ESR

SURVEILLANCE REPORT

Notifiable and other diseases in New Zealand

Annual Report 2010

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

April 2011

ISSN: 1179 3058

This report is available at www.surv.esr.cri.nz

First published: 29 April 2011
Revised: 1 September 2011

This edition has been revised to correct errors in the data presented in the *Limitations of surveillance data* section regarding completeness and in the meningococcal disease section regarding antimicrobial susceptibility.

Suggested citation:
The Institute of Environmental Science and Research Ltd.
Notifiable and Other Diseases in New Zealand: Annual Report 2010
Porirua, New Zealand

ISSN: 1179-3058

Client Report FW11030

Acknowledgements

This report was prepared as part of a Ministry of Health contract for scientific services.

The report could not have been produced without the continued support of staff in the public health services in New Zealand who provide us with data from their regions.

The material presented in the report was prepared by staff in the Health Intelligence and Communicable Disease sections of the Health group of the Institute of Environmental Science and Research Ltd.

The Ministry of Health is thanked for their helpful comments and feedback.

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SUMMARY

SUMMARY

A summary of the main trends in diseases and conditions presented in the main body of this report are shown in this section.

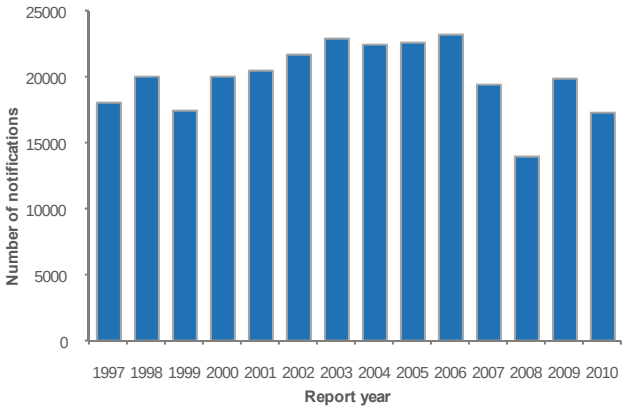
Notifiable diseases

In 2010, 17 277 cases of notifiable diseases were reported through EpiSurv (Figure 1). This is a decrease from the 19 718 cases reported in 2009 and the second lowest count in the last 14 years (after 2008 with 13 933 cases).

Between 2009 and 2010 there were some significant changes in the number of cases reported for individual diseases. There was a statistically significant increase in reported cases of cryptosporidiosis (854 to 954, 12%), giardiasis (1639 to 1985, 21%), legionellosis (74 to 178, 141%), rickettsial disease (5 to 14, 180%), tetanus (1 to 7, 600%), and toxic shellfish poisoning (1 to 9, 800%).

Between 2009 and 2010 a statistically significant decrease occurred in reported cases of dengue fever (139 to 51, -63%), gastroenteritis (712 to 492, -31%), hepatitis C (32 to 17, -47%), invasive pneumococcal disease (697 to 535, -23%), lead absorption (273 to 201, -26%), measles (248 to 48, -81%), meningococcal disease (133 to 97, -27%), mumps (63 to 41, -35%), non seasonal influenza (3670 to 1826, -50%), and pertussis (1398 to 873, -38%).

Figure 1. Total disease notifications by year, 1997–2010



Enteric diseases

Enteric diseases continued to comprise the majority of disease notifications in 2010. Although campylobacteriosis notifications have more than halved in the last five years, at 7346 notifications, this disease still contributed 42.5% of all disease notifications in 2010. There was a statistically significant increase in the notification rate of cryptosporidiosis and giardiasis between 2009 and 2010. In contrast, gastroenteritis was the only enteric disease to show a statistically significant rate decrease compared with 2009. 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).

Exotic diseases

Rickettsial disease was the only exotic disease to show a statistically significant increase in notification rates between 2009 and 2010. The increase was driven by higher murine typhus case counts, almost all of whom acquired their infection locally. All cases of brucellosis, dengue fever, leprosy, Q fever, Ross River virus infection and taeniasis had overseas exposures that accounted for their infection. This was also true for malaria apart from one case of Asian ethnicity with an unknown travel history. There was no evidence of any recent locally-acquired hydatid disease.

Vaccine preventable diseases

In 2010, there were seven cases of tetanus notified, compared with an average of 0.8 cases per year for the previous five years. The 2010 cases included an unvaccinated child in the 1–4 years age group.

Notification rates for invasive pneumococcal disease, measles, meningococcal disease and pertussis were all significantly lower in 2010 compared with 2009.

A significant increase in the pertussis notification rate between 2008 and 2009 (9.8 per 100 000 compared with 32.4 per 100 000) was followed by a significant decrease in the pertussis rate in 2010 (20.0 per 100 000). Pertussis epidemics occur in New Zealand approximately every three to four years. The 2009 pertussis notification rate was well below that seen in previous epidemics (107.6, 85.3 and 65.8, for the 2000, 2004 and 2005 epidemic years, respectively).

The 2010 meningococcal disease rate (2.4 per 100 000) remains well down on the peak annual rate observed during the epidemic in 2001 (16.7 per 100 000), but is still higher than before the start of the epidemic in 1989–1990 (1.5 per 100 000).

Influenza

The average weekly influenza consultation rate was 49.3 per 100 000 patient population, which was approximately half the 2009 rate (106.1 per 100 000). The peak weekly consultation rate of 151.6 per 100 000 practice patient population in August 2010 was lower than 2009, but higher than 2007 and 2008.

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 2010, *Chlamydia trachomatis* infection was again the most commonly diagnosed sexually transmitted infection (STI) in New Zealand, and it had over four-times the rate of the most commonly reported notifiable disease, campylobacteriosis. From the 15 district health boards (DHBs) participating in laboratory-based surveillance in 2010, 7.8 cases of chlamydia per 1000 population were reported. The highest DHB rate of chlamydia infection was reported for Tairawhiti DHB (13.1 per 1000 population) followed by Lakes (11.9 per 1000 population) and Hawke's Bay (9.9 per 1000 population) DHBs. Based on data from 10 DHBs, there was a increase of 13.1% (from 6.9 to 7.8 per 1000 population) in the chlamydia restricted national rate between 2007 and 2010.

From laboratory-based surveillance in 2010, 65 cases of gonorrhoea per 100 000 population were reported based on data from 17 DHBs. The highest rate of gonorrhoea was reported for Tairawhiti DHB (360 per 100 000 population) followed by Hawke's Bay DHB (124 per 100 000 population). Based on data from 13 DHBs, there was a decrease of 20.3% (from 80.9 to 64.5 per 100 000) in the gonorrhoea restricted national rate between 2007 and 2010.

Between 2009 and 2010, the genital warts clinic visit rate decreased across all three clinic types: sexual health clinics (SHCs) from 3.9% to 3.2% (3294 to 2797 cases), family planning clinics (FPCs) from 0.3% to 0.2% (546 to 295 cases) and student and youth health clinics (SYHCs) from 0.10% to 0.08% (242 to 187 cases).

The number of syphilis cases reported by SHCs decreased from 138 in 2009 to 120 in 2010. In addition, FPCs reported one case of syphilis in 2010 and SYHCs reported two cases.

In 2010, 39 cases of acquired immune deficiency syndrome (AIDS) were notified. The 2010 notification rate (0.9 per 100 000) was not significantly higher than the 2009 rate (0.6 per 100 000, 28 cases).

Outbreaks

In 2010, 606 outbreaks were reported involving 6321 cases. This represented a decrease in the number of outbreaks and cases compared with 2009 (638 outbreaks with 10 734 cases).

The most common pathogen implicated was norovirus with 152 of the outbreaks and 3223 of the cases, followed by *Giardia* spp. with 97 outbreaks and 378 cases.

The most common setting linked to an outbreak was private homes (229 outbreaks, 1034 cases), followed by restaurants/cafés (81 outbreaks, 414 cases).

Antibiotic resistance

The complete analysed dataset for antibiotic resistance is only available up until the end 2009.

Methicillin resistance prevalence among *Staphylococcus aureus* has remained stable at 7–9% each year since 2000. A trend of declining prevalence of mupirocin resistance in *S. aureus* was evident since a peak in 2000, and there was a high prevalence of fusidic acid resistance among *S. aureus.*

There was a continuing high prevalence of penicillin non-susceptibility among *Streptococcus pneumoniae*.

A significant decline was reported in cefotaxime non-susceptibility among invasive pneumococci in 2009, following a trend of increasing resistance since 2000.

In 2009, stable levels of trimethoprim and co-amoxiclav resistance were reported among urinary *Escherichia coli*, together with continuing low levels of nitrofurantoin resistance, and a trend of increasing fluoroquinolone resistance.

An increasing prevalence of extended-spectrum β-lactamases in Enterobacteriaceae has been reported.

INTRODUCTION

INTRODUCTION

This report provides a summary of diseases currently notifiable under the Health Act 1956 or the Tuberculosis Act 1948. Other communicable diseases and organisms of public health importance under surveillance in New Zealand are also included.

The focus is on diseases reported in 2010 and where data are available, the trend since 1997, with the aim of supporting prevention and control measures.

Data on individual diseases are presented in alphabetical order.

Also presented in this report are data for influenza, sexually transmitted infections (STIs), antibiotic resistance and disease outbreaks.

Purposes of surveillance

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.

SURVEILLANCE METHODS

SURVEILLANCE METHODS

Interpreting data

Data in this report, with the exception of the meningococcal data, are presented by date reported and not by 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 (e.g., date reported or date of onset of illness)
- whether laboratory-reported, 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 place of residence (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. Price sensitivity and availability of medical practitioners may also determine whether cases present to health care services for diagnosis.

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

The number 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, Other and European ethnic groups. The Other ethnic group includes all ethnic groups except European, Asian, Pacific Peoples and Māori.

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 are entered at each public health unit (PHU) via a secure web-based portal onto a computerised database (EpiSurv). The real-time data are 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 depend on the specific disease, but usually include demography, outcome, basis of diagnosis, risk factor 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.

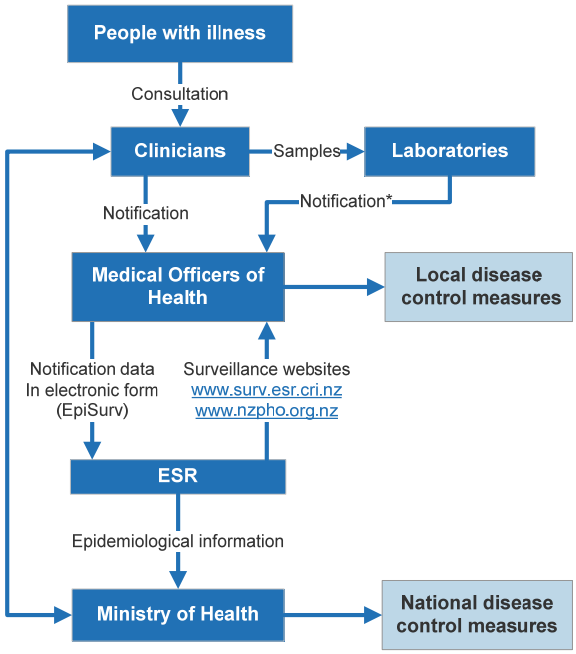
Case definitions (including laboratory and clinical criteria) for notification of diseases and/or conditions, can be found in the Communicable Disease Manual [4]. Case definitions for diseases that have been added to the notification schedule after 1998 can be found on the Ministry of Health website 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. Several of the communicable diseases diagnosed by clinical laboratories are either not covered adequately or not covered at all by the notifiable disease surveillance systems.

Figure 2. Notifiable disease surveillance system



* From 21 December 2007

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 (RSV), enteroviruses, adenoviruses, salmonellae and streptococci.

Outbreak surveillance

ESR introduced an outbreak surveillance system in July 1996 and has been systematically refining this system since then [5]. 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. A new outbreak report form was introduced in October 2010. As a result, some variables previously reported are no longer available for analysis.

Statistics New Zealand

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

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 [6]. In 2010, this was based on a network of 91 general practices/practitioners from all district health boards (DHBs) in New Zealand and operated from January to September. 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 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

In New Zealand, STIs are not notifiable, with the exception of acquired immune deficiency syndrome (AIDS), 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.

Different denominators are used to calculate the rates in the clinical and the laboratory settings. Data from the clinics use the total number of clinic visits to calculate a clinic visit rate. In the case of FPCs and SYHCs, many visits are not related to STIs. For laboratory data the denominator is the mid-year population estimates published by Statistics New Zealand for the DHBs.

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 they provide a useful, complementary source of STI incidence data. Comparison of 2010 data shows that the number of cases reported by laboratories was 3.8 and 2.7 times higher for chlamydia and gonorrhoea respectfully than the number of cases reported from the clinics from the DHBs that participate in laboratory surveillance.

Ministry of Health

The Ministry of Health collates national data on patients admitted and discharged from publicly funded hospitals. These data are stored as part of the National Minimum Dataset (see http://www.moh.govt.nz/moh.nsf/indexmh/dataandstatistics-collections-nmds 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 of death for all deaths registered in New Zealand

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

Hospital admission data include 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.

New Zealand Paediatric Surveillance Unit

The New Zealand Paediatric Surveillance Unit (NZPSU) [8] was established in 1997 to provide active surveillance of acute flaccid paralysis (AFP) to fulfil World Health Organization (WHO) requirements for certification of polio eradication. Along with AFP, the conditions currently under surveillance by the NZPSU include haemolytic uraemic syndrome (HUS), congenital rubella syndrome (CRS), perinatal exposure to human immunodeficiency virus (HIV), vitamin K deficiency bleeding and pneumococcal meningitis. 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 are 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).

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 acquired immune deficiency syndrome (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).

Analytical methods

Key analytical methods used include the following:

Dates

Notification data contained in this report are based on information recorded on EpiSurv as at 17 February 2011. Changes made to EpiSurv data by PHU staff after this date will not be reflected in this report. Consequently, future analyses of these data may produce revised results. Notification data for the years from 1997 to 2009 have been updated to reflect those in EpiSurv as at 17 February 2011.

Disease numbers are reported according to the date of notification, with the exception of data reported in the meningococcal disease section (which is reported according to the earliest date available among onset, hospitalisation, laboratory and notification dates). Laboratory results are reported according to the date the specimen was received.

Geographic breakdown

This report provides rates for current district health boards (DHBs) where these are available and health districts where 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, 2010

DHB	Code	Population
Northland	NL	157 350
Waitemata	WM	537 100
Auckland	AK	450 200
Counties Manukau	CM	490 700
Waikato	WK	364 399
Lakes	LS	102 600
Bay of Plenty	BP	210 090
Tairawhiti	TW	46 500
Taranaki	TK	109 260
Hawke's Bay	HB	155 280
Whanganui	WG	63 181
MidCentral	MC	167 232
Hutt Valley	HU	143 800
Capital and Coast	CC	291 318
Wairarapa	WR	40 280
Nelson Marlborough	NM	138 100
West Coast	WC	32 730
Canterbury	CB	508 200
South Canterbury	SC	55 860
Southern	ST	303 250
Total		**4 367 430**

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 5 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 ethnicity, have been derived from 2010 mid-year population estimates published by Statistics New Zealand. Denominator data used to determine disease rates for ethnic groups are based on 2006 census data from Statistics New Zealand. Ethnicity is prioritised in the following order: Māori, Pacific Peoples, Asian, Other, European and Unknown.

Rates have not been calculated where there are fewer than five notified cases in any category. Calculating 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. 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 are reported for a number of 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

The Pearson chi-square test or, where necessary, 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

LIMITATIONS OF SURVEILLANCE DATA

Quality

A report is prepared each year on the quality of selected EpiSurv fields to assist in the monitoring of a quality assurance programme. The latest report was published in 2010 [9].

Sensitivity

Sensitivity was assessed in 2003 using reporting on meningococcal disease [10]. This showed that the sensitivity of meningococcal disease surveillance is probably in excess of 87%.

An assessment of the ascertainment of pertussis cases ages less than one year old in 2006 found that under-identification, estimated using capture-recapture analysis, was modest for both active surveillance (16%) and passive notification (19%) [11].

The sensitivity of surveillance for other diseases will often be less, particularly for common enteric diseases where only a small proportion of those infected will present to health care services. 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 were provided for selected key EpiSurv variables each year from 1999 to 2010.

The completeness of date of birth, age, and sex data is generally very high (>98%), changing little over the last five years. The completeness of date of birth, age, and sex remained high (≥99.5%) in 2010. The completeness of ethnicity data for 2010 was similar to 2009 (92.1%)

The National Health Index (NHI) provides an important link between notifiable disease, immunisation, and laboratory records. Significant progress has been made in the completeness of the NHI data over the past five years and a high percentage (94.9%) of EpiSurv records now have an NHI recorded.

Table 2. Data completeness by year and EpiSurv variable, 1999–2010

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

Timeliness

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

Of the notifications with an onset date recorded (62.2% of notifications) in 2010, 59.4% were reported to a public health service (PHS) within one week of the onset of symptoms and 80.6% were reported within two weeks of the onset of symptoms.

In 2010, 97.1% of disease notifications were entered into EpiSurv within one week of being reported to the PHS and 98.1% were entered within two weeks of being reported to the PHS.

Accuracy

Reliable population denominator data are available, except in the case of STIs where the population covered by a particular laboratory may be an estimate.

Another limitation is the identification of cases on the basis of serology, which is not as specific as if the implicated organism was isolated or detected by polymerase chain reaction (PCR).

NOTIFIABLE DISEASES

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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 that are reported here. More detailed information is available from the AEG's website http://dnmeds.otago.ac.nz/departments/psm/research/aids/newsletters.html

In 2010, 39 cases of AIDS were reported to the AEG compared with 28 cases in 2009. The 2010 AIDS notification rate (0.9 per 100 000) was not significantly higher than the 2009 rate (0.6 per 100 000).

Twenty-five cases (64.1%) were men infected through sex with other men, 11 (28.2%) were infected through heterosexual contact (6 men and 5 women), one was infected overseas through injecting drug use, and the mode of infection was unknown for two cases.

The distribution of the 2010 cases according to ethnicity was: 23 (59.0%) European, eight (20.5%) Māori, five (12.8%) Other, and three of (7.7%) Asian ethnicity. The cases ranged from 23 to 69 years of age, with a mean age of 44.9 years.

Eight deaths due to AIDS were reported to the AEG as having occurred in 2010. However, this number 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 first became 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 [12].

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 2010. 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

No cases of Chikungunya fever were notified in 2010. Three 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 2010. The only case that has been notified since 1997 was a laboratory-confirmed case that occurred in 2004 in a 40–49 year old female. She was thought to have acquired the infection in China.

Ross River virus

Five cases of Ross River virus infection were notified in 2010, four of which were laboratory confirmed. Of the five cases, three were female and two were male. The cases were in the 20–69 years age group and all were of European ethnicity. One of the cases was hospitalised and all of the cases had travelled to Australia during the incubation period of the disease.

Botulism

There have been no notifications of botulism in humans in New Zealand since two cases were reported in 1985 [13].

Brucellosis

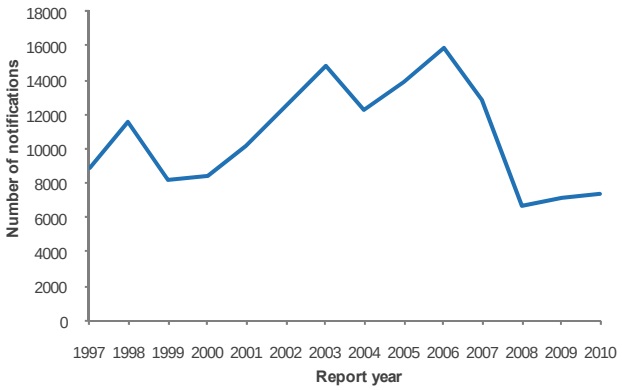
One case of brucellosis was notified in New Zealand in 2010. The laboratory-confirmed case was a female aged 30–39 years who had spent time on a farm in the United States of America during the incubation period for the disease.

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 7346 cases of campylobacteriosis notified in 2010. The 2010 rate of 168.2 per 100 000 population was not a significant increase from the 2009 rate of 166.3 per 100 000 (7177 cases). Since 2008, 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 42.5% of all notifications in 2010.

