SURVEILLANCE REPORT

NOTIFIABLE DISEASES IN NEW ZEALAND 2015

Prepared as part of a Ministry of Health contract for scientific services by the Health Intelligence Team, Institute of Environmental Science and Research Limited

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SUMMARY

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SUMMARY

This report provides a summary of the key trends in notifiable diseases for 2015.

A total of 14,306 notifiable disease cases were reported through EpiSurv, New Zealand's notifiable disease database in 2015, compared with 15,045 in 2014.

From 2014 to 2015, notifications of the following diseases decreased significantly: campylobacteriosis, dengue fever, acute gastroenteritis, giardiasis, hepatitis A, measles and rheumatic fever (Table 1). However, notifications of cryptosporidiosis, legionellosis and VTEC/STEC infection increased significantly over this time period.

ENTERIC DISEASES

From 2014 to 2015, notifications for most enteric diseases decreased, except for cryptosporidiosis and VTEC/STEC infection. There was a significant increase in notified cases of cryptosporidiosis in 2015 (696 cases, 15.1 per 100,000 population) compared with 2014 (584 cases, 12.9 per 100,000). There were 21 outbreaks of cryptosporidiosis involving 94 cases reported during 2015 (compared with 20 outbreaks involving 60 cases in 2014).

A significant increase in notified cases of VTEC/STEC infection occurred, with 330 cases in 2015 (7.2 per 100,000) compared with 187 cases in 2014 (4.1 per 100,000). This was the highest yearly total for VTEC/STEC infections since the first New Zealand case was detected in 1993. The increase may be due to a recent change in laboratory methods in one large Auckland laboratory, where all faecal specimens are now screened for VTEC/STEC using polymerase chain reaction (PCR).

There was a significant decrease in notified cases of campylobacteriosis in 2015 (6218 cases, 135.3 per 100,000) compared with 2014 (6782 cases, 150.4 per 100,000). Fewer outbreaks of campylobacteriosis were reported in 2015 (19 outbreaks, involving 88 cases), compared with 2014 (35 outbreaks, involving 241 cases). Despite a decrease in cases, campylobacteriosis still accounted for 44% of all notifications in 2015.

There was also a significant decrease in notified cases of giardiasis in 2015 (1510 cases, 32.9 per 100,000) compared with 2014 (1709 cases, 37.9 per 100,000).

VACCINE-PREVENTABLE DISEASES

A decrease in notified cases of invasive pneumococcal disease, measles and mumps occurred from 2014 to 2015. In particular, notified cases of measles significantly decreased, with only 10 cases (0.2 per 100,000 population) notified during 2015, down from 280 cases (6.2 per 100,000) in 2014 (a year of relatively high incidence with several large outbreaks).

A slight increase in notified cases of pertussis was observed, with 1168 cases in 2015 (25.4 per 100,000 population) compared with 1099 cases in 2014 (24.4 per 100,000 population). The number of cases notified in the less than 1 year age group remained relatively stable in 2015 (90 cases, 152.3 per 100,000 population), compared with 2014 (88 cases, 149.4 per 100,000).

EXOTIC AND RARE DISEASES

Notified cases of dengue fever showed a significant decrease, with 125 cases in 2015 (2.7 per 100,000) compared with 179 cases in 2014 (4.0 per 100,000).

There was also a significant decrease in notified cases of Zika virus infection in 2015 with 7 cases compared with 57 cases in 2014.

In 2015, 48 cases of Chikungunya fever were notified compared with 44 cases in 2014 (a rate of 1.0 per 100,000 for both years). The most commonly visited countries were Samoa and the Cook Islands.

Five cases of leprosy were notified in 2015 compared with four cases in 2014. All cases were overseas

during the incubation period for the disease. The countries lived in or visited were Kiribati (2 cases), Philippines (2 cases), Nepal and Thailand (1 case).

Seven cases of murine typhus (a rickettsial disease) were notified in 2015. Three of these cases were assumed to have acquired their infection in New Zealand.

Table 1. Number of cases and rates per 100,000 population for selected notifiable diseases in New Zealand, 2014 and 2015

Disease	Number of notifications		Rate per 100,000		Change[d,e]
	2014	2015	2014	2015	
AIDS[a]	19	9	0.4	0.2	↓
Campylobacteriosis	6782	6218	150.4	135.3	↓
Chikungunya fever	44	48	1.0	1.0	↑
Cryptosporidiosis	584	696	12.9	15.1	↑
Dengue fever	179	125	4.0	2.7	↓
Gastroenteritis (acute)[b]	756	500	16.8	10.9	↓
Giardiasis	1709	1510	37.9	32.9	↓
Hepatitis A	74	47	1.6	1.0	↓
Hepatitis B[c]	35	34	0.8	0.7	↓
Hepatitis C[c]	29	35	0.6	0.8	↑
Invasive pneumococcal disease	489	451	10.8	9.8	↓
Legionellosis	123	254	2.7	5.5	↑
Leptospirosis	56	63	1.2	1.4	↑
Listeriosis	25	26	0.6	0.6	↑
Malaria	33	38	0.7	0.8	↑
Measles	280	10	6.2	0.2	↓
Meningococcal disease	45	64	1.0	1.4	↑
Mumps	18	13	0.4	0.3	↓
Paratyphoid fever	19	34	0.4	0.7	↑
Pertussis	1099	1168	24.4	25.4	↑
Rheumatic fever[f]	200	112	4.4	2.4	↓
Salmonellosis	956	1051	21.2	22.9	↑
Shigellosis	128	111	2.8	2.4	↓
Tuberculosis disease	302	300	6.7	6.5	↓
Typhoid fever	42	43	0.9	0.9	↑
VTEC/STEC infection	187	330	4.1	7.2	↑
Yersiniosis	681	634	15.1	13.8	↓

[a] Data source: AIDS Epidemiology Group [1]

[b] Cases of acute gastroenteritis from a common source or foodborne intoxication, eg, staphylococcal intoxication.

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

[d] ↓↓= significant decrease, ↑↑ = significant increase, NC = no change, ↓ = not significant decrease, ↑ = not significant increase.

[e] Fisher's exact tests were used to determine statistical significance. Results are considered statistically significant when the *P* value is less than or equal to 0.05.

[f] Includes rheumatic fever initial attack and recurrent cases.

INTRODUCTION

INTRODUCTION

The *Notifiable Diseases in New Zealand: Annual Report 2015* gives an overview of the current state of notifiable diseases in New Zealand. The report includes diseases currently notifiable under the Health Act 1956 and the Tuberculosis Act 1948.

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”.[2] 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”.[3]

Surveillance provides *information for action*. Specific objectives for disease surveillance may include the following:[4]

- 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 2015 and, where data is available, the trends since 1997, 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, outbreaks and sexually transmissible diseases can be found in separate annual reports at www.surv.esr.cri.nz.

SURVEILLANCE METHODS

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SURVEILLANCE METHODS

INTERPRETING DATA

Data in this report is presented by the date the case was reported to a public health unit (PHU) (report date) and not by the date of the onset of illness (onset date). 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 location (usually a DHB).

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.[5] Issues associated with the cost of healthcare may also determine whether people visit healthcare providers for diagnosis.[6]

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 (eg, broad case definitions for viral communicable diseases) 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 ethnicity (including New Zealander).

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 and the Tuberculosis Act 1948, 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.

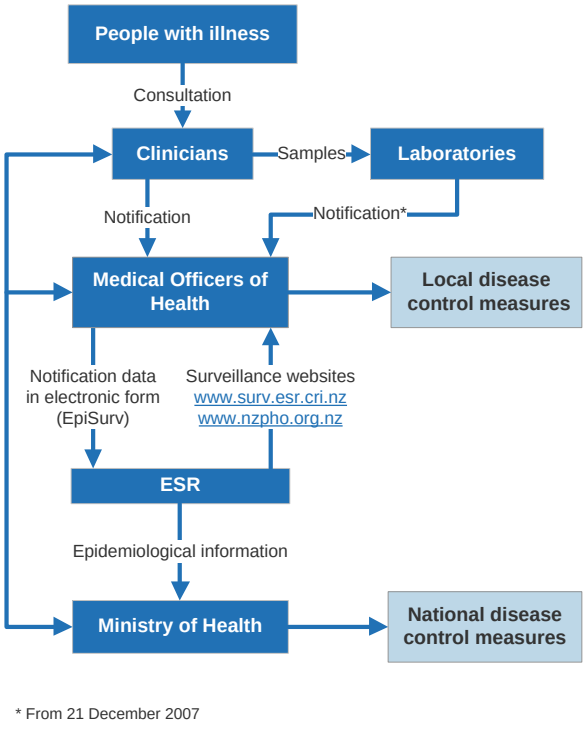
This report includes sections on all the diseases that are currently notifiable in New Zealand under the Health Act 1956 and the Tuberculosis Act 1948, excluding lead absorption, chemical poisoning from the environment and hazardous substances. Massey University's Centre for Public Health Research is responsible for the collection and reporting of these three conditions.

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 (May 2012).[7]

Information on trigger points for notification of a laboratory test result is in the 'Direct Laboratory Notification of Communicable Diseases: National Guidelines'.[8]

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

Figure 1. Notifiable disease surveillance system



* From 21 December 2007

Laboratory-based surveillance

Laboratory results for all organisms that meet the laboratory component of the notification criteria are reported directly to the medical officers of health. Laboratory reported cases may however not meet the clinical component 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 supplies 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.[9] 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 numbers and notifications 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.[7]

New Zealand Paediatric Surveillance Unit

The New Zealand Paediatric Surveillance Unit (NZPSU) [10] 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 a reply-paid card to the NZPSU on which they indicate 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, VTEC/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 18 February 2016. Changes made to EpiSurv data by PHU staff after this date are not reflected in this report. Consequently, future analyses of data may produce revised results. Notification data published in previous annual reports (from 1997 to 2014) has been updated to reflect cases in EpiSurv as at 18 February 2016.

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 aggregated from the Statistics New Zealand 2015 mid-year population estimates for territorial authorities in New Zealand.

Table 2. District Health Board populations, 2015

DHB	Population
Northland	168,300
Waitemata	575,600
Auckland	490,000
Counties Manukau	521,700
Waikato	390,600
Lakes	104,800
Bay of Plenty	221,500
Tairawhiti	47,400
Taranaki	115,900
Hawke's Bay	160,500
Whanganui	62,600
MidCentral	172,100
Hutt Valley	144,000
Capital & Coast	301,100
Wairarapa	43,200
Nelson Marlborough	144,800
West Coast	32,700
Canterbury	526,100
South Canterbury	58,600
Southern	314,000
Total	**4,595,500**

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 speckled 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 [7], 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 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 2015 mid-year population estimates published by Statistics New Zealand. Denominator data used to determine disease rates for ethnic groups is based on the proportion of people in each ethnic group from the 2013 Census 'usually resident population' applied to the 2015 mid-year population estimates from Statistics New Zealand. 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 necessarily mean that this was the source of the infection.

Vaccination data

Data on immunisation 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 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 when the *P* value is less than or equal to 0.05.

LIMITATIONS OF SURVEILLANCE DATA

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LIMITATIONS OF SURVEILLANCE DATA

Quality

Each year a report is prepared on the quality of selected EpiSurv fields to assist in the monitoring of a quality assurance programme. The latest report was published in 2015.[11]

Sensitivity

Sensitivity was assessed in 2003 using reporting on meningococcal disease.[12] This showed that the sensitivity of meningococcal disease surveillance is probably in excess of 87%. The sensitivity of surveillance for other diseases will often be less than for meningococcal disease, particularly for common enteric diseases where only a small proportion of those infected present to healthcare services. An acute gastrointestinal illness study conducted during 2005–2007 estimated that only 0.4% of community cases result in a notification.[13]

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 EpiSurv variables from 2006 to 2015.

The completeness of date of birth, age and sex data is generally very high (>98%), with little variation over the last five years. In 2015, the completeness of date of birth, age and sex data remained high (≥99%). The completeness of ethnicity data in 2014 (94.5%) was similar to that of 2013 (94.0%).

The National Health Index (NHI) provides a unique identifier for all healthcare users and is an important link between notifiable disease, immunisation and laboratory records.

Significant progress over recent years has meant a high percentage of EpiSurv records (>94% over the last five years) now record an NHI identifier. In 2015, 97.7% of notifications had NHI recorded, a slight increase from 96.9% in 2014. Laboratory reporting of notifiable diseases has improved the completion of NHI for notification records, but ethnicity is not provided with laboratory-reported notifications. For this reason, about 20% of notifications now have ethnicity derived from the NHI database rather than directly from the EpiSurv record.

Table 3. Complete data for selected EpiSurv variables, 2006–2015

Report year	Completeness of data (%)				
	Date of birth	Age	Sex	Ethnicity	NHI
2006	98.8	99.1	97.8	81.7	62.8
2007	98.7	99.0	99.2	79.2	63.9
2008	99.3	99.5	99.8	70.2	84.1
2009	99.2	99.3	98.8	92.1	91.0
2010	99.7	99.8	99.5	91.5	94.9
2011	99.6	99.7	99.0	94.9	94.3
2012	99.7	99.8	99.9	95.0	96.6
2013	99.7	99.8	100.0	94.7	97.4
2014	99.8	99.9	100.0	94.0	96.9
2015	99.8	99.8	100.0	94.5	97.7

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 2015.

In 2015, 63.8% of disease notifications had an onset date recorded (compared with 64.7% in 2014). Of these, 60.2% were reported to a public health service (PHS) within one week of the onset of symptoms and 79.6% 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, tuberculosis disease). For other diseases there may be delays in confirmation of the diagnosis due to the particular laboratory test required (eg leptospirosis).

In 2015, 89.8% (89.9% in 2014) of the notifications were entered into EpiSurv within a day of being reported to a PHS, 98.8% were entered within one week and 99.4% were entered within two weeks.

Table 4. Timeliness of disease reporting and data entry for notifiable diseases, 2015

Disease	Onset date recorded (%)	Reporting delay[a]		Entry delay[b]		
		≤1 week	≤2 weeks	≤1 day	≤1 week	≤2 weeks
Campylobacteriosis	59.0	55.7	91.1	91.8	99.5	99.9
Chikungunya fever	81.3	51.3	66.7	97.9	100.0	100.0
Cryptosporidiosis	73.7	38.4	80.7	89.7	99.7	100.0
Dengue fever	88.8	33.3	66.7	99.2	100.0	100.0
Gastroenteritis[c]	65.5	87.2	94.2	77.2	90.0	94.0
Giardiasis	50.3	22.2	49.6	92.6	99.7	99.9
Hepatitis A	97.9	41.3	78.3	95.7	100.0	100.0
Invasive pneumococcal disease	73.8	64.3	88.3	83.6	98.2	98.9
Legionellosis	82.7	28.6	61.4	79.9	96.9	98.4
Leptospirosis	88.9	19.6	66.1	76.2	98.4	100.0
Measles	100.0	60.0	90.0	100.0	100.0	100.0
Meningococcal disease	100.0	96.9	100.0	89.1	100.0	100.0
Pertussis	89.0	19.4	40.0	88.0	99.3	99.9
Rheumatic fever - initial attack	98.2	19.1	45.5	74.1	98.2	99.1
Salmonellosis	75.6	43.9	85.5	91.5	99.5	100.0
Shigellosis	87.4	37.1	81.4	93.7	99.1	100.0
Tuberculosis disease	74.3	1.8	6.7	91.3	99.0	99.0
Typhoid fever	81.4	48.6	82.9	95.3	100.0	100.0
VTEC/STEC infection	73.9	43.9	70.9	93.3	99.4	99.7
Yersiniosis	55.5	27.6	60.8	85.2	99.5	100.0
Zika virus	57.1	50.0	75.0	85.7	85.7	85.7
Other	28.1	44.3	66.5	82.9	91.3	93.1
Total	**64.3**	**43.8**	**74.8**	**89.8**	**98.8**	**99.4**

[a] Percentage of notifications reported (with onset date recorded) to a public health service 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 PHS.

[c] Cases of acute gastroenteritis from a common source or foodborne intoxication, eg, staphylococcal intoxication.

NOTIFIABLE DISEASES

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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: http://dnmeds.otago.ac.nz/departments/psm/research/aids/newsletters.html.

In 2015, nine cases of AIDS were reported to the AEG compared with 19 cases in 2014.

The 2015 AIDS notification rate (0.2 per 100,000 population) was slightly lower than the 2014 rate (0.4 per 100,000 population).

Five cases (55.6%) were men infected through sex with other men; including one case reported as infected through either injecting drug use or sex with another man. Two were infected through heterosexual contact (one male and one female), and the mode of infection was unknown for two cases.

The Māori ethnic group (4 cases) had the highest number of cases, followed by European or Other (2 cases), Pacific peoples (2 cases), and Asian (1 case).

The age of the cases ranged from 30 to 67 years, with a mean age of 46 years.

Anthrax

No cases of anthrax were notified in New Zealand in 2015. 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.[14]

Arboviral diseases

This section includes any 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 New Zealand in 2015. Six cases of Barmah Forest virus infection have been notified since 1997; two cases each in 2005 and 2009 and one case each in 1999 and 2004. All six cases reported travelling overseas during the incubation period for the disease.

Chikungunya fever

In 2015, 48 cases of Chikungunya fever were notified in New Zealand compared with 44 cases in 2014. The 2015 notification rate (1.0 per 100,000) was the same as the 2014 rate. Before 2014 only five cases had been notified - one case each year in 2007, 2008, 2009, 2011 and 2013.

Adults in the 30–39 years (1.6 per 100,000) age group had the highest rate followed by those in the 20–29, 50–59 and 60–69 (1.5 per 100,000) years age groups.

Males (0.9 per 100,000) had a slightly lower rate than females (1.2 per 100,000).

Ethnicity was recorded for 46 (95.8%) cases. Pacific peoples (9.5 per 100,000) had the highest rate, followed by the European or Other (0.6 per 100,000) ethnic group.

Hospitalisation status was recorded for 43 (89.6%) cases, of which 17 (39.5%) were hospitalised.

Of the 48 cases, 42 (87.5%) were laboratory-confirmed.

All cases had travelled overseas during the incubation period for the disease. The countries commonly visited or lived in were Samoa (28 cases) and Cook Islands (11 cases). Some cases reported travel to more than one country.

Japanese encephalitis

No cases of Japanese encephalitis were notified in New Zealand in 2015. Since 1997, only one case of Japanese encephalitis has been notified (in 2004). The case was overseas during the incubation period for the disease.

Ross River virus infection

Four cases of Ross River virus infection were notified in New Zealand in 2015 compared with one case in 2014.

The cases were in the 60–69 (2 cases), 20–29 and 40–49 (1 case each) years age groups. Two cases were male and two were female.

Three cases were from the European or Other ethnic group and one case was from the Māori ethnic group.

Hospitalisation status was recorded for three (75.0%) cases, of which no cases were hospitalised.

All four cases were laboratory-confirmed and had been in Australia during the incubation period.

Zika virus infection

In 2015, seven cases of Zika virus infection were notified in New Zealand compared with 57 cases in 2014. The 2015 notification rate (0.2 per 100,000) was a significant decrease from the 2014 rate (1.3 per 100,000). Before 2014 only one case (in 2002) had been notified.

The cases were in the 50–59 (3 cases), 40–49 (2 cases), 20–29 and 30–39 (1 case each) years age groups. Four cases were male and three were female.

Four cases were from the Pacific peoples ethnic group and three cases were from the European or Other ethnic group.

Hospitalisation status was recorded for six (85.7%) cases, of which two (33.3%) were hospitalised. Of the seven cases, six (85.7%) were laboratory-confirmed.

All cases had travelled overseas during the incubation period for the disease. The countries visited or lived in were the Samoa (4 cases), Vanuatu (2 cases), American Samoa and Thailand (1 case each). Some cases reported travel to more than one country.

Botulism

There were no cases of botulism notified in 2015. One probable case of botulism was notified during 2014. This was the first case of botulism in New Zealand since 1985 when two cases were reported.[15]

Brucellosis

One case of brucellosis was notified in New Zealand in 2015. The laboratory-confirmed case was a male aged 20–29 years who had recently arrived from Saudi Arabia. Since 1997, 15 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.[16]

Campylobacteriosis

In 2015, 6218 cases of campylobacteriosis were notified in New Zealand. The 2015 rate of 135.3 per 100,000 was significantly lower than the 2014 rate of 150.4 per 100,000 (6782 cases). Campylobacteriosis continues to be the most commonly notified disease, comprising 43.5% of all notifications in 2015. Between 2006 and 2008, the number of cases reported showed a significant decrease compared with the preceding decade (Figure 2).

