ESR

SURVEILLANCE REPORT

Notifiable and other diseases in New Zealand

Annual Report 2012

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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This edition has been revised to correct the name of the influenza A/Victoria/361/2011-like strain.

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SUMMARY

SUMMARY

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

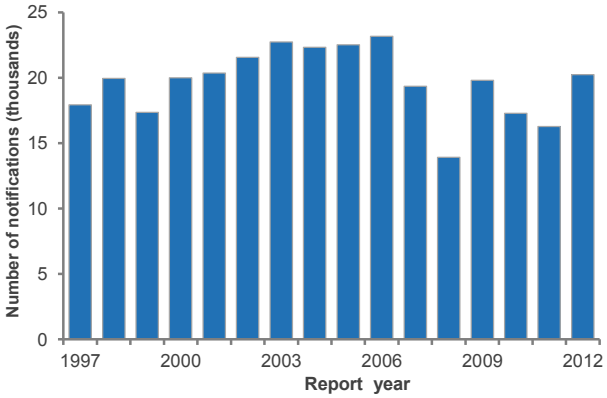
Notification process

Two significant changes to notification procedures occurred during 2012. The notifiable disease case definitions were updated with the release of the latest edition of the Communicable Disease Control Manual by the Ministry of Health in May 2012 and amendments were made to the notifiable disease schedule of the Health Act 1956. The amendments to the schedule included the renaming of *Enterobacter sakazakii* to *Cronobacter* species, updating rabies to include other lyssaviruses, and the addition of Q fever (previously reported under rickettsial diseases) and verotoxin- or Shiga toxin-producing *Escherichia coli* (VTEC/STEC) (previously notified under acute gastroenteritis) to the schedule.

Notifiable diseases

In 2012, 20 253 cases of notifiable disease were notified through EpiSurv (Figure 1). This was an increase from the 16 280 cases notified in 2011 and was the highest annual number of notifications since the peak in 2006 (23 179 cases).

Figure 1. Total disease notifications by year, 1997–2012



Between 2011 and 2012, there was a statistically significant increase in the notification rate of hepatitis A (0.6 to 1.8 per 100 000 population, 213.4%), pertussis (45.3 to 133.1 per 100 000, 193.8%), dengue fever (1.0 to 1.7 per 100 000, 82.2%), leptospirosis (1.5 to 2.5 per 100 000, 65.1%), cryptosporidiosis (13.8 to 19.8 per 100 000, 42.9%), shigellosis (2.3 to 3.0 per 100 000, 29.9%), acute gastroenteritis (14.3 to 16.6 per 100 000, 15.9%) and campylobacteriosis (151.8 to 158.6 per 100 000, 4.4%).

A significant decrease in notification rates between 2011 and 2012 was noted for measles (13.5 to 1.5 per 100 000, −88.7%), mumps (1.2 to 0.6 per 100 000, −49.3%), meningococcal disease (2.7 to 1.9 per 100 000, −29.0%), invasive pneumococcal disease (IPD) (12.5 to 11.0 per 100 000, −12.2%) and giardiasis (43.9 to 38.8 per 100 000, −11.7%).

Enteric diseases

Enteric diseases continued to comprise the majority (more than 60%) of notifications in 2012. Campylobacteriosis accounted for 35% of all notifications in 2012 (7301 cases). There was a significant increase in the rate of campylobacteriosis in 2012 (158.6 per 100 000 population) compared to 2011 (151.8 per 100 000). Despite this increase, the 2012 campylobacteriosis notifications comprised less than half the number of campylobacteriosis notifications during the peak in 2006 (15 873 cases).

Other enteric diseases that showed a significant increase in the notification rate between 2011 and 2012 were acute gastroenteritis, cryptosporidiosis, hepatitis A and shigellosis. Only giardiasis presented a significant decrease in notification rate between 2011 and 2012.

Enteric diseases continued to show seasonal variations in notifications, particularly for campylobacteriosis (summer peak), cryptosporidiosis (spring peak), salmonellosis (peak varies with serotype), and VTEC/STEC infection (autumn and spring peaks).

Vaccine-preventable diseases

With 5902 cases, pertussis was the second most commonly reported notifiable disease in 2012 after campylobacteriosis. The 2012 pertussis rate (133.1 per 100 000 population) was well above that recorded in previous pertussis epidemics (107.6, 85.3 and 65.8 per 100 000, for the 2000, 2004 and 2005 epidemic years, respectively).

There was a significant decrease in the notification rate for other vaccine-preventable diseases: IPD, measles, meningococcal disease and mumps. The rate of IPD continued to decrease following the introduction of the 7-valent pneumococcal conjugate vaccine in 2008 and the 10-valent pneumococcal conjugate vaccine in 2011. There were 68 cases of measles notified in 2012 giving a rate of 1.5 per 100 000 population, a significant decrease from the previous year (13.5 per 100 000, 596 cases).

Exotic diseases

All cases of arboviral disease, leprosy, and taeniasis notified in 2012 had an overseas exposure that accounted for the infection. All three cases of murine typhus notified in 2012 acquired the infection locally. There was no evidence of any recent locally acquired hydatid disease.

There was a significant increase in the dengue fever notification rate in 2012 (1.7 per 100 000, 77 cases) compared to 2011 (1.0 per 100 000, 42 cases). However, the 2012 rate was well below the 2008 rate (3.2 per 100 000, 139 cases), the highest notification rate for dengue fever since 1997.

Influenza

The average weekly influenza consultation rate from May to September 2012 was 50.2 per 100 000 patient population. This consultation rate was higher than the 2011 rate (40.4 per 100 000) and similar to the 2010 rate (50.9 per 100 000). The peak weekly consultation rate of 154.1 per 100 000 patient population occurred in early August and was higher than the peaks in 2011 and 2010 (66.1 and 151.6 per 100 000, respectively).

Of the 2425 viruses identified in 2012, the most commonly identified viruses were A(H3N2) viruses (65.0%, 1577 viruses). These viruses have genetically and antigenically drifted away from the reference strain A/Perth/16/2009 (H3N2) to A/Victoria/361/2011-like strain. There were low percentages of influenza B viruses (12.6%, 306 viruses) and influenza A(H1N1)pdm09 viruses (10.2%, 247 viruses) identified. All 592 viruses tested by the National Influenza Centre at ESR, except two A(H1N1)pdm09 viruses, were sensitive to oseltamivir.

No cases of non-seasonal influenza were notified in New Zealand in 2012 following the reclassification of influenza A(H1N1)pdm09 virus as a seasonal influenza virus from 1 January 2011.

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

Sexually transmitted infections

In 2012, *Chlamydia trachomatis* infection was again the most commonly diagnosed sexually transmitted infection (STI) in New Zealand, and the population rate was more than four times that of the most commonly reported notifiable disease, campylobacteriosis.

For the 15 District Health Boards (DHBs) participating in laboratory-based surveillance in 2012, the rate of chlamydia infection was 744 per 100 000 population. The highest rate of chlamydia was for Tairawhiti DHB (1350 per 100 000), followed by Lakes (1349 per 100 000) and Hawke's Bay (958 per 100 000) DHBs. Based on data from the 15 DHBs, there was a 5% decrease (from 785 to 744 per 100 000) in the estimated national chlamydia rate between 2009 and 2012.

For the 17 DHBs participating in laboratory-based surveillance in 2012, the rate of gonorrhoea infection was 89 cases per 100 000 population. The highest rate of gonorrhoea was for Tairawhiti DHB (408 per 100 000 population), followed by Hawke's Bay DHB (174 per 100 000 population). Based on data from the 17 DHBs, there was a 35% increase (from 66 to 89 per 100 000) in the estimated national gonorrhoea rate between 2009 and 2012. This increase coincided with the introduction of the nucleic acid amplification test (NAAT) by laboratories in many DHBs since 2011.

Between 2011 and 2012, genital warts case counts decreased by 11% in sexual health clinics (SHCs) (2493 to 2231 cases) and by 8% in family planning clinics (FPCs) (276 to 255 cases).

The number of syphilis cases reported by SHCs decreased for the third consecutive year with 80 cases reported in 2012. Between 2011 and 2012, the syphilis case count decreased or was similar for all DHBs, except Canterbury DHB, which increased from 3 cases to 28 cases. FPCs reported no cases of syphilis in 2012.

In 2012, 20 cases of acquired immunodeficiency syndrome (AIDS) were notified. The 2012 notification rate (0.5 per 100 000) was the same as the 2011 rate (24 cases).

Outbreaks

In 2012, there was an increase in the number of outbreaks and in the number of associated cases (716 outbreaks, 10 491 cases) compared with 2010 (607 outbreaks, 6354 cases) and 2011 (581 outbreaks, 7796 cases).

The most common pathogen implicated in outbreaks in 2012 was norovirus (249 outbreaks, 6097 cases), followed by *Giardia* spp. (69 outbreaks, 284 cases).

More than 80% of outbreaks reported in 2012 had person-to-person recorded as a mode of transmission. The most common exposure settings recorded were long-term care facilities (187 outbreaks, 4623 cases) and private homes (184 outbreaks, 709 cases).

Antimicrobial resistance

The results of antibiotic resistance surveillance carried out in 2012 will be available later in 2013. Reporting in this section is for data collected for the period 2000 to 2011.

The prevalence of methicillin resistance among *Staphylococcus aureus* has increased slowly over the last 10 years and the national rate was more than 10% for the first time in 2011.

Penicillin and cefotaxime non-susceptibility among *Streptococcus pneumoniae* declined during the latest three-year period (2009–2011).

Levels of trimethoprim, co-amoxiclav and nitrofurantoin resistance among urinary *Escherichia coli* are stable, but there was a significant increase in fluoroquinolone resistance.

There is an increasing prevalence of extended-spectrum β-lactamases in Enterobacteriaceae, especially among *Klebsiella*. Several classes of β-lactamases that inactivate carbapenems (carbapenemases) have been identified among Enterobacteriaceae and *Pseudomonas*.

Multidrug-resistant tuberculosis (MDR-TB) remains rare in New Zealand, with two cases identified in 2011 from 233 culture-positive TB cases.

INTRODUCTION

INTRODUCTION

This report provides a summary of 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 [1]. A surveillance system includes the functional capacity for data collection and analysis, as well as the timely dissemination of information derived from these data for effective prevention and control activities [2].

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

- 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
- to fulfil statutory and international reporting requirements.

Details about the individual surveillance systems are provided in the section entitled ‘Surveillance methods’.

The focus of this report is on diseases reported in 2012 and (where data is available) the trends since 1997, with the aim of informing measures for prevention and control.

Data about individual notifiable diseases is presented in alphabetical order, followed by data for influenza, sexually transmitted infections (STIs), disease outbreaks and antibiotic resistance.

SURVEILLANCE METHODS

SURVEILLANCE METHODS

Interpreting data

Data in this report is presented by the date reported and not by the onset date. Cases are allocated to geographic location based on where the case 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 (e.g., 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 District Health Board (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 [4]. Issues associated with the cost of healthcare may also determine whether cases present to health care services for diagnosis [5].

The extent to which the data reflects the true incidence of the disease is affected by public awareness of the disease, access to health services, use of diagnostic facilities, case definitions (e.g., 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 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) ethnic groups. The ‘European or Other Ethnicity’ ethnic group is presented as European or Other ethnic group in this report.

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 section entitled ‘Analytical Methods’ contains more information about population rate calculations for diseases.

Data sources

The key sources of data used in this report are described in turn 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 public health unit (PHU) via a secure web-based portal into a computerised database (EpiSurv). The near real-time data is collated and analysed on behalf of the Ministry of Health by the Institute of Environmental Science and Research (ESR) Ltd. 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 (e.g., measles and yersiniosis) became notifiable only with the revised schedule of notifiable diseases that came into effect on 1 June 1996 [3].

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).

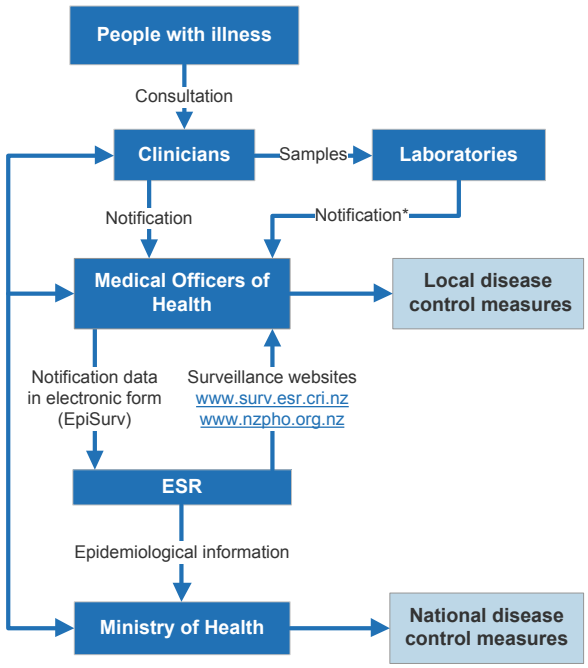
This report includes sections on all the diseases that are currently notifiable in New Zealand under the Health Act 1956 and the Tuberculosis Act 1948.

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) [6] (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' [7].

Figure 2 illustrates the major components and information flow of the notifiable disease surveillance system.

Figure 2. 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 (i.e., 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 are reported directly to the Medical Officers of Health (e.g., legionellae, *Leptospira*, meningococci, and salmonellae)

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

Statistics New Zealand

Denominator data used to calculate 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 and discharged from publicly funded hospitals. This data is stored as part of the National Minimum Dataset (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 [8]. Up to 99 procedure and accident diagnostic codes may be assigned to 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 2010 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 repeated admissions for patients with chronic notifiable diseases (e.g., tuberculosis) or for diseases that have long-term health impacts (e.g., 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 [9]. 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 via 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 each year, gathers data on the incidence and distribution of influenza [10]. In 2012, surveillance data was collected between May and September from a network of 85 general practices/practitioners from all DHBs in New Zealand, except Northland DHB. The number of practices in each DHB is approximately proportional to the size of each DHB's population. Participating general practitioners are asked to record the number of consultations for influenza-like illness (ILI) (using a standardised case definition) each week 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)) is submitted by sexual health clinics (SHCs) and family planning clinics (FPCs). Twenty-eight SHCs and 32 FPCs provided surveillance data in 2012. 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 2012.

For laboratory data, the DHB denominator is derived from the 2012 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 general practitioners. 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 is 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 (e.g., epidemiological typing) and periodic point-prevalence surveys of antimicrobial susceptibility among 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), University of Otago, was established in 1996 to monitor sporadic, familial, iatrogenic and variant CJD. A medical practitioner must immediately report any suspected cases of CJD directly to the Registry as well as inform the local Medical Officer of Health and the Director of Public Health at the Ministry of Health [6].

New Zealand Paediatric Surveillance Unit

The New Zealand Paediatric Surveillance Unit (NZPSU) [11] 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 had 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 used include the following.

Dates

Notification data contained in this report is based on information recorded on EpiSurv as at 7 February 2013. 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 for the years from 1997 to 2011 has been updated to reflect cases in EpiSurv as at 7 February 2013.

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 1. These are estimated from the Statistics New Zealand mid-year population estimates for territorial authorities in New Zealand.

Table 1. District Health Board populations, 2012

DHB	Population
Northland	158 300
Waitemata	553 600
Auckland	462 200
Counties Manukau	508 100
Waikato	370 302
Lakes	103 100
Bay of Plenty	212 120
Tairawhiti	46 800
Taranaki	110 320
Hawke's Bay	155 400
Whanganui	62 488
MidCentral	169 212
Hutt Valley	144 300
Capital and Coast	297 238
Wairarapa	40 630
Nelson Marlborough	140 700
West Coast	32 900
Canterbury	500 500
South Canterbury	56 550
Southern	307 850
Area outside DHB	510
Total	**4 433 120**

Map classification scheme

On the maps, the darkest colour represents the highest disease notification rates and the lightest colour 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, except those with a case status of 'not a case', are included for analysis in this report. Although every effort is made to ensure cases have a case status other than 'under investigation', the status may not be final and any changes will be reflected in future surveillance reports.

Population rate calculations for diseases

Denominator data used to determine all disease rates, except that used to determine disease rates for ethnic groups, has been derived from the 2012 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 2006 Census population applied to the 2012 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, e.g., 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 statistically significant when the *P* value is less than or equal to 0.05.

LIMITATIONS OF SURVEILLANCE DATA

LIMITATIONS OF SURVEILLANCE DATA

Quality

Each year a report is prepared on the quality of selected EpiSurv fields to assist in the monitoring of a quality assurance programme. The latest report was published in 2012 [12].

Sensitivity

The sensitivity of the notifiable disease surveillance system was assessed in 2003 using reporting on meningococcal disease [13]. This assessment 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 1 year old in 2006 found that under-identification, estimated using capture-recapture analysis, was modest for both active surveillance (16%) and passive notification (19%) [14].

The sensitivity of surveillance for other diseases will often be lower 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. A study of acute gastrointestinal illness, conducted during 2005–2007, estimated that only 0.4% of community cases result in a notification [15]. Due to long latency periods, the notifiable disease surveillance 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 2 shows the percentage of notifications for which complete data was provided for selected key EpiSurv variables for each year from 2003 to 2012.

The completeness of date of birth, age and sex data is generally very high (>98%), with little variation over the last five years. In 2012, the completeness of date of birth, age and sex data remained high (≥99.7%). The completeness of ethnicity data in 2012 (95.0%) was similar to that of 2011 (94.9%).

The National Health Index (NHI) provides a unique identifier 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 cases on EpiSurv (>90% over the last four years) now have an NHI recorded. In 2012, 96.6% of notifications had an 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 case.

Table 2. Data completeness by EpiSurv variable and year, 2003–2012

Report year	Completeness of data (%)				
	Date of birth	Age	Sex	Ethnicity	NHI
2003	98.8	99.3	98.7	80.0	29.2
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

Accuracy

Reliable population denominator data is available except for cases of sexually transmitted infections (STIs) and ethnic group populations. For laboratory-based surveillance of STIs, the population has been estimated based on the location of the laboratory that collected 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 2006 census population to the 2012 mid-year population estimates. This may not accurately reflect the distribution of ethnic groups in the population but is the best estimate available until data from the 2013 census becomes available.

Another limitation on 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 by using nucleic acid amplification testing.

Timeliness

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

Table 3 shows a summary of the timeliness of notifications by disease for 2012.

In 2012, 66.8% of all disease notifications had an onset date recorded (63.0% in 2011). Of these, 40.1% were reported to a public health service (PHS) within one week of the onset of symptoms and 69.7% were reported within two weeks of the onset of symptoms.

In 2012, 88.8% of the notifications were entered into EpiSurv within a day of being reported to the PHS, 98.4% were entered within one week and 99.3% were entered within two weeks.

Table 3. Timeliness of disease reporting and data entry for notifiable diseases, 2012

Disease	Onset date recorded (%)	Reporting delay[a]		Entry delay[b]		
		≤1 week	≤2 weeks	≤1 day	≤1 week	≤2 weeks
Campylobacteriosis	60.0	57.0	91.4	91.7	98.9	99.7
Cryptosporidiosis	76.7	36.0	79.9	92.9	98.9	99.2
Dengue fever	63.6	24.5	57.1	85.7	100.0	100.0
Gastroenteritis	74.0	88.4	96.1	71.2	87.2	91.7
Giardiasis	49.9	27.2	52.5	91.7	98.9	99.7
Hepatitis A	65.9	46.3	81.5	92.7	98.8	98.8
Invasive pneumococcal disease	69.9	57.2	82.7	85.9	99.0	99.8
Lead absorption	8.1	22.7	45.5	63.2	99.6	99.6
Legionellosis	82.9	26.2	57.9	89.5	100.0	100.0
Leptospirosis	88.5	23.0	46.0	75.2	97.3	100.0
Measles	85.3	82.8	93.1	80.9	98.5	98.5
Meningococcal disease	96.5	91.5	97.6	87.1	100.0	100.0
Pertussis	82.1	23.5	50.3	87.5	98.8	99.5
Rheumatic fever	79.9	20.3	42.7	89.4	96.6	99.4
Salmonellosis	60.4	35.9	76.5	91.5	99.1	99.7
Shigellosis	43.9	24.1	53.4	93.9	100.0	100.0
Tuberculosis disease	51.5	5.9	10.5	87.9	97.6	98.7
VTEC/STEC infection	81.0	47.1	78.2	87.8	99.3	100.0
Yersiniosis	46.6	24.5	62.7	90.3	99.4	99.6
Other diseases	66.1	55.4	78.5	83.7	95.9	97.6
Total	66.8	40.1	69.7	88.8	98.4	99.3

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

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) within the University of Otago carries out national AIDS/HIV surveillance and it is their data that is reported here [16]. More detailed information is available from the AEG website: http://dnmeds.otago.ac.nz/departments/psm/research/aids/newsletters.html.

In 2012, 20 cases of AIDS were reported to the AEG compared with 24 cases in 2011. The 2012 AIDS notification rate (0.5 per 100 000 population) was the same as the 2011 rate.

Ten cases (50.0%) were men infected through sex with other men, five (25.0%) were infected through heterosexual contact (2 men and 3 women), and the mode of infection was unknown for five cases (25.0%).

The 2012 cases were distributed by ethnic group as follows: European or Other (11 cases), Māori (4 cases), Asian (3 cases), and Middle Eastern/Latin American/African (MELAA) (2 cases). The cases ranged from 28 to 68 years of age with a mean age of 41.8 years.

Three deaths due to AIDS were reported to the AEG as having occurred in 2012. However, the number of deaths is likely to increase due to late notifications.

Anthrax

No cases of anthrax were notified in New Zealand in 2012. The last fatal case of human anthrax in New Zealand was reported 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 2012. 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

No cases of Chikungunya fever were notified in 2012. Four cases of Chikungunya fever have been notified since 1997, one case each year in 2007, 2008, 2009 and 2011. All four cases reported overseas travel during the incubation period for this disease.

Japanese encephalitis

No cases of Japanese encephalitis were notified in 2012. 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

One laboratory-confirmed case of Ross River virus infection was notified in 2012 compared with three cases in 2011. The case was a female in the 40–49 years age group who had been in Australia during the incubation period of the disease. Since 1997, nine cases have been notified and all reported overseas travel 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

No cases of brucellosis were notified in New Zealand in 2012. Since 1997, 13 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 7031 cases of campylobacteriosis notified in 2012. Campylobacteriosis continues to be the most commonly notified disease comprising 34.7% of all notifications in 2012. The 2012 rate of 158.6 per 100 000 population was a significant increase from the 2011 rate of 151.8 per 100 000 (6689 cases). Despite this increase, the number of cases notified in 2012 was less than half of the total number of cases notified in 2006 (15 873 cases) (Figure 3).

The notification pattern in 2012 was similar to that in previous years, highly seasonal with a summer peak and a winter trough (Figure 4). In 2012, the lowest monthly campylobacteriosis total was in July (327 notifications) and the highest monthly total was in January (998 notifications).

Figure 3. Campylobacteriosis notifications by year, 1997–2012

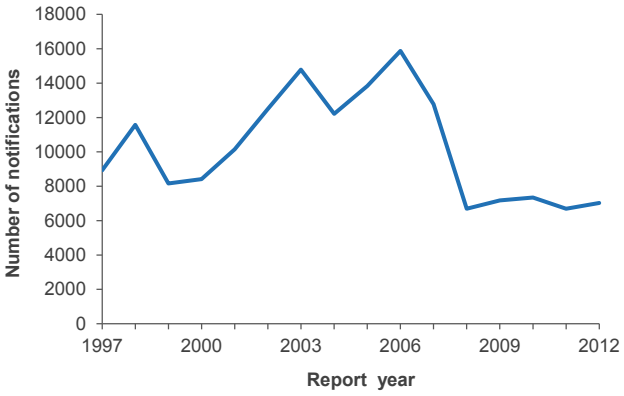
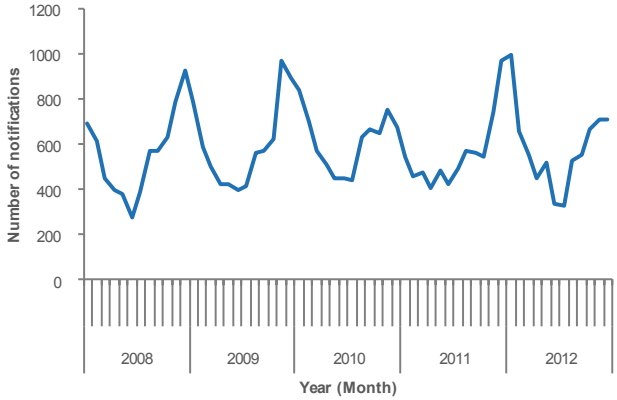


Figure 4. Campylobacteriosis notifications by month, January 2008–December 2012



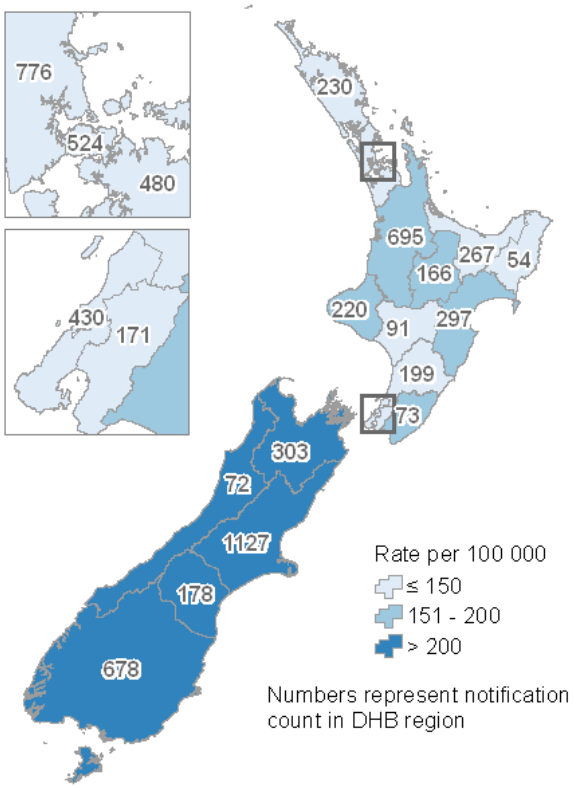
The campylobacteriosis rate varied throughout the country, with higher notification rates in the South Island of New Zealand (Figure 5). The highest rates were for South Canterbury (314.8 per 100 000 population, 178 cases), Canterbury (225.2 per 100 000, 1127 cases) and Southern (220.2 per 100 000, 678 cases) DHBs.

Age was recorded for 7024 (99.9%) cases. The highest notification rate was in the 1–4 years age group (300.1 per 100 000 population, 754 cases), followed by the less than 1 year age group (269.0 per 100 000, 163 cases).

Sex was recorded for all cases. Similar to previous years, the notification rate was higher for males (180.6 per 100 000 population, 3938 cases) than for females (137.3 per 100 000, 3093 cases).

Ethnicity was recorded for 6555 (93.2%) cases. The highest disease notification rate was for the European or Other ethnic group (182.9 per 100 000 population, 5620 cases), followed by the Māori (75.7 per 100 000, 490 cases) and Asian (75.0 per 100 000, 306 cases) ethnic groups. The lowest rate was for the MELAA (74.2 per 100 000, 28 cases) ethnic group.

Figure 5. Campylobacteriosis notifications by DHB, 2012



Hospitalisation status was recorded for 4370 (62.2%) cases of which 459 (10.5%) were hospitalised.

The risk factors recorded for campylobacteriosis are shown in Table 4. Consumption of food from retail premises and contact with farm animals were the most common risk factors associated with campylobacteriosis cases in 2012.

In 2012, 32 outbreaks of campylobacteriosis (including two outbreaks with more than one implicated pathogen) were reported, involving 282 cases.

Chemical poisoning from the environment

Poisonings arising from chemical contamination of the environment are required to be notified under the Health Act 1956.

In 2012, seven cases of chemical poisoning from contamination of the environment were notified, compared with three cases notified in 2011.

The cases were from five DHBs: Auckland (2 cases), Waikato (2 cases), Waitemata, Bay of Plenty and Southern (1 case each). Five cases were male and two were female, ranging in age from 15 to 52 years. Five cases were in the European or Other ethnic group, one was in the Asian ethnic group and the ethnic group was unknown for one case.

Table 4. Exposure to risk factors associated with campylobacteriosis, 2012

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Consumed food from retail premises	1 175	1 346	4 510	46.6
Contact with farm animals	1 216	1 647	4 168	42.5
Consumed untreated water	574	1 759	4 698	24.6
Contact with faecal matter	441	2 113	4 477	17.3
Recreational water contact	405	2 237	4 389	15.3
Contact with other symptomatic people	306	2 297	4 428	11.8
Contact with sick animals	166	2 279	4 586	6.8
Travelled overseas during the incubation period	213	3 056	3 762	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.

A range of exposures prior to illness were recorded, including: carbon monoxide (3 cases), bleach, mould and mildew remover, fish-smoking and swimming at a public pool (1 case each).

Hospitalisation status was recorded for all cases, of which two were hospitalised. In 2012, two deaths were reported after cases were exposed to carbon monoxide arising from use of a generator in a disused mine. The coroner's findings have not yet been released.

In 2012, one outbreak of chemical poisoning from the environment (carbon monoxide poisoning) was reported, involving five cases (none of these cases had individual case notifications).

Cholera

No cases of cholera were notified in New Zealand in 2012. Since 1997, a total of 12 laboratory-confirmed cases of cholera have been notified, all of which were overseas-acquired.

Creutzfeldt-Jakob disease

The CJD Registry was established in 1996 to monitor sporadic, familial, iatrogenic and variant Creutzfeldt-Jakob disease (CJD). This section is based on the 16th annual report of the Registry [20].

In 2012, 11 cases of possible CJD were referred to the Registry. Two received an alternative diagnosis.

Of the remaining nine cases, two were classified as definite and seven as probable sporadic CJD cases based on clinical, cerebrospinal fluid, electroencephalogram, magnetic resonance imaging and/or post-mortem examination findings. The age distribution of these probable and definite cases was as follows: 60–69 years (3 cases), 70–79 years (3 cases), 80–89 years (2 cases), and 90 years and over (1 case). Six of the cases were male and three were female.

Since 1997, 65 cases of CJD have been documented by the Registry, 17 definite and 48 probable. No cases of variant CJD, the form linked with bovine spongiform encephalopathy, have ever been identified in New Zealand.

Cronobacter species invasive disease

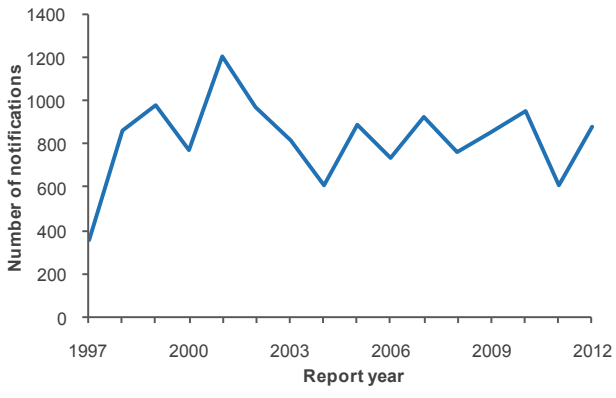
Cronobacter species invasive disease (formerly known as *Enterobacter sakazakii* invasive disease) has been notifiable in New Zealand since 21 July 2005. One case of *Cronobacter* species invasive disease, a female in the 70 years and over age group with a chronic illness and immune suppression, was notified in New Zealand in 2012. Since 2005, a total of four cases have been notified, all were adults aged 50 years and over.

Cryptosporidiosis

During 2012, 877 cases of cryptosporidiosis were notified, compared with 610 cases in 2011 (Figure 6). The 2012 notification rate (19.8 per 100 000 population) was a significant increase from 2011 (13.8 per 100 000, 610 cases), but similar to the notification rates in 2005 (21.5 per 100 000), 2007 (21.9 per 100 000), and 2010 (21.8 per 100 000).