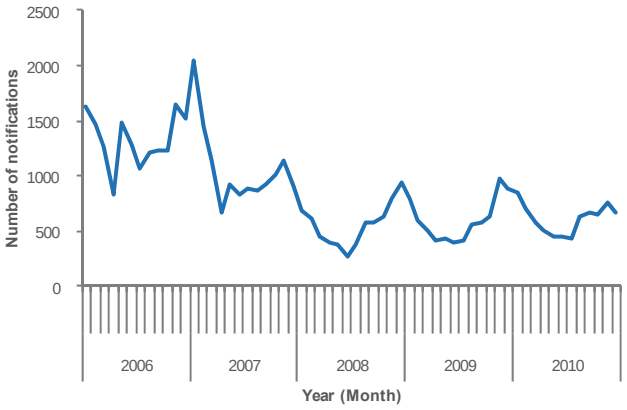
Figure 3. Campylobacteriosis notifications by year, 1997–2010



The notification pattern in 2010 was similar to previous years, highly seasonal with a summer peak and a winter trough (Figure 4). The lowest monthly campylobacteriosis total was in July 2010 (441 notifications) and the highest monthly total was in January 2010 (840 notifications).

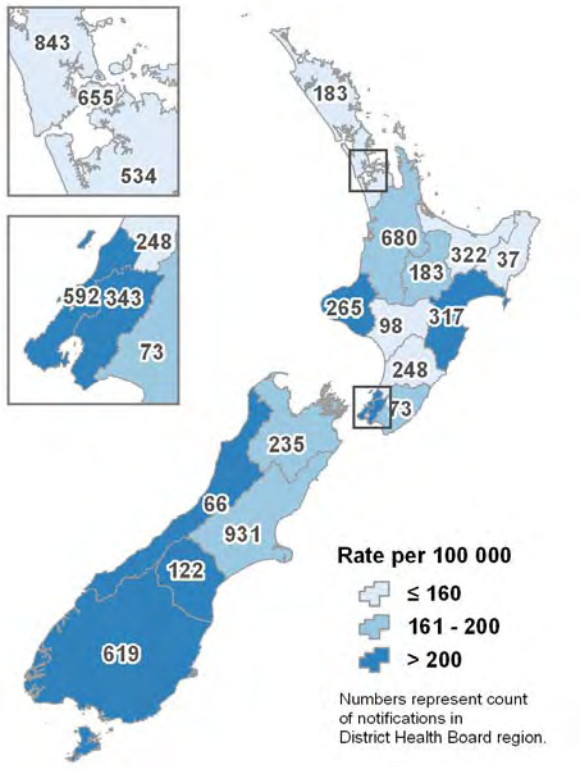
Campylobacteriosis rates varied throughout the country as demonstrated in Figure 5. The highest rates were reported by Taranaki (242.5 per 100 000, 265 cases) and Hutt Valley (238.5 per 100 000 population, 343 cases) DHBs. The lowest rates were reported in Tairawhiti (79.6 per 100 000, 37 cases), and Counties Manukau (108.8 per 100 000, 534 cases) DHBs.

Figure 4. Campylobacteriosis notifications by month, January 2006–December 2010



Age information was available for 7335 (99.9%) cases. The highest age-specific rate occurred in the 1–4 years age group (314.4 per 100 000 population, 780 cases) and those aged less than 1 year (279.3 per 100 000, 178 cases).

Figure 5. Campylobacteriosis notifications by DHB, 2010



Sex was recorded for 7300 (99.4%) cases. Similar to previous years, the sex-specific notification rate was higher for males (190.9 per 100 000 population, 4093 cases) compared with females (144.3 per 100 000, 3207 cases).

Ethnicity was recorded for 6533 (88.9%) cases. The highest disease notification rates were for those of European ethnicity (206.2 per 100 000 population, 5556 cases), followed by Other (144.6 per 100 000, 49 cases) and Asian (101.2 per 100 000, 345 cases) ethnicities. The lowest rates were reported for Pacific Peoples (58.3 per 100 000, 132 cases) and Māori (79.8 per 100 000, 451 cases) ethnicities.

Hospitalisation status was recorded for 4000 (54.5%) cases, of which 438 (11.0%) cases were hospitalised.

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

In 2010, 29 outbreaks of campylobacteriosis (including two outbreaks with more than one implicated pathogen) were reported involving 113 cases.

Chemical poisoning from the environment

At present, only poisonings arising from chemical contamination are required to be notified under the Health Act 1956. In addition, hazardous substance injuries are required to be notified under the Hazardous Substances and New Organisms Act 1996.

In 2010, three probable cases of chemical poisoning from the environment were notified. This was lower than the number notified in 2009 (6 cases), but higher than the number notified in 2008 (1 case).

Two males, one European and one Māori, in the 10–14 years age group from Waikato DHB presented with symptoms consistent with cyanobacterial poisoning. Both cases had been water skiing on Lake Kainui.

A European female in the 20–29 years age group from Bay of Plenty DHB self-reported carbon monoxide poisoning due to a leak in a gas heater in her rented accommodation. No further evidence of carbon monoxide poisoning was available.

Cholera

Two cases of cholera were notified in New Zealand in 2010. Both cases were European males, in the 40–49 years and 60–69 years age groups from Canterbury and Auckland DHBs, respectively. Both cases reported overseas travel to Thailand during the incubation period. One hospitalisation was reported in 2010. Since 1997, a total of 12 confirmed cholera cases have been notified.

Creutzfeldt-Jakob disease

The CJD Registry was established in 1996 to monitor sporadic, familial, iatrogenic and variant Creutzfeldt-Jakob disease (CJD). This section is based on the 14th annual report of the Registry [14].

In 2010, five cases of possible CJD were referred to the Registry. Of these, one received an alternative diagnosis, and one had a negative brain biopsy.

The remaining three cases were classified as probable sporadic CJD based on clinical, cerebrospinal fluid, electroencephalogram, and/or magnetic resonance imaging findings. The age distribution of these probable cases was as follows: 60–69 years (2 cases) and 70–79 years (1 case). Two of the cases were male and one was female. All three cases died with no autopsy performed.

Since 1997, 52 cases of CJD were documented by the Registry, 16 definite and 36 probable. No cases of variant CJD, the form linked with bovine spongiform encephalopathy, have ever been identified in New Zealand.

Table 3. Exposure to risk factors associated with campylobacteriosis, 2010

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Contact with farm animals	1 055	1 643	4 648	39.1
Consumed food from retail premises	926	1 591	4 829	36.8
Consumed untreated water	498	1 795	5 053	21.7
Contact with faecal matter	365	2 092	4 889	14.9
Recreational water contact	281	2 249	4 816	11.1
Contact with other symptomatic people	236	2 292	4 818	9.3
Contact with sick animals	163	2 109	5 074	7.2
Travelled overseas during the incubation period	185	2 745	4 416	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.

Cryptosporidiosis

During 2010, 954 cases of cryptosporidiosis were notified (21.8 per 100 000 population), which was a significant increase from the number notified in 2009 (19.8 per 100 000, 854 cases) (Figure 6).

Figure 6. Cryptosporidiosis notifications by year, 1997–2010

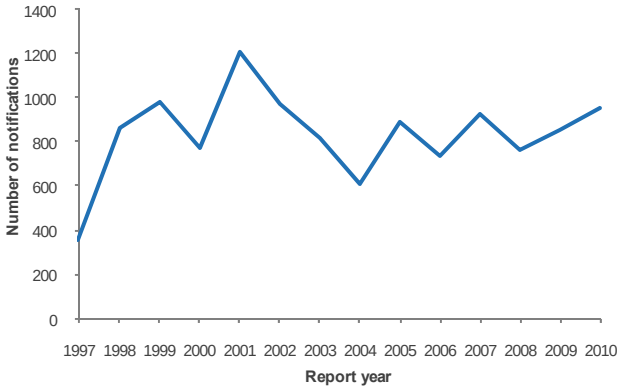
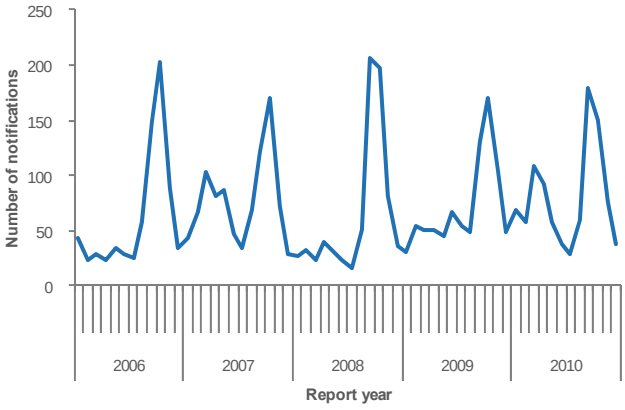


Figure 7 shows cryptosporidiosis cases by month since 2005. There is a distinct seasonal pattern with the highest number of notifications reported during spring each year, with an additional smaller peak in autumn in 2007 and 2010.

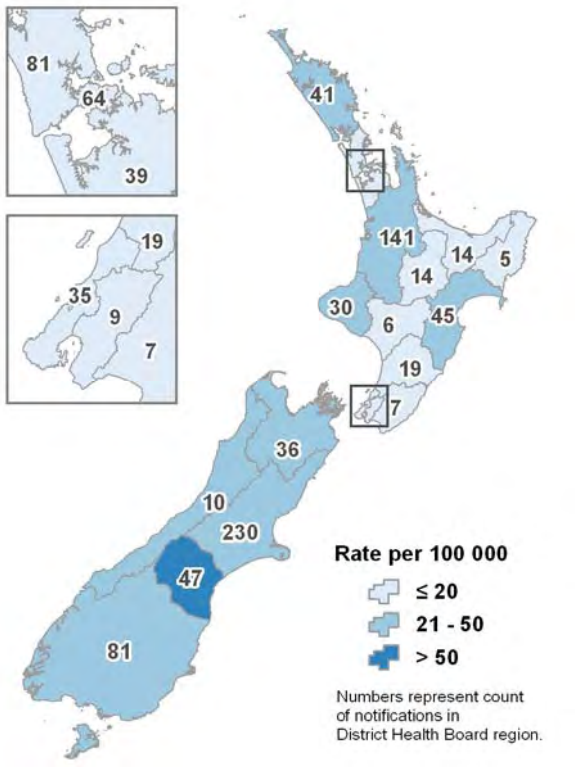
Figure 7. Cryptosporidiosis notifications by month, January 2006–December 2010



Cryptosporidiosis notification rates varied throughout the country as illustrated in Figure 8. The highest rates were reported in South Canterbury (84.1 per 100 000 population, 47 cases) and Canterbury (45.3 per 100 000, 230 cases) DHBs, and the lowest rate was reported in Hutt Valley DHB (6.3 per 100 000, 9 cases).

Age was recorded for 951 (99.7%) of the cases reported. Of these, 522 cases (54.9%) were children aged less than 15 years. The highest age-specific rate was in the 1–4 years age group (115.3 per 100 000 population, 286 cases), followed by the less than 1 year age group (53.4 per 100 000, 34 cases). The lowest rate was in the 70 years and over age group (4.1 per 100 000, 16 cases).

Figure 8. Cryptosporidiosis notifications by DHB, 2010



Sex was recorded for 948 (99.4%) of the cases reported. Sex-specific notification rates for cryptosporidiosis were higher for males (22.5 per 100 000 population, 482 cases) compared with females (21.0 per 100 000, 466 cases).

Of the 901 (94.4%) cases where ethnicity information was recorded, the highest notification rates were for those of European ethnicity (29.3 per 100 000, 790 cases) followed by Other (23.6 per 100 000, 8 cases), Māori (12.2 per 100 000, 69 cases), Asian (6.5 per 100 000, 22 cases), and Pacific Peoples (5.3 per 100 000, 12 cases) ethnicities.

Hospitalisation status was recorded for 710 cases (74.4%), of which 25 (3.5%) cases were hospitalised.

In 2010, 43 cryptosporidiosis outbreaks (including one outbreak with two implicated pathogens) were reported, involving 294 cases.

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 2010.

Table 4. Exposure to risk factors associated with cryptosporidiosis, 2010

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Contact with farm animals	320	260	374	55.2
Recreational water contact	203	311	440	39.5
Consumed untreated water	168	276	510	37.8
Contact with faecal matter	167	290	497	36.5
Contact with other symptomatic people	153	350	451	30.4
Consumed food from retail premises	135	357	462	27.4
Contact with sick animals	89	370	495	19.4
Travelled overseas during the incubation period	53	554	347	8.7

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

Cysticercosis

No cases of cysticercosis were notified in New Zealand in 2010. Since 1997, five cycticercosis cases have been reported, three cases in 2005 and two cases in 2007. Ministry of Health hospitalisation data for 2010 recorded four hospitalisations with the primary reason for admission being cysticercosis. These hospitalisations were comprised of three male admissions in the 20–29 years age group, all of Indian ethnicity, and one female admission in the 30–39 years age group with ethnicity unstated.

Decompression sickness

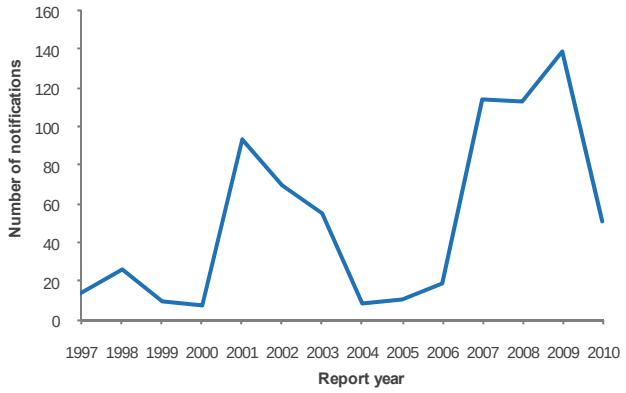
There were no cases of decompression sickness notified in 2010. Over the last five years only one case of decompression sickness has been notified.

Ministry of Health hospitalisation data for 2010 recorded 18 cases with decompression sickness as the primary reason for admission. Over the last five years the number of hospitalisations has ranged from eight cases in 2006 to 24 cases in 2009. The number of hospitalisations recorded consistently exceeds the number of notifications recorded annually in EpiSurv, indicating continued under-reporting of this condition.

Dengue fever

There were 51 cases of dengue fever notified in 2010 compared with 139 cases in 2009 (Figure 9). The 2010 notification rate (1.2 per 100 000 population) was significantly lower than the 2009 rate (3.2 per 100 000 population).

Figure 9. Dengue fever notifications by year, 1997–2010



Age was recorded for all the reported dengue fever cases. The highest age-specific rates were reported in the 20–29 years age group (2.5 per 100 000 population, 15 cases), followed by the 30–39 years age group (1.8 per 100 000 population, 10 cases), and the 60–69 years age group (1.7 per 100 000 population, 7 cases).

Sex was recorded for 50 (98.0%) cases. The notification rate was similar in males (1.2 per 100 000 population, 26 cases) and females (1.1 per 100 000 population, 24 cases).

Ethnicity was recorded for 47 (92.2%) cases. The highest rate was reported for those of Asian ethnicity (2.1 per 100 000 population, 7 cases), followed by those of European ethnicity (1.3 per 100 000, 36 cases)

Hospitalisation status was recorded for 43 (84.3%) cases. Of the 43 cases, 16 (37.2%) were hospitalised. Of the 51 notified cases, 50 (98.0%) were laboratory confirmed.

Travel history was recorded for all cases and all cases had travelled overseas during the incubation period for this disease. The countries commonly visited by cases were Indonesia (37.3%, 19 cases), Thailand (13.7%, 7 cases), and Vanuatu (11.8%, 6 cases). Note that cases may have travelled to more than one country.

Twenty-five cases (49.0%) undertook some protective measures e.g. use of insect repellent, bed nets, protective clothing and staying in screened or air conditioned accommodation. No information on protective measures was recorded for the remaining 26 cases (51.0%).

Ministry of Health hospitalisation data for 2010 recorded 15 cases where dengue fever was the primary diagnosis on admission.

Diphtheria

No cases of toxigenic respiratory diphtheria were notified in New Zealand in 2010. The last toxigenic respiratory diptheria case in New Zealand was reported in 1998 [15].

In 2010, 21 cultures of *Corynebacterium diphtheriae* were received by the ESR Special Bacteriology Laboratory for toxigenicity testing, typing and surveillance purposes. The majority (18 cultures, 85.7%) were from cutaneous sources, one culture was from blood and two were from respiratory sources. The patients ranged in age from 2 to 68 years.

All of the isolates were determined to be non-toxigenic by polymerase chain reaction (PCR) examination for the toxin gene. Fifteen (71.4%) of the isolates were biovar *mitis*, and six (28.6%) were biovar *gravis*, including the blood isolate.

ESR received 32 isolates in 2009 and 53 in 2008. The reduction in numbers received over the last few years may be due to changes in testing laboratories and staff rather than a declining occurrence of the organism, particularly in cutaneous infections.

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 from this disease in 2004 who had been receiving powdered infant formula [16].

Two cases of *E. sakazakii* invasive disease were notified in New Zealand in 2010, bringing the number of cases notified since 2005 to three. The cases were a female in the 50–59 years age group and a male who was over 70 years of age. One case had a chronic illness and the other case had no details of illness recorded. The 2005 case was an elderly male with peritonitis on a renal ward.

Gastroenteritis

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 (e.g., salmonellosis, campylobacteriosis, and VTEC/STEC infection) are reported separately.

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

In 2010, 492 cases of gastroenteritis (11.3 per 100 000 population) were notified. This was a significant decrease from 2009 (16.5 per 100 000, 712 cases). A casual agent was reported for 182 cases (37.0%). Of these, the most common pathogens were rotavirus (49.5%, 90 cases) and norovirus (42.9%, 78 cases). The breakdown of cases where a causal agent was identified is presented in Table 5.

The highest gastroenteritis rate was reported in Hutt Valley DHB (37.6 per 100 000 population, 54 cases), followed by Capital and Coast (30.9 per 100 000, 90 cases), MidCentral (26.3 per 100 000, 44 cases), and Whanganui (25.3 per 100 000, 16 cases) DHBs.

Table 5. Gastroenteritis cases where organism was identified, 2010

Organism	Cases	Percentage (%)
Rotavirus infection	90	49.5
Norovirus infection	78	42.9
Sapovirus infection	5	2.7
Vibrio parahaemolyticus infection	3	1.6
Histamine (scromboid) poisoning	2	1.1
Bacillus cereus food poisoning	1	0.5
Clostridium difficile	1	0.5
Clostridium perfringens	1	0.5
Staphylococcal food intoxication	1	0.5
Total	**182**	**100.0**

Age was recorded for 476 (96.7%) cases. Age-specific rates were highest in the less than one year age group (48.6 per 100 000 population, 31 cases) followed by those in the 1–4 years age group (35.5 per 100 000, 88 cases). The lowest age-specific rates was recorded for those in the 5–9 years age group (2.1 per 100 000, 6 cases).

Sex was recorded for 478 (97.2%) cases. Sex-specific rates were slightly higher for females (11.7 per 100 000 population, 261 case) than males (10.1 per 100 000, 217 cases)

Ethnicity was recorded for 443 (90.0%) cases. Of these, the highest notification rates occurred among those of Other (17.7 per 100 000 population, 6 cases) and European (14.3 per 100 000, 384 cases) ethnicities.

Hospitalisation status was recorded for 320 (65.0%) cases. Of these, 25 cases (7.8%) were hospitalised.

In 2010, 365 gastroenteritis outbreaks were reported involving 5188 cases, of which 83 cases were included as individual case notifications.

The risk factors recorded for gastroenteritis cases are shown in Table 6. The most common risk factors associated with gastroenteritis were consumption of food from retail premises and contact with other symptomatic people.

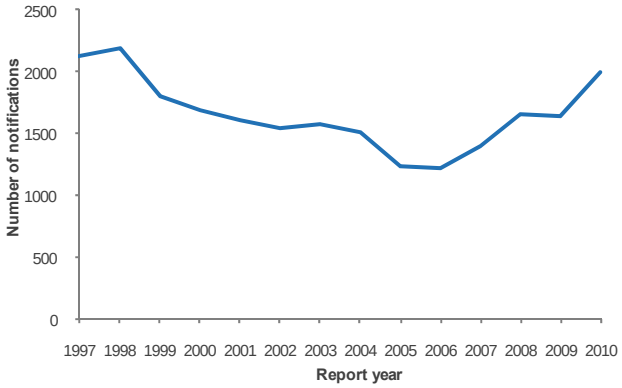
Giardiasis

There were 1985 cases of giardiasis notified in 2010. The 2010 rate (45.4 per 100 000 population) was a significant increase on the 2009 rate (38.0 per 100 000, 1639 cases).

Figure 10 shows giardiasis notifications by year from 1997 to 2010.

Rates varied throughout the country as illustrated in Figure 11. The highest rates were recorded in Hawke's Bay DHB (67.6 per 100 000 population, 105 cases), followed by Auckland (67.5 per 100 000, 304 cases), and Canterbury (55.5 per 100 000, 282 cases) DHBs. The lowest rate was recorded in MidCentral DHB (17.3 per 100 000, 29 cases).