Figure 2. Campylobacteriosis notifications by year, 1997–2015

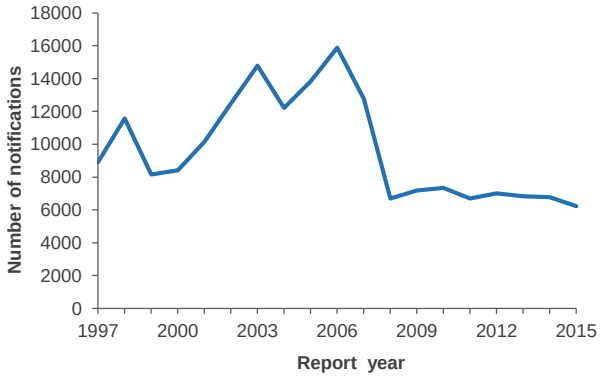
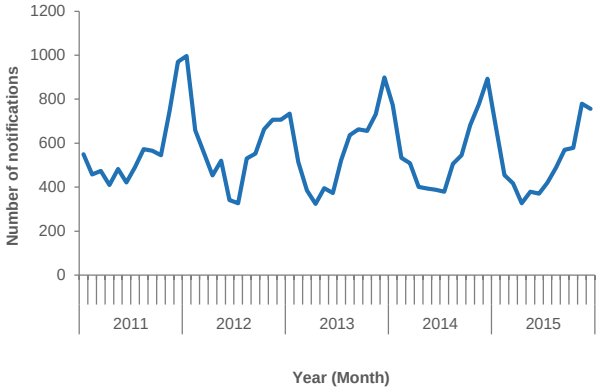


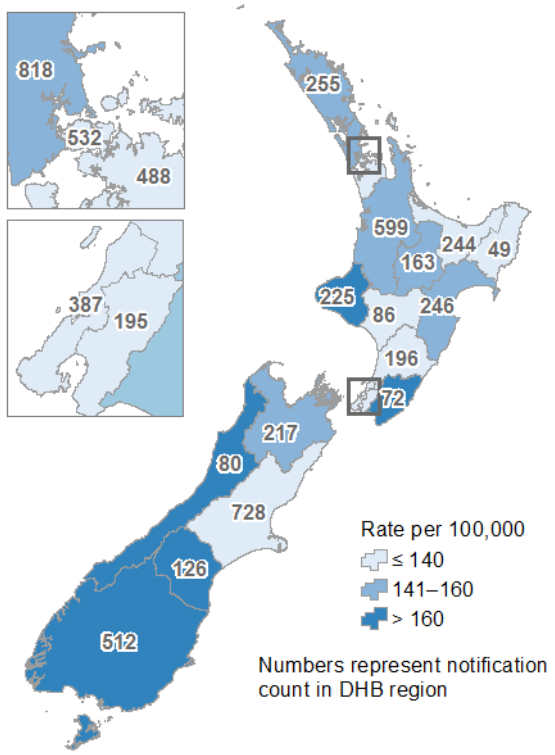
Figure 3 shows campylobacteriosis notifications by month since 2011. There is a distinct seasonal pattern, with an early summer peak and a winter trough.

Figure 3. Campylobacteriosis notifications by month, January 2011–December 2015



In 2015, the highest notification rates for campylobacteriosis were for people living in West Coast, South Canterbury, Taranaki, Wairarapa and Southern DHBs (244.6, 215.0, 194.1, 166.7 and 163.1 per 100,000 respectively) (Figure 4).

Figure 4. Campylobacteriosis notifications by DHB, 2015



Children aged 1–4 years (258.7 per 100,000) and infants aged less than 1 year (214.9 per 100,000) had the highest notification rates.

Sex was recorded for 6215 (99.9%) cases. Males (153.6 per 100,000) had a higher rate than females (117.6 per 100,000).

Ethnicity was recorded for 5843 (94.0%) cases. The European and Other ethnic group (158.2 per 100,000) had the highest notification rate for campylobacteriosis, followed by the MELAA (82.8 per 100,000) and Māori (70.9 per 100,000) ethnic groups. Further information by DHB, sex, age and ethnic group are in Tables 30 to 33 in the Appendix.

Hospitalisation status was recorded for 3952 (63.6%) cases, of which 484 (12.2%) cases were hospitalised. No deaths due to campylobacteriosis were recorded in EpiSurv in 2015.

Consumption of food from retail (food) 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 2015, 19 outbreaks of campylobacteriosis were reported involving 88 cases.

Table 5. Exposure to risk factors associated with campylobacteriosis, 2015

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Consumed food from retail premises	1041	1164	4013	47.2
Contact with farm animals	933	1454	3831	39.1
Consumed untreated water	547	1542	4129	26.2
Contact with faecal matter	396	1826	3996	17.8
Recreational water contact	370	1868	3980	16.5
Contact with other symptomatic people	251	1963	4004	11.3
Travelled overseas during the incubation period	239	2633	3346	8.3
Contact with sick animals	170	1964	4084	8.0

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

Cholera

No cases of cholera were notified in New Zealand in 2015. Since 1997, a total of 12 laboratory-confirmed cases of cholera have been notified with the last case reported in 2010. All 12 cases were acquired while travelling overseas.

Creutzfeldt-Jakob disease

The National Creutzfeldt-Jakob Disease (CJD) 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 19th annual report of the Registry (1 January 2015 to 31 December 2015).[17]

In 2015, six cases of suspected sporadic CJD (sCJD) were referred to the New Zealand CJD Registry for evaluation. These cases were subsequently classified as four definite cases, one probable case, and one possible case. This equates to a rate of 1.09 per million population per year (95% exact Poisson confidence interval (0.35, 2.54)).

The age distribution of the notified cases was: 60–69 (3 cases), 70–79 (2 cases) and 80–89 years (1 case). Three cases were male and three were female.

Since 1997, the Registry has documented 85 cases of sCJD, including 39 definite and 46 probable (not including the possible case).

No case of variant CJD, the form linked with bovine spongiform encephalopathy, has 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. Three cases of *Cronobacter* species invasive disease were notified in New Zealand in 2015. A total of eight cases of *Cronobacter* species invasive disease have been reported since the disease became notifiable, none of these were in neonates or infants.

The three cases reported in 2015 were two females aged 70–79 years and one male aged 40–49 years. The cases were from Counties Manukau, Lakes and Capital & Coast DHBs. Two of the cases were in hospital with other serious illnesses, and one of these cases died (*Cronobacter* species invasive disease was not recorded as the cause of death).

No sources of infection were confirmed for any of the cases.

Cryptosporidiosis

In 2015, 696 cases (15.1 per 100,000) of cryptosporidiosis were notified in New Zealand. This was a significant increase from the 584 cases (12.9 per 100,000) notified in 2014 (Figure 5).

Figure 5. Cryptosporidiosis notifications by year, 1997–2015

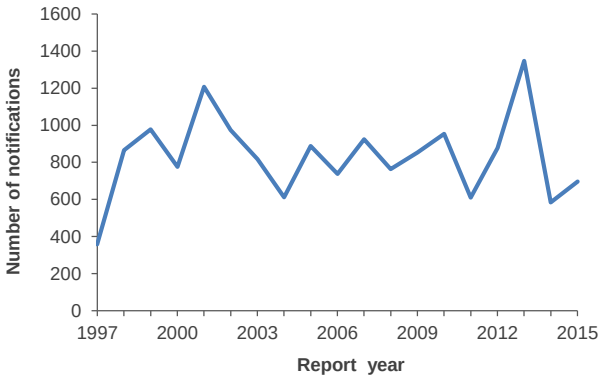
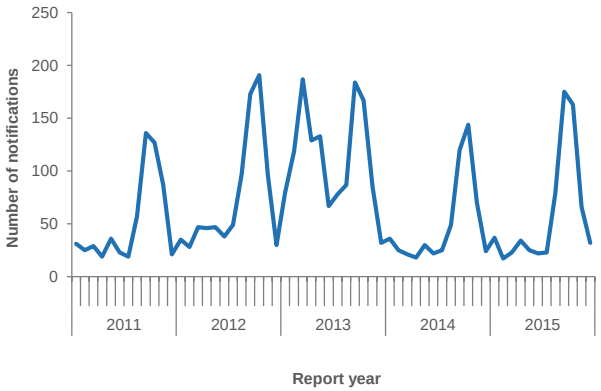


Figure 6 shows cryptosporidiosis cases by month since 2011. There is a distinct seasonal pattern, with the highest number of notifications generally reported during spring each year.

Figure 6. Cryptosporidiosis notifications by month, January 2011–December 2015



In 2015, the highest notification rates for cryptosporidiosis were reported in Waikato, Wairarapa, MidCentral, South Canterbury and Taranaki DHBs (29.7, 25.5, 24.4, 23.9 and 20.7 per 100,000 respectively) (Figure 7).

Children aged 1–4 years (80.7 per 100,000) and 5–9 years (28.2 per 100,000) had the highest notification rates compared with other age groups. Nearly half (48.9%) of all cases were children aged less than 15 years.

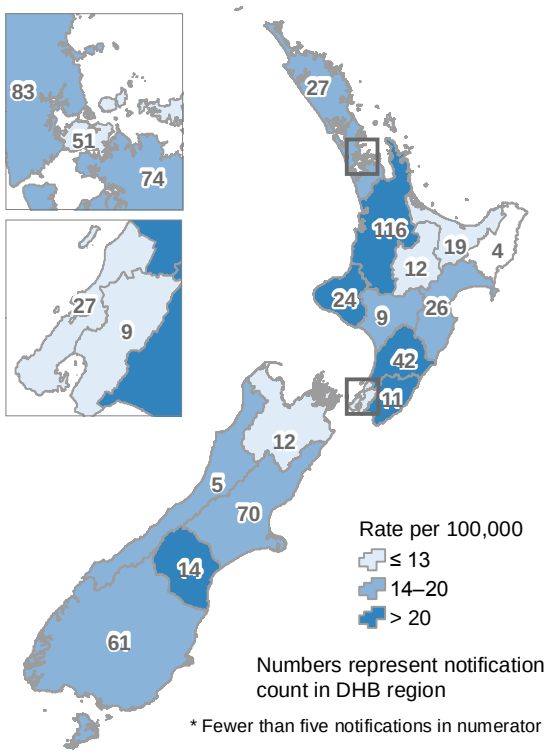
Females (16.3 per 100,000) had a slightly higher notification rate than males (14.0 per 100,000).

Ethnicity was recorded for 672 (96.6%) cases. The European or Other ethnic group (18.5 per 100,000) had the highest notification rate for cryptosporidiosis, followed by the MELAA (15.8 per 100,000) ethnic group.

Further information by DHB, sex, age and ethnic group are in Table 30 to 33 in the Appendix.

Hospitalisation status was recorded for 543 cases (78.0%), of which 41 (7.6%) cases were hospitalised.

Figure 7. Cryptosporidiosis notifications by DHB, 2015



Contact with farm animals and consumption of untreated water were the most common risk factors associated with cryptosporidiosis cases in 2015 (Table 6).

In 2015, 21 outbreaks of cryptosporidiosis were reported, involving 94 cases.

Table 6. Exposure to risk factors associated with cryptosporidiosis, 2015

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Contact with farm animals	262	141	293	65.0
Consumed untreated water	144	196	356	42.4
Contact with faecal matter	139	232	325	37.5
Contact with sick animals	101	240	355	29.6
Recreational water contact	86	284	326	23.2
Consumed food from retail premises	80	268	348	23.0
Contact with other symptomatic people	83	296	317	21.9
Travelled overseas during the incubation period	50	436	210	10.3

[a] Percentage refers to the number of cases who 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

One probable case of cysticercosis was notified in New Zealand in 2015. The case was a male in the 40–49 years age group who was in Zambia during the incubation period. Since 1997, eight cysticercosis cases have been reported - three cases in 2005, two cases in 2007, and one each in 2013, 2014 and 2015.

Decompression sickness

No cases of decompression sickness were notified in New Zealand in 2015.

Ministry of Health hospitalisation data for 2015 recorded 24 cases with decompression sickness as the primary diagnosis.

Over the last five years the number of hospitalisations with decompression sickness as the principal diagnosis has ranged from 22 to 42 annually, compared with up to two notifications in EpiSurv per year, indicating consistent under-notification of this condition.

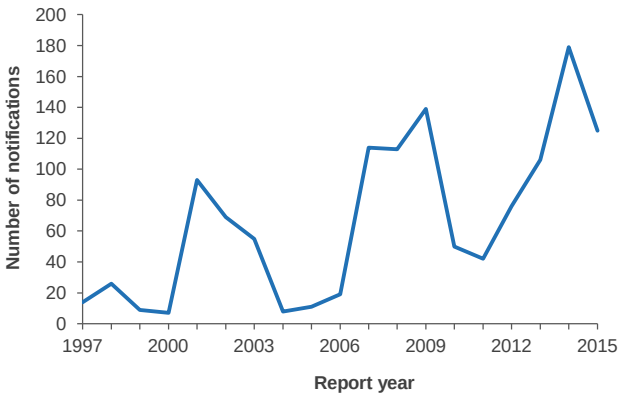
Dengue fever

In 2015, 125 cases of dengue fever were notified in New Zealand compared with 179 cases in 2014 (Figure 8). The 2015 notification rate (2.7 per 100,000) was a significant decrease from the 2014 rate (4.0 per 100,000).

Adults in the 20–29 and 30–39 (3.7 per 100,000) years age groups had the highest rate, followed by the 60–69 (3.6 per 100,000) years age group.

Males (2.8 per 100,000) and females (2.7 per 100,000) had a similar rate.

Figure 8. Dengue fever notifications by year, 1997–2015



Ethnicity was recorded for 116 (92.8%) cases. Pacific peoples (16.6 per 100,000) had the highest rate for dengue fever, followed by the Asian (3.3 per 100,000) ethnic group.

Hospitalisation status was recorded for 114 (91.2%) cases, of which 56 (49.1%) were hospitalised. Of the 125 cases, 121 (96.8%) were laboratory-confirmed.

Travel history was recorded for 124 (99.2%) cases, all of these had travelled overseas during the incubation period for the disease. The countries commonly visited or lived in were Tonga (43 cases), Indonesia (25 cases), and Samoa (16 cases). Some cases reported travelling to more than one country.

Diphtheria

Two confirmed cases of cutaneous toxigenic diphtheria were notified in New Zealand in 2015, two cases were also notified in 2014. Both cases were in the 5–9 years age group and from Counties Manukau DHB. They had both recently arrived from Pakistan and were part of an outbreak reported in New Zealand.

The last case of toxigenic respiratory diphtheria was reported in 1998. [18]

In 2015, the Special Bacteriology Laboratory at ESR received 42 isolates of *Corynebacterium diphtheriae* for toxin testing. The majority (36 isolates, 85.7%) were from cutaneous sources, five were from the throat, and one was from blood. Five isolates, from three individuals, were found to be toxigenic strains. Two of these isolates were from the throat, including one from an asymptomatic contact (who was therefore not a notified case). The other isolate was from a case that had a positive skin lesion but no respiratory symptoms, therefore this case was considered to have cutaneous infection with associated throat carriage.

Gastroenteritis (acute)

Acute gastroenteritis includes a number of communicable diseases. 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 childcare centre worker) are notifiable on suspicion. Illnesses such as norovirus, rotavirus and sapovirus infections, and histamine (scromboid) poisoning are included in this section (Table 7). Toxic shellfish poisoning is reported separately at the end of this section.

Diseases and conditions that are notifiable in their own right (eg, campylobacteriosis, giardiasis, VTEC/STEC and salmonellosis) are reported separately.

In 2015, 500 cases of acute gastroenteritis were notified in New Zealand. The 2015 rate of 10.9 per 100,000 was a significant decrease compared with the 2014 rate of 16.8 per 100,000 (756 cases). A causal agent was reported for 184 (36.8%) cases. Of these, the most common pathogen recorded was norovirus (79.9%, 147 cases).

The distribution of cases by causal agent is shown in Table 7.

Table 7. Acute gastroenteritis cases by agent type, 2015

Agent type[a]	Cases	Percentage (%)
Agent identified	**184**	**36.8**
Norovirus infection	147	29.4
Rotavirus infection	23	4.6
Aeromonas species	6	1.2
Clostridium perfringens	4	0.8
Staphylococcal food poisoning	2	0.4
Ciguatera fish poisoning	1	0.2
Vibrio parahaemolyticus	1	0.2
Agent not identified	**316**	**63.2**
Total	**500**	**100.0**

[a] Does not include diseases that are notifiable in their own right eg, campylobacteriosis.

The highest notification rates for acute gastroenteritis were reported from MidCentral, Whanganui and Capital & Coast DHBs (41.3, 27.2, and 24.9 per 100,000 respectively).

Infants aged less than 1 year (57.5 per 100,000) and children aged 1–4 years (20.3 per 100,000) had high notification rates for acute gastroenteritis, followed by adults aged 70 years and over (16.7 per 100,000).

Females (11.8 per 100,000) had a higher rate than males (10.0 per 100,000).

The MELAA ethnic group (15.8 per 100,000) had the highest notification rate for gastroenteritis followed by the European or Other (10.7 per 100,000) and Asian (7.9 per 100,000) ethnic groups.

Hospitalisation status was recorded for 326 (65.2%) cases. Of these, 28 cases (8.6%) were hospitalised.

The risk factors recorded for acute gastroenteritis cases are shown in Table 8. The most common risk factor associated with gastroenteritis was consumption of food from retail premises.

In 2015, 143 outbreaks of acute gastroenteritis were reported involving 1676 cases, of which 111 cases were also reported as individual case notifications.

Toxic shellfish poisoning

In 2015, three cases of toxic shellfish poisoning were notified, compared with 18 cases in 2014. The poisoning type was unspecified for all three cases.

There was one case in each of the 30–39 years, 40–49 years and 50–59 years age groups. Two cases were male and one was female. All cases were from Nelson Marlborough DHB and were in the European or Other ethnic group.

Table 8. Exposure to risk factors associated with acute gastroenteritis, 2015

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Consumed food from retail premises	202	28	270	87.8
Contact with other symptomatic people	71	161	268	30.6
Contact with faecal matter	48	171	281	21.9
Contact with farm animals	23	189	288	10.8
Consumed untreated water	12	175	313	6.4
Recreational water contact	12	196	292	5.8
Travelled overseas during the incubation period	5	224	271	2.2
Contact with sick animals	0	208	292	0.0

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

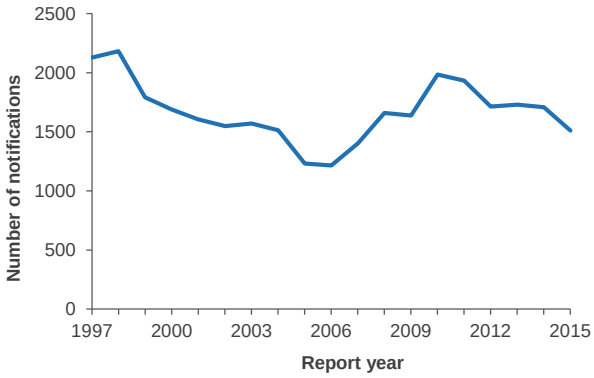
Hospitalisation status was recorded for all cases and one case (33.3%) was hospitalised.

One case had eaten recreationally collected seafood and the other two cases had eaten seafood purchased from a retail outlet.

Giardiasis

In 2015, 1510 cases of giardiasis were notified in New Zealand compared with 1709 in 2014. The notification rate (32.9 per 100,000) was significantly lower than the 2014 rate (37.9 per 100,000). Figure 9 shows giardiasis notifications by year from 1997 to 2015.

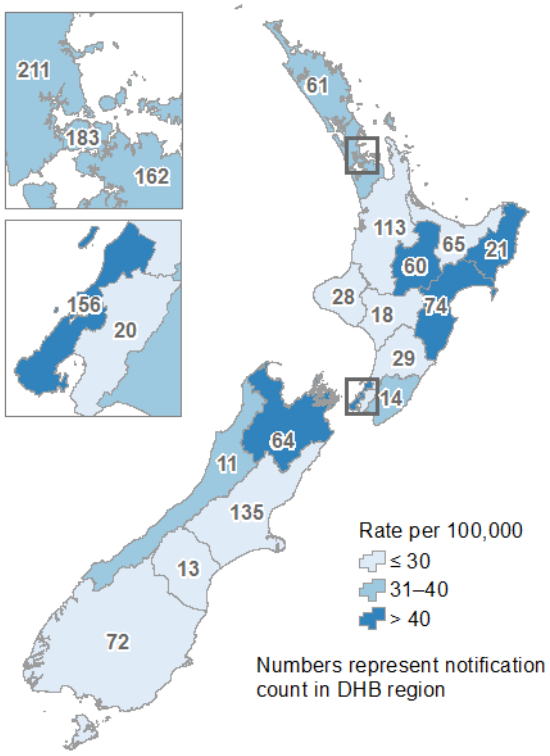
Figure 9. Giardiasis notifications by year, 1997–2015



In 2015, the highest notification rates for giardiasis were reported from Lakes, Capital & Coast, Hawke's Bay, Tairawhiti, and Nelson Marlborough DHBs (57.3, 51.8, 46.1, 44.3 and 44.2 per 100,000, respectively) (Figure 10).

Children aged 1–4 years (114.3 per 100,000), adults aged 30–39 years (53.1 per 100,000) and infants aged less than 1 year (45.7 per 100,000) had the highest notification rates. Males had a slightly higher rate of giardiasis thanfemales (35.1 and 30.7 per 100,000 respectively).

Figure 10. Giardiasis notifications by DHB, 2015



Ethnicity was recorded for 1397 (92.5%) cases. The MELAA ethnic group (47.3 per 100,000) had the highest notification rate for giardiasis, followed by the European or Other ethnic group (37.7 per 100,000).

