

Notifiable Disease Monitoring Report 2023

Tāmaki Makaurau (Auckland) &
Te Tai Tokerau (Northland)

National Public Health Service
Northern Region

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About the National Public Health Service

The NPHS is a directorate within Health New Zealand | Te Whatu Ora (Health NZ). NPHS is tasked with promoting and protecting the health and wellbeing of communities and preventing disease, with actions focused on reducing inequities, influencing health determinants and supporting people to be healthy where they live, learn, work and play. This report has been written by NPHS Northern Region, which covers Te Tai Tokerau (Northland) and Tāmaki Makaurau (Auckland).

NPHS Northern Region is responsible for preventing disease and improving the health of those living in Te Tai Tokerau and across the three Tāmaki Makaurau health districts (formerly District Health Boards): Te Toka Tumai Auckland, Waitematā and Counties Manukau.

NPHS Northern Region works alongside whānau, iwi, communities and organisations to create and support healthier communities and reduce or eliminate the cause and spread of infectious diseases. This involves collective efforts to improve the wider determinants that affect people's health, such as housing or transport. The region faces a number of challenges such as climate change, an ageing population and a rising prevalence of long-term health conditions. The reality is a growing demand for quality infrastructure and services because of these challenges, with the need to prioritise actions that advance equity and safeguard the needs of future generations. Addressing these issues is essential to improving population health and the prosperity of Te Tai Tokerau and Tāmaki Makaurau.

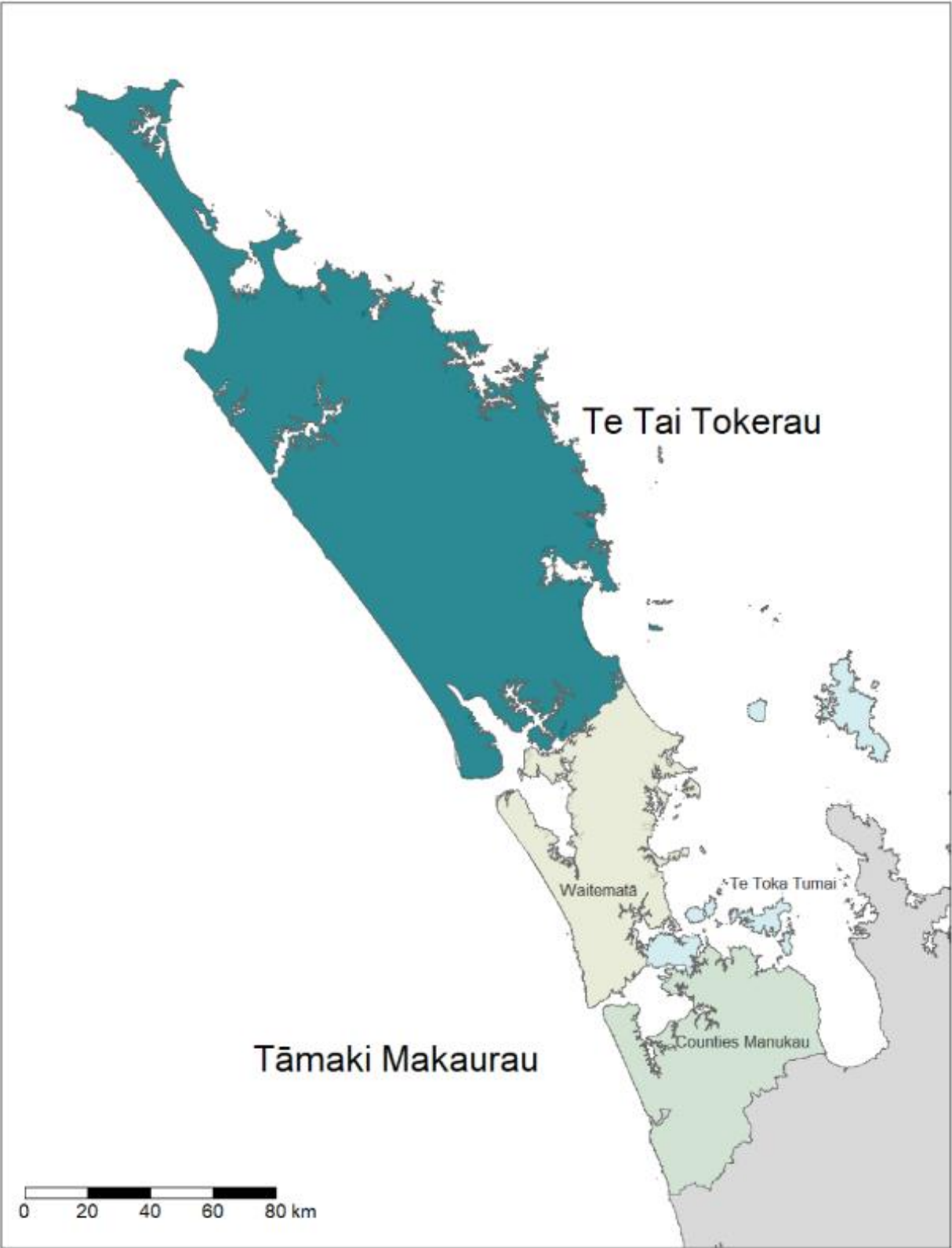
NPHS Northern Region has a statutory role under the Aotearoa New Zealand (NZ) *Public Health and Disability Act 2000* to improve, promote and protect the health of people and communities in Te Tai Tokerau and Tāmaki Makaurau. The medical officer of health has an enforcement and regulatory role under the Health Act 1956 and other legislative designations to protect the health of the community.

For more information on the NPHS please visit: www.tewhatauora.govt.nz/corporate-information/our-health-system/health-sector-organisations/national-public-health-service

Abbreviations and acronyms

AIDS	Acquired immunodeficiency syndrome
CFR	Case fatality rate
COVID-19	Coronavirus disease 2019
DHB	District Health Board
ECEC	Early childhood education centre
ESR	Institute of Environmental Science and Research
Hib	Haemophilus influenzae type B
HIV	Human immunodeficiency virus
IPD	Invasive Pneumococcal Disease
MoH	Ministry of Health - Manatū Hauora
NDCMS	Notifiable Diseases and Case Management System
NOS	Not otherwise specified
NEC	Not elsewhere classified
NFD	Not further defined
NZ	Aotearoa New Zealand
NZDep	New Zealand Deprivation Index
SARS-CoV-2	Severe acute respiratory syndrome coronavirus 2
Stats NZ	Statistics New Zealand
TB	Tuberculosis
VPD	Vaccine-preventable disease
VTEC/STEC	Verotoxin-producing <i>Escherichia coli</i> / Shiga toxin-producing <i>Escherichia coli</i>
WHO	World Health Organisation

Figure 1: NPHS Northern Region geographical area, 2024



Executive summary

2023 was a year of continued change across the health sector in Aotearoa New Zealand (NZ). Implementation of the Pae Ora (Healthy Futures) Act on 1 July 2022 established a national health system, led by Health NZ. In parallel Te Pou Hauora Tūmatanui - Public Health Agency and the National Public Health Service were also established. As part of these reforms the public health services of Tāmaki Makaurau and Te Tai Tokerau were merged in 2023 to form a single Northern Region public health service.

This report presents information for Tāmaki Makaurau and Te Tai Tokerau distinctly, due to the way the data is available and given the noted variances in populations across these sub-regions. Since the data for Te Tai Tokerau is being presented for the first time, comparisons with previous years cannot be made for cumulative disease categories. Additionally, due to the lower proportions of Pacific and Asian populations in Te Tai Tokerau, caution should be exercised when interpreting disease rates, as this may skew the data.

COVID-19 cases still represent the highest number of notifications. However, this year's edition does not include COVID-19 data as the virus is now considered endemic and comprehensive reporting is available from [Health NZ](#). To effectively understand COVID-19 trends, it is most useful to combine hospitalisation data, wastewater analysis, and whole genome sequencing (WGS) to track genomic shifts.

Notifiable diseases

In 2023, there were 5,683 disease notifications in Tāmaki Makaurau and 866 in Te Tai Tokerau. The confirmed cases comprised 4,418 (77.7%) in Tāmaki Makaurau and 707 (81.6%) in Te Tai Tokerau. The highest burden of cases was attributed to enteric disease, which accounted for 80% of the notifications, with campylobacteriosis representing the most reported disease in both regions. Additionally, vaccine-preventable diseases were responsible for the highest number of deaths, with 22 fatalities in Tāmaki Makaurau and six in Te Tai Tokerau.

There was an increase in vector-borne diseases in Tāmaki Makaurau compared to the previous year, with dengue and malaria being the most prevalent, reporting 28 and 24 cases respectively. In Te Tai Tokerau, there was only one case of dengue fever in 2023, with no other vector-borne diseases reported. Across the Northern region, India emerged as the most common source country for vector-borne diseases, accounting for ten cases of dengue fever, four cases of chikungunya fever, and two cases of malaria, all linked to travel during their exposure period.

Te Tai Tokerau has a higher incidence of leptospirosis, with 7.4 cases per 100,000 population, compared to Tāmaki Makaurau (0.8 cases per 100,000) and the national average (3.3 cases per 100,000). This elevated incidence rate in Te Tai Tokerau is largely attributed to its larger rural population, which more frequently engages in activities such as farming and pest control. Similarly, the incidence of cryptosporidiosis in Te Tai Tokerau is nearly twice the national average, attributed to the same risk factors.

There was an increase in vaccine-preventable diseases in both Tāmaki Makaurau (345 cases) and Te Tai Tokerau (60 cases) compared to the previous year. The most common vaccine-preventable diseases in both Tāmaki Makaurau and Te Tai Tokerau were invasive pneumococcal disease (IPD), followed by pertussis. IPD and pertussis were highest among Māori and Pacific peoples, with many cases also living in areas of high socioeconomic deprivation. Additionally, IPD was associated with a significant number of hospitalisations and deaths. Furthermore, meningococcal disease rates were highest among Pacific children in Tāmaki Makaurau and among tamariki Māori in Te Tai Tokerau.

Notifications for measles and mumps were relatively high in both areas, with approximately 2.5% of measles notifications in Tāmaki Makaurau and 5.9% in Te Tai Tokerau resulting in confirmed cases. Similarly, 5.9% of mumps notifications led to confirmed cases in Tāmaki Makaurau, while no cases were confirmed in Te Tai Tokerau. The high number of notifications created a significant workload for the Northern region, and there are ongoing concerns regarding low immunisation rates within the community.

Acute rheumatic fever cases in Tāmaki Makaurau increased to 91 (5.2 cases per 100,000) in 2023, a substantial increase from 35 cases in 2022. Case numbers in 2023 were comparable to those seen before the COVID-19 pandemic. In Te Tai Tokerau, there was a slight rise in cases (1.5 cases per 100,000) compared to the previous year, but the figures remained significantly lower than pre-pandemic levels. A total of 150 cases were reported nationally, equating to an incidence rate of 2.9 cases per 100,000 population. The highest rates of the disease are observed in the most socio-economic deprived areas and predominantly affect Pacific and Māori children.

Tāmaki Makaurau reported a higher incidence rate of tuberculosis (TB), with 8.9 cases per 100,000 population, compared to Te Tai Tokerau at 2.5 cases per 100,000 and the national average of 5.6 cases per 100,000. TB is more prevalent among immigrants and disproportionately impacts Asian communities, necessitating considerable healthcare resources due to its significant public health implications and the extended duration of treatment often required.

Outbreaks

In 2023, there were 164 outbreaks notified in Tāmaki Makaurau and 20 in Te Tai Tokerau. As in previous years, enteric outbreaks represented the majority of notifications and cases, primarily occurring in early childhood education centers and residential aged care facilities. In contrast, non-enteric outbreaks were generally smaller and predominantly occurred within household settings.

Norovirus was the most common cause of enteric outbreaks in the Northern region, accounting for 1,762 cases in Tāmaki Makaurau and 196 cases in Te Tai Tokerau. Additionally, pertussis was the most common cause of non-enteric outbreaks in Tāmaki Makaurau, while a measles outbreak was the most significant outbreak reported in Te Tai Tokerau.

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1. Introduction

Purpose

The overarching purpose of the NPHS Northern Region Notifiable Disease Monitoring Report 2023, is to outline the burden of disease and highlight inequities across the Northern region.

The objectives of this report are to:

- Monitor trends in disease and health states, risks and protective behaviours.
- Provide information to support healthy public policy.
- Enable collaboration with communities to address their health needs.
- Provide suggestions around improvements to clinical practice, research and policy to address public health issues.

Scope

This report covers notifiable diseases and outbreaks for people who live, work and travel within Te Tai Tokerau and Tāmaki Makaurau (**Figure 1**).

Report structure

The body of this report provides the following information:

- Section 2 outlines the methods behind this report, including basic terms and definitions, the disease notification process and data sources.
- Section 3 presents disease notifications within the Northern region for 2023, including general trends and comparisons to all of NZ where indicated.
- Section 4 describes outbreaks within the Northern region for 2023.

2. Methods

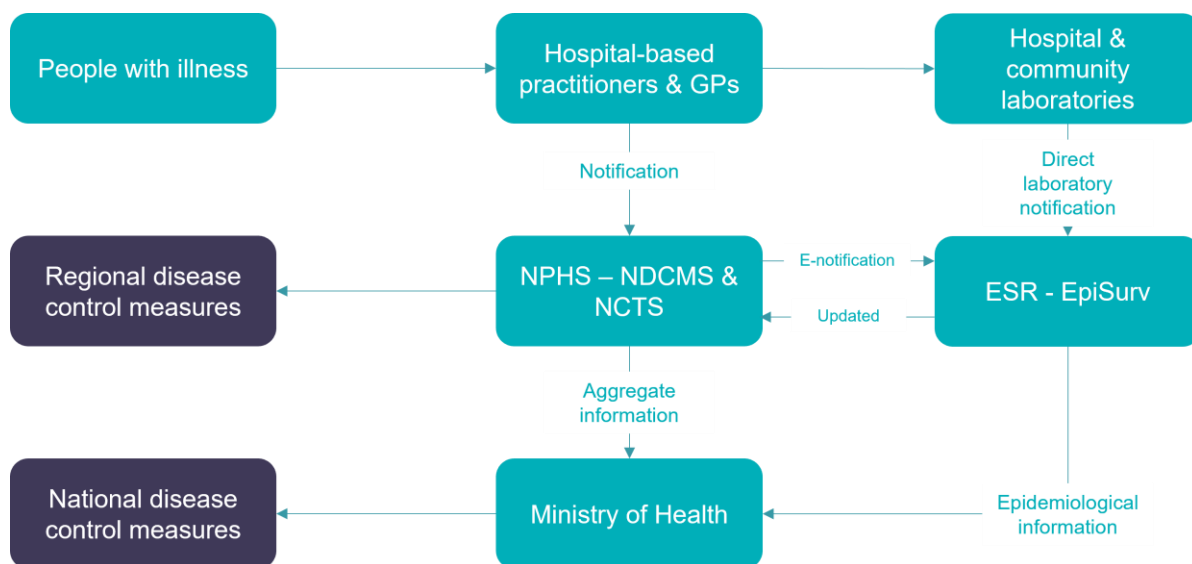
Notification process

Health practitioners and laboratories are required to report (notify) actual and suspected cases of notifiable diseases. These diseases are listed in Schedules 1 and 2 of the *Health Act 1956* (**Appendix 1**).¹

Notifications may be received from clinicians working in hospitals, general practices, urgent care centres or hospital and community laboratories (Figure 2). Notifications are promptly investigated and subsequently classified as confirmed, probable, suspected, under investigation or 'not a case' based on nationally determined case definitions published in the Ministry of Health | Manatū Hauora (MoH) *Communicable Disease Control Manual* (CDC Manual).¹ These classifications help determine whether public health action is required to manage the case and reduce the risk to others.

Case and contact management is managed through NPHS Northern Region's independent Notifiable Diseases and Case Management System (NDCMS), the NPHS' National Contact Tracing Solution (NCTS) and for measles, the Notifiable Disease Management System (NDMS). The MoH oversees national disease surveillance through the national notifiable disease database, EpiSurv, which is administered by the Institute of Environmental Science and Research (ESR). This informs regional and national disease control measures.

Figure 2: Notifiable disease process for NPHS Northern Region



¹ Ministry of Health. (2022). Notifiable diseases. Retrieved 05 July 2024, from <https://www.health.govt.nz/our-work/diseases-and-conditions/notifiable-diseases>.

Basic terms and definitions

'Notifications' refer to all instances of a disease as notified by laboratories and healthcare practitioners, regardless of the case classification. 'Cases' refers to only those notifications classified as confirmed, probable, or in some cases suspected, as per the MoH CDC Manual.

Unless cited otherwise, disease definitions and descriptions are sourced from the MoH CDC Manual and patient information webpages.^{2,3}

Data sources

Disease notification and outbreak information is provided for January to December 2023 based on data extracted from EpiSurv and NDCMS. Information is presented for Te Tai Tokerau and Tāmaki Makaurau alongside the totals for NZ as indicated.

Unless otherwise specified, cases, notifications, hospitalisations and deaths are presented as counts. Hospitalisations are defined as any hospital assessment or treatment lasting three hours or more, excluding triage and waiting time.⁴ Deaths refer to cases who died during the case investigation process and this may include instances where someone died with a notifiable disease but it was not identified as the cause of death. Some enteric diseases, such as campylobacteriosis, giardiasis and yersiniosis, are not fully investigated by NPHS Northern Region. Hospitalisations and deaths for these diseases are therefore not included in this report.

Incidence is expressed as crude rates, defined as the number of cases for a defined population based on estimated resident population statistics (**Appendix 2**).⁵ Incidence rates for Tāmaki Makaurau are calculated using the combined population of the Waitematā, Te Toka Tumai Auckland and Counties Manukau health districts. This figure is slightly larger than the unitary authority population due to the Counties Manukau district covering some parts of Waikato District Council. Incidence rates for NZ are calculated using the combined population of the remaining 17 health districts. Caution must be applied when interpreting rates for diseases with case numbers below 20, as these rates tend to have poor reliability.⁶ Cumulative incidence rates, hospitalisations and mortality have been deemed uninformative for the specified disease groups and therefore are not included.

Age groups comply with agreed national reporting age group categories. Simplified categories are used, except where this obscures meaningful differences.

² Ministry of Health. (2012). *Communicable Disease Control Manual*. Wellington: Ministry of Health.

³ Ministry of Health. (2016). *Diseases and illnesses*. Retrieved 11 May 2023, from <https://www.health.govt.nz/your-health/conditions-and-treatments/diseases-and-illnesses>.

⁴ Ministry of Health. (2022). *Appendix B: National Collections Glossary*. Retrieved 13 June 2023, from https://www.health.govt.nz/system/files/documents/pages/appendix_b_national_collections_glossary_2022.pdf.

⁵ Stats NZ. (2022). *Subnational population estimates (DHB, DHB constituency), by age and sex, at 30 June 1996-2022 (2015 boundaries)*. Retrieved 6 June 2023, from <https://nzdotstat.stats.govt.nz/wbos/Index.aspx?DataSetCode=TABLECODE7509>.

⁶ Centres for Disease Control and Prevention. (2023). *Suppression of Rates and Counts*. Retrieved 2 August 2023, from https://www.cdc.gov/cancer/uscs/technical_notes/stat_methods/suppression.htm.

Unless otherwise specified, ethnicity refers to prioritised ethnicity (Māori, Pacific, Asian, Other) as per the HISO 10001:2017 Ethnicity Data Protocols.⁷ Ethnic group-specific incidence rates are based on subnational ethnic population projections using a 2018 base and are presented as crude rates (**Appendix 2**).⁸ Level 2 ethnicity (total response) is included in some instances to provide greater detail around ethnicity of cases. As total response ethnicity allows up to three responses per person, totals may add up to more than 100%.

Risk and protective factors are obtained through phone and in-person interviews with cases and are presented where relevant. As cases may report more than one risk factor, totals may add up to more than 100%.

Overseas travel history is presented for diseases usually acquired outside NZ. This may be listed as 'source country', 'travel history', or 'last country visited' depending on the information available for each disease.

Socioeconomic deprivation data is provided for selected diseases using NZDep2018 analysis of 2018 census variables.⁹ District-specific incidence rates are calculated using estimated resident population statistics (**Appendix 2**).

Exotic mosquito surveillance data is sourced from biosecurity logging records as collected by NPHS Northern Region health protection staff and external contractors.

Limitations

NPHS Northern Region is unable to include iwi affiliation data in this report as this information is not collected by health districts in the region. In June 2022 the MoH established an **Iwi Affiliation Data Project** which aims to set up systems and processes for collecting this information to improve equity of health outcomes for Māori.¹⁰ NPHS Northern Region looks forward to including iwi affiliation data in future editions once available.

Outbreak data does not include information around the age or ethnicity of individual cases, however age ranges are provided where relevant.

Hospitalisations, deaths, risk factors and protective factors are manually recorded using case interviews and electronic medical records and as such may not reflect the true extent of the disease or exposure.

NPHS Northern Region ceased routine interviews of campylobacteriosis, cryptosporidiosis, giardiasis and yersiniosis cases in 2017. Thus, information on hospitalisations, deaths and risk factors is not available for these diseases.

⁷ Ministry of Health. (2017). *HISO 10001:2017 Ethnicity Data Protocols*. Wellington: Ministry of Health.

⁸ Health NZ. (2024). *Populations web tool*. Retrieved June 2024, from <https://tewhatauora.shinyapps.io/populations-web-tool/>.

⁹ University of Otago. (n.d). *Socioeconomic Deprivation Indexes: NZDep and NZiDep, Department of Public Health*. Retrieved 1 July 2023, from <https://www.otago.ac.nz/wellington/departments/publichealth/research/hirp/otago020194.html>.

¹⁰ Ministry of Health. (2022). *HISO 10094:2022 Māori Descent and Iwi Affiliation Data Protocols*. Wellington: Ministry of Health.

The most recent population denominator for the estimated resident population is due later this year, necessitating the use of approximate interpolation methods from previous census data and Health NZ data to populate denominator figures.

3. Notifiable diseases – Northern Region

Key points

- In 2023 the total number of disease notifications was 5,683 in Tāmaki Makaurau and 866 in Te Tai Tokerau. The total number of ‘true’ cases for each area was 4,418 (77.7%) in Tāmaki Makaurau and 707 (81.6%) in Te Tai Tokerau.
- In Tāmaki Makaurau there were 945 hospitalisations and 40 deaths due to the reported notifiable diseases, with a hospitalisation rate of 21.4% and case fatality rate (CFR) of 0.9%. In Te Tai Tokerau there were 199 hospitalisations and seven deaths, with a hospitalisation rate of 28.1% and CFR of 1.0%.
- In 2023 nearly 80% of notifications received were for enteric diseases. This amounted to 3,457 cases in Tāmaki Makaurau and 601 cases in Te Tai Tokerau.
- Vaccine-preventable diseases (VPDs) had the highest number of deaths for both regions. Tāmaki Makaurau recorded 22 deaths, with a CFR of 6.4%. Te Tai Tokerau recorded six deaths, with a CFR of 10%.

Table 1: Total notifications and cases by disease area, Tāmaki Makaurau, 2023

Disease area	Total notifications	Cases (%)	Rate per 100,000	Hospitalisations (%)	Deaths (%)
Blood-borne diseases	356	19 (5.3)	-	-	-
Hepatitis B	40	8 (20)	0.5	3 (37.5)	0
Hepatitis C	316	11 (3.5)	0.6	1 (9.1)	0
Vector-borne diseases	64	60 (93.8)	-	-	-
Chikungunya fever	5	5 (100)	0.3	2 (40)	0
Dengue fever	31	28 (90.3)	1.6	14 (50)	0
Malaria	24	24 (100)	1.4	20 (83.3)	0
Murine typhus	0	0	0	0	0
Rickettsial disease	3	2 (66.7)	0.1	2 (100)	0
Ross River virus infection	0	0	0	0	0
Zika virus	1	1 (100)	0.1	0	0
Zoonotic diseases	23	18 (78.3)	-	-	-
Brucellosis	3	3 (100)	0.2	3 (100)	0
Hydatid disease	1	1 (100)	0.1	1 (100)	0
Leptospirosis	14	14 (100)	0.8	12 (85.7)	0
Mpox	10	8 (80)	0.5	1 (12.5)	0
Q fever	4	0	0	0	0
Taeniasis	1	0	0	0	0

Enteric diseases	3,656	3,457 (94.6)	-	-	-
Botulism	0	0	0	0	0
Campylobacteriosis	1,942	1,942 (100)	110	*	*
Cholera	7	0	0	0	0
Cryptosporidiosis	196	195 (99.5)	11	*	*
Gastroenteritis - unknown cause	14	7 (50)	0.4	2 (28.6)	0
Gastroenteritis / foodborne intoxication	13	9 (69.2)	0.5	4 (44.4)	0
Giardiasis	292	292 (100)	16.5	*	*
Hepatitis A	39	15 (38.5)	0.8	12 (80)	0
Hepatitis NOS	5	1 (20)	0.1	1 (100)	0
Listeriosis	14	14 (100)	0.8	14 (100)	7 (50)
Listeriosis - perinatal	2	2 (100)	0.1	2 (100)	0
Paratyphoid fever	17	17 (100)	1	12 (70.6)	0
Salmonellosis	262	245 (93.5)	13.9	87 (35.5)	0
Shigellosis	215	81 (37.7)	4.6	20 (24.7)	0
Toxic shellfish poisoning	0	0	0	0	0
Typhoid fever	35	35 (100)	2	30 (85.7)	0
VTEC/STEC infection	176	175 (99.4)	9.9	52 (29.7)	0
Yersiniosis	427	427 (100)	24.2	*	*

Environmental diseases	269	249 (92.6)	-	-	-
Chemical poisoning from the environment	2	2 (100)	0.1	2 (100)	0
Hazardous substances injury	24	23 (95.8)	1.3	23 (100)	0
Lead absorption	142	141 (99.3)	8	2 (1.4)	0
Legionellosis	101	83 (82.2)	4.7	80 (96.4)	6 (7.2)
Vaccine-preventable diseases	974	345 (35.4)	-	-	-
Diphtheria	151	3 (2)	0.2	1 (33.3)	0
Haemophilus influenzae type b	35	1 (2.9)	0.1	1 (100)	0
Invasive pneumococcal disease	256	247 (96.5)	14	239 (96.8)	21 (8.5)
Measles	202	5 (2.5)	0.3	3 (60)	0
Meningococcal disease	20	18 (90)	1	18 (100)	0
Mumps	145	8 (5.5)	0.5	1 (12.5)	0
Pertussis	163	63 (38.7)	3.6	16 (25.4)	1 (1.6)
Rubella	2	0	0	0	0
Other bacterial diseases	341	270 (79.2)	-	-	-
Leprosy	2	2 (100)	0.1	0	0
Rheumatic fever - initial attack	108	91 (84.3)	5.2	91 (100)	0
Rheumatic fever - recurrent attack	8	3 (37.5)	0.2	3 (100)	0
Tuberculosis disease - new case	197	157 (79.7)	8.9	93 (59.2)	5 (3.2)

Tuberculosis disease - relapse or reactivation	15	9 (60)	0.5	6 (66.7)	0
Tuberculosis infection - on preventive treatment	1	0	0	0	0
Total	5,683	4,418 (77.7)	-	-	-

Source: EpiSurv, Stats NZ

*Not routinely investigated by NPHS Northern Region

Table 2: Total notifications and cases by disease area, Te Tai Tokerau, 2023

Disease area	Total notifications	Cases (%)	Rate per 100,000	Hospitalisations (%)	Deaths (%)
Blood-borne diseases	43	1 (2.3)	-	-	-
Hepatitis B	0	0	0	0	0
Hepatitis C	43	1 (2.3)	0.5	0	0
Vector-borne diseases	4	2 (50)	-	-	-
Chikungunya fever	0	0	0	0	0
Dengue fever	1	1 (100)	0.5	1 (100)	0
Malaria	0	0	0	0	0
Murine typhus	0	0	0	0	0
Rickettsial disease	2	1 (50)	0.5	1 (100)	0
Ross River virus infection	1	0	0	0	0
Zika virus	0	0	0	0	0
Zoonotic diseases	17	15 (88.2)	-	-	-
Brucellosis	0	0	0	0	0
Hydatid disease	0	0	0	0	0
Leptospirosis	17	15 (88.2)	7.3	10 (66.7)	0
Mpox	0	0	0	0	0
Q fever	0	0	0	0	0
Taeniasis	0	0	0	0	0
Enteric diseases	615	601 (97.7)	-	-	-
Botulism	0	0	0	0	0

Campylobacteriosis	266	266 (100)	130.2	*	*
Cholera	2	0	0	0	0
Cryptosporidiosis	64	64 (100)	31.3	*	*
Gastroenteritis - unknown cause	16	16 (100)	7.8	0	0
Gastroenteritis / foodborne intoxication	42	39 (92.9)	19.1	11 (28.2)	0
Giardiasis	36	36 (100)	17.6	*	*
Hepatitis A	0	0	0	0	0
Hepatitis NOS	0	0	0	0	0
Listeriosis	1	1 (100)	0.5	1 (100)	1 (100)
Listeriosis - perinatal	0	0	0	0	0
Paratyphoid fever	0	0	0	0	0
Salmonellosis	39	37 (94.9)	18.1	15 (40.5)	0
Shigellosis	9	4 (44.4)	2	1 (25)	0
Toxic shellfish poisoning	2	0	0	0	0
Typhoid fever	1	1 (100)	0.5	1 (100)	0
VTEC/STEC infection	85	85 (100)	41.7	19 (22.4)	0
Yersiniosis	52	52 (100)	25.5	*	*
Environmental diseases	26	18 (69.2)	-	-	-
Chemical poisoning from the environment	4	2 (50)	1	1 (50)	0
Hazardous substances injury	0	0	0	0	0

Lead absorption	12	12 (100)	5.9	0	0
Legionellosis	10	4 (40)	2	4 (100)	0
Vaccine-preventable diseases	144	60 (41.7)	-	-	-
Diphtheria	0	0	0	0	0
Haemophilus influenzae type b	4	0	0	0	0
Invasive pneumococcal disease	50	46 (92)	22.6	43 (93.5)	6 (13)
Measles	51	3 (5.9)	1.5	1 (33.3)	0
Meningococcal disease	4	4 (100)	2	4 (100)	0
Mumps	11	0	0	0	0
Pertussis	24	7 (29.2)	3.4	2 (28.6)	0
Rubella	0	0	0	0	0
Other disease group	17	10 (58.8)	-	-	-
Leprosy	0	0	0	0	0
Rheumatic fever - initial attack	4	3 (75)	1.5	3 (100)	0
Rheumatic fever - recurrent attack	2	2 (100)	1	2 (100)	0
Tuberculosis disease - new case	11	5 (45.5)	2.5	3 (60)	0
Tuberculosis disease - relapse or reactivation	0	0	0	0	0
Tuberculosis infection - on preventive treatment	0	0	0	0	0
Total	866	707 (81.6)	-	-	-

Source: EpiSurv, Stats NZ

Overview

In 2023 there were 5,683 disease notifications in Tāmaki Makaurau and 866 in Te Tai Tokerau (excluding COVID-19). Of the Tāmaki Makaurau notifications, 4,418 (77.7%) met the criteria for a confirmed, probable or suspected case while 1,265 (22.3%) were classified as 'not a case'. Of the Te Tai Tokerau notifications, 707 (81.6%) met the criteria for a confirmed, probable or suspected case while 159 (18.4%) were classified as 'not a case'.

Enteric diseases had the largest number of cases, representing almost 80% of total cases in Tāmaki Makaurau and more than 80% of total cases in Te Tai Tokerau. This was largely due to campylobacteriosis (1,942 cases in Tāmaki Makaurau and 266 in Te Tai Tokerau). Enterics also had the highest incidence of disease, with 195.8 cases per 100,000 population for Tāmaki Makaurau and 294.7 cases per 100,000 population for Te Tai Tokerau.

Hepatitis B and C (included under blood-borne diseases) had the lowest proportion of actual cases. Only 19 of 356 (5.3%) notifications in Tāmaki Makaurau and one of 43 (2.3%) notifications in Te Tai Tokerau met the criteria for a confirmed or probable case. This was mainly due to a change in direct laboratory notifications for hepatitis C which resulted in a larger number of notifications. This was a result of increased testing to achieve the World Health Organisation's (WHO) goal to eliminate hepatitis C by 2030. Most acute hepatitis B and C infections require investigation and public health action, while chronic infections are classified as 'not a case'.

Overall, there were 945 hospitalisations and 40 deaths in Tāmaki Makaurau, and 199 hospitalisations and seven deaths in Te Tai Tokerau associated with notifiable diseases (excluding COVID-19). This equated to an overall hospitalisation rate of 21.4% for Tāmaki Makaurau and 28.1% for Te Tai Tokerau for 2023. The overall CFR was 0.9% for Tāmaki Makaurau and 1.0% for Te Tai Tokerau.

Vaccine-preventable diseases (VPDs) caused the highest number of deaths for both regions. Tāmaki Makaurau recorded 22 deaths, with a CFR of 6.4%. Te Tai Tokerau recorded six deaths, with a CFR of 10%.

No notifications were received for anthrax, arboviral diseases (other than dengue and chikungunya fevers), *Cronobacter* species invasive disease, cysticercosis, decompression sickness, highly pathogenic avian influenza, Middle East Respiratory Syndrome (MERS), non-seasonal influenza, plague, poliomyelitis, primary amoebic meningoencephalitis, rabies, Severe Acute Respiratory Syndrome (SARS), tetanus, trichinosis or viral haemorrhagic fevers (other than dengue and chikungunya fevers). These diseases are rarely notified in Tāmaki Makaurau and Te Tai Tokerau, with no cases recorded in the past five years. For clarity these diseases are therefore not discussed any further in this report.

3.1 Blood-borne diseases

Blood-borne diseases refer to viral and bacterial infections that can be spread through contact with infected blood and body fluids. Notifiable blood-borne infections in NZ include hepatitis B,

hepatitis C and HIV infection. For HIV reporting, refer to '[Section 3.8 - Diseases under surveillance by other organisations](#)'.

In 2023, Tāmaki Makaurau received 356 notifications for blood-borne diseases (Table 3). Of these, 19 (5.3%) met the criteria for a confirmed or probable case. Te Tai Tokerau received 43 notifications, all for Hepatitis C (Table 4). Only one of these cases fulfilled the case definition as a confirmed case.

Table 3: Blood-borne infections in Tāmaki Makaurau, 2023

Disease	Total notifications	Total cases (%)	Rate per 100,000	Hospitalisations (%)	Deaths (%)
Hepatitis B	40	8 (20.0)	0.5	3 (37.5)	0
Hepatitis C	316	11 (3.5)	0.6	1 (9.1)	0
Total	356	19 (5.3)	-	-	-

Source: EpiSurv, Stats NZ

Table 4: Blood-borne infections in Te Tai Tokerau, 2023

Disease	Total notifications	Total cases (%)	Rate per 100,000	Hospitalisations (%)	Deaths (%)
Hepatitis B	0	0	-	-	0
Hepatitis C	43	1 (2.3)	0.5	0	0
Total	43	1 (2.3)	-	-	-

Source: EpiSurv, Stats NZ

3.1.1 Hepatitis B

Hepatitis B is an infectious liver disease caused by the hepatitis B virus. Transmission occurs largely through contact with blood or other body fluids of an infected person, such as through sexual contact, body piercing and tattooing. Perinatal mother-to-infant transmission is now uncommon in NZ.

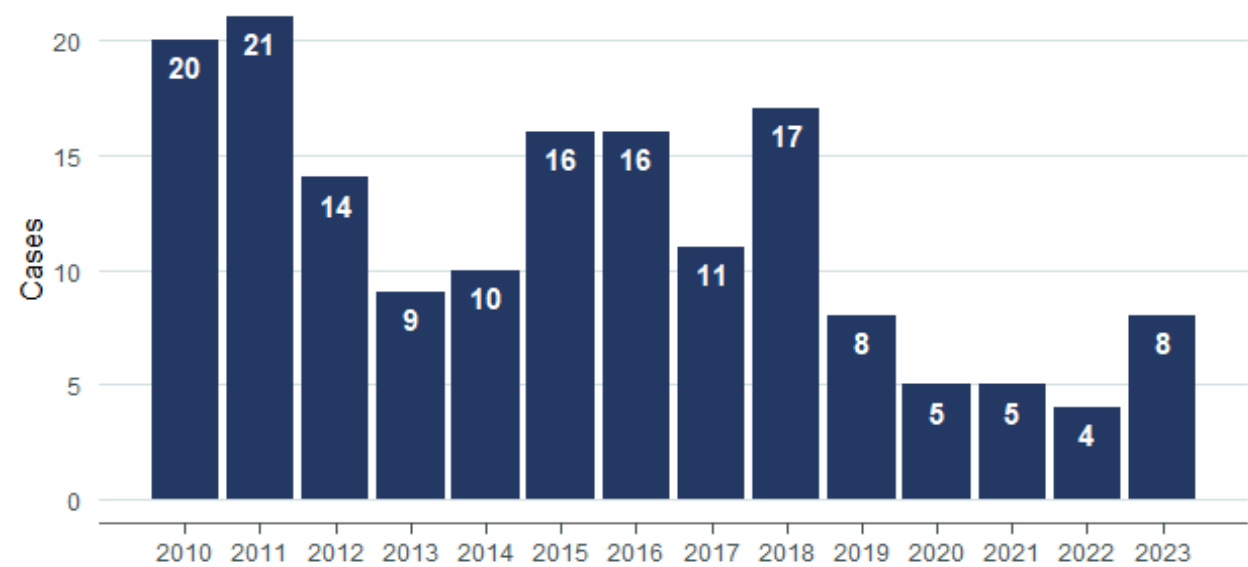
Acute infection often involves a mild illness with fever, jaundice, anorexia and abdominal discomfort. Only acute cases of hepatitis B are notifiable.

While most adults recover fully, some people may continue to carry the virus for several years and may develop liver damage and liver cancer. An estimated 1-2 percent of the NZ population

are chronic carriers of hepatitis B. For surveillance purposes, only cases of acute hepatitis B are notifiable ('incident' cases).

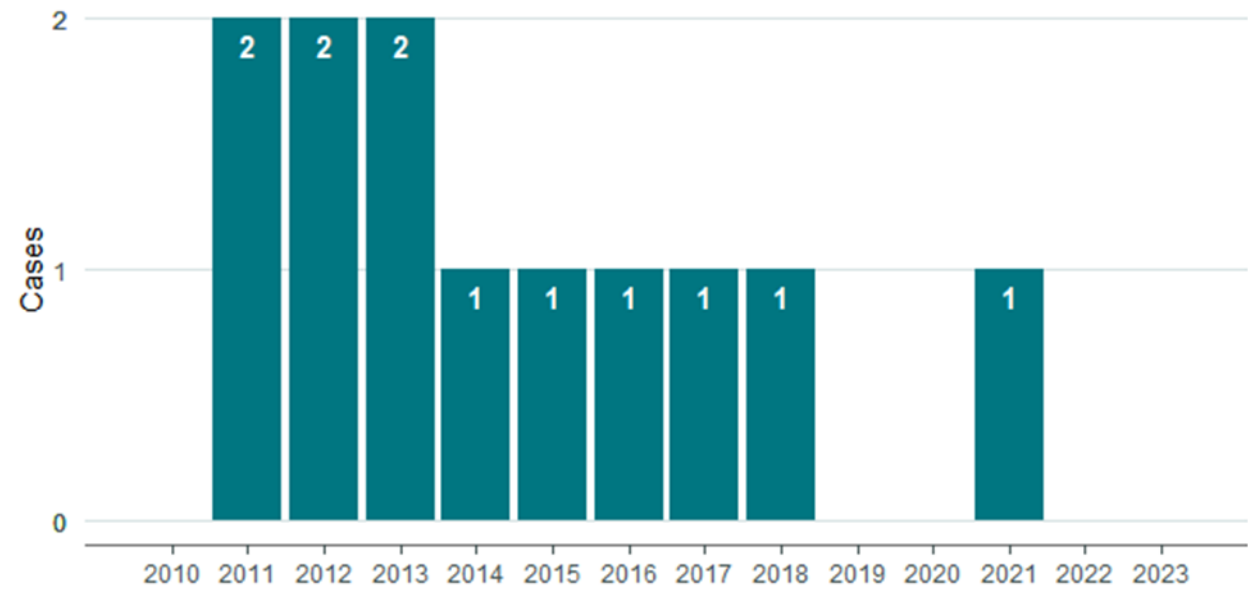
There were eight cases of acute hepatitis B in Tāmaki Makaurau and zero cases in Te Tai Tokerau. The incidence rate for Tāmaki Makaurau was 0.5 cases per 100,000 population. Nationally, the incidence rate was 0.4 cases per 100,000 population. The last notified case in Te Tai Tokerau was in 2021.

Figure 3: Acute hepatitis B cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

Figure 4: Acute hepatitis B cases in Te Tai Tokerau, 2010 to 2023



Source: EpiSurv

Figure 3 and 4 show the number of acute hepatitis B cases in Tāmaki Makaurau and Te Tai Tokerau respectively between 2010 and 2023.

In Tāmaki Makaurau, case numbers in 2023 were the same as 2019, potentially reflecting a return to pre-COVID-19 cases numbers. The 2023 case numbers were still lower than those typically seen between 2010 and 2018.

Table 5: Risk factors associated with acute hepatitis B in Tāmaki Makaurau, 2023

Risk factor	Cases	Percent
Household contact with a confirmed case in previous 60 days	2	25
Case overseas during incubation period	1	12.5
Sexual contact involving possible faecal-oral transmission in previous three months	1	12.5
Has the case undergone body piercing or tattooing procedures in the last 12m	1	12.5
History of injecting drug use	1	12.5

Source: EpiSurv

Table 5 above shows the risk factors associated with developing acute hepatitis B in 2023. These included household contact with a confirmed case, sexual contact with a confirmed case, body piercing or tattooing within the previous 12 months and previous injecting drug use. One case also reported being overseas during their incubation period.

3.1.2 Hepatitis C

Hepatitis C is an infectious liver disease caused by the hepatitis C virus. Transmission occurs largely through exposure to an infected person’s blood, such as through sharing contaminated injecting equipment or during sexual contact with a confirmed case.

Acute infection is often asymptomatic but may involve a mild illness with jaundice and anorexia. It is estimated up to 40% of infected individuals remain undiagnosed due to lack of awareness of exposure and lack of symptoms.

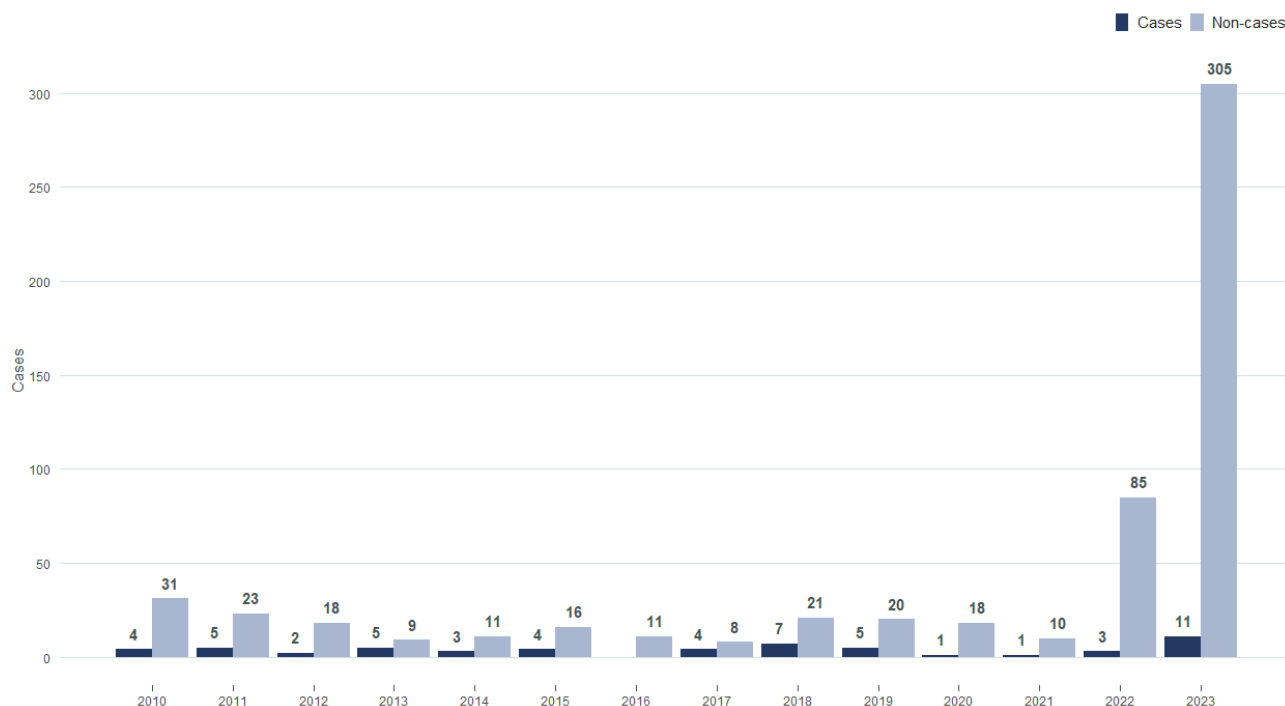
Without successful treatment, infected individuals may develop liver cirrhosis, liver cancer or liver failure. Hepatitis C is the leading cause of liver transplantation in NZ.

Hepatitis C is a curable infectious disease and NZ has signed up to the WHO goal of eliminating hepatitis C by 2030.

For surveillance purposes, only cases of acute hepatitis C are notifiable (‘incident’ cases).

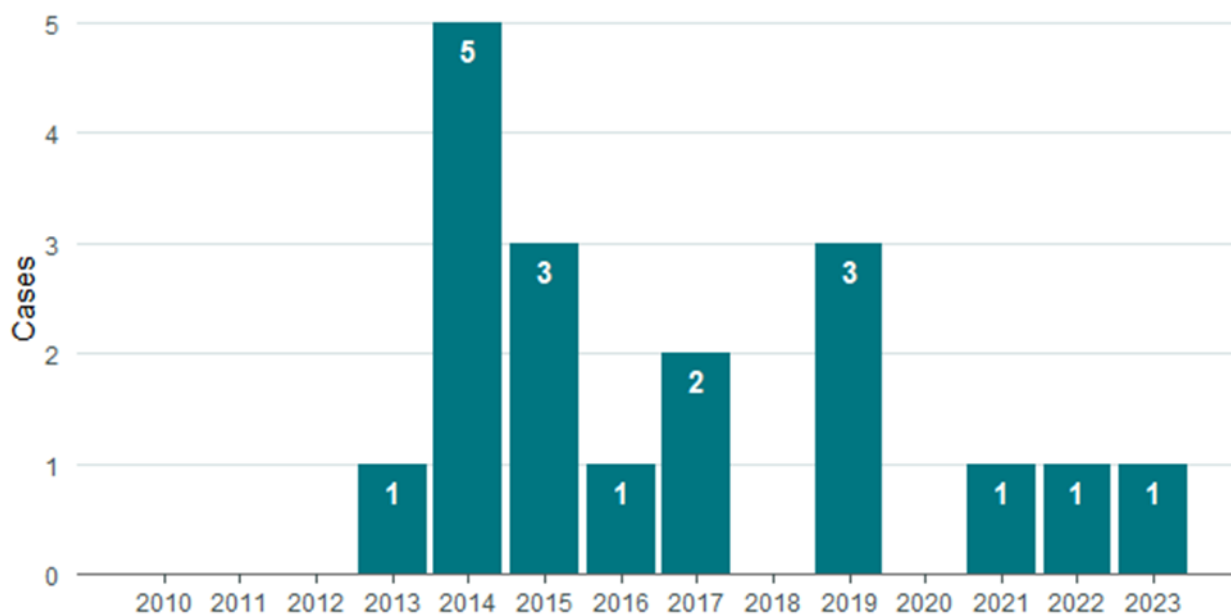
There were 11 cases of acute hepatitis C in Tāmaki Makaurau in 2023, one of which was hospitalised. There was a single case of hepatitis C in Te Tai Tokerau in 2023. The incidence rate in Tāmaki Makaurau was 0.6 cases per 100,000 population, matching that of the whole country.

Figure 5: Total acute hepatitis C notifications in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv/NDCMS

Figure 6: Acute hepatitis C cases in Te Tai Tokerau, 2010 to 2023



Source: EpiSurv

The number of hepatitis C notifications rose dramatically between 2021 (11), 2022 (88) and 2023 (316). The sharp rise in notifications in 2022 was due to a change in the direct laboratory notification process which resulted in the Tāmaki Makaurau service being notified of all positive hepatitis C screening results. In previous years, hepatitis C results were only notified when there was evidence of seroconversion to hepatitis C within 12 months of the date of testing. The increase in notifications since 2021 was also potentially due to increased awareness, testing and treatment within the community. Hepatitis C is a curable infectious disease and Aotearoa New Zealand has signed up to the WHO goal of eliminating hepatitis C by 2030.

The increase in notifications resulted in the proportion of confirmed and probable cases falling to 3.4% of notifications, compared to an average of 17.4% of notifications between 2010 and 2021.

There were 11 confirmed acute cases of hepatitis C in 2023, nearly four times the number of actual cases in 2022. There was a single confirmed case in Te Tai Tokerau.

Table 6: Risk factors associated with acute hepatitis C in Tāmaki Makaurau, 2023

Risk factor	Cases	Percent
History of injecting drug use	7	63.6
Case overseas during incubation period	1	9.1
Sexual contact involving possible faecal-oral transmission in previous three months	1	9.1

Source: EpiSurv

Table 7: Risk factors associated with acute hepatitis C in Te Tai Tokerau, 2023

Risk factor	Cases	Percent
History of injecting drug use	1	100

Source: EpiSurv

Table 6 shows the risk factors associated with developing acute hepatitis C in Tāmaki Makaurau in 2023. The most common risk factor was a history of injecting drug use followed by overseas travel within the previous six months and sexual contact. For the one case in Te Tai Tokerau in 2023 the identified risk factor was injecting drug use (Table 7).

Occasional cases meet the case definition of an acute case following reinfection. It is possible to be re-infected with hepatitis C if the same risk factors are present, after curative treatment and evidence of viral clearance.

3.2 Vector-borne diseases

Vector-borne diseases are human illnesses caused by parasites, viruses and bacteria that are transmitted by living organisms capable of transmitting infectious pathogens.¹¹ These diseases account for around 17% of all infectious diseases worldwide and cause more than 700,000 deaths per year. Vectors involved in human disease transmission include mosquitoes, ticks, fleas, aquatic snails and sandflies, among others.

Mosquito-borne viral infections such as dengue fever, chikungunya fever, Zika virus infection, Japanese encephalitis and yellow fever are often referred to as 'arboviral' or arthropod-borne viral infections. Arboviral infections may also be tick-borne.

NZ does not currently harbour the exotic mosquito species required for ongoing transmission of malaria, dengue fever and other arboviral diseases, therefore all cases notified within 2023 were acquired overseas. Public health undertakes routine surveillance of potential entry points into NZ.

Table 8: Vector-borne diseases in Tāmaki Makaurau, 2023

Disease	Total notifications	Total cases (%)	Rate per 100,000	Hospitalisations (%)	Deaths (%)
Chikungunya fever	5	5 (100.0)	0.3	2 (40.0)	0
Dengue fever	31	28 (90.3)	1.6	14 (50.0)	0
Malaria	24	24 (100.0)	1.4	20 (83.3)	0
Murine typhus	0	0	-	-	-
Rickettsial disease ¹	3	2 (66.7)	0.1	2 (100)	0
Ross River virus	0	0	-	-	-
Zika virus infection	1	1 (100.0)	0.1	0	0
Total	64	60 (93.8)	-	-	-

Source: EpiSurv, Stats NZ

¹Excluding murine typhus

In 2023 there were 64 notifications for vector-borne diseases for Tāmaki Makaurau (Table 8). Of these, 60 (93.8%) met the criteria for a confirmed or probable case. Dengue fever and malaria accounted for the highest number of cases, with 28 and 24 cases respectively. There were two

¹¹ World Health Organisation. (2020). *Vector-borne diseases*. Retrieved 29 May, 2023, from <https://www.who.int/news-room/fact-sheets/detail/vector-borne-diseases>

cases of rickettsial disease and one case of Zika virus. No cases of murine typhus or Ross River virus infection were reported in Tāmaki Makaurau in 2023.

In Te Tai Tokerau there was a single case of dengue fever in 2023 with no other vector-borne diseases.

Across the Northern region the most common source country for vector-borne diseases was India, with ten cases of dengue fever, four cases of chikungunya fever and two cases of malaria reporting travel to this country during their exposure period.

3.2.1 Chikungunya fever

Chikungunya fever is an arboviral infection that is spread through the bite of an infected mosquito, mainly *Aedes aegypti* and *Aedes albopictus*. There is no person-to-person transmission.

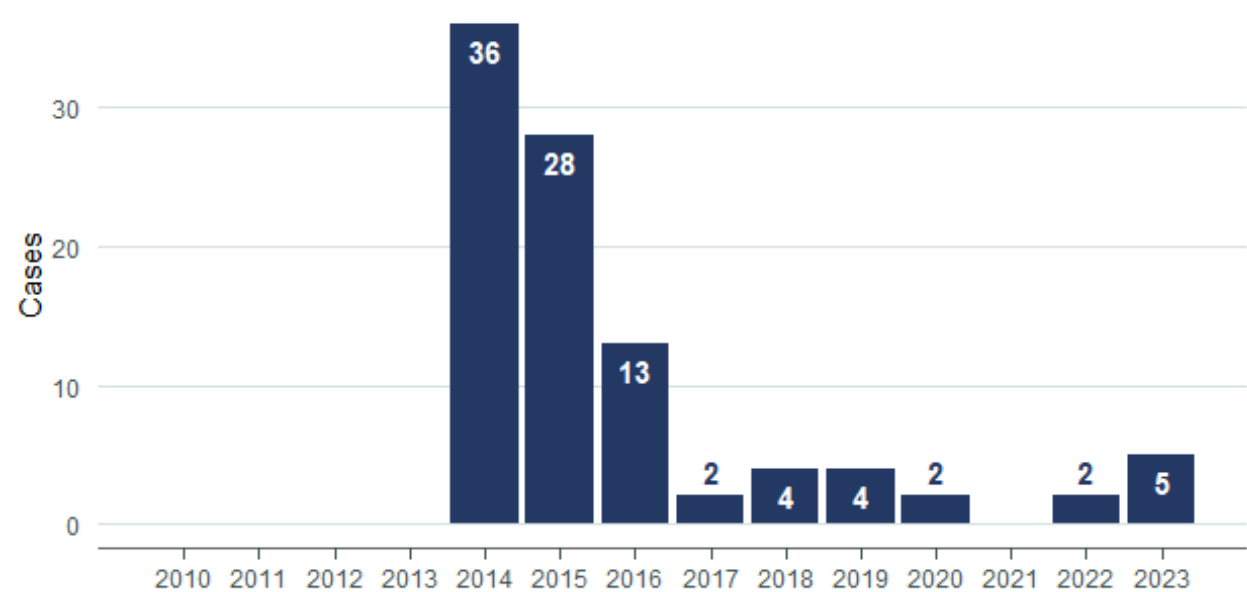
Symptoms often include a flu-like illness with high fevers, chills, muscle aches, headache, rash, nausea and vomiting. Pain or inflammation of the small joints of the hands and feet may also be present. These symptoms can persist for several weeks or months.

A. aegypti and *A. albopictus* mosquitoes are not currently established in NZ and are considered exotic species. Thus, all recent cases of chikungunya fever have occurred amongst recent overseas travellers. There is no vaccine or drug prophylaxis available to prevent chikungunya fever. Protecting against mosquito bites when in endemic areas is crucial.

There were five chikungunya fever cases in Tāmaki Makaurau in 2023. Two cases were hospitalised. There were no notifications of chikungunya fever in Te Tai Tokerau in 2023.

The incidence rate for Tāmaki Makaurau was 0.3 cases per 100,000 population, which was similar to that of NZ as a whole.

Figure 7: Chikungunya cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

While the number of cases in 2023 represented an increase on previous years, it was low compared to 2014 – 16.

Table 9: Protective factors associated with chikungunya fever in Tāmaki Makaurau, 2023

Protective factor	Always	Never	Occasionally	Unknown
Wearing long-sleeved shirts and trousers	0	2	1	2
Use of insect repellent	1	3	0	0
Use of bed nets	0	3	0	0
Screened or air-conditioned accommodation	1	2	1	1

Source: EpiSurv

Table 10: Recently visited countries of chikungunya fever cases in Tāmaki Makaurau, 2023

Travel history	Cases
India	4
Malaysia	1

Source: EpiSurv

Four of the five cases in Tāmaki Makaurau contracted chikungunya fever in India, while one contracted it in Malaysia.

3.2.2 Dengue fever

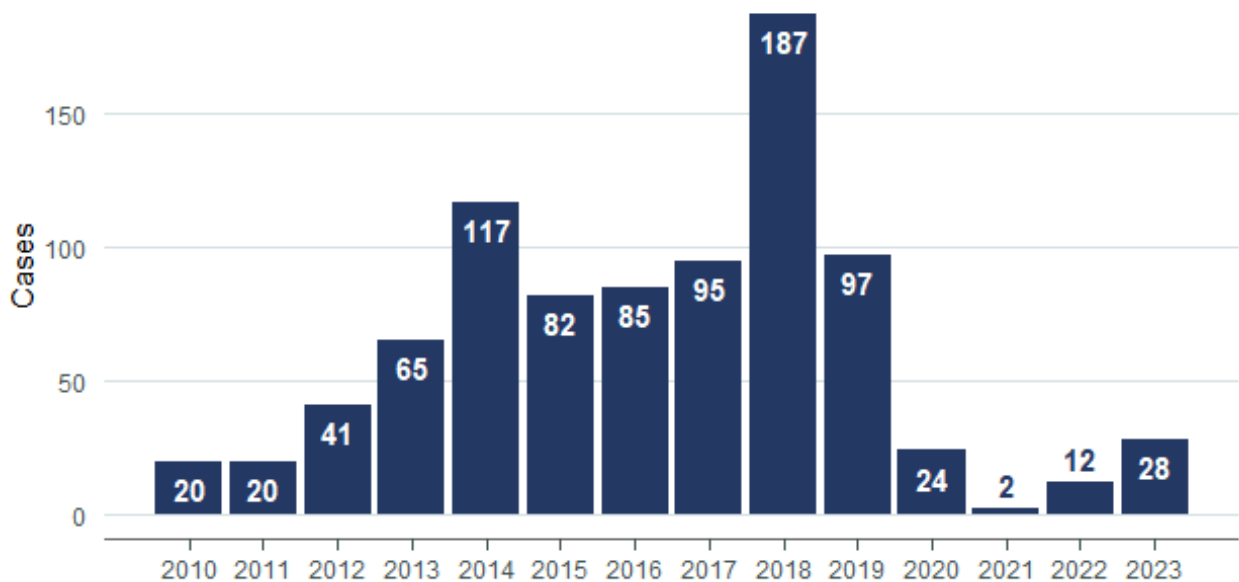
Dengue fever is an arboviral infection that is spread through the bite of an infected mosquito, mainly *Aedes aegypti* and *Aedes albopictus*. There are four types of the virus that cause dengue (DEN 1-4). Infection by one type gives immunity to that type but does not give immunity against the other types. There is no person-to-person transmission.

Symptoms of dengue fever include fever, headache, myalgia, arthralgia, rash, anorexia, vomiting and abdominal pain. Dengue haemorrhagic fever can occur when a person who has previously had one type of dengue fever becomes infected by another type. Symptoms are similar to classical dengue, followed several days later by bleeding manifestations and shock.

Dengue fever is endemic in many countries across Asia, South America and Africa. No vaccine or specific treatment is available, so travellers should ensure they take precautions to prevent mosquito bites. All recent cases of dengue in NZ have occurred amongst recent overseas travellers.

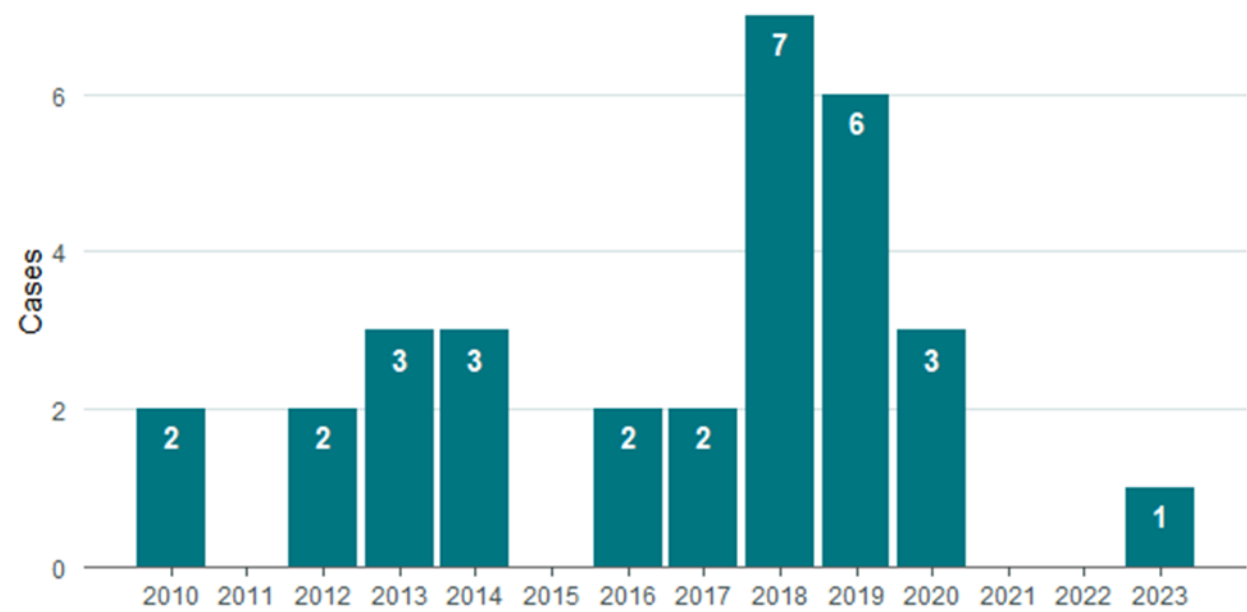
There were 31 dengue fever notifications in Tāmaki Makaurau in 2023, of which 28 were confirmed cases. In total there were 14 hospitalisations and no deaths. The incidence rate for Tāmaki Makaurau was 1.6 cases per 100,000 population, higher than the national incident rate of 1.1 cases per 100,000 population. One dengue fever case was identified in Te Tai Tokerau in 2023. This was consistent with the usually low numbers of dengue fever in this area. The Te Tai Tokerau case was hospitalised.

Figure 8: Dengue fever cases in Tāmaki Makaurau, 2010 to 2023



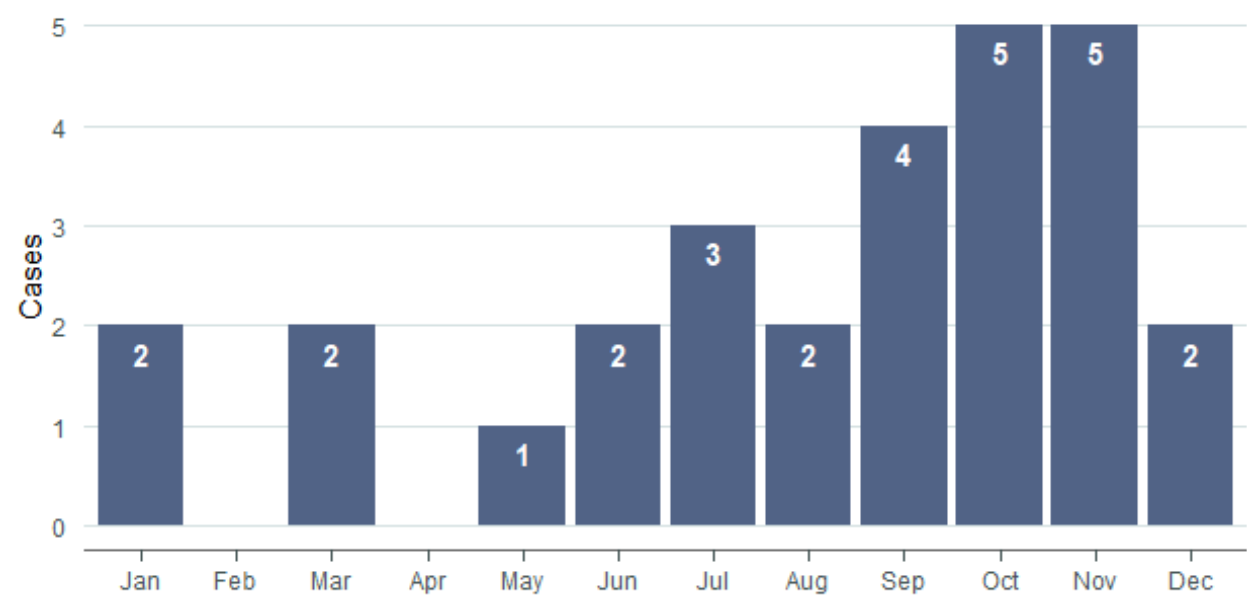
Source: EpiSurv

Figure 9: Dengue fever cases in Te Tai Tokerau, 2010 to 2023



Source: EpiSurv

Figure 10: Dengue fever cases in Tāmaki Makaurau by month, 2023



Source: EpiSurv

As shown in Figure 10 above, in Tāmaki Makaurau cases were more common towards the end of 2023.

As shown in Table 11 below, cases were highest among the '30 to 39' and '40 to 49' age groups, with 2.4 and 3 cases per 100,000 people respectively.

Table 11: Dengue fever cases in Tāmaki Makaurau by age group, 2023

Age group	Cases	Rate per 100,000
Age under 1	0	-
1 to 4	0	-
5 to 9	0	-
10 to 14	1	0.8
15 to 19	0	-
20 to 29	5	2
30 to 39	7	2.4
40 to 49	7	3
50 to 59	1	0.5
60 to 69	5	3
Age 70+	2	1.2
Total	28	1.6

Source: EpiSurv, Stats NZ

Ethnic group-specific incidence rates for dengue fever were highest in Asian peoples with 2.2 cases per 100,000 population (11 cases), followed by European and Other, with two cases per 100,000 population (15 cases). Of these cases, ten identified as Indian and six identified as NZ European.

Table 12: Ethnic group-specific incidence rates for dengue fever in Tāmaki Makaurau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	0	-
Pacific peoples	1	0.4
Asian	11	2.2
European and Other	15	2
Unknown	1	-
Total	28	1.6

Source: EpiSurv, Stats NZ

Table 13: Detailed ethnicity counts for dengue fever cases in Tāmaki Makaurau, 2023

Detailed ethnicity	Cases
Indian	10
NZ European	6
Latin American	4
African nfd	2
Hispanic nec	2
Hispanic nfd	2
Other European nfd	2
Other*	4

* Other consists of four ethnicities with one case each

Source: EpiSurv, Stats NZ

Table 14: Recently visited countries of dengue fever cases in Tāmaki Makaurau, 2023

Travel history	Cases
India	10
Indonesia	5
Malaysia	4
Thailand	4
Japan	2
Singapore	2
Albania	1
Bangladesh	1
Estonia	1
Laos	1
Nepal	1
Oman	1
Peru	1
Philippines	1
Solomon Islands	1
Sri Lanka	1
Sudan	1
Turkey	1
Vietnam	1
Zimbabwe	1

Source: EpiSurv

Table 14 shows the last country visited by cases before arriving in NZ. India was the most frequent followed by Indonesia. No cases were acquired in NZ. Table 15 below shows the serotypes of dengue fever cases for 2023. The most common serotype was 3A (four positive cases), followed by 2A (two positive cases).

