ESR

SURVEILLANCE REPORT

Notifiable and other diseases in New Zealand

Annual Report 2013

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

SUMMARY

A summary of the key trends in notifiable and other communicable diseases of public health importance in New Zealand is presented here.

Mixed trends for 2013

A total of 17 711 notifiable disease cases were notified through EpiSurv, New Zealand's notifiable disease database in 2013, compared with 19 932 in 2012. During 2013 there was one change to the notifiable disease schedule under the Health Act 1956: the addition of Middle East respiratory syndrome (MERS) in September.

From 2012 to 2013, there were decreases in the rates of most vaccine-preventable diseases, in particular measles and pertussis. There were mixed trends among the enteric diseases, with increases in the rates of cryptosporidiosis and VTEC/STEC infection, and decreases in campylobacteriosis and acute gastroenteritis. There was a significant increase in the notification rate for dengue fever, while the notification rate for leptospirosis was down significantly from 2012.

Table 1 provides a summary of notifiable disease numbers and rates in 2013 and 2012, including an indication of the significant changes over this period.

Increases in some enteric disease rates

There were increases in both cryptosporidiosis and VTEC/STEC infection from 2012 to 2013, with 1348 cases of cryptosporidiosis notified in 2013 (30.1 per 100 000). This is an increase from the 877 cases in 2012 (19.8 per 100 000), as well as the highest annual total since cryptosporidiosis was made notifiable in 1996. A high autumn peak in notified cases was observed in 2013 in addition to the usual spring peak. There were 98 outbreaks of *Cryptosporidium* spp. involving 547 cases reported during 2013 (compared to 47 outbreaks involving 164 cases in 2012). VTEC/STEC infection rates increased from 3.3 per 100 000 (147 cases) in 2012 to 4.6 per 100 000 (207 cases) in 2013. A high autumn peak was also observed for VTEC/STEC infection.

Campylobacteriosis accounted for 38.6% of all notifications in 2013 (6837 cases), despite a significant decrease in the 2013 rate (152.9 per 100 000) compared with the 2012 rate (158.3 per 100 000, 7016 cases). The total number of campylobacteriosis cases for 2013 was less than half the number of cases seen during the peak in 2006 (15 873 cases).

A decrease in notified cases was also observed for acute gastroenteritis, from 735 in 2012 (16.6 per 100 000) to 558 in 2013 (12.5 per 100 000).

Vaccine-preventable disease rates decrease

There were decreases in the notification rates for the following vaccine-preventable diseases: invasive pneumococcal disease, measles, meningococcal disease, mumps and pertussis. In particular, measles and pertussis rates decreased significantly from 2012 to 2013. Eight cases of measles (including three laboratory-confirmed cases) were notified during 2013, compared with 68 cases in 2012. The 2013 notification rate for pertussis remains high (79.2 per 100 000, 3539 cases) but has decreased significantly since 2012 (133.0 per 100 000, 5898 cases). Pertussis was the second most commonly reported notifiable disease after campylobacteriosis.

Exotic diseases

There was a significant increase in the notification rate for dengue fever in 2013 (2.4 per 100 000, 106 cases) compared with 2012 (1.7 per 100 000, 76 cases). All cases had a history of overseas travel prior to infection.

All cases of chikungunya fever, Ross River virus, cysticercosis and taeniasis notified in 2013 had an overseas exposure prior to infection.

Four cases of murine typhus (a rickettsial disease) were reported in 2013 and three of these cases had acquired the infection locally.

Seven cases of hydatid disease were reported in 2013 compared with one case in 2012. Two cases had acquired the infection overseas, four cases had evidence of a past infection and for one case the source of infection had not yet been established.

Eleven cases of leprosy were notified during 2013 compared to two cases in 2012. Nine cases had a known history of overseas travel prior to infection.

Influenza rates were low during 2013

Influenza is a common cause of winter illness in New Zealand and is currently monitored through sentinel surveillance of general practices. Influenza activity was relatively low compared with previous years and remained below the baseline level throughout the surveillance period (May to September 2013). The average weekly consultation rate was 22.6 per 100 000 patient population, lower than the 2012 rate of 50.2 per 100 000. The peak weekly consultation rate of 47.3 per 100 000 occurred in mid-September and was much lower than the 2012 peak (154.1 per 100 000).

Of the 2326 influenza viruses identified in 2013, the most commonly identified viruses were influenza A viruses (60.4%, 1405 viruses), with influenza B accounting for the remaining viruses (39.6%, 921

viruses). Influenza A(H3N2) accounted for 36.3% (845/2326) of all viruses and influenza A(H1N1) for 12.9% (300/2326). All of the influenza A(H1N1) viruses were of the pandemic strain A(H1N1)pdm09.

No cases of non-seasonal influenza were notified to Episurv in 2013.

Cases of the highly pathogenic avian influenza A(H5N1) and avian influenza A(H7N9) continued to be reported in both humans and birds overseas, but no cases have been reported in New Zealand.

Sexually transmitted infections

In New Zealand, sexually transmitted infections (with the exception of AIDS) are not notifiable and their surveillance relies on the voluntary provision of data from sexual health clinics (SHCs), family planning clinics (FPCs) and laboratories.

In 2013, chlamydia was the most commonly diagnosed sexually transmitted infection. There were 30 346 positive tests for chlamydia from 28 316 patients, giving a national rate of 633 per 100 000 for laboratory-confirmed chlamydia. This rate is more than four times higher than the most commonly reported notifiable disease, campylobacteriosis. The highest rates of chlamydia were reported for the following District Health Boards (DHBs): Tairawhiti, Lakes and Hawke's Bay (1465, 1217 and 850 per 100 000 respectively).

There were 4590 positive tests for gonorrhoea from 3344 patients, giving a national rate of 78 per 100 000. The introduction of nucleic acid amplification testing for gonorrhoea in late 2011 and 2012 has led to increased testing and detection of this disease. The highest rates of gonorrhoea were reported for Tairawhiti, Hawke's Bay and Lakes DHBs (400, 156 and 141 per 100 000 respectively).

In 2013, SHCs and FPCs reported a total of 2102 first presentations of genital warts. Compared with 3826 cases in 2009, this represents a significant decrease (45.1%) since the human papillomavirus (HPV) immunisation programme began in 2008.

There was no change in the number of infectious syphilis cases reported by SHCs between 2012 and 2013 (80 cases). Only three cases were reported by FPCs in 2013.

In 2013, 25 cases of acquired immune deficiency syndrome (AIDS) were notified to the AIDS Epidemiology Group, compared with 20 cases in 2012.

Outbreaks

In 2013, there was a decrease in the number of reported outbreaks and associated cases (652 outbreaks, 7137 cases) compared with 2012 (719 outbreaks, 10 500 cases) but the figures were similar to 2011 (581 outbreaks, 7796 cases). Over the 10-year period from 2004 to 2013, there has been an increasing trend in the number of outbreaks reported.

The most common pathogens implicated in outbreaks in 2013 were norovirus (169 outbreaks, 3685 cases), *Cryptosporidium* spp. (98 outbreaks, 547 cases) and *Giardia* spp. (78 outbreaks, 333 cases). Five outbreaks (85 cases) involved both *Cryptosporidium* spp. and *Giardia* spp.

More than 80% of outbreaks reported in 2013 had person-to-person transmission recorded as a mode of transmission. The most common exposure settings were private homes (231 outbreaks, 782 cases) and long-term care facilities (145 outbreaks, 3133 cases).

Antimicrobial resistance

Antimicrobial resistance is an increasingly important public health issue. A summary of key trends in antimicrobial resistance in New Zealand for the period 2003–2012 is presented in this report.

The prevalence of methicillin resistance among *Staphylococcus aureus* has increased slowly over the last 10 years to just over 10% of isolates tested.

Penicillin resistance among *Streptococcus pneumoniae* has remained relatively stable over the last 10 years, while the prevalence of cefotaxime resistance has decreased from 11.5% for 2003–2005 to 7.6% in 2012.

Levels of co-amoxiclav and nitrofurantoin resistance among urinary *Escherichia coli* have remained stable over the past 10 years, but there was an increase in trimethoprim and fluoroquinolone resistance.

There is an increasing prevalence of extended-spectrum β-lactamases in Enterobacteriacae, especially among *Klebsiella*. Several classes of β-lactamases that inactivate carbapenems have been identified among Enterobacteriacae and *Pseudomonas* in New Zealand since 2009.

Multi-drug resistant tuberculosis remains rare in New Zealand, with the four cases in 2012 accounting for 1.7% of the culture-positive tuberculosis cases.

Table 1. Number of cases and rates per 100 000 population for selected notifiable diseases in New Zealand, 2013 and 2012

Disease	Number of notifications		Rate per 100 000		Change[d,e]
	2013	2012	2013	2012	
AIDS[a]	25	20	0.6	0.5	→
Campylobacteriosis	6837	7016	152.9	158.3	←
Cryptosporidiosis	1348	877	30.1	19.8	➔
Dengue fever	106	76	2.4	1.7	➔
Gastroenteritis (acute)[b]	559	765	12.5	17.2	←
Giardiasis	1729	1714	38.7	38.7	→
Hepatitis A	91	82	2.0	1.8	→
Hepatitis B[c]	28	39	0.6	0.9	←
Hepatitis C[c]	37	31	0.8	0.7	→
Invasive pneumococcal disease	480	489	10.7	11.0	←
Legionellosis	155	150	3.5	3.4	→
Leptospirosis	59	108	1.3	2.4	←
Listeriosis	19	25	0.4	0.6	←
Malaria	47	38	1.1	0.9	→
Measles	8	68	0.2	1.5	←
Meningococcal disease	68	85	1.5	1.9	←
Mumps	23	26	0.5	0.6	←
Paratyphoid fever	25	22	0.6	0.5	→
Pertussis	3539	5898	79.2	133.0	←
Rheumatic fever[f]	205	185	4.6	4.2	→
Salmonellosis	1143	1081	25.6	24.4	→
Shigellosis	137	132	3.1	3.0	→
Tuberculosis disease	278	293	6.2	6.6	←
Typhoid fever	50	44	1.1	1.0	→
VTEC/STEC infection	207	147	4.6	3.3	➔
Yersiniosis	484	514	10.8	11.6	←

[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, - = 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 and Other Diseases in New Zealand: Annual Report 2013* gives an overview of the current state of communicable diseases in New Zealand. The report includes diseases currently notifiable under the Health Act 1956 and the Tuberculosis Act 1948. Other non-notifiable communicable diseases and organisms of public health importance are also included.

The data presented has been derived from a number of 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 for 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 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 2013 and (where data is available) the trends since 1997, with the aim of informing measures for prevention and control.

The report has four main sections:

- notifiable diseases (presented alphabetically)
- non-notifiable diseases (influenza and sexually transmitted infections (STIs))
- summary of disease outbreaks
- summary of antimicrobial resistance.

National data and trends over time can be found 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.

SURVEILLANCE METHODS

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 onset of illness (onset date). Cases are allocated to geographic location based on where the person first consulted a medical practitioner.

Notifiable disease data in this report may differ from those 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, ethnicity and location (usually a DHB).

It should be noted that various factors influence disease notification and therefore the calculation of notifiable disease 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 cases present to health care services 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 health care 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 health care access 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 size of the New Zealand population together with the low number of cases for some diseases means 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 hence control of these diseases in New Zealand.

Notification data is entered at each PHU via a secure web-based portal into a database (EpiSurv). The near real-time data is collated and analysed on behalf of the Ministry of Health by ESR. The data collected depends on the specific disease, but usually includes demography, outcome, basis of diagnosis, risk factors and some clinical management information. Some diseases (eg, measles and yersiniosis) became notifiable only with the revised schedule of notifiable diseases that came into effect on 1 June 1996 [4].

In December 2012 the following changes were made to the schedule of notifiable diseases:

- *Enterobacter sakazakii* was renamed as *Cronobacter* species
- rabies was updated to include other lyssaviruses
- Q fever was added (previously reported under rickettsial diseases)
- verotoxin- or shiga toxin-producing *Escherichia coli* (VTEC/STEC) was added (previously notified under acute gastroenteritis).

On 6 September 2013 Middle East respiratory syndrome (MERS) was added to the notifiable disease schedule.

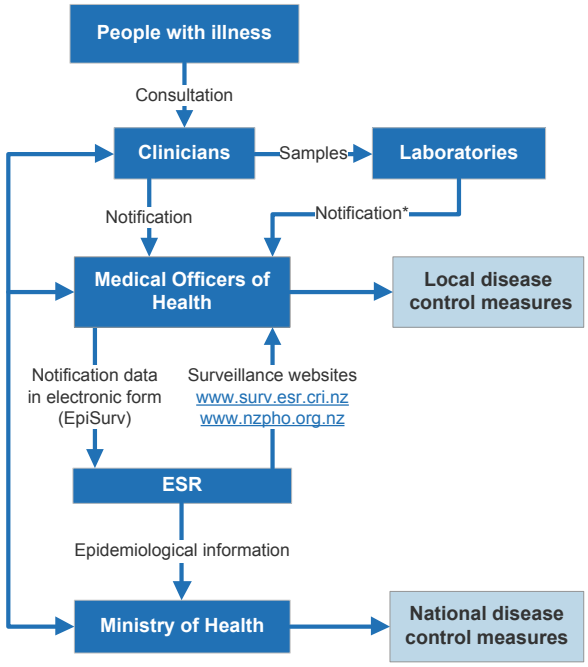
This report includes sections on all the diseases that are currently notifiable in New Zealand under the Health Act 1956 and the Tuberculosis Act 1948. During 2013 responsibility for the collection and reporting of lead absorption, chemical poisoning from the environment and hazardous substance notifications transferred from ESR to Massey University Centre for Public Health Research.

Case definitions (including laboratory and clinical criteria) for notification of diseases and/or conditions can be found in the latest version of the Communicable Disease Control Manual (May 2012) [7] (see www.health.govt.nz for more information).

Information regarding trigger points for notification of a laboratory test result can be found in the document entitled, '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-based surveillance is the collection of laboratory data for public health purposes. Many of the communicable diseases diagnosed by clinical laboratories are either not covered adequately or not covered at all by the notifiable disease surveillance systems; for example, influenza and sexually transmitted infections.

Laboratory-based surveillance is sometimes also conducted to enhance surveillance data gathered by other methods (ie, notifiable disease surveillance). Organisms covered by laboratory-based surveillance include antimicrobial-resistant organisms, legionellae, *Leptospira*, meningococci, respiratory syncytial virus, enteroviruses, adenoviruses, salmonellae and streptococci.

Laboratory results for organisms that meet the laboratory component of the notification criteria (eg, legionellae, *Leptospira*, meningococci, and

salmonellae) are reported directly to the Medical Officers of Health.

For some organisms (eg, *Yersinia*) not all isolates are referred to a reference laboratory for confirmation and typing.

Statistics New Zealand

Denominator data used to calculate the population rates of disease is supplied by Statistics New Zealand. Further details are provided in the section entitled 'Analytical methods'.

Ministry of Health

The Ministry of Health collates national data on patients admitted to and 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). Patients are assigned disease codes using the 10th revision of the International Classification of Diseases (ICD10) coding system [9]. Up to 99 procedure and accident diagnostic codes may be assigned for each admission. The first of these is 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 or while in hospital.

The Ministry of Health also maintains a Mortality Collection, which records a classification for the underlying cause of each death registered in New Zealand. Mortality data is available only up to 2011 due to the extended length of time taken to complete coronial inquires.

Anonymised data for selected diseases was extracted from Ministry of Health databases and sent to ESR for analysis and comparison with data from other surveillance systems.

Hospital admission data presented in this report includes multiple admissions for patients with chronic notifiable diseases (eg, tuberculosis) or for diseases that have long-term health impacts (eg, meningococcal disease). 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.

Outbreak surveillance

In July 1996 ESR introduced an outbreak surveillance system and has been systematically refining this system since then [10]. The surveillance system has operated electronically since mid-1997 as an additional module of EpiSurv. Unlike the other surveillance systems described above, this system collects data from PHUs on disease outbreaks, rather than individual cases.

Influenza sentinel surveillance system

An influenza sentinel surveillance system, which in inter-pandemic times operates from May to September, gathers data on the incidence and distribution of influenza [11]. In 2013, surveillance data was collected between May and October from a network of 70 general practices/practitioners from 18 DHBs in New Zealand (not including Auckland and Counties Manukau). The number of practices in each DHB is approximately proportional to the size of each DHB's population. Participating general practitioners (GPs) are asked to record the number of consultations for influenza-like illness (ILI) each week (using a standardised case definition) by age group. Each practice is also requested to collect nasopharyngeal swabs from up to three patients per week. The swabs are sent to laboratories for viral isolation and strain identification.

Sexually transmitted infection surveillance system

With the exception of acquired immunodeficiency syndrome (AIDS), the late sequelae of human immunodeficiency virus infection and hepatitis B, sexually transmitted infections are not notifiable in New Zealand. Therefore, surveillance efforts rely upon clinics and laboratories voluntarily providing data. Data on STIs of public health importance (chlamydia, gonorrhoea, genital herpes, genital warts, syphilis and non-specific urethritis (NSU)) are submitted by sexual health clinics (SHCs) and family planning clinics (FPCs). Twenty-seven SHCs and 32 FPCs provided surveillance data in 2013. This information was supplemented by data on chlamydia and gonorrhoea from diagnostic laboratories. Forty-three laboratories across all 20 DHBs provided data for at least part of the year in 2013.

Improvements to STI data collection and analysis methods since January 2013 have produced new estimates of national and DHB population rates. These improvements allow for the exclusion of repeat tests for an individual within a defined episode period (eg, 42 days for chlamydia tests) and extend coverage for chlamydia to all DHBs in New Zealand, and for gonorrhoea, to all DHBs except Northland.

For laboratory data, the DHB denominator is derived from the 2013 mid-year population estimates for territorial authorities in New Zealand published by Statistics New Zealand. For clinics, only the total number of confirmed cases is reported and rates are not calculated.

The number of cases of STIs reported through the clinic-based surveillance system underestimates the true burden of disease in New Zealand because a substantial percentage of STIs are diagnosed by

other health providers, particularly GPs. Laboratories receive specimens from all health providers and so are useful sources of STI incidence data. In DHBs with both clinic and laboratory-based surveillance, the number of chlamydia and gonorrhoea cases reported by laboratories is approximately three to four times higher than the number of cases reported by clinics.

Antibiotic Reference Laboratory at ESR

The Antibiotic Reference Laboratory at ESR is responsible for the national surveillance of antimicrobial resistance among human pathogens. Data from various surveillance systems and sources are used to compile national antimicrobial resistance data. These sources include routine diagnostic susceptibility testing in hospital and community laboratories, bacterial isolates referred to ESR for further investigation (eg, epidemiological typing) and periodic point-prevalence surveys of antimicrobial susceptibility for a specific organism using a purpose-collected sample of isolates from throughout the country. See www.surv.esr.cri.nz/antimicrobial/antimicrobial_resistance.php for more information about the surveillance of antimicrobial resistance.

Surveillance of AIDS in New Zealand

Since 1989, the AIDS Epidemiology Group (AEG) in Dunedin has been contracted to collect information about people diagnosed with AIDS through notification to Medical Officers of Health. Coding 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) [12] was established in 1997 initially to provide active surveillance of acute flaccid paralysis (AFP) to fulfil World Health Organization (WHO) requirements for the certification of polio eradication. Along with AFP, the conditions currently under surveillance for children aged 15 years and under by the NZPSU include haemolytic uraemic syndrome (HUS), congenital rubella syndrome (CRS) and perinatal exposure to human immunodeficiency virus (HIV) (see http://dnmeds.otago.ac.nz/departments/womens/paediatrics/research/nzpsu/index.html 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 over 90%. The data is then collated and analysed by the NZPSU. Information from the NZPSU is used in this report to enhance notification data on polio, verotoxin- or shiga toxin- producing *Escherichia coli* infection (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 11 February 2014. Changes made to EpiSurv data by PHU staff after this date will not be reflected in this report. Consequently, future analyses of data may produce revised results. Notification data from 1997 to 2012 has been updated to reflect cases in EpiSurv as at 11 February 2014.

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 DHBs where data was available and for PHUs where the data cannot be presented by DHB.

The DHB populations used are presented in Table 2. These are estimated from the Statistics New Zealand mid-year population estimates for territorial authorities in New Zealand.

Table 2. District Health Board populations, 2013

DHB	Population
Northland	158 750
Waitemata	562 200
Auckland	467 900
Counties Manukau	515 600
Waikato	372 778
Lakes	103 000
Bay of Plenty	212 920
Tairawhiti	46 700
Taranaki	110 700
Hawke's Bay	155 460
Whanganui	62 402
MidCentral	169 678
Hutt Valley	143 900
Capital & Coast	299 922
Wairarapa	40 660
Nelson Marlborough	141 300
West Coast	32 650
Canterbury	507 420
South Canterbury	57 010
Southern	309 800
Total	**4 470 750**

Map classification scheme

On the maps, 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 to calculate a rate (fewer than five cases).

Case status for notifications

All notifications recorded in EpiSurv that meet the case definitions [7] 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 have been included in this report. Any changes will be reflected in future surveillance reports.

Population rate calculations for diseases

The denominator data used to determine all disease rates (except the data used to determine disease rates for ethnic groups), has been derived from the 2013 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 estimated resident 2013 Census population applied to the 2013 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 have not been calculated where there are fewer than five notified cases in any category. Calculating population rates from fewer than five cases produces unstable rates.

Percentages

Percentages are calculated using total number of cases for which the information was recorded as the denominator, unless specified otherwise. These percentages are usually presented with numbers in brackets showing 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 imply 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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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 2013 [13].

Sensitivity

Sensitivity was assessed in 2003 using reporting on meningococcal disease [14]. This showed that the sensitivity of meningococcal disease surveillance is probably in excess of 87%.

An assessment of the ascertainment of pertussis cases aged less than one year in 2006 found that under-identification, estimated using capture-recapture analysis, was modest for both active surveillance (16%) and passive notification (19%) [15].

The sensitivity of surveillance for other diseases will often be less than that of meningococcal disease and pertussis, particularly for common enteric diseases where only a small proportion of those infected present to health care services. An acute gastrointestinal illness study conducted during 2005–2007 estimated that only 0.4% of community cases result in a notification [16]. Due to long latency periods, the system is less sensitive for the surveillance of conditions resulting from longer-term environmental exposure.

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 key EpiSurv variables each year from 2004 to 2013.

The completeness of date of birth, age and sex data is generally very high (>98%), with little variation over the last five years. In 2013, the completeness of date of birth and age data remained high (≥99%). Sex was completed for 100% of cases. The completeness of ethnicity data in 2013 (94.7%) was similar to that of 2012 (95.0%).

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

Significant progress has been made over the past five years and a high percentage of EpiSurv records (>90% over the last five years) now have an NHI recorded. In 2013, 97.4% of notifications had NHI recorded. 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. Data completeness by EpiSurv variable and year, 2004–2013

Report year	Completeness of data (%)				
	Date of birth	Age	Sex	Ethnicity	NHI
2004	98.7	99.1	98.3	82.0	51.5
2005	98.7	99.0	98.2	81.6	64.3
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

Accuracy

Reliable population denominator data is available except for STI and ethnic group populations. For STIs, the population has been estimated based on the location of the laboratory that collects the samples for testing. Population data for ethnic groups has been estimated by applying the proportion of people in each ethnic group from the estimated resident 2013 census population to the 2013 mid-year population estimates from Statistics New Zealand.

Another 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 2013.

In 2013, 66.5% of disease notifications had an onset date recorded (66.8% in 2012). Of these, 31.6% were reported to a public health service (PHS) within one week of the onset of symptoms and 68.8% were reported within two weeks of the onset of symptoms.

In 2013, 74.8% of the notifications were entered into EpiSurv within a day of being reported to a PHS, 98.7% were entered within one week and 99.4% were entered within two weeks of being reported to a PHS.

Table 4. Timeliness of disease reporting and data entry for notifiable diseases, 2013

Disease	Onset date recorded (%)	Reporting delay[a]		Entry delay[b]		
		≤1 week	≤2 weeks	≤1 day	≤1 week	≤2 weeks
Campylobacteriosis	60.2	42.5	90.6	80.5	98.9	99.8
Cryptosporidiosis	75.4	27.8	76.6	80.7	99.5	99.8
Dengue fever	75.5	8.8	60.0	74.5	99.1	100.0
Gastroenteritis[c]	81.4	76.2	91.2	59.9	90.9	93.2
Giardiasis	52.3	20.3	52.4	83.3	99.4	99.8
Hepatitis A	76.9	25.7	65.7	75.8	98.9	98.9
Invasive pneumococcal disease	69.6	52.1	81.4	50.4	98.8	99.6
Legionellosis	89.7	18.7	52.5	53.5	100.0	100.0
Leptospirosis	93.2	16.4	49.1	28.8	100.0	100.0
Meningococcal disease	97.1	93.9	98.5	64.7	100.0	100.0
Pertussis	81.1	15.4	39.9	64.0	99.1	99.4
Rheumatic fever	86.3	14.1	39.5	81.0	91.2	92.7
Salmonellosis	60.2	31.0	78.1	78.0	99.0	99.6
Shigellosis	40.9	21.4	75.0	75.2	100.0	100.0
Tuberculosis disease	67.3	4.8	9.6	69.4	98.6	99.6
VTEC/STEC infection	73.4	46.7	78.9	75.8	99.5	100.0
Yersiniosis	49.2	11.8	55.9	77.3	99.4	99.8
Other	59.2	39.4	64.7	67.6	97.9	99.3
Total	**66.5**	**31.6**	**68.8**	**74.8**	**98.7**	**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

NOTIFIABLE DISEASES

Acquired immunodeficiency syndrome

Acquired immunodeficiency syndrome (AIDS), but not human immunodeficiency virus (HIV) infection, is a notifiable disease in New Zealand. The AIDS Epidemiology Group (AEG) carries out national AIDS/HIV surveillance and their data is reported here [1]. More detailed information is available from the AEG website: http://dnmeds.otago.ac.nz/departments/psm/research/aids/newsletters.html.

In 2013, 25 cases of AIDS were reported to the AEG compared with 20 cases in 2012. The 2013 AIDS notification rate (0.6 per 100 000) was slightly higher than the 2012 rate (0.5 per 100 000).

Thirteen cases (52.0%) were men who were infected through sex with other men, nine (36.0%) were infected through heterosexual contact (6 men and 3 women) and the mode of infection was unknown for three cases (12.0%).

The 2013 cases were distributed by ethnic group as follows: European or Other (13 cases), Māori (4 cases), Pacific Peoples (1 case), Middle Eastern/Latin American/African (MELAA) (6 cases) and unknown (1 case). The cases ranged from 25 to 78 years of age with a mean age of 48.4 years.

Six deaths due to AIDS were reported to the AEG as having occurred in 2013. However, the number of deaths is likely to increase due to late notifications.

Anthrax

No cases of anthrax were notified in New Zealand in 2013. The last fatal case of human anthrax in New Zealand occurred in 1903. Eleven cases have been notified since anthrax was first made a notifiable disease in 1919 with the last case reported in 1940. New Zealand has been considered free of anthrax since the last recorded outbreak among domestic livestock in 1954 [17].

Arboviral diseases

This section includes arboviral diseases with cases notified since 1997. See individual disease sections entitled 'Dengue fever' and 'Yellow fever' for details regarding those diseases.

Barmah Forest virus

No cases of Barmah Forest virus infection were notified in 2013. 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 overseas travel during the incubation period for this disease.

Chikungunya fever

One laboratory-confirmed case of Chikungunya fever was notified in 2013. This case was female, in the 40–49 years age group, and had been in Indonesia during the incubation period for the disease. Since 1997, five cases have been notified, one case each year in 2007, 2008, 2009, 2011 and 2013. All five cases reported overseas travel during the incubation period for this disease.

Japanese encephalitis

No cases of Japanese encephalitis were notified in 2013. Since 1997, only one case of Japanese encephalitis has been notified (2004). The case was overseas during the incubation period for this disease.

Ross River virus

Three laboratory-confirmed cases of Ross River virus infection were notified in 2013 compared with one case in 2012. Age and sex were recorded for all cases. All three cases were male and were aged in the 30–39 years, 50–59 years and 60–69 years age groups. All of the cases recorded travel to Australia during the incubation period for this disease.

Botulism

There have been no cases of botulism in humans notified in New Zealand since two cases were reported in 1985 [18].

Brucellosis

One case of brucellosis was notified in New Zealand in 2013. The laboratory-confirmed case was a male aged 50–59 years who had previously lived in Tonga. Since 1997, 14 cases of brucellosis have been notified. There has been no evidence of locally acquired brucellosis in humans since the declaration of freedom from the disease in cattle in New Zealand in 1996 [19].

Campylobacteriosis

There were 6837 cases of campylobacteriosis notified in 2013. The 2013 rate of 152.9 per 100 000 was a significant decrease from the 2012 rate of 158.3 per 100 000 (7016 cases). Since 2006, there has been a significant decrease in the number of cases reported compared with the preceding decade (Figure 2). Campylobacteriosis continues to be the most commonly notified disease comprising 38.6% of all notifications in 2013.

The notification pattern in 2013 was similar to previous years – highly seasonal with a summer peak and a winter trough (Figure 3). The lowest monthly campylobacteriosis total was in April 2013 (324

notifications) and the highest monthly total was in December 2013 (899 notifications).

Figure 2. Campylobacteriosis notifications by year, 1997–2013

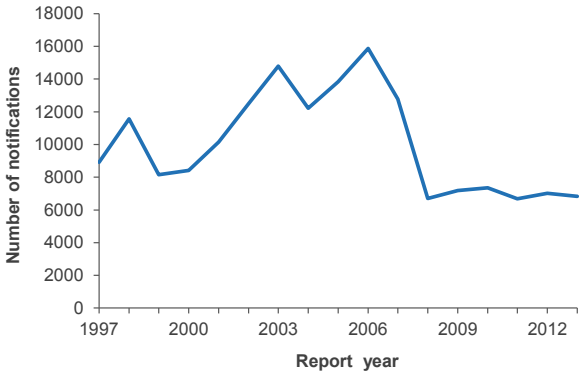
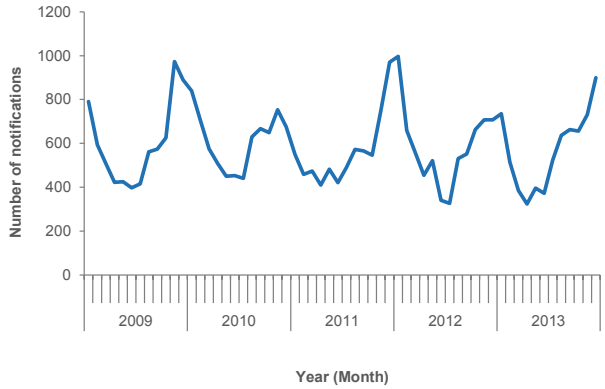


Figure 3. Campylobacteriosis notifications by month, January 2009–December 2013



In 2013, the highest notification rates for campylobacteriosis were for people living in South Canterbury, Hawke's Bay, Taranaki, West Coast and Waikato DHBs (292.9, 216.1, 213.2, 211.3 and 207.6 per 100 000 respectively) (Figure 4).

