ESR

SURVEILLANCE REPORT

Notifiable and other diseases in New Zealand

2011

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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.

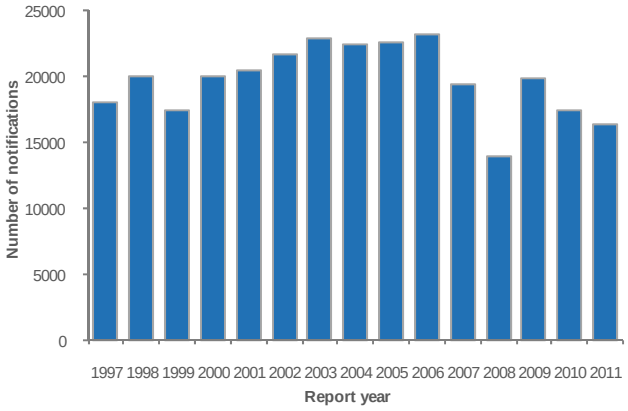
Notifiable diseases

In 2011, 16 294 cases of notifiable disease were reported through EpiSurv (Figure 1). This was the second consecutive year in which the total number of notifications has decreased (notifications were 19 803 and 17 294 in 2009 and 2010, respectively). The total number of disease notifications in 2011 is the second lowest in the last 15 years (after 2008 with 13 933 cases).

Between 2010 and 2011, there were some significant changes in the numbers of cases reported for individual diseases. There were statistically significant increases in reported cases of measles (48 to 597, 1144%), pertussis (872 to 1998, 129%), acute gastroenteritis (491 to 630, 28%), and yersiniosis (406 to 514, 27%).

Between 2010 and 2011, statistically significant decreases occurred in reported cases of hepatitis A (46 to 26, -43%), cryptosporidiosis (954 to 610, -36%), campylobacteriosis (7346 to 6692, -9%), and salmonellosis (1146 to 1056, -8%).

Figure 1. Total disease notifications by year, 1997–2011



Enteric diseases

Enteric diseases continued to comprise the majority (more than 70%) of notifications in 2011. Campylobacteriosis contributed 41% of all notifications in 2011 (6692 cases) despite the significant decrease in the notification rate of campylobacteriosis in 2010 and 2011. Campylobacteriosis notifications have more than halved since the peak of 15 873 cases in 2006. Several other enteric diseases including cryptosporidiosis, hepatitis A and salmonellosis, also showed significant decreases in notifications between 2010 and 2011. In contrast, there were significant increases in the notification rates of acute gastroenteritis and yersiniosis between 2010 and 2011. Enteric diseases continue to show seasonal variations in notifications, in particular campylobacteriosis (summer peak), cryptosporidiosis (spring peak), salmonellosis (peak varies with serotype), and verotoxin- or Shiga toxin- producing *Escherichia coli* infection (VTEC/STEC infection) (autumn and spring peaks).

Vaccine preventable diseases

Three vaccine preventable diseases contributed notably to the total notification counts in 2011: pertussis, measles and invasive pneumococcal disease (IPD). At 1998 cases, pertussis was the second most commonly reported notifiable disease in 2011 after campylobacteriosis. Although there was a significant increase in the pertussis notification rate from 2010 to 2011 (20.0 to 45.4 per 100 000 population), the 2011 rate was well below that seen in previous pertussis epidemics (107.6, 85.3 and 65.8 per 100 000, for the 2000, 2004 and 2005 epidemic years, respectively).

A total of 597 measles cases were notified in 2011. This was a significant increase compared with the number of cases reported in 2010 (48), and the largest annual count since the last measles epidemic, which peaked in 1997 with 1984 cases.

In 2011, 552 cases of IPD were notified. The 2011 notification rate (12.5 per 100 000) was similar to the 2010 rate (12.2 per 100 000, 535 cases), but was a significant decrease compared with the 2009 rate (16.1 per 100 000, 697 cases). IPD was made notifiable following the introduction of the 7-valent pneumococcal conjugate vaccine on 17 October 2008.

Exotic diseases

All cases of arboviral disease, leprosy, Q fever and taeniasis notified in 2011 had overseas exposures that accounted for their infection. Among the five cases of murine typhus notified in 2011, three acquired their infection locally with the remaining two becoming infected overseas. There was no evidence of any recent locally-acquired hydatid disease.

Influenza

The average weekly influenza consultation rate during May to October 2011 was 37.1 per 100 000 patient population. This consultation rate was lower than the 2010 rate (49.3 per 100 000) and the lowest rate since 2000 (32.5 per 100 000). The peak weekly consultation rate of 66.1 per 100 000 patient population which occurred at the end of July, was lower than the peaks in 2009 and 2010 (284.0 and 151.6 per 100 000, respectively).

Of the 1268 viruses identified in 2011, 276 viruses were influenza B/Victoria lineage viruses. Influenza A(H3N2) viruses were the next most commonly identified viruses (36.8%, 466 viruses), followed by influenza A(H1N1)pdm09 viruses (9.3%, 118 viruses).

No cases of non-seasonal influenza were notified in New Zealand in 2011 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 2011, *Chlamydia trachomatis* infection was again the most commonly diagnosed sexually transmitted infection (STI) in New Zealand, and the population rate was over five-times that of the most commonly reported notifiable disease, campylobacteriosis. From the 15 District Health Boards (DHBs) participating in laboratory-based surveillance in 2011, the rate of chlamydia infection was 7.9 cases of chlamydia per 1000 population. The highest rate of chlamydia infection was in Tairawhiti DHB (15.1 per 1000 population), followed by Lakes (12.6 per 1000 population) and Hawke's Bay (10.1 per 1000 population) DHBs. Based on data from 12 DHBs, there has been no change (7.8 per 1000 population) in the chlamydia restricted national rate between 2008 and 2011.

From the 17 DHBs participating in laboratory-based surveillance in 2011, the rate of gonorrhoea infection was 67 cases per 100 000 population. The highest rate of gonorrhoea was in Tairawhiti DHB (356 per 100 000 population), followed by Hawke's Bay DHB (90 per 100 000 population). Based on data from 15 DHBs, there was a decrease of 11% (from 75.1 to 66.6 per 100 000) in the gonorrhoea national rate between 2008 and 2011.

Between 2010 and 2011, genital warts case counts decreased across all three clinic types: by 11% in sexual health clinics (SHCs) (2772 to 2469 cases), by 9% in family planning clinics (FPCs) (302 to 276 cases) and by 12% in student and youth health clinics (SYHCs) (182 to 160 cases).

The number of syphilis cases reported by SHCs decreased for the second consecutive year with 82 cases reported in 2011. In addition, FPCs reported one case of syphilis in 2011.

In 2011, 24 cases of acquired immune deficiency syndrome (AIDS) were notified. The 2011 notification rate (0.5 per 100 000) was lower than the 2010 rate (0.9 per 100 000, 28 cases).

Outbreaks

In 2011, 580 outbreaks were reported involving 7893 cases. This represented a decrease in the number of outbreaks but an increase in the number of cases associated with outbreaks compared with 2010 (606 outbreaks with 6321 cases).

The most common pathogen implicated was norovirus (181 outbreaks, 4013 cases), followed by *Giardia* spp. (72 outbreaks, 242 cases).

Outbreaks reported in 2011 were most commonly associated with private homes (152 outbreaks, 803 cases), followed by long-term care facilities (131 outbreaks, 3089 cases).

Antibiotic resistance

The complete analysed dataset for antibiotic resistance is only available up until the end of 2010.

The prevalence of methicillin and mupirocin resistance among *Staphylococcus aureus* has remained stable at 7–9% and 10–13% since 2000 and 2006, respectively. There was a high prevalence of fusidic acid resistance among *S. aureus* in 2010, particularly among methicillin-resistant *S. aureus* (MRSA) and a decrease in fluoroquinolone resistance among MRSA.

There was a continuing high prevalence of penicillin non-susceptibility among *Streptococcus pneumoniae.* However, a significant decline was reported in cefotaxime non-susceptibility among invasive pneumococci from 2009 to 2010 compared with 2006 to 2008.

In 2010, stable levels of trimethoprim and co-amoxiclav resistance were reported among urinary *Escherichia coli*, together with continuing low levels of nitrofurantoin resistance. Fluoroquinolone resistance in urinary *E.coli* was at 6.9% for the 2009–2010 period. This was a significant increase from the 2006–2008 period (4.5%).

An increasing prevalence of extended-spectrum β-lactamases in Enterobacteriaceae was observed, with a prevalence of 13.8% among bacteraemic *Klebsiella* in 2010.

Several classes of β-lactamases that inactivate carbapenems have emerged among *Pseudomonas* and Enterobacteriaceae.

Multidrug-resistant tuberculosis (MDR-TB) remains rare in New Zealand with four cases in 2010 (1.6% of culture-positive cases). One of the MDR-TB cases was extensively drug resistant (XDR-TB), the first such case identified in New Zealand.

INTRODUCTION

INTRODUCTION

This report provides a summary of diseases currently notifiable under the Health Act 1956 and the Tuberculosis Act 1948. Other 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 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]:

- to identify cases of disease that require immediate public health control measures
- to monitor disease incidence and distribution, and alert health workers to changes in disease activity in their area
- to identify outbreaks and support their effective management
- to assess disease impact 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 methods section of this report.

The focus of this report is on diseases reported in 2011 and where data are available, the trend since 1997, with the aim of informing prevention and control measures.

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

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 locale 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 (eg, 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 cost of healthcare may also determine whether cases present to health care services for diagnosis [5].

The extent to which the data reflect the true incidence of the disease is affected by public awareness of the disease, access to health services, use of diagnostic facilities, case definitions (eg, broad case definitions for viral communicable diseases), and the interest, resources and priorities of local health care services.

The numbers of cases and population rates reported for different ethnic groups are presented in this report. 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 small size of the New Zealand population and 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. See the Analytical Methods section for more information about population rate calculations for diseases.

Data sources

The key sources of data used in this report are:

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. From 21 December 2007, laboratories are also 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 onto a computerised database (EpiSurv). The 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 on each disease depends on the specific disease, but usually include demography, outcome, basis of diagnosis, risk factors and some clinical management information. Some of the diseases for example, measles and yersiniosis, only became notifiable with the revised schedule of notifiable diseases, which came into effect on 1 June 1996 [3].

This report includes sections on all of 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 Communicable Disease Control Manual [6]. Case definitions for diseases that have been added to the notification schedule after 1998 can be found on the Ministry of Health website, www.moh.govt.nz.

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

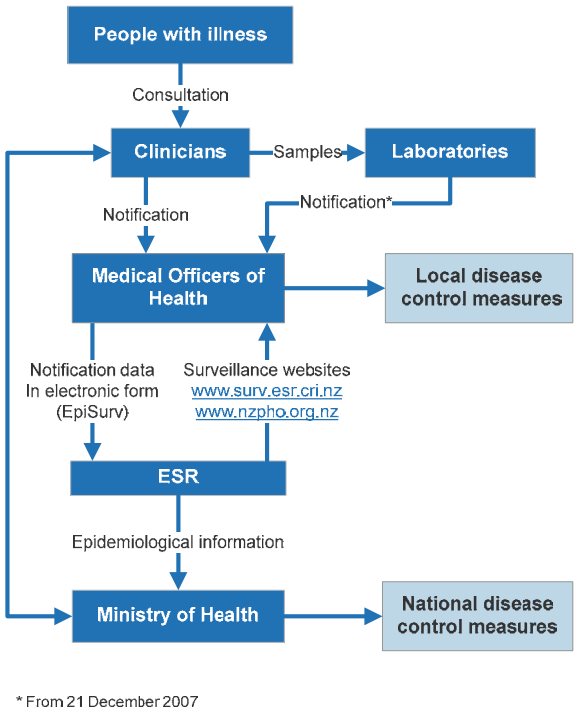
Laboratory-based surveillance

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 eg, influenza and sexually transmitted infections.

Also, laboratory-based surveillance sometimes takes place to enhance surveillance data gathered by other methods. Organisms covered by laboratory-based surveillance include antimicrobial-resistant organisms, legionellae, *Leptospira*, meningococci, respiratory syncytial virus, enteroviruses, adenoviruses, salmonellae and streptococci.

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

Figure 2. Notifiable disease surveillance system



* From 21 December 2007

Statistics New Zealand

Data used to calculate rates of disease is supplied by Statistics New Zealand. See the Analytical Methods section for further details.

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). Cases are assigned disease codes using the 10th revision of the International Classification of Diseases (ICD10) coding system [7]. 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 led to admission. This may be different from the underlying diagnosis that caused the admission.

The Ministry of Health also maintains a Mortality Collection, which holds a classification for the underlying cause for all deaths registered in New Zealand. Mortality data is only available up to 2009 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 includes repeated admissions for patients with chronic notifiable diseases, for example, tuberculosis, or for diseases which have long-term health impacts, for example, 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

ESR introduced an outbreak surveillance system in July 1996 and has been systematically refining this system since then [8]. 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 [9]. In 2011, this was based on a network of 88 general practices/practitioners from all DHBs in New Zealand and operated from May to October (to cover the Rugby World Cup event held in New Zealand during September and October 2011). The number of practices is approximately proportional to the size of the population in each DHB. Participating general practitioners are asked to record the number of consultations for influenza-like illness (ILI) (using a standardised case definition) each week and 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 immune deficiency syndrome (AIDS), the late sequelae of human immunodeficiency virus infection and hepatitis B, sexually transmitted infections are not notifiable in New Zealand. Therefore surveillance efforts rely upon clinics and laboratories voluntarily providing data. Data on STIs of public health importance (chlamydia, gonorrhoea, genital herpes, genital warts, syphilis and non-specific urethritis (NSU)) are submitted from sexual health clinics (SHCs), family planning clinics (FPCs) and student and youth health clinics (SYHCs). This information is supplemented by data on chlamydia and gonorrhoea from 40 diagnostic laboratories in 18 DHBs throughout New Zealand.

For laboratory data, the denominator is estimated from the Statistics New Zealand mid-year population estimates for territorial authorities in New Zealand. Reporting of a clinic visit rate, using the total number of clinic visits as the denominator, has been discontinued following consultation with stakeholders. For clinics, the total number of cases seen is reported.

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. The numbers of chlamydia and gonorrhoea cases reported by laboratories are approximately three-times higher than the number of cases reported by the clinics from the DHBs that participated in laboratory surveillance.

Antibiotic Reference Laboratory at ESR

The Antibiotic Reference Laboratory at ESR is responsible for the national surveillance of antimicrobial resistance among human pathogens. Data from various surveillance systems and sources are used to compile national antimicrobial resistance data. These sources include routine diagnostic susceptibility testing in hospital and community laboratories, bacterial isolates referred to ESR for further investigation (eg, epidemiological typing), and periodic point-prevalence surveys of antimicrobial susceptibility 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 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. Although CJD is notifiable to medical officers of health, in practice notification occurs directly from hospital clinicians to the Registry (personal communication, M Pollock, CJD Registry, 2005).

New Zealand Paediatric Surveillance Unit

The New Zealand Paediatric Surveillance Unit (NZPSU) [10] was established in 1997 to provide active surveillance of acute flaccid paralysis (AFP) to fulfil World Health Organization (WHO) requirements for the certification of polio eradication. Along with AFP, the conditions currently under surveillance 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 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 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 21 February 2012. 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 2010 has been updated to reflect those in EpiSurv as at 21 February 2012.

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 these are available and for PHUs where the data cannot be presented by DHB.

The DHB populations used are shown 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, 2011

DHB	Code	Population
Northland	NL	158 150
Waitemata	WM	545 800
Auckland	AK	456 600
Counties Manukau	CM	499 900
Waikato	WK	367 723
Lakes	LS	103 000
Bay of Plenty	BP	211 890
Tairawhiti	TW	46 600
Taranaki	TK	109 860
Hawke's Bay	HB	155 790
Whanganui	WG	63 077
MidCentral	MC	168 346
Hutt Valley	HU	144 500
Capital and Coast	CC	294 654
Wairarapa	WR	40 580
Nelson Marlborough	NM	139 900
West Coast	WC	32 960
Canterbury	CB	502 660
South Canterbury	SC	56 380
Southern	ST	306 450
Total[a]		**4 405 080**

[a] Total does not equal sum of individual DHBs

Map classification scheme

On the maps, the darkest colour represents the highest rates and the lightest colour represents the lowest rates of disease. The speckled colour shows where there were 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. While 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 for the determination of disease rates for ethnic groups, has been derived from 2011 mid-year population estimates published by Statistics New Zealand. 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 2011 mid-year population estimates from Statistics New Zealand. Ethnicity is prioritised in the following order: Māori, Pacific Peoples, Asian, MELAA, European or Other Ethnicity (including New Zealander).

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.

Risk factors and source 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. The risk factor questions on the EpiSurv case report forms are those that are currently known for that disease. 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. P-values less than 0.05 are considered to be significant at the 95% level of confidence.

LIMITATIONS OF SURVEILLANCE DATA

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Quality

Each year a report is prepared on the quality of selected EpiSurv fields to assist in the monitoring of a quality assurance programme. The latest report was published in 2011 [11].

Sensitivity

Sensitivity was assessed in 2003 using reporting on meningococcal disease [12]. This showed that the sensitivity of meningococcal disease surveillance is probably in excess of 87%.

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%) [13].

The sensitivity of surveillance for other diseases will often be less than that of meningococcal disease and pertussis, particularly for common enteric diseases where only a small proportion of those infected present to health care services. An acute gastrointestinal illness study conducted during 2005–2007 estimated that only 0.4% of community cases result in a notification [14]. Due to long latency periods, the system is less sensitive for the surveillance of conditions resulting from longer-term environmental exposure.

Completeness

The completeness of data recorded in EpiSurv varies among diseases. Table 2 shows the percentage of notifications for which complete data was provided for selected key EpiSurv variables each year from 1999 to 2011.

The completeness of date of birth, age and sex data is generally very high (>98%), with little variation over the last five years. In 2011, the completeness of date of birth, age and sex data remained high (≥99.0%). The completeness of ethnicity data in 2011 (94.9%) was higher than in 2010 (91.5%).

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 EpiSurv records (>90% over the last three years) now have 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 year and EpiSurv variable, 1999–2011

Report year	Completeness of data (%)				
	Date of birth	Age	Sex	Ethnicity	NHI
1999	94.6	99.4	98.9	82.8	7.6
2000	96.7	99.5	98.3	81.4	8.2
2001	98.3	99.1	98.2	80.7	17.1
2002	98.6	99.3	98.2	76.5	20.2
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

Accuracy

Reliable population denominator data is available, except in the case of STIs and ethnic group populations. For STIs, the population has been estimated based on the location of the laboratory that collects the samples for testing. Population data for ethnic groups has been estimated by applying the proportion of people in each ethnic group from the estimated resident 2006 census population to the 2011 mid year population estimates. This may not accurately reflect the distribution of ethnic groups in the population but is the best estimate available until the next census is completed.

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

Timeliness

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

Of the notifications with an onset date recorded (63.0% of notifications) in 2011, 44.8% were reported to a public health service (PHS) within one week of the onset of symptoms and 74.8% were reported within two weeks of the onset of symptoms.

In 2011, 98.8% of disease notifications were entered into EpiSurv within one week of being reported to the PHS and 99.5% were entered within two weeks of being reported to the PHS.

NOTIFIABLE DISEASES

NOTIFIABLE DISEASES

Acquired immune deficiency syndrome

Acquired Immune Deficiency 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 which is reported here. More detailed information is available from the AEG website http://dnmeds.otago.ac.nz/departments/psm/research/aids/newsletters.html

In 2011, 24 cases of AIDS were reported to the AEG compared with 39 cases in 2010. The 2011 AIDS notification rate (0.5 per 100 000) was lower than the 2010 rate (0.9 per 100 000).

Thirteen cases (54.2%) were men infected through sex with other men, nine (37.5%) were infected through heterosexual contact (6 men and 3 women), one was infected through injecting drug use overseas, and the mode of infection was unknown for one case.

The 2011 cases were distributed by ethnic group as follows: European or Other (12 cases), Māori (5 cases), Asian (3 cases), Pacific Peoples, and Middle Eastern/Latin American/African (MELAA) (2 cases each). The cases ranged from 25 to 64 years of age with a mean age of 42.9 years.

One death due to AIDS was reported to the AEG as having occurred in 2011. However, the number of deaths is likely to increase due to late notifications.

Anthrax

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 [15].

Arboviral diseases

This section includes arboviral diseases with cases notified since 1997. See individual disease sections for dengue fever and yellow fever.

Barmah Forest virus

No cases of Barmah Forest virus infection were notified in 2011. 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.

Chikungunya fever

One laboratory-confirmed case of Chikungunya fever was notified in 2011. The case was a male in the 60–69 years age group who had travelled to Indonesia during the incubation period of the disease. Three additional cases of Chikungunya fever have been notified since 1997, one case each year in 2007, 2008 and 2009.

Japanese encephalitis

No cases of Japanese encephalitis were notified in 2011. The only case that has been notified since 1997 was a laboratory-confirmed case in 2004. The case was a female in the 40–49 years age group who was thought to have acquired the infection in China.

Ross River virus

Three laboratory-confirmed cases of Ross River virus infection were notified in 2011. Of the three cases, two were female and one was male. The cases were aged 40–69 years and all were in the European or Other ethnic group. All of the cases had travelled overseas during the incubation period of the disease, two to Australia and the other to Norfolk Island (with a prior history of travel to Australia).

Botulism

There have been no cases of botulism in humans notified in New Zealand since two cases were reported in 1985 [16].

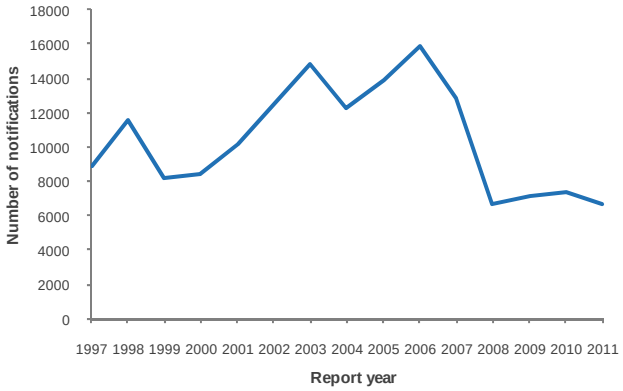
Brucellosis

No cases of brucellosis were notified in New Zealand in 2011. 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 in cattle in New Zealand in 1998.

Campylobacteriosis

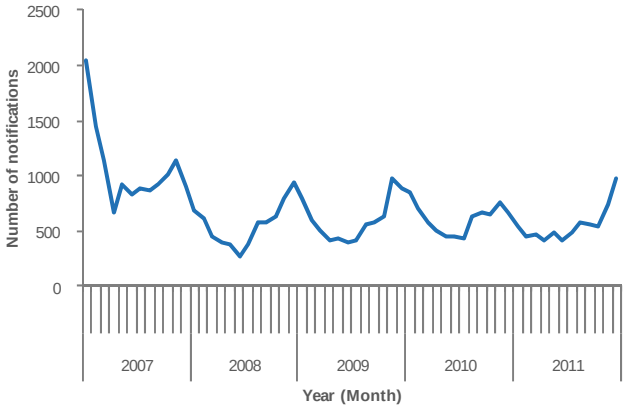
There were 6692 cases of campylobacteriosis notified in 2011. The 2011 rate of 151.9 per 100 000 population was a significant decrease from the 2010 rate of 168.2 per 100 000 (7346 cases). Since 2006, there has been a significant decrease in the number of cases reported compared with the preceding decade (Figure 3). Campylobacteriosis continues to be the most commonly notified disease comprising 41.1% of all notifications in 2011.

Figure 3. Campylobacteriosis notifications by year, 1997–2011



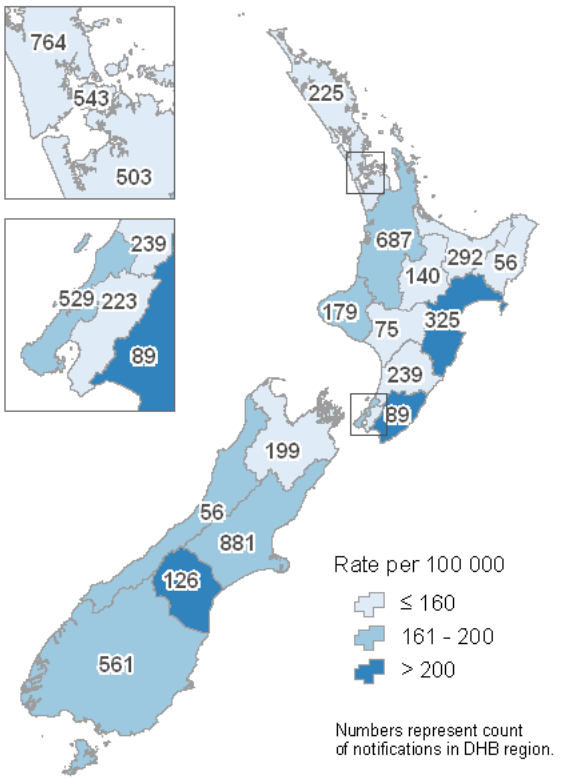
The notification pattern in 2011 was similar to previous years, highly seasonal with a summer peak and a winter trough (Figure 4). The lowest monthly campylobacteriosis total was in April 2011 (411 notifications) and the highest monthly total was in December 2011 (973 notifications).

Figure 4. Campylobacteriosis notifications by month, January 2007–December 2011



Campylobacteriosis rates varied throughout the country as demonstrated in Figure 5. The highest rates were in South Canterbury (223.5 per 100 000 population, 126 cases), Wairarapa (219.3 per 100 000, 89 cases) and Hawke's Bay (208.6 per 100 000, 325 cases) DHBs. The lowest rates were in Counties Manukau (100.6 per 100 000, 503 cases), Auckland (118.9 per 100 000, 543 cases), and Whanganui (118.9 per 100 000, 75 cases) DHBs.

Figure 5. Campylobacteriosis notifications by DHB, 2011



Age was recorded for 6680 (99.8%) cases. The highest age-specific rate was in the 1–4 years age group (289.4 per 100 000 population, 729 cases), followed by those aged less than 1 year (248.5 per 100 000, 155 cases).

Sex was recorded for 6624 (99.0%) cases. Similar to previous years, the sex-specific notification rate was higher for males (173.2 per 100 000 population, 3748 cases) compared with females (128.4 per 100 000, 2876 cases).

Ethnicity was recorded for 6280 (93.8%) cases. The highest disease notification rate was in the European or Other ethnic group (175.5 per 100 000 population, 5350 cases), followed by the MELAA (98.2 per 100 000, 37 cases) and Māori (71.9 per 100 000, 465 cases) ethnic groups. The lowest rates were in the Pacific Peoples (52.2 per 100 000, 139 cases) and Asian (71.1 per 100 000, 289 cases) ethnic groups.

Hospitalisation status was recorded for 3759 (56.2%) cases, of which 397 (10.6%) cases were hospitalised.

The risk factors recorded for campylobacteriosis are shown in Table 3.

In 2011, 28 outbreaks of campylobacteriosis (including one outbreak with more than one implicated pathogen) were reported involving 114 cases.

Table 3. Exposure to risk factors associated with campylobacteriosis, 2011

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Consumed food from retail premises	1 013	1 392	4 287	42.1
Contact with farm animals	933	1 628	4 131	36.4
Consumed untreated water	483	1 764	4 445	21.5
Contact with faecal matter	396	2 006	4 290	16.5
Contact with other symptomatic people	297	2 163	4 232	12.1
Recreational water contact	284	2 130	4 278	11.8
Travelled overseas during the incubation period	211	2 690	3 791	7.3
Contact with sick animals	125	2 109	4 458	5.6

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

Chemical poisoning from the environment

At present, only poisonings arising from chemical contamination of the environment are required to be notified under the Health Act 1956.

In 2011, three cases of chemical poisoning from contamination of the environment were notified, compared with an annual average of 3.3 cases reported in the past three years.

A female in the 40–49 years age group from Auckland DHB had felt unwell with a headache for two days before presenting at the emergency department. The case reported engaging in welding activities without a mask for several days prior to the onset of symptoms.

A female in the 20–29 years age group from Bay of Plenty DHB presented with headache and nausea and complained of a strong oil smell in her house following the oil spill that washed up on Mount Maunganui beach from a grounded cargo ship.

A male in the 60–69 years age group was reported with laboratory-confirmed mercury poisoning due to unusually high consumption of particular types of fish known to accumulate mercury.

Cholera

No cases of cholera were notified in New Zealand in 2011. Since 1997, a total of 12 laboratory-confirmed cases of cholera have been notified, all were overseas-acquired.

Creutzfeldt-Jakob disease

This section is based on the 15th annual report of the Creutzfeldt-Jakob Disease (CJD) Registry [17].

In 2011, six cases of possible CJD were referred to the Registry. Of these, one received an alternative diagnosis, and one had previously been referred to the Registry in 2008.

The remaining four cases were classified as probable sporadic CJD based on clinical, cerebrospinal fluid, electroencephalogram and/or magnetic resonance imaging findings. Post mortem examination findings are awaited for three cases. The age distribution of these probable cases was 50–59 years (1 case), 70–79 years (2 cases) and 80–89 years (1 case). Two of the cases were male and two were female.

Since 1997, 56 cases (16 definite and 40 probable) of CJD have been documented by the Registry. No cases of variant CJD, the form linked with bovine spongiform encephalopathy, have ever been identified in New Zealand.

Cryptosporidiosis

During 2011, 610 cases of cryptosporidiosis were notified (13.8 per 100 000 population), which was a significant decrease from the number of cases notified in 2010 (21.8 per 100 000, 954 cases) (Figure 6).

Figure 6. Cryptosporidiosis notifications by year, 1997–2011

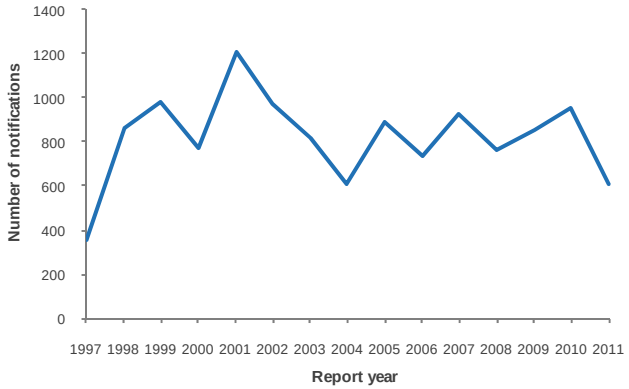
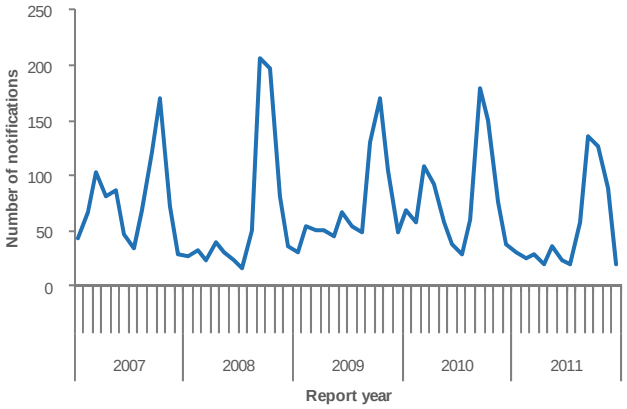


Figure 7 shows cryptosporidiosis cases by month since 2007. There is a distinct seasonal pattern with the highest number of notifications reported during spring each year and an additional smaller peak in autumn in 2007 and 2010.

