ESR 2015).

No severe exotic respiratory diseases of priority border health concern in New Zealand, 2011-15

During 2011-15, there were four severe respiratory diseases of priority border health concern detected in the world (WHO 2016). These included three influenza ('Flu') viruses (A(H5N1), A(H7N9), A(H3N2)) and one new coronavirus (Middle East Respiratory Syndrome Coronavirus). There were no cases of these diseases reported in New Zealand during this period (ESR 2015).

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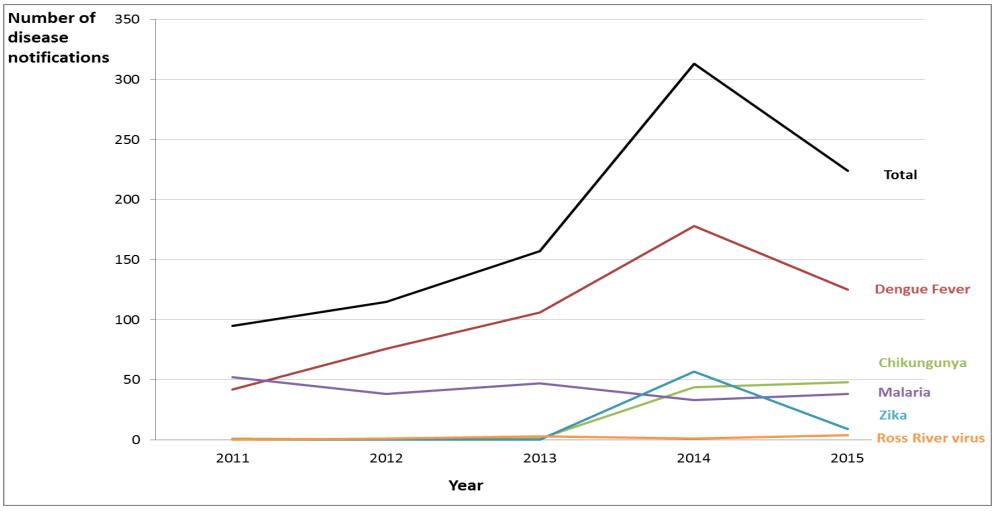
Five mosquito-borne diseases detected in New Zealand, 2011-15

Five mosquito-borne diseases were diagnosed in New Zealanders, 2011-15 (ESR 2015; ESR 2016). This included diseases caused by four mosquito-borne viruses (Chikungunya, Zika, Ross River virus and Dengue Fever) and one mosquito-borne parasitic disease (Malaria). Marked increases in Chikungunya, Zika and Dengue Fever were reported during this time.

Figure 1: Number of case notifications of priority border health diseases detected in New Zealand, 2011-15



Data Source: ESR 2016

Mosquito-borne diseases more than doubled in New Zealand, 2011-15

Total cases of mosquito-borne diseases in New Zealand more than doubled between 2011 and 2015 (Figure 1, black). But cases peaked in 2014 at more than triple the 2011 count. The most common disease driving this trend was Dengue Fever (Figure 1, red), causing the majority of all mosquito-borne diseases diagnosed during 2011-15.

In 2014, there were statistically significant increases in Zika, Chikungunya and Dengue Fever from 2013 levels (ESR 2015). In 2015, Zika and Dengue Fever counts decreased markedly, but Chikungunya numbers remained similar to 2014.

Between 2011-15, annual Malaria case counts were relatively consistent (averaging 42 cases per year, 2011-15), and Ross River Fever remained a rare disease (with a peak of 4 cases in 2015).

Similar Trends in Some Mosquito-borne Diseases Overseas

The number of countries affected by mosquito-borne disease outbreaks overseas increased between 2011 and 2015.