Children aged less than 1 year (230.5 per 100 000) and 1–4 years (281.7 per 100 000) had the highest notification rates compared with other age groups.

Males (174.1 per 100 000) had a higher rate than females (132.3 per 100 000).

The European and Other ethnic group (180.5 per 100 000) had a high notification rate for campylobacteriosis compared with other ethnic groups (Māori, 80.2 per 100 000 and Pacific Peoples, 53.2 per 100 000). Further information by DHB, sex, age and ethnicity can be found in Tables 44 to 47 in the Appendix.

Hospitalisation status was recorded for 4236 (62.0%) cases, of which 455 (10.7%) cases were hospitalised. One death due to campylobacteriosis was recorded in EpiSurv in 2013.

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

In 2013, 40 outbreaks of campylobacteriosis were reported involving 170 cases. Nine outbreaks involved more than one implicated pathogen.

Figure 4. Campylobacteriosis notifications by DHB, 2013

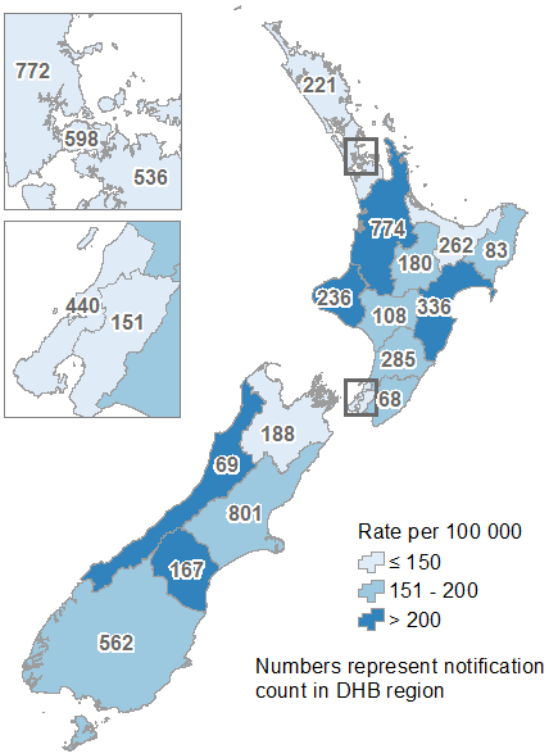


Table 5. Exposure to risk factors associated with campylobacteriosis, 2013

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Consumed food from retail premises	1034	1324	4479	43.9
Contact with farm animals	1109	1546	4182	41.8
Consumed untreated water	579	1645	4613	26.0
Contact with faecal matter	447	1941	4449	18.7
Recreational water contact	360	2074	4403	14.8
Contact with other symptomatic people	287	2148	4402	11.8
Contact with sick animals	180	2097	4560	7.9
Travelled overseas during the incubation period	212	2836	3789	7.0

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

Cholera

No cases of cholera were notified in New Zealand in 2013. Since 1997, a total of 12 laboratory-confirmed cases of cholera have been notified, all of which were acquired overseas.

Creutzfeldt-Jakob disease

The National Creutzfeldt-Jakob Disease Registry was established in 1996 to monitor sporadic, familial, iatrogenic and variant CJD. This section is based on the 17th annual report of the Registry [20]. In 2013, six cases of possible sporadic CJD (sCJD) were referred to the Registry.

Of these cases, three were classified as definite and three as probable sCJD, based on clinical, cerebrospinal fluid, electroencephalogram, magnetic resonance imaging and/or post mortem examination findings. The age distribution of the cases was as follows: 60–69 years (1 case), 70–79 years (2 cases), 80–89 years (2 cases) and 90+ years (1 case). Four of the cases were male and two were female.

Since 1997, the Registry has documented 71 cases of CJD, including 20 definite and 51 probable cases. No cases of variant CJD, the form linked with bovine spongiform encephalopathy, have ever been identified in New Zealand. The incidence of probable CJD cases in 2013 was slightly higher than expected (1 per 1 million). However, a temporal cluster of cases can be expected given New Zealand's small population. This has been noted previously, when 11 cases of CJD were reported in 2009.

Cronobacter species invasive disease

Cronobacter species invasive disease (formerly known as *Enterobacter sakazakii*) has been notifiable in New Zealand since mid-2005. One case of *Cronobacter* species invasive disease was notified in New Zealand in 2013. The case was a male in the 30–39 years age group with a chronic illness. The source of infection was suspected environmental contamination of a peripherally inserted central catheter line. This case brings the total number of cases notified since 2005 to five.

Cryptosporidiosis

During 2013, 1348 cases of cryptosporidiosis were notified (30.1 per 100 000), which was a significant increase from the 877 cases notified in 2012 (19.8 per 100 000) (Figure 5). This is the highest annual total since cryptosporidiosis became notifiable in 1996.

Figure 5. Cryptosporidiosis notifications by year, 1997–2013

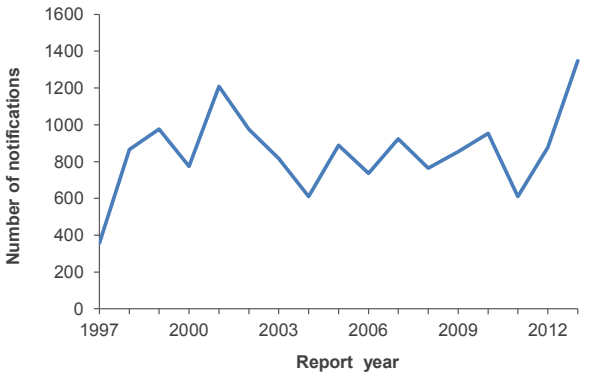


Figure 6 shows cryptosporidiosis cases by month since 2009. There is a distinct seasonal pattern with the highest number of notifications reported during spring each year and an additional smaller peak in autumn. However, the 2013 autumn peak is much larger than in previous years.

Figure 6. Cryptosporidiosis notifications by month, January 2009–December 2013

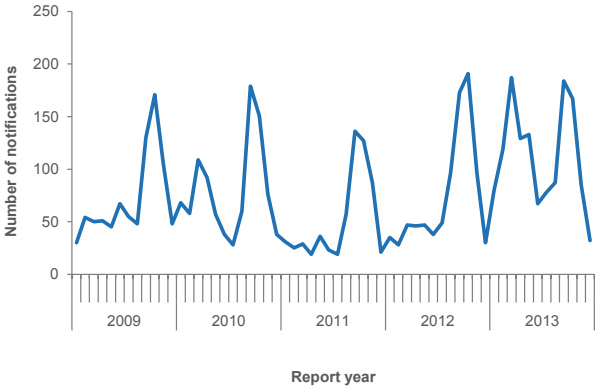


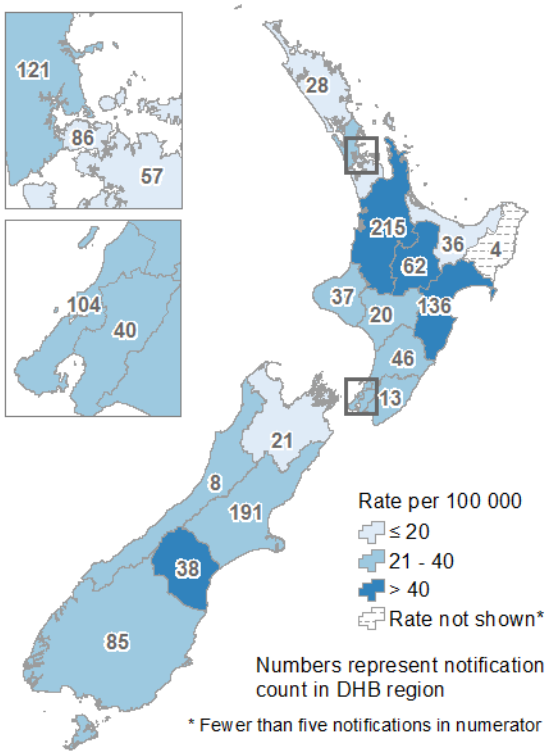
Table 6. Exposure to risk factors associated with cryptosporidiosis, 2013

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Recreational water contact	385	472	491	44.9
Contact with farm animals	395	499	454	44.2
Contact with other symptomatic people	296	519	533	36.3
Contact with faecal matter	288	510	550	36.1
Consumed food from retail premises	267	519	562	34.0
Consumed untreated water	232	531	585	30.4
Contact with sick animals	101	686	561	12.8
Travelled overseas during the incubation period	81	877	390	8.5

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

In 2013, the highest notification rates for cryptosporidiosis were reported in Hawke's Bay, South Canterbury, Lakes and Waikato DHBs (87.5, 66.7, 60.2 and 57.7 per 100 000 respectively) (Figure 7).

Figure 7. Cryptosporidiosis notifications by DHB, 2013



Children aged 1–4 years (168.7 per 100 000) and less than 1 year (65.1 per 100 000) had the highest notification rates compared with other age groups. More than half (53.6%) of all cases were children aged less than 15 years.

Females (32.1 per 100 000) had a slightly higher rate than males (28.1 per 100 000).

The European and Other ethnic group (35.4 per 100 000) had a high notification rate for cryptosporidiosis compared with other ethnic groups (Māori, 23.5 per 100 000 and Pacific Peoples, 12.7 per 100 000).

Further information by DHB, sex, age and ethnicity can be found in Tables 44 to 47 in the Appendix.

Hospitalisation status was recorded for 1034 cases (76.7%), of which 61 (5.9%) cases were hospitalised.

Recreational contact with water and contact with farm animals were the most common risk factors associated with cryptosporidiosis cases in 2013 (Table 6).

In 2013, 98 outbreaks of cryptosporidiosis were reported, involving 547 cases. Seven of these outbreaks involved more than one implicated pathogen. During 2012 there were fewer outbreaks of cryptosporidiosis (47 outbreaks involving 164 cases).

Cysticercosis

One case of cysticercosis was notified in New Zealand in 2013. The case was a female in the 20–29 year age group who was in Nepal during the incubation period. Since 1997, six cysticercosis cases have been reported, three cases in 2005, two cases in 2007 and one in 2013.

Ministry of Health data for 2013 recorded two hospitalisations with cysticercosis as the principal diagnosis.

Decompression sickness

There were two cases of decompression sickness notified in 2013. Both cases were male, aged between 20–39 years and from Waitemata DHB. The cases were both diving-related.

Ministry of Health hospitalisation data for 2013 recorded 42 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 23 in 2010 to 42 in 2013, indicating consistent under-notification of this condition.

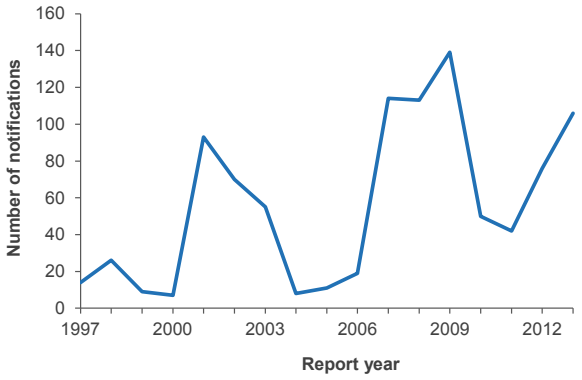
Dengue fever

In 2013, 106 cases of dengue fever were notified compared with 76 cases in 2012 (Figure 8). The 2013 notification rate (2.4 per 100 000) was a significant increase from the 2012 rate (1.7 per 100 000).

Adults aged between 30–39 years and 20–29 years had the highest notification rates (4.5 and 3.1 per 100 000 respectively).

Males (3.0 per 100 000) had a higher rate than females (1.7 per 100 000).

Figure 8. Dengue fever notifications by year, 1997–2013



The Asian ethnic group (4.7 per 100 000) had a higher notification rate for dengue fever compared with Māori (0.7 per 100 000) and Pacific Peoples (1.8 per 100 000).

Of the 72 (67.9%) cases for which hospitalisation status was recorded, 38 (52.8%) were hospitalised. Of the 106 notified cases, 103 (97.2%) were laboratory-confirmed.

Travel history was recorded for all cases and all had travelled overseas during the incubation period of the disease. The countries commonly visited or lived in by cases were Indonesia (27 cases), Thailand (17 cases), India (14 cases) and Singapore (10 cases). Some cases reported travel to more than one country.

The use of protective measures was recorded for 42 (39.6%) cases. Protective measures reported by the cases included the use of insect repellent, bed nets, protective clothing and staying in screened or air-conditioned accommodation.

Ministry of Health data for 2013 recorded 34 hospitalisations in which dengue fever (classical) was the principal diagnosis and one additional hospitalisation in which dengue haemorrhagic fever was the principal diagnosis.

Diphtheria

No cases of toxigenic diphtheria were notified in New Zealand in 2013. The last case of toxigenic diphtheria in New Zealand was reported in 2009 and was a cutaneous infection associated with traditional tattooing. The last case of toxigenic respiratory diphtheria was reported in 1998 [21].

In 2013, 38 cultures of *Corynebacterium diphtheriae* were received by the Special Bacteriology Laboratory at ESR for toxigenicity testing, typing and surveillance purposes. The majority (34 cultures, 89.5%) were from cutaneous sources, whereas two cultures were from blood and two were from the throat. The patients ranged in age from 5 to 83 years.

All of the isolates were determined to be non-toxigenic by PCR testing for the presence of the toxin gene. Twenty five (65.8%) of the isolates were biovar *mitis* and 13 (34.2%) were biovar *gravis*. The two throat isolates were biovar *gravis*; while the two blood isolates were biovar *gravis* and biovar *mitis* strains.

Gastroenteritis (acute)

Gastroenteritis includes a number of communicable diseases. Not all sporadic 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) are notifiable on suspicion. Infections caused by norovirus, rotavirus and sapovirus, as well as histamine (scromboid) and toxic shellfish poisoning are included in this section (Table 7). Diseases and conditions that are notifiable in their own right (eg, campylobacteriosis, giardiasis, VTEC/STEC and salmonellosis) are reported separately.

From July 2000, PHUs have also been encouraged to record all cases of acute gastroenteritis caused by non-notifiable or unknown foodborne intoxicants, including those self-reported by the public.

There were 559 cases of acute gastroenteritis notified in 2013. The 2013 rate of 12.5 per 100 000 was significantly lower than the 2012 rate of 17.2 per 100 000 (765 cases). A causal agent was reported for 188 cases (33.6%). Of these, the most common pathogens recorded were rotavirus (43.6%, 82 cases) and norovirus (38.8%, 73 cases). The breakdown of cases where a causal agent was identified is presented in Table 7.

Table 7. Acute gastroenteritis cases by agent type, 2013

Agent type	Cases	Percentage (%)
Agent identified	**188**	**33.6**
Rotavirus infection	82	43.6
Norovirus infection	73	38.8
Histamine (scrombroid) poisoning	9	4.8
Clostridium difficile	8	4.3
Clostridium perfringens	4	2.1
Vibrio parahaemolyticus	4	2.1
Aeromonas species	2	1.1
Bacillus licheniformis food poisoning	1	0.5
Chemical food poisoning	1	0.5
Ciguatera fish poisoning	1	0.5
Enteropathogenic *Escherichia coli*	1	0.5
Sapovirus infection	1	0.5
Toxic shellfish poisoning	1	0.5
Agent not identified	**371**	**66.4**
Total	**559**	**100.0**

The highest notification rates for acute gastroenteritis were for people living in Hutt Valley, MidCentral, Whanganui and Capital & Coast DHBs (52.1, 40.7, 36.9 and 31.7 per 100 000 respectively).

Children aged less than 1 year (38.4 per 100 000) and 1–4 years (28.7 per 100 000) had high notification rates for acute gastroenteritis, as did adults aged 70 years and over (20.7 per 100 000).

Table 8. Exposure to risk factors associated with acute gastroenteritis, 2013

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Consumed food from retail premises	233	42	284	84.7
Contact with other symptomatic people	102	198	259	34.0
Contact with faecal matter	42	189	328	18.2
Contact with farm animals	26	243	290	9.7
Consumed untreated water	19	190	350	9.1
Recreational water contact	22	233	304	8.6
Travelled overseas during the incubation period	14	277	268	4.8
Contact with sick animals	4	246	309	1.6

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

Females (13.7 per 100 000) had a slightly higher rate than males (11.2 per 100 000).

The European or Other ethnic group (13.5 per 100 000) had high notification rates compared with Māori (7.3 per 100 000) and Asian (6.2 per 100 000) ethnic groups.

Hospitalisation status was recorded for 441 (78.9%) cases. Of these, 28 cases (6.3%) were hospitalised.

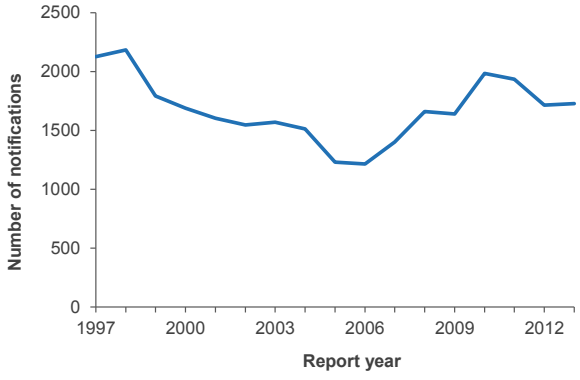
In 2013, 361 outbreaks of acute gastroenteritis were reported involving 5778 cases, of which 119 cases were also included as individual case notifications.

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.

Giardiasis

There were 1729 cases of giardiasis notified in 2013. The 2013 notification rate (38.7 per 100 000) was the same as the 2012 rate. Figure 9 shows giardiasis notifications by year from 1997 to 2013.

Figure 9. Giardiasis notifications by year, 1997–2013



In 2013, the highest notification rates for giardiasis were for people living in Lakes, Capital & Coast, Nelson Marlborough and Waikato DHBs (55.3, 54.7, 50.2 and 48.0 per 100 000, respectively) (Figure 10).

Children aged 1–4 years (151.0 per 100 000) and less than 1 year (50.1 per 100 000) had high notification rates for giardiasis, as did adults aged 30–39 years (67.0 per 100 000).

Males and females had similar rates of giardiasis (39.0 and 38.4 per 100 000 respectively).

Figure 10. Giardiasis notifications by DHB, 2013

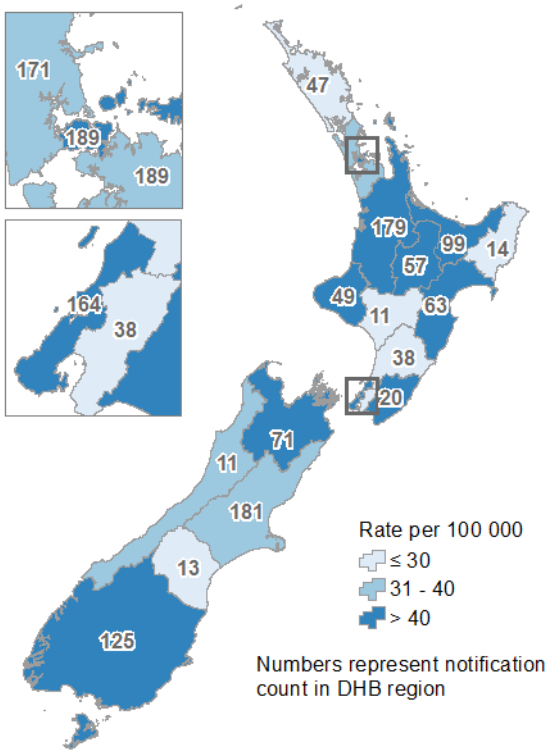


Table 9. Exposure to risk factors associated with giardiasis, 2013

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Contact with faecal matter	335	463	931	42.0
Contact with other symptomatic people	303	506	920	37.5
Recreational water contact	293	539	897	35.2
Consumed untreated water	237	509	983	31.8
Contact with farm animals	246	599	884	29.1
Consumed food from retail premises	203	522	1004	28.0
Travelled overseas during the incubation period	193	734	802	20.8
Contact with sick animals	39	741	949	5.0

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

The highest notification rates were in the MELAA ethnic group (59.9 per 100 000) and the European or Other ethnic group (47.0 per 100 000) compared with other ethnic groups (Māori, 14.5 per 100 000 and Pacific Peoples, 5.8 per 100 000).

Hospitalisation status was recorded for 1087 (62.9%) cases, of which 36 (3.3%) were hospitalised.

The most commonly reported risk factors for giardiasis were contact with faecal matter and contact with other symptomatic people (Table 9).

There were 78 giardiasis outbreaks reported in 2013, involving 333 cases. Eight of these outbreaks involved more than one implicated pathogen.

Haemophilus influenzae serotype b disease

Two cases of confirmed *Haemophilus influenzae* serotype b (Hib) disease were notified in 2013. Neither case was aged less than 5 years (compared with one, three and five cases aged less than 5 years reported in 2012, 2011 and 2010 respectively).

A Hib vaccine was introduced in January 1994. The current schedule introduced in 2008 recommends a primary course of three doses of DTaP-IPV-HepB/Hib vaccine at six weeks, three months and five months of age and a booster of Hib vaccine at 15 months [22].

Hepatitis A

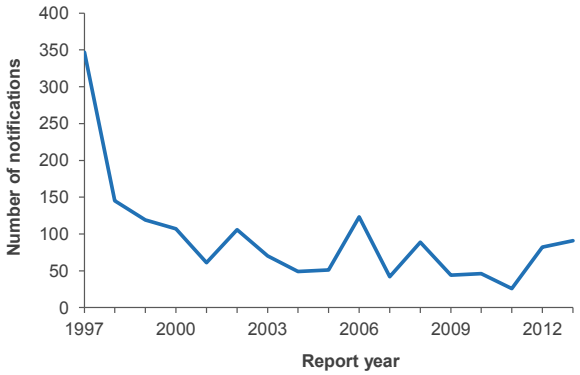
In 2013, 91 cases of hepatitis A were notified, compared with 82 notifications in 2012. Since a decrease in notifications between 1997 and 2001, numbers have been relatively stable. Increases in notifications (primarily due to outbreaks of disease) were observed in 2002, 2006, 2008, 2012 and 2013 (Figure 11).

The notification rate for hepatitis A was 2.0 per 100 000 in 2013, similar to the 2012 rate (1.8 per 100 000). Of the DHBs with more than five cases reported in 2013, the highest rates were among people living in Canterbury and Hawke's Bay DHBs (9.1 and 4.5 per 100 000 respectively). An outbreak of hepatitis A in Ashburton contributed to the high rate for Canterbury DHB.

Children aged from 1–15 years had the highest rates of hepatitis A compared with other age groups.

Females (2.2 per 100 000) had a slightly higher notification rate than males (1.9 per 100 000).

Figure 11. Hepatitis A notifications by year, 1997–2013



Of the ethnic groups with more than five cases reported, the highest notification rates were in the Pacific Peoples, Māori and Asian ethnic groups (7.6, 2.4 and 2.1 per 100 000 respectively).

Hospitalisation status was recorded for 89 (97.8%) cases. Of these, 32 cases (36.0%) were hospitalised.

Travel information was recorded for all cases, of which 31 (34.1%) had travelled overseas during the incubation period of the disease. The countries most frequently visited by hepatitis A cases included Samoa (11 cases) and Australia, Fiji and Vanuatu (4 cases each).

In 2013, five outbreaks of hepatitis A were reported involving 54 cases.

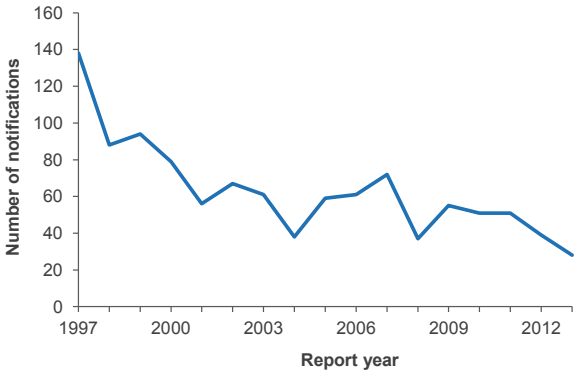
Hepatitis B

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

In 2013, 28 cases of hepatitis B were notified, compared with 39 cases in 2012 (Figure 12). There has been a general downward trend in the number of hepatitis B notifications reported between 1984 (over 600 cases) and 2004 (38 cases), with numbers of notifications fluctuating between 28 and 55 in the last five years.

The general decrease since 1984 is primarily attributed to the introduction of the hepatitis B vaccine to the immunisation schedule between 1985 and 1988 [22].

Figure 12. Hepatitis B notifications by year, 1997–2013



The national hepatitis B notification rate for 2013 was 0.6 per 100 000, which is a slight decrease compared with the 2012 rate of 0.9 per 100 000.

In 2013 the highest number of notifications were in Waikato (5 cases) and Auckland, Counties Manukau, and Canterbury (4 cases each) DHBs.

Adults aged between 30–49 years had the highest notification rates for hepatitis B (1.3 per 100 000).

Males (0.8 per 100 000) had a higher rate than females (0.4 per 100 000).

Of the ethnic groups with more than five cases reported, the highest notification rates were in the Pacific Peoples (2.2 per 100 000) and Māori (0.9 per 100 000) ethnic groups.

Of the 24 (85.7%) cases where hospitalisation status was recorded, 10 (41.7%) were hospitalised.

The most common risk factors associated with hepatitis B in 2013 were overseas travel during the incubation period (38.5%), sexual contact with a confirmed case or carrier (22.2%) and household contact with a confirmed case or carrier (20.0%) (Table 10).

No outbreaks of hepatitis B were reported in 2013.

Table 10. Exposure to risk factors associated with hepatitis B, 2013

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Overseas during incubation period	10	16	2	38.5
Sexual contact with confirmed case or carrier	4	14	10	22.2
Household contact with confirmed case or carrier	4	16	8	20.0
Body piercing/tattooing in last 12 months	4	22	2	15.4
Case is a blood product or tissue recipient	4	22	2	15.4
Occupational exposure to blood	2	24	2	7.7
History of injecting drug use	1	24	3	4.0

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

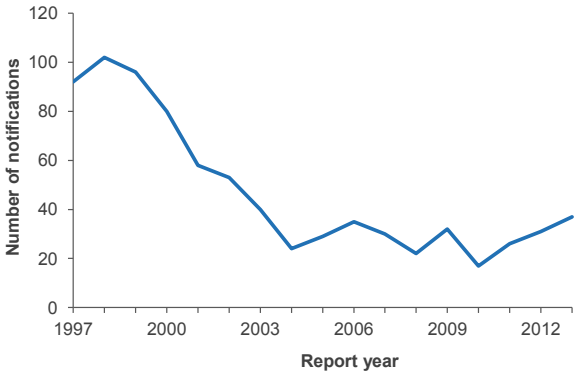
Hepatitis C

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

In 2013, a total of 37 cases of hepatitis C were notified, compared with 31 cases in 2012. After a peak of 102 cases in 1998 there was a steady decline in notifications until 2004. The number of notifications has fluctuated in recent years between 17 and 37 cases per year (Figure 13).

The hepatitis C notification rate for 2013 was 0.8 per 100 000, which was similar to that for 2012 (0.7 per 100 000). Canterbury (12 cases) and Southern (8 cases) DHBs had the highest number of cases reported in 2013.

Figure 13. Hepatitis C notifications by year, 1997–2013



The highest notification rate was for the 30–39 year age group (1.8 per 100 000) followed by the 20–29 years (1.7 per 100 000) and 50–59 years (1.4 per 100 000) age groups.

Males (1.0 per 100 000) had a higher rate than females (0.7 per 100 000).

Ethnicity was recorded for all cases, of which 27 cases (73.0%) were in the European or Other ethnic group.

Of the 34 (91.9%) cases for which hospitalisation status was recorded, seven (20.6%) were hospitalised.

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

Hepatitis (viral) – not otherwise specified

Two cases of hepatitis (viral) not otherwise specified (NOS) were notified in 2013, the same number as in 2012. Both cases were female and aged 40 years and over. One case reported travel to India during the incubation period for this disease. The other case is still under investigation, however, contaminated health supplements are reported to be the suspected source. A link between cases of non-viral hepatitis and a health supplement available in New Zealand was reported by the Centers for Disease Control and Prevention in October 2013 [23].

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 [24].

During 2013, 39 laboratory-confirmed A(H5N1) cases resulting in 25 fatalities occurred worldwide in Cambodia (26 cases, 14 deaths), Egypt (4 cases, 3 deaths), Indonesia (3 cases, 3 deaths), China (2 cases, 2 deaths), Vietnam (2 cases, 1 death), Bangladesh (1 case, 1 death) and Canada (1 case, 1 death). From 2003 to 24 January 2014, there have been 650 cases of A(H5N1) reported from 15 countries, of which 386 were fatal (a case fatality rate of 59.4%) [25].

Hydatid disease

Hydatid disease is caused by the larval stage of the tapeworm *Echinococcus granulosus*. Seven cases (0.2 per 100 000) of hydatid disease were notified

Table 11. Exposure to risk factors associated with hepatitis C, 2013

Risk factor	Yes	No	Unknown	Percentage (%) [a]
History of injecting drug use	23	6	8	79.3
Sexual contact with confirmed case or carrier	6	16	15	27.3
Household contact with confirmed case or carrier	6	19	12	24.0
Body piercing/tattooing in the last 12 months	4	18	15	18.2
Occupational exposure to blood	1	22	14	4.3
Overseas during incubation period	1	23	13	4.2
Case is a blood product or tissue recipient	0	23	14	-

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

in 2013 (6 confirmed and 1 probable), compared with one in 2012. Since 1997, 60 cases of hydatid disease have been notified.

The cases in 2013 were reported from Auckland and Canterbury (2 cases each) and Bay of Plenty, Nelson Marlborough and Southern (1 case each) DHBs. Age and sex were recorded for all cases and four of the seven cases were male. The highest number of cases was in the 60–69 years age group (5 cases).

One of the confirmed cases, a male from the Pacific Peoples ethnic group aged 20–29 years with newly diagnosed hydatid disease, had lived in Tonga until 2005. In New Zealand he had contact with farm animals and dogs in his youth and had worked as a freezing worker in recent years. No clear source of infection has yet been established. Two other confirmed cases, a female aged 50–59 years and a female aged 60–69 years both acquired their infections overseas (Romania and India, respectively).

Laboratory evidence and medical history indicate a past infection for the remaining four cases; three males (2 confirmed and 1 probable case) and one female, all 60–69 years of age who did not acquire the disease overseas.