Hospitalisation status was recorded for 965 (63.9%) cases, of which 42 (4.4%) were hospitalised.

The most commonly reported risk factors for giardiasis were contact with faecal matter and consumption of food from retail premises (Table 9).

In 2015, 45 giardiasis outbreaks were reported involving 207 cases.

Table 9. Exposure to risk factors associated with giardiasis, 2015

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Contact with faecal matter	298	382	830	43.8
Consumed food from retail premises	209	391	910	34.8
Recreational water contact	233	441	836	34.6
Consumed untreated water	208	410	892	33.7
Contact with other symptomatic people	223	445	842	33.4
Contact with farm animals	199	498	813	28.6
Travelled overseas during the incubation period	190	628	692	23.2
Contact with sick animals	45	599	866	7.0

[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 had more than one risk factor recorded.

Haemophilus influenzae serotype b disease

In 2015, three cases of *Haemophilus influenzae* serotype b (Hib) disease were notified in New Zealand. Two cases were laboratory-confirmed. The third case met the probable case definition by detection of *H. influenzae* type b antigen in CSF (cerebrospinal fluid). All cases were aged less than 5 years. The cases were all European or Other ethnicity (2 males and 1 female), and none were vaccinated. Two of the cases lived in a communal setting and were part of an outbreak.

A Hib vaccine was introduced in January 1994. The current immunisation schedule recommends a primary course of three doses of DTaP-IPV-HepB/Hib vaccine for infants when aged six weeks, three months and five months, and a booster of Hib vaccine when aged 15 months.[19]

Hepatitis A

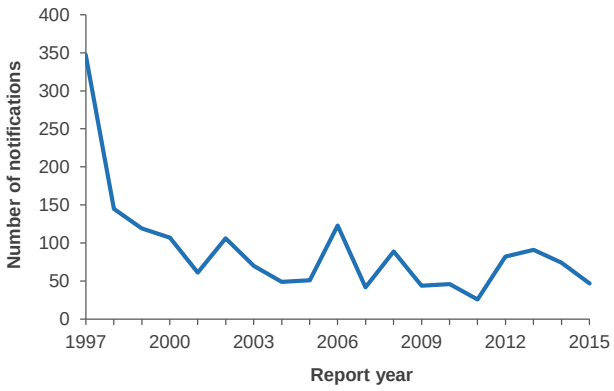
In 2015, 47 cases of hepatitis A were notified in New Zealand, compared with 74 notifications in 2014. Since 2001, numbers show some fluctuation, primarily due to outbreaks in 2002, 2006, 2008, 2012 and 2013 (Figure 11). The 2015 notification rate (1.0 per 100,000) was significantly lower than the 2014 rate (1.6 per 100,000).

MidCentral (2.9 per 100,000), Counties Manukau (1.9 per 100,000) and Auckland DHBs (1.8 per 100,000) had the highest notification rates.

Adults aged 20–29 and 40–49 years (both 1.8 per 100,000) had the highest rate, followed by people aged 15–19 years (1.6 per 100,000).

Females (1.2 per 100,000) had a slightly higher rate than males (0.8 per 100,000).

Figure 11. Hepatitis A notifications by year, 1997–2015



Ethnicity was recorded for 44 (93.6%) cases. Of the ethnic groups with more than five cases reported, Pacific peoples (2.5 per 100,000) had the highest notification rate for hepatitis A, followed by the Asian (1.7 per 100,000) and Māori (0.9 per 100,000) ethnic groups.

Hospitalisation status was recorded for 46 (97.9%) cases, of which, 24 (52.2%) were hospitalised.

Travel information was recorded for all cases, with 24 cases (51.1%) having travelled overseas during the incubation period for the disease. The countries most commonly visited were Samoa (5 cases) and Fiji (4 cases). Two cases reported travelling to more than one country.

In 2015, two outbreaks of hepatitis A were reported involving nine cases.

Hepatitis B

In New Zealand, only acute hepatitis B is a notifiable disease, so notification rates do not give an indication of the burden of chronic hepatitis B infection.

In 2015, 34 cases of hepatitis B were notified compared with 35 cases in 2014 (Figure 12). The 2015 notification rate (0.7 per 100,000) was similar to the 2014 notification rate (0.8 per 100,000). The number of hepatitis B cases has ranged from 28 to 51 in the last five years.

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 universal childhood immunisation for hepatitis B in 1988.[19]

Figure 12. Acute hepatitis B notifications by year, 1997–2015

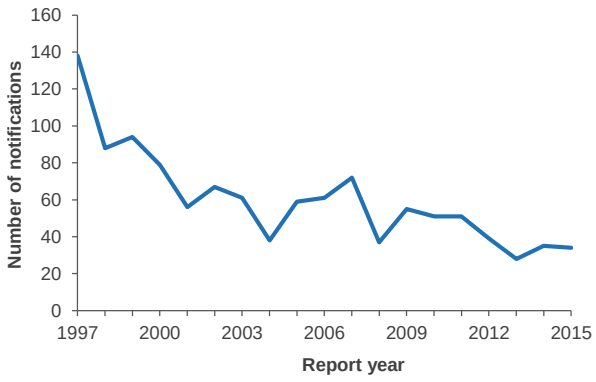


Table 10. Exposure to risk factors associated with acute hepatitis B, 2015

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Travelled overseas during the incubation period	10	24	0	29.4
Sexual contact with confirmed case or carrier	4	18	12	18.2
Household contact with confirmed case or carrier	2	25	7	7.4
Case is a child of a seropositive mother	2	28	4	6.7
History of injecting drug use	2	29	3	6.5
Case is a blood product or tissue recipient	2	30	2	6.3
Occupational exposure to blood	2	31	1	6.1

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

Auckland DHB had the highest number of cases (10 cases, 2.0 per 100,000).

The highest notification rate was in the 40–49 and 50–59 years age groups (both 1.3 per 100,000).

Males (1.1 per 100,000) had a higher rate than females (0.4 per 100,000).

Ethnicity was recorded for 32 (94.1%) cases. The Māori (0.9 per 100,000) and European or Other (0.6 per 100,000) ethnic groups had the highest notification rates for hepatitis B.

Hospitalisation status was recorded for 33 (97.1%) cases, of which 19 (57.6%) were hospitalised. One death due to hepatitis B was reported in 2015.

The risk factors recorded for hepatitis B are shown in Table 10. The most common risk factors reported were overseas travel and sexual contact with a confirmed case or carrier.

Hepatitis C

In New Zealand, only acute hepatitis C is a notifiable disease, so notification rates do not give an indication of the burden of chronic hepatitis C infection.

In 2015, 35 cases of hepatitis C were notified compared with 29 cases in 2014. After a peak of 102 cases in 1998 notifications steadily declined until 2004. The number of notifications has ranged from 26 to 36 in the last five years (Figure 13).

The 2015 notification rate (0.8 per 100,000) was similar to the 2014 rate (0.6 per 100,000).

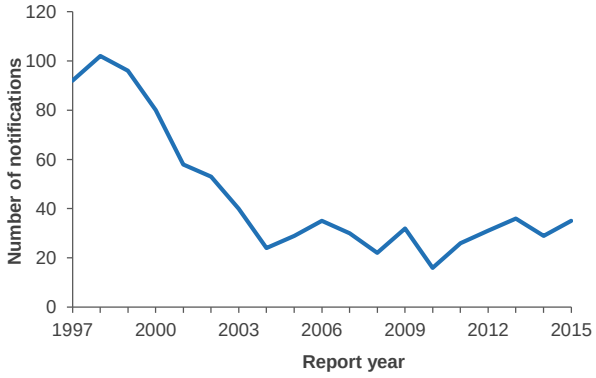
Canterbury DHB had the highest number of cases (9 cases, 1.7 per 100,000).

Adults aged 30–39 years (2.3 per 100,000) had the highest notification rate, followed by adults aged 20–29 (1.4 per 100,000) and 40–49 years (0.8 per 100,000).

Males (0.7 per 100,000) had a similar notification rate to females (0.8 per 100,000).

Ethnicity was recorded for all cases. The highest notification rate was in the Māori ethnic group (1.9 per 100,000), followed by the European or Other ethnic group (0.7 per 100,000).

Figure 13. Acute hepatitis C notifications by year, 1997–2015



Hospitalisation status was recorded for 34 (97.1%) cases, of which 11 (32.4%) were hospitalised.

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

Table 11. Exposure to risk factors associated with acute hepatitis C, 2015

Risk factor	Yes	No	Unknown	Percentage (%) [a]
History of injecting drug use	27	7	1	79.4
Household contact with confirmed case or carrier	11	17	7	39.3
Sexual contact with confirmed case or carrier	8	16	11	33.3
Body piercing/tattooing in the last 12 months	4	24	7	14.9
Case is a blood product or tissue recipient	1	24	10	4.0
Occupational exposure to blood	1	26	8	3.7
Travelled overseas during the incubation period	1	27	7	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.

Hepatitis (viral) not otherwise specified

In 2015, four cases of hepatitis (viral) not otherwise specified (NOS) were notified, compared with eight cases in 2014. Three cases were hepatitis D and one was hepatitis E.

Hepatitis D

The hepatitis D cases were in the 50–59 (2 cases) and 20–29 years (1 case) age groups. Two cases were male and one was female.

Cases were in the Pacific peoples (2 cases) and Māori (1 case) ethnic groups.

Hospitalisation status was recorded for two cases (66.7%), of which one was hospitalised.

Travel history was recorded for two cases (66.7%), of which one case reported travelling overseas to Kiribati during the incubation period for the disease. The other case had not travelled overseas.

Hepatitis E

The hepatitis E case was in the 40–49 years age group, female and in the European or Other ethnic group.

The case reported travelling overseas to India during the incubation period for the disease.

The case was not hospitalised.

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.[20]

Hydatid disease

Four cases of hydatid disease (*Echinococcus granulosus)* were notified in 2015 (1 confirmed and 3 probable), the same number as in 2014. Since 1997, 68 cases of hydatid disease have been notified.

Cases were reported from Counties Manukau, Tairawhiti, Hawke's Bay and Canterbury DHBs (1 case each). Two cases were male and two were female. One case was in the 30–39 years age group and three were in the 60–69 years age group.

One of the probable cases, a male aged 30–39 years from the Asian ethnic group, had previously lived in India. Two cases (one probable and one confirmed), had been previously diagnosed with hydatids. Both reported growing up on farms and being exposed to farm dogs in New Zealand. No risk factor information was reported for the fourth case.

Hospitalisation status was recorded for all four cases, and one (confirmed) case was hospitalised.

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

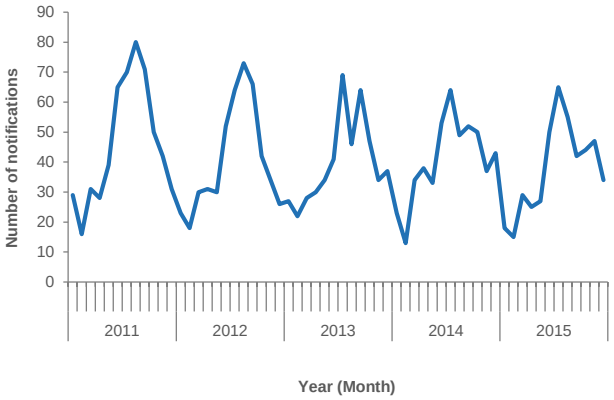
A full description of the epidemiology of invasive pneumococcal disease (IPD) will be reported separately in the 2015 Invasive Pneumococcal

Disease in New Zealand report.

In 2015, 451 cases of IPD were notified. The 2015 notification rate of 9.8 per 100,000 was lower than the 2014 rate (10.8 per 100,000, 489 cases).

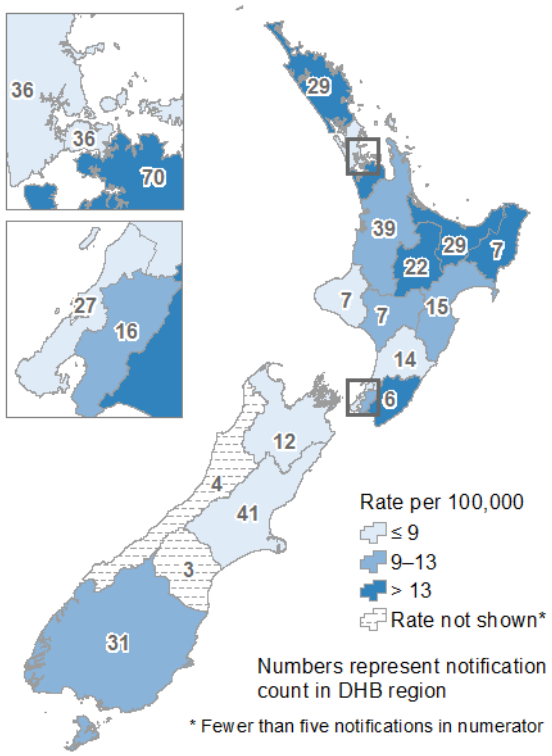
There is a distinct seasonal pattern for IPD, with the highest number of notifications reported during winter, and particularly in July, each year (Figure 14).

Figure 14. Invasive pneumococcal disease notifications by month, January 2011–December 2015



In 2015, the highest rates of IPD were reported from Lakes, Northland, Tairawhiti and Wairarapa DHBs (21.0, 17.2, 14.8 and 13.9 per 100,000, respectively) (Figure 15).

Figure 15. Invasive pneumococcal disease notifications by DHB, 2015



Adults aged 70 years and over (37.0 per 100,000), 60–69 years (18.7 per 100,000), and children aged less than 1 year (18.6 per 100,000) had the highest rates of IPD.

Males (10.7 per 100,000) had higher rates than females (8.9 per 100,000).

Ethnicity was recorded for 437 (96.9%) cases. The Pacific peoples (18.4 per 100,000) and Māori (15.7 per 100,000) ethnic groups had the highest rates of IPD.

Further information on IPD rates by DHB, sex, age and ethnic group are in Tables 30 to 33 in the Appendix.

Hospitalisation status was recorded for 423 (93.8%) cases, of which 409 (96.7%) were hospitalised.

There were 26 deaths due to IPD reported in 2015. The deaths were in the 30–39 (1 case), 40–49 (2 cases), 50–59 (2 cases), 60–69 (5 cases) years and 70 years and over (16 cases) age groups.

The risk factors recorded for IPD are shown in Table 12 and Table 13. The most commonly reported risk factor for children aged less than 1 year was premature birth. Having a chronic illness was the most common risk factor for cases aged five years and older.

Table 14 shows the vaccination status of cases by age group.

In June 2008, pneumococcal conjugate vaccine (PCV) was added to the New Zealand childhood immunisation schedule. The 7-valent conjugate vaccine (PCV7), Prevenar® was used until a schedule change to the 10-valent conjugate vaccine (PCV10), Synflorix® in July 2011. In July 2014, Synflorix® was replaced by the 13-valent conjugate vaccine (PCV13), Prevenar13®. The recommended schedule for PCV is four doses given to infants at age six weeks, three months, five months and 15 months. For defined groups of high risk children, the schedule also includes 23-valent pneumococcal polysaccharide vaccine (23PPV).[19]

Table 12. Exposure to risk factors associated with invasive pneumococcal disease for cases aged less than 5 years, 2015

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Premature (<37 weeks gestation) [b]	3	3	5	50.0
Attends childcare	1	6	20	14.3
Smoking in the household	1	8	18	11.1
Immunocompromised	3	24	0	11.1
Chronic illness	2	23	2	8.0
Chronic lung disease or cystic fibrosis	1	25	1	3.8
Congenital or chromosomal abnormality	1	26	0	3.7

[a] Percentage refers to the percentage of cases who 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 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, 2015

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Chronic illness	207	168	49	55.2
Current smoker[b]	86	242	85	26.2
Immunocompromised	75	297	52	20.2
Chronic lung disease or cystic fibrosis	66	314	44	17.4
Resident in long-term or other chronic-care facility	32	339	53	8.6
Cochlear implants	7	339	78	2.0
Congenital or chromosomal abnormality	4	369	51	1.1
Anatomical or functional asplenia	2	361	61	0.6

[a] Percentage refers to the percentage of cases who 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. Age group and vaccination status of invasive pneumococcal disease notifications, 2015

Age group	Total cases	One dose	Two doses	Three doses	Four doses	Vaccinated (no dose info)	Not vaccinated	Unknown
<6 months	6	0	2	0	0	0	3	1
6 months–4 years	21	1	0	7	6	3	1	3
5–9 years	3	0	0	0	1	0	2	0
10–19 years	15	0	0	0	0	0	10	5
20+ years	406	3	0	0	0	3	127	273
Total	451	4	2	7	7	6	143	282

The Invasive Pathogens Laboratory at ESR received a *Streptococcus pneumoniae* isolate from a normally sterile site for serotyping for 430 (95.3%) notified cases in 2015. Table 15 shows the breakdown of these 430 culture-positive cases by serotype and age group. Just over 90% (22/24) of cases in the less than five years age group were due to serotypes not covered by PCV10, compared with 71.9% (143/199) and 83.6% (173/207) of cases in the 5–64 years age group and 65 years and over age group, respectively. Serotype 19A, a PCV13 serotype, was the most prevalent type across all ages (90 cases). Serotype 7F, a PCV10 serotype, was the second most prevalent type in the 5–64 years age group (28 cases). Serotype 22F, a 23PPV serotype, was the second most prevalent type in the 65 years and over age group (40 cases).

Table 15. Invasive pneumococcal disease notifications by serotype and age group, 2015

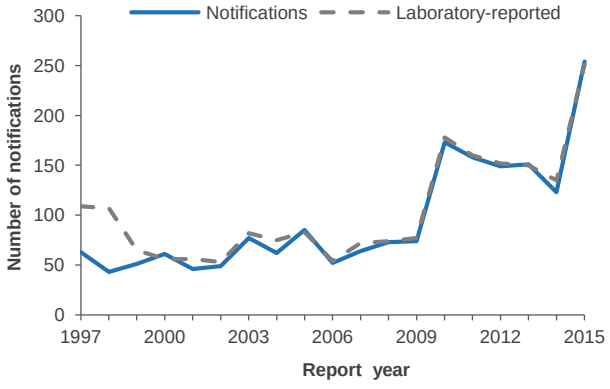
Serotype	<5 years	5–64 years	65+ years	Total
4	1	9	7	17
6B	1	0	1	2
9V	0	3	1	4
14	0	0	3	3
18C	0	1	1	2
19F	0	14	5	19
23F	0	1	5	6
1	0	0	1	1
5	0	0	0	0
7F	0	28	10	38
3	2	15	16	33
6A	0	1	0	1
19A	3	40	47	90
Other (non-PCV13)	17	87	110	214
Total[a]	**24**	**199**	**207**	**430**

[a] Totals are for isolates of culture-positive cases referred to ESR for serotyping. Note: The 7-valent pneumococcal conjugate vaccine (PCV7) covers serotypes 4, 6B, 9V, 14, 18C, 19F and 23F; PCV10 covers serotypes 1, 5 and 7F in addition to the PCV7 serotypes; and PCV13 covers serotypes 3, 6A and 19A in addition to the PCV10 serotypes.

Legionellosis

During 2015, 254 cases of legionellosis were notified compared with 123 cases in 2014. The 2015 notification rate (5.5 per 100,000) was a significant increase from the 2014 rate (2.7 per 100,000). The yearly number of cases was relatively stable between 1997 and 2009, but increased in 2010 and had remained high (Figure 16). The 2010 increase could not be explained wholly due to outbreaks or the increasing use of PCR. In contrast, the increase in legionellosis notifications during 2015 is likely due to the LegiNZ study, which involves testing hospitalised patients with suspected pneumonia for *Legionella* spp using PCR. The study began in May 2015 and includes 20 hospitals in 17 DHBs.

Figure 16. Legionellosis notifications and laboratory-reported cases by year, 1997–2015



MidCentral, Bay of Plenty, Waitemata, Northland, and Canterbury DHBs had the highest notification rates (13.9, 10.4, 8.0, 7.7 and 7.4 per 100,000 respectively). All of these DHBs were part of the LegiNZ study.

Adults aged 70 years and over (24.1 per 100,000) and 60–69 years (11.1 per 100,000) had the highest rates of legionellosis notifications.

Males (6.9 per 100,000) had a higher rate than females (4.2 per 100,000).

Ethnicity was recorded for 249 (98.0%) cases. The European or Other ethnic group (6.8 per 100,000) had the highest notification rate for legionellosis, followed by the Māori (2.8 per 100,000) ethnic group. Further information by DHB, age, sex and ethnic group is in Table 30 to 33 in the Appendix.

Hospitalisation status was recorded for 244 cases (96.1%), of which 197 (80.7%) were hospitalised.

Four deaths due to legionellosis were reported in 2015. The cases were in the 70 years and over (3 cases) and 40–49 (1 case) years age groups. There were four additional deaths recorded among notified legionellosis cases, including two where the primary cause of death was unknown and two where legionellosis was not the cause of death.