Figure 7 shows cryptosporidiosis cases by month since 2008. There is a distinct seasonal pattern with the highest number of notifications reported during spring each year and an additional smaller peak in autumn.

Figure 6. Cryptosporidiosis notifications by year, 1997–2012



The cryptosporidiosis notification rate varied throughout the country (Figure 8). The highest rates were for South Canterbury (81.3 per 100 000 population, 46 cases) and Waikato (48.3 per 100 000, 179 cases) DHBs.

Age was recorded for all cases. The highest notification rate was for the 1–4 years age group (120.6 per 100 000 population, 303 cases), followed by the 5–9 years age group (38.8 per 100 000, 113 cases). The lowest rate was for the 70 years and over age group (3.3 per 100 000, 14 cases).

Sex was recorded for all cases. The notification rate for cryptosporidiosis was higher for males (20.7 per 100 000 population, 452 cases) than for females (18.9 per 100 000, 425 cases).

Of the 853 (97.3%) cases where ethnicity was recorded, the highest notification rate was for the European or Other ethnic group (24.3 per 100 000 population, 746 cases), followed by the MELAA (13.2 per 100 000, 5 cases) and Māori (10.7 per 100 000, 69 cases) ethnic groups.

Hospitalisation status was recorded for 707 cases (80.6%), of which 48 (6.8%) cases were hospitalised.

The risk factors for cryptosporidiosis are given in Table 5. Similar to previous years, contact with farm animals was the most common risk factor associated with cryptosporidiosis cases in 2012.

In 2012, 47 outbreaks of cryptosporidiosis (including two outbreaks with more than one implicated pathogen) were reported, involving 164 cases.

Cysticercosis

No cases of cysticercosis were notified in New Zealand in 2012. Since 1997, five cysticercosis cases have been reported, three cases in 2005 and two cases in 2007.

Ministry of Health data for 2012 recorded no hospitalisations with cysticercosis as the primary reason for admission.

Figure 7. Cryptosporidiosis notifications by month, January 2008–December 2012

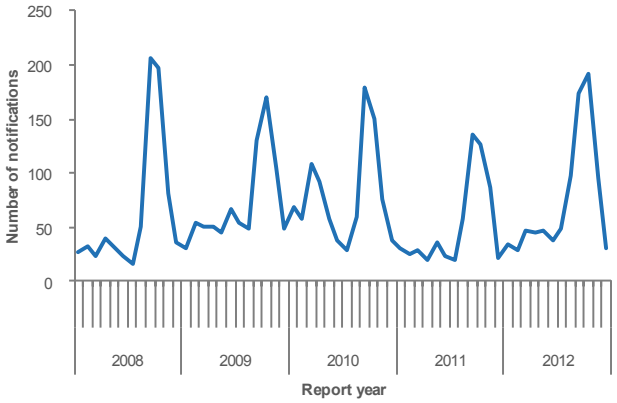


Figure 8. Cryptosporidiosis notifications by DHB, 2012

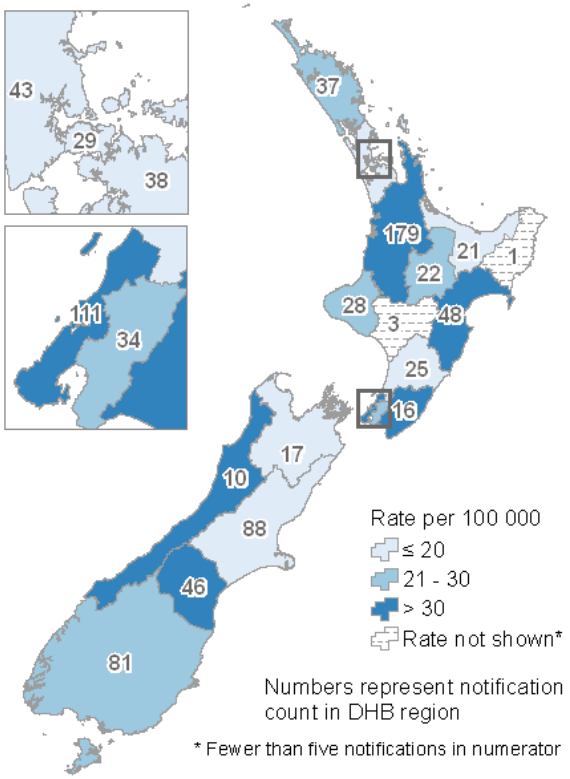


Table 5. Exposure to risk factors associated with cryptosporidiosis, 2012

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Contact with farm animals	393	233	251	62.8
Consumed untreated water	231	285	361	44.8
Contact with faecal matter	187	348	342	35.0
Recreational water contact	190	405	282	31.9
Consumed food from retail premises	156	366	355	29.9
Contact with sick animals	128	350	399	26.8
Contact with other symptomatic people	142	409	326	25.8
Travelled overseas during the incubation period	60	577	240	9.4

[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 have more than one risk factor recorded.

Decompression sickness

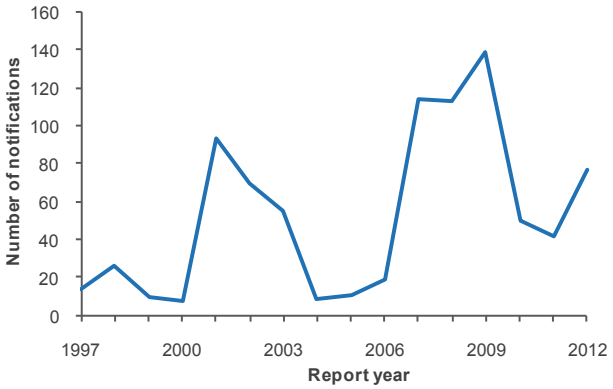
There were no cases of decompression sickness notified in 2012. The last case of decompression sickness was notified in 2006.

Ministry of Health data for 2012 recorded 33 hospitalisations with decompression sickness as the primary reason for admission. Between 2008 and 2012, the number of hospitalisations with decompression sickness as the primary reason for admission ranged from 24 to 35, indicating consistent under-notification of this condition.

Dengue fever

In 2012, 77 cases of dengue fever were notified compared with 42 cases in 2011 (Figure 9). The 2012 notification rate (1.7 per 100 000 population) was a significant increase from the 2011 rate (1.0 per 100 000).

Figure 9. Dengue fever notifications by year, 1997–2012



Age and sex were recorded for all dengue fever cases. The highest notification rate was for the 20–29 years age group (2.9 per 100 000 population, 18 cases), followed by the 50–59 years (2.5 per 100 000, 14 cases), 30–39 years (2.3 per 100 000, 13 cases) and 60–69 years (2.3 per 100 000, 10 cases) age groups.

The notification rate was slightly higher for males (1.9 per 100 000 population, 42 cases) than for females (1.6 per 100 000, 35 cases).

Ethnicity was recorded for 68 (88.3%) cases. The highest notification rate was for the Asian ethnic group (3.7 per 100 000 population, 15 cases), followed by the European or Other ethnic group (1.5 per 100 000, 46 cases).

Of the 57 (74.0%) cases for which hospitalisation status was recorded, 22 (38.6%) were hospitalised. Of the 77 notified cases, 75 (97.4%) were laboratory-confirmed.

Travel history was recorded for 76 (98.7%) cases and all had travelled overseas during the incubation period of the disease. The countries commonly visited or resided in by cases were Thailand (19 cases), Fiji (14 cases) and Indonesia (13 cases). It should be noted that some cases reported travel to more than one country.

The use of protective measures was recorded for 33 (42.9%) 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 2012 recorded 16 hospitalisations in which dengue fever (classical) was the principal diagnosis on admission.

Diphtheria

No cases of toxigenic diphtheria were notified in New Zealand in 2012. 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 2012, 10 cultures of *Corynebacterium diphtheriae* were received by the ESR Special Bacteriology Laboratory for toxigenicity testing, typing and surveillance purposes. The majority (8 cultures, 80.0%) were from cutaneous sources, whereas one culture was from blood, and one was from a throat. The patients ranged in age from 5 to 63 years.

All of the isolates were determined to be non-toxigenic by polymerase chain reaction (PCR) examination for the toxin gene. Seven (70.0%) of the isolates were biovar *mitis* and two (20.0%) were biovar *gravis*. The blood isolate was a biovar *intermedius* strain.

Gastroenteritis (acute)

Gastroenteritis comprises a variety of communicable diseases and infections. Infections caused by agents such as norovirus, rotavirus, sapovirus, and *Bacillus cereus* are included in this section (Table 6). Diseases and conditions that are notifiable in their own right (e.g., campylobacteriosis, giardiasis and salmonellosis) are reported separately.

From July 2000, PHUs have 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 735 cases of acute gastroenteritis notified in 2012. The 2012 rate of 16.6 per 100 000 population was a significant increase from the 2011 rate (14.3 per 100 000, 630 cases).

A causal agent was recorded for 298 (40.5%) acute gastroenteritis cases in 2012 (Table 6). Among these cases, 91.3% were norovirus (71.5%, 213 cases) or rotavirus (19.8%, 59 cases) infections. This was similar to an average of 92.3% (55.2% for norovirus and 37.1% for rotavirus) for the preceding five years.

Table 6. Acute gastroenteritis cases by agent type, 2012

Agent type	Cases	Percentage (%)
Agent identified	**298**	**40.5**
Norovirus infection	213	29.0
Rotavirus infection	59	8.0
Enteropathogenic *Escherichia coli*	9	1.2
Clostridium difficile	4	0.5
Histamine (scrombroid) poisoning	4	0.5
Bacillus cereus food poisoning	2	0.3
Clostridium perfringens	2	0.3
Sapovirus infection	2	0.3
Aeromonas species	1	0.1
Ciguatera fish poisoning	1	0.1
Staphylococcal food intoxication	1	0.1
Agent not identified	**437**	**59.5**
Total	**735**	**100.0**

The highest acute gastroenteritis rate was for MidCentral DHB (75.1 per 100 000 population, 127 cases), followed by Hutt Valley (29.8 per 100 000, 43 cases), Auckland (26.6 per 100 000, 123 cases) and Capital and Coast (26.6 per 100 000, 79 cases) DHBs.

Age was recorded for 711 (96.7%) cases. Notification rates were highest for the less than 1 year (44.6 per 100 000 population, 27 cases), 70 years and over (33.5 per 100 000, 141 cases) and 1–4 years (33.0 per 100 000, 83 cases) age groups.

Sex was recorded for all cases. The notification rate was higher for females (18.7 per 100 000 population, 422 cases) than for males (14.4 per 100 000, 313 cases).

Ethnicity was recorded for 656 (89.3%) cases. Of these, the highest notification rates were for the European or Other (17.9 per 100 000 population, 549 cases), Māori (8.8 per 100 000, 57 cases) and Asian (7.8 per 100 000, 32 cases) ethnic groups.

Hospitalisation status was recorded for 560 (76.2%) cases. Of these, 40 cases (7.1%) were hospitalised.

In 2012, 469 outbreaks of acute gastroenteritis were reported, involving 8582 cases, of which 208 cases were reported as individual case notifications.

The risk factors recorded for acute gastroenteritis cases are given in Table 7. The most common risk factor associated with gastroenteritis was the consumption of food from retail premises.

Giardiasis

There were 1719 cases of giardiasis notified in 2012. Following a rising trend in notifications from 2006 to 2010, there has been a decrease in the number of notifications since 2010 (Figure 10). The 2012 notification rate (38.8 per 100 000 population) was a significant decrease from the 2011 rate (43.9 per 100 000, 1934 cases).

Figure 10. Giardiasis notifications by year, 1997–2012

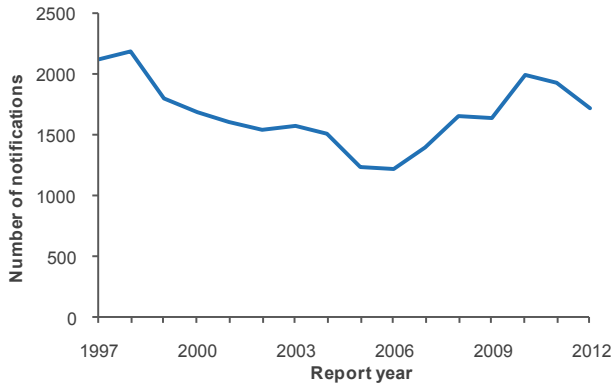


Table 7. Exposure to risk factors associated with acute gastroenteritis, 2012

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Consumed food from retail premises	324	59	352	84.6
Contact with other symptomatic people	145	241	349	37.6
Contact with faecal matter	47	242	446	16.3
Contact with farm animals	41	284	410	12.6
Consumed untreated water	21	240	474	8.0
Contact with sick animals	9	305	421	2.9
Travelled overseas during the incubation period	9	408	318	2.2
Recreational water contact	6	288	441	2.0

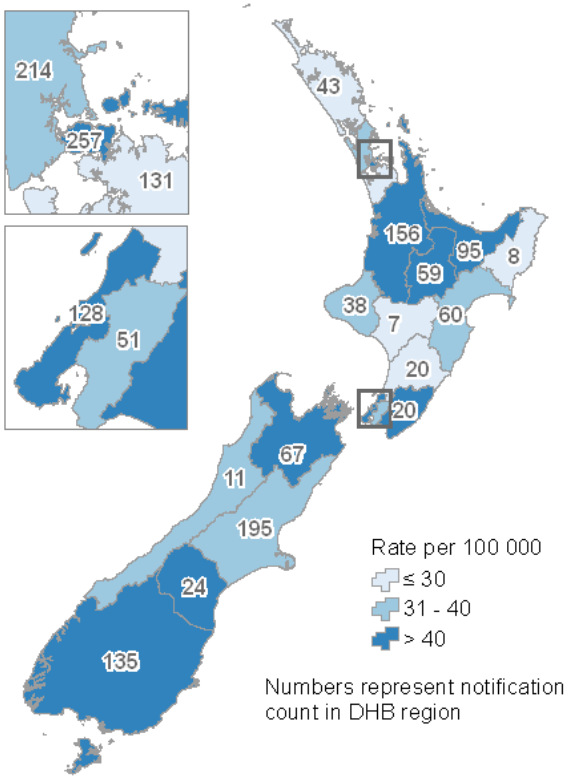
[a] Percentage refers to the number of cases that answered "yes" out of the total number of cases for which this information was supplied. Some cases had more than one risk factor recorded.

The notification rate varied throughout the country (Figure 11). The highest rate was for Lakes DHB (57.2 per 100 000 population, 59 cases), followed by Auckland (55.6 per 100 000, 257 cases) and Wairarapa (49.2 per 100 000, 20 cases) DHBs.

Age was recorded for 1716 (99.8%) cases. The highest notification rate was for the 1–4 years age group (136.5 per 100 000 population, 343 cases), followed by the 30–39 years age group (72.1 per 100 000, 402 cases).

Of the 1718 (99.9 %) cases where sex was recorded, the notification rate was higher for females (40.3 per 100 000 population, 907 cases) than for males (37.2 per 100 000, 811 cases).

Figure 11. Giardiasis notifications by DHB, 2012



Ethnicity was recorded for 1604 (93.3%) giardiasis cases. Of these, the highest notification rate was for the MELAA ethnic group (103.3 per 100 000 population, 39 cases), followed by the European or Other (44.7 per 100 000, 1375 cases), Asian (18.1 per 100 000, 74 cases), Māori (16.1 per 100 000, 104 cases) and Pacific Peoples (4.5 per 100 000, 12 cases) ethnic groups.

Hospitalisation status was recorded for 1033 (60.1%) cases, of which 38 (3.7%) were hospitalised.

The risk factors recorded for giardiasis cases in 2012 are presented in Table 8. The most commonly reported risk factors were contact with faecal matter and recreational water contact.

There were 69 outbreaks of giardiasis (including five outbreaks with more than one pathogen recorded) reported in 2012, involving 284 cases.

Haemophilus influenzae serotype b disease

Four cases of *Haemophilus influenzae* serotype b (Hib) disease were notified in 2012. All cases were laboratory-confirmed.

One case in 2012 was aged less than 5 years (compared with three in 2011 and five in 2010). This case was male, from Waikato DHB and in the European or Other ethnic group.

A Hib vaccine was introduced in January 1994. The current schedule introduced in 2008 recommends three doses of Hib vaccine at 6 weeks, 3 months and 5 months of age [22]. The 2012 case aged less than 5 years was recorded as having been fully vaccinated and was hospitalised with septicaemia.

One death from Hib was reported in 2012, in the 70 years or over age group.

Table 8. Exposure to risk factors associated with giardiasis, 2012

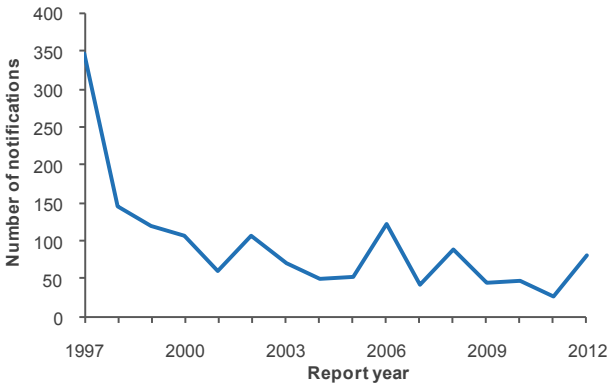
Risk factor	Yes	No	Unknown	Percentage (%) [a]
Contact with faecal matter	326	390	1003	45.5
Recreational water contact	269	468	982	36.5
Contact with other symptomatic people	254	475	990	34.8
Consumed untreated water	214	446	1059	32.4
Contact with farm animals	236	532	951	30.7
Consumed food from retail premises	173	440	1106	28.2
Travelled overseas during the incubation period	170	686	863	19.9
Contact with sick animals	31	645	1043	4.6

[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.

Hepatitis A

In 2012, a total of 82 cases of hepatitis A were notified, compared with 26 notifications in 2011. Since a peak of notifications in 1997 (347 cases), there has been an overall decreasing trend in the number of hepatitis A notifications reported, although increases in notifications (due primarily to disease outbreaks) compared to the previous year were observed in 2002, 2006, 2008 and 2012 (Figure 12).

Figure 12. Hepatitis A notifications by year, 1997–2012



The national hepatitis A notification rate for 2012 was 1.8 per 100 000 population, which was a significant increase from the 2011 rate of 0.6 per 100 000. Of the DHBs with more than five cases reported in 2012, the highest rates were for Waitemata (6.5 per 100 000, 36 cases), Auckland (3.2 per 100 000, 15 cases) and Counties Manukau (3.0 per 100 000, 15 cases) DHBs.

Age was recorded for all cases. Of the age groups with more than five cases reported in 2012, the notification rate was highest in those aged 5–9 years (7.2 per 100 000 population, 21 cases), followed by the 1–4 years (5.2 per 100 000, 13 cases) and 10–14 years (3.5 per 100 000, 10 cases) age groups.

Sex was recorded for all cases. Of these, the notification rate for males (2.1 per 100 000 population, 45 cases) was higher than for females (1.6 per 100 000, 37 cases).

Ethnicity was recorded for 80 (97.6%) hepatitis A cases. Of these, the highest notification rate was for the MELAA ethnic group (13.2 per 100 000, 5 cases), followed by the Asian (13.0 per 100 000, 53 cases) ethnic group.

Hospitalisation status was recorded for 75 (91.5%) cases. Of these, 33 cases (44.0%) were hospitalised.

Of the 76 cases with travel information recorded, 38 (50.0%) had travelled overseas during the incubation period of the disease. The countries most frequently visited included India (14 cases), Fiji (5 cases), Samoa (5 cases), Pakistan and Singapore (3 cases each).

In 2012, one outbreak of hepatitis A was reported, involving 30 cases.

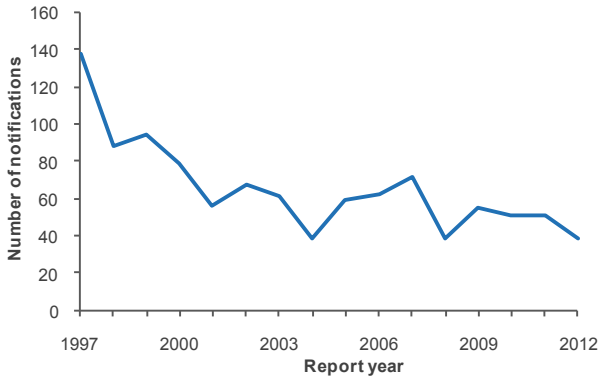
Hepatitis B

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

In 2012, 39 cases of hepatitis B were notified, compared with 51 cases in 2011 (Figure 13). There has been a general decreasing trend in the number of hepatitis B notifications reported between 1984 (over 600 cases) and 2004 (38 cases), with numbers of notifications fluctuating between 38 and 72 in recent years. This general decrease is attributed primarily to the introduction of the hepatitis B vaccine to the immunisation schedule progressively between 1985 and 1988 [22].

The hepatitis B notification rate for 2012 was 0.9 per 100 000 population, which is a small decrease compared with the 2011 rate of 1.2 per 100 000.

Figure 13. Hepatitis B notifications by year, 1997–2012



In 2012, hepatitis B cases were spread across 15 DHBs, ranging from one to six cases per DHB.

Age was recorded for all cases. In 2012, the highest notification rate was for the 40–49 years age group (2.4 per 100 000 population, 15 cases), followed by the 50–59 years age group (1.4 per 100 000, 8 cases).

Sex was recorded for all cases. The notification rate was higher for males (1.1 per 100 000 population, 25 cases) than for females (0.6 per 100 000, 14 cases).

Ethnicity was recorded for 38 (97.4%) cases. Of the ethnic groups with more than five cases reported in 2012, the highest notification rate was for the Asian (1.7 per 100 000, 7 cases), followed by the Māori (1.2 per 100 000, 8 cases) and European or Other (0.7 per 100 000, 20 cases) ethnic groups.

Of the 37 (94.9%) cases with hospitalisation status recorded, 17 (45.9%) were hospitalised.

The most common risk factors reported by hepatitis B cases in 2012 were being overseas during the incubation period for this disease, sexual contact with a confirmed case or carrier, and household contact with a confirmed case or carrier (Table 9).

In 2012, one outbreak of hepatitis B was reported, involving two cases.

Hepatitis C

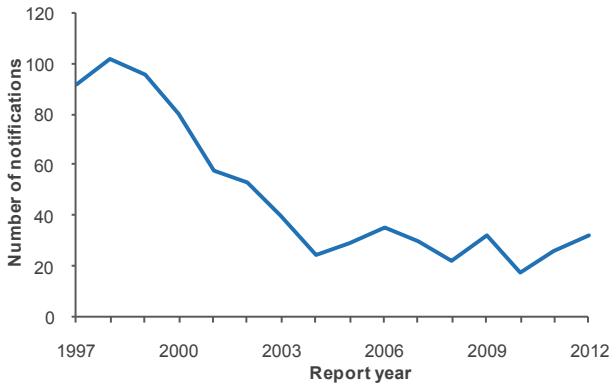
In New Zealand, only acute hepatitis C is a notifiable disease; therefore, notification rates do not describe the burden of chronic hepatitis C infection.

In 2012, a total of 32 cases of hepatitis C were notified, compared with 26 cases in 2011. 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 35 cases per year (Figure 14).

The hepatitis C notification rate for 2012 was 0.7 per 100 000 population, which was similar to that for 2011 (0.6 per 100 000). Southern (13 cases) and Canterbury (5 cases) DHBs had the highest number of cases reported in 2012.

Age and sex were recorded for all cases. The highest notification rate was for the 20–29 year age group (2.1 per 100 000 population, 13 cases) followed by the 30–39 years (1.3 per 100 000, 7 cases) and 40–49 years (1.0 per 100 000, 6 cases) age groups.

Figure 14. Hepatitis C notifications by year, 1997–2012



The notification rate was similar for males (0.8 per 100 000 population, 17 cases) and females (0.7 per 100 000, 15 cases).

Ethnicity was recorded for all cases, of which 27 cases (0.9 per 100 000 population) were in the European or Other ethnic group.

Of the 31 (96.9%) cases for which hospitalisation status was recorded, five (16.1%) were hospitalised.

The risk factors for hepatitis C cases are presented in Table 10. The most commonly reported risk factors were a history of injecting drug use and household contact with a confirmed case or carrier.

Hepatitis (viral) - not otherwise specified

Two cases of hepatitis (viral) not otherwise specified (NOS) were notified in 2012, compared with seven cases notified in 2011. The cases were males aged 40 years and over. One case was infected with hepatitis E and reported overseas travel during the incubation period for this disease. The other case was infected with hepatitis D and reported no exposure to risk factors commonly associated with this disease.

Table 9. Exposure to risk factors associated with hepatitis B, 2012

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Overseas during incubation period	11	26	2	29.7
Sexual contact with confirmed case or carrier	7	18	14	28.0
Household contact with confirmed case or carrier	6	27	6	18.2
History of injecting drug use	2	33	4	5.7
Body piercing/tattooing in the last 12 months	2	34	3	5.6
Occupational exposure to blood	2	35	2	5.4
Case is a child of seropositive mother	0	31	8	0.0
Case is a blood product or tissue recipient	0	36	3	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. Several cases had more than one risk factor recorded.

Table 10. Exposure to risk factors associated with hepatitis C, 2012

Risk factor	Yes	No	Unknown	Percentage (%) [a]
History of injecting drug use	24	5	3	82.8
Household contact with confirmed case or carrier	8	18	6	30.8
Body piercing/tattooing in the last 12 months	6	19	7	24.0
Sexual contact with confirmed case or carrier	5	16	11	23.8
Case is a blood product or tissue recipient	1	25	6	3.8
Overseas during incubation period	1	26	5	3.7
Occupational exposure to blood	1	27	4	3.6
Case is a child of seropositive mother	1	29	2	3.3

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

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 [23].

During 2012, 32 laboratory-confirmed A(H5N1) cases resulting in 20 fatalities occurred in Egypt (11 cases, 5 deaths), Indonesia (9 cases, 9 deaths), Vietnam (4 cases, 2 deaths), Bangladesh (3 cases, no deaths), Cambodia (3 cases, 3 deaths), and China (2 cases, 1 death). Between 2003 and 15 Feb 2013, 620 cases were reported from 15 countries, of which 367 were fatal (a case fatality rate of 59.2%) [24].

Hydatid disease

Hydatid disease is caused by the larval stage of the tapeworm *Echinococcus granulosus*. One probable case of hydatid disease was notified in 2012. Since 1997, 53 cases of hydatid disease have been notified.

The 2012 case, a European male aged over 70 years, was hospitalised and found to have a previously undiagnosed cyst in the liver. The case was a shepherd and abattoir worker in his youth.

Echinococcus species are notifiable organisms under the Biosecurity Act 1993. All cases of hydatid disease are reported to the Ministry of Agriculture and Forestry for investigation of possible disease reservoirs in New Zealand animals. In September 2002, New Zealand was declared provisionally free of hydatids. However, hydatids is 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 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 provided separately in the report entitled 'Invasive Pneumococcal Disease in New Zealand, 2012', available from www.surv.esr.cri.nz in August 2013.

In 2012, 488 cases of IPD were notified. The 2012 notification rate of 11.0 per 100 000 population was a significant decrease from the 2011 rate (12.5 per 100 000, 552 cases). Figure 15 shows the number of IPD notifications by month between 2009 and 2012 There is a distinct seasonal pattern, with the highest number of notifications reported during winter (in particular, July) each year.

The IPD notification rate varied throughout the country (Figure 16). The highest rate was for Wairarapa DHB (24.6 per 100 000 population, 10 cases), followed by Bay of Plenty DHB (17.0 per 100 000, 36 cases).

Figure 15. Invasive pneumococcal disease notifications by month, January 2009–December 2012

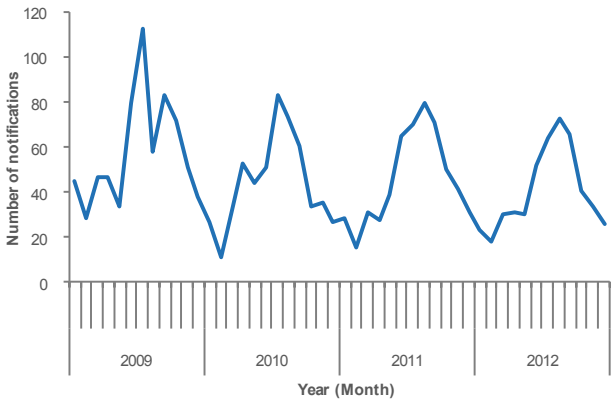
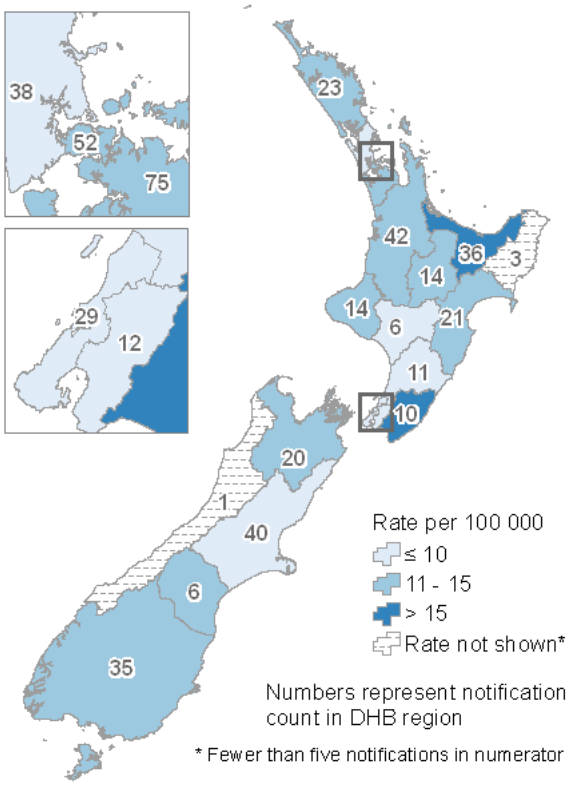


Figure 16. Invasive pneumococcal disease notifications by DHB, 2012



Age and sex were recorded for all cases. The notification rate was highest for the less than 1 year age group (51.2 per 100 000 population, 31 cases), followed by the 70 years and over (39.2 per 100 000, 165 cases) and 60–69 years (19.6 per 100 000, 84 cases) age groups.

The rate of IPD was higher for males (12.0 per 100 000 population, 262 cases) than for females (10.0 per 100 000, 226 cases).

Ethnicity was recorded for 475 (97.3%) cases. The highest notification rate was for the Pacific Peoples ethnic group (22.1 per 100 000 population, 59 cases), followed by the Māori (15.8 per 100 000, 102 cases) and European or Other (9.6 per 100 000, 294 cases) ethnic groups.

Of the 472 (96.7%) cases for which hospitalisation status was recorded, 447 (94.7%) were hospitalised. There were 31 deaths due to IPD reported in 2012. The deaths were distributed into the less than 5 years (4), 15–29 years (2), 30−49 years (1), 50−69 years (6), and 70 years and over (18) age groups.

The risk factors recorded for IPD are presented in Table 11 (for cases aged less than 5 years) and Table 12 (for cases aged 5 years and over). The most commonly reported risk factor for cases aged less than five years was exposure to smoking in the household and for cases aged five years and older was having a chronic illness.

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 approximately October 2011, the 10-valent pneumococcal conjugate vaccine (PCV10) replaced PCV7 as supplies of the latter were depleted. The recommended schedule for PCV7 and PCV10 is four doses given at 6 weeks, 3 months, 5 months and 15 months of age [22]. Table 13 presents the vaccination status of cases by age group.Of the 318 (65.2%) IPD cases with a known vaccination status, 272 were not vaccinated, eight reported having received one dose of vaccine, 32 received at least two doses of vaccine, and six reported being vaccinated but no dose information was provided.

Since the introduction of the PCV in New Zealand, there has been a significant decrease in the rate of IPD for the less than 5 years age group from 32.7 per 100 000 population in 2009 to 18.6 per 100 000 in 2012.