Of the six cases (85.7%) for which hospitalisation status was recorded, two (33.3%) confirmed cases were 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. However, hydatids are notoriously difficult to eradicate, and a high level of vigilance and thorough investigation of human cases remains appropriate. Given the natural history of the disease, cases may occur for some years yet even in a country that is provisionally free of hydatids.

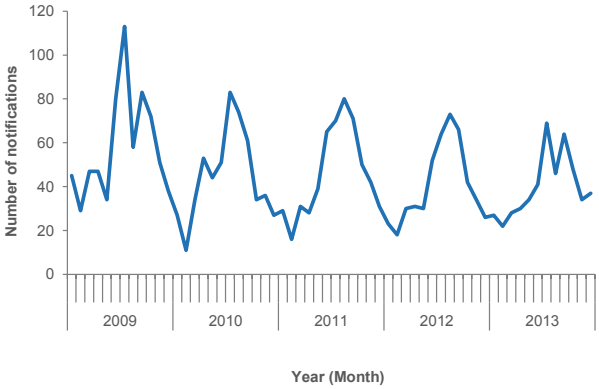
Invasive pneumococcal disease

Invasive pneumococcal disease (IPD) was added to the schedule of notifiable diseases on 17 October 2008. A full description of the epidemiology of IPD will be reported separately in the 2013 Invasive Pneumococcal Disease in New Zealand report available from www.surv.esr.cri.nz.

In 2013, 480 cases of IPD were notified. The 2013 notification rate of 10.7 per 100 000 was slightly lower than the 2012 rate (11.0 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 2009–December 2013



In 2013, the highest rates of IPD were among people living in Lakes, West Coast, Wairarapa, Bay of Plenty, Whanganui and Hawke's Bay DHBs (25.2, 18.4, 17.2, 16.9, 16.0 and 15.4 per 100 000 respectively) (Figure 15).

Figure 15. Invasive pneumococcal disease notifications by DHB, 2013

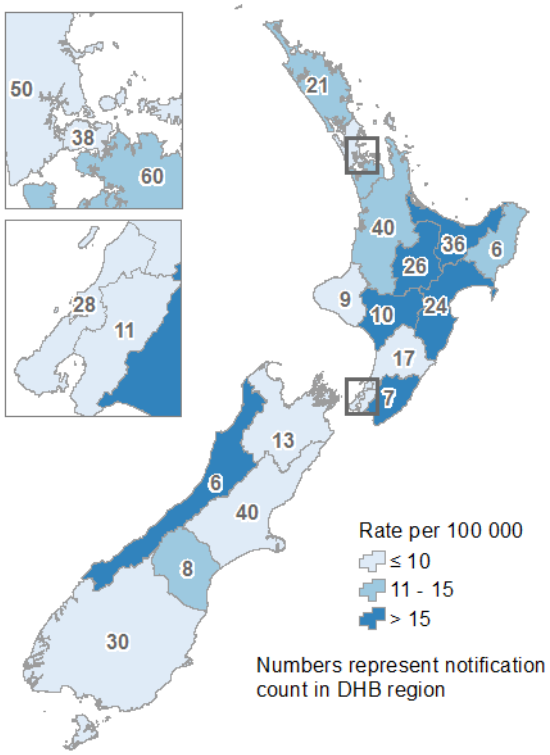


Table 12. Exposure to risk factors associated with invasive pneumococcal disease for cases aged less than five years, 2013

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Premature (<37 weeks gestation)[b]	6	9	4	40.0
Smoking in the household	6	11	24	35.3
Attends childcare	4	13	24	23.5
Chronic illness	3	33	5	8.3
Immunocompromised	2	32	7	5.9
Congenital or chromosomal abnormality	1	34	6	2.9

[a] Percentage refers to the percentage of cases who answered "yes" out of the total number of cases for which this information was supplied. Some cases had more than one risk factor recorded.
[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 five years and over, 2013

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Chronic illness	205	191	43	51.8
Current smoker[b]	92	277	70	24.9
Chronic lung disease or cystic fibrosis	71	334	34	17.5
Immunocompromised	69	321	49	17.7
Resident in long term or other chronic care facility	28	368	43	7.1
Anatomical or functional asplenia	7	386	46	1.8
Cochlear implants	5	376	58	1.3
Congenital or chromosomal abnormality	4	375	60	1.1

[a] Percentage refers to the percentage of cases who answered "yes" out of the total number of cases for which this information was supplied. 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 of invasive pneumococcal disease notifications and vaccinations received, 2013

Age group	Total cases	One dose	Two doses	Three doses	Four doses	Five doses	Vaccinated (no dose info)	Not vaccinated	Unknown
<6 months	11	3	3	0	0	0	0	4	1
6 months–4 years	30	0	0	9	13	1	0	0	7
5–9 years	16	0	0	1	1	0	0	11	3
10–19 years	23	0	0	0	0	0	0	8	15
20+ years	400	1	1	0	0	0	5	157	236
Total	**480**	**4**	**4**	**10**	**14**	**1**	**5**	**180**	**262**

Adults aged 70 years and over (34.4 per 100 000) and infants aged less than 1 year (31.7 per 100 000) had the highest rates of IPD.

Males (11.4 per 100 000) had higher rates than females (10.1 per 100 000).

The Pacific Peoples (19.2 per 100 000) and Māori (17.4 per 100 000) ethnic groups had the highest rates of IPD.

Further information by DHB, sex, age and ethnicity can be found in Tables 44 to 47 in the Appendix.

Of the 464 (96.7%) cases for which hospitalisation status was recorded, 442 (95.3%) were hospitalised.

There were 18 deaths due to IPD reported in 2013. The deaths were distributed by age group as follows: less than 1 year (1), 15–19 years (1), 40–49 years (1), 50–59 years (2), 60–69 years (2) and 70 years and over (11).

The risk factors recorded for IPD are shown in Table 12 and Table 13. The most commonly reported risk factor was exposure to smoking in the household for cases aged less than five. 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, IPD became a vaccine-preventable disease in New Zealand with the addition of the 7-valent pneumococcal conjugate vaccine (PCV7) to the childhood immunisation schedule. From October 2011, the 10-valent pneumococcal conjugate vaccine (PCV10) replaced PCV7 as supplies of the latter were depleted. The recommended schedule for PCV is four doses given at six weeks, three months, five months and 15 months of age [22].

For 453 (94.4%) of the notified cases in 2013, the Invasive Pathogens Laboratory at ESR received a *Streptococcus pneumoniae* isolate from a normally sterile site for serotyping. Table 15 shows the breakdown of cases by serotype, vaccine coverage and age group. Nearly 90% (33/37) of cases in the less than five years age group were due to serotypes not covered by PCV10, compared with 55.3% (131/237 cases) and 69.8% (125/179 cases) in the 5–64 years and 65 years and over age groups, respectively. Serotype 19A, a non-PCV10 serotype, was the most prevalent type in the less than five years and 65 years and over age groups. Serotype 7F, a PCV10 serotype, was the most prevalent type in the 5–64 years age group.

Table 15. Invasive pneumococcal disease notifications by serotype and age group, 2013

Serotype	<5 years	5–64 years	65+ years	Total
4		23	9	32
6B		3	4	7
9V		8	3	11
14		3	4	7
18C		10	6	16
19F	1	7	5	13
23F		3	3	6
1	2	1		3
5				0
7F	1	48	20	69
3	3	9	11	23
6A	1	2		3
19A	12	36	28	76
Other (non PCV13)	17	84	86	187
Total	**37**	**237**	**179**	**453**

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 2013, 155 cases of legionellosis were notified, representing a rate of 3.5 per 100 000. This was similar to the 2012 rate of 3.4 per 100 000 (150 cases). The annual number of cases was fairly stable between 1997 and 2009 but it increased in 2010 and has remained relatively high (Figure 16).

Notification rates were lower than 5.0 per 100 000 for all DHBs, except Canterbury DHB (11.4 per 100 000, 58 cases).

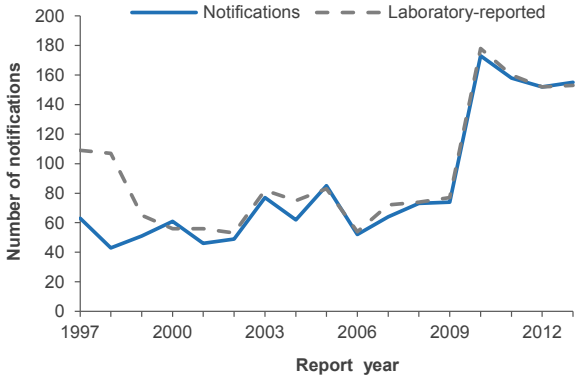
Adults aged 70 years and over (12.8 per 100 000) and 60–69 years (9.7 per 100 000) accounted for the highest rates of legionellosis.

Males (4.7 per 100 000, 104 cases) had a higher rate of disease than females (2.2 per 100 000, 51 cases).

The highest number of legionellosis cases was for the European or Other ethnic group (132 cases, 4.5 per 100 000).

Of the 148 (95.5%) cases in 2013 for which hospitalisation status was recorded, 120 (81.1%) were hospitalised.

Figure 16. Legionellosis notifications and laboratory-reported cases by year, 1997–2013



Three deaths due to legionellosis were reported in 2013. All three deaths were among people aged over 70 years. Note that there were three additional deaths among the notified cases of legionellosis – one where legionellosis was not the primary cause of death and two where cause of death was unknown.

Table 16 provides a summary of risk factors for which data was available. The following exposures were recorded for the 99 (64%) cases who reported exposure to environmental sources of infection during the incubation period: compost, potting mix or soil (73), showers or hot water systems (21), air conditioning units or heat pumps (10), spa or indoor pools (4), cooling towers (3) and fountains (1). Overseas travel during the incubation period was reported for 10 cases.

Table 16. Risk factors associated with legionellosis, 2013

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Exposure to known environmental risk factor during the incubation period	99	26	30	79.2
Pre-existing immunosuppressive or debilitating condition	56	78	21	45.2
Smokes cigarettes	32	108	15	22.9

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

The Legionella Reference Laboratory at ESR reported 150 cases infected with *Legionella* in 2013. The most common *Legionella* species reported in 2013 were *Legionella longbeachae* (50.7%, 76 cases) and *Legionella pneumophila* (28.0%, 42 cases) (Table 17).

There was one outbreak associated with a spa pool in Hokitika (2 cases), with *Legionella pneumophila* serogroup 1 identified.

Table 17. *Legionella* strains for laboratory-reported cases, 2013

Legionella species and serogroup	Cases	Percentage (%)
L. longbeachae	**76**	**50.7**
L. longbeachae sg 1	20	13.3
L. longbeachae sg 2	9	6.0
L. longbeachae sg not determined	47	31.3
L. pneumophila	**42**	**28.0**
L. pneumophila sg 1	31	20.7
L. pneumophila sg 3	1	0.7
L. pneumophila sg 4	1	0.7
L. pneumophila sg 5	1	0.7
L. pneumophila sg 10	2	1.3
L. pneumophila sg 12	3	2.0
L. pneumophila sg 13	1	0.7
L. pneumophila sg not determined	2	1.3
Other *Legionella* species	**32**	**21.3**
L. micdadei	9	6.0
L. bozemanae sg 1	4	2.7
L. dumoffii	3	2.0
L. gormanii	2	1.3
L. sainthelensi	2	1.3
L. jordanis	1	0.7
Legionella species not determined	11	7.3
Total	**150**	**100**

Leprosy

In 2013, 11 cases of leprosy were notified, compared with two cases in 2012. The highest number of cases was reported from MidCentral (5 cases) and Hutt Valley DHBs (3 cases).

Cases were distributed by age group as follows: 1–4 years (1 case), 5–9 years (1 case), 10–14 years (3 cases), 15–19 years (2 cases), 20–29 years (1 case), and 40–49 years (3 cases). Ten cases were male and one case was female.

Ethnicity was recorded for 10 (90.9%) cases, of which, nine were in the Pacific Peoples ethnic group and one case was in the Asian ethnic group.

Three cases were laboratory-confirmed. The clinical form of leprosy for cases was recorded as tuberculoid (7 cases), borderline (3 cases) and lepromatous (1 case).

Overseas travel information was recorded for 10 (90.9%) cases. Of these, nine cases were overseas during the incubation period for this disease. The countries lived in or visited by the cases were Kiribati (4 cases), Samoa (2 cases), American Samoa, India and Timor-Leste (1 case each). One case had not travelled overseas during the incubation period for this disease (this case is still under investigation).

Three outbreaks of *Mycobacterium leprae* were reported during 2013, involving nine cases. Note that a confirmed diagnosis of leprosy may take many months and therefore numbers may be revised when more information is available.

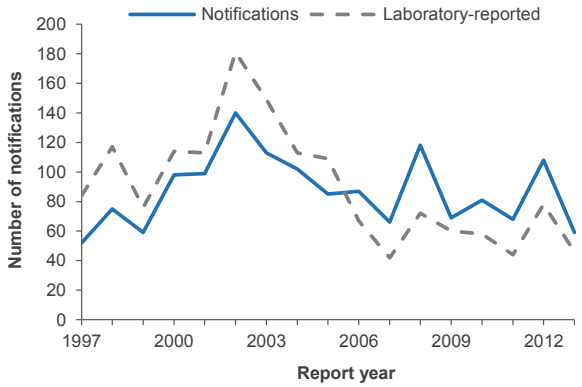
Ministry of Health data for 2013 recorded no hospitalisations where leprosy was the principal diagnosis.

Leptospirosis

In 2013, a total of 59 cases of leptospirosis were notified. The 2013 rate of 1.3 cases per 100 000 was a significant decrease from the notification rate in 2012 (2.4 per 100 000, 108 cases). All of the 59 notified cases were laboratory-confirmed by either microscopic agglutination titre (MAT) (45 cases), or nucleic acid testing (NAT) (12 cases) or both MAT and NAT (2 cases).

Figure 17 shows the number of notified and ESR laboratory-reported cases of leptospirosis per year since 1997. The highest notification rates for leptospirosis were reported from Hawke's Bay, Taranaki, MidCentral and Bay of Plenty DHBs (7.1, 5.4, 3.5 and 3.3 per 100 000 respectively).

Figure 17. Leptospirosis notifications and laboratory-reported cases by year, 1997–2013



The highest notification rates were for the 50–59 years (2.9 per 100 000) and 20–29 years (2.3 per 100 000) age groups.

Males had a higher notification rate (2.4 per 100 000) than females (0.3 per 100 000).

The highest notification rates were for the Māori (1.5 per 100 000) and European or Other (1.5 per 100 000) ethnic groups.

All 59 cases had a hospitalisation status recorded, and 38 (64.4%) were hospitalised.

Occupation was recorded for 56 (94.9%) of the 59 notified cases. Of these, 40 cases (71.4%) were recorded as engaged in occupations previously identified as high-risk for exposure to *Leptospira* spp. in New Zealand [26]. The percentage of such cases was similar to that of 2012 (76.9%). Of the 40 cases with a high-risk occupation recorded, 22 (52.4%) worked in the meat processing industry (as freezing workers, meat process workers or butchers) and 18 (42.9%) were farmers or farm workers. Of the 19 cases that did not report a high-risk occupation (or had no occupation recorded) two (4.8%) had an occupation that involved direct contact with animals including a veterinarian and a possum trapper (1 case each). The remaining 17 cases reported the following risk factors: animal/outdoor exposures (13 cases), contact with lakes, rivers and streams (3 cases) and overseas travel during the incubation period (1 case). Two cases reported more than one risk factor.

The Leptospira Reference Laboratory at ESR reported 46 cases of infection with *Leptospira* in 2013. Table 18 presents the species and serovars identified for the 2013 laboratory-reported cases. The most common *Leptospira* serovars reported were *Leptospira borgpetersenii* sv Hardjo (37.0%, 17 cases) and *Leptospira borgpetersenii* sv Ballum (23.9%, 11 cases).

No outbreaks of leptospirosis were reported in 2013.

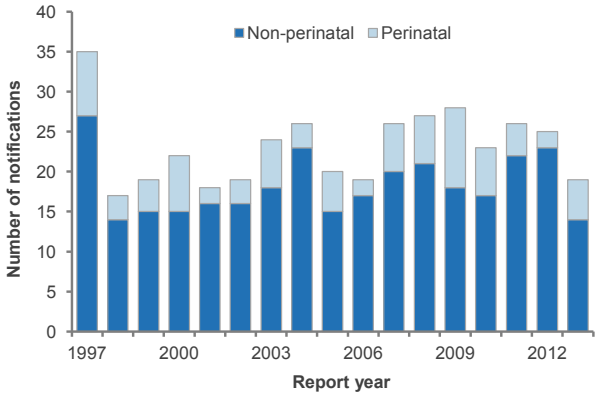
Table 18. *Leptospira* species and serovars for laboratory-reported cases, 2013

Leptospira species and serovar	Cases	Percentage (%)
L. borgpetersenii	**30**	**65.2**
L. borgpetersenii sv Hardjo	17	37.0
L. borgpetersenii sv Ballum	11	23.9
L. borgpetersenii sv Tarassovi	2	4.3
L. interrogans	**13**	**28.3**
L. interrogans sv Pomona	9	19.6
L. interrogans sv Canicola	1	2.2
L. interrogans sv Copenhageni	3	6.5
***Leptospira* serovar not identified**	**3**	**6.5**
Total	**46**	**100.0**

Listeriosis

In 2013, 19 cases of listeriosis were notified, a rate of 0.4 per 100 000. Figure 18 shows listeriosis notifications (both perinatal and non-perinatal) for each year since 1997. The notification rate for listeriosis has been stable over the past 17 years (ranging from 0.4 to 0.6 per 100 000), since a peak of 0.9 per 100 000 in 1997.

Figure 18. Listeriosis notifications (perinatal and non-perinatal) by year, 1997–2013



Five (26.3%) of the 2013 cases were recorded as perinatal, an increase from 2012 (2 cases). The length of gestation was known for all perinatal cases, with a range of 23–36 weeks. Three of these cases resulted in perinatal deaths. The cases were in the Asian (2 cases), European or Other (2 cases) and Māori (1 case) ethnic groups. Three cases were in the 30–39 years age group and two were in the 20–29 years age group.

The 14 non-perinatal listeriosis cases were from 10 DHBs, with the highest number of notifications reported in the Waitemata and Bay of Plenty DHBs (3 cases each).

Eleven non-perinatal cases were aged 50 years and over (including six cases aged 70 years and over). Seven cases were male and seven were female.

The non-perinatal listeriosis cases were distributed by ethnic group as follows: European or Other (11 cases) and Māori (3 cases).

Hospitalisation status was recorded for all 14 non-perinatal cases, of which all were hospitalised. Of these 14 cases, four were hospitalised for the treatment of another illness and eight were receiving immunosuppressive drugs.

Information on underlying illness was recorded for all non-perinatal cases and nine cases (64.3%) had an underlying illness such as cancer, autoimmune disease, Crohn's disease, heart disease, diabetes or another chronic illness.

Two non-perinatal deaths were reported in 2013, both in the 70 years and over age groups.

The Special Bacteriology Laboratory at ESR serotyped 19 isolates of *Listeria monocytogenes* in 2013. Twelve (63.2%) were serotype O1/2 and seven (36.8%) were serotype O4.

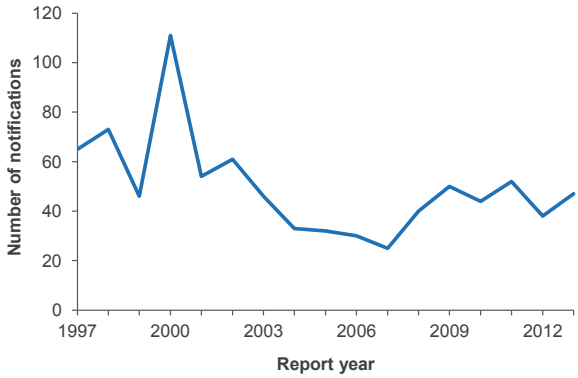
There were no outbreaks reported during 2013.

Malaria

In 2013, 47 cases of malaria were notified, compared with 38 cases in 2012 (Figure 19). All 47 cases were laboratory-confirmed. The 2013 notification rate (1.1 per 100 000) was slightly higher than the 2012 rate (0.9 per 100 000).

The highest notification rate for malaria was among adults in the 20–29 years age group (3.1 per 100 000), followed by the 30–39 years age group (1.1 per 100 000).

Figure 19. Malaria notifications by year, 1997–2013



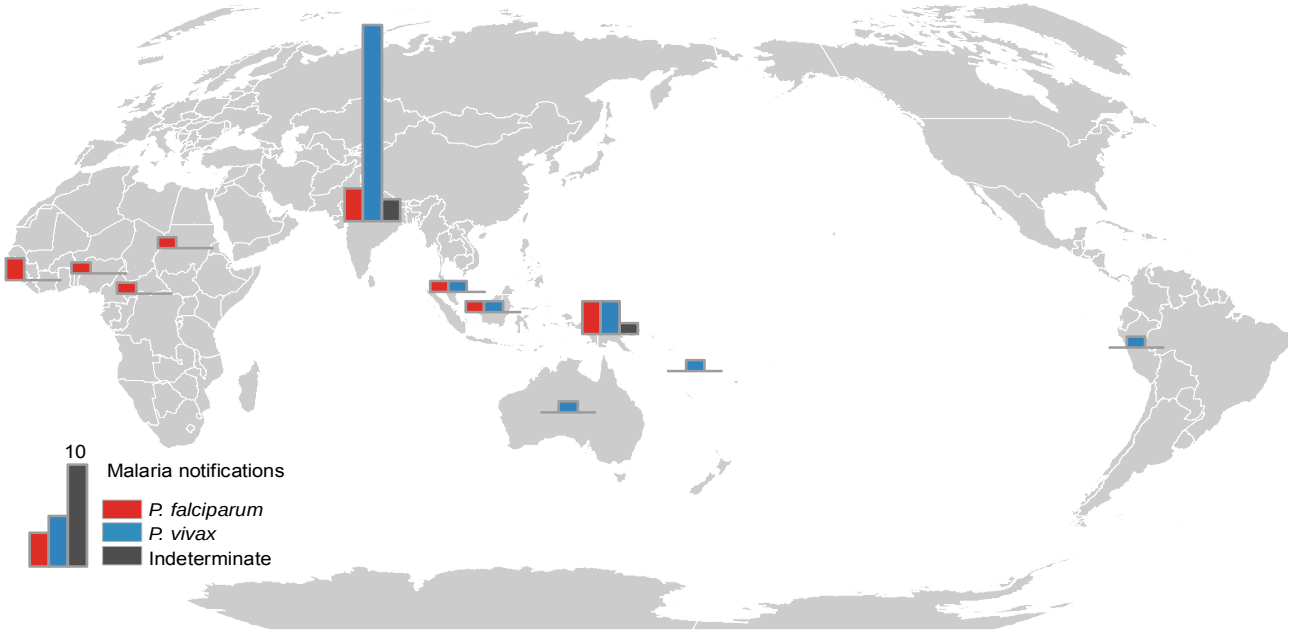
Males had a higher notification rate (1.5 per 100 000) than females (0.7 per 100 000).

Ethnicity was recorded for 46 (97.9%) cases. The highest notification rate was for the MELAA ethnic group (10.0 per 100 000), followed by the Asian (3.9 per 100 000) and Pacific Peoples (2.2 per 100 000) ethnic groups.

Of the 41 (87.2%) cases for which hospitalisation status was recorded, 35 (85.4%) were hospitalised.

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

Figure 20. *Plasmodium* species and country of overseas travel for malaria notifications, 2013



Note: Some cases reported travel to more than one country during the incubation period for this disease. The cases that travelled to Australia, Singapore and United States of America also specified travel to another malaria-endemic country (Papua New Guinea and Indonesia).
Four cases are not shown on the map, because the countries they visited were not recorded.

Table 19 presents the region and country of overseas travel and *Plasmodium* species identified for malaria notifications in 2013. The region most commonly reported as having been lived in or visited for cases with *Plasmodium falciparum* was Sub-Saharan Africa (15 cases). For cases identified with *Plasmodium vivax*, the region most commonly reported was Southern and Central Asia (14 cases), followed by Oceania (8 cases). The country visited or lived in with the highest number of malaria cases was India with 16 cases, of which 12 cases were identified with *Plasmodium vivax* (Figure 20). It should be noted that some cases reported travel to more than one country.

Malaria prophylaxis was prescribed for six cases, of which two reported taking it as prescribed. Eighteen cases did not have prophylaxis prescribed and prophylaxis information was unknown for 23 cases.

The Ministry of Health recorded 42 hospitalisations in 2013 where malaria was the principal diagnosis.

Table 19. Region and country of overseas travel and *Plasmodium* species for malaria notifications, 2013

Region	Country resided in or visited	Plasmodium species			
		P. falciparum	*P. vivax*	*P. ovale*	Indeterminate
North Africa and the Middle East	Sudan	1	1		
	United Arab Emirates	2			
	North Africa nfd[a]	1			
Sub-Saharan Africa	Central and West Africa nfd[a]	2			
	Congo	1			
	Ethiopia		2		
	Mozambique	1			
	South Africa	1			
	Tanzania	1			
	Uganda	5			
	Zambia	1			
	Zimbabwe	3			
Southern and Central Asia	Bhutan		1		
	Central Asia nfd[a]	1			
	India	2	12		2
	Pakistan		1		
South-East Asia	Cambodia		1		
	Indonesia	1	1		
	Singapore[b]	1			
Oceania	Australia[b]	1	2		
	Papua New Guinea	3	5		
	Solomon Islands			1	
	Vanuatu		1		
The Americas	Bolivia				1
	United States of America[b]		1		

[a] nfd: not further defined.
[b] These cases also specified travel to another malaria-endemic country: Papua New Guinea (3 cases) and Indonesia (1 case).
Note: some cases were infected with more than one *Plasmodium* species and reported travel to more than one country during the incubation period for this disease.

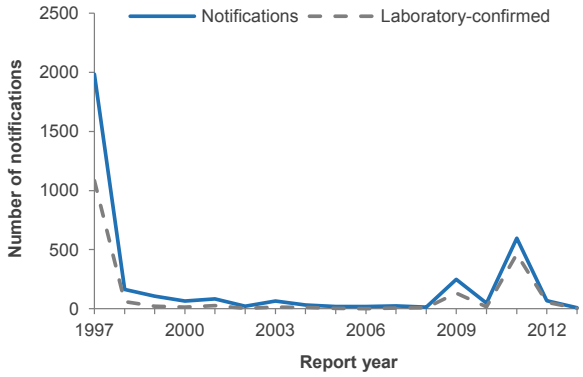
Measles

Measles immunisation was introduced in 1969 [22] 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 15 months of age and the second at four years of age. During measles outbreaks, the MMR vaccine may be recommended to infants aged less than 12 months if cases are occurring in the very young [22].

In 2013, eight cases of measles were notified, of which seven were confirmed cases (including three laboratory-confirmed cases). In 2012, 68 cases of measle were notified, of which 59 cases were confirmed (including 55 laboratory-confirmed cases) (Figure 21). The 2013 notification rate (0.2 per 100 000) was a significant decrease from 2012 (1.5 per 100 000).

The cases were from Lakes (5 cases) and Counties Manukau, Capital & Coast and Canterbury (1 case each) DHBs.

Figure 21. Measles notifications and laboratory-confirmed cases by year, 1997–2013



Age, sex and ethnicity were recorded for all cases. The highest number of notifications was in the 15−19 years age group (4 cases), followed by the 5−9 years (2 cases), less than 1 year and 1−4 years (1 case each) age groups.

Five cases were female and three were male.

The cases belonged to the following ethnic groups: Māori (6 cases), Asian and European or Other (1 case each).

Hospitalisation status was recorded for all cases and only one case was hospitalised.

All eight measles cases had a known vaccination status. None of the cases were vaccinated, including two cases aged less than 15 months who were therefore not eligible for vaccination. Of the cases for which risk factor information was recorded, 85.7% (6/7) reported contact with another measles case in the previous three weeks and 57.1% (4/7) reported overseas travel during the incubation period for this disease.

Two measles outbreaks were reported in late December 2013 and both were ongoing. These outbreaks accounted for six of the seven confirmed cases in 2013. The remaining confirmed case was overseas during the incubation period for measles and was not associated with an outbreak.

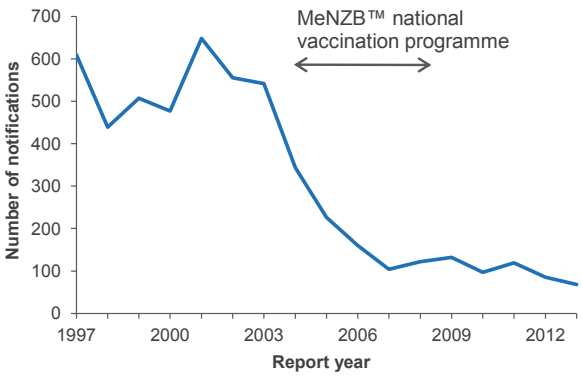
Meningococcal disease

A full description of the epidemiology of meningococcal disease will be provided separately in the report entitled 'The Epidemiology of Meningococcal Disease in New Zealand in 2013', available from www.surv.esr.cri.nz in June 2014.

There were 68 cases of meningococcal disease notified in 2013. The notification rate (1.5 per 100 000) was a decrease from the 2012 rate (1.9 per 100 000, 85 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) and the rate immediately before the introduction of the MeNZB™ vaccine (8.4 per 100 000 in 2004). The 2013 rate is the same rate as observed in the immediate pre-epidemic years (1989–1990).

Figure 22 shows the number of meningococcal disease notifications from 1997 to 2013.

Figure 22. Meningococcal disease notifications by year, 1997–2013



Of the DHBs which reported five or more cases in 2013, the highest rates were for Counties Manukau (2.3 per 100 000, 12 cases) and Southern (2.3 per 100 000, 7 cases) DHBs.

As in previous years, the highest notification rate was for the less than 1 year age group (18.4 per 100 000, 11 cases), followed by the 1–4 years age group (5.2 per 100 000, 13 cases).

The number of cases was the same for males and females (34 cases each).

Ethnicity was recorded for all cases notified in 2013. Of the ethnic groups reporting more than five cases, the highest notification rate was for the Māori ethnic group (3.4 per 100 000, 23 cases), followed by the Pacific Peoples (3.3 per 100 000, 9 cases) and European or Other (1.1 per 100 000, 34 cases) ethnic groups.

Hospitalisation status was recorded for all cases, of which 66 (97.1%) were hospitalised. For the hospitalised cases, pre-hospital management information was recorded for 64 (97.0%) cases. Of these, 28 cases (43.8%) were seen by a doctor prior to hospital admission and only four (6.3%) were given intravenous or intramuscular antibiotics before admission.

Four deaths were reported during 2013 giving a case fatality rate of 5.9%. Among these, one case had been seen by a doctor and given antibiotics, one case was not seen by a doctor but was given antibiotics and one case was not seen by a doctor. The pre-hospital management of the remaining case was unknown.