Table 16 provides a summary of risk factors for which data was available. A total of 168 (84.0%) cases reported exposure to known environmental risk factors during the incubation period for the disease. Further details of the exposures were recorded for 148 of these 168 cases as follows: compost, potting mix or soil (96), shower or hot water system (39), cooling tower (21), air conditioning unit or heat pump (7), spa or indoor pool (4), fountain (1), and swimming pool (1). Some cases reported more than one exposure to known environmental risk factors. Fourteen people had travelled overseas during the incubation period for the disease.

The Legionella Reference Laboratory at ESR reported 251 cases infected with *Legionella* in 2015. Table 17 shows the strains identified for those cases. As in previous years, the most common *Legionella* species identified were *L. longbeachae* (52.2%, 131 cases) and *L. pneumophila* (29.1%, 73 cases).

In 2015, four outbreaks of *Legionella* were reported, involving 30 cases.

Table 16. Exposure to risk factors associated with legionellosis, 2015

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Exposure to known environmental risk factor during the incubation period	168	32	54	84.0
Pre-existing immunosuppressive or debilitating condition	79	125	50	38.7
Smokes cigarettes	32	178	44	15.2

[a] Percentage refers to the percentage of cases who 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 17. *Legionella* strains for laboratory-reported cases, 2015

Legionella species and serogroup	Cases	Percentage (%)
L. longbeachae	**131**	**52.2**
L. longbeachae sg 1	60	23.9
L. longbeachae sg 2	15	6.0
L. longbeachae sg not determined	56	22.3
L. pneumophila	**73**	**29.1**
L. pneumophila sg 1	44	17.5
L. pneumophila sg 2	1	0.4
L. pneumophila sg 3	1	0.4
L. pneumophila sg 4	1	0.4
L. pneumophila sg 5	3	1.2
L. pneumophila sg 8	2	0.8
L. pneumophila sg 12	13	5.2
L. pneumophila sg 15	1	0.4
L. pneumophila sg not determined	7	2.8
Other *Legionella* species	**47**	**18.7**
L. micdadei	9	3.6
L. sainthelensi	5	2.0
L. dumoffii	5	2.0
L. bozemanae	4	1.6
L. jordanis	4	1.6
L. gormanii	3	1.2
L. anisa	2	0.8
L. feelei	1	0.4
Legionella species not determined	14	5.6
Total	**251**	**100**

Leprosy

In 2015, five cases of leprosy were notified, compared with four cases in 2014.

Cases were reported from Bay of Plenty (2 cases), Auckland, Capital & Coast, and Southern DHBs (1 case each).

The cases were in the 10–14 (2 cases), 30–39, 60–69 and 70 years and over (1 case each) age groups. Four cases were male and one case was female. The cases were in the Pacific peoples, Asian (2 cases each) and the European or Other (1 case) ethnic groups.

Three cases were laboratory-confirmed. Two cases were probable, of which one had histology suggestive of leprosy and the other had a clinically compatible illness, including a positive nerve conduction study. The clinical form of leprosy was recorded as borderline (2 cases), tuberculoid (2 cases) and lepromatous (1 case).

One case was hospitalised.

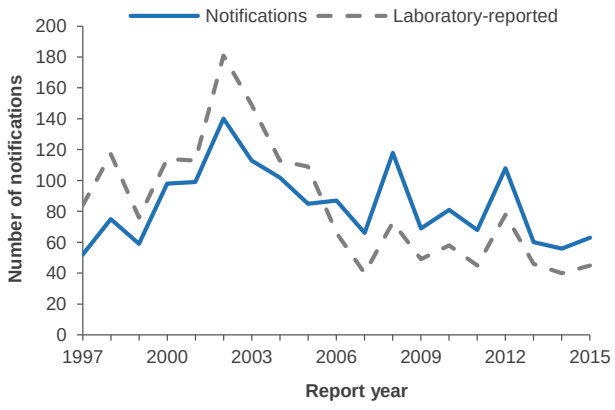
All cases reported travelling overseas during the incubation period for the disease. The countries lived in or visited by the cases were Kiribati (2 cases), Philippines (2 cases), Nepal and Thailand (1 case).

Leptospirosis

In 2015, a total of 63 cases of leptospirosis were notified. The 2015 rate of 1.4 cases per 100,000 was a slight increase from the notification rate in 2014 (1.2 per 100,000, 56 cases). Of the 63 notified cases, 60 were laboratory-confirmed by either microscopic agglutination titre (MAT) (39 cases), or nucleic acid testing (NAAT) (9 cases) or both MAT and NAAT (12 cases). One case was confirmed only by isolation of *Leptospira* and two cases were not laboratory-confirmed.

Figure 17 shows the number of notified cases of leptospirosis each year since 1997.

Figure 17. Leptospirosis notifications by year, 1997–2015



The highest notification rates for leptospirosis were reported from Hawke's Bay, Nelson Marlborough, Waikato and Southern DHBs (5.0, 3.5, 2.3 and 2.2 per 100,000 respectively).

The highest notification rates were in the 60–69, 50–59, 20–29 and 40–49 years age groups (2.7, 2.1, 2.0 and 1.9 per 100,000 respectively).

Fifty-nine cases were male and four were female.

Ethnicity was recorded for 61 (96.8%) cases. The highest notification rate was for the Māori and European or Other ethnic groups (both 1.6 per 100,000).

Hospitalisation status was recorded for 62 (98.4%) cases, of which 44 (71.0%) were hospitalised.

Occupation was recorded for 62 (98.4%) of the 63 cases. Of these, 50 (80.6%) were engaged in occupations previously identified as high-risk for exposure to *Leptospira* spp. in New Zealand.[21] The percentage of such cases was slightly higher than reported in 2014 (79.2%) and 2013 (71.4%). Of the 50 cases with a high-risk occupation, 36 (72.0%) were farmers or farm workers, nine (18.0%) worked in the meat processing industry (as freezing workers, meat process workers or butchers) and five (10.0%) worked in an occupation that involved contact with animals or their environment (eg, cattle exporter, hunter and trapper). Of the 13 cases that did not report a high-risk occupation (or had no occupation recorded), 11 reported animal/outdoor exposures, nine had exposure to lakes, rivers or streams, and three had travelled overseas during the incubation period for the disease. Seven cases reported more than one risk factor.

The Leptospira Reference Laboratory at ESR reported 45 cases of infection with *Leptospira* in 2015. Table 18 presents the species and serovars identified for those cases. The most common *Leptospira* serovars reported were *L. borgpetersenii* sv Ballum (31.1%, 14 cases), *L. borgpetersenii* sv Hardjo (26.7%, 12 cases) and *L. interrogans* sv Pomona (20.0%, 9 cases).

One outbreak of leptospirosis was reported in 2015.

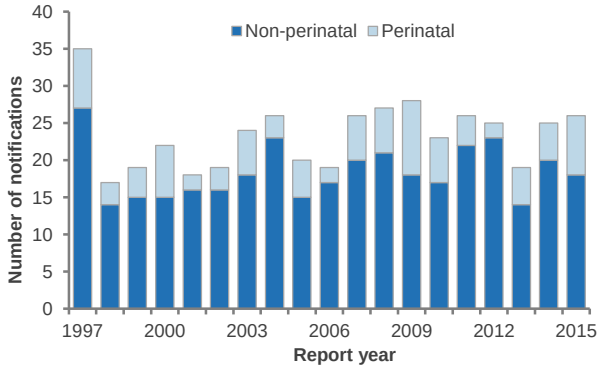
Table 18. *Leptospira* species and serovars for laboratory-reported cases, 2015

Leptospira species and serovar	Cases	Percentage (%)
L. borgpetersenii	**30**	**66.7**
L. borgpetersenii sv Ballum	14	31.1
L. borgpetersenii sv Hardjo	12	26.7
L. borgpetersenii sv Tarassovi	4	2.5
L. interrogans	**15**	**33.3**
L. interrogans sv Pomona	9	20.0
L. interrogans sv Copenhageni	3	6.7
L. interrogans sv Canicola	3	6.7
Total	**45**	**100.0**

Listeriosis

In 2015, 26 cases of listeriosis were notified compared with 25 cases in 2014. Figure 18 shows listeriosis notifications (both perinatal and non-perinatal) for each year since 1997. The notification rate was the same in 2015 and 2014 (both 0.6 per 100,000). The notification rate has been relatively stable for the past 18 years (ranging from 0.4 to 0.7 per 100,000), since a peak of 0.9 per 100,000 in 1997.

Figure 18. Listeriosis notifications (perinatal and non-perinatal) by year, 1997–2015



Perinatal

Eight cases of perinatal listeriosis were notified in 2015. The length of gestation was known for all perinatal cases, with a range of 14–40 weeks. The cases were in the 20–29 (4 cases), 30–39 (3 cases) and 40–49 years (1 case) age groups. The ethnic groups of the cases were Asian (5 cases), European or Other (2 cases) and Pacific peoples (1 case). Three perinatal deaths from listeriosis occurred in 2015.

Non-perinatal

The 18 non-perinatal listeriosis cases were from 10 DHBs, with the highest number of notifications reported in Bay of Plenty DHB (4 cases), followed by Canterbury and Capital & Coast DHBs (3 cases each).

The cases were in the 70 years and over (9 cases), 60–69 (3 cases), 1–4, 20–29 (2 cases each), 40–49 and 50–59 (1 case each) years age groups. Eleven cases were male and seven were female.

The European or Other ethnic group (10 cases) had the highest number of cases of non-perinatal listeriosis, followed by the Māori (5 cases) and Asian (3 cases) ethnic groups.

Eleven non-perinatal cases were hospitalised for listeriosis and seven were hospitalised for the treatment of another illness.

Information on underlying illness was recorded for 17 (94.4%) non-perinatal cases, of which 14 cases (82.4%) had an underlying illness such as cancer, autoimmune disease, heart disease, diabetes or another chronic illness. Five cases were reported to be receiving immunosuppressive drugs. One case had a hip replacement six months prior to the onset of illness but with no underlying illness and was not reported as receiving immunosuppressive drugs.

One non-perinatal death was reported in 2015, in the 70 years and over age group.

The Special Bacteriology Laboratory at ESR serotyped 26 isolates of *Listeria monocytogenes* in 2015. The serotypes identified were O4 (15 isolates, 57.7%) and O1/2 (11 isolates, 42.3%).

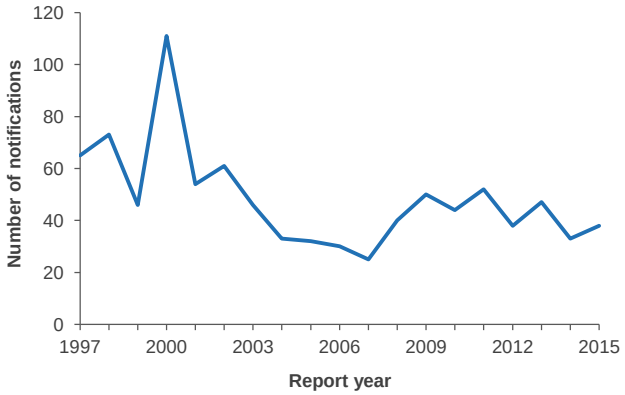
No outbreaks of *Listeria* were reported during 2015.

Malaria

In 2015, 38 cases of malaria were notified compared with 33 cases in 2014 (Figure 19). The 2015 notification rate (0.8 per 100,000) was similar to the 2014 rate (0.7 per 100,000).

Adults in the 20–29 years (2.5 per 100,000) age group had the highest rate followed by the 30–39 years (0.9 per 100,000) age group.

Figure 19. Malaria notifications by year, 1997–2015



Males (1.2 per 100,000) had a higher rate than females (0.5 per 100,000).

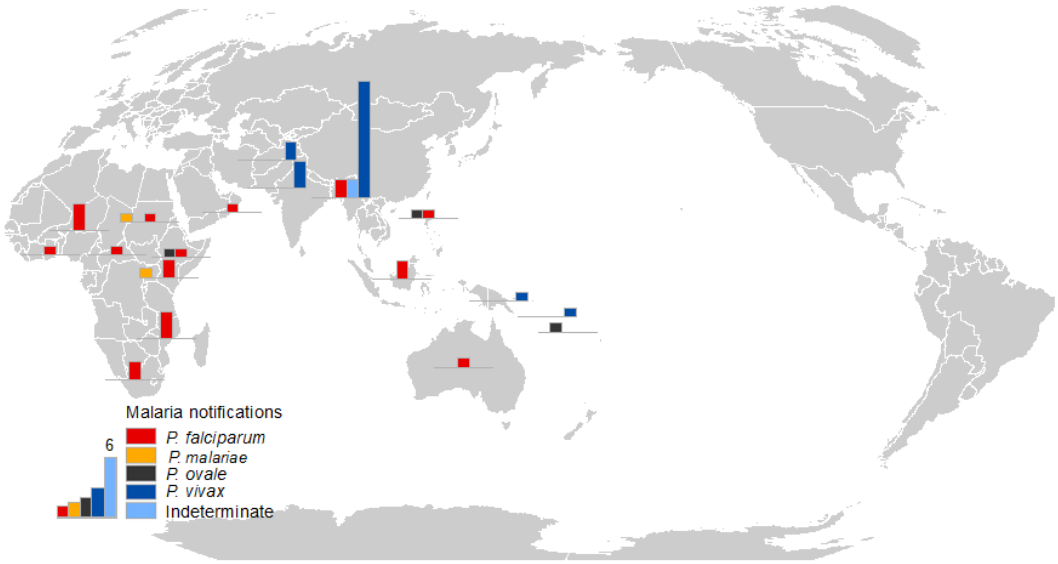
Ethnicity was recorded for 37 (97.4%) cases. The MELAA (11.8 per 100,000) ethnic group had the highest rate, followed by the Asian (3.5 per 100,000) ethnic group.

Hospitalisation status was recorded for 33 (86.8%) cases, of which 23 (69.7%) were hospitalised.

All cases had either lived or travelled overseas during the incubation period for the disease or had a prior history of travel to malaria-endemic areas.

Figure 20 presents the region and country of overseas travel and *Plasmodium* species identified for malaria notifications in 2015. The region most commonly reported for cases with *P. vivax* was Southern and Central Asia (18 cases). For cases identified with *P. falciparum*, the region most commonly reported was Sub-Saharan Africa (13 cases). The country with the highest number of malaria cases was India (17 cases), of which 13 cases were identified with *P. vivax* (Table 19). Some cases reported travelling to more than one country.

Figure 20. *Plasmodium* species and country of overseas travel for malaria notifications, 2015



Note: Some cases reported travelling to more than one country during the incubation period for the disease. The case who travelled to Australia also reported travel to a malaria-endemic country (Mozambique).

Table 19. Region and country of overseas travel and *Plasmodium* species for malaria notifications, 2015

Region	Country resided in or visited	Plasmodium species				
		P. falciparum	*P. vivax*	*P. ovale*	*P. malariae*	Indeterminate
North Africa and the Middle East	Oman	1				
	Sudan	1			1	
Sub-Saharan Africa	Central African Republic	1				
	Ghana	1				
	Kenya	2			1	
	Mozambique	3				
	Nigeria	3				
	South Africa	2				
	Uganda	1		1		
Southern and Central Asia	Afghanistan		2			
	India	2	13			2
	Pakistan		3			
Southeast Asia	Indonesia	2				
	Philippines	1		1		
Oceania	Australia[a]	1				
	Papua New Guinea		1			
	Solomon Islands		1			
	Vanuatu			1		

[a] This case also reported travel to a malaria-endemic country (Mozambique).

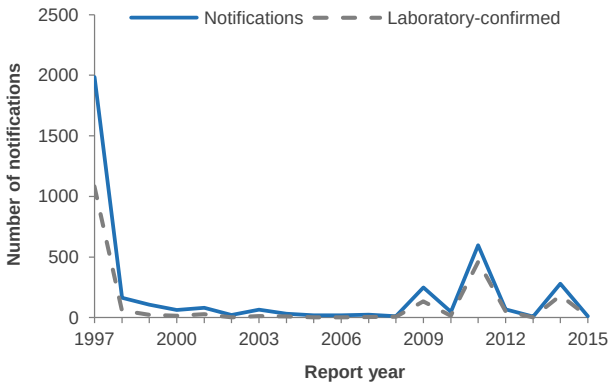
Note: Some cases reported travelling to more than one country during the incubation period for the disease.

Measles

Measles immunisation was introduced in 1969 [19] and measles has been a notifiable disease since June 1996.[4] Since January 2001, the recommended measles, mumps and rubella (MMR) immunisation schedule has been two doses, the first given at age 15 months and the second at age four years. During measles outbreaks, the first dose may be advanced to age 12 months and the MMR vaccine may be recommended for infants aged less than 12 months if cases are occurring in the very young.[19]

In 2015, 10 confirmed cases of measles were notified (including 9 laboratory-confirmed cases). In 2014, 280 confirmed cases of measles were notified (including 183 laboratory-confirmed cases) (Figure 21). The 2015 notification rate (0.2 per 100,000) was a significant decrease from the 2014 notification rate (6.2 per 100,000).

Figure 21. Measles notifications and laboratory-confirmed cases by year, 1997–2015



Cases were reported from MidCentral (4 cases), Counties Manukau, Waikato (2 cases each), Bay of Plenty and Canterbury (1 case each) DHBs.

The cases were aged in the 20–29 years (4 cases), 10–14 years, 30–39 years (2 cases each), less than 1 year and 1–4 years (1 case each) age groups. Seven cases were male and three female.

The highest number of cases was from the European or Other (5 cases) ethnic group, followed by the Asian (3 cases) and Pacific peoples (2 cases) ethnic groups.

Two (20.0%) cases were hospitalised.

None of the cases were immunised, including one case who was less than 15 months and therefore ineligible for vaccination.

The source of the virus was known for nine (90.0%) cases, of these five (55.6%) cases were imported. The countries the cases had been to during the incubation period for the disease were Australia (2 cases), India, Indonesia and Vanuatu (1 case each). The remaining four cases were import-related (ie, locally acquired infections due to transmission from an imported case).

Two measles outbreaks were reported in 2015, involving six cases.

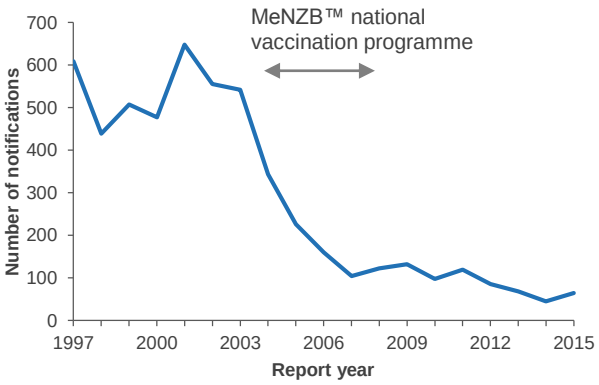
The Ministry of Health hospitalisation data included five hospitalisations in 2015 where measles was the principal diagnosis.

Meningococcal disease

In 2015, 64 cases of meningococcal disease were notified. The notification rate (1.4 per 100,000) was slightly higher than the 2014 rate (1.0 per 100,000, 45 cases). The rate was also a significant decrease from the peak rate (16.7 per 100,000 in 2001) experienced during the New Zealand meningococcal disease epidemic (driven by the B:P1.7-2,4 strain). The 2015 rate is below the rate observed in the immediate pre-epidemic years (1989–1990).

Figure 22 shows the number of meningococcal disease notifications from 1997 to 2015.

Figure 22. Meningococcal disease notifications by year, 1997–2015



Of the four DHBs that reported five or more cases in 2015, the highest rate was for Northland (4.8 per 100,000, 8 cases), followed by Waitemata (1.7 per 100,000, 10 cases), Capital & Coast (1.7 per 100,000, 5 cases), and Counties Manukau (1.3 per 100,000, 7 cases) DHBs.

The highest rate was for the <1 year age group (22.0 per 100,000, 13 cases), followed by 1–4 years (6.9 per 100,000, 17 cases).

Males had a higher notification rate (1.9 per 100,000, 43 cases) than females (0.9 per 100,000, 21 cases).

Ethnicity was recorded for 98.4% of cases. The Māori ethnic group (2.9 per 100,000, 20 cases) had the highest notification rate for meningococcal disease, followed by the Pacific peoples (2.8 per 100,000, 8 cases) ethnic group.

Hospitalisation status was recorded for all cases, of which 62 (96.9%) were hospitalised. For the hospitalised cases, pre-hospital management information was recorded for 60 (96.8%) cases. Of these, 29 (48.3%) cases were seen by a doctor prior to hospital admission of whom, only six (20.7%) were given intravenous or intramuscular antibiotics before admission. Three cases did not report seeing a doctor but were given intramuscular antibiotics prior to admission.

Four deaths were reported during 2015 giving a case fatality rate of 6.3%. Of these, three cases had been admitted to hospital, none had been seen by a doctor prior to admission, but one had been given antibiotics by paramedics.

Sixty-one (95.3%) cases were laboratory-confirmed and the strain type was determined for 59 cases: group B (41 cases, including 10 B:P1.7-2,4), group C (6 cases), group W (6 cases), and group Y (6 cases) (Table 35). Of the 30 cases in children <5 years of age, 28 were able to be typed and, of these, 23 (82%) were determined to be group B strain.