The Invasive Pathogens Laboratory at ESR received a *Streptococcus pneumoniae* isolate from an invasive site for serotyping for 459 (94.1%) of the notified cases in 2012. Table 14 presents a summary of the IPD cases by serotype and age group.

Table 11. Exposure to risk factors associated with invasive pneumococcal disease for cases aged less than 5 years, 2012

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Smoking in the household	11	14	33	44.0
Premature (<37 weeks gestation)[b]	2	16	13	11.1
Attends childcare	2	20	36	9.1
Chronic illness	4	51	3	7.3
Immunocompromised	3	52	3	5.5
Chronic lung disease or cystic fibrosis	1	52	5	1.9
Congenital or chromosomal abnormality	1	54	3	1.8
Cochlear implants	1	56	1	1.8

[a] Percentage refers to the percentage 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.

[b] Only cases aged less than 1 year are included for reporting of this risk factor.

Table 12. Exposure to risk factors associated with invasive pneumococcal disease for cases aged 5 years and over, 2012

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Chronic illness	242	142	46	63.0
Current smoker[b]	85	248	77	25.5
Chronic lung disease or cystic fibrosis	69	316	45	17.9
Immunocompromised	65	307	58	17.5
Resident in long-term or other chronic-care facility	39	351	40	10.0
Congenital or chromosomal abnormality	6	361	63	1.6
Cochlear implants	1	348	81	0.3
Anatomical or functional asplenia	1	372	57	0.3

[a] Percentage refers to the percentage 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.

[b] Only cases aged 15 years and over are included for reporting of this risk factor.

Table 13. Invasive pneumococcal disease notifications and vaccinations received by age group, 2012

Age group	Total cases	One dose	Two doses	Three doses	Four doses	Five doses	Vaccinated (no dose info)	Not vaccinated	Unknown
<6 months	16	4	3	2	0	0	0	5	2
6 months–4 years	42	2	2	15	8	2	3	3	7
5–9 years	13	0	0	0	0	0	1	10	2
10–19 years	18	0	0	0	0	0	0	7	11
20+ years	399	2	0	0	0	0	2	247	148
Total	**488**	**8**	**5**	**17**	**8**	**2**	**6**	**272**	**170**

More than 80% (43/52) of cases in the less than 5 years age group were due to serotypes not covered by PCV10, compared to 54.4% (111/204) and 64.0% (130/203) in the 5–64 years and 65 years and over age groups, respectively. Serotype 19A, a non-PCV10 serotype, was the most prevalent serotype in every age group.

Among the four deaths in the less than 5 years age group, three cases were infected with serotypes not covered by PCV10 and serotype information was un available for one case. Three of the cases that died had received at least 2 doses of vaccine and one was not immunised.

Lead absorption

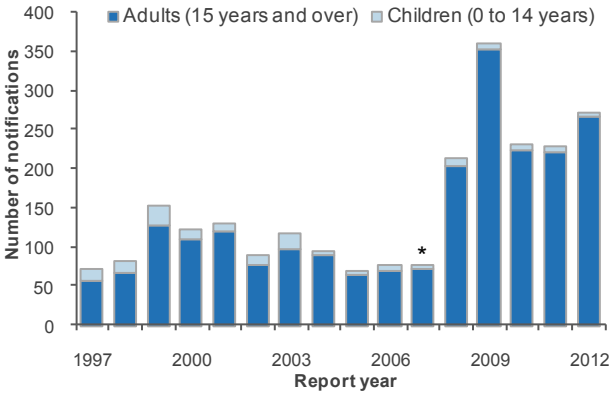
There were 272 cases of lead absorption notified in 2012 (6.1 per 100 000 population) compared with 230 cases in 2011 (5.2 per 100 000). There has been a notable increase in the number of notifications for adults aged 15 years and over since 2007 (Figure 17). This increase in notifications coincided with the introduction of direct laboratory notification, the lowering of the non-occupational notifiable blood-lead level from 0.72 to 0.48 µmol/L, and enhanced routine occupational screening in the Auckland region.

Table 14. Invasive pneumococcal disease notifications by serotype and age group, 2012

Serotype	<5 years	5–64 years	65+ years	Total
4	0	26	22	48
6B	0	3	5	8
9V	1	5	7	13
14	2	11	5	18
18C	0	5	4	9
19F	1	13	11	25
23F	0	5	4	9
1	1	7	0	8
5	0	0	0	0
7F	4	18	15	37
3	2	9	14	25
6A	2	1	4	7
19A	18	30	32	80
Other serotypes	21	71	80	172
Serotype unknown	6	16	7	29
Total	**58**	**220**	**210**	**488**

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.

Figure 17. Lead absorption notifications in children and adults by year, 1997–2012



* In 2007, direct laboratory notification was introduced, the non-occupational notifiable blood level was lowered from 0.72 to 0.48 µmol/L and enhanced occupational screening was introduced in the Auckland region.

The lead absorption notification rate varied across New Zealand in 2012, with the highest notification rates for Wairarapa (17.2 per 100 000 population, 7 cases), Whanganui (16.0 per 100 000, 10 cases) and Auckland (14.3 per 100 000, 66 cases) DHBs.

Age was recorded for all cases. The cases aged less than 15 years were distributed by age group as follows: 1–4 years (2 cases), 5–9 years (2 cases) and 10–14 years (1 case). Among the cases aged 15 years and over, the highest notification rates were for the 50–59 years age group (11.9 per 100 000 population, 68 cases), 40–49 years (11.3 per 100 000, 71 cases) and 60–69 years (10.3 per 100 000, 44 cases) age groups.

Sex was recorded for all cases. The notification rate was higher for males (11.7 per 100 000 population, 256 cases) than for females (0.7 per 100 000, 16 cases) in 2012.

Ethnicity was recorded for 226 (83.1%) cases. The highest notification rates were for the European or Other (6.1 per 100 000 population, 188 cases) and Pacific Peoples (6.0 per 100 000, 16 cases) ethnic groups.

Hospitalisation status was recorded for 148 (54.4%) cases. Of these, three (2.0%) cases were hospitalised.

Table 15 summarises the risk factor information for lead absorption cases. For children, the most common risk factor was living in, or regularly visiting, a building built prior to 1970 that had paint chalking or flaking and/or had recently undergone alteration or refurbishment. The most common risk factor for adults was exposure to a high-risk occupation.

Blood lead levels were recorded for all cases notified in 2012. For child cases, blood lead level concentrations ranged from 0.58 to 2.30 µmol/L, with a median of 0.76 µmol/L. For adult cases, blood-lead level concentrations ranged from 0.48 to 5.32 µmol/L, with a median of 0.80 µmol/L.

In 2012, four outbreaks of lead absorption were reported, involving 16 cases.

Table 15. Exposure to risk factors associated with lead absorption, 2012

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Children (0–14 years)				
Case lived in or regularly visited a building built prior to 1970[b]	3	0	2	100.0
Case played in soil containing paint debris	1	0	4	100.0
Pica behaviour	2	0	3	100.0
Close contact of case was occupationally exposed to lead	1	2	2	33.3
Case lived near an industry that is likely to release lead	0	3	2	0.0
Adults (15 years and over)				
Case had exposure to high risk occupations[c]	145	52	70	73.6
Case lived in or regularly visited a building built prior to 1970[b]	46	49	172	48.4
Case or close contact had exposure to lead through hobbies[d]	57	69	141	45.2
Close contact of case was occupationally exposed to lead	4	88	175	4.3

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

[b] Of these, three children and 26 adults had lived in or regularly visited buildings that had chalking/flaking paint, had old paint being stripped or recently stripped, and/or had recently undergone alterations or refurbishment.

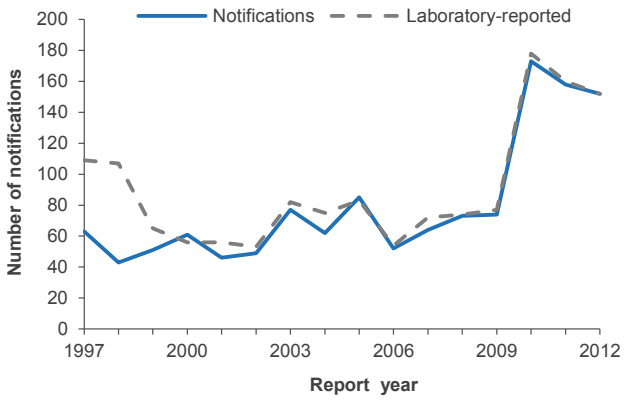
[c] Occupations included painter/decorator (30 cases), radiator fitter (10), foundry worker (6), electrician/electrical engineer (3), factory process worker (3), lead lighter/glass processing worker (3), maintenance/trades worker (3), plastics factory worker (3), scrap metal worker (3), fitter/welder (2), roof tiler (2), cleaner, fibreglass worker, lead tackle worker, manufacturer, panelbeater, plumber, sports instructor, truck driver (1 each), and unspecified (69).

[d] Hobbies included: shooting (45 cases), making bullets (5), making sinkers/weights (5), boat/car repairs (2), cleaning firearms (2), home renovations, and lead lighting (1 each). Note that some cases reported more than one hobby.

Legionellosis

During 2012, 152 cases of legionellosis were notified, representing a rate of 3.4 per 100 000 population. This was similar to the 2011 rate of 3.6 per 100 000 (158 cases). The annual number of cases notified remained fairly stable between 1997 and 2009 but increased dramatically in 2010 (Figure 18).

Figure 18. Legionellosis notifications and laboratory-reported cases by year, 1997–2012



Notification rates were lower than 5.0 per 100 000 population for all DHBs except Canterbury DHB (10.4 per 100 000 population, 52 cases).

Age and sex were recorded for all cases. The highest notification rates were for the 70 years and over (11.4 per 100 000 population, 48 cases) and 60–69 years (9.6 per 100 000, 41 cases) age groups.

The notification rate was higher for males (4.5 per 100 000 population, 98 cases) than for females (2.4 per 100 000, 54 cases).

Ethnicity was recorded for 150 (98.7%) cases. The highest legionellosis rate was for the European or Other ethnic group (4.1 per 100 000 population, 126 cases), followed by the Pacific Peoples ethnic group (3.4 per 100 000, 9 cases).

Of the 142 (93.4%) cases in 2012 for which hospitalisation status was recorded, 115 (81.0%) were hospitalised.

There were six deaths due to legionellosis reported in 2012. The deaths were in the 50−59 years (1), 60−69 years (1) and 70 years and over (4) age groups. The two cases aged less than 70 years who died also reported having a pre-existing immunosuppressive or debilitating condition.

Table 17 provides a summary of risk factors for which data was available. The following exposures were recorded for the 84 (55.3%) cases that reported environmental sources of infection during the incubation period: compost, potting mix or soil (52 cases), showers or hot water systems (17 cases), air conditioning units or heat pumps (10 cases), fountains (4 cases), spa or indoor pools (4 cases), and cooling towers (1 case). Overseas travel during the incubation period was reported for 15 cases.

The Legionella Reference Laboratory at ESR reported 152 cases infected with *Legionella* in 2012. Table 16 shows the strains identified for the 2012 laboratory-reported cases. The most common *Legionella* species reported in 2012 were *L. longbeachae* (51.3%, 78 cases) and *L. pneumophila* (33.6%, 52 cases).

One outbreak of legionellosis was reported in 2012, involving 19 cases.

Table 16. *Legionella* strains for laboratory-reported cases, 2012

Legionella species and serogroup	Cases	Percentage (%)
L. longbeachae	**78**	**51.3**
L. longbeachae sg 1	20	13.2
L. longbeachae sg 2	13	8.6
L. longbeachae sg not determined	45	29.6
L. pneumophila	**51**	**33.6**
L. pneumophila sg 1	39	25.7
L. pneumophila sg 12	4	2.6
L. pneumophila sg 4	2	1.3
L. pneumophila sg 2	1	0.7
L. pneumophila sg 3	1	0.7
L. pneumophila sg not determined	4	2.6
Other *Legionella* species	**23**	**15.1**
L. micdadei	9	5.9
L. dumoffii	5	3.3
L. jordanis	4	2.6
L. sainthelensi	2	1.3
Legionella species not determined	3	2.0
Total	**152**	**100.0**

Table 17. Risk factors associated with legionellosis, 2012

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Exposure to environmental sources of infection during the incubation period	84	26	42	76.4
Pre-existing immunosuppressive or debilitating condition	42	87	23	32.6
Smokes cigarettes	32	101	19	24.1

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

Leprosy

Two laboratory-confirmed cases of leprosy were notified in 2012 compared with one case in 2011. Both cases were males aged 20–29 years old in the European or Other ethnic group. The clinical form of leprosy for both cases was recorded as lepromatous. Both cases were overseas during the incubation period for this disease. The countries resided in or visited by the cases were Fiji and Kiribati, respectively.

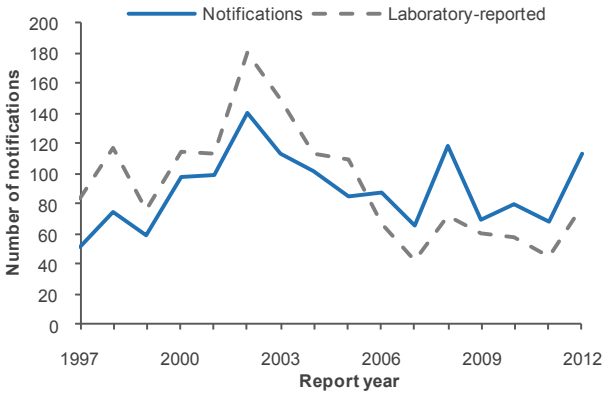
Ministry of Health data for 2012 recorded one hospitalisation where leprosy was the principal diagnosis on admission.

Leptospirosis

In 2012, a total of 113 cases of leptospirosis were notified. The 2012 rate of 2.5 cases per 100 000 population was a significant increase from the notification rate in 2011 (1.5 per 100 000, 68 cases). Of the 113 notified cases, 107 (94.7%) were laboratory-confirmed.

Figure 19 shows the number of notified and laboratory-reported cases of leptospirosis for each year since 1997.

Figure 19. Leptospirosis notifications and laboratory-reported cases by year, 1997–2012



In 2012, there were 31 cases (8.4 per 100 000 population) reported in Waikato DHB, 19 cases (12.2 per 100 000) in Hawke's Bay DHB, and 11 cases (6.5 per 100 000) in MidCentral DHB. The remaining 52 cases were spread across 15 different DHBs (1−6 cases per DHB)

Age and sex were recorded for all cases. The highest notification rates were for the 40–49 years (5.0 per 100 000 population, 31 cases) and 50–59 years (4.6 per 100 000, 26 cases) age groups. The majority of cases were male (92.0%, 104 cases).

Ethnicity was recorded for 108 (95.6%) cases. The highest notification rates were for the Māori (2.9 per 100 000, 19 cases) and European or Other (2.8 per 100 000, 86 cases) ethnic groups.

Of the 107 (94.7%) cases where hospitalisation status was recorded, 66 (61.7%) were hospitalised.

Occupation was recorded for 104 (92.0%) of the 113 notified cases. Of these, 80 cases (76.9%) were recorded as engaged in occupations previously identified as high risk for exposure to *Leptospira* spp. in New Zealand [25]. The percentage of such cases was similar to that of 2011 (74.2%). Of the 80 cases with a high-risk occupation recorded, 58 (72.5%) were farmers or farm workers and 22 (27.5%) worked in the meat-processing industry (as freezing workers, meat process workers or butchers). Of the 33 cases that did not report a high-risk occupation (or had no occupation recorded) five (15.2%) had an occupation that involved direct contact with animals including stock truck drivers (4 cases) and a veterinary technician (1 case). The remaining 28 cases reported animal/outdoor exposures (15 cases), contact with lakes, rivers and streams (10 cases), or overseas travel during the incubation period for this disease (3 cases) as risk factors.

The Leptospira Reference Laboratory at ESR reported 78 cases infected with *Leptospira* in 2012. Table 18 presents the species and serovars identified for the 2012 laboratory-reported cases. The most common *Leptospira* serovars reported were *L. borgpetersenii* sv Hardjo (35.9%, 28 cases) and *L interrogans* sv Pomona (25.6%, 20 cases). In addition, one case of *L. interrogans* sv Australis, a serovar previously exotic to New Zealand, was identified. This case had not travelled overseas but reported exposure to a dairy farm environment.

No outbreaks of leptospirosis were reported in 2012.

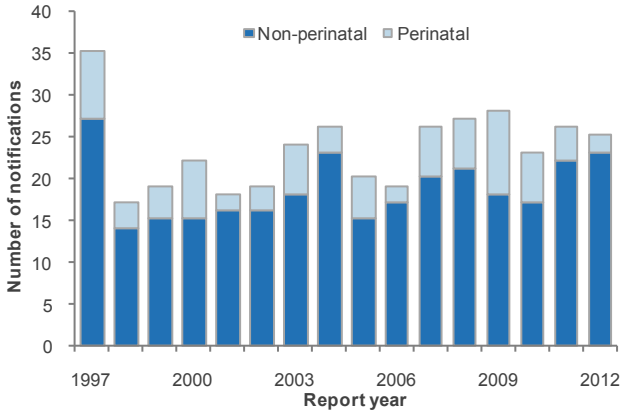
Table 18. *Leptospira* species and serovars for laboratory-reported cases, 2012

***Leptospira* species and serovar**	**Cases**	**Percentage (%)**
L. borgpetersenii	**50**	**64.1**
L. borgpetersenii sv Hardjo	28	35.9
L. borgpetersenii sv Ballum	11	14.1
L. borgpetersenii sv Tarassovi	11	14.1
L. interrogans	**23**	**29.5**
L. interrogans sv Pomona	20	25.6
L. interrogans sv Australis	1	1.3
L. interrogans sv Canicola	1	1.3
L. interrogans sv Copenhageni	1	1.3
***Leptospira* serovar not identified**	**5**	**6.4**
Total	**78**	**100.0**

Listeriosis

In 2012, 25 cases of listeriosis were notified, a rate of 0.6 per 100 000 population. Figure 20 shows listeriosis notifications (both perinatal and non-perinatal) for each year since 1997. The notification rate for listeriosis has been stable, ranging from 0.4 to 0.6 per 100 000, over the past 15 years since the peak of 0.9 per 100 000 in 1997.

Figure 20. Listeriosis notifications (perinatal and non-perinatal) by year, 1997–2012



Two (8.0%) of the 2012 cases were recorded as perinatal, a decrease from 2011 (4 cases). The lengths of gestation for the two perinatal cases were 14 weeks and 22 weeks, respectively, and both foetuses died. The mothers were in the MELAA and Pacific Peoples ethnic groups and were 29 and 31 years old, respectively.

The 23 non-perinatal listeriosis cases were from nine DHBs, with the majority (60.9%) of notifications from Counties Manukau (5 cases), Bay of Plenty (5 cases), and Hawke's Bay (4 cases) DHBs. Age, sex and ethnicity were recorded for all cases. Twenty-one non-perinatal cases were aged 50 years and over (including 13 cases aged 70 years and over). Twelve cases were female and 11 were male. Cases were distributed by ethnic group as follows: European or Other (18 cases), Pacific Peoples (3 cases,), Māori and Asian (1 case each).

Hospitalisation status was recorded for all 23 non-perinatal cases, of which 22 (95.7%) were hospitalised. Of these 22 cases, nine were hospitalised for treatment of another illness and six were receiving immunosuppressive drugs (it should be noted that some cases reported more than one risk factor). Information on underlying illness was recorded for all non-perinatal cases and 16 (69.6%) had an underlying illness such as cancer, autoimmune disease, Crohn's disease, renal failure or other chronic illness.

Four non-perinatal deaths were reported in 2012 in the 60–69 years and 70 years and over age groups (2 cases each).

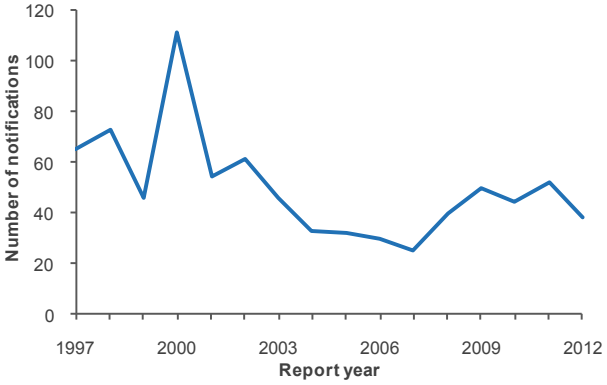
The Special Bacteriology Laboratory at ESR reported 25 cases infected with *Listeria monocytogenes* in 2012. Thirteen (52.0%) were serotype O1/2 and 12 (48.0%) were serotype O4.

There was one outbreak of listeriosis reported in 2012, involving six cases. Isolates from four of the cases were determined by the Special Bacteriology Laboratory as serotype O1/2, with DNA profiles that matched those of isolates from ready-to-eat (RTE) meat products sold in the Hawke's Bay and Tauranga regions.

Malaria

In 2012, 38 cases of malaria were notified compared with 52 cases in 2011 (Figure 21). The 2012 notification rate (0.9 per 100 000 population) was lower than the 2011 rate (1.2 per 100 000).

Figure 21. Malaria notifications by year, 1997–2012



Age was recorded for all malaria cases. The highest notification rate was for the 20–29 years age group (2.5 per 100 000 population, 16 cases), followed by the 40–49 years age group (1.4 per 100 000, 9 cases).

Sex was recorded for 37 (97.4%) cases. The notification rate was higher for males (1.5 per 100 000 population, 32 cases) than for females (0.2 per 100 000, 5 cases).

Ethnicity was recorded for all 38 cases, of which 25 were in the Asian ethnic group (6.1 per 100 000 population).

Of the 34 (89.5%) cases for which hospitalisation status was recorded, 22 (64.7%) were hospitalised. All 38 notified cases were laboratory-confirmed.

Travel history was recorded for all the reported malaria cases. Thirty-three (42.3%) cases had resided or travelled overseas during the incubation period for this disease. The remaining five (13.2%) cases had not been overseas recently, but had a prior history of travel to malaria-endemic areas.

Table 19 presents the region and country of overseas travel and *Plasmodium* species identified for malaria

notifications in 2012. The region most commonly reported as having been resided in or visited for cases with *P. falciparum* was Sub-Saharan African (4 cases). Among cases identified with *P. vivax*, the region most commonly reported was Southern and Central Asia (18 cases), followed by Oceania (5 cases). The country visited or resided in with the highest number of malaria cases was India with 23 cases, of which 18 cases were identified with *P. vivax* (Figure 22). It should be noted that some cases wereinfected with more than one *Plasmodium* species and reported travel to more than one country.

Malaria prophylaxis was prescribed for five cases, of which four reported taking it as prescribed. Seven cases did not have prophylaxis prescribed and prophylaxis information was unknown for 26 cases.

Ministry of Health data for 2012 recorded 28 hospitalisations where malaria was the principal diagnosis on admission.

Table 19. Region and country of overseas travel and *Plasmodium* species for malaria notifications, 2012

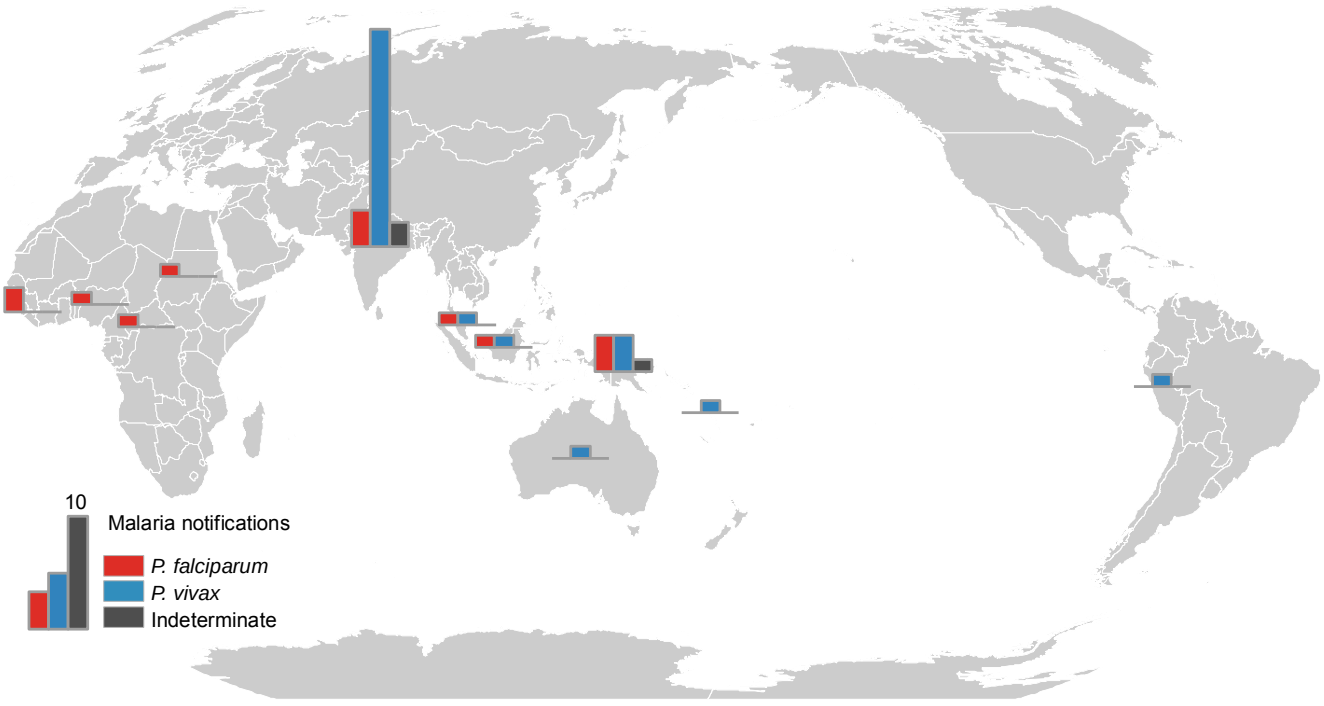
Region	Country resided in or visited	Plasmodium species		
		P. falciparum	*P. vivax*	Indeterminate
North Africa and the Middle East	Sudan	1		
	North Africa nfd[a]			1
Sub-Saharan Africa	Central African Republic	1		
	Ghana	2		
	Nigeria	1		
Southern and Central Asia	India	3	18	2
South-East Asia	Indonesia	1	1	
	Singapore[b]	1	1	
Oceania	Australia[b]		1	
	Papua New Guinea	3	3	1
	Vanuatu		1	
The Americas	Peru		1	

[a] nfd: not further defined.

[b] These cases also specified travel to another malaria-endemic country:Indonesia (2 cases) and India (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.

Figure 22. *Plasmodium* species and country of overseas travel for malaria notifications, 2012

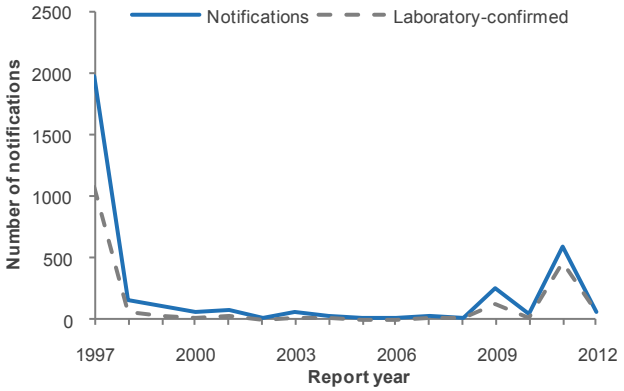


Note: Some cases were infected with more than one *Plasmodium* species and reported travel to more than one country during the incubation period for this disease. The case that travelled to Australia and Singapore also specified travel to another malaria-endemic country (India and Indonesia).

Measles

In New Zealand, measles immunisation was introduced in 1969 [22] and measles has been a notifiable disease since June 1996 [3]. In 2012, 68 cases of measles were notified (55 cases were laboratory confirmed), compared to 596 cases in 2011 (461 cases were laboratory confirmed) (Figure 23). The 2012 notification rate (1.5 per 100 000 population) was a significant decrease from 2011 (13.5 per 100 000).

Figure 23. Measles notifications and laboratory-confirmed cases by year, 1997–2012



The highest notification rates were for Counties Manukau (6.5 per 100 000 population, 33 cases) and Northland (5.1 per 100 000, 8 cases) DHBs.

Age, sex and ethnicity were recorded for all cases. The highest notification rate was for the less than 1 year age group (28.1 per 100 000 population, 17 cases), followed by the 1−4 years (7.6 per 100 000, 19 cases), 5−9 years (2.7 per 100 000, 8 cases), 15−19 years (2.6 per 100 000, 8 cases) and 10–14 years (2.4 per 100 000, 7 cases) age groups.

The notification rate was similar for females (1.6 per 100 000 population, 35 cases) and males (1.5 per 100 000, 33 cases).

The highest notification rates were for the Pacific Peoples (10.5 per 100 000, 28 cases) and Māori (3.9 per 100 000, 25 cases) ethnic groups.

Hospitalisation status was recorded for 67 (98.5%) cases, of which nine (12.4%) cases were hospitalised. No deaths due to measles were reported in 2012.

Since January 2001, the recommended measles, mumps and rubella (MMR) vaccine immunisation schedule has been two doses given at 15 months and 4 years of age. The MMR vaccine may be recommended to infants aged less than 12 months during measles outbreaks if cases are occurring in the very young [22]. Of the 68 measles cases, 57 (83.8%) had a known vaccination status. Of these, 40 were not vaccinated, including 20 cases aged less than 15 months. Ten cases had received one dose of vaccine and seven cases had received two doses of vaccine (Table 20).

Of the cases for which risk factor information was recorded, 38.3% (18/47) reported contact with another measles case in the previous three weeks, 23.8% (10/42) attended school, pre-school or childcare and 14.3% (6/42) reported overseas travel during the incubation period for this disease.

No outbreaks of measles were reported in 2012.

Meningococcal disease

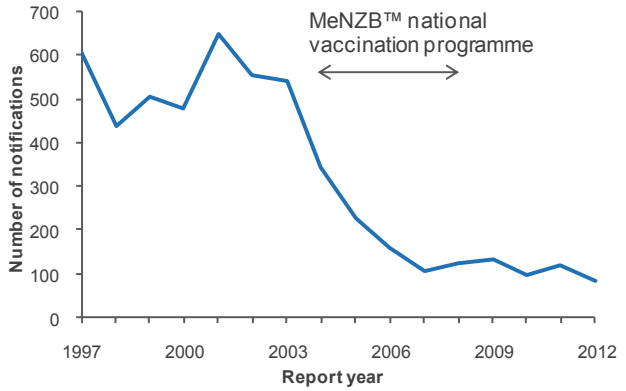
A full description of the epidemiology of meningococcal disease will be provided separately in a report entitled 'The Epidemiology of Meningococcal Disease in New Zealand in 2012', available from www.surv.esr.cri.nz in May 2013.

There were 85 cases of meningococcal disease notified in 2012. The notification rate (1.9 per 100 000 population) was a significant decrease from the 2011 rate (2.7 per 100 000, 119 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). However, the 2012 rate remained higher than the rate of 1.5 per 100 000 in the immediate pre-epidemic years (1989–1990). Figure 24 shows the number of meningococcal disease notifications from 1997 to 2012.

Table 20. Age group and vaccination status of measles notifications, 2012

Age group	Total cases	One dose	Two doses	Vaccinated (no dose info)	Not vaccinated	Unknown
<15 months	21	1	0	0	20	0
15 months–3 years	14	5	1	0	8	0
4–9 years	9	2	2	0	4	1
10–19 years	15	2	3	0	5	5
20+ years	9	0	1	0	3	5
Total	**68**	**10**	**7**	**0**	**40**	**11**

Figure 24. Meningococcal disease notifications by year, 1997–2012



Of the DHBs with more than five or more cases reported in 2012, the highest rates were for Taranaki (5.4 per 100 000 population, 6 cases) and Lakes (4.8 per 100 000, 5 cases) DHBs.