Table 15: Serotypes of disease cases in Tāmaki Makaurau by last country visited, 2023

Serotype	Last country visited	Cases
Type 1	Indonesia	2
Type 2	India	2
1	Malaysia	1
2	India	1
2	Malaysia	1
2	Singapore	1
2	Solomon Islands	1
2A	India	1
2A	Sudan	1
3A	India	1
3A	Oman	1
3A	Thailand	2
N/a	Indonesia	1
NS1	Malaysia	1
NS1	Zimbabwe	1
Not recorded	India	3
Not recorded	Indonesia	2
Not recorded	Thailand	2
Not recorded	Peru	1
Not recorded	Philippines	1
Not recorded	Singapore	1
Total		28

Source: EpiSurv

As shown in Table 16, protective measures taken by the cases to prevent mosquito bites included wearing long-sleeved clothes, using insect repellent and staying in accommodation with insect screens or air-conditioners. Only one case reported always wearing long-sleeved clothes, while 17 cases stated never wearing long-sleeve clothes. Bed nets were used by only two cases, as was insect repellent, while seven cases reported always using accommodation with screens or air conditioning. Most cases reported 'never', 'rarely' or 'occasionally' using protective measures.

Table 16: Protective factors associated with dengue fever in Tāmaki Makaurau, 2023

Protective factor*	Always	Never	Occasionally	Rarely
Wearing long-sleeved shirts and trousers	1	17	8	2
Use of insect repellent	2	15	10	1
Use of bed nets	2	21	4	1
Screened or air-conditioned accommodation	7	9	10	2

*More than one protective factor may be identified per case.

3.2.3 Malaria

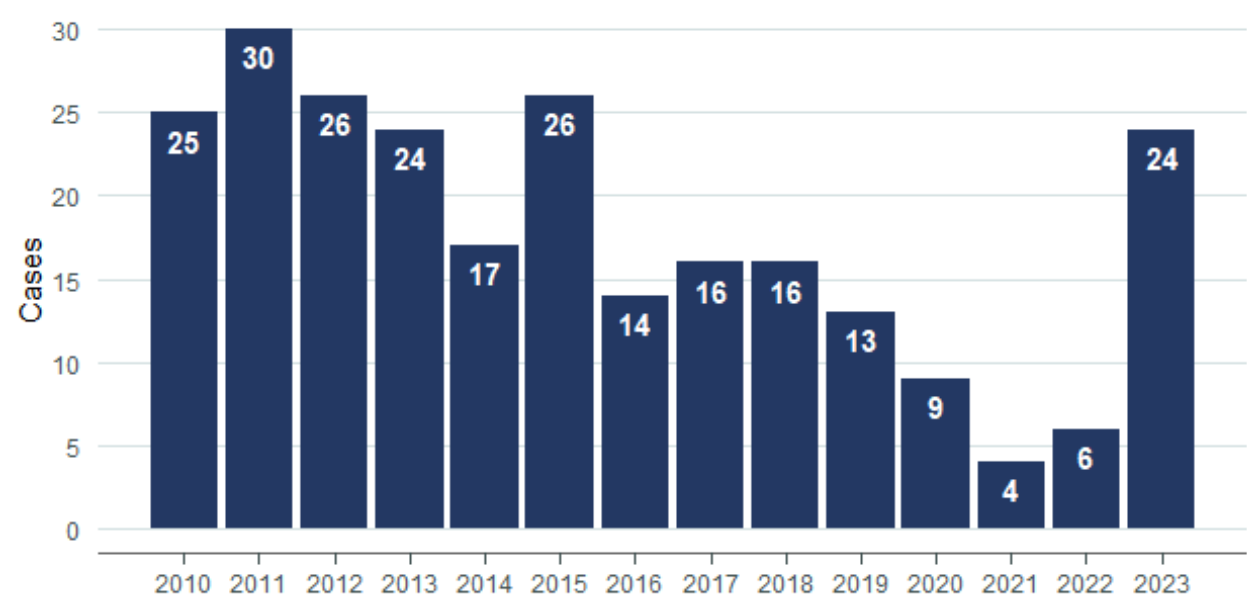
Malaria is an acute febrile illness caused by *Plasmodium* parasites. Transmission usually occurs through the bite of an infected female *Anopheles* mosquito but may rarely occur through transfusion of infected blood and sharing of contaminated intravenous equipment.

Symptoms include high fever, rigors, sweats, headache, nausea, vomiting, diarrhoea, coughing, arthralgia, abdominal and back pain. Infection with *P. falciparum* can be severe, involving neurological symptoms, pulmonary oedema, renal failure, severe anaemia and death.

All cases of malaria in NZ to date have occurred in people with recent overseas travel. There are no *Anopheles* species of mosquitoes in NZ, so there is no risk of local mosquito-borne transmission.

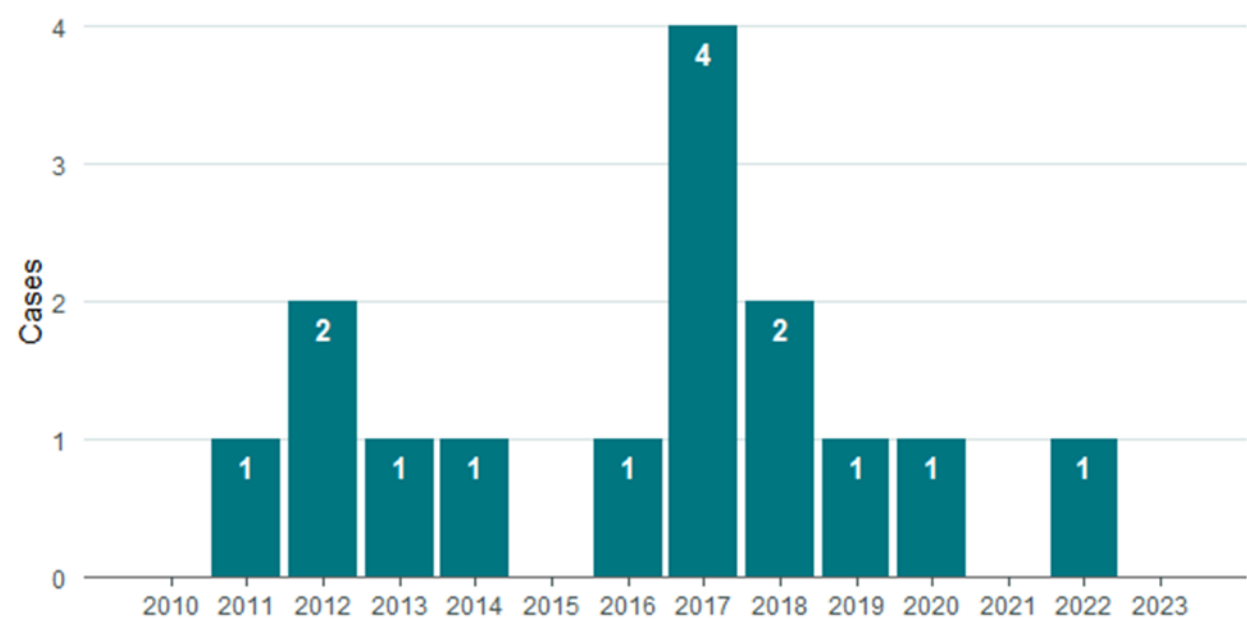
There were 24 malaria cases in Tāmaki Makaurau (see Figure 11) in 2023, 20 hospitalisations and zero deaths. The incidence rate for Tāmaki Makaurau was 1.4 cases per 100,000 population, which was higher than the national rate of one case per 100,000 population. There were no confirmed cases in Te Tai Tokerau in 2023 (Figure 12). The last case in Te Tai Tokerau was reported in 2022.

Figure 11: Malaria cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

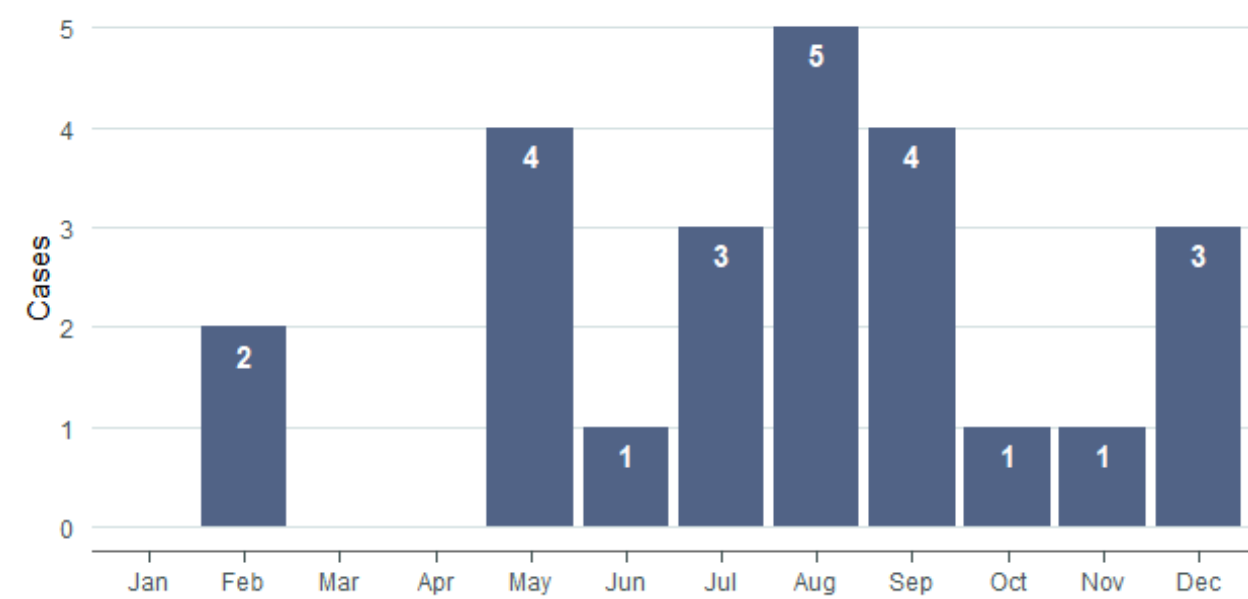
Figure 12: Malaria cases in Te Tai Tokerau, 2010 to 2023



Source: EpiSurv

Like dengue fever, malaria cases in Tāmaki Makaurau were more common in the latter half of 2023 (see Figure 13).

Figure 13: Malaria cases in Tāmaki Makaurau by month, 2023



Source: EpiSurv

Tables 17 and 18 show the age and ethnic group distribution of malaria cases for 2023 in Tāmaki Makaurau. Cases were highest among the '40 to 49' and '60 to 69' age groups, with 2.8 and 2.0 cases per 100,000 population, respectively.

Table 17: Age-specific incidence rates for malaria in Tāmaki Makaurau, 2023

Age group	Cases	Rate per 100,000
Age under 1	0	-
1 to 4	1	1.1
5 to 9	0	-
10 to 14	0	-
15 to 19	2	1.6
20 to 29	5	1.9
30 to 39	3	1
40 to 49	7	2.8
50 to 59	2	0.8
60 to 69	4	2
Age 70+	0	-
Total	24	1.2

Source: EpiSurv, Stats NZ

Ethnic group-specific cases (Table 18) were highest among Asian (14 cases) and European and Other (six cases) ethnicities, with 2.9 cases and 0.8 cases per 100,000 population respectively. There were only three cases amongst Pacific Peoples, and the incidence rate for this ethnicity group was 1.2 cases per 100,000 population.

Table 18: Ethnic group-specific incidence rates for malaria in Tāmaki Makaurau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	0	-
Pacific peoples	3	1.2
Asian	14	2.9
European and Other	6	0.8
Unknown	1	-
Total	24	1.4

Source: EpiSurv, Stats NZ

Table 19 below shows there was a wide range of source countries with Pakistan, India, and Papua New Guinea contributing the most cases. Five cases reported no overseas travel. These cases were consistent with relapsing or latent malaria. No cases were acquired in NZ.

Table 19: Source countries of malaria cases in Tāmaki Makaurau, 2023

Country acquired	Cases
No overseas travel reported	5
Pakistan	4
India	2
Papua New Guinea	2
Abia State, Nigeria	1
Afghanistan	1
Australia	1
Bali, Indonesia	1
Cameroon	1
Ghana	1
Mumbai, India	1
Solomon Islands	1
South Sudan	1
Sudan	1
Uganda	1
Total	24

Source: EpiSurv

3.2.4 Murine typhus

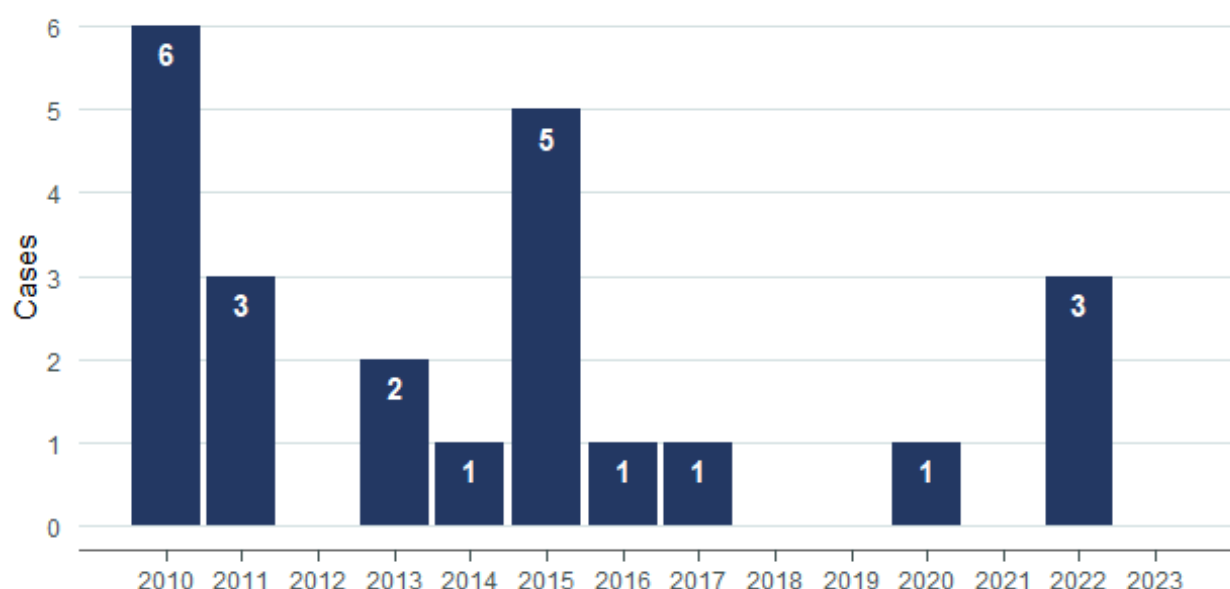
Murine typhus is a rickettsial disease caused by *Rickettsia typhi* bacteria. *R. typhi* is the only rickettsial species endemic in NZ.

Transmission occurs through a bite from an arthropod vector, usually fleas and ticks, which carry the bacteria. Symptoms may include fever, headache, malaise, lymphadenopathy, myalgia, photophobia, cough and a macular or haemorrhagic rash.

Murine typhus was previously known as *Rickettsia mooseri* or 'shop' typhus.

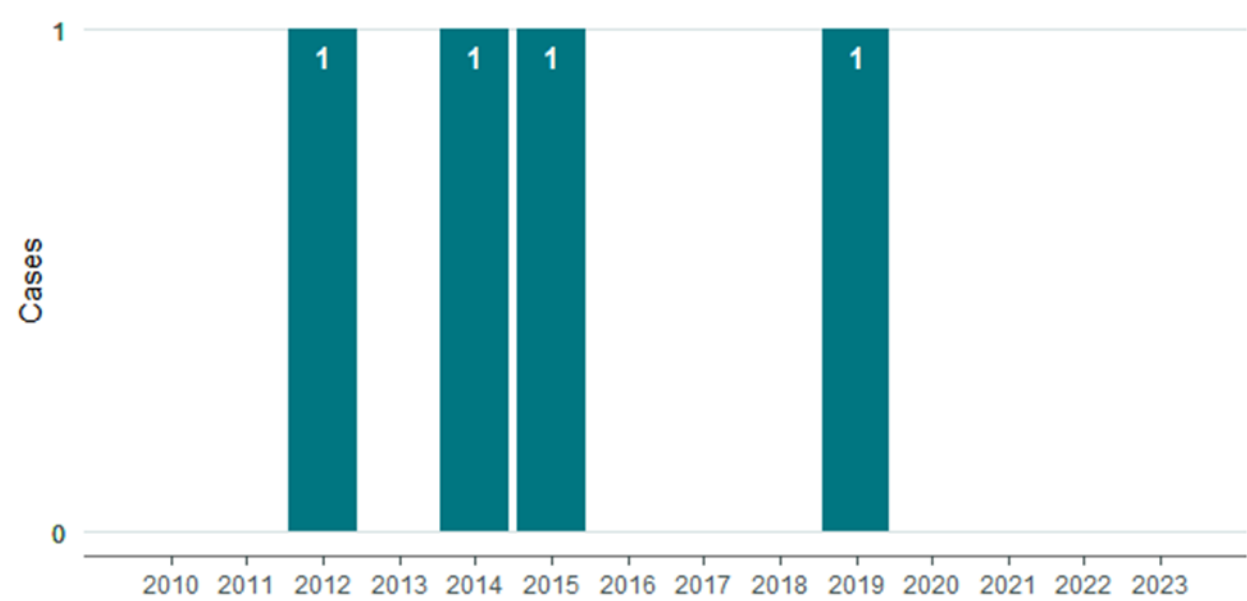
Figures 14 and 15 show the number of murine typhus cases in the Northern region between 2010 and 2023. In Tāmaki Makaurau, zero cases were reported in 2021 and 2023, with only one case in 2020 and three in 2022. The last case confirmed in Te Tai Tokerau was in 2019. Overall, murine typhus notifications have decreased over the past 13 years.

Figure 14: Murine typhus cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

Figure 15: Murine typhus cases in Te Tai Tokerau, 2010 to 2023



Source: EpiSurv

3.2.5 Rickettsial disease

Rickettsial disease refers to a group of infections caused by *Rickettsia* bacteria, other than murine typhus, i.e. those caused by species *Rickettsia typhi* (see Murine typhus for infections caused by *R. typhi*). Transmission occurs through a bite from an arthropod vector, usually fleas and ticks, which carry the bacteria.

Rickettsial disease generally presents with fever, headache and malaise, with lymphadenopathy, myalgia, photophobia, cough and a macular or haemorrhagic rash may also be present. Some cases may have an inoculation eschar (black ulcer or papule) at the bite wound. Complications may include bronchitis, pneumonia, delirium, deafness and hepatosplenomegaly.

Each *Rickettsia* species is associated with a different spectrum of clinical features, geographical distribution, insect vector (tick, louse, flea, mite or chigger), seasonal incidence and other epidemiological factors.

Rickettsia felis has been detected in fleas in the North Island but has not been associated with any human cases of Rickettsial disease.

In 2023 there were two rickettsial disease cases in Tāmaki Makaurau and a single case in Te Tai Tokerau. In total there were four cases in NZ in 2023. All three Northern region cases were hospitalised. There were no deaths.

3.2.6 Ross River virus infection

Ross River virus infection is an arboviral infection caused by Ross River virus. Transmission occurs through a bite from an infected mosquito, and person-to-person transmission has not been documented.¹²

Infection is often asymptomatic, with some individuals developing a flu-like illness characterised by fever, chills, headache, myalgias and rash. Most people recover completely in a few weeks.

Ross River fever is the most common mosquito-borne infection in Australia. It is also found in Papua New Guinea and other islands in the South Pacific but is not common in NZ.

There were no cases of Ross River virus infection notified in the Northern region. The last case reported in Tāmaki Makaurau was in 2019.

3.2.7 Zika virus infection

Zika is an arthropod-borne viral infection caused by the Zika virus. Transmission typically occurs through the bite of an infected mosquito, although transmission between sexual partners has also been documented. Pregnant women may transmit the disease to their unborn babies which can result in severe birth defects such as microcephaly.

While most infections are asymptomatic, some individuals may experience a mild fever, arthralgia, myalgia, headache, conjunctivitis and rash. Guillain-Barré syndrome may occur in some cases.

Zika virus is found in parts of Africa, southern Asia, the Pacific and the Americas. The mosquito species that spread Zika virus, mainly *Aedes* spp., are not normally found in NZ.

There was one Zika virus case in Tāmaki Makaurau in 2023. There were no hospitalisations and no deaths. Four suspected cases were notified in Te Tai Tokerau, but none met the definition for a confirmed or probable case. The last case in Te Tai Tokerau was reported in 2016.

There were four cases in the whole of NZ in 2023, and the incidence rate nationally was 0.1 cases per 100,000 population, the same as Tāmaki Makaurau.

3.2.8 Exotic mosquito interceptions

There are 16 established species of mosquito in NZ: 13 native and three introduced.¹³ Exotic mosquitoes (i.e. those that are not yet established in NZ) are considered high-risk insects due to their ability to spread diseases such as malaria, dengue fever, chikungunya fever and Zika

¹² Community and Public Health. (2022). *Ross River Fever*. Christchurch: Community and Public Health (CDHB).

¹³ Southern Monitoring Services Ltd. (n.d.). *New Zealand Mosquitoes*. Retrieved 14 April, 2023, from <https://www.smsl.co.nz/NZBEL/New+Zealand+Mosquitoes.html>.

virus infection.¹⁴ International travel and climate change enable exotic mosquitoes to spread to new territories. Mosquito-borne diseases are spreading globally, with a wet, humid, warmer climate enabling new regions to be established with various mosquito species.⁵ Establishment of high-risk exotic mosquitoes in NZ would increase the risk of outbreaks of these diseases, therefore careful monitoring is required.

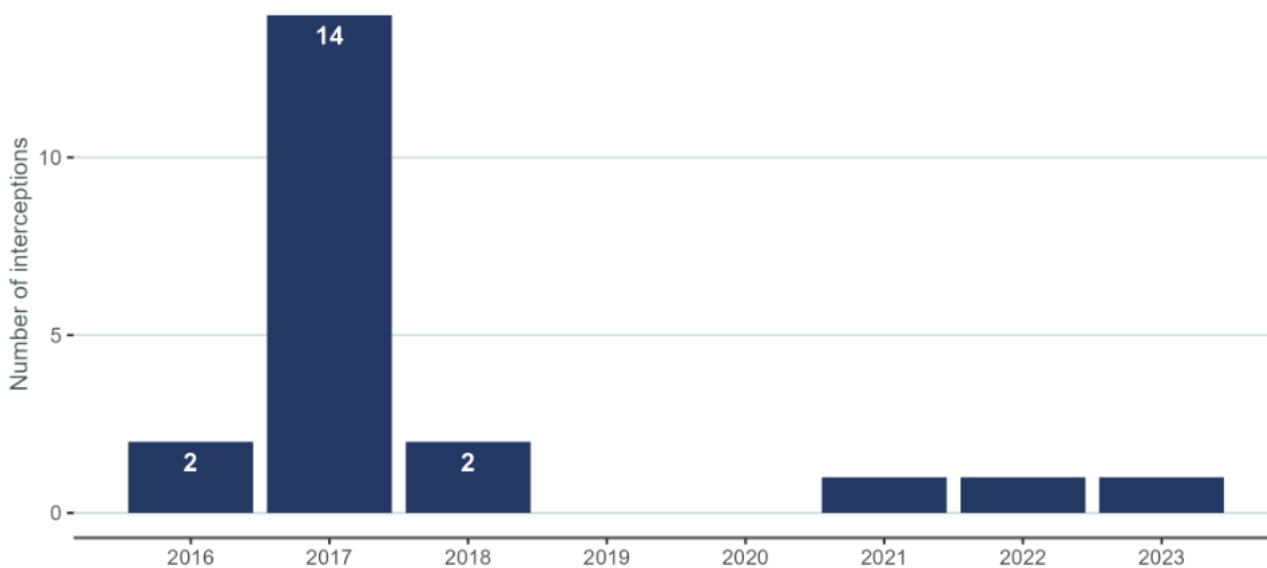
Common practices to prevent the introduction of exotic mosquitoes into NZ include spraying aircraft with insecticides, unsealing freight cargo in designated inspection zones and conducting exotic mosquito surveillance at international ports. Public health undertakes routine surveillance of potential entry points in to NZ as well as transitional (quarantine) facilities as required.

Arguably, Te Tai Tokerau bears the greatest risk from exotic mosquito incursions as a result of its climate. Multiple trap locations include Whangārei, Marsden Point, Tutukaka, Whangārei Heads, Bay of Islands and Whangaroa.

One exotic mosquito interception occurred in Tāmaki Makaurau in 2023, with the detection of *Aedes aegypti* larvae at Auckland International Airport. This same species was also intercepted in 2021 and 2022 (Figure 16). Routine surveillance at Ports of Auckland detected only the established introduced species *Culex quinquefasciatus* and *Aedes notoscriptus*, and the native mosquito species *Culex pervigilans*.

No exotic mosquitoes were captured in Te Tai Tokerau traps in 2023.

Figure 16: *Aedes aegypti* interceptions in Tāmaki Makaurau, 2016 to 2023



Source: NPHS Northern Region Biosecurity Logging Master

¹⁴ EHINZ. (2022). *High-risk insects caught at New Zealand's border*. Retrieved 14 April, 2023, from <https://www.ehinz.ac.nz/indicators/border-health/high-risk-pests-caught-at-new-zealands-border/>.

3.3 Zoonotic diseases

Zoonotic diseases are infectious diseases that can be passed from animals to humans. Many of NZ’s zoonotic diseases are also enteric, including campylobacteriosis, cryptosporidiosis, giardiasis and salmonellosis. These diseases are covered in the Enteric diseases section of this report.

Some zoonotic infections occur primarily in certain groups or occupations, such as leptospirosis and brucellosis in meat processors, farmers and veterinarians. Other zoonotic infections, such as Q fever, are not endemic to NZ so are often acquired overseas.

Mpox is a zoonotic infection caused by the mpox virus. The disease is endemic in Central and West Africa, where transmission to humans is typically from rodents and certain species of monkeys. Due to swift spread of this infection across Africa, WHO declared mpox a Public Health Emergency of International Concern in 2024.

Table 20: Zoonotic illnesses in Tāmaki Makaurau, 2023

Disease	Total notifications	Total cases (%)	Rate per 100,000	Hospitalisations (%)	Deaths (%)
Brucellosis	3	3 (100.0)	0.2	3 (100.0)	0
Hydatid disease	1	1 (100.0)	0.1	1 (100.0)	0
Leptospirosis	14	14 (100.0)	0.8	12 (85.7)	0
Mpox	10	8 (80.0)	0.5	1 (12.5)	0
Q fever	4	0	-	0	0
Taeniasis	1	0	-	-	-
Total	33	26 (78.8)	-	-	-

Source: EpiSurv, Stats NZ

Table 21: Zoonotic illnesses in Te Tai Tokerau, 2023

Disease	Total notifications	Total cases (%)	Rate per 100,000	Hospitalisations (%)	Deaths (%)
Brucellosis	0	0	-	-	-
Hydatid disease	0	0	-	-	-
Leptospirosis	17	15 (88.2)	7.3	10 (66.7)	0
Mpox	0	0	-	-	-
Q fever	0	0	-	-	-
Taeniasis	0	0	-	-	-
Total	17	15	-	-	-

Source: EpiSurv, Stats NZ

In 2023, there were 33 notifications for zoonotic diseases in Tāmaki Makaurau (Table 20). Of these, 26 (78.3%) met the criteria for a confirmed or probable case. The greatest number of cases were a result of the 14 cases of leptospirosis. No cases of taeniasis or Q fever were reported in 2023. There were 17 notifications for zoonotic diseases in Te Tai Tokerau, with 15 of these confirmed as leptospirosis (Table 21). The leptospirosis incident rate for Te Tai Tokerau (7.3 cases per 100,000 population) greatly exceeded the Tāmaki Makaurau incidence rate (0.8 cases per 100,000 population).

3.3.1 Brucellosis

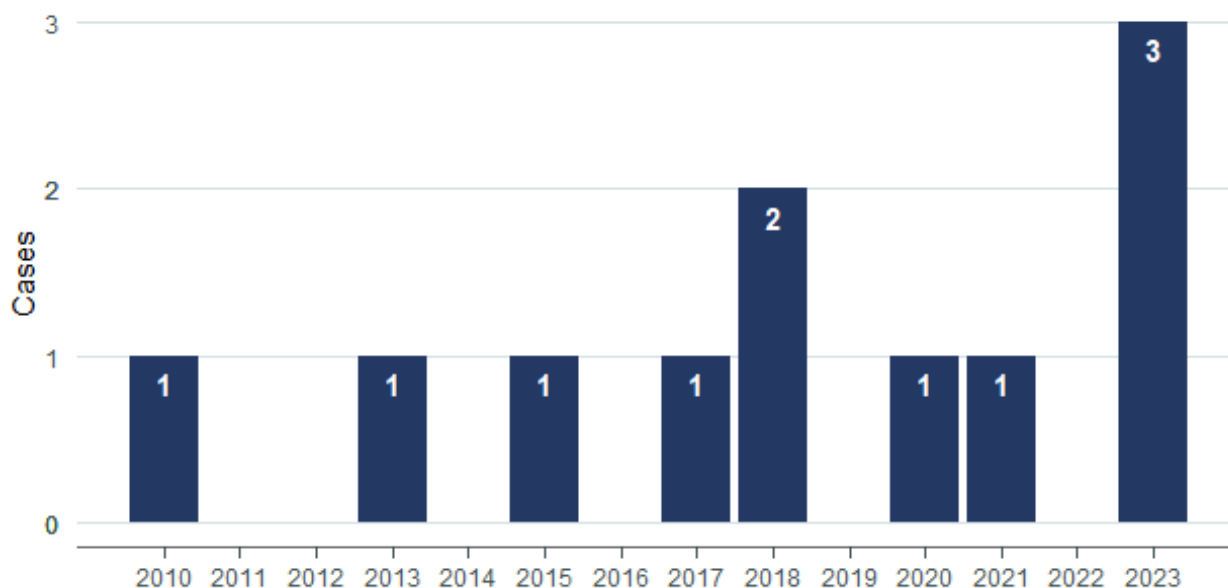
Brucellosis is a zoonotic infection caused by the bacterium *Brucella*. Humans may become infected through contact or ingestion of milk products from infected animals. Human-to-human transmission has been reported but is very rare.

Brucellosis is often asymptomatic, but may involve an acute illness with fever, arthralgia, headache, malaise, anorexia, constipation, respiratory tract symptoms and hepatosplenomegaly. Complications may include testicular inflammation, endocarditis, meningitis and encephalitis.

In NZ, brucellosis generally occurs among farmers, veterinarians and abattoir workers. Internationally, ingestion of unpasteurised goat milk is the most common risk factor.

There were three brucellosis cases in Tāmaki Makaurau in 2023. All were hospitalised and there were no deaths. The incidence rate for Tāmaki Makaurau was 0.2 cases per 100,000 population. Two suspected cases were notified in Te Tai Tokerau, however neither met the definition of a case. There were four cases in NZ as a whole, with an incidence rate of 0.1 cases per 100,000 population.

Figure 17: Brucellosis cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

Brucella suis, linked to Tonga, was identified in two of the cases. *Brucella abortus* was isolated from the third case, associated with travel from India.

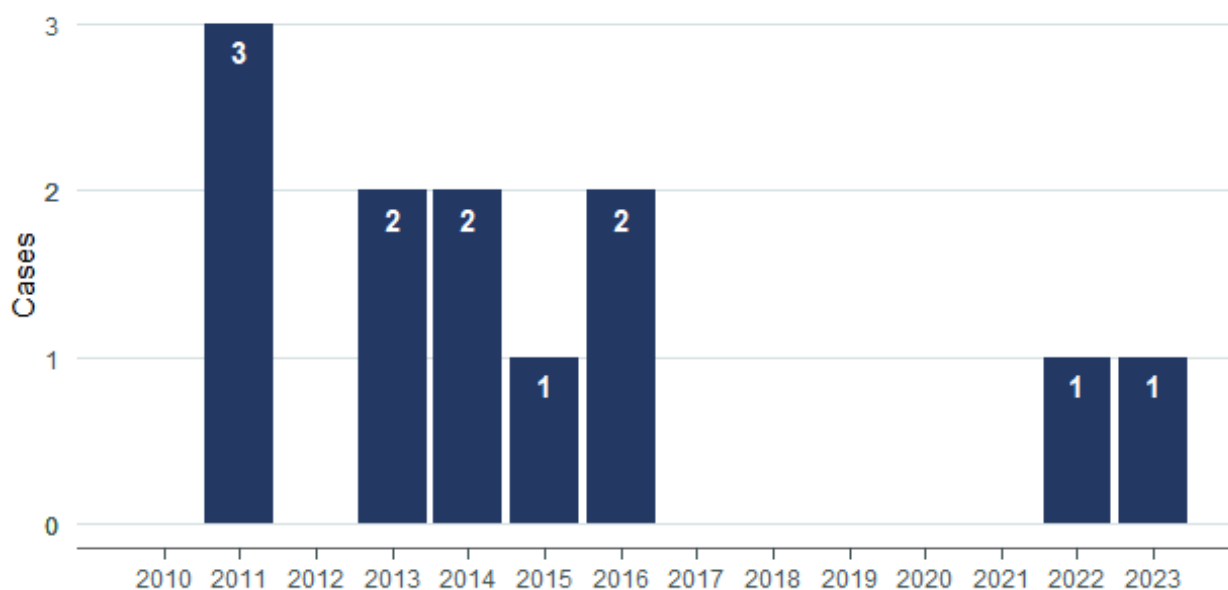
3.3.2 Hydatid disease

Hydatid disease is a parasitic infection caused by the tapeworm *Echinococcus granulosus*. It is also known as hydatidosis or cystic echinococcosis. Transmission is through ingestion of food or water containing tapeworm eggs, or through contact with infected animals, particularly dogs and farm animals. There is no person-to-person transmission.

Hydatid disease involves the development of cysts in the liver, lung, spleen, brain, heart or kidney. Affected individuals can be asymptomatic for years and only develop symptoms when the cysts begin to affect surrounding tissues. Symptoms may include anorexia, weight loss and lethargy, with liver cysts causing abdominal pain, nausea, vomiting and lung cysts causing chronic cough, shortness of breath and chest pain. Rupture of a cyst may produce a life-threatening allergic reaction.

There was one hydatid disease case in Tāmaki Makaurau in 2023. The case was chronic and not infectious (see Figure 18). The case was hospitalised but it was not fatal. There were no notifications of hydatid disease in Te Tai Tokerau in 2023. There were two cases in the whole of NZ in 2023.

Figure 18: Hydatid disease cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

Between 2011 and 2016 there were ten cases of hydatid disease reported in Tāmaki Makaurau. There were no cases reported between 2017 and 2021.

3.3.3 Leptospirosis

Leptospirosis is a zoonotic infection caused by *Leptospira* bacteria. Transmission is mainly via contact with urine or organs from infected animals or contact with soil and water contaminated by animals. Person-to-person transmission is very rare.

Symptoms include fever, chills, headache, cough, myalgia, nausea, diarrhoea and abdominal pain. Severe disease may involve jaundice, renal failure, pneumonitis and meningitis.

Leptospirosis is endemic worldwide, with higher incidence rates in tropical countries. Most cases in NZ have worked in the meat processing industry or have had recent farm contact. Other risk factors include recreational water activities, such as rafting or kayaking, and contact with floodwaters.

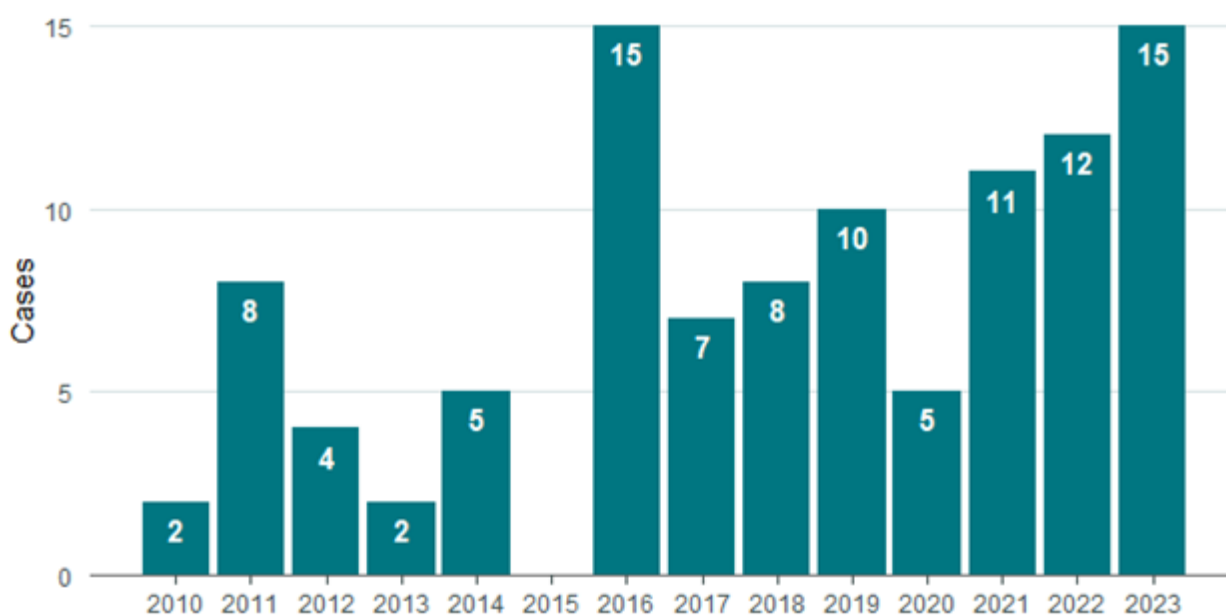
There were 14 leptospirosis cases in Tāmaki Makaurau in 2023, with 12 hospitalisations and no deaths. The incidence rate was 0.8 cases per 100,000 population. There were 15 leptospirosis cases in Te Tai Tokerau in 2023, with 10 hospitalisations and no deaths. The incidence rate was 7.4 cases per 100,000 population. There were 170 cases in NZ as a whole, with an incidence rate of 3.3 cases per 100,000 population.

Figure 19: Leptospirosis cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

Figure 20: Leptospirosis cases in Te Tai Tokerau, 2010 to 2023

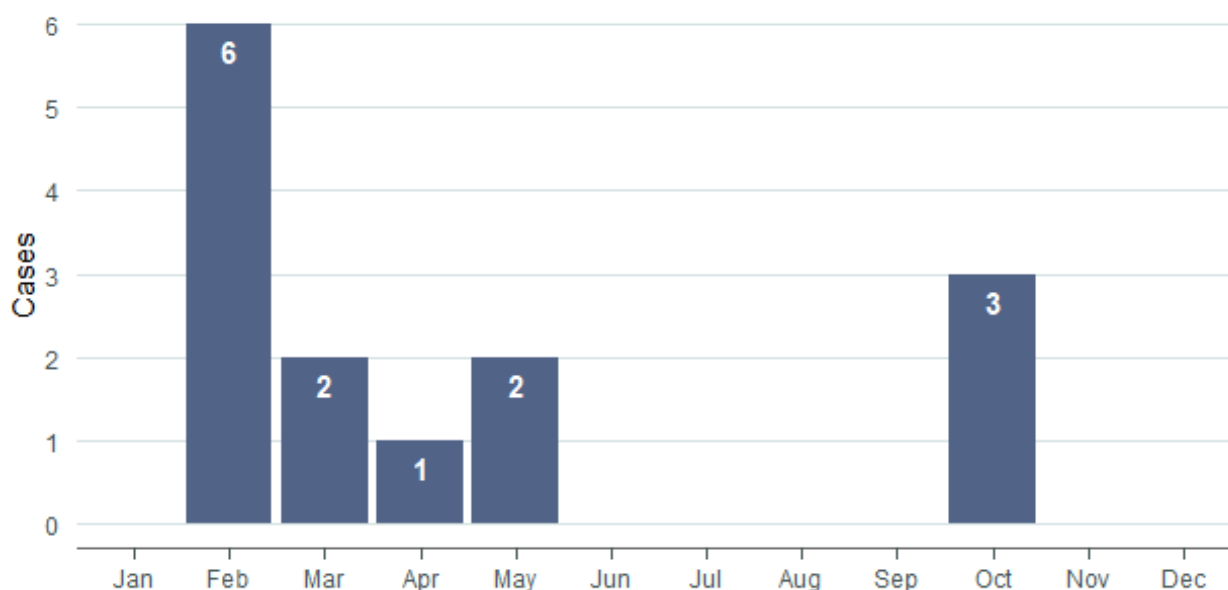


Source: EpiSurv

There have been consistently high numbers of leptospirosis cases in Te Tai Tokerau since 2016, although 2020 saw a significant drop, possibly due to COVID-19 restrictions.

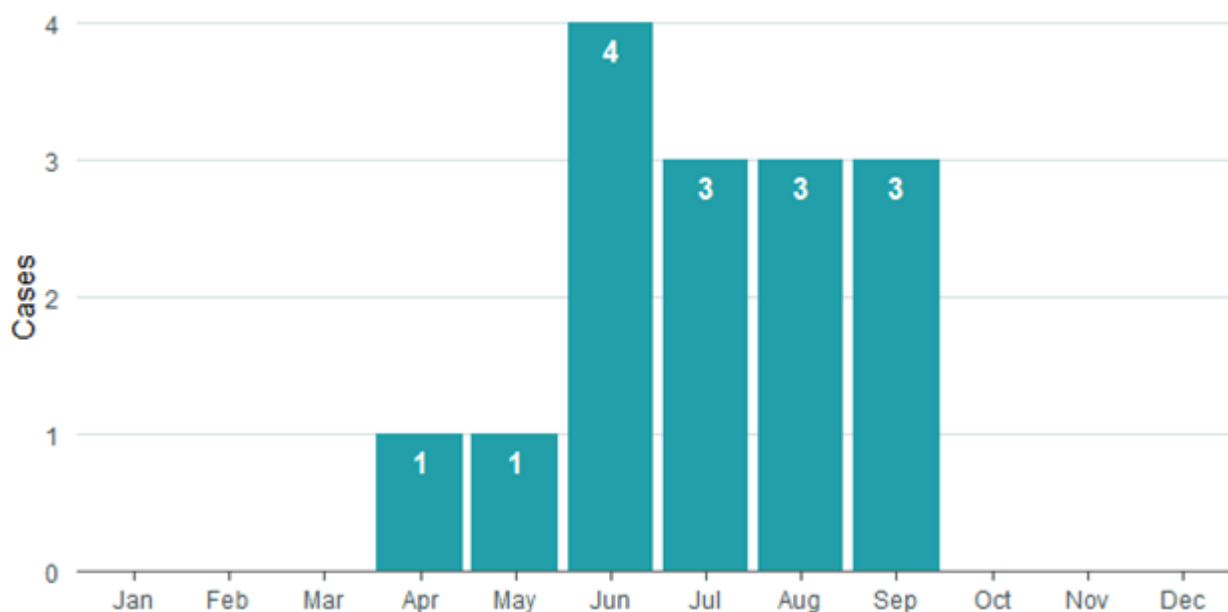
The incidence rate of leptospirosis in Te Tai Tokerau is more than double that of the rest of NZ. This is largely due to the area having a larger rural population, and more commonly undertaking activities such as farming and pest control.

Figure 21: Leptospirosis cases in Tāmaki Makaurau by month, 2023



Source: EpiSurv

Figure 22: Leptospirosis cases in Te Tai Tokerau by month, 2023



Source: EpiSurv

In Tāmaki Makaurau, cases of leptospirosis were more common in the first half of 2023, with only three cases from June to December, all reported in October (see Figure 21). Flooding in late January and February in Tāmaki Makaurau likely contributed to several of these cases.

In contrast to Tāmaki Makaurau, cases in Te Tai Tokerau were reported solely from April to September in 2023 (see Figure 22).

Table 22: Leptospirosis cases in Tāmaki Makaurau by age group and sex, 2023

Age group	Female	Male	Cases	Rate per 100,000
Age under 1	0	0	0	-
1 to 4	0	0	0	-
5 to 9	0	0	0	-
10 to 14	1	0	1	0.8
15 to 19	0	1	1	0.8
20 to 29	0	0	0	-
30 to 39	2	2	4	1.3
40 to 49	0	0	0	-
50 to 59	1	4	5	2.1
60 to 69	0	1	1	0.5
Age 70+	0	2	2	1
Total	4	10	14	0.7

Source: EpiSurv, Stats NZ

Table 23: Leptospirosis cases in Te Tai Tokerau by age group and sex, 2023

Age group	Female	Male	Cases	Rate per 100,000
Age under 1	0	0	0	-
1 to 4	0	0	0	-
5 to 9	0	0	0	-
10 to 14	0	0	0	-
15 to 19	0	2	2	16.7
20 to 29	0	0	0	-
30 to 39	1	4	5	20.4
40 to 49	0	1	1	4.6
50 to 59	1	0	1	3.7
60 to 69	1	3	4	13.9
Age 70+	0	2	2	6.7
Total	3	12	15	7.4

Source: EpiSurv, Stats NZ

Tables 22 and 23 (above) show the age and sex distribution of leptospirosis cases for 2023 in both Tāmaki Makaurau and Te Tai Tokerau. In Te Tai Tokerau, cases were highest amongst the '30 to 39' and '60 to 69' year age groups. In both areas males were overrepresented.

Table 24: Ethnic group-specific incidence rates for leptospirosis in Tāmaki Makaurau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	1	0.5
Pacific peoples	0	-
Asian	1	0.2
European and Other	11	1.4
Unknown	1	-
Total	14	0.8

Source: EpiSurv, Stats NZ

Table 25: Ethnic group-specific incidence rates for leptospirosis in Te Tai Tokerau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	3	4
Pacific peoples	0	-
Asian	0	-
European and Other	12	10.4
Unknown	0	-
Total	15	7.3

Source: EpiSurv, Stats NZ

Ethnic group-specific incidence rates were highest among European and Other in both Tāmaki Makaurau and Te Tai Tokerau, followed by Māori (Tables 24 and 25).

Table 26: Leptospirosis cases in Tāmaki Makaurau by occupation, 2023

Occupation	Cases
Retired	4
Not stated	3
Dairy cattle farm worker	2
Not recorded	2
Dairy cattle farmer	1
Not in the labour force	1
Unemployed	1
Total	14

Source: EpiSurv

Table 27: Leptospirosis cases in Te Tai Tokerau by occupation, 2023

Occupation	Cases
Not recorded	5
Beef cattle farm worker	3
Dairy cattle farmer	2
Retired	2
Construction manager	1
Farmer and farm manager	1
Not stated	1
Total	15

Source: EpiSurv

In Tāmaki Makaurau, retired people had the highest number of cases (four) with two cases among dairy cattle farm workers. In Te Tai Tokerau, farmers accounted for many of the cases amongst those whose occupation was recorded (Tables 26 and 27).

Table 28: Risk factors associated with leptospirosis in Tāmaki Makaurau, 2023

Risk factor	Cases	Percent
Exposure to farm or wild animals or their products in 20 days before illness	12	85.7
Exposure to streams, rivers, lakes in 20 days before illness	7	50.0
Exposure was linked to employment	5	35.7

Source: EpiSurv

Table 29: Risk factors associated with leptospirosis in Te Tai Tokerau, 2023

Risk factor	Cases	Percent
Exposure to farm or wild animals or their products in 20 days before illness	13	86.7
Exposure was linked to employment	10	66.7
Exposure to streams, rivers, lakes in 20 days before illness	8	53.3

Source: EpiSurv

Tables 28 and 29 above show the risk factors associated with developing leptospirosis in 2023. The most common risk factor was exposure to farm or wild animals followed by exposure to streams, rivers or lakes. More than one risk factor may be identified per case.

3.3.4 Mpox

Mpox (formerly monkeypox) is an infection caused by the mpox virus. The disease is endemic in Central and West Africa, where transmission to humans is typically from rodents and certain species of monkey. However, the virus may also be spread via close contact with skin lesions, body fluids, respiratory droplets and contaminated materials.

Infection often involves a prodrome with fever, aches and lymphadenopathy, followed by a characteristic centrifugal rash with lesions appearing on the face and moving to the distal extremities. The rash progresses through four stages from macules to papules, vesicles then pustules, followed by scabbing.

There are two clades of mpox, Clades I and II. The CFR for Clade II is around 1%, while for Clade I it is around 10%. A global outbreak due to Clade IIb was declared in May 2022, with cases reported in all WHO regions.¹⁵ In late 2022, WHO recommended a change in name to 'mpox' to avoid racist and stigmatising language associated with the former name.

In 2023, there were ten mpox notifications in Tāmaki Makaurau. Of these, there were eight mpox cases with one hospitalisation and no deaths. The incidence rate for Tāmaki Makaurau was 0.5 cases per 100,000. There were no notifications in Te Tai Tokerau. For the whole of NZ, there were eight cases (incidence rate 0.2 cases per 100,000).

Prior to 2022 there had never been a case of mpox reported in Tāmaki Makaurau. Following the declaration of a global outbreak of mpox by the WHO in May 2022, Tāmaki Makaurau saw a steady influx of cases. Case numbers dropped considerably by the end of that year, largely due to the successful rollout of the mpox vaccine in Europe and North America which improved herd immunity and significantly slowed transmission of the disease.

Table 30: Ethnic group specific incidence rates of mpox cases in Tāmaki Makaurau, 2023

Ethnicity	Cases	Rate per 100,000
Asian	3	0.5
European and Other	5	0.7
Māori	0	-
Pacific peoples	0	-
Unknown	0	-
Total	8	0.5

Source: EpiSurv

¹⁵ World Health Organisation. (2022). *WHO recommends new name for monkeypox disease*. Retrieved 8 June 2023, from <https://www.who.int/news/item/28-11-2022-who-recommends-new-name-for-monkeypox-disease>.

Table 31: Ethnic group-specific count of mpox in Tāmaki Makaurau, 2023

Detailed ethnicity	Cases
Chinese	3
NZ European	3
British nfd	1
European nfd	1

Source: EpiSurv

Tables 30 and 31 show the ethnic group distribution of mpox cases in Tāmaki Makaurau. Five of the cases were NZ European and three identified as Chinese.

Table 32: Mpox cases in Tāmaki Makaurau by age, group and sex, 2023

Age group	Female	Male	Cases	Rate per 100,000
Age under 1	0	0	0	-
1 to 4	0	0	0	-
5 to 9	0	0	0	-
10 to 14	0	0	0	-
15 to 19	0	0	0	-
20 to 29	0	1	1	0.4
30 to 39	0	3	3	1
40 to 49	0	2	2	0.9
50 to 59	0	2	2	0.9
60 to 69	0	0	0	-
Age 70+	0	0	0	-
Total	0	8	8	0.5

Source: EpiSurv/ Stats NZ

Table 32 shows the age group distribution of mpox cases for 2023 in Tāmaki Makaurau. All cases were aged between 20 and 60 years old.

Table 33: Recently visited countries of mpox cases in Tāmaki Makaurau, 2023

Travel history	Cases
Australia	1
Czech Republic	1
Germany	1
Malaysia	1
Netherlands	1
Thailand	1
United States of America	1

Source: EpiSurv

Seven of the eight cases reported recent travel. Locations of recent travel, when reported, are listed in Table 33.

3.3.5 Q fever

Q fever is a zoonotic infection caused by the bacterium *Coxiella burnetii*. Transmission generally occurs through inhalation of contaminated aerosols or dust generated by placental tissues, body fluids or excreta of infected animals. The bacteria may also be transmitted through direct contact with infected animals or other contaminated matter.

While often asymptomatic, Q fever may cause an acute febrile illness accompanied by headache, weakness and myalgia. Chronic infection may be characterised by pneumonia, subacute endocarditis, hepatitis, granulomatous lesions and post Q-fever fatigue syndrome.

Q fever is most often an occupational disease affecting farmers, veterinarians and abattoir workers. *C. burnetii* is not endemic in NZ, therefore all cases to date have been in recent overseas travellers. Q fever was once considered part of the genus *Rickettsia* but is now classified as a separate genus and a separate notifiable disease.

There were no cases of Q fever in Tāmaki Makaurau in 2023. While four suspected cases were notified in Tāmaki Makaurau, none met the definition for a confirmed or probable case. There were no notifications of Q fever in Te Tai Tokerau in 2023. The last case in NZ was reported in 2019.

3.3.6 Taeniasis

Taeniasis refers to intestinal infection by adult tapeworms of the genus *Taenia*. Transmission occurs through consumption of raw or undercooked pork or beef that contains tapeworm cysts.

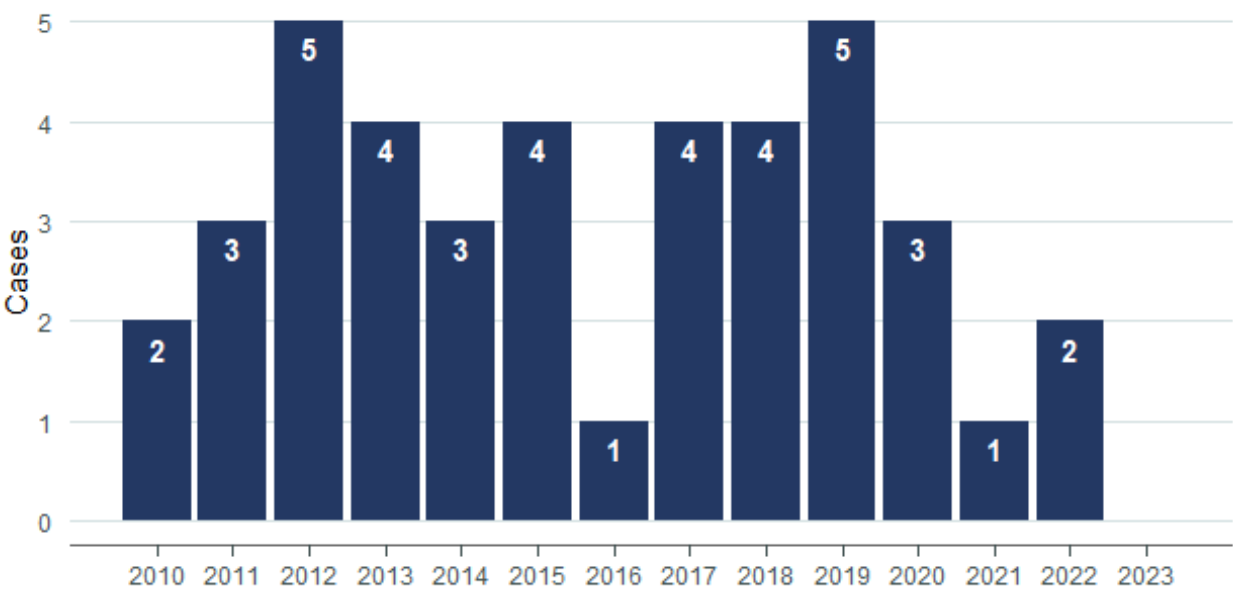
Most infections are asymptomatic, although some individuals may experience nervousness, insomnia, anorexia, weight loss, abdominal pain and digestive disturbances. Tapeworm segments may migrate out of the anus and be seen on clothing or in the faeces.

Adult tapeworms may live in the human intestine, growing up to eight metres in length and shedding eggs for up to 25 years. Consumption of *T. solium* eggs via contaminated food or water may lead to invasion of brain, muscle and skin by larval cysts ('cysticercosis').

There were no cases of taeniasis in Tāmaki Makaurau in 2023. One suspected case was notified but did not meet the case definition. The last case in Tāmaki Makaurau was reported in 2022.

There were no notifications of taeniasis in Te Tai Tokerau in 2023. The last case in Te Tai Tokerau was reported in 2021.

Table 34: Taeniasis cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

3.4 Enteric diseases

Enteric diseases refer to a group of illnesses that affect the gastrointestinal system. These may be caused by viruses, bacteria, parasites or toxins. While the term 'enteric' is often used interchangeably with 'food and waterborne', not all enteric diseases are caused primarily by food and water, with direct person-to-person spread and animal or farm contact representing common routes of transmission.

Enteric illnesses often cause diarrhoea, vomiting, abdominal cramps and fever. As these diseases are often mild and self-limiting, it is estimated only a small proportion of people seek medical care for their illness. For most enteric diseases, identifying the pathogen or agent responsible for the disease is only possible through laboratory testing. Therefore, it is likely that many enteric diseases are under-reported.

Table 35: Enteric diseases in Tāmaki Makaurau, 2023

Disease	Total notifications	Total cases (%)	Rate per 100,000	Hospitalisations (%)	Deaths (%)
Botulism	0	0	-	-	-
Campylobacteriosis	1,942	1,942 (100.0)	110	*	*
Cholera	7	0	-	-	-
Cryptosporidiosis	196	195 (99.5)	11.0	*	*
Gastroenteritis – unknown cause	14	7 (50.0)	0.4	2 (28.6)	0
Gastroenteritis / foodborne intoxication	13	9 (69.2)	0.5	4 (44.4)	0
Giardiasis	292	292 (100)	16.5	*	*
Hepatitis A	39	15 (38.5)	0.8	12 (80.0)	0
Hepatitis NOS	5	1 (20.0)	0.1	1 (100.0)	0
Listeriosis	14	14 (100.0)	0.8	14 (100.0)	7 (50.0)
Listeriosis – perinatal	2	2 (100.0)	0.1	2 (100.0)	0
Paratyphoid fever	17	17 (100.0)	1.0	12 (70.6)	0
Salmonellosis	262	245 (93.5)	13.9	87 (35.5)	0
Shigellosis	215	81 (37.7)	4.6	20 (24.7)	0
Toxic shellfish poisoning	0	0	-	-	-
Typhoid fever	35	35 (100.0)	2.0	30 (85.7)	0
VTEC/STEC infection	176	175 (99.4)	9.9	52 (29.7)	0
Yersiniosis	427	427 (100.0)	24.2	10 (2.3)	*
Total	3,656	3,457 (94.6)	-	-	-

Source: EpiSurv, Stats NZ

*Not routinely investigated in Tāmaki Makaurau

Table 36: Enteric diseases in Te Tai Tokerau, 2023

Disease	Total notifications	Total cases (%)	Rate per 100,000	Hospitalisations (%)	Deaths (%)
Botulism	0	0	-	-	-
Campylobacteriosis	266	266 (100.0)	130.2	47 (17.7)	0
Cholera	2	0	-	-	-
Cryptosporidiosis	64	64 (100.0)	31.3	9 (14.1)	0
Gastroenteritis – unknown cause	16	16 (100.0)	7.8	0	0
Gastroenteritis / foodborne intoxication	42	39 (92.9)	19.1	11 (28.2)	0
Giardiasis	36	36 (100.0)	17.6	5 (13.9)	0
Hepatitis A	0	0	-	-	-
Hepatitis NOS	0	0	-	-	-
Listeriosis	1	1 (100.0)	0.5	1 (100.0)	1 (100.0)
Listeriosis – perinatal	0	0	-	-	-
Paratyphoid fever	0	0	-	-	-
Salmonellosis	39	37 (94.9)	18.1	15 (40.5)	0
Shigellosis	9	4 (44.4)	2	1 (25)	0
Toxic shellfish poisoning	2	0	-	-	-
Typhoid fever	1	1 (100.0)	0.5	1 (100.0)	0
VTEC/STEC infection	85	85 (100.0)	41.6	19 (22.3)	0
Yersiniosis	52	52 (100.0)	25.5	15 (28.8)	-
Total	615	601 (97.7)			

In 2023, Tāmaki Makaurau received 3,656 notifications and Te Tai Tokerau received 615 notifications for enteric diseases (Table 35). Of these, 3,457 met the criteria for a confirmed or probable case in Tāmaki Makaurau, and 601 for Te Tai Tokerau.

Campylobacteriosis accounted for the highest number of cases (1,942 cases in Tāmaki Makaurau and 266 in Te Tai Tokerau). In Tāmaki Makaurau, this was followed by yersiniosis (427 cases) and giardiasis (292 cases). In Te Tai Tokerau, the second and third most common notifications was VTEC/STEC infection (85 cases) and cryptosporidiosis (64 cases).

The greatest number of hospitalisations for Tāmaki Makaurau was salmonellosis (87 hospitalisations) and VTEC/STEC (52 hospitalisations). However, the highest hospitalisation rate was seen for hepatitis not otherwise specified (NOS), listeriosis, and listeriosis-perinatal, with all cases (17 total) admitted to hospital.

For Te Tai Tokerau, the greatest number of hospitalisations was observed with VTEC/STEC infection (19 hospitalisations) and salmonellosis (15 hospitalisations). The highest hospitalisation rate was seen for listeriosis and typhoid fever with both cases (2) admitted to hospital.

Seven deaths were recorded in Tāmaki Makaurau and one death in Te Tai Tokerau, all due to non-perinatal listeriosis.

No cases of botulism, cholera or toxic shellfish poisoning were reported in 2023 for either area.

3.4.1 Botulism

Botulism is a rare infection caused by neurotoxins from *Clostridium botulinum* bacteria. The bacteria are found throughout the environment in soil, dust and honey and some marine environments. Transmission occurs through ingesting or inhaling bacterial spores, or by consuming food containing the botulinum toxin. The bacteria may also infect open wounds.

Infants usually become unwell through consuming *C. botulinum* spores in food or soil and may experience constipation and poor feeding in the early stages of infection. Adults and older children generally become ill through eating contaminated food and may experience nausea, vomiting and diarrhoea. For both age groups, progressive muscle weakness, breathing difficulties and death will occur if the condition is left untreated.

There were no cases of botulism notified in the Northern region in 2023. The last case in NZ was reported in 2021.

3.4.2 Campylobacteriosis

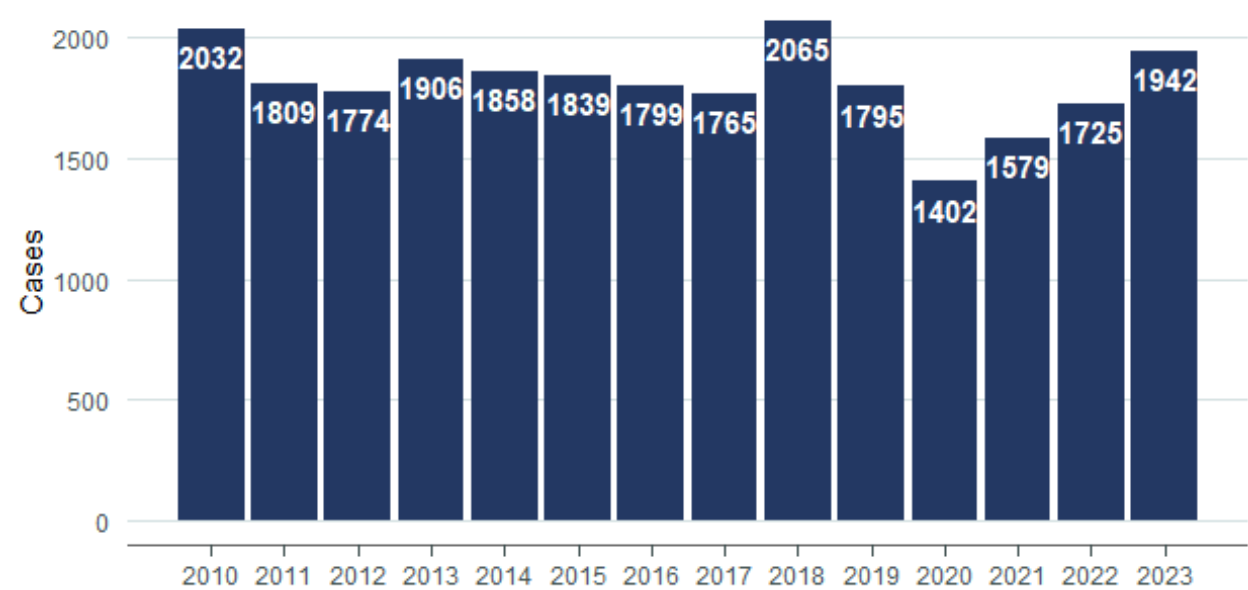
Campylobacteriosis is a common gastrointestinal infection caused by the bacterium *Campylobacter*. Transmission occurs through ingesting contaminated food, consuming faecal-contaminated water or through direct contact with infected farm or domestic animals. Person-to-person contamination is uncommon.

Symptoms begin within several days of ingesting the bacteria and include abdominal pain, fever and watery or bloody diarrhoea. Hospitalisation and deaths from campylobacteriosis are rare.

Campylobacteriosis is the most frequently notified disease in NZ, with cases generally peaking in spring and summer.

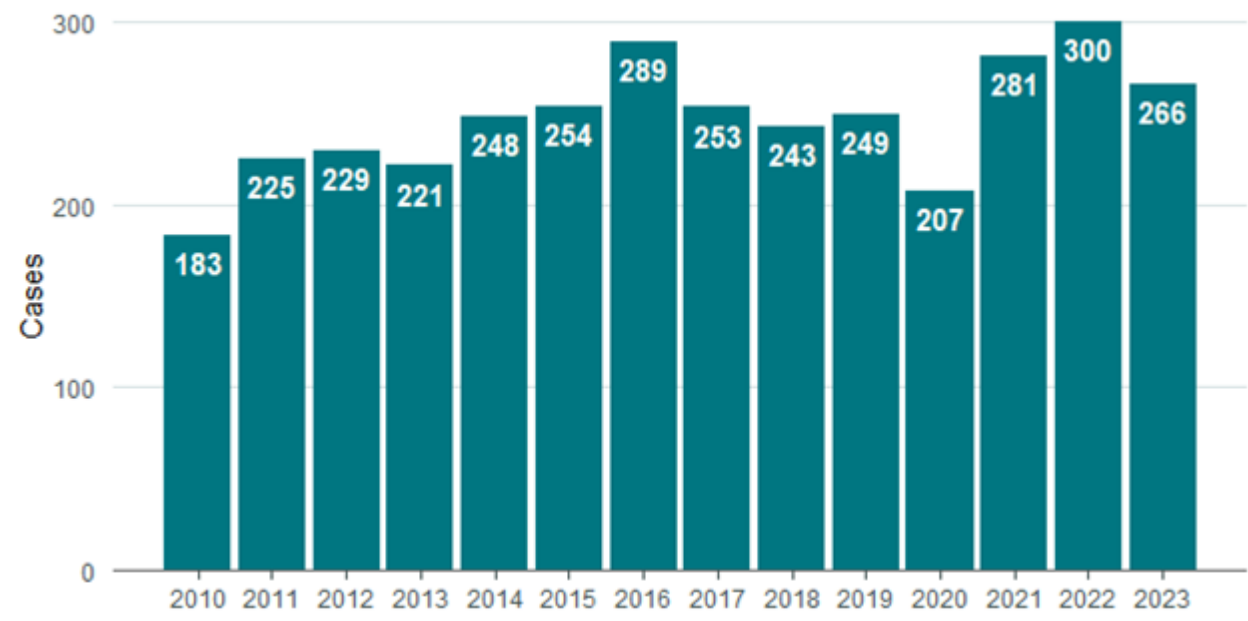
There were 1,942 campylobacteriosis cases (110.0 cases per 100,000) in Tāmaki Makaurau and 266 (130.4 cases per 100,000) cases in Te Tai Tokerau in 2023. This compares to a national incidence rate of 116.6 per 100,000.