The antimicrobial susceptibility of 36 viable meningococcal isolates received by ESR from cases of invasive disease in 2015 was tested. All isolates were susceptible to ceftriaxone, rifampicin and ciprofloxacin. Twenty-one isolates (58.3%) had reduced susceptibility to penicillin, with minimum inhibitory concentrations of 0.12–0.5 mg/L.

Middle East Respiratory Syndrome (MERS)

MERS became notifiable in New Zealand on 6 September 2013. Although no cases have been reported in New Zealand, worldwide 1,638 confirmed cases of human infection with MERS Coronavirus (MERS-CoV), including 587 deaths, were reported to WHO from September 2012 to 27 January 2016. [22]

Mumps

Immunisation against mumps was introduced to the New Zealand Immunisation Schedule in 1990 as part of the MMR vaccine, [19] and mumps became notifiable in June 1996.[4] The last epidemic occurred in 1994.[19]

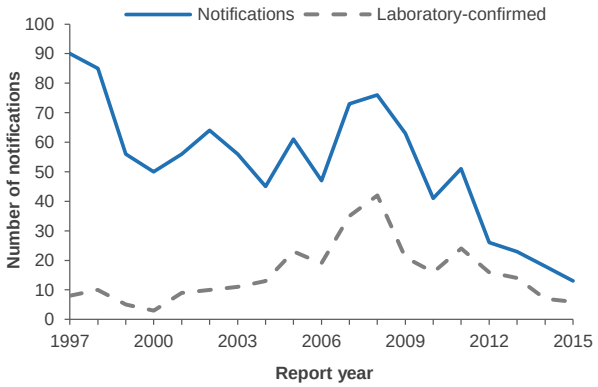
In 2015, 13 cases of mumps were notified (6 were laboratory-confirmed) compared with 18 cases in 2014 (7 laboratory-confirmed).

Figure 23 shows notifications and laboratory-confirmed cases from 1997 to 2015. The 2015 notification rate (0.3 per 100,000) was similar to the 2014 rate (0.4 per 100,000).

Cases were reported from Northland, Taranaki (3 cases each), Counties Manukau, Waitemata (2 cases each), Tairawhiti, Capital & Coast, and Canterbury (1 case each) DHBs.

Cases ranged in age from 2 to 57 years, with more than half of the cases aged less than 10 years. Ten cases were male and three cases were female.

Figure 23. Mumps notifications and laboratory-confirmed cases by year, 1997–2015



Ethnicity was recorded for all cases. The European or Other ethnic group (5 cases) had the highest number of cases reported, followed by the Asian (4 cases), Māori (3 cases), and Pacific peoples (1 case) ethnic groups.

Hospitalisation status was recorded for all cases, of which one (7.7%) was hospitalised.

Of the cases for which risk factor information was recorded, 30.8% (4/13) reported travelling overseas during the incubation period for the disease and 27.3% (3/11) attended school, pre-school or childcare.

Table 20. Age group and vaccination status of mumps notifications, 2015

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	1	1	0	0	0	0
4–9 years	6	1	4	0	1	0
10–19 years	1	0	0	0	0	1
20+ years	5	0	0	0	1	4
Total	**13**	**2**	**4**	**0**	**2**	**5**

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

The recommended vaccination schedule for mumps is two doses of the MMR vaccine, at ages 15 months and four years.[19] In 2015, eight cases (61.5%) had a known vaccination status. Of these, two were not vaccinated. Two cases had received one dose of vaccine and four cases had received two doses of vaccine (Table 20). One of the cases that had received two doses of vaccine was laboratory-confirmed by serology.

The Ministry of Health hospitalisation data recorded eight hospitalisations in 2015 where mumps was the principal diagnosis.

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 2015, 34 cases of paratyphoid fever were notified compared with 19 cases in 2014. The 2015 notification rate (0.7 per 100,000) was slightly higher than the 2014 rate (0.4 per 100,000). Figure 24 shows the number of notifications and laboratory-reported cases of paratyphoid fever each year since 1997.

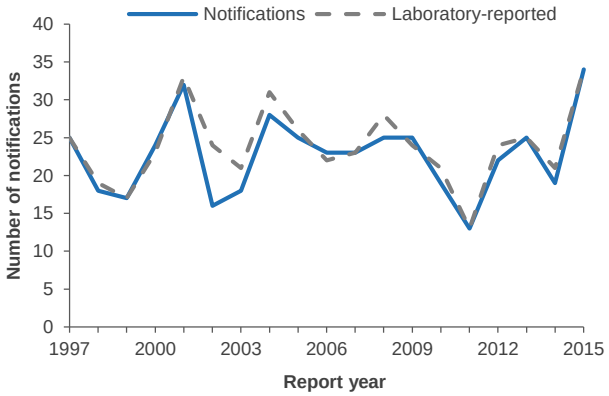
Adults aged 20–29 and 30–39 years had the highest notification rates (1.5 and 1.2 per 100,000 respectively).

Males (0.7 per 100,000) and females (0.8 per 100,000) had a similar rate.

The Asian (1.3 per 100,000) ethnic group had the highest notification rate, followed by the European or Other (0.7 per 100,000) ethnic group.

Hospitalisation status was known for 30 (88.2%) cases, of which 11 (36.7%) were hospitalised.

Figure 24. Paratyphoid fever notifications and laboratory-reported cases by year, 1997–2015



Of the 34 cases notified in 2015, 28 (82.4%) had travelled overseas during the incubation period for the disease. Six cases had not travelled overseas. The countries most commonly visited were Indonesia (14 cases), India (6 cases) and Australia (3 cases). Some cases reported travelling to more than one country.

The Enteric Reference Laboratory at ESR confirmed 34 isolates as *Salmonella* Paratyphi during 2015. The serotypes identified were *S*. Paratyphi B var. Java (21 isolates) and *S*. Paratyphi A (13 isolates). It should be noted that isolates of *S*. Paratyphi B var. Java are currently notified as paratyphoid fever. However, the spectrum of illness associated with *S*. Paratyphi B var. Java infection is more consistent with non-typhoidal salmonellosis.[23] Both serotypes were identified in cases with no history of overseas travel.

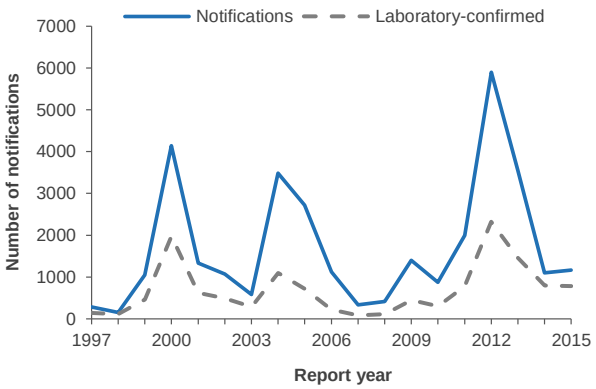
No outbreaks of paratyphoid fever were reported in 2015.

Pertussis (whooping cough)

Pertussis is a vaccine-preventable disease caused by the bacterial agent *Bordetella pertussis*. Epidemics occur every 2–5 years, predominantly in young children, with a periodicity that is less affected by mass immunisation than other childhood vaccine-preventable diseases.[19] A recent national outbreak of pertussis occurred from 2011 to 2013. Pertussis vaccination has been part of the routine immunisation schedule in New Zealand since 1960. Pertussis has been notifiable since 1996.[4]

In 2015, 1168 pertussis cases were notified, of which 650 (55.7%) were laboratory-confirmed (237 by isolation, 276 by PCR, and 137 by isolation and PCR). The 2015 notification rate (25.4 per 100,000) was similar to the 2014 notification rate (24.4 per 100,000, 1099 cases) (Figure 25).

Figure 25. Pertussis notifications and laboratory-confirmed cases by year, 1997–2015



The pertussis notification rate varied by DHB region, with the highest rate reported in Southern DHB (53.8 per 100,000, 169 cases), followed by Nelson Marlborough (50.4 per 100,000, 73 cases), Canterbury (44.9 per 100,000, 236 cases), and Whanganui (33.5 per 100,000, 21 cases) DHBs.

The highest notification rate was for the less than 1 year age group (152.3 per 100,000, 90 cases), followed by the 1–4 (55.1 per 100,000, 136 cases), 5–9 (45.7 per 100,000, 144 cases) and 10–14 years (41.9 per 100,000, 123 cases) age groups.

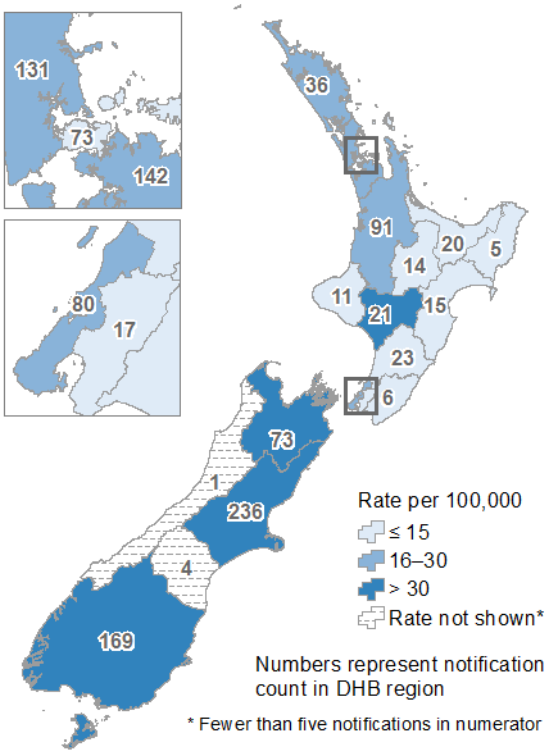
Females (26.9 per 100,000, 628 cases) had a higher notification rate than males (23.9 per 100,000, 540 cases).

The Pacific peoples (31.8 per 100,000, 90 cases) ethnic group had the highest notification rate for pertussis, followed by the European or Other (26.2 per 100,000, 800 cases), and Māori (25.7 per 100,000, 176 cases) ethnic groups.

Hospitalisation status was recorded for 1020 (87.3%) cases, of which 108 (10.6%) were hospitalised. Approximately 62% (48/77) of cases in the less than 1 year age group were hospitalised.

The proportion of hospitalised cases (for all age groups) by ethnic group was: Pacific peoples (40.9%, 27/66), Asian (25.0%, 9/36), MELAA (25.0%, 1/4), Māori (20.9%, 31/148) and European or Other (4.8%, 35/736).

Figure 26. Pertussis notifications by DHB, 2015



The current immunisation schedule for pertussis is a primary course of DTaP-IPV-HepB/Hib at ages six weeks, three months and five months, followed by booster doses at ages four years (DTaP-IPV) and 11 years (Tdap). Vaccination with Tdap is also recommended for pregnant women from 28 to 38 weeks gestation.[19]

Table 21. Age group and vaccination status of pertussis notifications, 2015

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]	16	0	0	0	0	0	0	16	0
6 weeks–2 months	33	17	0	0	0	0	1	13	2
3–4 months	19	6	8	1	0	0	0	4	0
5 months–3 years	126	3	2	80	3	0	2	32	4
4–10 years	215	6	4	23	94	6	15	43	24
11+ years	759	29	1	5	18	27	65	170	444
Total	**1168**	**61**	**15**	**109**	**115**	**33**	**83**	**278**	**474**

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

Vaccination status was known for 694 (59.4%) cases (Table 21). Of these, 278 (40.1%) cases were not vaccinated, including 16 infants aged under six weeks who were ineligible for vaccination. Sixty-one (8.8%) cases had received one dose of pertussis vaccine, 15 (2.2%) had received two doses and 257 (37.0%) had received three or more doses. A further 83 (12.0%) cases were reported as being vaccinated, but no dose information was available Vaccination status was known for 68 (63.0%) of the hospitalised cases. Of these, 39 (57.4%) cases had not been vaccinated (including 13 that were aged 0–5 weeks and therefore not eligible for vaccination), 18 (26.5%) had received one dose of pertussis vaccine, two (2.9%), and seven (10.3%) had received three or more doses. A further two cases were reported as being vaccinated, but no dose information was available.

In 2015, 41.8% (257/615) of cases reported contact with a laboratory-confirmed case of pertussis and 39.8% (375/943) of cases had attended school, pre-school or childcare.

Twenty outbreaks of *Bordetella pertussis* were reported in 2015, involving 223 cases.

Ministry of Health hospitalisation data for 2015 included 111 hospitalisations for which pertussis was the principal diagnosis.

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.[24]

Poliomyelitis (polio)

There were no polio notifications in 2015.

The New Zealand Paediatric Surveillance Unit carries out active surveillance of acute flaccid paralysis (AFP) to demonstrate the absence of wild polio virus. In 2015, seven cases of AFP were notified to the Unit. All seven cases were reviewed by the National Certification Committee for the Eradication of Polio (NCCEP) and classified as non-polio.

Since the mass oral polio vaccine (OPV) immunisation 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).[19] The most recent vaccine-associated case occurred in 1999.[25] No cases have been reported since the inactivated polio vaccine (IPV) replaced OPV in 2002.

In 1976, an imported case of wild polio virus infection was managed in New Zealand after a child arrived unwell from Tonga.[19]

Primary amoebic meningoencephalitis

The last case of primary amoebic meningoencephalitis (*Naegleria fowleri)* in New Zealand was notified in 2000. There were five prior cases in New Zealand, four of which were part of the same outbreak in 1968. All six cases in New Zealand were fatal and were linked to swimming in geothermal pools in the central North Island.[26]

Q fever

No cases of Q fever (*Coxiella burnetii*) were notified in 2015. Only three cases of Q fever have been notified in New Zealand since 1997, one case each year in 2004, 2010 and 2011. All three cases reported travelling overseas during the incubation period for the disease.

Prior to 2012, Q fever was reported under the rickettsial diseases section.

Rabies and other lyssaviruses

New Zealand is classified as a rabies-free country.[27] No cases of rabies or other lyssavirus have been reported in New Zealand.

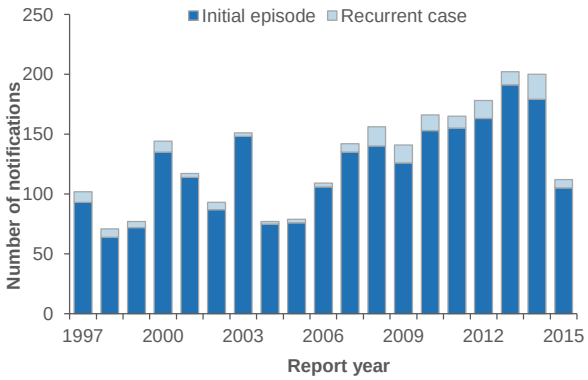
Rheumatic fever

In 2015, 112 cases of rheumatic fever were notified compared with 200 cases in 2014. The 2015 notification rate (2.4 per 100,000) was a significant decrease from the 2014 rate (4.4 per 100,000).

Of the 112 cases of rheumatic fever, 105 cases were initial episodes and seven were recurrences. This is a rate of 2.3 per 100,000 for initial episodes and 0.2 per 100,000 for recurrences.

Figure 27 shows the number of initial episodes and recurrent cases of rheumatic fever reported each year since 1997.

Figure 27. Rheumatic fever (initial episodes and recurrent cases) by year, 1997–2015



Hospitalisation date was recorded for 105 (98.1%) of the 107 cases that were hospitalised. Of these, 59 (56.2%) cases were notified within seven days of hospital admission.

Ministry of Health hospitalisation data for 2015 included 146 hospitalisations where rheumatic fever was the principal diagnosis.

A full description of the epidemiology of rheumatic fever will be reported separately in the Rheumatic Fever in New Zealand Annual Report available from www.surv.esr.cri.nz.

Initial episodes

Of the 105 initial episode cases notified, 78 were confirmed, 19 were probable and 8 were suspect cases.

Counties Manukau (6.5 per 100,000) had the highest rate followed by Lakes (5.7 per 100,000) and Bay of Plenty (3.2 per 100,000) DHBs.

Children in the 10–14 years (16.4 per 100,000, 48 cases) age group had the highest rate, followed by the 5–9 years (11.1 per 100,000, 34 cases) age group.

Males and females had the same rate (2.3 per 100,000).

The Pacific peoples (19.8 per 100,000, 56 cases) and Māori (6.9 per 100,000, 47 cases) ethnic groups had the highest rates and accounted for 98% of initial episode cases.

Of the 105 initial episode cases, 100 (95.2%) cases were hospitalised.

Recurrences

In 2015, seven recurrent cases were notified, from Auckland (3 cases), Counties Manukau (2 cases), Capital & Coast and Bay of Plenty (1 case each) DHBs.

The age range of cases was 8 to 37 years. Four cases were male and three were female.

All seven recurrent cases were either Pacific peoples (5 cases) or Māori (2 cases).

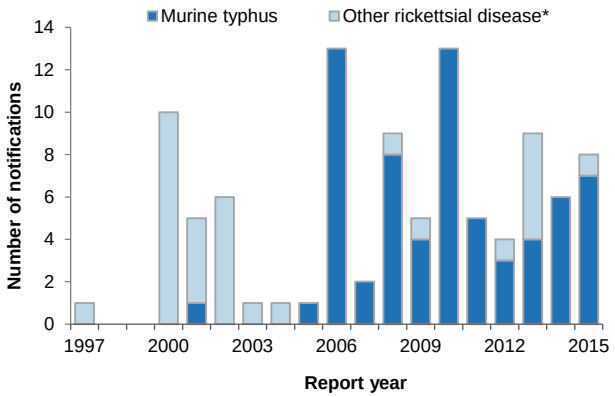
All seven recurrent cases were hospitalised.

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.

In 2015, eight cases of rickettsial disease were notified compared with six cases in 2014 (Figure 28). The 2015 notification rate (0.2 per 100,000) was similar to the 2014 rate (0.1 per 100,000). Seven of the notifications were for murine typhus and one was for scrub typhus (caused by *Orientia tsutsugamushi*).

Figure 28. Rickettsial disease notifications, 1997–2015



* Includes all other diseases caused by organisms of the *Rickettsia* genus, except typhus. No cases of typhus (caused by *Rickettsia prowazekii*) have been reported between 1997 and 2015.

Murine typhus

Seven laboratory-confirmed cases of murine typhus (caused by *Rickettsia typhi*) were notified, from Waitemata (4 cases), Auckland, Northland and Waikato (1 case each) DHBs.

The cases were in the 20–29, 60–69 (2 cases each) and 40–49, 50–59 and 70 years and over (1 case each) years age groups. Six cases were male and one was female.

Ethnicity was recorded for six (85.7%) cases and all were in the European or Other ethnic group.

Five (71.4%) cases were hospitalised. Three cases had not travelled overseas during the incubation period for the disease and are assumed to have acquired their infection in New Zealand. Four cases had travelled overseas.

Typhus

No cases of typhus (caused by *Rickettsia prowazekii*) have been reported from 1997 to 2015.

Other rickettsial diseases

One laboratory-confirmed case of scrub typhus (caused by *Orientia tsutsugamushi*) was notified. The case was a female, in the 30–39 years age group who had been in South Africa during the incubation period for the disease.

Rubella (German measles)

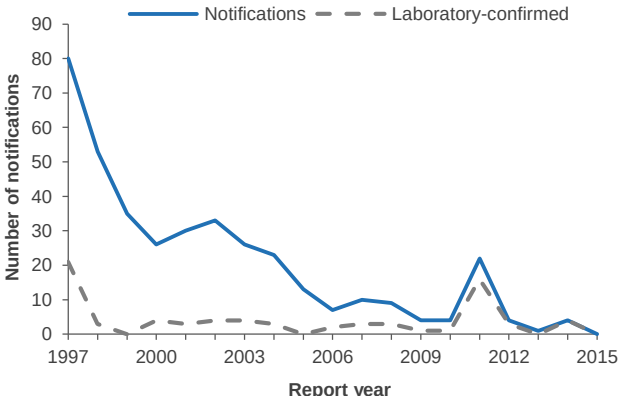
Rubella immunisation was introduced in 1970 for all children at age four years. In 1979 it was limited to girls at age 11 years and then extended to all children again when MMR was introduced in 1990. The recommended immunisation schedule for rubella is two doses of MMR vaccine, given at 15 months and 4 years of age.[19]

Rubella has been a notifiable disease since June 1996.[19]

No cases of rubella were notified in 2015, compared with four cases in 2014.

Since the last national rubella outbreak in 1995 [19], the number of rubella cases notified each year has decreased steadily, except for an increase in notifications in 2011 during the measles outbreak (Figure 29).

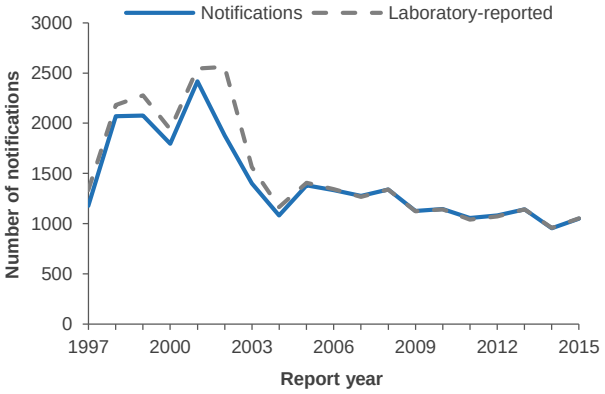
Figure 29. Rubella notifications and laboratory-confirmed cases by year, 1997–2015



Salmonellosis

In 2015, 1051 cases of salmonellosis were notified. The 2015 notification rate (22.9 per 100,000) showed a slight increase from the 2014 rate (21.2 per 100,000, 956 cases). Notifications for salmonellosis saw a large decrease between 2001 and 2004 and have remained relatively stable since 2005 (Figure 30).