Figure 10. Giardiasis notifications by year, 1997–2010



Age was recorded for 1983 (99.9%) cases. Age-specific rates were highest in the 1–4 years age group (159.2 per 100 000 population, 395 cases), followed by the 30–39 years age group (79.0 per 100 000, 451 cases). The rate for the 1–4 years age group was significantly higher than all other age groups.

Of the 1974 (99.4%) cases where sex was recorded, sex-specific notification rates were similar for males (46.4 per 100 000 population, 995 cases) compared with females (44.0 per 100 000, 979 cases).

Ethnicity was recorded for 1741 (87.7%) giardiasis cases. Of these, the highest notification rate was for those of Other ethnicity (124.0 per 100 000 population, 42 cases), followed by those of European (56.4 per 100 000, 1519 cases), Māori (20.0 per 100 000, 113 cases), Asian (17.0 per 100 000, 58 cases), and Pacific Peoples (4.0 per 100 000, 9 cases) ethnicities.

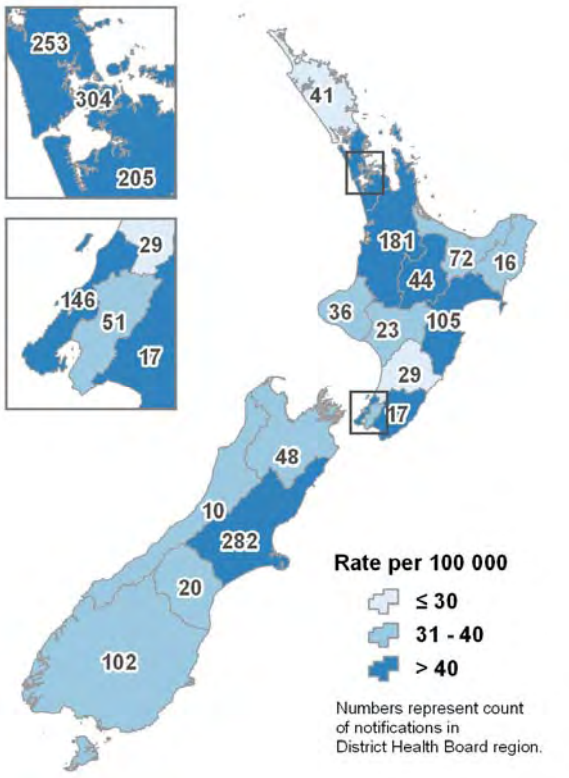
Table 6. Exposure to risk factors associated with gastroenteritis, 2010

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Consumed food from retail premises	176	44	272	80.0
Contact with other symptomatic people	64	143	285	30.9
Contact with faecal matter	31	135	326	18.7
Contact with farm animals	23	154	315	13.0
Consumed untreated water	18	134	340	11.8
Recreational water contact	14	158	320	8.1
Contact with sick animals	6	160	326	3.6
Travelled overseas during the incubation period	6	179	307	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.

Hospitalisation status was recorded for 1040 (52.4%) cases, of which 21 (2.0%) were hospitalised.

Figure 11. Giardiasis notifications by DHB, 2010



There were 97 giardiasis outbreaks (including one outbreak with two implicated pathogens) reported in 2010, involving 378 cases.

The risk factors recorded for giardiasis are shown in Table 7.

Haemophilus influenzae serotype b disease

Eight cases of *Haemophilus influenzae* serotype b (Hib) disease were notified in 2010 and all cases were laboratory confirmed.

Five of the laboratory-confirmed cases in 2010 were aged less than five years (compared with four in 2009 and three in 2008). Of these, three were male and two were female. The cases were of Māori (4 cases) and European (1 case) ethnicities, and were from Waitemata, Counties Manukau, Waikato, Hawke's Bay, and Whanganui DHBs.

A Hib vaccine was introduced in January 1994 [17]. The current schedule introduced in May 2008 recommends three doses of Hib vaccine at six weeks, three months, and five months of age [18].

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

One death in an adult aged 60–69 years was reported in 2010

Table 7. Exposure to risk factors associated with giardiasis, 2010

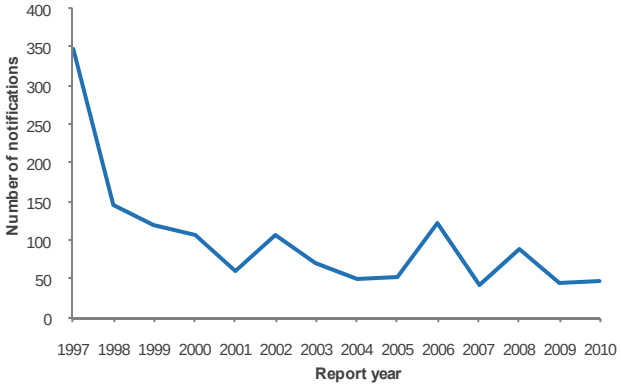
Risk factor	Yes	No	Unknown	Percentage (%) [a]
Contact with faecal matter	248	354	1 383	41.2
Contact with other symptomatic people	244	418	1 323	36.9
Consumed untreated water	190	353	1 442	35.0
Contact with farm animals	198	449	1 338	30.6
Recreational water contact	195	444	1 346	30.5
Consumed food from retail premises	151	416	1 418	26.6
Travelled overseas during the incubation period	163	600	1 222	21.4
Contact with sick animals	20	563	1 402	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.

Hepatitis A

In 2010, a total of 46 cases of hepatitis A were notified, compared with 44 notifications in 2009. 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, 2008 and marginally in 2010 (Figure 12).

Figure 12. Hepatitis A notifications by year, 1997–2010



The national hepatitis A notification rate for 2010 was 1.1 per 100 000 population, which was a non-significant increase from the 2009 rate of 1.0 per 100 000 population. Counties Manukau (1.8 per 100 000, 9 cases), Auckland (1.6 per 100 000 population, 7 cases) and Canterbury (1.4 per 100 000 population, 7 cases) DHBs has the highest reported rates in 2010.

Age was recorded for all cases. Similar age-specific rates occurred in the 15–19 years (2.2 per 100 000 population, 7 cases), 5–9 years (2.1 per 100 000 population, 6 cases), and 20–29 years (2.0 per 100 000 population, 12 cases) age groups.

Sex was recorded for all cases. Males (1.1 per 100 000 population, 23 cases) had a similar notification rate to females (1.0 per 100 000 population, 23 cases).

Ethnicity was recorded for 43 (93.5%) hepatitis A cases. The highest notification rates were reported for those of Asian (5.3 per 100 000, 18 cases) ethnicity, followed by those of Pacific Peoples (4.4 per 100 000, 10 cases) and European (0.4 per 100 000, 12 cases) ethnicities.

Hospitalisation status was recorded for 39 cases (84.8%). Thirteen cases (33.3%) were hospitalised. No deaths due to hepatitis A were reported in 2010.

Around 71% of the cases (30/42) had travelled overseas during the incubation period of the disease. The countries most frequently visited by hepatitis A cases included India (7 cases), Fiji (4 cases), Samoa (4 cases), and Vanuatu (3 cases).

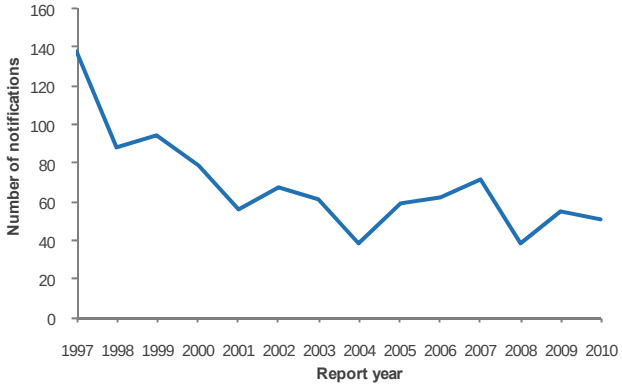
One hepatitis A outbreak was reported in 2010 involving three cases.

Hepatitis B

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

In 2010, 51 cases of hepatitis B were notified, compared with 55 notifications in 2009 (Figure 13). There has been a general downward trend in the number of hepatitis B notifications reported between 1984 (over 600 notifications) and 2004 (38 notifications) 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 [17].

Figure 13. Hepatitis B notifications by year, 1997–2010



The national hepatitis B notification rate for 2010 was 1.2 per 100 000 population, which was similar to the 2009 rate of 1.3 per 100 000. The highest rate was observed in Tairawhiti DHB (10.8 per 100 000, 5 cases), followed by Counties Manukau DHB (2.0 per 100 000, 10 cases) and Auckland (1.8 per 100 000, 8 cases).

Age was recorded for all cases. Age-specific rates were highest in the 30–39 years age group (2.6 per 100 000 population, 15 cases), followed by the 20–29 years age group (2.0 per 100 000, 12 cases).

Sex was recorded for 50 (98.0%) cases. The notification rate was higher for males (1.8 per 100 000 population, 39 cases) than females (0.5 per 100 000, 11 cases).

Ethnicity was recorded for 49 (96.1%) cases. The highest notification rates were for those of Pacific Peoples (3.1 per 100 000, 7 cases) ethnicity, followed by those of Asian (2.1 per 100 000, 7 cases), Māori (1.8 per 100 000, 10 cases) and European (0.9 per

100 000, 24 cases) ethnicities.

Of the 43 cases (84.3%) for which hospitalisation status was recorded, 13 (30.2%) were hospitalised.

No deaths due to hepatitis B were recorded in 2010.

The most common risk factors associated with hepatitis B in 2010 were overseas travel (26.3%), sexual contact (22.2%) and household contact with a confirmed case or carrier (18.8%) (Table 8).

Table 8. Exposure to risk factors associated with hepatitis B, 2010

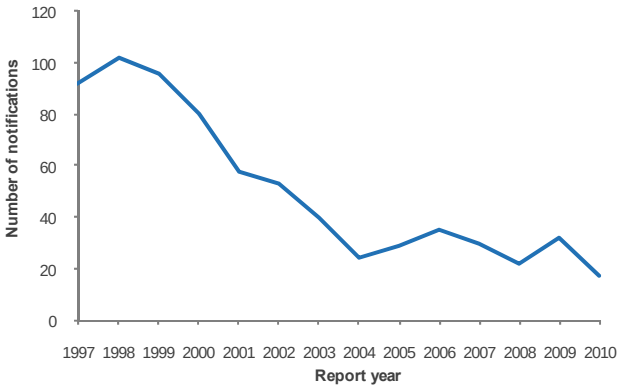
Risk factor	Yes	No	Unknown	Percentage (%) [a]
Overseas during incubation period	10	28	13	26.3
Sexual contact with confirmed case or carrier	6	21	24	22.2
Household contact with confirmed case or carrier	6	26	19	18.8
Body piercing/ tattooing in last 12 months	5	29	17	14.7
Case is a blood product or tissue recipient	3	32	16	8.6
Occupational exposure to blood	2	35	14	5.4
Case was child of seropositive mother	1	29	21	3.3
History of injecting drug use	1	34	16	2.9

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

Hepatitis C

In 2010, a total of 17 cases of hepatitis C were notified, compared with 32 notifications in 2009. After a peak of 102 notifications in 1998 there was a steady decline in notifications until 2004. Numbers of notifications have fluctuated in recent years from 17 to 35 cases per year (Figure 14).

Figure 14. Hepatitis C notifications by year, 1997–2010



The hepatitis C notification rate for 2010 was 0.4 per 100 000 population which was a significant decrease compared with 2009 (0.7 per 100 000).

Age and sex were recorded for all cases. Age-specific rates were highest in the 20–29 years age group (1.2 per 100 000 population, 7 cases), followed by the 30–39 years age group (0.9 per 100 000, 5 cases).

The notification rate was slightly higher for males (0.5 per 100 000 population, 10 cases) than females (0.3 per 100 000, 7 cases).

Ethnicity was recorded for 16 of the cases (94.1%), of which 11 cases (0.4 per 100 000) were of European ethnicity.

Of the 14 cases (82.4%) for which hospitalisation status was recorded, three (21.4%) were hospitalised. No deaths due to hepatitis C were recorded in 2010.

The risk factors for hepatitis C are shown in Table 9. The most commonly reported risk factors were a history of injecting drug use (78.6%, 11 cases), and body piercing or tattooing in the last 12 months (40.0%, 4 cases).

Table 9. Exposure to risk factors associated with hepatitis C, 2010

Risk factor	Yes	No	Unknown	Percentage (%) [a]
History of injecting drug use	11	3	3	78.6
Body piercing/ tattooing in last 12 months	4	6	7	40.0
Sexual contact with confirmed case or carrier	3	7	7	30.0
Household contact with confirmed case or carrier	2	9	6	18.2
Case is a blood product or tissue recipient	1	10	6	9.1
Occupational exposure to blood	0	11	6	0.0
Case was child of seropositive mother	0	12	5	0.0
Overseas during incubation period	0	12	5	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.

Hepatitis (viral) - not otherwise specified

Three cases of hepatitis (viral) not otherwise specified (NOS) were notified in 2010, compared with two cases notified in 2009. One case was infected with hepatitis D, one with hepatitis E and for the remaining case the hepatitis type was not stated. All were males aged between 15 and 30 years old. Two were of Asian ethnicity and one was of the Pacific Peoples ethnic group. Two had travelled overseas during the incubation period.

Since 1997, 39 cases of hepatitis NOS have been notified in New Zealand.

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 [19].

During 2010, 48 laboratory-confirmed A(H5N1) cases resulting in 24 fatalities were reported worldwide in Egypt (29 cases, 13 deaths), Indonesia (9 cases, 7 deaths), China (2 cases, 1 death), Vietnam (7 cases, 2 deaths) and Cambodia (1 case, 1 death) [20]. A total of 520 cases and 307 deaths (case fatality rate of 59.0%) have been reported since 2003. Indonesia has the highest case fatality rate 82.5% (141 deaths from 171 cases) for countries with more than ten reported cases [21].

Hydatid disease

Hydatid disease is caused by the larval stage of the tapeworm *Echinococcus granulosus*. Four cases of hydatid disease, two confirmed and two probable, were notified in 2010. Since 1997, 47 cases of hydatid disease have been notified.

One of the confirmed cases, a Pacific Peoples female in the 20–29 years age group with newly diagnosed hydatid disease, had until recently lived in Tonga. The other confirmed case, a European male aged over 70 years, contracted hydatid disease over 35 years ago. Laboratory evidence and medical history indicated a past infection for the two probable cases (both were male with one of Asian ethnicity in the 60–69 years age group, and the other of Māori ethnicity in the 70 years and over age group). Both probable cases had previous occupational exposure working on a farm. Two cases (one confirmed and one probable) were hospitalised.

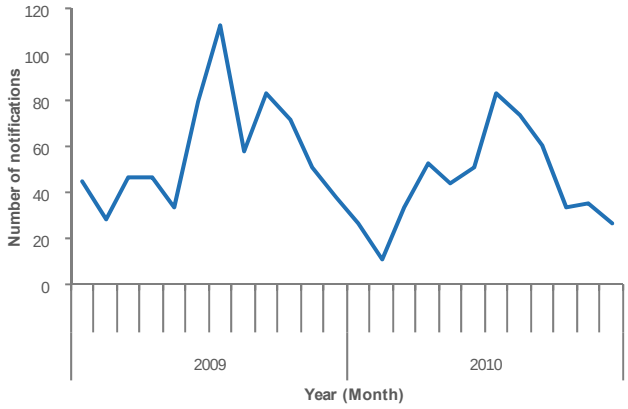
Echinococcus species are notifiable organisms under the Biosecurity Act 1993. All cases of hydatid disease are reported to the Ministry of Agriculture and Forestry for investigation of possible disease reservoirs in New Zealand animals. In September 2002, New Zealand was declared provisionally free of hydatids. However, hydatids are 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.

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 in 2009 is reported separately in the Invasive Pneumococcal Disease in New Zealand, 2009 report available from www.surv.esr.cri.nz [22].

In 2010, 535 cases of IPD were notified. The 2010 notification rate of 12.2 per 100 000 population is significantly less than the 2009 rate of 16.1 per 100 000 (697 cases). Figure 15 shows the number of IPD notifications by month in 2009 and 2010. There is a distinct seasonal pattern with the highest number of notifications reported during winter, in particular July of 2009 and 2010.

Figure 15. Invasive pneumococcal disease notifications by month, January 2009–December 2010



IPD rates varied throughout the country as illustrated in Figure 16. The highest rate was reported in Counties Manukau DHB (21.4 per 100 000 population, 105 cases), followed by Lakes DHB (17.5 per 100 000 population, 18 cases).

Age and sex were recorded for all cases. Age-specific rates were highest in people aged 70 years and over (45.0 per 100 000, 177 cases), followed by those in the less than 1 year (34.5 per 100 000 population, 22 cases) and 60–69 years (22.4 per 100 000, 91 cases) age groups.

Sex-specific rates of IPD were slightly higher among males (13.0 per 100 000 population, 279 cases) than females (11.5 per 100 000 population, 256 cases).

Ethnicity was recorded for 515 (96.3%) cases. The highest notification rate occurred in Pacific Peoples (36.2 per 100 000 population, 82 cases), followed by those of Māori (22.5 per 100 000, 127 cases) and European (10.6 per 100 000, 285 cases) ethnicities.

Of the 523 (97.8%) cases for which hospitalisation status was recorded, 502 (96.0%) were hospitalised. There were 27 deaths due to IPD reported in 2010. Of these, four deaths occurred in cases aged less than 50 years: 15-19 years (2 deaths), 30-39 years (1 death), and 40-49 years (1 death).

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. The recommended schedule for PCV-7 is four doses given at 6 weeks, 3 months, 5 months and 15 months of age. Table 10 shows vaccination status of cases by age group.

The risk factors recorded for IPD are shown in Table 11. The most common risk factor was chronic illness (52.8%, 254/481).

Figure 16. Invasive pneumococcal disease notifications by DHB, 2010

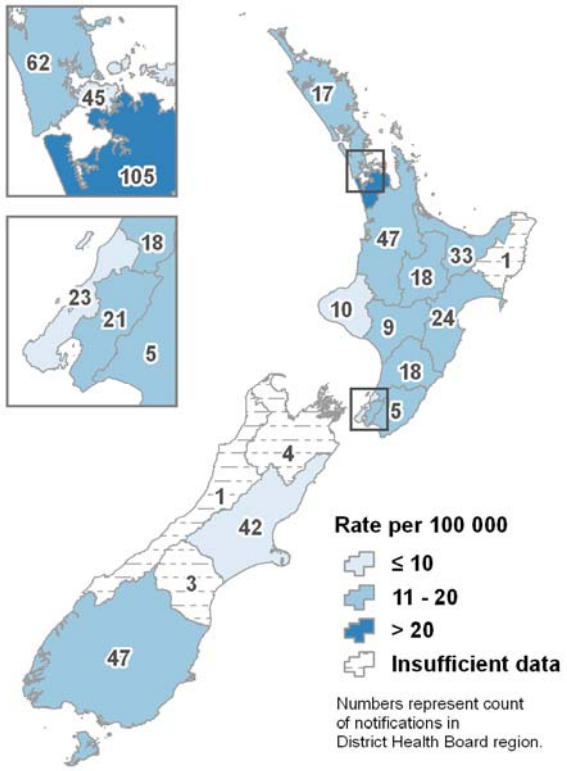


Table 10. Age group of invasive pneumococcal disease notifications and vaccinations received, 2010

Age group	Total cases	One dose	Two doses	Three doses	Four doses	Five doses	Vaccinated (no dose info)	Not vaccinated	Unknown
<1 year	22	3	2	8	0	0	0	5	4
1–2 years	23	1	0	6	7	0	3	4	2
3–4 years	20	0	2	3	1	0	0	11	3
5–9 years	13	1	0	1	0	0	0	9	2
10–19 years	27	0	0	0	0	0	0	18	9
20+ years	430	2	0	0	0	0	1	285	142
Total	**535**	**7**	**4**	**18**	**8**	**0**	**4**	**332**	**162**

Table 11. Exposure to risk factors associated with invasive pneumococcal disease, 2010

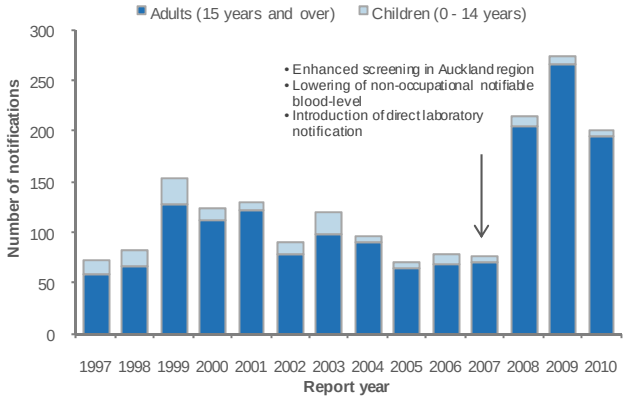
Risk factor	Yes	No	Unknown	Percentage (%)[a]
Chronic illness	254	227	54	52.8
Attends childcare (if case is <5 years of age)	10	9	46	52.6
Smoking in the household (if case is <5 years of age)	9	12	44	42.9
Current smoker	93	293	149	24.1
Immunocompromised	87	379	69	18.7
Premature <37 weeks gestation (if case is <1 year of age)	2	9	11	18.2
Resident in long term or other chronic care facility	34	457	44	6.9
Congenital or chromosomal abnormality	6	481	48	1.2
Anatomical or functional asplenia	4	457	74	0.9

[a] Percentage refers to the percentage 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.

