Science for Communities

NOTIFIABLE DISEASES IN NEW ZEALAND ANNUAL REPORT 2019

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The information presented in the report was prepared by the Epidemiology Team and other staff from the Health and Environment Group at ESR.

Disclaimer

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

SUMMARY

This report provides a summary of the key trends in notifiable diseases for 2019.

In 2019, a total of 18,776 notifications were reported through New Zealand's notifiable disease database, EpiSurv, compared with 19,313 in 2018.

From 2018 to 2019, notifications of the following diseases increased significantly: acute gastroenteritis, giardiasis, measles, and shiga toxin-producing *Escherichia coli* (STEC) infection (Table 1). Notifications of campylobacteriosis, cryptosporidiosis, dengue fever, invasive pneumococcal disease, mumps, and pertussis decreased significantly.

ENTERIC DISEASES

The introduction of enteric PCR tests from 2015 has had an impact of the number of cases of enteric disease reported in recent years. There were significant increases in acute gastroenteritis, giardiasis, and STEC infection notifications from 2018 to 2019.

In 2019, 487 cases (9.9 per 100,000) of acute gastroenteritis were notified, compared with 231 cases (4.8 per 100,000) in 2018. This increase was largely associated with detection of Enterotoxigenic *Escherichia coli* (ETEC) which accounted for 226 cases in 2019, compared with 14 cases in 2018.

There were 1749 cases (35.6 per 100,000) of giardiasis notified in 2019, compared with 1585 in 2018 (32.7 per 100,000). Contact with faecal matter and recreational water contact were the most common risk factors associated with cryptosporidiosis cases in 2019.

A total of 1101 cases (22.4 per 100,000) of STEC infection was notified in 2019, compared with 925 cases (19.1 per 100,000) in 2018. Notifications of STEC infection have increased markedly since 2014 (187 cases, 4.1 per 100,000), driven by the introduction of tests which are more sensitive to detecting non-O157 serotypes than traditional methods.

There were significant decreases in campylobacteriosis and cryptosporidiosis notifications from 2018 to 2019. A total of 6202 cases (126.1 per 100,000) of campylobacteriosis was notified in 2019, compared with 6957 (143.7 per 100,000) in 2018. Campylobacteriosis remains the most commonly notified disease in New Zealand (33% of all notifications in 2019). There were 1035 cases (21.0 per 100,000) of cryptosporidiosis notified in 2019, compared with 1613 in 2018 (33.3 per 100,000). Contact with farm animals was the most common risk factor associated with cryptosporidiosis cases in 2019.

VACCINE-PREVENTABLE DISEASES

New Zealand experienced a large national measles outbreak in 2019. A total of 2213 cases (45.0 per 100,000) of measles were notified in 2019, compared with 30 cases (0.6 per 100,000) in 2018. The majority (79%) of cases were reported in the Auckland region. The rate for Pacific peoples was 14 times the rate for European/Other, while the rate for Māori was 4 times the European/Other rate. Vaccination status was known for 1965 (89%) cases, of which 1572 (80%) were not immunised. Thirty-three cases were recorded as imported while the remainder were import-related.

There was a significant decrease in invasive pneumococcal disease notifications in 2019 (497 cases, 10.1 per 100,000), compared with 2018 (557 cases, 11.5 per 100,000). Serotype 19A was the most prevalent serotype (65 cases). Eleven deaths due to invasive pneumococcal disease were reported with two deaths in children aged less than 5 years, neither of which were due to vaccine serotypes.

There was a significant decrease in mumps cases in 2019, when 264 cases (5.4 per 100,000) were notified, compared with 435 cases (9.0 per 100,000) in 2018. The outbreak that started in 2017, and was mainly in the Auckland region, was largely over by the end of 2018 but cases have not yet returned to pre-outbreak levels.

There was a significant decrease in pertussis notifications in 2019 (1206 cases, 24.5 per 100,000), compared with 2018 (2956 cases, 61.1 per 100,000) when a national pertussis outbreak occurred.

EXOTIC DISEASES

There was a significant decrease in dengue fever notifications in 2019 (224 cases, 4.6 per 100,000), compared with 2018 (294 cases, 6.1 per 100,000). Almost half (47%, 105/222) of the cases with a known travel history had travelled to Fiji.

Table 1. Number of cases and rate per 100,000 population for selected notifiable diseases in New Zealand, 2018 and 2019

Disease	Number of notifications		Rate per 100,000		Change[d,e]
	2018	2019	2018	2019	
AIDS[a]	14	19	0.3	0.4	↑
Campylobacteriosis	6957	6202	143.7	126.1	↓
Chikungunya fever	11	11	0.2	0.2	NC
Cryptosporidiosis	1613	1035	33.3	21.0	↓
Dengue fever	294	224	6.1	4.6	↓
Gastroenteritis (acute)[b]	231	487	4.8	9.9	↑
Giardiasis	1585	1749	32.7	35.6	↑
Hepatitis A	68	58	1.4	1.2	↓
Hepatitis B[c]	33	28	0.7	0.6	↓
Hepatitis C[c]	34	24	0.7	0.5	↓
Invasive pneumococcal disease	557	497	11.5	10.1	↓
Legionellosis	175	169	3.6	3.4	↓
Leptospirosis	109	96	2.3	2.0	↓
Listeriosis	30	31	0.6	0.6	↑
Malaria	36	28	0.7	0.6	↓
Measles	30	2213	0.6	45.0	↑
Meningococcal disease	120	139	2.5	2.8	↑
Mumps	435	264	9.0	5.4	↓
Paratyphoid fever	18	18	0.4	0.4	NC
Pertussis	2956	1206	61.1	24.5	↓
Rheumatic fever[f]	187	173	3.9	3.5	↓
Salmonellosis	1100	1188	22.7	24.2	↑
Shigellosis	217	222	4.5	4.5	↑
STEC infection	925	1101	19.1	22.4	↑
Tuberculosis disease[g]	308	323	6.4	6.6	↑
Typhoid fever	53	55	1.1	1.1	↑
Yersiniosis	1201	1186	24.8	24.1	↓

[a] Data source: AIDS Epidemiology Group.
[b] Cases of acute gastroenteritis from a common source or person in a high-risk category (eg food handler or childcare worker) or foodborne intoxication, eg, staphylococcal intoxication.
[c] Only acute cases of this disease are notifiable.
[d] ↓↓= significant decrease, ↑↑ = significant increase, NC = no change, ↓ = non-significant decrease, ↑ = non-significant increase.
[e] Fisher's exact tests were used to determine statistical significance. Results are considered statistically significant when $P \leq 0.05$.
[f] Includes rheumatic fever initial episodes and recurrent cases.
[g] Includes new tuberculosis cases and reactivations.

INTRODUCTION

The *Notifiable Diseases in New Zealand: Annual Report 2019* gives an overview of the current state of notifiable diseases in New Zealand. The report includes diseases currently notifiable under the Health Act 1956.

The data presented has been derived from surveillance systems operated by the Institute of Environmental Science and Research Ltd (ESR) and from other organisations in New Zealand.

Surveillance is "the ongoing systematic collection, analysis and interpretation of outcome-specific data for use in the planning, implementation and evaluation of public health practice".[1] A surveillance system "includes the functional capacity for data collection and analysis, as well as the timely dissemination of information derived from these data to enable effective prevention and control activities".[2]

Surveillance provides *information for action*. Specific objectives for disease surveillance may include the following:[3]

- to identify cases of disease that require immediate public health control measures;
- to monitor disease incidence and distribution, and to alert health workers to changes in disease activity in their area;
- to identify outbreaks and support their effective management;
- to assess the impact of disease and help set priorities for prevention and control activities;
- to identify risk factors for diseases so as to support their effective management;
- to evaluate prevention and control activities;
- to identify and predict emerging hazards;
- to monitor changes in disease agents through laboratory testing;
- to generate and evaluate hypotheses about disease aetiology;
- to fulfil statutory and international reporting requirements.

Details about the individual surveillance systems are provided in the 'Surveillance Methods' section of this report.

The focus of this report is on diseases reported in 2019, with the aim of providing information for prevention and control measures. The report presents each notifiable disease, or disease grouping, in alphabetical order.

National data and trends over time are shown in summary tables in the Appendix. Data is also presented for specific population groups including by district health board (DHB), sex, age group and ethnic group.

Information on influenza-like illness and sexually transmitted infections can be found in separate reports at www.surv.esr.cri.nz.

SURVEILLANCE METHODS

INTERPRETING DATA

Data in this report is presented by the date the case was reported to a public health unit (PHU) and not by the date of the onset of illness. In general, cases are allocated to geographic location based on where a medical practitioner first diagnosed them.

Notifiable disease data in this report may differ from that published in other reports depending on:

- the date of data extraction from EpiSurv;
- the date used to aggregate data (eg, the date reported or date of onset of illness);
- whether laboratory-reported cases, notified cases or self-reported cases are used;
- whether the case has been confirmed by laboratory tests.

The information in this report shows disease trends by age group, sex, ethnic group and DHB region.

It should be noted that various factors influence disease notification and therefore the calculation of incidence rates. Where the illness is not severe, cases are less likely to consult a medical practitioner and, even if diagnosed, are less likely to be notified without laboratory confirmation.[4] Issues associated with the cost of and access to healthcare may also determine whether people visit healthcare providers for diagnosis.[5]

The extent to which the data reflects the true incidence of a disease is affected by public awareness of the disease, access to health services, use of diagnostic facilities, case definitions and the interest, resources and priorities of local healthcare services.

This report presents the number of cases and population rates for different ethnic groups. However, caution should be exercised in the interpretation of these numbers as ethnicity information is not always provided, different ethnic groups have different patterns of access to healthcare, and the numbers may not accurately reflect the true burden of disease in the population.

For different ethnic groups, numbers and disease rates are based on a prioritised classification of ethnicity, with the Māori ethnic group at the top of the hierarchy, followed by Pacific peoples, Asian, Middle Eastern/Latin American/African (MELAA) and European or Other (including New Zealander) ethnic groups.

The small New Zealand population and the low number of cases for some diseases mean that the disease rates calculated in this report may be highly variable from year to year. As such, it is necessary to interpret trends with caution. The ‘Analytical Methods’ section contains more information about the calculation of population rates for diseases.

DATA SOURCES

The key sources of data used in this report are described below.

EpiSurv – the national notifiable disease surveillance system

Under the Health Act 1956, health professionals are required to inform their local medical officer of health of any notifiable disease that they suspect or diagnose. Since December 2007, laboratories have also been required to report notifiable diseases to medical officers of health. These notifications provide the basis for surveillance, and therefore control, of these diseases in New Zealand.

Notification data is entered at each PHU via a secure web-based portal into a database (EpiSurv). ESR collates and analyses the near real-time data on behalf of the Ministry of Health. The data collected depends on the specific disease, but usually includes demography, outcome, basis of diagnosis, risk factors and some clinical management information. The current schedule of notifiable diseases is available at www.health.govt.nz/our-work/diseases-and-conditions/notifiable-deseases.

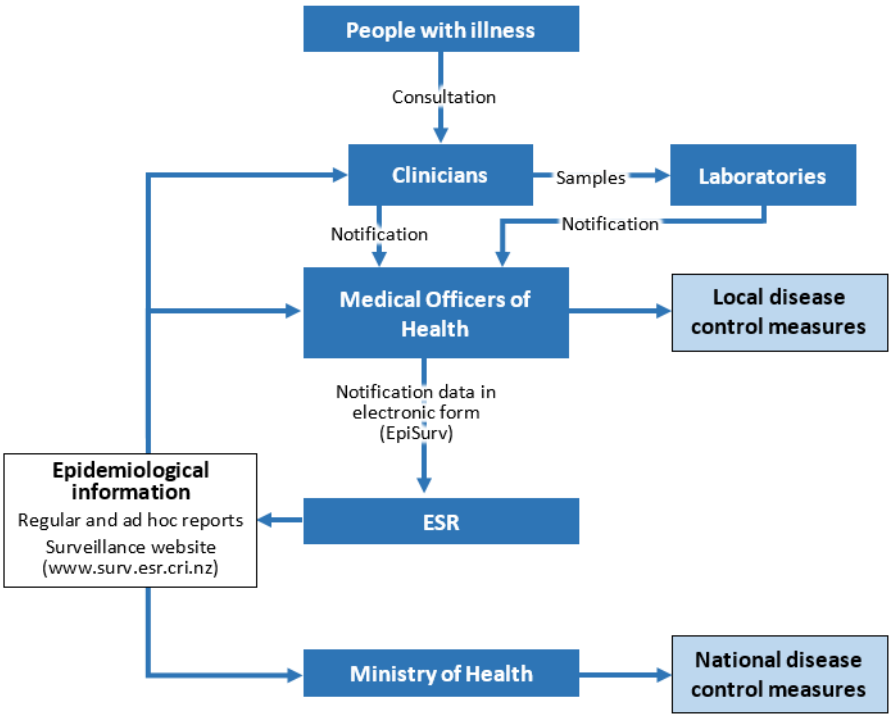
This report includes sections on diseases that are currently notifiable in New Zealand under the Health Act 1956, excluding gonorrhoea, HIV, syphilis, lead absorption and poisoning arising from chemical contamination of the environment. Sexually transmitted infections are reported elsewhere, while Massey University's Centre for Public Health Research is responsible for the collection and reporting of surveillance data on lead absorption and poisoning arising from chemical contamination of the environment.

Case definitions (including laboratory and clinical criteria) for notification of diseases and/or conditions are in the latest version of the Communicable Disease Control Manual.[6]

Information on trigger points for notification of a laboratory test result is in the 'Direct Laboratory Notification of Communicable Diseases: National Guidelines'.[7]

Figure 1 illustrates the major components and information flow of the notifiable disease surveillance system.

Figure 1. Notifiable disease surveillance system



Laboratory-based surveillance

Laboratory results for all organisms that meet the laboratory criteria for notification are reported directly to medical officers of health. After further testing at a reference laboratory, some reported cases may not meet the laboratory criteria of the surveillance case definition. Laboratory-reported cases may also not meet the clinical criteria of the case definition. For this reason, the number of laboratory-reported cases may not match the number of notified cases for some diseases.

Laboratory-based surveillance may be conducted to enhance data gathered by notifiable disease surveillance. Organisms under laboratory-based surveillance include *Legionella* spp., *Leptospira*, *Neisseria meningitidis*, *Salmonella* spp. and invasive *Streptococcus pneumoniae*. For these organisms, isolates are referred to a reference laboratory for confirmation and typing.

Statistics New Zealand

Statistics New Zealand provides the denominator data used to calculate the population rates of disease. Further details are provided in the 'Analytical Methods' section.

Ministry of Health

The Ministry of Health collates national data on patients discharged from publicly funded hospitals. This data is stored as part of the National Minimum Dataset (NMDS) (see www.health.govt.nz for more information). Upon discharge, patients are assigned disease codes using the 10th revision of the International Classification of Diseases (ICD10) coding system.[8] Information provided in this report uses the principal or primary diagnosis, which is the condition that was chiefly responsible for the hospital admission. This may be different from the diagnoses for the patient on admission, while in hospital, or from the final diagnosis after discharge.

Anonymised data for selected diseases was extracted from the NMDS and sent to ESR for analysis and comparison with data from other surveillance systems.

Hospital discharge data presented in this report includes multiple records for patients with chronic notifiable diseases (eg, tuberculosis), for diseases that have long-term health impacts (eg, meningococcal disease) and may include re-admissions for acute diseases (eg, pertussis). For some diseases, the criteria for notification (clinical and laboratory or epidemiological evidence) do not match those required for diagnostic coding. For these reasons, hospitalisation and notification numbers may differ.

Surveillance of AIDS in New Zealand

Since 1989, the AIDS Epidemiology Group (AEG) at the University of Otago has been contracted to collect information about people diagnosed with AIDS through notification to medical officers of health. The use of an AIDS-specific identifier ensures that the identity of the patient is known only to the reporting doctor, but is sufficiently specific to allow detection of duplicate reports.

New Zealand Creutzfeldt-Jakob Disease Registry

The New Zealand Creutzfeldt-Jakob disease (CJD) Registry (the Registry), at the University of Otago was established in 1996 to monitor sporadic, familial, iatrogenic and variant CJD. A medical practitioner must immediately report any suspected cases of CJD directly to the Registry as well as inform the local Medical Officer of Health and the Director of Public Health at the Ministry of Health.[6]

New Zealand Paediatric Surveillance Unit

The New Zealand Paediatric Surveillance Unit (NZPSU) [9] was established in 1997 to provide active surveillance of acute flaccid paralysis (AFP) to fulfil World Health Organization (WHO) requirements for the certification of polio eradication. Since then, other conditions have been added for surveillance by the NZPSU. Conditions currently under surveillance include haemolytic uraemic syndrome (HUS), congenital

rubella syndrome (CRS) and perinatal exposure to human immunodeficiency virus (HIV) (see http://www.otago.ac.nz/nzpsu for a complete list).

Every month, participating paediatricians and other specialists in paediatric practice send either a reply-paid card or an email to the NZPSU to report whether they have seen any cases of the conditions under surveillance in the previous month. The average response rate to the monthly card/email is generally above 90%. The NZPSU then collates and analyses the data. Information from the NZPSU is used in this report to enhance notification data on polio (AFP data), STEC infection (HUS data) and rubella (CRS data).

ANALYTICAL METHODS

Key analytical methods are provided below.

Dates

The notification data contained in this report is based on information recorded on EpiSurv as at 21 February 2020. Changes made to EpiSurv data by PHU staff after this date are largely not reflected in this report. Consequently, future analyses of data may produce revised results. Notification data published in previous annual reports has been updated to reflect cases in EpiSurv as at 21 February 2020.

Disease numbers are reported according to the date of notification. Laboratory results are reported according to the date the specimen was received.

Geographic breakdown

This report provides rates for current DHB regions. The DHB populations used are shown in Table 2. These are from the Statistics New Zealand 2019 mid-year population estimates.

Table 2. District Health Board populations, 2019

DHB	Population
Northland	189,600
Waitemata	624,700
Auckland	498,100
Counties Manukau	579,200
Waikato	428,900
Lakes	115,100
Bay of Plenty	256,100
Tairawhiti	50,100
Taranaki	122,900
Hawke's Bay	175,000
Whanganui	67,400
MidCentral	184,200
Hutt Valley	155,900
Capital & Coast	319,400
Wairarapa	47,700
Nelson Marlborough	158,100
West Coast	32,300
Canterbury	569,700
South Canterbury	61,400
Southern	343,000
Total	**4,979,300**

Map classification scheme

On the maps provided in this report, the darkest colour represents the highest disease notification rates and the lightest colour represents the lowest rates. The dark grey colour shows where there was insufficient data (fewer than five cases) to calculate a rate.

Case status for notifications

All notifications recorded in EpiSurv that meet the case definitions [6], apart from cases classified as ‘not a case’, are included for analysis in this report. In some instances, the investigation of a case may not be complete and the status may be set to ‘under investigation’. These cases are included in this report. Any changes to the final case status will be reflected in future surveillance reports.

Population rate calculations for diseases

The denominator data used to determine disease rates (except the data used to determine disease rates for ethnic groups) has been derived from the 2019 mid-year population estimates published by Statistics New Zealand.

Denominator data used to determine disease rates for ethnic groups is based on population projections by prioritised ethnic group for 2019 produced by Statistics New Zealand. according to assumptions agreed to by the Ministry of Health. Population projections are only available for Maori, Pacific, Asian and Other so MELAA was estimated as 1.7% of Other - based on 2013 census data proportions. Ethnicity is prioritised in the following order: Māori, Pacific peoples, Asian, MELAA, European or Other (including New Zealander) ethnic groups.

Rates are not calculated where a category has fewer than five notified cases. Calculating population rates from fewer than five cases produces unstable rates.

Percentages

Percentages are calculated using the total number of cases for which the information was known as the denominator, unless specified otherwise. Cases with ‘unknown’ information are excluded from the denominator. These percentages are usually presented with numbers in brackets that show the numerator and denominator used, eg, 49.3% (523/1061).

Risk factors and sources of infection

For many diseases, an analysis of exposure to risk factors for the cases is reported. These risk factors are those included in the current EpiSurv case report forms. More than one risk factor is often reported for each case. The reporting of exposure to a risk factor does not mean that this was the source of the infection.

Vaccination data

Data on vaccinations is reported for a number of vaccine-preventable diseases. This represents the vaccination status of the case as reported in EpiSurv and has not been routinely validated against the National Immunisation Register.

Statistical tests

Fisher's exact tests were used to determine statistical significance. Results are considered to be statistically significant where $P \leq 0.05$.

LIMITATIONS OF SURVEILLANCE DATA

Quality

Quality assurance in the collection and reporting of notifiable disease data in EpiSurv is supported by validation at the time of data entry (eg, automated fields), regular (weekly, monthly, quarterly, annual) data quality reports run by ESR on key reporting fields, and liaison with PHUs.

Sensitivity

Sensitivity is a measure of our ability to identify the true burden of disease. More common and less severe diseases such as acute gastroenteritis are significantly less likely to be notified than diseases such as meningococcal disease.[10, 11]

The introduction of new diagnostic methods can alter our ability to detect notifiable diseases over time. For example, diagnostic tests for enteric disease can now screen for multiple disease agents at the same time and increase their detection. Changes in test sensitivity should be considered when interpreting disease trends.

Completeness

The completeness of data recorded in EpiSurv varies among diseases. Table 3 shows the percentage of notifications for which complete data was provided for selected demographic variables from 2010 to 2019.

The completeness of date of birth, age, sex and NHI data remains very high (99%), with little variation over the last eight years. The completeness of ethnicity data in 2019 (97.5%) was higher than in 2018 (93.2%).

Table 3. Complete data for selected EpiSurv variables, 2010–2019

Report year	Completeness of data (%)				
	Date of birth	Age	Sex	Ethnicity	NHI
2010	99.7	99.8	99.5	91.5	94.9
2011	99.6	99.7	99.0	95.7	94.6
2012	99.7	99.8	100.0	95.9	96.8
2013	99.7	99.8	100.0	95.3	97.5
2014	99.8	99.9	100.0	94.6	97.0
2015	99.8	99.8	100.0	94.9	97.7
2016	99.9	100.0	100.0	96.2	98.4
2017	99.9	99.9	100.0	96.0	98.7
2018	99.9	99.9	99.9	93.2	99.0
2019	99.9	99.9	99.9	97.5	98.7

Accuracy

A limitation to accuracy is the identification of cases on the basis of serology, which may not be as specific as isolating the implicated organism or detecting it using polymerase chain reaction (PCR).

Timeliness

Timely receipt of information is essential for appropriate public health investigation and action.

Table 4 shows a summary of the timeliness of notifications by disease for 2019.

In 2019, 68.7% of disease notifications had an onset date recorded (compared with 70.4% in 2018). Of these, 54.7% were reported to a public health unit (PHU) within one week of the onset of symptoms and 79.5% were reported within two weeks of the onset of symptoms.

For some diseases, reporting delays are related to the nature of the symptoms, leading to late presentation eg, giardiasis, pertussis, rheumatic fever, tuberculosis disease. For other diseases there may be delays in confirmation of the diagnosis due to the particular laboratory test required eg, leptospirosis.

In 2019, 82.5% (82.9% in 2018) of the notifications were entered into EpiSurv within a day of being reported to a PHU and over 99% were entered within one week.