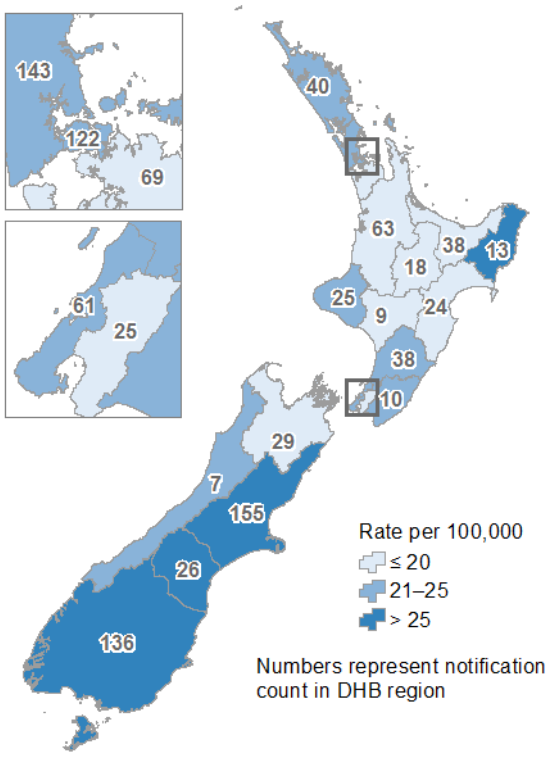
Figure 30. Salmonellosis notifications and laboratory-reported cases by year, 1997–2015



The salmonellosis notification rate varied throughout the country (Figure 31). The highest rates were in South Canterbury (44.4 per

100,000), Southern (43.3 per 100,000), Canterbury (29.5 per 100,000) and Tairawhiti (27.4 per 100,000) DHBs.

Figure 31. Salmonellosis notifications by DHB, 2015



Notification rates were highest for infants aged less than 1 year and children aged 1–4 years (103.2 and 77.4 per 100,000 respectively).

Ethnicity was recorded for 1001 (95.2%) cases. The notification rate for males and females was the same (both 22.9 per 100,000).

The highest notification rates were for the European or Other (24.4 per 100,000) and the MELAA (23.7 per 100,000) ethnic groups.

Further information by DHB, sex, age and ethnic group is in Tables 30 to 33 in the Appendix.

Hospitalisation status was recorded for 840 (79.9%) cases, of which 161 (19.2%) were hospitalised.

The most common risk factors reported for salmonellosis in 2015 were consuming food from retail premises, travelling overseas and having contact with farm animals (Table 22).

The Enteric Reference Laboratory at ESR confirmed 1053 isolates of *Salmonella* from humans (excluding *S.* Paratyphi and *S.* Typhi) in 2015. The most common serotypes identified were *S.* Typhimurium phage type 56 variant (96 isolates), *S.* Typhimurium phage type 135 (64 isolates), *S.* Typhimurium phage type 101 (56 isolates), *S.* Brandenburg and *S.* Infantis (52 isolates each).

A summary of the laboratory-reported cases from 2010 to 2015 for selected *Salmonella* serotypes and phage types is provided in Table 36 in the Appendix.

The yearly trend for selected *Salmonella* serotypes for the last five years is shown in Figure 32. Between 2014 and 2015, the number of cases of *S.* Thompson and *S.* Bovismorbificans noticeably increased. Serotypes with a decreasing trend from 2011 to 2014 include *S.* Typhimurium phage type 1 and *S.* Typhimurium phage type 156. However, these two serotypes increased from 2014 to 2015.

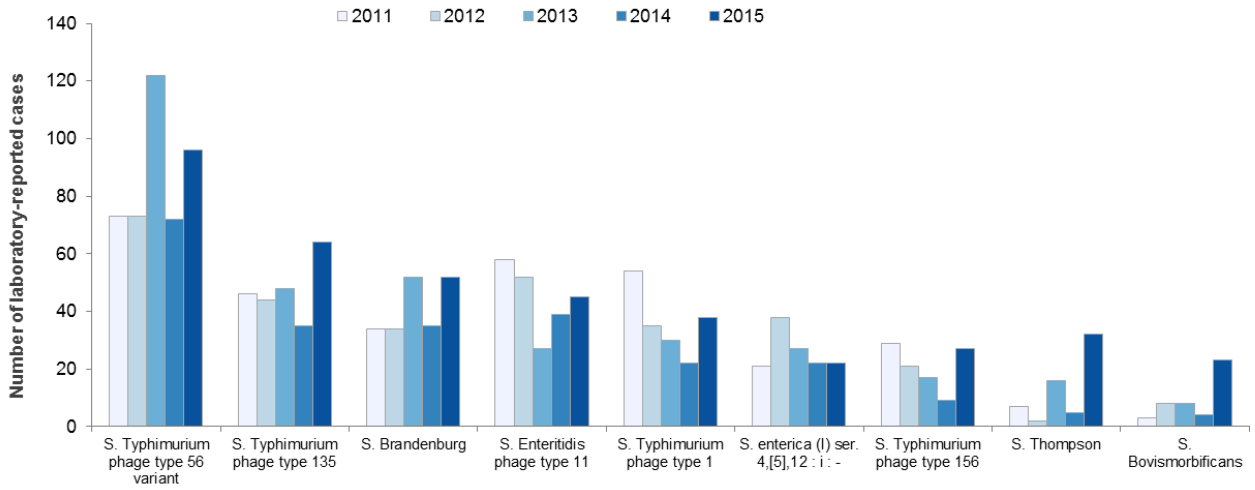
In 2015, 18 outbreaks of salmonellosis were reported, involving 101 cases.

Table 22. Exposure to risk factors associated with salmonellosis, 2015

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Consumed food from retail premises	228	303	520	42.9
Travelled overseas during the incubation period	268	600	183	30.9
Contact with farm animals	171	400	480	30.0
Contact with faecal matter	122	416	513	22.7
Consumed untreated water	105	369	577	22.2
Recreational water contact	109	422	520	20.5
Contact with other symptomatic people	68	501	482	12.0
Contact with sick animals	28	491	532	5.4

[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 32. Laboratory-reported cases of selected *Salmonella* serotypes and phage types by year, 2011–2015



Severe acute respiratory syndrome (SARS)

No cases of SARS have ever been diagnosed in New Zealand since SARS emerged in Southern China in 2003 [7].

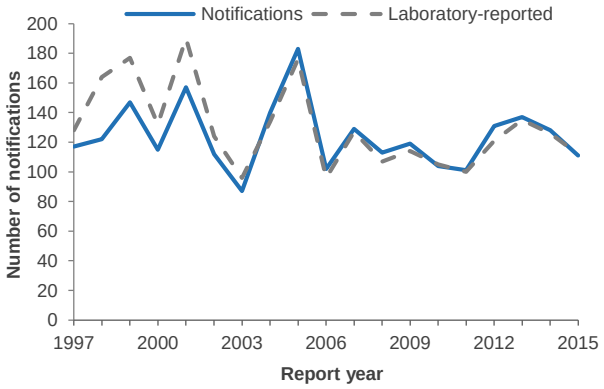
Shigellosis

In 2015, 111 cases of shigellosis were notified compared with 128 in 2014. The 2015 notification rate (2.4 per 100,000) was slightly lower than the 2014 rate (2.8 per 100,000). Figure 33 shows total cases by year between 1997 and 2015. After a peak of 183 cases in 2005, the yearly total cases from 2006 to 2015 have ranged from 101 to 137.

Auckland, Counties Manukau and Capital and Coast DHBs had the highest notification rates (5.3, 4.4 and 3.7 per 100,000 respectively).

The highest notification rate was in the 1–4 years age group (4.5 per 100,000), followed by the 40–49 (2.9 per 100,000) and 30–39 (2.7 per 100,000) years age groups.

Figure 33. Shigellosis notifications and laboratory-reported cases by year, 1997–2015



Males (2.7 per 100,000) had a higher rate than females (2.1 per 100,000).

Ethnicity was recorded for 102 (91.9%) cases. The MELAA ethnic group had the highest notification rate (9.9 per 100,000, 5 cases), followed by the Pacific peoples (7.4 per 100,000, 29 cases) ethnic group.

Further information by DHB, sex, age and ethnic group is in Tables 30 to 33 in the Appendix.

Hospitalisation status was recorded for 109 (98.2%) cases, of which 26 (23.9%) were hospitalised. No deaths due to shigellosis were reported in 2015.

The risk factors recorded for shigellosis are shown in Table 23.

All cases had travel information reported, of which 63 (56.8%) had lived or travelled overseas during the incubation period for the disease. Two further cases had a prior history of travel. The countries most commonly lived in or visited were India (15 cases), Indonesia (8 cases) and Fiji (7 cases). Some cases reported travel to more than one country.

The Enteric Reference Laboratory at ESR confirmed 112 isolates as *Shigella* during 2015. The most common species identified were *S. sonnei* (57 isolates, 50.9%) and *S. flexneri* (51 isolates, 45.5%). The most common *S. sonnei* biotypes identified were biotype g (37 isolates, 64.9%) and biotype a (20 isolates, 35.1%).

Twelve outbreaks of shigellosis involving 56 cases were reported in 2015.

Table 23. Exposure to risk factors associated with shigellosis, 2015

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Travelled overseas during the incubation period	63	48	0	56.8
Consumed food from retail premises	18	22	71	45.0
Contact with other symptomatic people	17	33	61	34.0
Recreational water contact	11	33	67	25.0
Contact with faecal matter	10	32	69	23.8
Consumed untreated water	6	29	76	17.1
Contact with farm animals	3	43	65	6.5
Contact with sick animals	0	43	68	0.0

[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 had more than one risk factor recorded.

Taeniasis

Five cases of taeniasis were notified in 2015, the same number that was notified in 2014.

All five cases were overseas during the incubation period for the disease. Countries lived in or visited were Cambodia, Central African Republic, Ethiopia, Laos, Malaysia, Singapore, and Thailand (1 case each). One case visited three countries.

A total of 48 cases have been notified since 1997. Of these, 47 cases (97.9%) reported a history of travelling overseas. The other case had an unknown travel history.

Tetanus

One case of tetanus was notified in New Zealand in 2015. The case was a female in the 70 years and over age group. This was a late notification with a date of onset in 2014. The case died but the cause of death was unknown.

Between 1997 and 2015, a total of 32 tetanus cases were reported. Of these, four were children aged less than 10 years. None were vaccinated. Of the 32 cases, two females aged over 70 years died from tetanus (one was not vaccinated and the vaccination status of the other was unknown).

Trichinellosis

No cases of trichinellosis were notified in 2015.

Trichinellosis was added to the notifiable diseases schedule in 1988. Since then three cases have been reported, the most recent in 2001.[28]

Tuberculosis disease

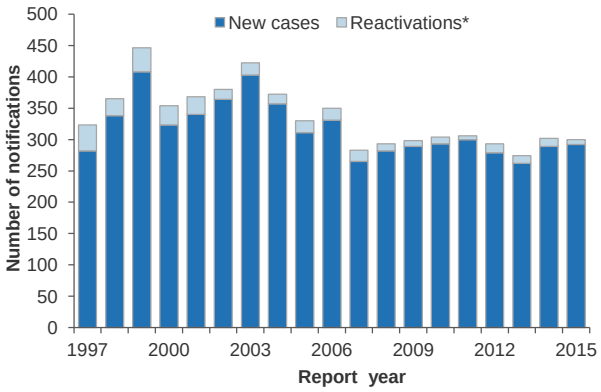
A full description of the epidemiology of tuberculosis and data on antimicrobial drug-resistant tuberculosis in New Zealand for 2015 will be reported separately in the report titled 'Tuberculosis in New Zealand: Annual Report 2015' available at www.surv.esr.cri.nz.

In 2015, a total of 300 cases of tuberculosis disease were notified, including 292 (97.3%) new cases and eight (2.7%) reactivations*. Figure 34 shows the total number of new tuberculosis cases and reactivations reported since 1997. The overall rate in 2015 was 6.5 per 100,000, similar to the rate in 2014 (6.7 per 100,000). The number of cases has remained fairly static since 2007.

In 2015, laboratory information was available for 299 (99.7%) cases. Of these, 261 (87.3%) cases were reported as laboratory-confirmed.

In 2015, two outbreaks of tuberculosis were reported, involving seven cases.

Figure 34. Tuberculosis notifications (new cases and reactivations) by year, 1997–2015



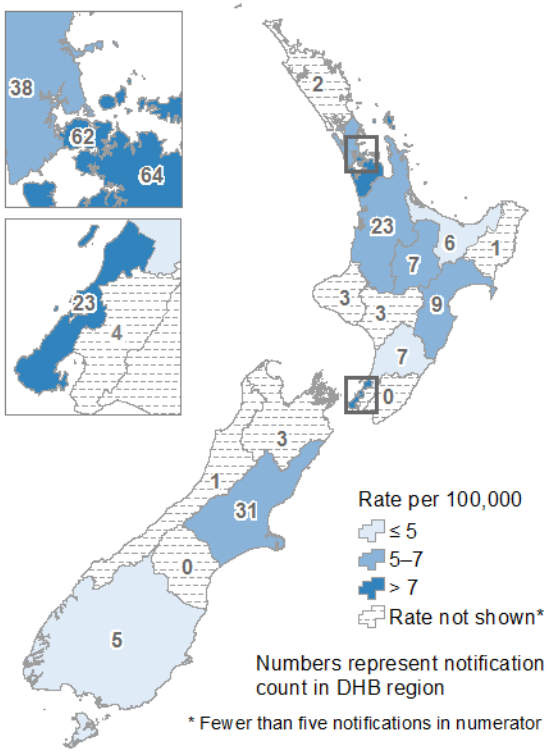
* The term 'reactivation' refers to cases with second or subsequent episodes of tuberculosis disease.

Ministry of Health hospitalisation data for 2015 included 227 hospitalisations where tuberculosis was the principal diagnosis.

Tuberculosis disease - new cases

In 2015, the rates of new tuberculosis notifications varied by geographical region (Figure 35). Auckland DHB had the highest notification rate (12.7 per 100,000, 62 cases), followed by Counties Manukau (12.3 per 100,000, 64 cases) and Capital & Coast (7.6 per 100,000, 23 cases) DHBs.

Figure 35. Tuberculosis notifications (new cases) by DHB, 2015



Tuberculosis rates were highest for adults in the 20–29 years (12.3 per 100,000, 80 cases), 30–39 years (10.2 per 100,000, 57 cases) and 40–49 years (6.1 per 100,000, 38 cases) age groups. Three cases were children aged less than five years.

Males had a higher notification rate (7.0 per 100,000, 158 cases) than females (5.7 per 100,000, 134 cases).

The Asian ethnic group had the highest notification rate for tuberculosis (35.9 per 100,000, 187 cases), followed by the Pacific peoples (19.5 per 100,000, 55 cases) and MELAA (15.8 per 100,000, 8 cases) ethnic groups.

Further information on DHB, sex, age and ethnic group is in Tables 30 to 33 in the Appendix.

Hospitalisation status was recorded for 291 (99.7%) new tuberculosis disease cases in 2015, of which 173 (59.5%) were hospitalised. Five deaths due to tuberculosis were reported among the 60–69 years and 70 years and over age groups (2 cases each), and 50–59 years age group (1 case).

Bacillus Calmette-Guérin (BCG) vaccination status was recorded for 160 (54.8%) cases, of which 119 (74.4%) had been vaccinated. Of the three children aged less than five years, none were reported as having received the BCG vaccine. One child was reported with miliary and renal/genitourinary tract tuberculosis.

The majority of cases (241/292, 82.5%) for whom information was available were born overseas. Among the 51 cases born in New Zealand, 12 had been or were presently living with a person born outside New Zealand.

A total of 67 (27.3%) new tuberculosis cases reported contact with a confirmed case of tuberculosis.

Tuberculosis disease - reactivation/relapse cases

The eight tuberculosis reactivation or relapse cases reported in 2015 were from five DHBs: Counties Manukau (3 cases), Waitemata (2 cases), Northland, Bay of Plenty, and Canterbury (1 case each). Those experiencing reactivated or relapsed tuberculosis were all aged 30 years and over, with the highest number of cases in the 70 years and over age group (4 cases).

The Asian ethnic group (4 cases) had the highest number of cases, followed by the Māori (3 cases), and European or Other (1 case) ethnic group.

Four of the eight cases with reactivated/relapse tuberculosis were born overseas, of which two cases were diagnosed with previous disease overseas and two in New Zealand. Of the four New Zealand born cases, three were previously diagnosed in New Zealand. The place of previous diagnosis for the other case was unknown. Treatment status was recorded for six of the eight cases, of which five had previously been treated for the disease.

Hospitalisation status was recorded for all reactivation cases, of which four were

hospitalised.

One death in the 60–69 years age group was reported among the reactivation cases.

Of the four cases where BCG vaccination status was recorded, all had been vaccinated.

Typhoid fever

In 2015, 43 cases of typhoid fever were notified compared with 42 cases in 2014. The 2015 notification rate (0.9 per 100,000) was the same as the 2014 rate. Figure 36 shows an increasing trend in the number of typhoid fever notifications from 1997 to 2015. From 2008 to 2015 the number of notified cases per year has ranged from 29 to 50.

Counties Manukau (3.8 per 100,000) and Auckland (2.0 per 100,000) DHBs had the highest notification rates for typhoid fever.

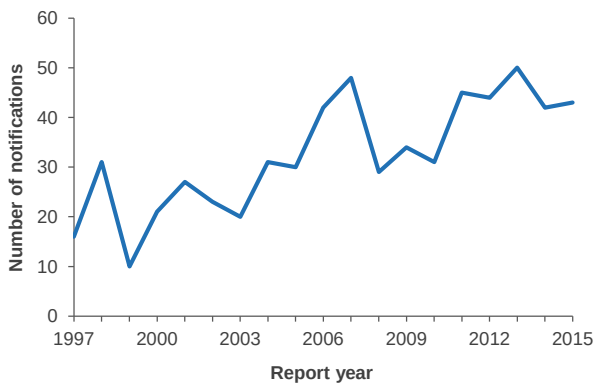
Notification rates were highest for the 1–4 (3.2 per 100,000) and 20–29 (2.0 per 100,000 age groups.

Males (1.0 per 100,000) had a similar notification rate to females (0.9 per 100,000).

Ethnicity was recorded for 42 (97.7%) cases. The Pacific peoples (6.4 per 100,000) and Asian (4.2 per 100,000) ethnic groups had the highest notification rates.

Hospitalisation status was recorded for 36 (83.7%) cases, of which 33 (91.7%) were hospitalised.

Figure 36. Typhoid fever notifications by year, 1997–2015



Of the 43 cases notified in 2015, 31 (72.1%) cases had travelled overseas during the incubation period for the disease. The countries most commonly visited were India (17 cases) and Samoa (9 cases). Some cases reported travelling to more than one country.

The Enteric Reference Laboratory at ESR confirmed 46 isolates as *Salmonella* Typhi during 2015. The most common phage types identified were *S.* Typhi phage type E1a (16 isolates) and *S.* Typhi phage type E9 variant (8 isolates).

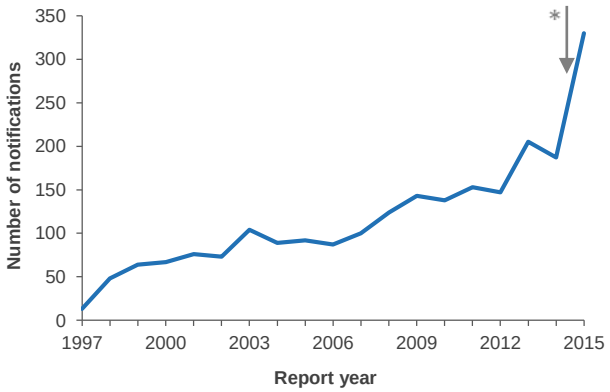
Three outbreaks of typhoid fever involving seven cases were reported in 2015.

Verotoxin- or Shiga toxin-producing *Escherichia coli* infection

In 2015, 330 cases of verocytotoxin- or Shiga toxin-producing *Escherichia coli* (VTEC/STEC) infection were notified. The 2015 notification rate (7.2 per 100,000) was significantly higher than the 2014 rate (4.1 per 100,000, 187 cases). The introduction of screening of all faecal specimens using PCR in an Auckland laboratory in July 2015 resulted in increased VTEC/STEC detection and contributed to this change in notification rate. The proportion of cases notified from the Northern region (Northland, Waitemata, Auckland and Counties Manukau DHBs) increased from 31% in 2014 to 53% in 2015.