Lead absorption

There were 201 cases of lead absorption notified in 2010 (4.6 per 100 000 population) compared with 273 cases in 2009 (6.3 per 100 000). Figure 17 shows a significant increase in the number of notifications of adults aged 15 years and over between 2008 and 2010. 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, 1997–2010



Cases were distributed across New Zealand in 2010, with the highest rates in Hutt Valley (15.3 per 100 000 population, 22 cases), Whanganui (12.7 per 100 000, 8 cases), and South Canterbury (12.5 per 100 000, 7 cases) DHBs.

Age and sex were recorded for all cases. Of the 201 cases notified in 2010, seven (3.5%) were aged less than 15 years and were distributed by age group as follows: less than one year (2 cases), 1–4 years (2 cases) and 5–9 years (3 cases). Of the adult cases aged 15 years and over, the highest age-specific rate occurred in the 50–59 years age group (9.8 per 100 000 population, 53 cases), followed by the 60–69 years (8.9 per 100 000, 36 cases) and 40–49 years (8.2 per 100 000, 52 cases) age groups.

Sex-specific rates were significantly higher for males (8.2 per 100 000 population, 175 cases) than females (1.2 per 100 000, 26 cases) in 2010.

Ethnicity was recorded for 175 (87.1%) cases. The highest notification rate occurred among those of European ethnicity (6.1 per 100 000 population, 164 cases).

Hospitalisation status was recorded for 134 (66.7%) cases. Of these, four cases were hospitalised.

Table 12 and Table 13 summarise risk factor information for lead absorption cases. Several cases had more than one risk factor recorded. For both children and adults, 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.

Blood-lead levels were recorded for all notifications. For child notifications, blood-lead level concentrations ranged from 0.59 to 2.02 µmol/L with a median of 0.99 µmol/L. For adult notifications, blood-lead level concentrations ranged from 0.48 to 5.68 µmol/L, with a median of 0.84 µmol/L.

Table 12. Exposure to risk factors associated with lead absorption for children (0–14 years), 2010

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Case lived in or regularly visited a building built prior to 1970[b]	6	0	1	100.0
Case played in soil containing paint debris	3	2	2	60.0
Close contact of case was occupationally exposed to lead	1	1	5	50.0
Pica behaviour	1	3	3	25.0
Case lived near an industry that is likely to release lead	0	4	3	0.0

Table 13. Exposure to risk factors associated with lead absorption for adults (15 years and over), 2010

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Case lived in or regularly visited a building built prior to 1970[b]	65	37	92	63.7
Case had exposure to high risk occupations[c]	66	50	78	56.9
Case had exposure to lead through hobbies[d]	35	70	89	33.3
Close contact of case was occupationally exposed to lead	3	93	98	3.1

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

[b] Of these, six children and 51 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.

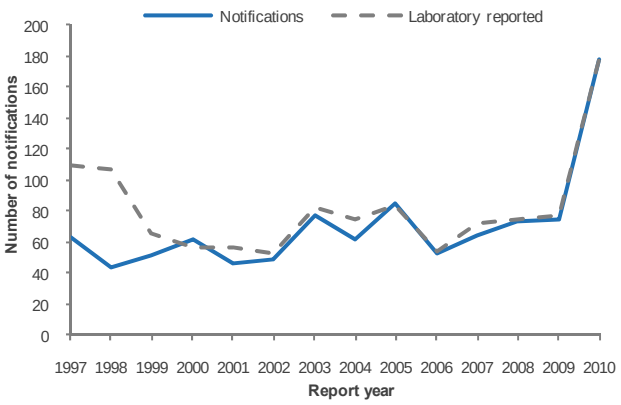
[c] Occupations included painter/decorator (26), construction trades worker (4), radiator repairer (4), engineer (2), laboratory technician/worker (2), abrasive blaster (1), airline manager (1), artist (1), boilermaker (1), farmer (1), lead lighter (1), lead tackle worker (1), metal casting trades worker (1), miner (1), process worker (1), telecommunications cable jointer (1), welder (1), and unspecified (16).

[d] Hobbies included: shooting (18), home renovations (5), making sinkers (4), boat building/repairs (2), making bullets (2), other (4)

Legionellosis

In 2010, a total of 178 cases of legionellosis were notified. This represents a rate of 4.1 per 100 000 population, which is a significant increase from 1.7 per 100 000 (74 cases) in 2009 (Figure 18).

Figure 18. Legionellosis notifications and laboratory-reported cases by year, 1997–2010



The highest rates in 2010 were reported in Canterbury DHB (12.2 per 100 000 population, 62 cases), followed by Northland (6.4 per 100 000, 10 cases), Southern (4.9 per 100 000, 15 cases), and Waitemata (4.5 per 100 000, 24 cases) DHBs.

Age and sex were recorded for all cases. The highest age-specific rate was reported in cases aged 60–69 years (11.3 per 100 000, 46 cases), followed by the 70 years and over (10.7 per 100 000, 42 cases) and 50–59 years (7.7 per 100 000, 42 cases) age groups.

The 2010 legionellosis rate was higher for males (4.6 per 100 000, 99 cases) than for females (3.6 per 100 000, 79 cases).

Ethnicity was reported for 172 (96.6%) cases. The legionellosis rate was highest among those of European ethnicity (5.4 per 100 000, 146 cases), followed by Pacific Peoples (2.7 per 100 000, 6 cases), Asian (2.6 per 100 000, 9 cases), and Māori (1.8 per 100 000, 10 cases) ethnicities.

Of the 173 cases in 2010 for which hospitalisation status was recorded, 136 (78.6%) were hospitalised.

There were five legionellosis deaths reported in 2010. Three deaths were in the 70 years and over age group and two in the 50–59 years age group.

Table 15 provides a summary of risk factors for which data were available. Of the 98 cases with a definite or suspected environmental source of infection recorded, 78 (79.6%) reported contact with compost, potting mix or soil, 17 (17.3%) reported exposure to showers or hot water systems, four reported exposure to spa or indoor pools, three reported exposure to air conditioning units, and three reported exposure to cooling towers. Seven cases reported overseas travel during the incubation period.

During 2010, 178 cases of legionellosis were laboratory reported. Table 14 shows the strains identified for the laboratory-reported cases in 2010.

There were no legionellosis outbreaks reported in 2010.

Table 14. Legionellosis strains for laboratory reported cases, 2010

Legionella species and serogroup	Cases	Percentage (%)
L. pneumophila	**51**	**28.7**
L. pneumophila sg 1	32	18.0
L. pneumophila sg 4	8	4.5
L. pneumophila sg 6	4	2.2
L. pneumophila sg 12	4	2.2
L. pneumophila sg 2	2	1.1
L. pneumophila sg 10	1	0.6
L. longbeachae	**72**	**40.4**
L. longbeachae sg 1	34	19.1
L. longbeachae sg 2	5	2.8
L. longbeachae sg unknown	33	18.5
L. bozemanae	**8**	**4.5**
L. bozemanae sg 1	7	3.9
L. bozemanae sg 2	1	0.6
Other *Legionella* species	**47**	**26.4**
L. dumoffii	13	7.3
L. micdadei	6	3.4
L. jordanis	4	2.2
L. feeleii sg1	2	1.1
L. gormanii	2	1.1
L. sainthelensi	2	1.1
L. longbeachae/*L. jordanis*	1	0.6
Legionella species not identified	17	9.6
Total	**178**	**100**

Table 15. Risk factors associated with legionellosis, 2010

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Contact with definite or suspected environmental source of infection	98	25	55	79.7
Pre-existing immunosuppressive or debilitating condition	56	80	42	41.2
Smokers or ex-smokers	20	117	41	14.6

[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

Three cases of leprosy were notified in 2010, the same as in 2009.

The cases were aged in the 40–49 years (2 cases) and 60–69 years (1 case) age groups. Two cases were male and one case was female. Two cases had ethnicity recorded as Asian and one as Pacific Peoples.

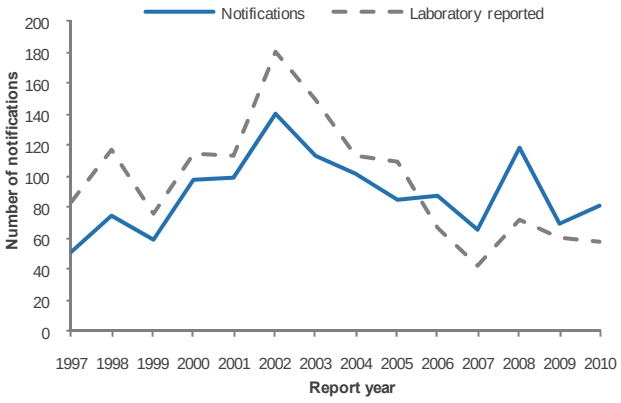
All three cases were laboratory confirmed and the acid-fast status was recorded as multibacillary. The clinical form of leprosy was recorded for two of the three cases, both lepromatous. All cases were overseas during the incubation period. Countries previously resided in included India (1 case), Philippines and Hong Kong (1 case) and Samoa (1 case).

Leptospirosis

In 2010, a total of 81 cases of leptospirosis were notified. The rate of 1.9 cases per 100 000 population was similar to the notification rate in 2009 (1.6 per 100 000, 69 cases). Of the 81 notified cases, 73 (90.1%) 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, 1997–2010



The highest rates in 2010 were reported in West Coast DHB (18.3 per 100 000 population, 6 cases), followed by Whanganui (12.7 per 100 000, 8 cases), MidCentral (7.8 per 100 000, 13 cases), and Hawke's Bay (7.1 per 100 000, 11 cases) DHBs.

Age and sex were recorded for all cases. The highest age-specific rates were reported in the 30–39 years age group (3.5 per 100 000 population, 20 cases), followed by the 40–49 years age group (3.3 per 100 000, 21 cases). The majority of cases were male (85.2%, 69 cases). Ethnicity was recorded for 78 (96.3%) cases. The disease notification rate for those of European ethnicity (2.5 per 100 000, 66 cases) was higher than for those of Māori ethnicity (1.8 per 100 000, 10 cases).

Occupation was recorded for 75 (92.6%) of the 81 notified cases. Of these, 59 cases (78.7%) 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 in high-risk occupations was lower than that in the previous year (83.3% in 2009). Of the 59 cases with a high-risk occupation recorded, 42 (71.2%) were farmers or farm workers, 14 (23.7%) worked in the meat-processing industry (as freezing workers, butchers, or slaughterers) and three (5.1%) were hunters or trappers. Of the 22 cases that either did not report a high-risk occupation or did not have an occupation recorded, 13 reported animal/outdoor exposures as a risk factor.

Leptospira species and serovars (sv) were recorded for 64 (79.0%) cases: *L. borgpetersenii* sv Ballum (21), *L. borgpetersenii* sv Hardjo (19), *L. interrogans* sv Pomona (11), *L. borgpetersenii* sv Tarassovi (8), *L. interrogans* sv Canicola (1), and *L. interrogans* sv Copenhageni (1). One case had mixed serovars: *L. borgpetersenii* sv Hardjo and *L. interrogans* sv Pomona. In addition, two cases with a history of overseas travel had serovars exotic to New Zealand identified. *L. interrogans* sv Australis was identified in a case that was in Samoa during the incubation period of the disease and *L. kirschneri* sv Grippotyphosa was identified in the second case who had recently travelled to Thailand. These were isolated in New Zealand then sent to Australia for further identification.

Two outbreaks of leptospirosis were reported in 2010 involving a total of five cases. Two cases were hospitalised.

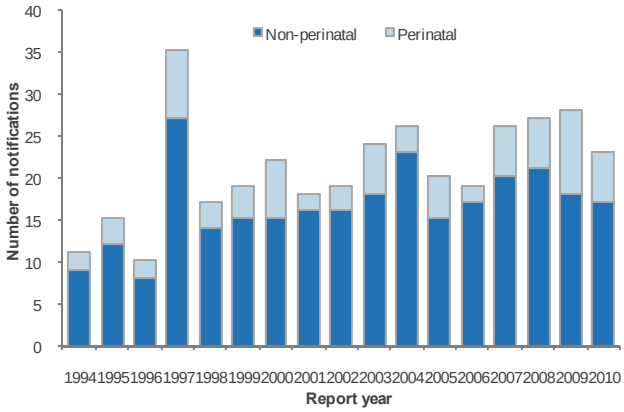
Listeriosis

In 2010, 23 cases of listeriosis were notified, a rate of 0.5 per 100 000 population. Figure 20 shows listeriosis notifications (perinatal and non-perinatal) each year for the last 16 years. Over the preceding five years (2005–2009), the average number of cases per year was 24, peaking with 28 cases (0.6 per 100 000) in 2009, the highest since 1997 (35 cases, 0.9 per 100 000).

Six (26.1%) of the 2010 cases were recorded as perinatal, a decrease from 2009 (10 cases). Weeks of gestation were known for all perinatal cases, with a range of 7–33 weeks. Four foetuses of 7, 12, 21 and 25 weeks of gestation died.

Three mothers were of European ethnicity aged 20–29 years, 30–39 years, and 40–49 years, and three were of Pacific Peoples ethnicity, two in the 20–29 years and one in the 30–39 years age group.

Figure 20. Listeriosis notifications (perinatal and non-perinatal) by year, 1994–2010



The 17 non-perinatal cases were from 13 DHBs, with the greatest number from Auckland (3 cases), Bay of Plenty (2 cases), and Southern (2 cases) DHBs. Two of the non-perinatal cases were aged less five years, with 15 cases aged over 50 years (including eight aged over 70 years). Sex was recorded for all cases, of which nine were female and eight were male. Ethnicity was recorded for all cases, of which 13 cases were of European ethnicity, two were Pacific Peoples, and one each of Māori and Asian ethnicities.

Hospitalisation status was recorded for all 17 non-perinatal cases, of which 15 (88.2%) were hospitalised. Of these 15 cases, six were hospitalised for treatment of another illness and nine were receiving immunosuppressive drugs (note that a case may have more than one risk factor). Information on underlying illness was recorded for 16 (94.1%) of the non-perinatal cases, of which 11 had an underlying illness such as cancer, autoimmune disease, diabetes, renal failure, and other chronic illnesses. Three non-perinatal deaths were reported in 2010, all aged 70 years and over.

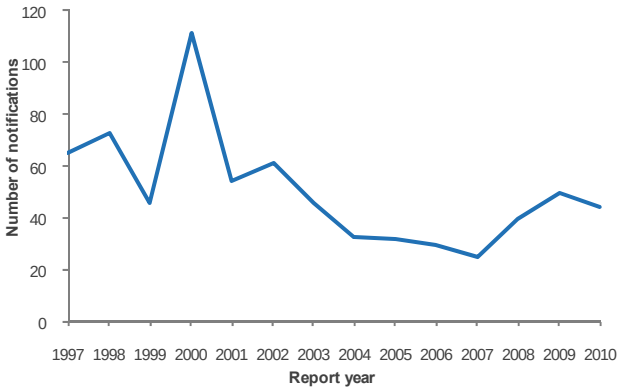
Twenty-two cultures of *Listeria monocytogenes* were received for typing by the ESR Special Bacteriology Laboratory. Sixteen (72.7%) were serotype 4 and the remaining six (27.3%) were serotype 1/2. Serotype 4 strains have steadily become predominant over serotype 1/2 strains in recent years.

There were no outbreaks of listeriosis reported in 2010.

Malaria

In 2010, 44 cases of malaria were notified compared with 50 cases in 2009 (Figure 21). The 2010 notification rate (1.0 per 100 000 population) was lower than that for 2009 (1.2 per 100 000 population).

Figure 21. Malaria notifications by year, 1997–2010



Age was recorded for all the reported malaria cases. The highest age-specific rates were reported in the 20–29 years age group (2.2 per 100 000 population, 13 cases), followed by the 15–19 years age group (1.6 per 100 000 population, 5 cases).

Sex was recorded for all the reported malaria cases. The notification rate was significantly higher for males than females (1.6 per 100 000 population, 34 cases; 0.4 per 100 000 population, 10 cases, respectively).

Ethnicity was recorded for 41 (93.2%) cases. The highest notification rates were reported for those of Asian (6.2 per 100 000 population, 21 cases), Pacific Peoples (3.1 per 100 000 population, 7 cases) and European (0.4 per 100 000, 11 cases) ethnicities.

Hospitalisation status was recorded for 40 (90.9%) of the cases. Of the 40 cases, 27 (67.5%) were hospitalised. All 44 notified cases were laboratory-confirmed.

Travel history was recorded for 43 (97.7%) of the reported malaria cases. Forty-one (95.3%) cases had resided or travelled overseas during the incubation period of the disease. Two cases (4.7%) had not been overseas recently, but had a prior history of travel to malaria endemic areas. The most common countries visited or resided in were India (39.5%, 17 cases) and Vanuatu (16.3%, 7 cases). Note that cases may have travelled to more than one country. The overseas area travelled to or resided in and the *Plasmodium* species identified are listed in Table 16. The most common species identified was *P. vivax* (29 cases), followed by *P. falciparum* (12 cases), and indeterminate species (4 cases). Note that cases may have had more than one species identified.

Malaria prophylaxis was taken as prescribed by four cases, nine cases did not take prophylaxis as prescribed, and prophylaxis use was unknown for 31 cases.

Ministry of Health hospitalisation data for 2010 recorded 40 cases with the primary reason for admission being malaria.

Table 16. *Plasmodium* species and area of overseas travel for malaria cases, 2010

Area resided in or visited	Plasmodium species [a]		
	P. vivax	P. falciparum	Indeterminate
Afghanistan	1		
Australia[d]	1		
Cambodia	2	1	
Central and West Africa (nfd[b])			1
Congo	1		
Egypt	1		
Fiji		1	
France[d]	1		
Germany[d]		1	
Ghana		1	
India	16	1	1
Indonesia	1		
Ireland[d]	1		
Jordan	1		
Korea, Democratic People's Republic of	1		
Malaysia			1
Nigeria		1	
Papua New Guinea	2	1	
Singapore	1		
Solomon Islands		1	
South Africa		1	
Sudan	1	2	
United Kingdom (nfd[b]) [d]		1	
Vanuatu	3	3	1
Zambia		1	
Total[c]	**34**	**16**	**4**

[a] No cases of *P. malarie* or *P. ovale* were identified in 2010.

[b] nfd – not further defined

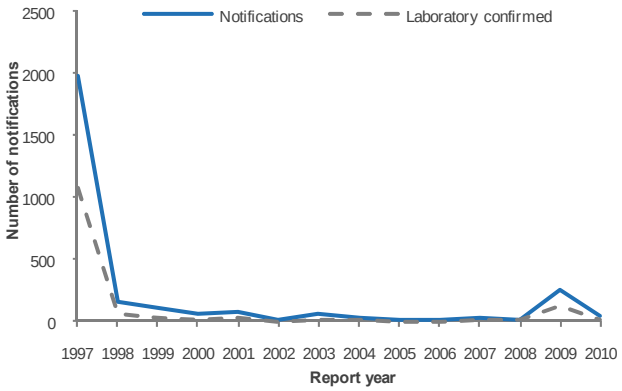
[c] Cases may have travelled to more than one country during the incubation period and may have been infected with more than one species of malaria.

[d] Cases who travelled to these countries also specified travel history to other malaria endemic countries

Measles

In New Zealand, measles immunisation was introduced in 1969 [17] and measles has been a notifiable disease since June 1996. In 2010, there were 48 measles notifications, of which 15 (31.3%) were laboratory-confirmed cases. This was a significant decrease from 2009 when there were 248 notifications with 133 (53.6%) laboratory-confirmed cases. This was the second highest number of notifications since a peak of 1984 cases in 1997 (Figure 22).