Table 4. Timeliness of disease reporting and data entry for selected notifiable diseases, 2019

Disease	Onset date recorded (%)	Reporting delay (%)[a]		Entry delay (%)[b]		
		≤1 week	≤2 weeks	≤1 day	≤1 week	≤2 weeks
Campylobacteriosis	53.2	61.8	89.7	79.5	99.8	100.0
Chikungunya fever	81.8	0.0	33.3	54.5	100.0	100.0
Cryptosporidiosis	54.4	44.2	81.3	80.3	99.8	100.0
Dengue fever	92.0	39.8	78.6	89.3	99.1	100.0
Gastroenteritis (acute)[c]	93.6	50.3	83.1	81.3	96.1	97.7
Giardiasis	51.2	24.6	51.5	80.4	99.8	100.0
Hepatitis A	89.7	61.5	90.4	91.4	100.0	100.0
Invasive pneumococcal disease	76.5	71.1	92.4	83.1	98.8	100.0
Legionellosis	82.8	41.4	81.4	81.1	100.0	100.0
Leptospirosis	88.5	36.5	64.7	65.6	100.0	100.0
Measles	95.1	86.0	97.9	91.8	100.0	100.0
Meningococcal disease	97.8	91.9	97.8	95.0	100.0	100.0
Pertussis	92.5	19.9	46.3	86.5	100.0	100.0
Rheumatic fever - initial episode	89.6	32.9	55.5	89.0	97.1	97.7
Salmonellosis	85.7	60.6	87.9	82.4	99.9	100.0
Shigellosis	89.2	44.9	82.3	80.6	100.0	100.0
STEC infection	87.9	53.4	78.2	78.5	99.8	100.0
Tuberculosis disease	71.5	3.5	8.2	90.1	99.7	100.0
Typhoid fever	90.9	28.0	80.0	96.4	100.0	100.0
Yersiniosis	50.4	28.9	62.4	79.8	99.9	100.0
Other	58.4	76.5	88.1	85.5	97.3	98.2
Total	**68.7**	**54.7**	**79.5**	**82.5**	**99.6**	**99.8**

[a] Percentage of notifications reported (with onset date recorded) to a public health unit within 1 week and 2 weeks of the onset of symptoms.
[b] Percentage of notifications entered into EpiSurv within 1 day, 1 week and 2 weeks of being reported to a PHU.
[c] Cases of acute gastroenteritis from a common source or person in a high-risk category (eg food handler or childcare worker) or foodborne intoxication, eg, staphylococcal intoxication.

NOTIFIABLE DISEASES

Acquired immunodeficiency syndrome

Acquired immunodeficiency syndrome (AIDS) is a notifiable disease in New Zealand. The AIDS Epidemiology Group (AEG) within the University of Otago carries out national AIDS/HIV surveillance. More detailed information is available from the AEG website: https://www.otago.ac.nz/aidsepigroup/newsletters/

In 2019, 19 cases of AIDS were reported to the AEG compared with 14 cases in 2018.

The 2019 and 2018 AIDS notification rates were similar (0.4 and 0.3 per 100,000 population, respectively).

The cases ranged from ages 30 to 68 years, with a mean age of 52.0 years.

Fourteen cases were male and five were female.

Nine cases were of European or Other ethnicity, four Māori, three Asian, two Pacific and one was MELAA.

Ten cases (53.0%) were men who had sex with other men (MSM), seven (37.0%) were infected heterosexually, and for two cases (10.0%) the means of infection was not reported.

One death from AIDS was reported in 2019.

Anthrax

No cases of anthrax were notified in 2019. The last case was notified in 1940. New Zealand has been considered free of anthrax since the last recorded outbreak among domestic livestock in 1954.[12]

Arboviral diseases

This section includes arboviral diseases with cases notified since 1997. Dengue fever and yellow fever are reported in separate sections later in the report.

Barmah Forest virus infection

No cases of Barmah Forest virus infection were notified in 2019. Six cases have been notified since 1997, most recently two cases in 2009, all with a history of travel to Australia.

Chikungunya fever

Eleven cases of Chikungunya fever were notified in 2019, the same number as in 2018. All cases were laboratory confirmed.

The cases were aged 30–39 (5 cases), 20–29 and 50–59 (3 cases each) years. Eight cases were male and three were female. Seven cases were of European or Other ethnicity, two were Asian, one was Māori and one MELAA.

Hospitalisation status was recorded for 10 cases, of which two (20.0%) were hospitalised.

All 11 cases had travelled overseas during the incubation period for the disease or had a prior travel history that could account for their infection. The countries visited or lived in were Thailand (5 cases), India (4 cases), Australia and Singapore (2 cases each), Cambodia, England, Fiji, France, Japan, Maldives, and Vietnam (1 case each). Some cases reported travel to more than one country.

Japanese encephalitis

No cases of Japanese encephalitis were notified in 2019. Since 1997, only one case of Japanese encephalitis has been notified (in 2004).

Ross River virus infection

Five cases of Ross River virus infection were notified in 2019, compared with one case in 2018. All five cases were laboratory confirmed.

The cases were aged 60–69 (2 cases), 15–19, 30–39 and 50–59 (1 case each) years. Four cases were female, and one was male. All cases were of European or Other ethnicity.

No cases were hospitalised.

Four cases had been in Australia, one of these had also been in Indonesia. The fifth case had been in Vietnam during the incubation period for the disease and was classified as probable because only low levels of IgM antibodies were detected and Ross River virus has not previously been reported in Vietnam.

Zika virus infection

Seven cases of Zika virus infection were notified in 2019, compared with two cases in 2018. All cases were laboratory confirmed.

The cases were aged 40–49 (3 cases), 30–39 and 50–59 (2 cases each) years. Five cases were male and two cases were female (one of whom was pregnant). Six cases were of European or Other ethnicity and one was Asian.

One case was hospitalised.

All cases had travelled overseas during the incubation period for the disease. The countries visited or lived in were Fiji (4 cases), Cambodia, Myanmar, Thailand, Vietnam, and Zimbabwe (1 case each). Some cases reported travel to more than one country.

Botulism

No cases of botulism were notified in 2019. The most recent case of botulism was notified in 2014. Prior to that, two cases were reported in 1985.[13]

Brucellosis

Two laboratory-confirmed cases of brucellosis were notified in 2019. One case was a male aged 30–39 years who had been in India during the incubation period. The other was a male aged 60–69 years, with no recent travel history, who had worked with pigs and cattle in Australia and New Zealand and was considered to have been exposed a number of years earlier.

Since 1997, 21 cases of brucellosis have been notified. There has been no evidence of locally acquired brucellosis in humans since New Zealand's declaration of freedom from bovine brucellosis in 1996.[14]

Campylobacteriosis

In 2019, 6202 cases of campylobacteriosis were notified, compared with 6957 cases in 2018. The 2019 rate of 126.1 per 100,000 was a significant decrease from the 2018 rate of 143.7 per 100,000. Campylobacteriosis is the most commonly notified disease, accounting for 33.1% of all notifications in 2019. Since 2008, the annual number of campylobacteriosis cases reported has been much lower than in preceding years (Figure 2).

Figure 2. Campylobacteriosis notifications by year, 2000–2019

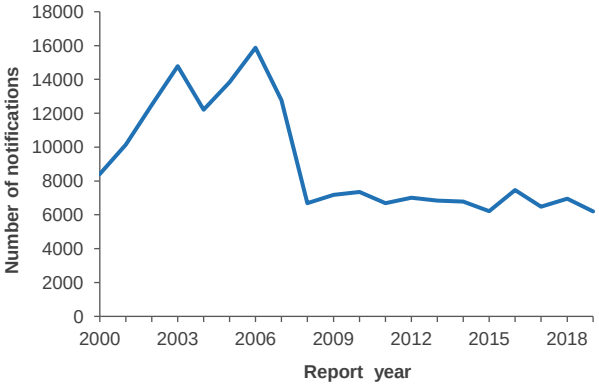
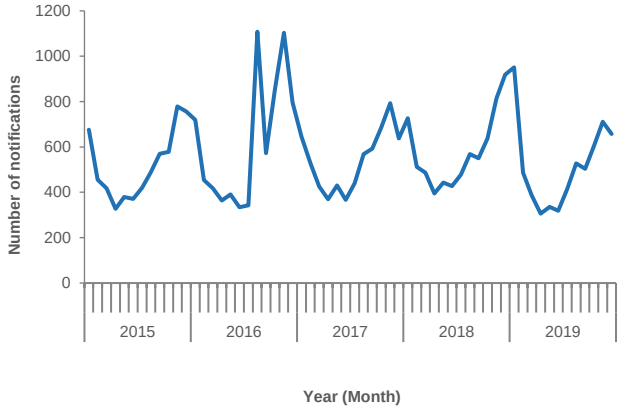


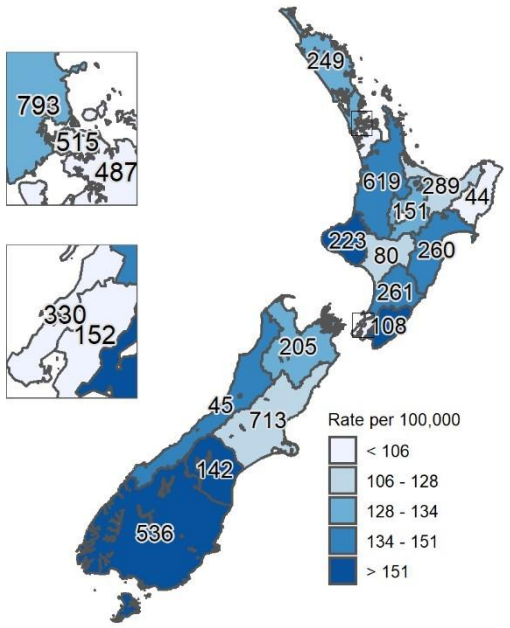
Figure 3 shows campylobacteriosis notifications by month since 2015. There is a distinct seasonal pattern, with an early summer peak and a winter trough. However, this trend was disrupted in 2016, due to a large outbreak in Hawke's Bay in August (964 cases were linked to the outbreak). The second peak in October 2016 is due to some cases with an onset date in August/September being reported late.

Figure 3. Campylobacteriosis notifications by month, January 2015–December 2019



The highest notification rates for campylobacteriosis were reported from South Canterbury, Wairarapa, Taranaki and Southern DHBs (232.4, 226.9, 181.6 and 158.0 per 100,000 respectively) (Figure 4).

Figure 4. Campylobacteriosis notifications by DHB, 2019



Numbers represent notification count in DHB region.
Where fewer than five rates are not shown.

Table 5. Exposure to risk factors associated with campylobacteriosis, 2019

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Consumed food from retail premises	917	996	4289	47.9
Contact with farm animals	1036	1228	3938	45.8
Consumed untreated water	580	1367	4255	29.8
Consumed water other than regular supply (home or work)	468	1505	4229	23.7
Recreational water contact	497	1638	4067	23.3
Contact with faecal matter	326	1762	4114	15.6
Travelled overseas during the incubation period	394	2376	3432	14.2
Attended school, preschool or childcare	367	2230	3605	14.1
Contact with other symptomatic people	244	1804	4154	11.9

[a] Percentage refers to the number of cases that answered "yes" out of the total number of cases for which this information was known. Some cases had more than one risk factor recorded.

Children aged 1–4 years (242.7 per 100,000) and infants aged less than 1 year (214.6 per 100,000) had the highest notification rates.

Sex was recorded for 6201 cases. Males (146.7 per 100,000) had a higher rate than females (106.1 per 100,000).

Ethnicity was recorded for 5867 (94.6%) cases. The ethnic group with the highest notification rate for campylobacteriosis was European or Other (160.5 per 100,000), followed by MELAA (93.3 per 100,000) and Māori (67.4 per 100,000).

Further information by DHB, sex, age and ethnic group is in Table 33 to Table 36 in the Appendix.

Hospitalisation status was recorded for 3899 (62.9%) cases, of which 537 (13.8%) cases were hospitalised.

Consumption of food from retail premises and contact with farm animals were the most common risk factors for campylobacteriosis (Table 5). Multiple risk factors are often reported for each case.

In 2019, 20 outbreaks of campylobacteriosis were reported, involving 156 cases (Table 27).

Cholera

No cases of cholera were notified in 2019. Since 1997, a total of 13 laboratory-confirmed cases of cholera have been notified, with the last case reported in 2018. All 13 cases were overseas during the incubation period for the disease.

Creutzfeldt-Jakob disease

The New Zealand Creutzfeldt-Jakob Disease (CJD) Surveillance Registry is responsible for receiving notifications of suspected cases of CJD, undertaking a review of each notified case, and providing advice and reporting on CJD in New Zealand. This section is based on the 23rd annual report of the CJD Registry (1 January 2019 to 31 December 2019).[15]

In 2019, 11 cases of suspected sporadic CJD (sCJD) were referred to the New Zealand CJD Registry for evaluation. These cases were subsequently classified as one definite case, five probable cases, and five cases that did not meet surveillance criteria for possible CJD.

The six definite or probable cases were aged 50–59 (2 cases), 60–69 years (1 case), and 70 years and over (3 cases).

Four cases were female and two were male.

Since 1997, the Registry has documented 113 cases of sCJD, consisting of 51 definite and 62 probable cases.

No cases of variant CJD, the form linked with bovine spongiform encephalopathy, have been identified in New Zealand to date.

Cronobacter species invasive disease

Cronobacter species invasive disease (previously known as *Enterobacter sakazakii*) has been notifiable in New Zealand since mid-2005. In December 2017, the case definition of *Cronobacter* species invasive disease was restricted to infants less than 1 year old.

No cases of *Cronobacter* species invasive disease were notified in 2019, and there have been no cases in infants or neonates since it became notifiable in mid-2005.

Cryptosporidiosis

In 2019, 1035 cases of cryptosporidiosis were notified, compared with 1613 in 2018 (Figure 5). The 2019 notification rate (21.0 per 100,000) was a significant decrease from the 2018 rate (33.3 per 100,000).

Figure 5. Cryptosporidiosis notifications by year, 2000–2019

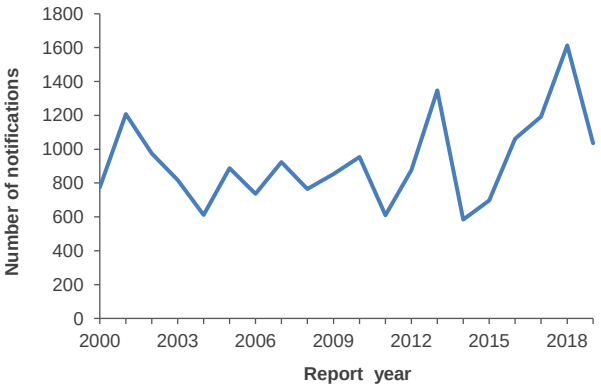
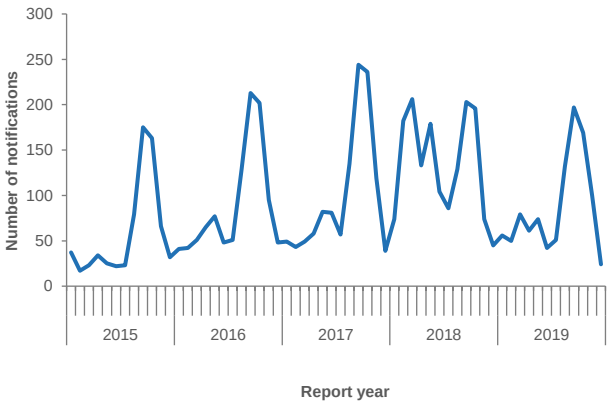


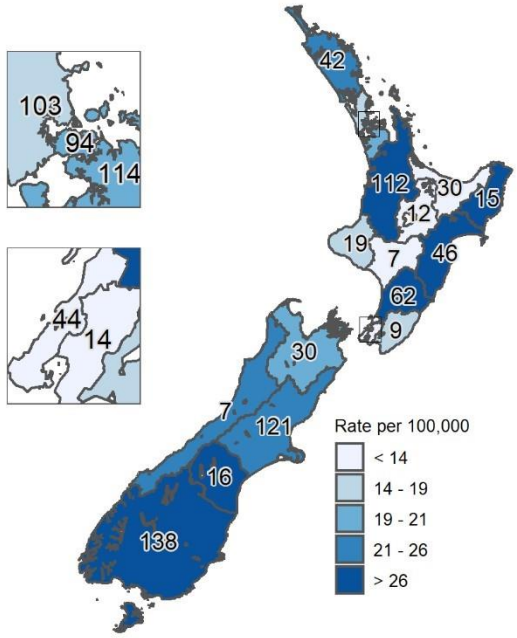
Figure 6 shows cryptosporidiosis cases by month since 2015. There is a distinct seasonal pattern, with the highest number of notifications generally reported during spring each year. The introduction of more sensitive diagnostic testing methods from 2015 has affected recent trends.

Figure 6. Cryptosporidiosis notifications by month, January 2015–December 2019



In 2019, the highest notification rates for cryptosporidiosis were reported from Southern, MidCentral and Tairawhiti DHBs (40.7, 33.8 and 30.4 per 100,000 respectively (Figure 7).

Figure 7. Cryptosporidiosis notifications by DHB, 2019



Numbers represent notification count in DHB region.
Where fewer than five rates are not shown.

Children aged 1–4 years (101.6 per 100,000), had the highest notification rate followed by infants aged less than 1 year (33.5 per 100,000) and children aged 5–9 years (30.3 per 100,000). Almost half (42.4%) of all cases were in children aged less than 15 years.

Females (22.4 per 100,000) had a higher rate than males (19.6 per 100,000).

Ethnicity was recorded for 1017 (98.3%) cases. The ethnic group with the highest notification rate for cryptosporidiosis was European or Other (26.0 per 100,000), followed by MELAA (19.4 per 100,000).

Further information by DHB, sex, age and ethnic group is in Table 33 to Table 36 in the Appendix.

Hospitalisation status was recorded for 649 cases (62.7%), of which 62 (9.6%) cases were hospitalised.

Contact with farm animals, consuming untreated water and attending school, preschool or childcare were the most common risk factors associated with cryptosporidiosis cases in 2019 (Table 6).

In 2019, 15 outbreaks of cryptosporidiosis were reported, involving 92 cases (Table 27).

Table 6. Exposure to risk factors associated with cryptosporidiosis, 2019

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Contact with farm animals	292	212	531	57.8
Consumed untreated water	153	285	597	34.9
Attended school, preschool or childcare	187	359	489	34.2
Recreational water contact	138	354	543	28.1
Contact with faecal matter	128	352	555	26.7
Consumed food from retail premises	114	334	587	25.5
Contact with other symptomatic people	113	369	553	23.4
Consumed water other than regular supply	107	359	569	23.0
Travelled overseas during the incubation period	50	507	478	9.0

[a] Percentage refers to the number of cases that answered "yes" out of the total number of cases for which this information was known. Some cases have more than one risk factor recorded.

Cysticercosis

No cases of cysticercosis were notified in 2019. Since 1997, nine cases have been notified.

Decompression sickness

Three cases of decompression sickness were notified in 2019. The cases were aged 30–39, 40–49 and 50–59 years. All three cases were male.

Ministry of Health hospital discharge data for 2019 included 33 cases where decompression sickness was the principal diagnosis (Table 32).

Over the last five years, the number of hospitalisations with decompression sickness as the principal diagnosis has ranged from 16 to 33 annually, compared with only four notifications in EpiSurv during this time, indicating consistent under-notification of this condition.

Dengue fever

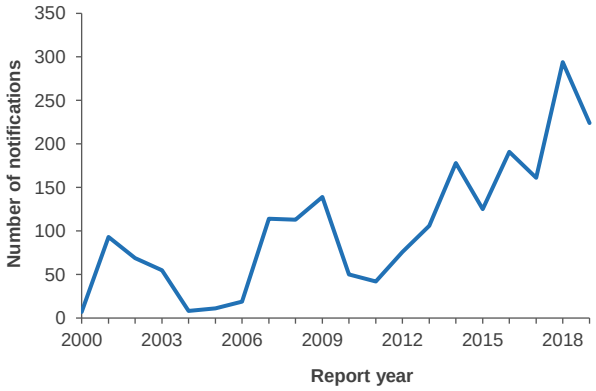
In 2019, 224 cases of dengue fever were notified, compared with 294 cases in 2018 (Figure 8). The 2019 notification rate (4.6 per 100,000) was a significant decrease from the 2018 rate (6.1 per 100,000). Of the 224 cases, 219 (97.8%) were laboratory confirmed.

Adults aged 30–39 years (7.7 per 100,000) had the highest notification rate followed by those aged 40–49 years (6.4 per 100,000).

Males and females had similar rates (4.5 and 4.6 per 100,000, respectively).

Ethnicity was recorded for 223 (99.6%) cases. The ethnic group with the highest notification rate was MELAA (9.7 per 100,000) followed by Asian (6.5 per 100,000).

Figure 8. Dengue fever notifications by year, 2000–2019



Further information by DHB, sex, age and ethnic group is in Table 33 to Table 36 in the Appendix.

Hospitalisation status was recorded for 194 (86.6%) cases, of which 67 (34.5%) were hospitalised.

Travel history was known for 222 (99.6%) cases. The countries most commonly visited or lived in were Fiji (105 cases), India (23 cases), Thailand (23 cases), and Indonesia (22 cases). Some cases reported travel to more than one country.

Diphtheria

One confirmed case of cutaneous toxigenic diphtheria was notified in 2019. The case was aged 5–9 years and was a recent arrival from Papua New Guinea.

The last case of toxigenic respiratory diphtheria was notified in 1998.[16]

In 2019, the Special Bacteriology Laboratory at ESR received isolates of *Corynebacterium diphtheriae* for toxin testing from 55 patients. The majority (41 isolates, 74.5%) were from cutaneous sources, seven were from the throat and seven were from other sites. One isolate from a cutaneous source was found to be toxigenic.

Gastroenteritis (acute)

Not all cases of acute gastroenteritis are notifiable. Cases thought to be related to a common source, as well as those occurring in a person in a high-risk category (eg, food handler or early childhood service worker) are notifiable. Single cases of chemical, bacterial or toxic food poisoning are also notifiable under this category. Botulism and toxic shellfish poisoning (TSP) are reported in separate sections elsewhere in this report. Diseases and conditions that are notifiable separately (eg, campylobacteriosis, giardiasis, STEC infection and salmonellosis) are reported in their own sections.

In 2019, 487 cases of acute gastroenteritis (other than botulism and TSP) were notified. The 2019 notification rate of 9.9 per 100,000 was significantly higher than the 2018 rate of 4.8 (231 cases). A causal agent was reported for 330 (67.8%) cases. Of these, the most common cause was enterotoxigenic *Escherichia coli* (46.4%, 226 cases). The distribution of acute gastroenteritis cases by cause is shown in Table 7.

The highest notification rates for acute gastroenteritis were reported from Bay of Plenty, Lakes, Wairarapa and Waikato DHBs (47.1, 35.8, 29.4 and 29.1 per 100,000 respectively).

Infants aged less than 1 year had the highest notification rate (18.4 per 100,000), followed by adults aged 60–69 years and children aged 1–4 years (13.9 and 13.8 per 100,000 respectively).

Females (10.3 per 100,000) had a higher rate than males (9.4 per 100,000).

The ethnic group with the highest notification rate was European or Other (11.8 per 100,000), followed by MELAA (9.7 per 100,000) and Māori (9.0 per 100,000).