Figure 23: Campylobacteriosis cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

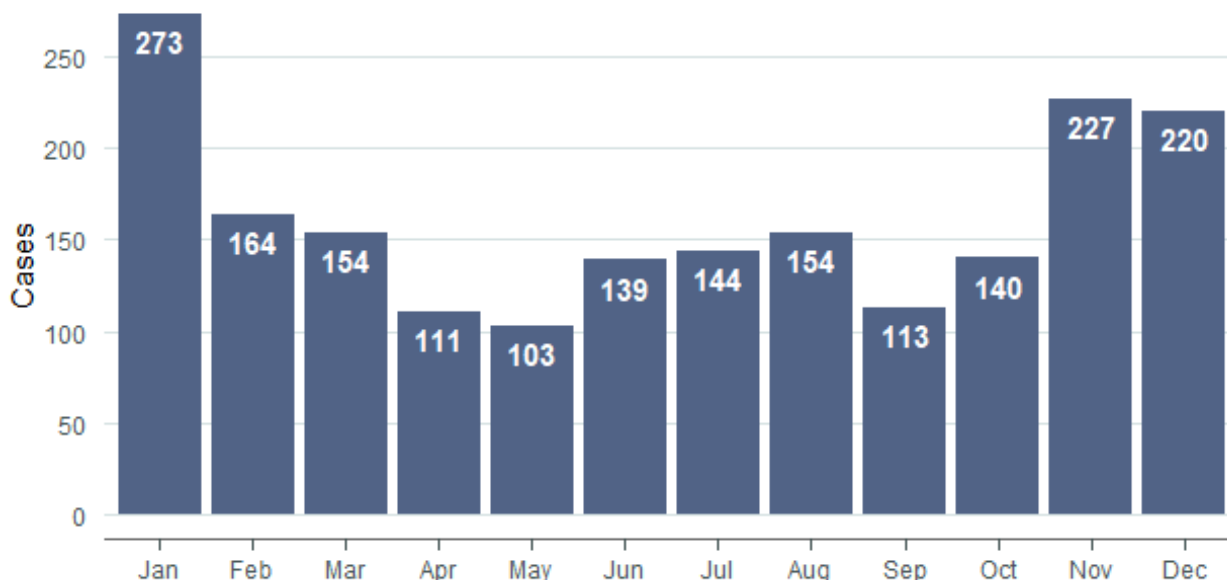
Figure 24: Campylobacteriosis cases in Te Tai Tokerau, 2010 to 2023



Source: EpiSurv

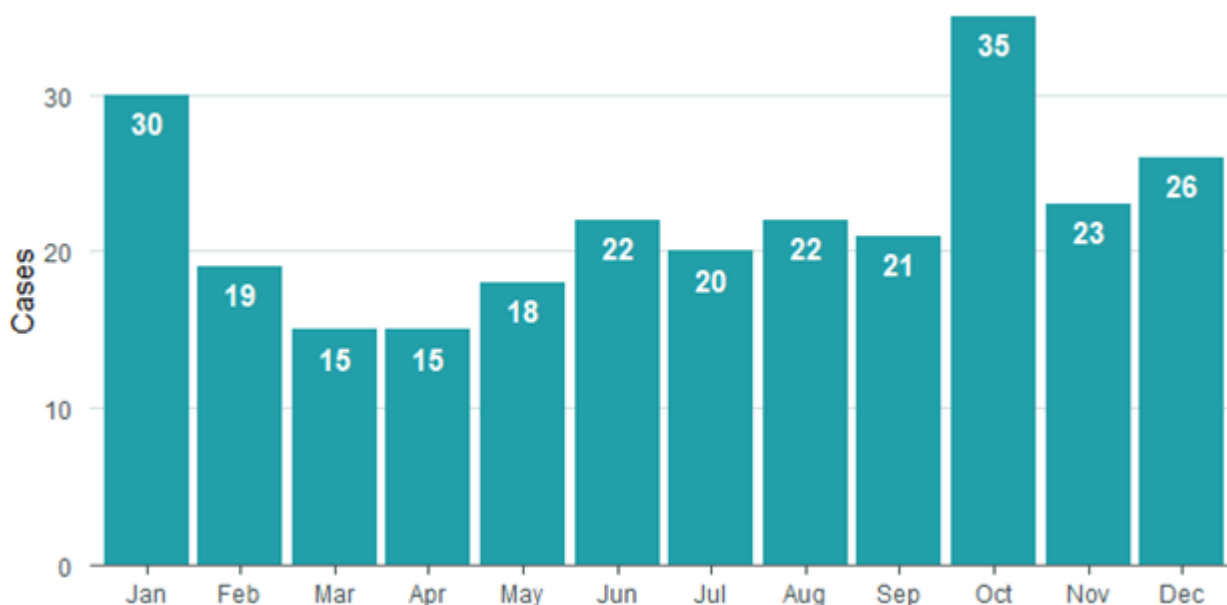
Figure 23 shows the number of campylobacteriosis cases in Tāmaki Makaurau between 2010 and 2023. Case numbers have increased since 2020, with 2023 having the highest number of cases. In contrast, cases in Te Tai Tokerau (Figure 24) decreased in 2023 compared to 2022 and 2021 (although were still higher than 2020).

Figure 25: Campylobacteriosis cases in Tāmaki Makaurau by month, 2023



Source: EpiSurv

Figure 26: Campylobacteriosis cases in Te Tai Tokerau by month, 2023



Source: EpiSurv

In 2023, cases were more common over the spring and summer months and peaked in Tāmaki Makaurau in January with 273 cases (Figure 25). Te Tai Tokerau cases peaked in October, with 35 cases (Figure 26).

Table 37: Age-specific incidence rates for campylobacteriosis in Tāmaki Makaurau, 2023

Age group	Cases	Rate per 100,000
Age under 1	26	122.5
1 to 4	119	140.1
5 to 9	57	50.2
10 to 14	72	60.7
15 to 19	112	100.4
20 to 29	295	118.9
30 to 39	258	89.0
40 to 49	202	86.9
50 to 59	249	115.3
60 to 69	252	149.6
Age 70+	300	186.7
Total	1,942	110.0

Source: EpiSurv, Stats NZ

Table 38: Age-specific incidence rates for campylobacteriosis in Te Tai Tokerau, 2023

Age group	Cases	Rate per 100,000
Age under 1	5	206.1
1 to 4	26	267.9
5 to 9	13	95.9
10 to 14	8	55.7
15 to 19	6	50.2
20 to 29	24	122.8
30 to 39	27	110.0
40 to 49	20	91.4
50 to 59	35	128.2
60 to 69	45	156.5
Age 70+	57	190.6
Total	266	130.4

Source: EpiSurv, Stats NZ

Table 39: Ethnic group-specific incidence rates for campylobacteriosis in Tāmaki Makaurau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	111	52.8
Pacific peoples	114	46.2
Asian	343	62.4
European and Other	1,137	149.9
Unknown	237	-
Total	1,942	110

Source: EpiSurv, Stats NZ

Table 40: Ethnic group-specific incidence rates for campylobacteriosis in Te Tai Tokerau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	62	83.7
Pacific peoples	4	85.7
Asian	3	31.3
European and Other	196	169.1
Unknown	1	-
Total	266	130.2

Source: EpiSurv, Stats NZ

Tables 37 and 38 show the age distribution of campylobacteriosis cases for 2023 in both regions. Incidence rates were highest among the '70+' and '60 to 69' age groups for Tāmaki Makaurau with 186.7 and 149.6 cases per 100,000 population, respectively. In Te Tai Tokerau, incident rates were highest amongst the '1 to 4' and 'Age under 1' groups, with 267.9 and 206.1 cases per 100,000 population, respectively.

Tables 39 and 40 show the ethnic group-specific distribution of cases for 2023. Incidence rates for Tāmaki Makaurau were highest among European and Other followed by Asian, with 149.9 and 62.4 cases per 100,000 population, respectively. Incidence rates for Te Tai Tokerau were highest among European and Other with 169.1 cases per 100,000 population.

Routine interviews with cases of campylobacteriosis acquired in Tāmaki Makaurau ceased in 2017 but is still carried out in Te Tai Tokerau.

3.4.3 Cholera

Cholera is a gastrointestinal infection caused by toxigenic strains of the bacterium *Vibrio cholerae*. Transmission is via ingestion of contaminated food or water, with direct person-to-person transmission being rare.

There are over 200 serogroups of *V. cholerae*, however only toxigenic strains of serogroups O1 and O139 are associated with clinical cholera. Symptoms include watery diarrhoea and vomiting, which can lead to profound dehydration and death if untreated.

Cholera is not endemic in NZ, but occasional imported cases occur, mainly in travellers from Asia.

There were no cases of cholera in the Northern region in 2023. The last case in Tāmaki Makaurau was reported in 2018. No cases have been reported in Te Tai Tokerau for at least 25 years.

3.4.4 Cryptosporidiosis

Cryptosporidiosis is a gastrointestinal infection caused by the protozoan *Cryptosporidium*. Transmission is via ingestion of contaminated water or food or contact with the faeces of an infected person or animal.¹⁶

Symptoms may include profuse watery diarrhoea, abdominal pain, nausea and vomiting, weight loss and mild fever. Asymptomatic carriage is common.

Cryptosporidiosis may be prevented through hand hygiene and appropriate treatment of drinking water.

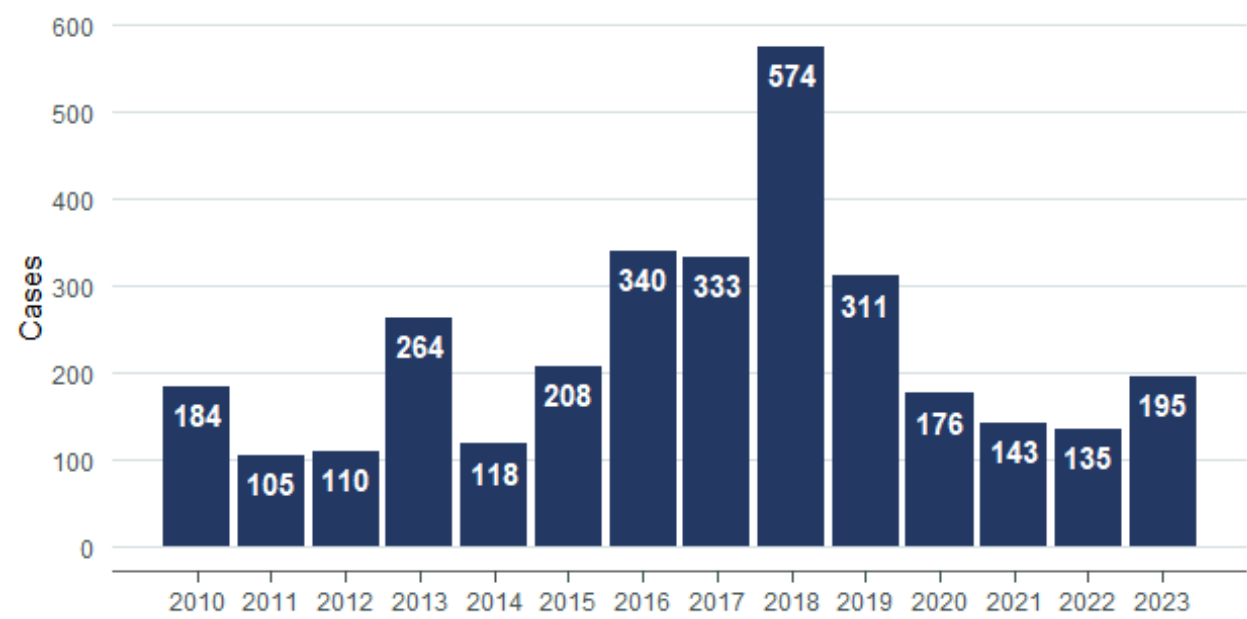
In 2023, there were 195 Cryptosporidiosis cases (11.0 cases per 100,000 population) in Tāmaki Makaurau and 64 cases (31.4 cases per 100,000 population) in Te Tai Tokerau. This compares to a national incidence rate of 15.9 cases per 100,000 population.

Hospitalisations and deaths from cryptosporidiosis are not recorded.

Te Tai Tokerau has an incidence rate for cryptosporidiosis nearly double of the rest of NZ. This is mainly due to a significant portion of the population being rural and increased contact with farm animals.

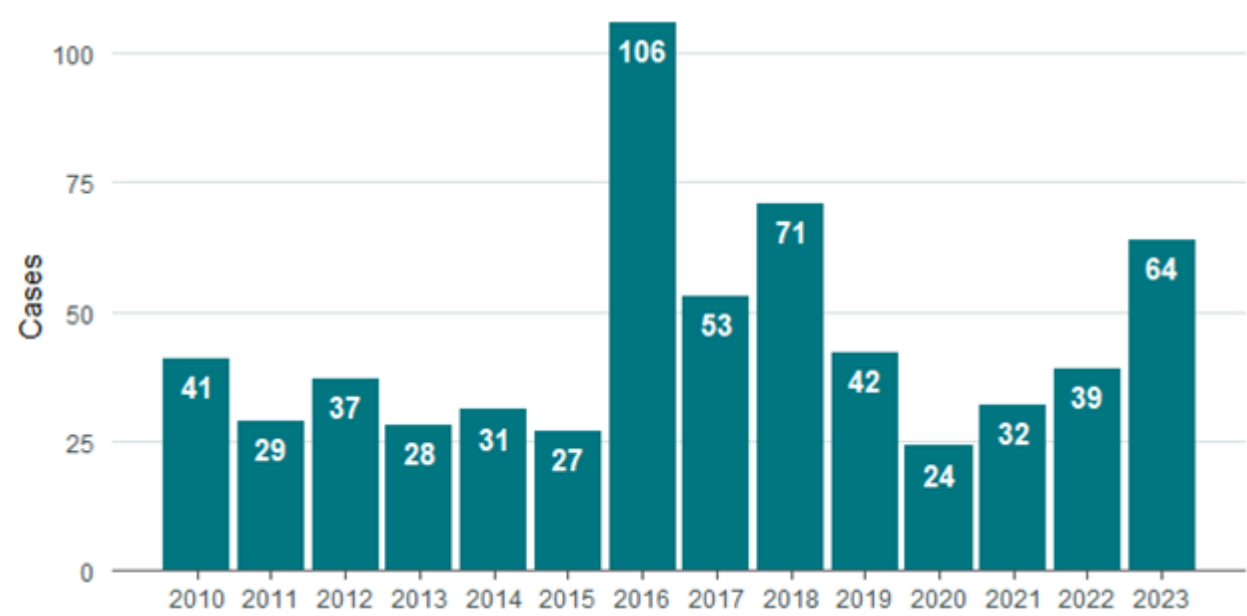
¹⁶ Ministry of Health. (2023). *Cryptosporidium and Giardia - HE1212*. Retrieved 11 May, 2023, from <https://health.govt.nz/products/cryptosporidium-and-giardia>.

Figure 27: Cryptosporidiosis cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

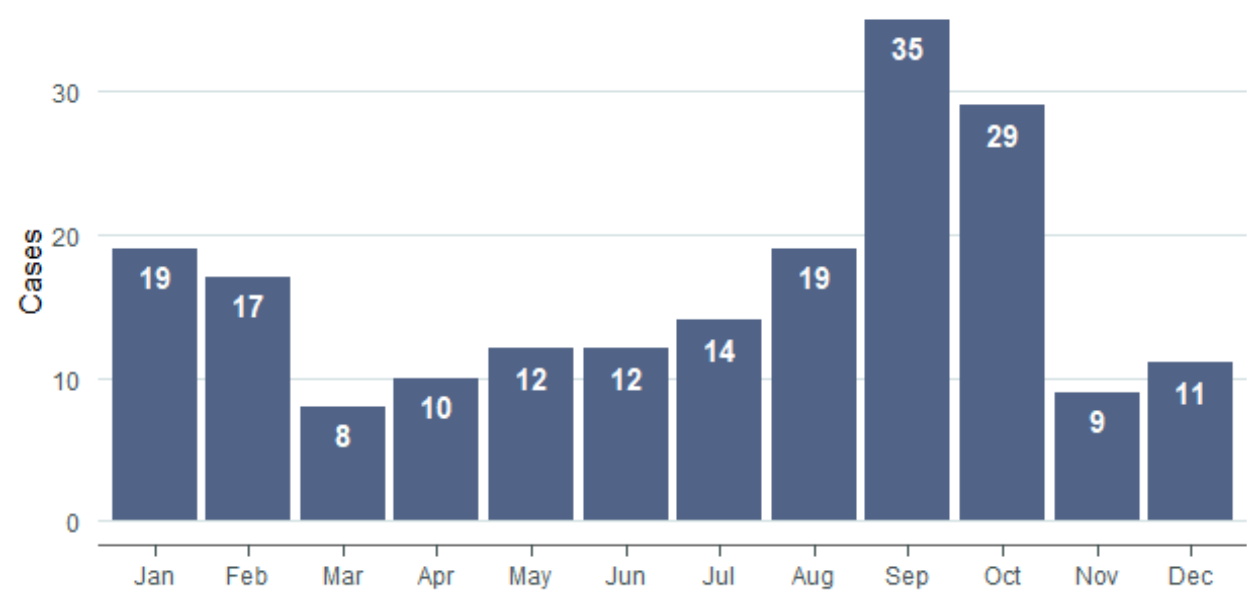
Figure 28: Cryptosporidiosis cases in Te Tai Tokerau 2010 to 2023



Source: EpiSurv

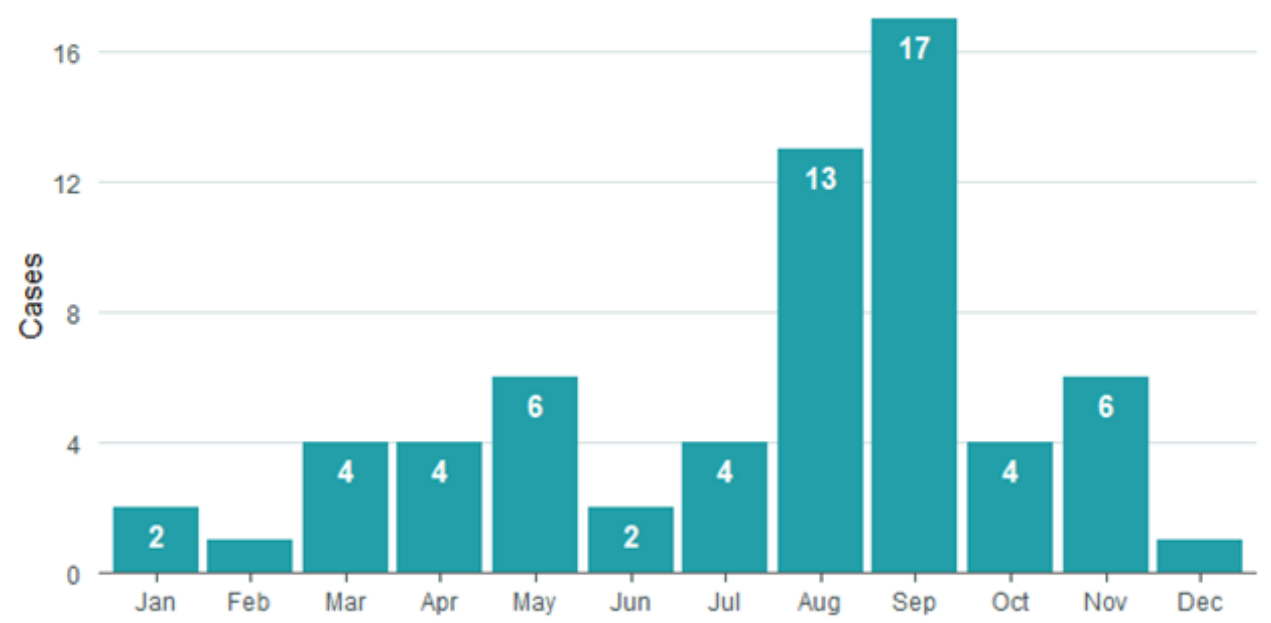
Figures 27 and 28 show the number of cryptosporidiosis cases in the Northern region between 2010 and 2023. Case numbers in 2023 were higher than 2020 and 2021 for both regions. Case numbers in Tāmaki Makaurau in 2023 were significantly lower than pre-COVID-19 levels, with cases ranging from 135 to 195 each year from 2020 to 2023 compared to more than 300 cases per year from 2016 to 2019.

Figure 29: Cryptosporidiosis cases in Tāmaki Makaurau by month, 2023



Source: EpiSurv

Figure 30: Cryptosporidiosis cases in Te Tai Tokerau by month, 2023



Source: EpiSurv

In 2023, cases were more common in late winter and spring, with a peak in September of 35 cases for Tāmaki Makaurau and 17 cases for Te Tai Tokerau (Figures 29 and 30).

Table 41: Age-specific incidence rates for cryptosporidiosis in Tāmaki Makaurau, 2023

Age group	Cases	Rate per 100,000
Age under 1	4	18.8
1 to 4	24	28.3
5 to 9	16	14.1
10 to 14	16	13.5
15 to 19	11	9.9
20 to 29	31	12.5
30 to 39	49	16.9
40 to 49	18	7.7
50 to 59	14	6.5
60 to 69	7	4.2
Age 70+	5	3.1
Total	195	11.0

Source: EpiSurv, Stats NZ

Table 42: Age-specific incidence rates for cryptosporidiosis in Te Tai Tokerau, 2023

Age group	Cases	Rate per 100,000
Age under 1	0	-
1 to 4	18	185.5
5 to 9	12	88.6
10 to 14	5	34.8
15 to 19	1	8.4
20 to 29	6	30.7
30 to 39	9	36.7
40 to 49	5	22.9
50 to 59	6	22
60 to 69	1	3.5
Age 70+	1	3.3
Total	64	31.4

Source: EpiSurv, Stats NZ

Tables 41 - 44 show the age and ethnic group distribution of cryptosporidiosis cases for 2023. Incidence rates for Tāmaki Makaurau were highest among the '1 to 4' and 'age under 1' age groups, with 28.3 and 18.8 cases per 100,000 population, respectively. For Te Tai Tokerau, '1 to 4' and '5 to 9' age groups had the highest incidence rates with 185.5 and 88.6 cases per 100,000

population respectively. Ethnic group-specific incidence rates for cryptosporidiosis were highest among European and Other followed by Asian for Tāmaki Makaurau, and Pacific peoples followed by European and Other for Te Tai Tokerau.

Table 43: Ethnic group-specific incidence rates for cryptosporidiosis in Tāmaki Makaurau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	13	6.2
Pacific peoples	6	2.4
Asian	36	6.5
European and Other	118	15.6
Unknown	22	-
Total	195	11

Source: EpiSurv, Stats NZ

Table 44: Ethnic group-specific incidence rates for cryptosporidiosis in Te Tai Tokerau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	19	25.6
Pacific peoples	3	64.2
Asian	0	-
European and Other	42	36.2
Unknown	0	-
Total	64	31.3

Source: EpiSurv, Stats NZ

Routine interviews with cases of cryptosporidiosis acquired in Tāmaki Makaurau ceased in 2017 but is still carried out in Te Tai Tokerau. In 2023, 40 cases (62.5%) in Te Tai Tokerau confirmed contact with farm animals.

3.4.5 Gastroenteritis – unknown cause

Gastroenteritis refers to vomiting and/or diarrhoea due to inflammation of the gastrointestinal tract. Acute gastroenteritis, which involves sudden onset of symptoms, is often caused by ingestion of toxins, viruses, bacteria, parasites or chemicals. Transmission is usually via ingestion of contaminated food or water or through direct contact with infected stool.

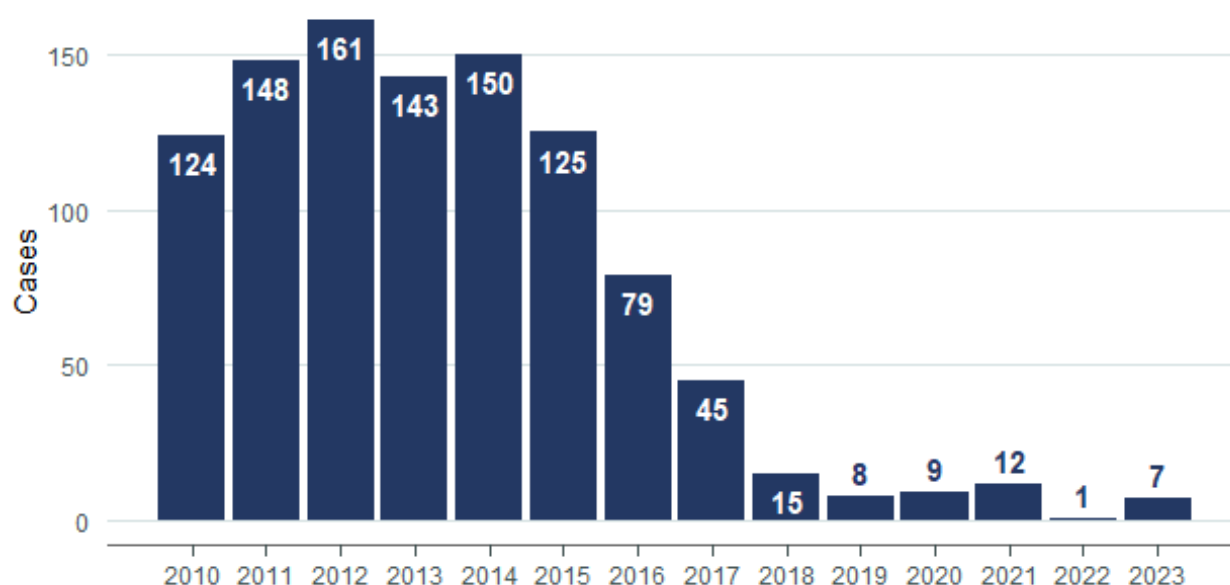
Single cases of acute gastroenteritis are notifiable if there is a suspected common source, the case is in a high-risk category (e.g. food handlers, early childhood service workers or other people at increased risk of spreading the infection) or where there the cause is of public health importance. 'Gastroenteritis – unknown cause' is used when no specific cause has been found.

Within NPHS Northern Region there is variation in how cases of gastroenteritis – unknown cause are quantified. In Tāmaki Makaurau, cases that are part of an existing outbreak are not included in overall numbers, nor are calls relating to a single case of unknown foodborne illness.

In 2023, there were seven gastroenteritis - unknown cause cases (0.4 cases per 100,000 population) in Tāmaki Makaurau and 16 cases (7.8 cases per 100,000 population) in Te Tai Tokerau. The national incidence rate was 5.2 cases per 100,000 population. These cases are often classified as probable when no pathogen is isolated.

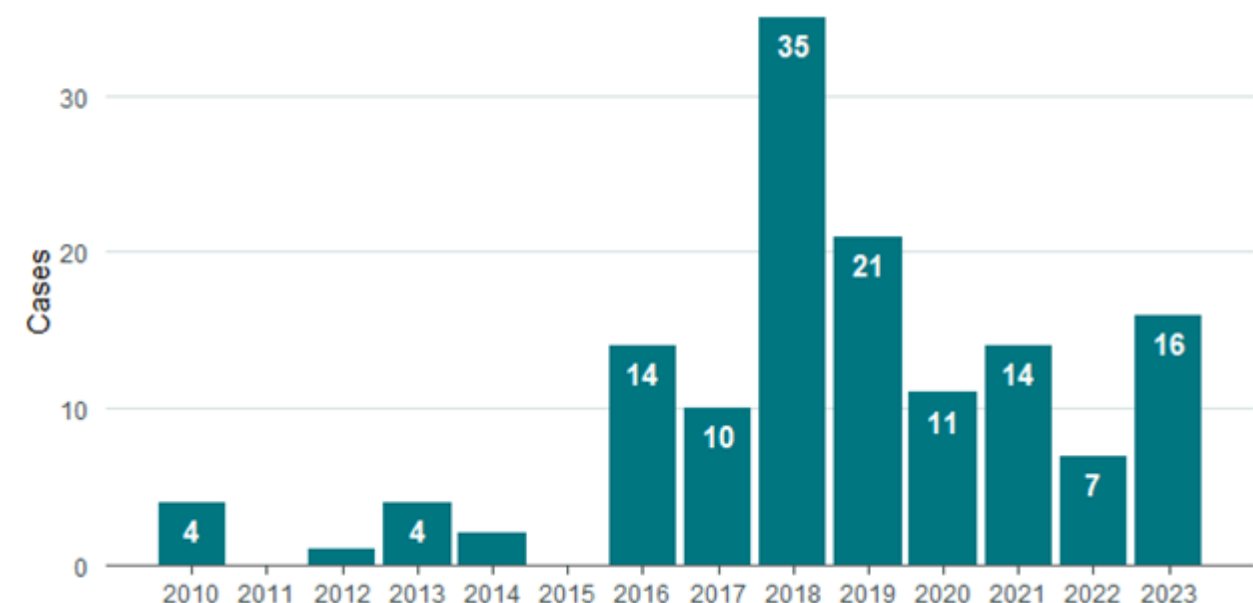
There were two hospitalisations in Tāmaki Makaurau and none in Te Tai Tokerau. There were no deaths across the Northern region.

Figure 31: Gastroenteritis - unknown cause cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

Figure 32: Gastroenteritis - unknown cause cases in Te Tai Tokerau, 2010 to 2023



Source: EpiSurv

Figures 31 and 32 show the number of gastroenteritis – unknown cause cases across the Northern region between 2010 and 2023. Case numbers for 2023 were similar to 2020 and 2021 but slightly higher than 2022 for both Tāmaki Makaurau and Te Tai Tokerau.

3.4.6 Gastroenteritis/foodborne intoxication

Gastroenteritis/foodborne intoxication refers to cases of acute gastroenteritis where the cause is known but not otherwise classified, including cases of chemical and toxic food poisoning.¹⁷ Transmission is usually through ingestion of contaminated food or water, although some infections may be spread through direct contact with infected stool.

Toxic food poisoning includes gastrointestinal illnesses due to *Bacillus cereus*, ciguatera fish poisoning, *Clostridium botulinum* (botulism), *Clostridium perfringens*, enteropathogenic *E. coli* (EPEC), enterotoxigenic *E. coli* (ETEC), histamine (scombroid) poisoning, *Staphylococcus aureus* and *Vibrio parahaemolyticus*.

Symptoms include sudden onset vomiting and/or diarrhoea, as well as neurological, dermatological, musculoskeletal and/or cardiovascular symptoms depending on the cause. Histamine (scombroid) poisoning and ciguatera poisoning may both result from consumption of certain fish species, although histamine poisoning has a much more rapid onset (10-60 minutes) compared to ciguatera poisoning (1-48 hours).^{18,19}

Within NPHS Northern Region there is variation in how cases of gastroenteritis/foodborne intoxication are quantified. In Tāmaki Makaurau, cases that are part of an existing outbreak are

¹⁷ ESR. (2017). *Enteric Disease*. Wellington: ESR.

¹⁸ Oakley, A. (2004). *Scombroid fish poisoning*. Retrieved 12 May 2023, from <https://dermnetnz.org/topics/scombroid-fish-poisoning>.

¹⁹ Regional Public Health. (2023). *Ciguatera Fish Poisoning*. Retrieved 12 May, 2023, from <https://www.rph.org.nz/public-health-topics/illness-and-disease/ciguatera-fish-poisoning/ciguatera-fish-poisoning-factsheet.pdf>.

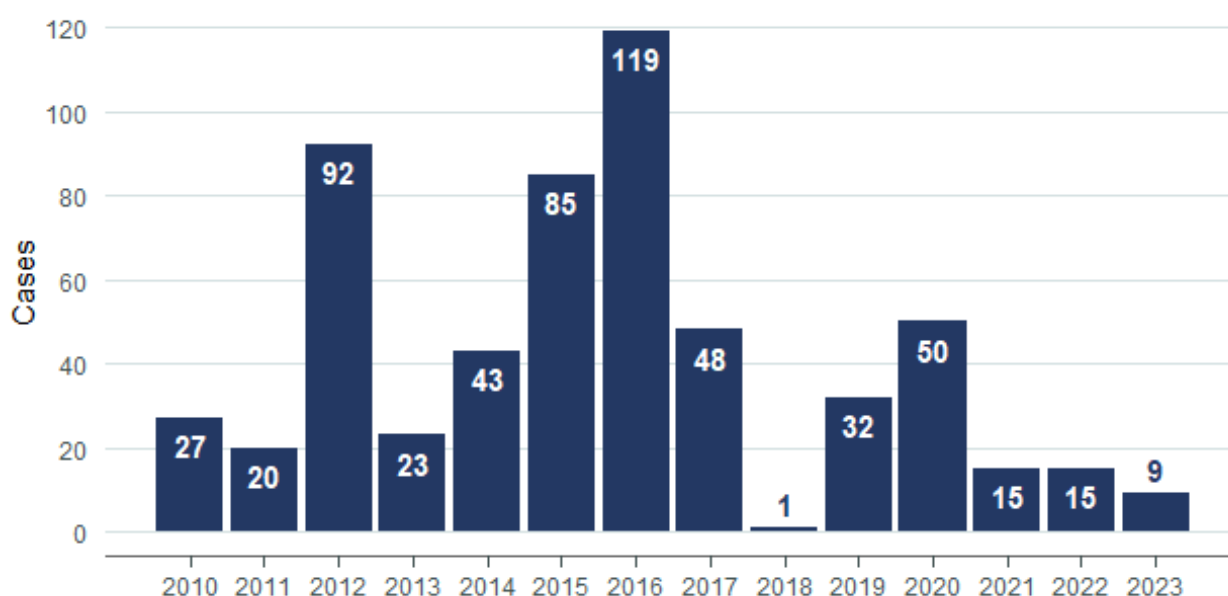
not included in overall numbers, nor are calls relating to a single case of gastroenteritis/foodborne intoxication.

In 2023, there were nine gastroenteritis/foodborne intoxication cases (0.5 cases per 100,000 population) in Tāmaki Makaurau and 39 (19.1 cases per 100,000 population) in Te Tai Tokerau. The national incidence rate was 3.7 cases per 100,000 population.

All of the Tāmaki Makaurau cases were confirmed cases of *Vibrio parahaemolyticus*

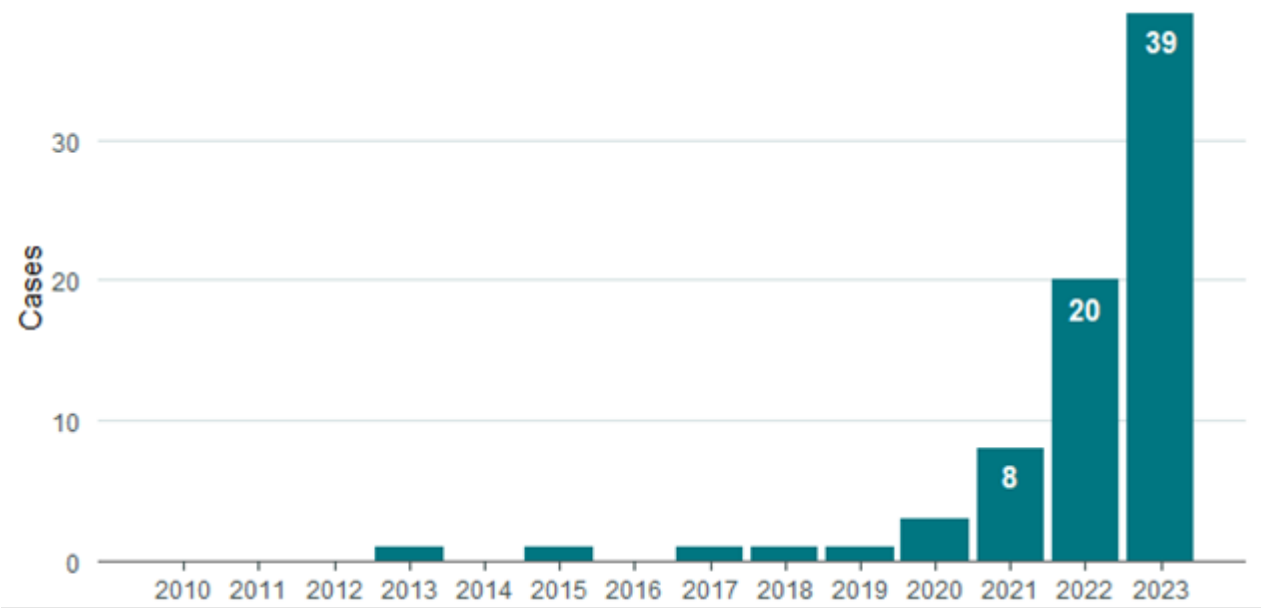
Of these cases, four were hospitalised in Tāmaki Makaurau and 11 were hospitalised in Te Tai Tokerau. There were no deaths across the Northern region.

Figure 33: Gastroenteritis/foodborne intoxication cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

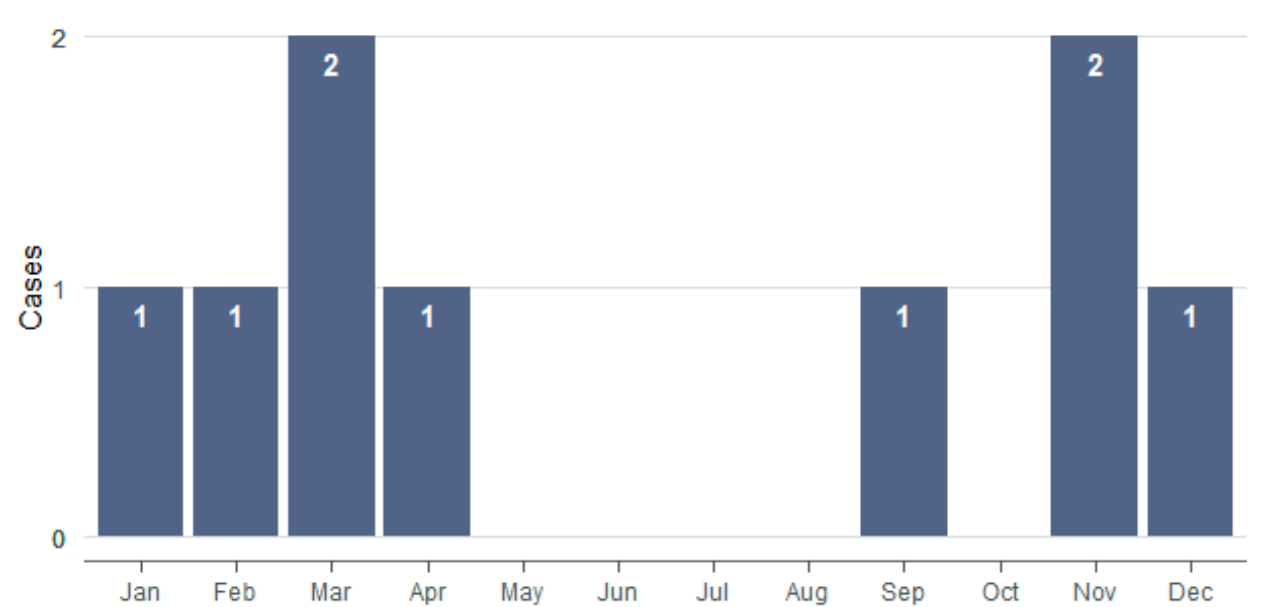
Figure 34: Gastroenteritis/foodborne intoxication cases in Te Tai Tokerau, 2010 to 2023



Source: EpiSurv

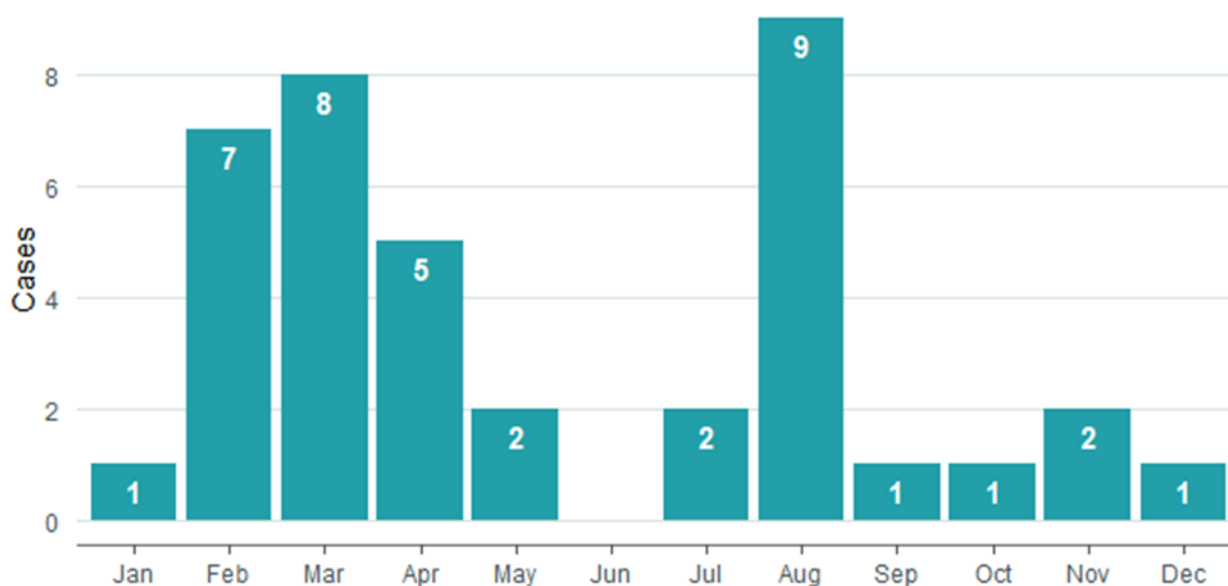
Figures 33 and 34 show the number of gastroenteritis/foodborne intoxication cases across the Northern region between 2010 and 2023. Tāmaki Makaurau case numbers from 2021 to 2023 were lower compared to prior years. In comparison, Te Tai Tokerau case numbers continued to increase with 2023 having the highest case numbers.

Figure 35: Gastroenteritis/foodborne intoxication cases in Tāmaki Makaurau by month, 2023



Source: EpiSurv

Figure 36: Gastroenteritis/foodborne intoxication cases in Te Tai Tokerau by month, 2023



Source: EpiSurv

In 2023, there was no seasonal pattern for Tāmaki Makaurau, with cases recorded throughout the year (Figure 35). For Te Tai Tokerau, there were higher case numbers during autumn and winter compared to the rest of the year (Figure 36).

Table 45: Age-specific incidence rates for gastroenteritis/foodborne intoxication Tāmaki Makaurau, 2023

Age group	Cases	Rate per 100,000
Age under 1	0	-
1 to 4	0	-
5 to 9	0	-
10 to 14	0	-
15 to 19	0	-
20 to 29	1	0.4
30 to 39	3	1
40 to 49	1	0.4
50 to 59	4	1.9
60 to 69	0	-
Age 70+	0	-
Total	9	0.5

Source: EpiSurv, Stats NZ

Table 46: Age-specific incidence rates for gastroenteritis/foodborne intoxication Te Tai Tokerau, 2023

Age group	Cases	Rate per 100,000
Age under 1	3	123.7
1 to 4	8	82.4
5 to 9	1	7.4
10 to 14	0	-
15 to 19	0	-
20 to 29	3	15.3
30 to 39	4	16.3
40 to 49	9	41.2
50 to 59	4	14.6
60 to 69	4	13.9
Age 70+	3	10
Total	39	19.1

Source: EpiSurv, Stats NZ

Tables 45 and 46 show the age and ethnic group distribution of gastroenteritis/foodborne intoxication cases for 2023. Incidence rates for cases in Tāmaki Makaurau were highest among the ‘50 to 59’ and ‘30 to 39’ age groups, with 1.9 and 1 cases per 100,000 population, respectively. The highest incidence rates for Te Tai Tokerau were ‘Age under 1’ and ‘1 to 4’ age groups with 123.7 and 82.4 cases per 100,000 population.

Table 47: Ethnic group-specific incidence rates for gastroenteritis/foodborne intoxication in Tāmaki Makaurau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	2	1
Pacific peoples	4	1.6
Asian	0	-
European and Other	3	0.4
Unknown	0	-
Total	9	0.5

Source: EpiSurv, Stats NZ

Table 48: Ethnic group-specific incidence rates for gastroenteritis/foodborne intoxication in Te Tai Tokerau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	20	27.0
Pacific peoples	0	-
Asian	3	31.3
European and Other	16	13.8
Unknown	0	-
Total	39	19.1

Source: EpiSurv, Stats NZ

Ethnic group-specific incidence rates for gastroenteritis/foodborne intoxication in Tāmaki Makaurau were highest among Pacific peoples followed by Māori, with 1.6 and 1 cases per 100,000 population, respectively. In Te Tai Tokerau over half of the cases identified as Māori.

Table 49: Gastroenteritis/foodborne intoxication cases in Tāmaki Makaurau by laboratory type, 2023

Type	Cases
<i>Vibrio parahaemolyticus</i>	9
Total	9

Source: EpiSurv, Stats NZ

Table 49 shows the gastroenteritis/foodborne intoxication cases by type in Tāmaki Makaurau. *Vibrio parahaemolyticus* was identified in all nine cases. Although not listed as a notifiable disease, *Vibrio* is managed as a notifiable enteric pathogen as documented in the CDC Manual.

3.4.7 Giardiasis

Giardiasis is a gastrointestinal infection caused by the parasite *Giardia*. Transmission is via ingesting contaminated water or food, or through contact with the faeces of an infected person or animal.²⁰

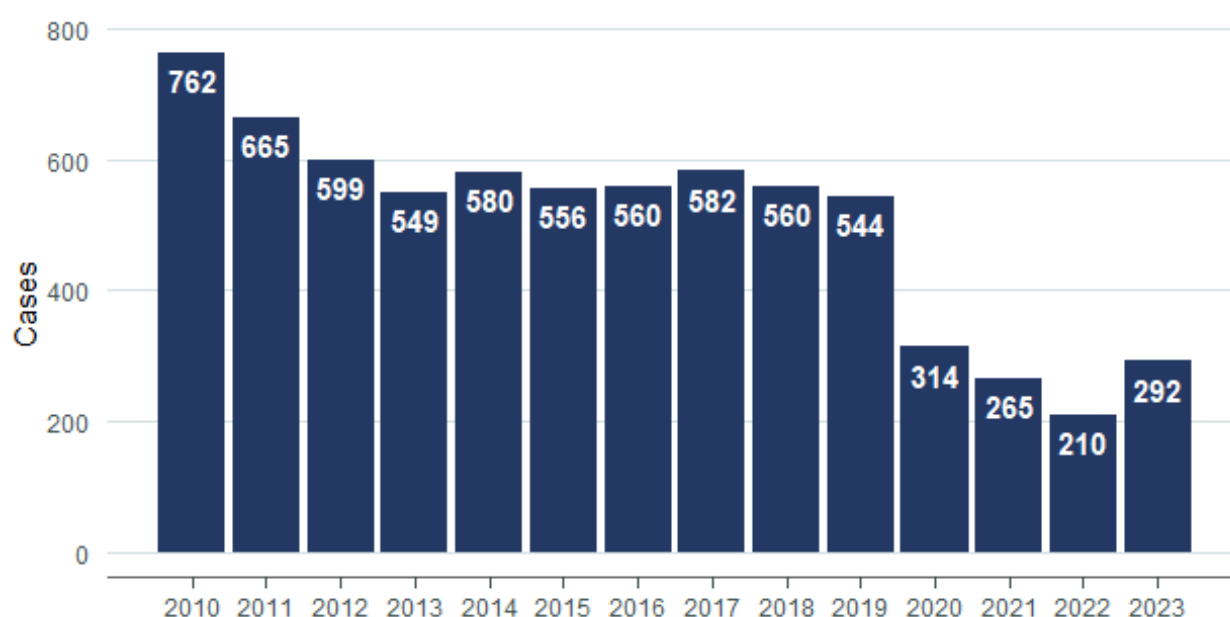
Symptoms include diarrhoea, abdominal cramps, bloating, flatulence, nausea, weight loss and malabsorption. Asymptomatic carriage is common.

Children aged one to four have the highest incidence rate for giardiasis in NZ. *Giardia* may be prevented through hand hygiene and appropriate treatment of drinking water.

In 2023, there were 292 giardiasis cases (16.5 cases per 100,000 population) in Tāmaki Makaurau and 36 cases (17.7 cases per 100,000 population) in Te Tai Tokerau. This compares to a national incidence rate of 17.2 cases per 100,000 population.

Hospitalisations and deaths from giardiasis are not recorded.

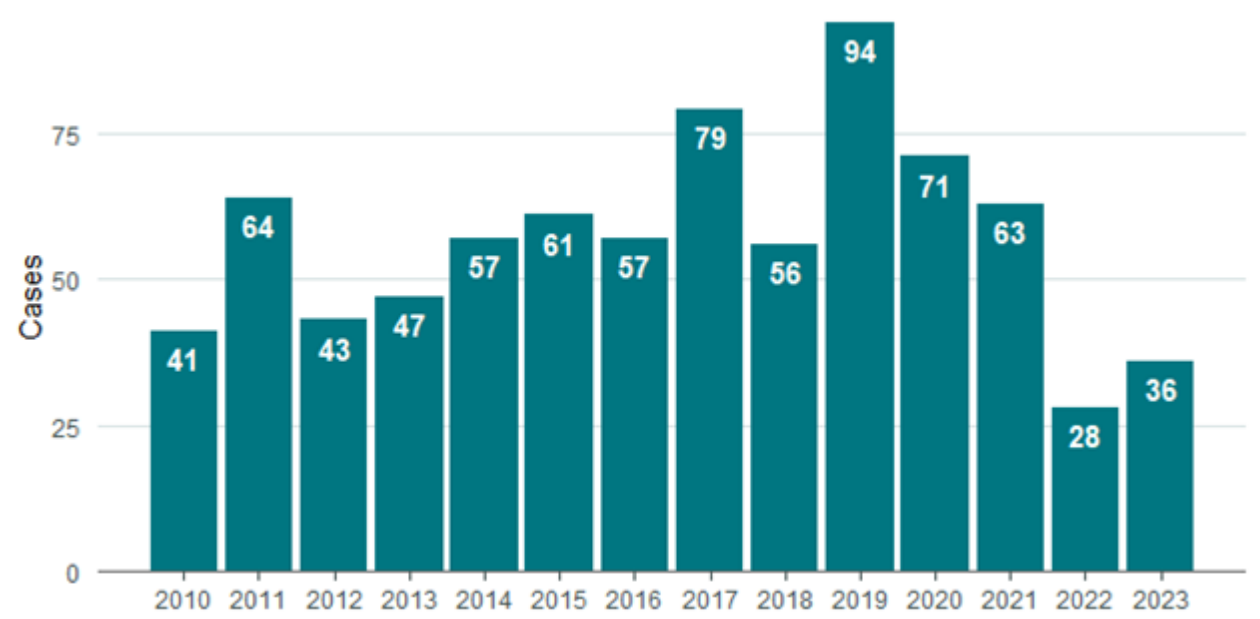
Figure 37: Giardiasis cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

²⁰ Ministry of Health. (2023). *Cryptosporidium and Giardia - HE1212*. Retrieved 11 May, 2023, from <https://health.govt.nz/products/cryptosporidium-and-giardia>.

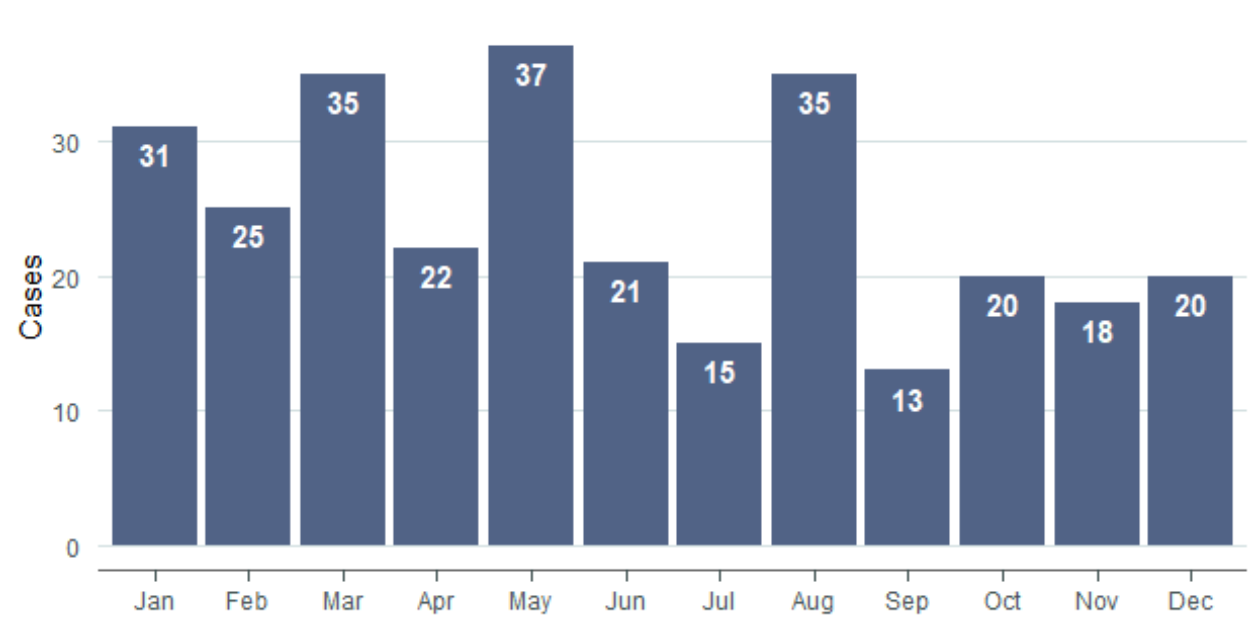
Figure 38: Giardiasis cases in Te Tai Tokerau, 2010 to 2023



Source: EpiSurv

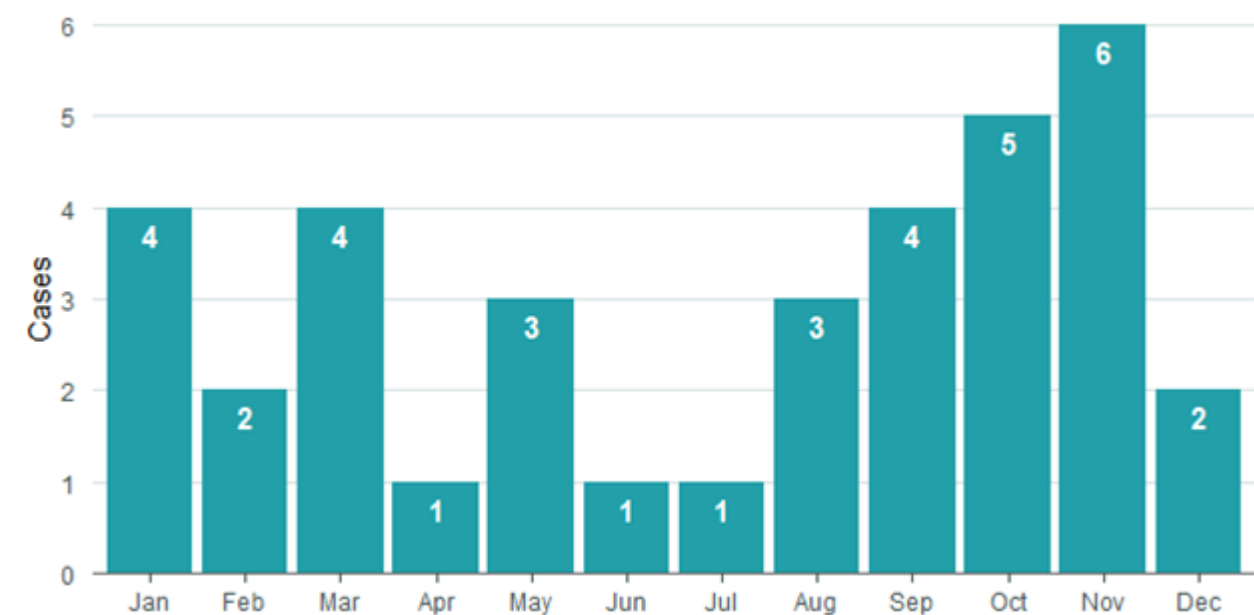
Figures 37 and 38 show the number of giardiasis cases across the Northern region between 2010 and 2023. Tāmaki Makaurau numbers were lower from the years 2020 to 2022 but increased in 2023. Case numbers were still much lower than pre-COVID-19 levels, with more than 500 cases per year reported between 2010 and 2019. This may be related to improved hand hygiene practices as a result of COVID-19 prevention. Te Tai Tokerau case numbers increased in 2023 but were still much lower compared to pre-2022 case numbers.

Figure 39: Giardiasis cases in Tāmaki Makaurau by month, 2023



Source: EpiSurv

Figure 40: Giardiasis cases in Te Tai Tokerau by month, 2023



Source: EpiSurv

In 2023, there were no noticeable patterns regarding when cases occurred in the year for cases in Tāmaki Makaurau (Figure 39). In Te Tai Tokerau, cases were more common later in the year and peaked with five cases in October and six cases in November (Figure 40).

Table 50: Age-specific incidence rates for giardiasis in Tāmaki Makaurau, 2023

Age group	Cases	Rate per 100,000
Age under 1	4	18.8
1 to 4	35	41.2
5 to 9	21	18.5
10 to 14	6	5.1
15 to 19	6	5.4
20 to 29	43	17.3
30 to 39	65	22.4
40 to 49	41	17.6
50 to 59	22	10.2
60 to 69	34	20.2
Age 70+	15	9.3
Total	292	16.5

Source: EpiSurv, Stats NZ

Table 51: Age-specific incidence rates for giardiasis in Te Tai Tokerau, 2023

Age group	Cases	Rate per 100,000
Age under 1	2	82.4
1 to 4	8	82.4
5 to 9	5	36.9
10 to 14	2	13.9
15 to 19	1	8.4
20 to 29	2	10.2
30 to 39	3	12.2
40 to 49	4	18.3
50 to 59	3	11.0
60 to 69	4	13.9
Age 70+	2	6.7
Total	36	17.7

Source: EpiSurv, Stats NZ

Tables 50 and 51 show the age distribution of giardiasis cases across the Northern region. Incidence rates in Tāmaki Makaurau were highest among the ‘1 to 4’ and ‘30 to 39’ age groups, with 41.2 and 22.4 cases per 100,000 population, respectively. Incidence rates in Te Tai Tokerau were highest among the ‘Age under 1’ and ‘1 to 4’ age groups, with 82.4 cases per 100,000 population for both groups.

Table 52: Ethnic group-specific incidence rates for giardiasis in Tāmaki Makaurau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	17	8.1
Pacific peoples	3	1.2
Asian	64	11.6
European and Other	178	23.5
Unknown	30	-
Total	292	16.5

Source: EpiSurv, Stats NZ

Table 53: Ethnic group-specific incidence rates for giardiasis in Te Tai Tokerau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	8	10.8
Pacific peoples	1	21.4
Asian	3	31.3
European and Other	24	20.7
Unknown	0	-
Total	36	17.6

Source: EpiSurv, Stats NZ

Tables 52 and 53 show the ethnic-group distribution for giardiasis cases for 2023 across the Northern region. Ethnic group-specific incidence rates for Tāmaki Makaurau were highest among European and Other with 23.5 cases per 100,000 population, followed by Asian with 11.6 cases per 100,000. In Te Tai Tokerau two thirds of cases identified as European and Other.

Routine interviews with cases of giardiasis acquired in Tāmaki Makaurau ceased in 2017, but are still carried out in Te Tai Tokerau.

3.4.8 Hepatitis A

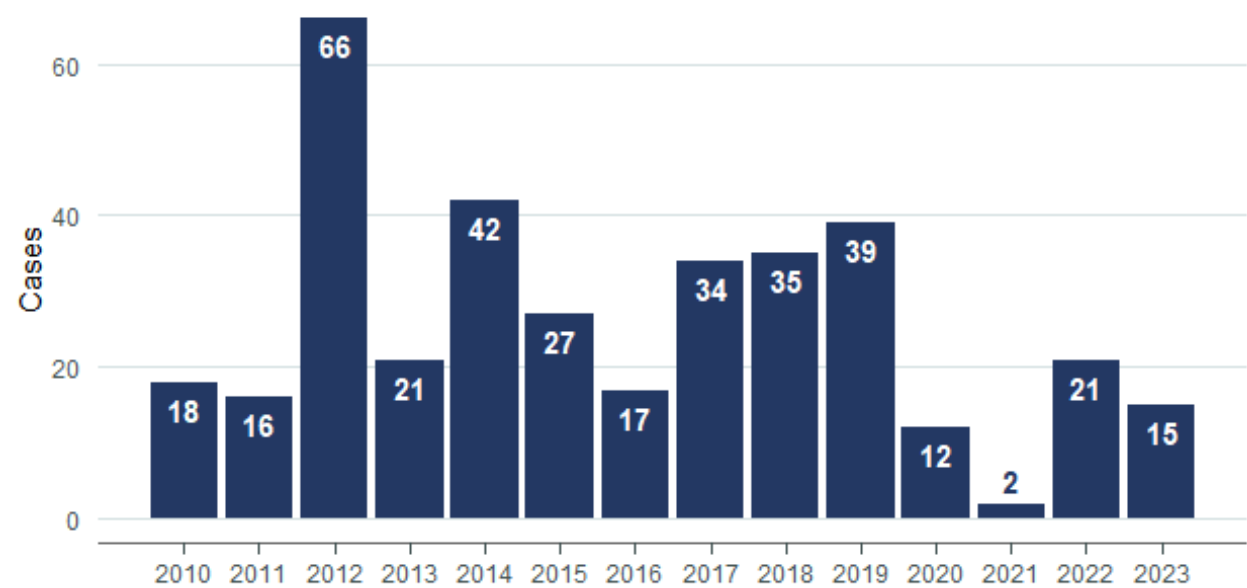
Hepatitis A is an infectious liver disease caused by the hepatitis A virus. Transmission occurs largely via the faecal-oral route, although foodborne and blood-borne transmission may occur.

Infection often involves a prodromal illness followed by jaundice and abdominal discomfort. Children are often asymptomatic or present with atypical symptoms. While most people recover completely, complications such as liver failure and death may occur.

The incidence of hepatitis A in NZ has decreased sharply since the 1960s, and currently about half the cases notified have a history of overseas travel. A vaccine is available for those travelling in high-risk areas.

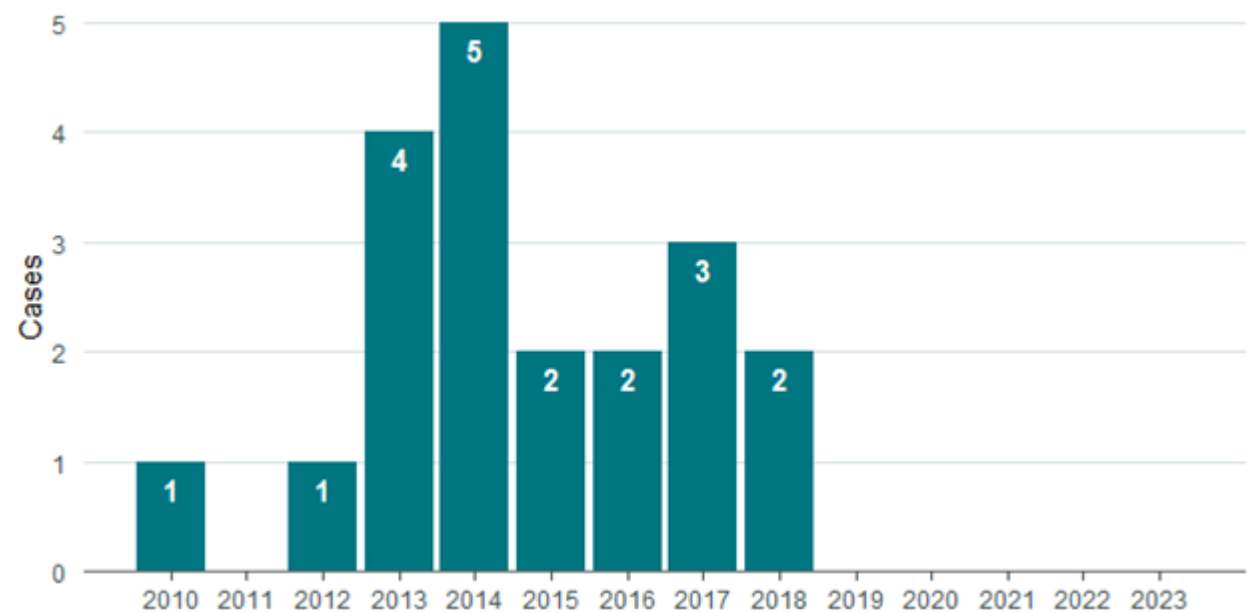
In 2023, there were 15 hepatitis A cases (0.9 cases per 100,000 population) in Tāmaki Makaurau and no cases in Te Tai Tokerau. The last case in Te Tai Tokerau was reported in 2018. This compares to a national incidence rate of 0.7 cases per 100,000. Of these cases, 12 were hospitalised in Tāmaki Makaurau. There were no deaths across the Northern region.

Figure 41: Hepatitis A cases in Tāmaki Makaurau by month, 2010 to 2023



Source: EpiSurv

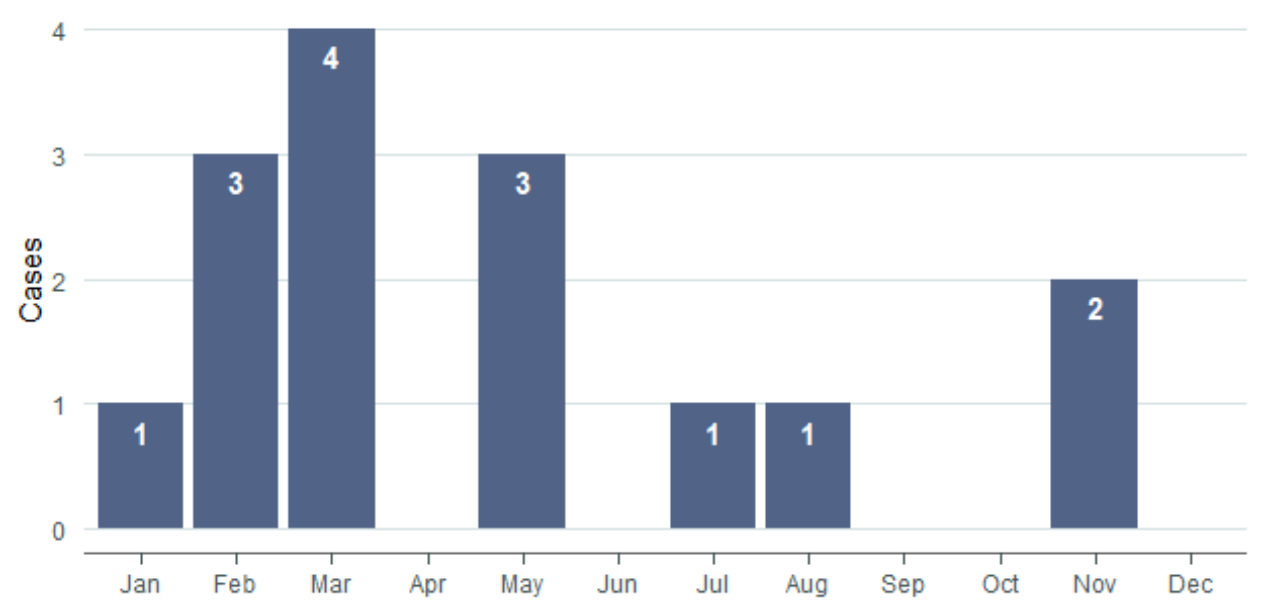
Figure 42: Hepatitis A cases in Te Tai Tokerau by month, 2010 to 2023



Source: EpiSurv

Figures 41 and 42 show the number of hepatitis A cases across the Northern region from 2010 to 2023. Tāmaki Makaurau case numbers in 2023 were higher compared to 2022 but overall, case numbers from 2020 to 2023 were much lower compared to pre-COVID-19 numbers.