Sixty-one (89.7%) notified cases were laboratory-confirmed and the strain type was determined for 56 cases: group B (30 cases, including 11 of B:P1.7-2,4), group C (17 cases, including 15 of C:P1.5-1,10-8), group W135 (5 cases) and group Y (4 cases). Strain type B:P1.7-2,4 was known previously as the 'New Zealand epidemic strain'.

The antimicrobial susceptibility of 43 viable meningococcal isolates received by ESR from cases of invasive disease in 2013 was tested. All isolates were susceptible to ceftriaxone, rifampicin and ciprofloxacin. Thirty-three percent (14/43) had reduced susceptibility to penicillin, with minimum inhibitory concentrations of 0.12–0.5 mg/L.

Middle East respiratory syndrome Coronovirus

Coronaviruses are a large family of viruses that are known to cause a range of illnesses in humans; from the common cold to severe acute respiratory syndrome (SARS). This new strain, which has been named Middle East respiratory syndrome (MERS-CoV), had not previously been detected in humans or animals and appears to be most closely related to coronaviruses previously found in bats.

MERS-CoV became notifiable in New Zealand on 6 September 2013. Although no cases have been reported in New Zealand, there have been 191 confirmed cases of human infection with MERS-CoV (including 82 deaths) reported to WHO worldwide from September 2012 to mid-March 2014 [27].

Mumps

Immunisation against mumps was introduced to the New Zealand Immunisation Schedule in 1990 as part of the MMR vaccine [22], and mumps became notifiable in June 1996 [4]. The last epidemic occurred in 1994.

In 2013, 23 cases of mumps were notified (14 were laboratory-confirmed) compared with 26 cases notified in 2012 (16 were laboratory-confirmed). Figure 23 shows notifications and laboratory-confirmed cases from 1997 to 2013. The 2013 notification rate (0.5 per 100 000) was a slight decrease from 2012 (0.6 per 100 000).

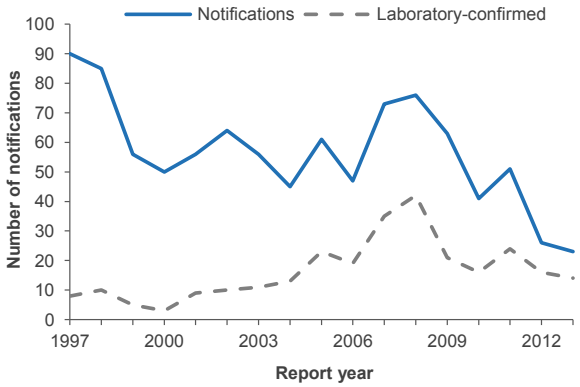
Approximately half of the notifications were reported in Northland, Waitemata, and Auckland DHBs (4 cases each). The remaining cases were spread across 10 DHBs.

In 2013, the cases ranged in age from 11 months to 58 years, with almost half of the cases aged less than 10 years.

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

The highest notification rates were in the Pacific Peoples ethnic group (1.8 per 100 000), followed by Asian (1.0 per 100 000) and Māori (0.7 per 100 000) ethnic groups.

Figure 23. Mumps notifications and laboratory-confirmed cases by year, 1997–2013



Hospitalisation status was recorded for all cases. Of these, one case (4.3%) was hospitalised.

Of the cases for which risk factor information was recorded, 47.8% (11/23) attended school, pre-school or childcare, 15.8% (3/19) had contact with another case of the disease and 9.1% (2/22) reported overseas travel during the incubation period for this disease.

Table 20. Age group of mumps notifications and vaccination received, 2013

Age group	Total cases	One dose	Two doses	Vaccinated (no dose info)	Not vaccinated	Unknown
<15 months[a]	1	0	0	0	1	0
15 months–3 years	3	1	0	0	2	0
4–9 years	6	1	3	0	2	0
10–19 years	3	0	0	1	1	1
20+ years	10	2	0	0	3	5
Total	**23**	**4**	**3**	**1**	**9**	**6**

[a] Children aged less than 15 months are not eligible for vaccination.

The recommended vaccination schedule for mumps is two doses of the MMR vaccine, at 15 months and four years of age [22]. In 2013, 17 cases (73.9%) had a known vaccination status and of these, nine (52.9%) cases were not vaccinated, including one case aged less than 15 months who was not eligible for vaccination.

Four cases had received one dose of vaccine and three cases had received two doses of vaccine. One further case reported having been vaccinated, but no dose information was available (Table 20).

Non-seasonal influenza

Non-seasonal influenza (capable of being transmitted between human beings) became a notifiable and quarantinable disease in New Zealand in April 2009. At this time, confirmed cases required evidence of A(H1N1)pdm09 influenza virus infection. During 2009, a total of 3670 cases of non-seasonal influenza were notified and 1826 cases were notified in 2010. In August 2010, the WHO declared that the world was entering the post-pandemic phase, and the virus has continued to circulate behaving as seasonal influenza. In New Zealand, A(H1N1)pdm09 influenza virus has been classified as seasonal since 31 December 2010.

Since 2011 none of the circulating influenza strains have been considered to have pandemic potential.

As of August 2013, influenza A(H7N9) is notifiable as non-seasonal influenza. No cases have been notified in New Zealand.

Paratyphoid fever

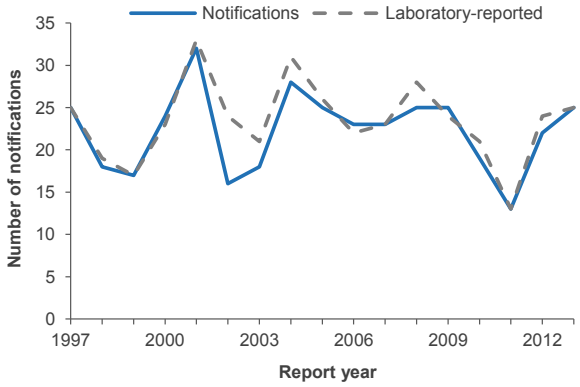
There were 25 cases of paratyphoid fever notified in 2013. The 2013 notification rate (0.6 per 100 000) was similar to the 2012 rate (0.5 per 100 000, 22 cases). Figure 24 shows the number of notifications and laboratory-reported cases of paratyphoid fever for each year since 1997.

Age and sex were recorded for all cases. The highest notification rate was for the 20–29 years age group (1.4 per 100 000, 9 cases). The notification rate was similar for males (0.6 per 100 000, 14 cases) and females (0.5 per 100 000, 11 cases).

Ethnicity was recorded for all 25 cases. The 2013 cases were in the European or Other (15 cases), Asian (9 cases) and Māori (1 case) ethnic groups.

Of the 20 (80.0%) cases for which hospitalisation status was recorded, 13 (65.0%) were hospitalised.

Figure 24. Paratyphoid fever notifications and laboratory-reported cases by year, 1997–2013



Of the 25 cases notified in 2013, 20 (80.0%) reported overseas travel during the incubation period for this disease. The countries visited were Cambodia (6 cases), India and Thailand (5 cases each), Indonesia and Vietnam (4 cases each), Malaysia, Singapore and Australia (2 cases each), Bangladesh and Hong Kong (1 case each). Some cases reported travel to more than one country.

The Enteric Reference Laboratory at ESR reported 25 cases infected with *Salmonella* Paratyphi in 2013. The serotypes identified were *S.* Paratyphi A (14 cases) and *S.* Paratyphi B var. Java (11 cases). 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 [28].

One outbreak of paratyphoid fever involving 14 cases was reported in 2013. *Salmonella* Paratyphi B var. Java was isolated from three cases. *Shigella sonnei* was also detected in the stool sample of one of the outbreak cases.

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 [22]. New Zealand is currently experiencing a national outbreak of pertussis which commenced in mid-2011. Childhood vaccination has been routine in New Zealand since 1960 and the disease has been notifiable since 1996 [4].

In 2013, 3539 pertussis cases were notified, of which 862 (24.4%) were laboratory-confirmed by the isolation of *Bordetella pertussis* from the nasopharynx. A further 591 cases (16.7%) were laboratory-confirmed by PCR. The 2013 notification rate (79.2 per 100 000) was a significant decrease from the 2012 notification rate (133.0 per 100 000, 5898 cases) (Figure 25).

The pertussis notification rate varied by DHB region, with the highest rate reported for Nelson Marlbourgh (334.0 per 100 000, 472 cases), followed by the West Coast (183.0 per 100 000, 60 cases), Tairawhiti (117.8 per 100 000, 55 cases) and Canterbury (114.5 per 100 000, 581 cases) DHBs (Figure 26).

The highest notification rate was for the less than 1 year age group (440.9 per 100 000, 264 cases), followed by the 1–4 years (224.4 per 100 000, 556 cases) and 5–9 years (122.8 per 100 000, 366 cases) age groups.

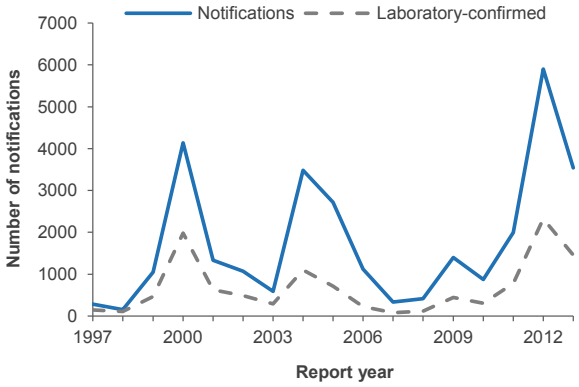
Females (88.6 per 100 000, 2011 cases) had a higher notification rate than males (69.4 per 100 000, 1527 cases).

The European or Other ethnic group (86.8 per 100 000) had the highest notification rate, followed by Pacific Peoples (85.4 per 100 000).

Hospitalisation status was recorded for 3087 (87.2%) pertussis cases, of which 227 (7.4%) were hospitalised. Approximately 46% (122/264) of cases in the less than 1 year age group were hospitalised. The highest notification rates among all hospitalised cases were in the Pacific Peoples (20.3 per 100 000, 56 cases) and Māori (9.0 per 100 000, 60 cases) ethnic groups. In 2013, 158 (69.6%) of the hospitalised cases had a known vaccination status. Of these, 74 cases had not been vaccinated, 39 had received one dose of pertussis vaccine, 15 had received two doses and 26 cases had received three or more doses. A further four cases reported being vaccinated, but no dose information was available. There was one death due to pertussis reported in 2013; an infant aged less than six weeks.

Since March 2008, the recommended and funded immunisation schedule for pertussis has been a primary course of DTaP-IPV-HepB/Hib at six weeks, three months and five months of age, followed by booster doses at ages four (DTaP-IPV) and eleven (Tdap) [22].

Figure 25. Pertussis notifications and laboratory-confirmed cases by year, 1997–2013



Vaccination status was known for 1938 (54.8%) cases notified during 2013 (Table 21). Of these, 623 (32.1%) cases were not vaccinated, including 31 cases who were aged less than six weeks and therefore not eligible for vaccination. One hundred and seventy-seven (9.1%) cases had received one dose of vaccine, 53 (2.7%) cases had received two doses and 752 (20.9%) cases had received three or more doses of pertussis vaccine.

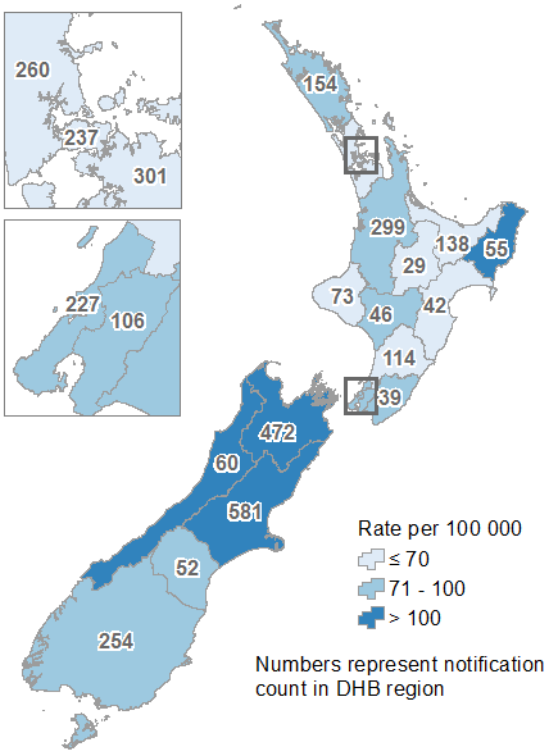
In 2013, 29.7% (479/1613) of cases reported contact with a laboratory-confirmed case of pertussis and 32.1% (873/2722) had attended school, pre-school or childcare.

Table 21. Age group and vaccination status of pertussis notifications, 2013

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]	32	0	0	0	0	0	0	31	1
6 weeks–2 months	78	38	3	0	0	0	3	27	7
3–4 months	55	17	25	0	0	0	0	9	4
5 months–3 years	550	8	11	330	42	1	25	102	31
4–10 years	535	9	6	54	194	26	54	128	64
11+ years	2289	105	8	21	29	55	251	326	1494
Total	**3539**	**177**	**53**	**405**	**265**	**82**	**333**	**623**	**1601**

[a] Children aged less than six weeks are not eligible for vaccination.

Figure 26. Pertussis notifications by DHB, 2013



Ministry of Health data for 2013 recorded 271 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, which originated in Hong Kong in 1894.

From 1900 to 1911, 21 cases of plague were recorded in New Zealand, nine of which were fatal [29].

Poliomyelitis (polio)

There were no polio notifications in 2013. The New Zealand Paediatric Surveillance Unit carries out active surveillance of acute flaccid paralysis (AFP). In 2013, there were 12 cases of AFP notified to the Unit. All 12 cases have been reviewed by the National Certification Committee for the Eradication of Polio (NCCEP) and have been classified as non-polio.

Since the mass oral polio vaccine (OPV) immunisation campaigns in New Zealand in 1961 and 1962, a total of six polio cases have been reported. All of these cases were either laboratory-confirmed as vaccine-associated (4 cases) or classified as probable vaccine-associated cases (2 cases) [22]. The most recent vaccine-associated case occurred in 1999 [30] but there have been no cases since the inactivated polio vaccine (IPV) replaced OPV in 2002. In 1976, an imported case of wild poliovirus infection was managed in New Zealand after a child arrived unwell from Tonga [22].

Primary amoebic meningoencephalitis

Primary amoebic meningoencephalitis is caused by the amoeboflagellate *Naegleria fowleri*. The last case of primary amoebic meningoencephalitis 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 were fatal and were linked to swimming in geothermal pools in the central North Island [31].

Q fever

Q fever, previously reported under rickettsial diseases, was added to the notifiable infectious diseases schedule in December 2012. No cases of Q fever were notified in 2013. 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 overseas travel during the incubation period for this disease.

Rabies and other lyssaviruses

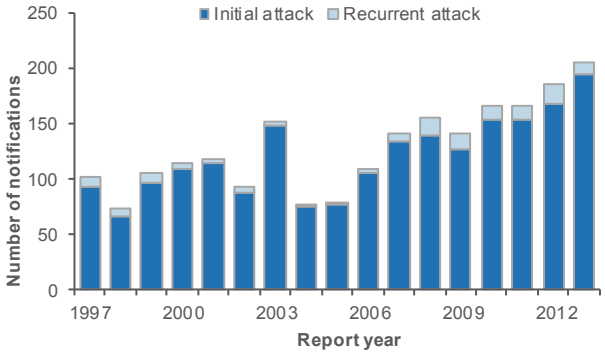
New Zealand is classified as a rabies-free country [32]. There have been no cases of rabies reported in New Zealand since rabies became notifiable in 1996.

The notifiable infectious diseases schedule of the Health Act 1956 was changed in December 2012 to extend rabies notifications to include other lyssaviruses. No cases of other lyssavirus infections were reported in 2013.

Rheumatic fever

In 2013, 194 initial attack cases and 11 recurrent cases of rheumatic fever were notified in New Zealand. This is a rate of 4.3 per 100 000 for initial attack cases and 0.2 per 100 000 for recurrent cases (and an overall rate of 4.6 per 100 000). This is similar to the rate reported for 2012 (4.2 per 100 000). Figure 27 shows the number of initial attack and recurrent cases of rheumatic fever reported each year since 1997.

Figure 27. Rheumatic fever (initial attack and recurrent cases) by year, 1997–2013

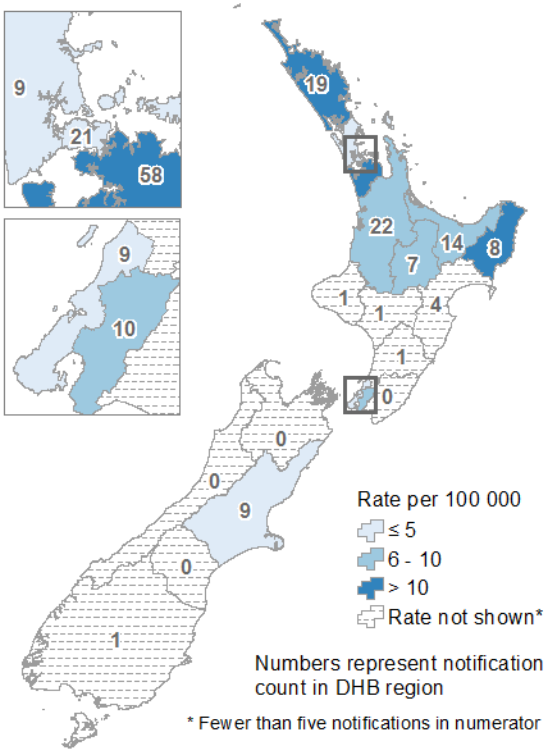


The following analysis is for rheumatic fever initial attack cases. The highest notification rates were among people living in Tairawhiti, Northland and Counties Manukau DHBs (17.1, 12.0 and 11.2 per 100 000 respectively) (Figure 28).

The highest rates were recorded among children aged 10–14 years (33.3 per 100 000), followed by children aged 5–9 years (14.8 per 100 000).

Males had a higher notification rate (5.0 per 100 000) than females (3.7 per 100 000).

Figure 28. Rheumatic fever (initial attack) cases by DHB, 2013



The Pacific Peoples (32.2 per 100 000) and Māori (13.8 per 100 000) ethnic groups had the highest rates of rheumatic fever initial attack in 2013 compared with other ethnic groups.

In 2013, hospitalisation status was recorded for 188 (96.9%) of rheumatic fever initial attack cases, of which 170 (90.4%) were hospitalised.

A total of 156 of the rheumatic fever initial attack notifications were confirmed cases. Of these, 147 (94.2%) were reported as having met the Jones criteria for rheumatic fever [33] and 137 (87.8%) were reported as having evidence of a preceding group A streptococcal infection. The most commonly-reported major clinical manifestations among initial attack cases in 2013 were carditis (82.4%) and polyarthritis (67.3%) (Table 22).

A total of 155 cases occurred in school-aged children (5–17 years). Information on the school attended was provided for 121 cases (78.1%). One case was reported as being home-schooled.

The following analysis is for cases of recurrent rheumatic fever. The 11 recurrent rheumatic fever cases reported in 2013 ranged from nine to 28 years of age, with seven cases in the 20–29 year age group. Seven cases were female and four were male. Seven cases were of Māori ethnicity and four were of Pacific Peoples ethnicity. All recurrent rheumatic fever cases were hospitalised.

The onset date was reported for 177 of the 205 rheumatic fever cases (86.3%). Of these, there was a delay of more than 100 days between the onset date and report date for 28 (15.8%) cases.

Ministry of Health data for 2013 recorded 287 hospitalisations where rheumatic fever was the principal diagnosis.

Table 22. Clinical manifestations for rheumatic fever (initial attack) notifications, 2013

Clinical manifestation	Yes	No	Unknown	Percentage (%)[a]
Major manifestations				
Carditis	131	28	35	82.4
Polyarthritis	113	55	26	67.3
Erythema marginatum	26	101	67	20.5
Subcutaneous nodules	5	112	77	4.3
Minor manifestations				
Elevated erythrocyte sedimentation rate	148	18	28	89.2
Positive C-reactive protein	147	21	26	87.5
Arthralgia	93	50	51	65.0
Fever	95	48	51	66.4
Prolonged PR interval	92	55	47	62.6
Other manifestations				
Indolent carditis	18	61	115	22.8
Chorea	17	113	64	13.1

[a] Percentage refers to the number of cases that answered "yes" out of the total number of cases for which this information was supplied. Most cases had more than one clinical manifestation recorded.

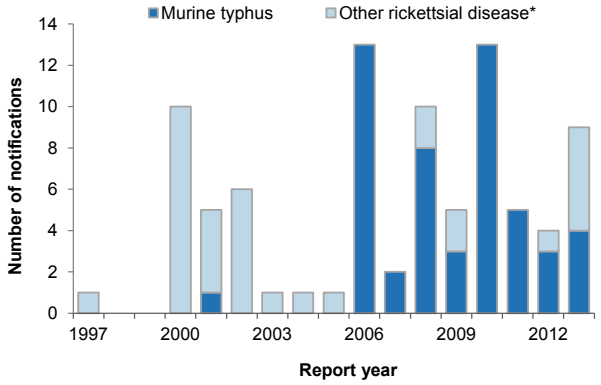
Rickettsial disease

This section includes typhus, murine typhus and other rickettisal diseases caused by organisms of the *Rickettsia* genus. Q fever is discussed separately.

In 2013, nine cases of rickettsial disease were notified compared with four cases in 2012 (Figure 29). The 2013 notification rate was 0.2 per 100 000. Four of these notifications were for murine typhus.

Ministry of Health data for 2013 recorded six hospitalisations for which rickettsial diseases were the principal diagnosis. Of these, two hospitalisations were for murine typhus (*Rickettsia typhi*).

Figure 29. Rickettsial disease notifications, 1997–2013



* Includes all other diseases caused by organisms of the *Rickettsia* genus, except typhus. No cases of typhus (caused by *Rickettsia prowazekii*) were reported between 1997 and 2013.

Murine typhus

In 2013, four laboratory-confirmed cases of murine typhus (caused by *Rickettsia typhi*) were notified, from Waikato (2 cases), Waitemata and Counties Manukau (1 case each) DHBs.

Age and sex were recorded for all murine typhus cases in 2013. The cases were in the 60–69 years (3 cases) and 50–59 years (1 case) age groups. Two cases were male and two female.

Ethnicity was recorded for three (75.0%) cases and all were in the European or Other ethnic group.

Two cases were hospitalised. Three of the cases had not travelled overseas during the incubation period for this disease and are assumed to have acquired their infection in New Zealand.

Typhus

No cases of typhus (caused by *Rickettsia prowazekii*) have been reported from 1997 to 2013.

Other rickettsial diseases

In 2013, five laboratory-confirmed cases of rickettsial disease were notified: spotted fever (*Rickettsia conorii*) (2 cases), scrub typhus (*Orientia tsutsugamushi*) (1 case), *Rickettsia* group not further defined (1 case) and not specified (1 case).

Age, sex and ethnicity were recorded for all rickettsial disease cases. There was one case in each of the following age groups: 15–19 years, 20–29 years, 40–49 years, 50–59 years and 60–69 years. Three cases were male and two were female. The ethnicity of the cases was recorded as follows: European or Other (3 cases), Māori (1 case) and MELAA (1 case).

Two cases were hospitalised. All five of the cases had travelled overseas during the incubation period for this disease.

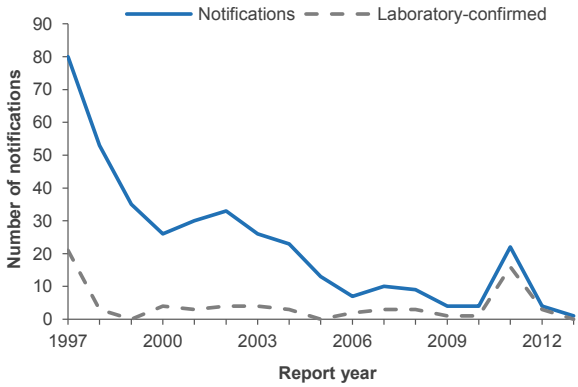
Rubella (German measles)

In New Zealand, rubella immunisation was introduced in 1970 and rubella has been a notifiable disease since June 1996 [22].

One case of rubella was notified in 2013 (compared with four cases in 2012). The case was a female aged less than 1 year and was not laboratory-confirmed.

Since the last national rubella outbreak in 1995, there has been a steady decrease in the number of rubella cases notified each year [22], except for an increase in notifications in 2011 during the measles outbreak (Figure 30).

Figure 30. Rubella notifications and laboratory-confirmed cases by year, 1997–2013

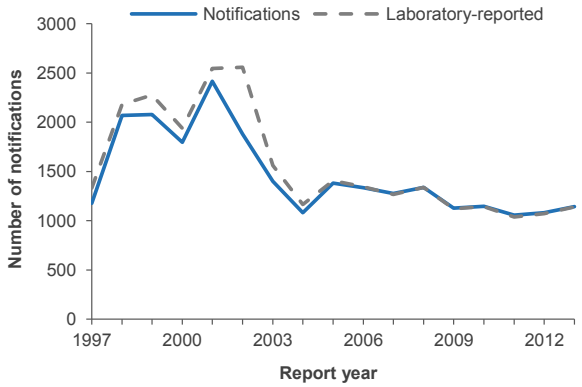


The recommended immunisation schedule for rubella is two doses of the MMR vaccine, with the first given at 15 months of age and the second at four years of age [22]. The young age of the 2013 case (less than 1 year) made them ineligible for vaccination and the case had not travelled overseas during the incubation period for this disease.

Salmonellosis

In 2013, 1143 cases of salmonellosis were notified. The 2013 notification rate (25.6 per 100 000) was similar to the 2012 rate (24.4 per 100 000, 1081 cases). There was a large decrease in the number of salmonellosis notifications between 2001 and 2004 (Figure 31). Notifications have remained relatively stable since 2005.

Figure 31. Salmonellosis notifications and laboratory-reported cases by year, 1997–2013



The salmonellosis notification rate varied throughout the country in 2013 (Figure 32). The highest rates were for Southern (53.9 per 100 000), Nelson Marlborough (36.8 per 100 000) and South Canterbury (36.8 per 100 000) DHBs.

Notification rates were highest for children aged less than 1 year and 1–4 years (106.9 and 81.5 per 100 000 respectively).

Males had a slightly higher notification rate (26.4 per 100 000) than females (24.7 per 100 000).

The highest notification rates were for the European or Other (28.6 per 100 000) ethnic group and the MELAA (26.0 per 100 000) ethnic group, compared with other groups.

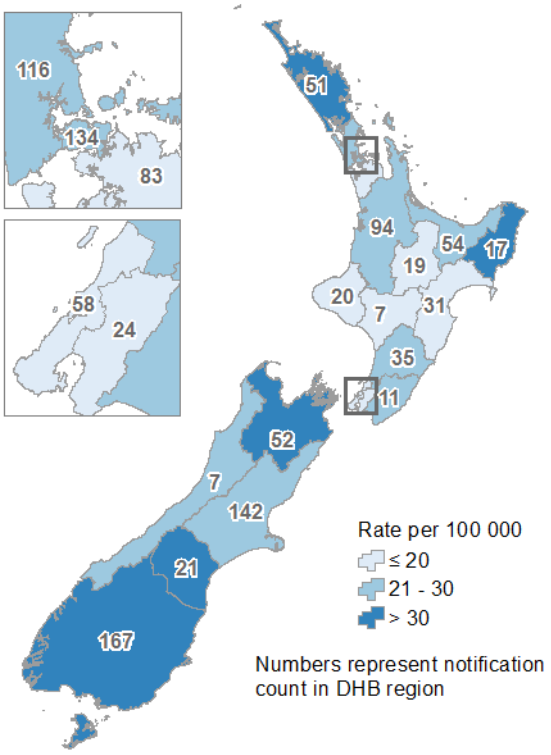
Further information by DHB, sex, age and ethnicity can be found in Tables 44 to 47 in the Appendix.

Hospitalisation status was recorded for 763 (66.8%) cases, of which 129 (16.9%) were hospitalised.

The most common risk factors reported for salmonellosis in 2013 were the consumption of food from retail premises, contact with farm animals and overseas travel (Table 23).

The Enteric Reference Laboratory at ESR reported 1141 cases infected with *Salmonella* (excluding *S.* Paratyphi and *S.* Typhi) in 2013. The most common serotypes identified in 2013 were *S.* Typhimurium phage type 56 variant* (122 cases), *S.* Infantis (70 cases) and *S.* Typhimurium phage type 160 (69 cases).

Figure 32. Salmonellosis notifications by DHB, 2013



A summary of the laboratory-reported cases from 2009 to 2013 for selected *Salmonella* serotypes and phage types is provided in Table 50 in the Appendix.

The annual trend for selected *Salmonella* serotypes in recent years is shown in Figure 33. Between 2009 and 2013, there was a noticeable increase in the number of cases infected with *S.* Stanley and *S. enterica* subsp. *enterica* (I) ser. 4,[5],12 : i : -, which is considered a variant of *S.* Typhimurium (4,[5],12 : i : 1,2). Overseas, the prevalence of this latter serotype has increased considerably since the mid-1990s [34]. Serotypes with a decreasing trend in the last five years include: *S.* Typhimurium phage type 156, *S.* Typhimurium phage type 1 and *S.* Typhimurium phage type 101 (Table 50).

In 2013, 18 outbreaks of salmonellosis (including three outbreaks with more than one implicated pathogen) were reported, involving 98 cases.

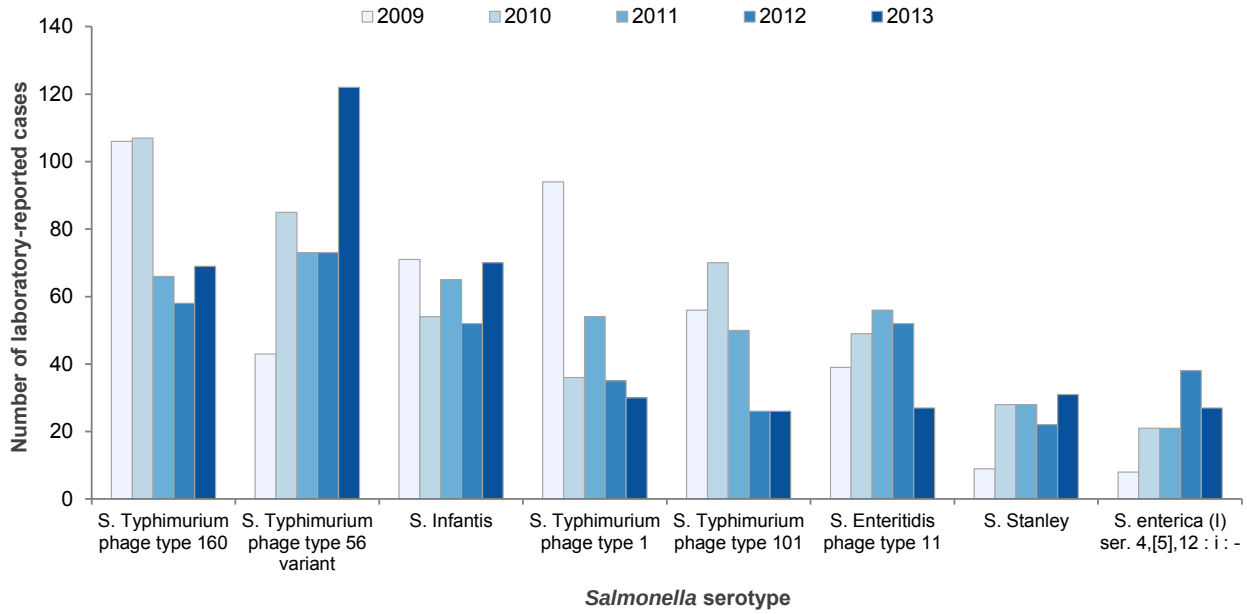
* Prior to 2013 *S.* Typhimurium phage type 56 variant was known as *S.* Typhimurium phage type RDNC-May 06.