Table 7. Acute gastroenteritis cases by cause, 2019

Cause[a]	Cases	Percentage (%)
Cause identified	**330**	**67.8**
Enterotoxigenic *Escherichia coli* (ETEC)	226	46.4
Vibrio parahaemolyticus	49	10.1
Norovirus	20	4.1
Enteropathogenic *Escherichia coli* (EPEC)	12	2.5
Histamine (scombroid) poisoning	10	2.1
Ciguatera fish poisoning	10	2.1
Chemical food poisoning	1	0.2
Rotavirus	1	0.2
Tutin poisoning	1	0.2
Cause not identified	**157**	**32.2**

[a] Does not include diseases that are notifiable separately.
Note: there may be more cases associated with specific causes through outbreak reporting, see Appendix.

Hospitalisation status was recorded for 468 (96.1%) cases, of which 37 cases (7.9%) were hospitalised.

The most common risk factor associated with acute gastroenteritis was consumption of food from retail premises (Table 8).

In 2019, 419 outbreaks of acute gastroenteritis were reported, involving 7782 cases (Table 27).

Table 8. Exposure to risk factors associated with acute gastroenteritis, 2019

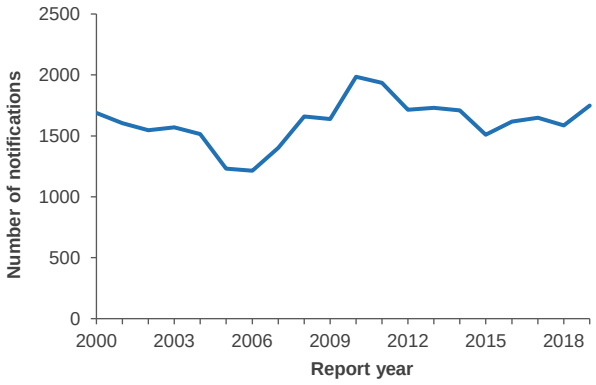
Risk factor	Yes	No	Unknown	Percentage (%)[a]
Consumed food from retail premises	259	119	109	68.5
Travelled overseas during the incubation period	183	253	51	42.0
Consumed water other than regular supply	130	235	122	35.6
Recreational water contact	109	266	112	29.1
Contact with other symptomatic people	94	278	115	25.3
Contact with farm animals	58	327	102	15.1
Consumed untreated water	48	286	153	14.4
Contact with human faecal matter	46	321	120	12.5

[a] Percentage refers to the number of cases that answered "yes" out of the total number of cases for which this information was known. Some cases had more than one risk factor recorded.

Giardiasis

In 2019, 1749 cases of giardiasis were notified, compared with 1585 in 2018. The 2019 notification rate (35.6 per 100,000) was significantly higher than the 2018 rate (32.7 per 100,000). Figure 9 shows giardiasis notifications by year from 2000 to 2019.

Figure 9. Giardiasis notifications by year, 2000–2019



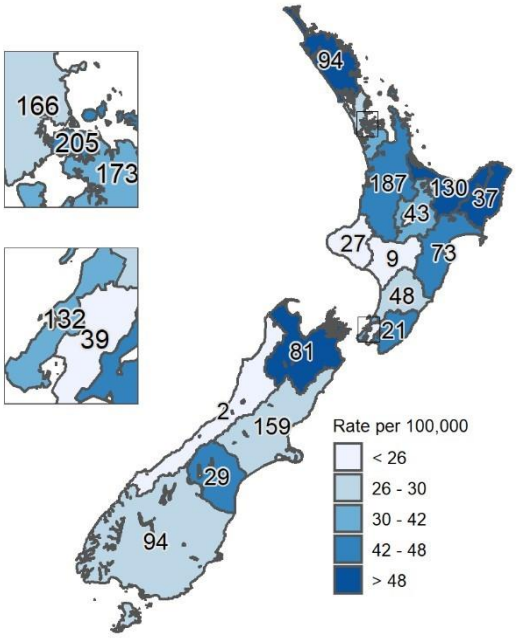
The highest notification rates for giardiasis were reported from Tairawhiti, Nelson Marlborough, Bay of Plenty, Northland and South Canterbury DHBs (75.1, 51.6, 51.4, 49.8 and 47.5 per 100,000 respectively) (Figure 10).

Children aged 1–4 years (126.0 per 100,000) had the highest notification rate followed by adults aged 30–39 years (59.2 per 100,000).

Males (37.0 per 100,000) had a higher rate than females (34.2 per 100,000).

Ethnicity was recorded for 1705 (97.5%) cases. The ethnic group with the highest notification rate for giardiasis was European or Other (45.6 per 100,000), followed by MELAA (36.9 per 100,000).

Figure 10. Giardiasis notifications by DHB, 2019



Numbers represent notification count in DHB region.
Where fewer than five rates are not shown.

Further information by DHB, sex, age and ethnic group is in Table 33 to Table 36 in the Appendix.

Hospitalisation status was recorded for 1148 (65.6%) cases, of which 43 (3.7%) were hospitalised.

The most commonly reported risk factors for giardiasis were contact with faecal matter and recreational contact with water (Table 9).

In 2019, 24 giardiasis outbreaks were reported, involving 145 cases (Table 27).

Table 9. Exposure to risk factors associated with giardiasis, 2019

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Contact with faecal matter	354	445	950	44.3
Recreational water contact	322	517	910	38.4
Contact with other symptomatic people	308	512	929	37.6
Consumed water other than regular supply	284	542	923	34.4
Consumed untreated water	247	498	1004	33.2
Contact with farm animals	276	578	895	32.3
Consumed food from retail premises	198	482	1069	29.1
Attended school, preschool or childcare	231	680	838	25.4
Contact with faecal matter	354	445	950	44.3

[a] Percentage refers to the number of cases that answered “yes” out of the total number of cases for which this information was known. Some cases had more than one risk factor recorded.

Haemophilus influenzae serotype b disease

In 2019, two cases of *Haemophilus influenzae* serotype b (Hib) disease were notified, compared with three in 2018. Both cases were laboratory confirmed.

One case was a female, aged 50–59 years, and one was a male, aged 60–69 years.

One case was of Māori ethnicity, and one was European or Other.

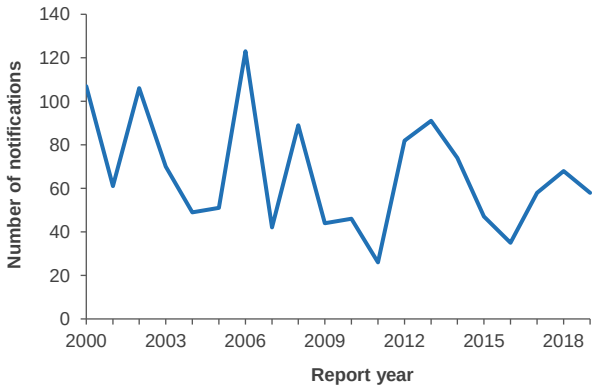
Both cases were unvaccinated.

A Hib vaccine was introduced in January 1994. The current vaccination schedule consists of a primary course of three doses of DTaP-IPV-HepB/Hib vaccine for infants when aged 6 weeks, 3 months and 5 months, and a booster of Hib vaccine when aged 15 months.[17]

Hepatitis A

In 2019, 58 cases of hepatitis A were notified, compared with 68 cases in 2018. The 2019 notification rate (1.2 per 100,000) was similar to the 2018 rate (1.4 per 100,000). Since 2000, annual notification numbers have fluctuated, ranging from 26 cases in 2011 to 123 cases in 2006 (Figure 11).

Figure 11. Hepatitis A notifications by year, 2000–2019



Counties Manukau (3.4 per 100,000), Auckland (1.9 per 100,000) and Waitemata (1.8 per 100,000) DHBs had the highest notification rates.

Young adults aged 15–19 years (2.2 per 100,000), children aged 1–4 years and adults aged 20–29 years (both 2.0 per 100,000) had the highest notification rates.

Males (1.3 per 100,000) had a similar rate to females (1.1 per 100,000).

Ethnicity was recorded for 56 cases (96.6%). The ethnic group with the highest notification rate for hepatitis A was Pacific peoples (5.3 per 100,000), followed by Asian (2.5 per 100,000).

Hospitalisation status was recorded for 57 cases (98.3), of which 36 (63.2%) were hospitalised.

Travel information was recorded for 55 (94.8%) cases, with 32 cases (58.2%) having travelled overseas during the incubation period for the disease. The countries most commonly visited were India and Samoa (7 cases each), Fiji (5 cases), Indonesia (4 cases), Tonga and the United States (3 cases). Four cases reported travel to more than one country.

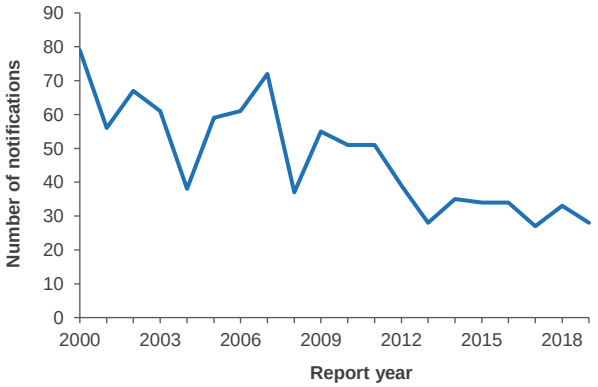
In 2019, two outbreaks of hepatitis A were reported, involving 13 cases (Table 27).

Hepatitis B

Only acute hepatitis B is notifiable, so notification rates do not give an indication of the burden of chronic hepatitis B infection.

In 2019, 28 cases of hepatitis B were notified, compared with 33 cases in 2018. The 2019 notification rate (0.6 per 100,000) was similar to the 2018 rate (0.7 per 100,000). The annual number of hepatitis B cases has ranged from 27 to 34 in the last five years (Figure 12).

Figure 12. Acute hepatitis B notifications by year, 2000–2019



There has been a decrease in the number of hepatitis B cases since 1984 when over 600 cases were notified. This decrease is primarily due to the introduction of hepatitis B vaccine to the national immunisation schedule in 1988.[17]

Counties Manukau DHB had the highest number of cases (5 cases), followed by Canterbury (4 cases), Lakes and Southern DHBs (3 cases each).

Adults aged 30–39 years (1.1 per 100,000) and 50–59 years (0.8 per 100,000) had the highest notification rates.

Table 10. Exposure to risk factors associated with acute hepatitis B, 2019

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Travelled overseas during the incubation period	9	15	4	37.5
Body piercing/tattooing in the last 12 months	5	18	5	21.3
Sexual contact with confirmed case or carrier	3	12	13	20.0
Household contact with confirmed case or carrier	4	17	7	19.0
History of injecting drug use	1	22	5	4.3
Case is a blood product or tissue recipient	1	22	5	4.3

[a] Percentage refers to the number of cases that answered "yes" out of the total number of cases for which this information was known. Some cases had more than one risk factor recorded.

Males (0.9 per 100,000) had a higher rate than females (0.3 per 100,000).

Ethnicity was recorded for all 28 cases. The ethnic group with the highest notification rate for hepatitis B was Māori (1.2 per 100,000, 10 cases), followed by European or Other (0.4 per 100,000, 12 cases).

Hospitalisation status was recorded for all 28 cases, of which 16 (57.1%) were hospitalised.

The most commonly reported risk factors for hepatitis B were overseas travel, body piercing/tattooing in the last 12 months, and sexual or household contact with a confirmed case or carrier (Table 10).

Hepatitis C

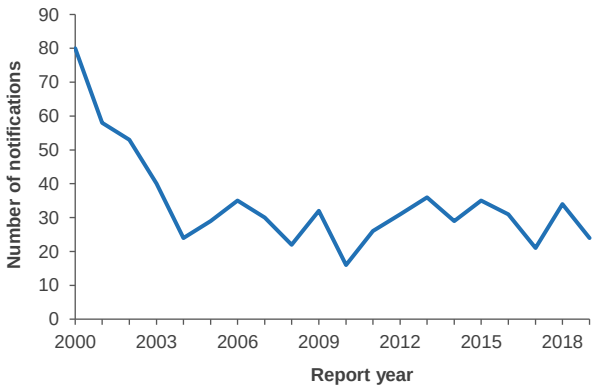
Only acute hepatitis C is notifiable, so notification rates do not give an indication of the burden of chronic hepatitis C infection.

In 2019, 24 cases of hepatitis C were notified compared with 34 cases in 2018. The 2019 notification rate (0.5 per 100,000) was slightly lower than the 2018 rate (0.7 per 100,000).

After a peak of 102 cases in 1998, notifications steadily declined until 2004. The number of notifications has ranged from 21 to 35 in the last five years (Figure 13).

Canterbury DHB had the highest number of cases (7 cases), followed by Southern (4 cases), Northland, Counties Manukau and Nelson Marlborough (3 cases each).

Figure 13. Acute hepatitis C notifications by year, 2000–2019



Adults aged 30–39 years (1.2 per 100,000, 8 cases) had the highest notification rate. No more than four cases were reported in any other age group, so rates were not calculated.

Males (0.6 per 100,000) had a slightly higher rate than females (0.4 per 100,000).

Ethnicity was recorded for 22 (91.7%) cases. The ethnic group with the highest notification rate for hepatitis C was Māori (0.6 per 100,000, 5 cases), followed by European or Other (0.5 per 100,000, 15 cases).

Hospitalisation status was recorded for 22 (91.7%) cases, of which five (22.7%) were hospitalised.

The most commonly reported risk factors for hepatitis C were history of injecting drug use and sexual or household contact with a confirmed case or carrier (Table 11).

Table 11. Exposure to risk factors associated with acute hepatitis C, 2019

Risk factor	Yes	No	Unknown	Percentage (%)[a]
History of injecting drug use	10	8	4	55.6
Sexual contact with confirmed case or carrier	7	6	9	53.8
Household contact with confirmed case or carrier	5	6	11	45.5
Body piercing/tattooing in the last 12 months	1	15	6	6.3
Travelled overseas during incubation period	1	16	7	5.9

[a] Percentage refers to the number of cases that answered "yes" out of the total number of cases for which this information was known. Some cases had more than one risk factor recorded.

Hepatitis (viral) not otherwise specified

In 2019, nine cases of hepatitis (viral) not otherwise specified (NOS) were notified, compared with seven cases in 2018. Six cases were hepatitis D and three were hepatitis E.

Hepatitis D

The six hepatitis D cases were aged 30–39 years, 40–49 years and 50–59 years (2 cases each). Four cases were female and two were male.

Five cases were of Pacific ethnicity and one was of Asian ethnicity.

Hospitalisation status was known for four cases; none were hospitalised.

The travel history for all six cases was unknown.

All six cases had co-infection with hepatitis B.

Hepatitis E

The three hepatitis E cases were aged 30–39 years (2 cases) and 60–69 years (1 case). Two cases were male and one was female.

All three cases were of Asian ethnicity.

The hospitalisation status was known for two cases; both were not hospitalised.

Two cases had travelled overseas during the incubation period and one had not.

Highly pathogenic avian influenza

Highly pathogenic avian influenza (HPAI) became a notifiable disease in New Zealand in February 2004. No human cases have been reported in New Zealand and no highly pathogenic avian influenza A(H5N1) has been reported in New Zealand animals.[18]

Hydatid disease

One confirmed case of hydatid disease (*Echinococcus granulosus*) was notified in 2019. The case was aged 70 years and over and died from a ruptured *E. granulosus* cyst. Since 1997, 72 cases of hydatid disease have been notified.

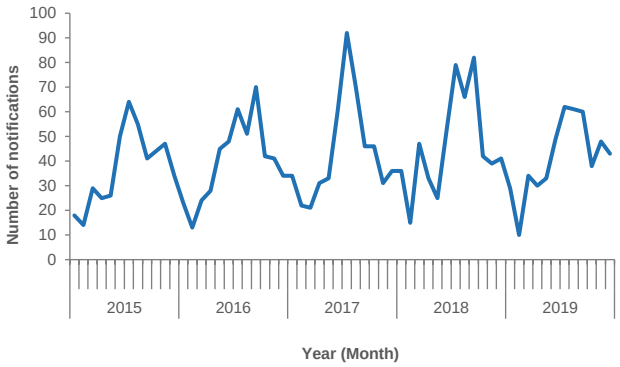
Echinococcus species are notifiable organisms under the Biosecurity Act 1993. All cases of hydatid disease are reported to the Ministry for Primary Industries for investigation of possible disease reservoirs in New Zealand animals. In September 2002, New Zealand was declared provisionally free of hydatids. Given the natural history of the disease, it is expected that cases may occur for some years.

Invasive pneumococcal disease

In 2019, 497 cases of invasive pneumococcal disease (IPD) were notified, compared with 557 cases in 2018. The 2019 notification rate of 10.1 per 100,000 was a significant decrease from the 2018 rate of 11.5 per 100,000.

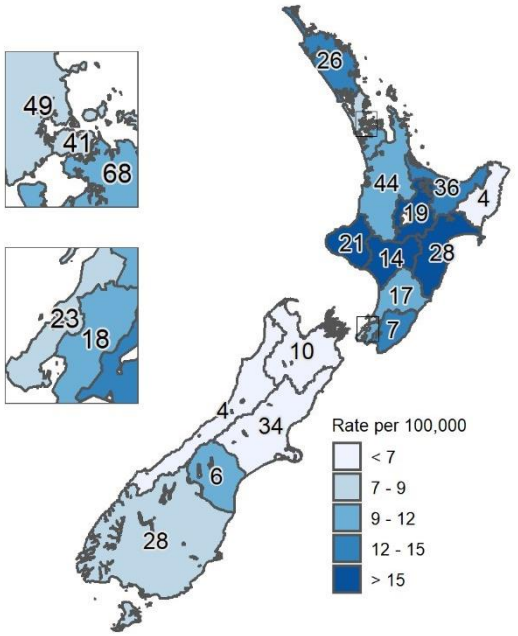
There is a distinct seasonal pattern for IPD, with the highest number of notifications reported during winter, and particularly in July, each year (Figure 14).

Figure 14. Invasive pneumococcal disease notifications by month, January 2015–December 2019



In 2019, the highest notification rates for IPD were reported from Whanganui, Taranaki, Lakes and Hawke's Bay DHBs (20.7, 17.1, 16.6 and 16.1 per 100,000 respectively) (Figure 15).

Figure 15. Invasive pneumococcal disease notifications by DHB, 2019



Numbers represent notification count in DHB region.
Where fewer than five rates are not shown.

Infants aged less than 1 year (30.2 per 100,000) had the highest rates of IPD, followed by adults aged 70 years and over (27.1 per 100,000) and 60–69 years (18.7 per 100,000).

Males (11.3 per 100,000) had a higher rate than females (8.9 per 100,000).

Ethnicity was recorded for 492 (99.0%) cases. The ethnic group with the highest rate of IPD was Pacific peoples (24.6 per 100,000), followed by Māori (18.5 per 100,000).

Further information by DHB, sex, age and ethnic group is in Table 33 to Table 36 in the Appendix.

Hospitalisation status was recorded for 493 (99.2%) cases, of which 477 (96.8%) were hospitalised.

There were 11 deaths due to IPD reported in 2019. One death was in an infant aged less than 1 year, one was in a child aged 1–4 years, and the remaining nine deaths were in adults aged 50 years and over. Both deaths in children aged less than 5 years were due to serotypes that were not in the vaccine. One death was due to serotype 21 and the other was due to serotype 23B.

The risk factors recorded for IPD are shown in Table 12 and Table 13. The most commonly reported risk factors for children aged less than 5 years were attending childcare and smoking in the household. Having a chronic illness was the most common risk factor for cases aged 5 years and over.

Pneumococcal conjugate vaccine (PCV) was added to the national immunisation schedule in June 2008. The 7-valent conjugate vaccine (PCV7) was used until July 2011 when the 10-valent conjugate vaccine (PCV10) was introduced. This was in turn replaced by the 13-valent conjugate vaccine (PCV13) in July 2014. The most recent schedule change was to revert to PCV10 in July 2017.

The recommended schedule for PCV is four doses given to infants at age 6 weeks, 3 months, 5 months and 15 months. For defined groups of high-risk children and adults, the schedule also includes PCV13 and 23-valent pneumococcal polysaccharide vaccine (23PPV).[17]

The Invasive Pathogens Laboratory at ESR received a viable *Streptococcus pneumoniae* isolate from a normally sterile site for serotyping for 461 (92.8%) notified cases in 2019. Table 14 shows the breakdown by serotype and age group. Although serotype 19A is not included in PCV10, studies have shown that PCV10 provides cross protection against serotype 19A.[19] Just over 70% (27/38, 71.1%) of cases aged less than 5 years were due to serotypes not covered by PCV10, compared with 75.9% (180/237) and 80.6% (150/186) of cases aged 5–64 years and 65 years and over, respectively.

Table 12. Exposure to risk factors associated with invasive pneumococcal disease for cases aged less than 5 years, 2019

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Attends childcare	5	6	35	45.5
Smoking in the household	5	13	28	27.8
Premature (<37 weeks gestation) [b]	5	24	17	17.2
Immunocompromised	3	38	5	7.3
Congenital or chromosomal abnormality	2	34	10	5.6
Chronic illness	2	38	6	5.0

[a] Percentage refers to the percentage of cases that answered "yes" out of the total number of cases for which this information was known. Some cases had more than one risk factor recorded. No cases reported asplenia, chronic lung disease or cochlear implants as risk factors.
[b] Only cases aged less than 1 year are included for reporting of this risk factor.

Table 13. Exposure to risk factors associated with invasive pneumococcal disease for cases aged 5 years and over, 2019

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Chronic illness	244	138	69	63.9
Current smoker[b]	103	230	118	30.9
Chronic lung disease or cystic fibrosis	62	319	70	16.3
Immunocompromised	64	311	76	17.1
Resident in long-term or other chronic-care facility	20	356	75	5.3

[a] Percentage refers to the percentage of cases that answered "yes" out of the total number of cases for which this information was known. Some cases had more than one risk factor recorded.
[b] Only cases aged 15 years and over are included in the reporting of this risk factor

Table 14. Invasive pneumococcal disease notifications by serotype and age group, 2019

Serotype	<5 years	5–64 years	65+ years	Total
PCV7	**0**	**17**	**11**	**28**
4	0	8	0	8
6B	0	3	1	4
9V	0	1	0	1
14	0	1	2	3
18C	0	0	0	0
19F	0	3	7	10
23F	0	1	1	2
PCV10	**11**	**40**	**25**	**76**
1	0	2	0	2
5	0	0	0	0
7F	1	7	1	9
19A[a]	10	31	24	65
PCV13	**2**	**11**	**16**	**29**
3	2	10	16	28
6A	0	1	0	1
Other (non-PCV13)	25	169	134	328
Total[b]	**38**	**237**	**186**	**461**

[a] In 2016, Medsafe approved the indication that PCV10 provides cross-protection against serotype 19A.
[b] Totals are for viable isolates of culture-positive cases referred to ESR for serotyping.