Figure 22. Measles notifications and laboratory confirmed cases by year, 1997–2010



The 2010 measles notification rate was 1.1 per 100 000 population, a significant decrease compared with the rate for 2009 (5.7 per 100 000). The highest rates were reported in Northland (19.7 per 100 000 population, 31 cases) and Auckland (1.1 per 100 000, 5 cases) DHBs.

Age was recorded for all cases. The highest age-specific rate was seen in the 1–4 years age group (3.6 per 100 000 population, 9 cases), followed by the 10–14 years (3.4 per 100 000, 10 cases) and the 15–19 years (3.1 per 100 000, 10 cases) age groups.

Sex was recorded for 47 (97.9%) cases. The notification rate was higher for males (1.2 per 100 000 population, 26 cases) than females (0.9 per 100 000, 21 cases).

Ethnicity was recorded for all cases. The highest notification rate was for those of European ethnicity (1.5 per 100 000, 41 cases) and Māori (1.2 per 100 000, 7 cases).

Hospitalisation status was recorded for 45 (93.8%) cases. Of the 45 cases, only one case was hospitalised. No deaths due to measles were recorded in 2010.

Of the cases for which the information was recorded, 32.5% (13/40) attended school, pre-school or childcare, 86.8% (33/38) had contact with another case of the disease in the previous three weeks and 5.4% (2/37) reported overseas travel during the incubation period.

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 four years of age [17]. However, following the increase in cases in 2009, the Ministry of Health recommended in August 2009 that the first dose be given from 12 months of age and, if measles was prevalent in the local community, that the could second dose be given one month later [24].

Of the 48 measles cases, 42 (87.5%) had a known vaccination status. Of these 42 cases, 35 were not vaccinated, including four cases aged less than 15 months and therefore not eligible for vaccination. Four cases had received one dose of vaccine including one case in the 15 months to 3 years age group, who was eligible for only one dose of vaccine. No cases were reported as having completed the measles vaccination (Table 17).

Table 17. Age group and vaccination status of measles notifications, 2010

Age group	Total cases	One dose	Two doses	Vaccinated (no dose info)	Not vaccinated	Unknown
<15 months	4	0	0	0	4	0
15 months–3 years	7	1	0	0	5	1
4–9 years	8	0	0	0	7	1
10–19 years	20	2	0	1	16	1
20+ years	9	1	0	2	3	3
Total	**48**	**4**	**0**	**3**	**35**	**6**

Meningococcal disease

A full description of the epidemiology of meningococcal disease is reported separately in the Epidemiology of Meningococcal Disease in New Zealand in 2010 report available from www.surv.esr.cri.nz in May 2011.

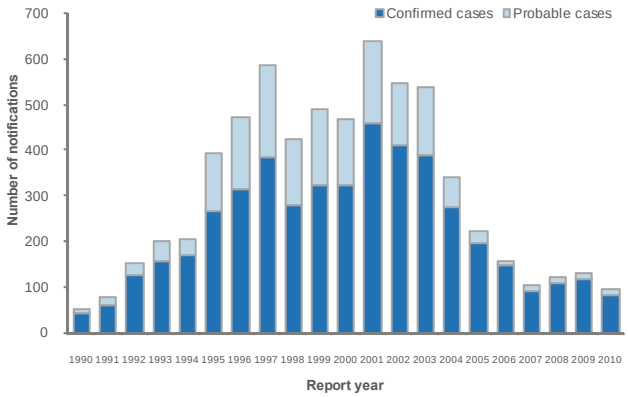
The surveillance of meningococcal disease in New Zealand is based upon matching and following up all laboratory and notification data.

The data presented in this section are based on the combined laboratory and notification database, which uses the earliest date for the case (if available, onset or hospitalisation date rather than report date). The population used to calculate rates was the 2006 census to allow comparison with earlier published reports. In contrast, the data in the appendicised tables in this report are based on notification reporting date and annual population estimates and hence the numbers may differ slightly to those reported in this section.

A total of 96 cases of meningococcal disease were notified in 2010, giving a rate of 2.4 per 100 000 population. This rate represented a significant decrease from the peak rate experienced during the New Zealand meningococcal disease epidemic (17.4 per 100 000 in 2001), and the rate recorded immediately before the introduction of the MeNZB vaccine (8.5 per 100 000 in 2004). However, the 2010 rate was still higher than the rate of 1.5 per 100 000 in the immediate pre-epidemic years (1989–1990). Figure 23 shows the number of confirmed and probable cases of meningococcal disease since 1990.

Of the 96 cases notified in 2010, 84 (87.5%) were laboratory confirmed by either culture (59) or DNA detection (25).

Figure 23. Meningococcal disease notifications by year, 1990–2010



Of the DHBs with more than five cases reported in 2010, the highest rates were recorded in Hutt Valley (5.9 per 100 000 population, 8 cases) and Hawke's Bay (4.7 per 100 000, 7 cases) DHBs. The lowest rates were in Canterbury (1.5 per 100 000, 7 cases) and Auckland (1.7 per 100 000, 7 cases) DHBs. No cases were reported from Whanganui, Wairarapa, and South Canterbury DHBs.

Age and sex were recorded for all cases. The notification rate was similar for males (2.4 per 100 000 population, 48 cases) and females (2.3 per 100 000, 48 cases). As in previous years, the highest age-specific rates occurred in the less than 1 year age group (47.7 per 100 000 population, 27 cases), followed by the 1–4 years age group (10.5 per 100 000, 23 cases).

Ethnicity was recorded for all cases reported in 2010. The highest disease rates were among Pacific Peoples (7.5 per 100 000 population, 17 cases) followed by those of Māori (7.4 per 100 000, 42 cases), and European (1.3 per 100 000, 35 cases) ethnicities.

Six deaths were reported during 2010, with an associated case-fatality rate of 6.3%.

Data on pre-hospital management were recorded for 94 (97.9%) cases. These data show that only 14 (14.9%) cases received antibiotic treatment prior to hospital admission. In 2010, no fatalities occurred among cases seen by a doctor and given antibiotics prior to hospital admission.

Group B disease, and particularly that caused by the New Zealand epidemic strain (B:P1.7-2,4), has continued to cause disease, with this strain accounting for 25 (29.8%) of the 84 laboratory-confirmed cases in 2010. Of the 25 cases infected by the epidemic strain, 24 (96.0%) cases were less than 20 years of age. Of these, vaccination status was known for 21 (91.7%) cases and only two cases were immunised with the MeNZB vaccine. One case had completed all four doses of MeNZB vaccine and the other case had received only one dose.

The antimicrobial susceptibility of 62 viable meningococcal isolates received by ESR from cases of invasive disease in 2010 were tested. All isolates were susceptible to ceftriaxone and rifampicin, 29.0% (18/62) had reduced susceptibility to penicillin, with minimum inhibitory concentrations (MICs) of 0.12–0.5 mg/L, and 1.6% (1/62) were ciprofloxacin resistant (MIC 0.12 mg/L). This ciprofloxacin-resistant isolate represents the first ciprofloxacin resistance identified among invasive meningococci in New Zealand.

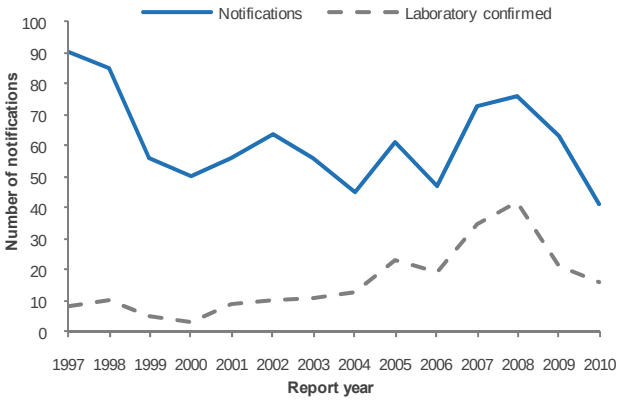
Mumps

Immunisation against mumps was introduced to the New Zealand Immunisation Schedule in 1990 as part of the MMR vaccine [17] and mumps became notifiable in June 1996. The last epidemic occurred in 1994.

In 2010, 41 cases of mumps were notified, of which 16 cases were laboratory confirmed. In comparison, 63 cases of mumps were notified in 2009, of which 21 were laboratory confirmed.

Figure 24 shows notified and laboratory-reported cases from 1997 to 2010.

Figure 24. Mumps notifications and laboratory-confirmed cases by year, 1997–2010



The 2010 mumps notification rate of 0.9 per 100 000 population represented a significant decrease compared with the rate for 2009 (1.5 per 100 000). The highest rates were recorded in Waitemata (1.3 per 100 000, 7 cases) and Canterbury (1.2 per 100 000, 6 cases) DHBs.

Age and sex were recorded for all cases. The highest age-specific rate was in the 1–4 years age group (6.0 per 100 000 population, 15 cases), followed by the 10–14 years age group (2.0 per 100 000, 6 cases).

The sex-specific notification rate was slightly higher for females (1.1 per 100 000 population, 25 cases) compared with males (0.7 per 100 000, 16 cases).

Ethnicity was recorded for all cases. The highest rate was reported for those of Asian ethnicity (3.2 per 100 000, 11 cases), followed by those of European ethnicity (0.8 per 100 000, 21 cases).

Hospitalisation status was recorded for 36 (87.8%) cases. Of these, one case was hospitalised. No deaths due to mumps were recorded in 2010.

Of the cases for which the information was recorded, 56.3% (18/32) attended school, pre-school or childcare during the incubation period, 3.6% (1/28) had contact with another case of the disease in the previous three weeks, and 6.1% (2/33) reported overseas travel.

The recommended immunisation schedule for mumps in 2010 was two doses of MMR vaccine, the first given at 15 months of age and the second given at four years of age [17]. Of the 41 mumps cases, 33 (80.4%) had a known vaccination status. Of these, 13 (39.4%) were not vaccinated. Eight cases had received one dose of vaccine and 12 cases reported having completed the mumps vaccination schedule.

Table 18 shows the number of doses of MMR vaccine given to mumps cases in each relevant age group.

Table 18. Age group of mumps notifications and vaccination received, 2010

Age group	Total cases	One dose	Two doses	Vaccinated (no dose info)	Not vaccinated	Unknown
<15 months	0	0	0	0	0	0
15 months to 3 years	12	6	1	0	4	1
4–9 years	8	1	6	0	1	0
10–19 years	7	1	5	0	1	0
20+ years	14	0	0	0	7	7
Total	**41**	**8**	**12**	**0**	**13**	**8**

Non-seasonal influenza

Non-seasonal influenza (capable of being transmitted between human beings) became a notifiable and quarantinable disease in New Zealand on the 30 April 2009. On 11 June 2009, the World Health Organization (WHO) declared that the criteria for an influenza pandemic had been met after the virus, later called pandemic A(H1N1) 09, had spread across more than 70 countries [25, 26]. On 10 August 2010, WHO declared the world was entering the post-pandemic period as it was expected the virus would take on the behaviour of seasonal influenza and continue to circulate in the environment [26]. In New Zealand, non-seasonal influenza ceased to be a notifiable disease on 31 December 2010.

During 2010, a total of 1826 cases of non-seasonal influenza were notified in New Zealand. The rate of 41.8 cases per 100 000 population represented a significant decrease from the notification rate in 2009 (85.0 per 100 000, 3670 cases).

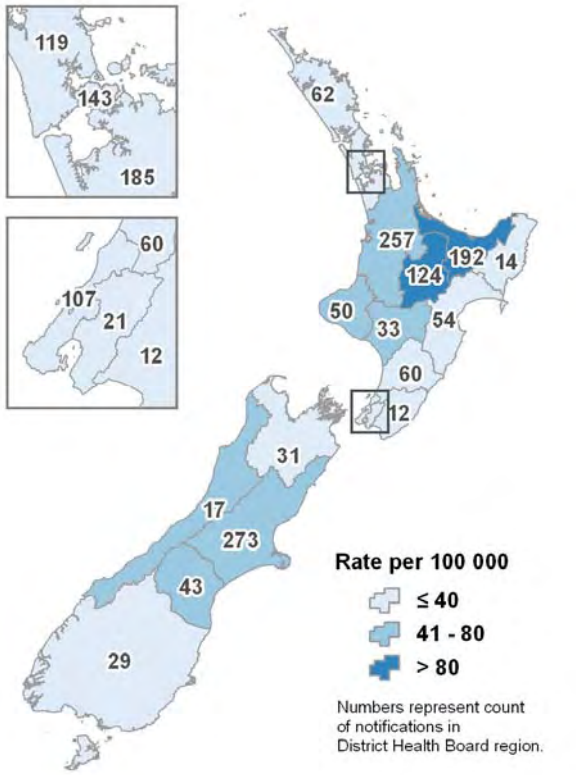
The notification rates for non-seasonal influenza varied by geographic region in 2010. The highest rates were reported in the Lakes DHB (120.9 per 100 000 population, 124 cases), followed by Bay of Plenty (91.4 per 100 000, 192 cases), South Canterbury (77.0 per 100 000, 43 cases), Waikato (70.5 per 100 000, 257 cases) and Canterbury (53.7 per 100 000, 273 cases) DHBs (Figure 25). This differs from the geographical regions that had the highest notification rates for non-seasonal influenza in 2009 which were West Coast (199.4 per 100,000, 65 cases), Capital and Coast (178.8 per 100,000, 515 cases) and Hutt Valley (149.3 per 100,000, 213 cases) DHBs.

Age was recorded for all cases. The highest age-specific rates were for cases aged less than one year (131.8 per 100 000 population, 84 cases), followed by cases aged 1–4 years (66.9 per 100 000, 166 cases) and 20–29 years (60.0 per 100 000, 362 cases).

Sex was reported for all cases. The female rate (43.6 per 100 000 population, 969 cases) was not significantly higher than the male rate (40.0 per 100 000, 857 cases).

Ethnicity was recorded for 1789 (98.0%) cases. The highest rates were reported for those of Other ethnicity (115.1 per 100 000, 39 cases), followed by those of Māori (68.3 per 100 000, 386 cases) and Pacific Peoples (60.5 per 100,000, 137 cases) ethnicities. The lowest rates were reported among those of European (39.0 per 100,000, 1051 cases) and Asian (51.6 per 100 000, 176 cases) ethnicities.

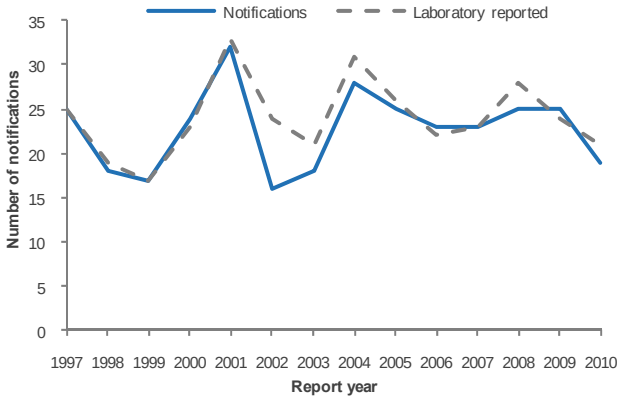
Figure 25. Non-seasonal influenza notifications by DHB, 2010



Paratyphoid fever

In 2010, 19 cases of paratyphoid fever were notified. The 2010 notification rate (0.4 per 100 000 population) was slightly lower than the 2009 rate (0.6 per 100 000, 25 cases). Figure 26 shows the number of notifications and laboratory-reported cases of paratyphoid fever each year since 1997.

Figure 26. Paratyphoid fever notifications and laboratory-reported cases by year, 1997–2010



Age and sex were recorded for all cases. The highest age-specific rate was in the 20–29 years age group (1.2 per 100 000 population, 7 cases). The sex-specific rates were similar for males (0.4 per 100 000 population, 8 cases) and females (0.5 per 100 000, 11 cases).

Ethnicity was recorded for 16 (84.2%) cases. Of these, the highest notification rate occurred among those of Asian ethnicity (2.1 per 100 000 population, 7 cases).

Of the 13 (68.4%) cases for which hospitalisation status was recorded, six (46.2%) were hospitalised.

Of the 19 cases notified in 2010, 18 cases (94.7%) had reported overseas travel during the incubation period. The countries visited were India (5 cases), Thailand (5 cases), Australia (3 cases), South America (2 cases), Vietnam (2 cases), Argentina, Bangladesh, Bolivia, Indonesia, Malaysia, Pakistan, and Northern Europe (1 case each).

The Enteric Reference Laboratory at ESR reported 21 cases infected with *Salmonella* Paratyphi in 2010. The serotypes identified were *Salmonella* Paratyphi B var. Java (12 cases), *S.* Paratyphi A (7 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 [27].

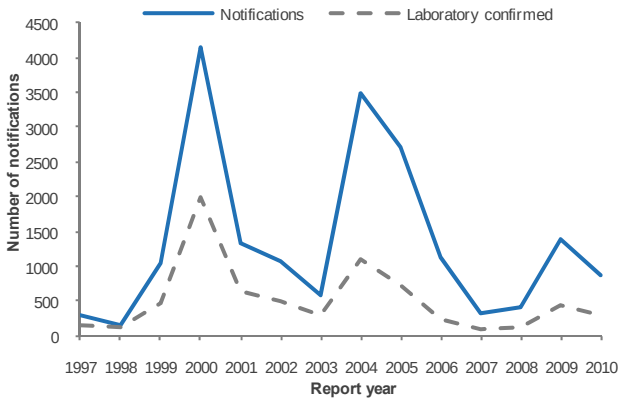
One outbreak of paratyphoid fever was reported in 2010, involving two siblings. *S.* Paratyphi B var. Java was isolated from both cases.

Pertussis (whooping cough)

Pertussis is a vaccine-preventable disease caused by the bacterial agent *Bordetella pertussis*. Epidemics occur in young children every three to four years, with periodicity unchanged by mass immunisation [17]. Childhood vaccination has been routine in New Zealand since 1960, and the disease has been notifiable since 1996.

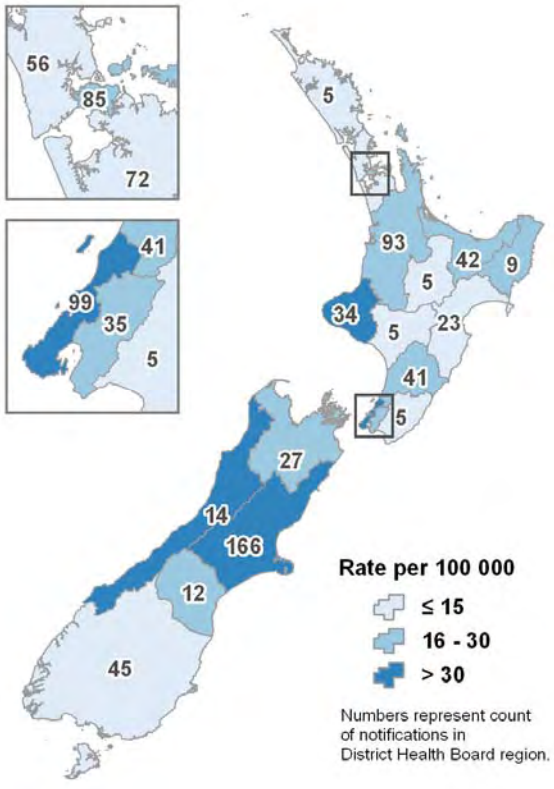
In 2010, 873 pertussis cases were notified, of which 307 (35.2%) were laboratory confirmed by isolation of *B. pertussis* from the nasopharynx and 23 (2.6%) confirmed by PCR and/or serology. The 2010 notification rate (20.0 per 100 000 population) represented a significant decrease from 2009 (32.4 per 100 000, 1398 cases). Notifications remained below the levels experienced in previous pertussis epidemics, which peaked at 4140 and 3485 cases annually in 2000 and 2004, respectively (Figure 27).

Figure 27. Pertussis notifications and laboratory-confirmed cases by year, 1997–2010



In 2010, the rate of pertussis varied by geographic region. The highest rate was reported in West Coast DHB (42.8 per 100 000 population, 14 cases), followed by Capital and Coast (34.0 per 100 000, 99 cases), Canterbury (32.7 per 100 000, 166 cases), Taranaki (31.1 per 100 000, 34 cases), and Waikato (25.5 per 100 000, 93 cases) DHBs (Figure 28).

Figure 28. Pertussis notifications by DHB, 2010



Age and sex were recorded for all cases. The highest age-specific rates were for cases aged less than one year (134.9 per 100 000 population, 86 cases), followed by cases aged 1–4 years (48.0 per 100 000, 119 cases) and 5–9 years (31.4 per 100 000, 90 cases).