Age and sex were recorded for all cases. Notification rates were similar for females (2.0 per 100 000 population, 44 cases) and males (1.9 per 100 000, 41 cases). As in previous years, the highest notification rate was for the less than 1 year age group (19.8 per 100 000, 12 cases), followed by the 1–4 years age group (5.6 per 100 000, 14 cases).

Ethnicity was recorded for all cases notified in 2012. Of the ethnic groups with more than five cases reported, the highest notification rate was for the Māori ethnic group (4.5 per 100 000, 29 cases) followed by the Pacific Peoples (3.7 per 100 000 population, 10 cases) and European or Other (1.4 per 100 000, 42 cases) ethnic groups.

Hospitalisation status was recorded for all cases, of which 82 (96.5%) were hospitalised.

Pre-hospital management information was recorded for 82 (96.5%) cases. Of these, 35 (42.7%) cases had been seen by a doctor prior to hospital admission, only 10 (12.2%) of which were given IV/IM antibiotics prior to hospital admission.

Six deaths were reported during 2012, with an associated case fatality rate of 7.1%. Among these, two had been seen by a doctor and not given antibiotics and four were not seen by a doctor prior to hospital admission.

Seventy-four (87.1%) notified cases were laboratory confirmed and the strain type was determined for 68 cases: group B (43 cases, including 15 B:P1.7-2,4), group C (23 cases, including 18 C:P1.5-1,10-8) and group Y (2 cases). Strain type B:P1.7-2,4 was known previously as the 'NZ epidemic strain'.

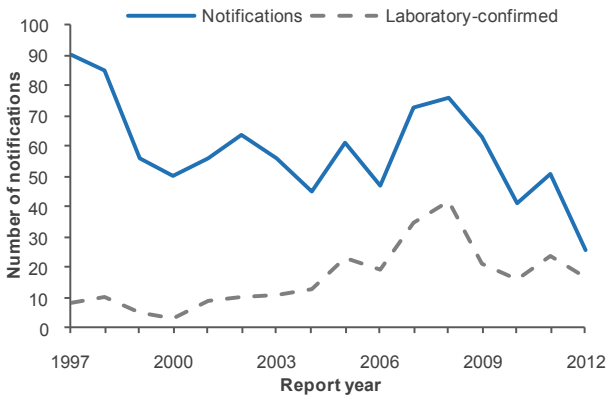
The antimicrobial susceptibility of 50 viable meningococcal isolates received by ESR from cases of invasive disease in 2012 was tested. All isolates were susceptible to ceftriaxone, rifampicin and ciprofloxacin. More than 30% (16/50) had reduced susceptibility to penicillin, with minimum inhibitory concentrations (MICs) of 0.12–0.5 mg/L.

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 [3]. The last epidemic occurred in 1994.

In 2012, 26 cases of mumps were notified (17 were laboratory-confirmed) compared to 51 notifications in 2011 (24 were laboratory-confirmed). Figure 25 shows notifications and laboratory-confirmed cases from 1997 to 2012.

Figure 25. Mumps notifications and laboratory-confirmed cases by year, 1997–2012



The 2012 mumps notification rate was 0.6 per 100 000 population, a significant decrease from 2011 (1.2 per 100 000).

Approximately 30% of the notifications were reported in Canterbury (8 cases) DHB with the rest of the cases spread across 12 DHBs (ranging from 1 to 3 cases each).

Age and sex were recorded for all cases. In 2012, the cases ranged in age from 1 year to over 70 years old, with 11 cases under the age of 10 years. Notification rates were the same for males (0.6 per 100 000 population, 12 cases) and females (0.6 per 100 000, 14 cases).

Ethnicity was recorded for 25 (96.2%) cases. The highest notification rate was for the Asian ethnic group (1.7 per 100 000 population, 7 cases), followed by the European or Other ethnic group (0.5 per 100 000, 15 cases).

Hospitalisation status was recorded for 22 (84.6%) cases. Of these, two cases (9.1%) were hospitalised. No deaths due to mumps were reported in 2012.

The recommended vaccination schedule for mumps is two doses of the MMR vaccine, the first given at 15 months of age and the second at 4 years of age [22]. In 2012, 13 cases (50.0%) had a known vaccination status. Of these, four (30.8%) were not vaccinated including one case aged less than 15 months. Two cases had received one dose of vaccine and five cases had received two doses of vaccine. A further two cases reported having been vaccinated, but no dose information was available (Table 21).

Of the cases for which risk factor information was recorded, 40.0% (8/20) attended school, pre-school or childcare, 26.3% (5/19) reported overseas travel and 14.3% (2/14) had contact with another case of the disease during the incubation period for this disease.

Non-seasonal influenza

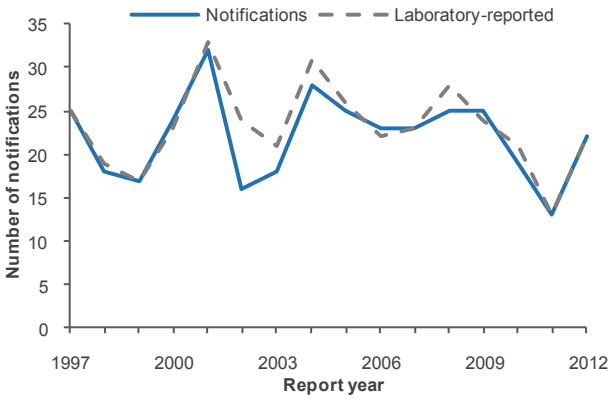
Non-seasonal influenza (capable of being transmitted between human beings) became a notifiable and quarantinable disease in New Zealand on 29 April 2009. At this time, confirmed cases required evidence of A(H1N1)pdm09 influenza virus infection. During 2009, a total of 3670 cases of non-seasonal influenza were notified and there were 1826 cases notified in 2010. In August 2010, the World Health Organization (WHO) declared that the world was entering the post-pandemic phase and since then the virus has continued to circulate with the behaviour of seasonal influenza. In New Zealand, the A(H1N1)pdm09 influenza virus has been classified as seasonal since 31 December 2010.

There has been no active case definition for non-seasonal influenza in New Zealand since 2011 because none of the circulating influenza strains are considered to have pandemic potential.

Paratyphoid fever

There were 22 cases of paratyphoid fever notified in 2012. The 2012 notification rate (0.5 per 100 000 population) was higher than the 2011 rate (0.3 per 100 000, 13 cases). Figure 26 shows the number of notifications and laboratory-reported cases of paratyphoid fever for each year since 1997.

Figure 26. Paratyphoid fever notifications and laboratory-reported cases by year, 1997–2012



Age and sex were recorded for all cases. The highest notification rate was for the 15–19 years age group (1.6 per 100 000 population, 5 cases). The notification rate was higher for males (0.6 per 100 000 population, 14 cases) than for females (0.4 per 100 000, 8 cases).

Ethnicity was recorded for 21 (95.5%) cases. The 2012 cases were in the Asian (13 cases) and European or Other (eight cases) ethnic groups.

Of the 17 (77.3%) cases for which hospitalisation status was recorded, 7 (41.2%) were hospitalised.

Of the 22 cases notified in 2012, 16 (72.7%) reported overseas travel during the incubation period for this disease. The countries visited were India (8 cases), Malaysia (3 cases), Indonesia (2 cases), Nepal (2 cases), Thailand (2 cases), Australia (2 cases), Myanmar and United States of America (1 case each). It should be noted that some cases reported travel to more than one country.

Table 21. Age group of mumps notifications and vaccination received, 2012

Age group	Total cases	One dose	Two doses	Vaccinated (no dose info)	Not vaccinated	Unknown
<15 months	1	0	0	0	1	0
15 months to 3 years	3	2	1	0	0	0
4–9 years	7	0	4	1	1	1
10–19 years	0	0	0	0	0	0
20+ years	15	0	0	1	2	12
Total	**26**	**2**	**5**	**2**	**4**	**13**

The Enteric Reference Laboratory at ESR reported 22 cases infected with *Salmonella* Paratyphi in 2012. The serotypes identified were *S.* Paratyphi A (15 cases) and *S.* Paratyphi B var. Java (7 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 [26].

One outbreak of paratyphoid fever was reported in 2012, involving two cases. *S.* Paratyphi A was isolated from both cases.

Pertussis (whooping cough)

Pertussis is a vaccine-preventable disease caused by the bacterial agent *Bordetella pertussis*. Epidemics occur every two to five years, predominantly in young children, with a periodicity less affected by mass immunisation compared with other childhood vaccine-preventable diseases [22]. Childhood vaccination has been routine in New Zealand since 1960, and the disease has been notifiable since 1996 [3].

In 2012, 5902 pertussis cases were notified, of which 1326 (22.5%) were laboratory-confirmed by the isolation of *B. pertussis* from the nasopharynx. A further 994 cases (16.8%) were laboratory confirmed by PCR. The number of cases notified in 2012 was higher than the annual number of cases notified during the peaks of previous pertussis epidemics (4140 cases in 2000 and 3485 cases in 2004) (Figure 27). The 2012 notification rate (133.1 per 100 000 population) was a significant increase from the 2011 notification rate (45.3 per 100 000, 1996 cases).

The pertussis notification rate varied by geographic region in 2012. The highest rate was for Nelson Marlborough DHB (478.3 per 100 000 population, 673 cases), followed by West Coast (465.0 per 100 000, 153 cases), Tairawhiti (320.5 per 100 000, 150 cases) and Wairarapa (302.7 per 100 000, 123 cases) DHBs (Figure 28).

Age and sex were recorded for all cases. The highest notification rate was for the less than 1 year age group (694.8 per 100 000, 421 cases), followed by the 1–4 years (356.6 per 100 000, 896 cases) and 5–9 years (260.4 per 100 000, 759 cases) age groups.

Females (149.3 per 100 000 population, 3364 cases) had a higher notification rate than did males (116.4 per 100 000, 2538 cases).

Ethnicity was recorded for 5778 (97.9%) cases. The highest notification rates were for the European or Other (147.8 per 100 000 population, 4543 cases), Māori (126.6 per 100 000, 820 cases) and MELAA (92.7 per 100 000, 35 cases) ethnic groups.

Hospitalisation status was recorded for 5300 (89.8%) pertussis cases notified in 2012, of which 318 (6.0%) cases were hospitalised. Approximately 48% (187/386) of cases in the less than 1 year age group were hospitalised. The highest notification rates among hospitalised cases were in the Pacific Peoples (16.5 per 100 000 population, 44 cases) and Māori (16.2 per 100 000, 105 cases) ethnic groups. In 2012, 231 (72.6%) of the hospitalised cases had a known vaccination status. Of these, 110 cases were not vaccinated, 53 had received one dose of pertussis vaccine, 23 had received two doses, and 35 cases had received three or more doses. A further 10 cases reported being vaccinated, but no dose information was available.

Figure 27. Pertussis notifications and laboratory-confirmed cases by year, 1997–2012

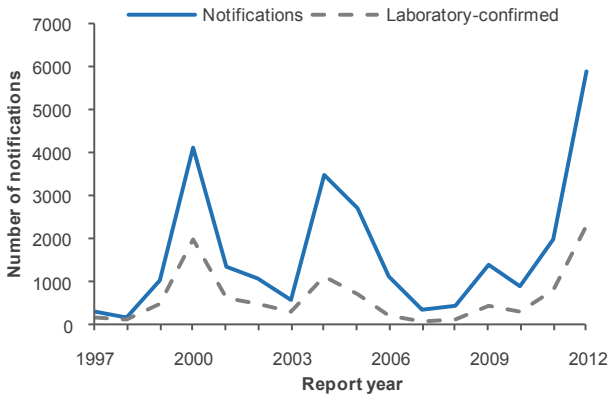
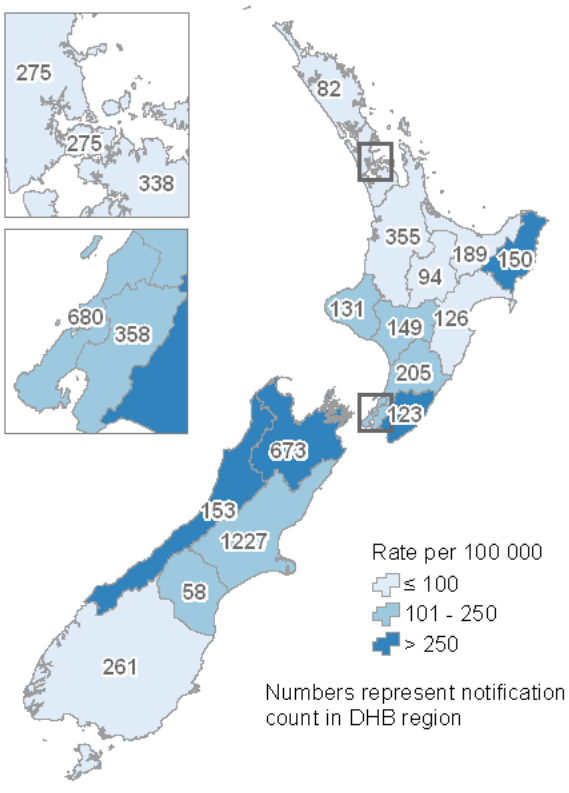


Figure 28. Pertussis notifications by DHB, 2012



There were two deaths due to pertussis reported in 2012. One was aged less than 6 weeks and the other was a 3 year old female with chronic lung disease.

Since February 2006, the recommended immunisation schedule for pertussis has been a primary course of DTaP-IPV at 6 weeks, 3 months and 5 months of age, followed by booster doses at both 4 (DTaP-IPV) and 11 (DTaP) years of age [22].

Vaccination status was known for 3431 (58.1%) cases notified during 2012 (Table 22). Of these, 1105 (32.2%) cases were not vaccinated, including 38 cases aged less than 6 weeks and therefore not eligible for vaccination. Two hundred and seventy-one (7.9%) cases had received one dose of vaccine, 96 (2.8%) cases had received two doses, and 1296 (37.8%) cases had received three or more doses of pertussis vaccine.

In 2012, 41.0% (1107/2700) of cases reported contact with a laboratory-confirmed case of pertussis and 41.0% (1787/4355) had attended school, pre-school or childcare.

In 2012, 33 outbreaks of pertussis were reported, involving 114 cases.

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 [27].

Poliomyelitis (polio)

In 2012, there were no cases of poliomyelitis notified.

The New Zealand Paediatric Surveillance Unit conducts active surveillance of acute flaccid paralysis (AFP). In 2012, there were eight cases of AFP notified to the Unit. All eight 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 immunisation campaigns in New Zealand in 1961 and 1962, 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 case occurred in 1999 [28]. In 1976, an imported case of wild poliovirus infection was managed in New Zealand after the child arrived unwell from Tonga [22].

Primary amoebic meningoencephalitis

Primary amoebic meningoencephalitis is caused by the amoeboflagellate *Naegleria fowleri*. The last notified case of primary amoebic meningoencephalitis in New Zealand occurred in 2000. There were five prior cases in New Zealand, four of which were part of the same outbreak in 1968. All cases were fatal and were linked to swimming in geothermal pools in the central North Island [29].

Q fever

Q fever, previously reported under rickettsial diseases, was added to the notifiable infectious diseases schedule of the Health Act 1956 in December 2012. No cases of Q fever were notified in 2012. Only three cases of Q fever have been notified in New Zealand since 1997. All three cases reported overseas travel during the incubation period for this disease.

Table 22. Age group and vaccination status of pertussis notifications, 2012

Age group	Total cases	One dose	Two doses	Three doses	Four doses	Five doses	Vaccinated (no dose info)	Not vaccinated	Unknown
0–5 weeks	43	0	0	0	0	0	0	38	5
6 weeks–2 months	134	67	2	0	0	0	3	50	12
3–4 months	87	21	42	0	0	0	2	20	2
5 months–3 years	870	15	23	478	71	2	45	178	58
4–10 years	1 145	22	14	86	322	126	140	270	165
11+ years	3 623	146	15	43	62	106	473	549	2 229
Total	**5 902**	**271**	**96**	**607**	**455**	**234**	**663**	**1 105**	**2 471**

Rabies and other lyssaviruses

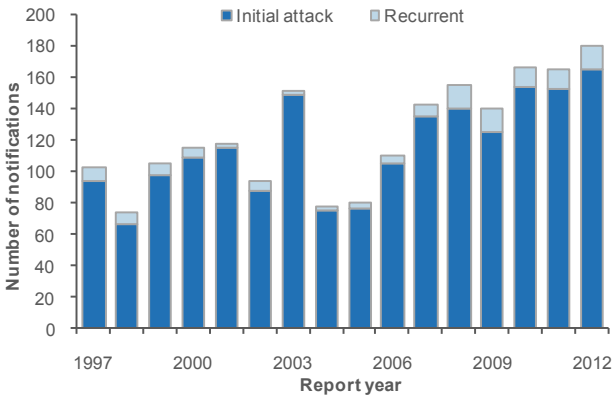
New Zealand is classified as a rabies-free country [30]. There have been no cases of rabies reported in New Zealand since rabies became notifiable in 1996.

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 2012.

Rheumatic fever

In 2012, 164 initial attack cases and 15 recurrent cases of rheumatic fever were notified in New Zealand. This represented a rate of 3.7 per 100 000 population for initial attack cases, and 0.3 per 100 000 for recurrent cases. The 2012 notification rates of initial attack and recurrent cases were similar to those of 2011. Figure 29 shows the number of initial attack and recurrent cases of rheumatic fever reported for each year since 1997. There has been an increasing trend in the number of notifications since 2004.

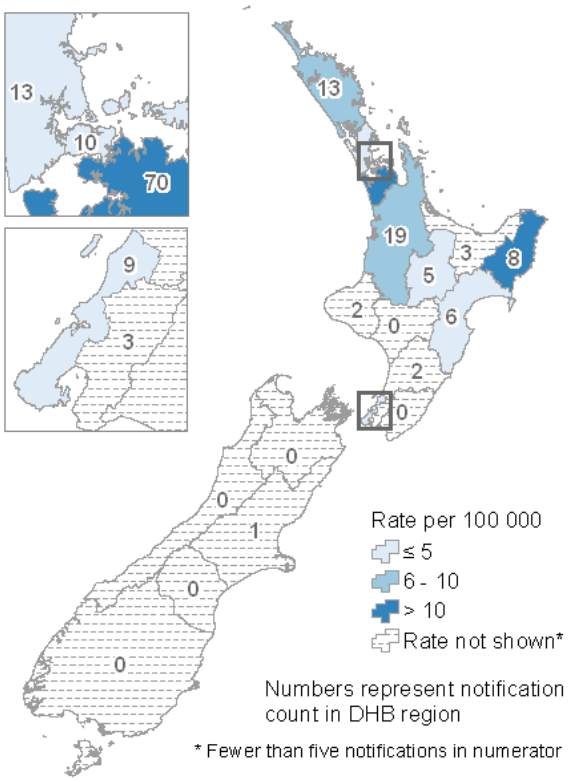
Figure 29. Rheumatic fever (initial attack and recurrent cases) by year, 1997–2012



The following analysis is for rheumatic fever (initial attack) cases. The highest notification rate was for Tairawhiti DHB (17.1 per 100 000 population, 8 cases), followed by Counties Manukau (13.8 per 100 000, 70 cases) and Northland (8.2 per 100 000, 13 cases) DHBs (Figure 30).

Age, sex and ethnicity were recorded for all rheumatic fever (initial attack) cases. The highest notification rate was for the 10–14 years age group (25.6 per 100 000 population, 74 cases), followed by the 5–9 years age group (14.1 per 100 000, 41 cases). The notification rate was higher for males (4.3 per 100 000 population, 93 cases) than for females (3.2 per 100 000, 71 cases). The Pacific Peoples (22.9 per 100 000, 61 cases) and Māori (13.9 per 100 000, 90 cases) ethnic groups had the highest notification rates for rheumatic fever (initial attack) in 2012.

Figure 30. Rheumatic fever (initial attack) cases by DHB, 2012



In 2012, hospitalisation status was recorded for 147 (89.6%) rheumatic fever (initial attack) cases, of which 141 (95.9%) were hospitalised.

There were 134 rheumatic fever (initial attack) notifications reported as confirmed cases. Of these, 114 (85.1%) cases were reported as having met the Jones criteria for rheumatic fever [31] and 99 (73.9%) were reported as having evidence of a preceding group A streptococcal infection.

The most commonly reported major clinical manifestations among initial attack cases in 2012 were carditis and polyarthritis (Table 23).

The following analysis is for cases of recurrent rheumatic fever. The 15 recurrent rheumatic fever cases in 2012 ranged from 8 to 31 years, with seven cases in the 20–29 years age group. Eight cases were female and seven were male. The cases were distributed in the Pacific Peoples (8 cases), Māori (6 cases) and European or Other (1 case) ethnic groups. Hospitalisation status was recorded for 13 (86.7%) recurrent rheumatic fever cases in 2012, of which 11 cases (84.6%) were hospitalised.

Ministry of Health data for 2012 recorded 229 hospitalisations where rheumatic fever was the principal diagnosis on admission.

Table 23. Clinical manifestations for rheumatic fever (initial attack) notifications, 2012

Clinical manifestation	Yes	No	Unknown	Percentage (%)[a]
Major manifestations				
Carditis	84	24	56	77.8
Polyarthritis	70	38	56	64.8
Erythema marginatum	10	71	83	12.3
Subcutaneous nodules	1	85	78	1.2
Minor manifestations				
Elevated erythrocyte sedimentation rate	114	15	35	88.4
Positive C-reactive protein	91	19	54	82.7
Arthralgia	69	33	62	67.6
Fever	69	33	62	67.6
Prolonged PR interval	51	38	75	57.3
Other manifestations				
Indolent carditis	15	43	106	25.9
Chorea	20	73	71	21.5

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

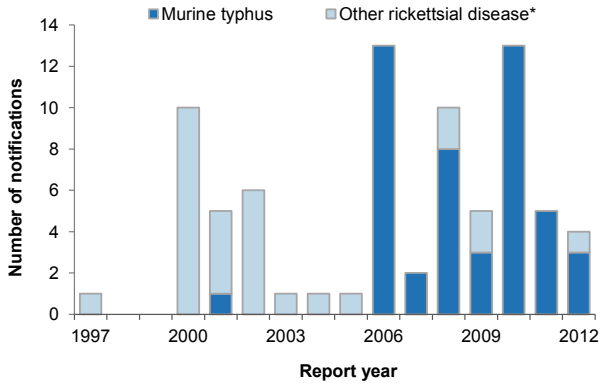
Rickettsial disease

This section includes typhus, murine typhus and other rickettsial diseases caused by organisms of the *Rickettsia* genus. Refer to the individual disease entitled 'Q fever' for details regarding that disease.

Four cases of rickettsial disease were notified in 2012, compared with five cases in 2011 (Figure 31). Three notifications were for murine typhus, and one was for spotted fever.

Ministry of Health data for 2012 recorded two hospitalisations for rickettsial disease where murine typhus (*Rickettsia typhi*) was the principal diagnosis on admission.

Figure 31. Rickettsial disease notifications, 1997–2012



* Includes all other diseases caused by organisms of the *Rickettsia* genus, except typhus. No cases of typhus (caused by *R. prowazekii*) were reported between 1997 and 2012.

Murine typhus

In 2012, three laboratory-confirmed cases of murine typhus (caused by *R. typhi*) were notified, from Waikato (2 cases) and Northland (1 case) DHBs.

Age, sex and ethnicity were recorded for all murine typhus cases in 2012. The cases were in the 20–29 years, 40–49 years and 50–59 years (1 case each) age groups. Two cases were female and one was male. Two cases were in the European or Other ethnic group and one in the Māori ethnic group.

All three cases were hospitalised. None of the cases had travelled overseas during the incubation period for this disease and are assumed to have acquired their infection in New Zealand.

A total of 48 cases of murine typhus have been reported since 1997.

Typhus

No cases of typhus (caused by *R. prowazekii*) were reported between 1997 and 2012.

Other rickettsial diseases

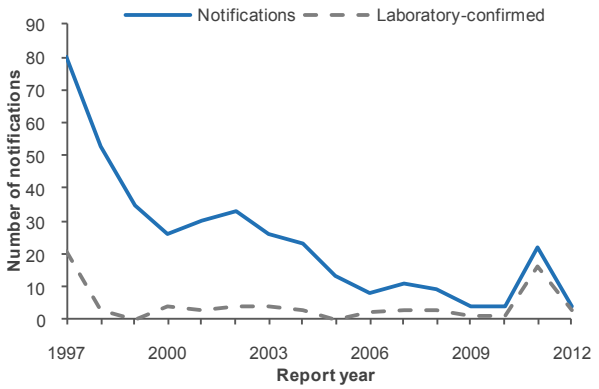
In 2012, one laboratory-confirmed case of spotted fever was notified. The case was female, in the 60–69 years age group, and had travelled to Australia during the incubation period for this disease.

Rubella (German measles)

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

Four cases of rubella were notified in 2012 (compared with 22 cases in 2011), of which three cases were 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 32).

Figure 32. Rubella notifications and laboratory-confirmed cases by year, 1997–2012



Rubella notifications in 2012 were from Canterbury (2 cases), Counties Manukau and Hutt Valley (1 case each) DHBs.

Age, sex and ethnicity were recorded for all cases. The cases were in the 1–4 years (2 cases), 20−29 years and 40−49 years (1 case each) age groups. All four rubella notifications were male. The 2012 cases were distributed in the Asian (2 cases), Māori and Pacific Peoples (1 case each) ethnic groups.

In 2012, one hospitalisation and no deaths due to rubella were reported.

The recommended vaccination schedule for rubella is two doses of the MMR vaccine, the first given at 15 months of age and the second at 4 years of age [22]. Vaccination status was recorded for all four cases. One case was not vaccinated, one case had received one dose of vaccine and one case had completed the MMR vaccination schedule. One case reported having been vaccinated, but no dose information was available.

Of the two cases for which risk factor information was recorded, one reported overseas travel during the incubation period for this disease.

Salmonellosis

In 2012, 1085 cases of salmonellosis were notified. The 2012 notification rate (24.5 per 100 000 population) was similar to the 2011 rate (23.9 per 100 000, 1055 cases). There has been a decreasing trend in the number of salmonellosis notifications since 2005 (Figure 33).

The salmonellosis notification rate varied throughout the country in 2012 (Figure 34). The highest rates were for Southern (54.9 per 100 000 population, 169 cases) and South Canterbury (51.3 per 100 000, 29 cases) DHBs.

Age was recorded for 1084 (99.9%) cases. As in previous years, notification rates were highest for the less than 1 year (107.3 per 100 000 population, 65 cases) and 1–4 years (73.6 per 100 000, 185 cases) age groups. Sex was recorded for all cases. The notification rate was slightly higher for males (25.7 per 100 000 population, 561 cases) than for females (23.3 per 100 000, 524 cases).

Figure 33. Salmonellosis notifications and laboratory-reported cases by year, 1997–2012

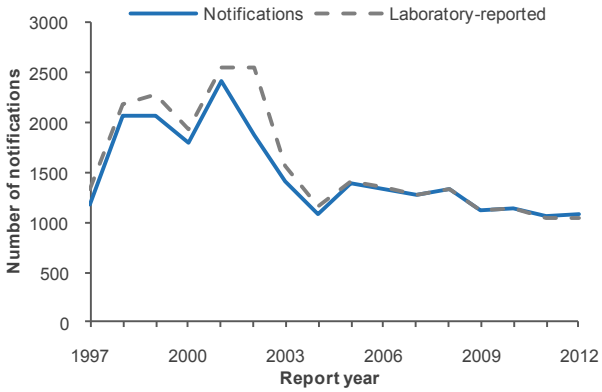
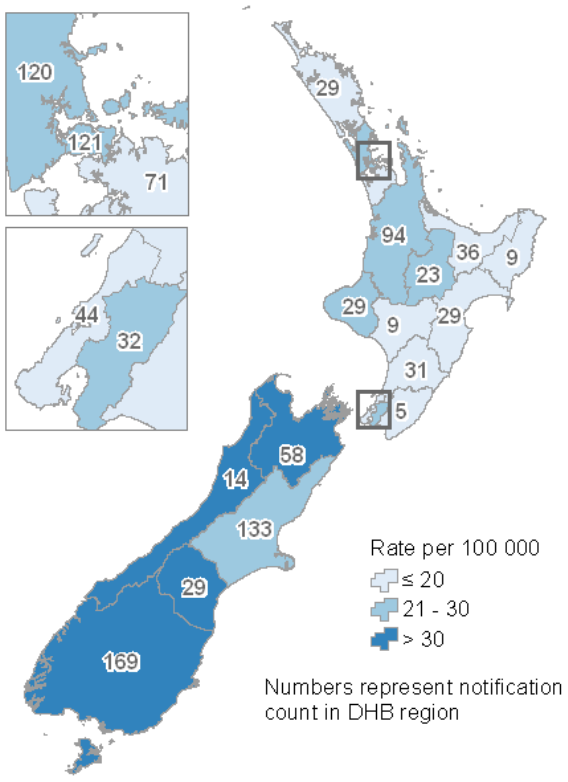


Figure 34. Salmonellosis notifications by DHB, 2012



Ethnicity was recorded for 1022 (94.2%) cases. The highest notification rates were for the European or Other (25.4 per 100 000 population, 781 cases), Asian (24.8 per 100 000, 101 cases) and MELAA (21.2 per 100 000, 8 cases) ethnic groups.

Hospitalisation status was recorded for 741 (68.3%) cases, of which 142 (19.2%) were hospitalised.

The most common risk factors reported for salmonellosis in 2012 were the consumption of food from retail premises and contact with farm animals (Table 24).

The Enteric Reference Laboratory at ESR reported 1044 cases infected with *Salmonella* (exclusive of *S.* Paratyphi and *S.* Typhi) in 2012. The most common serotypes identified in 2012 were *S.* Typhimurium phage type RDNC-May 06 (73 cases), *S.* Enteritidis phage type 11 and *S.* Infantis (52 cases each).

Table 52 in the Appendix shows a summary of the laboratory-reported cases from 2008 to 2012 for selected *Salmonella* serotypes and phage types.

Figure 35 illustrates the annual trend for selected *Salmonella* serotypes in recent years. Between 2009 and 2012, there was a noticeable increase in the number of cases infected with *S. enterica* subsp. *enterica* (I) ser. 4,[5],12 : i : -, which is considered a monophasic variant of *S.* Typhimurium (4,[5],12 : i : 1,2) due to antigenic and genotypic similarities between the two serotypes. Overseas, the prevalence of this latter serotype has increased considerably since the mid-1990s [32]. Serotypes with a decreasing trend in the last five years were *S.* Typhimurium phage type 160, *S.* Infantis, *S.* Typhimurium phage type 1 and *S.* Typhimurium phage type 101.