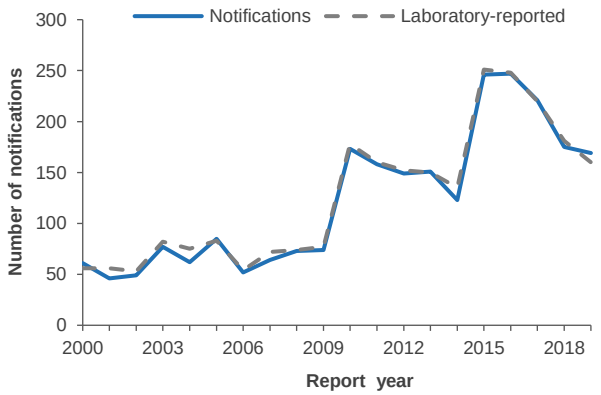
Serotype 19A was the most prevalent serotype (65 cases). In children aged less than 5 years the most prevalent serotype was also 19A (10 cases), followed by the non-PCV serotype 23B (5 cases). Serotype 8 was the most prevalent serotype in those aged 5–64 years (45 cases) and serotype 22F was the most prevalent serotype (26 cases) in adults aged 65 years and over, followed by serotype 19A (24 cases).

Legionellosis

During 2019, 169 cases of legionellosis were notified, compared with 175 in 2018. The 2019 notification rate of 3.4 per 100,000 was slightly lower than the 2018 rate of 3.6 per 100,000.

The annual number of cases was relatively stable between 2000 and 2009, but increased in 2010 and has remained high since (Figure 16). The increase in legionellosis cases in 2015 and 2016 is likely due to the LegiNZ study [20] which involved testing hospitalised patients with suspected pneumonia for *Legionella* spp. using PCR. The study ran from May 2015 to May 2016.

Figure 16. Legionellosis notifications and laboratory-reported cases by year, 2000–2019



In 2019, the highest notification rate for legionellosis was reported from West Coast DHB (27.6 per 100,000) followed by Canterbury, and Southern (7.4 and 5.9 per 100,000 respectively).

Adults aged 70 years and over (14.0 per 100,000) and 60–69 years (9.4 per 100,000) had the highest notification rates for legionellosis.

Males (5.1 per 100,000) had a higher rate than females (1.8 per 100,000).

Ethnicity was recorded for 167 (98.8%) cases. The ethnic group with the highest notification rate was European or Other (4.2 per 100,000), followed by Māori and Pacific peoples (3.0 and 2.2 per 100,000 respectively).

Further information by DHB, sex, age and ethnic group is in Table 33 to Table 36 in the Appendix.

Hospitalisation status was recorded for 158 (93.5%) cases, of which 141 (89.2%) were hospitalised.

Two deaths due to legionellosis were reported in 2019. Both were in cases aged 70 years and over.

Table 15 provides a summary of risk factors for which data was available. A total of 130 (92.2%) cases reported exposure to known environmental risk factors during the incubation period for the disease. Further details of the environmental exposures were recorded for 129 cases as follows: compost, potting mix or soil (108), shower or hot water system (14), spa or pool (8), air conditioning or cooling towers (5), medical respiratory devices (4), and water blasting (2). Some cases reported more than one exposure to known environmental risk factors.

No outbreaks of legionellosis were reported in 2019.

Table 15. Exposure to risk factors associated with legionellosis, 2019

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Exposure to known environmental source	130	11	28	92.2
Pre-existing immunosuppressive or debilitating condition	69	69	31	50.0
Smokes cigarettes	24	118	27	16.9

[a] Percentage refers to the percentage of cases that answered "yes" out of the total number of cases for which this information was known. Some cases had more than one risk factor recorded.

The Legionella Reference Laboratory at ESR confirmed 160 cases of legionellosis in 2019. As in previous years, the most common *Legionella* species identified were *L. longbeachae* (60.0%, 96 cases) and *L. pneumophila* (30.6%, 49 cases) (Table 16).

Table 16. *Legionella* strains for laboratory-reported cases, 2019

Legionella species and serogroup	Cases	Percentage (%)
L. longbeachae	**96**	**60.0**
L. longbeachae sg 1	46	28.8
L. longbeachae sg 2	5	3.1
L. longbeachae sg not determined	45	28.1
L. pneumophila	**49**	**30.6**
L. pneumophila sg 1	29	18.1
L. pneumophila sg 2	2	1.3
L. pneumophila sg 4	1	0.6
L. pneumophila sg 7	1	0.6
L. pneumophila sg not determined	16	10.0
Other *Legionella* species	**15**	**9.4**
L. dumoffii	4	2.5
L. bozemanae sg 1	3	1.9
L. sainthelensi	2	1.3
L. harrisonii sp nov.	1	0.6
L. maceachernii	1	0.6
L. micdadei	1	0.6
L. species D3582	1	0.6
Legionella species unidentified	2	1.3
Total	**160**	**100.0**

Leprosy

Six cases of leprosy were notified in 2019, compared with three cases in 2018. Five cases were male and one was female. The cases were aged 15–19 years (2 cases), 20–29 years (2 cases), 30–39 years (1 case) and 40–49 years (1 case). Four were of Pacific ethnicity and two were Asian.

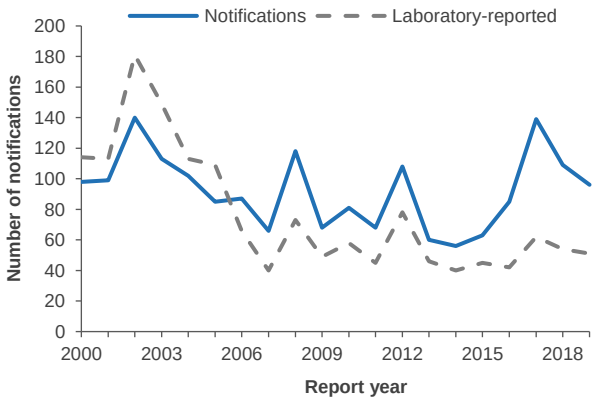
The cases had been in India, Nauru, Samoa, Solomon Islands, Sri Lanka and Tuvalu (1 case each).

Leptospirosis

In 2019, a total of 96 cases of leptospirosis were notified, compared with 109 cases in 2018. The 2019 notification rate of 2.0 cases per 100,000 was similar to the 2018 rate of 2.3 per 100,000. Of the 96 notified cases, 88 were laboratory confirmed by microscopic agglutination titre (MAT) (37 cases), or nucleic acid testing (NAAT) (33 cases) or both MAT and NAAT (18 cases). Eight cases were not laboratory confirmed.

Figure 17 shows the number of notified and laboratory-reported cases of leptospirosis each year since 2000.

Figure 17. Leptospirosis notifications by year, 2000–2019



The highest notification rates for leptospirosis were reported from West Coast and Tairawhiti, DHBs (18.4 and 14.2 per 100,000 respectively).

Adults aged 40–49 years (3.2 per 100,000), had the highest notification rates followed by those aged 20–29 (2.7 per 100,000), 60–69 (2.5 per 100,000) and 30–39 (2.3 per 100,000) years.

Males (3.3 per 100,000) had a much higher rate than females (0.6 per 100,000).

Ethnicity was recorded for 95 (99.0%) cases. The ethnic group with the highest notification rate was European or Other (2.6 per 100,000), followed by Māori (1.7 per 100,000).

Hospitalisation status was recorded for 92 (95.8%) cases, of which more than half (56.5%, 52/92 cases) were hospitalised.

Occupation was recorded for 87 (90.6%) cases. Of these, 56 (64.4%) were engaged in occupations considered high risk for exposure to *Leptospira* spp. in New Zealand [21]. Of the 56 cases with a high-risk occupation, 45 (80.4%) were farmers, farm workers or livestock transporters and 11 (19.6%) worked in the meat processing industry (as freezing workers, meat process workers or butchers). An additional two cases (2.3%) worked in an occupation that involved contact with animals or their environment (berry farmer and arborist).

Other risk factors reported included animal/outdoor exposure (75 cases), exposure to lakes, rivers or streams (17 cases), and overseas travel (7 cases).

No outbreaks of leptospirosis were reported in 2019.

The Leptospira Reference Laboratory at ESR confirmed 51 cases of infection with *Leptospira* in 2019. The most common *Leptospira* serovars reported were, *L. borgpetersenii* sv Hardjo (37.3%, 19 cases), *L. borgpetersenii* sv Ballum, (27.5%, 14 cases) and *L. interrogans* sv Pomona (15.7%, 8 cases) (Table 17).

Table 17. *Leptospira* species and serovars for laboratory-reported cases, 2019

Leptospira species and serovar	Cases	Percentage (%)
L. borgpetersenii	**35**	**68.6**
L. borgpetersenii sv Hardjo	19	37.3
L. borgpetersenii sv Ballum	14	27.5
L. borgpetersenii sv Tarassovi	2	3.9
L. interrogans	**9**	**17.6**
L. interrogans sv Pomona	8	15.7
L. interrogans sv Australis	1	2.0
Serovar not identified	**7**	**13.7**
Total	**51**	**100.0**

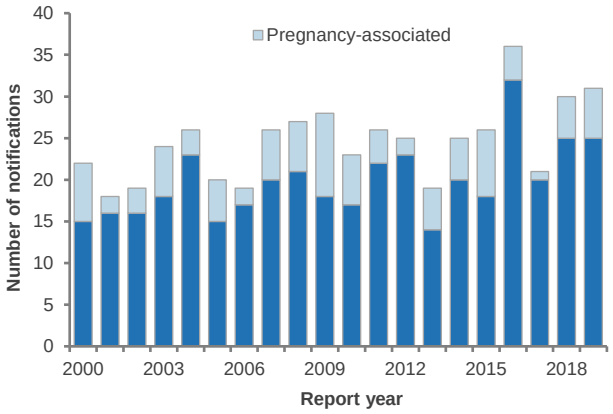
Listeriosis

In 2019, 31 cases of listeriosis were notified (including six pregnancy-associated) compared with 30 cases (five pregnancy-associated) in 2018. The 2019 notification rate of 0.6 cases per 100,000 was the same as in 2018.

Figure 18 shows listeriosis notifications for each year since 2000.

No outbreaks of *Listeria* were reported in 2019.

Figure 18. Listeriosis notifications by year, 2000–2019



The Special Bacteriology Laboratory at ESR serotyped 30 isolates of *Listeria monocytogenes* in 2019. The serotypes identified were O4 (16 isolates, 53.3%) and O1/2 (14 isolates, 46.7%). One case was confirmed by PCR only, with no culture available for typing.

Listeriosis not associated with pregnancy

The 25 notified listeriosis cases not associated with pregnancy were from 15 DHBs, with the highest number of notifications reported from Canterbury (4 cases) DHB.

Most (64.0%, 16 cases) were aged 60 years and over. Males (0.7 per 100,000) had a similar rate to females (0.6 per 100,000).

Ethnicity was recorded for 24 (96.0%) cases. Sixteen cases were of European or Other ethnicity, five were Māori and one each were Pacific, Asian and MELAA.

All 25 cases were hospitalised for listeriosis and 12 were also hospitalised for the treatment of another illness.

Information on underlying illness was recorded for 24 cases, of which 19 (79.2%) cases had an underlying illness such as cancer, renal failure, heart disease, autoimmune disease, or another chronic illness. Nine cases were reported to be receiving immunosuppressive drugs.

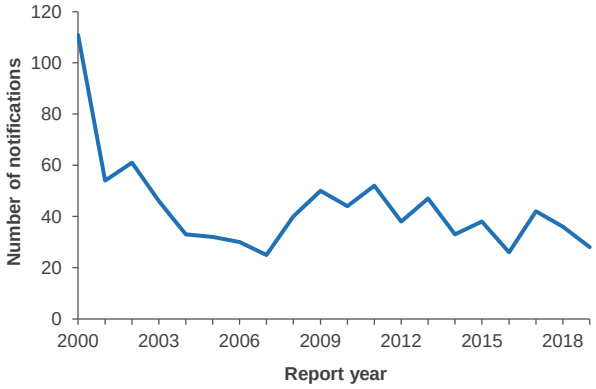
Pregnancy-associated listeriosis

Six cases of pregnancy-associated listeriosis were notified in 2019. The length of gestation ranged from 19 to 33 weeks. The cases were aged 20–29 and 30–39 years (3 cases each). Two cases were of Māori ethnicity, two were European or Other, one was Pacific and one was Asian. Four perinatal deaths from listeriosis occurred in 2019.

Malaria

In 2019, 28 cases of malaria were notified compared with 36 cases in 2018 (Figure 19). The 2019 notification rate of 0.6 per 100,000 was similar to the 2018 rate of 0.7 per 100,000.

Figure 19. Malaria notifications by year, 2000–2019



Adults aged 60–69 years had the highest rate (1.0 per 100,000), followed by those aged 20–29 (0.9 per 100,000) and 50–59 years (0.8 per 100,000).

Males (0.9 per 100,000) had a higher rate than females (0.3 per 100,000).

Ethnicity was recorded for 27 (96.4%) cases. The ethnic group with the highest rate was Asian (1.1 per 100,000), followed by European or Other (0.4 per 100,000).

Hospitalisation status was recorded for all 28 cases, of which 20 (71.4%) were hospitalised.

Table 18 shows the region and country of overseas travel and *Plasmodium* species identified for the 28 cases. Sub-Saharan Africa was the most commonly reported region for *P. falciparum* (11 cases), while South-East Asia was the most commonly reported region for *P. vivax* (3 cases).

The country most visited or lived in was India (5 cases), followed by Papua New Guinea (3 cases). Four of the five cases that travelled to India were of indeterminate *Plasmodium* species. Some cases reported travel to more than one country.

Information on prophylaxis was available for 24 cases, of which six (25.0%) were offered prophylaxis. Of these, three were recorded as taking prophylaxis as prescribed and three stopped taking it prematurely or missed doses.

Table 18. Region and country of overseas travel and *Plasmodium* species for malaria notifications, 2019

Region	Country resided in or visited	*Plasmodium* species				
		P. falciparum	*P. malariae*	*P. ovale*	*P. vivax*	Indeterminate
North Africa and the Middle East	South Sudan	1			1	
Sub-Saharan Africa	Congo	1				
	Eritrea	1				
	Ethiopia	1				
	Guinea	1				
	Kenya	1				
	Mali					1
	Mozambique	1				
	Nigeria	1				
	Rwanda			1		
	Sierra Leone	1				
	Uganda	2				
	West Africa	1				
Southern and Central Asia	Afghanistan				1	1
	India				1	4
South-East Asia	Borneo					1
	Indonesia	1			1	
	Pakistan				1	
	Philippines				1	
Oceania	Papua New Guinea	1	1			1
	Solomon Islands	1			1	

Note: Some cases reported travel to more than one country during the incubation period for the disease.

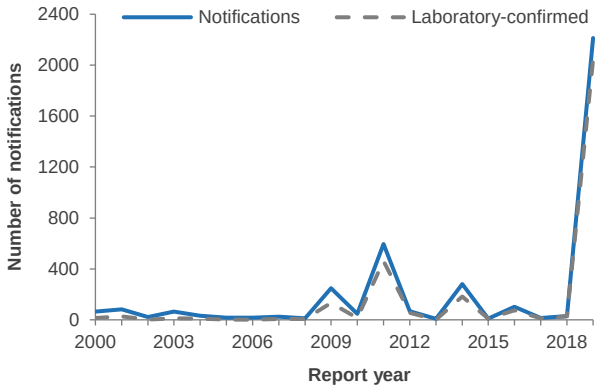
Measles

Measles vaccination was introduced in 1969 [17] and measles has been a notifiable disease since June 1996.[3] The recommended measles, mumps and rubella (MMR) vaccination schedule is two doses, given at ages 15 months and 4 years. During measles outbreaks, the first dose may be given at age 12 months, and MMR vaccine may be recommended for infants aged less than 12 months if cases are occurring in the very young.[17] In October 2017, New Zealand was verified by the WHO as having eliminated endemic measles.[22]

In 2019, 2213 cases of measles (including 2046 laboratory-confirmed cases) were notified, compared with 30 cases in 2018 (including 28 laboratory-confirmed cases). The 2019 notification rate (45.0 per 100,000) was significantly higher than the 2018 notification rate (0.6 per 100,000).

Figure 20 shows notifications and laboratory-confirmed cases from 2000 to 2019.

Figure 20. Measles notifications and laboratory-confirmed cases by year, 2000–2019

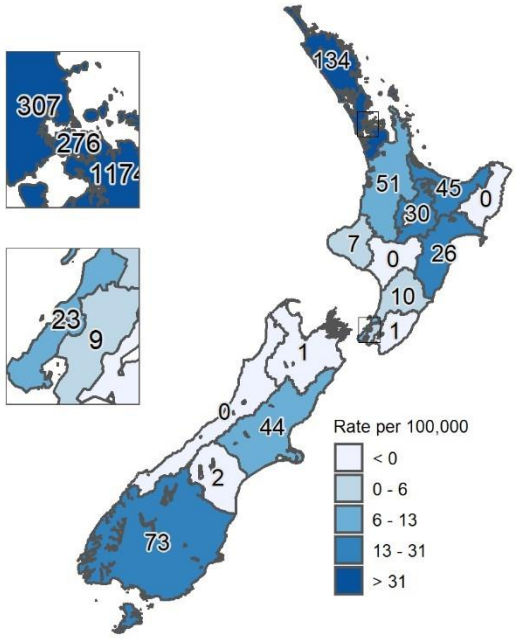


The highest rate was reported for Counties Manukau (208.0 per 100,000), followed by Northland (71.0 per 100,000), Auckland (56.8 per 100,000) and Waitemata (50.0 per 100,000) DHBs. No cases were reported in Tairawhiti, Whanganui and West Coast DHBs (Figure 21).

The highest rate was for infants aged less than 1 year (466.1 per 100,000), followed by children aged 1–4 years (126.0 per 100,000).

Males (47.4 per 100,000) had a higher rate than females (42.6 per 100,000).

Figure 21. Measles notifications by DHB, 2019



Numbers represent notification count in DHB region.
Where fewer than five rates are not shown.

Ethnicity was recorded for 2196 (99.2%) cases. The ethnic group with the highest notification rate for measles was Pacific peoples (281.0 per 100,000), followed by Māori (65.5 per 100,000) and MELAA (60.2 per 100,000).

Hospitalisation status was recorded for 2210 cases (99.9%), and 775 (35.1%) cases were hospitalised.

Vaccination status was known for 1965 (88.8%) cases, the majority of which (1572, 80.0%) were not vaccinated. Of the 393 vaccinated cases, 241 (61.3%) had received one vaccine dose, 141 (35.9%) had received two doses, and dose information was unknown for the remaining 11 cases.

The source of the virus was recorded for 864 cases. Thirty-three were imported and 831 were import-related. The countries of importation were Samoa (14 cases), the Philippines (4 cases), Australia, Thailand and Tonga (3 cases each), Afghanistan, China, Japan, Singapore, United Kingdom and Vietnam (1 case each).

Fourteen measles outbreaks were reported in 2019, involving 801 cases (Table 27).

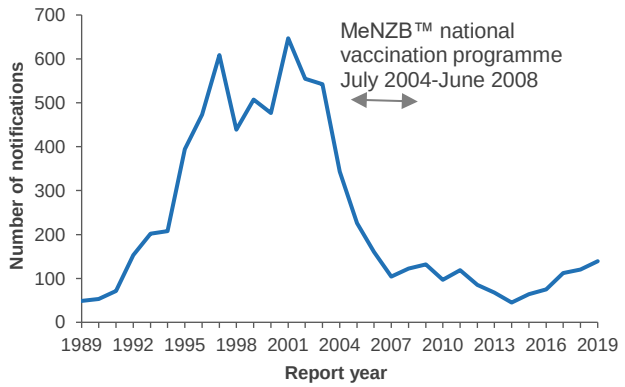
Ministry of Health hospital discharge data for 2019 included 678 hospitalisations where measles was the principal diagnosis (Table 32).

Meningococcal disease

In 2019, 139 cases of meningococcal disease were notified, compared with 120 cases in 2018. The 2019 notification rate (2.8 per 100,000) was similar to the 2018 rate (2.5 per 100,000).

Figure 22 shows the number of meningococcal disease notifications from 1989 to 2019. The highest annual number of cases was 647 reported in 2001 during the New Zealand meningococcal disease epidemic driven by the B:P1.7-2,4 strain.

Figure 22. Meningococcal disease notifications by year, 1989–2019



Ten DHBs reported five or more cases in 2019 and therefore had a rate calculated. The highest rate was for Northland (4.8 per 100,000), followed by Bay of Plenty (4.3 per 100,000) and Counties Manukau (4.1 per 100,000) DHBs.

The highest rate was for infants aged less than 1 year (52.0 per 100,000), followed by children aged 1–4 years (8.5 per 100,000).

Males (3.0 per 100,000) had a higher rate than females (2.6 per 100,000).

Ethnicity was recorded for all 139 cases. The ethnic group with the highest notification rate for meningococcal disease was Pacific peoples (9.0 per 100,000), followed by Māori (5.8 per 100,000).

Further information by DHB, sex, age and ethnic group is in Table 33 to Table 36 in the Appendix.

Of the 139 cases, 137 cases were hospitalised (98.6%). Pre-hospital management information was recorded for 129 (94.2%) hospitalised cases. Of these, 61 (47.3%) cases were seen by a doctor prior to hospital admission, and 21 (34.4%) of these were given intravenous or intramuscular antibiotics before admission. Three cases did not report seeing a doctor but were given intramuscular antibiotics prior to admission.

Ten deaths from meningococcal disease were reported during 2019, giving a case fatality rate of 7.2%. Five deaths were due to group B, two to group W and one to group Y. The group was not identified for two deaths. Three deaths were in infants aged less than 1 year, one was in a child aged 1–4 years, two were in adults aged 20–29 years and four were in adults aged 50 years and over. All of the cases that died had been admitted to hospital and two had been seen by a doctor prior to admission and given antibiotics.

Of the 139 cases, 134 (96.4%) were laboratory confirmed and the group was determined for 122 cases. Half (50.8%, 62 cases) were group B, 36 (29.5%) were group W, 16 (13.1%) were group Y, 7 (5.7%) were group C and 1 (0.8%) was group E (Table 19). For children aged less than 5 years, 50 cases were laboratory confirmed and 41 were typed: 26 (63.4%) were group B (7 were B:P1.7-2,4), 13 (31.7%) were group W (12 were W:P1.5,2), and 2 (4.9%) were group Y.

Table 19. Meningococcal disease strain group distribution by year, 2015–2019

	2015	2016	2017	2018	2019
Group B	**41**	**47**	**70**	**51**	**62**
B:P1.7-2,4	10	23	27	16	19
Other group B	31	24	43	35	43
Group C	**6**	**8**	**11**	**10**	**7**
C:P1.51,108	3	4	8	6	7
Other group C	3	4	3	4	**0**
Group W	**6**	**5**	**12**	**33**	**36**
W:P1.5,2	4	3	12	32	34
Other group W	2	2	0	1	2
Group X	**0**	**0**	**0**	**1**	**0**
Group Y	**6**	**7**	**11**	**16**	16
Group E	**0**	**0**	**0**	**0**	1
Total*	**59**	**67**	**104**	**111**	**122**

*Total number of laboratory-confirmed cases where strain was determined.

The antimicrobial susceptibilities of 93 viable meningococcal isolates received by ESR from cases of invasive disease in 2019 were tested. All isolates were susceptible to ceftriaxone, rifampicin and ciprofloxacin. Thirty isolates (32.3%) were penicillin resistant with minimum inhibitory concentrations (MICs) ≥0.5 mg/L. A further 33 (35.5%) isolates had intermediate resistance to penicillin (MICs 0.12–0.25 mg/L).