See factsheet: **Overseas infectious diseases of priority concern**

Asymptomatic disease

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

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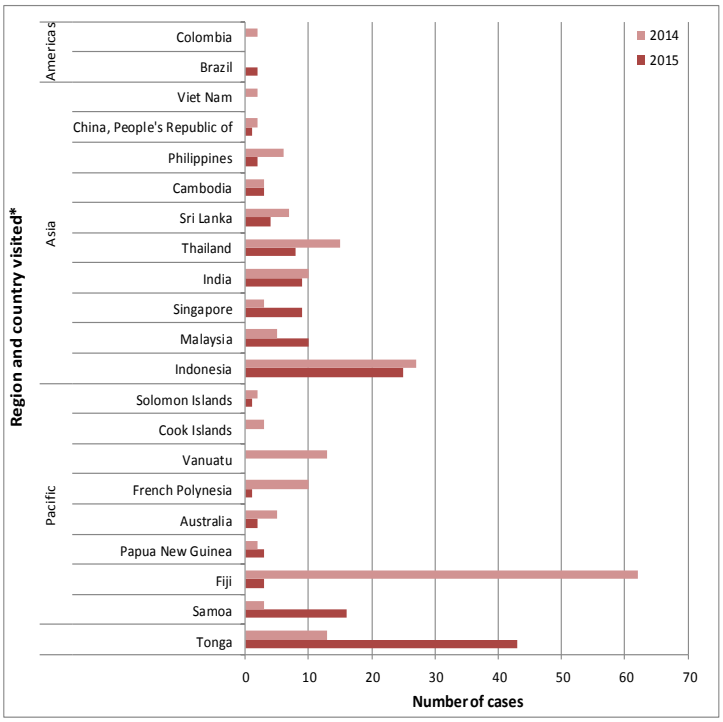
All mosquito-borne diseases were thought to have been acquired overseas

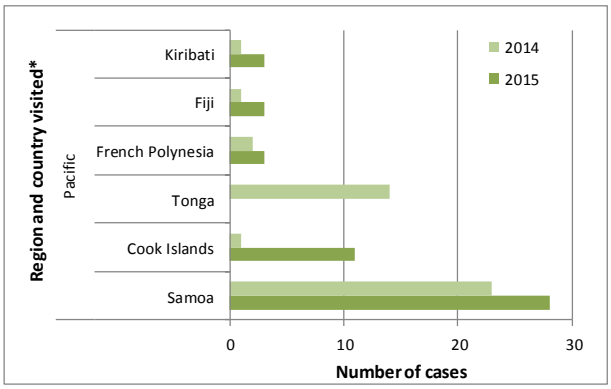
During 2011-15, people diagnosed with mosquito-borne diseases were thought to have acquired these diseases while travelling overseas (ESR 2015; ESR 2016). Figure 2 summarises the main destinations visited before diagnosis with Dengue Fever, Chikungunya and Zika in 2014 and 2015.

Figure 2: Countries reported to have been visited by New Zealand travellers prior to diagnosis, in 2014 or 2015, with:

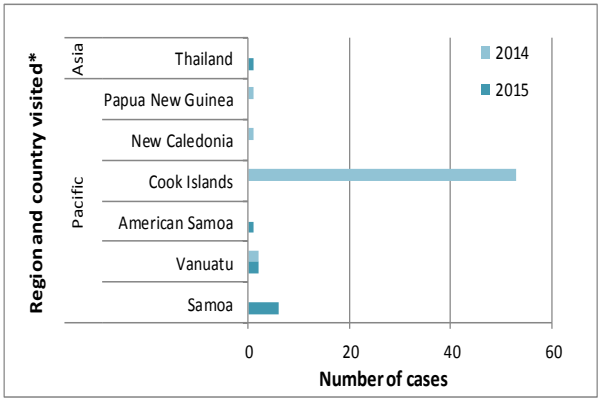
a) Dengue Fever



b) Chikungunya



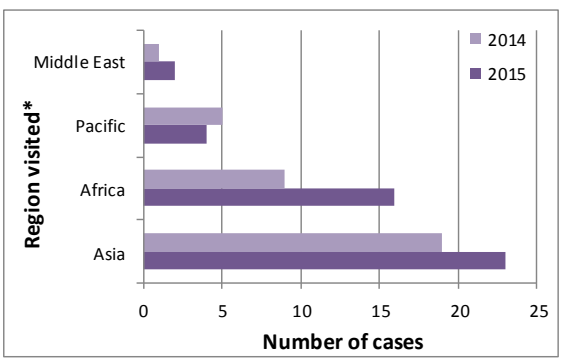
c) Zika



*Some cases visited more than one country. All countries potentially attributable to disease infection are included. Only countries with ≥2 cases are presented here. Data Source: ESR, 2016

In 2014-15, the vast majority of Chikungunya and Zika cases are likely to have become infected when travelling in the Pacific region (Figure 2.b-c), particularly Samoa, the Cook Islands and Tonga. Whereas, people diagnosed with Dengue Fever in 2014-15 had commonly visited countries in Asia as well as in the Pacific (Figure 2.a).

Figure 3: Regions visited by New Zealanders before Malaria diagnosis in 2014 and 2015



In 2014-15, people diagnosed with Malaria in New Zealand had most commonly visited Asia and Africa (Figure 3). India was the most frequently visited country by far (35 of 75 recorded overseas country visits listed among Malaria cases who were diagnosed in 2014 and 2015).