In 2010, females (23.5 per 100 000 population, 522 cases) had a higher notification rate than males (16.4 per 100 000, 351 cases).

Ethnicity was recorded for 832 (95.3%) cases. Similar rates occurred among those of Pacific Peoples (24.7 per 100 000, 56 cases), European (23.9 per 100 000 population, 645 cases), Other (20.7 per 100 000, 7 cases) and Māori (20.2 per 100 000, 114 cases) ethnicities.

Hospitalisation status was recorded for 799 (91.5%) pertussis cases notified in 2010, of which 94 (11.8%) were hospitalised. Of those hospitalised, 77 (81.9%) had a known vaccination status. Of these, eight cases were reported to have received three or more doses of pertussis vaccine and 48 cases were not vaccinated. There were no deaths due to pertussis reported in 2010.

Since February 2006, the recommended immunisation schedule for pertussis has been a primary course of DTaP-IPV at six weeks, three months and five months of age, followed by booster doses at both four (DTaP-IPV) and 11 (DTaP) years of age [17].

Vaccination status was known for 551 (63.1%) cases notified during 2010 (Table 19). Of these, 247 (44.8%) cases were not vaccinated, including 11 cases aged less than six weeks and therefore not eligible for vaccination. A total of 151 (27.4%) cases had received three or more doses of pertussis vaccine.

Of the 673 (77.1%) cases for which the relevant information was recorded, 219 (32.5%) attended school, pre-school or childcare. In 2010, 17 pertussis outbreaks involving 111 cases were reported.

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 [28].

Poliomyelitis (polio)

There were no polio notifications in 2010. The NZPSU carries out active surveillance of acute flaccid paralysis (AFP). In 2010, seven cases of AFP were notified to the unit. All of these cases have been reviewed by the National Certification Committee for the Eradication of Polio (NCCEP) and have been classified as non-polio cases.

Since the mass oral polio vaccine immunisation campaigns in New Zealand in 1961 and 1962, six polio cases have been reported. All of these cases were either laboratory confirmed as vaccine-associated (4 cases) or classified as probable vaccine-associated cases (2 cases) [17]. The most recent case occurred in 1999 [29].

In 1976, one case of wild poliovirus infection occurred that was managed in New Zealand. This case was acquired overseas as the child had arrived unwell from Tonga [17].

Primary amoebic meningoencephalitis

Primary amoebic meningoencephalitis is a rare communicable disease caused by the amoeboflagellate *Naegleria fowleri*. The last notified case of primary amoebic meningoencephalitis in New Zealand occurred in 2000. There were five prior cases in New Zealand, four of which were part of the same outbreak in 1968. All cases were fatal and were linked to swimming in geothermal pools in the central North Island [30].

Table 19. Age group and vaccination status of pertussis notifications, 2010

Age group	Total cases	One dose	Two doses	Three doses	Four doses	Five doses	Vaccinated (no dose info)	Not vaccinated	Unknown
0 - 5wks	12	0	0	0	0	0	0	11	1
6wks - 2mths	30	12	0	0	0	0	0	18	0
3 - 4mths	22	7	5	0	0	0	2	7	1
5mths - 3yrs	115	3	6	49	4	0	9	38	6
4 - 10yrs	131	5	2	15	20	9	8	55	17
11+ years	563	14	8	20	15	19	72	118	297
Total	**873**	**41**	**21**	**84**	**39**	**28**	**91**	**247**	**322**

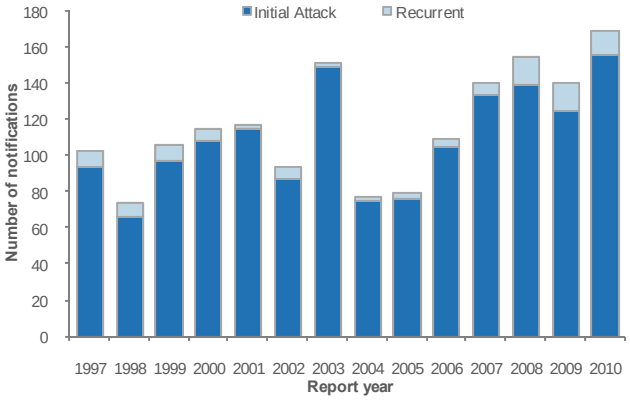
Rabies

New Zealand is classified as a rabies-free country [31]. There have been no cases of rabies reported in New Zealand since the disease became notifiable in 1996

Rheumatic fever

In 2010, 155 initial attack cases and 13 recurrent cases of rheumatic fever were notified in New Zealand. This represents a rate of 3.5 per 100 000 population for initial attack cases, slightly higher than the rate observed in 2009 (2.9 per 100 000, 124 cases). The 2010 rate (0.3 per 100 000, 13 cases) for recurrent cases was slightly lower than the 2009 rate (0.4 per 100 000, 16 cases). Figure 29 shows the number of initial attack and recurrent cases of rheumatic fever reported each year since 1997.

Figure 29. Rheumatic fever (initial attack and recurrent cases) by year, 1997–2010



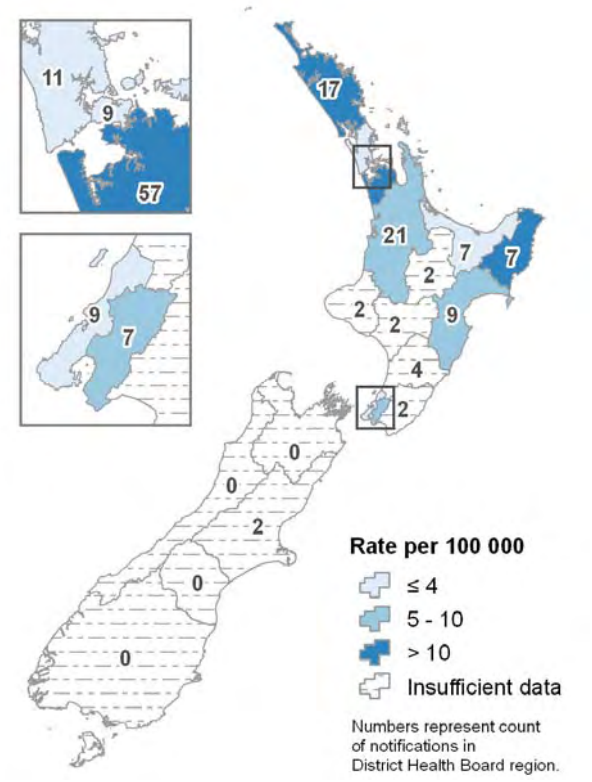
The following analysis is for rheumatic fever (initial attack) cases. The highest rate was reported in Tairawhiti DHB (15.1 per 100 000 population, 7 cases), followed by Counties Manukau (10.6 per 100 000, 52 cases) and Northland (10.2 per 100 000, 16 cases) DHBs (Figure 30).

Age and sex was recorded for all rheumatic fever (initial attack) cases. Approximately 75% (117 cases) of cases were aged less than 15 years, with the highest age-specific rate in the 10–14 years age group (25.4 per 100 000 population, 75 cases). Sex-specific rates were similar for females (3.6 per 100 000 population, 80 cases) and males (3.5 per 100 000, 75 cases).

Ethnicity was recorded for all rheumatic fever (initial attack) cases. The highest rates occurred amongst Pacific Peoples (23.9 per 100 000, 54 cases), followed by those of Māori ethnicity (16.8 per 100 000, 95 cases).

Of the 154 (99.4%) rheumatic fever (initial attack) cases for which a final case status was recorded, 114 (74.0%) were reported as confirmed cases, indicating that the case had a laboratory-confirmed diagnosis for streptococcal infection.

Figure 30. Rheumatic fever (initial attack) cases by DHB, 2010



The following analysis is for cases of recurrent rheumatic fever. The 13 cases of recurrent rheumatic fever ranged in age from 5 to 39 years, with the highest number in the 20–29 years age group (6 cases). Eight cases were female and five were male. The cases were of Māori (9 cases) and Pacific Peoples (4 cases) ethnicity.

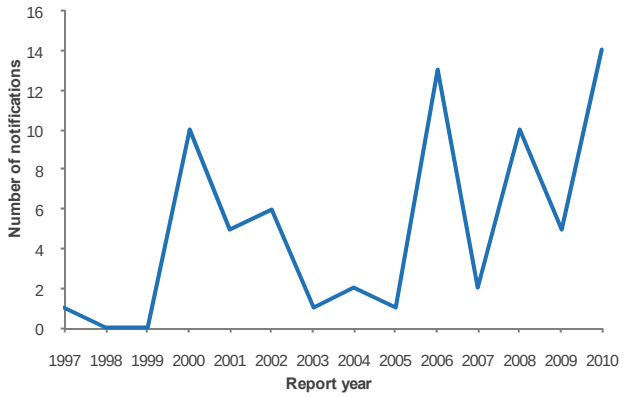
For all rheumatic fever cases (initial and recurrent attacks), hospitalisation status was recorded for 163 (97.0%) cases, of which 153 (93.9%) were hospitalised. No deaths due to rheumatic fever were reported in 2010.

One rheumatic fever outbreak was reported in 2010 involving two cases.

Rickettsial disease

Fourteen cases of rickettsial disease were notified in 2010, compared with five cases in 2009 (Figure 31). Thirteen notifications were for murine typhus, and one was for Q fever. The 2010 notification rate (0.3 per 100 000 population) was significantly higher than that for 2009 (0.1 per 100 000 population).

Figure 31. Rickettsial disease notifications, 1997–2010



Ministry of Health hospitalisation data for 2010 recorded seven hospitalisations where rickettsial disease was the primary reason for the admission. Of these, three were for rickettsiosis (unspecified), two were for typhus fever (unspecified), one was for typhus fever (due to *Rickettsia typhi*), and one was for Q fever. Note that the Ministry of Health hospitalisation data may include repeat admissions.

Murine typhus

Thirteen laboratory-confirmed cases of murine typhus were notified in 2010, and were from Waikato (7 cases), Waitemata (3 cases), Counties Manukau (2 cases), and Auckland (1 case) DHBs.

Age, sex and ethnicity were recorded for all the reported murine typhus cases. The cases were in the 15–19 years (1 case), 30–39 years (1 case), 40–49 years (7 cases), 50–59 years (3 cases), and 70 years and over (1 case) age groups. Of the 13 cases, eight were female and five were male. Twelve cases were of European ethnicity and one was of Asian ethnicity.

Hospitalisation status was recorded for 12 (92.3%) cases and 11 (91.7%) cases were hospitalised. Travel history was recorded for 12 (92.3%) cases. Eleven (91.7%) cases had not travelled overseas during the incubation period of the disease and are assumed to have acquired their infection in New Zealand. The remaining case had travelled to Nepal during the incubation period of the disease.

Q fever

One laboratory-confirmed case of Q fever was notified in 2010. This case, a male of European ethnicity in the 50–59 years age group, had travelled to Australia during the incubation period of the disease. This case also had an occupational exposure to the disease reservoir in Australia. The case was hospitalised. This is only the second case of Q fever notified in New Zealand since 1997.

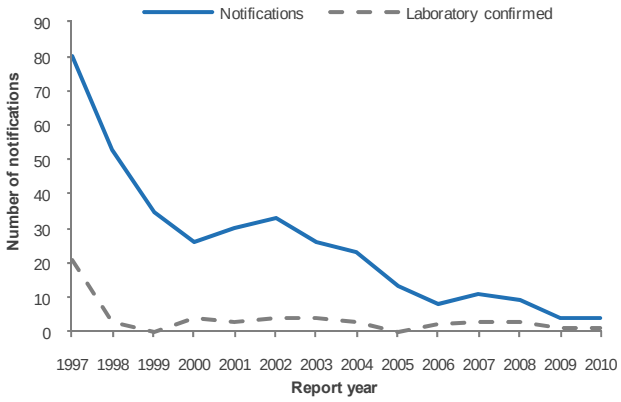
Rubella (German measles)

In New Zealand, rubella immunisation was introduced in 1970 and it has been a notifiable disease since June 1996 [17].

Four cases of rubella were notified in 2010, of which one case was laboratory confirmed (the same as 2009). No cases of congenital rubella were reported in 2010. The last reported case of congenital rubella was reported to the NZPSU in 1998. Since the last national outbreak in 1995 there has been a steady decrease in the number of rubella cases notified each year [17] (Figure 32).

The four cases of rubella notified in 2010 were from the Northland, Waitemata, Hutt Valley, and Capital and Coast DHBs. Age was recorded for all cases, three cases were aged 1–4 years and one case was aged 50–59 years. Two cases were male and two female. All cases were of European ethnicity.

Figure 32. Rubella notifications and laboratory confirmed cases by year, 1997–2010



No hospitalisations or deaths due to rubella were reported in 2010. Risk factor information was recorded for all cases. One case reported attending school, pre-school or childcare and overseas travel, one case reported overseas travel, one case reported attending school, pre-school or childcare and the remaining case reported no apparent risk factors.

The recommended vaccination schedule for rubella is a primary dose at 15 months of age and a second dose at four years of age [17]. Of the three cases for which vaccination status was recorded, two received one dose of the vaccine (one case was in the 15 months to 3 years age group and the other in the 4–9 years age group), and one case was not vaccinated (aged less than 15 months and therefore not eligible for vaccination). Table 20 shows the number of doses of MMR vaccine given to rubella cases in each age group.

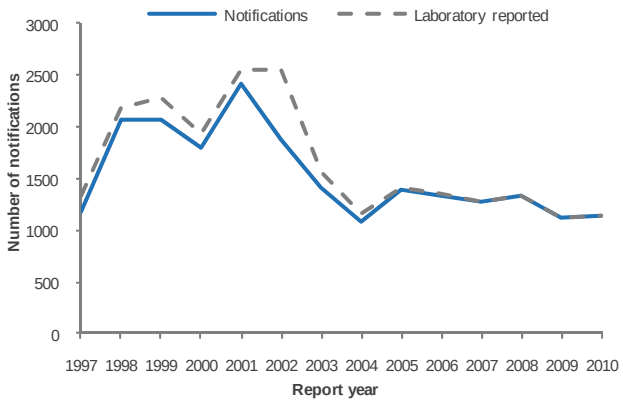
Table 20. Age group of rubella notifications and vaccination received, 2010

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

Salmonellosis

In 2010, 1146 cases of salmonellosis were notified. The 2010 notification rate (26.2 per 100 000 population) was similar to the 2009 rate (26.1 per 100 000, 1128 cases). The number of cases notified each year has remained fairly stable since 2005 (Figure 33).

Figure 33. Salmonellosis notifications and laboratory-reported cases by year, 1997–2010



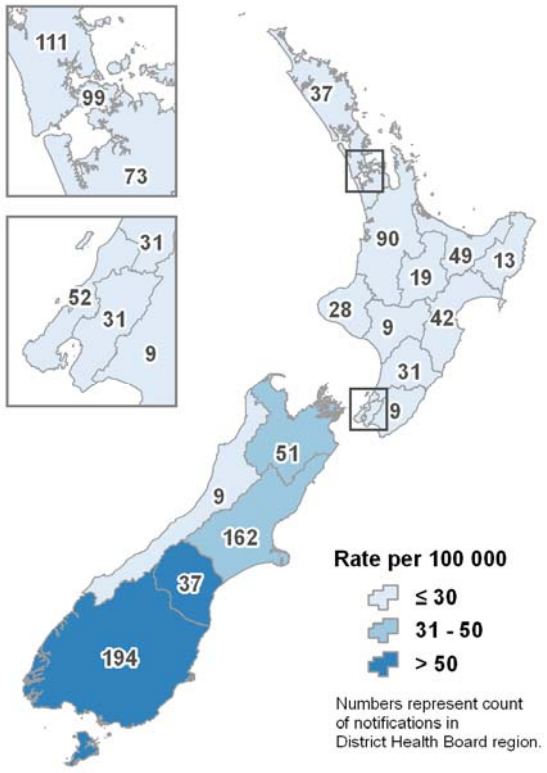
Rates varied throughout the country as illustrated in Figure 34. The highest rates were reported in South Canterbury (66.2 per 100 000 population, 37 cases) and Southern (64.0 per 100 000, 194 cases) DHBs.

Age was recorded for 1144 (99.8%) cases. As in previous years, the age-specific rates were highest in the less than 1 year age group (87.9 per 100 000 population, 56 cases), followed by the 1–4 years age group (87.1 per 100 000, 216 cases). The lowest rate occurred in the 10–14 years age group (16.2 per 100 000, 48 cases).

Sex was recorded for 1138 (99.3%) cases. Sex-specific rates were similar for males (26.2 per 100 000 population, 561 cases) and females (26.0 per 100 000, 577 cases).

Ethnicity was recorded for 1045 (91.2%) cases. The highest notification rates were reported for those of European ethnicity (31.1 per 100 000, 839 cases), followed by those of Other (20.7 per 100 000, 7 cases), Māori (19.5 per 100 000, 110 cases), and Asian (16.1 per 100 000, 55 cases) ethnicities.

Figure 34. Salmonellosis notifications by DHB, 2010



Of the 763 (66.6%) cases for which hospitalisation status was recorded, 136 (17.8%) were hospitalised.

The risk factors recorded for salmonellosis are shown in Table 21. The most common risk factors reported were contact with farm animals and consumption of food from retail premises.

In 2010, 23 outbreaks of salmonellosis were reported involving 100 cases, of which nine cases were hospitalised

Table 21. Exposure to risk factors associated with salmonellosis, 2010

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Contact with farm animals	223	358	565	38.4
Consumed food from retail premises	213	353	580	37.6
Consumed untreated water	113	373	660	23.3
Contact with faecal matter	108	403	635	21.1
Travelled overseas during the incubation period	131	524	491	20.0
Recreational water contact	79	475	592	14.3
Contact with other symptomatic people	71	479	596	12.9
Contact with sick animals	48	477	621	9.1

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

The Enteric Reference Laboratory at ESR reported 1144 cases infected with *Salmonella* (exclusive of *S.* Paratyphi and *S.* Typhi reported elsewhere) in 2010.

Table 22 shows the number of cases of selected *Salmonella* serotypes and subtypes reported. *S.* Typhimurium definitive type (DT) 160 remained the most common serotype confirmed.

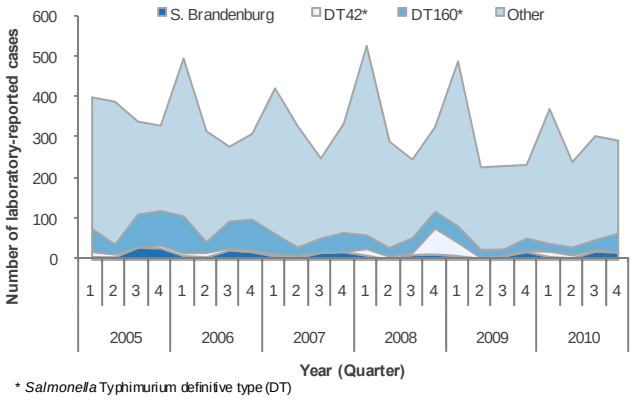
Table 22. Selected *Salmonella* serotypes and subtypes of laboratory-confirmed salmonellosis, 2007–2010

Subtype [a]	2007	2008	2009	2010
S. Typhimurium	**596**	**729**	**661**	**594**
DT160	152	135	106	107
DT101	43	72	56	70
DT1	91	72	94	36
DT156	73	67	54	35
DT42	15	93	40	26
RDNC-May06	51	55	43	85
Other or unknown	171	235	268	235
S. Enteritidis	**151**	**124**	**95**	**113**
DT9a	60	45	39	49
DT1b	18	19	4	5
DT26	17	10	2	1
Other or unknown	56	50	50	58
Other serotypes	**520**	**486**	**366**	**437**
S. Infantis	86	86	71	54
S. Brandenburg	47	33	36	47
S. Saintpaul	25	35	26	34
S. Virchow	34	14	12	16
S. Agona	13	10	10	12
S. Mississippi	11	10	14	9
Other or unknown	304	298	197	265
Total	**1 267**	**1 339**	**1 122**	**1 144**

[a] Excludes *S.* Paratyphi and *S.* Typhi already noted elsewhere

Figure 35 illustrates selected *Salmonella* types that have emerged in recent years and their contribution to the overall *Salmonella* burden in New Zealand.