Middle East Respiratory Syndrome (MERS)

MERS became notifiable on 6 September 2013. Although no cases have been reported in New Zealand, worldwide 2502 laboratory-confirmed cases of human infection with MERS coronavirus (MERS-CoV), including 861 related deaths, were reported to WHO from September 2012 to 31 December 2019. [23]

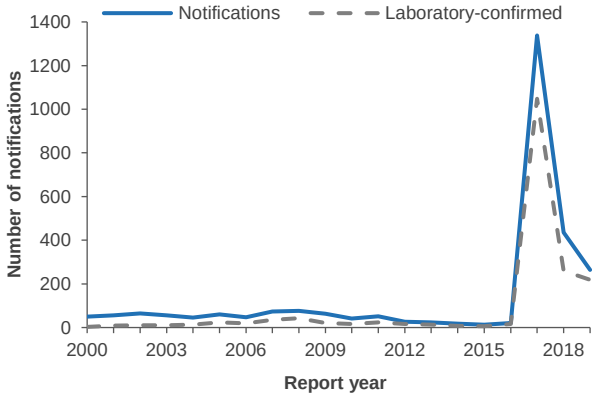
Mumps

Vaccination against mumps was introduced to the national immunisation schedule in 1990 as part of the MMR vaccine,[17] and mumps became notifiable in June 1996.[3] The recommended MMR vaccination schedule is two doses, given at ages 15 months and 4 years.[17] Prior to 2017, the last mumps epidemic occurred in 1994.[17]

In 2019, 264 cases of mumps (including 218 laboratory-confirmed cases) were notified, compared with 435 cases in 2018 (including 259 laboratory-confirmed cases). The 2019 notification rate of 5.4 per 100,000 was a significant decrease from the 2018 rate of 9.0 per 100,000.

Figure 23 shows notifications and laboratory-confirmed cases from 2000 to 2019.

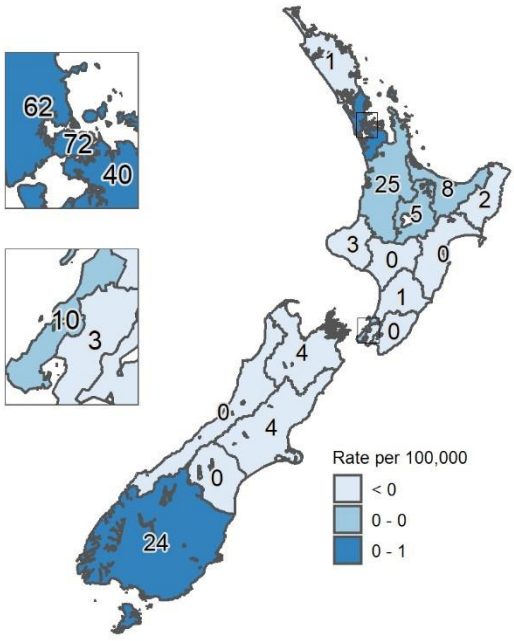
Figure 23. Mumps notifications and laboratory-confirmed cases by year, 2000–2019



The highest notification rate for mumps was reported from Auckland DHB (14.8 per 100,000, 72 cases), followed by Waitemata (10.1 per 100,000, 62 cases) and Counties Manukau (7.1 per 100,000, 40 cases) DHBs (Figure 24).

Adults aged 20–29 years (20.9 per 100,000) had the highest notification rate, followed by young adults 15–19 years (12.0 per 100,000) and children aged 1–4 years (6.5 per 100,000).

Figure 24. Mumps notifications by DHB, 2019



Numbers represent notification count in DHB region.
Where fewer than five rates are not shown.

Males (6.2 per 100,000) had a higher rate than females (4.5 per 100,000).

Ethnicity was recorded for 260 (98.5%) cases. The ethnic group with the highest notification rate was MELAA (21.4 per 100,000), followed by Pacific peoples (14.9 per 100,000), Asian (6.1 per 100,000) and European and Other (4.6 per 100,000).

Hospitalisation status was recorded for 258 (97.7%) cases, of which 27 (10.5%) were hospitalised.

Vaccination status was known for 171 (64.8%) cases (Table 20). Of these, 50 (29.2%) cases were not vaccinated, 35 (28.9%) had received one dose of vaccine, and 71 (58.7%) had received two doses. Dose information was unknown for the remaining 15 vaccinated cases.

Of the cases with risk factor information recorded, 39/175 (22.3%) had contact with another case, 43/246 (17.5%) attended school and 21/233 (9.0%) had travelled overseas during the incubation period for the disease.

Five mumps outbreaks were reported in 2019, involving 29 cases (Table 27).

Ministry of Health hospital discharge data for 2019 included 31 hospitalisations where mumps was the principal diagnosis (Table 32).

Table 20. Age group and vaccination status of mumps notifications, 2019

Age group	Total cases	One dose	Two doses	Vaccinated (no dose info)	Not vaccinated	Unknown
<15 months[a]	0	0	0	0	0	0
15 months–3 years	12	9	0	0	3	0
4–9 years	14	1	11	0	0	2
10–19 years	43	6	14	6	4	13
20+ years	195	19	46	9	43	57
Total	**264**	**35**	**71**	**15**	**50**	**93**

[a] Children aged less than 15 months are ineligible for vaccination.

Non-seasonal influenza

Non-seasonal influenza became a notifiable and quarantinable disease in New Zealand in April 2009, with confirmed cases requiring evidence of influenza A(H1N1)pdm09 infection (the pandemic strain). This strain was re-classified as seasonal on 1 January 2011.

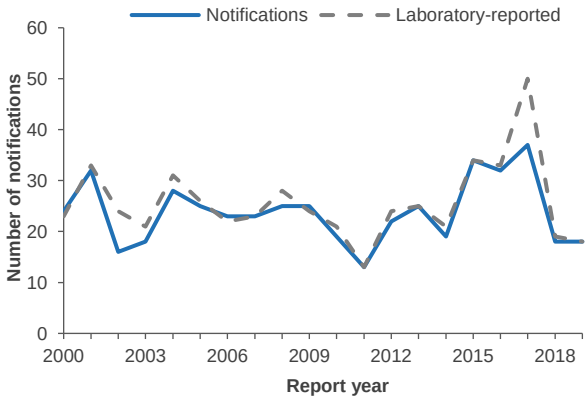
In August 2013, influenza A(H7N9) became notifiable as non-seasonal influenza. No cases have been notified to date.

Paratyphoid fever

In 2019, 18 cases of paratyphoid fever were notified compared with 18 cases in 2018. The 2019 notification rate of 0.4 per 100,000 was the same as the 2018 notification rate. The case definition for paratyphoid was changed at the end of 2017 to exclude cases of *S*. Paratyphi B var. Java. [24]

Figure 25 shows the number of notifications and laboratory-reported cases of paratyphoid fever each year since 2000.

Figure 25. Paratyphoid fever notifications and laboratory-reported cases by year, 2000–2019



Note: Case definition changed in December 2017 to exclude cases due to *S*. Paratyphi B var. Java.

The age group with the highest number of cases was adults aged 20–29 years (8 cases, 44.4%) followed by adults aged 30–39 years (4 cases).

Males and females had the same number of cases (9 each).

Ethnicity was recorded for all 18 cases. Ten cases were of Asian ethnicity, six were European or Other and two were Pacific.

Hospitalisation status was known for all cases Fifteen cases (83.3%) were hospitalised.

Overseas travel information was recorded for all 18 cases, of which 14 (77.8%) had travelled overseas during the incubation period for the disease. The country most commonly visited was India (6 cases), followed by Cambodia and Indonesia (2 cases each). Some cases reported travel to more than one country.

No outbreaks of paratyphoid fever were reported in 2019.

The Enteric Reference Laboratory at ESR confirmed 18 isolates as *Salmonella* Paratyphi during 2019. The serotypes identified were *S*. Paratyphi A (12 isolates) and *S*. Paratyphi B (6 isolates). All 12 *S*. Paratyphi A cases had a history of overseas travel. There were 26 isolates of *S*. Paratyphi B var. Java identified in 2019 which have been reported as salmonellosis.

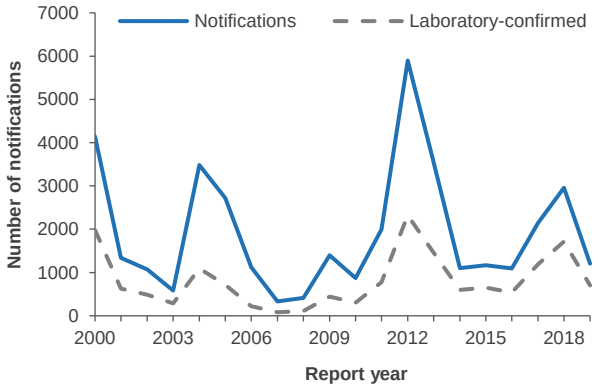
Pertussis

Pertussis is a vaccine-preventable disease caused by the bacterium *Bordetella pertussis*. Epidemics occur every 2–5 years, predominantly in young children, with a periodicity that is less affected by mass vaccination than other childhood vaccine-preventable diseases.[17] The most recent national outbreak of pertussis began in October 2017 and continued throughout 2018. Pertussis vaccination has been part of the national immunisation schedule in New Zealand since 1960. Pertussis has been notifiable since June 1996.[3]

The current vaccination schedule for pertussis is a primary course of DTaP-IPV-HepB/Hib at ages 6 weeks, 3 months and 5 months, followed by booster doses at ages 4 years (DTaP-IPV) and 11 years (Tdap). Vaccination with Tdap is also recommended for pregnant women from 28 to 38 weeks gestation.[17]

In 2019, 1206 pertussis cases were notified, of which 702 (58.2%) were laboratory confirmed (690 by PCR only, seven by isolation only and five by both isolation and PCR). The 2019 notification rate (24.5 per 100,000) was a significant decrease from the 2018 rate (61.1 per 100,000, 2956 cases) (Figure 26).

Figure 26. Pertussis notifications and laboratory-confirmed cases by year, 2000–2019



The highest rates of pertussis were reported from Nelson Marlborough (58.0 per 100,000), West Coast (55.2 per 100,000), and Capital & Coast (53.2 per 100,000) DHBs (Figure 27).

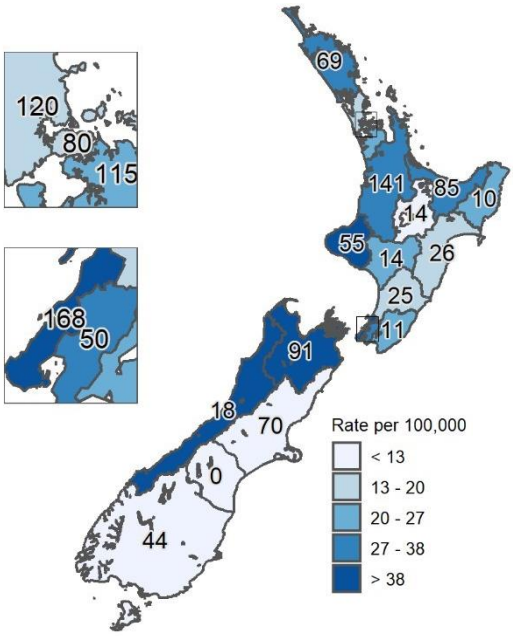
The highest notification rate was for infants aged less than 1 year (147.6 per 100,000) followed by children aged 1–4 (68.3 per 100,000), 5–9 (34.9 per 100,000) and 10–14 (30.3 per 100,000) years.

Females (28.6 per 100,000) had a higher rate than males (20.4 per 100,000).

The ethnic group with the highest notification rate for pertussis was MELAA (33.0 per 100,000) followed by Pacific peoples (29.5 per 100,000), Māori (27.4 per 100,000), and European or Other (27.3 per 100,000).

Hospitalisation status was recorded for 1169 (96.9%) cases, of which 112 (10.4%) were hospitalised. Half (50.0%, 43/86) of the cases aged less than 1 year were hospitalised.

Figure 27. Pertussis notifications by DHB, 2019



Numbers represent notification count in DHB region.
Where fewer than five rates are not shown.

The proportion of hospitalised cases (for all age groups) by ethnic group was: Pacific peoples (40.4%, 38/94), MELAA (23.5%, 4/17), Māori (15.6%, 33/212), Asian (14.0%, 7/50), and European or Other (5.1%, 40/788).

Vaccination status was known for 752 (62.4%) cases (Table 21). Of these, 322 (42.8%) cases were not vaccinated, including 12 infants aged less than 6 weeks who were ineligible for vaccination. Seventy-two (9.6%) cases had received one dose of pertussis vaccine, 15 (2.0%) had received two doses and 282 (37.5%) had received three or more doses. A further 61 (8.1%) cases were reported as being vaccinated, but no dose information was available.

Vaccination status was known for 77 (63.1%) of the hospitalised cases. Of these, 44 (57.1%) cases had not been vaccinated (including 10 that were aged less than 6 weeks and therefore not eligible for vaccination), 13 (16.9%) had received one dose of pertussis vaccine, three (3.9%) had received two doses, and 14 (18.2%) had received three or more doses. A further three (3.9%) cases were reported as being vaccinated, but no dose information was available.

Table 21. Age group and vaccination status of pertussis notifications, 2019

Age group	Total cases	One dose	Two doses	Three doses	Four doses	Five doses	Vaccinated (no dose info)	Not vaccinated	Unknown
0–5 weeks[a]	12	0	0	0	0	0	0	12	0
6 weeks–2 months	27	10	1	0	0	0	0	16	0
3–4 months	16	6	4	0	0	0	0	6	0
5 months–3 years	167	8	3	92	2	0	2	53	7
4–10 years	176	3	1	17	81	0	6	57	11
11+ years	808	45	6	8	32	0	53	178	436
Total	**1206**	**72**	**15**	**117**	**115**	**50**	**61**	**322**	**454**

[a] Children aged less than six weeks are ineligible for vaccination.

In 2019, 43.0% (264/614) of cases reported contact with a laboratory-confirmed case of pertussis.

One outbreak of *Bordetella pertussis* was reported in 2019, involving five cases (Table 27).

Ministry of Health hospital discharge data for 2019 included 111 hospitalisations where pertussis was the principal diagnosis (Table 32).

Plague

The last case of *Yersinia pestis* infection in New Zealand was reported in 1911, during the last plague pandemic that originated in Hong Kong in 1894.

From 1900 to 1911, 21 cases of plague were recorded in New Zealand, nine of which were fatal.[25]

Poliomyelitis (polio)

There were no cases of polio notified in 2019.

The New Zealand Paediatric Surveillance Unit carries out active surveillance of acute flaccid paralysis (AFP) to demonstrate the absence of wild poliovirus. In 2019, nine cases of AFP were notified to the unit. All nine cases were reviewed by the National Certification Committee for the Eradication of Poliomyelitis (NCCEP) and classified as non-polio.

Since the mass oral polio vaccine (OPV) vaccination campaigns in New Zealand in 1961 and 1962, six polio cases have been reported. All were either laboratory confirmed as vaccine associated (4 cases) or classified as probable vaccine-associated cases (2 cases).[17] The most recent vaccine-associated case occurred in 1999.[26]

No cases have been reported since the inactivated polio vaccine (IPV) replaced OPV in 2002. In 1976, an imported case of wild poliovirus infection was managed in New Zealand after a child arrived unwell from Tonga. [17]

Primary amoebic meningoencephalitis

The last case of primary amoebic meningoencephalitis (*Naegleria fowleri)* in New Zealand was notified in 2000. There were five prior cases, four of which were part of the same outbreak in 1968. All six cases were fatal and were linked to swimming in geothermal pools in the central North Island.[27]

Q fever

One case of Q fever (*Coxiella burnetii*) was notified in 2019. The case was a male aged 50–59 years and had stayed on a goat farm in Australia during kidding season. Three cases of Q fever were notified between 1997 and 2018; one case each in 2004, 2010 and 2011. All three cases reported overseas travel during the incubation period for the disease.

Rabies and other lyssaviruses

New Zealand is classified as a rabies-free country.[28] No cases of rabies or other lyssavirus have been reported in New Zealand.

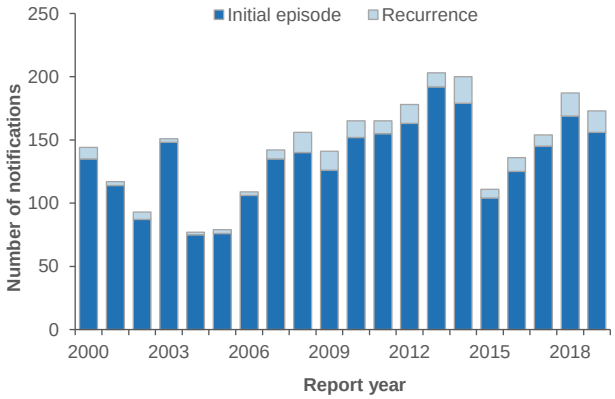
Rheumatic fever

In 2019, 173 cases of rheumatic fever were notified compared with 187 cases in 2018. The 2019 notification rate (3.5 per 100,000) was similar to the 2018 rate (3.9 per 100,000).

Of the 173 cases of rheumatic fever, 156 cases were initial episodes and 17 were recurrences. This is a rate of 3.2 per 100,000 for initial episodes and 0.3 per 100,000 for recurrences.

Figure 28 shows the number of initial episodes and recurrent cases of rheumatic fever reported each year since 2000.

Figure 28. Rheumatic fever notifications by year, 2000–2019



Hospitalisation date was recorded for 165 of the 166 cases that were hospitalised. Of these, 107 (64.8%) cases were notified within seven days of hospital admission.

Ministry of Health hospital discharge data for 2019 included 235 hospitalisations where rheumatic fever was the principal diagnosis (Table 32).

Initial episodes

Of the 156 initial episode cases notified, 108 were confirmed, 28 were probable and 20 were suspect cases.

Counties Manukau (10.1 per 100,000) DHB had the highest rate followed by Northland (7.4 per 100,000) and Bay of Plenty (3.6 per 100,000).

Children aged 10–14 years (21.1 per 100,000) had the highest rate, followed those aged 5–9 years (11.2 per 100,000).

Males and females had a similar rate (3.1 and 3.2 per 100,000 respectively).

The ethnic group with the highest rate was Pacific peoples (29.5 per 100,000), followed by Māori (7.2 per 100,000). These two ethnic groups accounted for 98.1% of initial episode cases.

Hospitalisation status was recorded for 154 cases, of which 150 (97.4%) were hospitalised.

Recurrences

In 2019, 17 recurrent cases were notified, from Counties Manukau (7 cases), Waikato (4 cases), Auckland (2 cases), Waitemata, MidCentral, Capital & Coast and Southern (1 case each) DHBs.

The cases ranged in age from 13 to 51 years. Nine were male and eight were female. Eleven cases were Pacific peoples, four were Māori, one was Asian and one was European or Other.

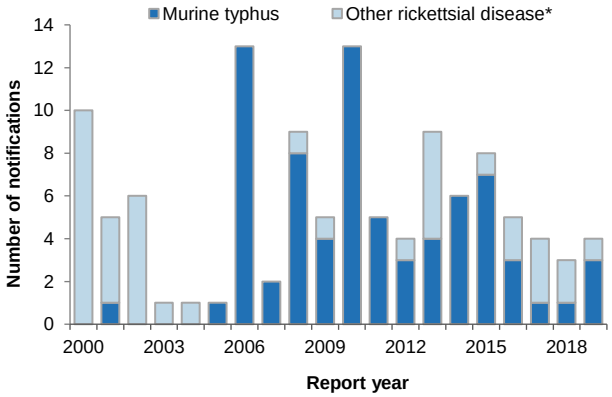
Sixteen (94.1%) recurrent cases were hospitalised.

Rickettsial disease

This section includes murine typhus (*Rickettsia typhi)*, typhus (*Rickettsia prowazekii*) and other rickettsial diseases caused by organisms of the *Rickettsia* genus. For Q fever, see its separate section.

Four cases of rickettsial disease were notified in 2019, compared with three cases in 2018 (Figure 29).

Figure 29. Rickettsial disease notifications by year, 2000–2019



* Includes all other diseases caused by organisms of the *Rickettsia* genus, except typhus.

Murine typhus (*Rickettsia typhi*)

Three probable cases of murine typhus were notified from Northland, Waikato and Bay of Plenty DHBs.

All three cases were female and of European or Other ethnicity. One was aged 20–29 years and two were 50–59 years. One case was hospitalised.

One case had travelled to Indonesia during the incubation period for the disease. The other two cases both lived on farms and had handled rats.

Typhus (*Rickettsia prowazekii*)

No cases of typhus have been reported from 1997 to 2019.

Other rickettsial diseases

A probable case of rickettsial disease due to *Rickettsia conorii* (spotted fever), was notified in 2019.

The case was a female, aged 5–9 years, and of Asian ethnicity. The case was hospitalised.

The case had travelled to India during the incubation period for the disease.

Rubella

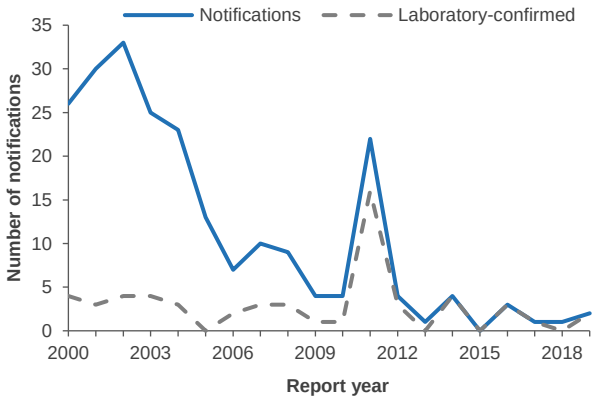
Rubella vaccination was introduced in 1970 for all children at age 4 years. In 1979 it was limited to girls at age 11 years and then extended to all children again when MMR was introduced in 1990. The recommended MMR vaccination schedule is two doses, given at ages 15 months and 4 years.[17] Rubella has been a notifiable disease since June 1996.[17]

Two cases of rubella were notified in 2019 compared with one case in 2018. Both were laboratory confirmed. One case was imported from the Philippines. Both cases were aged 30–39 years, one was of Asian ethnicity and one was European or Other. The vaccination status was unknown for both cases.

The last national rubella outbreak occurred in 1995.[17] There have been no reported cases of congenital rubella in New Zealand since 1998.

The number of rubella cases since 2000 is shown in Figure 30. There was an increase in notifications in 2011 during the measles outbreak.

Figure 30. Rubella notifications and laboratory-confirmed cases by year, 2000–2019



Salmonellosis

In 2019, 1188 cases of salmonellosis were notified, compared with 1100 in 2018. The 2019 notification rate (24.2 per 100,000) was higher than the 2018 rate (22.7 per 100,000). A large decrease in salmonellosis notifications occurred between 2001 and 2004 and numbers have remained relatively stable since 2005 (Figure 31).

The highest rate of salmonellosis was reported from Southern (41.9 per 100,000) DHB, followed by West Coast (36.8 per 100,000), South Canterbury (34.4 per 100,000) and Taranaki (31.8 per 100,000) DHBs (Figure 32).