Figure 7. Cryptosporidiosis notifications by month, January 2007–December 2011



Cryptosporidiosis notification rates varied throughout the country as illustrated in Figure 8. The highest rates were in South Canterbury (51.4 per 100 000 population, 29 cases) and Waikato (38.3 per 100 000, 141 cases) DHBs. The lowest rate was in Auckland DHB (6.6 per 100 000, 30 cases).

Age was recorded for 608 (99.7%) of the cases reported. Of these, 337 cases (55.4%) were children aged less than 15 years. The highest age-specific rate was in the 1–4 years age group (74.6 per 100 000 population, 188 cases), followed by the 5–9 years age group (27.2 per 100 000, 78 cases). The lowest rate was in the 70 years and over age group (1.2 per 100 000, 5 cases).

Sex was recorded for 605 (99.2%) of the cases reported. Sex-specific notification rates for cryptosporidiosis were higher for females (14.1 per 100 000 population, 315 cases) than males (13.4 per 100 000, 290 cases).

Of the 593 (97.2%) cases where ethnicity was recorded, the highest notification rate was in the European or Other ethnic group (16.7 per 100 000 population, 509 cases), followed by the Māori (9.1 per 100 000, 59 cases) and Asian (4.2 per 100 000, 17 cases) ethnic groups.

Hospitalisation status was recorded for 455 cases (74.6%), of which 27 (5.9%) cases were hospitalised. The risk factors for cryptosporidiosis are shown in Table 4. Similar to previous years, contact with farm animals was the most common risk factor associated with cryptosporidiosis cases in 2011.

In 2011, 29 outbreaks of cryptosporidiosis were reported, involving 103 cases.

Figure 8. Cryptosporidiosis notifications by DHB, 2011

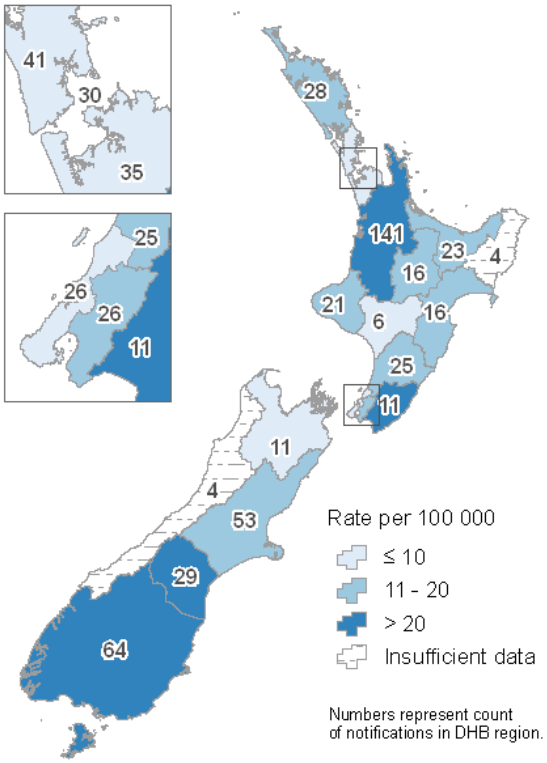


Table 4. Exposure to risk factors associated with cryptosporidiosis, 2011

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Contact with farm animals	278	134	198	67.5
Consumed untreated water	163	189	258	46.3
Contact with faecal matter	134	228	248	37.0
Consumed food from retail premises	118	240	252	33.0
Contact with sick animals	81	245	284	24.8
Recreational water contact	89	295	226	23.2
Contact with other symptomatic people	80	288	242	21.7
Travelled overseas during the incubation period	32	383	195	7.7

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

Cysticercosis

No cases of cysticercosis were notified in New Zealand in 2011. Since 1997, five cysticercosis cases have been reported, three cases in 2005 and two cases in 2007. Ministry of Health hospitalisation data for 2011 recorded no hospitalisations with cysticercosis as the primary reason for admission.

Decompression sickness

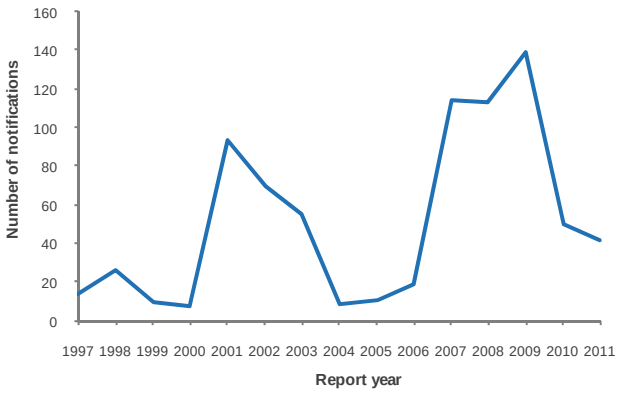
There were no cases of decompression sickness notified in 2011. Over the last 10 years, only 11 cases of decompression sickness have been notified.

Ministry of Health hospitalisation data for 2011 recorded 33 hospitalisations with decompression sickness as the primary reason for admission. Over the last five years the number of hospitalisations has ranged from 12 in 2007 and 2008, to 33 in 2011. The number of hospitalisations recorded has consistently exceeded the number of notifications reported each year, indicating continued under-reporting of this condition.

Dengue fever

In 2011, 42 cases of dengue fever were notified, compared with 50 cases in 2010 (Figure 9). The 2011 notification rate (1.0 per 100 000 population) was similar to the 2010 rate (1.1 per 100 000).

Figure 9. Dengue fever notifications by year, 1997–2011



Age and sex were recorded for all the reported dengue fever cases. The highest age-specific rate was in the 30–39 years age group (2.0 per 100 000 population, 11 cases), followed by the 60–69 years age group (1.4 per 100 000, 6 cases) and 50–59 years (1.3 per 100 000, 7 cases) age groups.

The notification rate was similar in males (1.0 per 100 000 population, 22 cases) and females (0.9 per 100 000, 20 cases).

Ethnicity was recorded for 34 (81.0%) cases. The highest notification rate was in the Asian ethnic group (2.2 per 100 000 population, 9 cases), followed by the European or Other ethnic group (0.7 per 100 000, 20 cases).

Of the 30 (71.4%) cases for which hospitalisation status was recorded, 12 (40.0%) were hospitalised. All 42 notified cases were laboratory-confirmed.

Travel history was recorded for all of the reported cases. Forty-one cases had travelled overseas during the incubation period of the disease and the remaining case had a prior history of overseas travel. The countries commonly visited by cases were Thailand (16.7%, 7 cases), Indonesia (16.7%, 7 cases) and Malaysia (16.7%, 7 cases). Note that cases may have travelled to more than one country.

Seventeen cases (40.5%) undertook some protective measures, for example, the use of insect repellent, bed nets, protective clothing and staying in screened or air conditioned accommodation. No information on protective measures was recorded for 24 cases (57.1%).

Ministry of Health hospitalisation data for 2011 recorded 15 hospitalisations where dengue fever (classical) was the principal diagnosis on admission.

Diphtheria

No cases of toxigenic respiratory diphtheria were notified in New Zealand in 2011. The last toxigenic respiratory diptheria case in New Zealand was reported in 1998 [18].

In 2011, 14 cultures of *Corynebacterium diphtheriae* were received by the Special Bacteriology Laboratory at ESR (21 in 2010, 32 in 2009, and 53 in 2008) for toxigenicity testing, typing and surveillance purposes. The majority (11 cultures, 78.6%) were from cutaneous sources, while three cultures were from blood. The patients ranged in age from 8 to 72 years.

All of the isolates were determined to be non-toxigenic by PCR examination for the toxin gene. Ten (71.4%) of the isolates were biovar *gravis* including all of those from blood, and four (28.6%) were biovar *mitis*.

Enterobacter sakazakii invasive disease

Enterobacter sakazakii invasive disease became notifiable in New Zealand on 21 July 2005. This followed a recommendation from an investigation into the death of a premature infant in a neonatal unit in 2004 who had been receiving powdered infant formula [19]. No cases of *E. sakazakii* invasive disease were notified in 2011. Three cases have been notified since 2005, one case in 2005 and two cases in 2010.

Gastroenteritis (acute)

Gastroenteritis comprises a variety of communicable diseases and infections. Infections caused by norovirus, rotavirus, sapovirus, *Vibrio parahaemolyticus* and histamine (scromboid) poisoning are included in this section (Table 5). Diseases and conditions that are notifiable in their own right (eg, campylobacteriosis, giardiasis and salmonellosis) are reported separately.

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

In 2011, 630 cases of acute gastroenteritis (14.3 per 100 000 population) were notified. This was a significant increase from 2010 (11.2 per 100 000, 491 cases). A casual agent was reported for 186 cases (29.5%). Of these, the most common pathogens recorded were rotavirus (48.4%, 90 cases) and norovirus (38.7%, 72 cases). The breakdown of cases where a causal agent was identified is presented in Table 5.

The highest acute gastroenteritis rate was in MidCentral DHB (58.2 per 100 000 population, 98 cases), followed by Capital and Coast (30.9 per 100 000, 91 cases), Hutt Valley (30.4 per 100 000, 44 cases) and Canterbury (23.7 per 100 000, 119 cases) DHBs.

Age was recorded for 605 (96.0%) cases. Age-specific rates were highest in the less than 1 year (40.1 per 100 000 population, 25 cases), 1–4 years (34.5 per 100 000, 87 cases) and 70 years and over (26.5 per 100 000, 108 cases) age groups.

Sex was recorded for 598 (94.9%) cases. Sex-specific rates were slightly higher for females (14.6 per 100 000 population, 328 cases) than males (12.5 per 100 000, 270 cases)

Ethnicity was recorded for 586 (93.0%) cases. Of these, the highest notification rates were in the European or Other (16.0 per 100 000 population, 488 cases), Pacific Peoples (7.9 per 100 000, 21 cases) and Māori (7.6 per 100 000, 49 cases) ethnic groups.

Hospitalisation status was recorded for 450 (71.4%) cases. Of these, 65 cases (14.4%) were hospitalised.

In 2011, 383 outbreaks of acute gastroenteritis were reported involving 6199 cases, of which 113 cases were included as individual case notifications.

The risk factors recorded for acute gastroenteritis cases are shown in Table 6. The most common risk factor associated with gastroenteritis was consumption of food from retail premises.

Table 5. Acute gastroenteritis cases where organism was identified, 2011

Organism	Cases	Percentage (%)
Rotavirus infection	90	48.4
Norovirus infection	72	38.7
Sapovirus infection	7	3.8
Clostridium perfringens	5	2.7
Staphylococcal food intoxication	3	1.6
Ciguatera fish poisoning	2	1.1
Clostridium difficile	2	1.1
Vibrio parahaemolyticus infection	2	1.1
Aeromonas species	1	0.5
Bacillus cereus food poisoning	1	0.5
Histamine (scromboid) poisoning	1	0.5
Total	**186**	**100.0**

Table 6. Exposure to risk factors associated with acute gastroenteritis, 2011

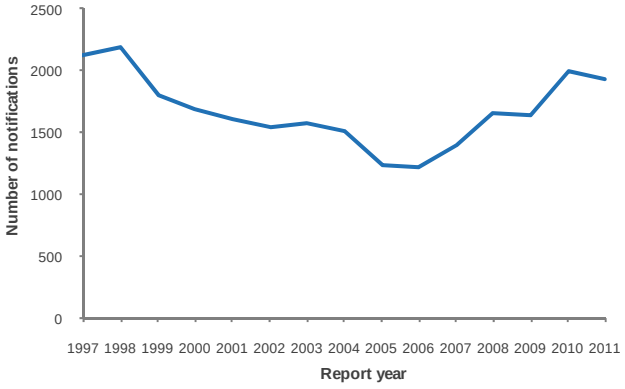
Risk factor	Yes	No	Unknown	Percentage (%) [a]
Consumed food from retail premises	268	60	302	81.7
Contact with other symptomatic people	99	264	267	27.3
Contact with faecal matter	38	243	349	13.5
Consumed untreated water	30	219	381	12.0
Contact with farm animals	23	278	329	7.6
Recreational water contact	9	283	338	3.1
Travelled overseas during the incubation period	6	303	321	1.9
Contact with sick animals	0	294	336	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. Cases may have more than one risk factor recorded.

Giardiasis

There were 1935 cases of giardiasis notified in 2011. The 2011 rate (43.9 per 100 000 population) was slightly lower than the rate observed in 2010 (45.4 per 100 000, 1985 cases). Figure 10 shows giardiasis notifications by year from 1997 to 2011.

Figure 10. Giardiasis notifications by year, 1997–2011



Rates varied throughout the country as illustrated in Figure 11. The highest rate was in Capital and Coast DHB (74.0 per 100 000 population, 218 cases), followed by South Canterbury (63.9 per 100 000, 36 cases) and Auckland (58.9 per 100 000, 269 cases) DHBs. The lowest rate was in Whanganui DHB (12.7 per 100 000, 8 cases).

Age was recorded for 1933 (99.9%) cases. Age-specific rates were highest in the 1–4 years age group (162.0 per 100 000 population, 408 cases), followed by the 30–39 years age group (78.7 per 100 000, 443 cases).

Of the 1917 (99.1%) cases where sex was recorded, sex-specific notification rates were similar for females (43.9 per 100 000 population, 984 cases) and males (43.1 per 100 000, 933 cases).

Ethnicity was recorded for 1789 (92.5%) giardiasis cases. Of these, the highest notification rate was in the MELAA ethnic group (87.6 per 100 000 population, 33 cases), followed by the European or Other (50.8 per 100 000, 1548 cases), Asian (18.7 per 100 000, 76 cases), Māori (17.0 per 100 000, 110 cases) and Pacific Peoples (8.3 per 100 000, 22 cases) ethnic groups.

Hospitalisation status was recorded for 1060 (54.8%) cases, of which 31 (2.9%) were hospitalised.

The risk factors recorded for giardiasis are shown in Table 7. The most commonly report risk factors were contact with faecal matter and contact with other symptomatic people.

There were 72 giardiasis outbreaks reported in 2011, involving 242 cases

Figure 11. Giardiasis notifications by DHB, 2011

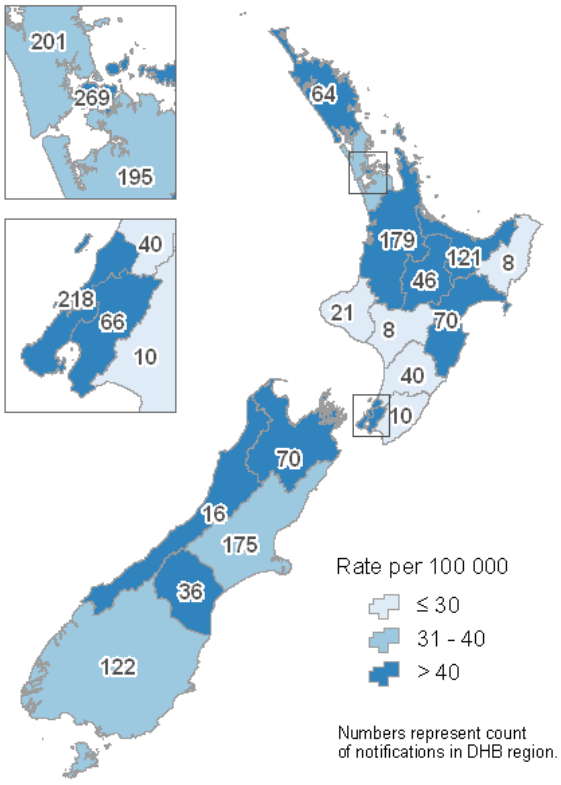


Table 7. Exposure to risk factors associated with giardiasis, 2011

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Contact with faecal matter	345	472	1 118	42.2
Contact with other symptomatic people	315	503	1 117	38.5
Consumed untreated water	240	495	1 200	32.7
Recreational water contact	262	556	1 117	32.0
Contact with farm animals	274	598	1 063	31.4
Consumed food from retail premises	209	526	1 200	28.4
Travelled overseas during the incubation period	170	785	980	17.8
Contact with sick animals	31	736	1 168	4.0

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

Haemophilus influenzae serotype b disease

Eight cases of *Haemophilus influenzae* serotype b (Hib) disease were notified in 2011, a rate of 0.2 per 100 000 population. All cases were laboratory-confirmed.

Three of the laboratory-confirmed cases in 2011 were aged less than 5 years (compared with five in 2010 and four in 2009). The cases were from Northland, Auckland and Capital and Coast DHBs (1 case each). Two were male and one was female. Cases were distributed by ethnic group as follows: Māori, Pacific Peoples and European or Other (1 case each).

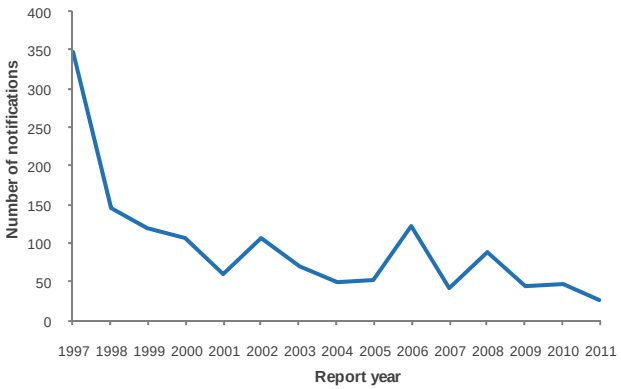
A Hib vaccine was introduced in January 1994. The current schedule introduced in 2008 recommends three doses of Hib vaccine at 6 weeks, 3 months and 5 months of age [20].

The vaccination history was recorded for all three cases aged less than 5 years. One of these cases was immunised with three doses. All three cases were hospitalised (one with meningitis, septicaemia, and pneumonia, one with septicaemia and pneumonia, and one with pneumonia).

Hepatitis A

In 2011, a total of 26 cases of hepatitis A were notified, compared with 46 notifications in 2010. Since a peak of notifications in 1997 (347 cases), there has been an overall downward trend in the number of hepatitis A notifications reported, although an increase in notifications (primarily due to outbreaks of disease) was observed in 2002, 2006 and 2008 (Figure 12).

Figure 12. Hepatitis A notifications by year, 1997–2011



The national hepatitis A notification rate for 2011 was 0.6 per 100 000 population, which was a significant decrease from the 2010 rate of 1.1 per 100 000 (46 cases). Auckland (8 cases) and Counties Manukau (5 cases) DHBs had the highest numbers of cases in 2011.

Age was recorded for all cases. The highest case counts occurred in the 5–9 years (6 cases), 20–29 years (6 cases) and 1–4 years (4 cases) age groups.

Sex was recorded for 25 (96.2%) cases. Of these, males (0.7 per 100 000 population, 16 cases) had a higher notification rate than females (0.4 per 100 000, 9 cases).

Ethnicity was recorded for 25 (96.2%) hepatitis A cases. The highest number of notifications was reported for those in the Asian ethnic group (12 cases), followed by the European or Other (6 cases), Pacific Peoples (3 cases), Māori and MELAA (2 cases each) ethnic groups.

Hospitalisation status was recorded for 25 (96.2%) cases. Of these, six cases (24.0%) were hospitalised.

Of the 24 cases with travel information recorded, 16 (66.7%) had travelled overseas during the incubation period of the disease. The countries most frequently visited by hepatitis A cases included India (9 cases), Samoa, United Arab Emirates and Thailand (2 cases each).

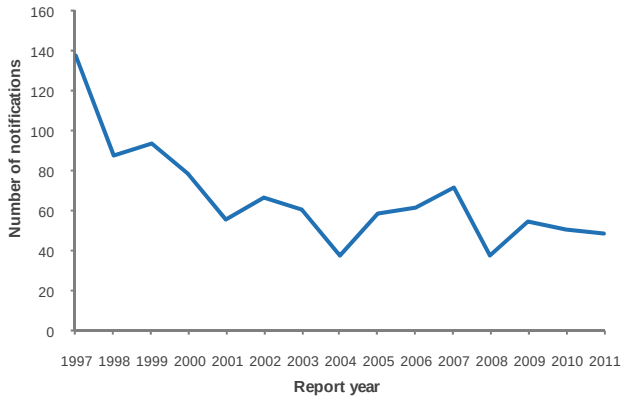
No outbreaks of hepatitis A were reported in 2011.

Hepatitis B

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

In 2011, 49 cases of hepatitis B were notified, compared with 51 cases in 2010 (Figure 13). There has been a general downward trend in the number of hepatitis B notifications reported between 1984 (over 600 cases) and 2004 (38 cases), with numbers of notifications fluctuating between 38 and 72 in recent years. The general decrease since 1984 is primarily attributed to the introduction of the hepatitis B vaccine to the immunisation schedule between 1985 and 1988 [20].

Figure 13. Hepatitis B notifications by year, 1997–2011



The national hepatitis B notification rate for 2011 was 1.1 per 100 000 population, which was similar to the 2010 rate of 1.2 per 100 000.

For the two-year period 2010–2011, the highest annualised rate in DHBs with five or more cases was in Tairawhiti (9.7 per 100 000, 9 cases), followed by Lakes (2.9 per 100 000, 6 cases) and Auckland (2.0 per 100 000, 18 cases) DHBs.

Age was recorded for all cases. In 2011, the age-specific rate was highest in the 20–29 years age group (2.4 per 100 000 population, 15 cases), followed by the 40–49 years age group (1.7 per 100 000, 11 cases).

Sex was recorded for all cases. The notification rate was higher for males (1.6 per 100 000 population, 34 cases) than females (0.7 per 100 000, 15 cases).

Ethnicity was recorded for 46 (93.9%) cases. The highest notification rate was in the Pacific Peoples ethnic group (2.6 per 100 000, 7 cases), followed by the Asian (1.7 per 100 000, 7 cases), Māori (1.5 per 100 000, 10 cases) and European or Other (0.7 per 100 000, 22 cases) ethnic groups.

Of the 41 (83.7%) cases where hospitalisation status was recorded, 15 (36.6%) were hospitalised.

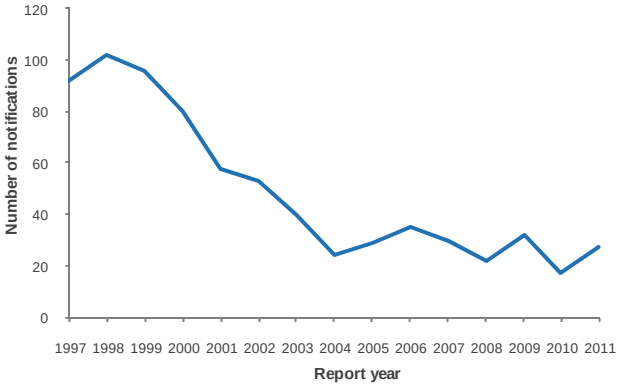
The most common risk factors associated with hepatitis B in 2011 were overseas travel during the incubation period (32.4%), sexual contact with a confirmed case or carrier (22.2%), and household contact with a confirmed case or carrier (10.3%) (Table 8).

Hepatitis C

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

In 2011, a total of 27 cases of hepatitis C were notified, compared with 17 cases notified in 2010. After a peak of 102 cases in 1998 there was a steady decline in notifications until 2004. Numbers of notifications have fluctuated in recent years between 17 and 35 cases per year (Figure 14).

Figure 14. Hepatitis C notifications by year, 1997–2011



The hepatitis C notification rate for 2011 was 0.6 per 100 000 population which was similar to 2010 (0.4 per 100 000). Southern (9 cases) and Canterbury (6 cases) DHBs had the highest numbers of cases reported in 2011.

Table 8. Exposure to risk factors associated with hepatitis B, 2011

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Overseas during incubation period	12	25	12	32.4
Sexual contact with confirmed case or carrier	6	21	22	22.2
Household contact with confirmed case or carrier	3	26	20	10.3
Body piercing/tattooing in last 12 months	3	35	11	7.9
Case was child of seropositive mother	1	30	18	3.2
Case is a blood product or tissue recipient	1	36	12	2.7
Occupational exposure to blood	0	36	13	0.0
History of injecting drug use	0	37	12	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.

Age and sex were recorded for all cases. Over 80% of hepatitis C cases were adults aged 20–59 years, with age-specific rates of between 0.9 and 1.0 per 100 000 population (5–6 cases) in the 20–29, 30–39, 40–49 and 50–59 years age groups.

The notification rate was higher for males (0.8 per 100 000 population, 18 cases) than females (0.4 per 100 000, 9 cases).

Ethnicity was recorded for all cases, of which 23 cases (0.8 per 100 000 population) were in the European or Other ethnic group.

Of the 25 (92.6%) cases for which hospitalisation status was recorded, four (16.0%) were hospitalised.

The risk factors for hepatitis C are shown in Table 9. The most commonly reported risk factors were a history of injecting drug use (64.0%) and household contact with a confirmed case or carrier (25.0%).

Hepatitis (viral) - not otherwise specified

Seven cases of hepatitis (viral) not otherwise specified (NOS) were notified in 2011, compared with three cases notified in 2010. Six cases were infected with hepatitis E and one with hepatitis D. The case with hepatitis D was male and in the Pacific Peoples ethnic group. Of the cases with hepatitis E, five were males and one was female. All cases were aged 15 years and older. Ethnicity was recorded for five (83.3%) hepatitis E cases. Of these, four were in the Asian ethnic group and one was in the European or Other ethnic group. Of the seven hepatitis NOS cases, four had been overseas during the incubation period.

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 [21].

During 2011, 62 laboratory-confirmed A(H5N1) cases resulting in 34 fatalities occurred worldwide. Cases and fatalities were reported in the following countries: Egypt (39 cases, 15 deaths), Indonesia (12 cases, 10 deaths), Cambodia (8 cases, 8 deaths), Bangladesh (2 cases, no deaths) and China (1 cases, 1 death). Between 1 January 2003 and 8 February 2012, there were 584 cases reported from 15 countries, of which 345 were fatal (case fatality rate 59.1%) [22].

Hydatid disease

Hydatid disease is caused by the larval stage of the tapeworm *Echinococcus granulosus*. Six cases of hydatid disease were notified in 2011, giving a rate of 0.1 per 100 000 population. Since 1997, 52 cases of hydatid disease have been notified.

All six cases were aged over 60 years. Four cases were male and two were female. Ethnicity was recorded for all cases, with five cases in the European or Other ethnic group and one in the Asian ethnic group. One case was hospitalised and all were laboratory-confirmed.

Three of the cases reported farm exposure during their childhood. Two cases were reported as past infections, one of which was first diagnosed over 50 years ago. The remaining case was a visitor from India.

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 thorough investigation and a high level of vigilance around human cases remains appropriate. Given the natural history of the disease, cases may occur for some years yet.

Table 9. Exposure to risk factors associated with hepatitis C, 2011

Risk factor	Yes	No	Unknown	Percentage (%) [a]
History of injecting drug use	16	9	2	64.0
Household contact with confirmed case or carrier	5	15	7	25.0
Body piercing/tattooing in last 12 months	4	18	5	18.2
Sexual contact with confirmed case or carrier	2	15	10	11.8
Case is a blood product or tissue recipient	2	18	7	10.0
Case was child of seropositive mother	2	21	4	8.7
Occupational exposure to blood	1	23	3	4.2
Overseas during incubation period	1	23	3	4.2

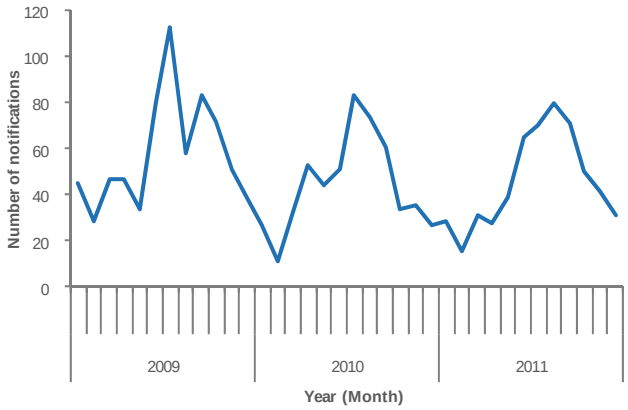
[a] Percentage refers to the number of cases that answered “yes” out of the total number of cases for which this information was supplied. Several cases had more than one risk factor recorded.

Invasive pneumococcal disease

Invasive pneumococcal disease (IPD) was added to the list of notifiable diseases on 17 October 2008. A full description of the epidemiology of IPD will be reported separately in the 2011 Invasive Pneumococcal Disease in New Zealand report available from www.surv.esr.cri.nz in August 2012.

In 2011, 552 cases of IPD were notified. The 2011 notification rate of 12.5 per 100 000 population was similar to the 2010 rate (12.2 per 100 000, 535 cases), but a significant decrease from the 2009 rate (16.1 per 100 000, 697 cases). Figure 15 shows the number of IPD notifications by month over a three-year starting from 2009. There is a distinct seasonal pattern with the highest number of notifications reported during winter, in particular July, each year.

Figure 15. Invasive pneumococcal disease notifications by month, January 2009–December 2011



IPD notification rates varied throughout the country as illustrated in Figure 16. The highest rate was in Lakes DHB (28.2 per 100 000 population, 29 cases), followed by Wairarapa (17.2 per 100 000, 7 cases) and Hawke's Bay (16.7 per 100 000, 26 cases) DHBs.

Age and sex were recorded for all cases. Age-specific rates were highest in those aged 70 years and over (46.5 per 100 000 population, 189 cases), followed by the less than 1 year (36.9 per 100 000, 23 cases) and 60–69 years (20.1 per 100 000, 84 cases) age groups.

Sex was recorded for all cases. Rates of IPD were slightly higher for males (13.2 per 100 000 population, 285 cases) than females (11.9 per 100 000, 267 cases).

Ethnicity was recorded for 538 (97.5%) cases. The highest notification rate was in the Pacific Peoples ethnic group (23.3 per 100 000 population, 62 cases), followed by the Māori (17.6 per 100 000, 114 cases) and European or Other (11.3 per 100 000, 344 cases) ethnic groups.

Of the 528 (95.7%) cases for which hospitalisation status was recorded, 511 (96.8%) were hospitalised. There were 32 deaths due to IPD reported in 2011. The majority of these deaths (28 deaths) were in the 50 years or older age group.

In June 2008, IPD became a vaccine-preventable disease in New Zealand with the addition of the 7-valent pneumococcal conjugate vaccine (PCV-7) to the childhood immunisation schedule. From approximately October 2011, the 10-valent pneumococcal conjugate vaccine (PCV-10) replaced PCV-7 as supplies of the latter were depleted. The recommended schedule for PCV-7 and PCV-10 is four doses given at 6 weeks, 3 months, 5 months and 15 months of age [20]. Table 10 shows vaccination status of cases by age group.

The risk factors recorded for IPD are shown in Table 11 and Table 12. Excluding cases who were born premature, the most commonly reported risk factor for cases aged less than 5 years was smoking in the household. For cases aged 5 years and older, the most commonly reported risk factor was chronic illness.