For more detailed graphs, please visit the EHINZ website listed below.

Data Source for Figure 3: ESR, 2016.

*Some cases visited more than one country.

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Who is most affected by exotic diseases in New Zealand?

Gender differences

In 2014-15, New Zealand males and females were equally likely to be diagnosed with mosquito-borne viruses (ESR 2016). However, males were more than twice as likely to be diagnosed with Malaria (a parasitic disease) than females (Incidence rate ratio 2.7 male versus female, p<0.05, or 20 female v 51 male cases, 2014-15) (ESR 2016). This pattern is possibly due to gender differences in taking part in outdoor activities when visiting Asia, where Malaria is more prevalent (Lau et al 2014).

Age differences

In 2014-15, children and young people (<20 years) and older people (≥70 years) were less likely than other age groups to be diagnosed with mosquito-borne viruses (ESR 2016). There were also very few children and older people diagnosed with Malaria. Young adults (20-29 years) were over twice as likely to be diagnosed with Malaria as other age groups (2.2 cases per 100,000 20-29 year olds v 0.9 per 100,000 50-59 year olds - 50-59 year olds being the second most frequently affected age group).

Figure 4.a: Incidence rates of mosquito-borne virus diagnosis in New Zealand, 2014 and 2015, by ethnicity

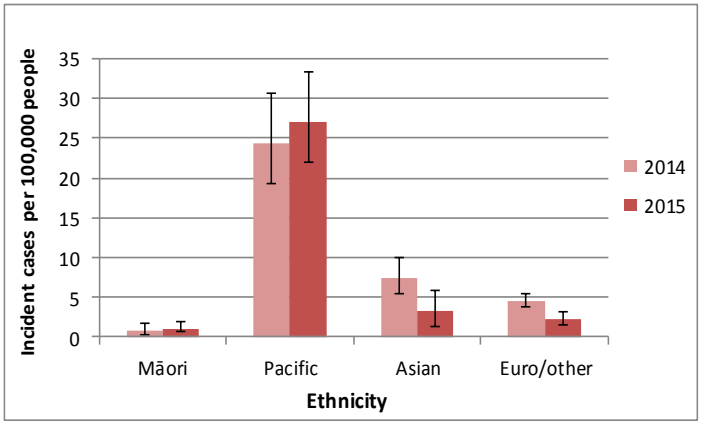
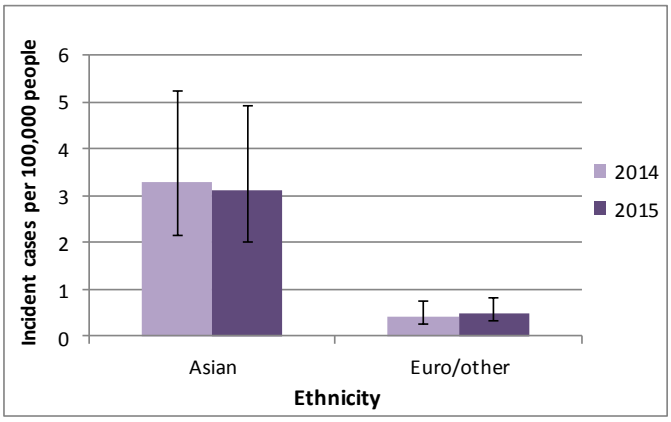


Figure 4.b: Incidence rates of Malaria diagnosis in New Zealand, 2014 and 2015, by ethnicity



Ethnicity is prioritised, incident rates are crude and 95% confidence intervals are shown (see metadata sheet). Some cases had unknown recorded ethnicity and could not be included: 29/280 and 11/186 arbovirus cases, and 1/33 and 1/38 Malaria cases, in 2014 and 2015, respectively. Malaria rates for Māori and Pacific were excluded from Figure 4.b due to small or zero case numbers. Data Source: ESR, 2016

Table 1: Number of cases of mosquito-borne diseases diagnosed in New Zealanders in 2015, by ethnicity

Ethnicity	Chikungunya	Dengue Fever	Ross River virus	Zika	Malaria
Māori	-	6	-	-	-
Pacific	27	47	-	6	-
Asian	-	17	-	-	18
Euro/other	17	46	-	-	14
Unknown	2	9	0	0	1

Small or zero case counts are suppressed (-) and ethnicity is prioritised (see metadata sheet). Data Source: ESR, 2016

In 2014-15, people of Pacific ethnicity had a higher rate of mosquito-borne virus diagnosis than other groups (Figure 4.a). Pacific people in New Zealand had five and twelve-fold higher rates than people of European/other ethnicities, in 2014 and 2015, respectively. During this period, Asian people had higher rates of Malaria than other ethnicities (Figure 4.b).