Figure 31. Salmonellosis notifications and laboratory-reported cases by year, 2000–2019

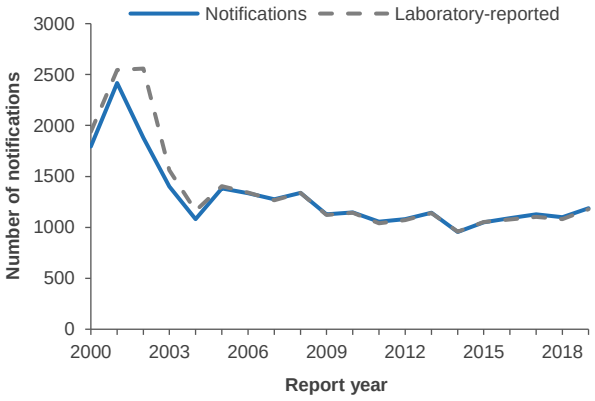
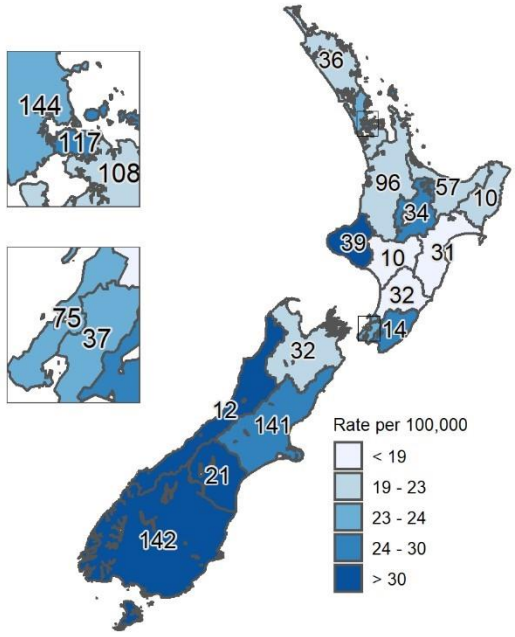


Figure 32. Salmonellosis notifications by DHB, 2019



Numbers represent notification count in DHB region.
Where fewer than five rates are not shown.

Notification rates were highest for infants aged less than 1 year (122.4 per 100,000), followed by children aged 1–4 years (64.2 per 100,000).

Males and females had the same rate (24.1 per 100,000).

Ethnicity was recorded for 1175 (98.9%) cases. The ethnic group with the highest notification rate was MELAA (29.1 per 100,000), followed by European or Other and Pacific peoples (28.2 and 22.4 per 100,000 respectively).

Further information by DHB, sex, age and ethnic group is in Table 33 to Table 36 in the Appendix.

Hospitalisation status was recorded for 1124 (94.6%) cases, of which 280 (24.9%) were hospitalised.

The most common risk factors reported for salmonellosis in 2019 were consumption of food from retail premises, overseas travel, and consumption of water other than regular supply (Table 22).

In 2019, 27 outbreaks of salmonellosis were reported, involving 228 cases (Table 27).

The Enteric Reference Laboratory at ESR confirmed the identity of *Salmonella* isolated from 1079 cases of salmonellosis from humans in 2019 (excludes isolates of *S*. Paratyphi A, B and C, and *S*. Typhi). The most common serotypes identified were *S*. Typhimurium (418 cases), *S*. Enteritidis (165 cases), and *S*. Bovismorbificans (50 cases). The most common *Salmonella* Typhimurium (STM) phage types were STM phage type 56 variant (49 isolates), STM phage type 101 (36 isolates) and STM phage type 135 (21 isolates).

The number of cases for selected Salmonella serotypes for the last five years is shown in Figure 33. From 2015 to 2019, the number of cases of S. Brandenburg, S. Typhimurium phage type 1 and S. Thompson have decreased, while cases of S. enterica serotype I 4,[5],12:i:- and S. Bovismorbificans have largely increased. For other serotypes, the number of cases varied from year to year.

A summary of selected *Salmonella* serotypes and phage types for 2015 to 2019 is provided in Table 38 in the Appendix.

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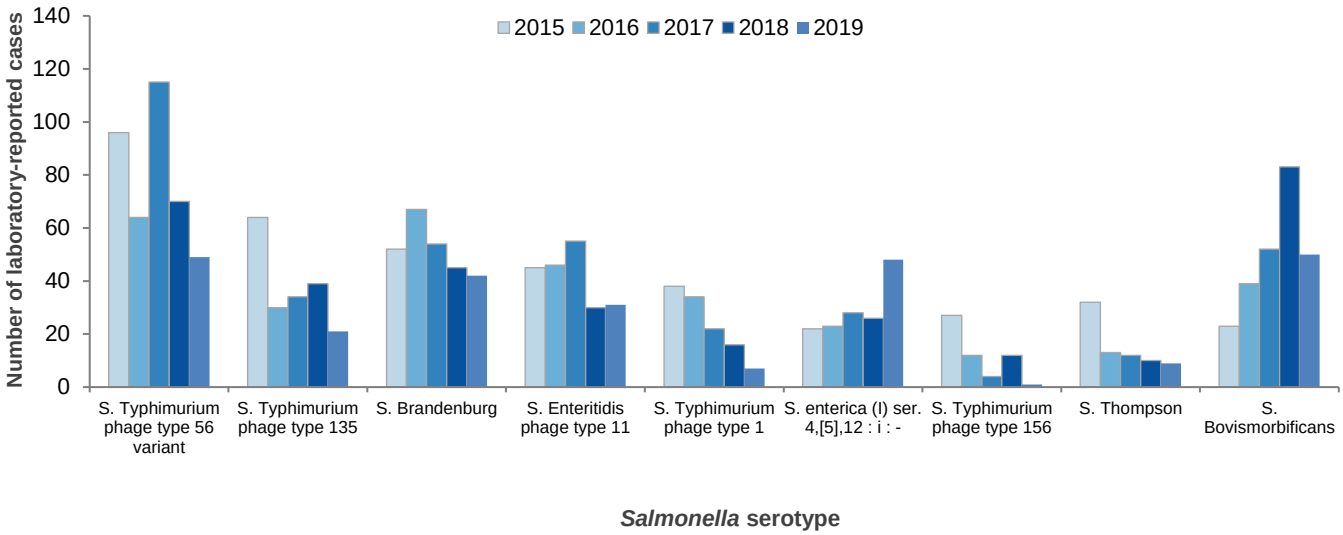
Table 22. Exposure to risk factors associated with salmonellosis, 2019

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Consumed food from retail premises	367	424	397	46.4
Travelled overseas during the incubation period	344	655	189	34.4
Consumed water other than regular supply	216	508	464	29.8
Contact with farm animals	207	592	389	25.9
Consumed untreated water	163	507	518	24.3
Recreational water contact	188	597	403	23.9
Contact with other symptomatic people	133	688	367	16.2
Attended a school, preschool or childcare centre	123	719	346	14.6
Contact with faecal matter	111	666	411	14.3

[a] Percentage refers to the number of cases that answered “yes” out of the total number of cases for which this information was known. Some cases had more than one risk factor recorded.

Figure 33. Selected *Salmonella* serotypes and phage types by year, 2015–2019



Severe acute respiratory syndrome (SARS)

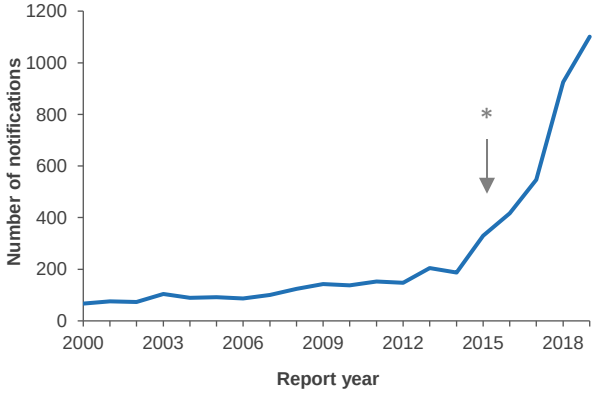
No cases of SARS have been diagnosed in New Zealand since SARS emerged in Southern China in 2003.[6]

Shiga toxin-producing *Escherichia coli* infection (STEC)

Shiga toxin-producing *Escherichia coli* (STEC) may also be referred to as Verocytotoxin-producing *E. coli* (VTEC) or enterohaemorrhagic *E. coli* (EHEC). STEC is now the preferred term.

In 2019, 1101 cases of STEC infection were notified, compared with 925 cases in 2018. The 2019 notification rate (22.4 per 100,000) was significantly higher than the 2018 rate (19.1 per 100,000). The introduction of culture independent diagnostic testing (CIDT), which is particularly sensitive to detecting non-O157 serotypes, is the main contributor to the increase since mid-2015 (Figure 34).

Figure 34. STEC infection notifications by year, 2000–2019



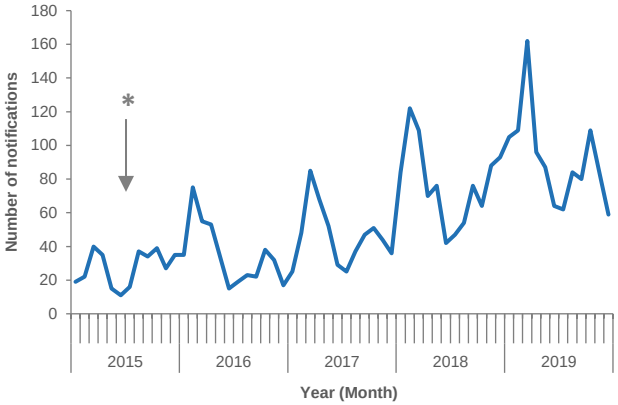
* Screening of faecal specimens using PCR begins in some laboratories

Fifteen paediatric cases of haemolytic uraemic syndrome (HUS) were reported to the New Zealand Paediatric Surveillance Unit (NZPSU) in 2019. Twelve cases were confirmed to be STEC associated. A further four cases of STEC-associated HUS were notified in adults (age range 25–77 years).

STEC infection notifications follow a seasonal pattern, with peaks occurring during autumn and spring each year (Figure 35)

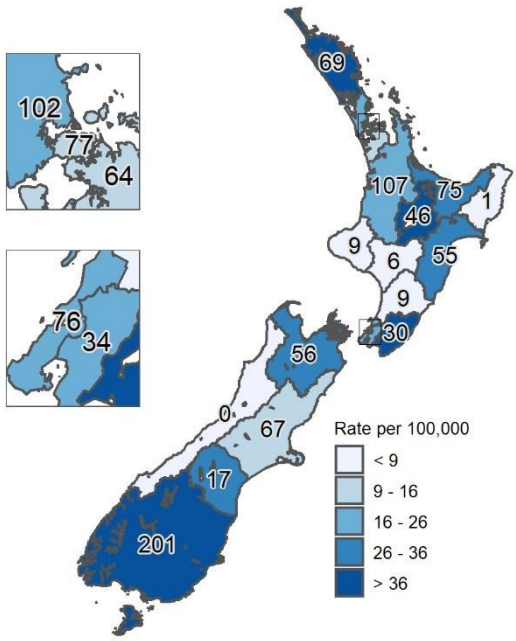
The highest rate of STEC infection notifications was from Wairarapa (63.0 cases per 100,000) DHB, followed by Southern (59.3 per 100,000), and Lakes (40.2 per 100,000) DHBs (Figure 36).

Figure 35. STEC infection notifications by month, January 2015–December 2019



*Screening of faecal specimens using PCR begins in some laboratories

Figure 36. STEC infection notifications by DHB, 2019



Numbers represent notification count in DHB region.
Where fewer than five rates are not shown.

There was a statistically significant increase in rates from 2018 to 2019 for Waikato, Bay of Plenty, Lakes and Canterbury DHBs. This is due to the laboratory servicing Bay of Plenty, Lakes, and the majority of Waikato, introducing CIDT in November 2018, and the Canterbury community testing laboratory introducing a more sensitive culture-based method in September 2018.

Infants aged less than 1 year had the highest notification rate (85.5 per 100,000), followed by children aged 1–4 years (76.4 per 100,000).

Females had a higher rate (23.3 per 100,000) than males (21.5 per 100,000).

Ethnicity was recorded for 1089 (98.9%) cases. The ethnic group with the highest notification rate was MELAA (33.0 per 100,000), followed by European or Other (28.5 per 100,000).

Further information by DHB, sex, age and ethnic group is in Table 33 to Table 36 in the Appendix.

Hospitalisation status was recorded for 1057 (96.0%) cases, of which 223 (21.1%) were hospitalised. Of these, 28.7% were *E. coli* O157:H7 (64 cases) and 10.7% were *E. coli* O26:H11 (24 cases). HUS was confirmed in 15 of the hospitalised cases and a serotype was determined in 13 of these (*E. coli* O157:H7, 9 cases; *E. coli* O26:H11, 3 cases; and *E. coli* O38:H26, 1 case).

No deaths due to STEC infection were reported in 2019.

The most common risk factors reported for STEC infection cases in 2019 were contact with pets, farm animals and animal manure (Table 23).

The most commonly consumed foods among STEC infection cases were raw fruit or vegetables, dairy products, chicken or poultry products, and beef or beef products (Table 24).

In 2019, 17 outbreaks of STEC infection were reported involving 144 cases (Table 27).

Ministry of Health hospital discharge data for 2019 included 29 hospitalisations where STEC infection was the principal diagnosis (Table 32).

The Enteric Reference Laboratory at ESR typed 714 isolates of STEC in 2019. Of these, 203 (28.4%) were identified as *E. coli* O157:H7 and 511 (71.6%) as *E. coli* non-O157 serotypes. The most common non-O157 serotypes identified were *E. coli* O26:H11 (16.7%, 119 isolates) and *E. coli* O128:H2 (7.7%, 55 isolates). The serotype could not be fully determined in 67 (9.4%) cases.

Table 23. Exposure to risk factors associated with STEC infection, 2019

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Contact with pets	472	82	5	85.2
Contact with farm animals	268	258	9	51.0
Contact with animal manure	134	292	51	31.5
Consumed water other than from a regular supply	218	558	128	28.1
Contact with recreational water	202	565	242	26.3
Attended a social function	178	698	133	20.3
Attended a school, preschool or childcare	166	722	131	18.7
Contact with children in nappies	156	720	111	17.8

[a] Percentage refers to the number of cases that answered "yes" out of the total number of cases for which this information was known. Some cases had more than one risk factor recorded.

Table 24. Foods consumed by STEC infection cases, 2019

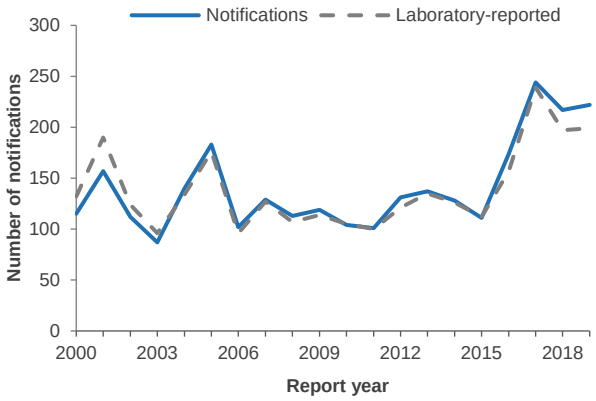
Foods consumed	Yes	No	Unknown	Percentage (%)[a]
Raw fruit or vegetables	653	149	192	81.4
Dairy products	626	146	228	81.1
Chicken or poultry products	642	152	207	80.9
Beef or beef products	568	263	176	68.4
Fruit or vegetable juice	350	421	204	45.4
Processed meat	365	462	176	44.1
Lamb or hogget or mutton	271	549	181	33.0
Home kill meat	164	682	159	19.4
Pink or undercooked meat	96	708	196	11.9
Unpasteurised milk or milk products	37	820	151	4.3

[a] Percentage refers to the number of cases that answered "yes" out of the total number of cases for which this information was known.

Shigellosis

In 2019, 222 cases of shigellosis were notified compared with 217 in 2018. The 2019 notification rate of 4.5 per 100,000 was the same as in 2018. Figure 37 shows total cases by year between 2000 and 2019.

Figure 37. Shigellosis notifications and laboratory-reported cases by year, 2000–2019



Auckland, Counties Manukau, Capital & Coast and Hawke's Bay DHBs had the highest notification rates (13.6, 6.2, 6.0 and 5.8 per 100,000 respectively).

The highest notification rates were in adults aged 20–29 years (6.6 per 100,000), children aged 1–4 years (6.1 per 100,000), and adults aged 30–39 and 50–59 years (both 5.7 per 100,000).

Males (4.8 per 100,000) had a similar rate to females (4.3 per 100,000).

Ethnicity was recorded for all 222 cases. The ethnic group with the highest notification rate was Pacific peoples (15.9 per 100,000), followed by MELAA (9.7 per 100,000).

Further information by DHB, sex, age and ethnic group is in Table 33 to Table 36 in the Appendix.

Hospitalisation status was recorded for 210 (94.6%) cases, of which 65 (31.0%) were hospitalised.

The most commonly reported risk factors for shigellosis were overseas travel and consumption of food from retail premises (Table 25).

Overseas travel information was recorded for 193 (86.9%) cases, of which 117 (60.6%) had travelled overseas during the incubation period for the disease. Ten further cases had a prior history of travel. The countries most commonly visited or lived in were India (25 cases), Fiji (14 cases), and Samoa (8 cases). Some cases reported travel to more than one country.

Nine outbreaks of shigellosis involving 27 cases were reported in 2019 (Table 27).

The Enteric Reference Laboratory at ESR confirmed 199 isolates as *Shigella* during 2019. The most common species identified were *S. sonnei* (107 isolates, 53.8%) and *S. flexneri* (84 isolates, 42.2%). The most common *S. sonnei* biotypes identified were biotype g (73 isolates, 68.2%) and biotype a (33 isolates, 30.8%).

Taeniasis

Five cases of taeniasis were notified in 2019, compared with four cases in 2018.

Four of the five cases were overseas during the incubation period for the disease. Countries visited or lived in were Thailand (2 cases), Iran, and South Africa (1 case each). The remaining case had previously lived in Ethiopia.

A total of 65 cases of taeniasis have been notified since 1997, of which 64 cases (98.5%) reported a history of overseas travel. One case had an unknown travel history.

Table 25. Exposure to risk factors associated with shigellosis, 2019

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Travelled overseas during the incubation period	117	76	29	60.6
Consumed food from retail premises	41	86	95	32.3
Consumed water other than regular supply	39	86	97	31.2
Contact with other symptomatic people	34	111	77	23.4
MSM[b]	11	45	166	19.6
Recreational water contact	25	106	91	19.1
Consumed untreated water	18	93	111	16.2
Travelled overseas during the incubation period	117	76	29	60.6

[a] Percentage refers to the number of cases that answered "yes" out of the total number of cases for which this information was known. Some cases had more than one risk factor recorded.
[b] MSM = Men who have sex with men.

Tetanus

No cases of tetanus were notified in 2019.

Between 1997 and 2018, a total of 33 tetanus cases were reported. Of these, four were children aged less than 10 years. None were vaccinated. Of the 33 cases, two females aged over 70 years died from tetanus (one was not vaccinated and the vaccination status of the other was unknown).

Toxic shellfish poisoning

One case of toxic shellfish poisoning was notified in 2019, compared with three cases in 2018.

The case, a male aged 30–39 years, had eaten recreationally collected seafood and was classified as suspected paralytic shellfish poisoning based on symptoms. No leftover shellfish was tested.

Trichinellosis

No cases of trichinellosis were notified in 2019.

Trichinellosis was added to the notifiable diseases schedule in 1988. Since then four cases have been reported, with two cases reported in 2001.[29]

Tuberculosis disease

In 2019, 323 cases of tuberculosis were notified, compared with 308 cases in 2018. The 2019 notification rate (6.6 per 100,000) was similar to the 2018 (6.4 per 100,000). There was a total of 307 (95.0%) new cases and 16 (5.0%) reactivations*.

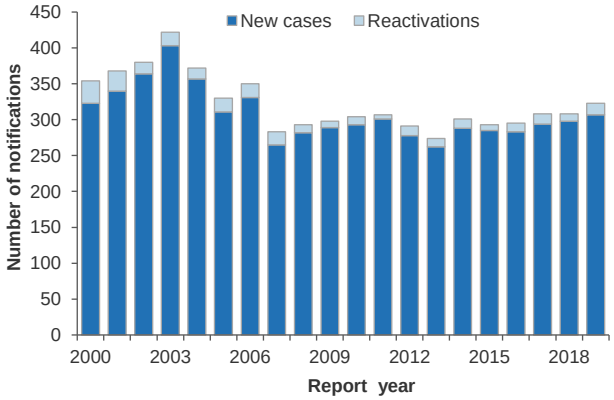
Figure 38 shows the total number of new and reactivation tuberculosis cases reported since 2000. The number of cases has remained fairly stable since 2007.

Laboratory information was available for 318 (98.5%) cases. Of these, 294 (92.5%) cases were reported as laboratory confirmed.

Information on tuberculosis disease cases by DHB, sex, age and ethnic group is in Table 33 to Table 36 in the Appendix.

Ministry of Health hospitalisation discharge data for 2019 included 246 hospitalisations where tuberculosis was the principal diagnosis (Table 32).

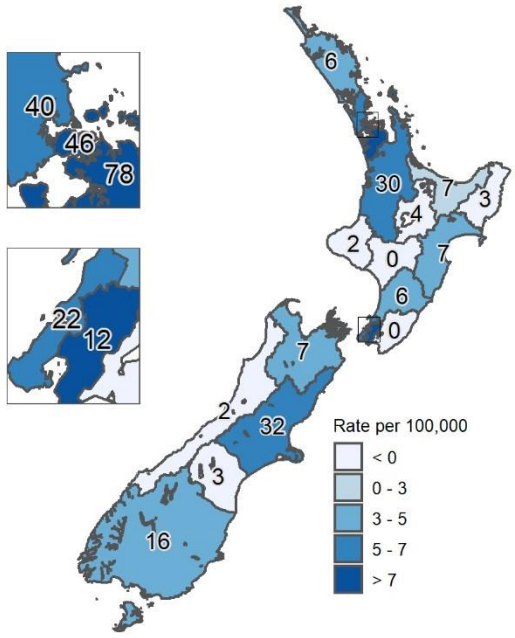
Figure 38. Tuberculosis notifications by year, 2000–2019



Tuberculosis disease – new cases

The highest notification rate for new tuberculosis cases was reported from Counties Manukau DHB (13.3 per 100,000), followed by Auckland (9.3 per 100,000) and Capital & Coast (7.0 per 100,000) DHBs (Figure 39).

Figure 39. Tuberculosis notifications (new cases) by DHB, 2019



Numbers represent notification count in DHB region.
Where fewer than five rates are not shown.

Adults aged 20–29 years (11.6 per 100,000) had the highest notification rate for new tuberculosis followed by those aged 30–39 (10.0 per 100,000) and 40–49 (7.9 per 100,000) years. One case was a child aged less than 5 years.

Males (7.0 per 100,000) had a higher rate than females (5.5 per 100,000).

* The term 'reactivation' refers to cases with second or subsequent episodes of tuberculosis disease.

The ethnic group with the highest notification rate for new tuberculosis cases was MELAA (29.1 per 100,000), followed by Asian (26.5 per 100,000) and Pacific peoples (15.2 per 100,000).

Hospitalisation status was recorded for 305 (99.3%) new tuberculosis disease cases in 2019, of which 171 (56.1%) were hospitalised.

Two deaths were reported in new tuberculosis cases, one in a case aged 30–39 years and the other in a case aged 70 years and over.

The tuberculosis case aged less than 5 years had not received the BCG vaccine and did not have miliary or meningeal tuberculosis.

The majority of new tuberculosis cases (251/307, 81.8%) were born overseas. Among the 56 cases born in New Zealand, 15 had been, or were presently, living with a person born outside New Zealand.