Figure 43: Hepatitis A cases in Tāmaki Makaurau by month, 2023



Source: EpiSurv

In 2023, cases in Tāmaki Makaurau were more common at the beginning of the year, with 11 cases recorded between January and June (Figure 43).

Table 54: Age-specific incidence rates for hepatitis A in Tāmaki Makaurau, 2023

Age group	Cases	Rate per 100,000
Age under 1	0	-
1 to 4	1	1.2
5 to 9	1	0.9
10 to 14	0	-
15 to 19	3	2.7
20 to 29	5	2
30 to 39	4	1.4
40 to 49	0	-
50 to 59	0	-
60 to 69	1	0.6
Age 70+	0	-
Total	15	0.8

Source: EpiSurv, Stats NZ

Table 55: Ethnic group-specific incidence rates for hepatitis A in Tāmaki Makaurau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	1	0.5
Pacific peoples	0	-
Asian	9	1.6
European and Other	5	0.7
Unknown	0	-
Total	15	0.8

Source: EpiSurv, Stats NZ

Tables 54 and 55 show the age and ethnic group distribution of hepatitis A cases for Tāmaki Makaurau in 2023. Incidence rates were highest among the '15 to 19' and '30 to 39' age groups, with 2.7 and 1.4 cases per 100,000 population, respectively. Ethnic group-specific incidence rates were highest among Asian and European and Other, with 1.6 and 0.7 cases per 100,000 population, respectively. Among the nine Asian cases, seven identified as being of Indian ethnicity (Table 56).

Table 56: Detailed ethnicity count of hepatitis A cases in Tāmaki Makaurau, 2023

Detailed ethnicity	Cases
Indian	7
African nfd	2
Chinese	1
Māori	1
Middle Eastern nec	1
Middle Eastern nfd	1
NZ European	1
Other Asian nec	1

Source: EpiSurv

Table 57: Recent travel history of hepatitis A cases in Tāmaki Makaurau, 2023

Travel history	Cases
India	7
Pakistan	3
Congo	1
Jordan	1
Malaysia	1
Mexico	1
Singapore	1
South Africa	1
United Arab Emirates	1
United Kingdom	1
United States of America	1

Source: EpiSurv

Table 57 shows the countries visited by hepatitis A cases in Tāmaki Makaurau during their exposure period. The most visited country was India (seven cases) followed by Pakistan (three cases).

Table 58: Risk factors associated with hepatitis A in Tāmaki Makaurau, 2023

Risk factor	Cases	Percent
Case overseas during incubation period	15	100.0%
Attendance at school, pre-school or childcare	1	6.7%
Contact with contaminated food or drink	1	6.7%
Household contact with a confirmed case in previous 60 days	1	6.7%
Nature of household contact	1	6.7%

Source: EpiSurv

All the hepatitis A cases in Tāmaki Makaurau had travelled overseas (in conjunction with some other risk factors) during their incubation period (Table 58). None of the cases had been immunised with an appropriate vaccine before the onset of their disease.

3.4.9 Hepatitis not otherwise specified

Hepatitis not otherwise specified (NOS) refers to infections caused by hepatitis D (also known as Delta hepatitis), hepatitis E and hepatitis G.

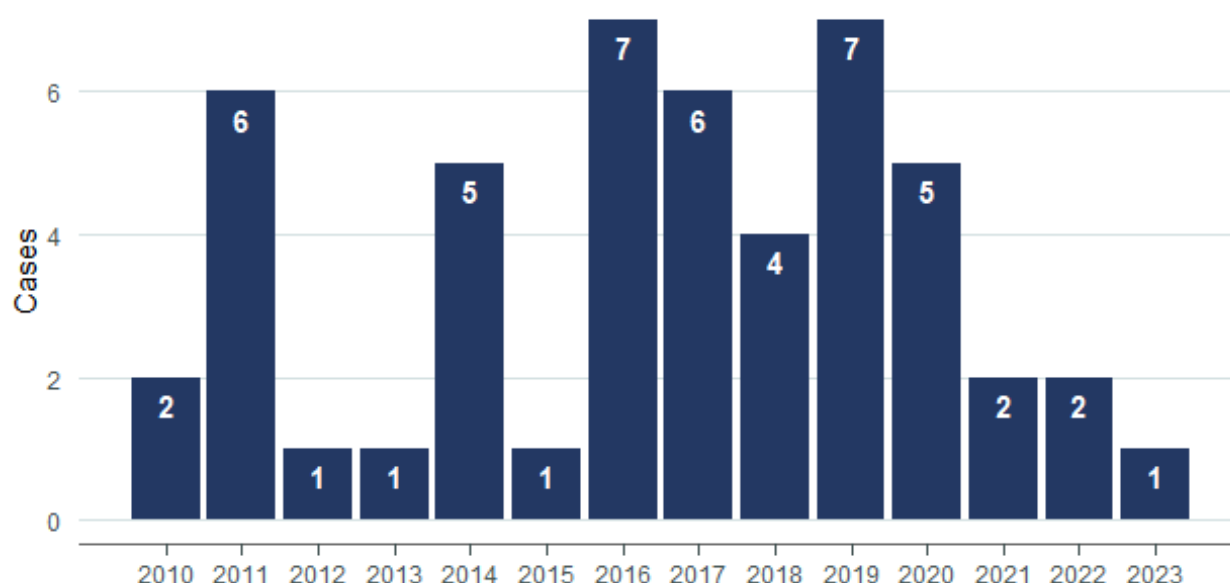
Hepatitis D may occur as an acute co-infection with hepatitis B or as a super-infection in people with chronic hepatitis B infection. Hepatitis E is an enteric infection with a similar course to hepatitis A. Hepatitis G is usually associated with chronic hepatitis B or hepatitis C infection or human immunodeficiency virus (HIV).

Infection usually involves an acute illness with variable symptoms including fever, malaise, anorexia and nausea with jaundice. Hepatitis G has no recognised disease sequelae.

In 2023, there was one hepatitis NOS case (0.1 cases per 100,000 population) in Tāmaki Makaurau and no cases in Te Tai Tokerau. The national incidence rate was 0.2 cases per 100,000 population.

There was one hospitalisation in Tāmaki Makaurau and no deaths across the region.

Figure 44: Hepatitis NOS cases in Tāmaki Makaurau 2010 to 2023



Source: EpiSurv

Figure 44 shows the number of hepatitis NOS cases in Tāmaki Makaurau between 2010 and 2023. Case numbers were slightly lower between 2021 to 2023 than pre-COVID-19 years.

3.4.10 Listeriosis

Listeriosis is an infection caused by the bacterium *Listeria monocytogenes*. Unlike most pathogens, listeria can multiply in refrigerated foods. Transmission generally occurs via ingestion of contaminated foods such as milk, cheese, vegetables, meat products or shellfish.

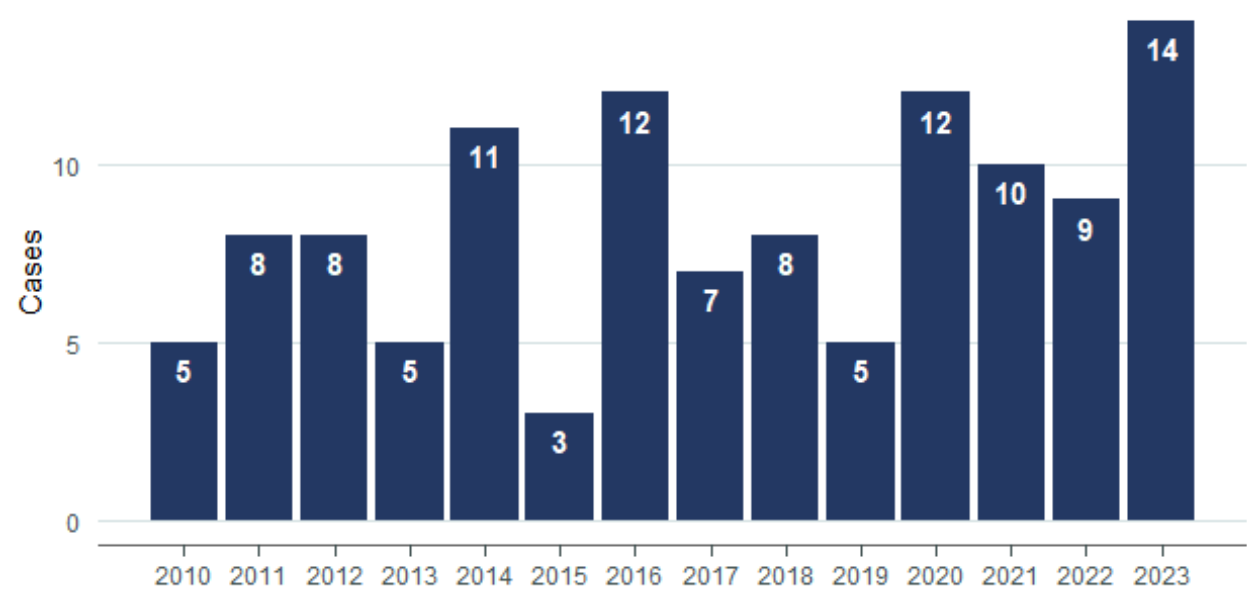
Symptoms include diarrhoea, fever, myalgia and vomiting. The elderly and immunosuppressed may present with septicaemia, meningitis or abscesses. Infections during pregnancy may lead to stillbirth, premature delivery and newborn septicaemia or meningitis.

While most cases of listeriosis are sporadic, outbreaks have occurred in NZ.

In 2023 there were 14 listeriosis cases (0.8 cases per 100,000 population) in Tāmaki Makaurau and there was one case (0.5 cases per 100,000 population) in Te Tai Tokerau. The national incidence rate was 0.7 cases per 100,000 population.

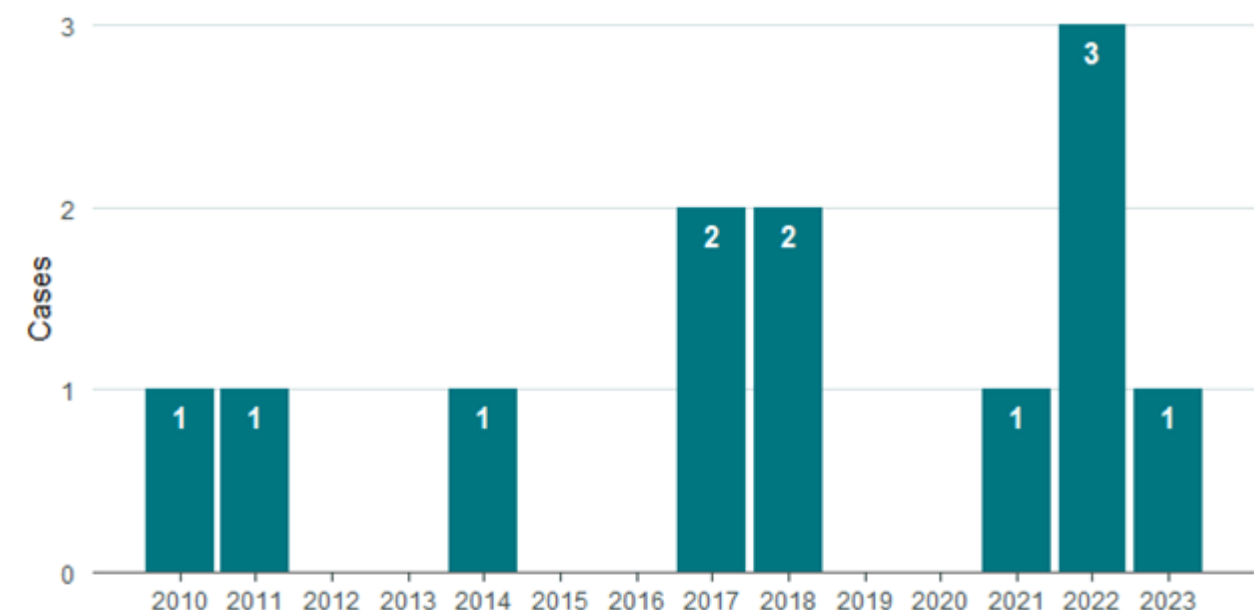
All 14 of the Tāmaki Makaurau cases were hospitalised. Half (seven) of the cases in Tāmaki Makaurau passed away, as did the case in Te Tai Tokerau.

Figure 45: Listeriosis cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

Figure 46: Listeriosis cases in Te Tai Tokerau, 2010 to 2023



Source: EpiSurv

Figures 45 and 46 show the number of listeriosis cases across the Northern region between 2010 and 2022. In 2023 Tāmaki Makaurau recorded its highest case numbers since 2010. In contrast, the case numbers in Te Tai Tokerau in 2023 were lower than 2022, and were similar to previous years with just one case.

Table 59: Listeriosis cases in Tāmaki Makaurau by age group and sex, 2023

Age group	Female	Male	Cases	Rate per 100,000
Age under 1	0	0	0	-
1 to 4	0	1	1	1.2
5 to 9	0	0	0	-
10 to 14	0	0	0	-
15 to 19	0	0	0	-
20 to 29	0	0	0	-
30 to 39	0	0	0	-
40 to 49	1	1	2	0.9
50 to 59	1	1	2	0.9
60 to 69	0	1	1	0.6
Age 70+	1	7	8	5
Total	3	11	14	0.8

Source: EpiSurv, Stats NZ

Table 60: Ethnic group-specific incidence rates for listeriosis in Tāmaki Makaurau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	1	0.5
Pacific peoples	1	0.4
Asian	5	0.9
European and Other	7	0.9
Unknown	0	-
Total	14	0.8

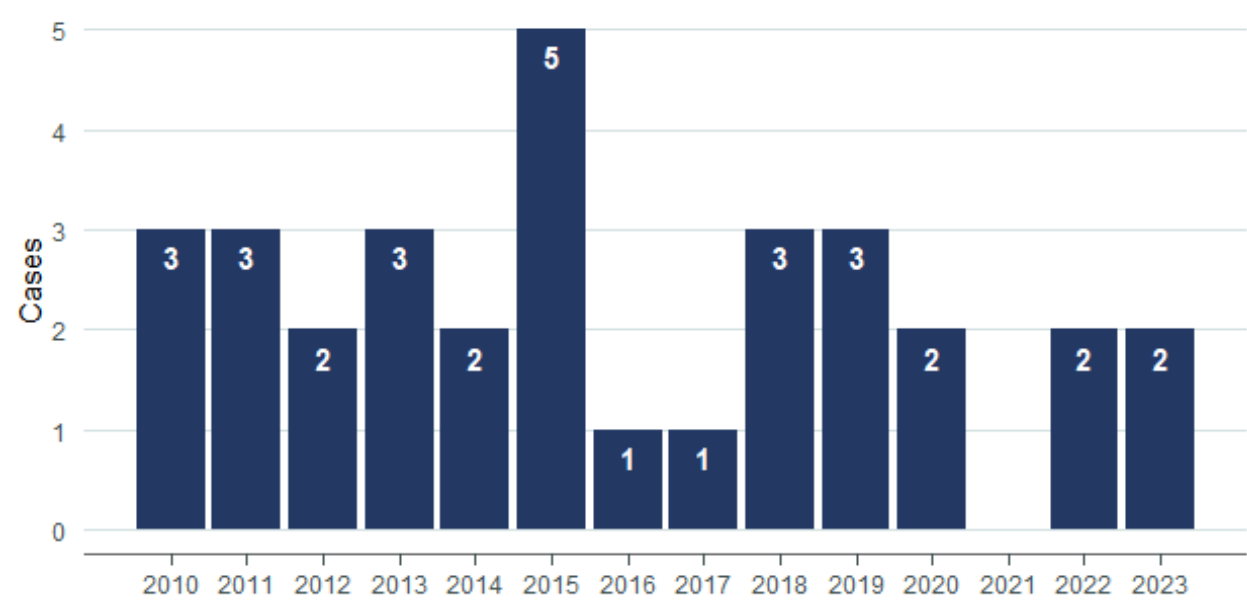
Source: EpiSurv, Stats NZ

Tables 59 and 60 show the age, sex and ethnic group distribution of listeria cases for Tāmaki Makaurau in 2023. Incidence rates were highest among the '70+' age group with five cases per 100,000 population. The ratio of female to male cases was 3:11, with the majority of 2023 cases occurring in males over the age of 70. Ethnic group-specific Tāmaki Makaurau incidence rates (Table 60) for listeriosis were highest among Asian and European and Other ethnicities, with 0.9 cases per 100,000 population for both groups.

3.4.11 Listeriosis (perinatal)

In 2023, there were two perinatal listeriosis cases (0.1 cases per 100,000 population) in Tāmaki Makaurau and no cases in Te Tai Tokerau. The national incidence rate was 0.1 cases per 100,000 population. Both cases in Tāmaki Makaurau were hospitalised and there were no deaths.

Figure 47: Perinatal listeriosis cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

3.4.12 Paratyphoid fever

Paratyphoid fever is an enteric illness caused by the bacterium *Salmonella enterica*, serotypes Paratyphi A, Paratyphi B, or Paratyphi C. Transmission occurs through ingestion of food and water contaminated by the faeces and urine of infected persons.

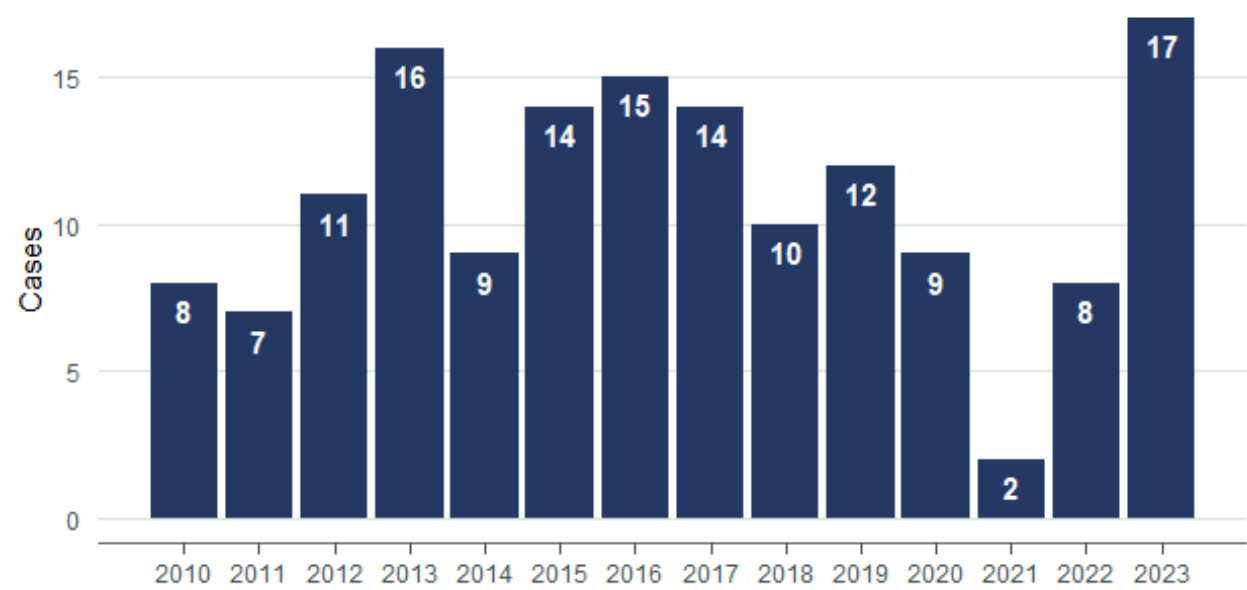
Symptoms of paratyphoid fever are similar to typhoid fever, although the illness tends to be shorter and less severe. It often manifests as acute gastroenteritis. *Salmonella* Paratyphi B var. Java does not cause enteric fever and produces a less serious disease than other Paratyphi variants, therefore infections caused by this biovar are notified and managed as salmonellosis cases.

Most cases of paratyphoid fever notified in NZ are associated with overseas travel, although local cases have arisen due to consumption of sewage-contaminated shellfish.

In 2023 there were 17 paratyphoid fever cases (1.0 cases per 100,000 population) in Tāmaki Makaurau and no cases in Te Tai Tokerau. The last reported case in Te Tai Tokerau was in 2019. This compares to a national incidence rate of 0.5 cases per 100,000 population.

Of the 17 cases in Tāmaki Makaurau, 12 were hospitalised and there were no deaths.

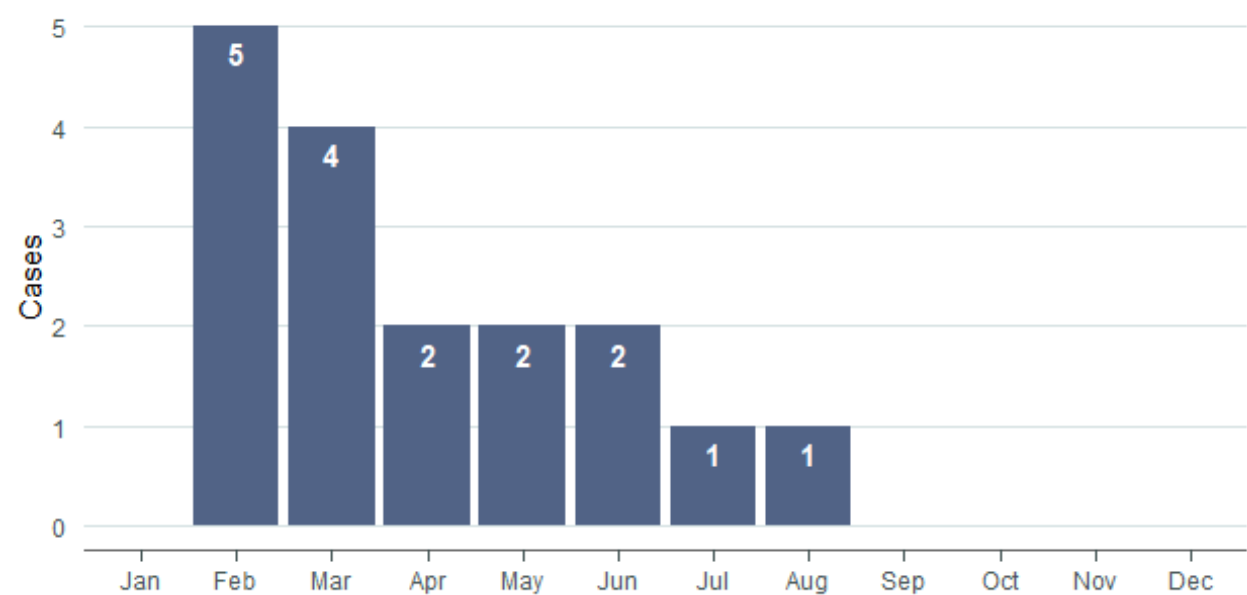
Figure 48: Paratyphoid fever cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

Figure 48 shows the number of paratyphoid cases in Tāmaki Makaurau between 2010 and 2023. Case numbers for 2023 are the highest since 2010.

Figure 49: Paratyphoid fever cases in Tāmaki Makaurau by month, 2023



Source: EpiSurv

In 2023, cases were more common over late summer and the autumn months, with a peak of five cases in February (Figure 49).

Table 61: Age-specific incidence rates for paratyphoid fever in Tāmaki Makaurau, 2023

Age group	Cases	Rate per 100,000
Age under 1	0	-
1 to 4	1	1.2
5 to 9	0	-
10 to 14	2	1.7
15 to 19	3	2.7
20 to 29	4	1.6
30 to 39	3	1
40 to 49	3	1.3
50 to 59	1	0.5
60 to 69	0	-
Age 70+	0	-
Total	17	1

Source: EpiSurv, Stats NZ

Table 62: Ethnic group-specific incidence rates for paratyphoid fever in Tāmaki Makaurau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	0	-
Pacific peoples	1	0.4
Asian	15	2.7
European and Other	1	0.1
Unknown	0	-
Total	17	1

Source: EpiSurv, Stats NZ

Tables 61 and 62 show the age and ethnic group distribution of paratyphoid fever incidence rates for Tāmaki Makaurau. The highest incidence rate was amongst Asian with 2.7 cases per 100,000 population.

Table 63: Recently visited countries of paratyphoid fever cases in Tāmaki Makaurau, 2023

Travel history	Cases
India	15
United Arab Emirates	1
United States of America	1

Source: EpiSurv

As shown in Table 63, India was the most frequently visited country (15 out of 17 cases).

Salmonella Paratyphi A was isolated from 16 of the cases.

3.4.13 Salmonellosis

Salmonellosis is an enteric illness caused by *Salmonella* bacteria. Transmission typically occurs through ingestion of contaminated food and water, for example undercooked meat, imported foodstuffs and cross-contaminated raw fruits and vegetables. Transmission may also occur through direct contact with an infected animal or through person-to-person spread.

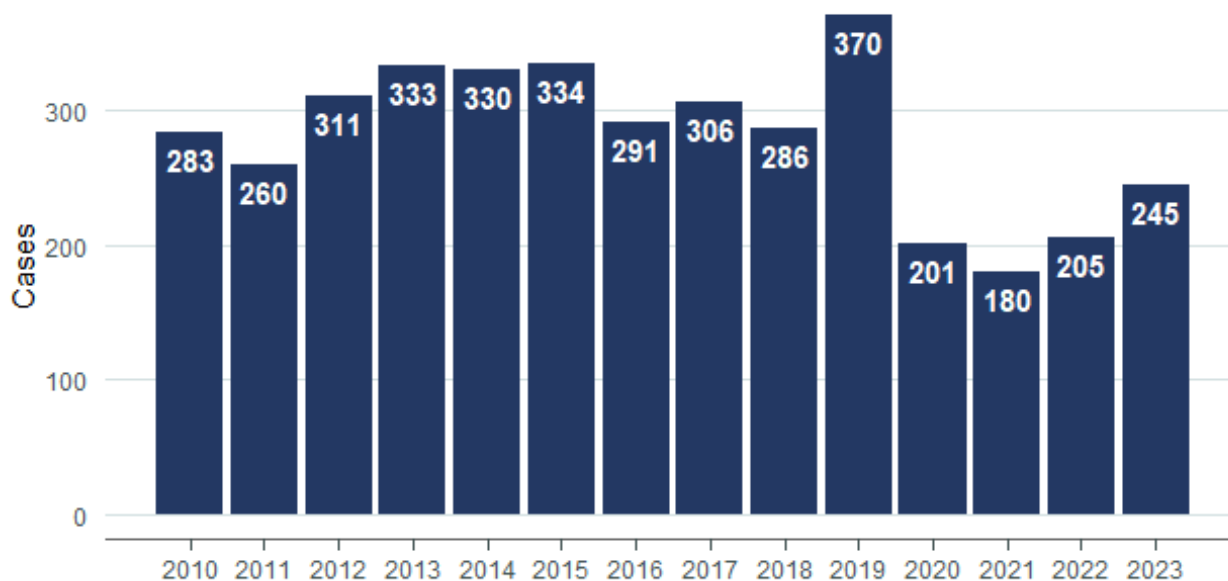
Salmonellosis may present as acute gastroenteritis, with abdominal pain, diarrhoea (occasionally bloody), fever, nausea and vomiting.

Infections due to *Salmonella* Typhi and Paratyphi are notified and managed separately to non-typhoidal salmonellosis.

In 2023, there were 245 salmonellosis cases (13.9 cases per 100,000 population) in Tāmaki Makaurau and 37 salmonellosis cases (18.1 cases per 100,000 population) in Te Tai Tokerau. This compares to a national incidence rate of 15.8 cases per 100,000 population.

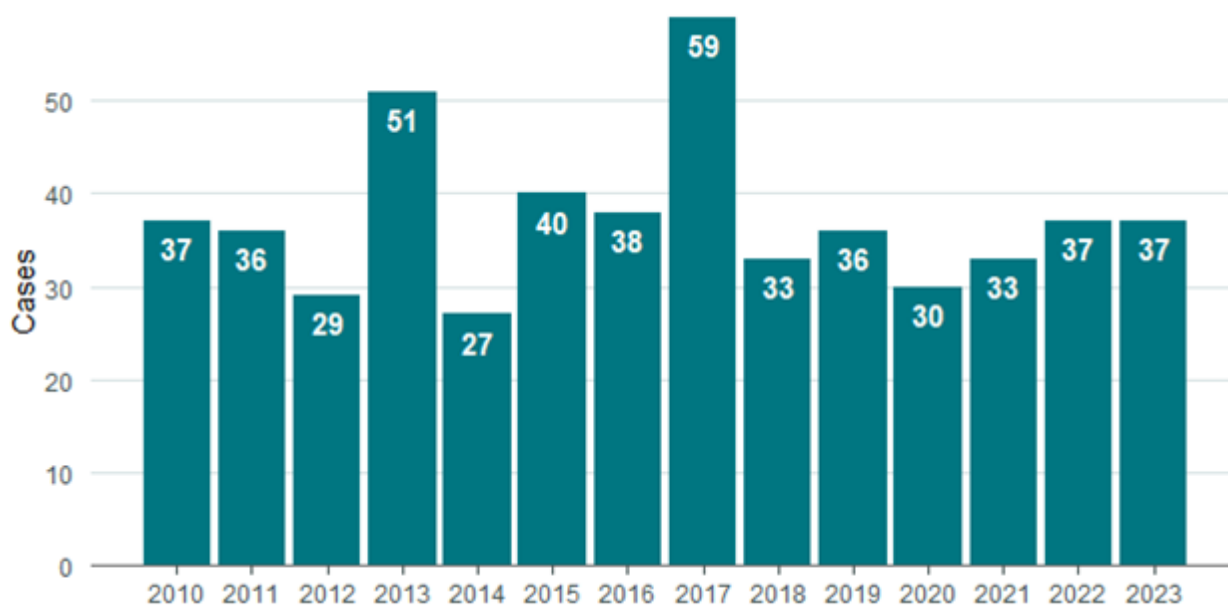
Of these cases, 87 were hospitalised in Tāmaki Makaurau and 15 were hospitalised in Te Tai Tokerau. There were no deaths across the Northern region.

Figure 50: Salmonellosis cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

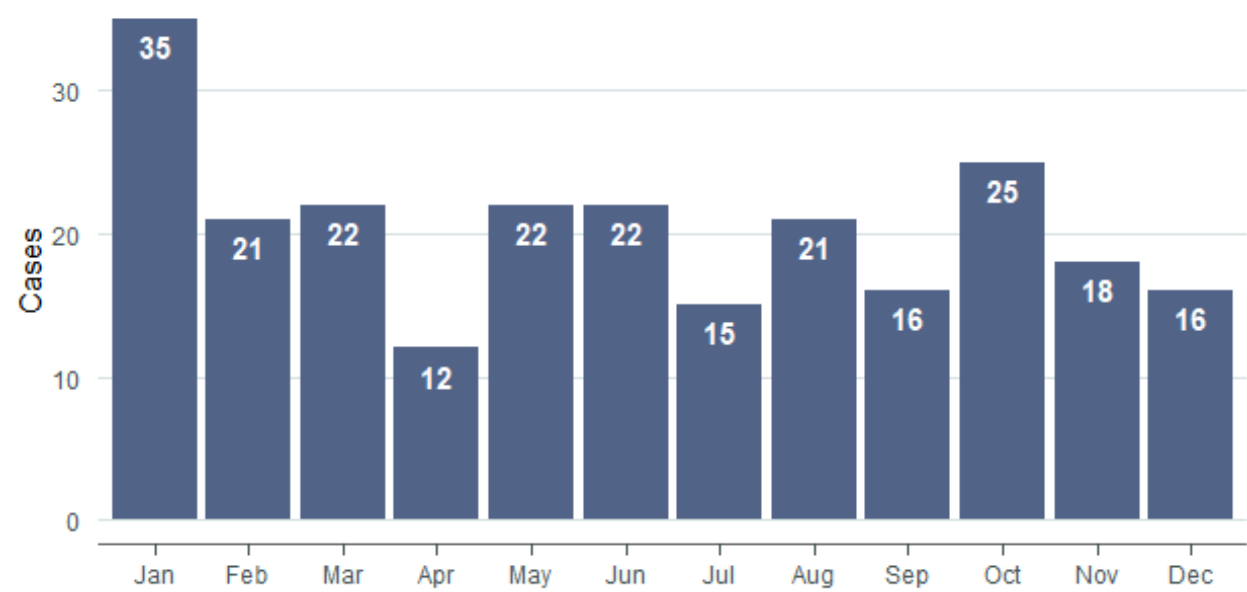
Figure 51: Salmonellosis cases in Te Tai Tokerau, 2010 to 2023



Source: EpiSurv

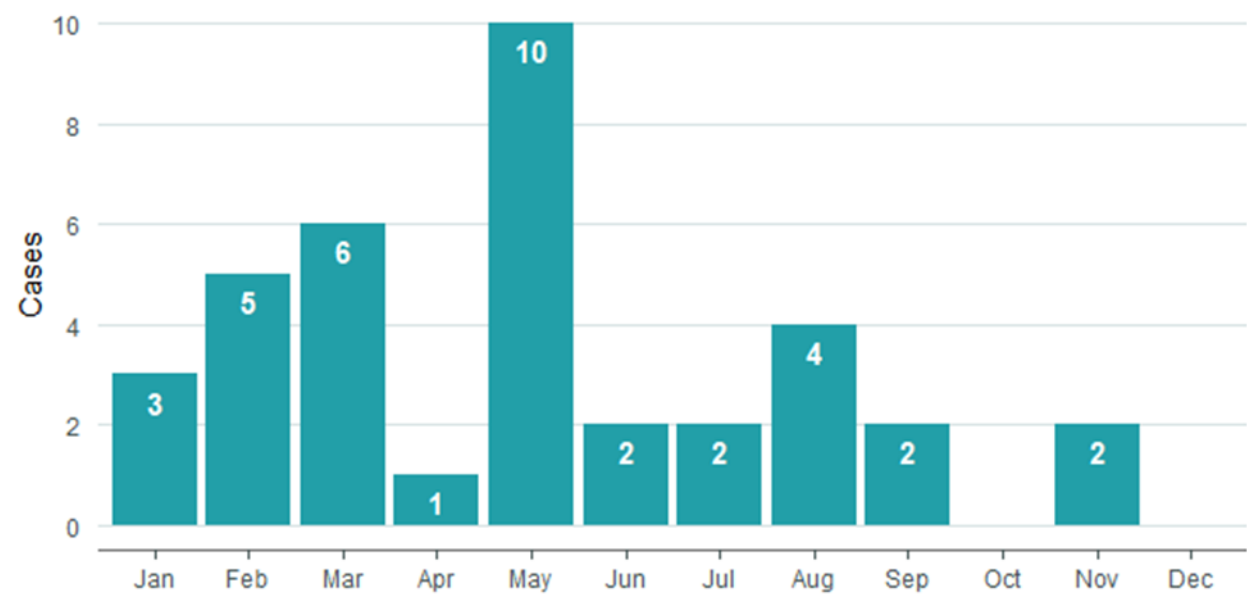
Figures 50 and 51 show the number of salmonellosis cases across the Northern region. Case numbers for Tāmaki Makaurau have been trending upwards since 2021 but are still lower than pre-COVID-19, when there were often more than 300 cases per year. Te Tai Tokerau case numbers for 2023 were the same as 2022, with similar numbers to pre-COVID-19 years.

Figure 52: Salmonellosis cases in Tāmaki Makaurau by month, 2023



Source: EpiSurv

Figure 53: Salmonellosis cases in Te Tai Tokerau by month, 2023



Source: EpiSurv

Tāmaki Makaurau cases numbers in 2023 did not display a specific seasonal pattern, with the most cases notified in January (35 cases) (Figure 52). Te Tai Tokerau case numbers were highest in May with 10 cases (Figure 53).

Table 64: Age-specific incidence rates for salmonellosis in Tāmaki Makaurau, 2023

Age group	Cases	Rate per 100,000
Age under 1	6	28.3
1 to 4	35	41.2
5 to 9	13	11.5
10 to 14	7	5.9
15 to 19	8	7.2
20 to 29	16	6.4
30 to 39	30	10.3
40 to 49	29	12.5
50 to 59	34	15.8
60 to 69	39	23.1
Age 70+	28	17.4
Total	245	13.9

Source: EpiSurv, Stats NZ

Table 65: Age-specific incidence rates for salmonellosis in Te Tai Tokerau, 2023

Age group	Cases	Rate per 100,000
Age under 1	4	164.9
1 to 4	4	41.2
5 to 9	1	7.4
10 to 14	1	7.0
15 to 19	1	8.4
20 to 29	2	10.2
30 to 39	3	12.2
40 to 49	3	13.7
50 to 59	9	33.0
60 to 69	3	10.4
Age 70+	6	20.1
Total	37	18.1

Source: EpiSurv, Stats NZ

Tables 64 and 65 show the age and ethnic group distribution of salmonellosis cases for 2023 across the Northern region. Tāmaki Makaurau incidence rates were highest among the '1 to 4' and 'Under 1' age groups, with 41.2 and 28.3 cases per 100,000 population, respectively.

Te Tai Tokerau incidence rates were highest among the same 'Under 1' and '1 to 4' age groups, with 164.9 and 41.2 cases per 100,000 population, respectively.

Table 66: Ethnic group-specific incidence rates for salmonellosis in Tāmaki Makaurau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	14	6.7
Pacific peoples	35	14.2
Asian	77	14
European and Other	119	15.7
Unknown	0	-
Total	245	13.9

Source: EpiSurv, Stats NZ

Table 67: Ethnic group-specific incidence rates for salmonellosis in Te Tai Tokerau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	17	22.9
Pacific peoples	0	-
Asian	2	20.9
European and Other	18	15.5
Unknown	0	-
Total	37	18.1

Source: EpiSurv, Stats NZ

Tables 66 and 67 show the ethnic group-specific incidence rates across the Northern region. Tāmaki Makaurau incidence rates were highest among European and Other followed by Pacific peoples, with 15.7 and 14.2 cases per 100,000 population, respectively. Te Tai Tokerau incidence rates were highest among Māori followed by European and Other with 22.9 and 20.9 cases per 100,000 population respectively.

Table 68: Salmonellosis cases in Tāmaki Makaurau by laboratory type when identified, 2023

Type	Cases
Salmonella Typhimurium	45
Salmonella Enteritidis	27
Salmonella Weltevreden	20
Salmonella Stanley	15
Presumptive Salmonella Typhimurium	8
Salmonella Agona	8
Salmonella Bovismorbificans	7
Salmonella Newport	7
Salmonella Javiana	5
Salmonella Paratyphi B var Java	7
Salmonella Anatum	4
Salmonella Bareilly	4
Salmonella Chester	4
Salmonella Infantis	4
Salmonella Pensacola	4
Salmonella Mississippi	3
Salmonella Virchow	3
Salmonella Aberdeen	2
Salmonella Havana	2
Salmonella Hvitittingfoss	2
Salmonella London	2
Salmonella Senftenberg	2
Salmonella Braenderup	1
Salmonella Brandenburg	1
Salmonella Chailey	1
Salmonella Choleraesuis var. Kunzendorf	1
Salmonella Coeln	1
Salmonella Corvallis	1
Salmonella Give	1

Salmonella Goldcoast	1
Salmonella Isangi	1
Salmonella Johannesburg	1
Salmonella Kintambo	1
Salmonella Liverpool	1
Salmonella Matopeni	1
Salmonella Mbandaka	1
Salmonella Montevideo	1
Salmonella Muenchen	1
Salmonella Oranienburg	1
Salmonella Orion	1
Salmonella Panama	1
Salmonella Poona	1
Salmonella Rissen	1
Salmonella Saintpaul	1
Salmonella Schwarzengrund	1
Salmonella Singapore	1
Salmonella Thompson	1
Salmonella Uganda	1

Source: EpiSurv

Table 69: Salmonellosis cases in Te Tai Tokerau by laboratory type when identified, 2023

Type	Cases
Salmonella Typhimurium	10
Salmonella Thompson	6
Salmonella Bovismorbificans	4
Salmonella Mississippi	2
Presumptive Salmonella Typhimurium	1
Salmonella Anatum	1
Salmonella Braenderup	1
Salmonella Chester	1
Salmonella Derby	1
Salmonella Emek	1
Salmonella Enteritidis	1
Salmonella Javiana	1
Salmonella Newport	1

Source: EpiSurv

Table 70: Recently visited countries of salmonellosis cases in Tāmaki Makaurau, 2023

Travel history	Cases
Indonesia	19
India	16
Fiji	15
Singapore	13
Vietnam	12
Thailand	11
Philippines	8
Tonga	6
Australia	5
China, People's Republic of	5
Hong Kong (Special Administrative Region)	5
United States of America	5
Cook Islands	3
Malaysia	3
Samoa	3
United Arab Emirates	3
Cambodia	2
Germany	1
Marshall Islands	1
Mexico	1
Morocco	1
Nepal	1
Northern Europe	1
South Africa	1
Sri Lanka	1
Switzerland	1
No overseas travel reported	128

Source: EpiSurv

Table 71: Recently visited countries of salmonellosis cases in Te Tai Tokerau, 2023

Travel history	Cases
Indonesia	2
Thailand	2
Fiji	2
No overseas travel reported	31

Source: EpiSurv

The most common *Salmonella* variant across the Northern region was *Salmonella enterica* serotype Typhimurium, followed by *Salmonella* Enteritidis (Tables 68 and 69).

Of those who reported overseas travel (Table 70 and Table 71), Indonesia was the most common country last visited followed by India for Tāmaki Makaurau residents. Indonesia, Fiji and Thailand were source countries for overseas acquired cases in Te Tai Tokerau.

Table 72: Risk factors associated with salmonellosis in Tāmaki Makaurau, 2023

Risk factor	Cases	Percent
Case overseas during incubation period	117	47.8
Attendance at school or preschool	24	9.8
Contact with other symptomatic people	21	8.6
Consume food from a food premise	20	8.2
Recreational contact with water	17	6.9
Prior history of overseas travel that might account for infection	15	6.1
Swimming pool or spa pool	11	4.5
Consume non-regular water supply	8	3.3
Contact with farm animals	8	3.3
Consume untreated water	7	2.9
Contact with sewerage, vomit, nappies, faecal matter	5	2.0
Other recreational contact with water	5	2.0
Contact with sick animals	3	1.2
Swimming in stream, river, beach	3	1.2

Source: EpiSurv

Table 73: Risk factors associated with salmonellosis in Te Tai Tokerau, 2023

Risk factor	Cases	Percent
Consume food from a food premise	12	32.4
Consume untreated water	9	24.3
Contact with farm animals	7	18.9
Consume non-regular water supply	6	16.2
Contact with sewerage, vomit, nappies, faecal matter	6	16.2
Case overseas during incubation period	6	16.2
Recreational contact with water	5	13.5
Attendance at school or preschool	5	13.5
Contact with other symptomatic people	3	8.1
Consume raw milk or derived products	2	5.4
Contact with sick animals	2	5.4
Swimming pool or spa pool	2	5.4
Swimming in stream, river, beach	2	5.4
Other recreational contact with water	2	5.4

Source: EpiSurv

Tables 72 and 73 show the risk factors associated with developing salmonellosis in 2023 across the Northern region. The most common risk factor in Tāmaki Makaurau was overseas travel (47.8% of cases), followed by attendance at school or preschool (9.8%). The most common risk factor for Te Tai Tokerau was consuming food from food premises (32.4%) followed by consuming untreated water (24.3%). Of note, more than one risk factor may be identified per case, therefore totals will add up to more than 100%.

3.4.14 Shigellosis

Shigellosis is an enteric infection caused by *Shigella* bacteria. Transmission occurs through consuming contaminated food or water, or through direct contact with the faeces of an infected person. It can also be transmitted through sexual contact, particularly between men who have sex with men. Shigellosis has a high secondary attack rate among contacts and is a common cause of enteric outbreaks.

Shigellosis generally causes an acute diarrhoeal illness with fever, abdominal cramps and blood or mucus in the stool.

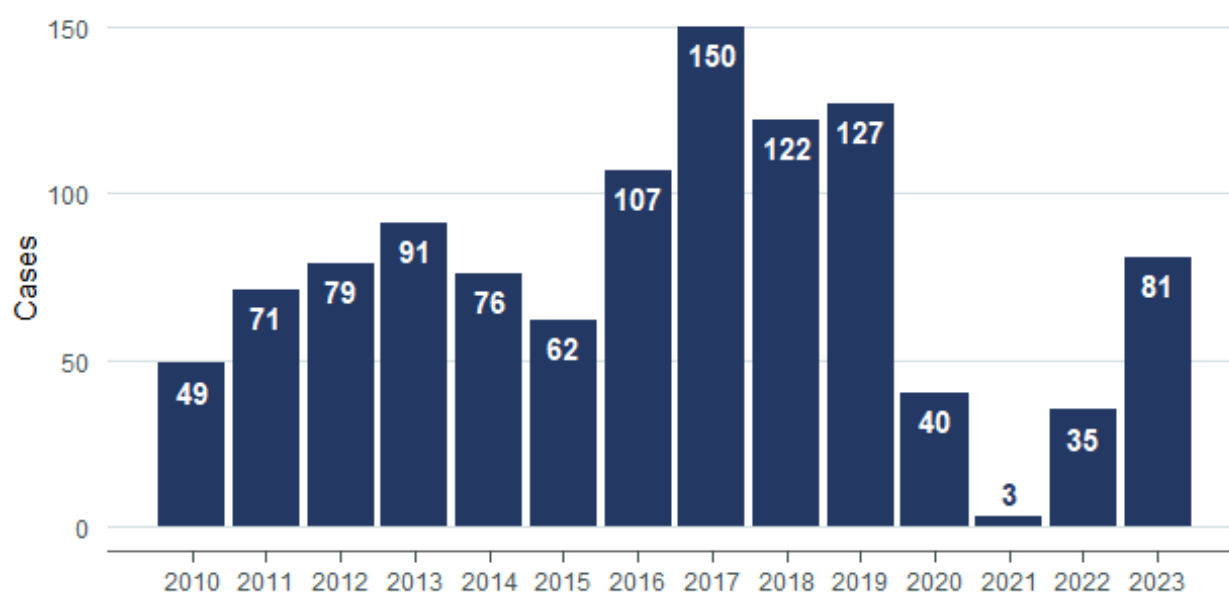
Shigella comprises four species or serogroups: group A (*S. dysenteriae*), group B (*S. flexneri*), group C (*S. boydii*) and group D (*S. sonnei*). *S. dysenteriae* type 1 can spread in epidemics and is associated with serious disease and complications, while *S. flexneri* can cause reactive arthritis and *S. sonnei* is generally associated with mild illness.

Of concern is the increasing incidence of multi-drug resistant (MDR) and extensively drug-resistant strains (XDR).

In 2023, there were 81 shigellosis cases (4.6 cases per 100,000 population) in Tāmaki Makaurau and four cases (2.3 cases per 100,000 population) in Te Tai Tokerau. This compares to a national incidence rate of 2.3 cases per 100,000 population.

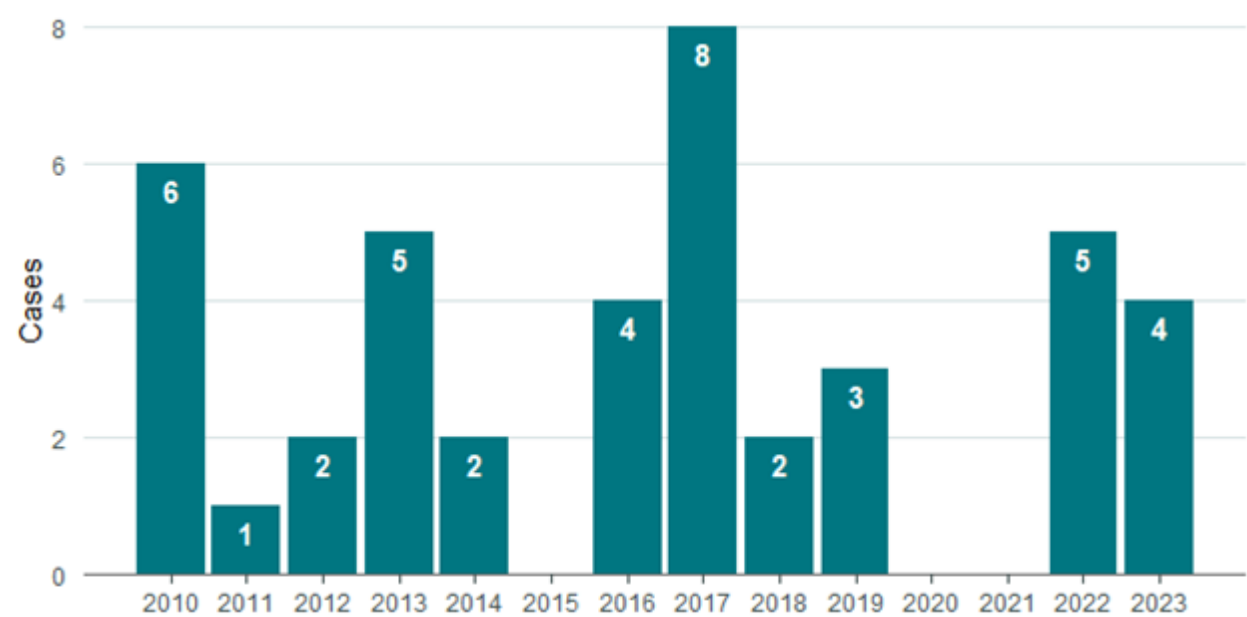
Of the Northern region cases, 20 were hospitalised in Tāmaki Makaurau and one was hospitalised in Te Tai Tokerau. There were no deaths across the Northern region.

Figure 54: Shigellosis cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

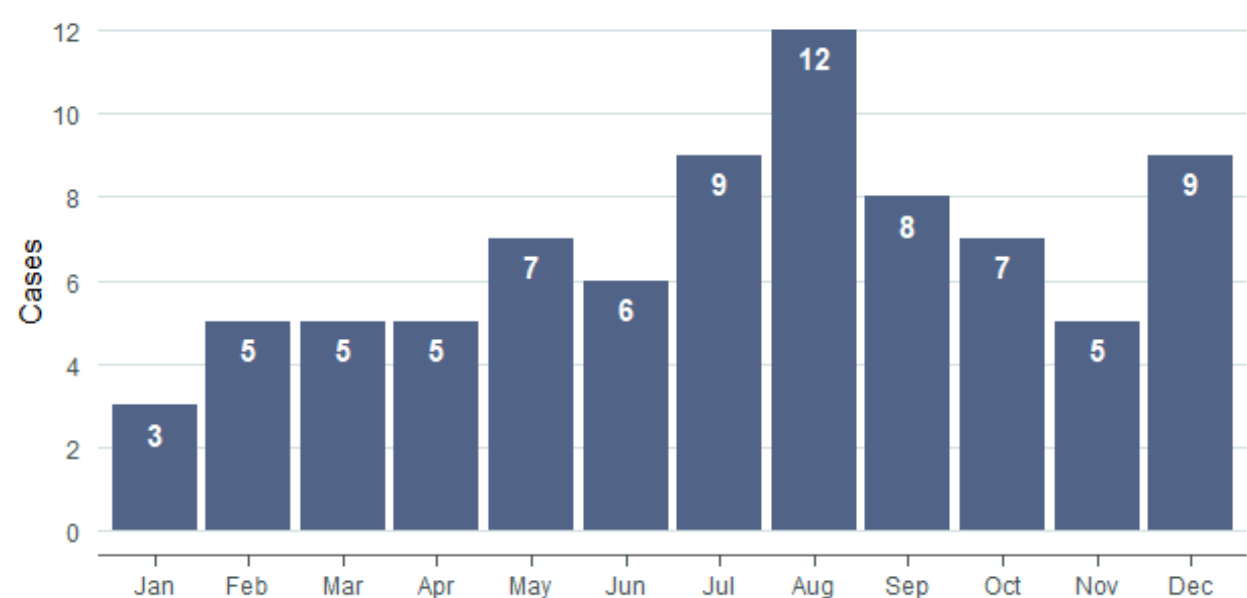
Figure 55: Shigellosis cases in Te Tai Tokerau, 2010 to 2023



Source: EpiSurv

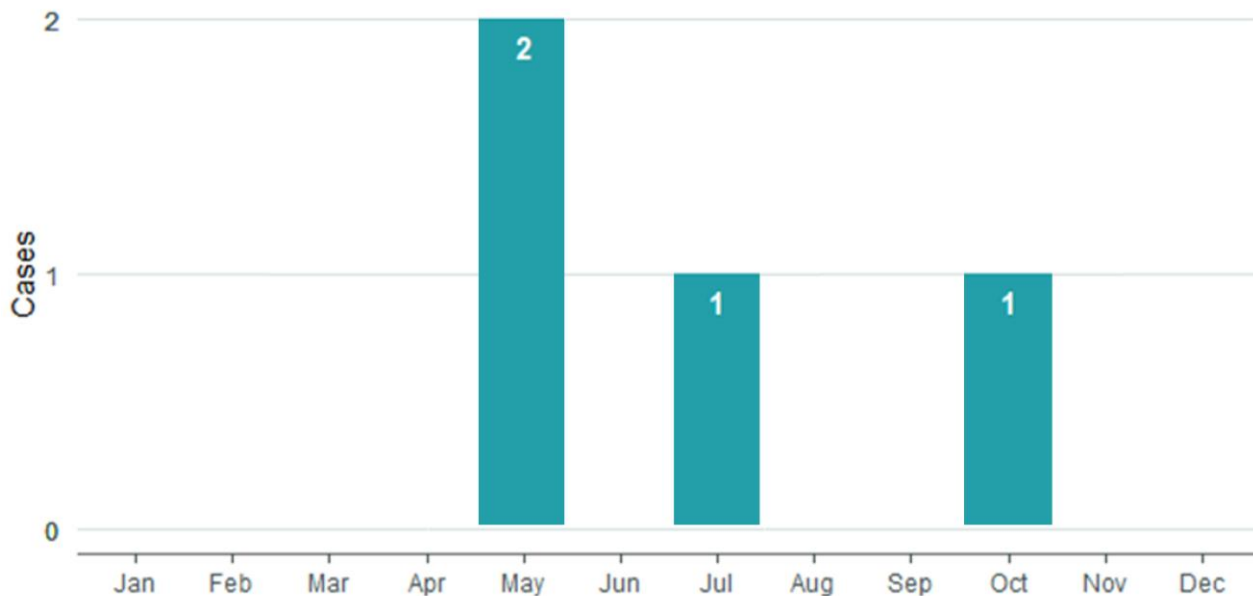
Figures 54 and 55 show the number of shigellosis cases across the Northern region between 2010 and 2023. Case numbers for Tāmaki Makaurau were higher in 2023 than case numbers from 2020 to 2022, but much lower compared to pre-COVID-19 years. Te Tai Tokerau case numbers remained steady, noting there were no reported cases in 2020 or 2021.

Figure 56: Shigellosis cases in Tāmaki Makaurau by month, 2023



Source: EpiSurv

Figure 57: Shigellosis cases in Te Tai Tokerau by month, 2023



Source: EpiSurv

In Tāmaki Makaurau, cases were more common in the second half of the year, with a peak of 12 cases in August (Figure 56). In Te Tai Tokerau, cases were more common in the middle of the year with two cases in May (Figure 57).

Table 74: Age-specific incidence rates for shigellosis in Tāmaki Makaurau, 2023

Age group	Cases	Rate per 100,000
Age under 1	0	-
1 to 4	7	8.2
5 to 9	1	0.9
10 to 14	2	1.7
15 to 19	2	1.8
20 to 29	14	5.6
30 to 39	25	8.6
40 to 49	7	3
50 to 59	9	4.2
60 to 69	12	7.1
Age 70+	2	1.2
Total	81	4.6

Source: EpiSurv, Stats NZ

Table 75: Age-specific incidence rates for shigellosis in Te Tai Tokerau, 2023

Age group	Cases	Rate per 100,000
Age under 1	0	-
1 to 4	1	10.3
5 to 9	1	7.4
10 to 14	0	-
15 to 19	0	-
20 to 29	0	-
30 to 39	0	-
40 to 49	1	4.6
50 to 59	0	-
60 to 69	1	3.5
Age 70+	0	-
Total	4	2

Source: EpiSurv, Stats NZ

Tables 74 and 75 show the age distribution of shigellosis across the Northern region. Tāmaki Makaurau incidence rates were highest among the '30 to 39' and '1 to 4' age groups, with 8.6 and 8.2 cases per 100,000 population, respectively. Te Tai Tokerau case numbers were too low to draw conclusions.

Table 76: Ethnic group-specific incidence rates for shigellosis in Tāmaki Makaurau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	8	3.8
Pacific peoples	6	2.4
Asian	23	4.2
European and Other	44	5.8
Unknown	0	-
Total	81	4.6

Source: EpiSurv, Stats NZ

Table 77: Ethnic group-specific incidence rates for shigellosis in Te Tai Tokerau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	1	1.3
Pacific peoples	0	-
Asian	2	20.9
European and Other	1	0.9
Unknown	0	-
Total	4	2.0

Source: EpiSurv, Stats NZ

Tables 76 and 77 show the ethnic group-specific shigellosis cases across the Northern region. Tāmaki Makaurau incidence rates were highest among European and Other followed by Asian, with 5.8 and 4.2 cases per 100,000 population, respectively. Te Tai Tokerau case numbers were too low to draw conclusions.

Table 78: Risk factors associated with shigellosis in Tāmaki Makaurau, 2023

Risk factor	Cases	Percent
Case overseas during incubation period	46	56.8
Sexual contact with another male (case aged 15y+)	14	17.3
Consume food from a food premise	12	14.8
Contact with other symptomatic people	9	11.1
Prior history of overseas travel that might account for infection	7	8.6
Consume non-regular water supply	5	6.2
Contact with sewerage, vomit, nappies, faecal matter	5	6.2
Recreational contact with water	4	4.9
Attendance at school or preschool	4	4.9
Contact with farm animals	2	2.5
Contact with sick animals	2	2.5
Swimming in stream, river, beach	2	2.5
Consume untreated water	1	1.2
Other recreational contact with water	1	1.2

Source: EpiSurv

Table 79: Risk factors associated with shigellosis in Te Tai Tokerau, 2023

Risk factor	Cases	Percent
Consume untreated water	2	50
Consume non-regular water supply	2	50
Contact with other symptomatic people	2	50
Attendance at school or preschool	2	50
Case overseas during incubation period	2	50
Consume food from a food premises	1	25
Recreational contact with water	1	25
Swimming in stream, river, beach	1	25

Source: EpiSurv

Tables 78 and 79 show the risk factors associated with developing shigellosis across the Northern region. The most common risk factor for Tāmaki Makaurau was overseas travel (46 cases) followed by sexual contact with another male (case aged 15y+) (14 cases). Te Tai Tokerau case risk factors are also listed above, noting this was for four cases only.

Table 80: Travel history of shigellosis cases in Tāmaki Makaurau, 2023

Travel history	Cases
India	11
Australia	5
Indonesia	5
United States of America	5
Fiji	4
United Arab Emirates	4
France	2
Germany	2
Samoa	2
Spain	2
Sri Lanka	2
Vanuatu	2
England	1
Ghana	1
Jordan	1
Kenya	1
Nepal	1
Netherlands	1
Pakistan	1
Philippines	1
Portugal	1
Qatar	1
Singapore	1
South Africa	1
Thailand	1
Tonga	1
No overseas travel reported	35

Source: EpiSurv

Table 81: Travel history of shigellosis cases in Te Tai Tokerau, 2023

Travel history	Cases
Samoa	1
Vanuatu	1
No overseas travel reported	2

Source: EpiSurv

Tables 80 and 81 provide further details on the travel history of shigellosis cases during their exposure period. The most commonly visited country was India followed by Australia, Indonesia, USA with 11 and five cases each respectively for Tāmaki Makaurau. There were 35 cases with no overseas travel reported. Two cases in Te Tai Tokerau had no overseas travel reported with the other two cases having travelled to either Samoa or Vanuatu.

3.4.15 Toxic shellfish poisoning

Toxic shellfish poisoning refers to a group of illnesses caused by toxins produced by microscopic algae.²¹ Transmission occurs via ingestion of bivalve shellfish, such as mussels and oysters, that contain high levels of these toxins.

There are four main types of poisoning in NZ: paralytic shellfish poisoning, amnesic shellfish poisoning, diarrhetic shellfish poisoning and neurotoxic shellfish poisoning. Most cases involve diarrhoea, vomiting and abdominal cramps, although respiratory and neurological symptoms are also possible. Paralytic and amnesic shellfish poisoning can both be fatal.

In 2023, there were no cases of toxic shellfish poisoning in the Northern region. The last case in Tāmaki Makaurau was reported in 2022.

While two suspected cases were notified in Te Tai Tokerau, neither met the definition for a confirmed or probable case. The last case in Te Tai Tokerau was reported in 2017.

3.4.16 Typhoid fever

Typhoid fever is an enteric illness caused by *Salmonella enterica* serotype Typhi bacteria. Transmission occurs through ingestion of food and water contaminated by the faeces and urine of infected persons. Direct person-to-person transmission is uncommon.

Symptoms include insidious onset of fever, headache, malaise, anorexia, dry cough, rose spots, abdominal pain, constipation or diarrhoea. Untreated, the infection may lead to intestinal perforation/haemorrhage, relapse or death.

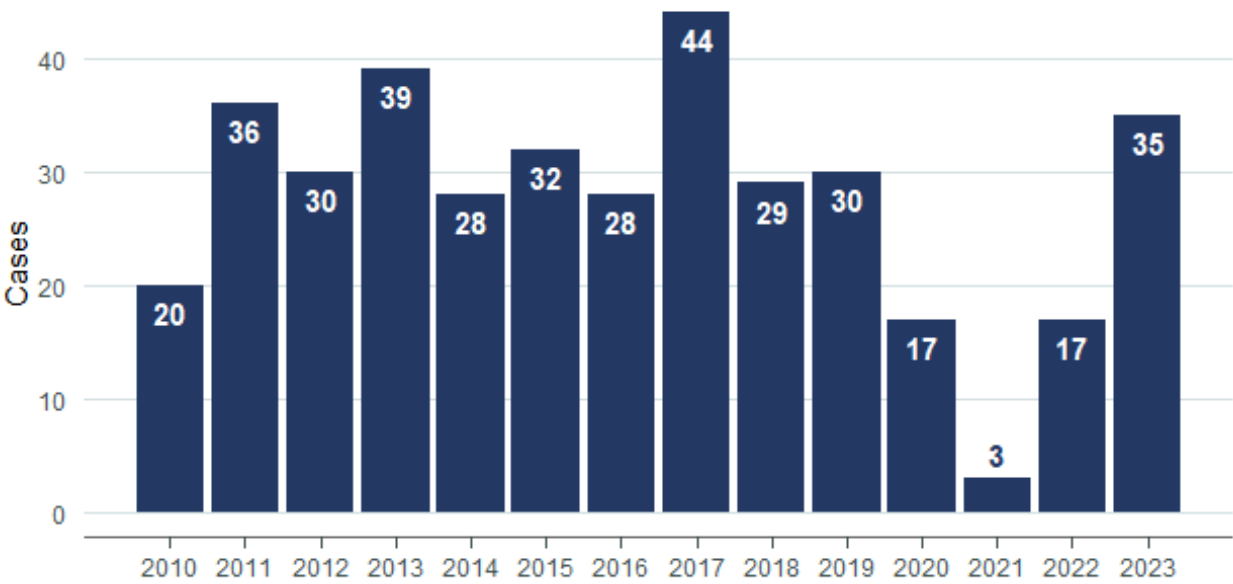
²¹ Ministry for Primary Industries. (2022). *What is toxic shellfish poisoning?* Retrieved 11 May, 2023, from <https://www.mpi.govt.nz/fishing-aquaculture/recreational-fishing/where-unsafe-to-collect-shellfish/what-toxic-shellfish-poisoning/>.

Most cases of typhoid fever notified in NZ are associated with overseas travel, although chronic carriage of *S. Typhi* may occur and act as a source of infection.

In 2023, there were 35 typhoid fever cases (2.0 cases per 100,000 population) in Tāmaki Makaurau and one typhoid case (0.5 cases per 100,000 population) in Te Tai Tokerau. This compares to a national incidence rate of 1.4 cases per 100,000 population.

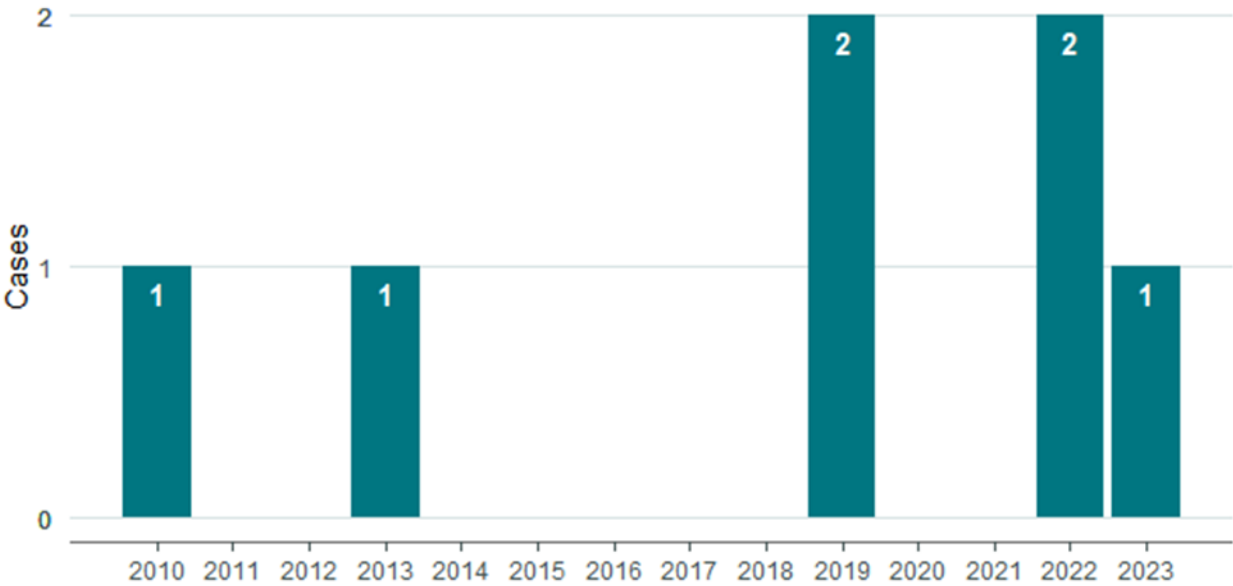
Of the Northern region cases, 30 were hospitalised in Tāmaki Makaurau and one was hospitalised in Te Tai Tokerau. There were no deaths in the Northern region.