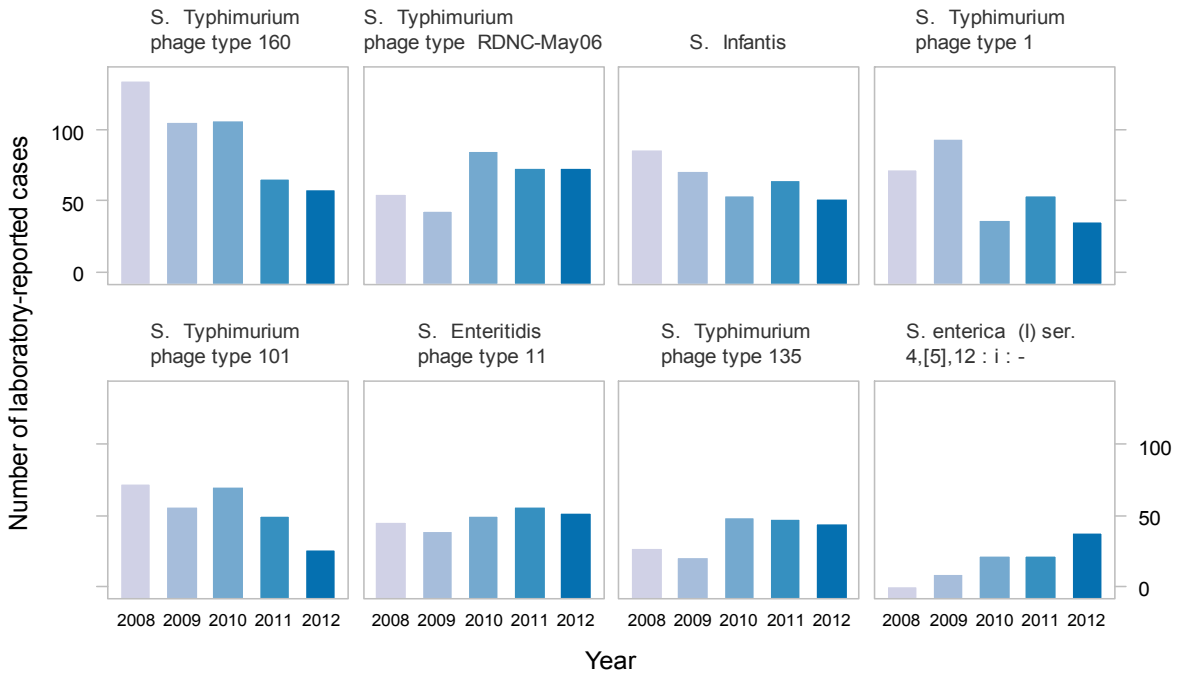
In 2012, 27 outbreaks of salmonellosis (including three outbreaks with more than one implicated pathogen) were reported, involving 149 cases.

Table 24. Exposure to risk factors associated with salmonellosis, 2012

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Consumed food from retail premises	236	294	555	44.5
Contact with farm animals	187	372	526	33.5
Travelled overseas during the incubation period	182	467	436	28.0
Consumed untreated water	120	361	604	24.9
Contact with faecal matter	111	412	562	21.2
Recreational water contact	87	454	544	16.1
Contact with other symptomatic people	71	460	554	13.4
Contact with sick animals	30	474	581	6.0

[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.

Figure 35. Laboratory-reported cases of selected *Salmonella* serotypes and phage types by year, 2008–2012



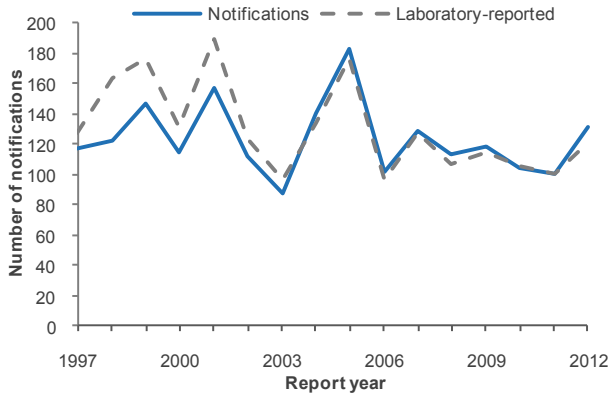
Severe acute respiratory syndrome

Between 20 March and 4 June 2003, 13 suspected cases of severe acute respiratory syndrome (SARS) were notified in New Zealand including one case in a traveller returning from China [33], subsequently reported to the World Health Organization as probable SARS. None of these cases tested positive for the SARS coronavirus [34]. There have been no cases of SARS reported in New Zealand since 2003.

Shigellosis

In 2012, 132 cases of shigellosis were notified. The 2012 notification rate (3.0 per 100 000 population) was a significant increase from the 2011 rate (2.3 per 100 000, 101 cases). There has been an overall decreasing trend since the peak of 183 notifications in 2005 (Figure 36).

Figure 36. Shigellosis notifications and laboratory-reported cases by year, 1997–2012



The highest shigellosis notification rates in 2012 were for Waitemata (5.6 per 100 000 population, 31 cases), Auckland (5.2 per 100 000, 24 cases) and Counties Manukau (4.9 per 100 000, 25 cases) DHBs.

Age was recorded for all cases. The highest notification rate was for the 1–4 years age group (6.4 per 100 000 population, 16 cases), followed by the 60–69 years (4.4 per 100 000, 19 cases) and 20–29 years (4.1 per 100 000, 26 cases) age groups. Sex was recorded for all cases. The notification rate was slightly higher for females (3.1 per 100 000 population, 70 cases) than for males (2.8 per 100 000, 62 cases).

Ethnicity was recorded for 122 (92.4%) cases. The highest notification rate was for the Pacific Peoples ethnic group (13.5 per 100 000 population, 36 cases), followed by the Asian (3.2 per 100 000, 13 cases) ethnic group.

Hospitalisation status was recorded for 74 (56.1%) cases, of which 26 (35.1%) cases were hospitalised.

The risk factors recorded for shigellosis are presented in Table 25. The most common risk factor reported for shigellosis in 2012 was overseas travel during the incubation period for this disease (55.4%, 72 cases). The countries most frequently resided in or visited were Samoa (19 cases), India (14 cases), Fiji (8 cases) and Vanuatu (5 cases). It should be noted that some cases reported travel to more than one country.

The Enteric Reference Laboratory at ESR reported 121 cases infected with *Shigella* during 2012. The predominant species identified were *Shigella sonnei* biotype a (27 cases, 22.3%), *S. sonnei* biotype g (27 cases, 22.3%), and *S. flexneri* type not determined (25 cases, 20.7%).

In 2012, 12 outbreaks of shigellosis (including three outbreaks with more than one implicated pathogen) were reported, involving 43 cases.

Taeniasis

Six cases of taeniasis were notified in 2012 (0.1 per 100 000 population), bringing the number of cases notified since 1997 to 33. All cases were overseas during the incubation period for this disease. Countries resided in or visited included Thailand (2 cases), and Eritrea, Ethiopia, South Africa and Sudan (1 case each). All 33 cases that have been notified in New Zealand since 1997 have reported a history of overseas travel.

Table 25. Exposure to risk factors associated with shigellosis, 2012

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Travelled overseas during the incubation period	72	58	2	55.4
Consumed food from retail premises	21	26	85	44.7
Recreational water contact	16	33	83	32.7
Contact with other symptomatic people	12	34	86	26.1
Consumed untreated water	8	28	96	22.2
Contact with faecal matter	8	41	83	16.3
Contact with farm animals	3	44	85	6.4
Contact with sick animals	0	47	85	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.

Tetanus

Two cases of tetanus were notified in New Zealand in 2012. This was similar to the number of cases notified each year since 2002 (between 0 and 2 cases each year), except in 2010 when seven cases were notified.

In 2012, one case was in the 5–9 years age group and the other in the 70 years and over age group. The child was not vaccinated and the adult was vaccinated over 20 years ago.

Between 1997 and 2012, a total of 30 tetanus cases were reported. Of these, four cases were children under 10 years of age none of whom were vaccinated. Among the 30 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 2012 recorded four hospitalisations (3 females and 1 male, all in the 30 years and over age group) with tetanus as the primary reason for admission in 2012.

Toxic shellfish poisoning

In 2012, 34 cases of toxic shellfish poisoning were notified (a rate of 0.8 per 100 000 population), compared with three cases in 2011. Thirty cases were reported with paralytic shellfish poisoning and the poisoning type was unspecified for four cases.

Age, sex and ethnicity were recorded for all cases. Cases ranged in age from 6 to 74 years, with the highest number of cases in the 60–69 year age group (13 cases). There were 17 males and 17 females. The majority of cases notified in 2012 were in the Māori ethnic group (24 cases).

Hospitalisation status was recorded for all cases and 17 (50.0%) cases were hospitalised. No deaths due to toxic shellfish poisoning were recorded in 2012.

In 2012, 29 of the 34 cases notified were part of an outbreak of toxic shellfish poisoning reported in the Bay of Plenty region. These 29 cases had consumed tuatuas (29 cases), mussels (3 cases) and pipis (1 case) collected from the Bay of Plenty coastline. Only four cases had consumed the seafood raw.

Of the five toxic shellfish poisoning cases not associated with the Bay of Plenty outbreak, four cases had eaten steamed mussels, purchased from a Wellington supermarket, at a private function, and one case had consumed raw scallops, collected from Kawhia Wharf.

Trichinellosis

No cases of trichinellosis were notified in 2012.

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 [35]. The other two cases were linked to the consumption of infected pork meat in 2001 [36].

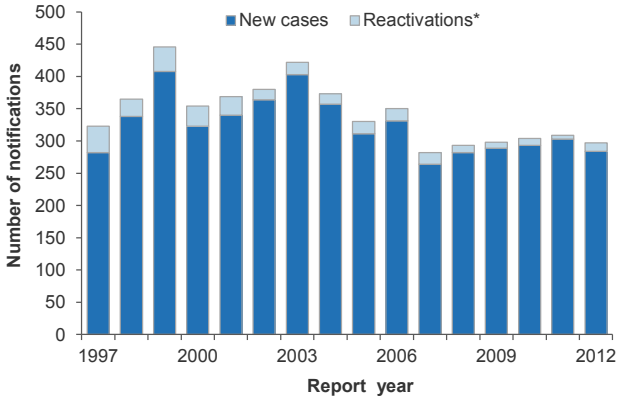
Tuberculosis disease

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

A full description of the epidemiology of tuberculosis and data on antimicrobial drug-resistant tuberculosis for 2012 will be provided separately in the report entitled 'Tuberculosis in New Zealand - Annual Report 2012', available from www.surv.esr.cri.nz in September 2013.

In 2012, 297 cases (a rate of 6.7 per 100 000 population) of tuberculosis disease (including both new and reactivations) were notified, of which 13 (4.4%) were reactivations*. The rate of tuberculosis disease has remained steady at around 6.9 per 100 000 over the last five years. In 2012, 238 (80.1%) cases were reported as laboratory-confirmed. Figure 37 shows the total number of new tuberculosis cases and reactivations reported since 1997.

Figure 37. Tuberculosis notifications (new cases and reactivations) by year, 1997–2012



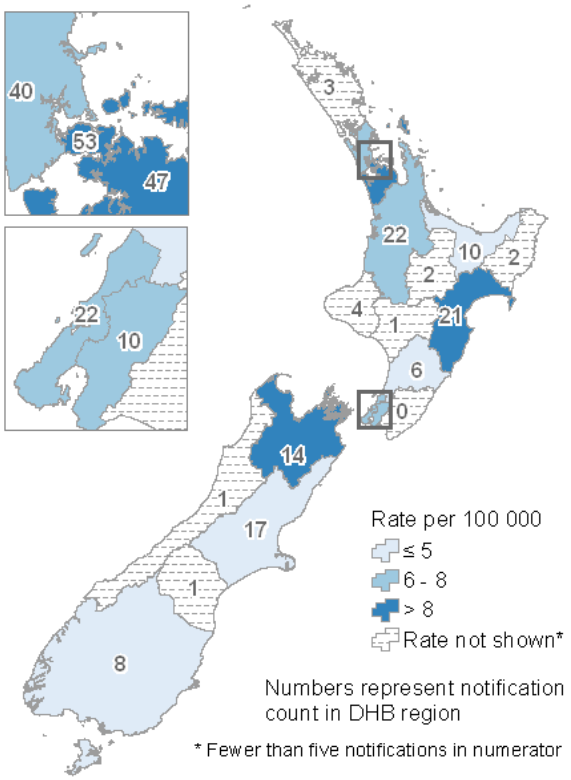
* The term 'reactivation' used in this context refers to cases with second or subsequent episodes of symptomatic tuberculosis disease with the same strain.

In 2012, three outbreaks of *Mycobacterium tuberculosis* were reported, involving 93 cases.

New tuberculosis cases

In 2012, the rate of new tuberculosis notifications varied by geographical region (Figure 38). Hawke's Bay DHB had the highest notification rate (13.5 per 100 000 population, 21 cases), followed by Auckland (11.5 per 100 000, 53 cases), Nelson Marlborough (10.0 per 100 000 population, 14 cases) and Counties Manukau (9.3 per 100 000, 47 cases) DHBs.

Figure 38. Tuberculosis notifications (new cases) by DHB, 2012



Age was recorded for all cases and sex was recorded for 283 (99.6%) cases. There were five cases aged less than 5 years, including one aged less than 1 year. Notification rates were highest for females in the 20–29 years age group (12.4 per 100 000, 38 cases) and males in the 70 years or over age group (12.3 per 100 000 population, 23 cases). Overall, the notification rate was slightly higher for males (6.8 per 100 000, 149 cases) than for females (5.9 per 100 000, 134 cases) for new tuberculosis cases.

Ethnicity was recorded for 281 (98.9%) cases. The highest notification rate was for the Asian ethnic group (41.7 per 100 000 population, 170 cases), followed by the MELAA (31.8 per 100 000, 12 cases) and Pacific Peoples (12.4 per 100 000, 33 cases) ethnic groups.

Hospitalisation status was recorded for 272 (95.8%) new tuberculosis disease cases in 2012, of which 143 (52.6%) were hospitalised.

Three deaths due to tuberculosis were reported in 2012 (two in the 70 years or over age group and one in the 60–69 years age group).

In 2012, Bacillus Calmette-Guérin (BCG) vaccination status was recorded for 145 (51.1%) cases, of which 104 (71.7%) had been vaccinated. Of the 5 cases aged less than 5 years, four were not vaccinated (including one case less than 1 year old) and one reported having received the BCG vaccination

In 2012, 77.3% (211/273) of the cases were born outside New Zealand. Of the 62 cases that were born in New Zealand, 11 (17.7%) had been or were presently residing with a person born outside New Zealand.

Approximately 22% (49/221) of new tuberculosis cases reported contact with a confirmed case of tuberculosis.

Reactivations of tuberculosis

There were 13 tuberculosis reactivation cases reported in 2012 from seven DHBs: Auckland (5 cases), Waitemata (2 cases), Canterbury (2 cases), Bay of Plenty, Taranaki, Capital and Coast, and Southern (1 case each). Cases were distributed in the 20–29 years, 30–39 years, 40–49 years, 50–59 years and 60–69 years (2 cases each), and the 70 years or over (3 cases) age groups. Reactivation cases included those in the Asian (7 cases), Māori (2 cases), MELAA (2 cases), Pacific Peoples and European or Other (1 case each) ethnic groups.

Information on the place of birth, where the original diagnosis was made and whether the case was previously treated for tuberculosis disease was recorded for seven (53.8%) of the reactivation cases. Three cases were both born and diagnosed with tuberculosis disease in New Zealand, and four were both born and diagnosed overseas. All seven cases had been previously treated for tuberculosis disease.

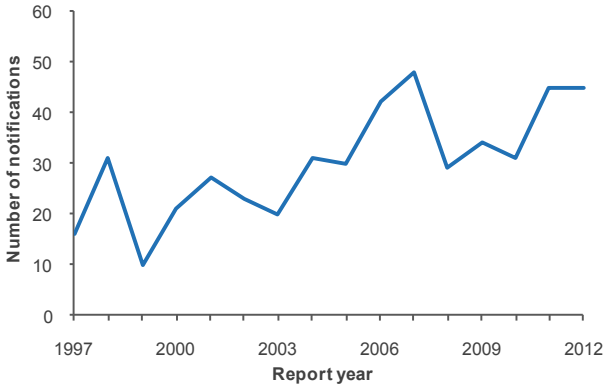
Hospitalisation status was recorded for all reactivation cases, of which 11 were hospitalised. There were no deaths reported for the reactivation cases.

BCG vaccination status was recorded for five cases, of which four had been vaccinated. These cases were aged between 20 and 49 years.

Typhoid fever

There were 45 cases of typhoid fever notified in 2012. The 2012 notification rate (1.0 per 100 000 population) was the same as the 2011 rate (1.0 per 100 000, 45 cases) and slightly higher than the 2010 rate (0.7 per 100 000, 31 cases). Figure 39 shows the general increasing trend in the annual number of typhoid fever notifications since 1997.

Figure 39. Typhoid fever notifications by year, 1997–2012



In 2012, 31 cases (68.9%) were reported in the Auckland region (including Waitemata, Auckland and Counties Manukau DHBs). The highest notification rates were for Counties Manukau (2.8 per 100 000 population, 14 cases) and Auckland (2.2 per 100 000, 10 cases) DHBs.

Age, sex and ethnicity were recorded for all cases. Notification rates were highest for the 20–29 years (2.9 per 100 000 population, 18 cases), 15–19 years (1.3 per 100 000, 4 cases) and 40–49 years (1.1 per 100 000, 7 cases) age groups.

Notification rates were similar for males (1.1 per 100 000 population, 25 cases) and females (1.0 per 100 000, 20 cases).

The highest notification rates were for the Pacific Peoples (10.5 per 100 000 population, 28 cases) and Asian (3.9 per 100 000, 16 cases) ethnic groups.

Hospitalisation status was recorded for 38 (84.4%) cases, of which 30 (78.9%) were hospitalised.

Of the 45 cases notified in 2012, 37 (82.2%) reported overseas travel during the incubation period for this disease. The countries resided in or visited included Samoa (21 cases), India (14 cases) and Australia, Indonesia, Nepal and Philippines (1 case each). It should be noted that some cases reported travel to more than one country.

The Enteric Reference Laboratory at ESR reported 40 cases infected with *Salmonella* Typhi in 2012. The most common phage types identified were *S.* Typhi phage type E1a (15 cases) and *S.* Typhi phage type E7 variant (12 cases).

One outbreak due to typhoid fever was reported in 2012, involving two cases.

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

There were 147 cases of verotoxin- or Shiga toxin-producing *Escherichia coli* (VTEC/STEC) infection notified in 2012. The 2012 notification rate (3.3 per 100 000 population) was similar to the 2011 rate (3.5 per 100 000, 153 cases). Figure 40 shows the number of notified cases of VTEC/STEC infection for each year since 1997. There has been an increasing trend in the number of notifications since 1997.

Three paediatric cases of VTEC/STEC-associated haemolytic uraemic syndrome (HUS) were reported to the New Zealand Paediatric Surveillance Unit (NZPSU) in 2012.

VTEC/STEC infection notifications follow a seasonal pattern with peaks during autumn and spring each year (Figure 41).

Figure 40. VTEC/STEC notifications by year, 1997–2012

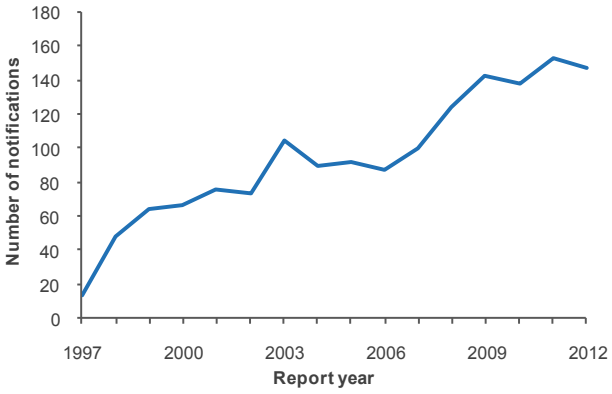
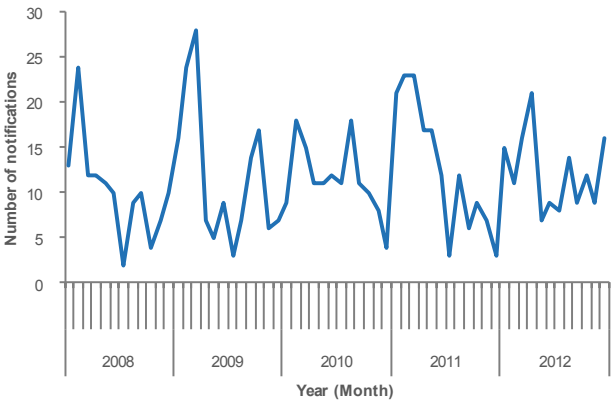


Figure 41. VTEC/STEC infection notifications by month, January 2008–December 2012



The rate for VTEC/STEC infection notifications varied throughout the country, with the highest rates being for Bay of Plenty (8.5 per 100 000 population, 18 cases), Northland (7.6 per 100 000, 12 cases) and Taranaki (7.3 per 100 000, 8 cases) DHBs (Figure 42).

Age was recorded for all cases of VTEC/STEC infection. The highest rate was for the 1–4 years age group (22.7 per 100 000 population, 57 cases), followed by the less than 1 year (14.9 per 100 000, 9 cases) age group.

Sex was recorded for all cases. The notification rates were similar for males (3.4 per 100 000 population, 74 cases) and females (3.2 per 100 000, 73 cases).

Ethnicity was recorded for 146 (99.3%) cases. Of these, the highest notification rate was for the European or Other ethnic group (4.1 per 100 000 population, 125 cases), followed by the Māori ethnic group (2.3 per 100 000, 15 cases).

Hospitalisation status was recorded for 133 (90.5%) notified cases, of which 44 (33.1%) were hospitalised. Among the 44 hospitalised cases, four had HUS.

The most common risk factors reported for VTEC/STEC infection cases reported in 2012 were contact with pets, farm animals and animal manure (Table 26).

The most common foods consumed by cases in 2012 were raw fruit or vegetables, dairy products and beef or beef products (Table 27).

The Enteric Reference Laboratory at ESR reported 142 cases infected with VTEC/STEC in 2012. Of these, 119 (83.8%) were identified with serotype O157:H7 and 23 (16.2%) with non-O157 serotypes.

One outbreak of VTEC/STEC infection was reported in 2012, involving three cases.

Figure 42. VTEC/STEC infection notifications by DHB, 2012

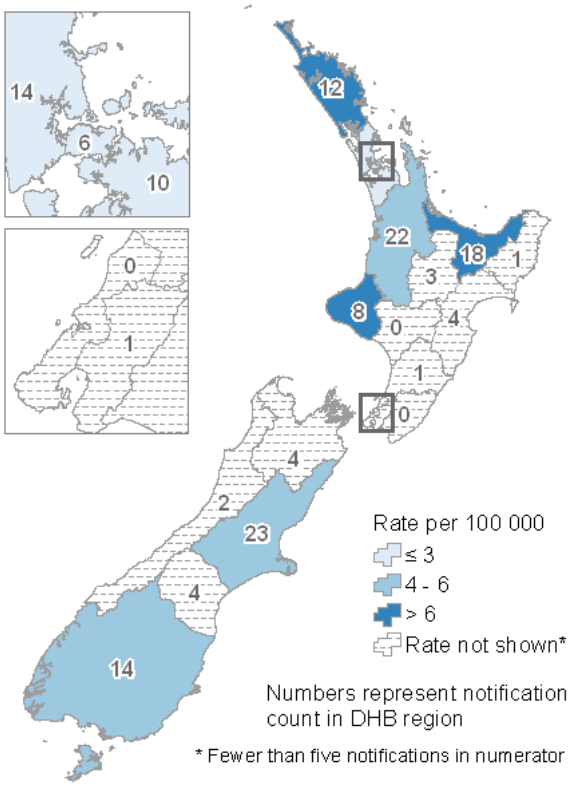


Table 26. Exposure to risk factors associated with VTEC/STEC infection, 2012

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Contact with pets	79	12	56	86.8
Contact with farm animals	39	43	65	47.6
Contact with animal manure	28	41	78	40.6
Contact with children in nappies	34	70	43	32.7
Contact with recreational water	37	80	30	31.6
Contact with other animals	19	57	71	25.0
Contact with a person with similar symptoms	23	91	33	20.2
Travelled overseas during the incubation period	3	118	26	2.5

[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.

Table 27. Foods consumed by VTEC/STEC infection cases, 2012

Foods consumed	Yes	No	Unknown	Percentage (%)[a]
Raw fruit or vegetables	105	15	27	87.5
Dairy products	101	16	30	86.3
Beef or beef products	94	24	29	79.7
Chicken or poultry	86	30	31	74.1
Processed meat	67	50	30	57.3
Fruit or vegetable juice	38	66	43	36.5
Lamb or hogget or mutton	27	84	36	24.3
Home kill meat	22	95	30	18.8
Pink or undercooked meat	10	88	49	10.2
Unpasteurised milk or milk products	9	109	29	7.6

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

Viral haemorrhagic fevers

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

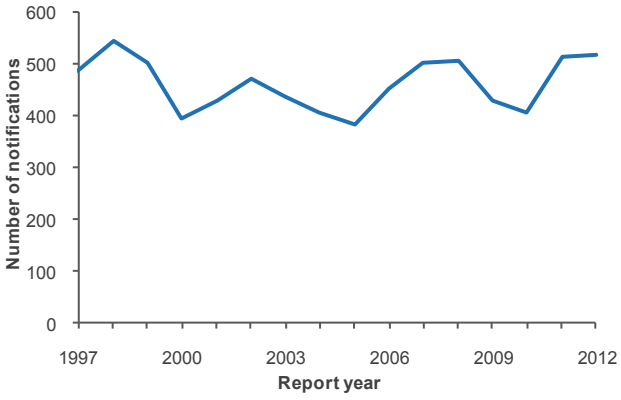
Yellow fever

No cases of yellow fever have been notified in New Zealand since at least 1996 when EpiSurv, the national notifiable diseases database, was established.

Yersiniosis

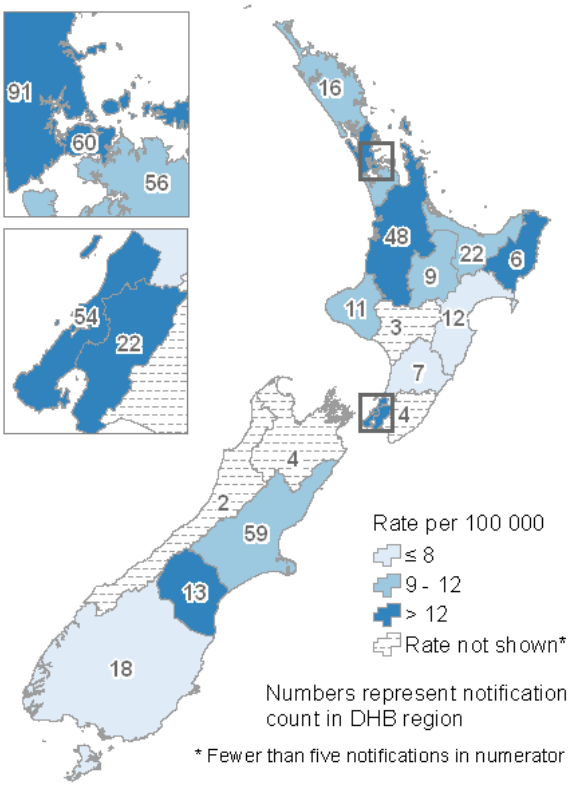
In 2012, 517 cases of yersiniosis were notified. The 2012 notification rate (11.7 per 100 000 population) was the same as the rate for 2011 (514 cases), but higher than the rate for 2010 (9.3 per 100 000, 406 cases). Figure 43 shows that the number of notified yersiniosis has fluctuated between 383 and 546 cases per year since 1997.

Figure 43. Yersiniosis notifications by year, 1997–2012



The rate varied throughout the country (Figure 44). The highest rates were for the South Canterbury (23.0 per 100 000 population, 13 cases), Capital and Coast (18.2 per 100 000, 54 cases), Waitemata (16.4 per 100 000, 91 cases) and Hutt Valley (15.2 per 100 000, 22 cases) DHBs.

Figure 44. Yersiniosis notifications by DHB, 2012



Age was recorded for all cases. The notification rate was highest for the less than one year age group (80.9 per 100 000 population, 49 cases), followed by the 1–4 years age group (53.7 per 100 000, 135 cases).

Sex was recorded for 516 (99.8%) of the cases. The notification rate was higher for males (12.9 per 100 000 population, 282 cases) than for females (10.4 per 100 000, 234 cases).

Ethnicity was recorded for 483 (93.4%) cases. The highest notification rate was for the Asian ethnic group (31.4 per 100 000 population, 128 cases), followed by the Pacific Peoples (10.9 per 100 000, 29 cases), European or Other (9.1 per 100 000, 280 cases), and Māori (6.5 per 100 000, 42 cases) ethnic groups.

Of the 279 (54.0%) notified cases for which hospitalisation status was recorded, 34 (12.2%) were hospitalised.

The risk factors recorded for yersiniosis cases reported in 2012 are presented in Table 28. The most common risk factors reported were consumption of food from retail premises and contact with farm animals.

The Enteric Reference Laboratory at ESR identified *Yersinia enterocolitica* in 443 isolates and *Yersinia pseudotuberculosis* in two isolates referred from clinical laboratories during 2012. The most common *Y. enterocolitica* biotype identified was biotype 4 (212 cases, 47.9%), followed by biotype 2 (107 cases, 24.2%), biotype 1A (69 cases, 15.6%) and biotype 3 (53 cases, 12.0%).

Five outbreaks due to *Yersinia* were reported in 2012, involving 14 cases.

Table 28. Exposure to risk factors associated with yersiniosis, 2012

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Consumed food from retail premises	71	103	343	40.8
Contact with farm animals	64	143	310	30.9
Contact with faecal matter	35	145	337	19.4
Consumed untreated water	35	146	336	19.3
Recreational water contact	21	170	326	11.0
Contact with other symptomatic people	19	162	336	10.5
Travelled overseas during the incubation period	12	201	304	5.6
Contact with sick animals	3	185	329	1.6

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 2012 is provided separately in the report entitled 'Influenza Surveillance in New Zealand 2012', available at www.surv.esr.cri.nz [37].

On average, 81 practices, with a total patient roll of 376 281, participated in the influenza sentinel surveillance system each week from May to September 2012. During the surveillance period, 4090 consultations for influenza-like illness (ILI) were reported. Based on this, the cumulative incidence rate of ILI consultations was 1087.0 per 100 000 patient population. This rate is higher than the cumulative incidence rate for 2011 (933.8 per 100 000) but lower than the rate for 2010 (1157.6 per 100 000). It is estimated that ILI resulting in a visit to a general practitioner affected over 48 186 people in New Zealand (1.1% of the total population) [37].

The average weekly consultation rate from May to September 2012 was 50.2 per 100 000 patient population, which is higher than the 2011 rate (40.4 per 100 000) and similar to the 2010 rate (50.9 per 100 000).

Overall, influenza activity in 2012 was at a medium level. The influenza consultation rate remained at or below the baseline level (50.0 per 100 000) from weeks 18 to 26 of the year, and then increased to a peak in week 31 (30 July–5 August), with a consultation rate of 154.1 per 100 000 patient population (Figure 45). The 2012 peak was higher than the peaks in 2011 and 2010 (66.1 and 151.6 per 100 000, respectively).

The consultation rate varied among DHBs, with the highest rates being recorded for Waitemata (126.6 per 100 000 patient population) and South Canterbury (110.4 per 100 000) DHBs (Figure 46).

Figure 45. Weekly sentinel surveillance consultation rates for influenza-like illness, 2010–2012

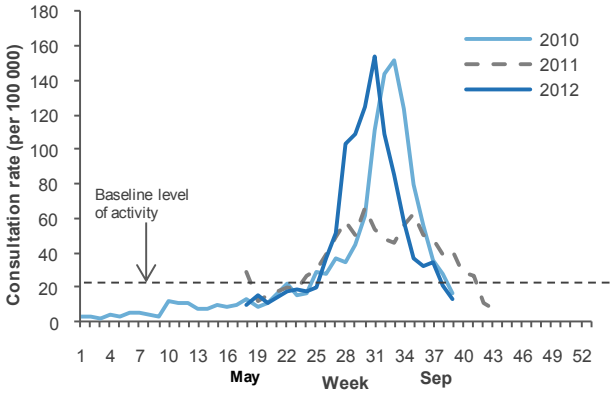


Figure 47 shows the average weekly ILI consultation rates by age group. The highest consultation rates for ILI were for children in the 1–4 years age group (2166.9 per 100 000 patient population) and for those in the less than 1 year age group (1557.2 per 100 000). Elderly people (aged 65 years and older) had the lowest ILI consultation rate at 654.4 per 100 000.