The number of notifications of VTEC/STEC infection has been increasing since 1997 (Figure 37). This is partly due to changes in laboratory testing practices, with increasingly sensitive assays and algorithms used for the detection of VTEC/STEC.

Figure 37. VTEC/STEC notifications by year, 1997–2015



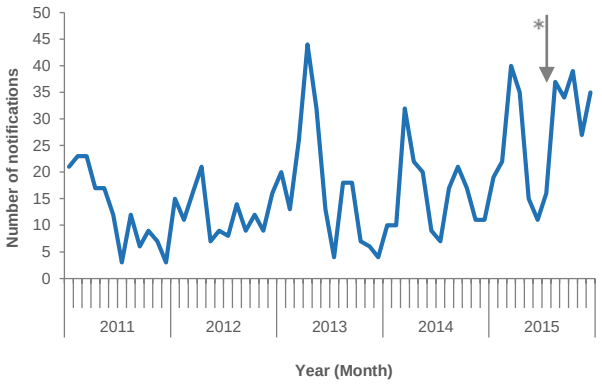
* Introduction of screening of all faecal specimens using PCR in an Auckland laboratory.

Fourteen paediatric cases of haemolytic uraemic syndrome (HUS) were reported to the New Zealand Paediatric Surveillance Unit (NZPSU) in 2015. Eight cases were confirmed to be VTEC/STEC-associated.

VTEC/STEC infection notifications follow a

seasonal pattern, with peaks occurring during autumn and spring each year (Figure 38). In 2015 the spring peak continued into the remainder of the year. The highest monthly total for 2015 occurred in March, when 40 cases were notified.

Figure 38. VTEC/STEC infection notifications by month, January 2011–December 2015



* Introduction of screening of all faecal specimens using PCR in an Auckland laboratory.

The rate for VTEC/STEC infection notifications varied throughout the country, with the highest rates in Northland, Waikato, Waitemata and South Canterbury DHBs (14.3, 13.6, 10.8 and 10.2 per 100,000 respectively) (Figure 39). A statistically significant increase in rates from 2014 to 2015 was detected for Northland and the three Auckland DHBs. The rates for Northland and Counties Manukau DHBs more than doubled from 6.6 to 14.3 and 3.1 to 8.6 per 100,000 respectively. The rates for Waitemata and Auckland DHBs tripled from 3.0 to 10.8 and 3.9 to 9.0 per 100,000 respectively.

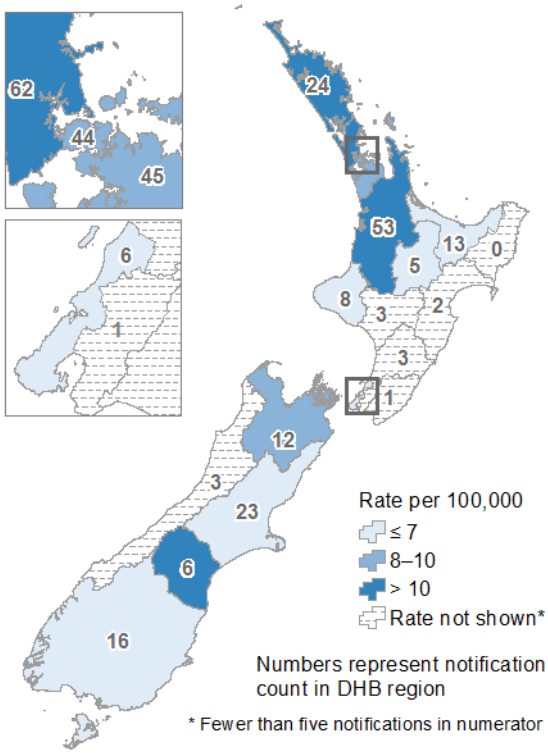
Children aged 1–4 years had the highest notification rate (40.5 per 100,000, 100 cases), followed by children aged less than 1 year (32.1 per 100,000, 19 cases).

Males and females had the same notification rate (both 7.2 per 100,000).

Ethnicity was recorded for 318 (96.3%) cases. The MELAA ethnic group had the highest notification rate (15.8 per 100,000, 8 cases), followed by the European or Other (8.4 per 100,000, 256 cases) ethnic group.

Further information regarding DHB, sex, age and ethnic group is in Tables 30 to 33 in the Appendix.

Figure 39. VTEC/STEC infection notifications by DHB, 2015



Hospitalisation status was recorded for 324 (98.2%) cases, of which 80 (24.7%) were hospitalised. Of the 80 hospitalised cases, 14 had HUS. No deaths due to VTEC/STEC infection were reported in 2015.

The most common risk factors reported for VTEC/STEC infection cases in 2015 were contact with pets, farm animals and animal manure, as shown in Table 24.

The most common foods that the cases consumed during the incubation period were dairy products, raw fruit or vegetables and chicken or poultry products (Table 25).

The Enteric Reference Laboratory at ESR confirmed 345 isolates of VTEC/STEC in 2015. Of these, 183 (53.0%) were identified as *E. coli* O157:H7 and 101 (29.3%) as *E. coli* non-O157 serotypes. The serotype was undetermined in 61 (17.7%) cases, but verocytotoxin-producing genes were detected by PCR.

In 2015, 17 outbreaks of VTEC/STEC infection were reported involving 94 cases.

Ministry of Health hospitalisation data recorded 14 hospitalisations in 2015 where VTEC/STEC infection was the primary diagnosis.

Table 24. Exposure to risk factors associated with VTEC/STEC infection, 2015

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Contact with pets	103	20	207	83.7
Contact with farm animals	79	32	219	71.2
Contact with animal manure	28	52	250	35.0
Contact with children in nappies	53	105	172	33.5
Contact with recreational water	54	115	161	32.0
Contact with a person with similar symptoms	19	69	242	21.6
Contact with other animals	29	174	127	14.3
Travelled overseas during the incubation period	20	236	74	7.8

[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 25. Foods consumed by VTEC/STEC infection cases, 2015

Foods consumed	Yes	No	Unknown	Percentage (%)[a]
Dairy products	139	20	171	87.4
Raw fruit or vegetables	137	23	170	85.6
Chicken or poultry products	120	37	173	76.4
Beef or beef products	116	42	172	73.4
Processed meat	81	69	180	54.0
Fruit or vegetable juice	56	88	186	38.9
Lamb or hogget or mutton	48	93	189	34.0
Home kill meat	39	120	171	24.5
Pink or undercooked meat	19	134	177	12.4
Unpasteurised milk or milk products	16	147	167	9.8

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

Viral haemorrhagic fevers

No cases of viral haemorrhagic fever (including Ebola) have ever been reported in New Zealand.[7]

Yellow fever

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

Yersiniosis

In 2015, 634 cases of yersiniosis were notified. The 2015 notification rate (13.8 per 100,000) was slightly lower than the 2014 rate (15.1 per 100,000, 681 cases).

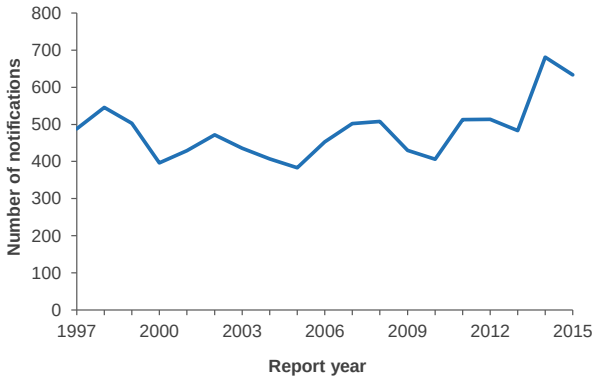
Figure 40 shows the number of notified yersiniosis cases by year since 1997.

Canterbury, South Canterbury, West Coast and Tairawhiti DHBs had the highest notification rates (30.8, 27.3, 21.4, and 21.1 per 100,000 respectively) (Figure 41).

Infants aged less than 1 year and children aged 1–4 years had the highest notification rates (69.4 and 41.4 per 100,000 respectively).

Females (14.5 per 100,000) had a slightly higher notification rate than males (13.1 per 100,000).

Figure 40. Yersiniosis notifications by year, 1997–2015

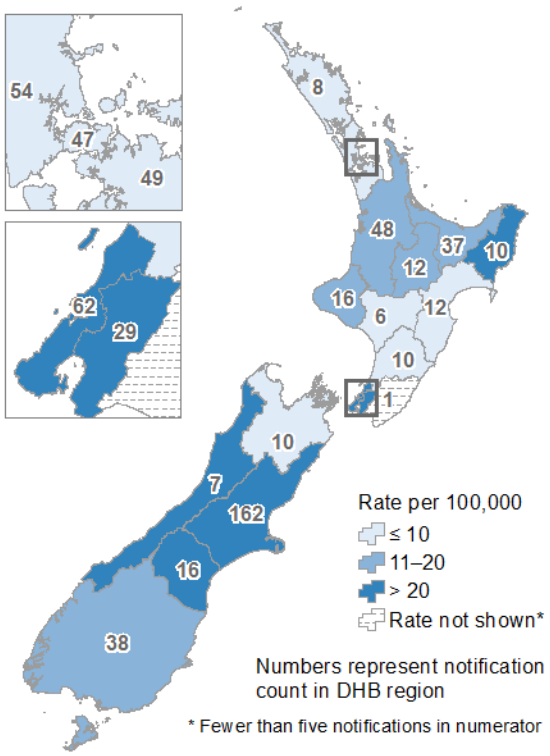


Ethnicity was recorded for 604 (95.3%) cases. The Asian (19.2 per 100,000), European or Other (14.0 per 100,000) and MELAA (13.8 per 100,000) ethnic groups had the highest notification rates.

Further information by DHB, sex, age and ethnic group is in Tables 30 to 33 in the Appendix.

Hospitalisation status was recorded for 445 (70.2%) cases, of which 54 (12.1%) were hospitalised.

Figure 41. Yersiniosis notifications by DHB, 2015



The risk factors recorded for yersiniosis cases are shown in Table 26. The most common risk factors reported were consuming food from retail premises and contact with farm animals.

The Enteric Reference Laboratory at ESR confirmed 521 isolates as *Yersinia enterocolitica* and 13 isolates as *Y. pseudotuberculosis* during 2015. The most common *Y. enterocolitica* biotypes identified were biotype 2 and biotype 1A (173 isolates, 33.2% each), followed by biotype 4 (111 isolates, 21.3%) and biotype 3 (59 isolates, 11.3%).

Two outbreaks due to *Yersinia* were reported in 2015, involving five cases.

Table 26. Exposure to risk factors associated with yersiniosis, 2015

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Consumed food from retail premises	147	161	326	47.7
Contact with farm animals	99	253	282	28.1
Contact with faecal matter	74	259	301	22.2
Recreational water contact	67	270	297	19.9
Consumed untreated water	57	257	320	18.2
Contact with other symptomatic people	40	289	305	12.2
Travelled overseas during the incubation period	36	326	272	9.9
Contact with sick animals	16	314	304	4.8

[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.

APPENDIX: NATIONAL DATA AND TRENDS

APPENDIX: NATIONAL DATA AND TRENDS

Comparison of notifiable disease cases and rates for 2014 and 2015

Table 27. Numbers of cases for rare (fewer than 10 cases reported in a single year) notifiable diseases in New Zealand, 2014 and 2015

Disease[a]	2014	2015
Botulism	1	1
Brucellosis	0	0
Creutzfeldt-Jakob disease[b]	6	6
Cronobacter species invasive disease	0	0
Cysticercosis	1	1
Diphtheria	2	2
Haemophilus influenzae type b disease	5	3
Hepatitis NOS	8	4
Hydatid disease	4	4
Leprosy	4	5
Rickettsial disease	6	8
Ross River virus infection	1	4
Rubella	4	0
Taeniasis	5	5
Tetanus	0	1
Zika virus infection	57	7

[a] No cases of the following notifiable diseases were reported in 2014 or 2015: anthrax, Barmah Forest virus infection, cholera, congenital rubella, decompression sickness, highly pathogenic avian influenza, Middle East respiratory syndrome (MERS), non-seasonal influenza, plague, poliomyelitis, primary amoebic meningo-encephalitis, Q fever, rabies, severe acute respiratory syndrome (SARS), trichinosis, viral haemorrhagic fever and yellow fever.

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

Deaths due to notifiable diseases, as recorded in EpiSurv, 1997–2015

Table 28. Deaths due to notifiable diseases, as recorded in EpiSurv, 1997–2015

Disease	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
AIDS [a]	34	19	18	19	14	11	10	13	15	14	5	2	2	8	1	3	6	3	-
Campylobacteriosis	2	2	1	3	1	1	0	0	1	1	1	0	0	0	0	0	1	0	0
Creutzfeldt-Jakob disease [b]	3	0	2	3	1	3	4	3	0	5	0	0	0	0	0	8	6	6	6
Gastroenteritis [c]	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0
Giardiasis	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haemophilus influenzae type b	1	0	0	0	1	1	2	0	0	0	0	0	0	1	0	1	0	0	0
Hepatitis B	2	0	0	0	1	0	0	0	1	0	1	0	0	0	0	1	0	1	1
Hydatid disease	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Invasive pneumococcal disease [d]												8	35	27	32	32	18	22	26
Legionellosis [e]	4	1	1	5	2	3	1	1	4	3	1	4	2	5	4	6	3	1	4
Listeriosis - non-perinatal	2	0	1	2	1	0	2	3	1	0	2	3	2	3	1	4	2	3	1
Listeriosis - perinatal	6	0	2	4	1	3	2	2	4	1	2	2	2	4	0	2	3	2	3
Malaria	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Meningococcal disease	24	23	23	17	26	18	13	8	14	7	7	8	5	6	13	6	4	3	4
Non seasonal influenza A (H1N1) [f]													36	17	0	0	0	0	0
Pertussis	0	0	0	1	0	1	1	1	0	0	0	0	0	0	1	2	1	0	0
Primary amoebic meningoencephalitis	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rheumatic fever	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salmonellosis	2	2	1	7	2	1	0	0	1	1	1	1	1	0	0	0	0	0	0
Shigellosis	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Tetanus	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0
Tuberculosis disease	15	8	14	8	2	6	6	6	4	6	3	4	4	9	3	5	2	4	6
VTEC/STEC infection	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0
Yersiniosis	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0

[a] Data source: AIDS Epidemiology Group, 2015 data not available. [1]

[b] Data source: CJD Registry.[17]

[c] Cases of acute gastroenteritis from a common source 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 by public health services when it occurs close to the time of notification and investigation.

Morbidity data for selected notifiable diseases, 2013–2015 (Ministry of Health)

Table 29. Hospital admissions for selected notifiable diseases, 2013–2015

Disease	ICD 10 codes	2013		2014		2015	
		Prin [a]	Oth [b]	Prin [a]	Oth [b]	Prin [a]	Oth [b]
AIDS	B20-B24	7	266	10	266	7	277
Arboviral diseases	A83, A84, A85.2, A92, A93, A94, B33.1	1		16	1	17	7
Brucellosis	A23	1				1	
Campylobacteriosis	A04.5	591	128	612	117	564	117
Cholera	A00						1
Creutzfeldt-Jakob disease	A81.0	5		8	3	5	1
Cryptosporidiosis	A07.2	38	21	22	4	21	9
Cysticercosis	B69	2	2	1			
Decompression sickness	T70.3	42	7	22	2	24	5
Dengue fever	A90, A91	35	1	64	2	54	4
Diphtheria	A36	1		1	1	1	1
Giardiasis	A07.1	24	23	43	25	33	20
Hepatitis A	B15	29	10	33	16	27	37
Hepatitis B	B16	18	26	25	30	20	25
Hepatitis C	B17.1	18	38	10	26	4	9
Hydatid disease	B67	5	10	8	14	20	11
Legionellosis	A48.1	79	10	51	29	49	84
Leprosy	A30		3	2	1	4	2
Leptospirosis	A27	47	5	34	10	50	16
Listeriosis	A32	13	11	15	13	19	13
Malaria	B50-B54	43	3	24		37	1
Measles	B05	4	1	65	9	5	2
Meningococcal disease	A39	69	16	50	16	75	16
Mumps	B26	7	2	16	2	8	4
Paratyphoid	A01.1-A01.4	11		5		4	
Pertussis	A37	272	63	112	35	111	51
Q fever	A78						
Rheumatic fever	I00, I01, I02	291	37	222	33	146	32
Rickettsial diseases	A75, A77, A79	6		4		6	
Rubella	B06		2	1	1		
Salmonellosis	A02	128	40	109	37	141	31
Shigellosis	A03	26	3	12	6	10	10
Taeniasis	B689		1				
Tetanus	A33-A35	4	2	1	1		1
Tuberculosis	A15-A19, P37.0	207	118	297	138	227	117
Typhoid	A01.0	47	3	37		47	4
Viral haemorrhagic fevers	A95, A98, A99						
VTEC/STEC infection	A04.3	19	8	7	5	14	6
Yellow fever	A95						
Yersiniosis	A04.6	29	18	26	25	38	24

[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.

Notifiable disease cases and rates by District Health Board, 2015

Table 30. Number of cases and rate per 100,000 population of notifiable diseases by DHB, 2015

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	255	151.5	818	142.1	532	108.6	488	93.5	599	153.4	163	155.5	244	110.2	49	103.4	225	194.1	246	153.3
Cryptosporidiosis	27	16.0	83	14.4	51	10.4	74	14.2	116	29.7	12	11.5	19	8.6	4		24	20.7	26	16.2
Dengue fever			19	3.3	34	6.9	29	5.6	8	2.0	1		3		1		1			
Gastroenteritis[b]	1		65	11.3	113	23.1	32	6.1	7	1.8	14	13.4	18	8.1	3		7	6.0	1	
Giardiasis	61	36.2	211	36.7	183	37.3	162	31.1	113	28.9	60	57.3	65	29.3	21	44.3	28	24.2	74	46.1
Hepatitis A	2		8	1.4	9	1.8	10	1.9					4		1					
Hepatitis B[c]	1		4		10	2.0	2		2		2		1				2		1	
Hepatitis C[c]	3		2		2												4		1	
Invasive pneumococcal disease	29	17.2	36	6.3	36	7.3	70	13.4	39	10.0	22	21.0	29	13.1	7	14.8	7	6.0	15	9.3
Legionellosis	13	7.7	46	8.0	14	2.9	24	4.6	19	4.9	4		23	10.4			4		8	5.0
Leptospirosis			2				2		9	2.3	1		4				4		8	5.0
Listeriosis			2		3		3		1				6	2.7						
Malaria			10	1.7	8	1.6	8	1.5					2						2	
Measles							2		2				1							
Meningococcal disease	8	4.8	10	1.7	3		7	1.3	4		2		2		1		3		3	
Mumps	3		2				2								1		3			
Paratyphoid fever			5	0.9	5	1.0	4		6	1.5	2								1	
Pertussis	36	21.4	131	22.8	73	14.9	142	27.2	91	23.3	14	13.4	20	9.0	5	10.5	11	9.5	15	9.3
Rheumatic fever[d]	4		10	1.7	16	3.3	36	6.9	9	2.3	6	5.7	8	3.6	3		2		3	
Salmonellosis	40	23.8	143	24.8	122	24.9	69	13.2	63	16.1	18	17.2	38	17.2	13	27.4	25	21.6	24	15.0
Shigellosis			13	2.3	26	5.3	23	4.4	6	1.5	1		5	2.3			1			
Tuberculosis disease	3		40	6.9	62	12.7	67	12.8	23	5.9	7	6.7	7	3.2	1		3		9	5.6
Typhoid fever			2		10	2.0	20	3.8	1				2						1	
VTEC/STEC infection	24	14.3	62	10.8	44	9.0	45	8.6	53	13.6	5	4.8	13	5.9			8	6.9	2	
Yersiniosis	8	4.8	54	9.4	47	9.6	49	9.4	48	12.3	12	11.5	37	16.7	10	21.1	16	13.8	12	7.5

[a] Table is continued on the following page.

[b] Cases of acute gastroenteritis from a common source or foodborne intoxication, eg, staphylococcal intoxication.

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

[d] Includes rheumatic fever initial attack 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.