Figure 35. Laboratory-reported cases of *S.* Brandenburg, DT42 and DT160 by quarter, 2005–2010



* *Salmonella* Typhimurium definitive type (DT)

Severe acute respiratory syndrome

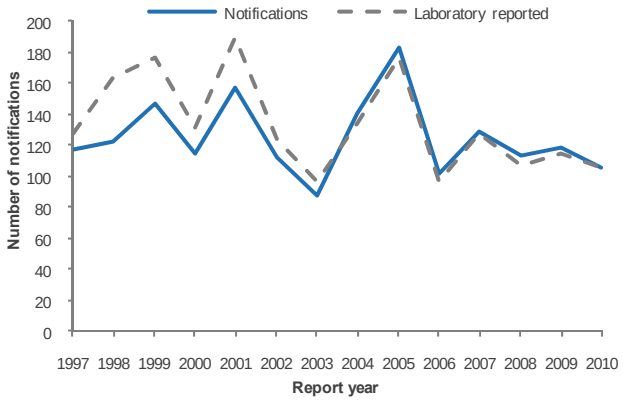
No cases of severe acute respiratory syndrome (SARS) have ever been confirmed in New Zealand. During the international outbreak of SARS in 2003, 13 notifications of suspected SARS cases were made in New Zealand, however, all of these cases subsequently tested negative for the SARS coronavirus [32].

Shigellosis

In 2010, a total of 105 cases of shigellosis were notified. The 2010 notification rate (2.4 per 100 000 population) was slightly lower than the 2009 rate (2.8 per 100 000, 119 cases). There has been a slight decreasing trend since the peak of 183 notifications in 2005 (Figure 36).

The highest shigellosis notification rates in 2010 were reported in Northland (4.4 per 100 000 population, 7 cases), Waitemata (3.5 per 100 000, 19 cases), Counties Manukau (3.3 per 100 000, 16 cases), and Auckland (3.1 per 100 000, 14 cases) DHBs.

Figure 36. Shigellosis notifications and laboratory-reported cases by year, 1997–2010



Age and sex were recorded for all cases. The highest age-specific rate occurred in the 1–4 years age group (4.8 per 100 000 population, 12 cases), followed by the 60–69 years (3.4 per 100 000, 14 cases) and 20–29 years (3.3 per 100 000, 20 cases) age groups. Sex-specific rates were similar for males (2.3 per 100 000 population, 50 cases) and females (2.5 per 100 000, 55 cases).

Ethnicity was recorded for 97 (92.4%) cases. The highest notification rate was for Pacific Peoples (6.6 per 100 000 population, 15 cases), followed by those of Asian (4.4 per 100 000, 15 cases) and Māori (3.0 per 100 000, 17 cases) ethnicities.

Hospitalisation status was recorded for 73 (69.5%) cases. Of these, 27 (37.0%) hospitalisations were reported.

The risk factors recorded for shigellosis are shown in Table 23. The most common risk factor was overseas travel during the incubation period (65.6%, 40 cases). The most frequently reported countries were India (11 cases), Fiji (7 cases), and Samoa (4 cases).

The Enteric Reference Laboratory at ESR reported 105 cases infected with *Shigella* during 2010. The predominant serogroups identified were *Shigella sonnei* biotype a (27 cases, 25.7%), *S. sonnei* biotype g (23 cases, 21.9%), *Shigella flexneri* 2a (21 cases, 20.0%), and *S. flexneri* 2b (10 cases, 9.5%).

Five shigellosis outbreaks were reported in 2010, involving 16 cases.

Taeniasis

Three cases of taeniasis were notified in 2010, bringing the number of cases notified since 1997 to 17. All three cases were overseas during the incubation period in Ethiopia (2 cases) and Cambodia (1 case). All cases that have been notified in New Zealand since 1997 have reported a history of overseas travel.

Tetanus

Seven cases of tetanus were notified in New Zealand in 2010. This is a significant increase from the one case reported in 2009, and the highest number of cases notified since 1992 when eight cases were reported. The age and vaccination status of the cases were: one case aged 1–4 years (not vaccinated), one case aged 40–49 years (last vaccinated in 1995), one case aged 60–69 years (vaccination status unknown) and four cases aged 70 years and over (two not vaccinated and two of unknown vaccination status). Four cases were female and three were male. All seven cases were hospitalised and one (aged 70+ years, vaccination status unknown) died from the disease.

Since 1997, a total of 28 tetanus cases have been reported. Of these, three cases were children, two aged 1–4 years and one aged 5–9 years. None of the children were vaccinated. Among the 28 cases overall, two died from tetanus, both females in the 70+ years age group (one was not vaccinated and one was of unknown vaccination status).

Ministry of Health hospitalisation data for 2010 record seven hospitalisations with the primary reason for admission being tetanus. The age distribution of the people admitted were: one aged 1–4 years, one aged 20–29 years, two aged 60–69 years and three aged 70 years and over. One was male and six were female.

Table 23. Exposure to risk factors associated with shigellosis, 2010

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Travelled overseas during the incubation period	40	21	44	65.6
Consumed food from retail premises	24	18	63	57.1
Contact with other symptomatic people	13	31	61	29.5
Recreational water contact	10	26	69	27.8
Consumed untreated water	5	19	81	20.8
Contact with faecal matter	5	40	60	11.1
Contact with farm animals	5	40	60	11.1
Contact with sick animals	1	41	63	2.4

Toxic shellfish poisoning

Nine cases of toxic shellfish poisoning were notified in 2010, giving a rate of 0.2 per 100 000 population. This is an increase compared with the average number of cases reported in the previous five years (1.8 cases per year). Four cases were reported with suspected paralytic shellfish poisoning. The poisoning type was unspecified for the remaining five cases.

The cases were reported in Waikato (4 cases), Bay of Plenty (2 cases), Lakes (1 case), Capital and Coast (1 case), and Canterbury (1 case) DHBs. All cases were adults, with the highest number of cases in the 30–39 years age group (3 cases), followed by the 60–69 years age group (2 cases). There were six female and three male cases. Of the eight cases where ethnicity was recorded, five were European and three were Māori. Five hospitalisations were reported.

Six of the cases had consumed raw and cooked tuatuas or pipis collected from Papamoa Beach. One case had consumed steamed crayfish collected from Carters Beach, one had consumed steamed tuatuas collected from an unknown location, and the remaining case had consumed fried mussels and scallops that were purchased from a food premise on the Kapiti Coast.

One toxic shellfish poisoning outbreak was reported in 2010, involving eight cases, of which six cases were also reported as individual notifications.

Trichinellosis

No cases of trichinellosis were notified in 2010. 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 [33]. The other three cases were linked to the consumption of infected pork meat in 2001.

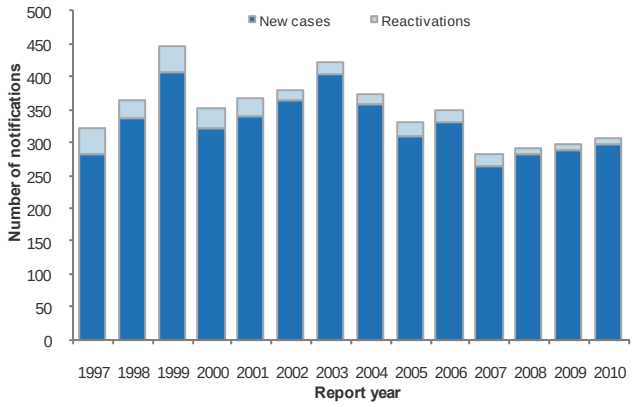
Tuberculosis disease

Tuberculosis infection is one of the most common causes of death from communicable disease worldwide. Infection is usually curable with early diagnosis and a combination of specific antibiotics, but this relies upon full compliance with medication.

A full description of the epidemiology of tuberculosis and data on antimicrobial drug-resistant tuberculosis in New Zealand for 2010 will be reported separately in the Tuberculosis in New Zealand - Annual Report 2010 available from www.surv.esr.cri.nz in September 2011.

In 2010, 307 cases of tuberculosis disease (new and reactivations) were notified, of which 10 (3.3%) were reactivations (note that the term reactivation used in this context means cases with second or subsequent episodes of symptomatic tuberculosis disease). The tuberculosis (new and reactivations) rate of 7.0 per 100 000 population in 2010 was similar to the 2009 rate (6.9 per 100 000, 299 total cases including 9 reactivations). In 2010, 243 (79.2%) cases were reported as laboratory confirmed. Figure 37 shows the total number of new tuberculosis cases and reactivations reported since 1997.

Figure 37. Tuberculosis notifications (new cases and reactivations) by year, 1997–2010



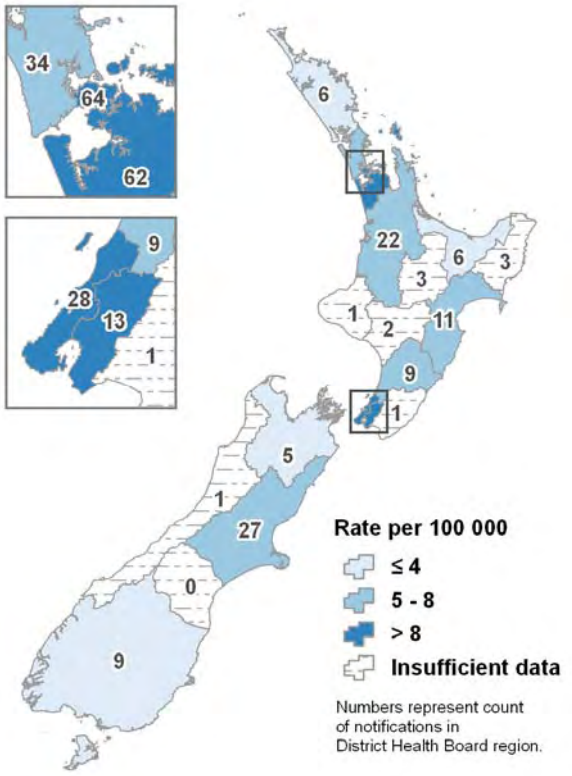
New tuberculosis cases

In 2010, the rates of new tuberculosis notifications per 100 000 population differed by geographical region (Figure 38). Auckland DHB had the highest rate (14.0 per 100 000 population, 63 cases), followed by Counties Manukau (12.4 per 100 000, 61 cases) and Capital and Coast (9.6 per 100 000, 28 cases) DHBs.

Age and sex were recorded for the 297 new cases of tuberculosis. There were three cases aged less than five years and 10 cases aged between five and 14 years. Age-specific rates were highest for females aged 30–39 years (12.1 per 100 000 population, 36 cases), males aged 30–39 years (11.8 per 100 000, 32 cases), and males aged 60–69 years (11.6 per 100 000, 23 cases). Overall, sex-specific rates were similar for males (6.9 per 100 000, 147 cases) compared with females (6.7 per 100 000, 150 cases) for new tuberculosis cases.

Ethnicity was recorded for 292 (98.3%) cases. The highest notification rate was reported among those of Asian ethnicity (51.6 per 100 000 population, 176 cases), followed by those of Other (35.4 per 100 000, 12 cases), Pacific Peoples (19.9 per 100 000, 45 cases), Māori (5.8 per 100 000, 33 cases), and European (1.0 per 100 000, 26 cases) ethnicities.

Figure 38. Tuberculosis notifications (new cases) by DHB, 2010



Of the 284 (95.6%) new tuberculosis cases in 2010 for which hospitalisation data were recorded, 163 (57.4%) were hospitalised. Seven deaths due to tuberculosis were reported in 2010, four cases were aged 60–69 years and three cases were aged 70 years and over.

Bacillus Calmette-Guérin (BCG) vaccination status was recorded for 158 (53.2%) cases and vaccination was confirmed for 124 (78.5%) of those cases. A further five (3.2%) cases had an unconfirmed history of vaccination.

Of the 292 (98.3%) new cases for which place of birth was recorded in 2010, 236 (80.8%) were born outside New Zealand. Of the 56 (19.2%) cases that were born in New Zealand, 26.2% (11/42 where information was recorded) had been or were presently residing with a person born outside New Zealand. Of the 222 (74.7%) cases for which these data were recorded, 57 (25.7%) cases had reported contact with a confirmed case of tuberculosis.

Reactivations of tuberculosis

The 10 tuberculosis reactivation cases were from six DHBs: Canterbury (4 cases), Waikato (2 cases), Waitemata, Auckland, Counties Manukau, and Hutt Valley (1 case each). Nine cases were in the 50 years and over age group and one case was aged 20–29 years. There were more male (7 cases) than female (3 cases) tuberculosis reactivation cases. The cases were of European (4 cases), Māori (3 cases), and Asian (3 cases) ethnicities.

In 2010, information on the place where the diagnosis was made and country of birth was recorded for eight of the 10 reactivation cases (Table 24 and Table 25). The first diagnosis of tuberculosis in these cases was made in New Zealand (4 cases) and overseas (4 cases).

Table 24 shows the place of the original tuberculosis disease diagnosis, stratified by whether the case was treated for tuberculosis disease.

Table 24. Place of original tuberculosis disease diagnosis and treatment status (for reactivations), 2010

Place of TB disease diagnosis	Case treated for TB disease			
	Yes	No	Unknown	Total
Overseas	4	0	0	4
New Zealand	2	0	2	4
Unknown	0	0	2	2
Total	**6**	**0**	**4**	**10**

Table 25 shows the place where the original tuberculosis disease diagnosis was made, stratified by the place of birth.

Table 25. Place of original tuberculosis disease diagnosis and place of birth (for reactivations), 2010

Place of TB disease diagnosis	Place of birth of case			
	NZ	Overseas	Unknown	Total
Overseas	0	4	0	4
New Zealand	4	0	0	4
Unknown	1	1	0	2
Total	**5**	**5**	**0**	**10**

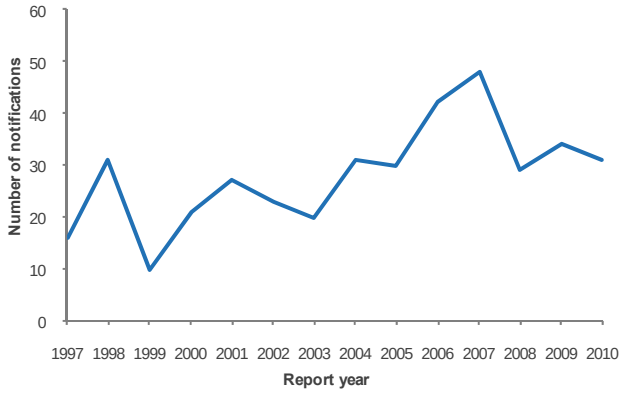
Hospitalisation data were recorded for all reactivation cases, and nine (90.0%) cases were hospitalised. There was one death reported among the reactivation cases, a male aged 20–29 years. Of the three cases where vaccination status was recorded, none were vaccinated.

Three outbreaks due to *Mycobacterium tuberculosis* were reported in 2010 involving eight cases.

Typhoid fever

There were 31 cases of typhoid fever notified in 2010. The 2010 notification rate (0.7 per 100 000 population) was similar to the 2009 rate (0.8 per 100 000, 34 cases) and 2008 rate (0.7 per 100 000, 29 cases). Figure 39 shows the number of typhoid fever notifications by year since 1997.

Figure 39. Typhoid fever notifications by year, 1997–2010



Twenty cases (64.5%) were reported in the Auckland region (includes Waitemata, Auckland and Counties Manukau DHBs). The highest rates were reported in Bay of Plenty (2.4 per 100 000 population, 5 cases), Auckland (2.0 per 100 000, 9 cases), and Counties Manukau (1.4 per 100 000, 7 cases) DHBs.

Age was recorded for all cases. Age-specific notification rates were highest in the 1–4 years age group (2.0 per 100 000 population, 5 cases), followed by the 15–19 years age group (1.6 per 100 000, 5 cases).

Sex was recorded for 30 (96.8%) cases. Sex-specific rates were slightly higher for males (0.8 per 100 000 population, 18 cases) compared with females (0.5 per 100 000 population, 12 cases).

Ethnicity was recorded for 30 (96.8%) cases. The highest notification rates occurred in Pacific Peoples (5.3 per 100 000 population, 12 cases) and those of Asian ethnicity (4.4 per 100 000, 15 cases).

Hospitalisation status was recorded for 27 (87.1%) cases, of which 23 (85.2%) cases were hospitalised.

Of the 31 cases notified in 2010, 27 cases (87.1%) had reported overseas travel during the incubation period. The countries visited included India (15 cases), Samoa (10 cases), Singapore (2 cases), Bangladesh, Malaysia, and Peru (1 case each).

The Enteric Reference Laboratory at ESR reported 30 cases infected with *Salmonella* Typhi in 2010.

The most common phage types identified were *S.* Typhi phage type E1a (20 cases), *S.* Typhi phage type E7 variant (3 cases), and *S.* Typhi phage type A variant (2 cases).

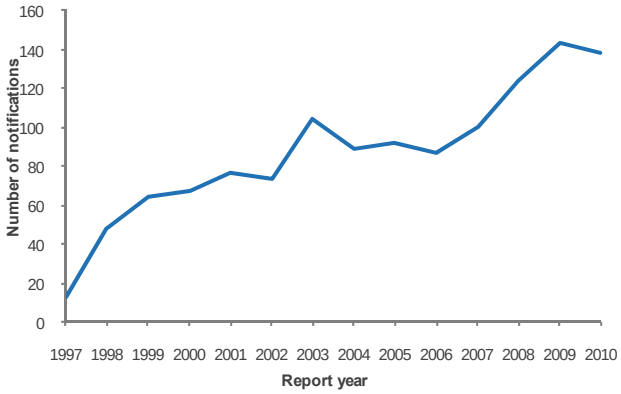
Two outbreaks due to typhoid fever were reported in 2010 involving five cases.

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

There were 138 cases of verotoxin- or Shiga toxin-producing *Escherichia coli* infection (VTEC/STEC infection) notified in 2010. The 2010 notification rate (3.2 per 100 000 population) was similar to the 2009 rate (3.3 per 100 000, 143 cases). Four cases of VTEC/STEC-associated haemolytic uraemic syndrome (HUS) were reported to the NZPSU in 2010.

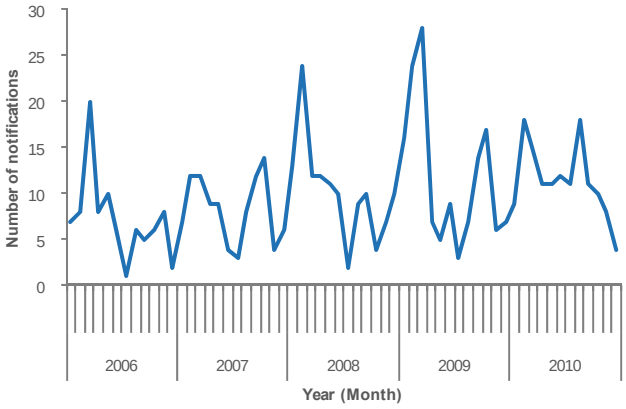
Figure 40 shows the number of notified cases of VTEC/STEC infection each year since 1997.

Figure 40. VTEC/STEC notifications by year, 1997–2010



VTEC/STEC infections have tended to be seasonal, as Figure 41 illustrates. In most years there has been an autumn and a spring peak in notifications.

Figure 41. VTEC/STEC infection notifications by month, January 2006–December 2010



Rates for VTEC/STEC infection varied throughout the country, with the highest rates in Tairawhiti (17.2 per 100 000 population, 8 cases), Lakes (7.8 per 100 000, 8 cases), and Waikato (6.6 per 100 000, 24 cases) DHBs.

Age was recorded for all cases. The highest rates were reported in the 1–4 years age group (25.8 per 100 000 population, 64 cases), followed by the less than one year age group (14.1 per 100 000, 9 cases) and the 5–9 years age group (4.5 per 100 000, 13 cases).

Sex was recorded for 137 (99.3%) cases. The rate was the same for females (3.1 per 100 000 population, 70 cases) and males (3.1 per 100 000, 67 cases).

Ethnicity was recorded for 136 (98.6%) cases. Of these, the highest notification rate was reported for those of European ethnicity (4.4 per 100 000, 118 cases), followed by those of Māori ethnicity (1.8 per 100 000, 10 cases).

Of the 113 (81.9%) notified cases for which hospitalisation status was recorded, 38 (33.6%) were hospitalised.

The risk factors recorded for VTEC/STEC infection cases reported in 2010 are shown in Table 26. The foods consumed by cases are shown in Table 27.

The Enteric Reference Laboratory at ESR reported 128 cases infected with VTEC/STEC in 2010. Of these, 115 (89.8%) were identified as serotype O157:H7, and 13 (10.2%) as non-O157:H7.

Five outbreaks of VTEC/STEC infection were reported in 2010, involving 12 cases.

Yellow fever

No cases of yellow fever have ever been notified in New Zealand.