Table 23. Exposure to risk factors associated with salmonellosis, 2013

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Consumed food from retail premises	238	327	578	42.1
Contact with farm animals	189	397	557	32.3
Travelled overseas during the incubation period	188	495	460	27.5
Contact with faecal matter	118	437	588	21.3
Consumed untreated water	112	390	641	22.3
Recreational water contact	109	465	569	19.0
Contact with other symptomatic people	57	490	596	10.4
Contact with sick animals	34	488	621	6.5

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

Figure 33. Laboratory-reported cases of selected *Salmonella* serotypes and phage types by year, 2009–2013



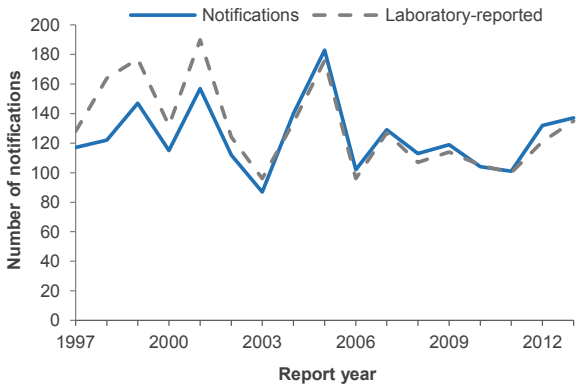
Severe acute respiratory syndrome

There have been no cases of SARS reported in New Zealand since 2003, when 13 suspected cases were notified. One of these cases was in a traveller returning from China [35]. This case was subsequently reported to the WHO as probable SARS. None of the 13 cases tested positive for the SARS coronavirus [36].

Shigellosis

In 2013, 137 cases of shigellosis were notified. The 2013 notification rate (3.1 per 100 000) was similar to the 2012 rate (3.0 per 100 000, 132 cases). After a peak of 183 cases in 2005, the annual totals from 2006 to 2013 have ranged from 101 to 137 cases (Figure 34).

Figure 34. Shigellosis notifications and laboratory-reported cases by year, 1997–2013



The highest shigellosis notification rates in 2013 were in Auckland, Counties Manukau and Southern DHBs (7.9, 7.0 and 3.9 per 100 000 respectively).

Children and younger adults had high rates of shigellosis compared with other age groups. The highest rates were in the 5–9 years age group (5.7 per 100 000), followed by the 1–4 years (4.8 per 100 000) and 20–29 years (4.4 per 100 000) age groups. Females (3.5 per 100 000) had a higher rate than males (2.6 per 100 000).

The Pacific Peoples ethnic group had the highest notification rate (18.8 per 100 000), compared with all other ethnic groups.

Further information by DHB, sex, age and ethnicity can be found in Tables 44 to 47 in the Appendix.

Hospitalisation status was recorded for 77 (56.2%) cases, of which 33 (42.9%) were hospitalised.

The risk factors recorded for shigellosis are shown in Table 24. The most common risk factor was overseas travel during the incubation period (50.8%, 66 cases). The most frequently visited countries reported were Samoa (18 cases) and Indonesia and India (8 cases each).

The Enteric Reference Laboratory at ESR reported 135 cases infected with *Shigella* during 2013. The predominant species identified were *Shigella sonnei* biotype a (35 cases, 25.9%), *Shigella flexneri* (31 cases, 23.0%) and *Shigella sonnei* biotype g (21 cases, 15.6%). The biotype could not be identified for the *Shigella flexneri* isolates.

Ten outbreaks of shigellosis were reported in 2013 involving 40 cases. One outbreak involved more than one implicated pathogen.

Taeniasis

Six cases of taeniasis were notified in 2013 (0.1 per 100 000), bringing the number of cases notified since 1997 to 38.

All cases were overseas during the incubation period for this disease. Countries lived in or visited included Thailand (2 cases), Afghanistan, Cambodia, and Ethiopia (1 case each). One case reported in 2013 had an unknown travel history.

All cases that have been notified in New Zealand since 1997 have reported a history of overseas travel.

Tetanus

One case of tetanus was notified in New Zealand in 2013. This was similar to the number of cases notified each year since 2002 (0–2 cases annually), except in 2010 when seven cases were notified.

The single 2013 case was a female in the 60–69 year age group and was not vaccinated.

Between 1997 and 2013, a total of 31 tetanus cases were reported. Of these, four cases were children under 10 years of age, none of whom were vaccinated. Among the 31 cases, two females in the 70 years and over age group died from tetanus (one was not vaccinated and the vaccination status of the other was unknown).

Ministry of Health data for 2013 recorded four hospitalisations with tetanus as the principal diagnosis in 2013.

Trichinellosis

No cases of trichinellosis were notified in 2013.

Trichinellosis, an infection caused by nematode worms of the genus *Trichinella*, was added to the notifiable disease schedule in 1988. Since 1988, there have been three notifications. An overseas source of infection was suspected for the first case, reported in 1992 [37]. The other two cases were linked to the consumption of infected pork meat in 2001 [38].

Table 24. Exposure to risk factors associated with shigellosis, 2013

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Travelled overseas during the incubation period	66	64	7	50.8
Consumed food from retail premises	16	16	105	50.0
Contact with other symptomatic people	20	21	96	48.8
Contact with faecal matter	9	26	102	25.7
Recreational water contact	9	28	100	24.3
Consumed untreated water	6	24	107	20.0
Contact with farm animals	5	31	101	13.9
Contact with sick animals	0	34	103	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 supplied. Some cases had more than one risk factor recorded.

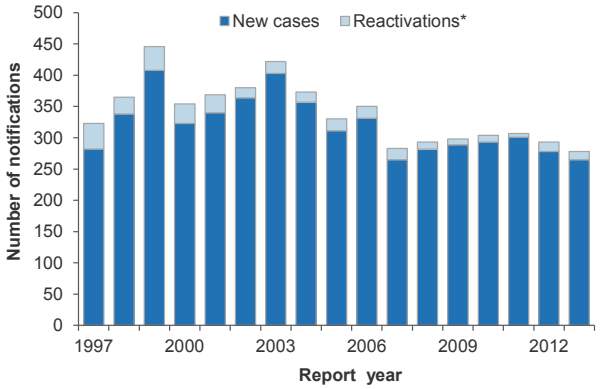
Tuberculosis disease

Tuberculosis disease is one of the most common causes of death from communicable disease worldwide. While most infections are usually curable with early diagnosis and a combination of specific antibiotics, multiple drug resistance in tuberculosis infection has become a major concern worldwide.

A full description of the epidemiology of tuberculosis and data on antimicrobial drug-resistant tuberculosis in New Zealand for 2013 will be reported separately in the report entitled 'Tuberculosis in New Zealand: Annual Report 2013' available at www.surv.esr.cri.nz in September 2014.

In 2013, 278 cases (6.2 per 100 000) of tuberculosis disease (including both new cases and reactivations) were notified, of which 13 (4.7%) were reactivations*. The rate of tuberculosis disease has remained at around six to seven cases per 100 000 over the last five years. In 2013, 227 (81.7%) cases were reported as laboratory-confirmed. Figure 35 shows the total number of new tuberculosis cases and reactivations reported since 1997.

Figure 35. Tuberculosis notifications (new cases and reactivations) by year, 1997–2013



In 2013, two outbreaks of tuberculosis were reported, involving 18 cases.

New tuberculosis cases

In 2013, the rates of new tuberculosis notifications varied by geographical region (Figure 36). Auckland DHB had the highest notification rate (11.5 per 100 000), followed by Capital & Coast DHB (11.0 per 100 000) and Counties Manukau DHB (10.5 per 100 000).

Tuberculosis rates were highest for adults in the 20–29 years age group (11.0 per 100 000) and 30–39 and 70+ years age groups (both 9.8 per 100 000). There were five cases aged 1–4 years.

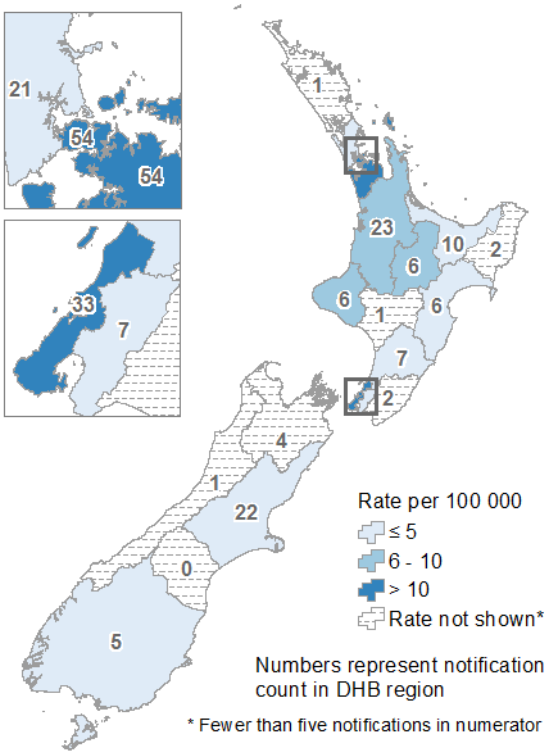
Males had a slightly higher notification rate (6.4 per 100 000) than females (5.5 per 100 000) for new tuberculosis cases.

The Asian ethnic group had the highest notification rate for tuberculosis (30.5 per 100 000), followed by MELAA (26.0 per 100 000) and Pacific Peoples (14.5 per 100 000) ethnic groups.

Further information regarding DHB, sex, age and ethnicity can be found in Tables 44 to 47 in the Appendix.

Hospitalisation status was recorded for 257 (97.0%) new tuberculosis disease cases in 2013, of which 157 (61.1%) were hospitalised. Two deaths due to tuberculosis were reported in 2013; both were aged over 70 years.

Figure 36. Tuberculosis notifications (new cases) by DHB, 2013



Bacillus Calmette-Guérin (BCG) vaccination status was recorded for 121 (45.7%) cases, of which 92 (76.0%) had been vaccinated. Of the five cases aged under five years, two reported having received the BCG vaccine, two had not been vaccinated and the vaccination status was unknown for the fifth case. None of these cases were recorded as having meningeal or miliary tuberculosis.

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

The majority of cases were born outside New Zealand (208/261 cases for whom information was available, 79.7%). Among the 53 cases born in New Zealand, nine had been or were presently living with a person born outside New Zealand.

Approximately 22.4% (46/205) of new tuberculosis cases reported contact with a confirmed case of tuberculosis.

Ministry of Health data for 2013 recorded 199 hospitalisations where tuberculosis was the principal diagnosis. In 2011, six deaths were reported with tuberculosis as the underlying (main) cause of death.

Reactivations of tuberculosis

The 13 tuberculosis reactivation cases reported in 2013 were from seven DHBs: Capital & Coast (4 cases), Auckland (3 cases), Counties Manukau (2 cases), Waitemata, Waikato, Canterbury and Southern (1 case each). The cases were evenly spread across age groups, with most cases in the 70 years or over age group (4 cases). Eight cases were in the Asian ethnic group and the Māori, MELAA, Pacific Peoples and European or Other ethnic groups had one case each. Ethnicity was unknown for one case.

Information regarding the place of birth, place of original diagnosis and whether the person had been previously treated for tuberculosis disease was recorded for nine of the reactivation cases. All nine cases were born and diagnosed overseas and all had been previously treated for the disease.

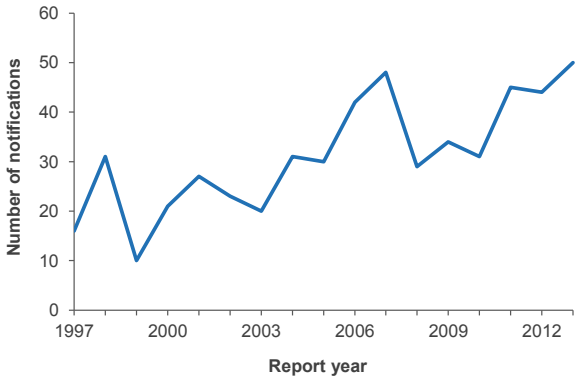
Hospitalisation status was recorded for all reactivation cases, of which five cases were hospitalised. There were no deaths reported among the reactivation cases.

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

Typhoid fever

There were 50 cases of typhoid fever notified in 2013. The 2013 notification rate (1.1 per 100 000) was similar to the 2012 rate (1.0 per 100 000, 44 cases). Figure 37 shows the general increasing trend in the annual number of typhoid fever notifications since 1997.

Figure 37. Typhoid fever notifications by year, 1997–2013



In 2013, 39 cases (78.0%) were reported in the Auckland region (including Waitemata, Auckland and Counties Manukau DHBs). The highest notification rates were for Counties Manukau (4.1 per 100 000, 21 cases) and Auckland (2.8 per 100 000, 13 cases) DHBs.

Notification rates were highest for the 20–29 years (2.5 per 100 000, 16 cases), 15–19 years (2.0 per 100 000, 6 cases) and 40–49 years (1.1 per 100 000, 7 cases) age groups.

Males had a slightly higher notification rate (1.4 per 100 000, 31 cases) than females (0.8 per 100 000, 19 cases).

The highest notification rates were for the Pacific Peoples (11.6 per 100 000, 32 cases) and Asian (2.7 per 100 000, 14 cases) ethnic groups.

Hospitalisation status was recorded for 45 (90.0%) cases, of which 37 (82.2%) were hospitalised.

Of the 50 cases notified in 2013, 34 (68.0%) reported overseas travel during the incubation period for this disease, 15 cases had not travelled overseas and the travel history was unknown for one case. The countries lived in or visited included Samoa (17 cases), India (12 cases), Fiji (2 cases) and Indonesia, Pakistan, Singapore and Philippines (1 case each). It should be noted that some cases reported travelling to more than one country.

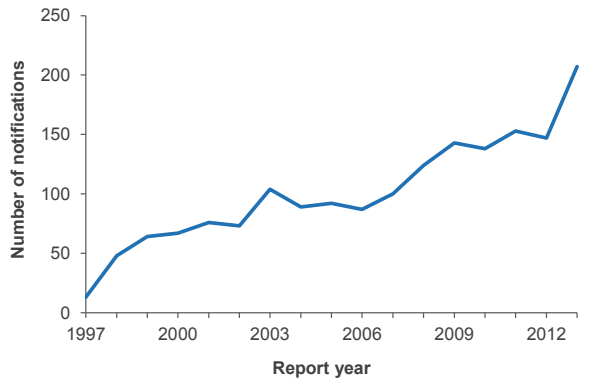
The Enteric Reference Laboratory at ESR reported 50 cases of infection with *Salmonella* Typhi in 2013. The most common phage types identified were *S.* Typhi phage type E1a and *S.* Typhi phage type E7 variant (13 cases each).

Three outbreaks due to typhoid fever were reported in 2013, involving 11 cases.

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

There were 207 cases of verocytotoxin- or shiga toxin-producing *Escherichia coli* (VTEC/STEC) infection notified in 2013. The 2013 notification rate (4.6 per 100 000) was significantly higher than the 2012 rate (3.3 per 100 000, 147 cases). There has been an increasing trend in the number of notifications of VTEC/STEC infection since 1997 (Figure 38). This may be partly due to changes in laboratory testing practices, with increasingly sensitive assays and algorithms used for the detection of VTEC/STEC.

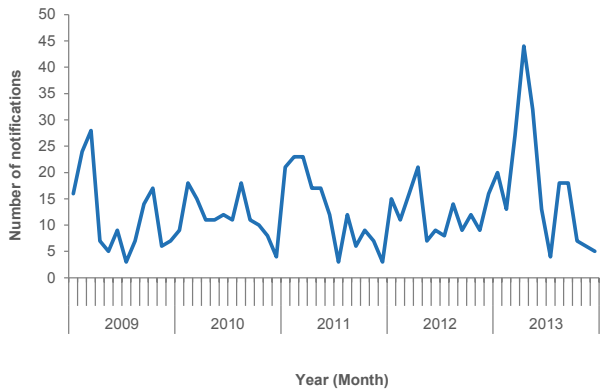
Figure 38. VTEC/STEC notifications by year, 1997–2013



Twenty paediatric cases of VTEC/STEC-associated haemolytic uraemic syndrome (HUS) were reported to the New Zealand Paediatric Surveillance Unit (NZPSU) in 2013.

VTEC/STEC infection notifications follow a seasonal pattern with peaks occurring during autumn and spring each year (Figure 39). The highest monthly total occurred in April 2013 when 44 cases were notified. Seven outbreaks of VTEC/STEC infection were reported in April, involving 32 cases.

Figure 39. VTEC/STEC infection notifications by month, January 2009–December 2013



The rate for VTEC/STEC infection notifications varied throughout the country, with the highest rates in Waikato, South Canterbury and Taranaki DHBs (11.8, 8.8 and 8.1 per 100 000 respectively) (Figure 40).

Children aged 1–4 years had the highest notification rate (26.6 per 100 000, 66 cases), followed by children aged less than 1 year (20.0 per 100 000, 12 cases).

Females had a higher notification rate (5.3 per 100 000) than males (3.9 per 100 000).

The European or Other ethnic group had the highest notification rate (5.8 per 100 000, 172 cases), compared with other ethnic groups (Māori, 3.1 per 100 000 and Pacific Peoples, 1.4 per 100 000).

Further information regarding DHB, sex, age and ethnicity can be found in Tables 44 to 47 in the Appendix.

Hospitalisation status was recorded for 174 (84.1%) notified cases, of which 73 (42.0%) were hospitalised. Among the 73 hospitalised cases, 15 had HUS.

The most common risk factors reported for VTEC/STEC infection cases reported in 2013 were contact with pets, farm animals and animal manure as shown in Table 25.

The most common foods consumed by cases in 2013 were raw fruit or vegetables, dairy products and chicken or poultry products (Table 26).

Figure 40. VTEC/STEC infection notifications by DHB, 2013

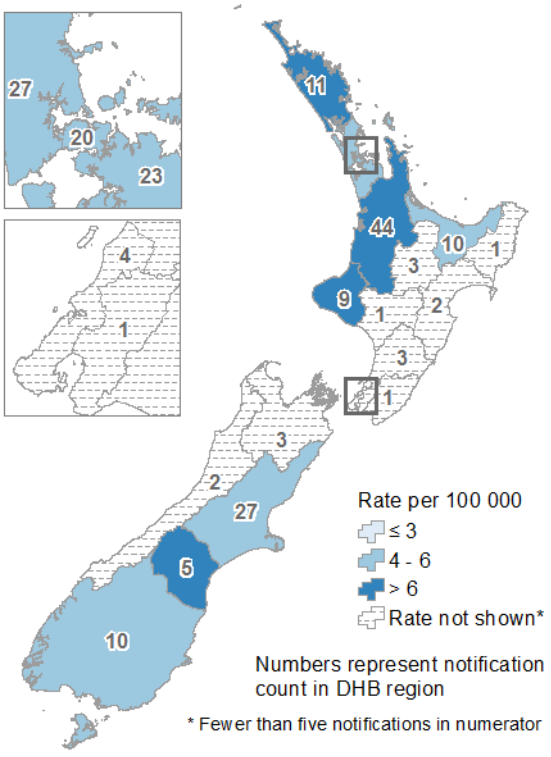


Table 25. Exposure to risk factors associated with VTEC/STEC infection, 2013

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Contact with pets	81	12	114	87.1
Contact with farm animals	57	33	117	63.3
Contact with animal manure	32	39	136	45.1
Contact with children in nappies	44	76	87	36.7
Contact with recreational water	46	89	72	34.1
Contact with other animals	25	50	132	33.3
Contact with a person with similar symptoms	37	106	64	25.9
Travelled overseas during the incubation period	6	148	53	3.9

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

Table 26. Foods consumed by VTEC/STEC infection cases, 2013

Foods consumed	Yes	No	Unknown	Percentage (%)[a]
Raw fruit or vegetables	123	8	76	93.9
Dairy products	114	16	77	87.7
Chicken or poultry	104	21	82	83.2
Beef or beef products	96	28	83	77.4
Processed meat	65	59	83	52.4
Fruit or vegetable juice	56	60	91	48.3
Lamb or hogget or mutton	43	70	94	38.1
Home kill meat	40	83	84	32.5
Unpasteurised milk or milk products	15	117	75	11.4
Pink or undercooked meat	10	105	92	8.7

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

The Enteric Reference Laboratory at ESR reported 215 cases infected with VTEC/STEC in 2013. Of these, 192 (89.3%) were identified with serotype O157:H7 and 22 (10.2%) with non-O157 serotypes. The serotype was undetermined in one case but verocytotoxin was detected by PCR.

Sixteen outbreaks of VTEC/STEC infection (including two outbreaks with more than one implicated pathogen) were reported in 2013, and involved 58 cases.

Viral haemorrhagic fevers

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

Yellow fever

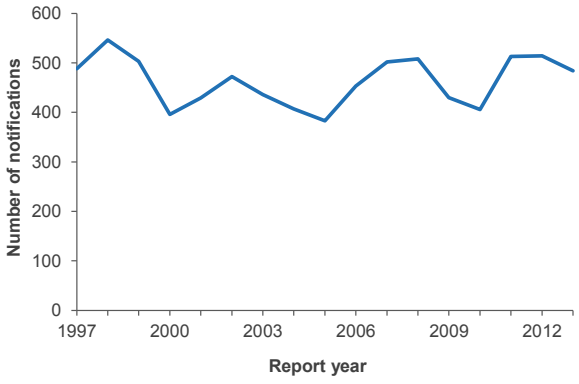
No cases of yellow fever have been notified in New Zealand since at least 1996.

Yersiniosis

In 2013, 484 cases of yersiniosis were notified. The 2013 notification rate (10.8 per 100 000) was slightly lower than the 2012 rate (11.6 per 100 000, 514 cases).

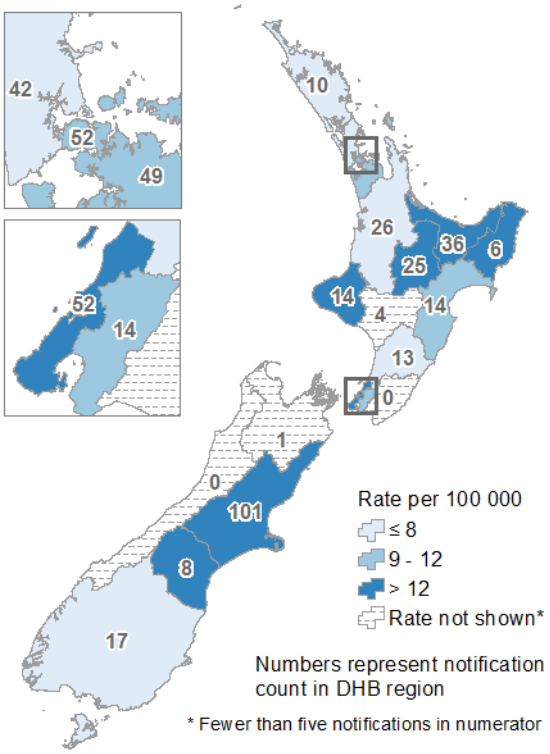
Figure 41 shows the number of notified yersiniosis cases by year since 1997.

Figure 41. Yersiniosis notifications by year, 1997–2013



In 2013, the highest rates of yersiniosis were found in people living in Lakes, Canterbury and Capital & Coast DHBs (24.3, 19.9 and 17.3 per 100 000 respectively) (Figure 42).

Figure 42. Yersiniosis notifications by DHB, 2013



Infants aged less than 1 year and children aged 1–4 years had the highest rates of disease (68.5 and 39.2 per 100 000).

Males had a slightly higher notification rate (11.6 per 100 000) than females (10.0 per 100 000).

The highest notification rate was in the Asian ethnic group (17.1 per 100 000), followed by the European or Other (10.2 per 100 000) and MELAA (10.0 per 100 000) ethnic groups.

Further information by DHB, sex, age and ethnicity can be found in Tables 44 to 47 in the Appendix.

Hospitalisation status was recorded for 313 (64.7%) notified cases, of which 33 (10.5%) were hospitalised.

The risk factors recorded for yersiniosis cases are shown in Table 27. The most common risk factors reported were the consumption of food from retail premises and contact with farm animals.

The Enteric Reference Laboratory at ESR identified 398 isolates as *Yersinia enterocolitica* and 12 isolates as *Yersinia pseudotuberculosis* during 2013. The most common *Yersinia enterocolitica* biotype identified was biotype 4 (143 cases, 35.9%), followed by biotype 2 (89 cases, 22.4%), biotype 1A (89 cases, 22.4%) and biotype 3 (76 cases, 18.8%).

Three outbreaks due to *Yersinia* were reported in 2013, involving 13 cases.

Table 27. Exposure to risk factors associated with yersiniosis, 2013

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Consumed food from retail premises	82	126	276	39.4
Contact with farm animals	59	172	253	25.5
Contact with faecal matter	52	156	276	25.0
Consumed untreated water	48	159	277	23.2
Recreational water contact	38	184	262	17.1
Contact with other symptomatic people	26	188	270	12.1
Travelled overseas during the incubation period	14	224	246	5.9
Contact with sick animals	11	205	268	5.1

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

NON-NOTIFIABLE DISEASES

NON-NOTIFIABLE DISEASES

Influenza

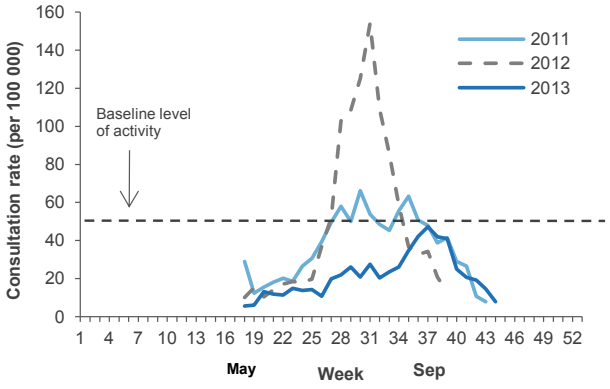
A full report on influenza surveillance in New Zealand for 2013 is provided separately in the report entitled 'Influenza Surveillance in New Zealand 2013', available at www.surv.esr.cri.nz [39].

On average, 67 practices, with a total patient roll of 371 146, participated in the influenza sentinel surveillance system each week from May to September, the usual influenza season in New Zealand. During the surveillance period, 1802 consultations for influenza-like illness (ILI) were reported. Based on this, the cumulative incidence rate of ILI consultations was 485.5 per 100 000 patient population. This rate is considerably lower than the cumulative incidence rate for 2012 (1087.0 per 100 000) and 2011 (816.4 per 100 000). It is estimated that ILI resulting in a visit to a general practitioner affected over 21 000 people in New Zealand (0.5% of the total population) [39].

The average weekly consultation rate from May to September 2013 was 22.6 per 100 000 patient population compared with 50.2 per 100 000 in 2012 and 40.4 per 100 000 in 2011.

Overall, influenza activity in 2013 was at a low level. The influenza consultation rate was below the baseline level (50.0 per 100 000) during the surveillance period (weeks 18 to 44). It peaked in week 37, with a consultation rate of 47.3 per 100 000 patient population (Figure 43). The 2013 peak was lower than the peaks in 2012 and 2011 (154.1 and 66.1 per 100 000, respectively).

Figure 43. Weekly sentinel surveillance consultation rates for influenza-like illness, 2011–2013



*In 2011, surveillance and reporting was extended by a month to cover the Rugby World Cup held during September and October. In 2013, surveillance and reporting was extended by a month to capture the peak consultation rate.

The consultation rate varied among DHBs, with the highest rates being recorded for South Canterbury (76.3 per 100 000 patient population) and Waitemata (44.6 per 100 000) DHBs (Figure 44).

Figure 44. Sentinel average weekly consultation rates for influenza-like illness by DHB, 2013

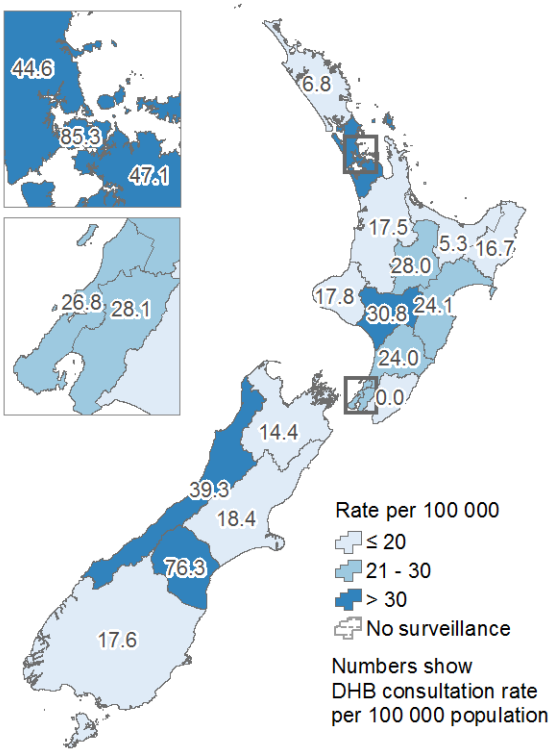
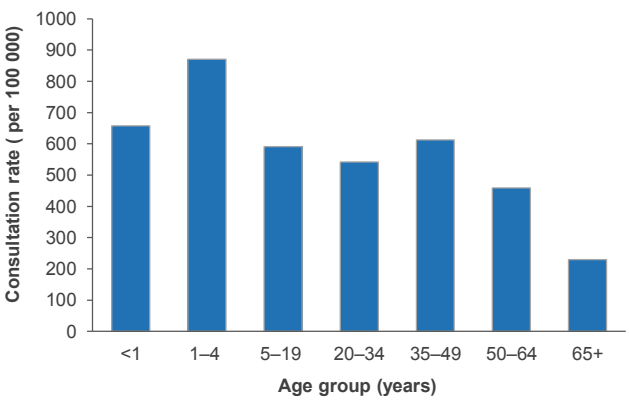


Figure 45 shows cumulative ILI consultation rates by age group. The highest consultation rates for ILI were for children in the 1–4 years age group (870.6 per 100 000 patient population) and for those in the less than 1 year age group (658.0 per 100 000). Elderly people (aged 65 years and older) had the lowest ILI consultation rate at 230.1 per 100 000.