A total of 57 (24.7%) new tuberculosis cases reported contact with a confirmed case of tuberculosis.

Tuberculosis disease–reactivations/relapses

The 16 reactivation tuberculosis cases reported in 2019 were from seven DHBs: Canterbury (5 cases), Waitemata, Counties Manukau (3 cases each), Hutt Valley (2 cases), Auckland, Waikato, and Southern (1 case each).

The reactivation tuberculosis cases were all aged 20 years and over, with the highest number of cases aged 70 years and over (5 cases), followed by 20–29 and 30–39 years (4 cases each).

Fourteen reactivation tuberculosis cases were of Asian ethnicity and two were MELAA.

All 16 reactivation tuberculosis cases were born overseas, of which eight cases were diagnosed with previous disease overseas and seven in New Zealand. The place of diagnosis was not recorded for one case. Treatment status was recorded for 13 of the 16 cases, all of which had previously been treated for the disease. Seven cases were previously treated in New Zealand, one with pulmonary disease and six with extra pulmonary disease.

Hospitalisation status was recorded for all 16 reactivation cases, of which seven were hospitalised.

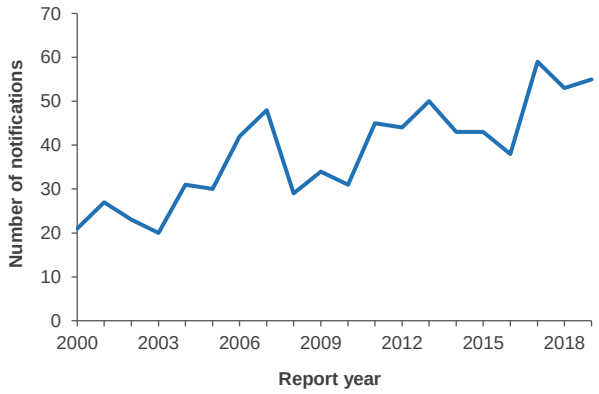
One death was reported among the reactivation tuberculosis cases in a case aged 70 years and over.

Typhoid fever

In 2019, 55 cases of typhoid fever were notified compared with 53 cases in 2018. The 2019 notification rate of 1.1 per 100,000 was the same as in 2018.

Figure 40 shows an increasing trend in the number of typhoid fever notifications since 2000. From 2011 to 2018, the number of notified cases each year has ranged from 38 to 59.

Figure 40. Typhoid fever notifications by year, 2000–2019



The highest notification rate for typhoid fever was reported from Counties Manukau DHB (4.1 per 100,000, 23 cases).

Notification rates were highest for adults aged 20–29 years (1.9 per 100,000), 40–49 and 50–59 years (both 1.6 per 100,000) and children aged 5–9 years (1.5 per 100,000).

Males and females had similar rates (1.2 and 1.1 per 100,000 respectively).

Ethnicity was recorded for 54 (98.2%) cases. The ethnic group with the highest notification rate was Pacific peoples (5.6 per 100,000) followed by Asian (4.4 per 100,000).

Hospitalisation status was recorded for 54 cases, of which 47 (87.0%) were hospitalised.

Of the 55 cases notified in 2019, 42 (76.3%) had travelled overseas during the incubation period for the disease. The countries most commonly visited were India (21 cases) and Samoa (10 cases). Some cases reported travel to more than one country.

One typhoid fever outbreak involving three cases was reported in 2019 (Table 27).

The Enteric Reference Laboratory at ESR confirmed 53 isolates as *Salmonella* Typhi during 2019. The most common phage types identified were *S*. Typhi phage type E1a (20 isolates) and *S*. Typhi ST1 (9 isolates).

Viral haemorrhagic fevers

No cases of viral haemorrhagic fever (including Ebola) have ever been reported in New Zealand.[6]

Yellow fever

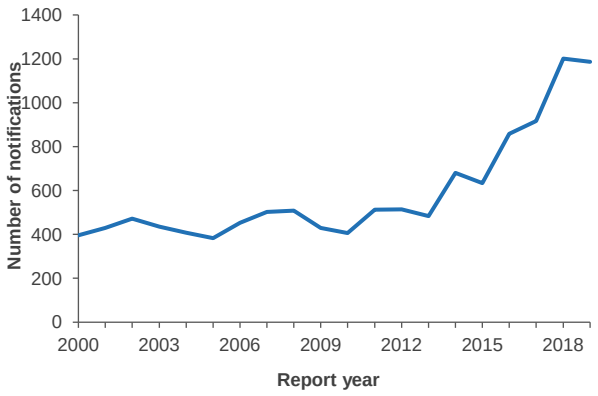
No cases of yellow fever have been notified in New Zealand since at least 1996.

Yersiniosis

In 2019, 1186 cases of yersiniosis were notified, compared with 1201 cases in 2018. The 2019 notification rate (24.1 per 100,000) was similar to the 2018 rate (24.8 per 100,000).

The number of notifications of yersiniosis has been steadily increasing since 2014, before the introduction of PCR tests for Yersinia in 2017 (Figure 41).

Figure 41. Yersiniosis notifications by year, 2000–2019



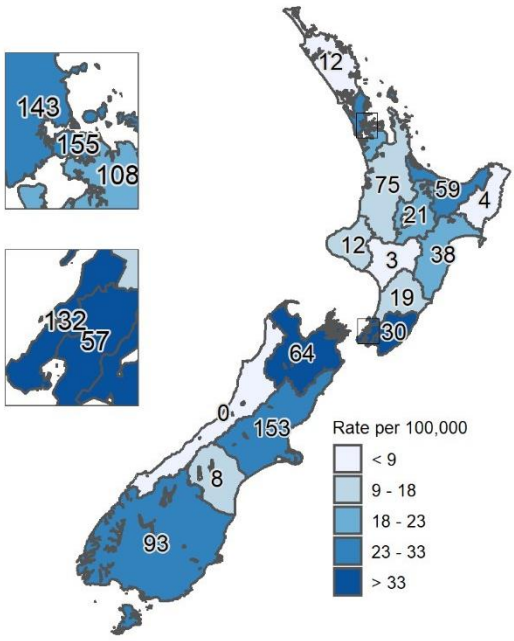
Wairarapa (63.0 per 100,000), Capital & Coast (41.8 per 100,000) and Nelson Marlborough (40.8 per 100,000) DHBs had the highest notification rates for yersiniosis (Figure 42).

Infants aged less than 1 year had the highest notification rate (100.6 per 100,000), followed by children aged 1–4 years (60.6 per 100,000).

Females (24.6 per 100,000) had a slightly higher rate than males (23.6 per 100,000).

Ethnicity was recorded for 1139 (96.0%) cases. The ethnic group with the highest notification rate was MELAA (50.5 per 100,000), followed by Asian (33.3 per 100,000), and European or Other (24.8 per 100,000).

Figure 42. Yersiniosis notifications by DHB, 2019



Numbers represent notification count in DHB region.
Where fewer than five rates are not shown.

Further information by DHB, sex, age and ethnic group is in Table 33 to Table 36 in the Appendix.

Hospitalisation status was recorded for 753 (63.5%) cases, of which 94 (12.5%) were hospitalised.

The most commonly reported risk factors were consumption of food from retail premises and contact with farm animals (Table 26).

Five outbreaks due to *Yersinia* were reported in 2019, involving 114 cases (Table 27).

The Enteric Reference Laboratory at ESR confirmed 779 isolates as *Yersinia enterocolitica* and 20 as *Y. pseudotuberculosis* during 2019. The most common *Y. enterocolitica* biotypes identified were biotype 2/3 serotype O:9 (42 isolates, 54.3%), biotype 1A (214 isolates, 27.5%) and biotype 4 serotype O:3 (124 isolates, 15.9%). Diagnostic laboratories in the upper half of the North Island no longer routinely detect *Y. pseudotuberculosis* from faecal specimens, so this species is likely to be under-detected.

Table 26. Exposure to risk factors associated with yersiniosis, 2019

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Consumed food from retail premises	210	263	713	44.4
Contact with farm animals	173	377	636	31.5
Recreational water contact	117	423	646	21.7
Consumed untreated water	103	375	708	21.5
Contact with faecal matter	104	426	656	19.6
Contact with other symptomatic people	47	457	682	9.3
Travelled overseas during the incubation period	58	568	560	9.3
Swimming in a public pool or spa pool	55	1131	0	4.6
Contact with sick animals	18	486	682	3.6

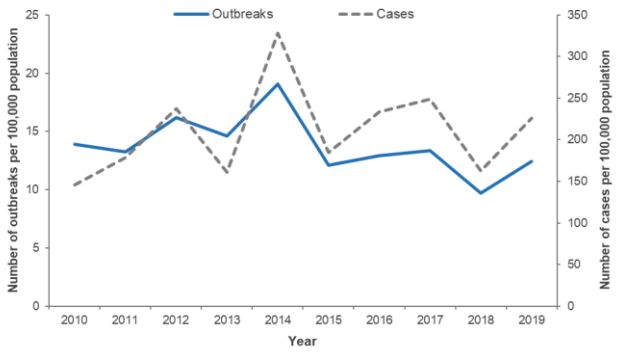
[a] Percentage refers to the number of cases that answered “yes” out of the total number of cases for which this information was known. Some cases had more than one risk factor recorded.

OUTBREAKS

This section summarises outbreaks that were recorded in EpiSurv in 2019. There were 619 reported outbreaks in 2019, a significant increase from the 477 reported in 2018. A total of 11,249 cases were associated with outbreaks in 2019, compared with 7962 cases in 2018.

The outbreak rate in 2019 (12.4 per 100,000 population) was higher than the rate reported in 2018 (9.7 per 100,000), which was the lowest rate reported in the past 10 years (Figure 43). The outbreak case rate was also higher in 2019 (225.9 cases per 100,000 population) than in 2018 (163.0 cases per 100,000 population).

Figure 43. Outbreak rate and outbreak case rate by year, 2010–2019



Causal agents

A causal agent or condition was identified in 66.6% (412/619) of outbreaks, involving 76.0% (8530/11,234) of all outbreak-associated cases (Table 29). No specific pathogen or condition was identified in the remaining 207 outbreaks, all of which were recorded as gastroenteritis.

Enteric agents were implicated in the majority of outbreaks (83.4%, 516/619) and accounted for the majority of associated cases (73.7%, 8284/11,249) (Table 27). Norovirus (29.1%, 180/619) was the most common causal agent implicated in outbreaks in 2019 and accounted for 38.7% of outbreak cases.

Non-enteric agents accounted for 16.6% (103/619) of outbreaks. This is a significant increase compared with 2018 when 6.3% of outbreaks were non-enteric. The increase in non-enteric outbreaks was due to an increase in reporting of acute respiratory illness/influenza outbreaks.

Outbreak settings

Most (73.7%, 456/619) outbreaks were set in institutions, with long-term care facilities (38.0%, 235/619) and childcare centres (24.9%, 154/619) accounting for over half of the reported outbreaks (Table 28). Outbreaks in long-term care facilities also had the highest number of associated cases (4842).

Modes of transmission

The most commonly reported mode of transmission in 2019 was person-to-person (86.1%, 533/619 outbreaks) (Table 29). Person-to-person transmission also accounted for the highest percentage of associated cases (93.3%, 10,498/11,279).

Table 27. Outbreaks and associated cases by pathogen, 2019

Pathogen or condition	Outbreaks[1]			Cases[1]	
	Total	% of outbreaks (n=619)	Median cases per outbreak	Total	% of cases (n=11,249)
Enteric	**516**	**83.4**	**11**	**8284**	**73.6**
Norovirus	180	29.1	19	4355	38.7
Salmonella[2]	27	4.4	2	228	2.0
Giardia	24	3.9	4	145	1.3
Campylobacter	20	3.2	3	156	1.4
STEC infection	17	2.7	3	144	1.3
Cryptosporidium	15	2.4	4	92	0.8
Sapovirus	10	1.6	18	223	2.0
Shigella	9	1.5	2	27	0.2
Rotavirus	7	1.1	13	344	3.1
Yersinia	5	0.8	11	114	1.0
Clostridium perfringens	3	0.5	20	53	0.5
Astrovirus	3	0.5	8	25	0.2
Histamine (scombroid) fish poisoning	3	0.5	2	9	0.1
Adenovirus	2	0.3	15.5	31	0.3
Hepatitis A	2	0.3	6.5	13	0.1
Enterotoxigenic *Escherichia coli* (ETEC)	2	0.3	4.5	9	0.1
Vibrio parahaemolyticus	1	0.2	24	24	0.2
Bacillus cereus	1	0.2	3	3	0.0
Typhoid fever	1	0.2	3	3	0.0
Pathogen not identified[3]	207	33.4	10	2704	24.0
Non-enteric	**103**	**16.6**	**17**	**2965**	**26.4**
Acute respiratory illness / influenza[4]	78	12.6	21	2040	18.1
Measles virus	14	2.3	8.5	801	7.1
Mumps virus	5	0.8	3	29	0.3
Streptococcus A	1	0.2	48	48	0.4
Dengue fever	1	0.2	21	21	0.2
Mycobacterium tuberculosis	1	0.2	9	9	0.1
Varicella zoster virus	1	0.2	8	8	0.1
Bordetella pertussis	1	0.2	5	5	0.0
Zika virus	1	0.2	4	4	0.0

[1] More than one agent was reported in 23 outbreaks, therefore the numbers don't add up to the group totals.
[2] Includes non-typhoidal *Salmonella* species only. Outbreaks of *S.* Typhi and *S.* Paratyphi are reported separately.
[3] All enteric outbreaks with no identified pathogen were recorded as gastroenteritis.
[4] Includes outbreaks of acute respiratory infection (8 outbreaks, 102 cases), influenza A (44 outbreaks, 1115 cases), influenza B (6 outbreaks, 415 cases), influenza virus NOS (1 outbreak, 19 cases), influenza-like illness (19 outbreaks, 447 cases) and RSV (1 outbreak, 11 cases).

Table 28. Outbreaks and associated cases by setting of exposure, 2019

Outbreak setting	Outbreaks[1]		Cases[1]	
	Total	% of outbreaks (n=619)	Total	% of cases (n=11,249)
Institution	**456**	**73.7**	**9314**	**82.8**
Long term care facility	235	38.0	4842	43.0
Childcare centre	154	24.9	2539	22.6
School	22	3.6	1193	10.6
Hospital (acute care)	16	2.6	151	1.3
Camp	8	1.3	133	1.2
Hotel / motel	4	0.6	36	0.3
Marae	3	0.5	20	0.2
Prison	1	0.2	62	0.6
Hostel / boarding house	1	0.2	20	0.2
Other institution	16	2.6	386	3.4
Commercial food operators	**41**	**6.6**	**335**	**3.0**
Restaurant / café / bakery	31	5.0	222	2.0
Takeaway	4	0.6	13	0.1
Caterers	2	0.3	37	0.3
Temporary or mobile service	1	0.2	23	0.2
Supermarket / delicatessen	1	0.2	2	0.0
Other food outlet	3	0.5	41	0.4
Workplace / Community / Other	**107**	**17.3**	**1220**	**10.8**
Home	70	11.3	253	2.3
Community, church, sports gathering	6	1.0	71	0.6
Workplace	5	0.8	80	0.7
Farm	5	0.8	26	0.2
Cruise ship, airline, tour bus, train	3	0.5	14	0.1
Other setting	24	3.9	806	7.2
Unknown setting	**19**	**3.1**	**430**	**3.8**

[1] More than one setting was recorded in 14 outbreaks, therefore the numbers don't add up to the group totals

Table 29. Outbreaks and associated cases by mode of transmission, 2019

Mode of transmission	Outbreaks				Cases	
	Primary mode	Secondary mode	Total	Percentage of outbreaks (n=619)[1]	Total	Percentage of cases (n=11,249)[1]
Person-to-person	464	69	533	86.1	10,498	93.3
Foodborne	55	12	67	10.8	690	6.1
Environmental	15	80	95	15.3	2,062	18.3
Waterborne	9	3	12	1.9	63	0.6
Zoonotic	6	4	10	1.6	48	0.4
Vector-borne	2	0	2	0.3	25	0.2
Sexual contact	1	0	1	0.2	3	0.0
Other	0	7	7	1.1	104	0.9
Unknown	-	-	20	3.2	118	1.0

[1] More than one mode of transmission was recorded for 123 outbreaks therefore the totals add up to more than 100%.
Note: No outbreaks with parenteral transmission were reported in 2019.

APPENDIX: NATIONAL DATA AND TRENDS

Table 30. Number of cases for rare notifiable diseases in New Zealand, 2018 and 2019

Disease[a]	2018	2019
Brucellosis	3	2
Cholera	1	0
Creutzfeldt-Jakob disease[b]	4	6
Cysticercosis	1	0
Decompression sickness	1	3
Diphtheria	0	1
Haemophilus influenzae type b disease	3	2
Hepatitis NOS	7	9
Hydatid disease	0	1
Leprosy	3	6
Q fever	0	1
Rickettsial disease	3	4
Ross River virus infection	1	5
Rubella	1	2
Taeniasis	4	5
Toxic shellfish poisoning	3	1
Zika virus	2	7

[a] No cases of the following notifiable diseases were reported in 2018 or 2019: anthrax, Barmah Forest virus infection, botulism, *Cronobacter* species invasive disease, highly pathogenic avian influenza, Japanese encephalitis, Middle East Respiratory Syndrome (MERS), non-seasonal influenza, plague, poliomyelitis, primary amoebic meningoencephalitis, rabies, severe acute respiratory syndrome (SARS), tetanus, trichinellosis, viral haemorrhagic fever and yellow fever.

[b] Creutzfeldt-Jakob disease data is provided by the National CJD Registry, University of Otago.

Table 31. Deaths due to notifiable diseases, as recorded in EpiSurv, 2000–2019

Disease	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
AIDS [a]	19	14	11	10	14	15	15	11	8	9	15	5	9	8	7	6	3	11	5	1
Campylobacteriosis	3	1	1	0	0	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0
Creutzfeldt-Jakob disease[b]	7	1	3	4	6	3	5	5	4	7	3	4	10	4	9	6	4	13	4	6
Gastroenteritis[c]	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0
Giardiasis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haemophilus influenzae type b	0	0	1	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0
Hepatitis B	0	1	0	0	0	1	0	1	0	0	0	0	1	0	1	1	0	0	1	0
Hydatid disease	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Invasive pneumococcal disease[d]									7	33	25	30	29	18	23	27	22	27	25	11
Legionellosis[e]	5	2	3	1	1	4	2	1	4	2	5	4	6	3	1	4	1	5	3	2
Listeriosis – non-pregnancy associated	2	1	0	2	3	1	0	2	3	2	3	1	4	2	3	1	0	0	2	0
Listeriosis – pregnancy associated	4	1	2	2	2	4	1	1	2	2	4	0	2	3	1	3	2	0	0	4
Malaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Meningococcal disease	17	26	18	13	8	14	7	7	8	5	6	13	6	4	3	4	2	9	10	10
Non seasonal influenza A (H1N1)[f]										36	17	0	0	0	0	0	0	0	0	0
Pertussis	1	0	1	1	1	1	0	0	0	0	0	1	2	1	0	0	0	0	0	0
Primary amoebic meningoencephalitis	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rheumatic fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salmonellosis	7	2	1	0	0	1	1	1	1	1	0	0	0	0	0	0	0	1	0	0
Shigellosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
STEC infection	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	2	0
Tetanus	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0
Tuberculosis disease	8	2	6	6	6	4	6	3	4	4	9	3	4	3	5	6	5	1	3	3
Typhoid fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Yersiniosis	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[a] Data source: AIDS Epidemiology Group.

[b] Data source: CJD Registry.[15]

[c] Cases of acute gastroenteritis from a common source or person in a high-risk category (eg, food handler or childcare worker) or foodborne intoxication, eg, staphylococcal intoxication

[d] Invasive pneumococcal disease became notifiable on 17 October 2008.

[e] One further legionellosis death occurred in a laboratory-reported but non-notified case in 2002.

[f] Non-seasonal influenza became notifiable on 26 April 2009. Deaths recorded in 2009 and 2010 were due to influenza A(H1N1)pdm09. Influenza A(H1N1)pdm09 virus was re-classified as seasonal influenza from 1 January 2011.

Note: The numbers in this table are those recorded in EpiSurv where the notifiable disease was the primary cause of death. Information on a death is most likely to be reported when it occurs close to the time of notification and investigation.

Table 32. Hospital admissions for selected notifiable diseases, 2017–2019

Disease	ICD 10 codes	2017		2018		2019	
		Prin [a]	Oth [b]	Prin [a]	Oth [b]	Prin [a]	Oth [b]
AIDS	B20-B24	6	263	7	283	7	235
Arboviral diseases	A83, A84, A85.2, A92, A93, A94, B33.1	6		3	1	2	
Brucellosis	A23		1	1	3	1	1
Campylobacteriosis	A04.5	591	142	631	151	582	120
Cholera	A00	2		2	3		
Creutzfeldt-Jakob disease	A81.0	19	6	3		4	2
Cryptosporidiosis	A07.2	46	21	82	53	43	24
Cysticercosis	B69	1		4	1	4	3
Decompression sickness	T70.3	25	2	16	1	33	1
Dengue fever	A90, A91	83	4	153	15	62	2
Diphtheria	A36	2	3	1	1	2	2
Giardiasis	A07.1	38	33	38	26	42	46
Hepatitis A	B15	40	42	47	49	31	45
Hepatitis B	B16	9	21	22	17	12	12
Hepatitis C	B17.1	6	10	10	11	7	7
Hydatid disease	B67.0-B67.4	1	1	2	1		1
Legionellosis	A48.1	82	89	72	75	105	31
Leprosy	A30		1	2		1	1
Leptospirosis	A27	100	16	84	17	64	11
Listeriosis	A32	7	12	17	24	22	24
Malaria	B50-B54	31	3	24	2	25	
Measles	B05	5		9	2	678	108
Meningococcal disease	A39	114	35	118	50	155	48
Mumps	B26	108	10	23	7	31	4
Paratyphoid	A01.1-A01.4	14	5	12		6	2
Pertussis	A37	141	39	194	64	111	37
Poliomyelitis	A80						1
Q fever	A78		1	2		1	
Rheumatic fever	I00, I01, I02	207	26	227	38	235	35
Rickettsial diseases	A75, A77, A79	4		4	1	5	3
Rubella	B06	1			2	1	
Salmonellosis	A02	175	40	200	61	231	55
Shigellosis	A03	33	12	37	22	44	22
STEC infection	A04.3	11	9	19	22	29	23
Taeniasis	B689						1
Tetanus	A33-A35	3	3		1		
Tuberculosis	A15-A19, P37.0	224	123	263	135	246	151
Typhoid	A01.0	65	4	60	8	49	
Viral haemorrhagic fevers	A95, A98, A99						
Yellow fever	A95						
Yersiniosis	A04.6	54	37	86	67	69	69

[a] Principal diagnosis.

[b] Other relevant diagnosis.

Note: Hospital admission data may include multiple admissions (to the same or different hospitals) for the same case, and admissions may relate to cases first diagnosed in previous years.