Figure 16. Invasive pneumococcal disease notifications by DHB, 2011

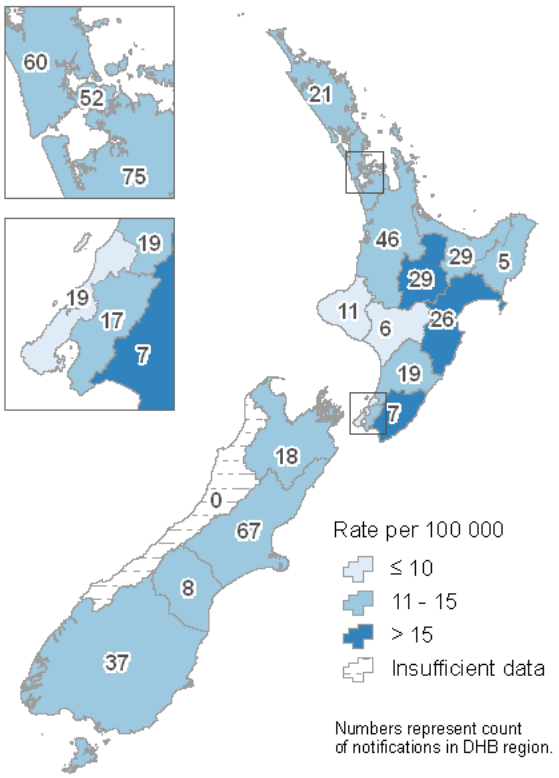


Table 10. Age group of invasive pneumococcal disease notifications and vaccinations received, 2011

Age group	Total cases	One dose	Two doses	Three doses	Four doses	Vaccinated (no dose info)	Not vaccinated	Unknown
<6 months	16	1	2	0	0	0	11	2
6 months–4 years	32	0	1	6	9	1	9	6
5–9 years	16	0	1	0	1	0	10	4
10–19 years	24	0	0	0	0	0	13	11
20+ years	464	0	0	0	0	3	276	185
Total	**552**	**1**	**4**	**6**	**10**	**4**	**319**	**208**

Table 11. Exposure to risk factors associated with invasive pneumococcal disease for cases aged less than 5 years, 2011

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Premature (<37 weeks gestation)[b]	5	8	10	38.5
Smoking in the household	7	14	27	33.3
Attends childcare	2	16	30	11.1
Chronic illness	3	41	4	6.8
Chronic lung disease or cystic fibrosis	2	42	4	4.5
Congenital or chromosomal abnormality	1	41	6	2.4
Cochlear implants	1	42	5	2.3
Resident in long-term or other chronic care facility	1	44	3	2.2

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

[b] Cases aged less than 1 year only.

Table 12. Exposure to risk factors associated with invasive pneumococcal disease for cases aged 5 years and over, 2011

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Chronic illness	261	187	56	58.3
Current smoker[b]	81	247	147	24.7
Immunocompromised	91	341	72	21.1
Chronic lung disease or cystic fibrosis	76	368	60	17.1
Resident in long term or other chronic care facility	41	412	51	9.1
Anatomical or functional asplenia	5	406	93	1.2
Congenital or chromosomal abnormality	5	428	71	1.2
Cochlear implants	4	380	120	1.0

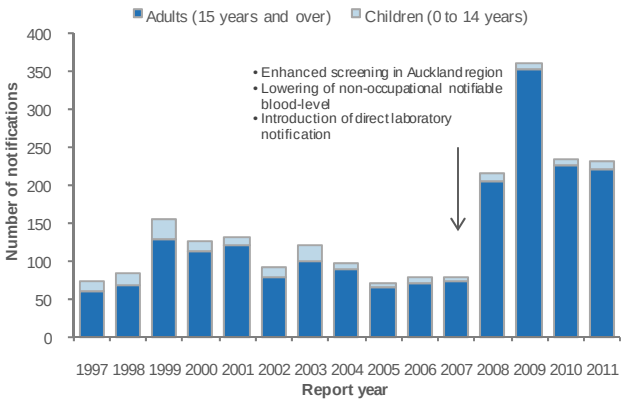
[a] Percentage refers to the percentage of cases that answered "yes" out of the total number of cases for which this information was supplied. Cases may have more than one risk factor recorded.

[b] Cases aged 15 years and over only.

Lead absorption

There were 230 cases of lead absorption notified in 2011 (5.2 per 100 000 population) compared with 232 cases in 2010 (5.3 per 100 000). Figure 17 shows a significant increase in the number of notifications of adults aged 15 years and over since 2007. This increase in notifications coincided with enhanced routine occupational screening in the Auckland region, lowering of the non-occupational notifiable blood-lead level from 0.72 to 0.48 µmol/L in September 2007, and the introduction of direct laboratory notification in December 2007.

Figure 17. Lead absorption notifications in children and adults by year, 1997–2011



Cases were distributed across New Zealand in 2011, with the highest notification rates in South Canterbury (14.2 per 100 000 population, 8 cases), Whanganui (11.1 per 100 000, 7 cases) and Auckland (10.3 per 100 000, 47 cases) DHBs.

Age was recorded for all cases. Of the 230 cases notified in 2011, nine (3.9%) were aged less than 15 years and were distributed by age group as follows: 1–4 years (6 cases), 5–9 years (1 case) and 10–14 years (2 cases). Of the adult cases aged 15 years and over, the highest age-specific rate occurred in the 50–59 years age group (10.1 per 100 000 population, 56 cases), followed by the 60–69 years (8.9 per 100 000, 37 cases) and 40–49 years (8.5 per 100 000, 54 cases) age groups.

Sex was recorded for all cases. Sex-specific rates were higher for males (9.3 per 100 000 population, 202 cases) than females (1.2 per 100 000, 28 cases) in 2011.

Ethnicity was recorded for 207 (90.0%) cases. The highest notification rates were in the Pacific Peoples (7.9 per 100 000 population, 21 cases) and European or Other (5.0 per 100 000, 153 cases) ethnic groups.

Hospitalisation status was recorded for 150 (65.2%) cases. Of these, nine (6.0%) cases were hospitalised.

Table 13 and Table 14 summarise risk factor information for lead absorption cases. Several cases had more than one risk factor recorded. 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 (50.0%). The most common risk factor for adults was exposure to high risk occupations (62.6%).

Blood-lead levels were recorded for all child notifications and 220 (99.5%) adult notifications. For child notifications, blood-lead level concentrations ranged from 0.56 to 1.51 µmol/L, with a median of 0.80 µmol/L. For adult notifications, blood-lead level concentrations ranged from 0.48 to 6.30 µmol/L, with a median of 0.80 µmol/L.

Table 13. Exposure to risk factors associated with lead absorption for children (0–14 years), 2011

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Case lived in or regularly visited a building built prior to 1970[b]	4	4	1	50.0
Pica behaviour	2	4	3	33.3
Case played in soil containing paint debris	2	5	2	28.6
Case lived near an industry that is likely to release lead	0	9	0	0.0
Close contact of case was occupationally exposed to lead	0	9	0	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.

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

Table 14. Exposure to risk factors associated with lead absorption for adults (15 years and over), 2011

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Case had exposure to high risk occupations[c]	107	64	50	62.6
Case lived in or regularly visited a building built prior to 1970[b]	63	47	111	57.3
Case or close contact had exposure to lead through hobbies[d]	49	74	98	39.8
Close contact of case was occupationally exposed to lead	7	105	109	6.3

[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, 34 adults lived in or regularly visited a building that had chalking/flaking paint, had old paint being or had been recently stripped, and/or had recently undergone alterations or refurbishment.

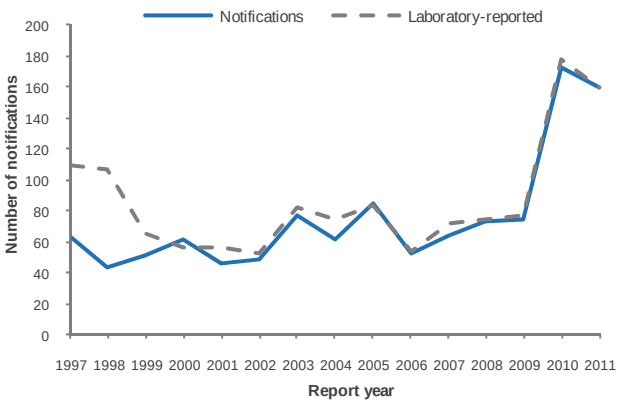
[c] Occupations included painter/decorator (19), foundry worker (6), lead lighter/glass processing worker (6), plumber/gasfitter (5), abrasive blaster (3), construction trades worker (3), boat builder (2), labourer (2), plastics factory worker (2), scrap metal worker (2), contractor, engineer, welder (1 each) and unspecified (54).

[d] Hobbies included: shooting (33), making sinkers (5), home renovations (3) making bullets (3), boat building (2) and other (8). Note: cases may have more than one hobby recorded.

Legionellosis

In 2011, a total of 159 cases of legionellosis were notified. This represents a rate of 3.6 per 100 000 population, which is a small decrease from 4.0 per 100 000 (173 cases) in 2010 (Figure 18).

Figure 18. Legionellosis notifications and laboratory-reported cases by year, 1997–2011



The highest notification rate in 2011 was in Canterbury DHB (12.9 per 100 000 population, 65 cases), followed by Nelson Marlborough (6.4 per 100 000, 9 cases) and Southern (4.6 per 100 000, 14 cases) DHBs.

Age was recorded for all cases. The highest age-specific rates were in the 70 years and over (12.5 per 100 000 population, 51 cases) and 60–69 years (11.5 per 100 000, 48 cases) age groups.

Sex was recorded for 158 (99.4%) cases. Sex-specific rates were higher for males (4.7 per 100 000 population, 102 cases) than females (2.5 per 100 000, 56 cases).

Ethnicity was recorded for 153 (96.2%) cases. The legionellosis rate was highest in the European or Other ethnic group (4.4 per 100 000 population, 133 cases), followed by the Pacific Peoples (3.0 per 100 000, 8 cases) ethnic group.

Of the 150 (94.3%) cases in 2011 for which hospitalisation status was recorded, 124 (82.7%) were hospitalised.

There were four deaths due to legionellosis reported in 2011. Three were in the 60–69 years age group and one was in the 70 years and over age group.

Table 16 provides a summary of risk factors for which data was available. Of the 107 cases who reported exposure to environmental sources of infection during the incubation period, 81 reported contact with compost, potting mix or soil, 10 reported exposure to showers or hot water systems, five reported exposure to air conditioning units, five reported exposure to cooling towers, and four reported exposure to spa or indoor pools. Six cases reported overseas travel during the incubation period.

During 2011, 160 cases of legionellosis were laboratory-reported. Table 15 shows the strains identified for the laboratory-reported cases in 2011. The most common *Legionella* species reported in 2011 were *L. longbeachae* (41.9%, 67 cases) and *L. pneumophila* (30.6%, 49 cases).

One outbreak of legionellosis was reported in 2011, involving 14 cases.

Table 15. *Legionella* strains for laboratory-reported cases, 2011

Legionella species and serogroup	Cases	Percentage (%)
L. longbeachae	**70**	**43.8**
L. longbeachae sg 1	29	18.1
L. longbeachae sg 2	3	1.9
L. longbeachae sg unidentified	38	23.8
L. pneumophila	**48**	**30.0**
L. pneumophila sg 1	38	23.8
L. pneumophila sg 2	3	1.9
L. pneumophila sg 12	3	1.9
L. pneumophila sg 4	2	1.3
L. pneumophila sg 13	2	1.3
L. bozemanae	**4**	**2.5**
L. bozemanae sg 2	2	1.3
L. bozemanae sg 1	1	0.6
L. bozemanae sg unidentified	1	0.6
Other *Legionella* species	**38**	**23.8**
L. dumoffii	12	7.5
L. sainthelensi	6	3.8
L. jordanis	3	1.9
L. micdadei	3	1.9
L. gormanii	2	1.3
L. bozemanae/*L. longbeachae*	2	1.3
Legionella species not identified	10	6.3
Total	**160**	**100.0**

Table 16. Risk factors associated with legionellosis, 2011

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Exposure to environmental sources of infection during the incubation period	107	14	38	88.4
Pre-existing immunosuppressive or debilitating condition	41	90	28	31.3
Smokes cigarettes	32	103	24	23.7

[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

One case of leprosy was notified in 2011, compared with three cases in 2010.

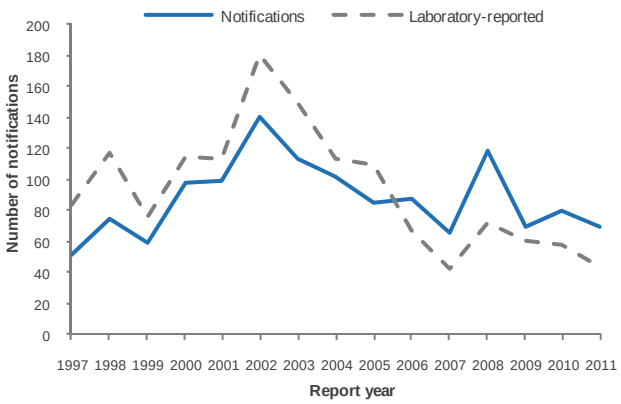
The case was a female aged over 70 years and in the Asian ethnic group. The case was not laboratory-confirmed. The clinical form of leprosy was recorded as tuberculoid. The case was overseas in Fiji during the incubation period.

Leptospirosis

In 2011, a total of 70 cases of leptospirosis were notified. The 2011 rate of 1.6 cases per 100 000 population was similar to the notification rate in 2010 (1.8 per 100 000, 80 cases). Of the 70 notified cases, 65 (92.9%) were laboratory-confirmed.

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

Figure 19. Leptospirosis notifications and laboratory-reported cases by year, 1997–2011



In 2011, the highest leptospirosis rates were in Whanganui (14.3 per 100 000, 9 cases), Hawke's Bay (7.1 per 100 000, 11 cases), Northland (5.1 per 100 000 population, 8 cases) and MidCentral (3.0 per 100 000 population, 5 cases) DHBs.

Age and sex were recorded for all cases. The highest age-specific rate was in the 50–59 years age group (3.1 per 100 000 population, 17 cases), followed by the 40–49 years age group (2.8 per 100 000, 18 cases). The majority of cases were male (90.0%, 63 cases).

Ethnicity was recorded for 67 (95.7%) cases. The highest disease notification rate was in the European or Other ethnic group (1.8 per 100 000, 55 cases), followed by the Māori ethnic group (1.5 per 100 000, 10 cases).

Of the 66 (94.3%) cases where hospitalisation status was recorded, 38 (57.6%) were hospitalised.

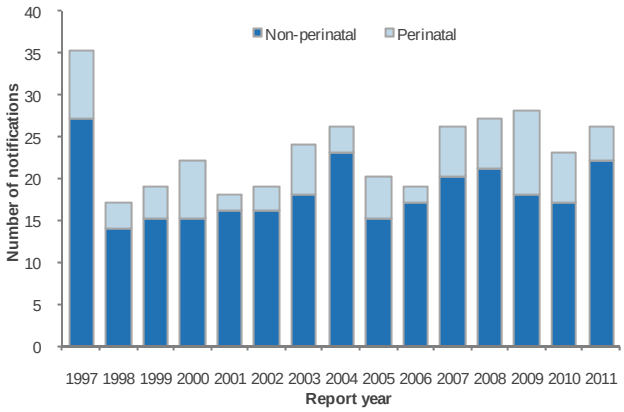
Occupation was recorded for 62 (88.6%) of the 70 notified cases. Of these, 46 cases (74.2%) were recorded as engaged in occupations previously identified as high risk for exposure to *Leptospira* spp. in New Zealand [23]. The proportion of leptospirosis cases reporting high-risk occupations in 2011 was lower than in 2010 (78.7%). Of the 46 cases with a high-risk occupation recorded, 36 (78.3%) were farmers or farm workers, and 10 (21.7%) worked in the meat-processing industry (as freezing workers, meat process workers or butchers). Of the 24 cases that either did not report a high-risk occupation or did not have an occupation recorded, 16 reported animal/outdoor exposures as a risk factor and three were overseas during the incubation period for the disease.

Leptospira species and serovars (sv) were recorded for 57 (81.4%) cases. The most commonly identified serovar was *L. borgpetersenii* sv Ballum (34.5%, 20 cases), followed by *L. borgpetersenii* sv Hardjo (25.9%, 15 cases), *L.interrogans* sv Pomona (22.4%, 13 cases), *L. borgpetersenii* sv Tarassovi (6.9%, 4 cases), *L. interrogans* sv Copenhageni (5.2%, 3 cases), and *L. interrogans* sv Canicola (1.7%, 1 case). In addition, *L. kirschneri* sv Grippotyphosa, a serovar exotic to New Zealand, was identified in a case that had recently travelled to Thailand.

Listeriosis

In 2011, 26 cases of listeriosis were notified, a rate of 0.6 per 100 000 population. Figure 20 shows listeriosis notifications (perinatal and non-perinatal) each year since 1997. Over the preceding five years (2006–2010) the average number of cases per year was 25, peaking at 28 cases (0.6 per 100 000) in 2009, the highest since 1997 (35 cases, 0.9 per 100 000).

Figure 20. Listeriosis notifications (perinatal and non-perinatal) by year, 1997–2011



Four (15.4%) of the 2011 cases were recorded as perinatal, a decrease from 2010 (6 cases). Weeks of gestation were known for all perinatal cases, with a range of 26–41 weeks. These cases were not fatal.Three mothers were in the Asian ethnic group and one mother was Māori. Two were in the 20–29

years age group and two were in the 30–39 years age group.

The 22 non-perinatal cases were from 11 DHBs, with the highest number from Counties Manukau (5 cases) and Canterbury (3 cases) DHBs. Eighteen non-perinatal cases were aged over 50 years (including 10 aged 70 years and over). Sex was recorded for all cases, of which 12 were male and 10 were female. Ethnicity was recorded for all cases. Cases were distributed by ethnic group as follows: European or Other (15 cases), Pacific Peoples (3 cases), Māori and Asian (2 cases each).

All 22 non-perinatal cases were hospitalised. Eleven were hospitalised for treatment of another illness and five were receiving immunosuppressive drugs (note that a case may have more than one risk factor recorded). Information on underlying illness was recorded for 21 (95.5%) of the non-perinatal cases, 15 had an underlying illness such as cancer, autoimmune disease, diabetes, renal failure, or other chronic illness. One non-perinatal death was reported in 2011 in the 50–59 years age group.

The Special Bacteriology Laboratory at ESR reported 26 cases infected with *Listeria monocytogenes* in 2011. Fifteen (57.7%) were serotype 4 and the remaining 11 (42.3%) were serotype 1/2. Serotype 4 strains have steadily become predominant over serotype 1/2 strains in recent years.

There were no outbreaks of listeriosis reported in 2011.

Malaria

In 2011, 52 cases of malaria were notified compared with 44 cases in 2010 (Figure 21). The 2011 notification rate (1.2 per 100 000 population) was higher than for 2010 (1.0 per 100 000).

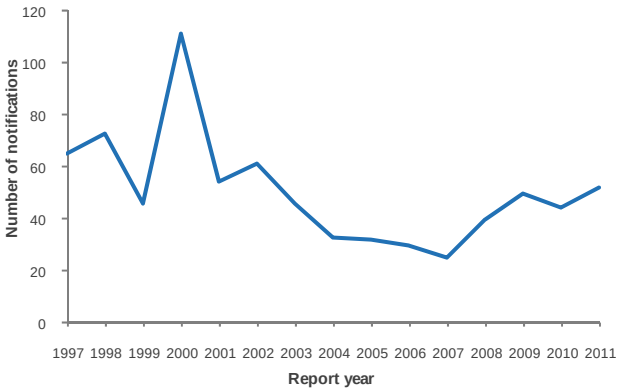
Age and sex were recorded for all the reported malaria cases. The highest age-specific rate was reported in the 20–29 years age group (4.2 per 100 000 population, 26 cases), followed by the 15–19 years age group (2.2 per 100 000, 7 cases).

The notification rate was higher for males (1.8 per 100 000 population, 39 cases) than females (0.6 per 100 000, 13 cases).

Ethnicity was recorded for 49 (94.2%) cases. The highest notification rate was in the Asian ethnic group (7.1 per 100 000 population, 29 cases), followed by the European or Other ethnic group (0.4 per 100 000, 13 cases).

Of the 43 (82.7%) cases for which hospitalisation status was recorded, 34 (79.1%) were hospitalised. All 52 notified cases were laboratory-confirmed.

Figure 21. Malaria notifications by year, 1997–2011



Travel history was recorded for all of the reported malaria cases. Forty (76.9%) cases had resided or travelled overseas during the incubation period for the disease. The remaining 12 (23.1%) cases had not been overseas recently, but had a prior history of travel to malaria endemic areas.

Table 17 shows the *Plasmodium* species identified and region of overseas travel for malaria notifications in 2011. The most frequently reported region for cases with *P. falciparum* was Sub-Saharan African. Among cases identified with *P. vivax*, the most common region reported was Southern and Central Asia (21 cases), followed by Oceania (7 cases). The country visited or resided in with the highest number of cases was India with 29 cases, of which 21 cases were identified with *P. falciparum* (Figure 22). Note that cases may have travelled to more than one country and may have been infected with more than one *Plasmodium* species.

Malaria prophylaxis was taken as prescribed by eight cases, five cases did not take prophylaxis as prescribed, eight cases did not have prophylaxis prescribed, and prophylaxis use was unknown for 31 cases.

Ministry of Health hospitalisation data for 2011 recorded 42 hospitalisations where malaria was the principal diagnosis on admission.

Measles

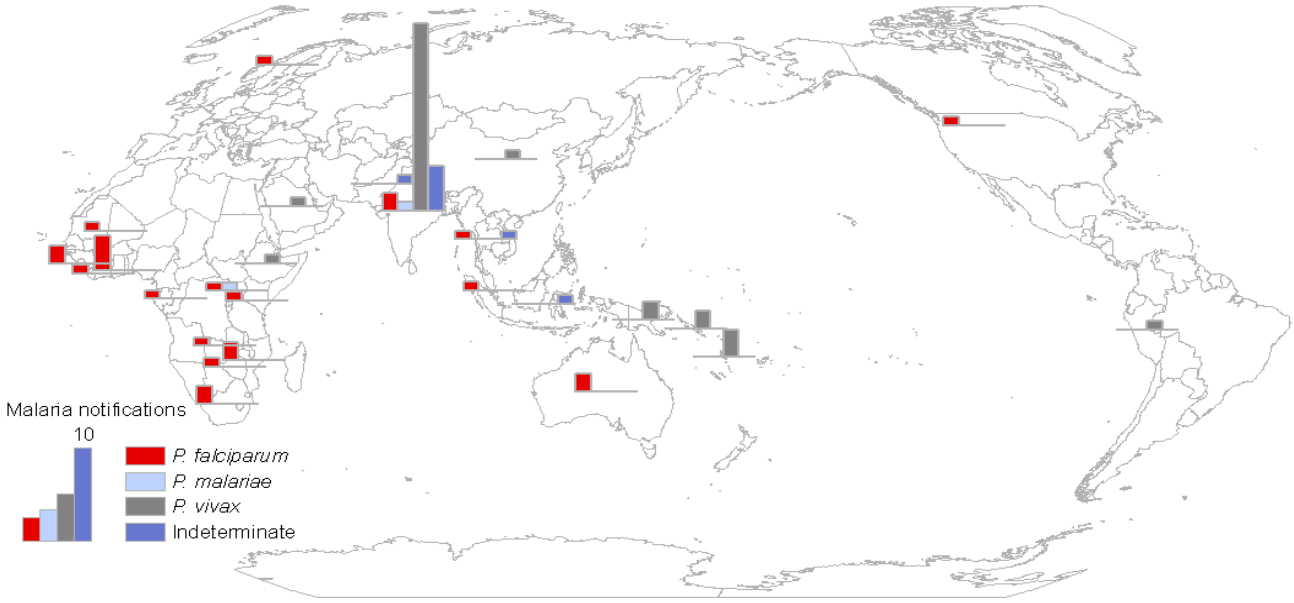
In New Zealand, measles immunisation was introduced in 1969 [20] and measles has been a notifiable disease since June 1996 [3]. In 2011, 597 cases of measles were notified (13.6 per 100 000 population), of which 462 (77.4%) were laboratory-confirmed. This was a significant increase from 2010 when 48 cases were notified (1.1 per 100 000) and 15 (31.3%) were laboratory-confirmed. The number of notifications in 2011 was the highest since the peak of 1984 cases notified in 1997 (Figure 23).

Table 17. *Plasmodium* species and region of overseas travel for malaria notifications, 2011

Region	*P. falciparum*	*P. malariae*	*P. vivax*	Indeterminate
North Africa and the Middle East	0	0	1	0
Sub-Saharan Africa	17	1	1	0
Southern and Central Asia	2	1	21	6
South-East Asia	2	0	1	2
Oceania	2	0	7	0
The Americas	1	0	1	0
North-West Europe	1	0	0	0

Note: Cases may have been infected with more than one *Plasmodium* species and may have travelled or resided in more than one country

Figure 22. *Plasmodium* species and country of overseas travel for malaria notifications, 2011



Note: Cases may have been infected with more than one *Plasmodium* species and may have travelled to or resided in more than one country. Those who travelled to Australia, Peru, Sweden and United States of America also specified travel to other malaria endemic countries.

The highest notification rates were in Auckland (46.2 per 100 000 population, 211 cases) and Waitemata (32.8 per 100 000, 179 cases) DHBs (Figure 24).

Age was recorded for all cases. The highest age-specific rate was in the less than 1 year age group (86.6 per 100 000 population, 54 cases), followed by the 1–4 years (49.6 per 100 000, 125 cases), 10–14 years (32.4 per 100 000, 95 cases) and 5–9 years (28.2 per 100 000, 81 cases) age groups.

Sex was recorded for 592 (99.2%) cases. The notification rate was higher for males (15.5 per 100 000 population, 335 cases) than females (11.5 per 100 000, 257 cases).

Figure 23. Measles notifications and laboratory-confirmed cases by year, 1997–2011

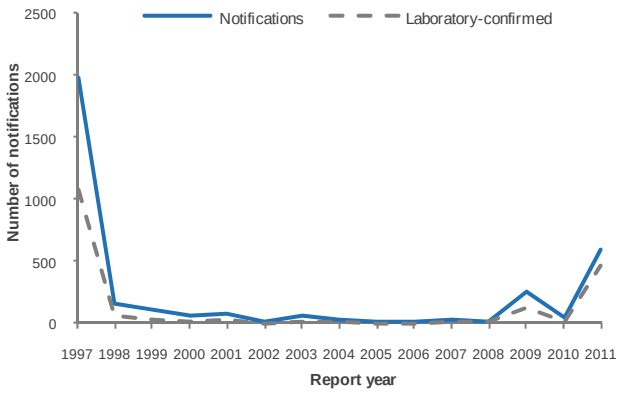
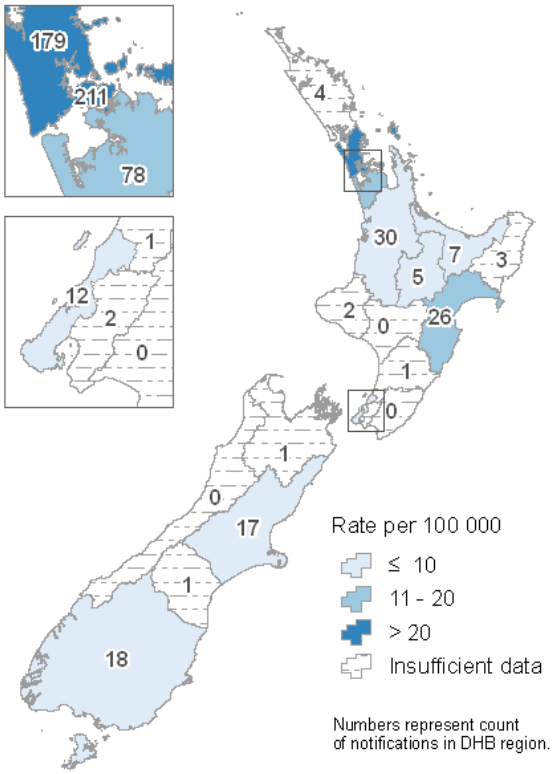


Figure 24. Measles notifications by DHB, 2011



Ethnicity was recorded for 590 (98.8%) cases. The highest notification rates were in the Pacific Peoples (23.3 per 100 000, 62 cases), Māori (17.5 per 100 000, 113 cases) and MELAA (15.9 per 100 000, 6 cases) ethnic groups.

Hospitalisation status was recorded for 588 (98.5%) cases, of which 101 cases were hospitalised.

The recommended measles, mumps and rubella (MMR) vaccine immunisation schedule that has been in place since January 2001, has been to give the first vaccine dose at 15 months and the second at 4 years of age [20]. However, during the 2011 measles outbreak, early vaccination from 12 months of age was permitted, with a second dose able to be given one month following the first dose [24].

Of the 597 measles cases, 472 (79.1%) had a known vaccination status. Of these, 361 were not vaccinated, including 80 cases aged less than 15 months. Eighty-four cases had received one dose of vaccine, including eight cases in the less than 15 months age group and 22 cases had received two doses of vaccine. A further five cases reported being vaccinated but no dose information was available (Table 18).

Of the cases for which risk factor information was recorded, 44.1% (208/472) attended school, pre-school or childcare, 54.8% (233/425) had contact with another case of the disease in the previous three weeks and 6.4% (27/423) reported overseas travel during the incubation period.

In 2011, six outbreaks of measles were reported involving 560 cases.

Meningococcal disease

A full description of the epidemiology of meningococcal disease will be reported separately in the 2011 Epidemiology of Meningococcal Disease in New Zealand report available from www.surv.esr.cri.nz in June 2012.

A total of 119 cases of meningococcal disease were notified in 2011, giving a rate of 2.7 per 100 000 population. This rate was 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 recorded immediately before the introduction of the MeNZB™ vaccine (8.4 per 100 000 in 2004). However, the 2011 rate remained higher than the rate of 1.5 per 100 000 in the immediate pre-epidemic years (1989–1990).

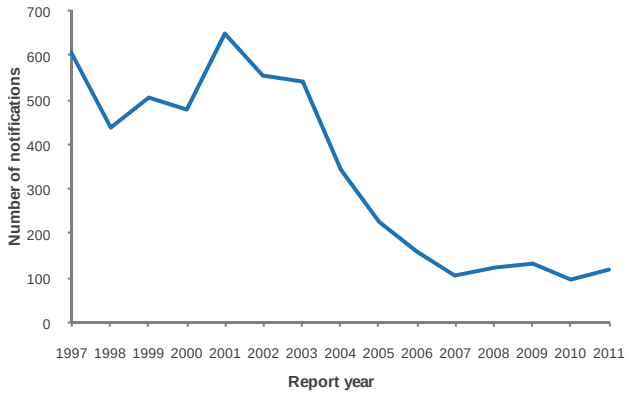
Figure 25 shows the number meningococcal disease notifications from 1997 to 2011.

Of the DHBs with more than five cases reported in 2011, the highest rates were in Northland (8.2 per 100 000 population, 13 cases) and Lakes (6.8 per 100 000, 7 cases) DHBs.

Table 18. Age group and vaccination status of measles notifications, 2011

Age group	Total cases	One dose	Two doses	Vaccinated (no dose info)	Not vaccinated	Unknown
<15 months	90	8	0	0	80	2
15 months–3 years	75	28	0	1	44	2
4–9 years	95	12	4	0	74	5
10–19 years	161	15	9	2	115	20
20+ years	176	21	9	2	48	96
Total	**597**	**84**	**22**	**5**	**361**	**125**

Figure 25. Meningococcal disease notifications by year, 1997–2011



Age and sex were recorded for all cases. Notification rates were similar for males (3.0 per 100 000 population, 65 cases) and females (2.4 per 100 000, 54 cases). As in previous years, the highest age-specific rate was in the less than 1 year age group (38.5 per 100 000, 24 cases), followed by the 1–4 years age group (12.7 per 100 000, 32 cases).