Figure 45. Sentinel cumulative consultation rates for influenza-like illness by age group, 2013



Ministry of Health data for 2013 recorded 782 hospitalisations with the primary reason for admission being influenza. This number was lower than for 2012 (1076) but higher than in 2011 (526). Figure 46 shows the number of hospitalisations by week discharged, of which 86.7% (676) occurred from June to October. The highest number of hospitalisations (247) occurred in September.

In addition to testing the respiratory samples as part of the influenza sentinel surveillance system, year-round laboratory-based surveillance (non-sentinel) of influenza is carried out by four regional virus diagnostic laboratories in New Zealand, and by the National Influenza Centre at ESR.

In 2013, a total of 2326 influenza viruses were identified from sentinel and non-sentinel surveillance. This was lower than in 2012 (2425) but higher than in 2011 (1268) viruses. Of the 2326 viruses identified, 196 came from sentinel practice surveillance. These 196 viruses were detected from 602 specimens, resulting in a detection rate of 32.6%. There were 2130 viruses identified from non-sentinel surveillance in 2013.

In 2013, the number of hospitalisations, sentinel and non-sentinel influenza viruses detected, and ILI consultations peaked between weeks 36 and 37.

Figure 47 shows the number and percentage of typed and subtyped influenza viruses from 1990 to 2013. There are noticeable changes in the predominant patterns, which are described in the following sections for the previous 11 years (2003–2013).

In 2013, influenza A viruses were most common (60.4%, 1405/2326), with influenza B viruses representing 39.6% (921/2326) of all viruses. The percentage of A(H1N1)pdm09 (2009 pandemic strain) viruses was low (12.9%, 300/2326).

Figure 46. Influenza hospitalisation by week discharged, 2013

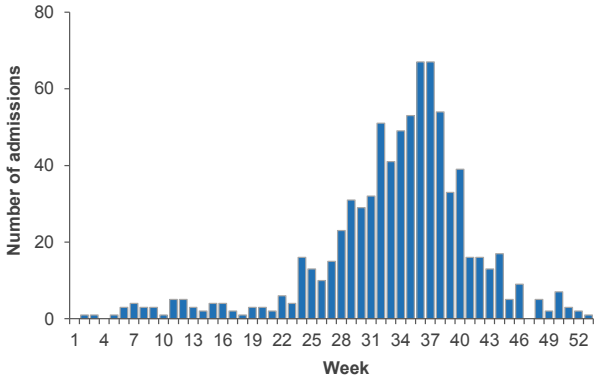
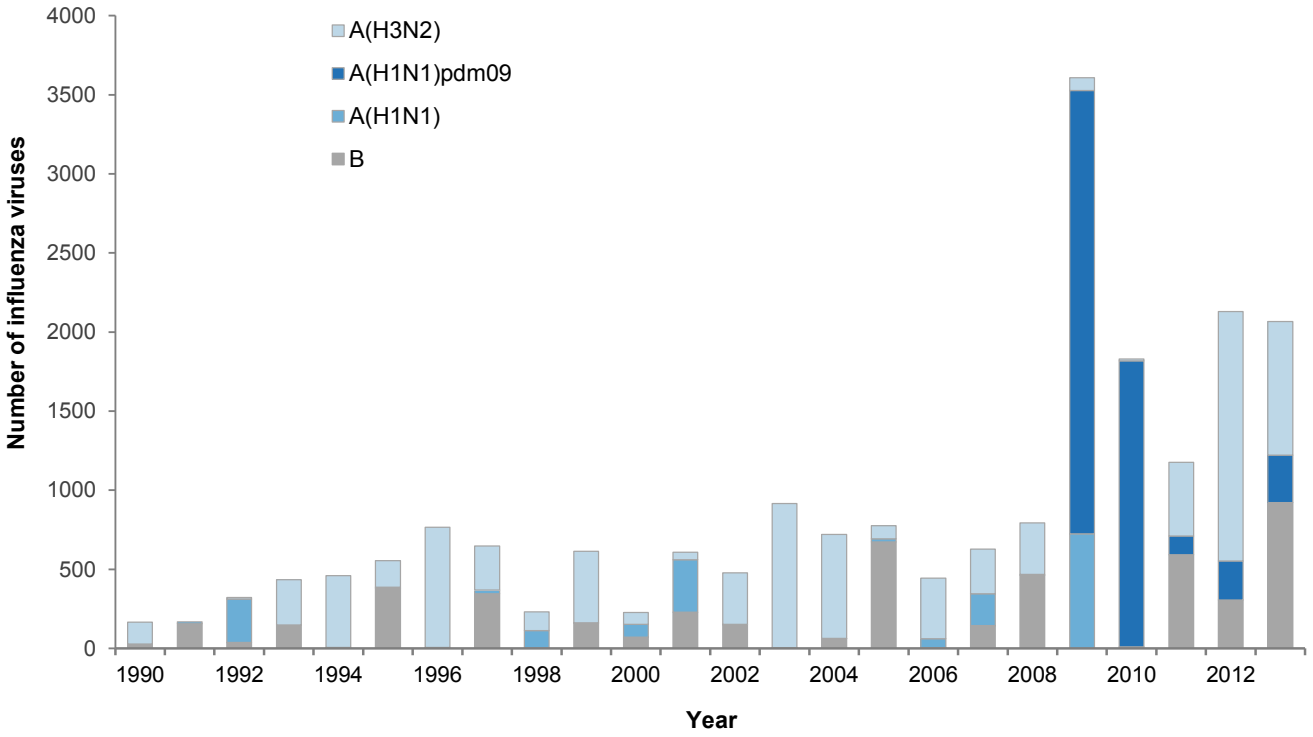


Figure 47. Influenza viruses by type, 1990–2013



Influenza A(H1N1) viruses

In 2013, influenza A(H1N1) viruses represented 12.9% of all viruses and 14.5% (300/2066) of all typed and subtyped viruses. All of these were the pandemic strain, A(H1N1)pdm09. The antigenic data from New Zealand isolates indicates that most of the A(H1N1)pdm09 currently circulating viruses were closely related to the vaccine strain A/California/7/2009 (H1N1). The seasonal influenza A(H1N1) viruses that were circulating before the emergence of the A(H1N1)pdm09 strain have not been detected in New Zealand since 2010.

Influenza A(H3N2) viruses

In 2013, influenza A(H3N2) viruses made up 36.3% (845/2326) of all viruses and 40.9% (845/2066) of all typed and subtyped viruses. The A(H3N2) viruses were closely related to the vaccine strain A/Victoria/361/2011-like or A/Texas/50/2012-like strain (A strain antigenically similar to A/Victoria/361/2011-like strain).

From 2003 to 2012, influenza A(H3N2) viruses were predominant for five seasons: 2003 (99.6%), 2004 (91.3%), 2006 (86.3%), 2007 (45.0%) and 2012 (74.0%).

Influenza A viruses that were not typed or subtyped accounted for 11.2% (260/2326) of all viruses.

Influenza B viruses

In 2013, influenza B viruses were the predominant influenza type, representing 39.6% (921/2326) of all viruses detected, of which 319 were antigenically typed: 6 as B/Victoria lineage (B/Brisbane/60/2008-like) and 313 as B/Yamagata lineage (B/Wisconsin/1/2010-like).

Since the 2002 introduction of the B/Victoria lineage viruses into New Zealand, this strain and B/Yamagata lineage viruses have been co-circulating in New Zealand. B/Victoria lineage viruses have predominated over the B/Yamagata lineage viruses every three years (in 2005, 2008 and 2011). In New Zealand, the influenza B viruses have been associated with a high disease burden in young children. The B/Victoria lineage viruses have been more associated with outbreaks involving schools compared with outbreaks of B/Yamagata lineage viruses. Two lineages of influenza B viruses (B/Victoria and B/Yamagata lineages) were co-circulating in 2013, with an increased proportion of B/Yamagata lineage viruses. The B/Yamagata lineage viruses have drifted from the B/Wisconsin/1/2010-like strain to the B/Massachusetts/2/2012-like strain.

B/Wisconsin/1/2010-like strain was the vaccine strain in 2013.

Oseltamivir resistance monitoring

In 2013, the fluorometric neuraminidase inhibition assay against oseltamivir and zanamivir were tested for 712 and 710 influenza viruses respectively. All viruses tested were sensitive to oseltamivir and zanamivir.

Influenza vaccine strain recommendations

Characterisation of the influenza viruses isolated during winter 2013 indicated a need to change the vaccine strains. Accordingly, the 2014 Southern Hemisphere winter influenza vaccine has the following composition:

A(H1N1)	an A/California/7/2009 (H1N1)pdm-like strain*
A(H3N2)	an A/Texas/50/2012 (H3N2)-like strain
B	a B/Massachusetts/2/2012-like strain

Influenza immunisation is recommended for people at increased risk of complications from influenza due to their age or medical conditions. Influenza vaccination has been free for people aged 65 years and over since 1997. Since 1999, it has been available to younger people with chronic illnesses who are at risk of developing complications from influenza. Free influenza vaccination has been available for pregnant women since 2009 and children under five with significant respiratory illness since 2013.

* Note: A/California/7/2009 (H1N1)-like strain is an influenza A(H1N1)pdm09 strain.

Sexually transmitted infections

This section summarises the epidemiology of sexually transmitted infections (STIs) for 2013, and examines trends since 2009 using both clinic-based surveillance and laboratory-based surveillance. A full description will be provided separately in the report entitled 'Sexually Transmitted Infections in New Zealand: Annual Surveillance Report 2013' available from www.surv.esr.cri.nz in June 2014.

The AIDS Epidemiology Group (AEG) carries out national surveillance of AIDS and HIV. A summary of the AIDS notifications for 2013 can be found in the section of this report entitled 'Acquired immunodeficiency syndrome'.

Laboratory surveillance methods

Laboratory-based surveillance of gonorrhoea and chlamydia began in the Waikato and Bay of Plenty regions in 1998. The Auckland region began contributing gonorrhoea data in 1998, and added chlamydia data in 2001. Since 2004 laboratories from other DHBs have joined the STI surveillance programme.

Chlamydia and gonorrhoea data was voluntarily provided from 43 participating laboratories across all DHBs in New Zealand in 2013. Population-based rates of chlamydia and gonorrhoea for most DHBs and estimates of national disease rates based on the data from these DHBs have been reported since 2009. This enables comprehensive regional and national population estimates of STI incidence to be made.

The implementation of improved STI data collection and analysis methods in 2013 has produced new estimates of national and DHB population rates for STIs. These improvements allow for the exclusion of repeat tests for an individual within a defined episode period (eg, 42 days for chlamydia), as well as extending coverage for chlamydia to all DHBs in New Zealand and coverage for gonorrhoea to all DHBs except Northland.

As a result of these changes, chlamydia and gonorrhoea population rates for 2013 onwards are not directly comparable with the rates reported prior to 2013. Limited trend analyses are therefore presented here.

The following DHBs have been combined for reporting purposes: Auckland, Waitemata and Counties Manukau DHBs (Labtests), and Hutt Valley and Capital & Coast DHBs (Aotea Pathology).

There was a substantial increase in the number of laboratories using nucleic acid amplification testing (NAAT) for gonorrhoea in late 2011 and in 2012. In addition, three other laboratories introduced NAAT testing in 2013. Increased detection of gonorrhoea is expected due to the improvements in test sensitivity and the ability to test for gonorrhoea in samples from a wider range of sites.

Clinic-based surveillance methods

Data on cases of chlamydia, gonorrhoea, genital herpes, genital warts, syphilis and non-specific urethritis (NSU) is submitted from sexual health clinics (SHCs) and family planning clinics (FPCs).

The number of STI cases reported through the clinic-based surveillance system underestimates the true burden of disease in New Zealand because a substantial number of STIs are diagnosed by other health providers, particularly GPs.

There was little variation in the number of clinic visits between 2012 (79 430 for SHCs and 178 508 for FPCs) and 2013 (80 829 for SHCs and 158 050 for FPCs). The number of visits to SHCs and FPCs decreased by approximately 4% and 16% respectively between 2009 and 2013. In 2013, more females than males were seen in each clinic setting: SHCs (59.0% female) and FPCs (96.1% female).

Chlamydia

Chlamydia data was available from both laboratory- and clinic-based surveillance sources in 2013. In 2013, genital *Chlamydia trachomatis* infection was the most commonly reported STI in New Zealand.

Laboratory surveillance

2013 analysis

In 2013, 42 laboratories from all DHBs in New Zealand provided chlamydia data, all of which met the selection criteria for chlamydia reporting. A total of 388 472 specimens were tested for chlamydia, of which 30 346 (7.8%) specimens from 28 316 patients tested positive. This represents an estimated national rate of 633 cases per 100 000 for laboratory-confirmed chlamydia.

Table 28 shows the percentage of specimens that tested positive for chlamydia, and the number and rate per 100 000 of laboratory-confirmed chlamydia cases by DHB and sex for 2013.

The national rate of chlamydia for females (888 per 100 000) was more than twice the national rate for males (367 per 100 000). The highest rate of chlamydia was in Tairawhiti (1465 per 100 000), followed by Lakes (1217 per 100 000) and Hawke's Bay (850 per 100 000) DHBs.

Table 28. Percentage of specimens testing positive for chlamydia, and the number and rate per 100 000 population of laboratory-confirmed chlamydia cases by sex and DHB, 2013

District Health Board[a]	Specimens testing positive (%)	Male		Female		Total[a]	
		Cases[b]	Rate[c]	Cases[b]	Rate[c]	Cases[b]	Rate[c]
Northland	9.0	167	214	605	750	774	488
Auckland region[d]	7.0	2990	393	6798	866	9793	634
Waikato	9.1	740	402	1892	1002	2633	706
Lakes	11.4	297	579	955	1803	1253	1217
Bay of Plenty	9.1	362	349	1094	1001	1480	695
Tairawhiti	15.3	180	786	503	2107	684	1465
Taranaki	7.4	145	265	417	743	563	509
Hawke's Bay	11.9	316	420	1004	1260	1321	850
Whanganui	10.8	100	333	304	981	404	647
MidCentral	9.5	303	365	740	852	1044	615
Wellington region[e]	6.8	774	357	1821	803	2613	589
Wairarapa	10.3	49	247	175	842	224	551
Nelson Marlborough	7.4	182	261	465	651	647	458
West Coast	7.0	39	235	108	674	150	459
Canterbury	6.8	827	328	1770	694	2601	513
South Canterbury	9.3	58	206	199	688	272	477
Southern	6.9	546	356	1306	836	1860	600
Total	**7.8**	**8075**	**367**	**20156**	**888**	**28316**	**633**

[a] Total includes cases where sex was unknown.
[b] Number of laboratory-confirmed cases.
[c] Rate of laboratory-confirmed cases per 100 000 population (repeat tests excluded).
[d] Includes Waitemata, Auckland and Counties Manukau DHBs.
[e] Includes Hutt Valley and Capital & Coast DHBs.

The lowest rates of chlamydia were in Nelson Marlborough (458 per 100 000), West Coast (459 100 000) and South Canterbury (477 per 100 000) DHBs. Chlamydia rates by DHB for 2013 are shown in Figure 48.

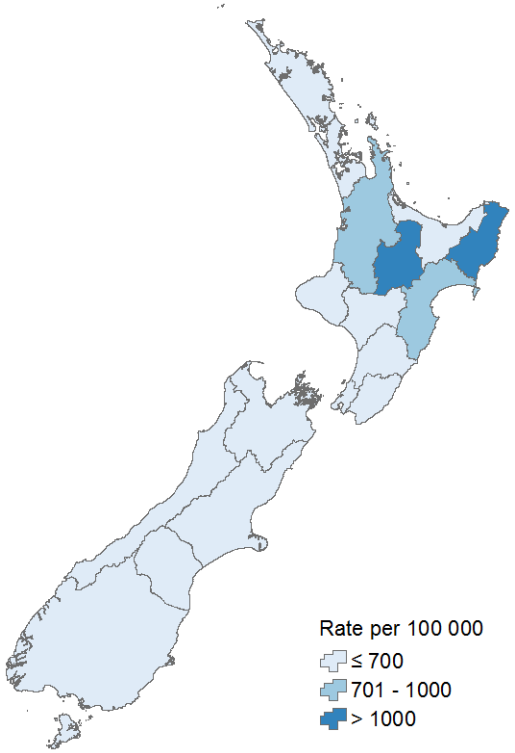
Trend analysis

In 2013 the national rate for chlamydia (excluding repeat tests) was 633 per 100 000. The 2013 rate was lower than the 2012 estimate (744 per 100 000) and the estimates for 2009–2011 (781–786 per 100 000).

The comparison of 2013 national and DHB rates with the 2009-2012 estimated rates should be interpreted with caution due to the introduction of a process to exclude repeat tests for an individual and the addition of DHBs that were not previously reporting. However, to directly compare 2013 data with previous years, an annual rate was estimated for 2013 using only the 15 DHBs that contributed data from 2009–2012 and including repeat tests for 2013. The estimated rate for 2013 (714 per 100 000) was lower than the 2012 estimate (744 per 100 000) and the estimates for 2009–2011 (781–786 per 100 000).

Lakes and Tairawhiti DHBs continue to have the highest chlamydia rates, and West Coast DHB continues to have a low rate.

Figure 48. Chlamydia rates by DHB, 2013



Clinic surveillance

The number of confirmed cases of chlamydia reported by SHCs and FPCs in 2013 was 4987 cases and 2745 cases, respectively (Table 29).

Table 29. Number of confirmed chlamydia cases by clinic setting and sex, 2013

Sex	Clinic type	
	Sexual health clinics (SHCs)	Family planning clinics (FPCs)
Male	2433	443
Female	2550	2299
Total[a]	**4987**	**2745**

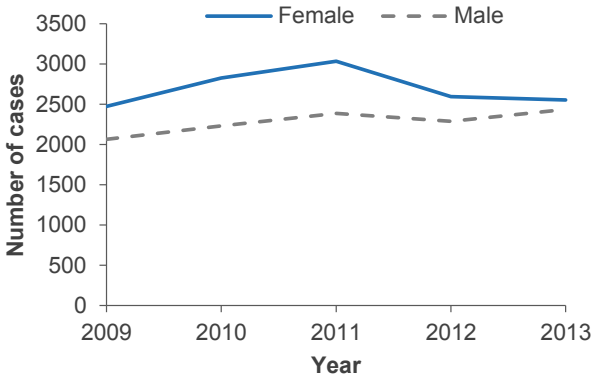
[a] Total includes cases where sex was unknown.

From 2012 to 2013, the number of chlamydia cases reported by SHCs increased by 2.1% (4884 to 4987 cases). The number of clinic visits for SHCs increased by 0.7% from 2012 to 2013. Over the same period, the number of cases reported by FPCs decreased by 4.3% (2867 to 2745 cases). The number of clinic visits for FPCs decreased by 11.5% from 2012 to 2013.

Over the five year period from 2009 to 2013, the number of chlamydia cases reported by SHCs increased by 9.9% (4536 to 4987 cases). In contrast, the number of chlamydia cases reported by FPCs decreased by 19.5% (3412 to 2745 cases).

During this period, the number of chlamydia cases reported by SHCs increased by 17.9% for males (2063 to 2433 cases) and by 3.1% for females (2473 to 2550 cases) (Figure 49).

Figure 49. Number of confirmed chlamydia cases reported by SHCs by year, 2009–2013



Genital herpes (first presentation)

Genital herpes data was sourced from clinic-based surveillance in 2013.

In 2013, there were 855 cases of genital herpes (first presentation) reported by SHCs and 255 cases reported by FPCs, (Table 30).

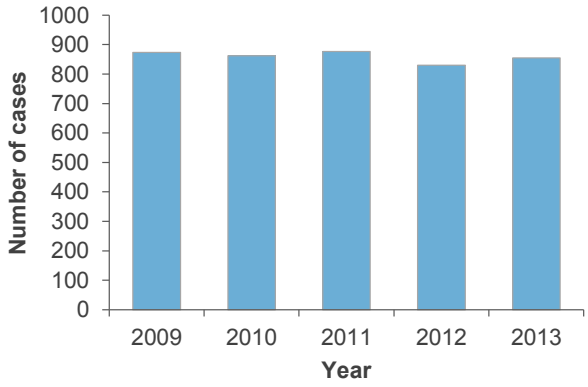
Table 30. Number of genital herpes (first presentation) cases by clinic setting and sex, 2013

Sex	Clinic type	
	Sexual health clinics (SHCs)	Family planning clinics (FPCs)
Male	380	58
Female	475	196
Total[a]	**855**	**255**

[a] Total includes cases where sex was unknown.

From 2009 to 2013, genital herpes cases reported by SHCs decreased by 2.2% (874 to 855 cases) (Figure 50), while genital herpes cases reported by FPCs increased by 30.1% (196 to 255 cases). Routine clinic surveillance methods in New Zealand do not collect data on the type of herpes simplex virus infection, so it is not possible to determine whether the trends in genital herpes differ by type of viral infection.

Figure 50. Number of cases of genital herpes (first presentation) reported by SHCs by year, 2009–2013



Genital warts (first presentation)

Genital warts data was sourced from clinic-based surveillance in 2013.

In 2013, the number of genital warts (first presentation) cases reported by SHCs and FPCs was 1854 cases and 248 cases, respectively (Table 31).

Table 31. Number of genital warts (first presentation) cases by clinic setting and sex, 2013

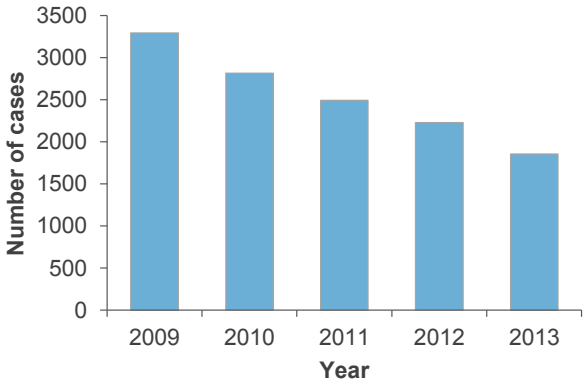
Sex	Clinic type	
	Sexual health clinics (SHCs)	Family planning clinics (FPCs)
Male	1113	57
Female	741	191
Total[a]	**1854**	**248**

[a] Total includes cases where sex was unknown.

From 2012 to 2013, the number of genital warts cases reported by SHCs decreased by 16.8% (2229 to 1854 cases) and FPCs decreased by 2.7% (255 to 248 cases).

From 2009 to 2013, the genital warts clinic case count reported by SHCs decreased by 43.7% (3294 to 1854 cases) (Figure 51) and FPCs by 53.4% (532 to 248 cases). This represents a significant decrease since the human papillomavirus (HPV) immunisation programme began in 2008.

Figure 51. Number of cases of genital warts (first presentation) reported by SHCs by year, 2009–2013



Gonorrhoea

Gonorrhoea data was available from both laboratory and clinic-based surveillance sources in 2013.

Laboratory surveillance

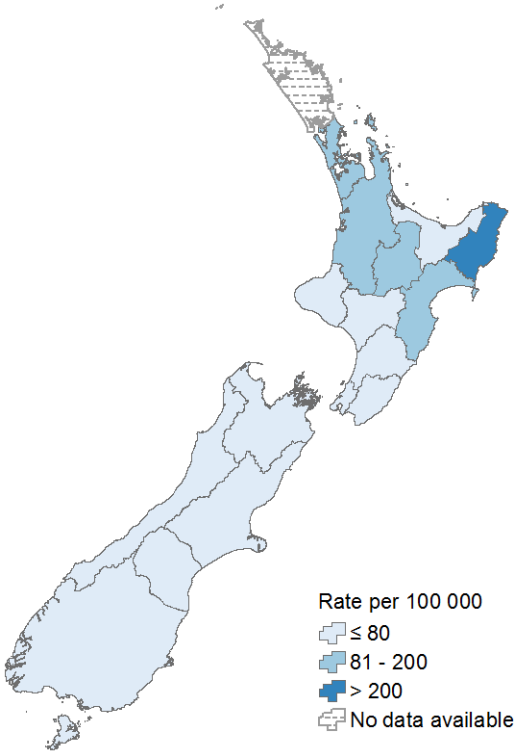
2013 analysis

In 2013, 43 laboratories provided gonorrhoea data. Of these, 39 laboratories from 19 DHBs met the selection criteria for gonorrhoea reporting. Laboratories in these DHBs tested 432 078 specimens for gonorrhoea, of which 4590 (1.1%) specimens from 3344 patients were positive. This represents an estimated national rate for laboratory-confirmed gonorrhoea of 78 per 100 000.

Table 32 presents the percentage of specimens that tested positive for gonorrhoea and the number and rate per 100 000 of laboratory-confirmed gonorrhoea cases by DHB and sex for 2013.

The national rate of gonorrhoea for males (82 per 100 000) was higher than for females (72 per 100 000). The highest rate of gonorrhoea in Tairawhiti DHB (400 per 100 000) was more than five times the national rate (78 per 100 000). Gonorrhoea rates by DHB for 2013 are shown in Figure 52.

Figure 52. Gonorrhoea rates by DHB, 2013



Trend analysis

In 2013 the national rate for gonorrhoea (excluding repeat tests) was 78 per 100 000. The 2013 rate was lower than the 2012 estimate (88 per 100 000) but higher than the estimate for the years from 2009–2011 (66–68 per 100 000).

Comparison of 2013 national and DHB rates with the 2009-2012 estimated rates should be interpreted with caution due to the introduction of a process to exclude repeat tests for an individual and the addition of DHBs that were not previously reporting. However, to directly compare 2013 data with previous years, an annual rate was estimated for 2013 using only the 17 DHBs that contributed data from 2009–2012 and including repeat tests for 2013. The estimated rate for 2013 (115 per 100 000) was higher than the 2012 estimate (88 per 100 000) and the estimates for 2009–2011 (66–68 per 100 000).

The use of NAAT testing for gonorrhoea has gradually been adopted by most laboratories since 2009. This will have led to increased detection of gonorrhoea infections over this period.

Tairawhiti and Hawke's Bay DHBs continue to have the highest rates of gonorrhoea, while West Coast, Wairarapa and Taranaki DHBs continue to have low rates.

Table 32. Percentage of specimens testing positive for gonorrhoea, and the number and rate per 100 000 population of laboratory-confirmed gonorrhoea cases by sex and DHB, 2013

District Health Board[a]	Specimens testing positive (%)	Male		Female		Total[b]	
		Cases[c]	Rate[d]	Cases[c]	Rate[d]	Cases[c]	Rate[d]
Northland[a]	-	-	-	-	-	-	
Auckland region[e]	1.4	934	123	660	84	1596	103
Waikato[g]	1.0	126	69	180	95	306	82
Lakes[g]	1.5	65	127	80	151	145	141
Bay of Plenty[g]	1.1	56	54	71	65	145	68
Tairawhiti	4.6	85	371	101	423	187	400
Taranaki	0.1	6	11	3	-	9	8
Hawke's Bay	2.4	100	133	143	180	243	156
Whanganui	0.9	15	50	8	26	23	37
MidCentral	0.5	32	39	19	22	51	30
Wellington region[f]	0.8	144	66	117	52	262	59
Wairarapa	0.8	5	25	7	34	12	30
Nelson Marlborough	0.1	12	17	5	7	17	12
West Coast	0.4	3	-	4	-	7	21
Canterbury	0.7	116	46	121	47	242	48
South Canterbury	0.2	3	-	3	-	7	12
Southern	0.4	40	26	44	28	92	30
Total	**1.1**	**1 742**	**82**	**1 566**	**72**	**3344**	**78**

[a] Incomplete data.
[b] Total includes cases where sex was unknown.
[c] Number of laboratory-confirmed cases.
[d] Rate of laboratory-confirmed cases per 100 000 population.
[e] Includes Waitemata, Auckland and Counties Manukau DHBs.
[f] Includes Hutt Valley and Capital & Coast DHBs.
[g] Pathlab laboratory introduced NAAT testing in 2013.

Clinic surveillance

In 2013, the number of confirmed cases of gonorrhoea reported by SHCs and FPCs was 820 and 247 cases respectively (Table 33).

Table 33. Number of gonorrhoea cases by clinic setting and sex, 2013

Sex	Clinic type	
	Sexual health clinics (SHCs)	Family planning clinics (FPCs)
Male	505	44
Female	315	203
Total[a]	**820**	**247**

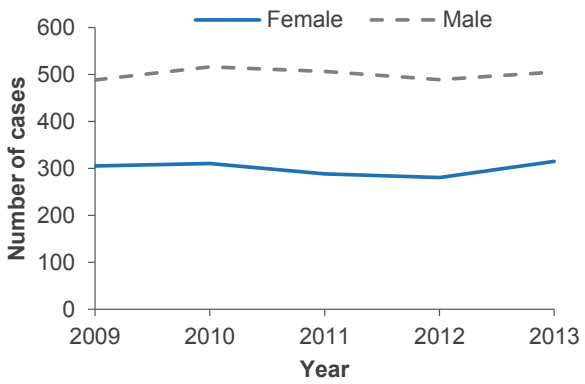
[a] Total includes cases where sex was unknown.

From 2012 to 2013, the number of gonorrhoea cases reported by SHCs increased by 6.6% (769 to 820 cases) and FPCs increased by 21.7% (203 to 247 cases).

From 2009 to 2013, the number of gonorrhoea cases reported by SHCs increased by 3.4% (793 to 820 cases) and FPCs increased by 32.1% (187 to 247 cases).

Between 2009 and 2013, the number of gonorrhoea cases reported by SHCs increased by 3.5% for males (488 to 505 cases) and increased by 3.3% for females (305 to 315 cases) (Figure 53).

Figure 53. Cases of gonorrhoea reported by SHCs by year, 2009–2013



Infectious syphilis

Infectious syphilis data was sourced from clinic-based surveillance in 2013.

In 2013, 80 cases of infectious syphilis were reported by SHCs and three cases were reported by FPCs (Table 34).

Of the 80 cases of infectious syphilis reported by SHCs, 72 (90.0%) cases were male and eight (10.0%) cases were female. The mean age of infectious syphilis cases was 37.7 years (range 18–69 years).