Figure 46. Sentinel average weekly consultation rates for influenza-like illness by DHB, 2012

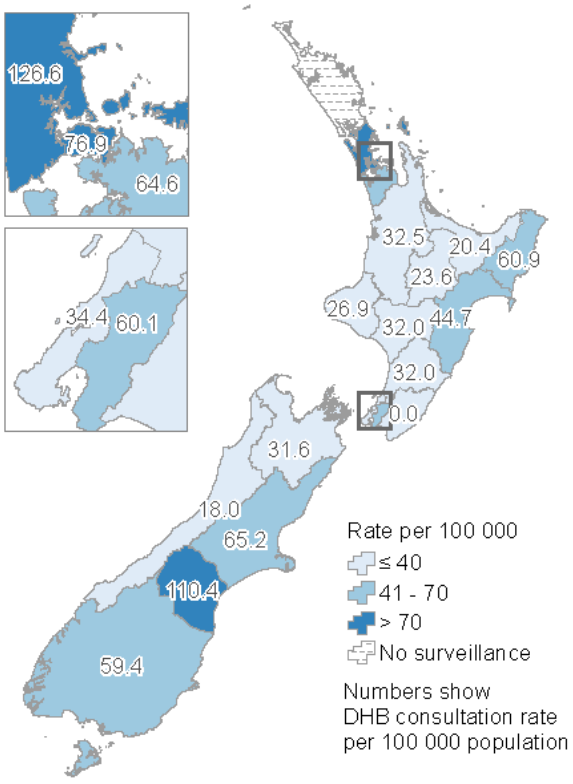
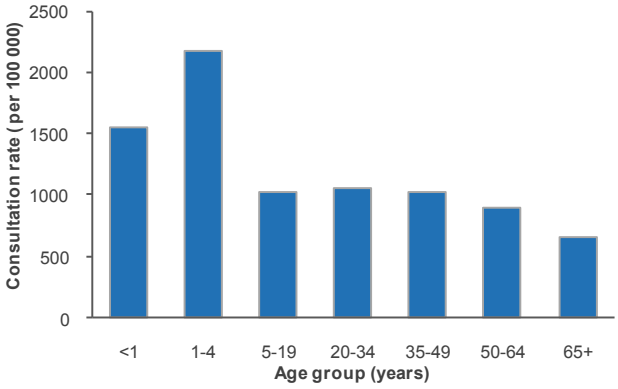


Figure 47. Sentinel average weekly consultation rates for ILI by age group, 2012



Ministry of Health data for 2012 recorded 1076 hospitalisations with the primary reason for admission being influenza. This number was higher than for 2011 and 2010 (526 and 975, respectively). Figure 48 shows the number of hospitalisations by week discharged, of which 95.0% (1022) occurred from June to October. The highest number of hospitalisations (492) occurred in July.

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 diagnosic laboratories in New Zealand, and by the National Influenza Centre at ESR.

In 2012, these five laboratories identified a total of 2425 influenza viruses. This was higher than in 2011 and 2010 (1268 and 2012 viruses, respectively). Of the 2425 viruses identified, 399 came from sentinel practice surveillance. These 399 viruses were detected from 895 specimens, resulting in a detection rate of 44.6%. There were 2026 non-sentinel viruses identified in 2012.

In 2012, the number of hospitalisations, sentinel viruses detected, non-sentinel influenza viruses, and ILI consultations peaked between weeks 28 and 31.

Figure 49 shows the number and percentage of typed and subtyped influenza viruses from 1990 to 2012. There are noticeable changes in terms of predominant patterns. These are described in the following sections for the last ten years, 2003 to 2012.

In 2012, influenza A viruses were most common (87.4%, 2119/2425), with A(H3N2) viruses representing 65.0% (1577/2425) of all viruses. There were low percentages of influenza B and A(H1N1)pdm09 viruses (12.6%, 306/2425 and 10.2%, 247/2425, respectively).

Figure 48. Influenza hospitalisation by week discharged, 2012

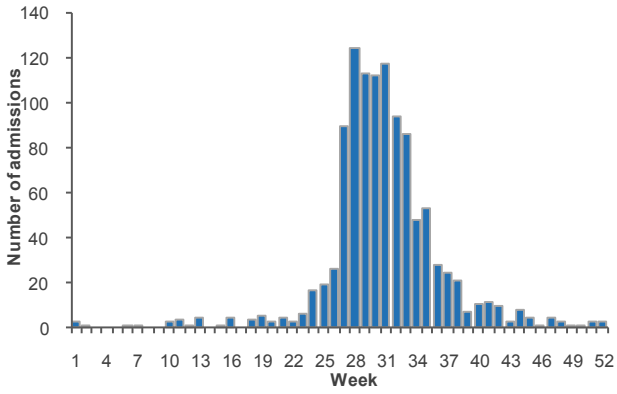
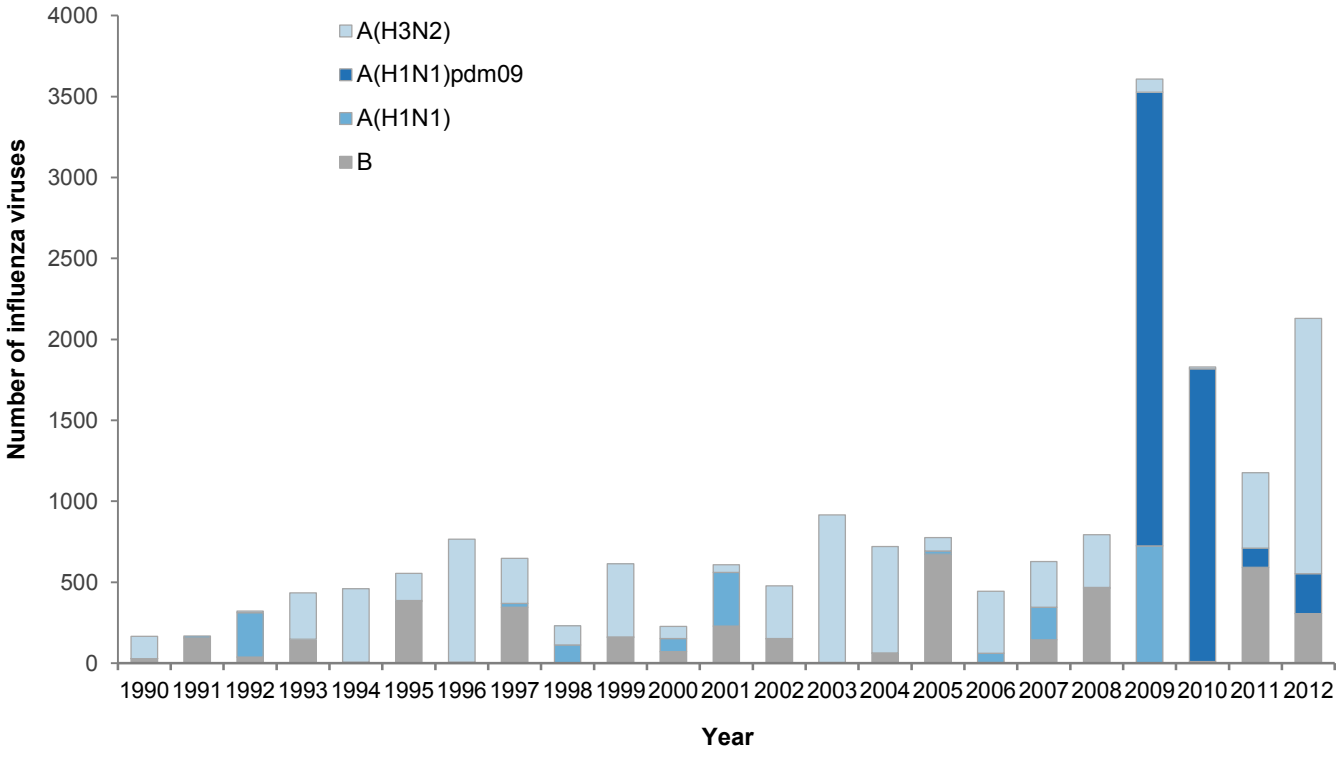


Figure 49. Influenza viruses by type, 1990–2012



Influenza A(H1N1) viruses

In 2012, influenza A(H1N1) viruses represented 10.2% of all viruses. All of these were the pandemic strain, A(H1N1)pdm09. The antigenic data from New Zealand isolates indicate 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 2012, influenza A(H3N2) viruses were the predominant viruses, consisting of 65.0% (1577/2425) of all viruses. The A(H3N2) viruses have both genetically and antigenically drifted away from the reference strain A/Perth/16/2009 (H3N2) 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 B viruses

In 2012, influenza B viruses represented 12.6% (306/2425) of all viruses detected, of which 118 were antigenically typed: 19 as B/Victoria lineage (B/Brisbane/60/2008-like) and 99 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 high disease burden in young children. The B/Victoria lineage viruses have been associated with outbreaks involving more schools and cases compared to outbreaks of B/Yamagata lineage viruses.

Oseltamivir resistance monitoring

In 2012, a fluorometric neuraminidase inhibition assay was used by the National Influenza Centre at ESR to test a total of 592 influenza viruses. All viruses (except two A(H1N1)pdm09) were sensitive to oseltamivir.

The first oseltamivir resistant influenza A(H1N1)pdm09 virus was detected in a 26-year-old male who was hospitalised with acute upper respiratory infection within seven days of returning to New Zealand from a trip to India. The second oseltamivir resistant influenza A(H1N1)pdm09 virus was detected in a 7-month-old infant girl in the Pacific Peoples ethnic group who was hospitalised with suspected pneumonia and who had not travelled overseas prior to hospitalisation.

Influenza vaccine strain recommendations

Characterisation of the influenza viruses isolated during the 2012 winter indicated a need to change the vaccine strains. Accordingly, the 2013 southern hemisphere winter influenza vaccine has the following composition:

A(H1N1)	an A/California/7/2009 (H1N1)-like strain
A(H3N2)	an A/Victoria/361/2011 (H3N2)-like strain
B	a B/Wisconsin/1/2010-like strain

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

Influenza immunisation is recommended for those at increased risk of complications from influenza due to either age or medical conditions. Influenza vaccination has been free for people aged 65 years and over since 1997. Since 1999, it has been extended to younger people with chronic illnesses who are at risk of developing complications from influenza. Subsidised influenza vaccination has been extended to pregnant women since 2009.

Sexually transmitted infections

This section summarises the epidemiology of sexually transmitted infections (STIs) for 2012, and examines trends since 2009 using clinic-based surveillance and since 2008 using laboratory-based surveillance. A full description will be provided separately in the report entitled 'Sexually Transmitted Infections in New Zealand: Annual Surveillance Report 2012', available from www.surv.esr.cri.nz in May 2013.

The AIDS Epidemiology Group (AEG) carries out national surveillance of acquired immunodeficiency syndrome (AIDS) and of human immunodeficiency virus (HIV). A summary of the AIDS notifications for 2012 can be found in the section entitled 'Acquired immunodeficiency syndrome' in this report.

Laboratory surveillance methods

Chlamydia and gonorrhoea data were voluntarily provided from 43 participating laboratories across 20 DHBs in New Zealand in 2012. Population-based rates of chlamydia and gonorrhoea for most DHBs and estimates of national 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.

As laboratories began supplying data at different times and some gaps in the data supply have occurred, rates of chlamydia and gonorrhoea for each analysis type were calculated using data from laboratories that met specific selection criteria. For a DHB to be included in the analyses, all laboratories servicing that DHB must have participated in the surveillance programme (unless the non-participating laboratory was a hospital laboratory undertaking only a small proportion of the DHB's STI testing).

In addition, the following participation criteria were required to be met for each analysis type.

1. 2012 analysis

This analysis includes the estimated national rate. Each laboratory in the DHB must have provided data for all 12 months of 2012.

2. National rate trend analysis

These rates enable national rates to be compared between years. For a DHB to be included in the national rate trend analysis, all laboratories in the selected DHB must have provided data for 12 months of each of the last four years.

3. Individual DHB trend analysis

For a DHB to be included in the individual DHB trend analysis, all laboratories in the selected DHB must have provided data for 12 months of each year for at least three of the last five years.

In some cases, where a community laboratory performed testing for more than one DHB, DHBs have been combined for reporting purposes. These include Auckland, Waitemata and Counties Manukau DHBs (Labtests), and Hutt Valley and Capital & Coast DHBs (Aotea Pathology).

The number of laboratories using nucleic acid amplification testing (NAAT) for gonorrhoea increased substantially in late 2011 and 2012. Increased detection of gonorrhoea is to be expected due to the improvements in test sensitivity (transport of specimen effects and specimen site effects) and the ability to test for gonorrhoea in samples from a wider range of sites.

Clinic-based surveillance methods

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

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 general practitioners.

There was little variation in the number of clinic visits between 2011 (81 928 for SHCs and 180 671 for FPCs) and 2012 (79 430 for SHCs and 178 508 for FPCs). The number of visits decreased for both SHCs and FPCs by approximately 6% between 2009 and 2012. In 2012, more females than males were seen in each clinic setting: SHCs (58.7% female) and FPCs (95.8% female).

Chlamydia

Chlamydia data was available from both laboratory- and clinic-based surveillance sources in 2012. In 2012, genital *Chlamydia trachomatis* infection was the most commonly reported STI in New Zealand.

Laboratory surveillance

2012 analysis

In 2012, 43 laboratories provided chlamydia data, and of these, 35 laboratories from 15 DHBs met the selection criteria for chlamydia reporting. Laboratories in these DHBs tested 292 434 specimens for chlamydia, of which 25 177 (8.6%) specimens tested positive from 24 509 patients. This represented an estimated national rate of 744 per 100 000 population for laboratory-confirmed chlamydia.

Table 29 presents the percentage of specimens testing positive for chlamydia, and the number and rate per 100 000 population of laboratory-confirmed chlamydia cases by DHB and sex for 2012.

The national rate of chlamydia for females (1071 per 100 000 population) was more than twice the national rate for males (401 per 100 000). The highest rate of chlamydia was for Tairawhiti DHB (1350 per 100 000), followed by Lakes (1349 per 100 000) and Hawke's Bay (958 per 100 000) DHBs.

National rate trend analysis

Fifteen DHBs met the selection criteria for the estimated national rate trend analysis for chlamydia. The estimated national chlamydia rate remained stable (781 to 786 per 100 000 population) from 2009 to 2012, followed by a slight decrease in 2012 (744 per 100 000). The estimated national chlamydia rates for 2009 to 2012 are shown in Figure 50.

Individual DHB trend analysis

Fifteen DHBs met the selection criteria for the individual DHB trend analysis. From 2008 to 2012 the chlamydia rate varied among DHBs and across years. Notably, Lakes and Tairawhiti DHBs had the highest chlamydia rates consistently between 2008 and 2012, whereas Wairarapa and West Coast DHBs (and Taranaki DHB since 2010) had the lowest rates consistently over the same period. Chlamydia rates by DHB for 2008 to 2012 are shown in Figure 51.

Figure 50. Estimated national chlamydia rate, 2009–2012

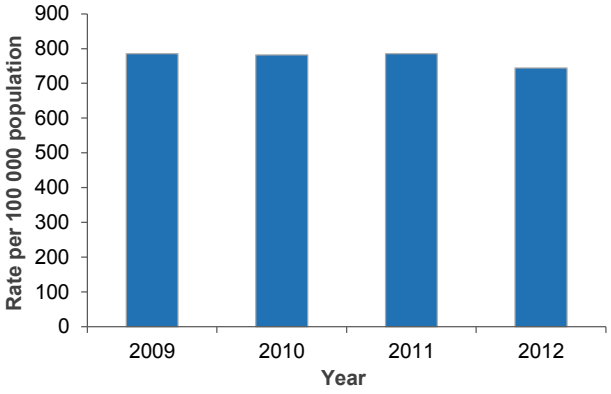
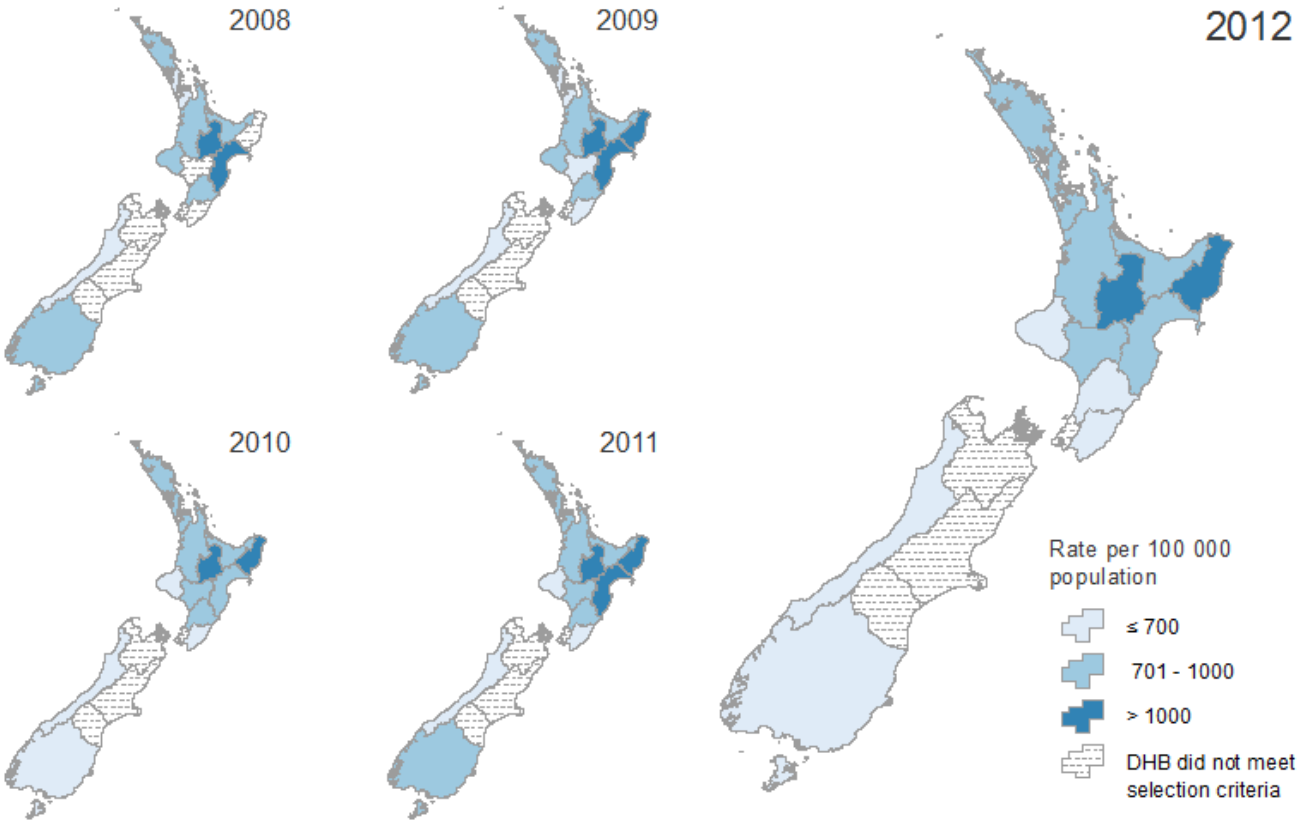


Table 29. Percentage of specimens testing positive for chlamydia, and the number and rate per 100 000 population of laboratory-confirmed chlamydia cases by sex and DHB, 2012

District Health Board[a]	Specimens testing positive (%)	Male		Female		Total[b]	
		Cases[c]	Rate[d]	Cases[c]	Rate[d]	Cases[c]	Rate[d]
Northland	11.0	286	368	1 004	1 251	1 291	816
Auckland region[e]	7.5	2 971	397	7 770	1 003	10 757	706
Waikato	9.3	687	377	2 001	1 066	2 693	727
Lakes	12.2	309	602	1 081	2 040	1 391	1 349
Bay of Plenty	9.2	417	404	1 120	1 031	1 596	752
Tairawhiti	13.9	165	725	466	1 937	632	1 350
Taranaki	8.3	170	313	485	867	655	594
Hawke's Bay	12.7	344	457	1 145	1 439	1 489	958
Whanganui	13.1	151	503	368	1 182	522	835
MidCentral	9.7	321	389	754	871	1 080	638
Wairarapa	10.5	42	211	187	903	229	564
West Coast	8.4	47	283	109	680	156	474
Southern	7.3	571	375	1 435	924	2 018	656
Total	**8.6**	**6 481**	**401**	**17 925**	**1 071**	**24 509**	**744**

[a] Only DHBs meeting the selection criteria are included in this table.
[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.

Figure 51. Chlamydia rates by DHB, 2008–2012



Clinic surveillance

The number of confirmed cases of chlamydia reported by SHCs and FPCs in 2012 were 4869 cases and 2863 cases, respectively (Table 30).

Between 2011 and 2012, the chlamydia clinic case count reported by SHCs decreased by 10.2% (5420 to 4869 cases). In contrast the chlamydia clinic case count reported by FPCs increased by 1.3% (2827 to 2863 cases).

Table 30. Number of confirmed chlamydia cases by clinic setting and sex, 2012

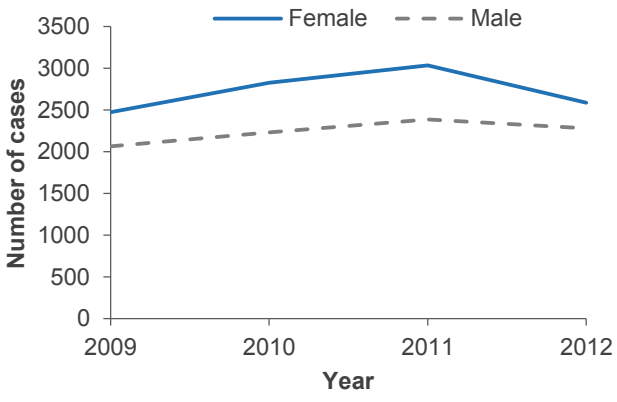
Sex	Clinic type	
	Sexual health clinics (SHCs)	Family planning clinics (FPCs)
Male	2 279	424
Female	2 586	2 438
Total[a]	**4 869**	**2 863**

[a] Total includes cases where sex was unknown.

From 2009 to 2012, the chlamydia clinic case count reported by SHCs increased by 7.3% (4536 to 4869 cases). In contrast, the chlamydia clinic case count reported by FPCs decreased by 16.1% (3412 to 2863 cases).

During this period, the chlamydia clinic case count reported by SHCs increased by 10.5% for males (2063 to 2279 cases) and by 4.6% for females (2473 to 2586 cases) (Figure 52).

Figure 52. Number of confirmed chlamydia cases reported by SHCs by year, 2009–2012



Genital herpes (first presentation)

Genital herpes data was available from clinic-based surveillance sources in 2012.

In 2012, the clinic counts of genital herpes (first presentation) reported by SHCs and FPCs were 830 cases and 252 cases, respectively (Table 31).

Table 31. Number of genital herpes (first presentation) cases by clinic setting and sex, 2012

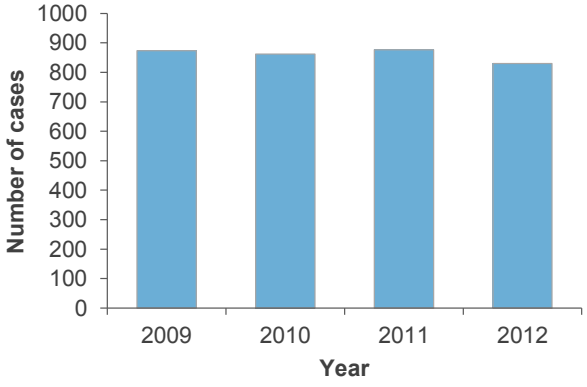
Sex	Clinic type	
	Sexual health clinics (SHCs)	Family planning clinics (FPCs)
Male	432	50
Female	398	202
Total[a]	**830**	**252**

[a] Total includes cases where sex was unknown.

Between 2011 and 2012, the genital herpes clinic case count reported by SHCs decreased by 5.4% (877 to 830 cases). In contrast, the genital herpes clinic case count reported by FPCs increased by 33.3% (189 to 252 cases).

From 2009 to 2012, the genital herpes clinic case count reported by SHCs increased by 5.0% (874 to 830 cases) (Figure 53), and FPCs by 28.6% (196 to 252 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 53. Number of cases of genital herpes (first presentation) reported by SHCs by year, 2009–2012



Genital warts (first presentation)

Genital warts data was available from clinic-based surveillance sources in 2012.

In 2012, the clinic counts of genital warts (first presentation) reported by SHCs and FPCs were 2231 cases and 255 cases, respectively (Table 32).

Table 32. Number of genital warts (first presentation) cases by clinic setting and sex, 2012

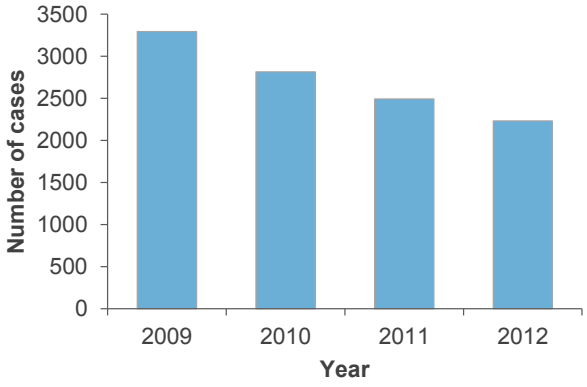
Sex	Clinic type	
	Sexual health clinics (SHCs)	Family planning clinics (FPCs)
Male	1 302	77
Female	928	178
Total[a]	**2 231**	**255**

[a] Total includes cases where sex was unknown.

Between 2011 and 2012, the genital warts clinic case count reported by SHCs decreased by 10.5% (2493 to 2231 cases) and FPCs by 7.6% (276 to 255 cases).

From 2009 to 2012, the genital warts clinic case count reported by SHCs decreased by 32.3% (3294 to 2231 cases) (Figure 54) and FPCs by 52.1% (532 to 255 cases).

Figure 54. Number of cases of genital warts (first presentation) reported by SHCs by year, 2009–2012



Gonorrhoea

Gonorrhoea data was available from both laboratory and clinic-based surveillance sources in 2012.

Laboratory surveillance

2012 analysis

In 2012, 42 laboratories provided gonorrhoea data. Of these, 35 laboratories from 17 DHBs met the selection criteria for gonorrhoea reporting. Laboratories in these DHBs tested 385 685 specimens for gonorrhoea, of which 3827 (1.0%) specimens tested positive from 3317 patients. This represented an estimated national rate of 89 per 100 000 population for laboratory-confirmed gonorrhoea.

Table 33 presents the percentage of specimens testing positive for gonorrhoea, and the number and rate per 100 000 population of laboratory-confirmed gonorrhoea cases by DHB and sex for 2012.

The national rate of gonorrhoea for males (90 per 100 000 population) was slightly higher than for females (86 per 100 000). The highest rate of gonorrhoea was for Tairawhiti DHB (408 per 100 000), which was more than four times the national rate (89 per 100 000).

National rate trend analysis

Seventeen DHBs met the selection criteria for the estimated national rate trend analysis for gonorrhoea. From 2009 to 2012, the gonorrhoea estimated national rate increased by 34.8% (from 66 to 89 per 100 000 population). This increase coincided with the introduction of NAAT testing in 2011 and 2012 in many DHBs. The gonorrhoea estimated national rates for 2009 to 2012 are shown in Figure 55.

Individual DHB analysis

Seventeen DHBs met the selection criteria for the individual DHB trend analysis. Gonorrhoea rates by DHB for 2008 to 2012 are shown in Figure 56. From 2008 to 2012, the gonorrhoea rate varied among DHBs and across years. Notable features over this period were:

- Tairawhiti DHB continued to have the highest rate of gonorrhoea
- Hawke's Bay DHB was consistently in the next highest rate category
- Northland DHB, and the Auckland region had increasing rates following the introduction of NAAT testing.

The introduction of NAAT testing for gonorrhoea will have contributed to the increases observed for some DHBs (see Figure 56).

Figure 55. Estimated national gonorrhoea rate by year, 2009–2012

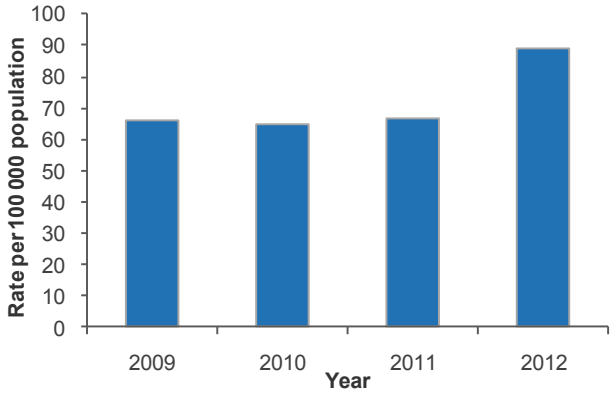
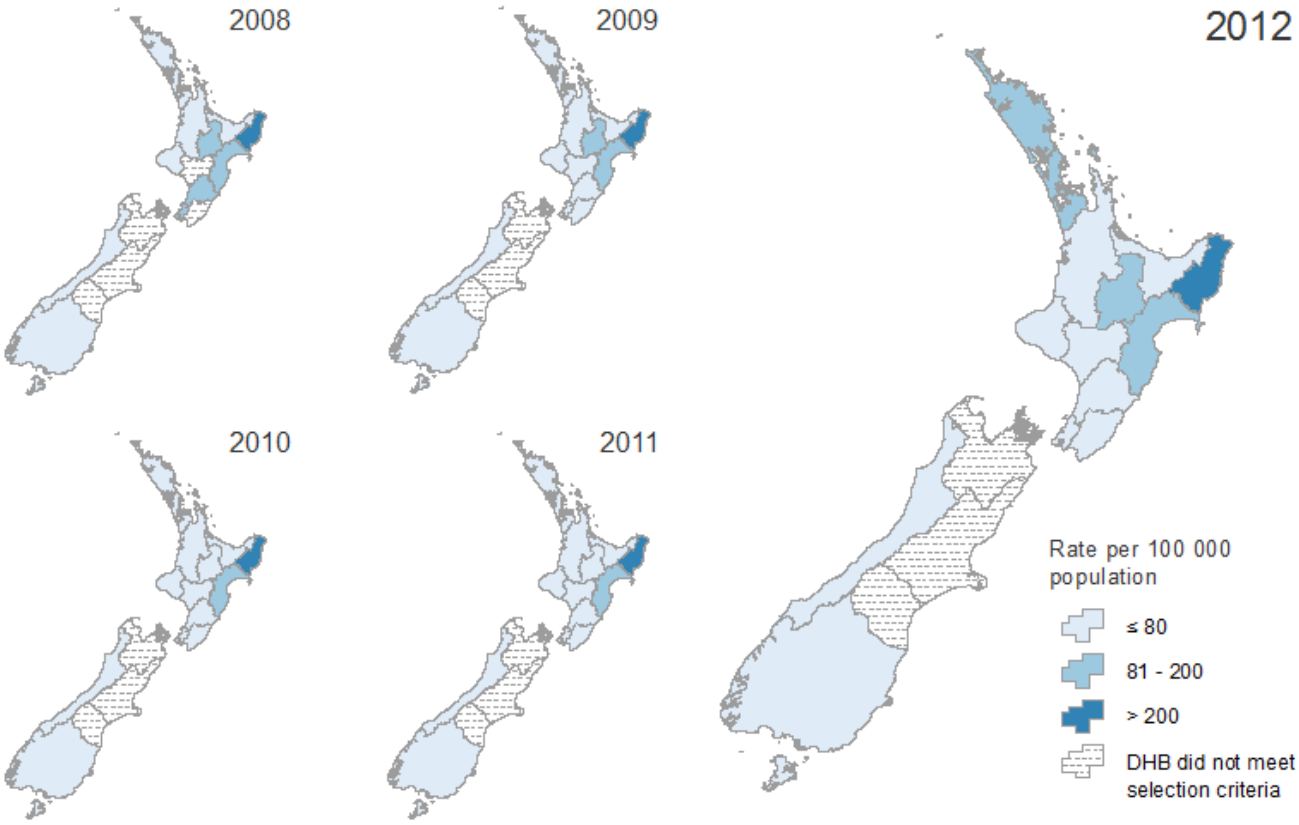


Table 33. Percentage of specimens testing positive for gonorrhoea, and the number and rate per 100 000 population of laboratory-confirmed gonorrhoea cases by sex and DHB, 2012

District Health Board[a]	Specimens testing positive (%)	Male		Female		Total[b]	
		Cases[c]	Rate[d]	Cases[c]	Rate[d]	Cases[c]	Rate[d]
Northland	1.0	65	84	107	133	173	109
Auckland region[e]	1.1	882	118	890	115	1783	117
Waikato	0.7	102	56	83	44	185	50
Lakes	1.2	64	125	40	75	104	101
Bay of Plenty	0.8	63	61	34	31	97	46
Tairawhiti	4.6	104	457	87	362	191	408
Taranaki	0.3	13	24	13	23	26	24
Hawke's Bay	2.3	106	141	164	206	270	174
Whanganui	1.4	29	97	9	29	38	61
MidCentral	0.7	41	50	27	31	68	40
Wellington region[f]	0.6	115	53	90	40	206	47
Wairarapa	0.8	6	30	8	39	14	34
West Coast	0.2	4	-	0	-	4	-
Southern	0.6	63	41	89	57	158	51
Total	**1.0**	**1 657**	**90**	**1 641**	**86**	**3317**	**89**

[a] Only DHBs meeting the selection criteria are included in this table.
[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 and Coast DHBs.