Ethnicity was recorded for 118 (99.2%) cases notified in 2011. The highest rate occurred in the Pacific Peoples ethnic group (7.1 per 100 000 population, 19 cases), followed by the Māori (6.3 per 100 000, 41 cases) and European or Other (1.8 per 100 000, 55 cases) ethnic groups.

Hospitalisation status was recorded for all cases, of which 115 (96.7%) were hospitalised.

Thirteen deaths were reported during 2011, with an associated case-fatality rate of 10.9%.

Pre-hospital management information was recorded for 114 (95.8%) cases. Of these, 53 (46.4%) cases had been seen by a doctor prior to hospital admisssion and only 17 (32.1%) of which were given IV/IM antibiotics prior to hospital admission.

Among the 13 fatalities reported in 2011, one had been seen by a doctor and was given antibiotics, five had been seen by a doctor but were not given antibiotics, and seven were not seen by a doctor prior to hospital admission.

Group B disease, particularly that drove the New Zealand epidemic strain (B:P1.7-2,4), has continued to cause disease, with this strain accounting for 34.3% (37 cases) of the 108 laboratory-confirmed cases in 2011. This was followed by cases due to group C disease (29.6%, 32 cases).

The antimicrobial susceptibility of 77 viable meningococcal isolates received by ESR from cases of invasive disease in 2011 was tested. All isolates were susceptible to ceftriaxone and ciprofloxacin, 19.5% (15/77) had reduced susceptibility to penicillin, with minimum inhibitory concentrations (MICs) of 0.12–0.5 mg/L and 1.3% (1/77) were rifampicin resistant (MIC ≥32 mg/L).

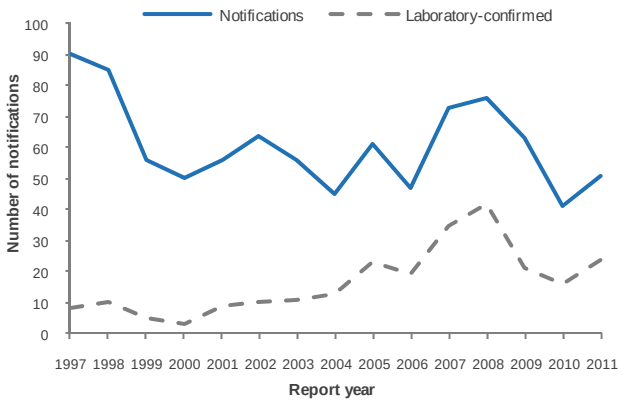
Mumps

Immunisation against mumps was introduced to the New Zealand Immunisation Schedule in 1990 as part of the MMR vaccine [20] and mumps became notifiable in June 1996 [3]. The last epidemic occurred in 1994.

In 2011, 51 cases of mumps were notified (24 were laboratory-confirmed). In comparison, 41 cases of mumps were notified in 2010 (16 were laboratory-confirmed). Figure 26 shows notifications and laboratory-confirmed cases from 1997 to 2011.

The 2011 mumps notification rate was 1.2 per 100 000 population, a small increase compared with the rate for 2010 (0.9 per 100 000).

Figure 26. Mumps notifications and laboratory-confirmed cases by year, 1997–2011



The highest notification rates were for Nelson Marlborough (7.1 per 100 000 population, 10 cases) and Auckland (2.2 per 100 000, 10 cases) DHBs.

Age and sex were recorded for all cases. The highest age-specific rates were in the 5–9 years (5.2 per 100 000 population, 15 cases) and 1–4 years (4.0 per 100 000, 10 cases) age groups.

Sex-specific notification rates were similar for males (1.2 per 100 000 population, 27 cases) and females (1.1 per 100 000, 24 cases).

Ethnicity was recorded for 50 (98.0%) cases. The highest rate was in the Asian ethnic group (3.0 per 100 000 population, 12 cases), followed by the Pacific Peoples (1.9 per 100 000, 5 cases) and Māori (1.4 per 100 000, 9 cases) ethnic groups.

Hospitalisation status was recorded for 45 (88.2%) cases. Of these, two cases were hospitalised.

The recommended vaccination schedule for mumps is two doses of the MMR vaccine, the first given at 15 months of age and second at 4 years of age [20]. In 2011, 37 cases (72.5%) had a known vaccination status. Of these, 14 (37.8%) were not vaccinated. Nine cases had received one dose of vaccine and 10 cases reported having completed the mumps vaccination schedule. A further four cases reported being vaccinated, but no dose information was available (Table 19).

Of the cases for which risk factor information was recorded, 55.6% (25/45) attended school, pre-school or childcare during the incubation period, 9.1% (3/33) had contact with another case of the disease in the previous three weeks and 12.8% (5/39) reported overseas travel during the incubation period.

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. No cases of non-seasonal influenza were notified in New Zealand in 2011.

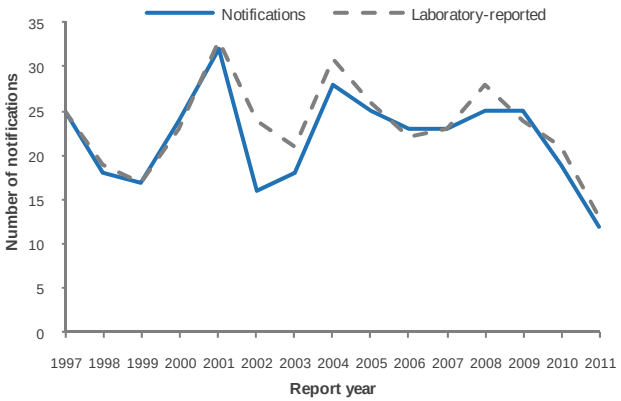
During the influenza pandemic that started in 2009, confirmed cases of non-seasonal influenza required laboratory evidence of A(H1N1)pdm09 influenza virus infection. A total of 3670 cases of influenza A(H1N1)pdm09 were notified in 2009 and 1826 cases were notified in 2010. In August 2010, the World Health Organization (WHO) declared the world was entering the post-pandemic phase and the virus has continued to circulate with the behaviour of seasonal influenza. In New Zealand, the A(H1N1)pdm09 influenza virus was classified as seasonal influenza from 1 January 2011.

Paratyphoid fever

There were 12 cases of paratyphoid fever notified in 2011. The 2011 notification rate (0.3 per 100 000 population) was similar to the 2010 rate (0.4 per 100 000, 19 cases). Figure 27 shows the number of notifications and laboratory-reported cases of paratyphoid fever each year since 1997.

Age and sex were recorded for all cases. The highest age-specific rate was in the 20–29 years age group (1.1 per 100 000 population, 7 cases). Sex-specific rates were the same for males and females (0.3 per 100 000 population, 6 cases).

Figure 27. Paratyphoid fever notifications and laboratory-reported cases by year, 1997–2011



Ethnicity was recorded for 11 (91.7%) cases. Cases were distributed by ethnic group as follows: European or Other (6 cases), Asian (4 cases) and Māori (1 case).

Of the nine (75.0%) cases for which hospitalisation status was recorded, four (44.4%) were hospitalised.

Of the 12 cases notified in 2011, 10 (83.3%) reported overseas travel during the incubation period for the disease. The countries visited were India (4 cases), Pakistan (2 cases), Thailand (2 cases), Bolivia, Indonesia, Sri Lanka and United Arab Emirates (1 case each). Note that cases may have travelled to more than one country.

The Enteric Reference Laboratory at ESR reported 13 cases infected with *Salmonella* Paratyphi in 2011. The serotypes identified were *S.* Paratyphi A (6 cases), *S.* Paratyphi B var. Java (5 cases) and *S.* Paratyphi B (2 cases). Note 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 [25].

One outbreak of paratyphoid fever was reported in 2011, involving two cases. *S.* Paratyphi A was isolated from both cases.

Table 19. Age group of mumps notifications and vaccination received, 2011

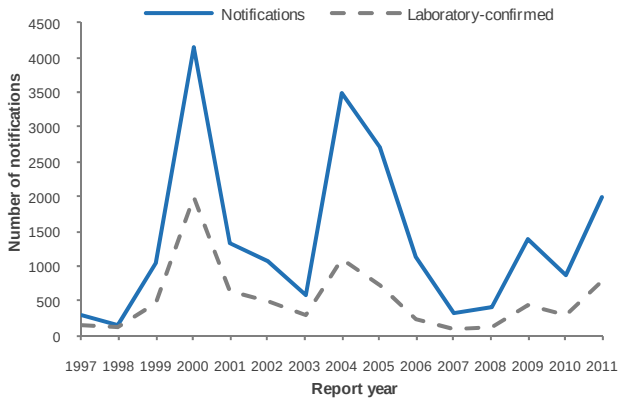
Age group	Total cases	One dose	Two doses	Vaccinated (no dose info)	Not vaccinated	Unknown
<15 months	2	0	0	0	1	1
15 months to 3 years	8	5	0	0	3	0
4–9 years	17	2	10	1	4	0
10–19 years	5	1	0	1	3	0
20+ years	19	1	0	2	3	13
Total	**51**	**9**	**10**	**4**	**14**	**14**

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 periodicity unchanged by mass immunisation [20]. Childhood vaccination has been routine in New Zealand since 1960, and the disease has been notifiable since 1996 [3].

In 2011, 1998 pertussis cases were notified, of which 516 (25.8%) were laboratory-confirmed by the isolation of *B. pertussis* from the nasopharynx. A further 262 cases (13.1%) were laboratory-confirmed by PCR. The 2011 notification rate (45.4 per 100 000 population) represented a significant increase from the 2010 notification rate (20.0 per 100 000, 872 cases). The number of notifications reported in 2011 was higher than in 2010, but lower than the annual number of notifications reported in previous pertussis epidemics (4140 cases in 2000 and 3485 cases in 2004) (Figure 28).

Figure 28. Pertussis notifications and laboratory-confirmed cases by year, 1997–2011

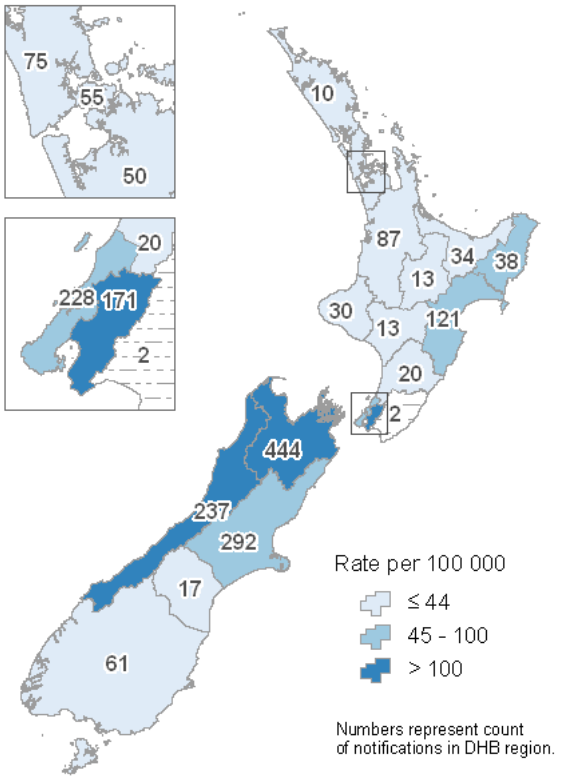


The pertussis rate varied by geographic region in 2011. The highest rate was in the West Coast DHB (719.1 per 100 000 population, 237 cases), followed by Nelson Marlborough (317.4 per 100 000, 444 cases) and Hutt Valley (118.3 per 100 000, 171 cases) DHBs (Figure 29).

Age was recorded for all cases. The highest age-specific rates were for cases aged less than 1 year (203.6 per 100 000, 127 cases), followed by cases aged 1–4 years (108.0 per 100 000, 272 cases) and 5–9 years (105.1 per 100 000, 302 cases).

Sex was recorded for 1987 (99.4%) cases. Females (51.1 per 100 000 population, 1146 cases) had a higher notification rate than males (38.9 per 100 000, 841 cases).

Figure 29. Pertussis notifications by DHB, 2011



Ethnicity was recorded for 1965 (98.3%) cases. The highest rate was in the European or Other ethnic group (51.9 per 100 000 population, 1582 cases), followed by the Māori (40.4 per 100 000, 261 cases) and MELAA (26.5 per 100 000, 10 cases) ethnic groups.

Hospitalisation status was recorded for 1878 (94.0%) pertussis cases notified in 2011, of which 129 (6.9%) were hospitalised. Of those hospitalised, 112 (86.8%) had a known vaccination status. Of these, four had received one dose of pertussis vaccine, five cases were reported to have received three or more doses of vaccine and 60 cases were not vaccinated. There was one death due to pertussis reported in 2011, the case was in the less than 1 year age group.

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 [20].

Vaccination status was known for 1365 (68.3%) cases notified during 2011 (Table 20). Of these, 418 (30.6%) cases were not vaccinated, including 15 cases aged less than 6 weeks and therefore not eligible for vaccination. Seventy-one cases had received one dose of vaccine, 23 cases had received two doses, and a total of 544 (39.9%) cases had received three or more doses of pertussis vaccine.

Table 20. Age group and vaccination status of pertussis notifications, 2011

Age group	Total cases	One dose	Two doses	Three doses	Four doses	Five doses	Vaccinated (no dose info)	Not vaccinated	Unknown
0–5 weeks	17	0	0	0	0	0	0	15	2
6 weeks–2 months	53	24	1	0	0	0	1	24	3
3–4 months	15	4	4	0	0	0	1	5	1
5 months–3 years	258	6	6	130	24	1	14	67	10
4–10 years	445	9	5	26	129	92	50	106	28
11+ years	1 210	28	7	24	36	82	243	201	589
Total	**1 998**	**71**	**23**	**180**	**189**	**175**	**309**	**418**	**633**

In 2011, 49.3% (523/1061) of cases reported contact with a laboratory-confirmed case of pertussis and 48.5% (773/1593) had attended school, pre-school or childcare.

There were 19 outbreaks of pertussis were reported in 2011, involving 405 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 [26].

Poliomyelitis (polio)

There were no poliomyelitis cases notified in 2011. The New Zealand Paediatric Surveillance Unit (NZPSU) carries out active surveillance of acute flaccid paralysis (AFP). In 2011, three AFP cases were notified to the NZPSU. All of these cases were reviewed by the National Certification Committee for the Eradication of Polio (NCCEP) and were classified as non-polio.

Since the mass oral polio vaccine immunisation campaigns in New Zealand in 1961 and 1962, a total of six polio cases have been reported. All of these cases were either laboratory-confirmed as vaccine-associated (4 cases) or classified as probable vaccine-associated cases (2 cases) [20]. The most recent case occurred in 1999 [27]. In 1976, an imported case of wild poliovirus infection was managed in New Zealand after the child arrived unwell from Tonga [20].

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 five cases were fatal and were linked to swimming in geothermal pools in the central North Island [28].

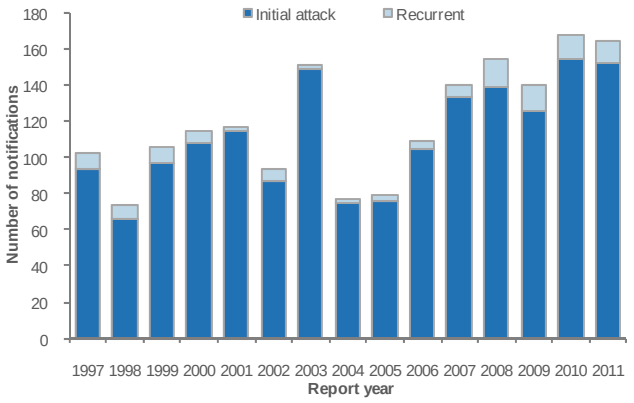
Rabies

New Zealand is classified as a rabies-free country [29]. There have been no cases of rabies reported in New Zealand since the disease became notifiable in 1996.

Rheumatic fever

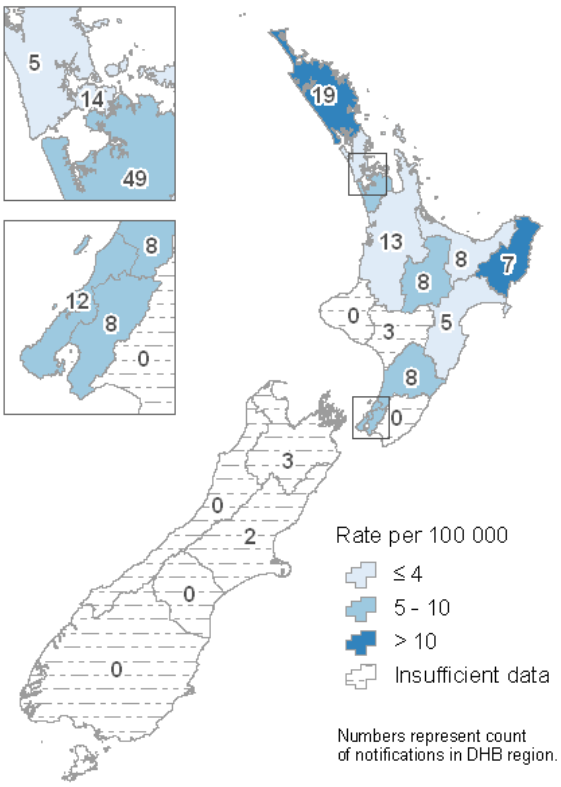
In 2011, 152 initial attack cases and 12 recurrent cases of rheumatic fever were notified in New Zealand. This represented a rate of 3.5 per 100 000 population for initial attack cases, and 0.3 per 100 000 for recurrent cases. The 2011 rates of initial attack and recurrent cases were the same as the 2010 rates. Figure 30 shows the number of initial attack and recurrent cases of rheumatic fever reported each year since 1997.

Figure 30. Rheumatic fever (initial attack and recurrent cases) by year, 1997–2011



The following analysis is for rheumatic fever (initial attack) cases. The highest notification rate was in Tairawhiti DHB (15.0 per 100 000 population, 7 cases), followed by Northland (11.4 per 100 000, 18 cases) and Counties Manukau (8.8 per 100 000, 44 cases) DHBs (Figure 31).

Figure 31. Rheumatic fever (initial attack) cases by DHB, 2011



Age was recorded for all rheumatic fever (initial attack) cases. The highest notification rate was in the 10–14 years age group (27.3 per 100 000 population, 80 cases), followed by the 5–9 years age group (15.0 per 100 000, 43 cases).

Sex was recorded for 150 (98.7%) cases. Sex-specific rates were higher for males (4.0 per 100 000 population, 86 cases) than females (2.9 per 100 000, 64 cases).

Ethnicity was recorded for all rheumatic fever (initial attack) cases. The highest rates were in the Pacific Peoples (22.5 per 100 000, 60 cases) and Māori (13.5 per 100 000, 87 cases) ethnic groups.

Of the 151 (99.3%) rheumatic fever (initial attack) cases for which a final case status was recorded, 123 (81.5%) were reported as confirmed cases, indicating that the case had a laboratory-confirmed diagnosis for group A streptococcal infection.

The following analysis is for cases of recurrent rheumatic fever. The 12 cases of recurrent rheumatic fever in 2011 ranged in age from 7 to 41 years, with the highest number in the 20–29 years age group (4 cases). Seven cases were male and five were female. The cases were in the Pacific Peoples (6 cases), Māori (5 cases) and European or Other (1 case) ethnic groups.

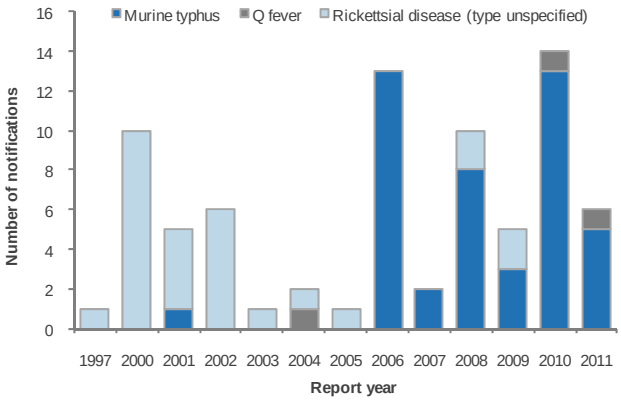
For all rheumatic fever cases (initial and recurrent attacks), hospitalisation status was recorded for 154 (93.9%) cases, of which 147 (95.5%) were hospitalised.

Rickettsial disease

Six cases of rickettsial disease were notified in 2011, compared with 14 cases in 2010 (Figure 32). Five notifications were for murine typhus (13 in 2010), and one was for Q fever (1 in 2010). The 2011 notification rate for ricksettsial disease (0.1 per 100 000 population) was lower than that for 2010 (0.3 per 100 000).

Ministry of Health hospitalisation data for 2011 recorded eight hospitalisations where rickettsial disease was the principal diagnosis on admission. Of these, three hospitalisations were for rickettsiosis (unspecified), two were for typhus fever (due to *Rickettsia typhi*), one was for Q fever, one was for spotted fever (due to *Rickettsia australis*), and one was for typhus fever (unspecified).

Figure 32. Rickettsial disease notifications, 1997–2011



Murine typhus

In 2011, five laboratory-confirmed cases of murine typhus were notified, from Waikato (2 cases), Waitemata (2 cases) and Auckland (1 case) DHBs.

Age and sex were recorded for all murine typhus cases in 2011. The cases were in the 20–29 years (2 cases), 40–49 years, 50–59 years and 70 years and over (1 case each) age groups. Of the five cases, two were female and three were male.

Ethnicity was recorded for four (80%) cases. All four cases were in the European or Other ethnic group.

Of the four (80.0%) cases for which hospitalisation status was recorded, three cases (75.0%) were hospitalised. Travel history was recorded for all cases. Three (60.0%) cases had not travelled overseas during the incubation period for the disease and are assumed to have acquired their infection in New Zealand. The remaining cases had travelled to Malaysia and Canada during the incubation period for the disease.

Q fever

In 2011, one laboratory-confirmed case of Q fever was notified. This case, a male in the 20–29 years age group and in the European or Other ethnic group, had travelled to Australia during the incubation period for the disease and had occupational exposure to the disease reservoir whilen Australia. The case was hospitalised. This is only the third case of Q fever notified in New Zealand since 1997.

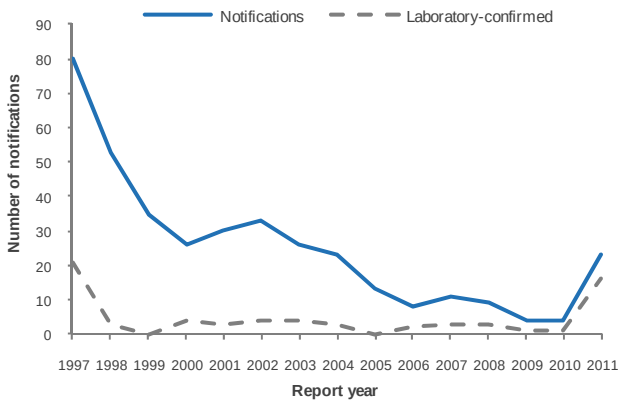
Rubella (German measles)

In New Zealand, rubella immunisation was introduced in 1970 and it has been a notifiable disease since June 1996 [20].

Twenty-three cases of rubella were notified in 2011 (compared with 4 cases in 2010), of which 16 cases were laboratory-confirmed. Since the last national outbreak in 1995, there has been a steady decrease in the number of rubella cases notified each year [20] (Figure 33). The increase in 2011 may reflect increased awareness of rash due to the measles outbreak.

The highest number of rubella cases in 2011 was in Auckland DHB (8 cases), followed by Canterbury (4 cases) and Waitemata (3 cases) DHBs.

Figure 33. Rubella notifications and laboratory-confirmed cases by year, 1997–2011



Age and sex were recorded for all cases. The highest numbers of cases were in the 20–29 years (8 cases), less than 1 year (4 cases) and 1–4 years (3 cases) age groups. Rubella notification rates among males (0.7 per 100 000 population, 16 cases) were higher than females (0.3 per 100 000, 7 cases).

Ethnicity was recorded for 22 (95.7%) cases. Cases were distributed by ethnic group as follows: European or Other (12 cases), Asian (6 cases), Māori (3 cases) and Pacific Peoples (1 case).

No hospitalisations due to rubella were reported in 2011.

The recommended vaccination schedule for rubella is two doses of the MMR vaccine, the first given at 15 months of age and second at 4 years of age [20]. Table 21 shows the vaccination status of rubella cases by age group. Of the 10 cases for which vaccination status was recorded, six were not vaccinated, including three cases aged less than 15 months. Three cases had received one dose of vaccine and one case reported having completed the MMR vaccination schedule.

Of the cases for which risk factor information was recorded, 26.7% (4/15) attended school, pre-school or childcare, and 47.1% (8/17) reported overseas travel during the incubation period for the disease

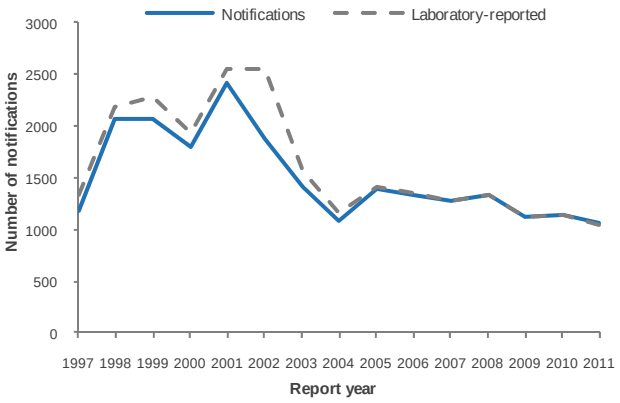
Table 21. Age group of rubella notifications and vaccination received, 2011

Age group	Total cases	One dose	Two doses	Vaccinated (no dose info)	Not vaccinated	Unknown
<15 months	5	0	0	0	3	2
15 months–3 years	2	1	0	0	1	0
4–9 years	2	1	1	0	0	0
10–19 years	2	1	0	0	0	1
20+ years	12	0	0	0	2	10
Total	**23**	**3**	**1**	**0**	**6**	**13**

Salmonellosis

In 2011, 1056 cases of salmonellosis were notified. The 2011 notification rate (24.0 per 100 000 population) was a significant decrease from the 2010 rate (26.2 per 100 000, 1146 cases). There has been a decreasing trend in the number of salmonellosis notifications since 2005 (Figure 34).

Figure 34. Salmonellosis notifications and laboratory-reported cases by year, 1997–2011



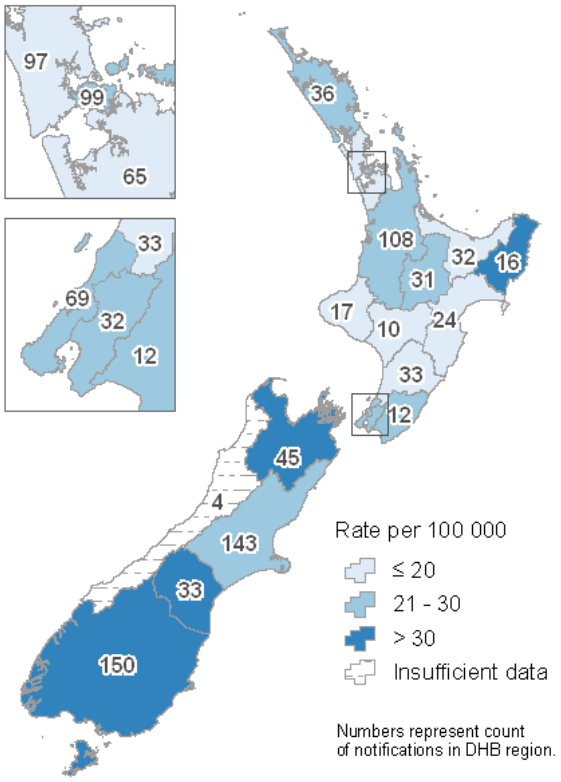
Rates varied throughout the country as illustrated in Figure 35. The highest rates were in South Canterbury (58.5 per 100 000 population, 33 cases) and Southern (48.9 per 100 000, 150 cases) DHBs.

Age was recorded for 1054 (99.8%) cases. As in previous years, the age-specific rates were highest in the less than 1 year (115.4 per 100 000 population, 72 cases) and 1–4 years (69.5 per 100 000, 175 cases) age groups. The lowest rate occurred in the 10–14 years age group (11.6 per 100 000, 34 cases).

Sex was recorded for 1048 (99.2%) cases. Sex-specific rates were higher for males (25.9 per 100 000 population, 560 cases) than females (21.8 per 100 000, 488 cases).

Ethnicity was recorded for 996 (94.3%) cases. The highest rate was in the MELAA ethnic group (26.5 per 100 000 population, 10 cases), followed by the European or Other (26.3 per 100 000, 801 cases), Pacific Peoples (15.4 per 100 000, 41 cases), Asian (14.8 per 100 000, 60 cases) and Māori (13.0 per 100 000, 84 cases) ethnic groups.

Figure 35. Salmonellosis notifications by DHB, 2011



Of the 707 (67.0%) cases for which hospitalisation status was recorded, 95 (13.4%) were hospitalised.

The risk factors recorded for salmonellosis are shown in Table 22. The most common risk factors reported were consumption of food from retail premises and contact with farm animals.

In 2011, 15 outbreaks of salmonellosis were reported involving 86 cases.

Table 22. Exposure to risk factors associated with salmonellosis, 2011

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Consumed food from retail premises	226	291	539	43.7
Contact with farm animals	196	366	494	34.9
Consumed untreated water	138	365	553	27.4
Travelled overseas during the incubation period	142	474	440	23.1
Contact with faecal matter	120	421	515	22.2
Recreational water contact	89	463	504	16.1
Contact with other symptomatic people	68	474	514	12.5
Contact with sick animals	44	474	538	8.5

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

The Enteric Reference Laboratory at ESR reported 1039 cases infected with *Salmonella* (exclusive of *S.* Paratyphi and *S.* Typhi reported elsewhere) in 2011.

Table 23 shows the number of cases of selected *Salmonella* serotypes and phage types reported from 2008 to 2011. The most common serotypes confirmed in 2011 were *S.* Typhimurium phage type RDNC-May 06 and *S.* Typhimurium phage type 160.

Figure 36 illustrates trends of selected *Salmonella* serotypes in recent years. Between 2007 and 2011, there was a noticeable increase in the number of cases infected with *S.* Typhimurium RDNC-May 06. This serotype, first confirmed in New Zealand in May 2006, has become one of the predominant serotypes identified in New Zealand each year. Serotypes with a decreasing trend in number of cases in the last five years were *S.* Typhimurium phage type 160, *S.* Infantis, *S.* Typhimurium phage type 1 and *S.* Typhimurium phage type 156.