Figure 58: Typhoid fever cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

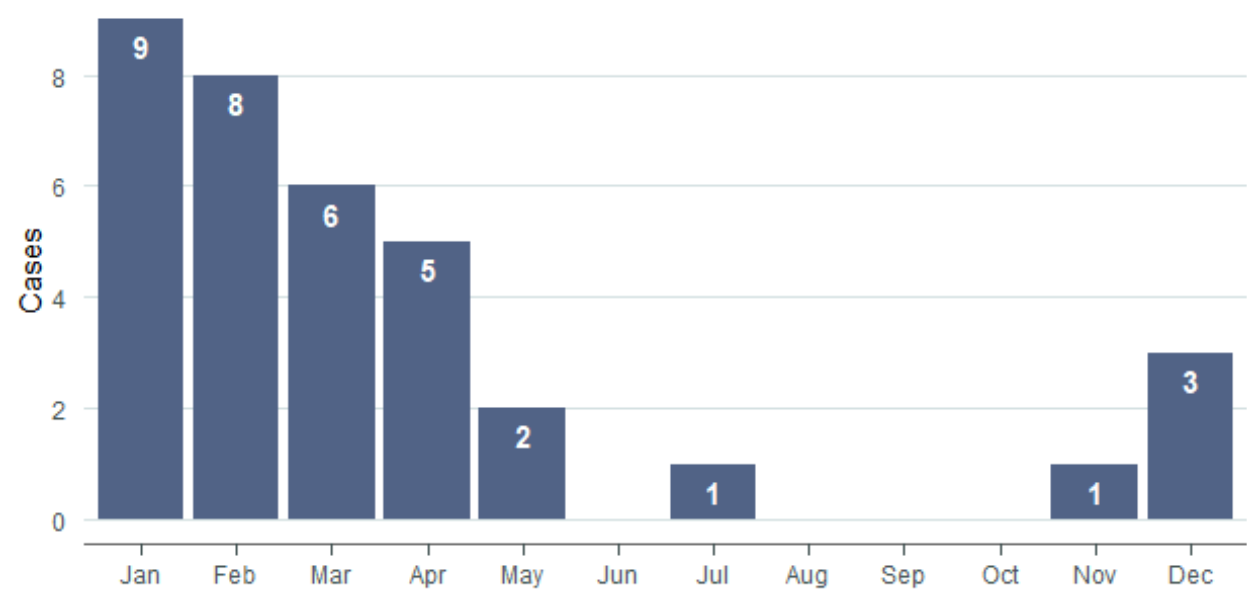
Figure 59: Typhoid fever cases in Te Tai Tokerau, 2010 to 2023



Source: EpiSurv

Figures 58 and 59 show the number of typhoid fever cases in the Northern region between 2010 and 2023. Case numbers in Tāmaki Makaurau in 2023 were higher than 2022 and similar to pre-COVID-19 numbers. Te Tai Tokerau has had between zero and two cases annually since 2010.

Figure 60: Typhoid fever cases in Tāmaki Makaurau by month, 2023



Source: EpiSurv

In 2023, cases in Tāmaki Makaurau were more common in the beginning of the year with a peak of nine cases in January (Figure 60).

Table 82: Age-specific incidence rates for typhoid fever in Tāmaki Makaurau, 2023

Age group	Cases	Rate per 100,000
Age under 1	0	-
1 to 4	6	7.1
5 to 9	1	0.9
10 to 14	3	2.5
15 to 19	4	3.6
20 to 29	5	2
30 to 39	9	3.1
40 to 49	5	2.2
50 to 59	0	-
60 to 69	2	1.2
Age 70+	0	-
Total	35	2

Source: EpiSurv, Stats NZ

Table 83: Ethnic group-specific incidence rates for typhoid fever in Tāmaki Makaurau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	0	-
Pacific peoples	2	0.8
Asian	32	6.5
European and Other	1	0.1
Unknown	0	-
Total	35	2

Source: EpiSurv, Stats NZ

Tables 82 and 83 show the age and ethnic group distribution of typhoid fever cases for Tāmaki Makaurau in 2023. Incidence rates were highest among the '1 to 4' and '15 to 19' age groups, with 7.1 and 3.6 cases per 100,000 population, respectively. Ethnic group-specific incidence rates were highest among Asian and Pacific peoples, with 6.5 and 0.8 cases per 100,000 population, respectively. Of the 32 Asian cases, 27 identified as Indian (Table 84).

Table 84: Detailed ethnicity count of typhoid fever cases in Tāmaki Makaurau, 2023

Detailed ethnicity	Cases
Indian	27
Other Asian nfd	2
Asian nfd	1
Fiji Indian	1
Fijian (except Fiji Indian/Indo-Fijian)	1
Middle Eastern nfd	1
Other Asian nec	1
Tongan	1

Source: EpiSurv

Table 85: Risk factors associated with typhoid fever in Tāmaki Makaurau, 2023

Risk factor	Cases	Percent
Case overseas during incubation period	30	85.7
Attendance at school or preschool	6	17.1
Contact with other symptomatic people	4	11.4
Contact with sewerage, vomit, nappies, faecal matter	3	8.6
Prior history of overseas travel that might account for infection	3	8.6
Consume non-regular water supply	2	5.7
Consume food from a food premise	1	2.9
Swimming pool or spa pool	1	2.9
Recreational contact with water	1	2.9
Swimming in stream, river, beach	1	2.9

Source: EpiSurv

Table 86: Source countries of typhoid fever cases in Tāmaki Makaurau, 2023

Travel history	Cases
India	26
Australia	2
Pakistan	2
Fiji	1
Malaysia	1
Morocco	1
Tonga	1
No overseas travel reported	5

Source: EpiSurv

The most common risk factor for acquiring typhoid fever was overseas travel, with 30 cases in Tāmaki Makaurau reporting travel outside NZ during their exposure period (Table 85). The most common source country for typhoid fever was India, with 26 cases thought to have acquired their infection in this country (Table 86).

3.4.17 VTEC/STEC infection

Verotoxin-producing *E. coli* (VTEC), also known as Shiga toxin-producing *E. coli* (STEC), infection is a gastrointestinal illness caused by certain strains of *Escherichia coli* bacteria.

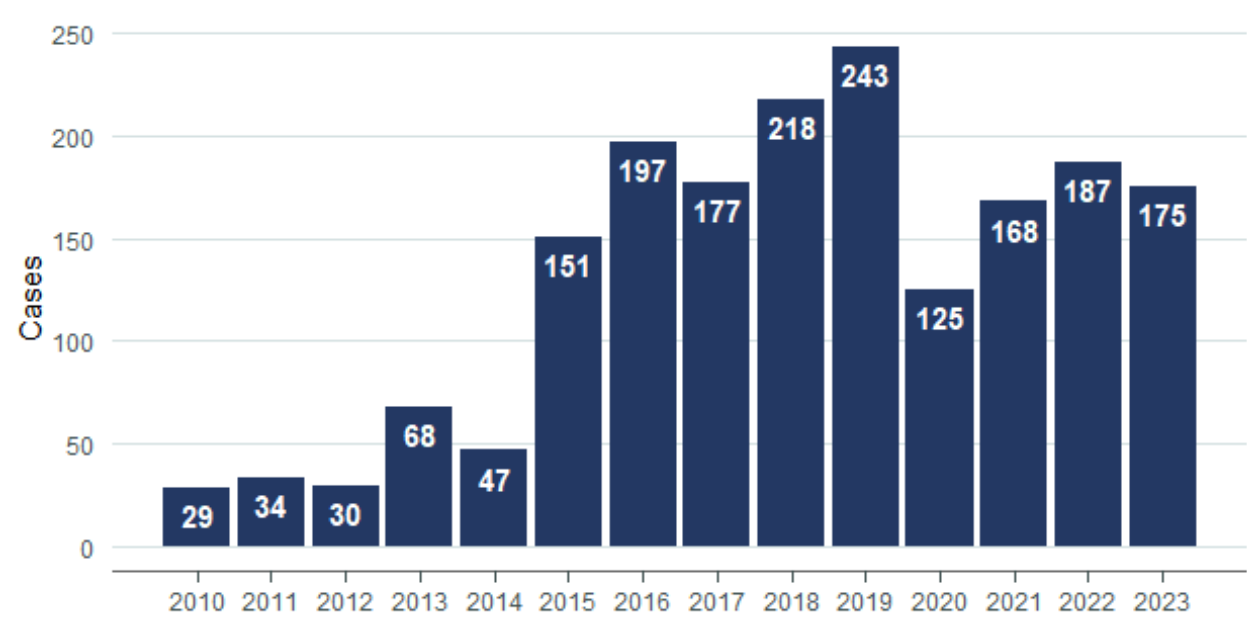
Transmission often occurs through consumption of contaminated drinking water, contact with farm animals and consumption of raw milk. Person-to-person spread in households and early childhood services has also been reported.

Many infections manifest as an acute onset diarrhoeal illness with or without blood or mucus in the stool. Infection with some serotypes, notably O157:H7, is associated with a higher frequency of bloody diarrhoea and hospitalisation than other serotypes. Antibiotic treatment is not recommended for VTEC/STEC infection as it can increase the risk of complications such as haemolytic uraemic syndrome and thrombotic thrombocytopenic purpura (most commonly seen in children and the elderly).

In 2023, there were 175 VTEC/STEC infection cases (9.9 cases per 100,000 population) in Tāmaki Makaurau and 85 cases (41.7 cases per 100,000) in Te Tai Tokerau. This compares to a national incidence rate of 19.2 cases per 100,000 population.

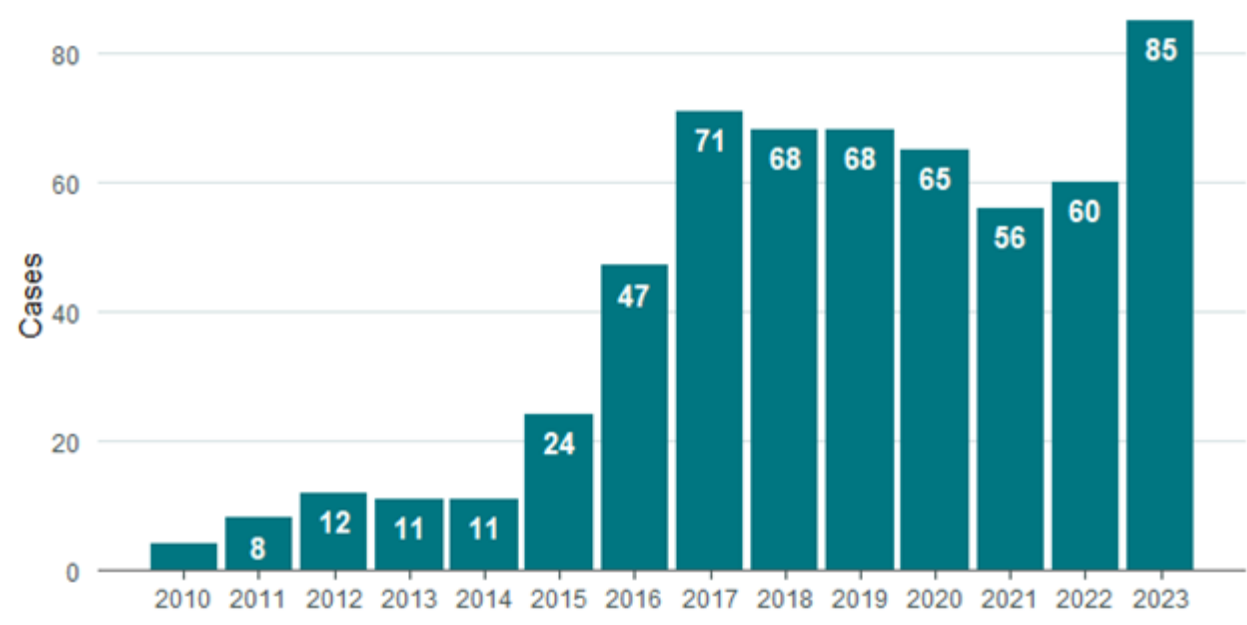
Of these cases, 52 were hospitalised in Tāmaki Makaurau and 19 were hospitalised in Te Tai Tokerau. There were no deaths across the Northern region.

Figure 61: VTEC/STEC infection cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

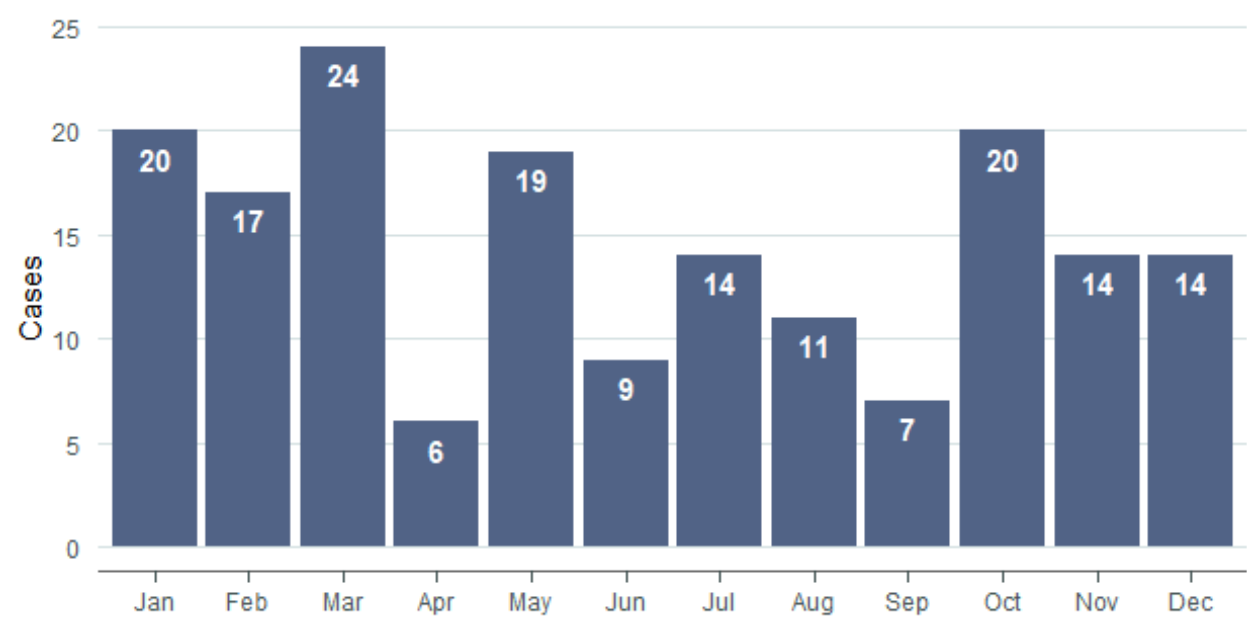
Figure 62: VTEC/STEC infection cases in Te Tai Tokerau, 2010 to 2023



Source: EpiSurv

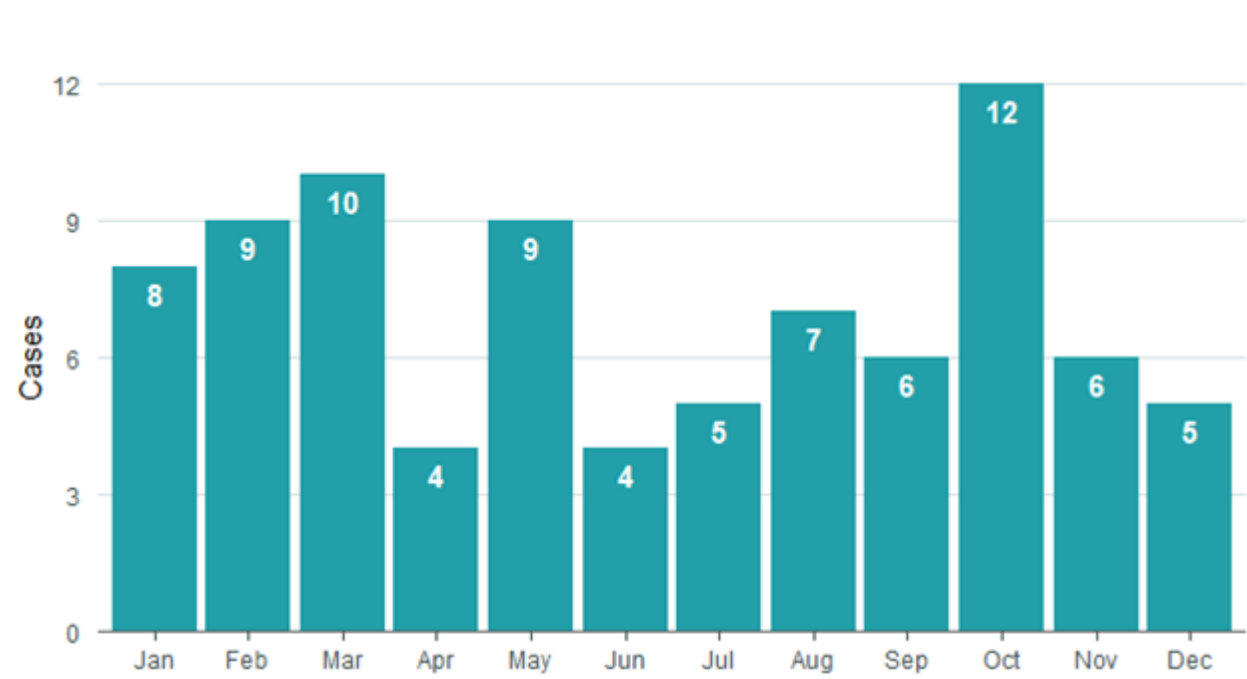
Figures 61 and 62 show the number of VTEC/STEC infection cases in the Northern region between 2010 and 2023. Tāmaki Makaurau case numbers were trending upwards from 2020 to 2022 but decreased in 2023. Te Tai Tokerau case numbers in 2023 were higher than prior reported years.

Figure 63: VTEC/STEC infection cases in Tāmaki Makaurau by month, 2023



Source: EpiSurv

Figure 64: VTEC/STEC infection cases in Te Tai Tokerau by month, 2023



Source: EpiSurv

In 2023, there were no specific seasonal patterns for cases across the Northern region (Figures 63 and 64).

Table 87: Age-specific incidence rates for VTEC/STEC infection in Tāmaki Makaurau, 2023

Age group	Cases	Rate per 100,000
Age under 1	4	18.8
1 to 4	14	16.5
5 to 9	7	6.2
10 to 14	12	10.1
15 to 19	6	5.4
20 to 29	32	12.9
30 to 39	25	8.6
40 to 49	9	3.9
50 to 59	17	7.9
60 to 69	12	7.1
Age 70+	37	23.0
Total	175	9.9

Source: EpiSurv, Stats NZ

Table 88: Age-specific incidence rates for VTEC/STEC infection in Te Tai Tokerau, 2023

Age group	Cases	Rate per 100,000
Age under 1	3	123.7
1 to 4	15	154.6
5 to 9	5	36.9
10 to 14	4	27.8
15 to 19	3	25.1
20 to 29	5	25.6
30 to 39	8	32.6
40 to 49	4	18.3
50 to 59	9	33.0
60 to 69	9	31.3
Age 70+	20	66.9
Total	85	41.7

Source: EpiSurv, Stats NZ

Tables 87 and 88 show the age distribution of VTEC/STEC infection cases for the Northern region. Tāmaki Makaurau incidence rates were highest among the 'age 70+' and 'Age under 1' groups, with 23.0 and 18.8 cases per 100,000 population, respectively. Te Tai Tokerau incidence rates

were highest among the '1 to 4' and 'Age under 1' age groups, with 154.6 and 123.7 cases per 100,000 population, respectively.

Table 89: Ethnic group-specific incidence rates for VTEC/STEC infection in Tāmaki Makaurau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	18	8.6
Pacific peoples	8	3.2
Asian	27	4.9
European and Other	122	16.1
Unknown	0	-
Total	175	9.9

Source: EpiSurv, Stats NZ

Table 90: Ethnic group-specific incidence rates for VTEC/STEC infection in Te Tai Tokerau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	22	29.7
Pacific peoples	4	85.7
Asian	2	20.9
European and Other	57	49.2
Unknown	0	-
Total	85	41.6

Source: EpiSurv, Stats NZ

Tables 89 and 90 show the ethnic group-specific distribution for the Northern region. Tāmaki Makaurau incidence rates were highest among European and Other followed by Māori, with 16.1 and 8.6 cases per 100,000 population, respectively. In Te Tai Tokerau 67% of cases identified as European and other with 26 percent Māori.

Table 91: VTEC/STEC infection cases in Tāmaki Makaurau by laboratory type where recorded, 2023

Type	Cases
Escherichia coli O157:H7	28
Escherichia coli O26:H11	24
Escherichia coli O128:H2	10
Escherichia coli O103:H2	5
Escherichia coli O146:H21	4
Escherichia coli O117:H7	3
Escherichia coli O176:H4	3
Escherichia coli O111:H8	2
Escherichia coli O8:H8	2
E. coli O157	1
Escherichia coli O103:H25	1
Escherichia coli O108:H25	1
Escherichia coli O123:H10	1
Escherichia coli O127:H40	1
Escherichia coli O145:HNT	1
Escherichia coli O151/O118:H2	1
Escherichia coli O174:H21	1
Escherichia coli O174:H8	1
Escherichia coli O38:H26	1
Escherichia coli O54:H45	1
Escherichia coli O5:H19	1
Escherichia coli O64:H20	1
Escherichia coli O87:H16	1
Escherichia coli O88:H8	1
Escherichia coli O91:H14	1

Source: EpiSurv

Of the cases in Tāmaki Makaurau, 28 were positive for the *E. coli* O157 and 24 cases were positive for O26 serotypes that are associated with complications such as haemolytic uraemic syndrome (Table 91).

Table 92: Recently visited countries of VTEC/STEC infection cases in Tāmaki Makaurau, 2023

Travel history	Cases
Indonesia	8
India	6
Fiji	5
Thailand	5
Australia	2
France	2
Samoa	2
Argentina	1
Cambodia	1
Chile	1
Cuba	1
Egypt	1
Italy	1
Kenya	1
Malaysia	1
Mexico	1
United States of America	1
Zambia	1
No overseas travel reported	142

Source: EpiSurv

In 2023, the most common country last visited amongst Tāmaki Makaurau cases was Indonesia, followed by India, with eight and six cases respectively (Table 92). There were 142 cases with no overseas travel. There was no travel data for Te Tai Tokerau cases.

Table 93: Risk factors associated with VTEC/STEC infection in Tāmaki Makaurau, 2023

Risk factor	Cases	Percent
Consume poultry in the week before onset	81	46.3
Consume raw fruit or veg in the week before onset	81	46.3
Consume juice in the week before onset	80	45.7
Consume beef in the week before onset	79	45.1
Consume dairy in the week before onset	66	37.7
Have contact with animals in week before onset	58	33.1
Contact with pets in week before onset	53	30.3
Consume processed or cured meat in the week before onset	46	26.3
Case overseas during incubation period	33	18.9
Consume lamb in the week before onset	30	17.1
Consume non-regular water supply in last week	21	12.0
Consume pink or undercooked meat in the week before onset	20	11.4
Travel in NZ week before onset	18	10.3
Contact with farm animals	17	9.7
Have contact with a person with similar symptoms	14	8.0
Attendance at school or preschool	12	6.9
Attend any social function the week before onset	12	6.9
Consume home kill in the week before onset	7	4.0
Recreational contact with water	5	2.9
Other recreational contact with water	4	2.3
Contact with sewage in week before onset	4	2.3
Handle raw meat or offal in the week before onset	3	1.7
Recreation activity in public pool in week before onset	1	0.6

Contact with other animals in week before onset	1	0.6
Have contact with animal manure in week before onset	1	0.6
Have contact with children in nappies in week before onset	1	0.6

Source: EpiSurv

Table 94: Risk factors associated with VTEC/STEC infection in Te Tai Tokerau, 2023

Risk factor	Cases	Percent
Consume raw fruit or veg in the week before onset	60	70.6
Consume beef in the week before onset	54	63.5
Have contact with animals in week before onset	54	63.5
Consume poultry in the week before onset	52	61.2
Consume dairy in the week before onset	46	54.1
Contact with pets in week before onset	44	51.8
Consume processed or cured meat in the week before onset	29	34.1
Consume home kill in the week before onset	29	34.1
Contact with farm animals	29	34.1
Consume lamb in the week before onset	23	27.1
Consume juice in the week before onset	21	24.7
Attendance at school or preschool	17	20.0
Consume non-regular water supply in last week	15	17.6
Have contact with children in nappies in week before onset	13	15.3
Recreational contact with water	12	14.1
Have contact with animal manure in week before onset	11	12.9
Consume pink or undercooked meat in the week before onset	10	11.8
Handle raw meat or offal in the week before onset	9	10.6
Other recreational contact with water	8	9.4
Attend any social function the week before onset	8	9.4
Contact with other animals in week before onset	7	8.2
Contact with sewage in week before onset	6	7.1
Have contact with a person with similar symptoms	5	5.
Recreation activity in public pool in week before onset	4	4.7

Consume raw milk or raw milk products in the week before onset	3	3.5
Recreation activity in other pool in week before onset	3	3.5
Travel in NZ week before onset	3	3.
Used spa pool in week before onset	2	2.4
Case overseas during incubation period	2	2.4
Recreation activity in river in week before onset	1	1.2

Source: EpiSurv

Risk factor interviewing is not always pathogen specific. As such, 'Consuming poultry in the week before onset' and 'Consuming raw fruit or veg in the week before onset' were the most common risk factors listed in Tāmaki Makaurau (Table 93), though these may not have been the source of the illness. Similarly, Te Tai Tokerau data reveals the most common risk factors were 'Consuming raw fruit or veg in the week before onset' and 'Consuming beef in the week before onset' with 60 and 54 cases respectively (Table 94).

3.4.18 Yersiniosis

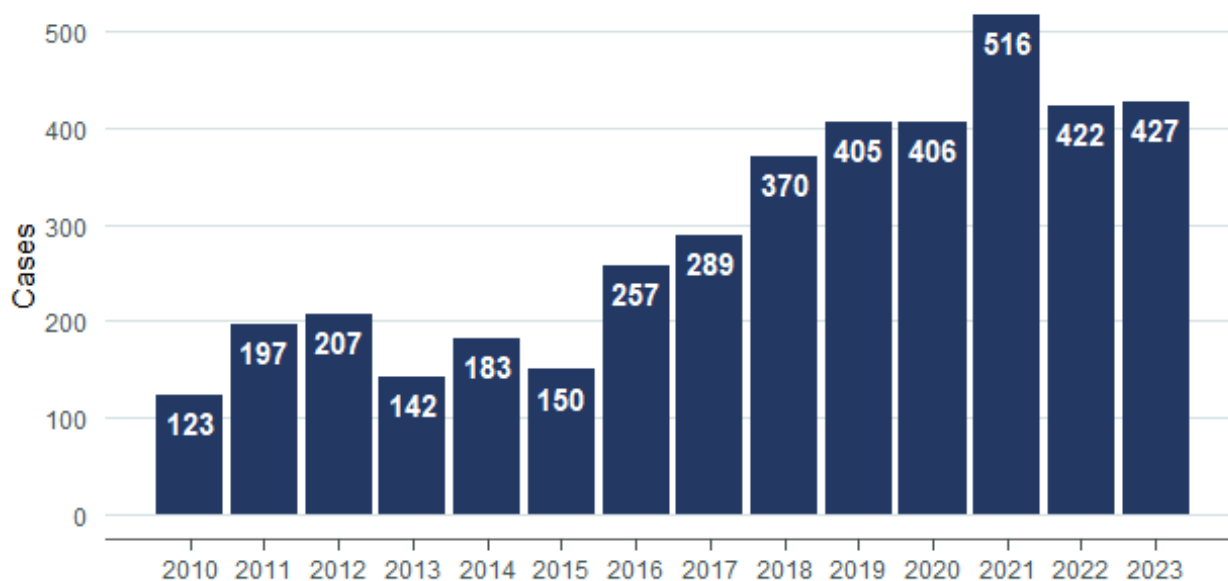
Yersiniosis is a bacterial infection caused by *Yersinia pseudotuberculosis* or *Yersinia enterocolitica*. Transmission mostly occurs through ingestion of contaminated food, including pork and dairy products, fruit, vegetables and tofu, although ingestion of untreated water, contact with infected animals and person-to-person spread has also been observed.

Y. pseudotuberculosis typically causes mesenteric adenitis and septicaemia while *Y. enterocolitica* causes enteric disease. In children under five years old, *Y. enterocolitica* typically causes diarrhoea, vomiting, fever and occasionally abdominal pain, while older children and adults often report abdominal pain as the predominant symptom.

An outbreak of yersiniosis due to *Y. pseudotuberculosis* occurred in NZ in 2014, with over 220 cases and no confirmed source.

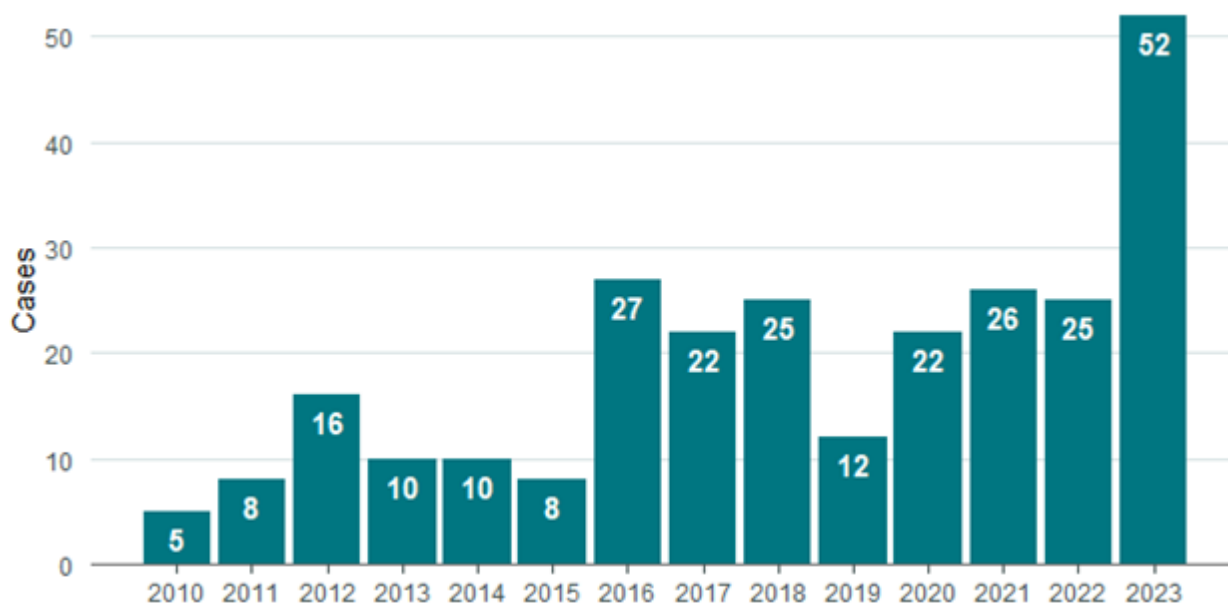
In 2023, there were 427 yersiniosis cases (24.2 cases per 100,000 population) in Tāmaki Makaurau and 52 cases (25.5 cases per 100,000 population) in Te Tai Tokerau. This compares to a national incidence rate of 27 cases per 100,000 population.

Figure 65: Yersiniosis cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

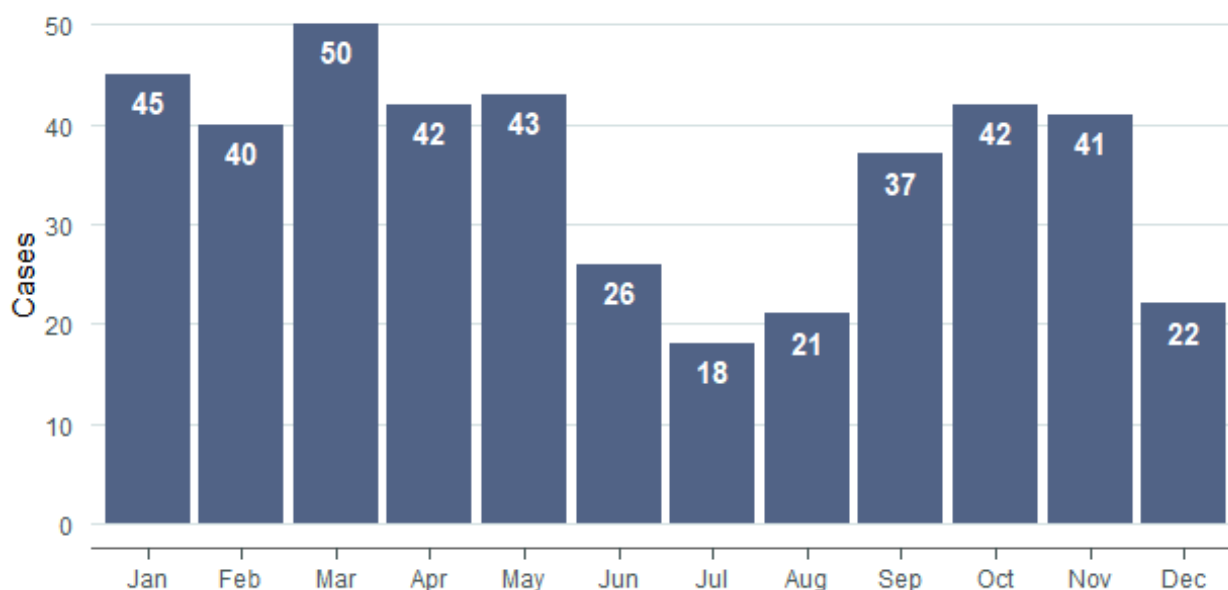
Figure 66: Yersiniosis cases in Te Tai Tokerau, 2010 to 2023



Source: EpiSurv

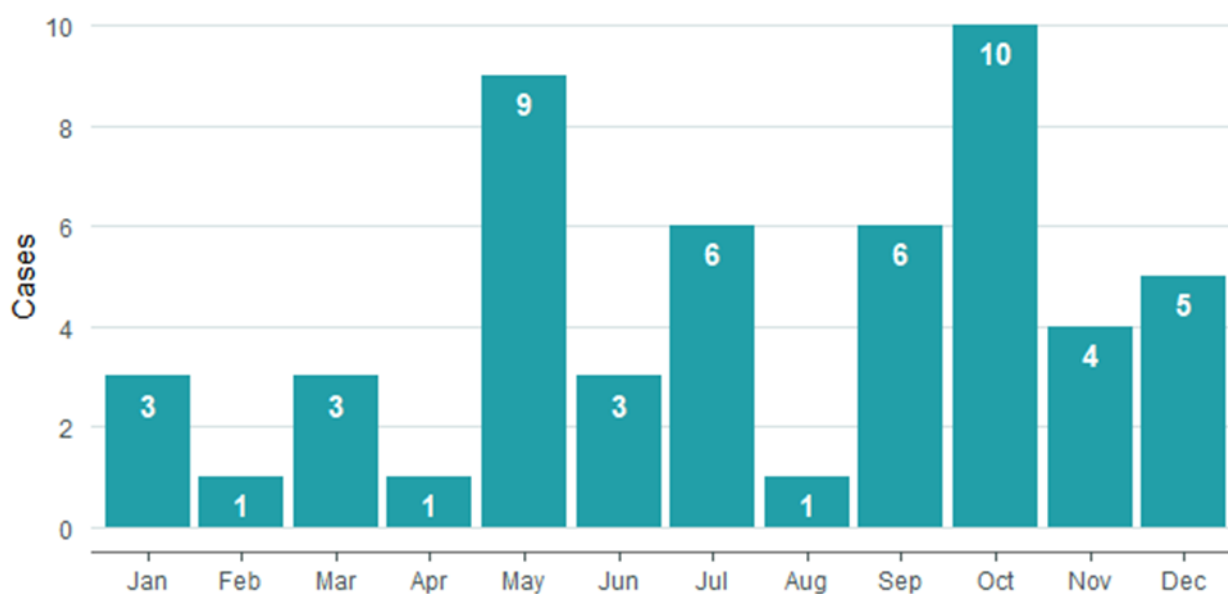
Figures 65 and 66 show the number of yersiniosis cases across the Northern region between 2010 and 2023. Tāmaki Makaurau case numbers for 2023 (427 cases) were similar to 2022 (422 cases). Case numbers were highest in 2021 with 516 cases. The number of cases for Te Tai Tokerau in 2023 was higher than all recent previous years, with 52 cases. Yersiniosis levels did not appear to have been impacted by the COVID-19 pandemic.

Figure 67: Yersiniosis cases in Tāmaki Makaurau by month, 2023



Source: EpiSurv

Figure 68: Yersiniosis cases in Te Tai Tokerau by month, 2023



Source: EpiSurv

There was no definite seasonal pattern for cases in Tāmaki Makaurau (Figure 67). There were more cases in the latter part of the year in Te Tai Tokerau, with October having the highest number (10) (Figure 68).

Table 95: Age-specific incidence rates for yersiniosis in Tāmaki Makaurau, 2023

Age group	Cases	Rate per 100,000
Age under 1	24	113.0
1 to 4	51	60.1
5 to 9	11	9.7
10 to 14	20	16.9
15 to 19	12	10.8
20 to 29	54	21.8
30 to 39	65	22.4
40 to 49	57	24.5
50 to 59	48	22.2
60 to 69	44	26.1
Age 70+	41	25.5
Total	427	24.2

Source: EpiSurv, Stats NZ

Table 96: Age-specific incidence rates for yersiniosis in Te Tai Tokerau, 2023

Age group	Cases	Rate per 100,000
Age under 1	3	123.7
1 to 4	5	51.5
5 to 9	0	-
10 to 14	2	13.9
15 to 19	1	8.4
20 to 29	5	25.6
30 to 39	4	16.3
40 to 49	6	27.4
50 to 59	5	18.3
60 to 69	10	34.8
Age 70+	11	36.8
Total	52	25.5

Source: EpiSurv, Stats NZ

Tables 95 and 96 show the age distribution of yersiniosis cases across the Northern region. The incidence rate for Tāmaki Makaurau cases were highest among the 'Age under 1' and '1 to 4' age groups, with 113.0 and 60.1 cases per 100,000 population, respectively. The incidence rate for Te

Tai Tokerau cases were highest among the 'Age under 1' and '1 to 4' age groups, with 123.7 and 51.5 cases per 100,000 population, respectively.

Table 97: Ethnic group-specific incidence rates for yersiniosis in Tāmaki Makaurau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	28	13.3
Pacific peoples	33	13.4
Asian	137	24.9
European and Other	181	23.9
Unknown	48	-
Total	427	24.2

Source: EpiSurv, Stats NZ

Table 98: Ethnic group-specific incidence rates for yersiniosis in Te Tai Tokerau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	11	14.8
Pacific peoples	0	-
Asian	7	73.0
European and Other	33	28.5
Unknown	1	-
Total	52	25.5

Source: EpiSurv, Stats NZ

Table 99: Detailed ethnicity count of yersiniosis cases in Tāmaki Makaurau, 2023

Detailed ethnicity	Cases
NZ European	145
Chinese	73
Unknown	47
Māori	28
Southeast Asian nfd	26
Indian	17
European nfd	15
Samoan	14
Other Asian nfd	10
Other European nfd	9
Middle Eastern nfd	7
Tongan	6
African nfd	5
Filipino	5
Other Asian nec	4
Asian nfd	3
Fijian	3
Other Pacific peoples nfd	3
Cook Islands Maori	2
Korean	2
Tokelauan	2
Other*	14

* Other consists of 14 ethnicities with one case each

Source: EpiSurv

Table 100: Detailed ethnicity count of yersiniosis cases in Te Tai Tokerau, 2023

Detailed ethnicity	Cases
NZ European	33
Māori	11
Other European nfd	3
Chinese	2
Other*	8

* Other consists of eight ethnicities with one case each

Source: EpiSurv

Tables 97 and 98 show the ethnic group-specific distribution across the Northern region. The incidence rate for Tāmaki Makaurau was highest among Asian followed by European and Other, with 24.9 and 23.9 cases per 100,000 population, respectively. Of the 137 cases among Asian people, 73 were of Chinese ethnicity (Table 99). The incidence rate for Te Tai Tokerau was highest among Asian followed by European and Other, with 73.0 and 28.5 cases per 100,000 population, respectively.

Routine interviews with cases of yersiniosis acquired in Tāmaki Makaurau ceased in 2017 but continues in Te Tai Tokerau.

3.5 Environmental diseases

Environmental illnesses occur when people are exposed to toxins or substances in the environment that cause disease. These health hazards may be found in people's home, work or recreational environments.

Environmental illnesses can be difficult to diagnose as they often present with non-specific symptoms or exacerbate an existing health problem. They may occur from short-term exposure to a substance, such as accidental ingestion of a cleaning product, or through long-term exposure, such as lead absorption.

Legionellosis is included in this section as it is transmitted to humans from an environmental source (e.g. water and soil).

Table 101: Environmental diseases in Tāmaki Makaurau, 2023

Disease	Total notifications	Total cases (%)	Rate per 100,000	Hospitalisations (%)	Deaths (%)
Chemical poisoning from the environment	2	2 (100.0)	0.1	2 (100.0)	0
Hazardous substances injury	24	23 (95.8)	1.3	24 (100.0)	0
Lead absorption	142	141 (99.3)	8.0	2 (1.4)	0
Legionellosis	101	83 (82.2)	4.7	80 (96.4)	6 (7.2)
Total	269	249 (92.6)	-	-	-

Source: EpiSurv, Stats NZ

Table 102: Environmental diseases in Te Tai Tokerau, 2023

Disease	Total notifications	Total cases (%)	Rate per 100,000	Hospitalisations (%)	Deaths (%)
Chemical poisoning from the environment	4	2 (50.0)	1	1 (50.0)	0
Hazardous substances injury	0	0	0	0	0
Lead absorption	12	12 (100)	5.9	0	0
Legionellosis	10	4 (40)	2	4 (100)	0
Total	26	18 (69.2)	-	-	-

Source: EpiSurv, Stats NZ

In 2023, Tāmaki Makaurau received a total of 269 notifications for environmental diseases (Table 101). Of these, 249 met the criteria for a confirmed or probable case. Lead absorption and legionellosis had the highest number of cases, with 142 cases and 101 cases, respectively.

In Te Tai Tokerau, there was 26 notifications, of which 18 were determined to be confirmed cases (Table 102). Lead absorption and legionellosis cases made up most of the cases.

3.5.1 Chemical poisoning from the environment

Poisoning arising from chemical contamination of the environment refers to any adverse health effect related to contamination of air, land or waterways from chemical products.^{22,23}

Examples include health effects following agrichemical spray drift events, skin effects following oil spills, cyanotoxin-related illness and unintentional carbon monoxide poisoning.²⁴

In 2023, there were two chemical poisonings from the environment cases in Tāmaki Makaurau. There were two hospitalisations and no deaths. One of these cases was a result from smoke exposure from a large scrap metal fire. The source of the other case is not listed.

There were two chemical poisonings from the environment cases in Te Tai Tokerau. One case was hospitalised and no deaths were recorded. These are the first cases of chemical poisoning from the environment reported in Te Tai Tokerau since at least 2010. For the whole of NZ, there were six cases.

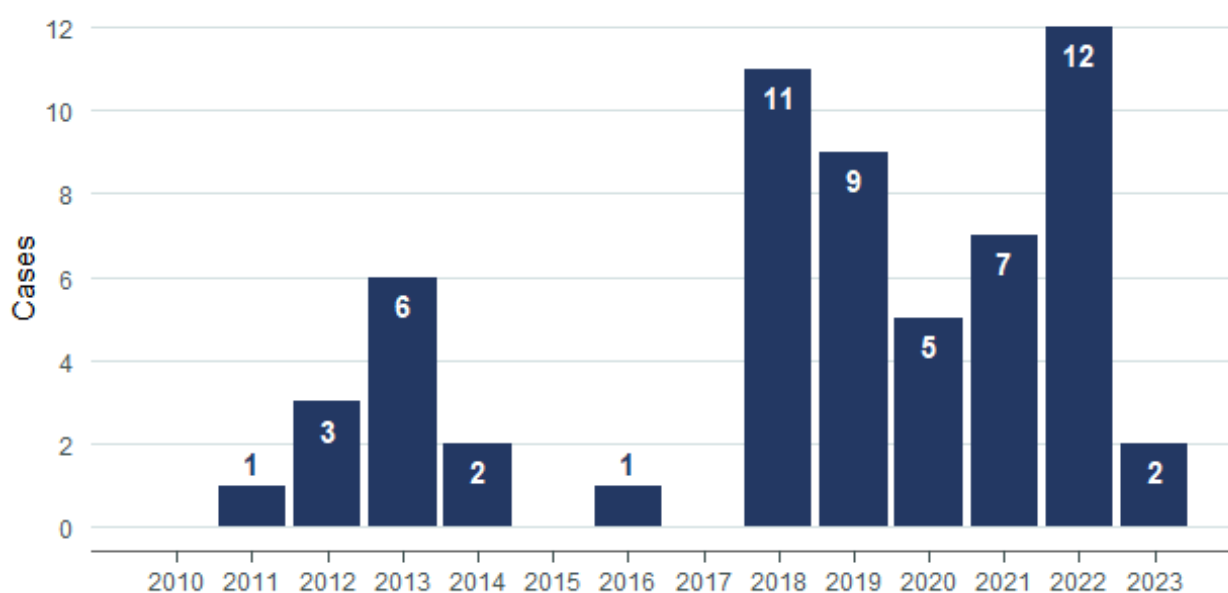
Across Aotearoa New Zealand this data is poorly collected currently and efforts are under way to improve this.

²² Better Health Channel. (2014). *Chemicals and spray drift*. Retrieved 11 May, 2023, from <https://www.betterhealth.vic.gov.au/health/healthyliving/chemicals-and-spray-drift#causes-of-chemical-spray-drift>.

²³ Ministry of Health. (2019). *The Investigation and Surveillance of Poisoning and Hazardous-substance Injuries: Guidelines for public health units* (4th edn). Wellington: Ministry of Health.

²⁴ EHINZ. (2021). *Hazardous Substances Disease and Injury Reporting Tool: A User's Guide for Public Health Units User's Guide for PHUs*. Wellington: EHINZ. Retrieved from https://www.ehinz.ac.nz/assets/Other/HSDIRT-Users-Guide-2021_Dec.pdf.

Figure 69: Chemical poisoning from the environment cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

Figure 69 shows the number of chemical poisonings from the environment cases in Tāmaki Makaurau between 2010 and 2023. Case numbers over the past five years have been relatively stable, with between five and 12 cases reported per year.

3.5.2 Hazardous substances injury

Hazardous substances injury refers to any accidental injury caused by a substance with explosive, flammable, oxidative or corrosive properties, or one that is toxic to humans.²⁵

Exposure to hazardous substances can occur through various pathways, including breathing in contaminated air and dust, ingesting contaminated water and food, skin exposure to chemicals and foetal exposure during pregnancy.²⁶

This group includes, for example, children swallowing cleaning products or cosmetics, illness caused by exposure to chemicals such as solvents or chlorine, nitrous oxide, contact dermatitis from chemicals, fireworks burns or eye injuries, and inhalation or 'huffing' butane.²⁷

Some people are more at risk of disease and injuries from hazardous substances. This includes children under five years old and people who handle chemicals in the workplace.

In 2023, there were 23 (1.3 cases per 100,000 population) hazardous substances injury cases in Tāmaki Makaurau. This data is from hospital sources as all notified cases were hospitalised. There

²⁵ Hazardous Substances and New Organisms Act 1996.

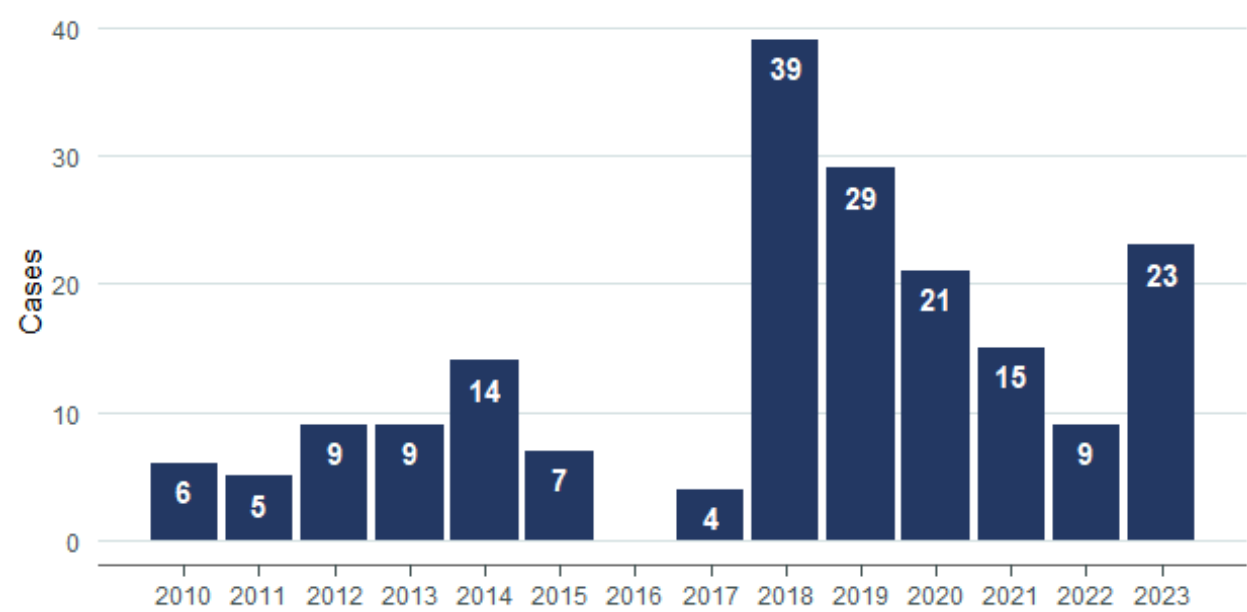
²⁶ EHINZ. (n.d.). *About hazardous substances and health*. Retrieved 11 May 2023, from <https://www.ehinz.ac.nz/indicators/hazardous-substances/about-hazardous-substances-and-health/>.

²⁷ EHINZ. (2021). *Hazardous Substances Disease and Injury Reporting Tool: A User's Guide for Public Health Units User's Guide for PHUs*. Wellington: EHINZ. Retrieved from https://www.ehinz.ac.nz/assets/Other/HSDIRT-Users-Guide-2021_Dec.pdf.

were no deaths. No cases were notified in Te Tai Tokerau. The national incident rate was 0.5 cases per 100,000 population.

Like chemical poisoning from the environment, great caution should be taken interpreting these results due to fallible reporting systems.

Figure 70: Hazardous substances injury cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

Figure 70 shows the number of hazardous substances injury cases in Tāmaki Makaurau between 2010 and 2023. Case numbers for 2023 were higher than 2022, after four consecutive years of declining cases.

Table 103: Hazardous substances injury cases in Tāmaki Makaurau by age group and sex, 2023

Age group	Female	Male	NA	Cases	Rate per 100,000
Age under 1	2	0	0	2	9.4
1 to 4	2	2	0	4	4.7
5 to 9	0	0	0	0	-
10 to 14	0	0	0	0	-
15 to 19	0	1	0	1	0.9
20 to 29	0	2	0	2	0.8
30 to 39	2	1	1	4	1.4
40 to 49	0	4	0	4	1.7
50 to 59	0	1	1	2	0.9
60 to 69	0	1	0	1	0.6
Age 70+	2	1	0	3	1.9
Total	8	13	2	23	1.3

Source: EpiSurv, Stats NZ

Tables 103 and 104 show the age, sex and ethnic group distribution of hazardous substances injury cases for 2023. The incidence was highest amongst infants and children under five years old. Ethnic group-specific incidence rates were highest among Māori (2.4 cases per 100,000 population).

Table 104: Ethnic group-specific incidence rates for hazardous substances injury in Tāmaki Makaurau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	5	2.4
Pacific peoples	4	1.6
Asian	2	0.4
European and Other	12	1.6
Unknown	0	-
Total	23	1.3

Source: EpiSurv, Stats NZ

3.5.3 Lead absorption

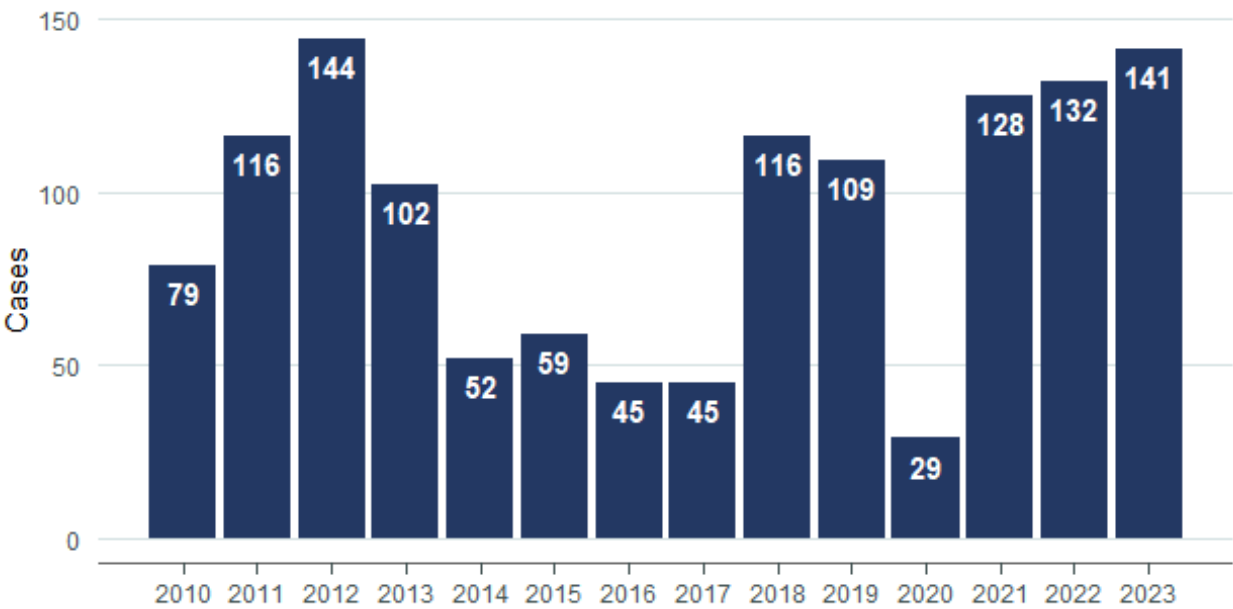
Lead poisoning can occur from exposure to lead-based paint, lead pipes, homemade fishing sinkers, kohl eye makeup, Ayurvedic medicines, lead-lighting, recreational shooting and battery manufacturing processes.

Symptoms include anorexia, nausea, constipation or diarrhoea, abdominal pain, weight loss, mood changes, memory impairment, sleep disturbance, headache, tingling hands and hypertension. At very high lead levels, brain damage and death may occur. Lead poisoning in pregnancy may cause premature birth or low birth weight, while high lead levels in childhood may lead to developmental issues.

The highest blood lead levels in adults occur in industrial workplaces, while the main source of non-occupational exposure is from restoring and cleaning older houses. In NZ, the blood lead levels that must be notified was reduced to 0.24 µmol/L (greater than or equal to) in January 2021.

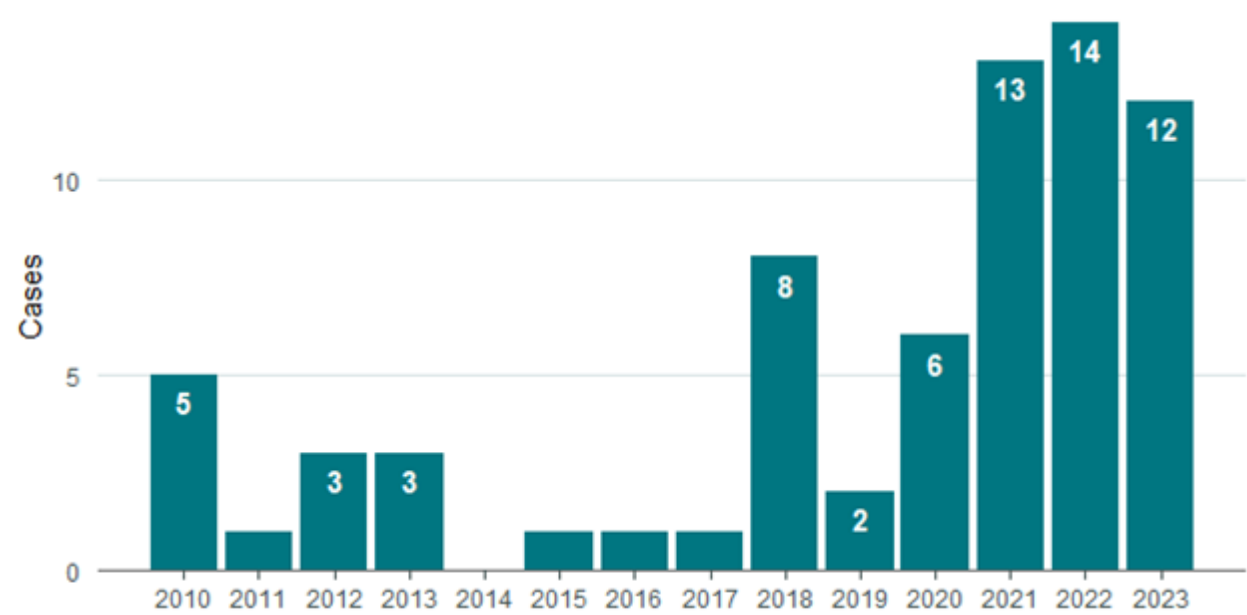
In 2023, there were 141 (8.0 cases per 100,000 population) lead absorption cases in Tāmaki Makaurau. There were two hospitalisations and no deaths. In Te Tai Tokerau there were 12 (5.9 cases per 100,000 population) lead absorption cases. There were no hospitalisations and no deaths. The incidence rate for the whole of NZ was 6.2 cases per 100,000 population.

Figure 71: Lead absorption cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

Figure 72: Lead absorption cases in Te Tai Tokerau, 2010 to 2023



Source: EpiSurv

Figures 71 and 72 show the number of lead absorption cases across the Northern region between 2010 and 2023. Case numbers for 2023 were similar to 2021 and 2022, but significantly higher than 2020. This may have been due to limited access to testing through general practitioners and occupational health programmes because of COVID-19 lockdowns.

Table 105: Lead absorption cases in Tāmaki Makaurau by age group and sex, 2023

Age group	Female	Male	Unknown	Cases	Rate per 100,000
Age under 1	0	0	0	0	-
1 to 4	0	1	0	1	1.2
5 to 9	2	1	0	3	2.6
10 to 14	0	0	0	0	-
15 to 19	0	4	0	4	3.6
20 to 29	2	20	0	22	8.9
30 to 39	2	16	0	18	6.2
40 to 49	3	20	0	23	9.9
50 to 59	2	27	0	29	13.4
60 to 69	3	24	1	28	16.6
Age 70+	3	10	0	13	8.1
Total	17	123	1	141	8

Source: EpiSurv, Stats NZ

Table 106: Lead absorption cases in Te Tai Tokerau by age group and sex, 2023

Age group	Female	Male	Cases	Rate per 100,000
Age under 1	0	0	0	-
1 to 4	1	0	1	10.3
5 to 9	0	0	0	-
10 to 14	0	0	0	-
15 to 19	0	0	0	-
20 to 29	0	1	1	5.1
30 to 39	0	0	0	-
40 to 49	0	3	3	13.7
50 to 59	1	1	2	7.3
60 to 69	0	4	4	13.9
Age 70+	0	1	1	3.3
Total	2	10	12	5.9

Source: EpiSurv, Stats NZ

Tables 105 to 108 show the age, sex and ethnic group distribution of lead absorption cases for 2023. The ratio of females to males was 1:7 (Tāmaki Makaurau) and 1:5 (Te Tai Tokerau), with over 80% of cases occurring in males aged between 20 and 69. Ethnic group-specific incidence

rates were highest among Pacific peoples with 24.3 and 21.4 cases per 100,000 population in each region respectively.

Table 107: Ethnic group-specific incidence rates for lead absorption in Tāmaki Makaurau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	5	2.4
Pacific peoples	60	24.3
Asian	17	3.1
European and Other	56	7.4
Unknown	3	-
Total	141	8

Source: EpiSurv, Stats NZ

Table 108: Ethnic group-specific incidence rates for lead absorption in Te Tai Tokerau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	2	2.7
Pacific peoples	1	21.4
Asian	1	10.4
European and Other	8	6.9
Unknown	0	-
Total	12	5.9

Source: EpiSurv, Stats NZ

Table 109: Lead absorption cases in Tāmaki Makaurau by occupation, 2023

Occupation	Cases
Painting trades worker	43
Not stated	28
Not recorded	21
Metal engineering process worker	19
Retired	5
Carpenter	2
Fabrication engineering trades worker	2
Response not identifiable	2
Technicians and trades workers	2
Bricklayer	1
Child 5-15	1
Child under 5	1
Construction trades worker	1
Construction worker	1
Engineering professionals nec	1
Laboratory manager	1
Light technician	1
Metal casting trades worker	1
Not in the labour force	1
Science technician	1
Sculptor	1
Secretary (general)	1
Student	1
Taxi driver	1
Teacher	1
Truck driver	1
Total	141

Source: EpiSurv

Table 110: Lead absorption cases in Te Tai Tokerau by occupation, 2023

Occupation	Cases
Painting trades worker	3
Construction trades worker	2
Not recorded	2
Not stated	2
Child under 5	1
Retired	1
Science technician	1
Total	12

Source: EpiSurv

Tables 109 and 110 show occupations associated with lead absorption in 2023. The most common occupational group was painting and trades workers. Note occupation was not recorded or stated in nearly 35% of cases.

Tables 111 and 112 confirm the average blood lead level by listed occupation.

Table 111: Occupational lead absorption cases by average blood lead level in Tāmaki Makaurau, 2023

Source of exposure	Count	Average blood lead level
Painting trades worker	39	0.73
Metal engineering process worker	19	0.67
Fabrication engineering trades worker	2	0.35
Science technician	1	0.25
Sculptor	1	0.68
Carpenter	1	1.13
Engineering professionals nec	1	0.36
Metal casting trades worker	1	0.35
Technicians and trades workers	1	0.49
Light technician	1	0.46
Response not identifiable	1	0.24
Occupation not stated	20	0.47
Total	88	0.52

Source: EpiSurv

Table 112: Occupational lead absorption cases by average blood lead level in Te Tai Tokerau, 2023

Source of exposure	Count	Average blood lead level
Painting trades worker	3	0.78
Construction trades worker	2	2.05
Science technician	1	0.33
Retired	1	0.58
Occupation not stated	1	0.39
Total	8	0.83

Source: EpiSurv

In addition to an occupation with lead exposure there are many other non-occupational risk factors. Tables 113 and 114 show that living in or regularly visiting a building built before the 1970s is commonly identified as a risk factor among cases. Some of these cases identified doing renovation work on their properties.

Table 113: Risk factors associated with lead absorption in Tāmaki Makaurau, 2023

Risk factor	Cases	Percent
Case has occupation which involves exposure to lead	88	62.4
Lives in or regularly visits a building built pre-1970s	46	32.6
Pre-1970s building undergoing or having recent alterations	14	9.9
Pre-1970s building paint being stripped	13	9.2
Pre-1970s building paint chalking flaking	10	7.1
Case has hobby which involves exposure to lead	7	5.0
Case plays in soil containing paint debris	1	0.7
Case ingests substances such as soil, dirt etc	1	0.7
No risk factors recorded	34	24.1

Source: EpiSurv

Table 114: Risk factors associated with lead absorption in Te Tai Tokerau, 2023

Risk factor	Cases	Percent
Lives in or regularly visits a building built pre-1970s	8	66.7
Case has occupation which involves exposure to lead	8	66.7
Pre-1970s building paint chalking flaking	5	41.7
Pre-1970s building paint being stripped	5	41.7
Pre-1970s building undergoing or having recent alterations	4	33.3
Case ingests substances such as soil, dirt etc	1	8.3
No risk factors recorded	1	8.3

Source: EpiSurv

3.5.4 Legionellosis

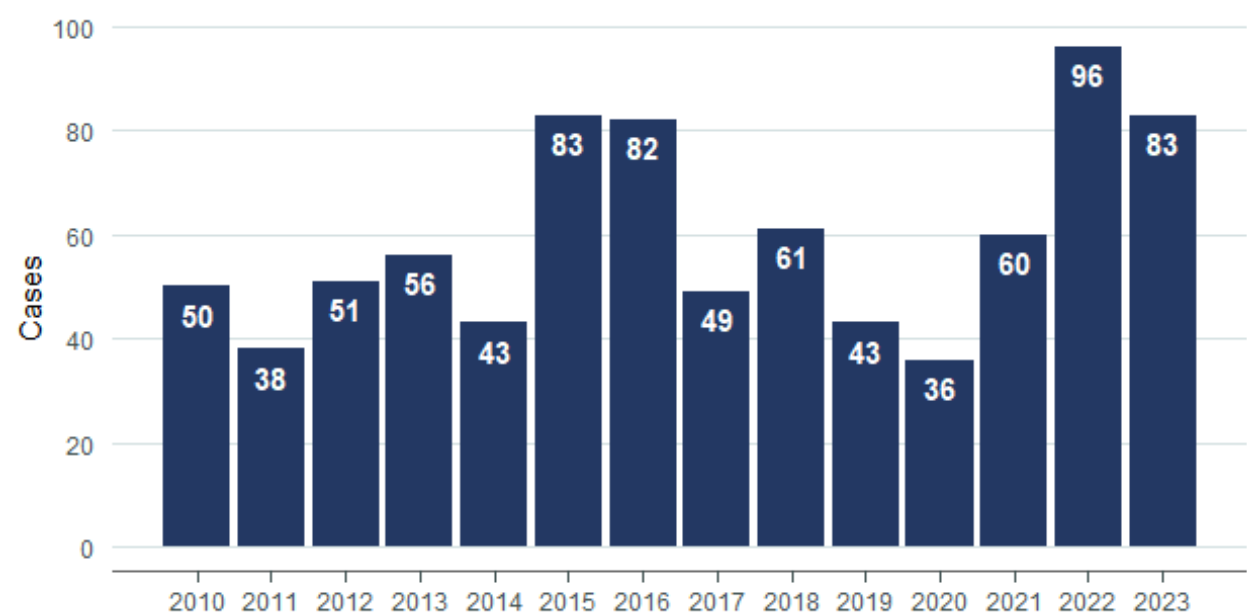
Legionellosis refers to a group of infections caused by *Legionella* bacteria. Transmission is through inhalation of water or dust particles carrying the bacteria. No person-to-person transmission has been documented.

Legionella infections include a mild febrile illness known as Pontiac fever, a more severe illness with pneumonia known as Legionnaire's disease, and extra-pulmonary disease involving the skin, joints, pericardium and other organs. Infections may arise sporadically or in outbreaks, with older people, smokers, chronic disease sufferers and the immunocompromised at highest risk. Legionnaire's disease is the most common manifestation of legionellosis reported worldwide, while the other forms are likely under-recognised and under-reported.

Most cases of legionellosis in NZ are caused by *L. longbeachae* and *L. pneumophila*. *L. longbeachae* is typically present in soil, whereas *L. pneumophila* is generally found in water, where it thrives in temperatures between 25 and 45°C. Sources where temperatures allow the bacteria to thrive include hot-water tanks, cooling towers, and evaporative condensers of large air-conditioning systems, such as those commonly found in hotels and large office buildings.