Figure 56. Gonorrhoea rates by DHB, 2008–2012



In 2010, NAAT testing was introduced in the Wellington region (Hutt Hospital Laboratory).
In 2011, NAAT testing was introduced in the Auckland region (Labplus) and Lakes (Taupo Southern Community Laboratory), Hawkes Bay (Hawke's Bay Southern Community Laboratory), and Southern DHBs.
In 2012, NAAT testing was introduced in the Auckland (Labtests) and Wellington (Aotea Pathology) regions, and Northland (Northland Pathology), Tairawhiti, Whanganui, MidCentral, and Wairarapa DHBs.

Clinic surveillance

In 2012, the numbers of confirmed gonorrhoea cases reported by SHCs and FPCs were 768 cases and 203 cases, respectively (Table 34).

Table 34. Number of gonorrhoea cases by clinic setting and sex, 2012

Sex	Clinic type	
	Sexual health clinics (SHCs)	Family planning clinics (FPCs)
Male	489	37
Female	279	166
Total[a]	**768**	**203**

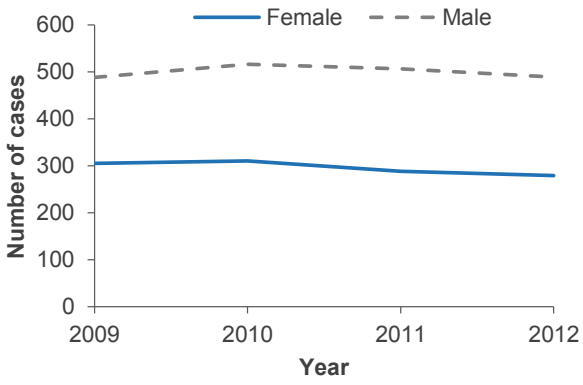
[a] Total includes cases where sex was unknown.

Between 2011 and 2012, the gonorrhoea clinic case count reported by SHCs decreased by 3.5% (796 to 768 cases). In contrast, the gonorrhoea clinic case count reported by FPCs increased by 33.6% (152 to 203 cases).

From 2009 to 2012, the gonorrhoea case count reported by SHCs decreased by 3.2% (796 to 768 cases). In contrast, the gonorrhoea clinic case count reported by FPCs increased by 8.6% (187 to 203 cases).

Between 2009 and 2012, the gonorrhoea case count reported by SHCs increased by 0.2% for males (488 to 489 cases), and decreased by 8.5% for females (305 to 279 cases) (Figure 57).

Figure 57. Cases of gonorrhoea reported at SHCs by year, 2009–2012



Infectious syphilis

Infectious syphilis data was available from clinic-based surveillance sources in 2012.

In 2012, 80 cases of infectious syphilis were reported by SHCs and no cases by FPCs (Table 35).

Of the 80 cases of infectious syphilis reported by SHCs in 2012, 75 (93.7%) cases were male and five (6.3%) cases were female. The mean age of infectious syphilis cases was 33.6 years (range 18–76 years).

Table 35. Number of infectious syphilis cases clinic setting and sex, 2012

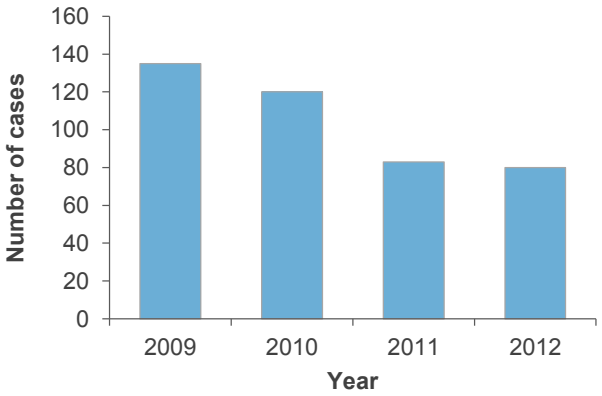
Sex	Clinic type	
	Sexual health clinics (SHCs)	Family planning clinics (FPCs)
Male	75	0
Female	5	0
Total[a]	**80**	**0**

[a] Total includes cases where sex was unknown.

Between 2011 and 2012, the infectious syphilis case count reported by SHCs decreased by 3.6% (from 83 to 80 cases).The syphilis clinic case count decreased or was similar for all DHBs, except Canterbury DHB which had an increase from 3 cases in 2011 to 28 cases in 2012.

Infectious syphilis clinic case counts reported by SHCs were highest in 2009 at 135 cases and have decreased each year since then (Figure 58). Between 2009 and 2012, infectious syphilis case counts decreased by 40.7% (135 to 80 cases).

Figure 58. Cases of infectious syphilis reported by SHCs, 2009–2012



Non-specific urethritis (males only)

Non-specific urethritis (NSU) data was available from clinic-based surveillance sources in 2012.

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 2012, the clinic count in SHCs and FPCs for NSU were 651 cases and 9 cases, respectively.

Between 2011 and 2012, the clinic case count reported by SHCs increased by 8.1% (602 to 651 cases) for NSU.

From 2009 to 2012, the clinic case count reported by SHCs decreased by 11.2% (733 to 651 cases) for NSU.

OUTBREAKS

OUTBREAKS

Introduction

The following is a summary of surveillance data for outbreaks reported in 2012. A full description of outbreaks will be provided separately in the report entitled 'Annual Summary of Outbreaks in New Zealand 2012' available at www.surv.esr.cri.nz in May 2013.

This summary presents outbreak data by public health unit (PHU) or public health services (PHS), agent type, mode of transmission and setting. It is important to note that a single outbreak may have multiple pathogens, multiple modes of transmission or multiple exposure settings recorded.

Outbreak definition

The Manual for Public Health Surveillance in New Zealand [38] 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 have been investigated.

Characteristics

There were 716 outbreaks reported by PHUs in 2012, involving 10 491 cases, compared to 581 outbreaks involving 7796 cases reported in 2011. Over the 10-year period between 2003 and 2012, there was an increasing trend in the number of outbreaks reported (Figure 59).

Table 36 gives the number of outbreaks and associated cases reported by PHUs and PHSs in 2012. 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 2012, 714 were final reports involving 10 446 cases, and two were interim reports (final details not yet available) involving 45 cases. According to the case definition for each outbreak, there were 3469 (33.1%) confirmed cases and 7022 probable cases (66.9%).

There were 191 hospitalisations and 40 deaths associated with outbreaks reported in 2012. The deaths were related to gastroenteritis (unspecified), influenza A(H3N2), influenza-like illness, *Listeria monocytogenes*, *Legionella pneumophila* and norovirus outbreaks.

Figure 59. Number of outbreaks and associated cases by year, 2003–2012

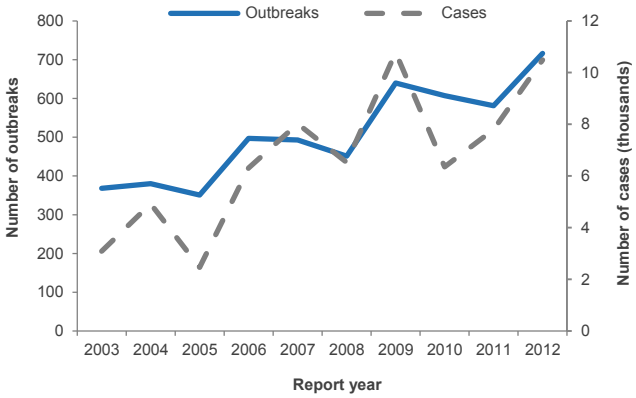


Table 36. Outbreaks and associated cases reported by public health services (PHSs)/ public health units (PHUs), 2012

PHS/PHU	Outbreaks	Cases
Northland	11	246
Auckland[a]	228	2 349
Waikato	157	1 207
Bay of Plenty	25	653
Rotorua	7	161
Taranaki	21	363
Hawke's Bay	16	427
Gisborne	6	134
Whanganui	5	68
Manawatu	47	628
Wellington[b]	72	1 613
Nelson	21	497
Marlborough	4	144
West Coast	3	34
Canterbury	47	1 040
South Canterbury	2	77
Otago	32	667
Southland	12	183
Total	**716**	**10 491**

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

Pathogens/agents

A summary of outbreaks and associated cases by pathogen or condition is presented in Table 37.

Enteric bacteria

During 2012, enteric bacteria were implicated in 82 (11.5%) reported outbreaks and 518 (4.9%) cases. Approximately 39.0% (32/82) of these outbreaks and 54.4% (282/518) of all cases attributed to enteric bacteria were linked to *Campylobacter* species. Of the 32 outbreaks of *Campylobacter*, the most common primary modes of transmission were foodborne (8 outbreaks), zoonotic (8), person-to-person (6) and waterborne (3). Person-to-person (15 outbreaks) was the most common secondary mode of transmission reported. The most common settings were in private homes (19 outbreaks) and restaurants/cafés/bakeries (4).

Of the 27 *Salmonella* outbreaks, the most common primary modes of transmission were foodborne (8 outbreaks), person-to-person (6), zoonotic (3) and waterborne (2). Person-to-person (10 outbreaks) and foodborne (3) were the most common secondary mode of transmission reported. The most common outbreak setting was in private homes (17 outbreaks).

Twelve outbreaks of *Shigella* were reported in 2012. Of these, nine were associated with person-to-person transmission and four with foodborne transmission. Five outbreaks of *Shigella* had an overseas exposure reported during the incubation period for this disease. The countries where exposure occurred were Samoa (3 outbreaks), Fiji and Mexico (1 each). The most common exposure setting reported for the remaining outbreaks was in private homes (6 outbreaks).

Yersinia was identified in five outbreaks. All five outbreaks reported person-to-person as a mode of transmission. One of the outbreaks also had zoonotic reported as an additional mode of transmission. One outbreak occurred on a farm, another in a school and the rest were in private homes.

Three outbreaks of enteropathogenic *Escherichia coli* (EPEC) were reported in 2012. *Salmonella* was also identified in two of these outbreaks. Foodborne transmission was reported as the primary mode in all three outbreaks with person-to-person transmission reported as the secondary mode in one outbreak. All three outbreaks were set in a takeaway restaurant.

One outbreak due to *Salmonella* Paratyphi A was reported. The four cases associated with the outbreak reported travel to India during the incubation period.

Table 37. Outbreaks and associated cases by pathogen or condition, 2012

Pathogen/Condition[a]	Outbreaks	Cases
Enteric bacteria	**82**	**518**
Aeromonas spp.	1	8
Campylobacter spp.	32	282
Escherichia coli (EPEC)	3	63
Plesiomonas shigelloides	1	3
Salmonella spp.	27	149
Salmonella Paratyphi	1	2
Salmonella Typhi	1	2
Shigella spp.	12	43
VTEC/STEC infection	1	3
Yersinia	5	14
Enteric protozoa	**115**	**444**
Cryptosporidium spp.	47	164
Giardia spp.	69	284
Enteric viruses	**276**	**6 490**
Astrovirus	2	5
Hepatitis A	1	30
Norovirus	249	6 097
Rotavirus	23	360
Sapovirus	3	18
Enteric (unspecified)	**180**	**1 996**
Gastroenteritis	180	1 996
Respiratory bacteria	**37**	**226**
Bordetella pertussis	33	114
Legionella pneumophila	1	19
Mycobacterium tuberculosis	3	93
Respiratory viruses	**16**	**762**
Influenza A	1	45
Influenza B	2	75
Influenza virus A(H3N2)	10	570
Influenza-like illness	3	72
Toxins	**13**	**159**
Clostridium difficile	6	107
Clostridium perfringens	4	18
Histamine fish poisoning	1	2
Staphylococcus aureus	1	3
Toxic shellfish poisoning	1	29
Other bacteria	**1**	**6**
Listeria monocytogenes	1	6
Other viruses	**1**	**2**
Hepatitis B	1	2
Other	**5**	**21**
Carbon monoxide poisoning	1	5
Lead absorption	4	16
Total	**716**	**10 491**

[a] Fifteen outbreaks involved more than one pathogen; therefore, individual pathogen outbreak numbers may not sum to group totals.

In 2012, one outbreak of *Salmonella* Typhi was reported. *S.* Typhi phage type E1a was identified as the causative agent. Person-to-person was reported as the primary mode of transmission and the outbreak was set in a private home. The index case was in Samoa during the incubation period for this disease.

The VTEC/STEC infection (*Escherichia coli* O157:H7) outbreak reported in 2012 was associated with person-to-person transmission and occurred in a private home.

Enteric protozoa

Enteric protozoa accounted for 115 (16.1%) outbreaks and 444 (4.2%) cases reported in 2012.

Giardia spp. was identified as the infectious agent in 60.0% of the outbreaks associated with enteric protozoa. Of the 69 outbreaks where *Giardia* spp. was identified, 36 (52.2%) were reported by Auckland and 24 (34.8%) by Waikato PHUs. The most common modes of transmission were person-to-person (60 outbreaks), waterborne (19), environmental (14) and zoonotic (9). The most commonly identified setting for *Giardia* outbreaks was in private homes (55 outbreaks).

Forty-seven outbreaks involving *Cryptosporidium* spp. occurred in 2012, 32 (68.1%) of which were reported by the Waikato PHU. The most common modes of transmission were person-to-person (43 outbreaks), zoonotic (28) and waterborne (19). The most common setting was in private homes (33 outbreaks), followed by farms (10) and childcare centres (3).

Enteric viruses

In 2012, enteric viruses were the infectious agent in 276 (38.5%) outbreaks with 6490 (61.9%) associated cases.

The majority of outbreaks due to enteric viruses were caused by norovirus (90.2%, 249/276), which resulted in 6097 associated cases. The median number of cases per norovirus outbreak was 19 (range 2–261 cases). Person-to-person transmission was involved in 231 outbreaks, 58 of which also recorded other modes of transmission. Environmental transmission was established as a mode in 40 outbreaks and foodborne transmission in 26 outbreaks.

Multiple settings were identified in eight norovirus outbreaks. Institutions were identified as the main exposure setting for 203 outbreaks, specifically long-term care facilities (123 outbreaks), acute care hospitals (43), childcare centres (25), camps (5), schools (4), a marae (1) and other institutions (8). Restaurants/cafés/bakeries were identified as the setting for 16 norovirus outbreaks and 11 outbreaks occurred in private homes.

In 2012, 23 (8.3%) outbreaks of rotavirus with 360 (5.5%) 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 outbreak settings reported were childcare centres (19 outbreaks), long-term care facilities (2), an acute care hospital (1) and a private home (1).

Three (1.1%) sapovirus outbreaks were associated with 18 (0.3%) cases. All of these outbreaks involved person-to-person transmission, although one outbreak also reported environmental transmission as a secondary mode. The outbreak settings reported were long-term care facilities (2 outbreaks) and childcare centres (1).

Enteric (unspecified)

During 2012, outbreaks of gastroenteritis without an organism identified accounted for 180 (25.1%) outbreaks and 1996 (19.0%) associated cases.

Respiratory bacteria

Respiratory bacteria resulted in 37 (5.2%) outbreaks and 226 (2.2%) associated cases in 2012.

There were 33 outbreaks of *Bordetella pertussis* reported in 2012 with 114 associated cases. Person-to-person was the only mode of transmission reported.

The settings associated with these outbreaks included private homes (28 outbreaks), childcare centres, school and other institution (1 each).

Three outbreaks due to *Mycobacterium tuberculosis* infection, involving 93 cases, were reported in 2012. Person-to-person transmission was the mode identified. Two outbreaks occurred in private homes and the remaining outbreak occurred in the workplace.

One *Legionella pneumophila* outbreak was reported in 2012, involving 19 cases, with an environmental mode of transmission.

Respiratory viruses

In 2012, respiratory viruses resulted in 16 (2.2%) outbreaks and 762 (7.3%) associated cases.

Ten outbreaks of influenza A(H3N2) virus, involving a total of 570 cases and 17 deaths, were reported in 2012. All of the outbreaks reported person-to-person mode of transmission. Eight outbreaks occurred at a long-term care facility and the remaining two outbreaks occurred in a school setting. The largest outbreak of influenza A(H3N2), involving 208 cases, occurred in a school.

Two outbreaks of influenza B and one of influenza A were reported in 2012. The outbreaks involved person-to-person transmission. The outbreaks of influenza B occurred in a long-term care facility and a school, whereas the influenza A outbreak was set in a hostel/boarding house.

Three outbreaks of influenza-like illness, involving 72 cases, were reported in 2012. Person-to-person was identified as the mode of transmission. All three outbreaks occurred at long-term care facilities.One of the outbreaks also reported a workplace as an additional exposure setting.

Toxins

Toxins were involved in 13 (1.8%) outbreaks and 159 (1.5%) associated cases reported in 2012.

The most commonly implicated agent was *Clostridium difficile*, which accounted for six outbreaks and 107 associated cases. Person-to person transmission was the most common mode identified. The exposure settings identified were acute care hospital (5 outbreaks) and long-term care facility (1).

The other implicated agents were *Clostridium perfringens* (4 outbreaks) histamine (scombroid) fish poisoning, *Staphylococcus aureus* and paralytic shellfish poisoning (1 each). All seven outbreaks reported foodborne as the mode of transmission. The exposure settings identified were restaurant/café/bakery (4 outbreaks), camp/takeaway, temporary or mobile food premises and unspecified setting (1 each).

Other bacteria

One outbreak of *Listeria monocytogenes* involving six cases was reported in 2012. Foodborne transmission was identified as the primary mode. The outbreak was set in an acute care hospital, with other food outlet reported as the secondary setting.

Other viruses

One outbreak of hepatitis B involving two cases was reported in 2012. Sexual contact was identified as the primary mode of transmission. The outbreak was set in the private home.

Other illness

Four outbreaks due to lead absorption, with 16 associated cases, were reported in 2012. The exposure setting for all four outbreaks was in the workplace.

One outbreak of carbon monoxide poisoning involving five associated cases was reported in 2012. The source of the carbon monoxide was a faulty power generator in a garage at a private home.

Modes of transmission

The modes of transmission recorded for outbreaks are detailed in Table 38.

Table 38. Outbreaks of infectious disease and associated cases by mode of transmission, 2012

Mode of transmission	Outbreaks				Cases	
	Primary mode[a]	Secondary mode[a]	All modes[a]	Percentage (%)[b]	All modes[c]	Percentage (%)[d]
Person-to-person	453	127	580	81.0	9 540	90.9
Foodborne	92	18	110	15.4	967	9.2
Environmental	27	66	93	13.0	1 473	14.0
Zoonotic	33	24	57	8.0	195	1.9
Waterborne	27	24	51	7.1	379	3.6
Sexual contact	1	-	1	0.1	2	0.0
Other	5	10	15	2.1	159	1.5
Unknown	-	-	44	6.1	195	1.9

[a] Number of outbreaks.

[b] Percentage of outbreaks for each mode of transmission, calculated using the total number of outbreaks (716).

[c] Number of associated cases.

[d] Percentage of cases for each mode of transmission, calculated using the total number of associated cases (10 491).

Note: More than one mode of transmission was recorded for 179 outbreaks (2183 associated cases). No outbreaks with vectorborne or parenteral as mode(s) of transmission were reported in 2012.

The primary modes of transmission were person-to-person (453 outbreaks), foodborne (92 outbreaks) and zoonotic (33 outbreaks). The most commonly reported secondary mode of transmission was person-to-person (127 outbreaks), followed by environmental (66), although environmental transmission accounted for more cases than did person-to-person (1330 versus 916). Overall, person-to-person transmission was associated with more than six times as many cases as environmental transmission (9540 versus 1473), and more than nine times as many cases as foodborne transmission (9540 versus 967). The mode of transmission was unknown for 44 (6.1%) outbreaks and more than one mode of transmission was identified for 179 (25.0%) outbreaks reported in 2012.

Person-to-person was the most common mode of transmission for enteric bacteria (67.1%, 55/82), enteric protozoa (88.6%, 102/115), enteric viruses (93.1%, 257/276), unspecified enteric pathogens (65.0%, 117/180) and respiratory disease (98.1%, 52/53). Foodborne transmission contributed substantially to outbreaks due to toxins (53.8%, 7/13), enteric bacteria (36.6%, 30/82) and unspecified enteric pathogens (22.8%, 41/180). Environmental transmission contributed substantially to outbreaks due to enteric protozoa (22.6%, 26/115) and enteric viruses (14.5%, 40/276). Waterborne was the second highest mode of transmission for enteric protozoa (32.2%, 37/115) and third highest for enteric bacteria (15.9%, 13/82).

Exposure settings

Outbreaks reported in 2012 were most commonly associated with long-term care facilities (26.1%, 187/716), private homes (25.7%, 184/716) and childcare centres (12.4%, 89/716) (Table 39).

Table 39. Number of cases associated with outbreaks of infectious disease by exposure setting, 2012

Outbreak setting	Outbreaks[a]	Cases[a]
Institutions	**369**	**8 211**
Long-term care facility	187	4 623
Childcare centre	89	1 385
Hospital (acute care)	57	1 268
School	11	457
Camp	9	148
Hostel/boarding house	2	48
Marae	1	28
Hotel/motel	1	12
Prison	1	12
Other institution	14	409
Commercial food operators	**99**	**596**
Restaurant/café/bakery	66	375
Takeaway	19	114
Fast food restaurant	4	13
Supermarket/delicatessen	2	4
Caterers	1	4
Temporary or mobile service	1	3
Other food outlet	6	83
Home	**184**	**709**
Private home	184	709
Workplace	**28**	**280**
Workplace	15	239
Farm	14	45
Community	**8**	**193**
Community, church, sports gathering	7	190
Petting zoo	1	3
Travel	**3**	**369**
Cruise ship	2	363
Tour bus	1	6
Other setting	**27**	**220**

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

ANTIMICROBIAL RESISTANCE

ANTIMICROBIAL RESISTANCE

The results of antibiotic resistance surveillance carried out in 2012 will be available later in 2013. Reporting in this section is for data collected for the period 2000 to 2011.

The following is a summary of some key trends in antimicrobial resistance. A fuller description of antimicrobial resistance in each pathogen is available at www.surv.esr.cri.nz/antimicrobial/antimicrobial_resistance.php. The prevalence of resistance among common, clinically important pathogens between 2000 and 2011 is presented in Table 40.

Staphylococcus aureus

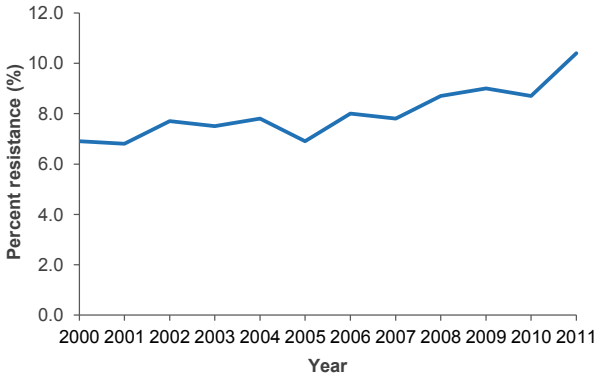
Methicillin resistance among *S. aureus* has increased, albeit slowly, over the last 10 years. In 2011, the national prevalence was more than 10% for the first time (Figure 60). However, there are large geographical differences throughout the country.

The rate of mupirocin resistance among *S. aureus* has declined each year since it peaked in 2000 at 21.5%. By 2011, the rate had more than halved to 8.0%.

There is a high prevalence of fusidic acid resistance among *S. aureus,* particularly among methicillin-resistant *S. aureus* (MRSA). The community-associated AK3 MRSA strain, which is now the most prevalent MRSA strain in New Zealand, is typically fusidic acid resistant.

Fluoroquinolone resistance among MRSA has decreased, which is due to a decrease in the prevalence of the ciprofloxacin-resistant healthcare-associated EMRSA-15 strain.

Figure 60. Methicillin resistance among *Staphylococcus aureus*, 2000–2011



Note: methicilin resistance was determined by testing oxacillin or cefoxitin susceptibility.

Streptococcus pneumoniae

Penicillin non-susceptibility among *S. pneumoniae* decreased significantly among both invasive and non-invasive isolates ($p<0.01$) in the latest three-year period (2009–2011) compared with the preceding three years (2006–2008). Cefotaxime non-susceptibility also decreased significantly among invasive pneumococci ($p<0.0001$) in the latest three-year period compared with the preceding three years.

The decreases in both penicillin and cefotaxime non-susceptibility may be due to the impact of the introduction of pneumococcal conjugate vaccine into the childhood immunisation programme in 2008. The pneumococcal serotypes covered by the vaccines are also the types that are most commonly resistant to penicillin and third-generation cephalosporins.

Vancomycin-resistant enterococci

Vancomycin-resistant enterococci were infrequently identified in 2011, and the only outbreak identified was a small cluster of isolations in one healthcare facility.

Escherichia coli

Levels of trimethoprim and co-amoxiclav resistance among urinary *E. coli* have remained relatively stable over the last 10 years. Nitrofurantoin resistance has remained consistently below 2%.

However, there is a trend of increasing fluoroquinolone resistance among *E. coli*. Among urinary isolates, the rise in fluoroquinolone resistance to 6.7% in the latest three-year period (2009–2011) was significant ($p<0.0001$) compared with the rate of 4.6% in the preceding three years (2006–2008). Rates of fluoroquinolone resistance are higher among bacteraemic *E. coli* than among urinary isolates.

ESBLs and carbapenemases

Extended-spectrum β-lactamases (ESBLs) are increasing in Enterobacteriaceae, with particularly high rates among bacteraemic *Klebsiella* including a rate of 11.4% in 2011.

Several classes of β-lactamases that inactivate carbapenems (i.e., carbapenemases), including the New Delhi metallo-β-lactamase, have been identified in Enterobacteriaceae and *Pseudomonas* since 2009. However, most have been associated with patients who had received healthcare overseas.

Mycobacterium tuberculosis

Multidrug-resistant tuberculosis (MDR-TB; i.e., resistance to at least isoniazid and rifampicin) remains rare in New Zealand with two cases in 2011, accounting for 0.9% of the 233 culture-positive TB cases. To date, there has been only 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 40. Prevalence of antimicrobial resistance, 2000–2011

Pathogen	Antimicrobial	Percent resistance[a] (number tested)			
		2000–2002	2003–2005	2006–2008	2009–2011
S. aureus[b]	methicillin	7.2 (251 448)	7.4 (219 363)	8.2 (242 146)	9.4 (300 093)
	erythromycin	12.0 (221 394)	12.0 (164 220)	12.1 (98 055)	11.9 (273 383)
	co-trimoxazole	1.2 (149 166)	2.0 (126 840)	1.3 (89 071)	1.1 (258 126)
	fluoroquinolone	-	7.3 (47 116)	7.9 (28 846)	6.1 (33 771)
	fusidic acid	-	19.7 (25 609)	15.7 (32 730)	13.8 (52 534)
	mupirocin	20.0 (91 555)	16.7 (48 423)	12.9 (67 154)	10.2 (42 559)
Methicillin-resistant *S. aureus*[c]	erythromycin	40.0 (1 409)	46.3 (1 596)	37.5 (3 146)	27.7 (18 499)
	co-trimoxazole	6.7 (1 409)	7.4 (1 596)	2.8 (3 068)	2.0 (18 514)
	fluoroquinolone	40.0 (1 409)	50.3 (1 596)	37.4 (3 000)	25.1 (13 963)
	fusidic acid	7.0 (1 409)	9.2 (1 596)	11.6 (3 011)	28.7 (15 411)
	mupirocin	8.5 (1 409)	9.5 (1 596)	7.5 (2 926)	9.4 (15 131)
S. pneumoniae, non-invasive disease[b]	penicillin[d]	26.5 (12 859)	27.0 (15 037)	30.0 (14 104)	23.3 (13 239)
	erythromycin	18.6 (14 404)	19.9 (10 222)	21.3 (7 273)	18.9 (12 076)
	tetracycline	15.4 (9 476)	18.1 (6 796)	19.0 (5 496)	17.5 (8 959)
S. pneumoniae, invasive disease[e]	penicillin[f]	15.3 (1 494)	17.2 (1 560)	20.3 (1 707)	16.7 (1 712)
	erythromycin	7.2 (1 494)	9.9 (1 560)	12.2 (1 707)	9.9 (1 712)
	cefotaxime[f]	6.2 (1 494)	11.5 (1 560)	13.2 (1 707)	7.9 (1 712)
Enterococcus spp.[b]	amoxicillin[g]	3.0 (22 566)	2.8 (26 492)	3.7 (35 746)	4.0 (43 526)
	vancomycin	0.3 (7 505)	0.1 (9 948)	1.3 (20 291)	0.4 (17 182)
E. coli, urinary isolates[b]	amoxicillin[g]	54.4 (194 799)	50.7 (117 009)	49.9 (117 456)	50.6 (256 098)
	co-amoxiclav	9.6 (194 950)	8.5 (127 750)	9.6 (117 965)	9.0 (261 828)
	trimethoprim	22.3 (207 837)	21.5 (138 748)	22.1 (128 276)	24.2 (270 530)
	nitrofurantoin	1.5 (206 149)	1.4 (139 738)	1.3 (127 682)	1.2 (271 089)
	fluoroquinolone	1.6 (201 382)	2.4 (135 803)	4.6 (110 769)	6.7 (227 279)
E. coli, non-urinary isolates[b,h]	co-amoxiclav	17.5 (11 508)	15.2 (5 059)	15.1 (3 249)	19.2 (4 267)
	cefuroxime	4.2 (6 576)	3.4 (3 956)	4.5 (2 534)	6.9 (4 060)
	ESBL positive	-	-	2.6 (2 307)	3.8 (4 216)
	gentamicin	2.4 (10 392)	2.6 (5 290)	5.3 (3 896)	5.3 (4 946)
	fluoroquinolone	2.4 (8 821)	3.9 (4 212)	8.1 (3 808)	8.8 (4 703)
P. aeruginosa[b]	gentamicin	10.5 (25 561)	6.1 (23 148)	4.3 (23 399)	4.4 (34 176)
	tobramycin	3.6 (10 421)	3.3 (7 616)	3.4 (9 388)	2.0 (13 261)
	ceftazidime	3.9 (13 253)	4.3 (16 031)	3.2 (18 163)	2.8 (31 914)
	fluoroquinolone	9.3 (22 869)	8.3 (23 761)	7.1 (23 961)	6.1 (36 769)
	imipenem/meropenem	-	4.8 (9 956)	4.9 (13 703)	3.5 (22 503)
	piperacillin/tazobactam	-	1.5 (4 928)	2.5 (11 960)	2.0 (18 884)
H. influenzae, non-invasive disease[b]	amoxicillin[g]	21.9 (28 476)	19.9 (19 529)	22.0 (24 823)	24.7 (27 772)
	co-amoxiclav	0.8 (16 333)	1.0 (14 090)	2.6 (15 123)	3.5 (23 396)
	co-trimoxazole	17.3 (22 443)	18.2 (15 939)	20.2 (13 098)	25.3 (21 176)
	tetracycline	1.2 (15 633)	0.8 (12 783)	0.8 (11 263)	1.0 (16 216)
H. influenzae, invasive disease[e]	amoxicillin[g]	19.2 (125)	31.6 (155)	36.9 (176)	35.2 (199)
	co-amoxiclav	1.6 (125)	9.7 (155)	23.9 (176)	19.6 (199)
	cefuroxime	0.8 (125)	9.7 (155)	23.9 (176)	19.6 (199)
N. meningitidis, invasive disease[e]	penicillin[i]	7.5 (796)	12.0 (551)	19.5 (231)	23.3 (215)
	rifampicin	0 (796)	0.2 (551)	0.0 (231)	1.4 (215)
N. gonorrhoeae[b]	penicillin	7.1 (2 782)	5.8 (4 700)	7.5 (6 028)	12.5 (4 090)
	fluoroquinolone	6.3 (2 349)	14.3 (4 195)	20.1 (7 315)	35.2 (7 334)
M. tuberculosis[b]	isoniazid	8.5 (811)	8.9 (872)	6.6 (725)	7.9 (731)
	rifampicin	0.7 (811)	1.0 (872)	0.6 (725)	1.9 (731)
	MDR[j]	0.5 (811)	1.0 (872)	0.4 (725)	1.8 (731)

[a] Intermediate resistance is not included in the resistant category unless otherwise stated (refer footnotes d, f and i below).