Severe acute respiratory syndrome

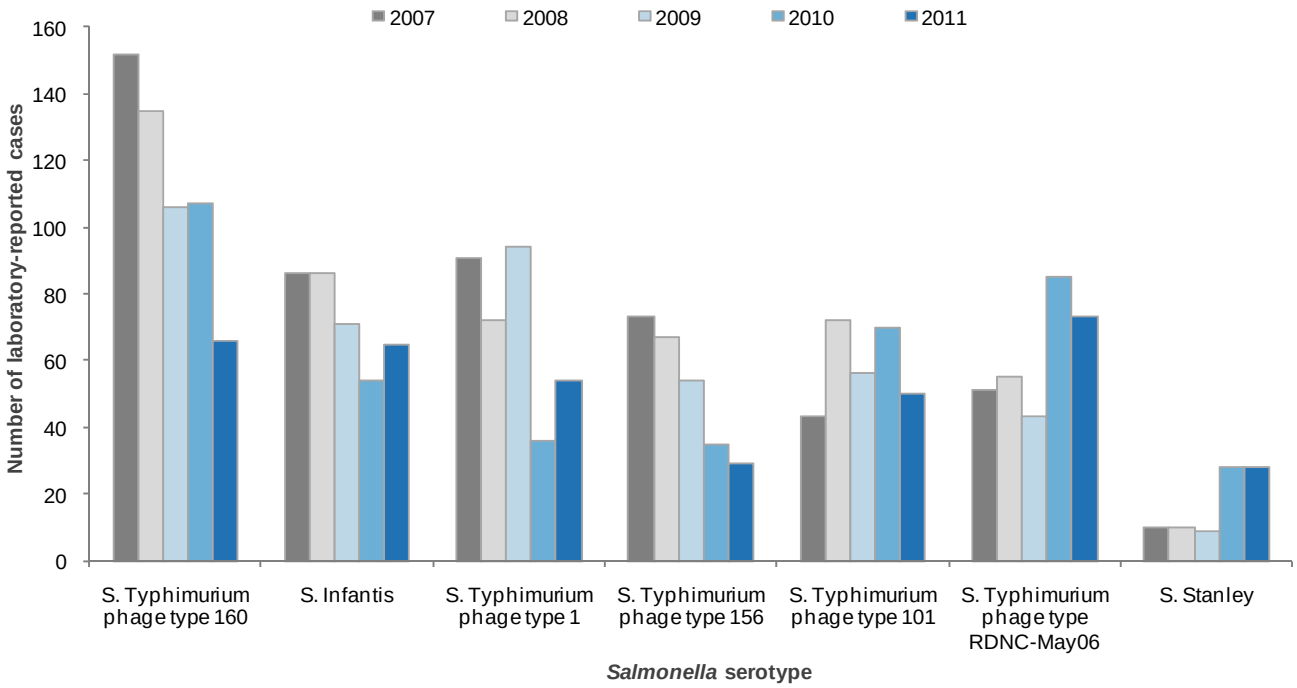
Between 20 March and 4 June 2003, 13 suspected cases of severe acute respiratory syndrome (SARS) were notified in New Zealand including one case in a traveller returning from China [30], subsequently reported to the World Health Organization as probable SARS. None of these cases tested positive for the SARS coronavirus [31]. There have been no cases of SARS reported in New Zealand since 2003.

Table 23. Selected *Salmonella* serotypes and phage types of laboratory-reported salmonellosis, 2008–2011

Serotype[a]	2008	2009	2010	2011
S. Typhimurium	**729**	**661**	**594**	**495**
160	135	106	107	66
101	72	56	70	50
1	72	94	36	54
135	27	20	48	47
156	67	54	35	29
42	93	40	26	14
RDNC[b]-May 06	55	43	85	73
Other or unknown	235	268	235	209
S. Enteritidis	**124**	**95**	**113**	**134**
9a	45	39	49	56
1b	19	4	5	8
26	10	2	1	2
Other or unknown	50	50	58	68
Other serotypes	**486**	**366**	**437**	**410**
S. Infantis	86	71	54	65
S. Brandenburg	33	36	47	34
S. Saintpaul	35	26	34	31
S. Stanley	10	9	28	28
S. Agona	10	10	12	20
S. Virchow	14	12	16	18
S. Mississippi	10	14	9	13
Other or unknown	298	197	265	229
Total	**1 339**	**1 122**	**1 144**	**1 039**

[a] Excludes *S.* Paratyphi and *S.* Typhi already noted elsewhere
[b] RDNC - reacts but does not conform to a known phage type pattern

Figure 36. Laboratory-reported cases of selected *Salmonella* serotypes and phage types by year, 2007–2011

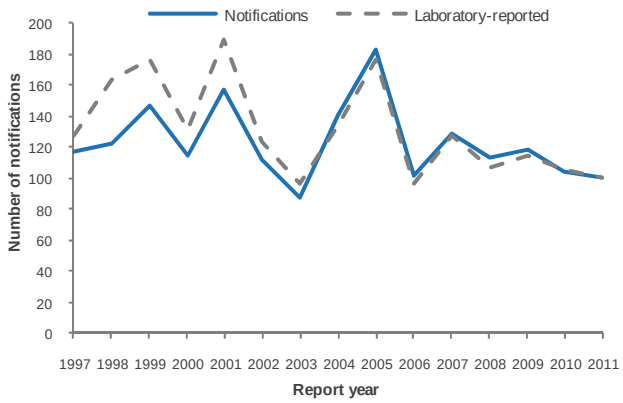


Shigellosis

In 2011, a total of 101 cases of shigellosis were notified. The 2011 notification rate (2.3 per 100 000 population) was slightly lower than the 2010 rate (2.4 per 100 000, 104 cases). There has been a slight decreasing trend since the peak of 183 notifications in 2005 (Figure 37).

The highest shigellosis notification rates in 2011 were in Waitemata (4.8 per 100 000 population, 26 cases), Counties Manukau (4.8 per 100 000, 24 cases) and Auckland (4.6 per 100 000, 21 cases) DHBs.

Figure 37. Shigellosis notifications and laboratory-reported cases by year, 1997–2011



Age and sex were recorded for all cases. The highest age-specific rate was in the 1–4 years age group (6.7 per 100 000 population, 17 cases), followed by the 20–29 years (3.6 per 100 000, 22 cases) and 5–9 years (3.1 per 100 000, 9 cases) age groups. Sex-specific rates were similar for males (2.3 per 100 000 population, 49 cases) and females (2.2 per 100 000, 50 cases).

Ethnicity was recorded for 89 (88.1%) cases. The highest notification rate was in the Pacific Peoples ethnic group (8.6 per 100 000 population, 23 cases), followed by the Asian (3.4 per 100 000, 14 cases), Māori (1.7 per 100 000, 11 cases) and European or Other (1.2 per 100 000, 38 cases) ethnic groups.

Hospitalisation status was recorded for 63 (62.5%) cases, of which 32 (50.8%) cases were hospitalised.

The risk factors recorded for shigellosis are shown in Table 24. The most common risk factor was overseas travel during the incubation period (75.6%, 34 cases). The most frequently visited countries reported were India (10 cases), Fiji (7 cases), and Australia (3 cases).

The Enteric Reference Laboratory at ESR reported 100 cases infected with *Shigella* during 2011. The predominant species identified were *Shigella sonnei* biotype a (38 cases, 38.0%), *S. sonnei* biotype g (20 cases, 20.0%), and *S. flexneri* 2a (15 cases, 15.0%).

Eleven outbreaks of shigellosis were reported in 2011 involving 77 cases.

Taeniasis

Ten cases of taeniasis were notified in 2011 (0.2 per 100 000 population), bringing the number of cases notified since 1997 to 27. All cases were overseas during the incubation period for the disease. Countries visited included Ethiopia (3 cases), Myanmar (2 cases), and one case each from Philippines, South Africa, Sudan, Thailand, and an unspecified country in the Central and West Africa region. All 27 cases that have been notified in New Zealand since 1997 have reported a history of overseas travel.

Table 24. Exposure to risk factors associated with shigellosis, 2011

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Travelled overseas during the incubation period	34	11	56	75.6
Consumed food from retail premises	13	14	74	48.1
Recreational water contact	7	20	74	25.9
Contact with other symptomatic people	6	18	77	25.0
Contact with faecal matter	5	21	75	19.2
Consumed untreated water	4	19	78	17.4
Contact with farm animals	1	25	75	3.8
Contact with sick animals	1	25	75	3.8

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

Tetanus

No cases of tetanus were notified in New Zealand in 2011. This was similar to the number of cases notified all years since 2004 (0–1 cases each year), except 2010 when seven cases were notified.

Between 1997 and 2011, a total of 28 tetanus cases were reported. Of these, three cases were children, two in the 1–4 years age group and one in the 5–9 years age group. None of the children were vaccinated. Among the 28 cases, two died from tetanus, both females in the 70 years and over age group (one was not vaccinated and the vaccination status of the other case was unknown).

Ministry of Health hospitalisation data for 2011 recorded three hospitalisations with the primary reason for admission being tetanus. All three admissions were male with one case in each of the following age groups: 20–29 years, 60–69 years and 70 years and over.

Toxic shellfish poisoning

Three cases of toxic shellfish poisoning were notified in 2011. This is a decrease compared with the previous year (9 cases). The cases were suspected of diarrhoeic shellfish poisoning, neurologic shellfish poisoning and paralytic shellfish poisoning (1 each).

The cases were reported from Bay of Plenty (2 cases) and Auckland (1 case) DHBs. All were male, in the European or Other ethnic group, and in the 15–19 years, 20–29 years, and 60–69 years (1 each) age groups. No hospitalisations were reported.

Two of the cases had collected tuatuas from Papamoa Beach. One case had consumed the tuatuas as fritters fried in oil and it is unknown whether the other case, who had also consumed other unspecified shellfish in the period prior to illness, had cooked or marinated the tuatuas before eating them. The remaining case had purchased and consumed mussel fritters from a food premises in Auckland.

No outbreaks of toxic shellfish poisoning were reported in 2011.

Trichinellosis

No cases of trichinellosis were notified in 2011. Trichinellosis, an infection caused by nematode worms of the genus *Trichinella*, was added to the notifiable disease schedule in 1988. Since then, there have been four notifications. The first case was reported in 1992 and an overseas source of infection was suspected [32]. The other three cases were linked to the consumption of infected pork meat in 2001.

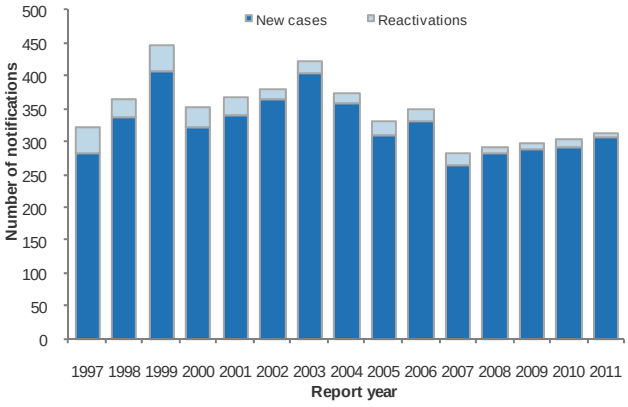
Tuberculosis disease

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

A full description of the epidemiology of tuberculosis and data on antimicrobial drug-resistant tuberculosis in New Zealand for 2011 will be reported separately in the Tuberculosis in New Zealand - Annual Report 2011 available from www.surv.esr.cri.nz in September 2012.

In 2011, 312 cases of tuberculosis disease (new and reactivations) were notified, of which six (1.9%) were reactivations (note that the term reactivation used in this context means cases with second or subsequent episodes of symptomatic tuberculosis disease with the same strain) giving a rate of 7.1 per 100 000 population. The rate of tuberculosis disease has remained steady around 7.0 per 100 000 over the last five years. In 2011, 231 (74.0%) cases were reported as laboratory-confirmed. Figure 38 shows the total number of new tuberculosis cases and reactivations reported since 1997.

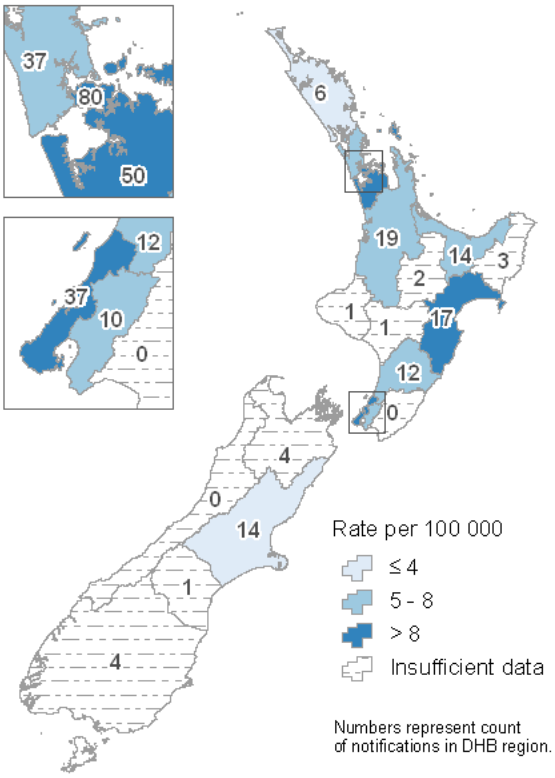
Figure 38. Tuberculosis notifications (new cases and reactivations) by year, 1997–2011



New tuberculosis cases

In 2011, the rates of new tuberculosis notifications per 100 000 population differed by geographical region (Figure 39). Auckland DHB had the highest notification rate (17.3 per 100 000 population, 79 cases), followed by Capital and Coast (12.6 per 100 000, 37 cases) and Hawke's Bay (10.9 per 100 000, 17 cases) DHBs.

Figure 39. Tuberculosis notifications (new cases) by DHB, 2011



Age was recorded for all cases and sex was recorded for 304 (99.3%) cases. There were 11 cases aged less than 10 years, of which three were infants aged less than 1 year. Age-specific rates were highest for males in the 20–29 years age group (14.0 per 100 000 population, 44 cases), males aged 70 years and over (12.2 per 100 000, 22 cases), and females aged 20–29 years (11.5 per 100 000, 35 cases). Overall, sex-specific rates were slightly higher for males (7.2 per 100 000, 156 cases) compared with females (6.6 per 100 000, 148 cases) for new tuberculosis cases.

Ethnicity was recorded for 297 (97.1%) cases. The highest notification rate was in the Asian ethnic group (40.3 per 100 000 population, 164 cases), followed by the MELAA (39.8 per 100 000, 15 cases), Pacific Peoples (18.0 per 100 000, 48 cases), Māori (5.9 per 100 000, 38 cases) and European or Other (1.0 per 100 000, 32 cases) ethnic groups.

Hospitalisation status was recorded for 291 (95.1%) new tuberculosis disease cases in 2011, of which 163 (56.0%) were hospitalised. Two deaths due to tuberculosis were reported in 2011, both cases were aged over 60 years.

Bacillus Calmette-Guérin (BCG) vaccination status was recorded for 164 (53.6%) cases, of which 122 (74.4%) had been vaccinated. Of the eight cases aged under 5 years, five (62.5%) had been vaccinated.

In 2011, 75.8% (226/298) were born outside New Zealand. Among the 72 cases that were born in New Zealand, 18 cases had been or were presently residing with a person born outside New Zealand.

Approximately 28% (66/230) of new tuberculosis cases reported contact with a confirmed case of tuberculosis.

Reactivations of tuberculosis

The six tuberculosis reactivation cases reported in 2011 were from five DHBs: Canterbury (2 cases), Waitemata, Auckland, Counties Manukau and MidCentral (1 case each). Three cases were in the 20–29 years age group, one in the 40–49 years age group and two in the 60 years and over age group. There were three male and three female tuberculosis reactivation cases. The cases were in the Pacific Peoples (2 cases), Māori, Asian, MELAA 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 five of the reactivation cases. Two cases were born and diagnosed with tuberculosis disease in New Zealand, one case was born in New Zealand but was diagnosed overseas and two cases were born and diagnosed overseas. All five cases had been previously treated for tuberculosis disease.

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

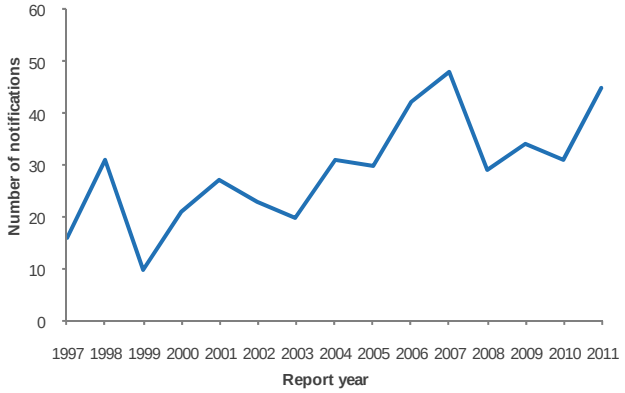
Of the three cases where BCG vaccination status was recorded, one case had been vaccinated. The case was in the 20–29 years age group.

Three outbreaks due to *Mycobacterium tuberculosis* were reported in 2011 involving 25 cases.

Typhoid fever

There were 45 cases of typhoid fever notified in 2011. The 2011 notification rate (1.0 per 100 000 population) was slightly higher than the 2010 rate (0.7 per 100 000, 31 cases) and the 2009 rate (0.8 per 100 000, 34 cases). Figure 40 shows the number of typhoid fever notifications by year since 1997.

Figure 40. Typhoid fever notifications by year, 1997–2011



Thirty-six cases (80.0%) were reported in the Auckland region (includes Waitemata, Auckland and Counties Manukau DHBs). The highest rates were in Waitemata (2.7 per 100 000 population, 15 cases), Auckland (2.4 per 100 000, 11 cases) and Counties Manukau (2.0 per 100 000, 10 cases) DHBs.

Age and sex were recorded for all cases. Age-specific rates were highest in the 5–9 years (2.4 per 100 000 population, 7 cases) and 20–29 years (2.1 per 100 000, 13 cases) age groups.

Sex-specific rates were similar for males (1.1 per 100 000 population, 23 cases) and females (1.0 per 100 000, 22 cases).

Ethnicity was recorded for 44 (97.8%) cases. The highest notification rates were in the Pacific Peoples (6.8 per 100 000 population, 18 cases) and Asian (5.2 per 100 000, 21 cases) ethnic groups.

Hospitalisation status was recorded for 30 (66.7%) cases, of which 28 (93.3%) cases were hospitalised.

Of the 45 cases notified in 2011, 31 (68.9%) cases had reported overseas travel during the incubation period. The countries visited included India (14 cases), Samoa (8 cases), Bangladesh (2 cases), Singapore (2 cases), Bolivia, Guatemala, Indonesia, Mexico, Nepal, Pakistan, Philippines, Saudi Arabia and Tonga (1 case each). Note that cases may have travelled to more than one country.

The Enteric Reference Laboratory at ESR reported 43 cases infected with *Salmonella* Typhi in 2011. The most common phage types identified were *S.* Typhi phage type E1a (22 cases) and *S.* Typhi phage type E7 variant (5 cases).

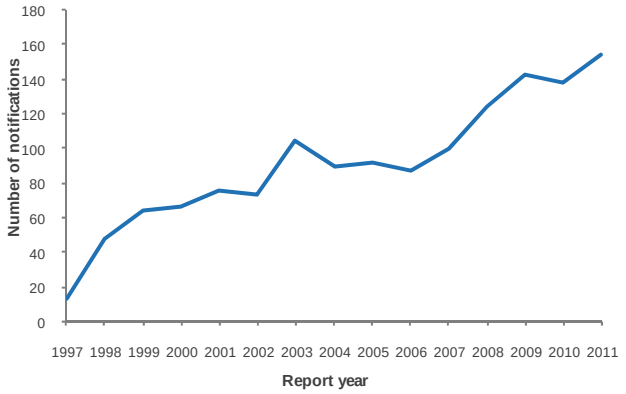
Five outbreaks due to typhoid fever were reported in 2011 involving 17 cases.

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

There were 154 cases of verotoxin- or Shiga toxin-producing *Escherichia coli* (VTEC/STEC) infection notified in 2011. The 2011 notification rate (3.5 per 100 000 population) was similar to the 2010 rate (3.2 per 100 000, 138 cases). Figure 41 shows the number of notified cases of VTEC/STEC infection each year since 1997.

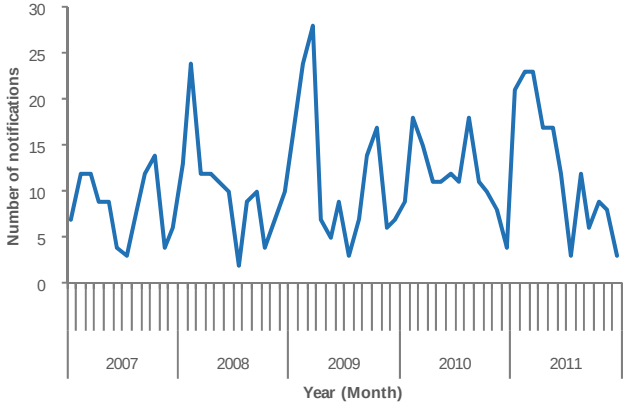
Six paediatric cases of VTEC/STEC-associated haemolytic uraemic syndrome (HUS) were reported to the NZPSU in 2011.

Figure 41. VTEC/STEC notifications by year, 1997–2011



VTEC/STEC infection notifications follow a seasonal pattern, showing peaks during autumn and spring. as illustrated in Figure 42.

Figure 42. VTEC/STEC infection notifications by month, January 2007–December 2011



Rates for VTEC/STEC infection varied throughout the country, with the highest rates in Waikato (8.2 per 100 000 population, 30 cases), Taranaki (8.2 per 100 000, 9 cases) and Northland (5.1 per 100 000, 8 cases) DHBs.

Age was recorded for all cases of VTEC/STEC infection. The highest rates were in the 1–4 years age group (23.8 per 100 000 population, 60 cases), followed by the less than 1 year (14.4 per 100 000, 9 cases) and 5–9 years (4.5 per 100 000, 13 cases) age groups.

Sex was recorded for 153 (99.4%) cases. The rate was higher for females (3.8 per 100 000 population, 85 cases) than males (3.1 per 100 000, 68 cases).

Ethnicity was recorded for 151 (98.1%) cases. Of these, the highest notification rate was in the European or Other ethnic group (4.3 per 100 000 population, 131 cases), followed by the Māori ethnic group (2.0 per 100 000, 13 cases).

Of the 133 (86.4%) notified cases for which hospitalisation status was recorded, 57 (42.9%) were hospitalised.

The risk factors recorded for VTEC/STEC infection cases reported in 2011 are shown in Table 25. The most common risk factors reported were contact with pets, contact with farm animals and contact with animal manure.

The foods consumed by cases are shown in Table 26. The most common foods consumed were raw fruit or vegetables, dairy products and beef or beef products.

The Enteric Reference Laboratory at ESR reported 153 cases infected with VTEC/STEC in 2011. Of these, 139 (90.8%) were identified as serotype O157:H7 and 14 (9.2%) as non-O157:H7.

Two outbreaks of VTEC/STEC infection were reported in 2011, involving seven cases.

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 2011, a total of 514 cases of yersiniosis were notified. The 2011 notification rate (11.7 per 100 000 population) was a significant increase from the 2010 rate (9.3 per 100 000, 406 cases), but similar to the rates (11.9 per 100 000) for 2007 and 2008. Figure 43 shows the number of notified yersiniosis cases by year since 1997.

Table 25. Exposure to risk factors associated with VTEC/STEC infection, 2011

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Contact with pets	70	6	78	92.1
Contact with farm animals	45	27	82	62.5
Contact with animal manure	27	30	97	47.4
Contact with other animals	19	39	96	32.8
Contact with recreational water	32	82	40	28.1
Contact with children in nappies	27	79	48	25.5
Contact with a person with similar symptoms	21	92	41	18.6
Travelled overseas during the incubation period	4	115	35	3.4

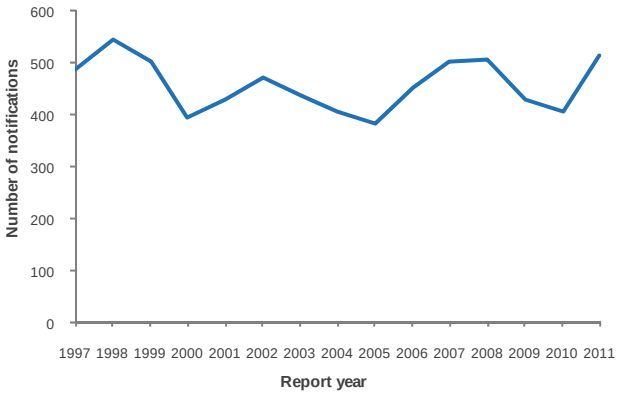
[a] Percentage refers to the number of cases that answered "yes" out of the total number of cases for which this information was supplied. Cases may have more than one risk factor recorded.

Table 26. Foods consumed by VTEC/STEC infection cases, 2011

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Raw fruit or vegetables	94	16	44	85.5
Dairy products	91	23	40	79.8
Beef or beef products	86	28	40	75.4
Chicken or poultry	79	33	42	70.5
Processed meat	75	37	42	67.0
Fruit or vegetable juice	35	67	52	34.3
Lamb or hogget or mutton	32	70	52	31.4
Home kill meat	31	77	46	28.7
Pink or undercooked meat	9	90	55	9.1
Unpasteurised milk or milk products	7	104	43	6.3

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

Figure 43. Yersiniosis notifications by year, 1997–2011



Rates varied throughout the country as illustrated in Figure 44. The highest rates were in the Waikato (22.8 per 100 000 population, 84 cases), West Coast (18.2 per 100 000, 6 cases), Capital and Coast (17.6 per 100 000, 52 cases) and Hutt Valley (17.3 per 100 000, 25 cases) DHBs.

Age was recorded for all cases. Age-specific rates were highest in the less than 1 year age group (65.7 per 100 000 population, 41 cases), followed by the 1–4 years age group (53.2 per 100 000, 134 cases).

Sex was recorded for 509 (99.0%) of the cases. Sex-specific rates were slightly higher for males (12.1 per 100 000 population, 261 cases) than for females (11.1 per 100 000, 248 cases).

Ethnicity was recorded for 486 (94.6%) cases. The highest notification rate was in the Asian ethnic group (31.2 per 100 000 population, 127 cases), followed by the MELAA (13.3 per 100 000, 5 cases), European or Other (9.8 per 100 000, 300 cases), Pacific Peoples (8.6 per 100 000, 23 cases) and Māori (4.8 per 100 000, 31 cases) ethnic groups.

Of the 288 (56.0%) notified cases for which hospitalisation status was recorded, 41 (14.2%) were hospitalised.

The risk factors recorded for yersiniosis cases reported in 2011 are shown in Table 27. 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 433 isolates and *Yersinia pseudotuberculosis* in eight isolates referred from clinical laboratories during 2011. The most common *Y. enterocolitica* biotype identified was biotype 4 (187 cases, 43.2%), followed by biotype 2 (131 cases, 30.3%), biotype 1A (79 cases, 18.2%) and biotype 3 (36 cases, 8.3%).

Two outbreaks due to *Yersinia* were reported in 2011 involving four cases.

Figure 44. Yersiniosis notifications by DHB, 2011

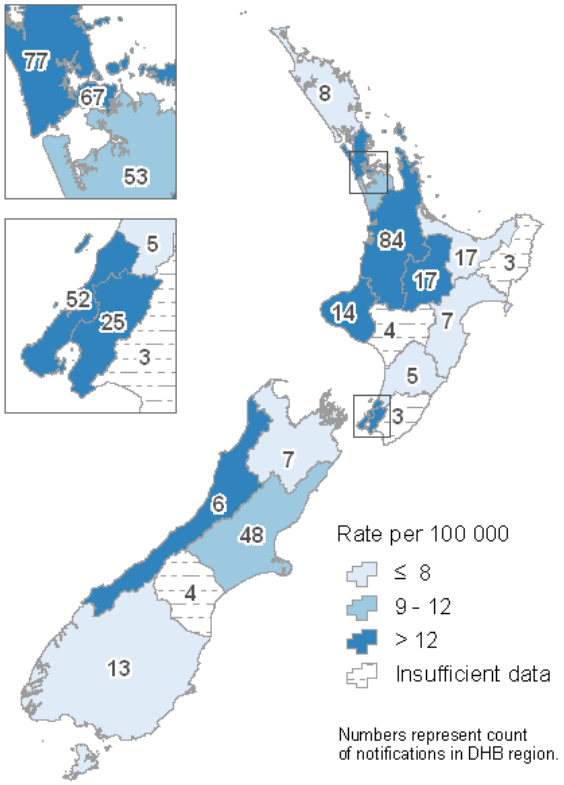


Table 27. Exposure to risk factors associated with yersiniosis, 2011

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Consumed food from retail premises	113	111	290	50.4
Contact with farm animals	81	159	274	33.8
Contact with faecal matter	52	184	278	22.0
Recreational water contact	39	197	278	16.5
Consumed untreated water	36	184	294	16.4
Contact with other symptomatic people	21	221	272	8.7
Travelled overseas during the incubation period	17	241	256	6.6
Contact with sick animals	7	213	294	3.2

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

NON-NOTIFIABLE DISEASES

NON-NOTIFIABLE DISEASES

Influenza

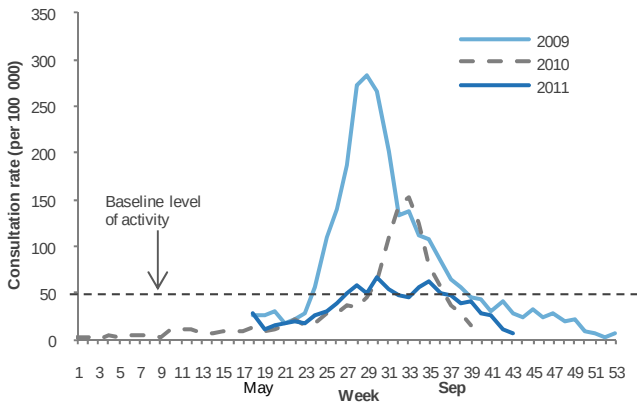
A full report on influenza surveillance in New Zealand for 2011 is reported separately in the 2011 Influenza Surveillance in New Zealand report available at www.surv.esr.cri.nz [33].

On average, 81 practices, with a total patient roll of 385 108, participated in the influenza sentinel surveillance system each week from May to October 2011 (extended by a month to cover the Rugby World Cup event held in New Zealand during September and October 2011). During the surveillance period, 3596 consultations for ILI were reported. It is estimated that influenza-like illness (ILI) resulting in a visit to a general practitioner affected over 41 133 people in New Zealand (0.9% of total population) [33].

The average weekly consultation rate from May to September 2011 was 40.4 per 100 000 patient population, which is lower than the 2010 rate (50.9 per 100 000) and the 2009 rate (109.2 per 100 000). This was the fourth lowest rate since 1997. The previous high rates were in 1997 (163.7 per 100 000) and 1999 (112.3). The lowest rate was recorded in 2000 (32.5 per 100 000).

Overall, influenza activity in 2011 was low. The influenza consultation rate remained at or below the baseline level (50.0 per 100 000) from weeks 18 to 27, and it then increased to a peak in week 30 (25–31 July), with a consultation rate of 66.1 per 100 000 patient population (Figure 45). The 2011 peak was lower than the peaks in 2010 and 2009 (151.6 and 284.0 per 100 000, respectively). The highest peak since 1997 was in 2009 (284.0 per 100 000) and 1997 (244.2). The lowest peak was recorded in 2000 (41.7).

Figure 45. Weekly sentinel surveillance consultation rates for influenza-like illness, 2009–2011



Consultation rates varied among DHBs, with rates highest in Waitemata (65.4 per 100 000 patient population), Whanganui (56.8 per 100 000) and South Canterbury (56.4 per 100 000) DHBs (Figure 46).