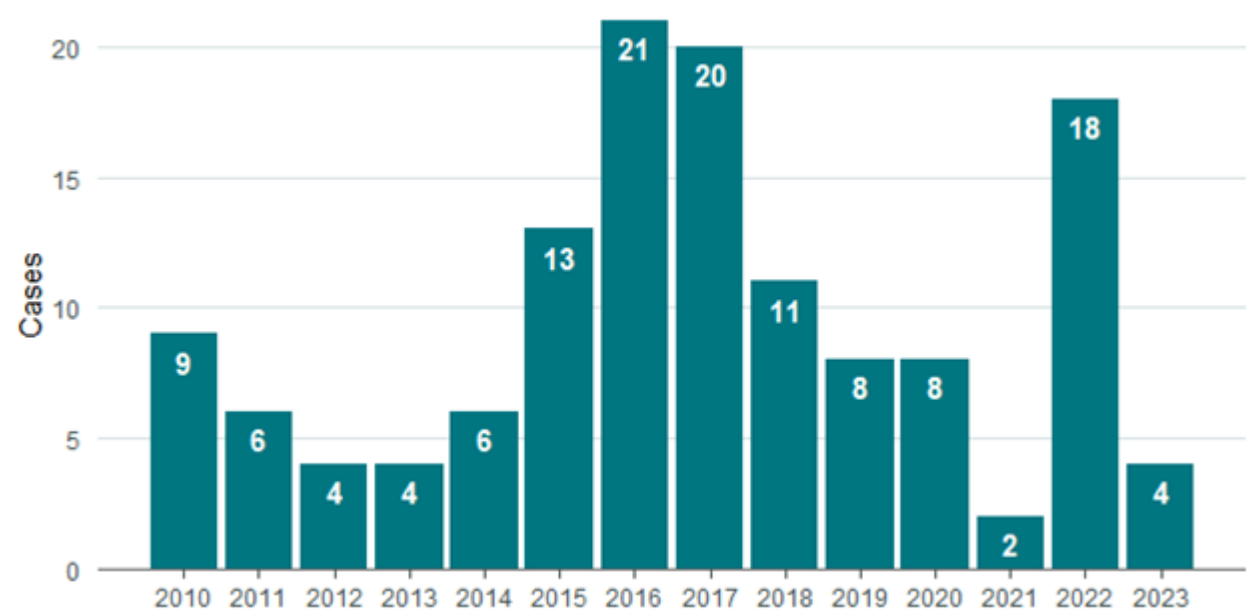
In 2023, there were 83 (4.7 cases per 100,000 population) legionellosis cases in Tāmaki Makaurau and four cases (2.0 cases per 100,000 population) in Te Tai Tokerau. In Tāmaki Makaurau there were 80 hospitalisations and six deaths. In Te Tai Tokerau there were four hospitalisations and no deaths. The national incidence rate was 4.4 cases per 100,000 population.

Figure 73: Legionellosis cases in Tāmaki Makuarau, 2010 to 2023



Source: EpiSurv

Figure 74: Legionellosis cases in Te Tai Tokerau, 2010 to 2023



Source: EpiSurv

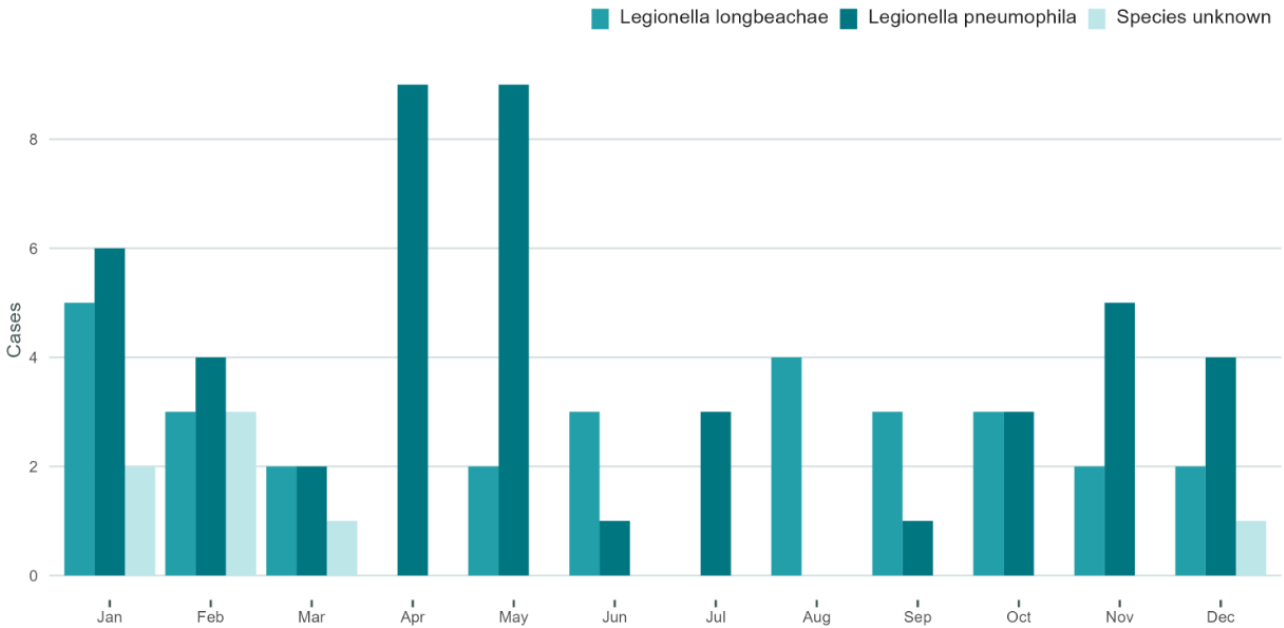
Figures 73 and 74 show the number of legionellosis cases across the Northern region between 2010 and 2023. A record number of cases were reported in 2022 in both areas, with 96 cases in Tāmaki Makaurau and 18 cases in Te Tai Tokerau, falling to 83 and four in 2023 respectively.

Of note, many legionellosis notifications are deemed ‘not a case’ each year as many meet the clinical, but not laboratory, criteria for a confirmed case. This is particularly true for *L. longbeachae* which is frequently diagnosed through a positive urinary antigen test but is not currently considered sufficient laboratory evidence for a confirmed case. In many instances, the public health service carried out a full investigation of the case as this was deemed to require a public health response.

Therefore, case numbers are likely an underestimate, particularly for *L. longbeachae* cases, and do not necessarily reflect the full reality of the operational response.

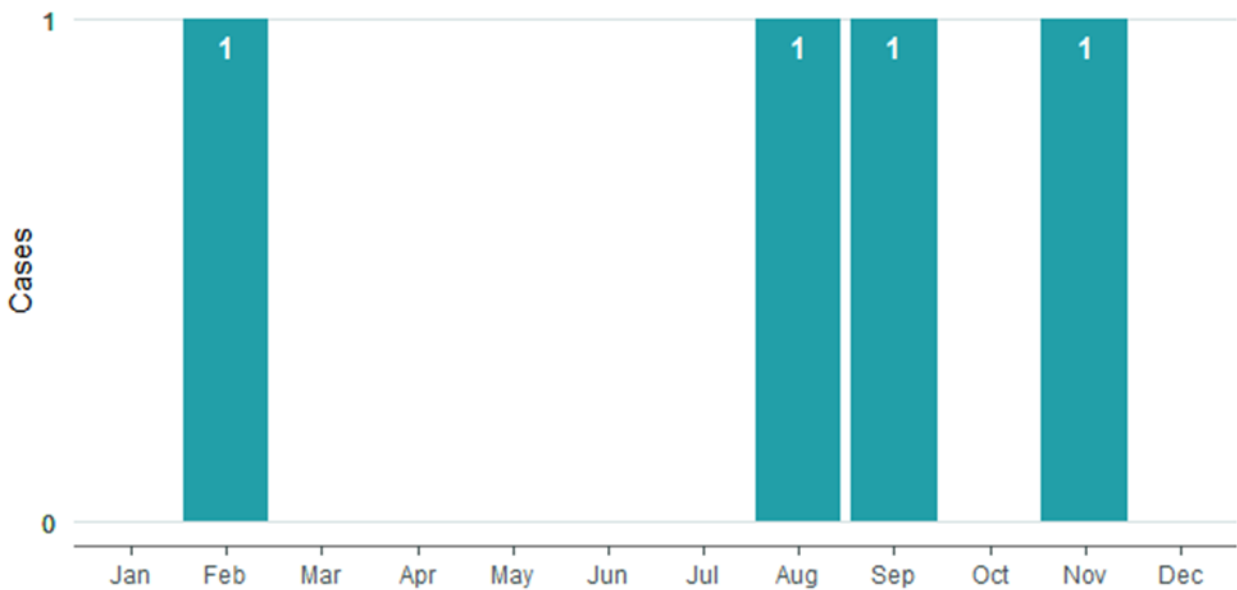
In 2023 there were fewer cases over the winter months in Tāmaki Makaurau (Figure 75). *Legionella pneumophila* was the predominant species, particularly during the autumn months. The onset months of the four cases in Te Tai Tokerau should not be overinterpreted.

Figure 75: Legionellosis cases in Tāmaki Makaurau by species by month, 2023



Source: EpiSurv/NDCMS

Figure 76: Legionellosis cases in Te Tai Tokerau by species, 2023



Source: EpiSurv

Table 115: Legionellosis cases in Tāmaki Makaurau by age group and sex, 2023

Age group	Female	Male	Cases	Rate per 100,000
Age under 1	0	0	0	-
1 to 4	0	0	0	-
5 to 9	0	0	0	-
10 to 14	0	0	0	-
15 to 19	0	0	0	-
20 to 29	1	0	1	0.4
30 to 39	1	0	1	0.3
40 to 49	2	4	6	2.6
50 to 59	3	13	16	7.4
60 to 69	5	18	23	13.6
Age 70+	10	26	36	22.4
Total	22	61	83	4.7

Source: EpiSurv, Stats NZ

Table 116: Legionellosis cases in Te Tai Tokerau by age group and sex, 2023

Age group	Female	Male	Cases	Rate per 100,000
Age under 1	0	0	0	-
1 to 4	0	0	0	-
5 to 9	0	0	0	-
10 to 14	0	0	0	-
15 to 19	0	0	0	-
20 to 29	0	0	0	-
30 to 39	0	0	0	-
40 to 49	1	0	1	4.6
50 to 59	1	0	1	3.7
60 to 69	0	1	1	3.5
Age 70+	0	1	1	3.3
Total	2	2	4	2

Source: EpiSurv, Stats NZ

Tables 115 to 118 show the age, sex and ethnic group distribution of legionellosis cases for 2023. Cases were highest among the '60 to 69' and '70+' age groups, with 13.6 and 22.4 cases per 100,000 population, respectively in Tāmaki Makaurau. Again, in Tāmaki Makaurau, ethnic group-

specific incidence rates were highest among European and Other followed by Māori, with 6.8 and 5.7 cases per 100,000 population, respectively.

Table 117: Ethnic group-specific incidence rates for legionellosis in Tāmaki Makaurau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	12	5.7
Pacific peoples	11	4.5
Asian	9	1.8
European and Other	52	6.8
Unknown	0	-
Total	84	4.9

Source: EpiSurv, Stats NZ

Table 118: Ethnic group-specific incidence rates for legionellosis in Te Tai Tokerau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	1	1.3
Pacific peoples	0	-
Asian	0	-
European and Other	3	2.6
Unknown	0	-
Total	4	2

Source: EpiSurv, Stats NZ

Tables 119 and 120 show risk factors associated with developing legionellosis. The most common risk factors identified were 'Exposure to an environmental source' (e.g. hot water systems, air conditioning, cooling towers, spa pools and compost), accounting for 58.3% of cases, followed by 'Immunosuppression or a debilitating condition', accounting for 35.7% of cases. It is worth noting the exact source is frequently not identified.

Table 119: Risk factors associated with legionellosis in Tāmaki Makaurau, 2023

Risk factor	Cases	Percent
Exposure to environmental sources of infection during incubation period	49	58.3
Does the case suffer from immunosuppression or a debilitating condition	30	35.7
Does case smoke cigarettes	17	20.2
Case overseas during incubation period	5	6.0
No risk factors recorded	1	1.2

Source: EpiSurv

Table 120: Risk factors associated with legionellosis in Te Tai Tokerau, 2023

Risk factor	Cases	Percent
Exposure to environmental sources of infection during incubation period	2	50
Does the case suffer from immunosuppression or a debilitating condition	2	50
Case overseas during incubation period	1	25
No risk factors recorded	1	25

Source: EpiSurv

3.6 Vaccine-preventable diseases

Vaccine-preventable diseases (VPDs) are infectious diseases caused by viruses or bacteria that can be prevented with vaccines. Infections caused by these diseases can often result in hospitalisations and even deaths. Some VPDs are covered in other sections of this report, including hepatitis B and tuberculosis (TB).

Table 121: Vaccine-preventable diseases in Tāmaki Makaurau, 2023

Disease	Total notifications	Total cases (%)	Rate per 100,000	Hospitalisations (%)	Deaths (%)
Diphtheria	151	3 (2)	0.2	1 (33.3)	0
Haemophilus influenzae type b	35	1 (2.9)	0.1	1 (100.0)	0
Invasive pneumococcal disease	256	247 (96.5)	14	239 (96.8)	21 (8.5)
Measles	202	5 (2.5)	0.3	3 (60)	0
Meningococcal disease	20	18 (90.0)	1	18 (100)	0
Mumps	145	8 (5.5)	0.5	1 (12.5)	0
Pertussis	163	63 (38.7)	3.6	16 (25.4)	1 (1.6)
Rubella	2	0	-	-	-
Total	974	345 (35.4)	-	-	-

Source: EpiSurv, Stats NZ

Table 122: Vaccine-preventable diseases in Te Tai Tokerau, 2023

Disease	Total notifications	Total cases (%)	Rate per 100,000	Hospitalisations (%)	Deaths (%)
Diphtheria	0	0	-	-	-
Haemophilus influenzae b	4	0	-	-	-
Invasive pneumococcal disease	50	46 (92)	22.6	43 (93.5)	6 (13)
Measles	51	3 (5.9)	1.5	1 (33.3)	0
Meningococcal disease	4	4 (100)	2	4 (100)	0
Mumps	11	0	-	-	-
Pertussis	24	7 (29.2)	3.4	2 (28.6)	0
Rubella	0	0	-	-	-
Total	144	60 (41.7)	-	-	-

Source: EpiSurv, Stats NZ

In 2023, Tāmaki Makaurau received a total of 974 notifications for VPDs (Table 121). Of these, 345 (35.4%) met the criteria for a confirmed or probable case. Te Tai Tokerau received 144 notifications for VPDs (Table 122), 41.7% (60 cases) of which were confirmed or probable cases.

Across the region, the most common vaccine preventable cases were due to invasive pneumococcal disease followed by pertussis. Eight of the 14 cases of measles in NZ in 2023 were from the Northern region.

There were cases of cutaneous toxigenic diphtheria, invasive Haemophilus influenzae type b disease, measles and mumps, none of which were notified in 2022.

3.6.1 Diphtheria

Diphtheria is caused by toxin-producing strains of the bacterium *Corynebacterium diphtheriae*. Diphtheria-like illness may result from infection with toxigenic *Corynebacterium ulcerans*.

Transmission occurs through contact with respiratory droplets or the infected skin of a case or carrier or, more rarely, contaminated articles. Unpasteurised milk has also been identified as a source of infection.

Infection primarily involves the respiratory tract or skin but can also include septic arthritis, conjunctivitis, and vaginal and external auditory canal infections. The disease has a 5-10% CFR.

Because of an effective vaccine, toxigenic diphtheria is now extremely rare in NZ, however it can still be brought back into the country through travel.

In 2023, there were three cases of diphtheria toxin producing *Corynebacteria* (0.2 cases per 100,000 population) in Tāmaki Makaurau and no cases in Te Tai Tokerau. Of the cases, there was one hospitalisation and no deaths. Prior to this, the most recent case in Tāmaki Makaurau was reported in 2017. These were the only cases reported in NZ.

The three confirmed cases were cutaneous diphtheria with no evidence of respiratory illness. All three cases had travelled to source countries (of Solomon Islands, Vanuatu and Samoa).

3.6.2 Haemophilus influenzae type B invasive disease

Invasive disease due to Haemophilus influenzae type b (Hib) may present as bacteraemia, meningitis, epiglottitis, cellulitis, septic arthritis, pneumonia, empyema, pericarditis or osteomyelitis.

Transmission occurs via droplet inhalation of or direct contact with respiratory tract secretions.

Hib was once the most common cause of life-threatening bacterial infection in children under five years old. However, the addition of the Hib vaccine to the national immunisation schedule in 1994 reduced the incidence significantly. Vaccines are also available for public health use for cases and contacts.

There were four cases of Hib notified in NZ in 2023. One of these cases was in Tāmaki Makaurau and was hospitalised and recovered. There were no cases reported in Te Tai Tokerau with the last cases reported in 2018.

3.6.3 Invasive pneumococcal disease

Invasive pneumococcal disease (IPD) involves detection of *Streptococcus pneumoniae* bacteria (also known as pneumococcus) in a normally sterile site. Depending on the site of infection, the main presenting condition is meningitis, pneumonia or septicaemia.

Up to 25% of the population carry the bacteria asymptomatically at the back of the nasopharynx. The risk of invasive disease is higher in infants, the elderly and those with immune deficiency states. *S. pneumoniae* is the most common cause of community-acquired pneumonia in all ages and a common cause of bacterial meningitis in children.

IPD was added to the notifiable disease schedule primarily for the purposes of surveillance – particularly to monitor the effect of introducing the pneumococcal vaccine for children in June 2008 and the incidence of disease in the community. This epidemiological information, along

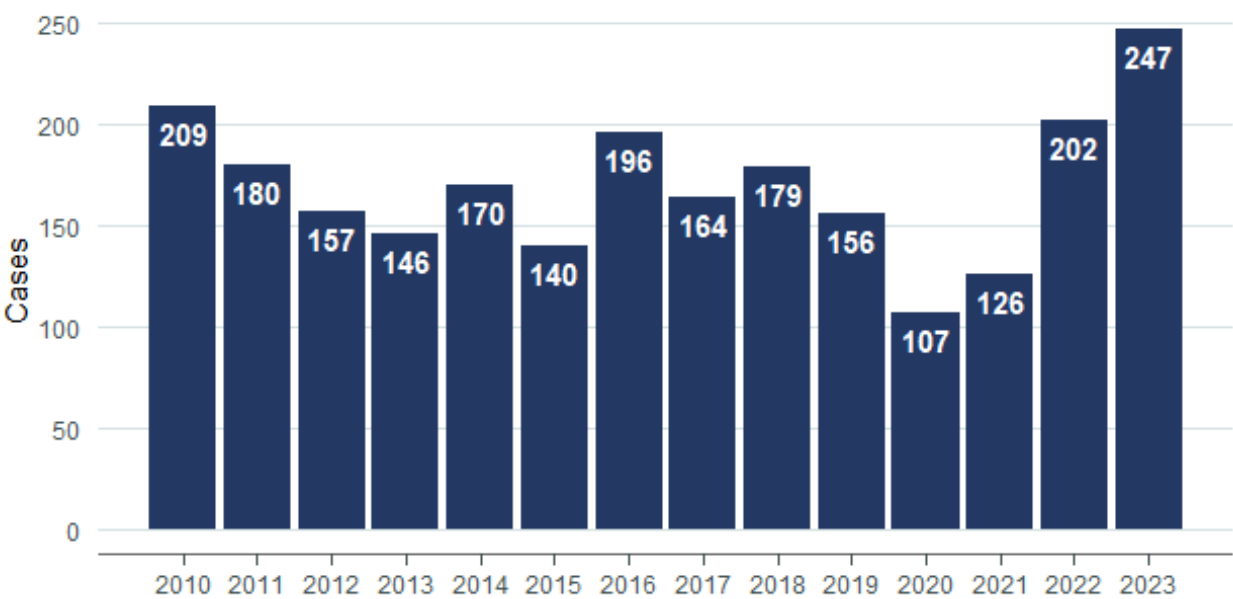
with information on the distribution of serotypes from laboratory-based surveillance, helps inform future immunisation policy.

Local public health action is not expected in response to individual notifications of this disease.

In 2023, there were 247 (14 cases per 100,000 population) IPD cases in Tāmaki Makaurau with 239 hospitalisations and 21 deaths. There were 46 (22.6 cases per 100,000 population) IPD cases in Te Tai Tokerau, with 43 hospitalisations and six deaths.

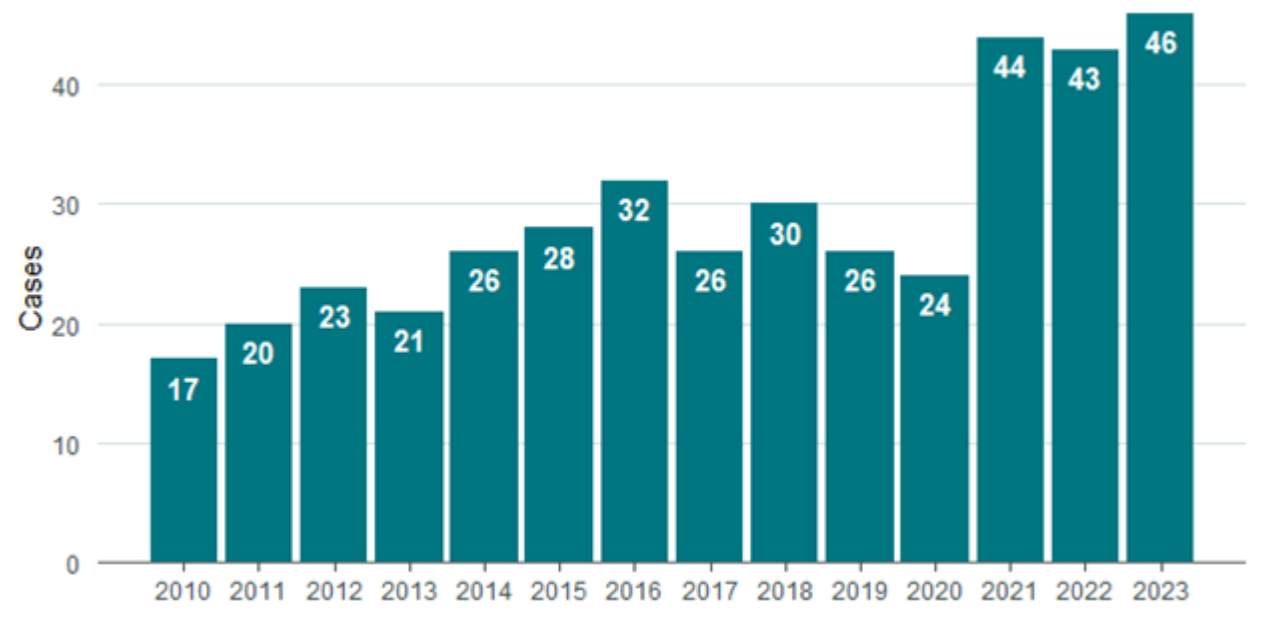
Nationally, there were 758 cases, and the incidence rate was 14.5 cases per 100,000 population.

Figure 77: IPD disease cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

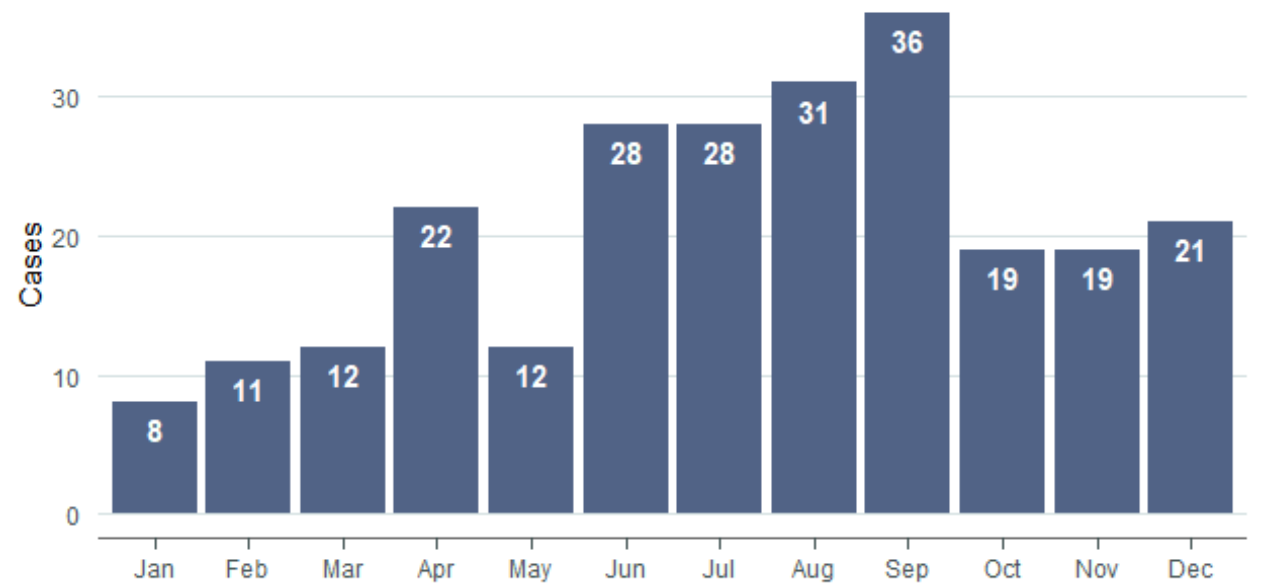
Figure 78: IPD cases in Te Tai Tokerau, 2010 to 2023



Source: EpiSurv

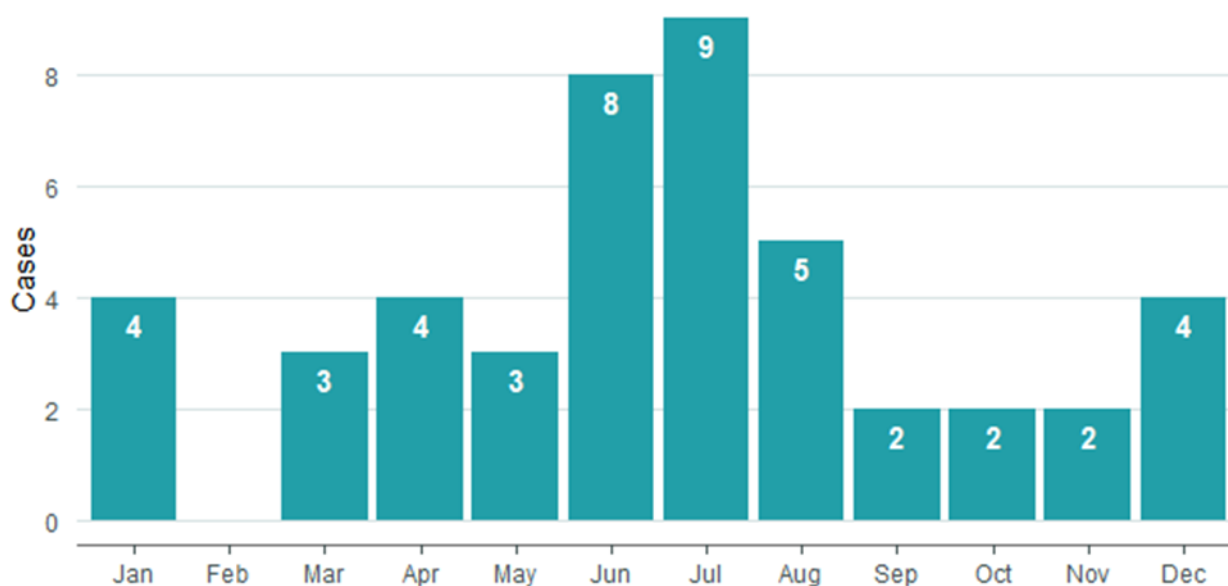
Figure 77 and 78 show the number of IPD cases across the Northern region between 2010 and 2023. Case numbers for 2023 were higher than in any other year since 2010 in both Tāmaki Makaurau and Te Ta Tokerau.

Figure 79: IPD cases in Tāmaki Makaurau by month, 2023



Source: EpiSurv

Figure 80: IPD cases in Te Tai Tokerau by month, 2023



Source: EpiSurv

Figures 79 and 80 show the distribution by month in Tāmaki Makaurau and Te Tai Tokerau. In 2023, cases were more common over winter for Te Tai Tokerau with eight and nine cases in June and July respectively. Tāmaki Makaurau also saw a surge of cases during the winter months. However, the greatest peak was in spring, with 36 cases registered in September.

Table 123: Age-specific incidence rates for IPD in Tāmaki Makaurau, 2023

Age group	Cases	Rate per 100,000
Age under 1	10	47.1
1 to 4	25	29.4
5 to 9	15	13.2
10 to 14	3	2.5
15 to 19	5	4.5
20 to 29	14	5.6
30 to 39	28	9.7
40 to 49	23	9.9
50 to 59	26	12.0
60 to 69	47	27.9
Age 70+	51	31.7
Total	247	14.0

Source: EpiSurv

Table 124: Age-specific incidence rates for IPD in Te Tai Tokerau, 2023

Age group	Cases	Rate per 100,000
Age under 1	3	123.7
1 to 4	5	51.5
5 to 9	0	-
10 to 14	1	7
15 to 19	0	-
20 to 29	0	-
30 to 39	9	36.7
40 to 49	2	9.1
50 to 59	4	14.6
60 to 69	5	17.4
Age 70+	17	56.8
Total	46	22.6

Source: EpiSurv

Tables 123 and 124 show the age group distribution of IPD cases for 2023 across the Northern region. Cases were highest among the 'under 1' and '70+' age groups in both regions. The rates for the 'under 1' group were 123.7 cases and 47.1 cases per 100,000 population for Te Tai Tokerau and Tāmaki Makaurau, respectively.

Table 125 shows ethnic group-specific incidence rates in 2023 were highest among Pacific peoples followed by Māori in Tāmaki Makaurau, with 32.4 and 19 cases per 100,000 population, respectively. In Te Tai Tokerau the incidence rate was much the same for both Māori and Pacific peoples (32.4 and 42.8 cases per 100,000) (Table 126).

Table 125: Ethnic group-specific incidence rates for IPD in Tāmaki Makaurau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	40	19
Pacific peoples	80	32.4
Asian	42	7.6
European and Other	79	10.4
Unknown	6	-
Total	247	14

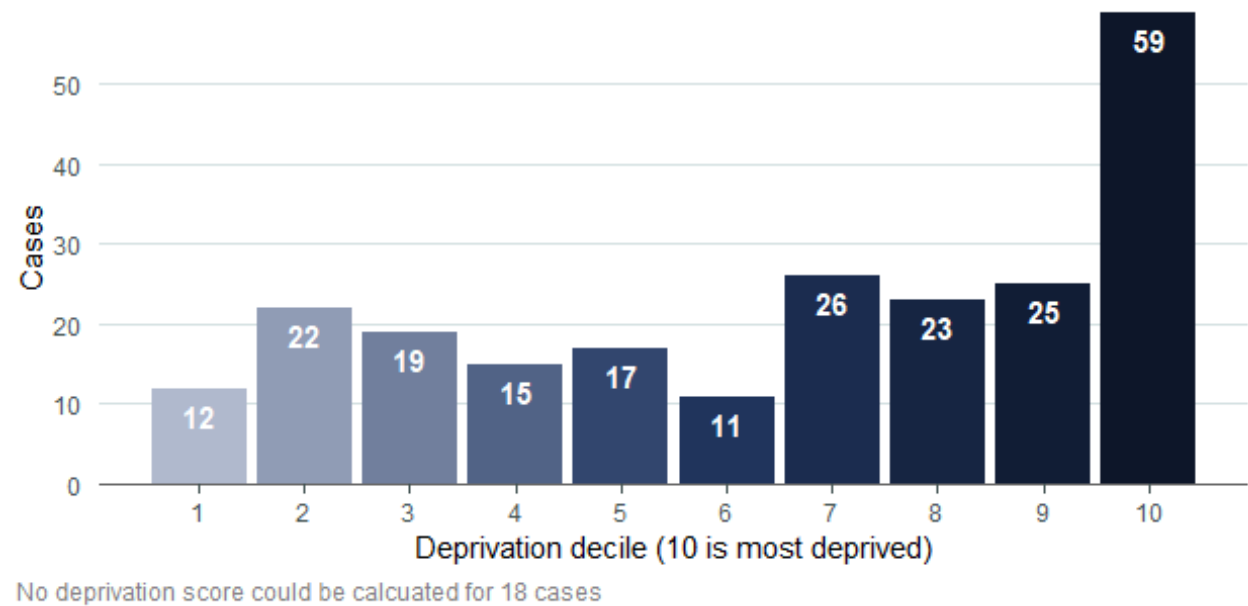
Source: EpiSurv

Table 126: Ethnic group-specific incidence rates for IPD in Te Tai Tokerau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	24	32.4
Pacific peoples	2	42.8
Asian	0	-
European and Other	20	17.3
Unknown	0	-
Total	46	22.5

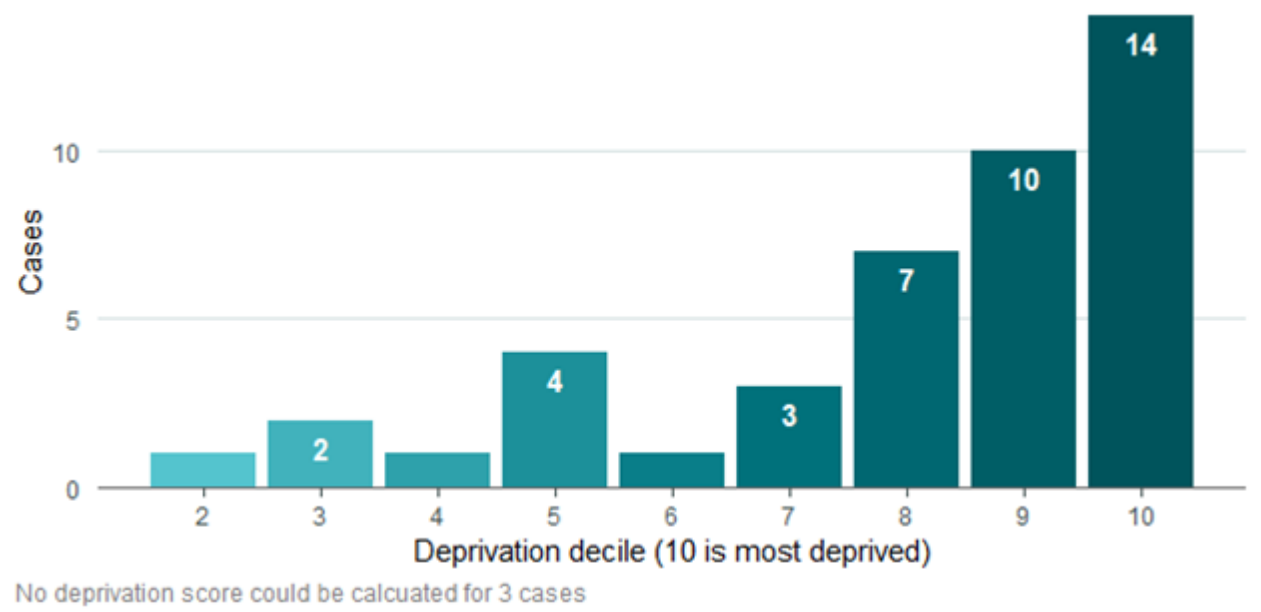
Source: EpiSurv

Figure 81: IPD cases in Tāmaki Makaurau by deprivation index, 2023



Source: EpiSurv

Figure 82: IPD cases in Te Tai Tokerau by deprivation index, 2023



Source: EpiSurv

In 2023, 54% of all IPD cases occurred in Tāmaki Makaurau’s most socioeconomic deprived areas (deprivation deciles 7, 8, 9 and 10) (Figure 81) while in Te Tai Tokerau, 67% of cases occurred in the most socioeconomic deprived areas (deciles 8, 9, 10) (Figure 82).

Pneumococcal disease immunisation

Immunisation against pneumococcal disease was first introduced to NZ in 2008 as a 7-valent pneumococcal conjugate vaccine (PCV7). In 2011 this was replaced by a 10-valent vaccine (PCV10), and in 2014 a 13-valent vaccine (PCV13) was introduced. NZ returned to using PCV10 between 2017 and 2022.

Following the introduction of PCV10 in 2011, PCV10-preventable cases of IPD declined, reaching a low of three cases in 2021. Similarly, after the PCV13 vaccine was introduced in 2014, PCV13-preventable cases decreased year on year from 2014 to 2017, when its use was discontinued in favour of PCV10. Since 2017, the proportion of PCV10-preventable cases has continued to drop while the proportion of PCV13-preventable cases has increased, mainly due to a rise in the 19A serotype. 19A is a predominant serotype in NZ and causes a significant burden.

Subsequently from 2023, PHARMAC decided to fund access to PCV13 for the National Immunisation Schedule which protects against three additional serotypes (3, 6A and 19A) that are not covered by PCV10. All children are now being given PCV13 as part of their routine immunisations at ages six weeks, five months and 12 months.

It is worth mentioning the proportion of cases not preventable by either vaccine has climbed, peaking at 76.9% in 2019. This information provides reassurance that the vaccination campaign against IPD has been successful in reducing the prevalence of vaccine-susceptible variants. Based on the current patterns, serotypes 8, 12F, and 22F would be appropriate candidates for future pneumococcal vaccines.

Table 127: Serotypes of IPD isolated in Tāmaki Makaurau, 2012 to 2023

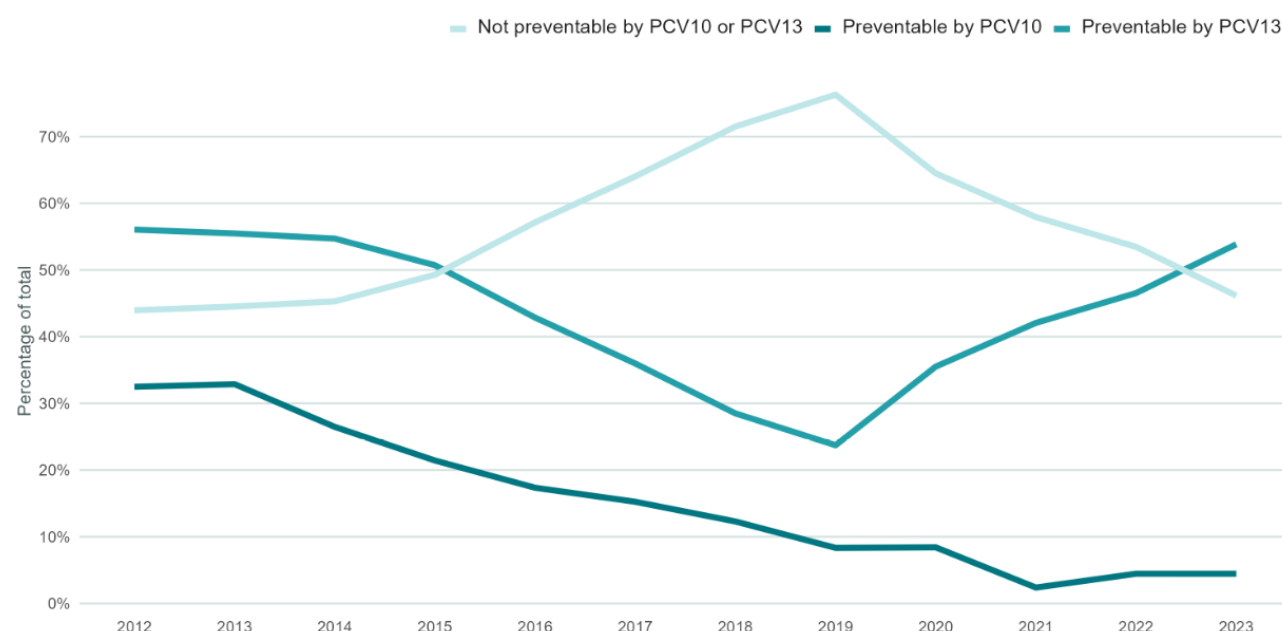
*Pale blue rows indicate serotypes contained in PCV10; mid blue rows indicate additional serotypes contained in PCV13.

Serotype	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
1	2	0	0	0	0	0	1	0	1	0	0	0	4
18C	2	4	4	1	1	0	0	0	0	0	1	2	15
19A	28	27	31	33	40	24	21	17	20	44	72	106	463
19F	11	5	6	9	3	2	4	3	3	3	3	1	53
23F	3	2	1	2	2	0	1	0	1	0	0	0	12
3	7	5	17	7	10	9	7	7	9	6	13	15	112
4	13	7	6	2	8	6	2	2	1	0	1	4	52
5	0	0	0	0	1	0	0	0	0	0	0	0	1
6A	2	1	0	1	0	1	1	0	0	0	0	1	7
6B	1	2	0	1	1	0	2	3	1	0	3	1	15
9V	6	3	5	2	1	2	1	1	0	0	1	1	23
7F	8	20	22	13	14	13	11	3	2	0	0	2	108
14	5	5	0	0	2	2	0	1	0	0	0	0	15
10 Non-typable	2	0	0	0	0	0	0	0	0	0	0	0	2
10A	2	1	1	0	2	1	5	3	0	2	0	2	19
11A	3	2	4	1	4	6	3	3	4	3	2	4	39
12F	0	3	1	1	2	7	25	16	12	7	1	2	77
13	2	0	1	1	1	0	0	2	1	0	0	1	9
15 Non-typable	2	2	1	0	0	0	0	0	0	0	0	0	5
15A	0	0	0	1	4	4	3	1	0	0	0	5	19
15B	3	1	5	6	4	4	2	4	2	7	4	3	45
15C	0	0	1	1	1	2	1	1	1	0	0	2	10
15F	0	0	0	0	0	0	0	0	0	0	0	1	1
16 Non-typable	0	2	4	0	0	0	0	0	0	0	0	0	6
16F	0	0	0	0	6	3	3	5	3	5	5	2	32
17F	1	2	0	1	2	1	2	2	0	1	2	0	14
18A	0	0	0	0	0	1	0	0	0	0	1	0	2
18F	0	0	0	0	0	0	1	0	1	0	0	0	2
20	2	2	0	1	0	1	0	0	0	0	1	0	7
21	0	0	0	0	2	0	1	3	0	0	0	1	7
22F	10	15	16	6	15	7	12	13	6	5	11	8	124
23A	2	2	4	10	4	8	9	5	3	5	4	4	60
23B	3	2	2	2	5	3	7	6	4	3	11	5	53
24 Non-typable	1	0	0	0	1	0	0	0	0	0	0	0	2
29	0	0	0	0	0	0	0	0	0	0	1	0	1
31	1	0	0	1	0	2	3	2	0	0	2	1	13
33 Non-typable	0	0	0	2	3	1	3	2	1	0	0	0	12
33F	1	2	2	2	7	4	2	0	0	3	1	2	26
34	0	1	2	1	4	1	4	2	0	2	1	1	19
35 Non-typable	1	2	5	0	0	0	0	0	0	0	0	0	8
35B	0	0	0	4	1	1	1	1	3	0	2	2	15
35F	0	0	0	0	0	2	1	0	1	1	0	0	5
37	0	0	0	0	1	0	1	0	2	0	0	0	4

38	1	0	1	1	0	5	2	1	0	0	0	0	11
42	0	0	0	0	0	1	0	0	0	0	0	0	1
6C	3	3	14	12	8	4	5	5	2	4	7	10	77
6D	0	0	0	0	1	0	0	0	0	0	0	0	1
7A	0	2	0	0	0	0	0	0	0	0	0	0	2
7C	0	0	1	2	2	2	1	1	0	2	1	2	14
8	8	3	4	3	11	14	12	14	14	12	28	23	146
9 Non-typable	1	1	0	0	0	0	0	1	0	0	0	0	3
9N	4	3	3	3	7	4	5	6	2	3	4	6	50
Non-typable	0	0	1	1	2	2	3	3	1	0	0	0	13
Unknown	0	0	0	0	0	0	0	0	0	0	5	2	7
(blank)	16	14	4	6	12	14	11	17	6	8	14	25	147
Total	157	146	170	140	196	164	179	156	107	126	202	247	1990

Source: EpiSurv

Figure 83: Percentage of IPD cases preventable by PCV10 and PCV13 in Tāmaki Makaurau, 2010-2023



Source: EpiSurv

Table 127 shows the serotypes for the Tāmaki Makaurau cases from 2012-2023. Serotype 19A has increased dramatically in recent years, likely a result of the return to the PCV10 vaccine from 2017 to 2022. In addition, there is a small increase in cases of serotype 3, also not covered by the PCV10 vaccine. This is demonstrated in Figure 83, which shows the rise in total percentage of cases that would have been covered by PCV13 vaccine had it been available. This is expected to gradually fall again with the reintroduction of this vaccine.

3.6.4 Measles

Measles is a viral infection characterised by fever, cough, coryza, conjunctivitis, Koplik’s spots (white buccal lesions) and a generalised maculopapular rash. Measles is spread through the air by breathing, coughing and sneezing, or through contact with infected saliva (i.e. kissing, sharing food and drink).

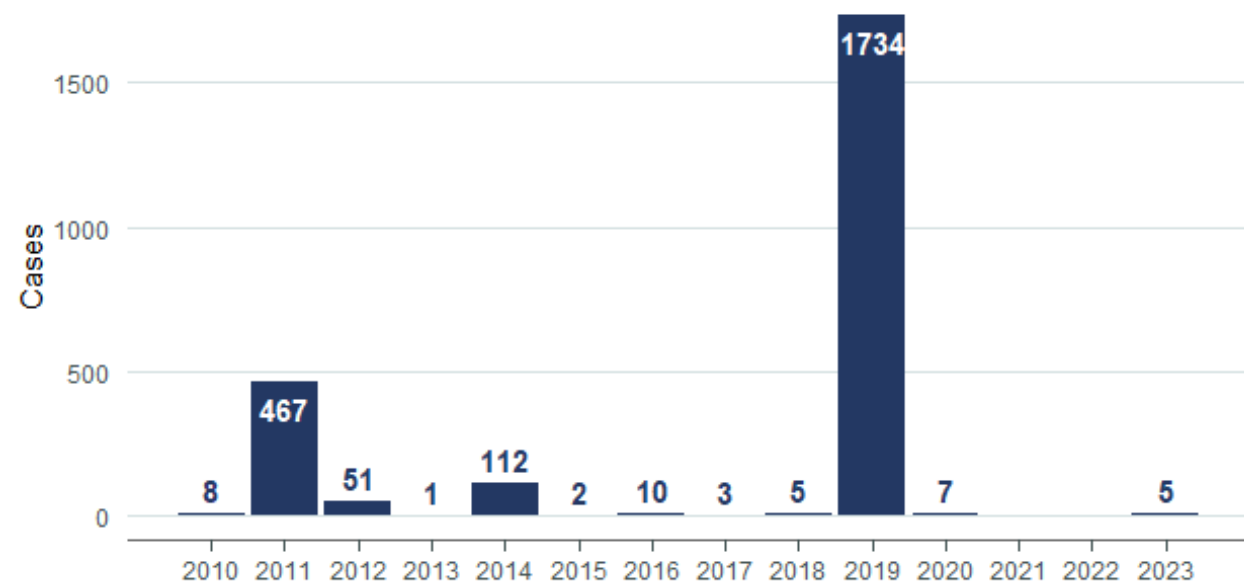
Up to 30% of cases will develop complications, with children under the age of five and adults over the age of 20 at highest risk. Complications include ear infections, diarrhoea, pneumonia, encephalitis, miscarriage, premature labour and low birthweight babies.

In 2017, NZ was verified by the WHO as having eliminated endemic measles. However, outbreaks have continued to occur due to international travel and historically low immunisation rates. The most recent outbreak in NZ occurred in 2019 with more than 2,000 cases and 700 hospitalisations. Prevention of further outbreaks relies on improving coverage with measles-mumps-rubella (MMR) vaccination.

In 2023, there were five measles cases in Tāmaki Makaurau with three hospitalisations and no deaths. The incidence rate for Tāmaki Makaurau was 0.3 cases per 100,000 population. There were three measles cases in Te Tai Tokerau in 2023 with one hospitalisation and no deaths. The incidence rate for Te Tai Tokerau was 1.5 cases per 100,000 population. It is worth mentioning that the last cases reported in the Northern region prior to 2023 was in 2020.

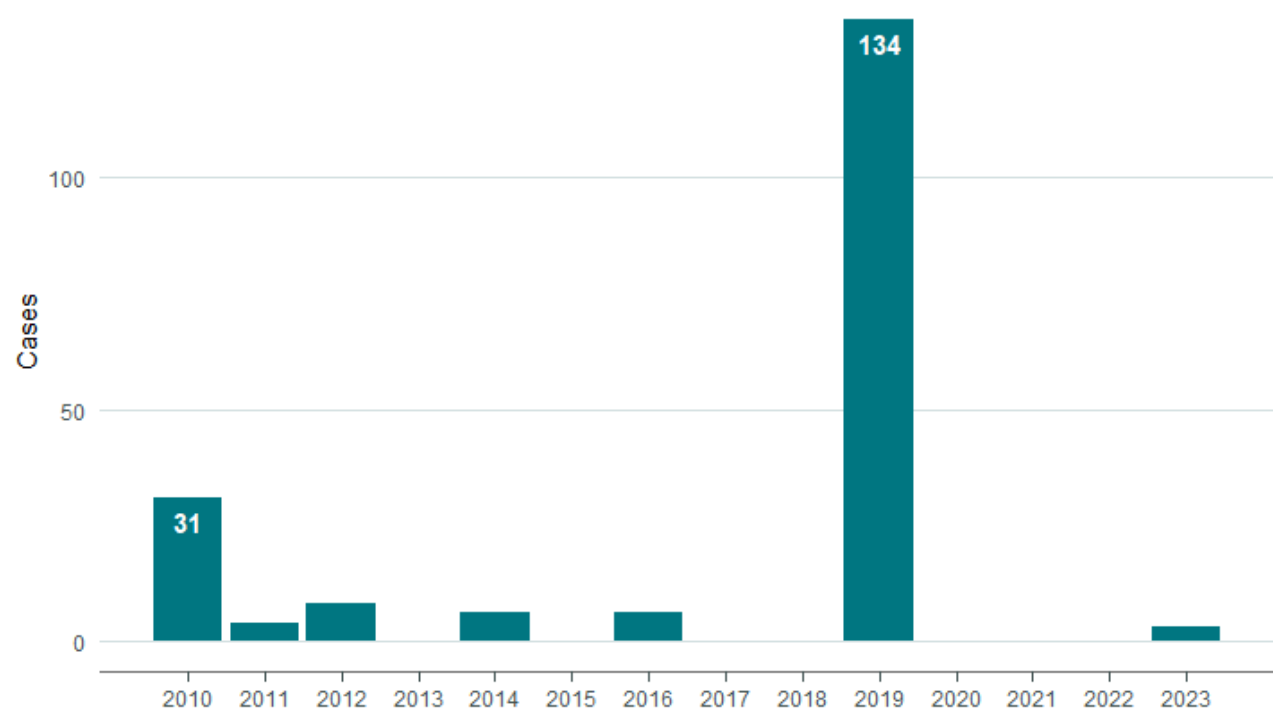
Nationally, in 2023 there were 14 cases and the incidence rate was 0.3 cases per 100,000 population.

Figure 84: Measles cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

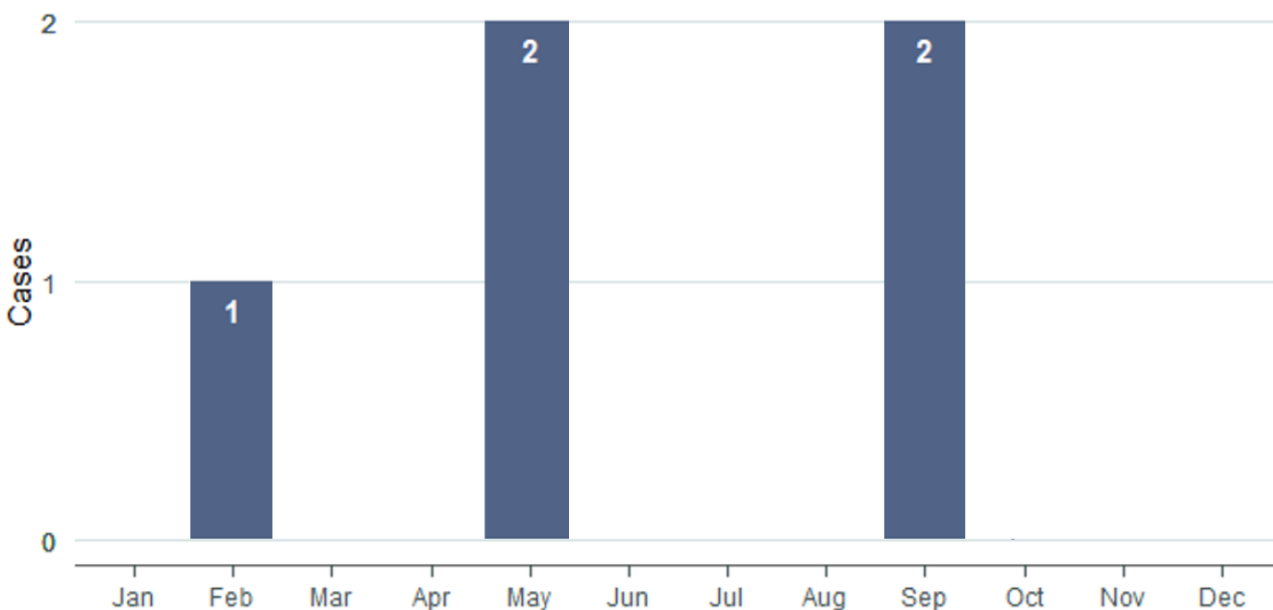
Figure 85: Measles cases in Te Tai Tokerau, 2010 to 2023



Source: EpiSurv

Figures 84 and 85 show the annual number of cases across the Northern region since 2010. The five cases in Tāmaki Makaurau and three cases in Te Tai Tokerau were the first cases since the large 2019 measles outbreak.

Figure 86: Measles cases in Tāmaki Makaurau by month, 2023



Source: EpiSurv

Measles cases were notified in Tāmaki Makauaru in February, May and September. Of the five cases, four were overseas acquired and one resulted from secondary transmission from household exposure.

All three Te Tai Tokerau measles cases were notified in October 2023. Of the three cases, one had no known source of infection and the remaining two were linked to the first case.

These eight cases across the Northern region underemphasise the enormous resources devoted to case and contact management work, with local, regional and national responses engaged for the varied cases to prevent a wider outbreak occurring.

In Tāmaki Makaurau, four of the cases identified as Asian and the fifth case identified as European or Other. One case was an infant, the remaining cases were aged 15 and older. Age and ethnicity data are not included for the three Te Tai Tokerau cases.

Table 128: Ethnic group specific incidence rates of measles cases in Tāmaki Makaurau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	0	-
Pacific peoples	0	-
Asian	4	0.7
European and Other	1	0.1
Unknown	0	-
Total	5	0.3

Source: EpiSurv, Stats NZ

Table 129: Age-specific incidence rates for measles in Tāmaki Makaurau, 2023

Age group	Cases	Rate per 100,000
Age under 1	1	4.7
1 to 4	0	-
5 to 9	0	-
10 to 14	0	-
15 to 19	1	0.9
20 to 29	2	0.8
30 to 39	1	0.3
40 to 49	0	-
50 to 59	0	-
60 to 69	0	-
Age 70+	0	-
Total	5	0.3

Source: EpiSurv, Stats NZ

3.6.5 Meningococcal disease

Meningococcal disease refers to a group of invasive diseases caused by the *Neisseria meningitidis* bacteria. To be classified as invasive, the bacteria must be detected in a normally sterile site such as cerebrospinal fluid (meningococcal meningitis), blood (meningococcal septicaemia) or, rarely, pericardial or synovial fluid. Meningococcal conjunctivitis (bacteria in the lining of the eye) is also considered an indication for public health action because of the high immediate risk of invasive disease.

Meningococcal bacteria are commonly carried in the nose and throat, and do not usually cause disease. Carriage rates are thought to be highest in older teenagers and young adults. The bacteria can be transferred from person-to-person through contact with saliva, e.g. intimate kissing, and prolonged contact. In rare cases, the bacteria can invade and rapidly lead to severe disease. The underlying reasons for why invasion occurs in some individuals are not well understood. The risk of invasive disease is higher in babies and young children, teenagers and young adults, immunocompromised people, smokers and those living in overcrowded and/or shared living situations.

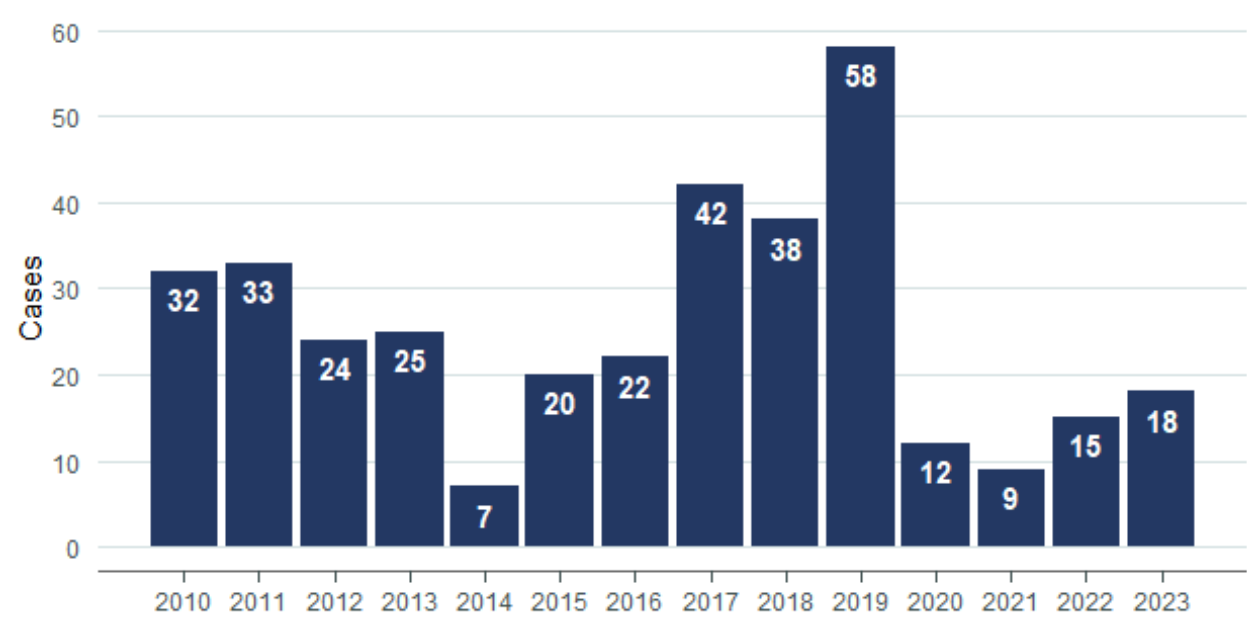
Meningococcal bacteria can be classified into groups A, B, C, W and Y, with most cases in NZ caused by group B. In the past, groups B and C were the most frequent causes of meningococcal disease. However, this has changed since 2018 with an increase in disease caused by groups W or Y.

The meningococcal B (MenB) vaccine was added to the National Immunisation Schedule for all babies aged 12 months and under on 1 March 2023. All tamariki under five years old can catch up for free until 31 August 2025. MenB and the quadrivalent vaccine MenQuadFi vaccine is also available for young people 13 to 25 years old in certain close-living situations. Both types of vaccines are available for public health use for cases and close contacts.

In 2023, there were 18 meningococcal disease cases notified in Tāmaki Makaurau. All received hospital care and there were no deaths. The incidence rate for Tāmaki Makaurau was one case per 100,000 population (similar to the national incidence rate).

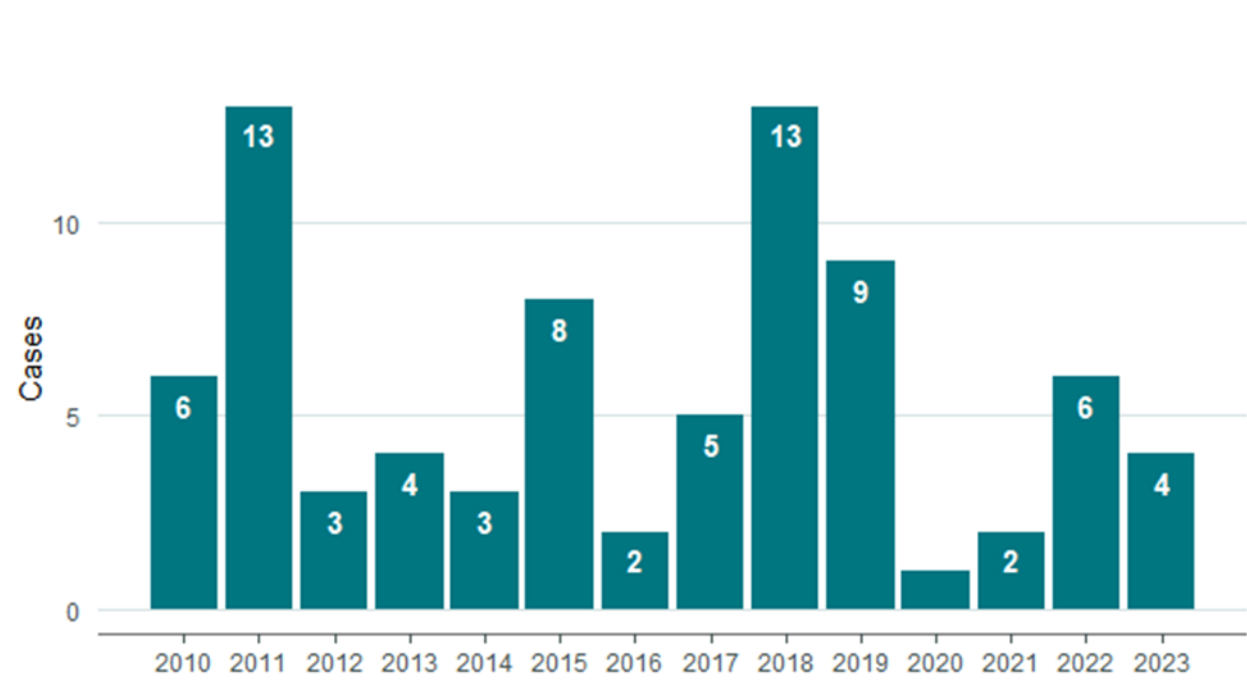
There were four cases in Te Tai Tokerau with four hospitalisations and no deaths. The incidence rate for Te Tai Tokerau was two cases per 100,000 population.

Figure 87: Meningococcal disease cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

Figure 88: Meningococcal disease cases in Te Tai Tokerau, 2010 to 2023



Source: EpiSurv

Figures 87 and 88 show the number of meningococcal disease cases across the Northern region between 2010 and 2023. Case numbers for 2023 in Tāmaki Makaurau were slightly above 2021 and 2022, although significantly lower than pre-COVID-19 levels. Te Tai Tokerau saw a small drop in meningococcal cases from six in 2022 to four in 2023.

There is usually a seasonal increase over the colder months but with small case numbers, this is not always observed.

Table 130: Age-specific incidence rates for meningococcal disease in Tāmaki Makaurau, 2023

Age group	Cases	Rate per 100,000
Age under 1	3	14.1
1 to 4	1	1.2
5 to 9	0	-
10 to 14	0	-
15 to 19	4	3.6
20 to 29	3	1.2
30 to 39	2	0.7
40 to 49	0	-
50 to 59	2	0.9
60 to 69	0	-
Age 70+	3	1.9
Total	18	1

Source: EpiSurv, Stats NZ

Table 131: Age-specific incidence rates for meningococcal disease in Te Tai Tokerau, 2023

Age group	Cases	Rate per 100,000
Age under 1	1	41.2
1 to 4	2	20.6
5 to 9	0	-
10 to 14	0	-
15 to 19	1	8.4
20 to 29	0	-
30 to 39	0	-
40 to 49	0	-
50 to 59	0	-
60 to 69	0	-
Age 70+	0	-
Total	4	2

Source: EpiSurv, Stats NZ

Tables 130 and 131 show the age group distribution of meningococcal disease cases for 2023. Across the Northern region four of the cases were aged under one (18.2% of cases).

Table 132: Ethnic group-specific incidence rates for meningococcal disease in Tāmaki Makaurau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	1	0.5
Pacific peoples	10	4.1
Asian	0	-
European and Other	6	0.8
Unknown	1	-
Total	18	1

Source: EpiSurv, Stats NZ

Table 133: Ethnic group-specific incidence rates for meningococcal disease in Te Tai Tokerau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	4	5.4
Pacific peoples	0	-
Asian	0	-
European and Other	0	-
Unknown	0	-
Total	4	2

Source: EpiSurv, Stats NZ

Tables 132 and 133 show that ethnic group-specific incidence rate in Tāmaki Makaurau was highest among Pacific peoples (4.1 cases per 100,000 population). One case identified as Māori, and six cases as European and Other. All cases in Te Tai Tokerau were of Māori ethnicity.

In the Northern region, infection was caused by a range of meningococcal serogroups. Eight of the 18 Tāmaki Makaurau cases (44%) were confirmed to be a result of serogroup B with three cases being serogroup B subtype P1.7-12,14 (Table 134). Group B was only identified in one of the four Te Tai Tokerau cases (Table 135).

Table 134: Meningococcal disease cases in Tāmaki Makaurau by serogroup and PorA subtype, 2023

PorA	B	C	W	Y	Not groupable	Unknown	Total
P1.7-12,14	3	0	0	0	0	0	3
P1.19-1,15	1	0	0	0	1	0	2
P1.5,2	0	2	0	0	0	0	2
P1.5-1,10-1	0	0	0	2	0	0	2
P1.5-2,10-4	0	0	0	2	0	0	2
P1.19,15	1	0	0	0	0	0	1
P1.7,4-46	1	0	0	0	0	0	1
P1.7-2,4	2	0	0	0	0	0	2
Not recorded	0	0	0	0	0	3	3
Total	8	2	0	4	1	3	18

Source: EpiSurv

Table 135: Meningococcal disease cases in Te Tai Tokerau by group and PorA subtype, 2023

PorA	B	Not groupable	Unknown	Total
P1.18,25-15	0	1	0	1
P1.7-2,4	1	0	0	1
Not recorded	0	0	2	2
Total	1	1	2	4

Source: EpiSurv

3.6.6 Mumps

Mumps is a viral infection that causes swelling in the glands and around the face. Mumps is spread through the air by breathing, coughing and sneezing, or through contact with infected saliva (i.e. kissing, sharing food and drink). People with the illness may also experience jaw pain, fever and headache, although a third of infected people may be asymptomatic.