Notifiable disease cases and rates by District Health Board, 2015

Table 30. Number of cases and rate per 100,000 population of notifiable diseases by DHB, 2015 (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	86	137.4	196	113.9	195	135.4	387	128.5	72	166.7	217	149.9	80	244.6	728	138.4	126	215.0	512	163.1
Cryptosporidiosis	9	14.4	42	24.4	9	6.3	27	9.0	11	25.5	12	8.3	5	15.3	70	13.3	14	23.9	61	19.4
Dengue fever			1		1		14	4.6			2				6	1.1	1		4	
Gastroenteritis[b]	17	27.2	71	41.3	22	15.3	75	24.9	5	11.6	1		6	18.3	29	5.5	1		12	3.8
Giardiasis	18	28.8	29	16.9	20	13.9	156	51.8	14	32.4	64	44.2	11	33.6	135	25.7	13	22.2	72	22.9
Hepatitis A			5	2.9	1										4				3	
Hepatitis B[c]			2		1		2				1				3					
Hepatitis C[c]	1				4		3				1		1		9	1.7			4	
Invasive pneumococcal disease	7	11.2	14	8.1	16	11.1	27	9.0	6	13.9	12	8.3	4		41	7.8	3		31	9.9
Legionellosis	1		24	13.9	2		7	2.3	3		4		4		39	7.4	3		12	3.8
Leptospirosis	4		3		2		1		3		5	3.5	4		3		1		7	2.2
Listeriosis	1				1		3		1		1				3				1	
Malaria					2		1				1				3				1	
Measles			4												1					
Meningococcal disease	1		3				5	1.7	1		1		1		4		1		4	
Mumps							1								1					
Paratyphoid fever	1						2		1		2				3				2	
Pertussis	21	33.5	23	13.4	17	11.8	80	26.6	6	13.9	73	50.4	1		236	44.9	4		169	53.8
Rheumatic fever[d]			3		4		3		1						3				1	
Salmonellosis	9	14.4	38	22.1	25	17.4	61	20.3	10	23.1	29	20.0	7	21.4	155	29.5	26	44.4	136	43.3
Shigellosis			3		3		11	3.7							12	2.3			7	2.2
Tuberculosis disease	3		7	4.1	4		23	7.6			3		1		32	6.1			5	1.6
Typhoid fever			1				2				1								3	
VTEC/STEC infection	3		3		1		6	2.0	1		12	8.3	3		23	4.4	6	10.2	16	5.1
Yersiniosis	6	9.6	10	5.8	29	20.1	62	20.6	1		10	6.9	7	21.4	162	30.8	16	27.3	38	12.1

[a] Table is continued from the previous page.

[b] Cases of acute gastroenteritis from a common source or foodborne intoxication, eg, staphylococcal intoxication.

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

[d] Includes rheumatic fever initial attack 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.

Notifiable disease cases and rates by sex, 2015

Table 31. Number of cases and rate per 100,000 population of notifiable diseases by sex, 2015

Disease	Sex					
	Male		Female		Total [a]	
	Cases	Rate	Cases	Rate	Cases	Rate
Campylobacteriosis	3466	153.6	2749	117.6	6218	135.3
Cryptosporidiosis	315	14.0	381	16.3	696	15.1
Dengue fever	63	2.8	62	2.7	125	2.7
Gastroenteritis (acute)[b]	224	9.9	276	11.8	501	10.9
Giardiasis	793	35.1	717	30.7	1510	32.9
Hepatitis A	19	0.8	28	1.2	47	1.0
Hepatitis B[c]	24	1.1	10	0.4	34	0.7
Hepatitis C[c]	16	0.7	19	0.8	35	0.8
Invasive pneumococcal disease	242	10.7	209	8.9	451	9.8
Legionellosis	155	6.9	99	4.2	254	5.5
Leptospirosis	59	2.6	4		63	1.4
Listeriosis	11	0.5	15	0.6	26	0.6
Malaria	26	1.2	12	0.5	38	0.8
Measles	7	0.3	3		10	0.2
Meningococcal disease	43	1.9	21	0.9	64	1.4
Mumps	10	0.4	3		13	0.3
Paratyphoid fever	15	0.7	19	0.8	34	0.7
Pertussis	540	23.9	628	26.9	1168	25.4
Rheumatic fever[d]	56	2.5	56	2.4	112	2.4
Salmonellosis	516	22.9	535	22.9	1051	22.9
Shigellosis	62	2.7	49	2.1	111	2.4
Tuberculosis disease	161	7.1	139	5.9	300	6.5
Typhoid fever	23	1.0	20	0.9	43	0.9
VTEC/STEC infection	162	7.2	168	7.2	330	7.2
Yersiniosis	295	13.1	339	14.5	634	13.8

[a] Total includes cases where sex was unknown.

[b] Cases of acute gastroenteritis from a common source or foodborne intoxication, eg, staphylococcal intoxication.

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

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

Note: For fewer than five cases notified, a rate is not calculated and the cell is blank.

Notifiable disease cases and rates by age group, 2015

Table 32. Number of cases and rate per 100,000 population of notifiable diseases by age group, 2015

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	127	214.9	638	258.7	288	91.4	231	78.7	320	101.0	972	149.3	630	112.3	702	112.8	804	132.7	736	154.7	766	170.7	6218	135.3
Cryptosporidiosis	11	18.6	199	80.7	89	28.2	41	14.0	44	13.9	124	19.0	80	14.3	55	8.8	24	4.0	16	3.4	12	2.7	696	15.1
Dengue fever							3		10	3.2	24	3.7	21	3.7	18	2.9	30	5.0	17	3.6	2		125	2.7
Gastroenteritis[b]	34	57.5	50	20.3	13	4.1	13	4.4	8	2.5	47	7.2	61	10.9	71	11.4	62	10.2	50	10.5	75	16.7	501	10.9
Giardiasis	27	45.7	282	114.3	114	36.2	43	14.7	25	7.9	144	22.1	298	53.1	230	36.9	153	25.3	146	30.7	47	10.5	1510	32.9
Hepatitis A			3		3		1		5	1.6	12	1.8	7	1.2	11	1.8	1		3		1		47	1.0
Hepatitis B[c]	1								1		5	0.8	3		8	1.3	8	1.3	5	1.1	3		34	0.7
Hepatitis C[c]									3		9	1.4	13	2.3	5	0.8	3		2				35	0.8
Invasive pneumococcal disease	11	18.6	16	6.5	3		8	2.7	7	2.2	19	2.9	25	4.5	44	7.1	63	10.4	89	18.7	166	37.0	451	9.8
Legionellosis									1		3		11	2.0	28	4.5	50	8.3	53	11.1	108	24.1	254	5.5
Leptospirosis									3		13	2.0	7	1.2	12	1.9	13	2.1	13	2.7	2		63	1.4
Listeriosis			2								6	0.9	3		2		1		3		9	2.0	26	0.6
Malaria			1		2		1		2		16	2.5	5	0.9	4		4		2		1		38	0.8
Measles	1		1				2				4		2										10	0.2
Meningococcal disease	13	22.0	17	6.9	3				7	2.2	8	1.2	4		3		1		2		6	1.3	64	1.4
Mumps			2		5	1.6			1		2		1		1		1						13	0.3
Paratyphoid fever					1				3		10	1.5	7	1.2	3		5	0.8	4		1		34	0.7
Pertussis	90	152.3	136	55.1	144	45.7	123	41.9	57	18.0	95	14.6	106	18.9	156	25.1	141	23.3	73	15.3	47	10.5	1168	25.4
Rheumatic fever[d]			2		35	11.1	48	16.4	8	2.5	14	2.2	4		1								112	2.4
Salmonellosis	61	103.2	191	77.4	67	21.3	32	10.9	30	9.5	157	24.1	113	20.2	113	18.2	132	21.8	98	20.6	56	12.5	1051	22.9
Shigellosis	1		11	4.5	7	2.2			8	2.5	17	2.6	15	2.7	18	2.9	14	2.3	12	2.5	8	1.8	111	2.4
Tuberculosis disease			3		5	1.6	2		13	4.1	80	12.3	60	10.7	38	6.1	31	5.1	28	5.9	40	8.9	300	6.5
Typhoid fever			8	3.2	2		3		1		13	2.0	5	0.9	6	1.0	5	0.8					43	0.9
VTEC/STEC infection	19	32.1	100	40.5	31	9.8	18	6.1	15	4.7	27	4.1	17	3.0	16	2.6	23	3.8	27	5.7	37	8.2	330	7.2
Yersiniosis	41	69.4	102	41.4	24	7.6	21	7.2	30	9.5	66	10.1	60	10.7	64	10.3	101	16.7	55	11.6	70	15.6	634	13.8

[a] Total includes cases where age was unknown.

[b] Cases of acute gastroenteritis from a common source or foodborne intoxication, eg, staphylococcal intoxication.

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

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

Note: For fewer than five cases notified, a rate is not calculated and the cell is blank.

Notifiable disease cases and rates by ethnic group, 2015

Table 33. Number of cases and rate per 100,000 population of notifiable diseases by ethnic group, 2015

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	486	70.9	127	44.9	354	68.0	42	82.8	4834	158.2	6218	135.3
Cryptosporidiosis	56	8.2	17	6.0	26	5.0	8	15.8	565	18.5	696	15.1
Dengue fever	6	0.9	47	16.6	17	3.3	0	-	46	1.5	125	2.7
Gastroenteritis[c]	46	6.7	15	5.3	41	7.9	8	15.8	327	10.7	501	10.9
Giardiasis	112	16.3	17	6.0	91	17.5	24	47.3	1153	37.7	1510	32.9
Hepatitis A	6	0.9	7	2.5	9	1.7	3	-	19	0.6	47	1.0
Hepatitis B[d]	6	0.9	3	-	2	-	2	-	19	0.6	34	0.7
Hepatitis C[d]	13	1.9	0	-	0	-	0	-	22	0.7	35	0.8
Invasive pneumococcal disease	108	15.7	52	18.4	16	3.1	1	-	260	8.5	451	9.8
Legionellosis	19	2.8	5	1.8	14	2.7	3	-	208	6.8	254	5.5
Leptospirosis	11	1.6	0	-	0	-	0	-	50	1.6	63	1.4
Listeriosis	5	0.7	1	-	8	1.5	0	-	12	0.4	26	0.6
Malaria	1	-	4	-	18	3.5	6	11.8	8	0.3	38	0.8
Measles	0	-	2	-	3	-	0	-	5	0.2	10	6.2
Meningococcal disease	20	2.9	8	2.8	3	-	0	-	32	1.0	64	1.4
Mumps	3	-	1	-	4	-	0	-	5	0.2	13	0.3
Paratyphoid fever	2	-	0	-	7	1.3	1	-	22	0.7	34	0.7
Pertussis	176	25.7	90	31.8	47	9.0	6	11.8	800	26.2	1168	25.4
Rheumatic fever[e]	49	7.1	61	21.6	2	-	0	-	0	-	112	2.4
Salmonellosis	104	15.2	49	17.3	89	17.1	12	23.7	747	24.4	1051	22.9
Shigellosis	5	0.7	21	7.4	13	2.5	5	9.9	58	1.9	111	2.4
Tuberculosis disease	27	3.9	55	19.5	191	36.7	8	15.8	18	0.6	300	6.5
Typhoid fever	1	-	18	6.4	22	4.2	0	-	1	-	43	0.9
VTEC/STEC infection	30	4.4	10	3.5	14	2.7	8	15.8	256	8.4	330	7.2
Yersiniosis	51	7.4	18	6.4	100	19.2	7	13.8	428	14.0	634	13.8

[a] Middle Eastern/Latin American/African.
[b] Total includes cases where ethnicity was unknown.
[c] Cases of acute gastroenteritis from a common source or foodborne intoxication, eg, staphylococcal intoxication.
[d] Only acute cases of this disease are notifiable.
[e] Includes rheumatic fever initial attack and recurrent cases.

Note: Denominator data used to determine disease rates for ethnic groups is based on the proportion of people in each ethnic group from the estimated resident 2013 census population applied to the 2014 mid-year population estimates from Statistics New Zealand. Ethnicity is prioritised in the following order: Māori, Pacific peoples, Asian, MELAA and European or Other (including New Zealander) ethnic groups. For fewer than five cases notified, a rate is not calculated and the cell is blank.

Table 34. Number of notifiable disease cases by year and source, 1990–2002[a]

Disease	Source[b]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
AIDS	N	73	78	50	70	44	49	76	43	29	33	26	26	17
Campylobacteriosis	N	3850	4148	5144	8101	7714	7442	7635	8924	11572	8161	8418	10145	12493
Cholera	N	5	0	0	0	2	2	0	0	1	1	0	3	1
Creutzfeldt-Jakob disease	N							2	1	0	2	3	1	3
Cryptosporidiosis	N							119	357	866	977	775	1208	975
Dengue fever	N	2	3	1	1	0	6	23	14	26	9	7	93	69
Gastroenteritis[c]	N							555	316	493	608	730	942	1088
Giardiasis	N							1235	2127	2183	1793	1688	1604	1547
Haemophilus influenzae type b	N							26	9	11	10	13	11	3
	L	143	148	166	118	75	14	24	8	10	9	10	8	3
Hepatitis A	N	150	224	288	257	179	338	311	347	145	119	107	61	106
Hepatitis B[d]	N	242	227	221	145	133	125	104	138	88	94	79	56	67
Hepatitis C[d]	N	11	25	89	91	79	88	59	92	102	96	80	58	53
Hydatid disease	N	4	0	4	4	1	5	3	2	2	8	3	7	2
Legionellosis	N	20	14	11	24	66	33	36	63	43	51	61	46	49
	L	21	42	60	76	121	76	60	109	107	65	56	56	53
Leprosy	N	1	4	5	3	1	1	10	3	3	10	4	3	4
Leptospirosis	N	117	106	70	116	70	65	56	52	75	59	98	99	140
	L	229	176	218	234	168	183	140	84	117	76	114	113	181
Listeriosis	N	16	26	16	11	8	13	10	35	17	19	22	18	19
Malaria	N	32	39	29	58	34	41	107	65	73	46	111	54	61
Measles	N							68	1984	164	107	64	82	21
Meningococcal disease	N	53	71	153	202	208	394	473	609	439	507	477	648	555
Mumps	N							76	90	85	56	50	56	64
Paratyphoid fever	N	1	1	2	10	7	24	20	25	18	17	24	32	16
Pertussis	N							1022	284	153	1046	4140	1334	1068
Rheumatic fever - initial attack	N	90	97	70	81	98	88	110	93	64	72	135	114	87
Rubella	N							306	80	53	35	26	30	33
Salmonellosis	N	1619	1244	1239	1340	1522	1334	1141	1177	2069	2077	1795	2417	1880
Shigellosis	N	197	152	124	128	185	191	167	117	122	147	115	157	112
Tetanus	N	0	0	8	2	2	2	3	0	2	6	1	4	1
Tuberculosis disease	N	348	335	327	323	352	391	352	323	365	446	354	368	380
Typhoid fever	N	7	9	11	14	24	21	15	16	31	10	21	27	23
VTEC/STEC infection	N				3	3	6	7	13	48	64	67	76	73
Yersiniosis	N							330	488	546	503	396	429	472

[a] Table is continued on the following page.

[b] Source: notification (N), laboratory (L), sentinel isolates (S).

[c] Cases of acute gastroenteritis from a common source or foodborne intoxication, eg, staphylococcal intoxication.

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

Table 34. Number of notifiable disease cases by year and source, 2003–2015 [a] (continued)

Disease	Source[b]	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
AIDS	N	33	38	49	29	31	48	28	39	24	20	25	19	9
Campylobacteriosis	N	14788	12215	13836	15873	12778	6694	7177	7346	6686	7016	6837	6782	6218
Cholera	N	1	2	0	0	1	0	0	2	0	0	0	0	0
Creutzfeldt-Jakob	N	6	8	3	5	8	5	8	5	4	9	6	6	6
Cryptosporidiosis	N	817	611	888	737	924	764	854	954	610	877	1348	584	696
Dengue fever	N	55	8	11	19	114	113	139	50	42	76	106	179	125
Gastroenteritis [c]	N	1030	1362	560	938	625	687	713	502	570	765	558	774	503
Giardiasis	N	1570	1514	1231	1214	1402	1660	1639	1985	1934	1714	1729	1709	1510
Haemophilus influenzae type b	N	12	4	7	9	15	9	10	8	8	4	2	5	3
	L	9	3	6	8	13	4	8	8	8	4	2	2	2
Hepatitis A	N	70	49	51	123	42	89	44	46	26	82	91	74	47
Hepatitis B [d]	N	61	38	59	61	72	37	55	51	51	39	28	35	34
Hepatitis C [d]	N	40	24	29	35	30	22	32	16	26	31	36	29	35
Hydatid disease	N	0	1	2	0	6	7	2	4	6	1	7	4	4
Legionellosis	N	77	62	85	52	64	73	74	173	158	149	151	123	254
	L	82	75	83	54	72	74	77	178	160	152	150	135	251
Leprosy	N	4	3	2	4	8	5	3	3	1	2	7	4	5
Leptospirosis	N	113	102	85	87	66	118	69	81	68	108	60	56	63
	L	149	113	109	66	40	73	49	58	45	78	46	40	45
Listeriosis	N	24	26	20	19	26	27	28	23	26	25	19	25	26
Malaria	N	46	33	32	30	25	40	50	44	52	38	47	33	38
Measles	N	66	32	18	18	24	12	248	48	596	68	8	280	10
Meningococcal	N	542	343	226	160	104	122	132	97	119	85	68	45	64
Mumps	N	56	45	61	47	73	76	63	41	51	26	23	18	13
Paratyphoid fever	N	18	28	25	23	23	25	25	19	13	22	25	19	34
Pertussis	N	585	3485	2719	1120	332	417	1398	872	1996	5897	3540	1099	1168
Rheumatic fever - initial attack	N	148	75	76	106	135	140	126	153	155	163	191	179	105
Rubella	N	26	23	13	7	10	9	4	4	22	4	1	4	0
Salmonellosis	N	1401	1081	1382	1335	1275	1339	1128	1146	1055	1081	1143	956	1051
Shigellosis	N	87	140	183	102	129	113	119	104	101	131	137	128	111
Tetanus	N	2	1	1	1	1	0	1	7	0	2	1	0	1
Tuberculosis disease	N	422	372	330	350	283	293	298	304	306	293	274	302	300
Typhoid fever	N	20	31	30	42	48	29	34	31	45	44	50	42	43
VTEC/STEC	N	104	89	92	87	100	124	143	138	153	147	205	187	330
Yersiniosis	N	436	407	383	453	502	508	430	406	513	514	483	681	634

[a] Table is continued from the previous page.

[b] Source: notification (N), laboratory isolate received at ESR (L), sentinel isolates (S).

[c] Cases of acute gastroenteritis from a common source or foodborne intoxication, eg, staphylococcal intoxication.

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

Table 35. Meningococcal disease strain group distribution by year, 2011–2015

	2011	2012	2013	2014	2015
Group B	**62**	**43**	**30**	**26**	**41**
B:P1.7-2,4	37	15	11	13	10
Other group B	25	28	19	13	31
Group C	**32**	**23**	**17**	**6**	**6**
C:P1.5-1,10-8	27	18	15	5	3
Other group C	**5**	**5**	**2**	**1**	**3**
Other	**6**	**2**	**10**	**4**	**12**
Group W	2	0	5	0	6
Group Y	3	2	4	3	6
Group 29E	0	0	0	1	0
Non-groupable	1	0	1	0	0
Total	**100**	**68**	**57**	**36**	**59**

Table 36. Number of laboratory-reported cases of salmonellosis for selected *Salmonella* serotypes and phage types, 2011–2015

Serotype[a]	2011	2012	2013	2014	2015
S. Typhimurium	**495**	**459**	**481**	**392**	**447**
1	54	35	30	22	38
12a	28	26	15	20	18
56 variant[b]	73	73	122	72	96
101	50	26	26	41	56
135	46	44	48	35	64
156	29	21	17	9	27
160	66	58	69	27	9
Other phage types or unidentified	149	176	154	166	139
S. Enteritidis	**134**	**125**	**137**	**116**	**110**
1b	8	9	14	5	4
11[c]	58	52	27	39	45
Other phage types or unidentified	68	64	96	72	61
Other serotypes	**410**	**460**	**523**	**450**	**496**
S. Agona	20	11	11	15	12
S. Bovismorbificans	3	8	8	4	23
S. Brandenburg	34	34	52	35	52
S. Infantis	65	52	70	56	52
S. Mississippi	13	12	20	21	16
S. Montevideo	1	26	11	7	3
S. Saintpaul	31	27	43	26	37
S. Stanley	28	22	31	34	25
S. Thompson	7	2	16	5	32
S. Virchow	18	17	15	5	16
S. Weltevreden	16	24	28	31	18
S. enterica (I) ser. 4,[5],12 : i : -	21	38	27	27	22
Other serotypes or unidentified	154	187	191	184	188
Total	**1039**	**1044**	**1141**	**958**	**1053**

[a] Excludes *S.* Paratyphi and *S.* Typhi.

[b] Before 2013, *S.* Typhimurium phage type 56 variant was known as *S.* Typhimurium RDNC-May 06.

[c] Before 2012, *S.* Enteritidis phage type 11 was known as a 9a. Further typing was performed on isolates previously confirmed as *S.* Enteritidis phage type 9a. However, typing results revealed that some isolates previously reported as *S.* Enteritidis phage type 9a were phage type 11.

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ACRONYMS AND ABBREVIATIONS

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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
CSF	Cerebrospinal fluid
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
IPD	Invasive pneumococcal disease
IPV	Inactivated polio vaccine
MAT	Microscopic agglutination titre
MELAA	Middle Eastern/Latin American/African
MeNZB™	Meningococcal B outer membrane vesicle vaccine
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
PHS	Public health service
RDNC	Reacts but does not conform to a known phage type pattern
SARS	Severe acute respiratory syndrome
sg	Serogroup
STEC	Shiga toxin-producing *Escherichia coli*
Tdap	Tetanus, diphtheria and acellular pertussis vaccine
VTEC	Verotoxin-producing *Escherichia coli*
WHO	World Health Organization
23PPV	23-valent pneumococcal polysaccharide vaccine


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