Figure 46. Sentinel average weekly consultation rates for influenza-like illness by DHB, 2011

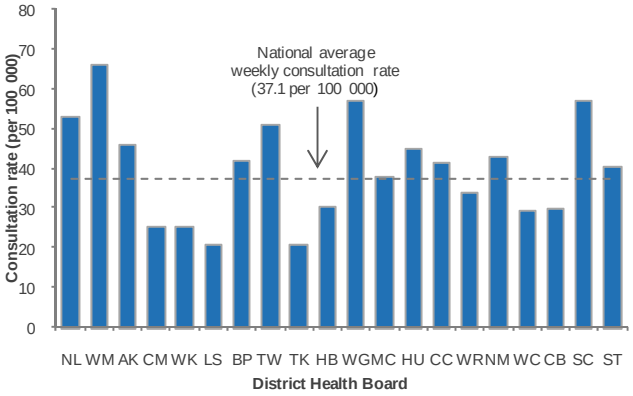
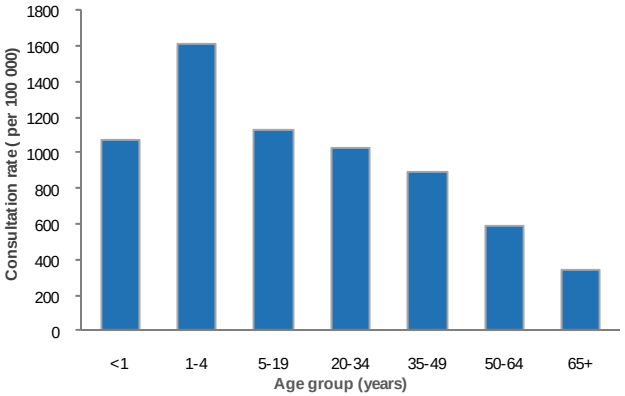


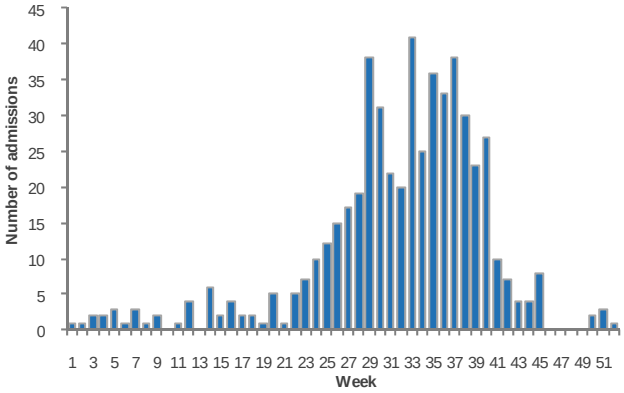
Figure 47 shows the average weekly ILI consultation rates by age group. The highest consultation rate for ILI was for children in the 1–4 years age group (1606.6 per 100 000 patient population) and those in the 5–19 years age group (1126.2 per 100 000). Elderly people (aged 65 years and older) had the lowest ILI consultation rate at 338.1 per 100 000.

Figure 47. Sentinel average weekly consultation rates for ILI by age group, 2011



Ministry of Health hospitalisation data for 2011 recorded 532 hospitalisations with the primary reason for admission being influenza. This was lower than in 2010 and 2009 (998 and 1517, respectively). Figure 48 shows the number of hospitalisations by week discharged, of which 88.2% (469) occurred from June to October. The highest number of hospitalisations (134) occurred in September. Hospitalisations peaked in week 33. Numbers of sentinel and non-sentinel influenza viruses detected peaked in weeks 33 and 36, and ILI consultation numbers peaked in week 30.

Figure 48. Influenza hospitalisation by week discharged, 2011

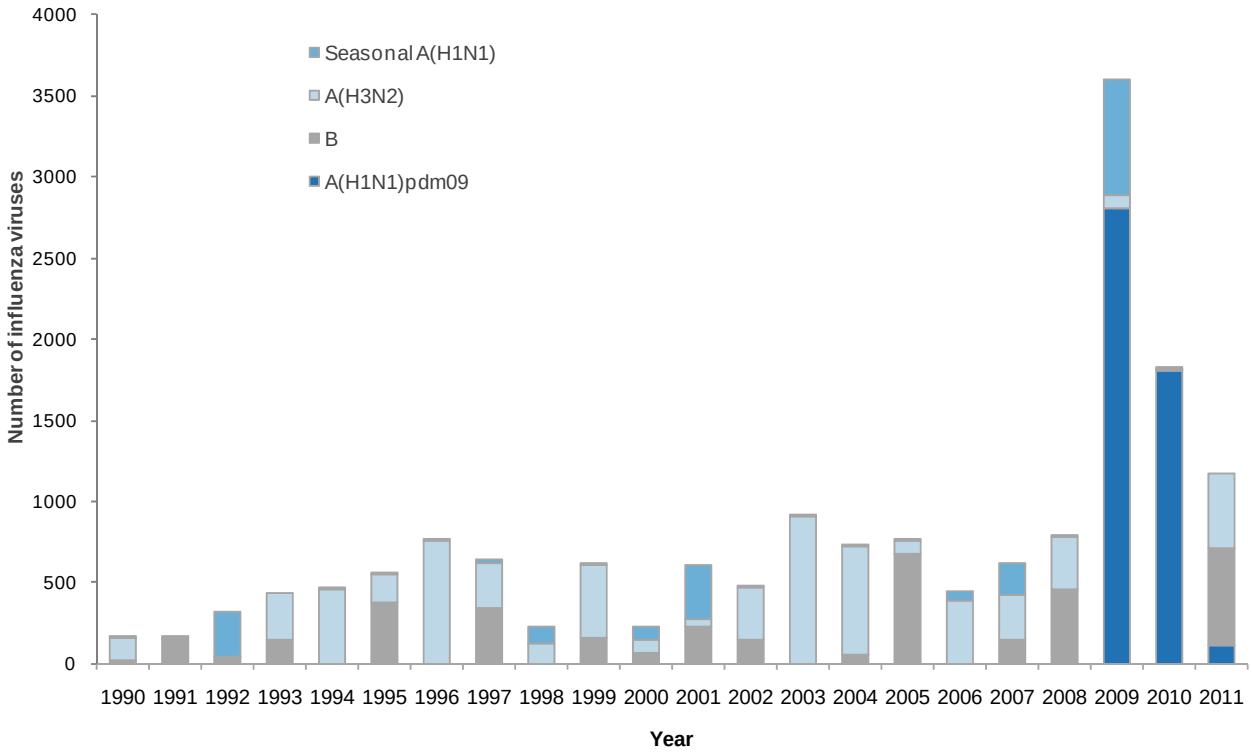


A total of 1268 influenza viruses were identified in 2011, lower than in 2010 and 2009 (2012 and 4900 viruses, respectively). Of the 1268 viruses identified, 336 came from sentinel practice surveillance from May to October, compared with 349 in 2010 (January to September) and 624 in 2009 (May to December). There were 932 non-sentinel viruses identified in 2011 compared with 1663 in 2010 and 4276 in 2009.

In 2011, influenza B was the predominant strain among all influenza viruses (46.7%, 592/1268), with B/Victoria lineage viruses (B/Brisbane/60/2008-like strain) representing 22.5% (276/1176) of all antigenically typed and subtyped viruses. Seasonal A(H3N2) represented one-third of all viruses. There was a small proportion of influenza A(H1N1)pdm09 viruses (9.3%, 118/1268).

Figure 49 shows the number and percentage of typed and subtyped influenza viruses from 1990 to 2011. There are noticeable changes in terms of predominant patterns. These are described next.

Figure 49. Influenza viruses by type, 1990–2011



Influenza A(H1N1) viruses

In 2011, influenza A(H1N1) viruses represented 9.3% 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 are closely related to the vaccine strain A/California/7/2009 (H1N1). The seasonal influenza A(H1N1) strain has not been detected since 2010 in New Zealand.

Influenza A(H3N2) viruses

In 2011, 39.6% of the typed/subtyped viruses were influenza A(H3N2). They were antigenically closely related to the 2011 vaccine strain A/Perth/16/2009 (H3N2)-like strain.

From 1990 to 2011, influenza A(H3N2) viruses predominated for 11 seasons in 1990 (83.2%), 1993 (65.7%), 1994 (98.7%), 1996 (99.1%),1998 (51.7%),1999 (73.7%), 2002 (68.0%), 2003 (99.6%), 2004 (91.3%), 2006 (86.3%) and 2007 (45.0%).

The highest number of deaths due to influenza (94 in 1996) in New Zealand was recorded during an A(H3N2) epidemic. The highest number of hospitalisations due to influenza (552) recorded by the Ministry of Health was in 2003 due to a season predominated by influenza A(H3N2) viruses.

Influenza B viruses

In 2011, there were 592 influenza B viruses detected, of which 280 were antigenically typed: 276 as B/Victoria lineage (B/Brisbane/60/2008-like) and four as B/Yamagata lineage (B/Florida/4/2006-like).

From 1990 to 2011, influenza B viruses predominated for six seasons in 1991 (92.3%), 1995 (68.8%), 1997 (53.5%), 2005 (87.0%), 2008 (58.3%) and 2011 (46.7%). Two antigenically distinct lineages of influenza B have co-circulated in many countries since the late 1980s. The B/Yamagata/16/88 lineage (most recent representative strain-B/Florida/4/2006) circulated worldwide, whereas the B/Victoria/2/87 lineage viruses only circulated in Asia and subsequently underwent independent evolution as an antigenically distinct lineage (most recent representative strain-B/Brisbane/60/2008). For reasons not wholly understood, the B/Victoria/2/87 lineage viruses remained geographically restricted to Asia until 2001.

Since the introduction of the B/Victoria lineage viruses into New Zealand in 2002, 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). The influenza B viruses have been associated with high disease burden in young children, and the B/Victoria lineage viruses have been associated with more explosive school outbreaks than the B/Yamagata lineage viruses in New Zealand.

Oseltamivir resistance monitoring

In 2011, the flurometric neuraminidase inhibition assay emplowed by the National Influenza Centre at ESR tested a total of 261 influenza viruses. All viruses were sensitive to oseltamivir with mean IC50 values for influenza A(H1N1)pdm09 at 0.54nM, influenza A(H3N2) at 0.46nM and influenza B at 31.9nM.

Influenza vaccine strain recommendations

Characterisation of the influenza viruses isolated during the 2011 winter indicated that there was no requirement to change any of the three components of the current vaccine. Accordingly, the 2012 southern hemisphere winter influenza vaccine has the following composition:

A(H1N1)	an A/California/7/2009(H1N1)-like strain
A(H3N2)	an A/Perth/16/2009(H3N2)-like strain
B	a B/Brisbane/60/2008-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.

Sexually transmitted infections

This brief report summarises the epidemiology of sexually transmitted infections (STIs) for 2011, and examines trends since 2006 using clinic-based and laboratory-based surveillance. A full description will be reported separately in the Sexually Transmitted Infections in New Zealand: Annual Surveillance Report 2011 available from www.surv.esr.cri.nz in May 2012.

The AIDS Epidemiology Group (AEG) carries out national surveillance of acquired immune deficiency syndrome (AIDS) and human immunodeficiency virus (HIV). A summary of the AIDS notifications for 2011 can be found in the AIDS section under notifiable diseases in this report.

Laboratory surveillance methods

Chlamydia and gonorrhoea data were provided voluntarily from 40 participating laboratories across 18 DHBs in New Zealand in 2011. 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.

As laboratories began supplying data at different times and some gaps in the data supply 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 had to be met for each analysis type.

1. Annual analysis

Each laboratory in the DHB must have provided data for all 12 months of 2011.

2. Restricted national rates

These rates enable comparison of national rates between years. For a DHB to be included in the restricted national rate trend analysis, the selected DHB must have met the selection criteria and provided data for all 12 months of each of the last five years.

3. Individual DHB trend analysis

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

In some cases, where a community laboratory carried out 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).

Clinic-based surveillance methods

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

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 2010 (504 435) and 2011 (502 609). More females than males were seen in each clinic setting: SHCs (60.6% female), FPCs (95.8%) and SYHCs (69.2%).

Chlamydia

Chlamydia data was available from both laboratory and clinic based surveillance sources in 2011. In 2011, genital *Chlamydia trachomatis* infection was the most commonly reported STI in New Zealand.

Laboratory surveillance

Annual 2011 analysis

In 2011, 39 laboratories provided chlamydia data, of these, 35 laboratories from 15 DHBs met the selection criteria for chlamydia reporting. Laboratories in these DHBs tested 293 456 specimens for chlamydia, of which 26 400 (9.0%) specimens tested positive from 25 666 patients. This represented a national rate of 7.9 per 1000 population.

Table 28 presents the percentage of specimens testing positive for chlamydia, number and rate per 1000 population of laboratory-confirmed chlamydia cases by DHB and sex for 2011

The national rate of chlamydia for females (11.5 per 1000 population) was nearly three-times the national rate for males (4.1 per 1000 population). The highest rate of chlamydia was in Tairawhiti DHB (15.1 per 1000 population), followed by Lakes (12.7 per 1000 population) and Hawke's Bay (10.1 per 1000 population) DHBs.

Restricted national rate trend analysis

Twelve DHBs met the selection criteria for the restricted national rate trend analysis for chlamydia. From 2008 to 2011, the chlamydia restricted national rate remained the same (7.8 per 1000 population). The chlamydia restricted national rates for 2008 to 2011 are shown in Figure 50.

Individual DHB trend analysis

Fifteen DHBs met the selection criteria for the individual DHB trend analysis. From 2007 to 2011 chlamydia rates varied among DHBs and across years. Notably, MidCentral, Tairawhiti and Lakes DHBs had increasing chlamydia rates over this period, while Bay of Plenty and Taranaki DHBs had decreasing rates. Chlamydia rates by DHB for 2007 to 2011 are shown in Figure 51.

Figure 50. Chlamydia restricted national rate 2008–2011

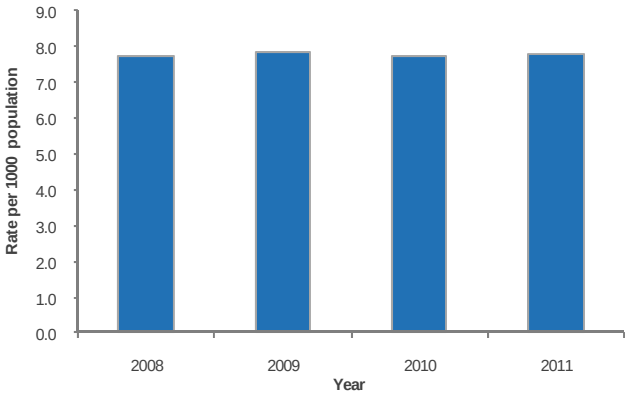


Table 28. Percentage of specimens testing positive for chlamydia, number and rate per 1000 population of laboratory-confirmed chlamydia cases by DHB and sex, 2011

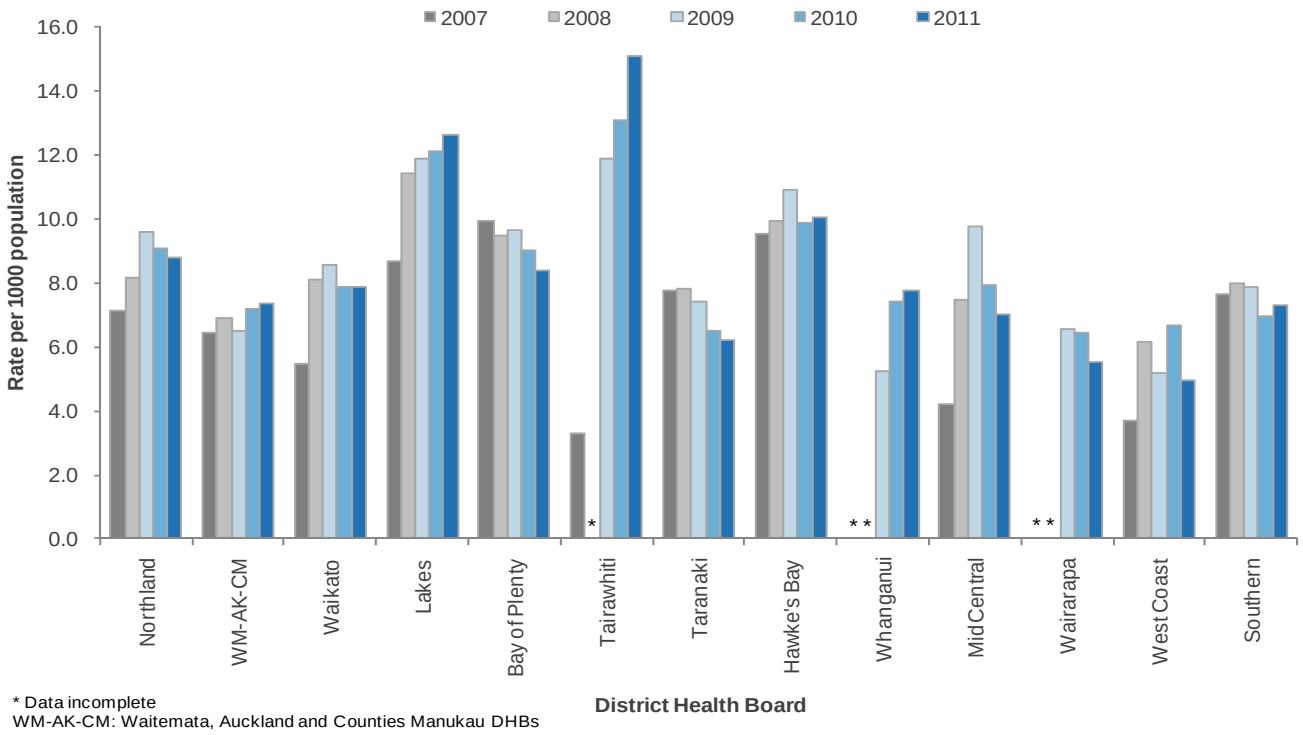
District Health Board	Specimens testing positive (%)	Number of laboratory-confirmed cases				Rate per 1000 population		
		Male	Female	Unknown	Total	Male	Female	Total
Northland	11.6	312	1 075	6	1 393	4.0	13.4	8.8
Auckland region[a]	7.8	2 952	8 103	7	11 062	4.0	10.6	7.4
Waikato	9.8	768	2 114	1	2 883	4.2	11.3	7.8
Lakes	11.9	271	1 048	2	1 321	5.3	19.7	12.6
Bay of Plenty	10.2	424	1 346	7	1 777	4.1	12.4	8.4
Tairawhiti	14.5	160	541	2	703	7.1	22.7	15.1
Taranaki	8.4	210	471	1	682	3.9	8.5	6.2
Hawke's Bay	12.3	369	1 191	0	1 560	4.9	15.0	10.1
Whanganui	11.8	111	368	0	479	3.7	11.7	7.8
MidCentral	10.5	341	838	3	1 182	4.2	9.7	7.0
Wairarapa	10.9	47	178	0	225	2.4	8.6	5.5
West Coast	8.0	48	114	1	163	2.9	7.1	5.0
Southern	7.8	600	1 623	13	2 236	4.0	10.5	7.3
Other[b]	7.1	479	905	0	1 384	-	-	
Total[c]	**9.0**	**6 613**	**19 010**	**43**	**25 666**	**4.1**	**11.5**	**7.9**

[a] Includes Waitemata, Auckland and Counties Manukau DHBs

[b] Data from DHBs where selection criteria were not met

[c] Total and rate calculations include only cases and population for DHBs meeting the selection criteria

Figure 51. Chlamydia rates by DHB, 2007–2011



* Data incomplete
WM-AK-CM: Waitemata, Auckland and Counties Manukau DHBs

Clinic surveillance

The numbers of confirmed cases of chlamydia reported by SHCs, FPCs and SYHCs were 5343 cases, 2827 cases and 965 cases, respectively (Table 29).

Between 2010 and 2011, the chlamydia clinic case counts increased by 7.1% in SHCs (4990 to 5343 cases), 11.6% in FPCs (2534 to 2827 cases) and 1.7% in SYHCs (949 to 965 cases).

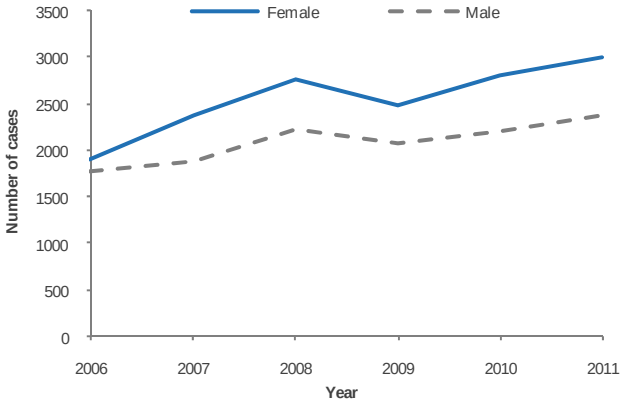
Table 29. Number of confirmed chlamydia cases by sex and clinic setting, 2011

	Clinic type		
	SHC	FPC	SYHC
No. of cases	**5 343**	**2 827**	**965**
Male	2 359	377	244
Female	2 984	2 450	721

From 2006 to 2011, the chlamydia clinic case counts increased by 53.1% in SHCs (3489 to 5343 cases) and 62.2% in SYHCs (595 to 965 cases). In contrast, the chlamydia clinic case count decreased by 1.7% in FPCs (2875 to 2827 cases).

During this period, the chlamydia clinic case counts at SHCs increased by 35.3% in males (1743 to 2359 cases) and 70.9% in females (1746 to 2984 cases) (Figure 52).

Figure 52. Number of confirmed chlamydia cases reported at SHCs by year, 2006–2011



Genital herpes (first presentation)

Genital herpes data was available from clinic-based surveillance sources in 2011.

In 2011, the clinic counts of genital herpes (first presentation) reported by SHCs, FPCs and SYHCs were 869 cases, 189 cases and 108 cases, respectively (Table 30).

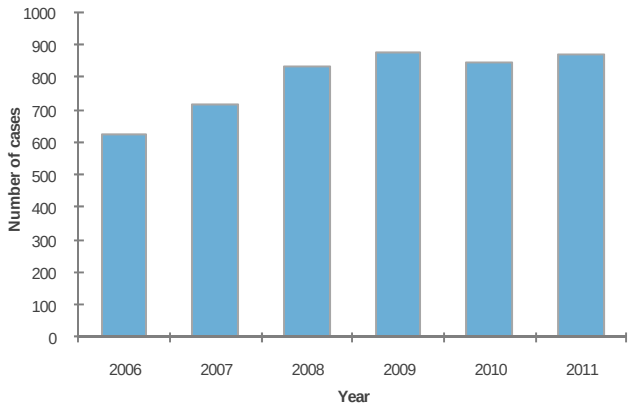
Table 30. Number of genital herpes (first presentation) cases by sex and clinic setting, 2011

	Clinic type		
	SHC	FPC	SYHC
No. of cases	**869**	**189**	**108**
Male	384	27	27
Female	485	162	81

Between 2010 and 2011, the genital herpes clinic case counts increased by 2.7% in SHCs (846 to 869 cases), 0.5% in FPCs (188 to 189 cases) and 33.3% in SYHCs (81 to 108 cases).

From 2006 to 2011, the genital herpes clinic case counts increased by 38.3% in SHCs (626 to 869 cases), 51.2% in FPCs (125 to 189 cases) and by 56.5% in SYHCs (69 to 108 cases) (Figure 53). Routine clinic surveillance methods in New Zealand do not facilitate the collection of data on the type of herpes simplex virus infection, so it is not possible to determine if the trends in genital herpes differ by type of viral infection.

Figure 53. Number of cases of genital herpes (first presentation) reported at SHCs by year, 2006–2011



Genital warts (first presentation)

Genital warts data was available from clinic-based surveillance sources in 2011.

In 2011, the clinic counts of genital warts (first presentation) reported by SHCs, FPCs and SYHCs were 2469 cases, 276 cases and 160 cases, respectively (Table 31).

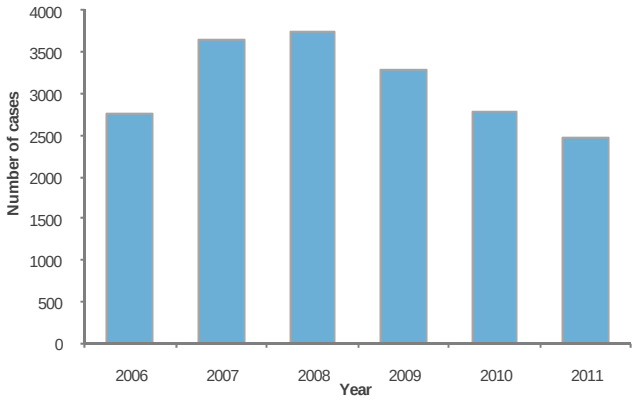
Table 31. Number of genital warts (first presentation) cases by sex and clinic setting, 2011

	Clinic type		
	SHC	FPC	SYHC
No. of cases	**2 469**	**276**	**160**
Male	1 340	90	61
Female	1 129	186	99

Between 2010 and 2011, the genital warts clinic case counts decreased by 10.9% in SHCs (2772 to 2469 cases), 8.6% in FPCs (302 to 276 cases) and 12.1% in SYHCs (182 to 160).

From 2006 to 2011, the genital warts clinic case counts decreased by 10.6% in SHCs (2762 to 2469 cases), 51.6% in FPCs (570 to 276 cases) and 24.9% in SYHCs (213 to 160 cases) (Figure 54).

Figure 54. Number of cases of genital warts (first presentation) reported at SHCs by year, 2006–2011



Gonorrhoea

Gonorrhoea data was available from both laboratory and clinic-based surveillance sources in 2011.

Laboratory surveillance

Annual 2011 analysis

In 2011, 39 laboratories provided gonorrhoea data. Of these, 35 laboratories from 17 DHBs met the selection criteria for gonorrhoea reporting. Laboratories in these DHBs tested 369 904 specimens for gonorrhoea, of which 2996 (0.8%) specimens tested positive from 2466 patients. This represented a national rate of 67 gonorrhoea cases per 100 000 population.

Table 32 presents the percentage of specimens testing positive for gonorrhoea, number and rate per 100 000 population of laboratory-confirmed gonorrhoea cases by DHB and sex for 2011.

The national rate of gonorrhoea in males (79 per 100 000 population) was 1.4-times the national rate in females (55 per 100 000). The highest rate of gonorrhoea was in Tairawhiti DHB (356 per 100 000), which was over five-times the national rate (67 per 100 000).

Restricted national rate trend analysis

Fifteen DHBs met the selection criteria for the restricted national rate trend analysis for gonorrhoea. In 2010 and 2011, there was a similar gonorrhoea restricted national rate (65.3 and 66.6 per 100 000 population, respectively). From 2008 to 2011, the gonorrhoea restricted national rate decreased by 11.3% (from 75.1 to 66.6 per 100 000 population). The gonorrhoea restricted national rates for 2008 to 2011 is shown in Figure 55.

Figure 55. Gonorrhoea restricted national rate by year, 2008-2011

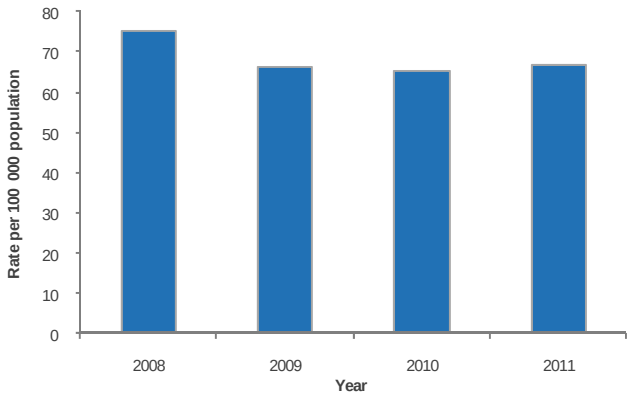


Table 32. Percentage of specimens testing positive for gonorrhoea, number and rate per 100 000 population of laboratory-confirmed gonorrhoea cases by DHB and sex, 2011

District Health Board	Specimens testing positive (%)	Number of laboratory-confirmed cases				Rate per 100 000 population		
		Male	Female	Unknown	Total	Male	Female	Total
Northland	0.5	43	41	0	84	55	51	53
Auckland region[a]	0.7	698	417	2	1 117	95	55	74
Waikato	0.8	128	80	0	208	71	43	57
Lakes	1.0	42	33	0	75	82	62	72
Bay of Plenty	1.0	83	44	0	127	80	41	60
Tairawhiti	4.0	82	84	0	166	361	352	356
Taranaki	0.9	31	43	1	75	57	77	68
Hawke's Bay	2.3	65	75	0	140	86	94	90
Whanganui	1.7	29	15	0	44	96	48	71
MidCentral	1.1	59	51	1	111	72	59	66
Wellington region[b]	0.7	110	67	0	177	51	30	40
Wairarapa	1.5	11	14	0	25	55	68	62
West Coast	0.3	4	5	0	9	24	31	27
Southern	0.6	44	61	3	108	29	39	35
Other[c]	0.5	39	43	2	84	-	-	
Total[d]	**0.8**	**1429**	**1030**	**7**	**2 466**	**79**	**55**	**67**

[a] Includes Waitemata, Auckland and Counties Manukau DHBs

[b] Includes Hutt Valley and Capital and Coast DHBs

[c] Data from DHBs where selection criteria were not met

[d] Total and rate calculations include only cases and population for DHBs meeting the selection criteria

Individual DHB analysis

Seventeen DHBs met the selection criteria for the individual DHB trend analysis. Gonorrhoea rates by DHB for 2007 to 2011 are shown in Figure 57. From 2007 to 2011, gonorrhoea rates varied among DHBs and across years. Notably, Tairawhiti DHB continued to have a high rate of gonorrhoea. Other notable features over this period were:

- Northland and Taranaki DHBs had increasing rates, associated with the addition of reporting by hospital laboratories in these DHBs
- Hawke's Bay and the Wellington region DHBs had decreasing rates
- the rate in Southern DHB remained low

Clinic surveillance

In 2011, the numbers of confirmed gonorrhoea cases reported by SHCs, FPCs and SYHCs were 767 cases, 152 cases and 36 cases, respectively (Table 33).

Table 33. Number of gonorrhoea cases by sex and clinic setting, 2011

	Clinic type		
	SHC	FPC	SYHC
No. of cases	**767**	**152**	**36**
Male	488	45	13
Female	279	107	23

Between 2010 and 2011, the gonorrhoea clinic case counts decreased by 6.2% in SHCs (818 to 767 cases), 1.9% in FPCs (155 to 152 cases) and 20.0% in SYHCs (45 to 36 cases).

From 2006 to 2011, gonorrhoea case counts increased by 14.0% in SHCs (673 to 767 cases) and 12.5% in SYHCs (32 to 36 cases). In contrast the case count decreased by 16.5% in FPCs (182 to 152 cases). During this period, gonorrhoea case counts at SHCs increased by 20.5% in males (405 to 488 cases) and 4.1% in females (268 to 279 cases) (Figure 56).