Table 34. Number of infectious syphilis cases by clinic setting and sex, 2013

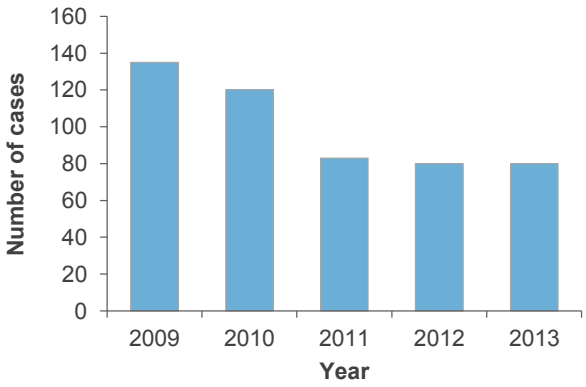
Sex	Clinic type	
	Sexual health clinics (SHCs)	Family planning clinics (FPCs)
Male	74	0
Female	6	3
Total[a]	**80**	**3**

[a] Total includes cases where sex was unknown.

Between 2012 and 2013, the number of infectious syphilis cases reported by SHCs remained the same (80 cases). The number of syphilis cases was similar in 2012 and 2013 for all DHBs except Canterbury, where the number of cases decreased from 28 in 2012 to 17 in 2013, and the Auckland region where the number of cases increased from 33 cases in 2012 to 42 cases in 2013.

The number of infectious syphilis cases reported by SHCs was highest in 2009 (135 cases) but decreased in 2010 and 2011 (Figure 54). Infectious syphilis cases decreased by 40.7% from 135 cases in 2009 to 80 cases in 2013.

Figure 54. Cases of infectious syphilis reported by SHCs, 2009–2013



Non-specific urethritis (males only)

NSU data was sourced from clinic-based surveillance in 2013.

For surveillance purposes, NSU is reported in males only and is defined as the presence of a urethral discharge where a laboratory-confirmed or probable diagnosis of chlamydia or gonorrhoea has been excluded.

In 2013, the number of cases of NSU reported from SHCs and FPCs was 750 cases and 14 cases respectively.

Between 2012 and 2013, the number of cases of NSU reported by SHCs increased by 15.2% (651 to 750 cases).

From 2009 to 2013, the clinic case count reported by SHCs increased by 2.3% (733 to 750 cases) for NSU.

OUTBREAKS

OUTBREAKS

Introduction

The following section provides a summary of outbreaks reported to ESR in 2013. A full description of outbreaks will be provided separately in the report entitled 'Annual Summary of Outbreaks in New Zealand 2013' available at www.surv.esr.cri.nz in May 2014.

This summary presents outbreak data by public health unit (PHU) or public health service (PHS), agent type, mode of transmission and setting. It is important to note that a single outbreak may have more than one pathogen, mode of transmission or exposure setting recorded.

Outbreak definition

The Guidelines for the Investigation and Control of Disease Outbreaks [40] states that the following types of outbreaks should be reported:

- two or more cases linked to a common source
- an increase (usually sudden) in disease incidence, compared to average or background levels
- a community-wide or person-to-person outbreak (except when the source has become well established as a national epidemic)
- any other situation where outbreak investigation or control measures are undertaken or considered.

Outbreak reporting is not required for single cases caused by a specific contaminated source, or for most secondary cases, with the exception of secondary cases in an institution or household that has been investigated.

Characteristics

There were 652 outbreaks involving 7137 cases reported by PHUs in 2013, compared with 719 outbreaks involving 10 500 cases reported in 2012. Over the 10-year period from 2004 to 2013, there was an increasing trend in the number of outbreaks reported (Figure 55).

Table 35 shows the number of outbreaks and associated cases reported by PHUs and PHSs in 2013. It should be noted that although outbreaks may be reported by a particular PHU, the distribution of cases may extend beyond the geographic boundaries of that PHU.

Of the outbreaks reported in 2013, 650 were final reports involving 7123 cases and two were interim reports for ongoing outbreaks (final details not yet available). According to the case definition for each disease outbreak, there were 2777 (38.9%) confirmed cases and 4360 probable cases (61.1%).

There were 113 hospitalisations and four deaths associated with outbreaks reported in 2013. The deaths were associated with norovirus and sapovirus infections (2 deaths each).

Figure 55. Number of outbreaks and associated cases by year, 2004–2013

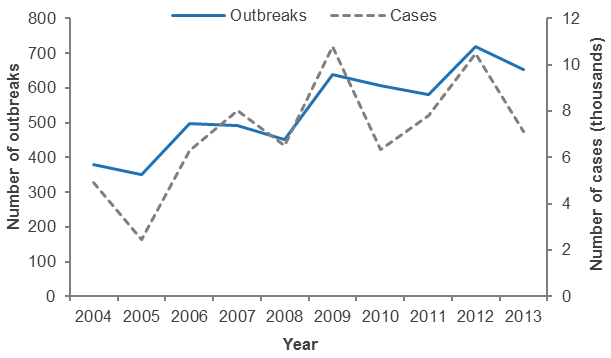


Table 35. Outbreaks and associated cases reported by public health service (PHS) or public health unit (PHU), 2013

PHS/PHU	Outbreaks	Cases
Northland	7	103
Auckland[a]	201	1437
Waikato	160	931
Bay of Plenty	10	120
Rotorua	3	55
Taranaki	24	343
Hawke's Bay	15	401
Gisborne	2	6
Whanganui	9	93
Manawatu	28	523
Wellington[b]	62	962
Nelson	11	197
Marlborough	5	86
West Coast	2	24
Canterbury	51	885
South Canterbury	2	45
Otago	36	533
Southland	24	393
Total	**652**	**7137**

[a] Includes Waitemata, Auckland and Counties Manukau DHBs.
[b] Includes Capital & Coast, Hutt Valley and Wairarapa DHBs.

Pathogens/agents

A summary of outbreaks and the number of associated cases by pathogen or condition is presented in Table 36.

Enteric bacteria

During 2013, enteric bacteria were implicated in 87 (13.3%) reported outbreaks and 367 (5.1%) cases. Approximately 46.0% (40/87) of these outbreaks and 46.3% (170/367) of all cases attributed to enteric bacteria were due to *Campylobacter* spp. Of the 40 outbreaks of *Campylobacter*, the most common primary modes of transmission were foodborne (13 outbreaks), person-to-person (9), zoonotic (8) and waterborne (4) and the most common secondary mode of transmission was person-to-person (18 outbreaks). The most common settings were private homes (25 outbreaks) and restaurants/cafés/bakeries (6 outbreaks).

Of the 18 *Salmonella* outbreaks, the most common primary modes of transmission were foodborne (7 outbreaks), person-to-person (5) and zoonotic (2). The most common secondary modes of transmission reported were person-to-person (7 outbreaks), and foodborne and zoonotic (2 outbreaks each). *Campylobacter* spp. was also identified in two of these outbreaks. The most common outbreak setting was private homes (7 outbreaks) followed by restaurants/cafés/bakeries (5).

One outbreak due to *Salmonella* Paratyphi B var Java was reported. *Shigella sonnei* was also identified in this outbreak. The 14 cases associated with the outbreak had travelled to Vietnam during the incubation period.

In 2013, three outbreaks of *Salmonella* Typhi were reported. All three outbreaks were attributed to person-to-person transmission. In one outbreak, the cases had travelled to Samoa during the incubation period for this disease. The remaining two outbreaks were in private homes.

Ten outbreaks of *Shigella* were reported in 2013. Of these, nine were associated with person-to-person transmission and four with foodborne transmission. Two outbreaks of *Shigella* had an overseas exposure (Samoa and Vietnam respectively) during the incubation period for this disease. All the remaining outbreaks occurred in private homes (8 outbreaks).

There were 16 outbreaks of verocytotoxin- or shiga toxin-producing *Escherichia coli* (VTEC/STEC) reported in 2013. Zoonotic (5 outbreaks), waterborne and person-to-person (4 each) were the most commonly reported primary modes of transmission. Person-to-person (10 outbreaks) was the most common secondary mode reported. The most common outbreak setting was private homes (13 outbreaks) followed by farms (2).

Table 36. Outbreaks and associated cases by pathogen or condition, 2013

Pathogen/Condition	Outbreaks[a]	Cases[b]
Enteric	**615**	**6948**
Norovirus	169	3685
Cryptosporidium spp.	98	547
Giardia spp.	78	333
Campylobacter spp.	40	170
Rotavirus	28	546
Salmonella spp.	18	98
VTEC/STEC infection	16	58
Shigella spp.	10	40
Clostridium perfringens	9	208
Sapovirus	8	159
Hepatitis A	5	54
Yersinia spp.	3	13
Clostridium difficile	3	19
Histamine fish poisoning	3	21
Salmonella Typhi	3	11
Astrovirus	2	17
Clostridium septicum	1	7
Salmonella Paratyphi	1	14
Staphylococcus aureus	1	2
Pathogen not identified[c]	139	1289
Non-enteric	**37**	**189**
Bordetella pertussis	20	60
Influenza/ influenza-like illness[d]	7	66
Mycobacterium leprae[e]	3	9
Measles virus	2	14
Mycobacterium tuberculosis	2	18
Sulphur dioxide poisoning	1	2
Mycoplasma pneumoniae	1	18
Legionella pneumophila	1	2

[a] More than one enteric agent was reported in 21 outbreaks with 372 cases, therefore numbers may not sum to group totals.
[b] Numbers may include cases reported in 2014 due to ongoing outbreaks.
[c] All enteric outbreaks with no identified pathogen were recorded as gastroenteritis.
[d] Includes outbreaks of influenza A (2 outbreaks with 5 cases), influenza B (4 outbreaks, 32 cases), and influenza B/rhinovirus (1 outbreak, 29 cases).
[e] Note that a confirmed diagnosis of leprosy may take many months and therefore these numbers may be revised when more information is available.

Yersinia was identified in three outbreaks. A different primary mode of transmission was reported for each outbreak: person-to-person, foodborne and zoonotic. One outbreak occurred in a restaurant/café/bakery and another in a private home. The third outbreak occurred in a workplace and a private home.

Enteric protozoa

Enteric protozoa accounted for 171 (26.2%) outbreaks and 795 (11.1%) cases reported in 2013.

Cryptosporidium spp. was identified as the infectious agent in 57.3% of the outbreaks associated with enteric protozoa. Of the 98 outbreaks where *Cryptosporidium* spp. was identified, 53 (54.1%) were reported by Waikato PHU and 31 (31.6%) by Auckland PHU. The most common primary modes of transmission were person-to-person (39 outbreaks), environmental (29), waterborne (11) and zoonotic (10). The most commonly-identified settings were private homes (67 outbreaks), farms (9) and childcare centres (7).

Seventy-eight outbreaks involving *Giardia* spp. occurred in 2013. Waikato and Auckland PHUs reported the highest number of outbreaks; 35 (44.9%) and 31 (39.7%) outbreaks respectively. The most common primary modes of transmission were person-to-person (26 outbreaks), waterborne (17), environmental (15) and zoonotic (9). The most common setting was private homes (60 outbreaks), followed by farms (6) and childcare centres (4).

Enteric viruses

In 2013, enteric viruses were the infectious agent in 210 (32.2%) outbreaks with 4297 (60.2%) associated cases.

Two astrovirus outbreaks involving 17 cases were reported in 2013. Person-to-person transmission was reported in both outbreaks. One outbreak was set in a long-term care facility and the other in a childcare centre.

Hepatitis A virus was identified in five outbreaks involving 54 cases in 2013. All of these outbreaks involved person-to-person transmission, although one outbreak also reported environmental transmission as a secondary mode. Three outbreaks were set in separate private homes, although one outbreak involved multiple households and two of these outbreaks also involved other settings. Other settings were also reported for the remaining two outbreaks.

The majority of outbreaks due to enteric viruses were caused by norovirus (80.5%, 169/210), which resulted in 3685 associated cases. The median number of cases per norovirus outbreak was 18 (range 2–96 cases). Person-to-person transmission was involved in 159 outbreaks, 52 of which also recorded other modes of transmission. Environmental transmission was established as a mode in 39 outbreaks and foodborne transmission in 16 outbreaks.

Multiple settings were identified in six norovirus outbreaks. Institutions were identified as the main exposure setting for norovirus outbreaks, specifically long-term care facilities (87 outbreaks), acute-care hospitals (21), childcare centres (15), hostels/boarding houses (4), schools (2) and other institutions (5). Food premises were identified as the setting for 14 norovirus outbreaks and nine outbreaks occurred in private homes.

In 2013, 28 (4.3%) outbreaks of rotavirus with 546 (7.7%) associated cases were reported. All of these outbreaks involved person-to-person transmission, although one outbreak also involved suspected contact with a contaminated surface. The most commonly-reported outbreak settings were childcare centres (20 outbreaks) and long-term care facilities (4 outbreaks).

Eight (1.2%) sapovirus outbreaks were associated with 159 (2.2%) cases. All of these outbreaks involved person-to-person transmission, although one outbreak also reported foodborne transmission as a primary mode. The outbreak settings were childcare centres (4 outbreaks) and long-term care facilities (3). One outbreak was set in both a private home and a restaurant/café/bakery.

Enteric (unspecified)

During 2013, outbreaks of gastroenteritis without an organism identified accounted for 139 (21.3%) outbreaks and 1289 (18.1%) associated cases.

Respiratory bacteria

Respiratory bacteria were the infectious agents in 24 (3.6%) outbreaks and 98 (1.4%) associated cases in 2013.

There were 20 outbreaks of *Bordetella pertussis* reported in 2013 with 60 associated cases. Person-to-person transmission was the only mode reported. Note that these outbreaks occurred in the context of an ongoing national outbreak of pertussis since mid-2011. The settings associated with these outbreaks included private homes (18 outbreaks), a childcare centre and exposure to a confirmed case in a group hunting trip (1 each).

One *Legionella pneumophila* outbreak was reported in 2013, involving two cases, with an environmental mode of transmission. The outbreak was linked to a spa pool in a hotel/motel.

Two outbreaks due to *Mycobacterium tuberculosis* infection, involving 18 cases, were reported in 2013.

These outbreaks were attributed to person-to-person transmission. One outbreak occurred in an acute-care hospital and the other in a private home.

One outbreak due to *Mycoplasma pneumoniae* infection, involving 18 cases, was reported in 2013. Person-to-person transmission was the mode identified. The outbreak occurred in a school.

Respiratory viruses

In 2013, respiratory viruses were the infectious agents in seven (1.1%) outbreaks and 66 (0.9%) associated cases.

Two outbreaks of influenza A and five of influenza B were reported in 2013, all involving person-to-person transmission. The outbreaks of influenza B occurred in a school (3 outbreaks), acute-care hospital and restaurant/café/bakery (1 each), whereas the influenza A outbreaks were set in a childcare centre and long-term care facility. Rhinovirus was also identified in one of the influenza B outbreaks that occurred in a school.

Toxins

Toxins were involved in 17 (2.6%) outbreaks and 257 (3.6%) associated cases reported in 2013.

The most commonly implicated agent was *Clostridium perfringens*, which accounted for nine outbreaks and 208 associated cases. All outbreaks reported foodborne as the primary mode of transmission. The exposure settings identified were restaurant/café/bakery (4 outbreaks), caterers and community/church/sports gathering (2 each), takeaway and a camp (1 each).

The other implicated agents were *Clostridium difficile* (3 outbreaks, including one outbreak with norovirus also implicated), *Clostridium septicum* (1 outbreak, *Campylobacter* spp. was also identified), histamine (scombroid) fish poisoning (3 outbreaks), and *Staphylococcus aureus* (1 outbreak).

The primary modes of transmission reported for the eight outbreaks were foodborne (5) and person-to-person (3). The exposure settings identified were private homes (2 outbreaks) and acute-care hospital, long-term care facility, restaurant/café/bakery, supermarket/delicatessen, temporary or mobile food premises and other setting (1 each).

Other bacteria

Three outbreaks due to *Mycobacterium leprae* infection, involving nine cases, were reported in 2013. Person-to-person transmission was the only mode identified and all confirmed cases had been exposed overseas. Note that a confirmed diagnosis of leprosy may take many months and therefore numbers may be revised when more information is available.

Other viruses

Two outbreaks of measles were reported in late December 2013. Both outbreaks are reported as interim and are ongoing. One outbreak was associated with a dance competition in Australia. Person-to-person contact was identified as the primary mode of transmission.

Other illnesses

One outbreak of sulphur dioxide poisoning with two associated cases was reported in 2013. The source of the sulphur dioxide was raw minced meat purchased from a local supermarket/delicatessen and prepared in a private home.

Modes of transmission

The modes of transmission recorded for outbreaks are detailed in Table 37.

Table 37. Outbreaks of infectious disease and associated cases by mode of transmission, 2013

Mode of transmission	Outbreaks				Cases	
	Primary mode[a]	Secondary mode[a]	All modes[a]	Percentage (%)[b]	All modes[c]	Percentage (%)[d]
Person-to-person	382	156	538	82.5	6521	91.4
Environmental	51	85	136	20.9	1676	23.5
Foodborne	100	20	120	18.4	778	10.9
Zoonotic	32	37	69	10.6	314	4.4
Waterborne	38	24	62	9.5	227	3.2
Other	8	12	20	3.1	299	4.2
Unknown	-	-	15	2.3	79	1.1

[a] Number of outbreaks. [b] Percentage of outbreaks for each mode of transmission, calculated using the total number of outbreaks (652).
[c] Number of associated cases. [d] Percentage of cases for each mode of transmission, calculated using the total number of associated cases (7137).
Note: More than one mode of transmission was recorded for 241 outbreaks (2429 associated cases). No outbreaks with vectorborne, sexual contact or parenteral as mode(s) of transmission were reported in 2013.

The most common primary modes of transmission were person-to-person (382 outbreaks), foodborne (100 outbreaks) and environmental (51 outbreaks). The most commonly reported secondary mode of transmission was person-to-person (156 outbreaks), followed by environmental (85). Person-to-person transmission was associated with almost four times as many cases as environmental transmission (6521 vs 1676) and more than eight times as many cases as foodborne transmission (6521 vs 778). The mode of transmission was unknown for 15 (2.3%) outbreaks and more than one mode of transmission was identified for 241 (37.0%) outbreaks reported in 2013.

Person-to-person was the most common mode of transmission for respiratory disease (96.8%, 30/31), enteric viruses (95.2%, 200/210), enteric protozoa (87.1%, 149/171), enteric bacteria (73.6%, 64/87) and unspecified enteric pathogens (67.6%, 94/139). Environmental transmission contributed to outbreaks due to enteric protozoa (36.8%, 63/171) and enteric viruses (21.0%, 44/210). Foodborne transmission contributed substantially to outbreaks due to toxins (82.4%, 14/17), enteric bacteria (36.8%, 32/87) and unspecified enteric pathogens (32.4%, 45/139). Waterborne transmission was the second highest mode of transmission for enteric protozoa (26.9%, 46/171) closely followed by zoonotic transmission (26.3%, 45/171). Zoonotic transmission was also the third highest mode of transmission for enteric bacteria (29.9%, 26/87).

Exposure settings

Outbreaks reported in 2013 were most commonly associated with private homes (35.4%, 231/652), long-term care facilities (22.2%, 145/652), childcare centres (10.9%, 71/652) and restaurants/cafés (8.3%, 54/652) (Table 38).

Table 38. Number of cases associated with outbreaks of infectious disease by exposure setting, 2013

Outbreak setting	Outbreaks[a]	Cases[a]
Institutions	**279**	**5152**
Long-term care facility	145	3133
Childcare centre	71	1033
Hospital (acute-care)	28	378
School	13	308
Camp	5	58
Hostel/boarding house	4	170
Hotel/motel	2	5
Prison	1	7
Other institution	12	221
Commercial food operators	**81**	**536**
Restaurant/café/bakery	54	341
Takeaway	14	44
Fast food restaurant	2	6
Supermarket/delicatessen	2	8
Caterers	4	115
Temporary or mobile service	1	7
Other food outlet	5	17
Home	**231**	**782**
Private home	231	782
Workplace	**28**	**136**
Farm	22	97
Workplace	6	39
Community	**5**	**130**
Community, church, sports gathering	4	126
Petting zoo	1	4
Travel	**3**	**36**
Aircraft	2	28
Tour bus	1	8
Other setting	**46**	**439**

[a] More than one setting was reported for some outbreaks.

ANTIMICROBIAL RESISTANCE

ANTIMICROBIAL RESISTANCE

The prevalence of antimicrobial resistance among common, clinically important pathogens between 2003 and 2012 is shown in Table 39. Most antimicrobial resistance data is only available up to the end of 2012. The following is a summary of the key trends in antimicrobial resistance. A full description of antimicrobial resistance in each pathogen is available at www.surv.esr.cri.nz/antimicrobial/antimicrobial_resistance.php.

Data on *Neisseria gonorrhoeae* resistance will be covered more comprehensively in the report entitled 'Sexually Transmitted Infections in New Zealand: Annual Surveillance Report 2013' available from www.surv.esr.cri.nz in June 2014.

Staphylococcus aureus

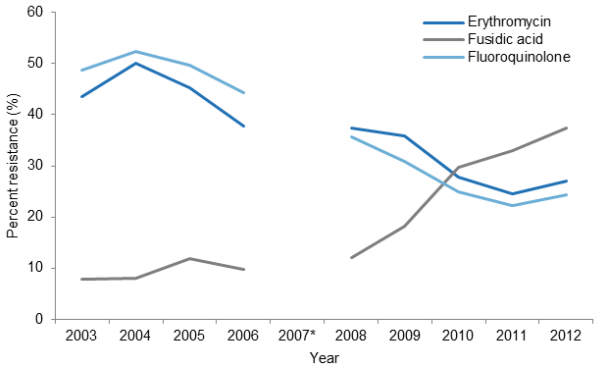
Methicillin resistance among *S. aureus* has increased, albeit slowly, over the last 10 years. In 2012, the national prevalence was 10.3%, however, there are large geographical differences throughout the country.

Over the last 10 years there has been a consistently high prevalence of fusidic acid resistance among *S. aureus*, with a rate of 14.7% in 2012. By contrast, the rate of mupirocin resistance has declined each year, since it peaked in 2000 at 21.5%. By 2012, the rate had more than halved to 7.9%.

Methicillin-resistant *Staphylococcus aureus*

Resistance to several non-β-lactam antibiotics among methicillin-resistant *S. aureus* (MRSA) has changed during the last 10 years. These changes largely reflect shifts in the predominant MRSA strains in New Zealand. In recent years the fusidic acid-resistant, community-associated AK3 MRSA strain has become increasingly prevalent, and accounted for 47% of isolates in the 2012 national MRSA survey. Conversely the MRSA strain that had previously been the most prevalent, the healthcare-associated EMRSA-15 strain, which is typically resistant to fluoroquinolones and erythromycin, only accounted for 9% of MRSA isolates in 2012 [41]. Accordingly, in recent years the rate of fusidic acid resistance has increased among MRSA while fluoroquinolone and erythromycin resistance has decreased (Figure 56).

Figure 56. Erythromycin, fluoroquinolone and fusidic acid resistance among methicillin-resistant *Staphylococcus aureus*, 2003–2012



Note: *Data not available for 2007.

Streptococcus pneumoniae

Penicillin non-susceptibility is still prevalent among *Streptococcus pneumoniae*, and there has been little overall change in the last 10 years. This is disappointing and somewhat unexpected, given that the pneumococcal serotypes covered by the conjugate vaccines used in the childhood immunisation programme since 2008 are also the serotypes that are most commonly resistant to penicillin and third-generation cephalosporins. Among invasive isolates, the rate of penicillin resistance (MIC ⩾0.12 mg/L) in 2012 was 17.2%, the same rate as for the 2003–2005 period. Similarly among non-invasive isolates, the rate of penicillin non-susceptibility (MIC ⩾0.12 mg/L) in 2012 was 25.1% and varied little from the rate recorded for the 2003–2005 period (27.0%).

However, the prevalence of cefotaxime non-susceptibility has decreased significantly over the last 10 years from 11.5% in the 2003–2005 period to 7.6% in 2012.

Vancomycin-resistant enterococci

Vancomycin-resistant enterococci were infrequently identified in 2012. One outbreak involving 14 patients in a healthcare facility was identified late in the year.

Escherichia coli

Levels of co-amoxiclav and nitrofurantoin resistance among urinary *E. coli* have remained relatively stable over the last 10 years. However, there appears to be a trend of increasing trimethoprim resistance among urinary *E. coli* from a rate of 21.5% during the 2003–2005 period to 24.8% in 2012.

There is also a trend of increasing fluoroquinolone resistance among both urinary and bacteraemic *E. coli,* with rates generally higher among bacteraemic *E. coli*.

ESBLs and carbapenemases

Extended-spectrum β-lactamases (ESBLs) are enzymes produced by some bacteria that confer resistance to cephalosporins and other beta-lactam antibiotics. ESBLs are increasing in Enterobacteriaceae, with particularly high rates among bacteraemic *Klebsiella* (15.4% in 2012).

Several classes of β-lactamases that inactivate carbapenems (ie, carbapenemases), including metallo-β-lactamases, KPC and OXA-48-like carbapenemases, have been identified among Enterobacteriaceae and *Pseudomonas* in New Zealand since 2009. However, with the exception of *Pseudomonas aeruginosa* with VIM-2 type metallo-β-lactamase, these carbapenemase-producing bacteria have been isolated from patients who had received healthcare or travelled overseas.

Mycobacterium tuberculosis

Multidrug-resistant tuberculosis (MDR-TB, with resistance to at least isoniazid and rifampicin) remains rare in New Zealand with four cases in 2012 accounting for 1.7% of the culture-positive TB cases. To date, there has only been one case of extensively drug-resistant TB (XDR-TB) identified in New Zealand. This case was in 2010. XDR-TB is defined as MDR-TB with additional resistance to any fluoroquinolone and at least one of the following second-line drugs: capreomycin, kanamycin or amikacin.

Table 39. Prevalence of antimicrobial resistance, 2003–2012

Pathogen	Antimicrobial	Percent resistance[a] (number tested)			
		2003–2005	2006–2008	2009–2011	2012
S. aureus[b]	methicillin	7.4 (219 363)	8.2 (242 146)	9.4 (300 093)	10.3 (109 670)
	erythromycin	12.0 (164 220)	12.1 (98 055)	11.9 (273 383)	12.3 (106 922)
	co-trimoxazole	2.0 (126 840)	1.3 (89 071)	1.1 (258 126)	0.9 (104 308)
	fluoroquinolone	7.3 (47 116)	7.9 (28 846)	6.1 (33 771)	6.8 (6155)
	fusidic acid	19.7 (25 609)	15.7 (32 730)	13.8 (52 534)	14.7 (10 162)
	mupirocin	16.7 (48 423)	12.9 (67 154)	10.2 (42 559)	7.9 (8252)
Methicillin-resistant *S. aureus* [c]	erythromycin	46.3 (1596)	37.5 (3146)	27.7 (18 499)	27.1 (7846)
	co-trimoxazole	7.4 (1596)	2.8 (3068)	2.0 (18 514)	1.5 (7940)
	fluoroquinolone	50.3 (1596)	37.4 (3000)	25.1 (13 963)	24.3 (4923)
	fusidic acid	9.2 (1596)	11.6 (3011)	28.7 (15 411)	37.4 (4794)
	mupirocin	9.5 (1596)	7.5 (2926)	9.4 (15 131)	9.5 (5142)
S. pneumoniae, non-invasive disease[b]	penicillin[d]	27.0 (15 037)	30.0 (14 104)	23.3 (13 239)	25.1 (2963)
	erythromycin	19.9 (10 222)	21.3 (7273)	18.9 (12 076)	19.2 (3219)
	tetracycline	18.1 (6796)	19.0 (5496)	17.5 (8959)	19.1 (2617)
S. pneumoniae, invasive disease[e]	penicillin[f]	17.2 (1560)	20.3 (1707)	16.7 (1712)	17.2 (459)
	erythromycin	9.9 (1560)	12.2 (1707)	9.9 (1712)	8.7 (459)
	cefotaxime[f]	11.5 (1560)	13.2 (1707)	7.9 (1712)	7.6 (459)
Enterococcus spp.[b]	amoxicillin[g]	2.8 (26 492)	3.7 (35 746)	4.0 (43 526)	4.2 (16 263)
	vancomycin	0.1 (9948)	1.3 (20 291)	0.4 (17 182)	0.7 (7207)
E. coli, urinary isolates[b]	amoxicillin[g]	50.7 (117 009)	49.9 (117 456)	50.6 (256 098)	50.1 (102 932)
	co-amoxiclav	8.5 (127 750)	9.6 (117 965)	9.0 (261 828)	7.4 (111 490)
	trimethoprim	21.5 (138 748)	22.1 (128 276)	24.2 (270 530)	24.8 (111 734)
	nitrofurantoin	1.4 (139 738)	1.3 (127 682)	1.2 (271 089)	1.1 (111 753)
	fluoroquinolone	2.4 (135 803)	4.6 (110 769)	6.7 (227 279)	7.6 (72 687)
E. coli, non-urinary isolates[b,h]	co-amoxiclav	15.2 (5059)	15.1 (3249)	19.2 (4267)	14.0 (1746)
	cefuroxime	3.4 (3956)	4.5 (2534)	6.9 (4060)	6.9 (1504)
	ESBL positive		2.6 (2307)	3.8 (4216)	3.6 (1733)
	gentamicin	2.6 (5290)	5.3 (3896)	5.3 (4946)	5.5 (1754)
	fluoroquinolone	3.9 (4212)	8.1 (3808)	8.8 (4703)	8.3 (1739)
P. aeruginosa [b]	gentamicin	6.1 (23 148)	4.3 (23 399)	4.4 (34 176)	6.0 (10 969)
	tobramycin	3.3 (7616)	3.4 (9388)	2.0 (13 261)	1.6 (3669)
	ceftazidime	4.3 (16 031)	3.2 (18 163)	2.8 (31 914)	2.5 (10 823)
	fluoroquinolone	8.3 (23 761)	7.1 (23 961)	6.1 (36 769)	6.7 (12 985)
	imipenem/meropenem	4.8 (9956)	4.9 (13 703)	3.5 (22 503)	4.8 (5892)
	piperacillin/tazobactam	1.5 (4928)	2.5 (11 960)	2.0 (18 884)	1.4 (8160)
H. influenzae, non-invasive disease[b]	amoxicillin[g]	19.9 (19 529)	22.0 (24 823)	24.7 (27 772)	23.0 (9468)
	co-amoxiclav	1.0 (14 090)	2.6 (15 123)	3.5 (23 396)	2.8 (8376)
	co-trimoxazole	18.2 (15 939)	20.2 (13 098)	25.3 (21 176)	30.0 (7734)
	tetracycline	0.8 (12 783)	0.8 (11 263)	1.0 (16 216)	1.0 (6751)
H. influenzae, invasive disease[e]	amoxicillin[g]	31.6 (155)	36.9 (176)	35.2 (199)	28.3 (60)
	co-amoxiclav	9.7 (155)	23.9 (176)	19.6 (199)	20.0 (60)
	cefuroxime	9.7 (155)	23.9 (176)	19.6 (199)	20.0 (60)
N. meningitidis, invasive disease[e]	penicillin[i]	12.0 (551)	19.5 (231)	23.3 (215)	32.0 (50)
	rifampicin	0.2 (551)	0.0 (231)	1.4 (215)	0.0 (50)
N. gonorrhoeae[b]	penicillin	5.8 (4700)	7.5 (6028)	12.5 (4090)	11.3 (893)
	fluoroquinolone	14.3 (4195)	20.1 (7315)	35.2 (7334)	40.6 (1674)
M. tuberculosis	isoniazid	8.9 (872)	6.6 (725)	7.9 (731)	7.7 (233)
	rifampicin	1.0 (872)	0.6 (725)	1.9 (731)	1.7 (233)
	MDR[k]	1.0 (872)	0.4 (725)	1.8 (731)	1.7 (233)

[a] Intermediate resistance is not included in the resistant category unless otherwise stated (refer to footnotes d, f and i below).
[b] Collated clinical laboratory data
[c] MRSA were tested by ESR until 2007, collated clinical laboratory data has been used since then.
[d] Penicillin non-susceptible (intermediate resistant and resistant), according to the Clinical and Laboratory Standards Institute (CLSI) interpretive criteria for the oral treatment of non-meningitis infections.
[e] Invasive disease isolates tested by ESR.
[f] Penicillin resistant and cefotaxime non-susceptible (intermediate resistant and resistant), according to the CLSI interpretive criteria for the parenteral treatment of meningitis.
[g] Ampicillin used in laboratory testing.
[h] From 2004, data is based on *E. coli* from bacteraemia.
[i] Penicillin reduced susceptibility (MIC 0.12–0.5 mg/L).
[k] Multidrug resistant (ie, resistant to at least isoniazid and rifampicin).