Table 1 shows the total case numbers for mosquito-borne viruses were highest for Pacific and European/other ethnic groups in 2015. Dengue Fever was the most common virus diagnosed among the major ethnic groups. Asian and European/other ethnic groups had similar Malaria case numbers.

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No socio-economic differences in rates of mosquito-borne diseases, 2014-15

In 2014-15, there were no differences in the rates of mosquito-borne disease diagnoses in New Zealand by different levels of socio-economic deprivation (For 2014-15, incidence rates were 5.8 v 6.4 cases of mosquito-borne virus diagnosis per 100,000 people living in the least deprived areas (NZDep2013 quintile 1) v the most deprived areas (quintile 5), respectively, and 0.7 v 0.7 cases of Malaria per 100,000 people living in quintile 1 v 5, respectively) (Atkinson et al 2014).

Most exotic diseases were diagnosed in the Auckland region, 2014-15

During 2014-15, people living in the Auckland region tended to be more likely to be diagnosed with a mosquito-borne virus than people living in other areas (Figure 5.a) (308 of 466 cases (66%) were in the Auckland region, 2014-15).

Figure 5.a: Incidence rates of mosquito-borne virus diagnosis in New Zealand, 2014 and 2015, by District Health Board

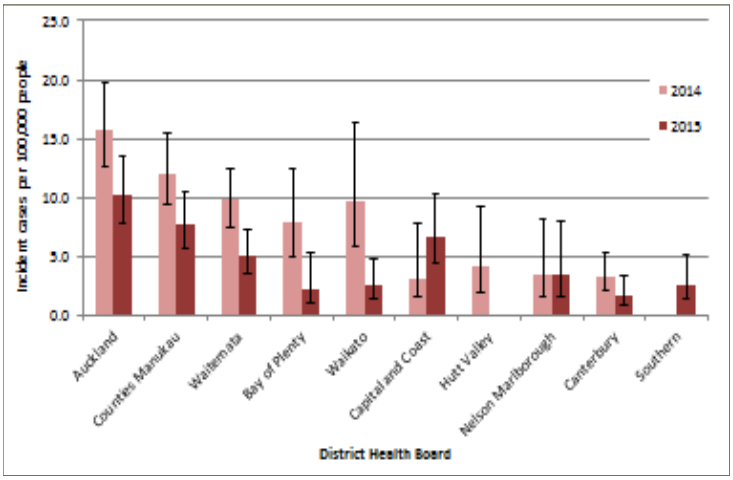
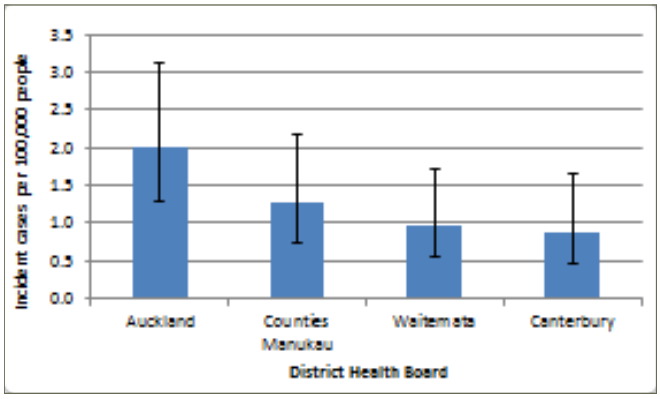


Figure 5.b: Incidence rates of Malaria diagnosis in New Zealand, 2014 and 2015, by District Health Board



Graphs present crude rates and 95% confidence intervals for counts >4 (see metadata sheet). Figure 4.b shows rates for two years aggregated data. Data Source: ESR, 2016

In 2014-15, the Auckland region had the highest number of Malaria cases diagnosed (43 cases in the region, including 19 cases in Auckland, 13 cases in Counties Manukau and 11 cases in Waitemata District Health Boards (DHB)), followed by Canterbury DHB (9 cases). However, due to these relatively small case numbers, incidence rates between these top four DHBs were not significantly different (Figure 5.b). All other DHBs had low or zero case numbers.

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* WHO = World Health Organization; ESR = Institute of Environmental Science and Research Limited

This indicator's metadata sheet can be viewed on the EHINZ website for further information

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