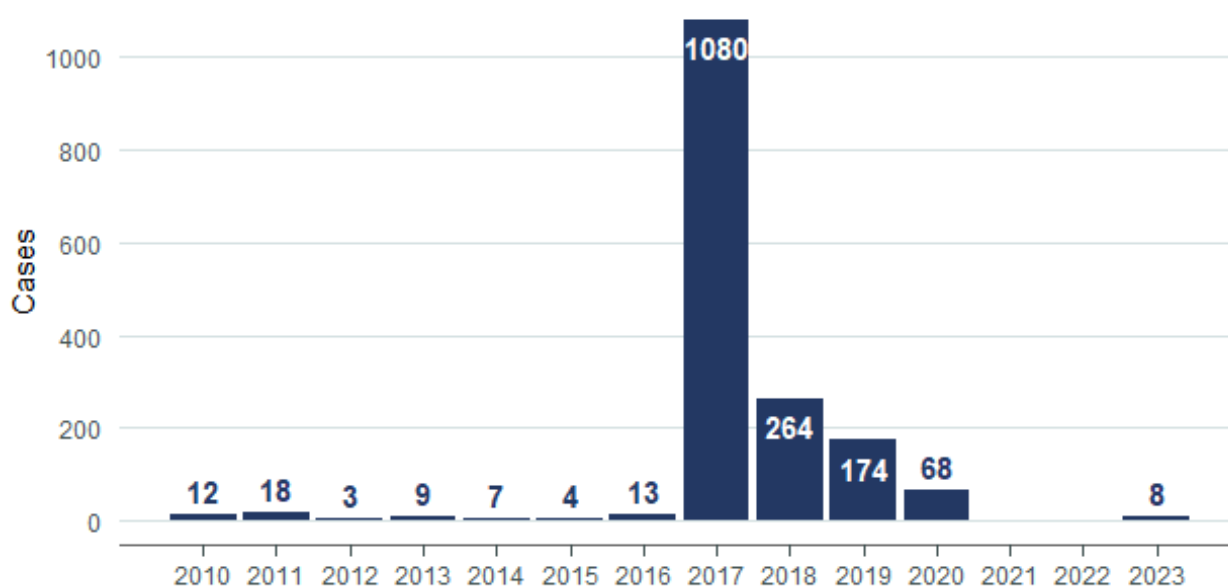
Complications of mumps include hearing loss, pancreatitis, encephalitis, meningitis, mastitis, orchitis and oophoritis.

Prior to the introduction of the measles-mumps-rubella (MMR) vaccine in NZ in 1990, mumps epidemics occurred every three to five years. The most recent outbreak in Tāmaki Makaurau occurred in 2017-18, with over 1,300 cases recorded.

In 2023, there were 145 mumps notifications with eight cases in Tāmaki Makaurau and 197 notifications with no confirmed cases in Te Tai Tokerau. Of the Tāmaki Makaurau cases, there was one hospitalisation and no deaths. The incidence rate for Tāmaki Makaurau was 0.45 cases per 100,000 population. The last case in Te Tai Tokerau was reported in 2019

Nationally, there were 16 cases and the incidence rate was 0.3 cases per 100,000 population.

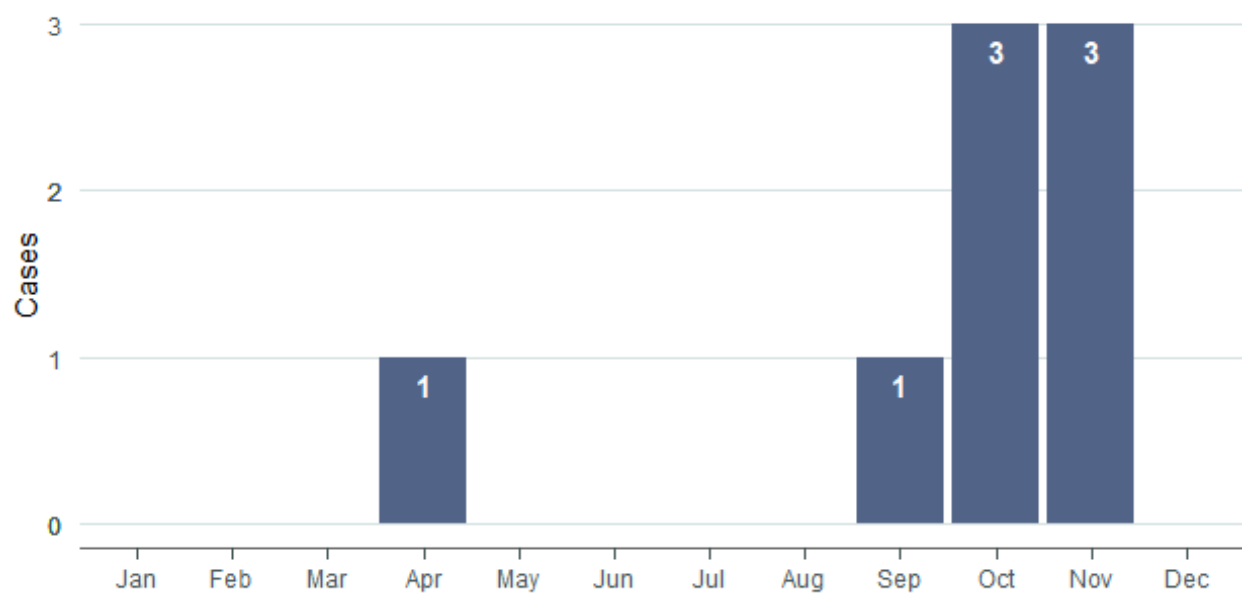
Figure 89: Mumps cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

Figure 89 shows the number of mumps cases in Tāmaki Makaurau between 2010 and 2023. There were record numbers in 2017 (1080 cases) reducing in 2018, 2019 and 2020. There were no cases in 2021 or 2022, likely attributable to COVID-19 restrictions. Cases increased again in 2023, with eight cases reported.

Figure 90: Mumps cases in Tāmaki Makaurau by month, 2023



Source: EpiSurv

In 2023, almost all the cases in Tāmaki Makaurau happened over spring with seven cases reported over that period.

Table 136: Ethnic group specific incidence rates of mumps cases in Tāmaki Makaurau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	0	-
Pacific peoples	0	-
Asian	5	0.9
European and Other	2	0.3
Unknown	1	-
Total	8	0.5

Source: EpiSurv

Table 136 shows the ethnic group distribution of mumps for 2023. Rates were highest among Asian people with 0.9 cases per 100,000 population.

Table 137: Age-specific incidence rates for mumps in Te Tai Tokerau, 2023

Age group	Cases	Rate per 100,000
Age under 1	0	-
1 to 4	0	-
5 to 9	1	0.9
10 to 14	0	-
15 to 19	0	-
20 to 29	1	0.4
30 to 39	6	2.1
40 to 49	0	-
50 to 59	0	-
60 to 69	0	-
Age 70+	0	-
Total	8	0.5

Source: EpiSurv

Table 137 shows the age group distribution of mumps cases for 2023. Incidence rates were highest among the '30 to 39' age group, with 2.1 cases per 100,000 population.

3.6.7 Pertussis

Pertussis (whooping cough) is a bacterial infection that causes a long coughing illness. Transmission usually occurs through respiratory, oral or nasal secretions, such as from coughing or sneezing, but may occur through indirect spread via contaminated objects.

Infection often involves a blocked or runny nose, fever, sneezing and coughing fits. The cough may be followed by vomiting, cyanosis or apnoea and a 'whoop' sound may be heard between these fits.

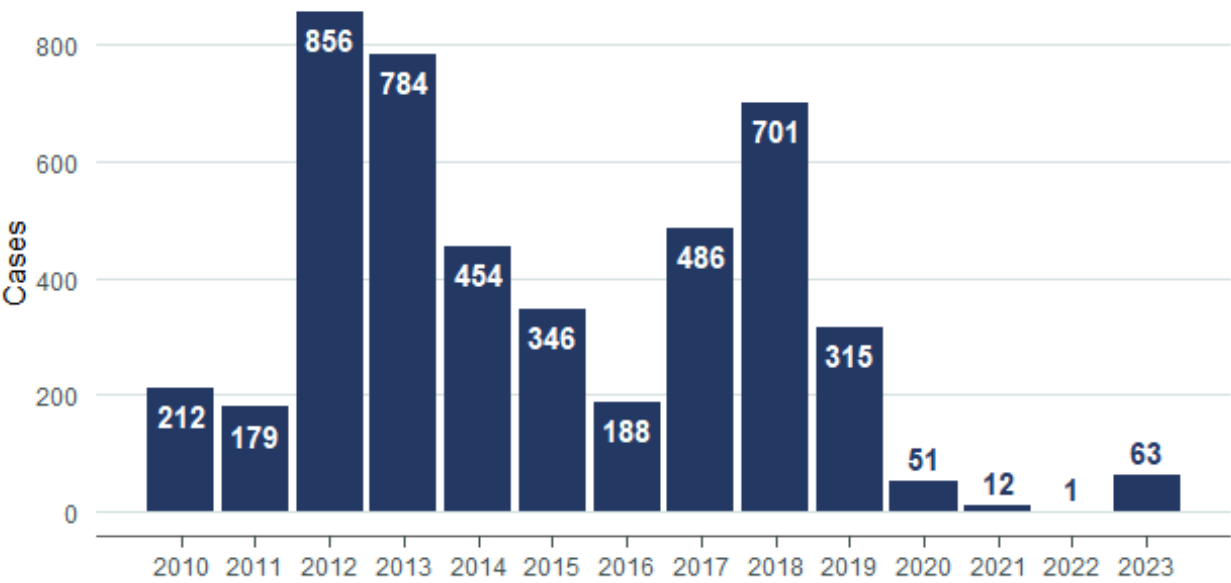
Pertussis infection can be very serious for babies and children, particularly those who are too young to be fully immunised.

All babies in NZ can be immunised against pertussis as part of their free childhood immunisations. Pregnant women should also be immunised as this protects the baby until it is old enough to be vaccinated.

In 2023, there were 163 pertussis notifications in Tāmaki Makaurau. Of these, there were 63 cases with 16 hospitalisations and one death. The incidence rate for Tāmaki Makaurau was 3.6 cases per 100,000 population. There were seven pertussis cases in Te Tai Tokerau, with two hospitalisations and no deaths. Nationally, there were 140 cases and the incidence rate was 2.7 cases per 100,000 population.

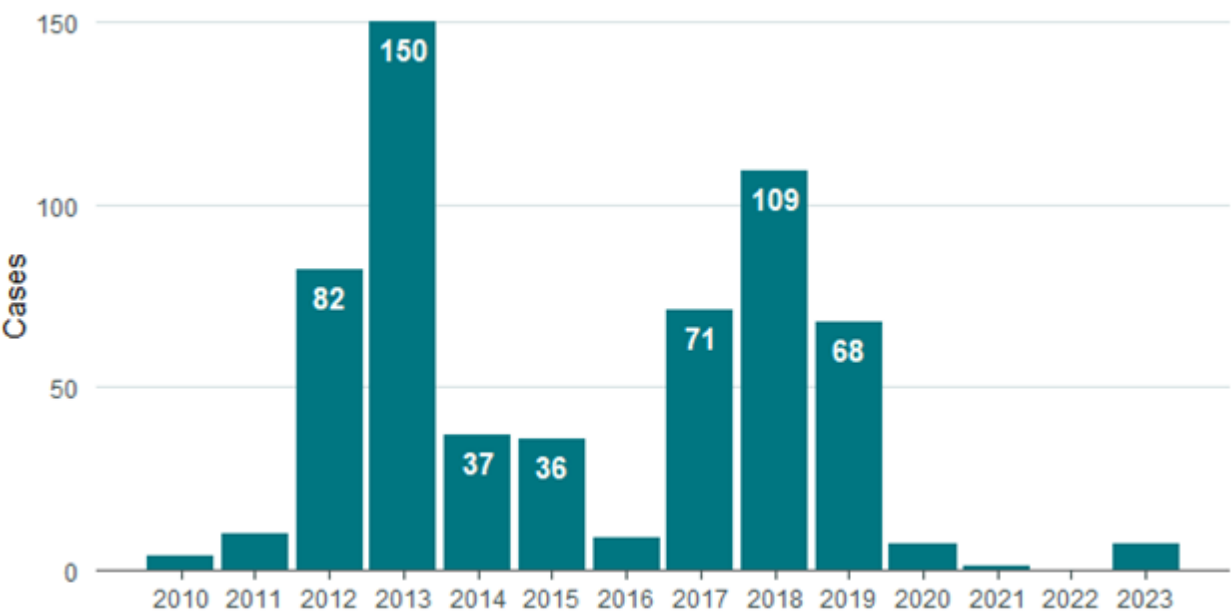
Please note monthly data, ethnicity group specific incidence rates and age-specific incidence rates are not provided this year for the seven Te Tai Tokerau cases.

Figure 91: Pertussis cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

Figure 92: Pertussis cases in Te Tai Tokerau, 2010 to 2023

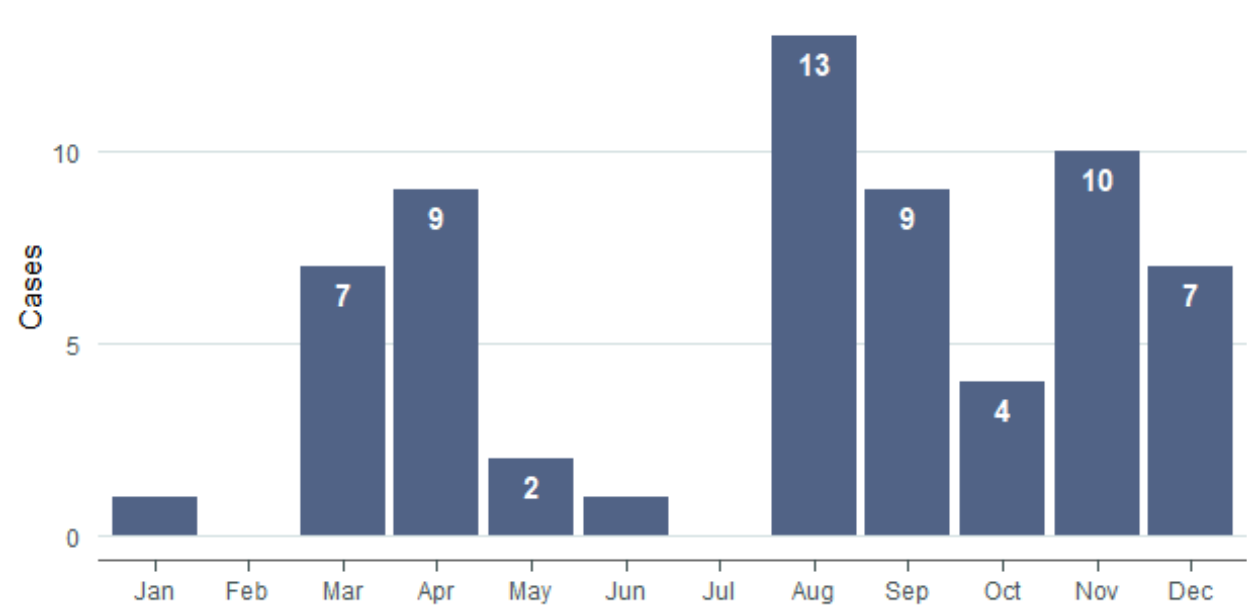


Source: EpiSurv

Figures 91 and 92 show the number of pertussis cases across the Northern region between 2010 and 2023. There were 63 cases in Tāmaki Makaurau, compared to 12 and 51 cases in 2021 and 2020, respectively. During 2022, only one case was recorded. These numbers are still significantly lower than pre-COVID-19 years when there were regularly several hundred cases per year. Te Tai

Tokerau also saw an increase with seven cases reported in 2023, the highest since pre-COVID-19 years.

Figure 93: Pertussis cases in Tāmaki Makaurau by month, 2023



Source: EpiSurv

In 2023, cases in Tāmaki Makaurau were more common over spring, with a peak of 23 cases between September and November (Figure 93).

Table 138: Ethnic group specific incidence rates of pertussis cases in Tāmaki Makaurau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	18	8.6
Pacific peoples	28	11.4
Asian	5	0.9
European and Other	11	1.5
Unknown	1	-
Total	63	3.6

Source: EpiSurv

Table 138 shows the ethnic group distribution of pertussis cases for 2023. Case rates were highest among Pacific peoples with 11.4 cases per 100,000 population, followed up by Māori with 8.6 cases per 100,000 population.

Table 139: Age-specific incidence rates for pertussis in Tāmaki Makaurau, 2023

Age group	Cases	Rate per 100,000
Age under 1	11	51.8
1 to 4	7	8.2
5 to 9	7	6.2
10 to 14	9	7.6
15 to 19	1	0.9
20 to 29	5	2.0
30 to 39	8	2.8
40 to 49	6	2.6
50 to 59	4	1.9
60 to 69	4	2.4
Age 70+	1	0.6
Total	63	3.6

Source: EpiSurv

Table 139 shows the age group distribution of pertussis cases for 2023. Case rates were highest among the 'under 1' age group, with 51.8 cases per 100,000 population.

3.6.8 Rubella

Rubella (also known as German measles) is a viral infection characterised by a generalised maculopapular rash and fever. Some people may also experience arthralgia, arthritis, lymphadenopathy or conjunctivitis. Transmission occurs through contact with respiratory droplets, such as through coughing and sneezing.

Up to 50% of people with rubella have no symptoms, while most others will only have symptoms for a few days. However, if caught during pregnancy, the virus can lead to serious birth defects, stillbirth or miscarriage.

Rubella immunisation was introduced into NZ in 1970, with the last large outbreak occurring in 1995-1996. The measles-mumps-rubella vaccine is free for all children and non-immune pregnant women.

There were no cases of rubella across the Northern region in 2023. While two suspected cases were notified in Tāmaki Makaurau, none met the definition for a confirmed or probable case. The last case in Tāmaki Makaurau was reported in 2019, while the last case in Te Tai Tokerau was reported in 2011.

3.7 Notifiable diseases not elsewhere classified

Table 140: Notifiable diseases not otherwise classified in Tāmaki Makaurau, 2023

Disease	Total notifications	Total cases (%)	Rate per 100,000	Hospitalisations (%)	Deaths (%)
Leprosy	2	2 (100.0)	0.11	0	0
Rheumatic fever (initial attack)	108	91 (84.3)	5.15	91 (100.0)	0
Rheumatic fever (recurrent)	8	3 (37.5)	0.17	3 (100.0)	0
TB disease (new case)	197	157 (79.7)	8.89	93 (59.2)	5 (3.2)
TB disease (relapse or reactivation)	15	9 (60.0)	0.51	6 (66.7)	0
TB infection (on preventive treatment)	1	0	-	-	-
Total*	331	262 (79.2)	-	-	-

Source: EpiSurv, Stats NZ

*Excluding COVID-19

In 2023, Tāmaki Makaurau received a total of 331 notifications for 'other bacterial diseases'. Of these, 262 (79.2%) met the criteria for a confirmed or probable case.

Table 141: Notifiable diseases not otherwise classified in Te Tai Tokerau, 2023

Disease	Total notifications	Total cases (%)	Rate per 100,000	Hospitalisations (%)	Deaths (%)
Leprosy	0	0	-	-	-
Rheumatic fever (initial attack)	3	3 (100)	1.5	100	0
Rheumatic fever (recurrent)	2	2 (100)	1	100	0
TB disease (new case)	5	5 (100)	2.5	60	0
TB disease (relapse or reactivation)	0	0	-	-	-
TB infection (on preventive treatment)	0	0	-	-	-
Total*	10	10	-	-	-

In 2023, Te Tai Tokerau received a total of ten notifications for notifiable diseases not elsewhere classified, excluding COVID-19 (Table 81). All ten met the criteria for a confirmed or probable case.

Of cases other than COVID-19, 50% were due to tuberculosis (TB), with five cases across three disease categories (new case, relapse or reactivation, on preventive treatment).

Most hospitalisations occurred for rheumatic fever (five cases hospitalised), and the highest rate of hospitalisation was also seen for rheumatic fever, with all five cases (100%) hospitalised. There were no deaths reported for Te Tai Tokerau.

3.7.1 COVID-19

COVID-19 is a viral infection caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2 coronavirus). Coronaviruses are a large family of viruses that cause illnesses such as the common cold.²⁸ Other diseases caused by coronaviruses include severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS). Like these, SARS-CoV-2 likely originated in animals and came to infect humans.

A COVID-19 pandemic was declared by WHO on 11 March 2020. The virus has since undergone genetic mutations over time, with some of the newer variants spreading more easily than the original virus. On 5 May 2023, the World Health Organisation declared that COVID-19 was no longer a global health emergency. The COVID-19 Public Health Response (Self-isolation Requirements) Order 2022 and COVID-19 Public Health Response (Masks) Order

²⁸ Te Whatu Ora - Health New Zealand. (2022). *What is COVID-19*. Retrieved 11 May, 2023, from <https://covid19.govt.nz/prepare-and-stay-safe/about-covid-19/what-is-covid-19>.

2022 were revoked on 15 August 2023. This removed the requirement to wear masks in healthcare facilities as well as the previous seven-day isolation requirement for positive cases. SARS-CoV-2 is transmitted through contact with respiratory particles (large droplets or smaller aerosols) via breathing, speaking, coughing or sneezing. While most people with COVID-19 experience a mild flu-like illness, older people, ethnic minorities and those with underlying medical conditions are at higher risk of severe illness from the virus. Some people who have had the virus suffer health impacts longer than a few weeks or months. This is commonly referred to as 'long COVID'.

In 2023, COVID-19 cases accounted for the largest number of notifications in NPHS Northern Region- this was similar to previous years. Most cases were self-reported by RAT tests and were classified as probable cases. People hospitalised with COVID-19 and who had a PCR test were classified as confirmed cases. In 2023, the most useful information to understand COVID-19 trends was a combination of hospitalisation data, wastewater analysis and whole-genome sequencing (to understand genomic shift). These data are reported elsewhere and not included in this report. For 2023 reporting please refer to the **Health NZ COVID-19 Trends and Insights Dashboard**.

3.7.2 Leprosy

Leprosy, also known as Hansen's disease, is a chronic disease caused by the bacterium *Mycobacterium leprae*. Transmission most likely occurs through close contact with an infected person's respiratory secretions or skin lesions. Transplacental transmission is thought to be responsible for cases under one year of age.

The disease is characterised by anaesthetic (numb) skin lesions and nerve enlargements, with the most severe forms involving widespread papules and nodules around the face and ears as well as peripheral neuropathy in one or more nerves.

All cases of leprosy in NZ have occurred in individuals who have contracted the disease overseas.

In 2023, there were two leprosy cases in Tāmaki Makaurau. There were no notifications or cases of leprosy in Te Tai Tokerau. Of the Tāmaki Makaurau cases, neither were hospitalised or died. Nationally, there were four cases notified.

3.7.3 Rheumatic fever

Rheumatic fever is an autoimmune consequence of a throat infection caused by *Streptococcus pyogenes* (also known as Group A *Streptococcus* or GAS). While most 'strep throat' infections resolve on their own, a small number of people will develop rheumatic fever if the infection remains untreated.²⁹

²⁹ Health NZ. (2022). *Rheumatic Fever*. Retrieved 29 May 2023, from <https://www.tewhaturora.govt.nz/keeping-well/health-info-for-public/diseases-and-conditions/rheumatic-fever/>.

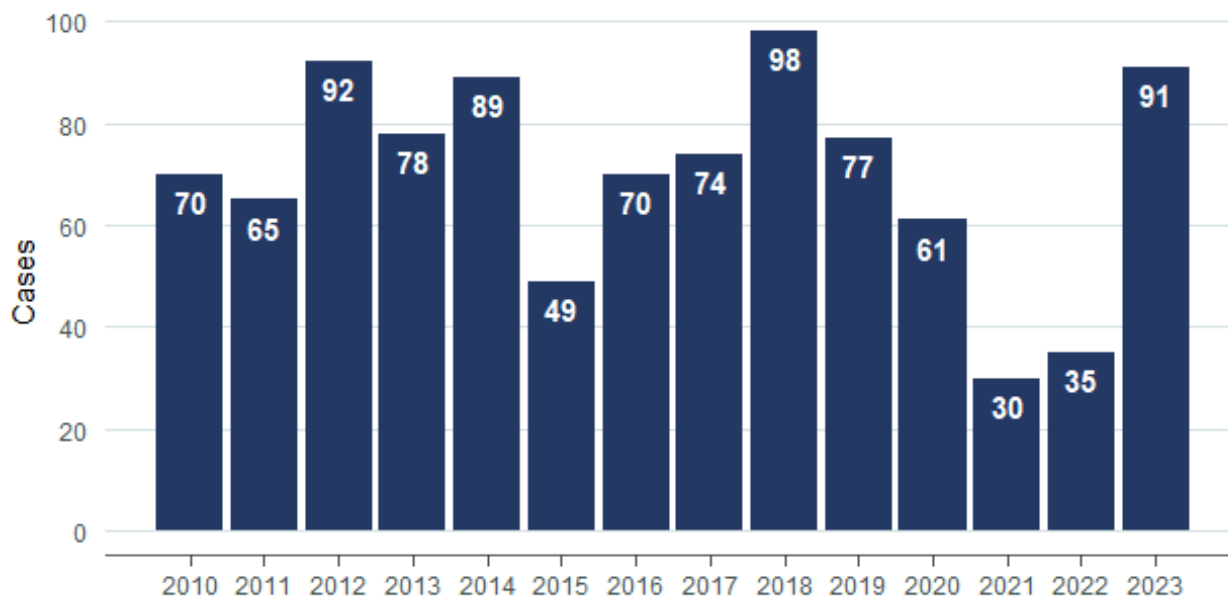
Acute infection usually develops several weeks following a sore throat and may include fever, rash (erythema marginatum), subcutaneous nodules, arthritis/arthralgia or unusual jerky movements (chorea). Even one attack of rheumatic fever can lead to rheumatic heart disease, which involves permanent scarring of the heart valves.

The incidence of rheumatic fever in NZ is higher than in comparable countries, with Māori and Pacific children and young people at the highest risk of disease.

Recurrent rheumatic fever (any episode of acute rheumatic fever after the first) is reported separately as it is an indicator of the quality of services and healthcare for people who have had an initial attack.

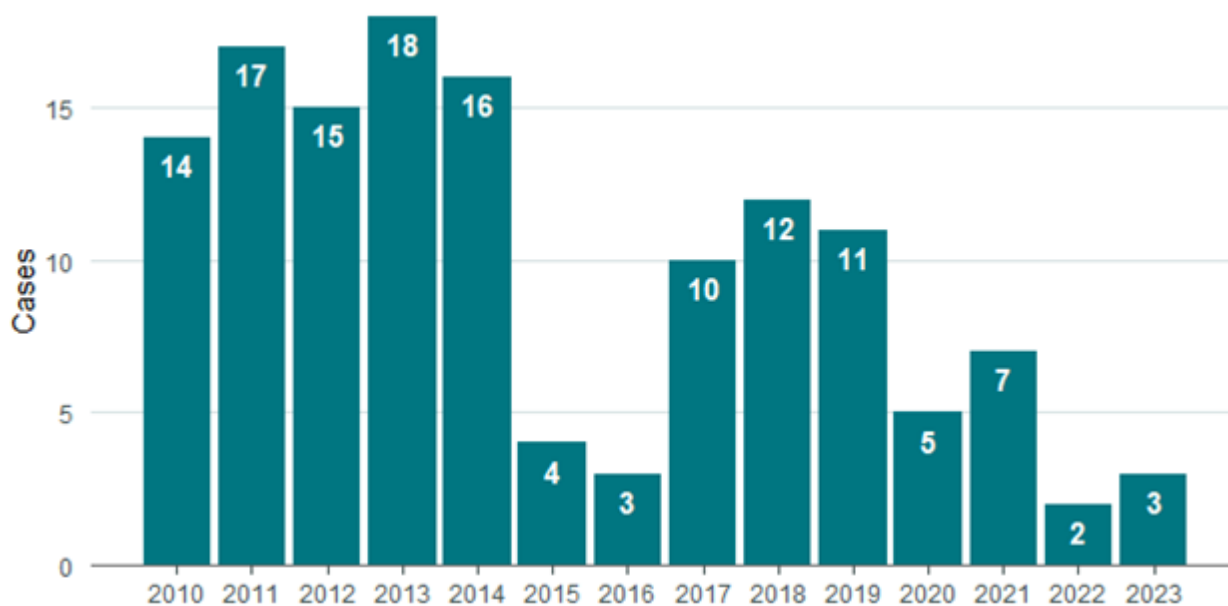
In 2023 there were 108 acute rheumatic fever notifications in Tāmaki Makaurau. Of these, there were 91 acute rheumatic fever cases (confirmed or probable). All were hospitalised and there were no deaths. There were three acute rheumatic fever cases in Te Tai Tokerau in 2023, with all requiring hospitalisation with no deaths. The incidence rate for Tāmaki Makaurau was 5.2 cases per 100,000 population, while the incidence rate for Te Tai Tokerau was 1.5 cases per 100,000. Nationally, there were 150 cases (2.9 cases per 100,000 population).

Figure 94: Rheumatic fever (initial attack) cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

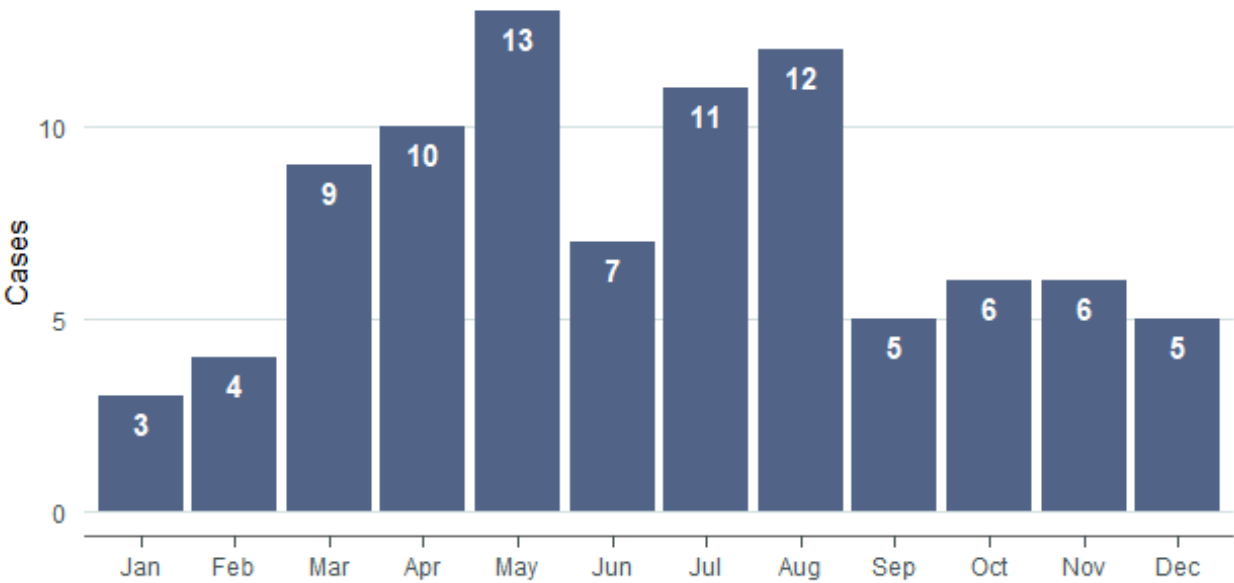
Figure 95: Rheumatic fever (initial attack) cases in Te Tai Tokerau, 2010 to 2023



Source: EpiSurv

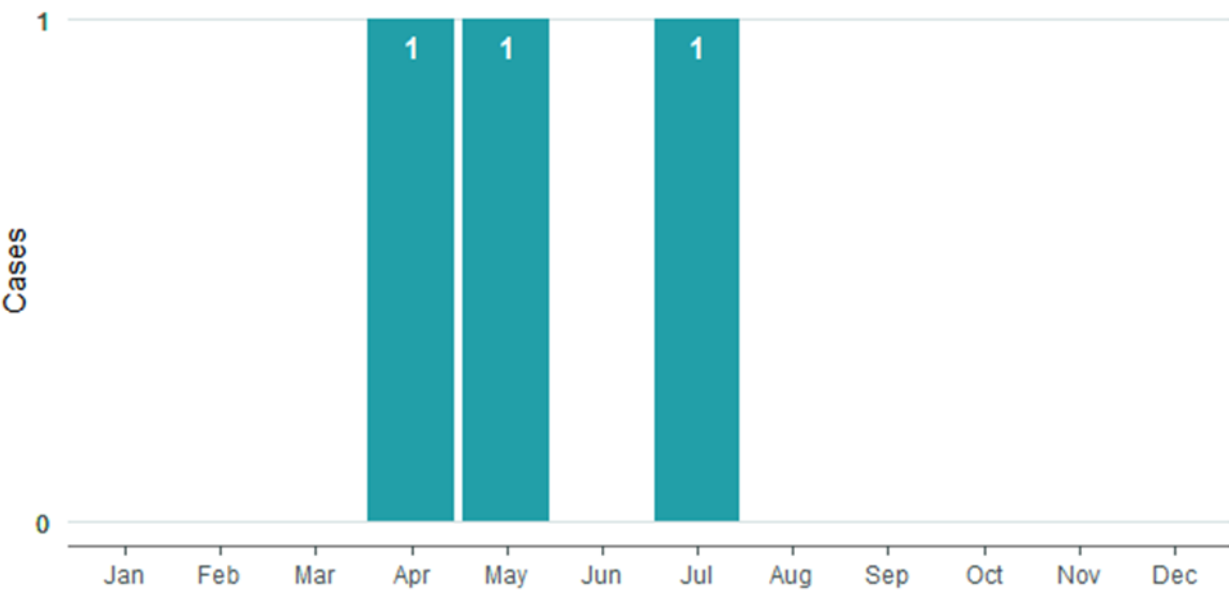
Figures 94 and 95 show the number of rheumatic fever (initial attack) cases across the Northern region between 2010 and 2023. Case numbers in Tāmaki Makaurau were markedly higher, with 91 cases in 2023 compared to 35 cases in 2022, reaching levels similar to pre-COVID-19 years. Cases in Te Tai Tokerau increased slightly from the year before, but were still significantly below pre-COVID-19 levels.

Figure 96: Rheumatic fever (initial attack) cases in Tāmaki Makaurau by month, 2023



Source: EpiSurv

Figure 97: Rheumatic fever (initial attack) cases in Te Tai Tokerau by month, 2023



Source: EpiSurv

In 2023, cases were more common in autumn and winter, with 62 cases reported in Tāmaki Makaurau between March and August (Figure 96).

Table 142: Incidence rates of acute rheumatic fever by health district, 2023

Health district	Cases	Rate per 100,000
Northland	3	1.5
Auckland	10	2.0
Counties Manukau	69	11.0
Waitematā	12	1.8
Total (Auckland)	91	5.2

Source: EpiSurv

Table 142 shows the incidence rate by health district in the Northern region. Of the Tāmaki Makaurau cases, 75.8% resided in Counties Manukau where there was an incident rate of 11 cases per 100,000 population.

Auckland and Waitematā incidence rates were significantly lower, with 2.0 and 1.8 cases per 100,000 population respectively. Northland had 1.5 cases per 100,000 population.

Table 143: Rheumatic fever (initial attack) cases in Tāmaki Makaurau by age group and sex, 2023

Age group	Female	Male	Cases	Rate per 100,000
Age under 1	0	0	0	-
1 to 4	0	0	0	-
5 to 9	6	19	25	22
10 to 14	10	20	30	25.3
15 to 19	2	7	9	8.1
20 to 29	13	10	23	9.3
30 to 39	1	0	1	0.3
40 to 49	0	3	3	1.3
50 to 59	0	0	0	-
60 to 69	0	0	0	-
Age 70+	0	0	0	-
Total	32	59	91	5.2

Source: EpiSurv, Stats NZ

Table 144: Rheumatic fever (initial attack) cases in Te Tai Tokerau by age group and sex, 2023

Age group	Female	Male	Cases	Rate per 100,000
Age under 1	0	0	0	-
1 to 4	0	0	0	-
5 to 9	0	0	0	-
10 to 14	0	1	1	7
15 to 19	2	0	2	16.7
20 to 29	0	0	0	-
30 to 39	0	0	0	-
40 to 49	0	0	0	-
50 to 59	0	0	0	-
60 to 69	0	0	0	-
Age 70+	0	0	0	-
Total	2	1	3	1.5

Source: EpiSurv, Stats NZ

Tables 143 and 144 show the age and ethnic group distribution of rheumatic fever (initial attack) cases for 2023 across the Northern region. Cases in Tāmaki Makaurau were highest among the '10 to 14' and '9 to 10' age groups, with 25.3 and 22 cases per 100,000 population, respectively. In Tāmaki Makaurau, the number of male cases was nearly double that of females. In Te Tai Tokerau, cases were highest among the '15 to 19' group with 16.7 cases per 100,000 population, and '10 to 14' group, with 7.0 cases per 100,000 population.

In Tāmaki Makaurau, ethnic group-specific incidence rates were highest among Pacific peoples followed by Māori, with 26.8 and 11.4 cases per 100,000 population, respectively. Of the Pacific cases, 45 identified as Samoan, 26 as Tongan, six as Cook Islands Māori and one as Fijian (Tables 145 and 147). In Te Tai Tokerau, all cases were of Māori ethnicity, with an incidence of 4.0 cases per 100,000 population (Table 146).

Table 145: Ethnic group-specific incidence rates for rheumatic fever (initial attack) in Tāmaki Makaurau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	24	11.4
Pacific peoples	66	26.8
Asian	0	-
European and Other	1	0.1
Unknown	0	-
Total	91	5.2

Source: EpiSurv, Stats NZ

Table 146: Ethnic group-specific incidence rates for rheumatic fever (initial attack) Te Tai Tokerau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	3	4
Pacific peoples	0	-
Asian	0	-
European and Other	0	-
Unknown	0	-
Total	3	1.5

Source: EpiSurv, Stats NZ

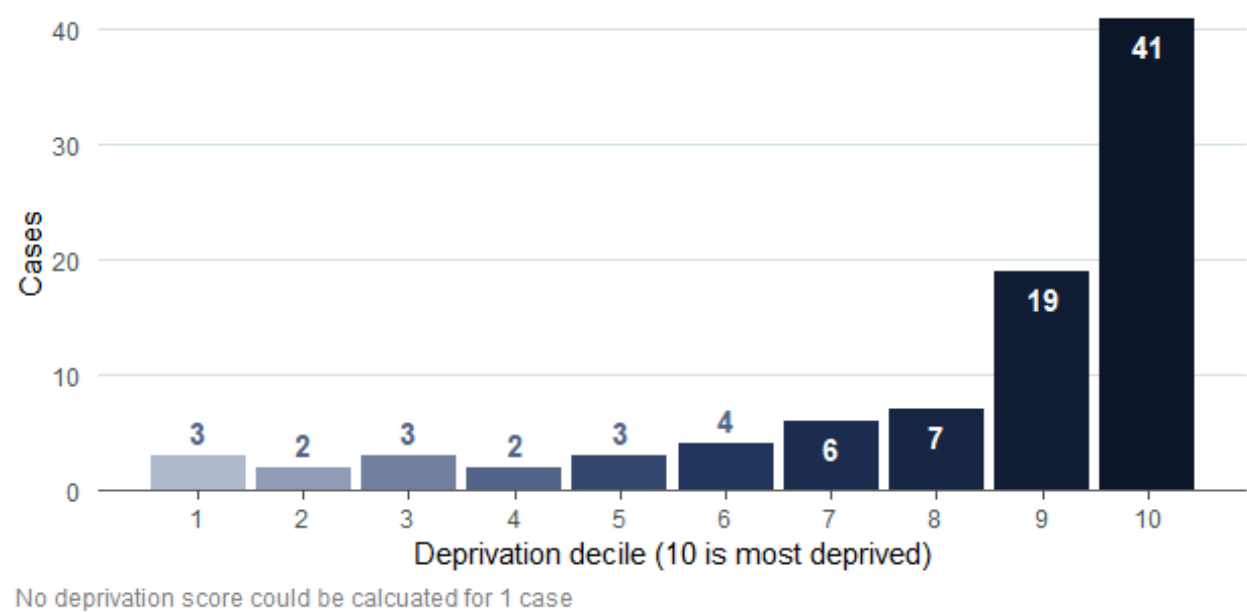
Table 147: Detailed ethnicity counts for rheumatic fever (initial attack) in Tāmaki Makaurau, 2023

Detailed ethnicity	Cases
Samoan	45
Tongan	26
Māori	24
Cook Islands Māori	6
NZ European	4
Fijian	1
Filipino	1
Niuean	1
Tokelauan	1

Source: EpiSurv

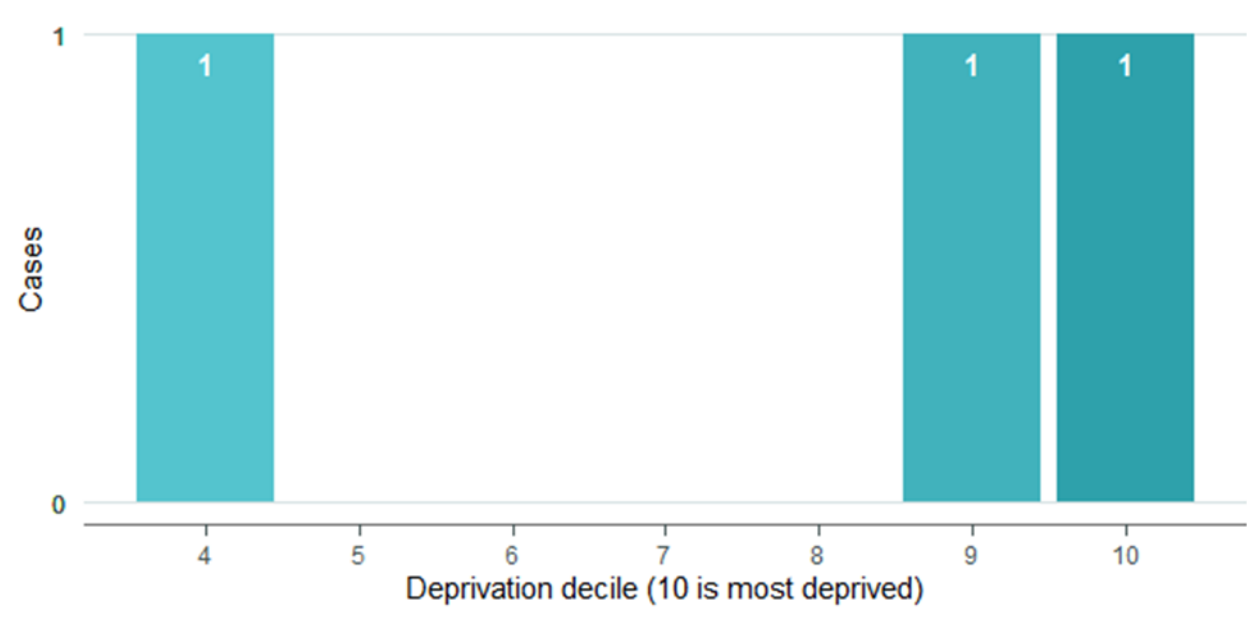
Figure 98 shows the rheumatic fever (initial attack) cases for Tāmaki Makaurau by deprivation index. This shows rheumatic fever is more common in areas of greatest deprivation.

Figure 98: Rheumatic fever (initial attack) cases by deprivation index in Tāmaki Makaurau, 2023



Source: EpiSurv, Stats NZ

Figure 99: Rheumatic fever (initial attack) cases by deprivation index in Te Tai Tokerau, 2023

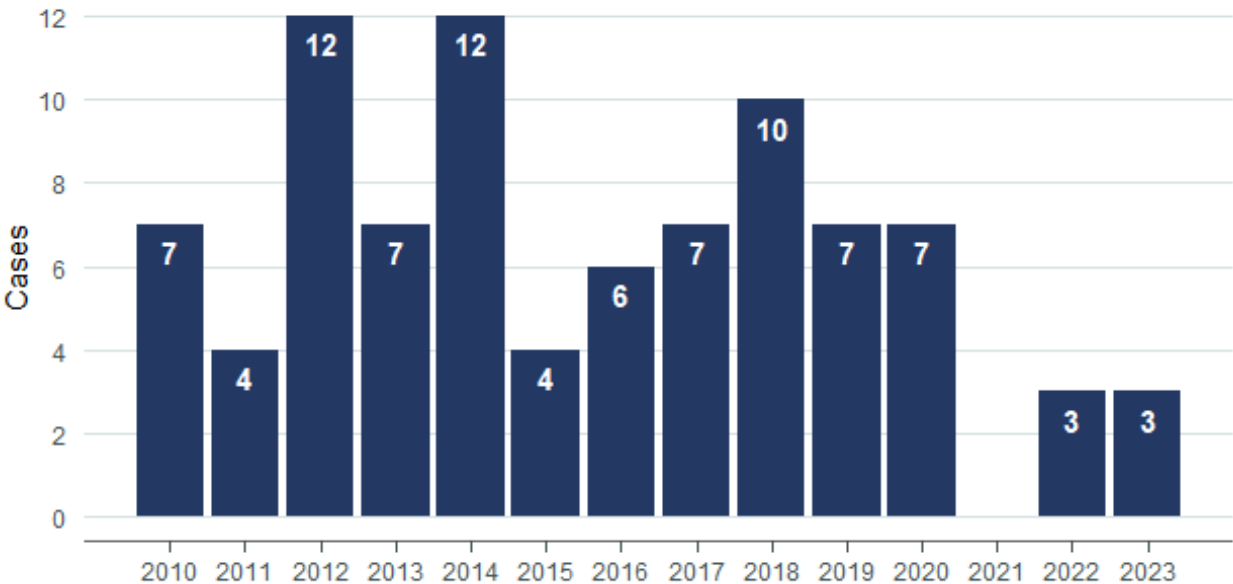


Source: EpiSurv, Stats NZ

3.7.4 Rheumatic fever (recurrent)

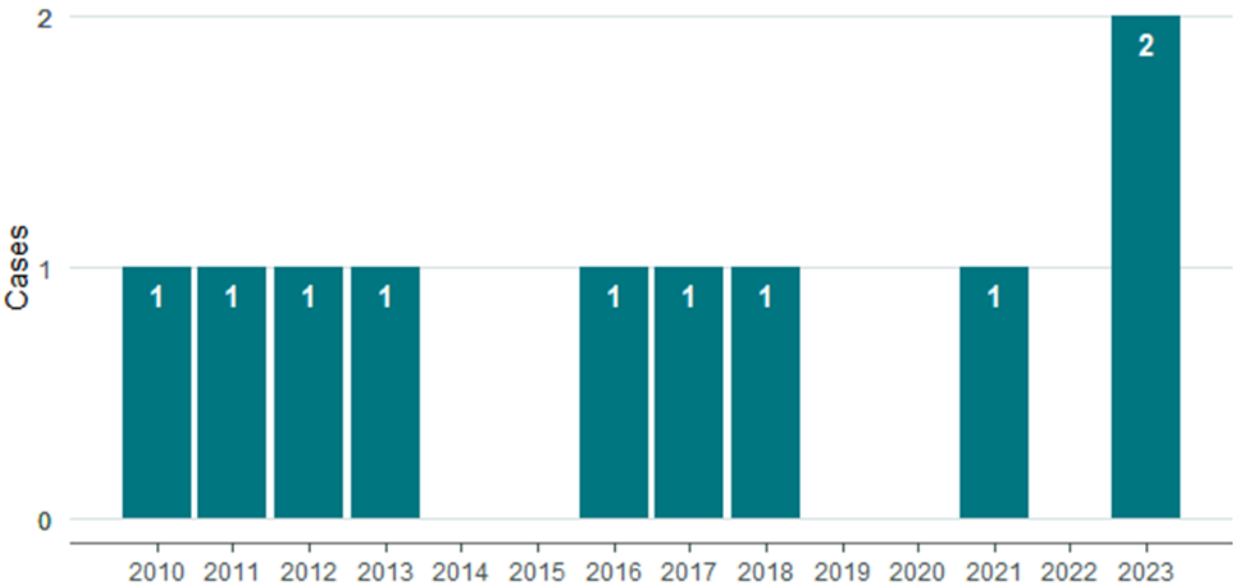
In 2023 there were eight rheumatic fever (recurrent) notifications in Tāmaki Makaurau. Of these, there were three confirmed or probable rheumatic fever (recurrent) cases. There were two rheumatic fever (recurrent) cases in Te Tai Tokerau. Nationally, there were eight cases.

Figure 100: Recurrent rheumatic fever cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

Figure 101: Recurrent rheumatic fever cases in Te Tai Tokerau, 2010 to 2023



Source: EpiSurv

Figures 100 and 101 show the number of recurrent rheumatic fever across the Northern region between 2010 and 2023. In Tāmaki Makaurau, case numbers for 2023 were similar to 2022 but

well below 2020 and pre-COVID-19 levels. In Te Tai Tokerau, while there were no cases in 2022, two cases were reported in 2023. This was the highest number of cases since 2010.

Table 148: Age-specific incidence rates for recurrent rheumatic fever in Tāmaki Makaurau, 2023

Age group	Cases	Rate per 100,000
Age under 1	0	-
1 to 4	0	-
5 to 9	1	0.9
10 to 14	0	-
15 to 19	0	-
20 to 29	0	-
30 to 39	2	0.7
40 to 49	0	-
50 to 59	0	-
60 to 69	0	-
Age 70+	0	-
Total	3	0.2

Source: EpiSurv, Stats NZ

Table 149: Age-specific incidence rates for recurrent rheumatic fever in Te Tai Tokerau, 2023

Age group	Cases	Rate per 100,000
Age under 1	0	-
1 to 4	0	-
5 to 9	0	-
10 to 14	0	-
15 to 19	0	-
20 to 29	2	10.2
30 to 39	0	-
40 to 49	0	-
50 to 59	0	-
60 to 69	0	-
Age 70+	0	-
Total	2	1

Source: EpiSurv, Stats NZ

Tables 148 and 149 show the age distribution of recurrent rheumatic fever cases for 2023 across the Northern region. In Tāmaki Makaurau, cases were highest among the ‘5 to 9’ and ‘30 to 39’ age groups, with 0.9 and 0.7 cases per 100,000 population, respectively. In Te Tai Tokerau, all the cases were among the ‘20 to 29’ age group with an incidence of 10.2 cases per 100,000 population.

With regards to ethnic group-specific incidence rates (Tables 150 and 151), all cases across the Northern region were of Māori ethnicity, with 1.4 and 2.7 cases per 100,000 population, for Tāmaki Makaurau and Te Tai Tokerau, respectively.

Table 150: Ethnic group-specific incidence rates for recurrent rheumatic fever in Tāmaki Makaurau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	3	1.4
Pacific peoples	0	-
Asian	0	-
European and Other	0	-
Unknown	0	-
Total	3	0.2

Source: EpiSurv, Stats NZ

Table 151: Ethnic group-specific incidence rates for recurrent rheumatic fever Te Tai Tokerau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	2	2.7
Pacific peoples	0	-
Asian	0	-
European and Other	0	-
Unknown	0	-
Total	2	1

Source: EpiSurv, Stats NZ

3.7.5 Tuberculosis disease

Tuberculosis (TB) is a bacterial infection caused by *Mycobacterium tuberculosis* complex, including *M. tuberculosis* or *M. bovis*. TB is spread through the air when a person with active TB disease of the lungs or throat coughs, sneezes or spits³⁰. When other people breathe in

³⁰ NSW Health. (2022). *Tuberculosis*. Retrieved 15 October 2024, from <https://www.health.nsw.gov.au/Infectious/factsheets/Pages/tuberculosis.aspx>.

these germs they can be infected. Most people are exposed to TB through people they spend a lot of time with, such as a family member or friend. Only 20-30% of people who are exposed to the bacteria will become infected.

In some situations, an initial TB infection can progress to active TB within six months, usually in children under five years or immunocompromised people. In most people with TB infection the body's defences control the germs which can stay alive in a dormant or inactive state. This is known as latent TB infection. People with latent TB infection are not infectious and cannot spread TB to others.

In some people (around 10% of those infected), TB bacteria overcome the body's immune defences, resulting in progression from latent TB infection to active TB disease. Around half of these people will develop active TB disease within two years, while the other half will develop active disease many years later. Risk factors for progression include ageing, chronic illnesses including HIV, immunosuppression and stressful events.

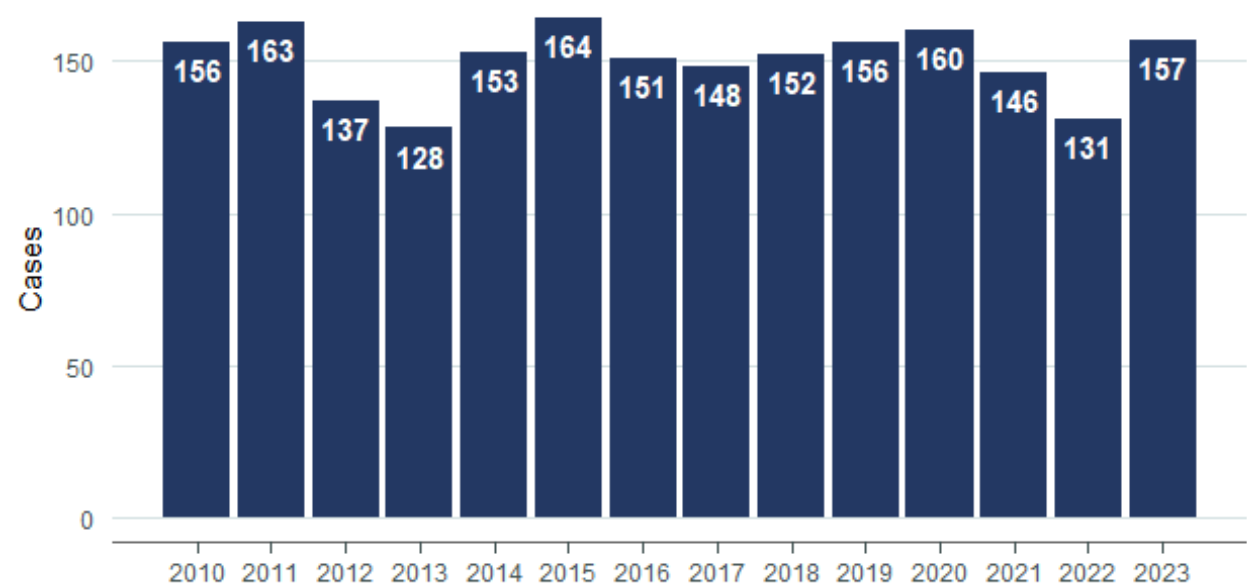
Active TB disease most commonly affects the lungs, but can also affect the brain, lymph nodes, bones, joints and kidneys. Only people with TB disease of the lungs or throat are infectious to others. Symptoms of active TB disease include cough, haemoptysis, fevers, night sweats, weight loss, lethargy, anorexia and pain or swelling in the affected area.

Active TB disease is treated with a combination of antibiotics for at least six months. Those with TB disease of the lungs and throat are isolated until they are no longer infectious. Those with latent TB infection may be offered a course of preventive treatment.

For surveillance purposes, TB disease is classified into four groups: new case, relapse or reactivation, latent TB infection (LTBI) or old disease on preventive treatment. 'New case' refers to active TB in a person who has never been treated for TB before or has active disease from a new genotype. 'Relapse or reactivation' refers to active TB in a person whose tuberculosis has been non-infectious or quiescent following full, partial or no treatment. LTBI refers to a person with a positive Mantoux test, Mantoux conversion or positive interferon-gamma release assay (IGRA) test with no evidence of active disease. Old disease on preventive treatment refers to a person who may have had active disease in the past, and treatment is given preventatively because there is concern about the possibility of relapse.

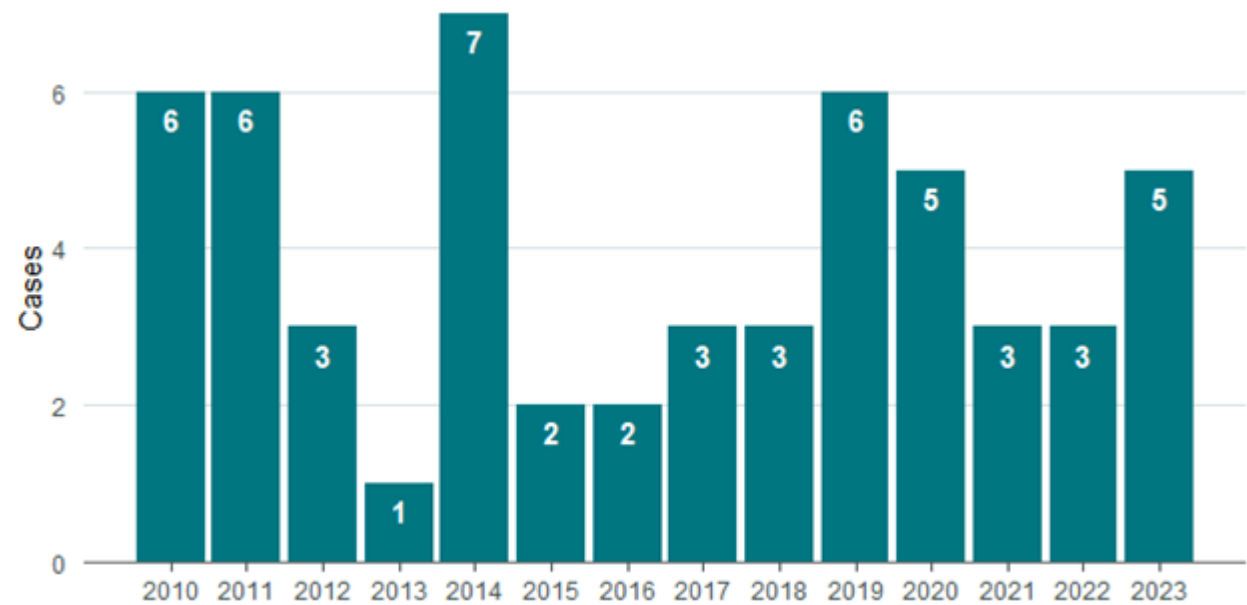
In 2023 there were 197 new tuberculosis notifications in Tāmaki Makaurau. Of these, there were 157 (8.9 cases per 100,000 population) new tuberculosis cases, with 93 hospitalisations and five deaths. There were five (2.5 cases per 100,000 population) new tuberculosis cases in Te Tai Tokerau with three hospitalisations and no deaths. Nationally, there were 292 cases (5.6 cases per 100,000 population).

Figure 102: New TB cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

Figure 103: New TB cases in Te Tai Tokerau, 2010 to 2023



Source: EpiSurv

Figures 102 and 103 show the number of new TB cases across the Northern region between 2010 and 2023. Case numbers for 2023 were slightly higher than 2022 and 2021 in Tāmaki Makaurau, and similar to pre-COVID-19 levels, with an average of 150 cases reported per year for the preceding 12 years. In Te Tai Tokerau cases have fluctuated between one and seven cases since 2010.

Table 152: Tuberculosis type for new Tāmaki Makaurau cases, 2023

TB type	Cases
Pulmonary	55
Pulmonary and extrapulmonary	33
Extrapulmonary	69

Source: EpiSurv

Table 153: Tuberculosis type for new Te Tai Tokerau cases, 2023

TB type	Case
Pulmonary	3
Pulmonary and extrapulmonary	0
Extrapulmonary	2
Total	5

Source: EpiSurv

In 2023, 55 (35%) cases in Tāmaki Makaurau were pulmonary only, 69 (43.9%) were extrapulmonary only and 33 (21%) were both (Table 152). In Te Tai Tokerau, three (60%) cases were pulmonary only, and two (40%) were extrapulmonary, with no combined cases (Table 153).

Table 154: Age-specific incidence rates for new TB cases in Tāmaki Makaurau, 2023

Age group	Cases	Rate per 100,000
Age under 1	0	-
1 to 4	3	3.5
5 to 9	4	3.5
10 to 14	2	1.7
15 to 19	8	7.2
20 to 29	25	10.1
30 to 39	32	11
40 to 49	21	9
50 to 59	21	9.7
60 to 69	21	12.5
Age 70+	20	12.4
Total	157	8.9

Source: EpiSurv, Stats NZ

Table 155: Age-specific incidence rates for new TB cases in Te Tai Tokerau, 2023

Age group	Cases	Rate per 100,000
Age under 1	0	-
1 to 4	0	-
5 to 9	0	-
10 to 14	0	-
15 to 19	0	-
20 to 29	2	10.2
30 to 39	1	4.1
40 to 49	1	4.6
50 to 59	0	-
60 to 69	1	3.5
Age 70+	0	-
Total	5	2.5

Source: EpiSurv, Stats NZ

Tables 154 and 155 show the age group distribution of new TB cases across the Northern region. In Tāmaki Makaurau, cases were highest among the '60 to 69' and '70+' age groups, with 12.5 and 12.4 cases per 100,000 population, respectively. In Te Tai Tokerau, cases were highest among the '20 to 29' and '40 to 49' age groups, with 10.2 and 4.6 cases per 100,000 population, respectively.

Table 156: Ethnic group-specific incidence rates for new TB in Tāmaki Makaurau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	4	1.9
Pacific peoples	27	11
Asian	115	23.5
European and Other	11	1.4
Unknown	0	-
Total	157	9.2

Source: EpiSurv, Stats NZ

Table 157: Ethnic group-specific incidence rates for new TB in Te Tai Tokerau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	1	1.3
Pacific peoples	0	-
Asian	2	20.9
European and Other	2	1.7
Unknown	0	-
Total	5	2.4

Source: EpiSurv, Stats NZ

Table 158: Detailed ethnicity counts for TB in Tāmaki Makaurau, 2023

Detailed ethnicity	Cases
Indian	47
Filipino	28
Chinese	13
Samoan	9
Cook Islands Māori	7
Tongan	5
Vietnamese	5
Ellice Islander	4
Gilbertese	4
I-Kiribati	4
Māori	4
Tuvalu Islander	4
Cambodian	3
Indonesian	3
NZ European	3
Afghani	2
Brazilian	2
Fiji Indian	2
Korean	2
Nepalese	2
Somali	2
Thai	2
Other*	13

* Other consists of 13 ethnicities with one case each

Source: EpiSurv, Stats NZ

In Tāmaki Makaurau, ethnic group-specific incidence rates (Table 156) were highest among Asian people with 23.5 per 100,000 population. Detailed ethnicity information for Tāmaki Makaurau is shown in Table 158, with the most commonly reported ethnicities being Indian (47 cases), Filipino (28 cases) and Chinese (13 cases).

In Te Tai Tokerau, ethnic group-specific incidence rates (Table 157) were highest among Asian people as well, with 22 cases per 100,000 population.

Of the 157 new TB cases in Tāmaki Makaurau, 142 (90.4 %) were born outside of NZ. The most common countries of birth were India (48 cases), Philippines (29 cases) and China (11 cases, (Table 159). Of the five new TB cases in Te Tai Tokerau, four (80%) were born outside of NZ.

Table 159: Birth countries of new TB cases in Tāmaki Makaurau, 2023

Birth country	Cases	Percent
India	48	33.8%
Philippines	29	20.4%
China	11	7.7%
Samoa	7	4.9%
Cook Islands	5	3.5%
Tonga	4	2.8%
Vietnam	4	2.8%
Cambodia	3	2.1%
Fiji	3	2.1%
Indonesia	3	2.1%
Afghanistan	2	1.4%
Brazil	2	1.4%
Malaysia	2	1.4%
Nepal	2	1.4%
Somalia	2	1.4%
South Korea	2	1.4%
Thailand	2	1.4%

Source: EpiSurv

*Other consists of 11 countries with one case each

Table 160: Birth countries for new tuberculosis cases in Te Tai Tokerau, 2023

Birth country	Cases	Percent
South Africa	2	50%
Other*	2	50%
Total	4	100%

* Other consists of two countries with one case each

Tables 161 and 162 show the ethnic group distribution of NZ-born new TB cases across the Northern region. For new TB cases born in NZ in Tāmaki Makaurau (16 cases, 10.1%), the largest proportion of notifications occurred among Pacific peoples (56.25%), followed by Māori (25%).

In Te Tai Tokerau there was only one NZ-born case, of Māori ethnicity.

Table 161: Ethnic group specific incidence rates for NZ-born new TB cases in Tāmaki Makaurau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	4	1.9
Pacific peoples	9	3.7
Asian	2	0.4
European and Other	1	0.1
Unknown	0	-
Total	16	0.9

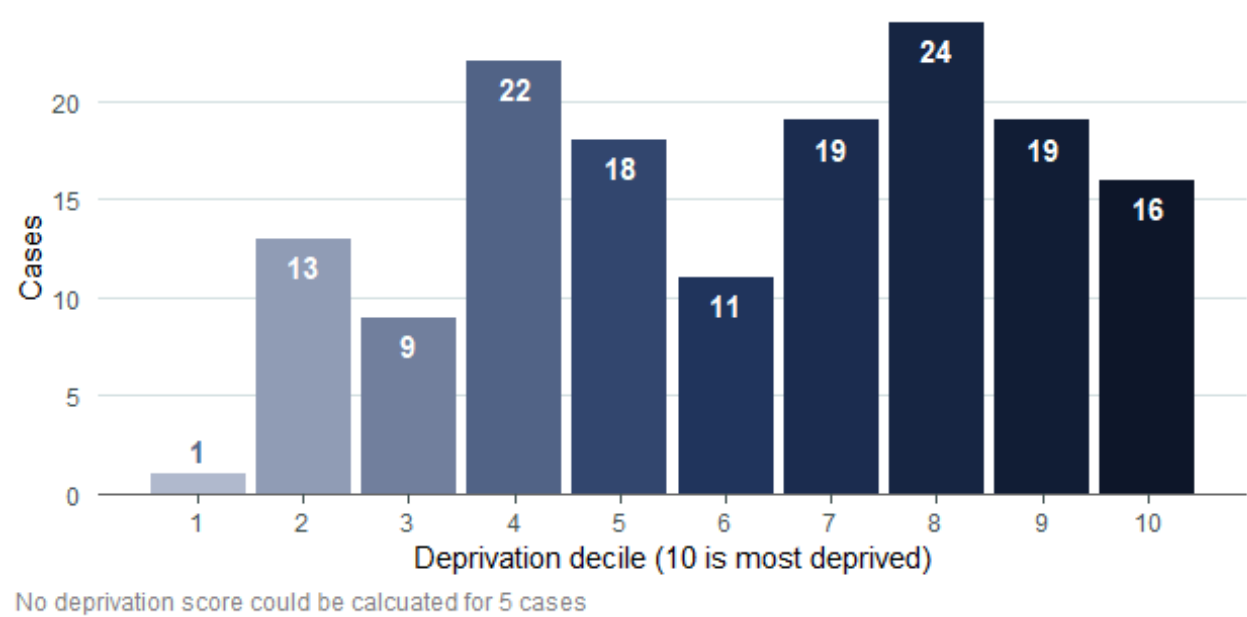
Source: EpiSurv

Table 162: Ethnic group specific incidence rates for NZ-born new TB cases in Te Tai Tokerau, 2023

Ethnicity	Cases	Rate per 100,000
Māori	1	1.3
Pacific peoples	0	-
Asian	0	-
European and Other	0	-
Unknown	0	-
Total	1	0.5

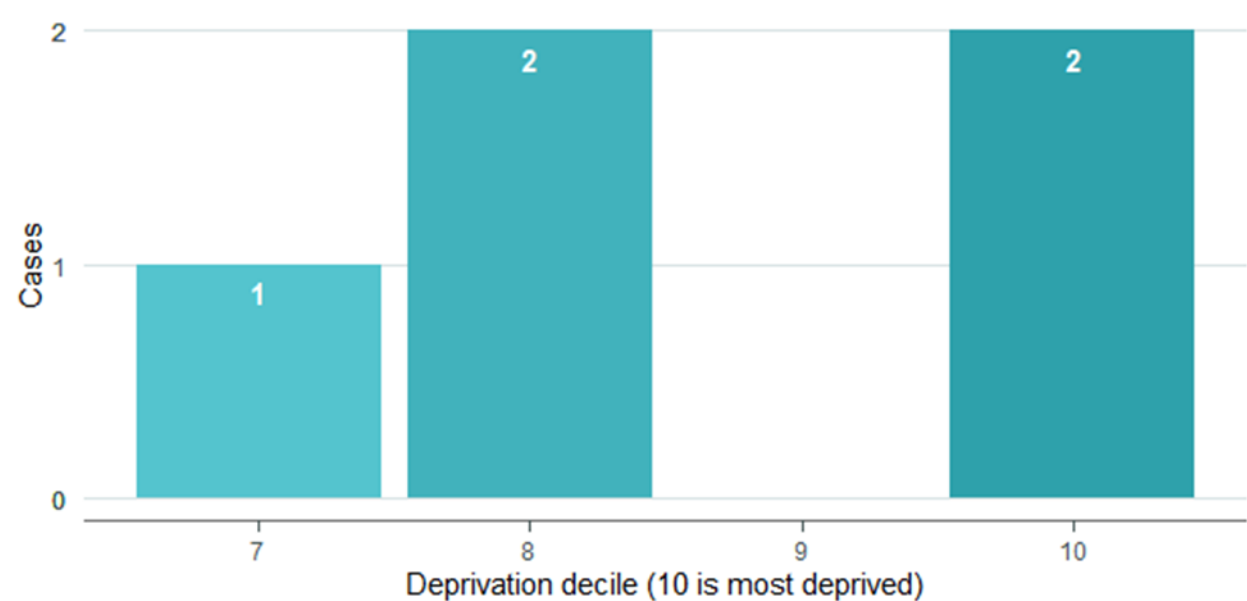
Source: EpiSurv

Figure 104: New TB cases in Tāmaki Makaurau by NZ deprivation index, 2023



Source: EpiSurv, Stats NZ

Figure 105: New TB cases in Te Tai Tokerau by NZ deprivation index, 2023



Source: EpiSurv, Stats NZ

The NZ Deprivation Index distribution of new TB cases across the Northern region is shown Figures 104 and 105. In Tāmaki Makaurau, 49.6% of cases occurred in deprivation deciles 7, 8, 9, and 10. In Te Tai Tokerau, 100% of cases occurred in the most deprived areas.