APPENDIX: NATIONAL DATA AND TRENDS

APPENDIX: NATIONAL DATA AND TRENDS

Comparison of notifiable disease cases and rates for 2013 and 2012

Table 40. Numbers of cases for rare (fewer than 10 cases reported per year) notifiable diseases in New Zealand, 2013 and 2012

Disease[a]	2013	2012
Brucellosis	1	0
Chikungunya fever	1	0
Creutzfeldt-Jakob disease[b]	6	9
Cronobacter species	1	1
Cysticercosis	1	0
Decompression sickness	2	0
Haemophilus influenzae type b	2	4
Hepatitis NOS	2	2
Hydatid disease	7	1
Leprosy	11	2
Rickettsial disease	9	4
Ross River virus infection	3	1
Rubella	1	4
Taeniasis	6	6
Tetanus	1	2

[a] No cases of the following notifiable diseases were reported in 2013 or 2012: anthrax, Barmah Forest virus infection, cholera, congenital rubella, 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] Creutzfled-Jakob disease data is provided by the National CJD Registry, University of Otago.

Deaths from notifiable diseases in EpiSurv, 1997–2013

Table 41. Deaths due to notifiable diseases recorded in EpiSurv, 1997–2013

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

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

[b] Data source: CJD Registry [20].

[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.

Mortality data for selected notifiable diseases, 2009–2011 (Ministry of Health)

Table 42. Reported deaths from selected notifiable diseases, 2009–2011

Disease	ICD 10 codes	2009		2010		2011[a]	
		Und[b]	Cont[c]	Und[b]	Cont[c]	Und[b]	Cont[c]
AIDS	B20-B24	9	8	16	6	8	6
Campylobacteriosis	A04.5	1			4		2
Cholera	A00						2
Creutzfeldt-Jakob disease	A81.0	7	1	4		6	
Dengue fever	A90, A91						
Hepatitis A	B15				2		
Hepatitis B	B16	1	1		2		
Hepatitis C	B17.1	1	2		2		
Hydatid disease	B67				1		1
Legionellosis	A48.1	3		6	1	2	
Listeriosis	A32	3	3	3			1
Meningococcal disease	A39	4		6		13	
Pertussis	A37			1			
Rheumatic fever	I00, I01, I02	1					
Salmonellosis	A02	1	4		1		
Shigellosis	A03						
Tetanus	A33-A35			1			
Tuberculosis	A15-A19, P37.0	7	24	11	17	6	13
Yersiniosis	A04.6	1					

[a] Latest year that data is available.
[b] Underlying – main cause of death.
[c] Contributory – selected contributory cause of death (not main cause of death).

Morbidity data for selected notifiable diseases, 2011–2013 (Ministry of Health)

Table 43. Hospital admissions for selected notifiable diseases, 2011–2013

Disease	ICD 10 codes	2011		2012		2013	
		Prin [a]	Oth [b]	Prin [a]	Oth [b]	Prin [a]	Oth [b]
AIDS	B20-B24	12	249	7	253	6	263
Arboviral diseases	A83, A84, A85.2, A92, A93, A94, B33.1			1	1	1	
Brucellosis	A23					1	
Campylobacteriosis	A04.5	446	134	546	113	585	124
Cholera	A00	1					
Creutzfeldt-Jakob disease	A81.0	4	5	12	2	5	
Cryptosporidiosis	A07.2	17	2	41	12	38	21
Cysticercosis	B69				3	2	2
Decompression sickness	T70.3	33	4	33	1	42	4
Dengue fever	A90, A91	15		16		35	1
Diphtheria	A36				1	1	
Giardiasis	A07.1	35	25	27	22	24	23
Hepatitis A	B15	9	10	34	4	29	10
Hepatitis B	B16	27	33	24	27	18	24
Hepatitis C	B17.1	9	30	22	34	17	35
Hydatid disease	B67	13	5	8	5	5	10
Legionellosis	A48.1	61	21	66	16	79	10
Leprosy	A30	1	1	1	1		3
Leptospirosis	A27	48	6	69	11	47	5
Listeriosis	A32	11	21	14	12	13	11
Malaria	B50-B54	44	1	28		42	3
Measles	B05	134	11	19		4	1
Meningococcal disease	A39	122	22	93	27	69	16
Mumps	B26	13	1	9	5	7	2
Paratyphoid	A01.1-A01.4	5		6		11	
Pertussis	A37	147	17	399	77	271	63
Q fever	A78	1					
Rheumatic fever	I00, I01, I02	258	43	227	34	287	36
Rickettsial diseases	A75, A77, A79	8	1	2	1	6	
Rubella	B06	1	1	2			2
Salmonellosis	A02	107	30	127	47	126	40
Shigellosis	A03	22	6	12	8	26	3
Taeniasis	B689		1				1
Tetanus	A33-A35	2	2	5	4	4	2
Tuberculosis	A15-A19, P37.0	224	103	203	116	199	114
Typhoid	A01.0	35	5	47	5	47	3
Viral haemorrhagic fevers	A95, A98, A99	2					
VTEC/STEC infection	A04.0-A04.4	50	22	58	24	46	50
Yellow fever	A95	1	1				
Yersiniosis	A04.6	16	22	20	25	29	17

[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, 2013

Table 44. Number of cases and rate per 100 000 population of notifiable diseases by DHB, 2013

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	221	139.2	772	137.3	598	127.8	536	104.0	774	207.6	180	174.8	262	123.1	83	177.7	236	213.2	336	216.1
Cryptosporidiosis	28	17.6	121	21.5	86	18.4	57	11.1	215	57.7	62	60.2	36	16.9	4		37	33.4	136	87.5
Dengue fever	3		20	3.6	34	7.3	11	2.1	1		4		5	2.3			1		2	
Gastroenteritis[b]	5	3.1	70	12.5	59	12.6	37	7.2	33	8.9	9	8.7	20	9.4			7	6.3	1	
Giardiasis	47	29.6	171	30.4	189	40.4	189	36.7	179	48.0	57	55.3	99	46.5	14	30.0	49	44.3	63	40.5
Hepatitis A	4		5	0.9	7	1.5	9	1.7	1				2		1				7	4.5
Hepatitis B[b]	2		1		4		4		5	1.3			1							
Hepatitis C[c]	1				4		1		1								3			
Invasive pneumococcal disease	21	13.2	50	8.9	38	8.1	60	11.6	40	10.7	26	25.2	36	16.9	6	12.8	9	8.1	24	15.4
Legionellosis	4		27	4.8	11	2.4	19	3.7	5	1.3			6	2.8			2		2	
Leptospirosis	2		1		1		2		5	1.3	1		7	3.3			6	5.4	11	7.1
Listeriosis			3		3		2						3				2			
Malaria	1		8	1.4	9	1.9	7	1.4	2				1						1	
Measles							1				5	4.9								
Meningococcal disease	4		7	1.2	6	1.3	12	2.3	4		3		2		1		3		3	
Mumps	4		4		4		1				1		2						1	
Paratyphoid fever			7	1.2	7	1.5	2												1	
Pertussis	154	97.0	260	46.2	237	50.7	301	58.4	299	80.2	29	28.2	138	64.8	55	117.8	73	65.9	42	27.0
Rheumatic fever[d]	20	12.6	9	1.6	23	4.9	63	12.2	24	6.4	8	7.8	14	6.6	8	17.1	1		4	
Salmonellosis	51	32.1	116	20.6	134	28.6	83	16.1	94	25.2	19	18.4	54	25.4	17	36.4	20	18.1	31	19.9
Shigellosis	5	3.1	18	3.2	37	7.9	36	7.0	4		1		1				2		1	
Tuberculosis disease	1		22	3.9	57	12.2	56	10.9	24	6.4	6	5.8	10	4.7	2		6	5.4	6	3.9
Typhoid fever	1		5	0.9	13	2.8	21	4.1	1				2							
VTEC/STEC infection	11	6.9	27	4.8	20	4.3	23	4.5	44	11.8	3		10	4.7	1		9	8.1	2	
Yersiniosis	10	6.3	42	7.5	52	11.1	49	9.5	26	7.0	25	24.3	36	16.9	6	12.8	14	12.6	14	9.0

[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, 2013

Table 44. Number of cases and rate per 100 000 population of notifiable diseases by DHB, 2013 (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	108	173.1	285	168.0	151	104.9	440	146.7	68	167.2	188	133.1	69	211.3	801	157.9	167	292.9	562	181.4
Cryptosporidiosis	20	32.1	46	27.1	40	27.8	104	34.7	13	32.0	21	14.9	8	24.5	191	37.6	38	66.7	85	27.4
Dengue fever	1				3		9	3.0	1		2				7	1.4	1		1	
Gastroenteritis[b]	23	36.9	69	40.7	75	52.1	95	31.7	9	22.1	4		8	24.5	19	3.7			16	5.2
Giardiasis	11	17.6	38	22.4	38	26.4	164	54.7	20	49.2	71	50.2	11	33.7	181	35.7	13	22.8	125	40.3
Hepatitis A	1		1				2				1				46	9.1	1		3	
Hepatitis B[b]	2				1						1		1		4				2	
Hepatitis C[c]	2				3		1				1				12	2.4			8	2.6
Invasive pneumococcal disease	10	16.0	17	10.0	11	7.6	28	9.3	7	17.2	13	9.2	6	18.4	40	7.9	8	14.0	30	9.7
Legionellosis			3		2		1				1		3		58	11.4	2		9	2.9
Leptospirosis	1		6	3.5					2		2		1		3		3		5	1.6
Listeriosis			1		1		1		1		1				1					
Malaria	1		6	3.5	1		3				1				6	1.2				
Measles							1								1					
Meningococcal disease	1		2		1		3								8	1.6	1		7	2.3
Mumps					1		1		1		1				1		1			
Paratyphoid fever					1		1				1				2		1		2	
Pertussis	46	73.7	114	67.2	106	73.7	227	75.7	39	95.9	472	334.0	60	183.8	581	114.5	52	91.2	254	82.0
Rheumatic fever[d]	1		1		10	6.9	9	3.0							9	1.8			1	
Salmonellosis	7	11.2	35	20.6	24	16.7	58	19.3	11	27.1	52	36.8	7	21.4	142	28.0	21	36.8	167	53.9
Shigellosis					3		7	2.3			1				7	1.4	2		12	3.9
Tuberculosis disease	1		7	4.1	7	4.9	37	12.3	2		4		1		23	4.5			6	1.9
Typhoid fever					1		1								4				1	
VTEC/STEC infection	1		3		1		4		1		3		2		27	5.3	5	8.8	10	3.2
Yersiniosis	4		13	7.7	14	9.7	52	17.3			1				101	19.9	8	14.0	17	5.5

[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, 2013

Table 45. Number of cases and rate per 100 000 population of notifiable diseases by sex, 2013

Disease	Sex					
	Male		Female		Total [a]	
	Cases	Rate	Cases	Rate	Cases	Rate
Campylobacteriosis	3833	174.1	3004	132.3	6837	152.9
Cryptosporidiosis	618	28.1	729	32.1	1348	30.1
Dengue fever	67	3.0	39	1.7	106	2.4
Gastroenteritis (acute)[b]	247	11.2	312	13.7	559	12.5
Giardiasis	858	39.0	871	38.4	1729	38.7
Hepatitis A	41	1.9	50	2.2	91	2.0
Hepatitis B[c]	18	0.8	10	0.4	28	0.6
Hepatitis C[c]	21	1.0	16	0.7	37	0.8
Invasive pneumococcal disease	251	11.4	229	10.1	480	10.7
Legionellosis	104	4.7	51	2.2	155	3.5
Leptospirosis	52	2.4	7	0.3	59	1.3
Listeriosis	7	0.3	12	0.5	19	0.4
Malaria	32	1.5	15	0.7	47	1.1
Measles	3		5	0.2	8	0.2
Meningococcal disease	34	1.5	34	1.5	68	1.5
Mumps	13	0.6	10	0.4	23	0.5
Paratyphoid fever	14	0.6	11	0.5	25	0.6
Pertussis	1527	69.4	2011	88.6	3539	79.2
Rheumatic fever[d]	113	5.1	92	4.1	205	4.6
Salmonellosis	582	26.4	561	24.7	1143	25.6
Shigellosis	58	2.6	79	3.5	137	3.1
Tuberculosis disease	146	6.6	132	5.8	278	6.2
Typhoid fever	31	1.4	19	0.8	50	1.1
VTEC/STEC infection	86	3.9	121	5.3	207	4.6
Yersiniosis	256	11.6	228	10.0	484	10.8

[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: 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 age group, 2013

Table 46. Number of cases and rate per 100 000 population of notifiable diseases by age group, 2013

	<1		1–4		5–9		10–14		15–19		20–29		30–39		40–49		50–59		60–69		70+		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	138	230.5	698	281.7	253	84.9	221	77.4	464	151.7	1091	170.7	754	134.7	862	139.2	877	150.7	744	167.7	735	170.8	6837	152.9
Cryptosporidiosis	39	65.1	418	168.7	185	62.1	81	28.4	61	19.9	163	25.5	210	37.5	86	13.9	48	8.3	38	8.6	19	4.4	1348	30.1
Dengue fever	0		1		1		4		5	1.6	20	3.1	25	4.5	15	2.4	19	3.3	9	2.0	7	1.6	106	2.4
Gastroenteritis[b]	23	38.4	71	28.7	19	6.4	12	4.2	20	6.5	64	10.0	66	11.8	73	11.8	47	8.1	47	10.6	89	20.7	559	12.5
Giardiasis	30	50.1	374	151	140	47.0	38	13.3	30	9.8	168	26.3	375	67.0	242	39.1	140	24.1	140	31.5	51	11.9	1729	38.7
Hepatitis A	0		13	5.2	20	6.7	14	4.9	4		15	2.3	10	1.8	5	0.8	6	1.0	3		1		91	2.0
Hepatitis B[c]	0								1		7	1.1	7	1.3	8	1.3	3				2		28	0.6
Hepatitis C[c]	0										11	1.7	10	1.8	8	1.3	8	1.4					37	0.8
Invasive pneumococcal disease	19	31.7	22	8.9	16	5.4	10	3.5	13	4.2	16	2.5	29	5.2	49	7.9	77	13.2	81	18.3	148	34.4	480	10.7
Legionellosis	0		1				1				5	0.8	2		21	3.4	27	4.6	43	9.7	55	12.8	155	3.5
Leptospirosis	0								2		15	2.3	9	1.6	11	1.8	17	2.9	5	1.1			59	1.3
Listeriosis	0				1						2		4		1		2		3		6	1.4	19	0.4
Malaria	0		1		2		3		4		20	3.1	6	1.1	3		4		3		1		47	1.1
Measles	1		1		2				4														8	0.2
Meningococcal disease	11	18.4	13	5.2	4		5	1.8	12	3.9	6	0.9	3		4		3		6	1.4	1		68	1.5
Mumps	1		4		5	1.7			3		3		3				4						23	0.5
Paratyphoid fever	0		2						6	2.0	9	1.4	3		1		4						25	0.6
Pertussis	264	440.9	556	224.4	366	122.8	221	77.4	136	44.5	315	49.3	414	73.9	522	84.3	369	63.4	219	49.4	157	36.5	3539	79.2
Rheumatic fever[d]	0				45	15.1	96	33.6	27	8.8	33	5.2	4										205	4.6
Salmonellosis	64	106.9	202	81.5	66	22.1	40	14.0	65	21.2	166	26.0	117	20.9	142	22.9	112	19.3	94	21.2	75	17.4	1143	25.6
Shigellosis	3		12	4.8	17	5.7	3		8	2.6	28	4.4	22	3.9	14	2.3	16	2.8	7	1.6	7	1.6	137	3.1
Tuberculosis disease	0		5	2.0	2		3		10	3.3	70	11	55	9.8	31	5.0	39	6.7	21	4.7	42	9.8	278	6.2
Typhoid fever	0		3		2		5	1.8	6	2.0	16	2.5	4		7	1.1	2		3		2		50	1.1
VTEC/STEC infection	12	20.0	66	26.6	21	7.0	16	5.6	13	4.2	20	3.1	10	1.8	8	1.3	12	2.1	14	3.2	15	3.5	207	4.6
Yersiniosis	41	68.5	97	39.2	22	7.4	25	8.8	16	5.2	60	9.4	43	7.7	46	7.4	54	9.3	32	7.2	47	10.9	484	10.8

[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: 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 ethnic group, 2013

Table 47. Number of cases and rate per 100 000 population of notifiable diseases by ethnic group, 2013

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	536	80.2	147	53.2	320	62.2	36	71.9	5348	180.5	6837	152.9
Cryptosporidiosis	157	23.5	35	12.7	42	8.2	14	28.0	1050	35.4	1348	30.1
Dengue fever	5	0.7	5	1.8	24	4.7	2		62	2.1	106	2.4
Gastroenteritis[c]	49	7.3	12	4.3	32	6.2	3		399	13.5	559	12.5
Giardiasis	97	14.5	16	5.8	77	15.0	30	59.9	1391	47.0	1729	38.7
Hepatitis A	16	2.4	21	7.6	11	2.1	2		40	1.4	91	2.0
Hepatitis B[d]	6	0.9	6	2.2	3		1		10	0.3	28	0.6
Hepatitis C[d]	8	1.2	1				1		27	0.9	37	0.8
Invasive pneumococcal disease	116	17.4	53	19.2	17	3.3	2		277	9.4	480	10.7
Legionellosis	7	1.0	4		4	0.8	5	10.0	132	4.5	155	3.5
Leptospirosis	10	1.5	3		2				43	1.5	59	1.3
Listeriosis	4				2				13	0.4	19	0.4
Malaria	1		6	2.2	20	3.9	5	10.0	14	0.5	47	1.1
Measles	6	0.9			1				1		8	0.2
Meningococcal disease	23	3.4	9	3.3	2				34	1.1	68	1.5
Mumps	5	0.7	5	1.8	5	1.0			8	0.3	23	0.5
Paratyphoid fever	1				9	1.8			15	0.5	25	0.6
Pertussis	488	73.0	236	85.4	115	22.4	15	30.0	2572	86.8	3539	79.2
Rheumatic fever[e]	99	14.8	93	33.7	6	1.2			6	0.2	205	4.6
Salmonellosis	77	11.5	56	20.3	84	16.3	13	26.0	846	28.6	1143	25.6
Shigellosis	4		52	18.8	13	2.5	3		50	1.7	137	3.1
Tuberculosis disease	27	4.0	41	14.8	165	32.1	14	28.0	26	0.9	278	6.2
Typhoid fever	2		32	11.6	14	2.7			2		50	1.1
VTEC/STEC infection	21	3.1	4	1.4	7	1.4			172	5.8	207	4.6
Yersiniosis	43	6.4	20	7.2	88	17.1	5	10.0	301	10.2	484	10.8

[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 are based on the proportion of people in each ethnic group from the estimated resident 2013 census population applied to the 2013 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. Where fewer than five cases have been notified, a rate has not been calculated and the cell has been left blank.

Notifiable disease cases by year and source, 1988–2013

Table 48. Number of notifiable disease cases by year and source, 1988–2000

Disease	Source[a]	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
AIDS	N	38	59	73	78	50	70	44	49	76	43	29	33	26
Campylobacteriosis	N	2796	4187	3850	4148	5144	8101	7714	7442	7635	8924	11572	8161	8418
Cholera	N	0	0	5	0	0	0	2	2	0	0	1	1	0
Creutzfeldt-Jakob disease	N									2	1	0	2	3
Cryptosporidiosis	N									119	357	866	977	775
Dengue fever	N	1	3	2	3	1	1	0	6	23	14	26	9	7
Gastroenteritis [b]	N									555	316	493	608	730
Giardiasis	N									1235	2127	2183	1793	1688
Haemophilus influenzae type b	N									26	9	11	10	13
	L	107	121	143	148	166	118	75	14	24	8	10	9	10
Hepatitis A	N	176	134	150	224	288	257	179	338	311	347	145	119	107
Hepatitis B [c]	N	370	309	242	227	221	145	133	125	104	138	88	94	79
Hepatitis C [c]	N	20	13	11	25	89	91	79	88	59	92	102	96	80
Hydatid disease	N	2	0	4	0	4	4	1	5	3	2	2	8	3
Influenza - LAB	S	136	119	343	183	317	423	441	521	673	743	127	425	73
Legionellosis	N	62	17	20	14	11	24	66	33	36	63	43	51	61
	L			21	42	60	76	121	76	60	109	107	65	56
Leprosy	N	2	4	1	4	5	3	1	1	10	3	3	10	4
Leptospirosis	N	99	90	117	106	70	116	70	65	56	52	75	59	98
	L	192	182	229	176	218	234	168	183	140	84	117	76	114
Listeriosis	N	7	10	16	26	16	11	8	13	10	35	17	19	22
Malaria	N	25	27	32	39	29	58	34	41	107	65	73	46	111
Measles	N									68	1984	164	107	64
Meningococcal disease	N	83	49	53	71	153	202	208	394	473	609	439	507	477
Mumps	N									76	90	85	56	50
Paratyphoid fever	N	2	0	1	1	2	10	7	24	20	25	18	17	24
Pertussis	N									1022	284	153	1046	4140
Rheumatic fever - initial attack	N	153	148	90	97	70	81	98	88	110	93	66	97	108
Rubella	N									306	80	53	35	26
Salmonellosis	N	1128	1860	1619	1244	1239	1340	1522	1334	1141	1177	2069	2077	1795
Shigellosis	N	145	137	197	152	124	128	185	191	167	117	122	147	115
Tetanus	N	1	0	0	0	8	2	2	2	3	0	2	6	1
Tuberculosis disease	N	295	303	348	335	327	323	352	391	352	323	365	446	354
Typhoid fever	N	15	17	7	9	11	14	24	21	15	16	31	10	21
VTEC/STEC infection	N						3	3	6	7	13	48	64	67
Yersiniosis	N									330	488	546	503	396

[a] Source: notification (N), laboratory (L), sentinel isolates (S).
[b] Cases of acute gastroenteritis from a common source or foodborne intoxication, eg, staphylococcal intoxication.
[c] Only acute cases of this disease are notifiable.

Notifiable disease cases by year and source, 1988–2013

Table 49. Number of notifiable disease cases by year and source, 2001–2013

Disease	Source[a]	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
AIDS	N	26	17	33	38	49	29	31	48	28	39	24	20	25
Campylobacteriosis	N	10 145	12 493	14 788	12 215	13 836	15 873	12 778	6694	7177	7346	6689	7016	6837
Cholera	N	3	1	1	2	0	0	1	0	0	2	0	0	0
Creutzfeldt-Jakob disease	N	1	3	6	8	3	5	8	5	8	5	4	9	6
Cryptosporidiosis	N	1208	975	817	611	888	737	924	764	854	954	610	877	1348
Dengue fever	N	93	70	55	8	11	19	114	113	139	50	42	76	106
Gastroenteritis	N	942	1088	1030	1363	560	938	625	687	713	502	570	765	559
Giardiasis	N	1604	1547	1570	1514	1231	1214	1402	1660	1639	1985	1934	1714	1729
Haemophilus influenzae type b	N	11	3	12	4	7	9	15	9	10	8	8	4	2
	L	8	3	9	3	6	8	13	4	8	8	8	4	2
Hepatitis A	N	61	106	70	49	51	123	42	89	44	46	26	82	91
Hepatitis B	N	56	67	61	38	59	61	72	37	55	51	51	39	28
Hepatitis C	N	58	53	40	24	29	35	30	22	32	17	26	31	37
Hydatid disease	N	7	2	0	1	2	0	6	7	2	4	6	1	7
Influenza - LAB	S	313	241	230	231	273	315	239	466	624	349	336	399	196
Legionellosis	N	46	49	77	62	85	52	64	73	74	173	158	150	155
	L	56	53	82	75	83	54	72	74	77	178	160	152	150
Leprosy	N	3	4	4	3	2	4	8	5	3	3	1	2	11
Leptospirosis	N	99	140	113	102	85	87	66	118	69	81	68	108	59
	L	113	181	149	113	109	66	40	73	49	58	45	78	46
Listeriosis	N	18	19	24	26	20	19	26	27	28	23	26	25	19
Malaria	N	54	61	46	33	32	30	25	40	50	44	52	38	47
Measles	N	82	21	66	32	18	18	24	12	248	48	596	68	8
Meningococcal disease	N	648	555	542	343	226	160	104	122	132	97	119	85	68
Mumps	N	56	64	56	45	61	47	73	76	63	41	51	26	23
Paratyphoid fever	N	32	16	18	28	25	23	23	25	25	19	13	22	25
Pertussis	N	1334	1068	585	3485	2719	1120	332	417	1398	872	1996	5898	3539
Rheumatic fever - initial attack	N	114	87	148	75	76	105	134	140	126	153	154	167	194
Rubella	N	30	33	26	23	13	7	10	9	4	4	22	4	1
Salmonellosis	N	2417	1880	1401	1081	1382	1335	1275	1339	1128	1146	1055	1081	1143
Shigellosis	N	157	112	87	140	183	102	129	113	119	104	101	132	137
Tetanus	N	4	1	2	1	1	1	1	0	1	7	0	2	1
Tuberculosis disease	N	369	380	422	373	330	350	283	293	298	304	307	293	278
Typhoid fever	N	27	23	20	31	30	42	48	29	34	31	45	44	50
VTEC/STEC infection	N	76	73	104	89	92	87	100	124	143	138	153	147	207
Yersiniosis	N	429	472	436	407	383	453	502	508	430	406	513	514	484

[a] Source: notification (N), laboratory (L), sentinel isolates (S).
[b] Cases of acute gastroenteritis from a common source or foodborne intoxication, eg, staphylococcal intoxication.
[c] Only acute cases of this disease are notifiable.

Selected *Salmonella* serotypes and phage types, 2009–2013 (Enteric Reference Laboratory, ESR)

Table 50. Number of laboratory-reported cases of salmonellosis for selected *Salmonella* serotypes and phage types, 2009–2013

Serotype[a]	2009	2010	2011	2012	2013
S. Typhimurium	**661**	**594**	**495**	**459**	**481**
1	94	36	54	35	30
12a	28	35	28	26	15
56 variant[b]	43	85	73	73	122
101	56	70	50	26	26
160	106	107	66	58	69
135	20	48	47	44	48
156	54	35	29	21	17
Other or unknown	288	213	176	176	154
S. Enteritidis	**95**	**113**	**134**	**125**	**137**
1b	4	5	8	9	14
11[c]	39	49	56	52	27
Other or unknown	52	59	70	64	95
Other serotypes	**366**	**437**	**410**	**460**	**523**
S. Agona	10	12	20	11	11
S. Brandenburg	36	47	34	34	52
S. Infantis	71	54	65	52	70
S. Mississippi	14	9	13	12	20
S. Montevideo	9	13	1	26	11
S. Saintpaul	26	34	31	27	43
S. Stanley	9	28	28	22	31
S. Virchow	12	16	18	17	15
S. Weltevreden	10	23	16	24	28
S. enterica (I) ser. 4,[5],12 : i : -	8	21	21	38	27
Other or unknown	188	224	201	197	215
Total	**1 122**	**1 144**	**1 039**	**1 044**	**1 141**

[a] Excludes *S.* Paratyphi and *S.* Typhi.
[b] Prior to 2013, *S.* Typhimurium phage type 56 variant was known as *S.* Typhimurium RDNC-May 06
[c] Prior to 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

ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Description
AEG	AIDS Epidemiology Group
AFP	Acute flaccid paralysis
AIDS	Acquired immunodeficiency syndrome
BCG	Bacillus Calmette-Guérin
CJD	Creutzfeldt-Jakob disease
CRS	Congenital rubella syndrome
DHB	District Health Board
DTaP-IPV-HepB/Hib	Diphtheria, tetanus, acellular pertussis, inactivated polio, hepatitis B and *Haemophilus influenzae* vaccine
ESBL	Extended-spectrum β-lactamase
ESR	Institute of Environmental Science and Research Limited
FPC	Family planning clinic
Hib	*Haemophilus influenzae* serotype b
HIV	Human immunodeficiency virus
HPAI	Highly pathogenic avian influenza
HUS	Haemolytic uraemic syndrome
ICD	International Classification of Diseases
ILI	Influenza-like illness
IPD	Invasive pneumococcal disease
IV/IM	Intravenous/intramuscular
MELAA	Middle Eastern/Latin American/African
MERS	Middle East respiratory syndrome
MeNZB™	Meningococcal B outer membrane vesicle vaccine
MIC	Minimum inhibitory concentration
MMR	Measles, mumps, rubella
MRSA	Methicillin-resistant *Staphylococcus aureus*
NCCEP	National Certification Committee for the Eradication of Polio
nfd	Not further defined
NHI	National Health Index
NMDS	National Minimum Dataset
NOS	Not otherwise specified
NSU	Non-specific urethritis
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
PHS	Public health service
PHU	Public health unit
sg	Serogroup
RDNC	Reacts but does not conform to a known phage type pattern
SHC	Sexual health clinic
STEC	Shiga toxin-producing *Escherichia coli*
STI	Sexually transmitted infection
sv	Serovar
Tdap	Tetanus, diphtheria and acellular pertussis vaccine
VRE	Vancomycin-resistant enterococci
VTEC	Verotoxin-producing *Escherichia coli*
WHO	World Health Organization