[b] Collated clinical laboratory data.

[c] MRSA tested by ESR up until 2007, thereafter collated clinical laboratory data.

[d] Penicillin non-susceptible (intermediate resistant and resistant), according to the interpretive criteria by the Clinical and Laboratory Standards Institute (CLSI) 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 based on *E. coli* from bacteraemia.

[i] Penicillin reduced susceptibility (MIC 0.12–0.5 mg/L).

[j] Multidrug resistant (i.e., 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 2011 and 2012

Table 41. Numbers of cases and rates per 100 000 population for common (10 or more cases reported per year) notifiable diseases in New Zealand, 2011–2012

Disease	2011		2012		Change[d,e]
	Cases	Rate	Cases	Rate	
AIDS[a]	24	0.5	20	0.5	-
Campylobacteriosis	6 689	151.8	7 031	158.6	➔
Cryptosporidiosis	610	13.8	877	19.8	➔
Dengue fever	42	1.0	77	1.7	➔
Gastroenteritis[b]	630	14.3	735	16.6	➔
Giardiasis	1 934	43.9	1 719	38.8	←
Hepatitis A	26	0.6	82	1.8	➔
Hepatitis B[c]	51	1.2	39	0.9	←
Hepatitis C[c]	26	0.6	32	0.7	→
Invasive pneumococcal disease	552	12.5	488	11.0	←
Lead absorption	230	5.2	272	6.1	→
Legionellosis	158	3.6	152	3.4	←
Leptospirosis	68	1.5	113	2.5	➔
Listeriosis	26	0.6	25	0.6	←
Malaria	52	1.2	38	0.9	←
Measles	596	13.5	68	1.5	←
Meningococcal disease	119	2.7	85	1.9	←
Mumps	51	1.2	26	0.6	←
Paratyphoid fever	13	0.3	22	0.5	→
Pertussis	1 996	45.3	5 902	133.1	➔
Rheumatic fever	164	3.7	179	4.0	→
Salmonellosis	1 055	23.9	1 085	24.5	→
Shigellosis	101	2.3	132	3.0	➔
Tuberculosis disease	309	7.0	297	6.7	←
Typhoid fever	45	1.0	45	1.0	←
VTEC/STEC infection	153	3.5	147	3.3	←
Yersiniosis	514	11.7	517	11.7	←

[a] Data source [16].

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

Comparison of notifiable disease cases and rates for 2011 and 2012

Table 42. Numbers of cases for rare (fewer than 10 cases reported per year) notifiable diseases in New Zealand, 2011–2012

Disease[a]	2011	2012
Chemical poisoning from the environment	3	7
Chikungunya fever	1	0
Cronobacter species	0	1
Haemophilus influenzae type b	8	4
Hepatitis NOS	7	2
Hydatid disease	6	1
Leprosy	1	2
Q fever	1	0
Rickettsial disease	5	4
Ross River virus infection	3	1
Rubella	22	4
Taeniasis	10	6
Tetanus	0	2
Toxic shellfish poisoning	3	34

[a] No cases of the following notifiable diseases were reported in 2011 and 2012: anthrax, brucellosis, Barmah Forest virus infection, cholera, congenital rubella, cysticercosis, decompression sickness, highly pathogenic avian influenza, non-seasonal influenza, plague, poliomyelitis, primary amoebic meningo-encephalitis, rabies, severe acute respiratory syndrome (SARS), trichinosis, viral haemorrhagic fever and yellow fever.

Deaths from notifiable diseases in EpiSurv, 1997–2012

Table 43. Deaths due to notifiable diseases recorded in EpiSurv, 1997–2012

Disease	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
AIDS[a]	34	19	18	19	14	11	10	13	15	14	5	2	2	8	1	3
Campylobacteriosis	2	2	1	3	1	1	0	0	1	1	1	0	0	0	0	0
Chemical poisoning from the environment	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
Creutzfeldt-Jakob disease [b]	3	0	2	3	1	3	4	3	0	5	0	0	0	0	0	8
Gastroenteritis [c]	0	0	0	0	0	1	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
Haemophilus influenzae type b disease	1	0	0	0	1	1	2	0	0	0	0	0	0	1	0	1
Hepatitis B	2	0	0	0	1	0	0	0	1	0	1	0	0	0	0	1
Hydatid disease	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Invasive pneumococcal disease [d]												8	35	27	32	31
Legionellosis [e]	4	1	1	5	2	3	1	1	4	3	1	4	2	5	4	6
Listeriosis - non perinatal	2	0	1	2	1	0	2	3	1	0	2	3	2	3	1	4
Listeriosis - perinatal	6	0	2	4	1	3	2	2	0	1	2	2	2	4	0	2
Malaria	1	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
Non-seasonal influenza [f]													36	17	0	0
Pertussis	0	0	0	1	0	1	1	1	0	0	0	0	0	0	1	2
Primary amoebic meningoencephalitis	0	0	0	1	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
Salmonellosis	2	2	1	7	2	1	0	0	1	1	1	1	1	0	0	0
Shigellosis	0	0	1	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
Tuberculosis disease	15	8	14	8	2	6	6	6	4	5	3	4	4	9	3	3
VTEC/STEC infection	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Yersiniosis	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0

[a] Data source [16].

[b] Data source [20].

[c] Cases of acute gastroenteritis from a common source or foodborne intoxication, e.g., 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, 2008–2010 (Ministry of Health, NMDS)

Table 44. Reported deaths from selected notifiable diseases, 2008–2010

Disease	ICD 10 codes	2008		2009		2010[a]	
		Und[b]	Cont[c]	Und[b]	Cont[c]	Und[b]	Cont[c]
AIDS	B20-B24	7	4	10	8	14	6
Campylobacteriosis	A04.5		4	1			4
Creutzfeldt-Jakob disease	A81.0	2		7	1	4	
Dengue fever	A90, A91	1					
Hepatitis A	B15		1				2
Hepatitis B	B16	1	3	1	1		2
Hepatitis C	B17.1		5	1	2		2
Hydatid disease	B67		2				1
Legionellosis	A48.1	3	2	3		6	1
Listeriosis	A32	1	1	3	3	3	
Meningococcal disease	A39	8		4		6	
Pertussis	A37					1	
Rheumatic fever	I00, I01, I02			1			
Salmonellosis	A02	1	2	1	4		1
Shigellosis	A03	1					
Tetanus	A33-A35					1	
Tuberculosis	A15-A19, P37.0	8	11	8	24	9	17
Yersiniosis	A04.6	1	1	1			

[a] Latest year that data are 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, 2010–2012 (Ministry of Health, NMDS)

Table 45. Hospital admissions for selected notifiable diseases, 2010–2012

Disease	ICD 10 codes	2010		2011		2012	
		Prin [a]	Oth [b]	Prin [a]	Oth [b]	Prin [a]	Oth [b]
AIDS	B20-B24	17	298	13	245	6	253
Arboviral diseases	A83, A84, A85.2, A92, A93, A94, B33.1	2				1	1
Campylobacteriosis	A04.5	526	107	445	132	544	116
Cholera	A00	1		1			
Creutzfeldt-Jakob disease	A81.0	5	2	4	4	6	3
Cryptosporidiosis	A07.2	16	14	16	2	42	12
Cysticercosis	B69	4	1				3
Decompression sickness	T70.3	24	2	33	4	33	1
Dengue fever	A90, A91	16	2	15		16	
Diphtheria	A36	2					1
Giardiasis	A07.1	18	15	35	25	27	23
Hepatitis A	B15	20	13	8	11	35	4
Hepatitis B	B16	26	24	27	33	24	25
Hepatitis C	B17.1	13	12	9	31	21	30
Hydatid disease	B67	5	9	14	7	8	3
Lead absorption	T56.0	6		5	1	6	3
Legionellosis	A48.1	68	11	61	21	68	14
Leprosy	A30	1	3	1	1	1	1
Leptospirosis	A27	57	3	49	5	69	12
Listeriosis	A32	13	18	11	19	14	13
Malaria	B50-B54	40	2	44	1	28	
Measles	B05	5	1	133	10	19	1
Meningococcal disease	A39	112	23	122	21	90	27
Mumps	B26	10	3	13	1	9	5
Paratyphoid	A01.1-A01.4	6	1	5		6	
Pertussis	A37	134	23	144	17	396	72
Q fever	A78	1		1			
Rheumatic fever	I00, I01, I02	252	55	256	43	229	35
Rickettsial disease	A75, A77, A79	6	1	7	1	2	
Rubella	B06	1	1	1	2	2	
Salmonellosis	A02	121	49	107	29	128	46
Shigellosis	A03	21	4	22	6	12	8
Taeniasis	B689		1		1		
Tetanus	A33-A35	7	1	3	2	4	4
Tuberculosis	A15-A19, P37.0	258	158	225	106	203	109
Typhoid	A01.0	34	1	34	5	48	5
Viral haemorrhagic fever	A95, A98, A99			2			
VTEC/STEC infection	A04.0-A04.4	35	24	50	23	55	23
Yellow fever	A95			1	1		
Yersiniosis	A04.6	13	14	16	23	18	23

[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, 2012

Table 46a. Number of cases and rate per 100 000 population of notifiable diseases by DHB, 2012

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	230	145.3	776	140.2	524	113.4	480	94.5	695	187.7	166	161.0	267	125.9	54	115.4	220	199.4	297	191.1
Cryptosporidiosis	37	23.4	43	7.8	29	6.3	38	7.5	179	48.3	22	21.3	21	9.9	1		28	25.4	48	30.9
Dengue fever	2		12	2.2	19	4.1	11	2.2	2		0		3		1		0		0	
Gastroenteritis[b]	1		88	15.9	123	26.6	42	8.3	46	12.4	24	23.3	45	21.2	3		13	11.8	2	
Giardiasis	43	27.2	214	38.7	257	55.6	131	25.8	156	42.1	59	57.2	95	44.8	8	17.1	38	34.4	60	38.6
Hepatitis A	1		36	6.5	15	3.2	15	3.0	3		0		1		0		1		2	
Hepatitis B[c]	2		5	0.9	3		6	1.2	3		1		1		2		2		1	
Hepatitis C[c]	0		0		1		1		0		0		0		0		3		2	
Invasive pneumococcal disease	23	14.5	38	6.9	52	11.3	75	14.8	42	11.3	14	13.6	36	17.0	3		14	12.7	21	13.5
Lead absorption	3		35	6.3	66	14.3	43	8.5	9	2.4	4		8	3.8	3		7	6.3	3	
Legionellosis	5	3.2	20	3.6	21	4.5	11	2.2	9	2.4	0		2		0		0		1	
Leptospirosis	4		2		2		2		31	8.4	0		4		3		4		19	12.2
Listeriosis	0		3		2		5	1.0	3		0		5	2.4	0		1		4	
Malaria	2		5	0.9	12	2.6	9	1.8	0		1		0		0		0		3	
Measles	8	5.1	10	1.8	8	1.7	33	6.5	1		0		0		0		0		0	
Meningococcal disease	3		9	1.6	8	1.7	7	1.4	5	1.4	5	4.8	5	2.4	1		6	5.4	2	
Mumps	1		2		2		0		2		0		1		1		1		0	
Paratyphoid fever	0		2		8	1.7	1		0		0		1		0		0		1	
Pertussis	82	51.8	275	49.7	275	59.5	338	66.5	355	95.9	94	91.2	189	89.1	150	320.5	131	118.7	126	81.1
Rheumatic fever	14	8.8	16	2.9	11	2.4	78	15.4	19	5.1	6	5.8	3		8	17.1	2		6	3.9
Salmonellosis	29	18.3	120	21.7	121	26.2	71	14.0	94	25.4	23	22.3	36	17.0	9	19.2	29	26.3	29	18.7
Shigellosis	2		31	5.6	24	5.2	25	4.9	6	1.6	0		7	3.3	0		4		1	
Tuberculosis disease	3		42	7.6	58	12.5	47	9.3	22	5.9	2		11	5.2	2		5	4.5	21	13.5
Typhoid fever	0		7	1.3	10	2.2	14	2.8	0		1		2		1		0		1	
VTEC/STEC infection	12	7.6	14	2.5	6	1.3	10	2.0	22	5.9	3		18	8.5	1		8	7.3	4	
Yersiniosis	16	10.1	91	16.4	60	13.0	56	11.0	48	13.0	9	8.7	22	10.4	6	12.8	11	10.0	12	7.7

[a] Table is continued on the following page.

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

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

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, 2012

Table 46b. Number of cases and rate per 100 000 population of notifiable diseases by DHB, 2012 (continued)

Disease	District Health Board [a]																			
	Whanganui		MidCentral		Hutt Valley		Capital and 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	91	145.6	199	117.6	171	118.5	430	144.7	73	179.7	303	215.4	72	218.8	1 127	225.2	178	314.8	678	220.2
Cryptosporidiosis	3		25	14.8	34	23.6	111	37.3	16	39.4	17	12.1	10	30.4	88	17.6	46	81.3	81	26.3
Dengue fever	0		5	3.0	2		9	3.0	0		0		0		5	1.0	0		6	1.9
Gastroenteritis [b]	11	17.6	127	75.1	43	29.8	79	26.6	3		17	12.1	7	21.3	47	9.4	2		12	3.9
Giardiasis	7	11.2	20	11.8	51	35.3	128	43.1	20	49.2	67	47.6	11	33.4	195	39.0	24	42.4	135	43.9
Hepatitis A	0		0		1		6	2.0	0		0		0		1		0		0	
Hepatitis B [c]	0		2		0		2		0		1		0		6	1.2	0		2	
Hepatitis C [c]	0		0		0		3		0		2		0		5	1.0	2		13	4.2
Invasive pneumococcal disease	6	9.6	11	6.5	12	8.3	29	9.8	10	24.6	20	14.2	1		40	8.0	6	10.6	35	11.4
Lead absorption	10	16.0	10	5.9	13	9.0	17	5.7	7	17.2	3		2		11	2.2	3		15	4.9
Legionellosis	1		4		1		7	2.4	0		5	3.6	1		52	10.4	2		10	3.2
Leptospirosis	6	9.6	11	6.5	1		0		4		4		5	15.2	5	1.0	2		4	
Listeriosis	0		0		0		1		0		0		0		0		1		0	
Malaria	0		1		1		0		0		1		0		3		0		0	
Measles	0		0		0		3		0		0		1		4		0		0	
Meningococcal disease	1		3		1		9	3.0	0		2		0		10	2.0	3		5	1.6
Mumps	0		0		1		2		1		3		0		8	1.6	1		0	
Paratyphoid fever	0		0		0		1		0		1		0		3		0		4	
Pertussis	149	238.4	205	121.1	358	248.1	680	228.8	123	302.7	673	478.3	153	465.0	1 227	245.2	58	102.6	261	84.8
Rheumatic fever	0		3		3		9	3.0	0		0		0		1		0		0	
Salmonellosis	9	14.4	31	18.3	32	22.2	44	14.8	5	12.3	58	41.2	14	42.6	133	26.6	29	51.3	169	54.9
Shigellosis	0		2		1		11	3.7	0		1		0		9	1.8	0		8	2.6
Tuberculosis disease	1		6	3.5	10	6.9	23	7.7	0		14	10.0	1		19	3.8	1		9	2.9
Typhoid fever	0		0		3		2		0		0		0		3		0		1	
VTEC/STEC infection	0		1		1		0		0		4		2		23	4.6	4		14	4.5
Yersiniosis	3		7	4.1	22	15.2	54	18.2	4		4		2		59	11.8	13	23.0	18	5.8

[a] Table is continued from the previous page.

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

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

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, 2012

Table 47. Number of cases and rate per 100 000 population of notifiable diseases by sex, 2012

Disease	Sex					
	Male		Female		Total [a]	
	Cases	Rate	Cases	Rate	Cases	Rate
Campylobacteriosis	3 938	180.6	3 093	137.3	7 031	158.6
Cryptosporidiosis	452	20.7	425	18.9	877	19.8
Dengue fever	42	1.9	35	1.6	77	1.7
Gastroenteritis [b]	313	14.4	422	18.7	735	16.6
Giardiasis	811	37.2	907	40.3	1 719	38.8
Hepatitis A	45	2.1	37	1.6	82	1.8
Hepatitis B[c]	25	1.1	14	0.6	39	0.9
Hepatitis C[c]	17	0.8	15	0.7	32	0.7
Invasive pneumococcal disease	262	12.0	226	10.0	488	11.0
Lead absorption	256	11.7	16	0.7	272	6.1
Legionellosis	98	4.5	54	2.4	152	3.4
Leptospirosis	104	4.8	9	0.4	113	2.5
Listeriosis	11	0.5	14	0.6	25	0.6
Malaria	32	1.5	5	0.2	38	0.9
Measles	33	1.5	35	1.6	68	1.5
Meningococcal disease	41	1.9	44	2.0	85	1.9
Mumps	12	0.6	14	0.6	26	0.6
Paratyphoid fever	14	0.6	8	0.4	22	0.5
Pertussis	2 538	116.4	3 364	149.3	5 902	133.1
Rheumatic fever	100	4.6	79	3.5	179	4.0
Salmonellosis	561	25.7	524	23.3	1 085	24.5
Shigellosis	62	2.8	70	3.1	132	3.0
Tuberculosis disease	156	7.2	140	6.2	297	6.7
Typhoid fever	25	1.1	20	0.9	45	1.0
VTEC/STEC infection	74	3.4	73	3.2	147	3.3
Yersiniosis	282	12.9	234	10.4	517	11.7

[a] Total includes cases where sex was unknown.
[b] Cases of acute gastroenteritis from a common source or foodborne intoxication, e.g., staphylococcal intoxication.
[c] Only acute cases of this disease are notifiable.
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, 2012

Table 48. Number of cases and rate per 100 000 population of notifiable diseases by age group, 2012

Disease	Age group (years)																					
	<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	163	269.0	754	300.1	347	119.0	274	94.8	440	141.3	1124	179.0	714	128.0	855	136.6	842	147.9	769	179.5	742	176.5	7031	158.6
Cryptosporidiosis	19	31.4	303	120.6	113	38.8	61	21.1	61	19.6	93	14.8	108	19.4	51	8.1	33	5.8	21	4.9	14	3.3	877	19.8
Dengue fever	0		0		2		2		5	1.6	18	2.9	13	2.3	12	1.9	14	2.5	10	2.3	1		77	1.7
Gastroenteritis[b]	27	44.6	83	33.0	18	6.2	15	5.2	27	8.7	83	13.2	104	18.6	85	13.6	82	14.4	46	10.7	141	33.5	735	16.6
Giardiasis	38	62.7	343	136.5	102	35.0	36	12.5	39	12.5	177	28.2	402	72.1	236	37.7	156	27.4	146	34.1	41	9.8	1719	38.8
Hepatitis A	0		13	5.2	21	7.2	10	3.5	5	1.6	12	1.9	7	1.3	7	1.1	3		3		1		82	1.8
Hepatitis B[c]	0		0		0		0		2		3		6	1.1	15	2.4	8	1.4	5	1.2	0		39	0.9
Hepatitis C[c]	0		0		0		0		3		13	2.1	7	1.3	6	1.0	1		0		2		32	0.7
Invasive pneumococcal disease	31	51.2	27	10.7	13	4.5	7	2.4	11	3.5	18	2.9	35	6.3	34	5.4	63	11.1	84	19.6	165	39.2	488	11.0
Lead absorption	0		2		2		1		4		28	4.5	45	8.1	71	11.3	68	11.9	44	10.3	7	1.7	272	6.1
Legionellosis	0		0		0		0		0		7	1.1	11	2.0	16	2.6	29	5.1	41	9.6	48	11.4	152	3.4
Leptospirosis	0		0		0		0		4		21	3.3	18	3.2	31	5.0	26	4.6	12	2.8	1		113	2.5
Listeriosis	0		0		0		1		0		1		1		1		2		6	1.4	13	3.1	25	0.6
Malaria	0		0		0		1		3		16	2.5	3		9	1.4	5	0.9	1		0		38	0.9
Measles	17	28.1	19	7.6	8	2.7	7	2.4	8	2.6	2		4		3		0		0		0		68	1.5
Meningococcal disease	12	19.8	14	5.6	4		6	2.1	15	4.8	12	1.9	7	1.3	5	0.8	6	1.1	2		2		85	1.9
Mumps	0		5	2.0	6	2.1	0		0		2		6	1.1	2		3		1		1		26	0.6
Paratyphoid fever	0		2		0		2		5	1.6	4		7	1.3	1		0		0		1		22	0.5
Pertussis	421	694.8	896	356.6	759	260.4	540	186.9	280	89.9	535	85.2	680	121.9	755	120.6	486	85.4	336	78.4	214	50.9	5902	133.1
Rheumatic fever	0		0		42	14.4	77	26.7	24	7.7	32	5.1	3		1		0		0		0		179	4.0
Salmonellosis	65	107.3	185	73.6	59	20.2	34	11.8	49	15.7	172	27.4	106	19.0	117	18.7	119	20.9	93	21.7	85	20.2	1085	24.5
Shigellosis	0		16	6.4	10	3.4	1		5	1.6	26	4.1	17	3.0	15	2.4	17	3.0	19	4.4	6	1.4	132	3.0
Tuberculosis disease	1		4		3		5	1.7	12	3.9	73	11.6	61	10.9	34	5.4	27	4.7	34	7.9	43	10.2	297	6.7
Typhoid fever	0		1		1		2		4		18	2.9	5	0.9	7	1.1	2		2		3		45	1.0
VTEC/STEC infection	9	14.9	57	22.7	15	5.1	6	2.1	8	2.6	11	1.8	9	1.6	7	1.1	9	1.6	7	1.6	9	2.1	147	3.3
Yersiniosis	49	80.9	135	53.7	20	6.9	23	8.0	24	7.7	57	9.1	45	8.1	45	7.2	51	9.0	28	6.5	40	9.5	517	11.7

[a] Total includes cases where age was unknown.

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

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

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, 2012

Table 49. Number of cases and rate per 100 000 population of notifiable diseases by ethnic group, 2012

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	490	75.7	111	41.6	306	75.0	28	74.2	5 620	182.9	7 031	158.6
Cryptosporidiosis	69	10.7	15	5.6	18	4.4	5	13.2	746	24.3	877	19.8
Dengue fever	2		2		15	3.7	3		46	1.5	77	1.7
Gastroenteritis[c]	57	8.8	16	6.0	32	7.8	2		549	17.9	735	16.6
Giardiasis	104	16.1	12	4.5	74	18.1	39	103.3	1 375	44.7	1 719	38.8
Hepatitis A	1		10	3.7	53	13.0	5	13.2	11	0.4	82	1.8
Hepatitis B[d]	8	1.2	2		7	1.7	1		20	0.7	39	0.9
Hepatitis C[d]	4		1		0		0		27	0.9	32	0.7
Invasive pneumococcal disease	102	15.8	59	22.1	16	3.9	4		294	9.6	488	11.0
Lead absorption	9	1.4	16	6.0	11	2.7	2		188	6.1	272	6.1
Legionellosis	8	1.2	9	3.4	7	1.7	0		126	4.1	152	3.4
Leptospirosis	19	2.9	2		1		0		86	2.8	113	2.5
Listeriosis	1		4		1		1		18	0.6	25	0.6
Malaria	1		5	1.9	25	6.1	3		4		38	0.9
Measles	25	3.9	28	10.5	1		0		14	0.5	68	1.5
Meningococcal disease	29	4.5	10	3.7	1		3		42	1.4	85	1.9
Mumps	2		1		7	1.7	0		15	0.5	26	0.6
Paratyphoid fever	0		0		13	3.2	0		8	0.3	22	0.5
Pertussis	820	126.6	210	78.7	170	41.7	35	92.7	4 543	147.8	5 902	133.1
Rheumatic fever	96	14.8	69	25.9	3		0		11	0.4	179	4.0
Salmonellosis	94	14.5	38	14.2	101	24.8	8	21.2	781	25.4	1 085	24.5
Shigellosis	6	0.9	36	13.5	13	3.2	3		64	2.1	132	3.0
Tuberculosis disease	38	5.9	34	12.7	177	43.4	14	37.1	31	1.0	297	6.7
Typhoid fever	0		28	10.5	16	3.9	0		1		45	1.0
VTEC/STEC infection	15	2.3	0		5	1.2	1		125	4.1	147	3.3
Yersiniosis	42	6.5	29	10.9	128	31.4	4		280	9.1	517	11.7

[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, e.g., staphylococcal intoxication.

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

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 2006 census population applied to the 2012 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, 1988–2012

Table 50. 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	2 796	4 187	3 850	4 148	5 144	8 101	7 714	7 442	7 635	8 924	11 572	8 161	8 418
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	310	492	601	727
Giardiasis	N									1 235	2 127	2 183	1 793	1 688
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	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									1 022	284	153	1 046	4 140
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	1 128	1 860	1 619	1 244	1 239	1 340	1 522	1 334	1 141	1 177	2 069	2 077	1 795
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, e.g., staphylococcal intoxication.

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

Notifiable disease cases by year and source, 1988–2012

Table 51. Number of notifiable disease cases by year and source, 2001–2012

Disease	Source[a]	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
AIDS	N	26	17	33	38	49	29	31	48	28	39	24	20
Campylobacteriosis	N	10 145	12 493	14 788	12 215	13 836	15 873	12 778	6 694	7 177	7 346	6 689	7 031
Cholera	N	3	1	1	2	0	0	1	0	0	2	0	0
Creutzfeldt--Jakob disease	N	1	3	6	8	3	5	8	5	8	5	4	9
Cryptosporidiosis	N	1 208	975	817	611	888	737	924	764	854	954	610	877
Dengue fever	N	93	70	55	8	11	19	114	113	139	50	42	77
Gastroenteritis [b]	N	940	1 087	1 026	1 363	557	937	622	686	712	493	630	735
Giardiasis	N	1 604	1 547	1 570	1 514	1 231	1 214	1 402	1 660	1 639	1 985	1 934	1 719
Haemophilus influenzae type b	N	11	3	12	4	7	9	15	9	10	8	8	4
	L	8	3	9	3	6	8	13	4	8	8	8	4
Hepatitis A	N	61	106	70	49	51	123	42	89	44	46	26	82
Hepatitis B[c]	N	56	67	61	38	59	62	72	38	55	51	51	39
Hepatitis C[c]	N	58	53	40	24	29	35	30	22	32	17	26	32
Hydatid disease	N	7	2	0	1	2	0	6	7	2	4	6	1
Influenza	S	313	241	230	231	273	315	239	466	624	349	336	399
Legionellosis	N	46	49	77	62	85	52	64	73	74	173	158	152
	L	56	53	82	75	83	54	72	74	77	178	160	152
Leprosy	N	3	4	4	3	2	4	8	5	3	3	1	2
Leptospirosis	N	99	140	113	102	85	87	66	118	69	80	68	113
	L	113	181	149	113	109	67	42	72	60	58	45	78
Listeriosis	N	18	19	24	26	20	19	26	27	28	23	26	25
Malaria	N	54	61	46	33	32	30	25	40	50	44	52	38
Measles	N	82	21	66	32	18	18	24	12	248	48	596	68
Meningococcal disease	N	648	555	542	343	226	160	104	122	133	97	119	85
Mumps	N	56	64	56	45	61	47	73	76	63	41	51	26
Paratyphoid fever	N	32	16	18	28	25	23	23	25	25	19	13	22
Pertussis	N	1 334	1 068	585	3 485	2 719	1 120	332	417	1 398	872	1 996	5 902
Rheumatic fever - initial attack	N	114	87	148	75	76	104	135	140	125	153	152	164
Rubella	N	30	33	26	23	13	8	11	9	4	4	22	4
Salmonellosis	N	2417	1880	1401	1081	1382	1335	1275	1339	1128	1146	1055	1085
Shigellosis	N	157	112	87	140	183	102	129	113	119	104	101	132
Tetanus	N	4	1	2	1	1	1	1	0	1	7	0	2
Tuberculosis disease	N	369	380	422	373	330	350	282	293	298	304	309	297
Typhoid fever	N	27	23	20	31	30	42	48	29	34	31	45	45
VTEC/STEC infection	N	76	73	104	89	92	87	100	124	143	138	153	147
Yersiniosis	N	429	472	436	407	383	453	502	508	430	406	514	517

[a] Source: Notification (N), Laboratory (L), Sentinel isolates (S).

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

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

Selected *Salmonella* serotypes and phage types, 2008–2012 (Enteric Reference Laboratory, ESR)

Table 52. Number of laboratory-reported cases of salmonellosis for selected *Salmonella* serotypes and phage types, 2008–2012

Serotype[a]	2008	2009	2010	2011	2012
S. Typhimurium	**729**	**661**	**594**	**495**	**459**
1	72	94	36	54	35
12a	28	28	35	28	26
101	72	56	70	50	26
160	135	106	107	66	58
135	27	20	48	47	44
156	67	54	35	29	21
RDNC[b]-May 06	55	43	85	73	73
Other or unknown	301	288	213	176	176
S. Enteritidis	**124**	**95**	**113**	**134**	**125**
1b	19	4	5	8	9
11[c]	45	39	49	56	52
Other or unknown	60	52	59	70	64
Other serotypes	**486**	**366**	**437**	**410**	**460**
S. Agona	10	10	12	20	11
S. Brandenburg	33	36	47	34	34
S. Infantis	86	71	54	65	52
S. Mississippi	10	14	9	13	12
S. Montevideo	0	9	13	1	26
S. Saintpaul	35	26	34	31	27
S. Stanley	10	9	28	28	22
S. Virchow	14	12	16	18	17
S. Weltevreden	8	10	23	16	24
S. enterica (I) ser. 4,[5],12 : i : -	-	8	21	21	38
Other or unknown	288	188	224	201	197
Total	**1 339**	**1 122**	**1 144**	**1 039**	**1 044**

[a] Excludes *S.* Paratyphi and *S.* Typhi.
[b] RDNC reacts but does not conform to a known phage-type pattern.
[c] Prior to 2012, *S.* Enteritidis phage type 11 was known as a 9a.

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ACRONYMS AND ABBREVIATIONS

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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	Diphtheria, tetanus, acellular pertussis and inactivated polio 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
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
VRE	Vancomycin-resistant enterococci
VTEC	Verotoxin-producing *Escherichia coli*
WHO	World Health Organization