Figure 56. Cases of gonorrhoea reported at SHCs by year, 2006–2011

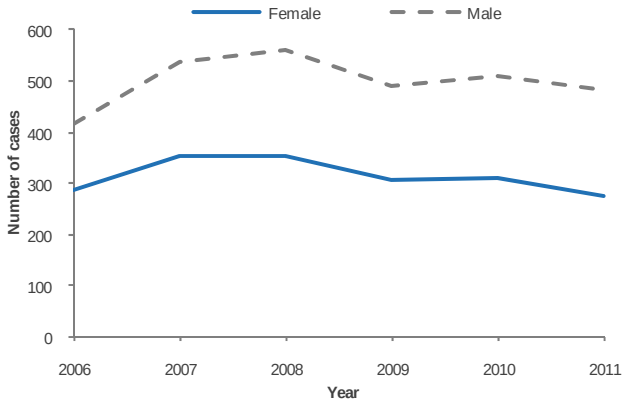
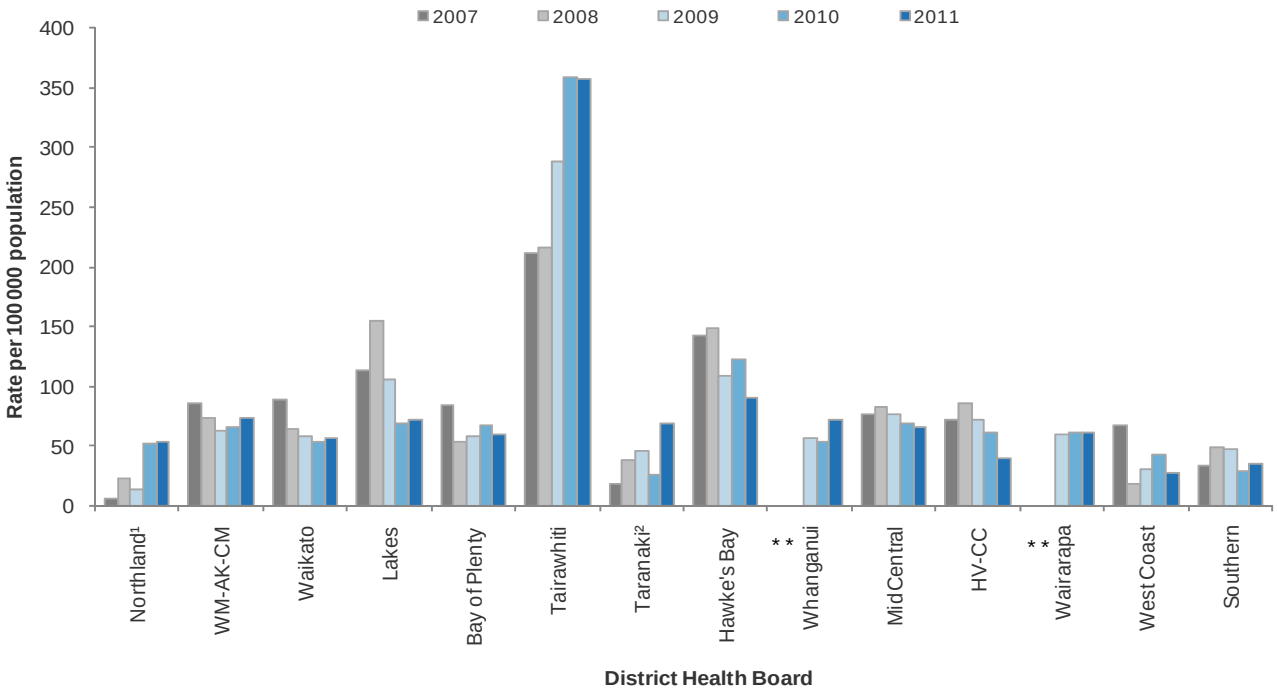


Figure 57. Gonorrhoea rates by DHB, 2007–2011



* Data incomplete

[1] The 2009-2010 rate increase was associated with the addition of reporting from the Whangarei Hospital laboratory
[2] The 2010-2011 rate increase was associated with the addition of reporting from the Taranaki Base Hospital laboratory
WM-AK-CM: Waitemata, Auckland and Counties Manukau DHBs
HV-CC: Hutt Valley and Capital and Coast DHBs

Infectious syphilis

Infectious syphilis data was available from clinic-based surveillance sources in 2011.

In 2011, 82 cases of infectious syphilis were reported by SHCs. One case of infectious syphilis was reported by FPCs and no cases were reported by SYHCs (Table 34).

Of the 82 cases of infectious syphilis reported by SHCs in 2011, 68 (82.9%) cases were male and 14 (17.1%) cases were female. The mean age of infectious syphilis cases was 34.8 years (range: 15–74 years).

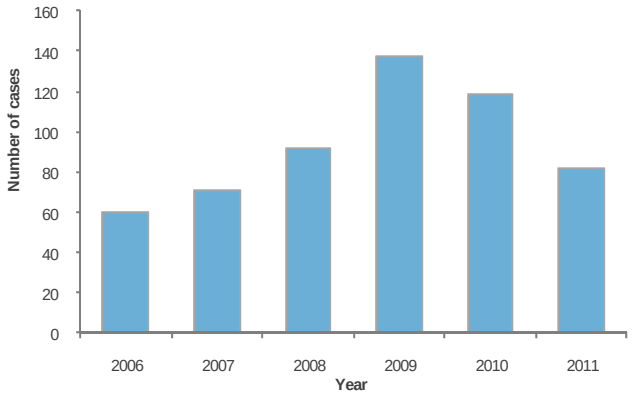
Table 34. Number of infectious syphilis cases by sex and health care setting, 2011

	Clinic type		
	SHC	FPC	SYHC
No. of cases	**82**	**1**	**0**
Male	68	1	0
Female	14	0	0

Between 2010 and 2011, the infectious syphilis case counts reported by SHCs decreased by 31.1% (119 to 82 cases).

From 2006 to 2011, the infectious syphilis clinic case counts reported by SHCs increased by 36.7% (60 to 82 cases) (Figure 58).

Figure 58. Cases of infectious syphilis reported at SHCs, 2006–2011



Non-specific urethritis (males only)

Non-specific urethritis (NSU) data was available from clinic-based surveillance sources in 2011.

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 2011, the clinic counts for NSU reported by SHCs, FPCs and SYHCs were 595 cases, 11 cases and 14 cases, respectively.

Between 2010 and 2011, the NSU case counts reported by SHCs decreased by 17.4% (720 to 595 cases).

From 2006 to 2011, the clinic case counts for NSU reported by SHCs decreased by 1.8% (606 to 595 cases).

OUTBREAKS

OUTBREAKS

Introduction

The following is a summary of surveillance data for outbreaks reported in 2011. A full description on outbreaks is reported separately in the Annual Summary of Outbreaks in New Zealand 2011 report available at www.surv.esr.cri.nz in May 2012.

This summary presents outbreak data by PHU, agent type, mode of transmission and setting. It is important to note that a single outbreak may have multiple pathogens, modes of transmission, or settings where exposure occurred recorded.

Outbreak definition

The Manual for Public Health Surveillance in New Zealand [34] states that the following types of outbreaks should be reported:

- two or more cases linked to a common source
- 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, and secondary cases, with the exception of secondary cases in an institution.

Characteristics

There were 580 outbreaks reported by the PHUs in 2011 involving 7893 cases, compared to 607 outbreaks involving 6354 cases reported in 2010. There has been an increasing trend in the number of outbreaks reported since 2002 (Figure 59).

Figure 59. Number of outbreaks and associated cases by year, 2002–2011

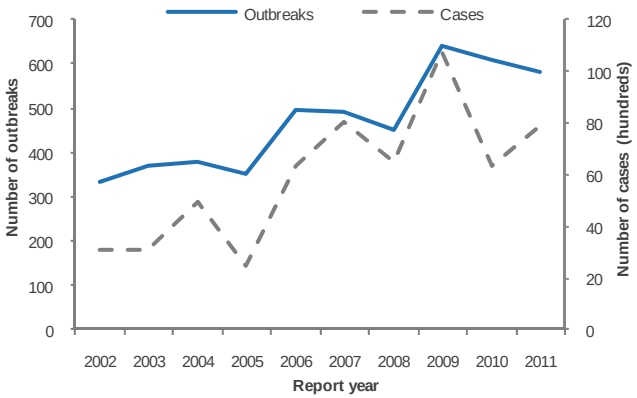


Table 35 outlines the number of outbreaks and associated cases reported by each public health unit (PHU)/public health service (PHS) in 2011.Note that while outbreaks may be reported by one PHU, the distribution of cases may extend beyond the geographic boundaries of that PHU.

Of these reported outbreaks, 576 were final reports involving 7178 cases, and four were interim reports (final details not yet available) involving 715 cases. According to the case definition for each outbreak, there were 3234 (41.0%) confirmed cases and 4659 probable cases (59.0%).

There were 200 hospitalisations and four deaths associated with outbreaks reported in 2011. The deaths were related to *Bordetella pertussis*, influenza A(H3N2), norovirus, and gastroenteritis (unspecified) outbreaks.

Table 35. Outbreaks and associated cases reported by each public health service (PHS) / public health unit (PHU), 2011

PHS/PHU	Outbreaks	Cases
Northland	11	206
Auckland[a]	170	1 712
Waikato	105	632
Bay of Plenty	13	155
Rotorua	5	72
Taranaki	15	249
Hawke's Bay	24	407
Gisborne	2	48
Whanganui	4	38
Manawatu	37	749
Wellington[b]	96	1 653
Nelson	2	24
Marlborough	7	141
West Coast	5	253
Canterbury	30	461
South Canterbury	8	245
Otago	27	370
Southland	19	478
Total	**580**	**7 893**

[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 shown in Table 36.

Table 36. Outbreaks and associated cases by pathogen or condition, 2011

Pathogen/Condition [a]	Outbreaks	Cases
Enteric bacteria	**64**	**307**
Campylobacter spp.	28	114
Salmonella spp.	15	86
Salmonella Paratyphi	1	2
Salmonella Typhi	5	17
Shigella spp.	11	77
VTEC/STEC infection	2	7
Yersinia	2	4
Enteric protozoa	**101**	**345**
Cryptosporidium spp.	29	103
Giardia spp.	72	242
Enteric viruses	**222**	**4 716**
Norovirus	181	4 013
Rotavirus	36	607
Sapovirus	9	167
Enteric (unspecified)	**155**	**1 319**
Gastroenteritis	155	1 319
Respiratory bacteria	**23**	**444**
Bordetella pertussis	19	405
Legionella	1	14
Mycobacterium tuberculosis	3	25
Respiratory viruses	**4**	**50**
Acute respiratory infection	1	10
Influenza A(H3N2)	1	10
Influenza-like illness	2	30
Toxins	**6**	**164**
Bacillus cereus	1	2
Ciguatera fish poisoning	1	2
Clostridium perfringens	4	153
Histamine fish poisoning	1	9
Other viruses	**6**	**560**
Measles	6	560
Other	**2**	**14**
Lead absorption	1	3
Skin infection	1	11
Total	**580**	**7893**

[a] Eight outbreaks involved more than one pathogen therefore individual pathogen outbreak numbers may not sum to group totals

Enteric bacteria

During 2011, enteric bacteria were implicated in 64 (11.0%) reported outbreaks and 307 (3.9%) cases. Approximately 43.8% (28/64) of these outbreaks and 37.1% (114/307) of all cases attributed to enteric bacteria were linked to *Campylobacter* species. Of the 28 outbreaks of *Campylobacter*, the most common primary modes of transmission were, person-to-person (8 outbreaks), foodborne (8) and waterborne (4). Person-to-person (9 outbreaks) and zoonotic (7) were the most common secondary mode of transmission reported. The most common settings were in private homes (15 outbreaks) and restaurants/cafés/bakeries (4).

Of the 15 *Salmonella* outbreaks, the most common primary modes of transmission were foodborne (8 outbreaks) and zoonotic (3). Person-to-person (11 outbreaks) and waterborne (5) were the most common secondary modes of transmission identified. The most common outbreak setting was in private homes (8 outbreaks).

Eleven outbreaks of *Shigella* were reported in 2011. Of these, 10 were associated with person-to-person transmission and four with foodborne transmission. Two outbreaks of *Shigella* had an overseas exposure reported (Tonga and North-West Europe) during the incubation period for the disease. The primary exposure settings reported for the remaining nine outbreaks were in private homes (8 outbreaks) and other institutions (1).

In 2011, five outbreaks of *Salmonella* Typhi were reported. *S.* Typhi phage type E1a was associated with two of the outbreaks. Person-to-person and foodborne (2 outbreaks each) were recorded as the primary modes of transmission, while person-to-person (3) and waterborne (2) transmission were recorded as secondary modes. Four outbreaks involved overseas travel to Samoa (2 outbreaks), Indonesia and Tonga (1 each) during the incubation period of the disease. The index case of the remaining outbreak suspected to be laboratory-acquired and person-to-person mode of transmission was recorded as the secondary mode.

VTEC/STEC infection *(Escherichia coli* O157:H7) was associated with two outbreaks in 2011. One outbreak reported environmental transmission as the primary mode, with person-to-person, waterborne and zoonotic listed as secondary modes. The remaining outbreak was associated with person-to-person transmission. Both outbreaks occurred in private homes.

Yersinia was identified in two outbreaks. One outbreak reported foodborne as the primary mode of transmission. Although no food items were implicated, undercooking and cross-contamination were suspected as contributing factors. Both outbreaks reported person-to-person transmission as the secondary mode and were set in private homes.

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

Enteric protozoa

Enteric protozoa accounted for 101 (17.4%) outbreaks and 345 (4.4%) cases reported in 2011.

Giardia spp. was identified as the infectious agent in 71.3% of outbreaks associated with enteric protozoa. Of the 72 outbreaks where *Giardia* spp. was identified, 35 (48.6%) were reported by Auckland and 26 (36.1%) by Waikato PHUs. The most common modes of transmission were person-to-person (62 outbreaks), zoonotic (22), environmental (21) and waterborne (20). The most commonly identified setting for *Giardia* outbreaks was in private homes (58 outbreaks).

Twenty-nine outbreaks involving *Cryptosporidium* spp. occurred in 2011, 23 (79.3%) of which were reported by the Waikato PHU. The most common modes of transmission were person-to-person (24 outbreaks), zoonotic (20) and waterborne (7). The most common setting was in private homes (18 outbreaks), followed by farms (10) and childcare centres (3).

Enteric viruses

Enteric viruses were the infectious agent in 222 (38.3%) outbreaks with 4716 (59.7%) associated cases in 2011.

The majority of outbreaks due to enteric viruses were caused by norovirus (81.5%, 181/222), which resulted in 4013 associated cases. The median number of cases per norovirus outbreak was 19 (range 2–167 cases). Person-to-person transmission was involved in 166 outbreaks, 56 of which also recorded other modes of transmission. Environmental transmission was established in 46 outbreaks and foodborne transmission in 20 outbreaks.

Multiple settings were identified in eight norovirus outbreaks. Institutions were identified as the primary exposure setting for 146 outbreaks, specifically long-term care facilities (88 outbreaks), acute care hospitals (38), childcare centres (17), camps (2), marae (1) and other institutions (4).

Restaurants/cafés were identified as the setting for 17 norovirus outbreaks and six outbreaks occurred in private homes.

In 2011, a total of 36 (6.2%) outbreaks of rotavirus with 607 (7.7%) associated cases were reported. All of these outbreaks involved person-to-person transmission, although nine outbreaks also involved environmental transmission. The outbreak settings reported were childcare centres (28 outbreaks), long-term care facilities (4), acute care hospitals (4), private homes (2) and restaurants/cafés/bakeries (1).

Nine (1.6%) sapovirus outbreaks were associated with 167 (2.1%) cases. The modes of transmission were person-to-person (8 outbreaks), environmental (2) and foodborne (1). The outbreak settings reported were childcare centres (4 outbreaks), long- term care facilities (4), restaurant/cafés/bakeries and schools (1 each).

Enteric (unspecified)

During 2011, outbreaks of gastroenteritis where no organism was isolated accounted for 155 (26.7%) outbreaks and 1319 (16.7%) associated cases.

Respiratory bacteria

Respiratory bacteria resulted in 23 (4.0%) outbreaks and 444 (5.6%) associated cases.

There were 19 outbreaks of *Bordetella pertussis* reported in 2011 with 405 associated cases. Person-to-person was identified as the only mode of transmission.

The settings associated with these outbreaks included private homes (12 outbreaks), childcare centres (2), community gatherings (2), workplaces, camps, acute care hospitals, and long-term care facilities (1 each).

One *Legionella* spp. outbreak was reported in 2011 involving 14 cases with environmental mode of transmission at a workplace.

Three outbreaks due to *Mycobacterium tuberculosis* infection, involving 25 cases were reported in 2011. Person-to-person transmission was the only mode identified. Two outbreaks occurred in private homes, and the remaining outbreak had multiple exposure settings recorded (private home and community gathering).

Respiratory viruses

Respiratory viruses resulted in four (0.7%) outbreaks and 50 (0.6%) associated cases.

Two outbreaks of influenza-like illness involving 30 cases were reported in 2011. Person-to-person was identified as the only mode of transmission. One outbreak, involving 24 cases occurred at a childcare centre, while the second outbreak involving six cases occurred at a long-term care facility.

One outbreak of influenza A(H3N2) virus and one of acute respiratory infection were reported in 2011. Both outbreaks involved 10 cases each with person-to-person mode of transmission at a long-term care facility.

Toxins

Toxins were involved in six (1.0%) outbreaks and 164 (2.1%) associated cases reported in 2011. The most commonly implicated agent was *Clostridium perfringens*, which accounted for four outbreaks and 155 associated cases. The other implicated agents were histamine (scombroid) fish poisoning and ciguatera fish poisoning (1 outbreak each).

Foodborne transmission was the primary mode identified in the six outbreaks. Primary exposure settings identified were restaurants/cafés/bakeries, supermarkets/delicatessens, caterers, takeaways, other food outlets and private homes (1 outbreak each).

Other viruses

Six measles outbreaks were reported in 2011, all had person-to-person identified as the primary mode of transmission. The outbreaks were in schools (2 outbreaks), acute care hospitals, airplanes and hostels/boarding houses (1 each). One school outbreak identified a community gathering as a secondary setting while the hostel/boarding house outbreak also had a secondary setting in an acute care hospital.

Other illness

One outbreak due to lead absorption, with three associated cases, was reported in 2011. The setting was in the workplace.

One outbreak of skin infection involving 11 associated cases was reported in 2011. *Pseudomonas* spp. was identified as the infecting agent in cases who had all attended the same skin piercing premise.

Modes of transmission

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

The primary modes of transmission were person-to-person (325 outbreaks), foodborne (101 outbreaks) and zoonotic (31 outbreaks). The most reported secondary mode of transmission was person-to-person (129 outbreaks), followed by environmental, although environmental transmission accounted for more cases than person-to-person (1616 versus 1147). Overall, person-to-person transmission was associated with over four-times as many cases as environmental transmission (7126 versus 1790), and over seven-times as many cases as foodborne transmission (7126 versus 754). The mode of transmission was unknown for 28 (4.5%) outbreaks and more than one mode of transmission was identified for 189 (32.6%) outbreaks reported in 2011.

Person-to-person was the most common mode of transmission for enteric bacteria (76.6%, 49/64), enteric protozoa (85.1%, 86/101), enteric viruses (92.8%, 206/222), unspecified enteric pathogens (53.5%, 83/155) and respiratory disease (96.3%, 26/27). While foodborne was the principal mode of transmission for toxins (100.0%, 6/6), it also contributed substantially to outbreaks due to enteric bacteria (39.1%, 25/64) and unspecified enteric pathogens (38.7%, 60/155). Environmental transmission contributed substantially to outbreaks due to enteric protozoa (24.8%, 25/101) and enteric viruses (24.3%, 54/222). Waterborne was the third highest mode of transmission for enteric protozoa (26.7%, 27/101) and enteric bacteria (28.1%, 18/64).

Table 37. Outbreaks of infectious disease and associated cases by mode of transmission, 2011

Mode of transmission	Outbreaks				Cases	
	Primary mode[a]	Secondary mode[a]	All modes[a]	Percentage (%)[b]	All modes[c]	Percentage (%)[d]
Person-to-person	325	129	454	78.3	7 126	90.3
Foodborne	101	20	121	20.9	752	9.5
Environmental	19	85	104	17.9	1 790	22.7
Zoonotic	31	26	57	9.8	187	2.4
Waterborne	20	25	45	7.8	141	1.8
Other	5	4	9	1.6	106	1.3
Unknown	-	-	28	4.8	187	2.4

[a] Number of outbreaks

[b] Percentage of outbreaks for each mode of transmission, calculated using the total number of outbreaks (580)

[c] Number of associated cases

[d] Percentage of cases for each mode of transmission, calculated using the total number of associated cases (7893).

Note: More than one mode of transmission was recorded for 189 outbreaks (2210 associated cases). No outbreaks with vectorborne, sexual contact, or parenteral as mode(s) of transmission were reported in 2011.

Exposure settings

Outbreaks reported in 2011 were most commonly associated with private homes (26.2%, 152/580), long-term care facilities (22.6%, 131/580) and childcare centres (16.2%, 94/580) (Table 38).

Table 38. Number of cases associated with outbreaks of infectious disease by exposure setting, 2011

Outbreak setting	Outbreaks[a]	Cases[a]
Commercial food operators	**91**	**598**
Restaurant/café/bakery	54	294
Takeaway	18	51
Caterer	7	90
Fast food restaurant	4	11
Supermarket/delicatessen	3	6
Other food outlet	5	146
Institutions	**305**	**6 309**
Long-term care facility	131	3 089
Childcare centre	94	1 501
Hospital (acute care)	52	741
School	10	716
Camp	5	99
Marae	3	14
Hostel/boarding house	1	18
Hotel/motel	1	12
Other institution	8	119
Community	**10**	**614**
Community, church, or sports gathering	10	614
Workplace	**25**	**98**
Farm	17	52
Other workplace	8	46
Home	**152**	**803**
Private home	152	803
Travel	**4**	**111**
Ship	2	76
Aircraft	1	21
Other travel modes	1	14
Other setting	**26**	**260**

[a] More than setting was reported for some outbreaks

ANTIBIOTIC RESISTANCE

ANTIBIOTIC RESISTANCE

Antimicrobial resistance

The prevalence of resistance among common, clinically important pathogens between 2000 and 2010 is shown in Table 39. Most antimicrobial resistance data is only available in complete analysed form up to the end of 2010. The following is a summary of some key trends in antimicriobial resistance. A full description of antimicrobial resistance in each pathogen is available at www.surv.esr.cri.nz/antimicrobial/antimicrobial_resistance.php.

Staphylococcus aureus

Between 2000 and 2010, methicillin resistance among *Staphylococcus aureus* was relatively stable at 7–9% each year.

Since 2006, mupirocin resistance among *S. aureus* has remained stable at 10–13% each year, following a decline from a peak of 21.5% in 2000.

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.

There has been a decrease in fluoroquinolone resistance among MRSA between 2003 and 2010 due to a decrease in the prevalence of the ciprofloxacin-resistant healthcare-associated EMRSA-15 strain.

Streptococcus pneumoniae

Penicillin non-susceptibility is still prevalent among *Streptococcus pneumoniae* despite the decrease during the latest two-year period (2009-2010) from the preceding three-year period (2006-2008). However, this decrease was only significant among non-invasive pneumococci ($p<0.0001$).

There was a significant decrease in cefotaxime non-susceptibility among invasive pneumococci ($p=0.0001$) in the latest two-year period (2009–2010) compared with the preceding three years (2006–2008).

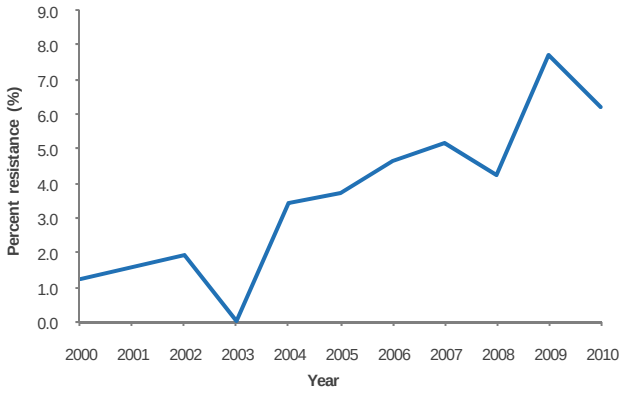
Vancomycin-resistant enterococci

Vancomycin-resistant enterococci were infrequently identified in 2009 and 2010 following the control of outbreaks in Auckland hospitals in 2007 and 2008, and Waikato Hospital in 2008.

Escherichia coli

Levels of trimethoprim and co-amoxiclav resistance among urinary *Escherichia coli* have remained stable. Nitrofurantoin resistance has remained consistently below 2% over the last 10 years. However, there is a trend of increasing fluoroquinolone resistance among urinary *E. coli* (Figure 60). The rise in fluoroquinolone resistance to 6.9% in the latest two-year period (2009–2010) was significant ($p<0.0001$) compared with the rate of 4.6% in the preceding three years (2006–2008).

Figure 60. Percent fluoroquinolone resistance among urinary *Escherichia coli*, 2000–2010



ESBLs and carbapenemases

Extended-spectrum β-lactamases (ESBLs) are increasing in Enterobacteriaceae, with a particularly high rate of 13.8% in bacteraemic *Klebsiella* in 2010.

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

Mycobacterium tuberculosis

Multidrug-resistant tuberculosis (MDR-TB) remains rare in New Zealand with four cases in 2010, accounting for 1.6% of the culture-positive TB cases. However, one of these MDR-TB cases was extensively drug resistant (XDR-TB), and represents the first case of XDR-TB identified in New Zealand. XDR-TB is defined as MDR-TB (ie, resistance to at least isoniazid and rifampicin) with additional resistance to any fluoroquinolone and at least one of the following second-line drugs capreomycin, kanamycin or amikacin.

Table 39. Prevalence of antimicrobial resistance, 1997–2010

Pathogen	Antimicrobial	Percent resistance [a] (number tested)			
		2000–2002	2003–2005	2006–2008	2009–2010
S. aureus [b]	methicillin	7.2 (251 448)	7.4 (219 363)	8.2 (242 146)	8.9 (191 307)
	erythromycin	12.0 (221 394)	12.0 (164 220)	12.1 (98 055)	11.8 (166 009)
	co-trimoxazole	1.2 (149 166)	2.0 (126 840)	1.3 (89 071)	1.1 (155 886)
	fluoroquinolone		7.3 (47 116)	7.9 (28 846)	6.7 (20 920)
	fusidic acid		19.7 (25 609)	15.7 (32 730)	13.9 (37 876)
	mupirocin	20.0 (91 555)	16.7 (48 423)	12.9 (67 154)	11.0 (31 355)
Methicillin-resistant *S. aureus* [c]	erythromycin	40.0 (1 409)	46.3 (1 596)	37.5 (3 146)	30.6 (9 632)
	co-trimoxazole	6.7 (1 409)	7.4 (1 596)	2.8 (3 068)	2.0 (9 578)
	fluoroquinolone	40.0 (1 409)	50.3 (1 596)	37.4 (3 000)	27.3 (7 809)
	fusidic acid	7.0 (1 409)	9.2 (1 596)	11.6 (3 011)	26.1 (9 691)
	mupirocin	8.5 (1 409)	9.5 (1 596)	7.5 (2 926)	9.0 (9 180)
	rifampicin	0.7 (1 409)	0.5 (1 596)	0.7 (1 336)	-
S. pneumoniae, non-invasive disease [b]	penicillin[d]	26.5 (12 859)	27.0 (15 037)	30.0 (14 104)	23.2 (9 360)
	erythromycin	18.6 (14 404)	19.9 (10 222)	21.3 (7 273)	18.6 (8 266)
	tetracycline	15.4 (9476)	18.1 (6 796)	19.0 (5 496)	17.6 (5 952)
S. pneumoniae, invasive disease [e]	penicillin[f]	15.3 (1 494)	17.2 (1 560)	20.3 (1 707)	17.9 (1 179)
	erythromycin	7.2 (1 494)	9.9 (1 560)	12.2 (1 707)	9.3 (1 179)
	cefotaxime[f]	6.2 (1 494)	11.5 (1 560)	13.2 (1 707)	8.6 (1 179)
Enterococcus spp [b]	amoxicillin[g]	3.0 (22 566)	2.8 (26 492)	3.7 (35 746)	3.7 (29 568)
	vancomycin	0.3 (7 505)	0.1 (9 948)	1.3 (20 291)	0.4 (11 436)
E. coli, urinary isolates[b]	amoxicillin[g]	54.4 (194 799)	50.7 (117 009)	49.9 (117 456)	50.8 (163 383)
	co-amoxiclav	9.6 (194 950)	8.5 (127 750)	9.6 (117 965)	9.8 (163637)
	trimethoprim	22.3 (207 837)	21.5 (138 748)	22.1 (128 276)	24.1 (171 510)
	nitrofurantoin	1.5 (206 149)	1.4 (139 738)	1.3 (127 682)	1.3 (170 447)
	fluoroquinolone	1.6 (201 382)	2.4 (135 803)	4.6 (110 769)	6.9 (142 978)
E. coli, non-urinary isolates [b,h]	co-amoxiclav	17.5 (11 508)	15.2 (5 059)	15.1 (3 249)	20.6 (2 729)
	cefuroxime	4.2 (6 576)	3.4 (3 956)	4.5 (2 534)	6.5 (2 418)
	ESBL positive			2.6 (2 307)	3.6 (2 680)
	gentamicin	2.4 (10 392)	2.6 (5 290)	5.3 (3 896)	5.3 (3 083)
	fluoroquinolone	2.4 (8 821)	3.9 (4 212)	8.1 (3 808)	9.5 (2 992)
P. aeruginosa [b]	gentamicin	10.5 (25 561)	6.1 (23 148)	4.3 (23 399)	4.0 (21 777)
	tobramycin	3.6 (10 421)	3.3 (7 616)	3.4 (9 388)	2.0 (8 999)
	ceftazidime	3.9 (13 253)	4.3 (16 031)	3.2 (18 163)	2.3 (19 157)
	fluoroquinolone	9.3 (22 869)	8.3 (23761)	7.1 (23 961)	6.3 (22712)
	imipenem/meropenem		4.8 (9 956)	4.9 (13 703)	3.6 (12 613)
	piperacillin/tazobactam		1.5 (4 928)	2.5 (11 960)	2.4 (9 770)
H. influenzae, non-invasive disease [b]	amoxicillin[g]	21.9 (28 476)	19.9 (19 529)	22.0 (24 823)	25.5 (18 698)
	co-amoxiclav	0.8 (16 333)	1.0 (14 090)	2.6 (15 123)	3.9 (15 929)
	co-trimoxazole	17.3 (22 443)	18.2 (15 939)	20.2 (13 098)	23.1 (13 302)
	tetracycline	1.2 (15 633)	0.8 (12 783)	0.8 (11 263)	1.0 (9 669)
H. influenzae, invasive disease [e]	amoxicillin[g]	19.2 (125)	31.6 (155)	36.9 (176)	37.2 (129)
	co-amoxiclav	1.6 (125)	9.7 (155)	23.9 (176)	20.2 (129)
	cefuroxime	0.8 (125)	9.7 (155)	23.9 (176)	20.2 (129)
N. meningitidis, invasive disease [e]	penicillin[i]	7.5 (796)	12.0 (551)	19.5 (231)	25.4 (138)
	rifampicin	0 (796)	0.2 (551)	0.0 (231)	1.4 (138)
N. gonorrhoeae [b]	penicillin	7.1 (2 782)	5.8 (4 700)	7.5 (6 028)	12.9 (2 696)
	fluoroquinolone	6.3 (2 349)	14.3 (4 195)	20.1 (7 315)	32.2 (4 825)
M. tuberculosis [k]	isoniazid	8.5 (811)	8.9 (872)	6.6 (725)	8.4 (498)
	rifampicin	0.7 (811)	1.0 (872)	0.6 (725)	2.4 (498)
	MDR[k]	0.5 (811)	1.0 (872)	0.4 (725)	2.2 (498)

[a] intermediate resistance not included in 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 CLSI interpretive criteria for the oral treatment of non-meningitis infections
[e] invasive disease isolates tested by ESR
[f] penicillin resistant and cefotaxime non-susceptible (intermediate resistant and resistant), according to the CLSI interpretive criteria for the parenteral treatment of meningitis
[g] ampicillin used in laboratory testing
[h] from 2004, data based on *E. coli* from bacteraemia
[i] penicillin reduced susceptibility (MIC 0.12-0.5 mg/L)
[k] multidrug resistant (ie, resistant to at least isoniazid and rifampicin)

APPENDIX: NATIONAL DATA AND TRENDS

APPENDIX: NATIONAL DATA AND TRENDS

Comparison of notifiable disease cases and rates for 2010 and 2011

Table 40. Numbers of cases and rates per 100 000 population for common (10 or more cases reported per year) notifiable diseases in New Zealand, 2010–2011

Disease	2010		2011		Change [d,e]
	Cases	Rate	Cases	Rate	
AIDS [a]	39	0.9	24	0.5	←
Campylobacteriosis	7 346	168.2	6 692	151.9	⇐
Cryptosporidiosis	954	21.8	610	13.8	⇐
Dengue fever	50	1.1	42	1.0	←
Gastroenteritis [b]	491	11.2	630	14.3	⇒
Giardiasis	1 985	45.4	1 935	43.9	←
Hepatitis A	46	1.1	26	0.6	⇐
Hepatitis B [c]	51	1.2	49	1.1	←
Hepatitis C [c]	17	0.4	27	0.6	→
Invasive pneumococcal disease	535	12.2	552	12.5	→
Lead absorption	232	5.3	230	5.2	←
Legionellosis	173	4.0	159	3.6	←
Leptospirosis	80	1.8	70	1.6	←
Listeriosis	23	0.5	26	0.6	→
Malaria	44	1.0	52	1.2	→
Measles	48	1.1	597	13.6	⇒
Meningococcal disease	97	2.2	119	2.7	→
Mumps	41	0.9	51	1.2	→
Paratyphoid fever	19	0.4	12	0.3	←
Pertussis	872	20.0	1 998	45.4	⇒
Rheumatic fever	167	3.8	164	3.7	←
Salmonellosis	1 146	26.2	1 056	24.0	⇐
Shigellosis	104	2.4	101	2.3	←
Tuberculosis disease	304	7.0	312	7.1	→
Typhoid fever	31	0.7	45	1.0	→
VTEC/STEC infection	138	3.2	154	3.5	→
Yersiniosis	406	9.3	514	11.7	⇒

[a] Data source [35]

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

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

[d] ⇐= significant decrease, ⇒ = significant increase, -- = no change, ← = not significant decrease, → = not significant increase

[e] Fisher's exact tests were used to determine statistical significance. P-values less than 0.05 are considered to be significant at the 95% level of confidence.