Table 33. Number of cases and rate per 100,000 population of notifiable diseases by DHB, 2019

Disease	District Health Board [a]																			
	Northland		Waitemata		Auckland		Counties Manukau		Waikato		Lakes		Bay of Plenty		Tairawhiti		Taranaki		Hawke's Bay	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Campylobacteriosis	249	132.0	793	129.2	515	106.0	487	86.3	619	145.3	151	132.0	289	114.3	44	89.2	223	181.6	260	149.8
Cryptosporidiosis	42	22.3	103	16.8	94	19.3	114	20.2	112	26.3	12	10.5	30	11.9	15	30.4	19	15.5	46	26.5
Dengue fever	6	3.2	30	4.9	46	9.5	22	3.9	35	8.2	4		16	6.3	3		3		3	
Gastroenteritis[b]	22	11.7	9	1.5	12	2.5	18	3.2	124	29.1	41	35.8	119	47.1	1		2		1	
Giardiasis	94	49.8	166	27.0	205	42.2	173	30.7	187	43.9	43	37.6	130	51.4	37	75.1	27	22.0	73	42.1
Hepatitis A			11	1.8	9	1.9	19	3.4	6	1.4	1								2	
Hepatitis B[c]			1		2		5	0.9	2		3		1						2	
Hepatitis C[c]	3		1		1		3										1			
Invasive pneumococcal disease	26	13.8	49	8.0	41	8.4	68	12.0	44	10.3	19	16.6	36	14.2	4		21	17.1	28	16.1
Legionellosis	9	4.8	15	2.4	15	3.1	18	3.2	4		3		11	4.3	1		3		2	
Leptospirosis	10	5.3	1		1		9	1.6	15	3.5	2		6	2.4	7	14.2	5	4.1	8	4.6
Listeriosis			3		3		2		3		1		1						1	
Malaria	1		5	0.8	5	1.0	3		2				2							
Measles	134	71.0	307	50.0	276	56.8	1174	208.0	51	12.0	30	26.2	45	17.8			7	5.7	26	15.0
Meningococcal disease	9	4.8	23	3.7	12	2.5	23	4.1	10	2.3	3		11	4.3	2		1		2	
Mumps	1		62	10.1	72	14.8	40	7.1	25	5.9	5	4.4	8	3.2	2		3			
Paratyphoid fever	1		2		7	1.4	4												1	
Pertussis	69	36.6	120	19.5	80	16.5	115	20.4	141	33.1	14	12.2	85	33.6	10	20.3	55	44.8	26	15.0
Rheumatic fever[d]	14	7.4	21	3.4	16	3.3	64	11.3	15	3.5	3		9	3.6	1		1		5	2.9
Salmonellosis	36	19.1	144	23.5	117	24.1	108	19.1	96	22.5	34	29.7	57	22.5	10	20.3	39	31.8	31	17.9
Shigellosis	3		26	4.2	66	13.6	35	6.2	5	1.2	6	5.2	12	4.7	1		3		10	5.8
STEC infection	69	36.6	102	16.6	77	15.9	64	11.3	107	25.1	46	40.2	75	29.7	1		9	7.3	55	31.7
Tuberculosis disease	6	3.2	40	6.5	46	9.5	78	13.8	30	7.0	4		7	2.8	3		2		7	4.0
Typhoid fever	3		3		4		23	4.1	6	1.4			3		1				3	
Yersiniosis	12	6.4	143	23.3	155	31.9	108	19.1	75	17.6	21	18.4	59	23.3	4		12	9.8	38	21.9

[a] Table is continued on the following page.
[b] Cases of acute gastroenteritis from a common source or person in a high-risk category (eg, food handler or childcare worker) or foodborne intoxication, eg, staphylococcal intoxication.
[c] Only acute cases of this disease are notifiable.
[d] Includes rheumatic fever initial episodes and recurrent cases.
Note: Where fewer than five cases have been notified a rate has not been calculated and the cell has been left blank.

Table 33. Number of cases and rate per 100,000 population of notifiable diseases by DHB, 2019 (continued)

Disease	District Health Board [a]																			
	Whanganui		MidCentral		Hutt Valley		Capital & Coast		Wairarapa		Nelson Marlborough		West Coast		Canterbury		South Canterbury		Southern	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Campylobacteriosis	80	118.5	261	142.4	152	98.3	330	104.4	108	226.9	205	130.7	45	138.0	713	125.9	142	232.4	536	158.0
Cryptosporidiosis	7	10.4	62	33.8	14	9.0	44	13.9	9	18.9	30	19.1	7	21.5	121	21.4	16	26.2	138	40.7
Dengue fever	5	7.4	8	4.4	3		3		3		5	3.2	2		16	2.8	3		8	2.4
Gastroenteritis[b]	11	16.3	1		19	12.3	38	12.0	14	29.4	11	7.0	1		28	4.9	4		11	3.2
Giardiasis	9	13.3	48	26.2	39	25.2	132	41.8	21	44.1	81	51.6	2		159	28.1	29	47.5	94	27.7
Hepatitis A			2				2								4				2	
Hepatitis B[c]	1		1		1		2								4				3	
Hepatitis C[c]											3		1		7	1.2			4	
Invasive pneumococcal disease	14	20.7	17	9.3	18	11.6	23	7.3	7	14.7	10	6.4	4		34	6.0	6	9.8	28	8.3
Legionellosis	1		3		3		3				7	4.5	9	27.6	42	7.4			20	5.9
Leptospirosis	4		6	3.3					1		6	3.8	6	18.4	3		1		5	1.5
Listeriosis	1		2		3		2		1						5	0.9	2		1	
Malaria					1		4				1				3				1	
Measles			10	5.5	9	5.8	23	7.3	1		1				44	7.8	2		73	21.5
Meningococcal disease	3		5	2.7	3		12	3.8	2		1				11	1.9			6	1.8
Mumps			1		3		10	3.2			4				4				24	7.1
Paratyphoid fever							1								1				1	
Pertussis	14	20.7	25	13.6	50	32.3	168	53.2	11	23.1	91	58.0	18	55.2	70	12.4			44	13.0
Rheumatic fever[d]	1		7	3.8	3		6	1.9							3				4	
Salmonellosis	10	14.8	32	17.5	37	23.9	75	23.7	14	29.4	32	20.4	12	36.8	141	24.9	21	34.4	142	41.9
Shigellosis	1				3		19	6.0	2		5	3.2			18	3.2			7	2.1
STEC infection	6	8.9	9	4.9	34	22.0	76	24.1	30	63.0	56	35.7			67	11.8	17	27.8	201	59.3
Tuberculosis disease			6	3.3	12	7.8	22	7.0			7	4.5	2		32	5.7	3		16	4.7
Typhoid fever			1		2						1				4				1	
Yersiniosis	3		19	10.4	57	36.8	132	41.8	30	63.0	64	40.8			153	27.0	8	13.1	93	27.4

[a] Table is continued from the previous page.

[b] Cases of acute gastroenteritis from a common source or person in a high-risk category (eg, food handler or childcare worker) or foodborne intoxication, eg, staphylococcal intoxication.

[c] Only acute cases of this disease are notifiable.

[d] Includes rheumatic fever initial episodes and recurrent cases.

Note: Where fewer than five cases have been notified a rate has not been calculated and the cell has been left blank.

Table 34. Number of cases and rate per 100,000 population of notifiable diseases by sex, 2019

Disease	Sex					
	Male		Female		Total [a]	
	Cases	Rate	Cases	Rate	Cases	Rate
Campylobacteriosis	3550	146.7	2650	106.1	6202	126.1
Cryptosporidiosis	474	19.6	560	22.4	1035	21.0
Dengue fever	109	4.5	115	4.6	224	4.6
Gastroenteritis (acute)[b]	227	9.4	257	10.3	487	9.9
Giardiasis	895	37.0	853	34.2	1749	35.6
Hepatitis A	31	1.3	27	1.1	58	1.2
Hepatitis B[c]	21	0.9	7	0.3	28	0.6
Hepatitis C[c]	15	0.6	9	0.4	24	0.5
Invasive pneumococcal disease	274	11.3	223	8.9	497	10.1
Legionellosis	124	5.1	45	1.8	169	3.4
Leptospirosis	81	3.3	15	0.6	96	2.0
Listeriosis	16	0.7	15	0.6	31	0.6
Malaria	21	0.9	7	0.3	28	0.6
Measles	1147	47.4	1064	42.6	2213	45.0
Meningococcal disease	73	3.0	66	2.6	139	2.8
Mumps	151	6.2	113	4.5	264	5.4
Paratyphoid fever	9	0.4	9	0.4	18	0.4
Pertussis	493	20.4	713	28.6	1206	24.5
Rheumatic fever[d]	85	3.5	86	3.4	173	3.5
Salmonellosis	584	24.1	603	24.1	1188	24.2
Shigellosis	115	4.8	107	4.3	222	4.5
STEC infection	520	21.5	581	23.3	1101	22.4
Tuberculosis disease	180	7.4	142	5.7	323	6.6
Typhoid fever	28	1.2	27	1.1	55	1.1
Yersiniosis	571	23.6	615	24.6	1186	24.1

[a] Total includes cases where sex was unknown.
[b] Cases of acute gastroenteritis from a common source or person in a high-risk category (eg, food handler or childcare worker) or foodborne intoxication, eg, staphylococcal intoxication.
[c] Only acute cases of this disease are notifiable.
[d] Includes rheumatic fever initial episodes and recurrent cases.

Table 35. Number of cases and rate per 100,000 population of notifiable diseases by age group, 2019

Disease	<1 year		1–4 years		5–9 years		10–14 years		15–19 years		20–29 years		30–39 years		40–49 years		50–59 years		60–69 years		70+ years		Total[a]	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Campylobacteriosis	128	214.6	597	242.7	269	81.6	219	67.8	324	102.6	865	124.1	667	102.8	660	106.3	809	128.6	804	154.7	860	162.9	6202	126.1
Cryptosporidiosis	20	33.5	250	101.6	100	30.3	69	21.4	55	17.4	179	25.7	141	21.7	89	14.3	56	8.9	41	7.9	35	6.6	1035	21.0
Dengue fever			2		6	1.8	6	1.9	10	3.2	38	5.5	50	7.7	40	6.4	36	5.7	26	5.0	10	1.9	224	4.6
Gastroenteritis[b]	11	18.4	34	13.8	11	3.3	8	2.5	19	6.0	55	7.9	80	12.3	69	11.1	67	10.6	72	13.9	54	10.2	487	9.9
Giardiasis	18	30.2	310	126.0	119	36.1	40	12.4	37	11.7	203	29.1	384	59.2	224	36.1	168	26.7	171	32.9	75	14.2	1749	35.6
Hepatitis A			5	2.0	5	1.5	4		7	2.2	14	2.0	10	1.5	5	0.8	6	1.0	2				58	1.2
Hepatitis B[c]											5	0.7	7	1.1	4		5	0.8	3		4		28	0.6
Hepatitis C[c]									2		4		8	1.2	2		3		4		1		24	0.5
Invasive pneumococcal disease	18	30.2	28	11.4	14	4.2	9	2.8	6	1.9	21	3.0	39	6.0	46	7.4	76	12.1	97	18.7	143	27.1	497	10.1
Legionellosis							1				2		7	1.1	13	2.1	23	3.7	49	9.4	74	14.0	169	3.4
Leptospirosis					1		1		7	2.2	19	2.7	15	2.3	20	3.2	14	2.2	13	2.5	6	1.1	96	2.0
Listeriosis									1		5	0.7	3		3		3		3		13	2.5	31	0.6
Malaria			1				1		2		6	0.9	4		3		5	0.8	5	1.0	1		28	0.6
Measles	278	466.1	310	126.0	85	25.8	153	47.4	309	97.9	718	103.0	212	32.7	116	18.7	29	4.6	3				2213	45.0
Meningococcal disease	31	52.0	21	8.5	13	3.9	3		15	4.8	17	2.4	3		5	0.8	8	1.3	11	2.1	12	2.3	139	2.8
Mumps			16	6.5	9	2.7	8	2.5	38	12.0	146	20.9	31	4.8	9	1.4	4		3				264	5.4
Paratyphoid fever			1		1		2		1		8	1.1	4								1		18	0.4
Pertussis	88	147.6	168	68.3	115	34.9	98	30.3	70	22.2	94	13.5	120	18.5	154	24.8	120	19.1	106	20.4	73	13.8	1206	24.5
Rheumatic fever[d]			1		37	11.2	70	21.7	20	6.3	35	5.0	6	0.9	2		2						173	3.5
Salmonellosis	73	122.4	158	64.2	64	19.4	38	11.8	44	13.9	151	21.7	146	22.5	117	18.8	149	23.7	149	28.7	99	18.8	1188	24.2
Shigellosis	2		15	6.1	11	3.3	7	2.2	5	1.6	46	6.6	37	5.7	24	3.9	36	5.7	25	4.8	14	2.7	222	4.5
STEC infection	51	85.5	188	76.4	52	15.8	39	12.1	48	15.2	122	17.5	87	13.4	78	12.6	124	19.7	143	27.5	169	32.0	1101	22.4
Tuberculosis disease			1		1				7	2.2	85	12.2	69	10.6	50	8.1	36	5.7	36	6.9	38	7.2	323	6.6
Typhoid fever			4		5	1.5	2		2		13	1.9	7	1.1	10	1.6	10	1.6	2				55	1.1
Yersiniosis	60	100.6	149	60.6	50	15.2	48	14.9	45	14.3	131	18.8	159	24.5	133	21.4	127	20.2	139	26.7	145	27.5	1186	24.1

[a] Total includes cases where age was unknown.
[b] Cases of acute gastroenteritis from a common source or person in a high-risk category (eg, food handler or childcare worker) or foodborne intoxication, eg, staphylococcal intoxication
[c] Only acute cases of this disease are notifiable.
[d] Includes rheumatic fever initial episodes and recurrent cases.
Note: Where fewer than five cases have been notified a rate has not been calculated and the cell has been left blank.

Table 36. Number of cases and rate per 100,000 population of notifiable diseases by ethnic group, 2019

Disease	Ethnic group											
	Māori		Pacific peoples		Asian		MELAA[a]		European or Other		Total[b]	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Campylobacteriosis	544	67.4	141	43.8	359	49.6	48	93.3	4775	160.5	6202	126.1
Cryptosporidiosis	123	15.2	32	9.9	78	10.8	10	19.4	774	26.0	1035	21.0
Dengue fever	13	1.6	15	4.7	47	6.5	5	9.7	143	4.8	224	4.6
Gastroenteritis[c]	73	9.0	13	4.0	35	4.8	5	9.7	350	11.8	487	9.9
Giardiasis	176	21.8	32	9.9	121	16.7	19	36.9	1357	45.6	1749	35.6
Hepatitis A	6	0.7	17	5.3	18	2.5	1		14	0.5	58	1.2
Hepatitis B[d]	10	1.2	2		4				12	0.4	28	0.6
Hepatitis C[d]	5	0.6	1		1				15	0.5	24	0.5
Invasive pneumococcal disease	149	18.5	79	24.6	19	2.6	2		243	8.2	497	10.1
Legionellosis	24	3.0	7	2.2	10	1.4			126	4.2	169	3.4
Leptospirosis	14	1.7	3		1		1		76	2.6	96	2.0
Listeriosis	7	0.9	2		2		1		18	0.6	31	0.6
Malaria			4		8	1.1	3		12	0.4	28	0.6
Measles	528	65.5	904	281.0	160	22.1	31	60.2	573	19.3	2213	45.0
Meningococcal disease	47	5.8	29	9.0	7	1.0	1		55	1.8	139	2.8
Mumps	21	2.6	48	14.9	44	6.1	11	21.4	136	4.6	264	5.4
Paratyphoid fever			2		10	1.4			6	0.2	18	0.4
Pertussis	221	27.4	95	29.5	54	7.5	17	33.0	811	27.3	1206	24.5
Rheumatic fever[e]	62	7.7	106	32.9	1				4		173	3.5
Salmonellosis	133	16.5	72	22.4	116	16.0	15	29.1	839	28.2	1188	24.2
Shigellosis	20	2.5	51	15.9	31	4.3	5	9.7	115	3.9	222	4.5
STEC infection	137	17.0	30	9.3	56	7.7	17	33.0	849	28.5	1101	22.4
Tuberculosis disease	29	3.6	49	15.2	206	28.5	17	33.0	20	0.7	323	6.6
Typhoid fever			18	5.6	32	4.4	1		3		55	1.1
Yersiniosis	87	10.8	47	14.6	241	33.3	26	50.5	738	24.8	1186	24.1

[a] Middle Eastern/Latin American/African.

[b] Total includes cases where ethnicity was unknown.

[c] Cases of acute gastroenteritis from a common source or person in a high-risk category (eg, food handler or childcare worker) or foodborne intoxication, eg, staphylococcal intoxication.

[d] Only acute cases of this disease are notifiable.

[e] Includes rheumatic fever initial episodes and recurrent cases.

Note: Denominator data used to determine disease rates for ethnic groups is based on population projections by prioritised ethnic group for 2019 produced by Statistics New Zealand. according to assumptions agreed to by the Ministry of Health. MELAA was estimated as 1.7% of Other, based on 2013 census data proportions. Ethnicity is prioritised in the following order: Māori, Pacific peoples, Asian, MELAA, European or Other (including New Zealander) ethnic groups. Where fewer than five cases have been notified a rate has not been calculated and the cell is blank.

Table 37. Number of cases of notifiable diseases by year, 2010–2019

Disease	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
AIDS	39	24	20	25	19	9	23	12	14	19
Campylobacteriosis	7346	6686	7016	6837	6782	6218	7457	6482	6957	6202
Cholera	2	0	0	0	0	0	0	0	1	0
Creutzfeldt-Jakob disease	3	4	10	4	9	6	4	13	4	6
Cryptosporidiosis	954	610	877	1348	584	696	1062	1192	1613	1035
Dengue fever	50	42	76	106	178	125	191	161	294	224
Gastroenteritis [a]	493	567	735	557	756	503	510	324	228	487
Giardiasis	1985	1934	1714	1729	1709	1510	1616	1648	1585	1749
Haemophilus influenzae type b	8	8	4	2	5	3	2	4	3	*2*
Hepatitis A	46	26	82	91	74	47	35	58	68	58
Hepatitis B [b]	51	51	39	28	35	34	34	27	33	28
Hepatitis C [b]	16	26	31	36	29	35	31	21	34	24
Hydatid disease	4	6	1	7	4	4	2	1	0	1
Invasive pneumococcal disease	535	552	489	479	489	447	480	522	557	497
Legionellosis	173	158	149	151	123	246	247	221	175	169
Leprosy	3	1	2	7	4	5	0	3	3	6
Leptospirosis	81	68	108	60	56	63	85	139	109	96
Listeriosis	23	26	25	19	25	26	36	21	30	31
Malaria	44	52	38	47	33	38	26	42	36	28
Measles	48	596	68	8	280	10	103	15	30	2213
Meningococcal disease	97	119	85	68	45	64	75	112	120	139
Mumps	41	51	26	23	18	13	20	1338	435	264
Paratyphoid fever	19	13	22	25	19	34	32	37	18	18
Pertussis	872	1996	5897	3540	1099	1168	1093	2142	2956	1206
Rheumatic fever - initial episode	152	155	163	192	179	104	125	145	169	156
Rubella	4	22	4	1	4	0	3	1	1	2
Salmonellosis	1146	1055	1081	1143	955	1051	1091	1127	1100	1188
Shigellosis	104	101	131	137	128	111	174	244	217	222
STEC infection	138	153	147	205	187	330	417	547	925	1101
Tetanus	7	0	2	1	0	1	1	0	0	0
Tuberculosis disease	304	307	291	274	301	293	295	308	308	323
Typhoid fever	31	45	44	50	43	43	38	59	53	55
Yersiniosis	406	513	514	483	680	634	858	917	1201	1186
Zika virus	-	-	-	-	57	9	100	11	2	7

[a] Cases of acute gastroenteritis from a common source or person in a high-risk category (eg, food handler or childcare worker) or foodborne intoxication, eg, staphylococcal intoxication.
[b] Only acute cases of this disease are notifiable.

Table 38. Selected *Salmonella* serotypes and phage types, 2015–2019

Serotype[a]	2015	2016	2017	2018	2019
S. Typhimurium	**447**	**389**	**429**	**345**	**418**
1	38	34	22	16	7
9	27	42	14	21	13
12	18	6	7	7	2
56 variant	96	64	115	70	49
101	56	47	65	61	36
135	64	30	34	39	21
156	27	12	4	12	1
160	9	6	5	7	4
Other phage types or unidentified	112	148	163	112	285
S. Enteritidis	**110**	**114**	**151**	**130**	**165**
1b	4	8	7	14	4
11	45	46	55	30	31
Other phage types or unidentified	61	60	89	86	130
Other serotypes	**496**	**570**	**523**	**576**	**496**
S. Agona	12	18	16	27	14
S. Bovismorbificans	23	39	52	83	50
S. Brandenburg	52	67	54	45	42
S. Infantis	52	14	18	16	26
S. Mississippi	16	21	15	15	15
S. Montevideo	3	2	2	5	2
S. Saintpaul	37	35	27	39	22
S. Stanley	25	60	39	35	41
S. Thompson	32	13	12	10	9
S. Virchow	16	10	7	7	8
S. Weltevreden	18	18	21	21	20
S. enterica (I) ser. 4,[5],12 :i:-	22	23	28	26	48
S. Paratyphi var Java[b]				32	26
Other serotypes or unidentified	188	250	232	215	173
Total	**1053**	**1073**	**1103**	**1051**	**1079**

[a] Excludes *S.* Paratyphi and *S.* Typhi.
[b] Prior to 2018 *S.* Paratyphi var Java was included in the paratyphoid counts. From this time it is classified as salmonellosis.

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ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Description
AEG	AIDS Epidemiology Group
AFP	Acute flaccid paralysis
AIDS	Acquired immunodeficiency syndrome
BCG	Bacillus Calmette-Guérin
CJD	Creutzfeldt-Jakob disease
CRS	Congenital rubella syndrome
DHB	District Health Board
DTaP-IPV-HepB/Hib	Diphtheria, tetanus, acellular pertussis, inactivated polio, hepatitis B and *Haemophilus influenzae* type b vaccine
ESR	Institute of Environmental Science and Research Limited
Hib	*Haemophilus influenzae* serotype b
HIV	Human immunodeficiency virus
HPAI	Highly pathogenic avian influenza
HUS	Haemolytic uraemic syndrome
ICD	International Classification of Diseases
IgM	Immunoglobulin M
IPD	Invasive pneumococcal disease
IPV	Inactivated polio vaccine
MELAA	Middle Eastern/Latin American/African
MeNZB™	Meningococcal B outer membrane vesicle vaccine
MERS	Middle East Respiratory Syndrome
MERS-CoV	Middle East respiratory syndrome coronavirus
MMR	Measles, mumps and rubella
NAAT	Nucleic acid amplification test
NCCEP	National Certification Committee for the Eradication of Polio
NHI	National Health Index
NMDS	National Minimum Dataset
NOS	Not otherwise specified
OPV	Oral polio vaccine
NZPSU	New Zealand Paediatric Surveillance Unit
PCR	Polymerase chain reaction
PCV7	7-valent pneumococcal conjugate vaccine
PCV10	10-valent pneumococcal conjugate vaccine
PCV13	13-valent pneumococcal conjugate vaccine
PHU	Public health unit
RDNC	Reacts but does not conform to a known phage type pattern
SARS	Severe acute respiratory syndrome
sv	Serovar
STEC	Shiga toxin-producing *Escherichia coli*
Tdap	Tetanus, diphtheria and acellular pertussis vaccine
VTEC	Verocytotoxin-producing *Escherichia coli*
WHO	World Health Organization
23PPV	23-valent pneumococcal polysaccharide vaccine

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