In Tāmaki Makaurau, of the 157 new cases, 18.4% were known to be a contact of a confirmed case either in NZ or overseas, while 68.1% had no known contact (Table 163). The remainder of cases (13.3%) were reported as unknown. In Te Tai Tokerau, only one case was a known contact of a case of TB (Table 164).

Table 163: New TB cases in Tāmaki Makaurau by contact exposure, 2023

Contact status	Cases
Contact with confirmed case in NZ	13
Contact with confirmed case overseas	16
Unknown	21
No	107
Not recorded	0
Total	157

Source: EpiSurv

Table 164: New TB cases in Te Tai Tokerau by contact exposure, 2023

Contact status	Cases
Contact with confirmed case in NZ	1
Contact with confirmed case overseas	0
Unknown	3
No	1
Not recorded	0
Total	5

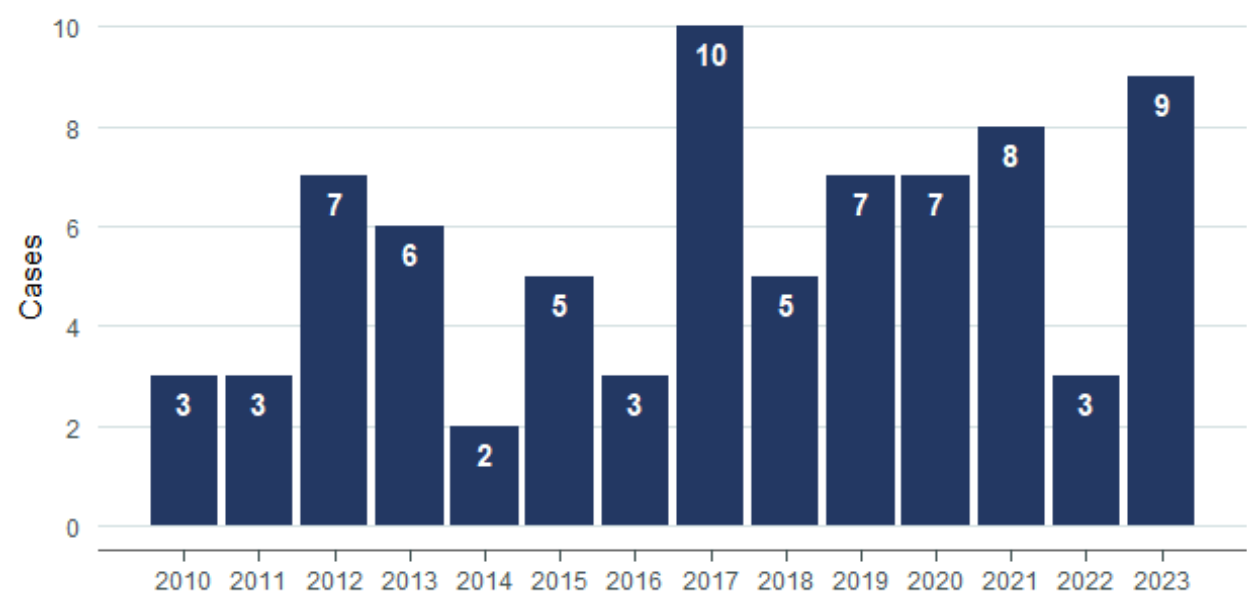
Source: EpiSurv

3.7.6 Tuberculosis (relapse or reactivation)

In 2023 there were 15 tuberculosis (relapse or reactivation) notifications in Tāmaki Makaurau. Of these, there were nine tuberculosis (relapse or reactivation) cases (0.51 cases per 100,000 population). Te Tai Tokerau had no reported relapse or reactivation cases.

For the rest of NZ, there were two additional cases (national incidence rate 0.2 cases per 100,000 population) and the incidence rate was 0.06 cases per 100,000 population.

Figure 106: TB relapse or reactivation cases in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

Figure 106 shows the number of TB relapse or reactivation cases in Tāmaki Makaurau between 2010 and 2023. Case numbers for 2023 were slightly higher than previous years, with the highest number since 2017.

3.8 Diseases under surveillance by other organisations

3.8.1 Acquired immunodeficiency syndrome

Acquired immunodeficiency syndrome (AIDS) describes the late stage of the spectrum of disease caused by HIV. In NZ, both AIDS and HIV are notifiable conditions. The number of people developing AIDS in NZ has declined since the mid-1990s as a result of improved treatments for people with HIV infection.

While HIV can be diagnosed using laboratory testing, AIDS is a clinical diagnosis. A person with HIV infection is said to have developed AIDS when one or more of a list of 25 AIDS-defining illnesses first develop.

Surveillance for HIV/AIDS is undertaken by the AIDS Epidemiology Group, Department of Preventive and Social Medicine at the University of Otago's Dunedin School of Medicine. For 2023 reporting please refer to the University of Otago's [AIDS Epidemiology Group](#).

3.8.2 Creutzfeldt-Jakob Disease

Creutzfeldt-Jakob Disease (CJD) is a rapidly progressive and universally fatal neurodegenerative disease. It is one of several human types of transmissible spongiform encephalopathies, a group of diseases caused by infectious protein particles known as prions.

Sporadic CJD accounts for up to 85% of cases and occurs at an incidence of 1-2 per million per year. Other forms of the disease include familial CJD (around 15% of cases), variant CJD (associated with bovine spongiform encephalopathy or 'mad cow disease') and iatrogenic CJD (typically transmitted via hormones or tissue from affected individuals).

There have been no cases of variant CJD recorded in NZ. Suspected and actual cases of CJD are required to be notified to the Medical Officer of Health, however, surveillance for this disease is undertaken by the NZ CJD Registry at the Dunedin School of Medicine. For 2023 reporting, please refer to the [NZ CJD Registry](#).

3.8.3 Human immunodeficiency virus

Human immunodeficiency virus (HIV) is a viral infection that acts by depleting the body's normal immunological defence mechanisms. AIDS is the late stage of the spectrum of HIV disease.

Transmission occurs through direct contact with an infected person's blood or body fluids. HIV infections in NZ are mostly concentrated in men who have sex with men (MSM), heterosexually infected individuals from sub-Saharan Africa and South-East Asia and those who share contaminated injecting equipment. HIV became notifiable in NZ in 2017.

Surveillance for HIV/AIDS is undertaken by the AIDS Epidemiology Group, Department of Preventive and Social Medicine at the University of Otago's Dunedin School of Medicine. For 2023 reporting please refer to the University of Otago's [AIDS Epidemiology Group](#).

3.8.4 Gonorrhoea

Gonorrhoea is a sexually transmitted infection caused by the bacterium *Neisseria gonorrhoeae*. Transmission is mostly through unprotected sex, although infected women can transmit the bacteria to their babies during childbirth.

Gonorrhoea is asymptomatic in around 50% of females and 5% of males. Symptoms include pelvic pain, abnormal vaginal or penile discharge, inter-menstrual bleeding, sore testicles, irritation of the inside of the penis, pain when urinating and rectal pain or bleeding. Babies who acquire the infection during childbirth may develop conjunctivitis.

Untreated infections can result in pelvic inflammatory disease, chronic pelvic pain, ectopic pregnancy and infertility. Treatment generally involves a course of antibiotics, although antimicrobial resistance in gonorrhoea has increased in recent years.

Surveillance for gonorrhoea is undertaken by ESR. For surveillance purposes, only laboratory-confirmed gonorrhoea is notifiable in NZ. For 2023 reporting please refer to ESR's [Sexually Transmitted Infection \(STI\) surveillance dashboard](#).

3.8.5 Syphilis

Syphilis is a sexually transmitted infection caused by the bacterium *Treponema pallidum*. Transmission is mostly through unprotected sex, although infected women can transmit the bacteria to their babies during pregnancy.

The symptoms of syphilis depend on the stage of infection (primary, secondary and tertiary). Primary syphilis is characterised by an ulcer at the site of infection which may take up to six weeks to heal. The secondary stage is characterised by a rash on the palms and soles, lymphadenopathy, fever, hair loss, myalgia, arthralgia, headaches and lethargy and may persist for up to six months. Some people will progress to tertiary (late stage) syphilis after several years which can lead to multi-organ damage. Transmission during pregnancy may result in intrauterine foetal death, stillbirth or congenital syphilis.

Syphilis rates have been increasing in NZ since 2012, both in men who have sex with men (MSM) and in heterosexual men and women.

Surveillance for syphilis is undertaken by ESR. For 2023 reporting please refer to ESR's **Sexually Transmitted Infection (STI) surveillance dashboard**.

4. Outbreaks

Key points

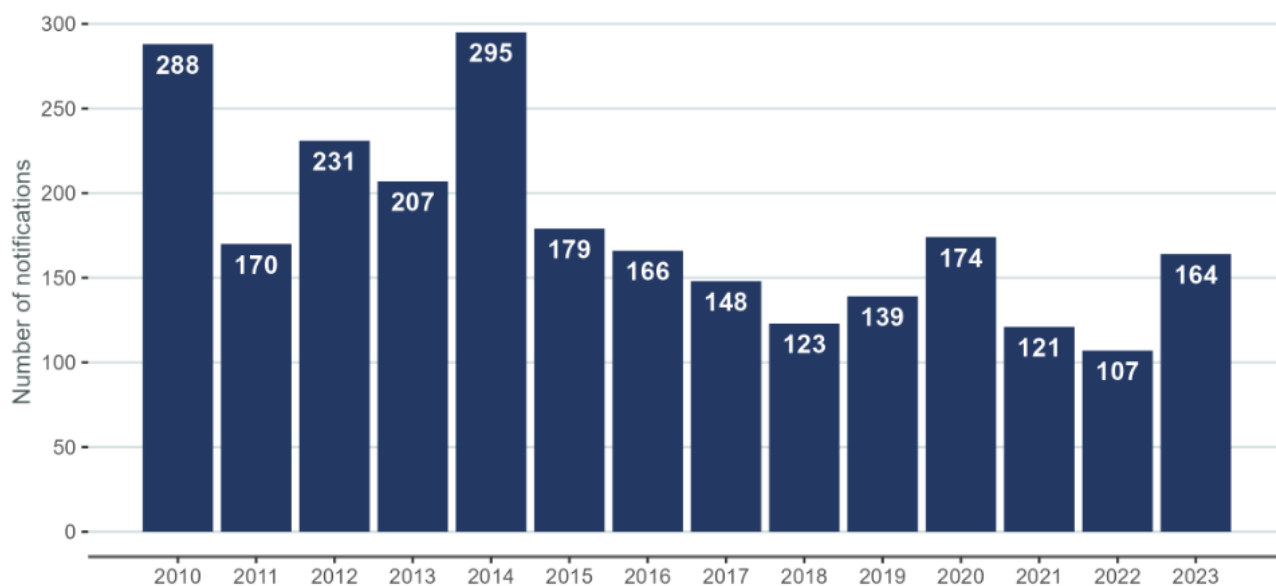
- There were 164 outbreaks notified in Tāmaki Makaurau in 2023. Excluding the single COVID-19 reported outbreak there were 163 outbreaks with a total of 2,709 associated cases.
- In the Northern region, enteric outbreaks were more commonly reported than non-enteric outbreaks. In Tāmaki Makaurau there were 151 enteric outbreaks notified and 13 outbreaks for other notifiable diseases. In Te Tai Tokerau, there were 17 enteric and three outbreaks that resulted from other types of disease.
- The most common outbreak settings were Early Childhood Education Centres (ECECs) (81 outbreaks), residential aged care facilities (39 outbreaks) and households (17 outbreaks).
- Norovirus was the most common cause of enteric outbreaks in the Northern region, with 1,762 cases and 196 cases, respectively.
- Pertussis was the most common cause of non-enteric outbreaks in Tāmaki Makaurau. A measles outbreak was the most significant outbreak reported in Te Tai Tokerau.

Outbreaks are defined as localised increases in the occurrence of disease in excess of normally expected levels.³¹ Disease outbreaks are often related to contaminated food or water, or to illness spread from person-to-person. Occasionally they occur due to environmental factors, such as *Legionella* bacteria, hazardous substances or lead poisoning.

Suspected outbreaks should be notified if there are two or more cases of any notifiable condition linked to a common source.

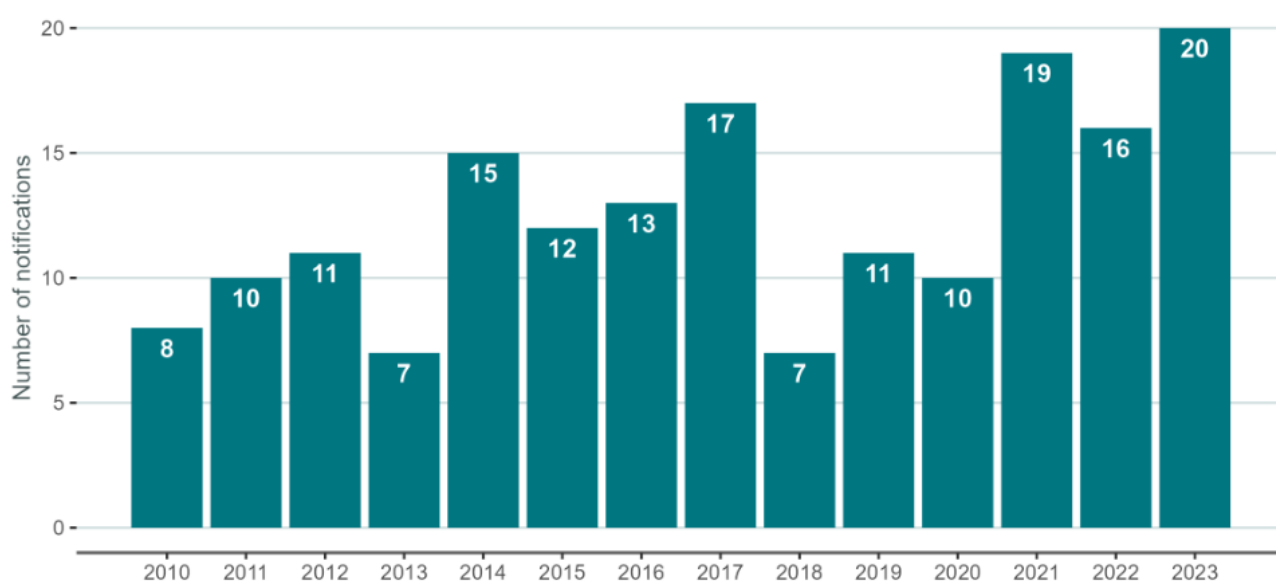
³¹ Hawke's Bay District Health Board. (n.d.). *Communicable Disease and Outbreaks*. <https://www.ourhealthhb.nz/community-services/health-protection/communicable-disease-and-outbreaks/#diseaseoutbreaks>.

Figure 107: Outbreak notifications in Tāmaki Makaurau, 2010 to 2023



Source: EpiSurv

Figure 108: Outbreak notifications in Te Tai Tokerau, 2010 to 2023



Source: EpiSurv

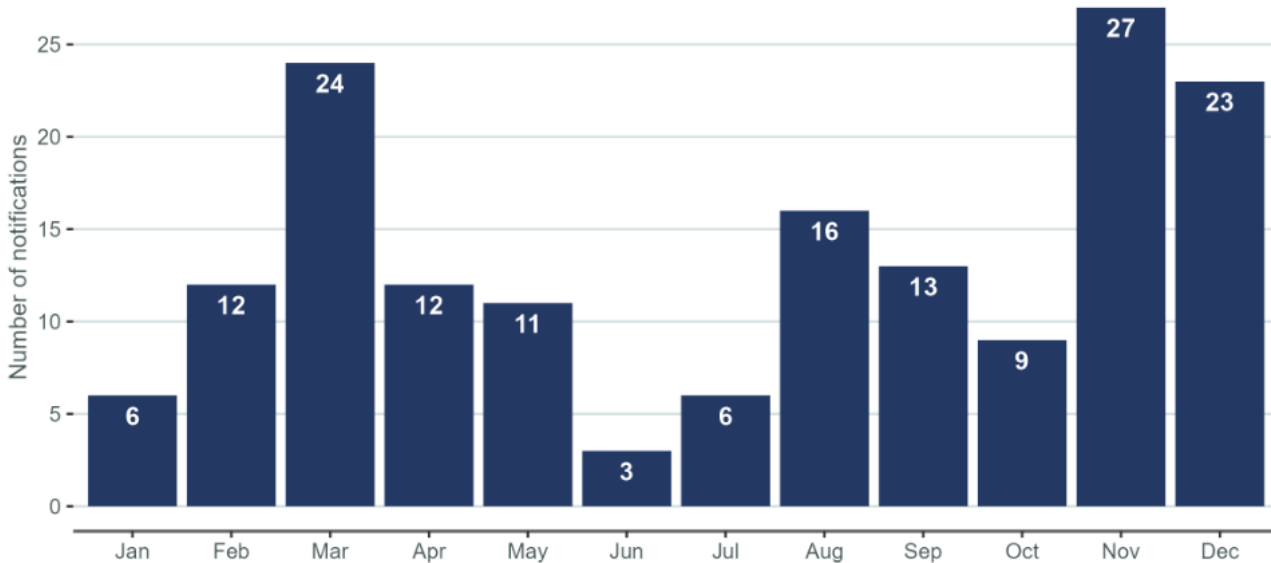
Tāmaki Makaurau identified or received notifications for 164 outbreaks throughout 2023 including the one reported COVID-19 outbreak. This was not a true reflection of the burden of COVID-19 disease. This is the highest number of outbreak notifications received by Tāmaki Makaurau since 2020 (Figure 107). Meanwhile, there were 20 outbreaks notified in Te Tai Tokerau, the greatest number in the database since at least 2010 (Figure 108).

Outbreaks typically follow a seasonal pattern, with more notifications received over early spring and summer. Notifications during the warmer months are usually for enteric outbreaks. This is possibly due to an increase in outdoor gatherings involving consumption of non-commercially

prepared foods such as salads, raw seafood and barbecued meat. In these situations, illness may occur through poor food storage and hygiene practices, or through inadequate cooking of food.

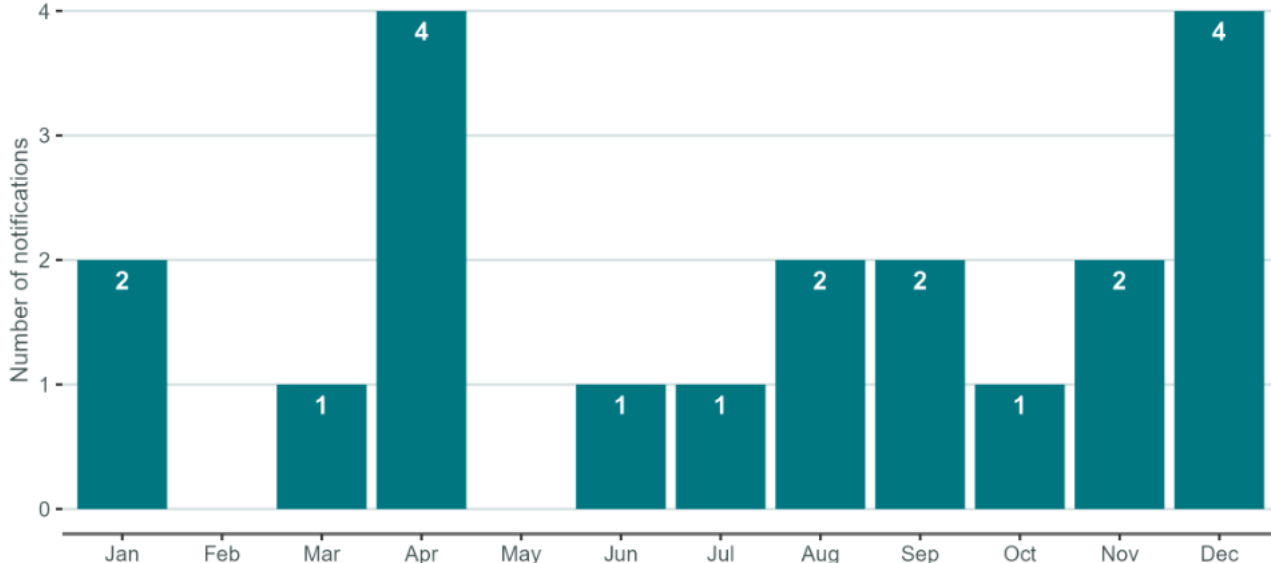
In concordance with the above, the pattern observed in 2023 shows most of the notifications were received in spring and summer months. November, December and March had the highest number of outbreak notifications, with 27, 23 and 24 outbreaks, respectively. June and July had the fewest outbreaks reported, with three and six outbreaks respectively. In Te Tai Tokerau the most outbreaks were reported in April and December with four outbreaks in each of these months.

Figure 109: Outbreak notifications by month in Tāmaki Makaurau, 2023



Source: EpiSurv

Figure 110: Outbreak notifications by month in Te Tai Tokerau, 2023



Source: EpiSurv

Table 165: Outbreaks and associated cases by pathogen or condition, Tāmaki Makaurau, 2023

Pathogen or condition	Outbreaks		Cases		
	Total	% of outbreaks (n=164) ¹	Total	% of cases	Median cases per outbreak (n=2,702)
Enteric	151	92.1	2,646	97.9	–
Norovirus	85	51.8	1,762	65.2	16
Sapovirus	10	6.1	183	6.8	14
Salmonella ²	7	4.3	34	1.3	2
Rotavirus	6	3.7	99	3.7	16.5
Escherichia	2	1.2	5	0.19	2.5
Shigella	2	1.2	8	0.3	4
Astrovirus	1	0.6	15	0.5	15
Campylobacter	1	0.6	17	0.6	17
Adenovirus	1	0.6	30	1.1	30
Pathogen not identified	36	22	493	18.2	11
Non-enteric³	12	7.3	56	2.1	–
Bordetella	7	4.3	38	1.4	5
Mycobacterium	2	1.2	5	0.2	2.5
Lead poisoning	1	0.6	4	0.1	4
Mpox	1	0.6	7	0.2	7
Measles virus	1	0.6	2	0.1	2

Source: EpiSurv (NPHS Northern Region Outbreak Surveillance Report)

¹More than one agent was reported in seven outbreaks, therefore group totals are greater than the total number of outbreaks and cases

²Includes non-typhoidal Salmonella species only

³COVID-19 outbreak excluded from analysis

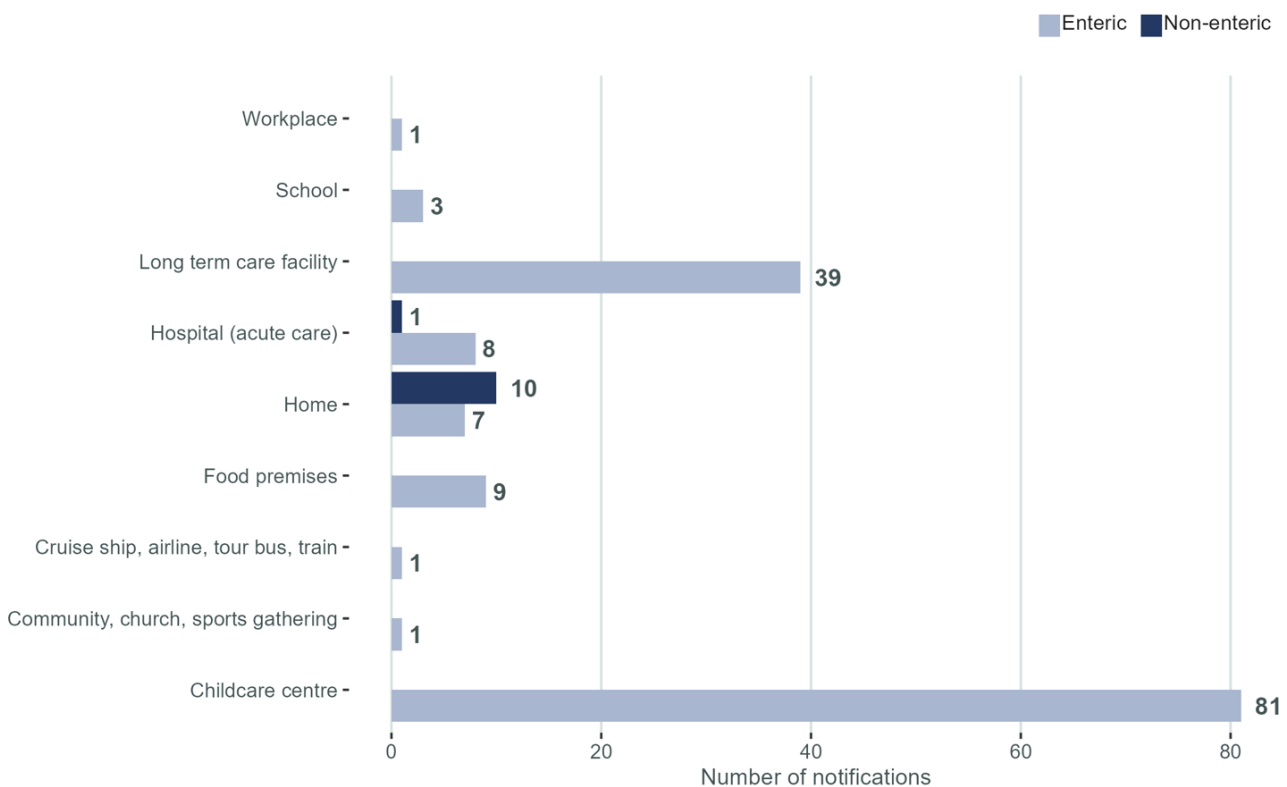
A causal agent was identified in 78% (128/164) of Tāmaki Makaurau outbreaks and 80% (16/20) of the Te Tai Tokerau ones. Enteric outbreaks accounted for 91.3% of the total number of outbreaks identified across the Northern region.

Norovirus was the most common causal agent (40.8%, 42/103) and had the highest percentage of associated cases (50.8%, 724/1,426). The most frequently reported non-enteric condition was COVID-19, which accounted for 10.7% of outbreaks and 12.8% of associated cases. The pathogen or condition with the highest median cases per outbreak was astrovirus, with a median number of 40 cases per outbreak.

Table 166: Outbreaks and associated cases by pathogen or condition, Te Tai Tokerau, 2023

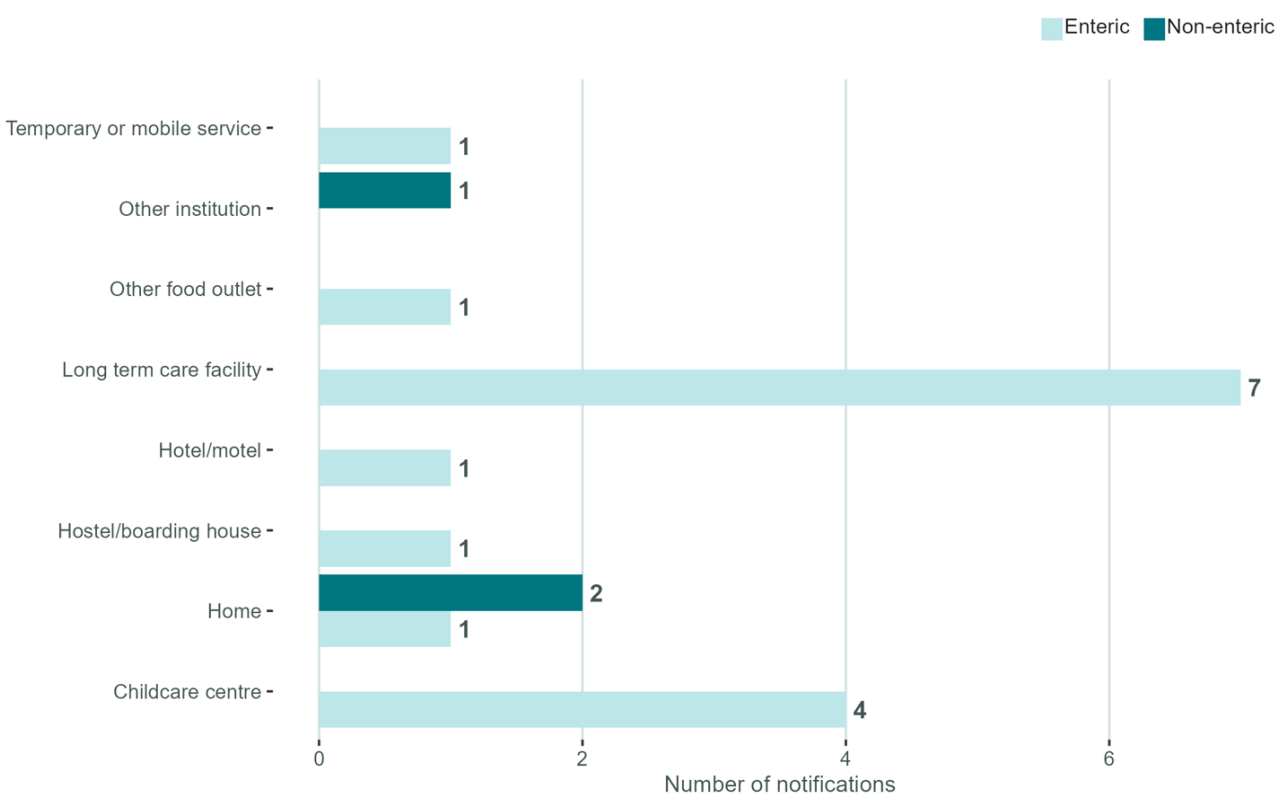
Pathogen or condition	Outbreaks		Cases		
	Total	% of outbreaks (n=20) ¹	Total	% of cases	Median cases per outbreak (n=286)
Enteric	17	85	272	95.1	-
Norovirus	7	35	196	68.5	24
Campylobacter spp.	2	10	25	8.7	13
Salmonella spp. ²	1	5	2	0.7	2
Rotavirus	1	5	14	4.9	14
Cryptosporidium	1	5	5	1.7	5
Giardia	1	5	2	0.7	2
Pathogen not identified	4	20	28	9.8	7
Non-enteric	3	15	14	4.9	-
Lead absorption	1	5	3	1.0	3
Bordetella	1	5	3	1.0	3
Measles virus	1	5	8	2.8	8

Figure 111: Outbreak notifications in Tāmaki Makaurau by setting, 2023



Source: EpiSurv (NPHS Northern Region Outbreak Surveillance Report)

Figure 112: Outbreak notifications in Te Tai Tokerau by setting, 2023



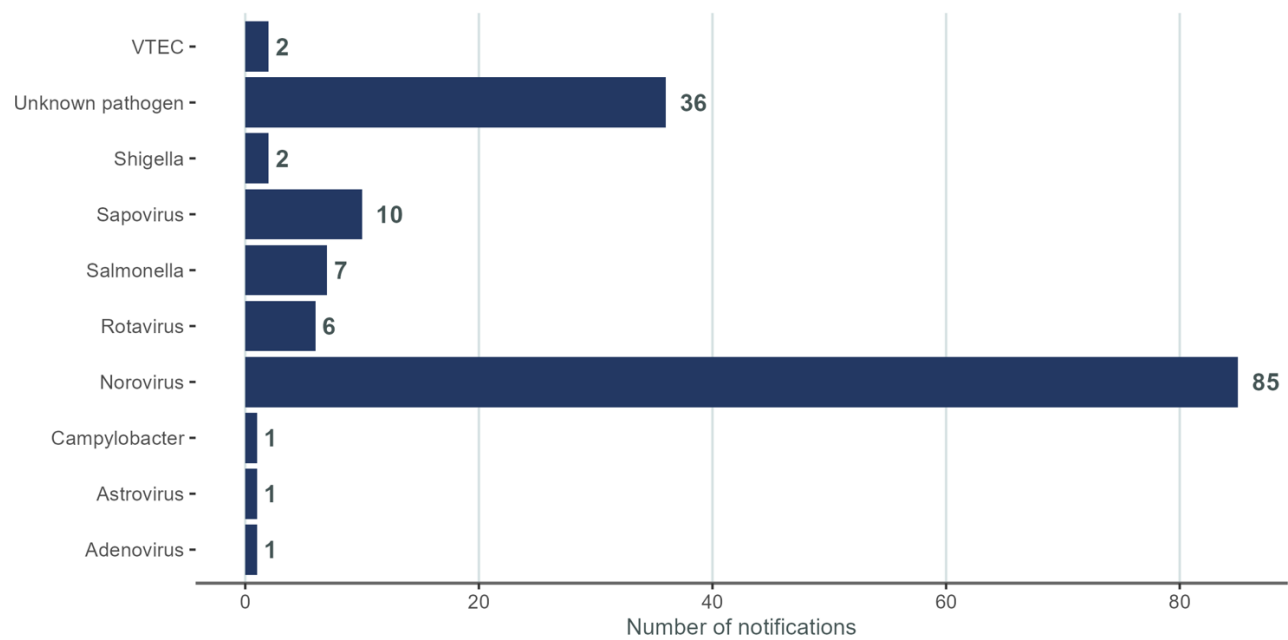
The most common exposure settings in the Northern region were ECECs with 82 enteric outbreaks, followed by residential care facilities with 46 enteric outbreaks.

There were 13 outbreaks in the household setting (eight enteric and five non-enteric), five outbreaks in food premises (all enteric), four outbreaks in community or church settings (all enteric), one outbreak in an airline setting (enteric), and three outbreaks in schools (all enteric).

4.1 Enteric outbreaks

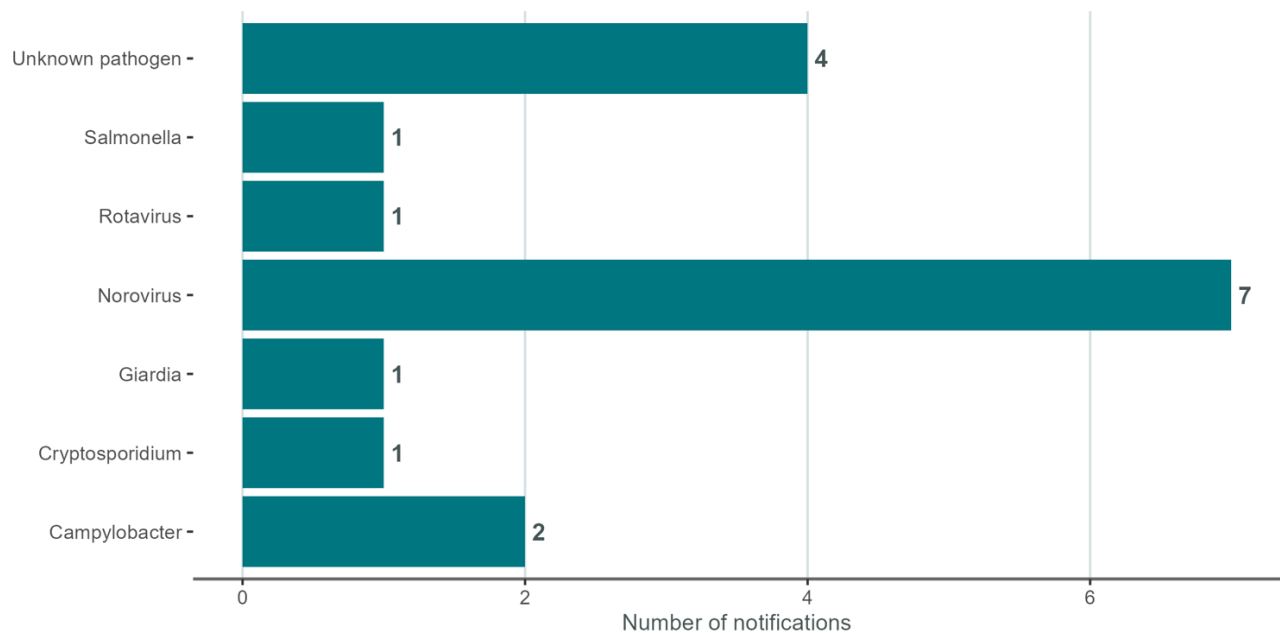
Tāmaki Makaurau received notifications for 151 enteric outbreaks in 2023, representing a total of 2,646 cases. A causative agent was identified in 115 outbreaks. Te Tai Tokerau received notifications for 17 enteric outbreaks in 2023, representing a total of 272 cases. A causative agent was found in 13 outbreaks.

Figure 113: Enteric outbreak notifications in Tāmaki Makaurau by pathogen/condition, 2023



Source: EpiSurv (NPHS Northern Region Outbreak Surveillance Report)

Figure 114: Enteric outbreak notifications in Te Tai Tokerau by pathogen/condition, 2023



Source: EpiSurv

In Tāmaki Makaurau, norovirus represented the greatest number of outbreaks and cases, with 85 outbreaks and 1,762 total cases (Figure 113). The median number of cases per norovirus outbreak was 16.

The highest median number of cases per outbreak was the single adenovirus outbreak, with 30 cases.

Salmonellosis, *E. Coli* and shigellosis infection were associated with the fewest cases per outbreak. Some of these were household outbreaks.

In Te Tai Tokerau, the greatest number of outbreaks were a result of norovirus with 196 cases across seven outbreaks (Figure 114). The median number of cases per norovirus outbreak was 24, also the highest median number of cases per outbreak.

Table 167: Enteric outbreak-associated cases by causative agent and setting, Tāmaki Makaurau, 2023

Pathogen or condition	Settings				
	ECEC	Residential care facility	Food premises	Household	School
Norovirus ¹	661	921	55	0	20
Sapovirus	178	5	0	0	0
Astrovirus	15	0	0	0	0
Shigella spp.	0	0	0	6	0
Campylobacter spp.	0	0	17	0	0
Salmonella spp. ²	0	0	15	13	0
Adenovirus	30	0	0	0	0
Rotavirus	82	17	0	0	0
E. Coli infection	0	0	0	5	0
Pathogen not identified	255	84	17	7	103
Total	1,221	1,027	104	31	123

Source: EpiSurv (NPHS Northern Region Outbreak Surveillance Report)

1 Public hospital outbreak numbers are not included in table

2 Includes non-typhoidal and typhoidal *Salmonella* species

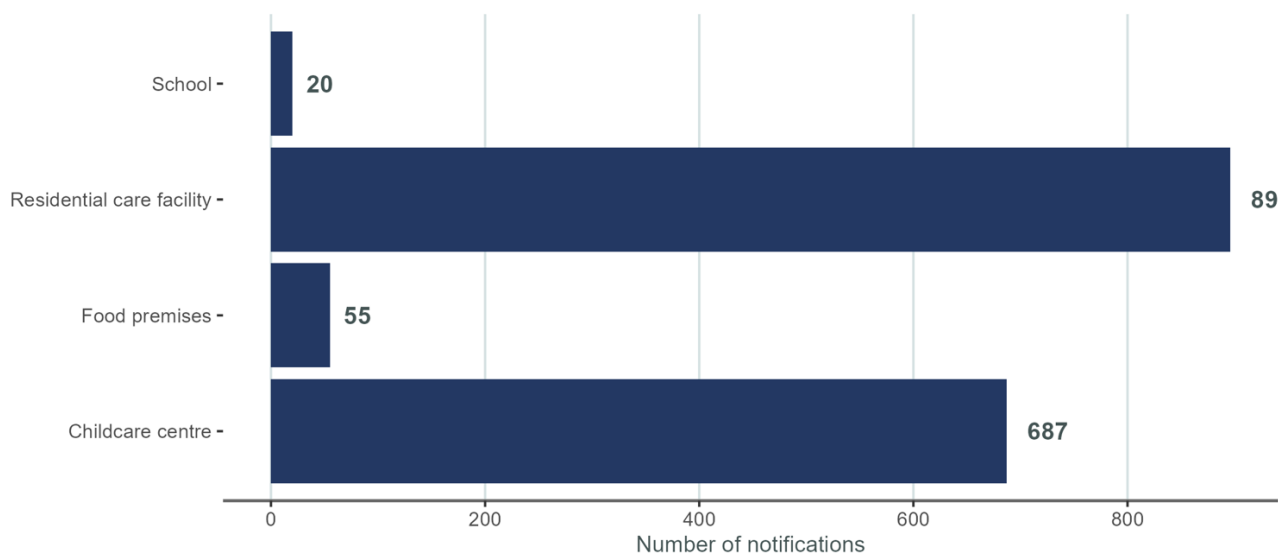
Table 168: Enteric outbreak-associated cases by causative agent and setting, Te Tai Tokerau, 2023

Pathogen or condition	Settings				
	ECEC	Residential care facility	Food premises	Household	School
Norovirus	0	173	23	0	0
Campylobacter spp.	0	0	0	0	0
Salmonella typhi	0	0	0	0	0
Cryptosporidium	0	0	0	0	0
Rotavirus	14	0	0	0	0
Giardia	2	0	0	0	0
Pathogen not identified	18	6	4	0	0
Total	34	179	27	0	0

Tables 167 and 168 show the exposure settings for outbreaks for the Northern region in 2023. The most common exposure events are typically early childhood centres and residential care facilities due to the reporting of these outbreaks and public health service investigation.

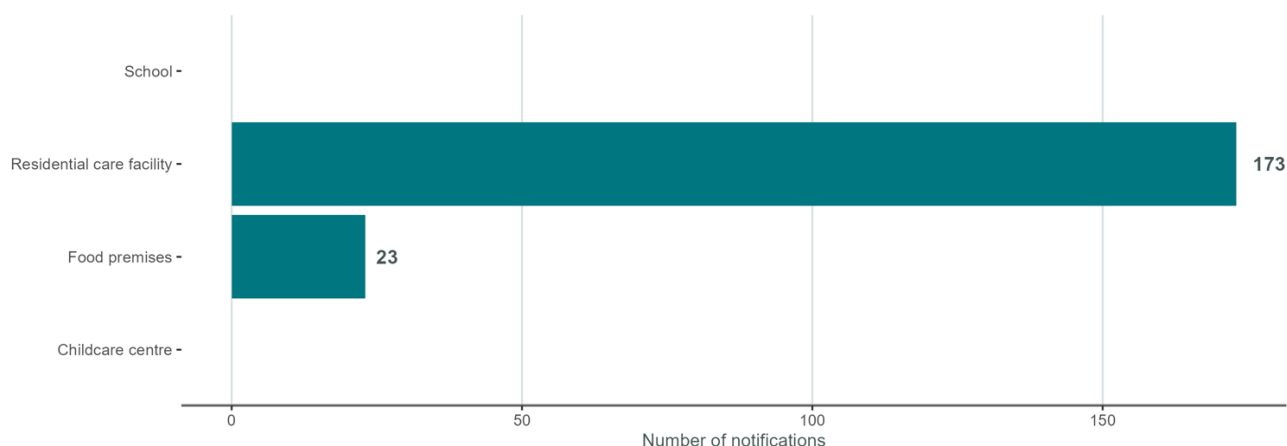
4.1.1 Norovirus

In Tāmaki Makaurau, 85 outbreaks with norovirus identified as a causative agent were notified in 2023, with a combined total of 1,762 confirmed and probable cases (median 16 cases per outbreak). In Te Tai Tokerau, seven outbreaks with norovirus identified as a causative agent were notified in 2023, with a combined total of 196 cases (median 24 cases per outbreak).

Figure 115: Norovirus outbreak cases in Tāmaki Makaurau by exposure setting, 2023

Source: EpiSurv

Figure 116: Norovirus outbreak cases in Te Tai Tokerau by exposure setting, 2023



Source: EpiSurv

In Tāmaki Makaurau there were 42 reported norovirus outbreaks linked to childcare centres, with a total of 687 cases. There were 31 reported outbreaks involving aged residential care facilities, with a total of 896 confirmed or probable cases. There were three norovirus outbreaks linked to food premises, with a total of 42 cases. No outbreak involving households was reported. A further outbreak was reported from a school, with 20 cases reported.

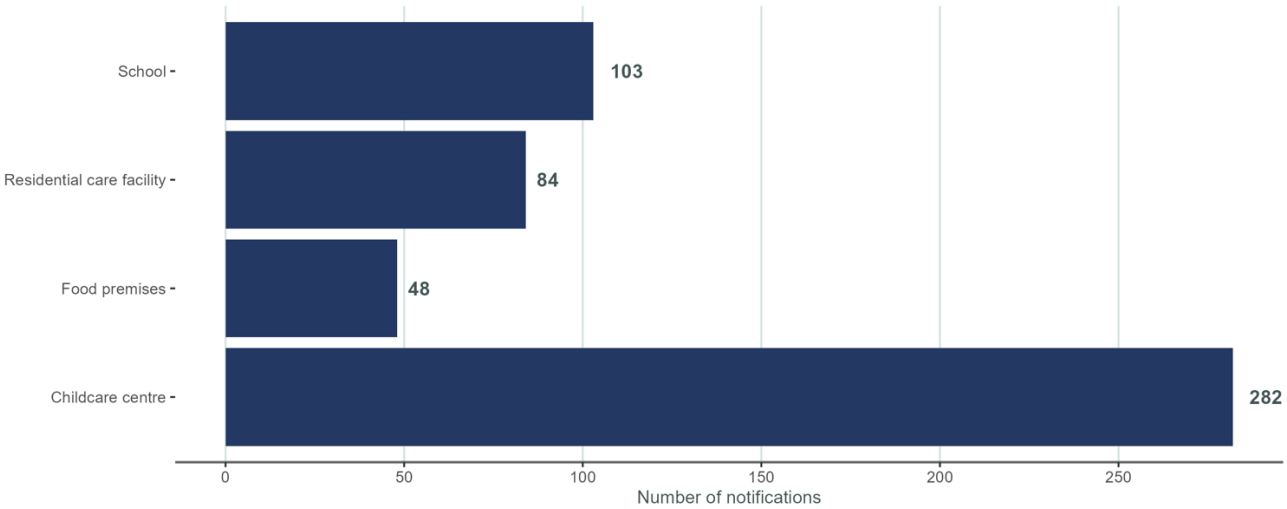
In Te Tai Tokerau, there were six norovirus outbreaks linked to aged residential care facilities, with a total of 173 cases. There was one outbreak involving a food premise, with a total of 23 confirmed or probable cases. No outbreaks involving households, schools or ECECs were reported.

4.1.2 Gastroenteritis – pathogen not identified

There were 36 outbreaks reported in Tāmaki Makaurau for which no causative agent could be identified. These had a combined total of 493 probable cases. Exposure settings included ECECs (23 outbreaks and 273 cases), residential care facilities (six outbreaks and 84 cases), household settings (one outbreak and seven cases), food premises/events (four outbreaks and 14 cases), schools (two outbreaks and 103 cases), a refugee centre (one outbreak with seven cases) and, consumption of oysters with unknown location (one outbreak with seven cases).

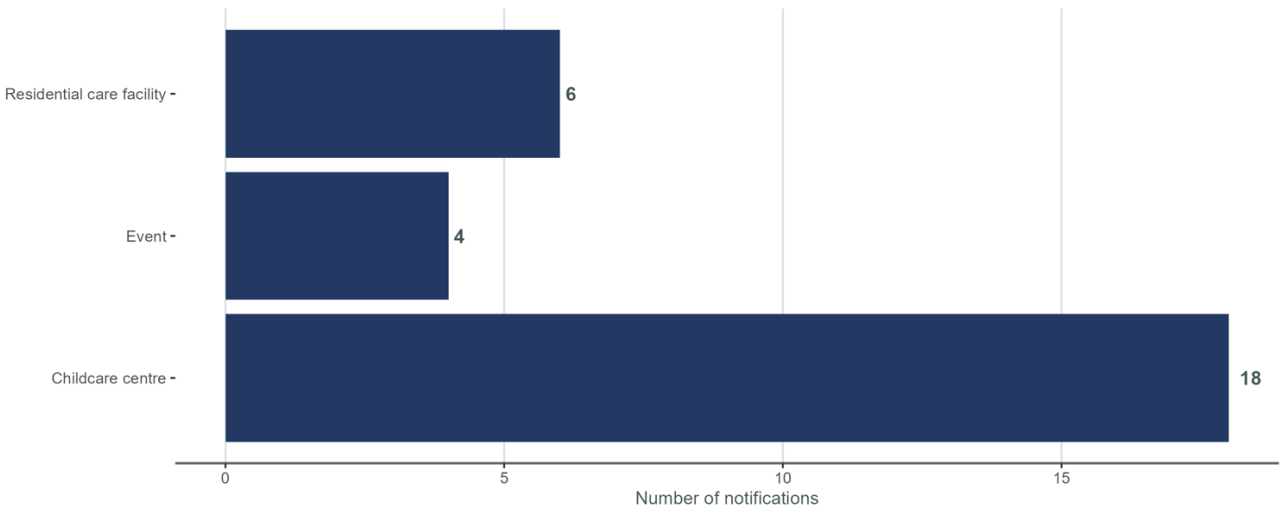
There were four outbreaks in Te Tai Tokerau in 2023 for which no causative agent could be identified. These had a combined total of 28 probable cases. Exposure settings included ECECs (two outbreaks and 18 cases), residential care facilities (one outbreaks and six cases), and an event where food was served (one outbreak and four cases).

Figure 117: Outbreak cases with no identified pathogen in Tāmaki Makaurau by exposure setting, 2023



Source: EpiSurv

Figure 118: Outbreak cases with no identified pathogen in Te Tai Tokerau by exposure setting, 2023



Source: EpiSurv

4.1.3 Sapovirus

In 2023, ten outbreaks due to sapovirus were reported in Tāmaki Makaurau, with a total of 183 cases (median 14 cases per outbreak). Nine of these outbreaks were linked to childcare centres and the other was linked to a residential care facility.

There were no sapovirus outbreaks reported for Te Tai Tokerau.

4.1.4 Astrovirus

One outbreak with astrovirus as a causative agent was reported in Tāmaki Makaurau in 2023 with a total of 15 confirmed or probable cases. This outbreak was linked to a childcare centre.

There were no Astrovirus outbreaks reported for Te Tai Tokerau.

4.1.5 Shigellosis

In Tāmaki Makaurau, two outbreaks due to shigella were reported in 2023, with a total of eight confirmed or probable cases. One of these outbreaks occurred in a household, while the other was overseas acquired.

There were no shigellosis outbreaks reported in Te Tai Tokerau.

4.1.6 Campylobacteriosis

In Tāmaki Makaurau, one outbreak of campylobacteriosis was reported (17 confirmed or probable cases). This outbreak was linked to a food premise.

In Te Tai Tokerau, two outbreaks of campylobacteriosis were reported, with a total of 25 confirmed or probable cases. One outbreak was linked to the consumption of raw milk involving two cases.

4.1.7 Adenovirus

In Tāmaki Makaurau one outbreak due to adenovirus was reported, with 30 confirmed or probable cases. The outbreak was linked to a childcare facility.

There were no Adenovirus outbreaks reported for Te Tai Tokerau.

4.1.8 Rotavirus

In Tāmaki Makaurau six outbreaks due to rotavirus were reported during 2023, with 99 confirmed or probable cases. Five of these outbreaks were linked to childcare centres and one outbreak was linked to an aged residential care facility.

In Te Tai Tokerau, one outbreak involving rotavirus was reported, with 14 confirmed or probable cases. This outbreak was linked to an ECEC.

4.1.9 E. Coli (VTEC/STEC) infection

In Tāmaki Makaurau, two outbreaks due to VTEC/STEC were reported, and these were linked to two different household outbreaks, involving five cases in total.

There were no VTEC/STEC outbreaks reported for Te Tai Tokerau.

4.1.10 Giardia infection

In Te Tai Tokerau one outbreak due to Giardia was reported in 2023, with a total of two confirmed or probable cases. This outbreak was linked to a childcare centre and one of the cases was hospitalised.

There were no Giardia outbreaks reported for Tāmaki Makaurau.

4.1.11 Cryptosporidium infection

In Te Tai Tokerau, one outbreak involving Cryptosporidium was reported, with five confirmed or probable cases.

There were no Cryptosporidium outbreaks reported for Tāmaki Makaurau.

4.1.12 Salmonella spp.

In Tāmaki Makaurau, three outbreaks with non-typhoid Salmonella as a causative agent were reported, with a total of 25 confirmed or probable cases. One outbreak involved a church event resulting in 15 cases being reported. The other two outbreaks involved two separate households.

There were three Salmonella typhi outbreaks reported for Tāmaki Makaurau. One outbreak was linked to a medical laboratory. There were six cases reported for all the typhoid outbreaks combined. There was a household outbreak of three cases of Salmonella paratyphi, In Te Tai Tokerau, there was one typhoid fever outbreak in 2023 with two cases.

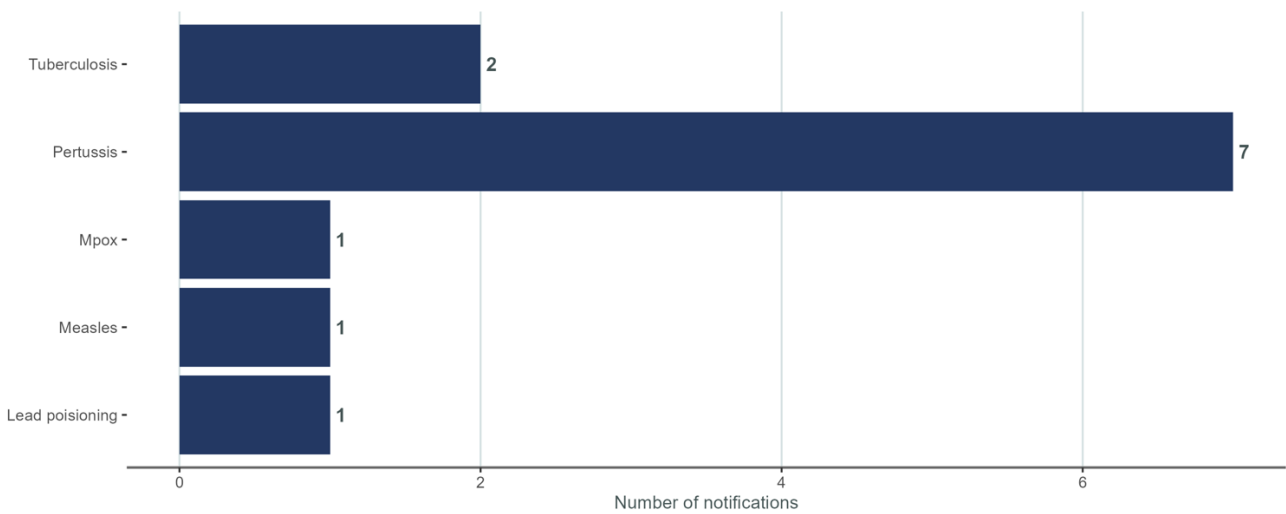
4.2 Non-enteric outbreaks

In Tāmaki Makaurau there were 12 reported non-enteric outbreaks in 2023, representing a total of 207 cases as well as the aforementioned single COVID-19 outbreak that was logged.

There were seven outbreaks of pertussis identified (Figure 119). The largest outbreak in this category was an outbreak of nine cases of pertussis.

In Te Tai Tokerau there were three non-enteric outbreaks reported (Figure 120). These were single outbreaks of pertussis, measles and a lead cluster.

Figure 119: Non-enteric outbreaks in Tāmaki Makaurau by condition, 2023



Source: EpiSurv (NPHS Northern Region Outbreak Surveillance Report)

Figure 120: Non-enteric outbreaks in Te Tai Tokerau by condition, 2023

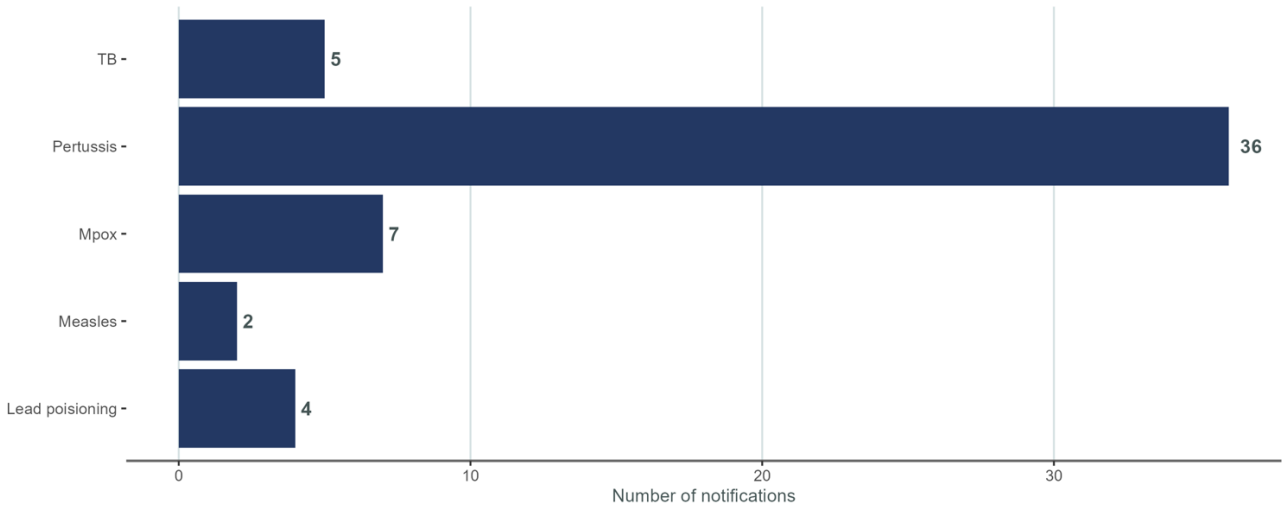


Source: EpiSurv (NPHS Northern Region Outbreak Surveillance Report)

The non-enteric outbreaks reported in Tāmaki Makaurau were all within households except for the mpox outbreak (Figure 121). In Te Tai Tokerau, the measles outbreak had eight cases. This outbreak included cases residing in other regions with three of the cases from Te Tai Tokerau,

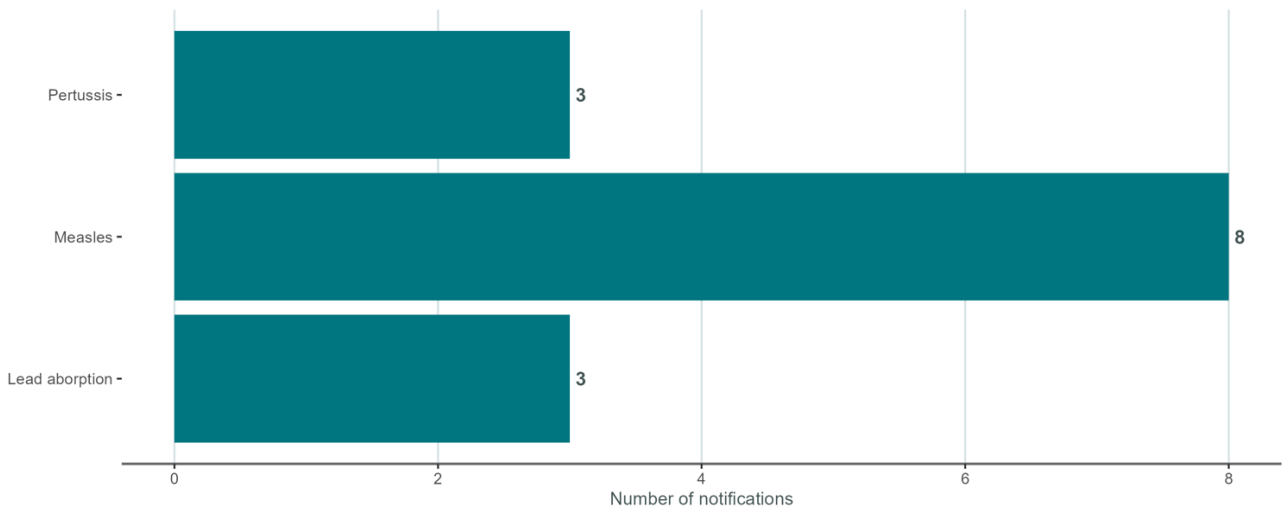
including the index case. The pertussis and lead absorption outbreaks were each within a home (Figure 122).

Figure 121: Non-enteric outbreak-associated cases by causative agent Tāmaki Makaurau, 2023



Source: EpiSurv (NPHS Northern Region Outbreak Surveillance Report)

Figure 122: Non-enteric outbreak-associated cases by causative agent Te Tai Tokerau, 2023



4.2.1 Pertussis

- Seven pertussis outbreaks were recorded in Tāmaki Makaurau in 2023 and a single outbreak was recorded in Te Tai Tokerau.
- All of the outbreaks were household outbreaks ranging in size from three to nine cases.

- Studies have proven most pertussis spread happens in a household setting.³²

4.2.2 Measles

- There was an eight-case outbreak of measles in Te Tai Tokerau in 2023, though only three of the eight cases resided in Te Tai Tokerau. The index case resided in Te Tai Tokerau. Five linked confirmed cases were notified to other regional public health services.
- A two-person outbreak was reported in Tāmaki Makaurau. The index case was locally acquired and contracted the illness from a household contact returning from abroad.

4.2.3 Tuberculosis

- Two outbreaks of TB were notified in Tāmaki Makaurau in 2023.
- The first involved three cases. Two of the cases were epidemiologically linked but were not proven by culture testing. Two of the cases were hospitalised.
- The second outbreak involved two household contacts, both of whom were hospitalised. The cases had indistinguishable TB genotyping results.

4.2.4 Mpox

- A seven-person mpox outbreak was reported in Tāmaki Makaurau in late 2023. Some of the cases had travelled overseas. This outbreak was linked to a common location.

4.2.5 Lead absorption

- Outbreaks of lead absorption were notified in both Tāmaki Makaurau and Te Tai Tokerau in 2023.
- Both outbreaks were related to home renovations in older properties.

³² Reid, S., & Wilson, E. (2011). New Zealand pertussis epidemiology and the Global Pertussis Initiative immunisation strategies. *The New Zealand medical journal*, 124(1333), 63–64. <https://nzmj.org.nz/media/pages/journal/vol-124-no-1333/e7833c9df2-1696470247/vol-124-no-1333.pdf>

Appendices

Appendix 1: List of notifiable diseases

Table 169: Notifiable Infectious Diseases Under the Health Act 1956

Section A – Infectious Diseases Notifiable to a Medical Officer of Health and Local Authority	
Acute gastroenteritis	Campylobacteriosis
Cholera	Cryptosporidiosis
Giardiasis	Hepatitis A
Legionellosis	Listeriosis
Meningoencephalitis - primary amoebic	Salmonellosis
Shigellosis	Typhoid and paratyphoid fever
Yersiniosis	
Section B – Infectious Diseases Notifiable to Medical Officer of Health	
Anthrax	Arboviral diseases
Brucellosis	COVID-19
Creutzfeldt-Jakob disease (CJD) and other spongiform encephalopathies	<i>Cronobacter</i> species
Diphtheria	Haemophilus influenzae b
Hepatitis B	Hepatitis C
Hepatitis (viral) not otherwise specified	Hydatid disease
Highly Pathogenic Avian Influenza (including HPAI subtype H5N1)	Invasive pneumococcal disease
Leprosy	Leptospirosis
Malaria	Measles
Middle East Respiratory Syndrome (MERS)	Monkeypox
Mumps	<i>Neisseria meningitidis</i> invasive disease
Non-seasonal influenza (capable of being transmitted between human beings)	Novel coronavirus capable of causing severe respiratory illness
Pertussis	Plague
Poliomyelitis	Q fever
Rabies and other lyssaviruses	Rheumatic fever
Rickettsial diseases	Rubella
Severe Acute Respiratory Syndrome (SARS)	Tetanus
Tuberculosis (all forms)	Verotoxin/Shiga toxin-producing <i>Escherichia coli</i>
Viral haemorrhagic fevers	Yellow fever
Section C- Infectious Diseases Notifiable to Medical Officer of Health without Identifying Information of Patient or Deceased Person	
Acquired Immunodeficiency Syndrome (AIDS)	Human Immunodeficiency Virus (HIV) infection
Gonorrhoeal infection	Syphilis
Diseases Notifiable to Medical Officer of Health (Other than Notifiable Infectious Diseases)	
Cysticercosis	Decompression sickness
Lead absorption equal to or in excess of 0.24µ mol/l (5µg/dl)	Poisoning arising from chemical contamination of the environment
Taeniasis	Trichinosis

Source: Schedule of notifiable diseases, June 2022. MoH

Appendix 2: Population denominator tables

Table 170: Northern Region population estimates by district, 2023

District	Total
Te Tai Tokerau	203,930
Waitematā	648,930
Te Toka Tumai Auckland	492,160
Counties Manukau	624,510
Total	1,969,530

Source: Health NZ and Stats NZ census ERP

Table 171: Northern Region population estimates by age group, 2023

Age	Tāmaki Makaurau (Auckland)	Te Tai Tokerau (Northland)
Age under 1	21,232	2,426
1 to 4	84,928	9,704
5 to 9	113,490	13,550
10 to 14	118,650	14,370
15 to 19	111,590	11,950
20 to 29	248,180	19,550
30 to 39	290,040	24,540
40 to 49	232,440	21,870
50 to 59	215,870	27,310
60 to 69	168,500	28,750
Age 70+	160,680	29,910
Total	1,765,600	203,930

Source: Health NZ and Stats NZ census ERP

Note: due to rounding, totals are not exact

Table 172: Northern Region population estimates by prioritised ethnic group, 2023

Ethnic group	Tāmaki Makaurau (Auckland)	Te Tai Tokerau (Northland)
Māori	210,400	74,100
Pacific	246,600	4,670
Asian	549,900	9,590
Other	758,400	115,900
Total	1,765,300	204,260

Source: Health NZ and Stats NZ census ERP

Note: due to rounding, totals are not exact