Comparison of notifiable disease cases and rates for 2010 and 2011

Table 41. Numbers of cases for rare (less than 10 cases reported per year) notifiable diseases in New Zealand, 2010–2011

Disease[a]	2010	2011
Brucellosis	1	0
Chemical poisoning from the environment	3	3
Chikungunya fever	0	1
Cholera	2	0
Enterobacter sakazakii invasive disease	2	0
Haemophilus influenzae type b disease	8	8
Hepatitis NOS	3	7
Hydatid disease	4	6
Leprosy	3	1
Non-seasonal influenza[b]	1 826	0
Rickettsial disease	14	6
Ross River virus infection	5	3
Rubella	4	23
Taeniasis	3	10
Tetanus	7	0
Toxic shellfish poisoning	9	3

[a] No cases of the following notifiable diseases were reported in 2010 and 2011: anthrax, Barmah Forest virus infection, congenital rubella, cysticercosis, decompression sickness, HPAI, plague, poliomyelitis, primary amoebic meningo-encephalitis, rabies, SARS, trichinosis, viral haemorrhagic fever and yellow fever.

[b] Non-seasonal influenza became notifiable on 26 April 2009. Influenza A(H1N1)pdm09 virus was classified as seasonal influenza from 1 January 2011.

Deaths from notifiable diseases in EpiSurv, 1997–2011

Table 42. Deaths due to notifiable diseases recorded in EpiSurv, 1997–2011

Disease	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
AIDS [a]	34	19	18	19	14	11	10	13	15	14	5	2	2	8	1
Campylobacteriosis	2	2	1	3	1	1	0	0	1	1	1	0	0	0	0
Chemical poisoning from the environment	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Creutzfeldt-Jakob disease [b]	3	0	2	3	1	3	4	3	0	5	0	0	0	0	0
Gastroenteritis [c]	0	0	0	0	0	1	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
Haemophilus influenzae type b disease	1	0	0	0	1	1	2	0	0	0	0	0	0	1	0
Hepatitis B	2	0	0	0	1	0	0	0	1	0	1	0	0	0	0
Hydatid disease	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Invasive pneumococcal disease [c]												8	35	27	32
Legionellosis [d]	4	1	1	5	2	3	1	1	4	3	1	4	2	5	4
Listeriosis - non perinatal	2	0	1	2	1	0	2	3	1	0	2	3	2	3	1
Listeriosis - perinatal	6	0	2	4	1	3	2	2	0	1	2	2	2	4	0
Malaria	1	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
Non seasonal influenza [f]													35	16	0
Pertussis	0	0	0	0	1	1	1	1	0	0	0	0	0	0	1
Primary amoebic meningoencephalitis	0	0	0	1	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
Salmonellosis	2	2	1	7	2	1	0	0	1	1	1	1	1	0	0
Shigellosis	0	0	1	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
Tuberculosis disease	15	8	14	8	2	6	6	6	4	5	3	4	4	9	2
VTEC/STEC infection	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0
Yersiniosis	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0

[a] Data source [35]

[b] Data source [17]

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

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

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

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

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

Mortality data for selected notifiable diseases, 2007–2009 (Ministry of Health, NMDS)

Table 43. Reported deaths from selected notifiable diseases, 2007–2009

Disease	ICD 10 codes	2007		2008		2009	
		Und [b]	Cont [c]	Und [b]	Cont [c]	Und [b]	Cont [c]
AIDS	B20-B24	10	8	7	3	10	8
Campylobacteriosis	A04.5	1			4	1	
Creutzfeldt-Jakob disease	A81.0	7		2		7	1
Dengue fever	A90, A91			1			
Hepatitis A	B15		2		1		
Hepatitis B	B16	2	3	1	3	1	1
Hepatitis C	B17.1				5	1	2
Hydatid disease	B67				1		
Legionellosis	A48.1	1		3	2	3	
Listeriosis	A32	2		1	1	3	3
Meningococcal disease	A39	7		8		4	
Rheumatic fever	I00, I01, I02					1	
Salmonellosis	A02			1	2	1	4
Shigellosis	A03			1			
Tetanus	A33-A35	1					
Tuberculosis	A15-A19, P37.0	7	8	8	11	8	24
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, 2009–2011 (Ministry of Health, NMDS)

Table 44. Hospital admissions for selected notifiable diseases, 2009–2011

Disease	ICD 10 codes	2009		2010		2011	
		Prin [a]	Oth [b]	Prin [a]	Oth [b]	Prin [a]	Oth [b]
AIDS	B20-B24	16	285	16	297	13	242
Arboviral diseases	A83, A84, A85.2, A92, A93, A94, B33.1	1	0	1	0	0	0
Brucellosis	A23	0	0	0	0	0	0
Campylobacteriosis	A04.5	473	101	518	106	443	131
Cholera	A00	0	0	1	0	1	0
Creutzfeldt-Jakob disease	A81.0	4	0	5	2	4	4
Cryptosporidiosis	A07.2	19	4	16	14	16	2
Cysticercosis	B69	1	2	4	1	0	0
Decompression sickness	T70.3	24	3	18	2	33	4
Dengue fever	A90, A91	22	3	15	2	15	0
Diphtheria	A36	0	0	2	0	0	0
Giardiasis	A07.1	21	13	18	15	35	25
Hepatitis A	B15	17	7	20	10	7	11
Hepatitis B	B16	27	27	25	23	27	33
Hepatitis C	B17.1	15	29	13	10	9	31
Hydatid disease	B67	2	1	1	0	1	0
Lead absorption	T56.0	5	0	6	0	5	1
Legionellosis	A48.1	33	9	68	11	61	21
Leprosy	A30	0	1	1	3	1	1
Leptospirosis	A27	46	3	57	3	49	5
Listeriosis	A32	11	17	13	18	11	18
Malaria	B50-B54	34	2	40	2	42	1
Measles	B05	29	1	5	0	132	10
Meningococcal disease	A39	167	23	112	22	122	21
Mumps	B26	9	3	10	3	13	1
Paratyphoid	A01.1-A01.4	3	0	6	1	5	0
Pertussis	A37	124	19	132	23	143	17
Poliomyelitis	A80	0	0	0	0	0	0
Rheumatic fever	I00, I01, I02	230	35	254	55	257	43
Rickettsial diseases	A75, A77, A78, A79	6	3	7	1	8	1
Rubella	B06	0	1	1	1	1	2
Salmonellosis	A02	130	28	120	49	106	29
Shigellosis	A03	14	5	21	4	22	6
Taeniasis	B689	0	0	0	1	0	1
Tetanus	A33-A35	1	0	7	1	3	2
Tuberculosis	A15-A19, P37.0	237	146	255	159	223	106
Typhoid	A01.0	25	1	34	1	34	5
VTEC/STEC infection	A04.0-A04.4	24	11	35	24	50	23
Yersiniosis	A04.6	24	22	13	14	16	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, 2011

Table 45a. Number of cases and rate per 100 000 population of notifiable diseases by DHB, 2011

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	225	142.3	764	140.0	543	118.9	503	100.6	687	186.8	140	135.9	292	137.8	56	120.2	179	162.9	325	208.6
Cryptosporidiosis	28	17.7	41	7.5	30	6.6	35	7.0	141	38.3	16	15.5	23	10.9	4		21	19.1	16	10.3
Dengue fever	0		3		10	2.2	7	1.4	3		3		1		1		0		0	
Gastroenteritis[b]	0		61	11.2	60	13.1	47	9.4	15	4.1	12	11.7	24	11.3	3		11	10.0	1	
Giardiasis	64	40.5	201	36.8	269	58.9	195	39.0	179	48.7	46	44.7	121	57.1	8	17.2	21	19.1	70	44.9
Hepatitis A	0		3		8	1.8	5	1.0	3		0		1		0		0		2	
Hepatitis B	2		6	1.1	10	2.2	5	1.0	2		4		3		4		0		1	
Invasive pneumococcal disease	21	13.3	60	11.0	52	11.4	75	15.0	46	12.5	29	28.2	29	13.7	5	10.7	11	10.0	26	16.7
Lead absorption	1		31	5.7	47	10.3	38	7.6	12	3.3	2		3		3		5	4.6	10	6.4
Legionellosis	6	3.8	19	3.5	10	2.2	12	2.4	6	1.6	0		4		0		3		3	
Leptospirosis	8	5.1	2		2		4		4		0		2		3		2		11	7.1
Malaria	1		7	1.3	16	3.5	7	1.4	3		0		4		0		2		1	
Measles	4		179	32.8	211	46.2	78	15.6	30	8.2	5	4.9	7	3.3	3		2		26	16.7
Meningococcal disease	13	8.2	9	1.6	7	1.5	17	3.4	13	3.5	7	6.8	4		1		3		4	
Mumps	1		2		10	2.2	6	1.2	1		0		3		0		1		2	
Pertussis	10	6.3	75	13.7	55	12.0	50	10.0	87	23.7	13	12.6	34	16.0	38	81.5	30	27.3	121	77.7
Rheumatic fever	19	12.0	5	0.9	14	3.1	49	9.8	13	3.5	8	7.8	8	3.8	7	15.0	0		5	3.2
Salmonellosis	36	22.8	97	17.8	99	21.7	65	13	108	29.4	31	30.1	32	15.1	16	34.3	17	15.5	24	15.4
Shigellosis	1		26	4.8	21	4.6	24	4.8	5	1.4	2		3		1		1		1	
Tuberculosis disease	6	3.8	37	6.8	80	17.5	50	10	19	5.2	2		14	6.6	3		1		17	10.9
Typhoid fever	0		15	2.7	11	2.4	10	2			1		2		0		0		1	
VTEC/STEC infection	8	5.1	9	1.6	10	2.2	16	3.2	30	8.2	5	4.9	8	3.8	2		9	8.2	4	
Yersiniosis	8	5.1	77	14.1	67	14.7	53	10.6	84	22.8	17	16.5	17	8	3		14	12.7	7	4.5

[a] Table is continued on following page

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

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, 2011

Table 45b. Number of cases and rate per 100 000 population of notifiable diseases by DHB, 2011 (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	75	118.9	239	142.0	223	154.3	529	179.5	89	219.3	199	142.2	56	169.9	881	175.3	126	223.5	561	183.1
Cryptosporidiosis	6	9.5	25	14.9	26	18.0	26	8.8	11	27.1	11	7.9	4		53	10.5	29	51.4	64	20.9
Dengue fever	0		3		0		6	2.0	0		0		1		2		1		1	
Gastroenteritis [b]	10	15.9	98	58.2	44	30.4	91	30.9	3		4		6	18.2	119	23.7	4		17	5.5
Giardiasis	8	12.7	40	23.8	66	45.7	218	74.0	10	24.6	70	50.0	16	48.5	175	34.8	36	63.9	122	39.8
Hepatitis A	0		0		0		1		0		1		0		2		0		0	
Hepatitis B	0		1		3		0		0		1		0		5	1.0	1		1	
Invasive pneumococcal disease	6	9.5	19	11.3	17	11.8	19	6.4	7	17.2	18	12.9	0		67	13.3	8	14.2	37	12.1
Lead absorption	7	11.1	7	4.2	12	8.3	11	3.7	0		7	5.0	3		14	2.8	8	14.2	9	2.9
Legionellosis	1		0		1		2		1		9	6.4	2		65	12.9	1		14	4.6
Leptospirosis	9	14.3	5	3.0	0		1		0		3		2		8	1.6	1		3	
Malaria	0		0		0		1		0		4		0		3		1		2	
Measles	0		1		2		12	4.1	0		1		0		17	3.4	1		18	5.9
Meningococcal disease	3		3		5	3.5	7	2.4	2		2		1		9	1.8	1		8	2.6
Mumps	1		1		2		1		0		10	7.1	0		8	1.6	0		2	
Pertussis	13	20.6	20	11.9	171	118.3	228	77.4	2		444	317.4	237	719.1	292	58.1	17	30.2	61	19.9
Rheumatic fever	3		8	4.8	8	5.5	12	4.1	0		3		0		2		0		0	
Salmonellosis	10	15.9	33	19.6	32	22.1	69	23.4	12	29.6	45	32.2	4		143	28.4	33	58.5	150	48.9
Shigellosis	1		0		0		7	2.4	0		0		0		4		1		3	
Tuberculosis disease	1		12	7.1	10	6.9	37	12.6	0		4		0		14	2.8	1		4	
Typhoid fever	0		2		0		1		0		0		0		2		0		0	
VTEC/STEC infection	0		3		4		5	1.7	1		3		3		24	4.8	4		6	2
Yersiniosis	4		5	3	25	17.3	52	17.6	3		7	5	6	18.2	48	9.5	4		13	4.2

[a] Table is continued from previous page

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

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, 2011

Table 46. Number of cases and rate per 100 000 population of notifiable diseases by sex, 2011

Disease	Sex					
	Male		Female		Total [a]	
	Cases	Rate	Cases	Rate	Cases	Rate
Campylobacteriosis	3 748	173.2	2 876	128.4	6 692	151.9
Cryptosporidiosis	290	13.4	315	14.1	610	13.8
Dengue fever	22	1.0	20	0.9	42	1.0
Gastroenteritis [b]	270	12.5	328	14.6	630	14.3
Giardiasis	933	43.1	984	43.9	1 935	43.9
Haemophilus influenzae type b	4		4		8	0.2
Hepatitis A	16	0.7	9	0.4	26	0.6
Hepatitis B	34	1.6	15	0.7	49	1.1
Hepatitis C	18	0.8	9	0.4	27	0.6
Hepatitis NOS	6	0.3	1		7	0.2
Invasive pneumococcal disease	285	13.2	267	11.9	552	12.5
Lead absorption	202	9.3	28	1.2	230	5.2
Legionellosis	102	4.7	56	2.5	159	3.6
Leptospirosis	63	2.9	7	0.3	70	1.6
Listeriosis - non perinatal	0		4		4	
Malaria	39	1.8	13	0.6	52	1.2
Measles	335	15.5	257	11.5	597	13.6
Meningococcal disease	65	3.0	54	2.4	119	2.7
Mumps	27	1.2	24	1.1	51	1.2
Paratyphoid fever	6	0.3	6	0.3	12	0.3
Pertussis	841	38.9	1 146	51.1	1 998	45.4
Rheumatic fever	91	4.2	71	3.2	164	3.7
Rickettsial disease	4		2		6	0.1
Rubella	16	0.7	7	0.3	23	0.5
Salmonellosis	560	25.9	488	21.8	1 056	24.0
Shigellosis	49	2.3	50	2.2	101	2.3
Taeniasis	6	0.3	4		10	0.2
Tuberculosis disease	159	7.3	151	6.7	312	7.1
Typhoid fever	23	1.1	22	1.0	45	1.0
VTEC/STEC infection	68	3.1	85	3.8	154	3.5
Yersiniosis	261	12.1	248	11.1	514	11.7

[a] Total includes cases where sex was unknown.

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

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, 2011

Table 47. Number of cases and rate per 100 000 population of notifiable diseases by age group, 2011

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	155	248.5	729	289.4	339	118.0	251	85.7	452	142.4	1 076	173.9	724	128.6	821	130.0	761	136.9	683	163.7	689	169.4	6 692	151.9
Cryptosporidiosis	15	24.1	188	74.6	78	27.2	56	19.1	40	12.6	84	13.6	55	9.8	46	7.3	26	4.7	15	3.6	5	1.2	610	13.8
Dengue fever	0		1		1		0		0		7	1.1	11	2.0	7	1.1	7	1.3	6	1.4	2		42	1.0
Gastroenteritis [b]	25	40.1	87	34.5	21	7.3	8	2.7	14	4.4	77	12.4	76	13.5	72	11.4	58	10.4	59	14.1	108	26.5	630	14.3
Giardiasis	38	60.9	408	162.0	139	48.4	48	16.4	26	8.2	175	28.3	443	78.7	287	45.4	168	30.2	149	35.7	52	12.8	1 935	43.9
Haemophilus influenzae type b	2		1		0		0		0		0		0		2		0		0		3		8	0.2
Hepatitis A	0		4		6	2.1	1		0		6	1.0	2		3		0		1		3		26	0.6
Hepatitis B	0		1		0		0		3		15	2.4	8	1.4	11	1.7	8	1.4	3		0		49	1.1
Hepatitis C	1		0		0		0		2		6	1.0	5	0.9	6	0.9	5	0.9	2		0		27	0.6
Invasive pneumococcal disease	23	36.9	25	9.9	16	5.6	13	4.4	11	3.5	33	5.3	38	6.8	42	6.6	78	14.0	84	20.1	189	46.5	552	12.5
Lead absorption	0		6	2.4	1		2		7	2.2	25	4.0	33	5.9	54	8.5	56	10.1	37	8.9	9	2.2	230	5.2
Legionellosis	0		0		0		1		1		4		10	1.8	16	2.5	28	5.0	48	11.5	51	12.5	159	3.6
Leptospirosis	0		0		0		0		1		10	1.6	15	2.7	18	2.8	17	3.1	8	1.9	1		70	1.6
Listeriosis	1		0		0		0		0		2		3		2		3		5	1.2	10	2.5	26	0.6
Malaria	0		0		0		3		7	2.2	26	4.2	7	1.2	5	0.8	3		1		0		52	1.2
Measles	54	86.6	125	49.6	81	28.2	95	32.4	66	20.8	70	11.3	83	14.7	18	2.8	4		1		0		597	13.6
Meningococcal disease	24	38.5	32	12.7	10	3.5	5	1.7	15	4.7	5	0.8	7	1.2	6	0.9	5	0.9	3		7	1.7	119	2.7
Mumps	2		10	4.0	15	5.2	4		1		6	1.0	7	1.2	3		1		1		1		51	1.2
Paratyphoid fever	0		1		0		0		0		7	1.1	1		2		0		1		0		12	0.3
Pertussis	127	203.6	272	108.0	302	105.1	231	78.9	95	29.9	132	21.3	227	40.3	247	39.1	171	30.8	101	24.2	93	22.9	1 998	45.4
Rheumatic fever	0		0		46	16.0	81	27.7	14	4.4	14	2.3	7	1.2	2		0		0		0		164	3.7
Rubella	4		3		2		1		1		8	1.3	2		0		1		1		0		23	0.5
Salmonellosis	72	115.4	175	69.5	55	19.1	34	11.6	61	19.2	162	26.2	90	16.0	122	19.3	116	20.9	90	21.6	77	18.9	1 056	24.0
Shigellosis	0		17	6.7	9	3.1	3		3		22	3.6	17	3.0	7	1.1	11	2.0	9	2.2	3		101	2.3
Tuberculosis disease	3		5	2.0	3		9	3.1	19	6.0	82	13.3	44	7.8	46	7.3	28	5.0	37	8.9	36	8.8	312	7.1
Typhoid fever	0		3		7	2.4	3		2		13	2.1	8	1.4	5	0.8	2		1		1		45	1.0
VTEC/STEC infection	9	14.4	60	23.8	13	4.5	10	3.4	5	1.6	14	2.3	11	2.0	8	1.3	2		7	1.7	15	3.7	154	3.5
Yersiniosis	41	65.7	134	53.2	18	6.3	24	8.2	20	6.3	50	8.1	60	10.7	46	7.3	49	8.8	40	9.6	31	7.6	514	11.7

[a] Total includes cases where age was unknown.

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

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, 2011

Table 48. Number of cases and rate per 100 000 population of notifiable diseases by ethnic group, 2011

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	465	71.9	139	52.2	289	71.1	37	98.2	5 350	175.5	6 692	151.9
Cryptosporidiosis	59	9.1	5	1.9	17	4.2	3		509	16.7	610	13.8
Dengue fever	1		3		9	2.2	1		20	0.7	42	1.0
Gastroenteritis [c]	49	7.6	21	7.9	25	6.2	3		488	16.0	630	14.3
Giardiasis	110	17.0	22	8.3	76	18.7	33	87.6	1 548	50.8	1 935	43.9
Haemophilus influenzae type b	2		1		0		0		5	0.2	8	0.2
Hepatitis A	2		3		12	3.0	2		6	0.2	26	0.6
Hepatitis B	10	1.5	7	2.6	7	1.7	0		22	0.7	49	1.1
Hepatitis C	4		0		0		0		23	0.8	27	0.6
Invasive pneumococcal disease	114	17.6	62	23.3	15	3.7	3		344	11.3	552	12.5
Lead absorption	19	2.9	21	7.9	13	3.2	1		153	5.0	230	5.2
Legionellosis	6	0.9	8	3.0	3		3		133	4.4	159	3.6
Leptospirosis	10	1.5	2		0		0		55	1.8	70	1.6
Listeriosis	3		3		5	1.2	0		15	0.5	26	0.6
Malaria	1		2		29	7.1	4		13	0.4	52	1.2
Measles	113	17.5	62	23.3	35	8.6	6	15.9	374	12.3	597	13.6
Meningococcal disease	41	6.3	19	7.1	2		1		55	1.8	119	2.7
Mumps	9	1.4	5	1.9	12	3.0	0		24	0.8	51	1.2
Paratyphoid fever	1		0		4		0		6	0.2	12	0.3
Pertussis	261	40.4	63	23.7	49	12.1	10	26.5	1 582	51.9	1 998	45.4
Rheumatic fever	92	14.2	66	24.8	0		0		6	0.2	164	3.7
Rickettsial disease	0		0		0		0		5	0.2	6	0.1
Rubella	3		1		6	1.5	0		12	0.4	23	0.5
Salmonellosis	84	13.0	41	15.4	60	14.8	10	26.5	801	26.3	1 056	24.0
Shigellosis	11	1.7	23	8.6	14	3.4	3		38	1.2	101	2.3
Tuberculosis disease	39	6.0	50	18.8	165	40.6	16	42.5	33	1.1	312	7.1
Typhoid fever	0		18	6.8	21	5.2	0		5	0.2	45	1.0
VTEC/STEC infection	13	2.0	2	-	4		1		131	4.3	154	3.5
Yersiniosis	31	4.8	23	8.6	127	31.2	5	13.3	300	9.8	514	11.7

[a] Total includes cases where ethnicity was unknown

[b] Middle Eastern/Latin American/African

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

Note: Denominator data used to determine disease rates for ethnic groups is based on the proportion of people in each ethnic group from the estimated resident 2006 census population applied to the 2011 mid year population estimates from Statistics New Zealand. Ethnicity is prioritised in the following order: Māori, Pacific Peoples, Asian, MELAA and European or Other Ethnicity (including New Zealander). 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, 1988–2011

Table 49. Number of notifiable disease cases by year and source, 1988–1999

Disease	Source[a]	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
AIDS	N	38	59	73	78	50	70	44	49	76	43	29	33
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
Cholera	N	0	0	5	0	0	0	2	2	0	0	1	1
Creutzfeldt-Jakob disease	N									2	1	0	2
Cryptosporidiosis	N									119	357	866	977
Dengue fever	N	1	3	2	3	1	1	0	6	23	14	26	9
Gastroenteritis [b]	N									555	310	492	601
Giardiasis	N									1 235	2 127	2 183	1 793
Haemophilus influenzae type b	N									26	9	11	10
	L	107	121	143	148	166	118	75	14	24	8	10	9
Hepatitis A	N	176	134	150	224	288	257	179	338	311	347	145	119
Hepatitis B	N	370	309	242	227	221	145	133	125	104	138	88	94
Hepatitis C	N	20	13	11	25	89	91	79	88	59	92	102	96
Hydatid disease	N	2	0	4	0	4	4	1	5	3	2	2	8
Influenza	S	136	119	343	183	317	423	441	521	673	743	127	425
Legionellosis	N	62	17	20	14	11	24	66	33	36	63	43	51
	L			21	42	60	76	121	76	60	109	107	65
Leprosy	N	2	4	1	4	5	3	1	1	10	3	3	10
Leptospirosis	N	99	90	117	106	70	116	70	65	56	52	75	59
	L	192	182	229	176	218	234	168	183	140	84	117	76
Listeriosis	N	7	10	16	26	16	11	8	13	10	35	17	19
Malaria	N	25	27	32	39	29	58	34	41	107	65	73	46
Measles	N									68	1984	164	107
Meningococcal disease	N	83	49	53	71	153	202	208	394	473	609	439	507
Mumps	N									76	90	85	56
Paratyphoid fever	N	2	0	1	1	2	10	7	24	20	25	18	17
Pertussis	N									1 022	284	153	1 046
Rheumatic fever - initial attack	N	153	148	90	97	70	81	98	88	110	93	66	97
Rubella	N									306	80	53	35
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
Shigellosis	N	145	137	197	152	124	128	185	191	167	117	122	147
Tetanus	N	1	0	0	0	8	2	2	2	3	0	2	6
Tuberculosis disease	N	295	303	348	335	327	323	352	391	352	323	365	446
Typhoid fever	N	15	17	7	9	11	14	24	21	15	16	31	10
VTEC/STEC infection	N						3	3	6	7	13	48	64
Yersiniosis	N									330	488	546	503

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

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

Notifiable disease cases by year and source, 1988–2011

Table 50. Number of notifiable disease cases by year and source, 2000–2011

Disease	Source[a]	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
AIDS	N	26	26	17	33	38	49	29	31	48	28	39	24
Campylobacteriosis	N	8 418	10 146	12 494	14 788	12 215	13 836	15 873	12 778	6 694	7 177	7 346	6 692
Cholera	N	0	3	1	1	2	0	0	1	0	0	2	0
Creutzfeldt-Jakob disease	N	3	1	3	6	8	3	5	8	5	8	5	4
Cryptosporidiosis	N	775	1 208	975	817	611	889	737	924	764	854	954	610
Dengue fever	N	7	93	70	55	8	11	19	114	113	139	51	42
Gastroenteritis [b]	N	727	940	1 087	1 026	1 363	557	937	622	687	712	492	630
Giardiasis	N	1 688	1 604	1 547	1 570	1 514	1 231	1 214	1 402	1 660	1 639	1 985	1 935
Haemophilus influenzae type b	N	13	11	3	12	4	7	9	15	9	10	8	8
	L	10	8	3	9	3	6	8	13	4	8	8	8
Hepatitis A	N	107	61	106	70	49	51	123	42	89	44	46	26
Hepatitis B	N	79	56	67	61	38	59	62	72	38	55	51	49
Hepatitis C	N	80	58	53	40	24	29	35	30	22	32	17	27
Hydatid disease	N	3	7	2	0	1	2	0	6	7	3	4	6
Influenza	S	73	313	241	230	231	273	315	239	466	624	349	336
Legionellosis	N	61	46	49	77	62	85	52	64	73	74	178	159
	L	56	56	53	82	75	83	54	72	74	77	178	160
Leprosy	N	4	3	4	4	3	2	4	8	5	3	3	1
Leptospirosis	N	98	99	140	113	102	85	87	66	118	69	81	70
	L	114	113	181	149	113	109	67	42	72	60	58	44
Listeriosis	N	22	18	19	24	26	20	19	26	27	28	23	26
Malaria	N	111	54	61	46	33	32	30	25	40	50	44	52
Measles	N	64	82	21	66	32	19	18	24	12	248	48	597
Meningococcal disease	N	477	648	555	542	343	226	160	104	122	133	97	119
Mumps	N	50	56	64	56	45	61	47	73	76	63	41	51
Paratyphoid fever	N	24	32	16	18	28	25	23	23	25	25	19	12
Pertussis	N	4 140	1 334	1 068	585	3 485	2 719	1 120	332	417	1 398	873	1 998
Rheumatic fever - initial attack	N	108	114	87	148	75	76	104	133	139	124	155	164
Rubella	N	26	30	33	26	23	13	8	11	9	4	4	23
Salmonellosis	N	1 795	2 417	1 880	1 401	1 081	1 382	1 335	1 275	1 339	1 128	1 146	1 056
Shigellosis	N	115	157	112	87	140	183	102	129	113	119	105	101
Tetanus	N	1	4	1	2	1	1	1	1	0	1	7	0
Tuberculosis disease	N	354	369	381	423	375	330	350	282	293	299	307	312
Typhoid fever	N	21	27	23	20	31	30	42	48	29	34	31	45
VTEC/STEC infection	N	67	76	73	104	89	92	87	100	124	143	138	154
Yersiniosis	N	396	429	472	436	407	383	453	502	508	430	406	514

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

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

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ACRONYMS AND ABBREVIATIONS

ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Description
AEG	AIDS Epidemiology Group
AFP	Acute flaccid paralysis
AIDS	Acquired immune deficiency 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
MoH	Ministry of Health
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
PCV-7	7-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
SYHC	Student youth health clinic
VRE	Vancomycin-resistant enterococci
VTEC	Verotoxin-producing *Escherichia coli*
WHO	World Health Organization