Table 26. Exposure to risk factors associated with VTEC/STEC infection, 2010

Risk factor	Yes	No	Unknown	Percentage (%)[a]
Contact with pets	61	10	67	85.9
Contact with farm animals	39	27	72	59.1
Contact with animal manure	30	28	80	51.7
Contact with children in nappies	42	46	50	47.7
Contact with a person with similar symptoms	30	60	48	33.3
Contact with recreational water	27	64	47	29.7
Contact with other animals	16	41	81	28.1
Travelled overseas during the incubation period	3	92	43	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.

Table 27. Foods consumed by VTEC/STEC infection cases, 2010

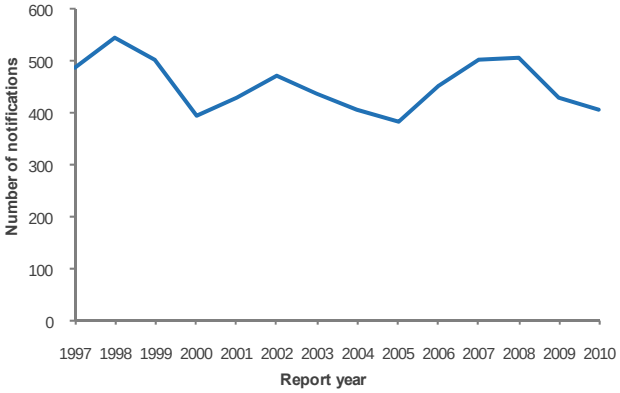
Risk factor	Yes	No	Unknown	Percentage (%)[a]
Consumed dairy products	75	15	48	83.3
Consumed raw fruit or vegetables	71	15	52	82.6
Consumed beef or beef products	67	20	51	77.0
Consumed chicken or poultry	63	26	49	70.8
Consumed processed meat	51	35	52	59.3
Consumed fruit or vegetable juice	29	47	62	38.2
Consumed home kill meat	21	64	53	24.7
Consumed lamb or hogget or mutton	19	62	57	23.5
Consumed unpasteurised milk or milk products	13	75	50	14.8
Consumed pink or undercooked meat	4	83	51	4.6

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

Yersiniosis

In 2010, a total of 406 cases of yersiniosis were notified. The 2010 rate (9.3 per 100 000 population) was slightly lower than the 2009 rate (10.0 per 100 000, 430 cases). Figure 42 shows the number of notified yersiniosis cases by year since 1997.

Figure 42. Yersiniosis notifications by year, 1997–2010



Rates varied throughout the country as illustrated in Figure 43. The highest rates were recorded in the Capital and Coast (19.2 per 100 000 population, 56 cases), Taranaki (18.3 per 100 000, 20 cases) and South Canterbury (16.1 per 100 000, 9 cases) DHBs.

Age was recorded for all cases. Age-specific rates were highest in the less than one year age group (69.0 per 100 000 population, 44 cases), followed by the 1–4 years age group (43.5 per 100 000, 108 cases).

Sex was recorded all cases. Of these, males had a significantly higher rate (10.5 per 100 000 population, 225 cases) compared to females (8.1 per 100 000, 181 cases).

Ethnicity was recorded for 364 (89.7%) cases. The highest notification rate was for those of Asian ethnicity (25.2 per 100 000, 86 cases) followed by Other (17.7 per 100 000, 6 cases), European (8.5 per 100 000, 228 cases), Pacific Peoples (7.5 per 100 000, 17 cases) and Māori (4.8 per 100 000, 27 cases) ethnicities.

Of the 222 (54.7%) notified cases for which hospitalisation status was recorded, 28 (12.6%) were hospitalised.

The risk factors recorded for yersiniosis cases reported in 2010 are shown in Table 28.

Two outbreaks of yersiniosis were reported in 2010 involving 13 cases.

Figure 43. Yersiniosis notifications by DHB, 2010

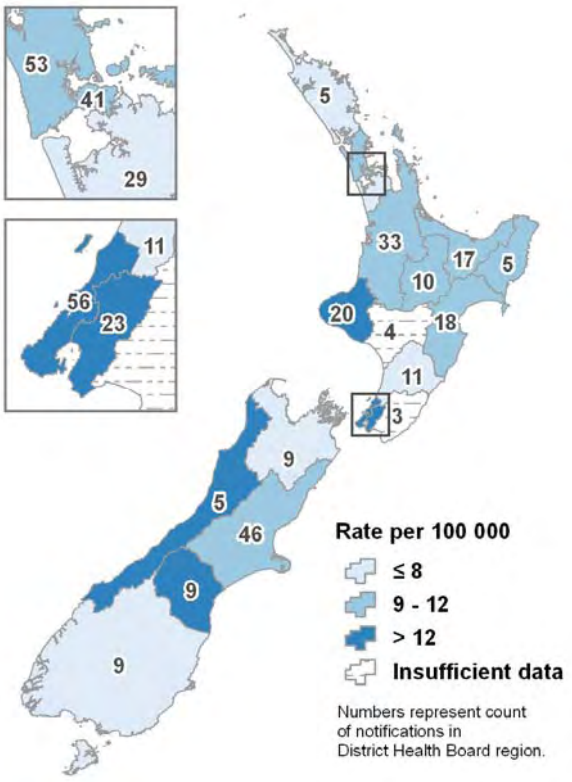


Table 28. Exposure to risk factors associated with yersiniosis, 2010

Risk factor	Yes	No	Unknown	Percentage (%) [a]
Consumed food from retail premises	72	84	250	46.2
Contact with farm animals	59	110	237	34.9
Consumed untreated water	30	116	260	20.5
Contact with faecal matter	26	126	254	17.1
Contact with other symptomatic people	18	140	248	11.4
Recreational water contact	16	140	250	10.3
Contact with sick animals	7	147	252	4.5
Travelled overseas during the incubation period	7	168	231	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.

NON-NOTIFIABLE DISEASES

NON-NOTIFIABLE DISEASES

Influenza

A full report on influenza surveillance in New Zealand for 2010 is reported separately in the Influenza Surveillance in New Zealand 2010 report available at www.surv.esr.cri.nz [34].

Following the emergence of influenza A(H1N1) 09 in 2009, influenza surveillance and reporting continued beyond the normal autumn, winter amd spring reporting period and throughout the summer of 2009/10. Therefore national influenza surveillance in 2010 was undertaken between January and September using a sentinel network of 91 general practices/practitioners. On average 81 practices, with a total patient roll of 355 222, participated each week. It is estimated that influenza-like illness (ILI) resulting in a visit to a general practitioner affected over 50 561 New Zealanders (an annual cumulative incidence rate of 1.16 per 1000 population). During the surveillance period, 4112 consultations for ILI were reported.

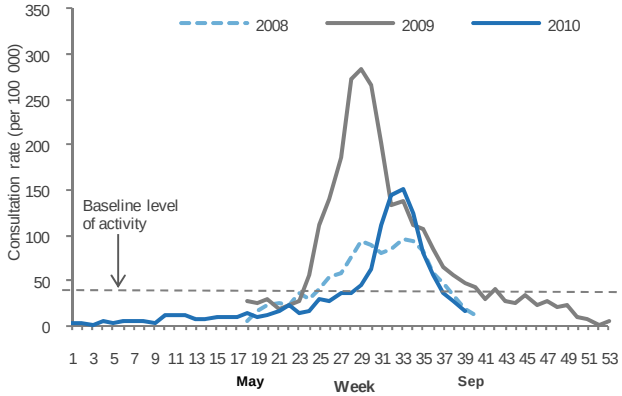
The average weekly consultation rate during May to September was 49.3 per 100 000 patient population, which is approximately half that of the 2009 rate (106.1 per 100 000). This was the ninth highest rate since 1997. The previous high rates were in 1997 (163.7 per 100 000 patient population) and 1999 (112.3). The lowest rate was recorded in 2000 (32.5 per 100 000).

Overall, influenza activity in 2010 was moderate. Influenza consultation activity remained at the baseline level from weeks 1 to 29, and then increased to a peak in week 33 (16–22 August) with a consultation rate of 151.6 per 100 000 patient population. The 2010 peak was lower than the peak in 2009 (284.0 per 100 000 patient population), but higher than the peak in 2008 and 2007 (95.2 and 69.5 per 100 000 patient population, respectively). The highest peak since 1997 was in 2009 (284.0 per 100 000 patient population) and 1997 (244.2). The lowest peak was recorded in 2000 (41.7).

Figure 44 compares the weekly consultation rates for ILI in 2010 with 2008 and 2009.

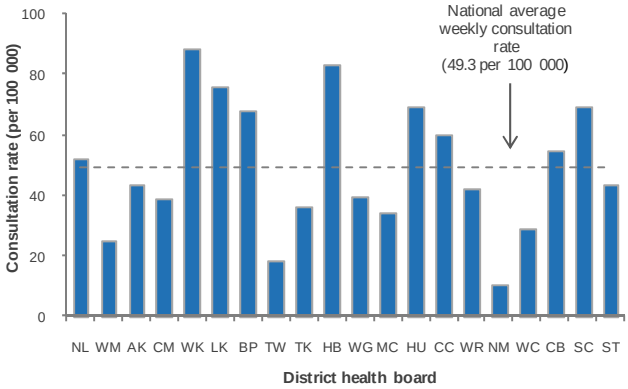
Figure 45 shows the average weekly consultation rates by district health board (DHB) for the influenza season.

Figure 44. Weekly sentinel surveillance consultation rates for influenza-like illness, 2008–2010



Consultation rates varied among DHBs, with rates above the national average at Waikato DHB (87.6 per 100 000 patient population), followed by Hawke's Bay (82.6 per 100 000), Lakes (75.4 per 100 000), Hutt Valley (68.7 per 100 000), South Canterbury (68.7 per 100 000), Bay of Plenty (67.3 per 100 000), Capital and Coast (59.7 per 100 000), Canterbury (53.9 per 100 000), and Northland (51.3 per 100 000) DHBs.

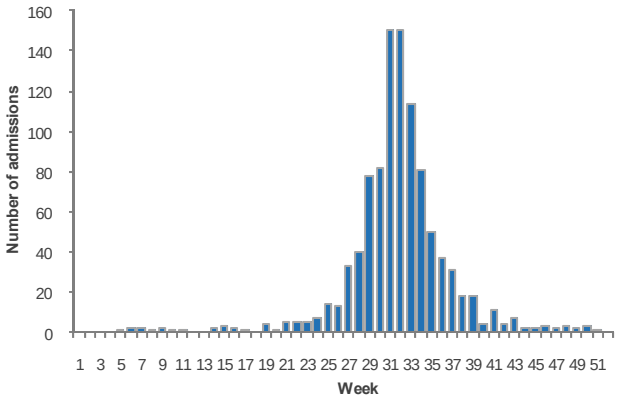
Figure 45. Sentinel average weekly consultation rates for influenza-like illness by DHB, 2010



The geographical distribution of influenza activity also varied in comparison with the previous year. In particular, some regions (mainly small urban and rural areas) that had relatively low ILI activity in 2009 experienced higher levels of activity in 2010.

In 2010, there were 998 hospitalisations with a primary diagnosis of influenza. This was lower than 2009 (1517), but higher than in 2008 and 2007 (365 and 316, respectively). Figure 46 shows these hospitalisations by week, of which 95.4% (952) occurred from June to October. The highest number of hospitalisations (517) occurred in August. Hospitalisations peaked in weeks 31 and 32 while the sentinel and non-sentinel influenza virus detection and ILI consultation peaked in week 33.

Figure 46. Influenza hospitalisation by week discharged, 2010



A total of 2012 influenza viruses were identified in 2010, lower than in 2009 (4900 viruses) and higher than in 2008 (1054 viruses). Of the 2012 viruses identified, 349 came from sentinel practice surveillance during January to September. There were 1663 non-sentinel viruses identified in 2010 compared with 4276 in 2009 and 588 in 2008.

As in 2009, the pandemic A(H1N1) 09 strain was the predominant strain in 2010. No seasonal A(H1N1) virus and only a small number of seasonal A(H3N2) (12) and influenza B viruses (10) were detected in 2010.

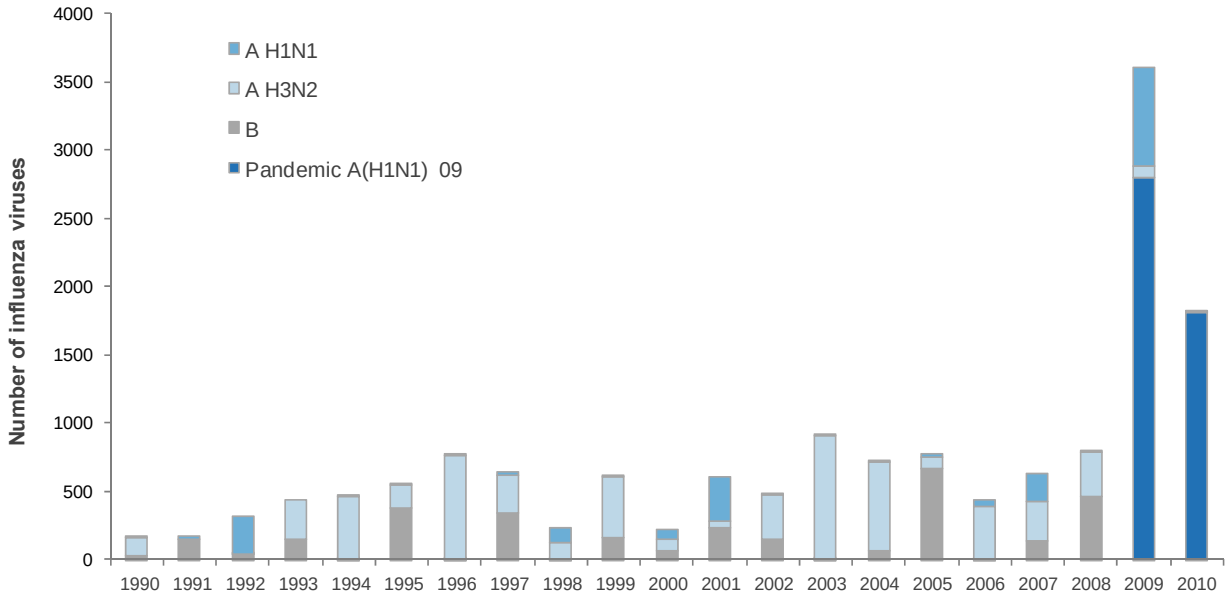
Figure 47 shows the number and percentage of typed and subtyped influenza viruses from 1990 to 2010. There are noticeable changes in terms of predominant patterns. These are described below.

Influenza A(H1N1) viruses

In 2010, influenza A(H1N1) viruses predominated at 98.8% of the subtyped isolates All were of the pandemic strain. The antigenic data from New Zealand isolates indicate that most of the current circulating pandemic A(H1N1) 09 viruses are closely related to the vaccine strain A/California/7/2009 (H1N1). Although sequence analysis of the viruses from Australia, New Zealand and Singapore during 2010 indicated that there was increasing genetic drift (with two major subclades both with E374K and N125D amino acid changes from previously circulating viruses), the epidemiological, virological and serological data do not suggest a need to change the vaccine strain as yet.

The seasonal influenza A(H1N1) strain predominated in three seasons (1992, 2000, and 2001) with associated relatively low hospitalisations (193 in 1992, 222 in 2000, and 343 in 2001).

Figure 47. Influenza viruses by type, 1990–2010



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
A H1N1	0.6%	7.7%	85.7%	0.0%	0.2%	1.1%	0.3%	3.6%	47.4%	0.3%	36.0%	54.4%	0.4%	0.1%	0.1%	2.3%	12.6%	32.1%	0.8%	20.1%	0.0%
A H3N2	83.2%	0.0%	2.8%	65.7%	98.7%	30.1%	99.1%	43.0%	51.7%	73.7%	32.9%	7.9%	68.0%	99.6%	91.3%	10.7%	86.3%	45.0%	41.0%	2.2%	0.7%
B	16.2%	92.3%	11.5%	34.3%	1.1%	68.8%	0.7%	53.5%	0.9%	26.0%	31.1%	37.8%	31.6%	0.3%	8.6%	87.0%	1.1%	23.0%	58.3%	0.0%	0.5%
Pandemic A(H1N1) 09	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	77.7%	98.8%

Influenza A(H3N2) viruses

Influenza A(H3N2) viruses have often been associated with more severe disease and with excess pneumonia and influenza mortality. From 1990 to 2008, 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 (94) in 1996 in New Zealand was recorded during an A(H3N2) epidemic. The highest hospitalisations (552) were recorded in 2003 due to a season predominated by influenza A(H3N2) viruses. In 2010, only 0.7% of the subtyped viruses were influenza A(H3N2). They were antigenically closely related to the 2010 vaccine strain A/Perth/16/2009 (H3N2)-like strain.

Influenza B viruses

From 1990 to 2008, influenza B viruses predominated for five years in 1991 (92.3%), 1995 (68.8%), 1997 (53.5%), 2005 (87.0%) and 2008 (58.3%). 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 2003, the two virus lineages have been co-circulating in New Zealand with the B/Victoria lineage predominating in 2005 and 2008. The influenza B viruses had 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.

In 2010, there were only 10 influenza B viruses isolated. Most of the influenza B viruses were antigenically closely related to the B/Brisbane/60/2008-like strain.

During 1990–2001, B/Yamagata lineage viruses circulated exclusively in New Zealand. For the first time in 2002, the B/Victoria lineage viruses spread to New Zealand and completely replaced the B/Yamagata lineage viruses.

Summary

Characterisation of the influenza viruses isolated during the 2010 winter indicated no requirement to change any of the three components of the current vaccine. Accordingly, the 2011 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 a pandemic A(H1N1) 09 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 2010, and examines trends since 2006 for clinic-based and laboratory-based surveillance. A full description can be found in the Sexually Transmitted Infections in New Zealand: Annual Surveillance Report 2010 available at www.surv.esr.cri.nz in May 2011.

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 figures for 2010 can be found in the AIDS section under notifiable diseases in this report.

Clinic-based surveillance

This section presents a summary of results from the clinic-based surveillance of STIs.

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 total number of clinic visits is used to calculate a clinic visit rate. In the case of FPCs and SYHCs, many visits are not related to STIs.

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.

Chlamydia

In 2010, genital *Chlamydia trachomatis* infection was the most commonly reported STI in New Zealand. The chlamydia clinic visit rate reported by SHCs, FPCs and SYHCs was 5.7% (4858 cases), 1.4% (2500 cases) and 0.4% (971 cases), respectively (Table 29).

Table 29. Number and clinic visit rate of chlamydia cases by sex and health care setting, 2010

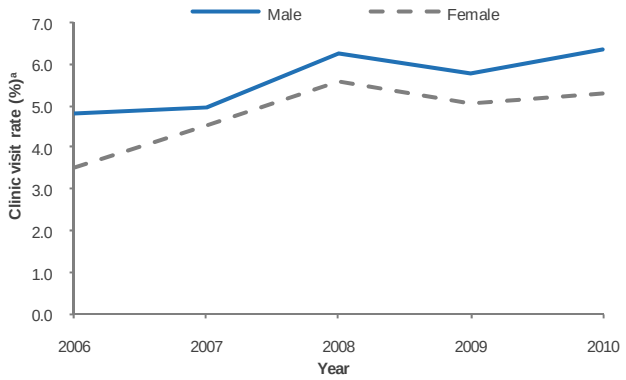
	Clinic type		
	SHC	FPC	SYHC
No. of cases[a]	**4 858**	**2 500**	**971**
Male	2 151	369	227
Female	2 706	2 130	744
Clinic visit rate (%)[a,b]	**5.7**	**1.4**	**0.4**
Male	6.3	4.5	0.3
Female	5.3	1.2	0.5

[a] Total includes cases with unknown sex
[b] Cases / total number of clinic visits

Between 2009 and 2010, the chlamydia clinic visit rate increased by 6.4% in SHCs (4544 to 4858 cases) and 25.1% in SYHCs (772 to 971 cases). In FPCs the chlamydia clinic visit rate decreased by 24.5% (3441 to 2500 cases).

From 2006 to 2010, the chlamydia clinic visit rate increased by 39.9% in SHCs (3489 to 4858 cases) and 31.1% in SYHCs (595 to 971 cases). In contrast, the chlamydia clinic visit rate decreased by 17.8% in FPCs (2875 to 2500 cases). During this period, the chlamydia clinic visit rate at SHCs increased by 31.2% in males (1743 to 2151 cases) and 49.8% in females (1746 to 2706 cases) (Figure 48). These trends may reflect changes in sexual behaviour, but they may also be accounted for by advances in the sensitivity and specificity of new diagnostic techniques.

Figure 48. Rates of chlamydia reported at SHCs, 2006–2010



[a] Cases / total number of clinic visits

Genital herpes (first presentation)

In 2010, the clinic visit rate for genital herpes (first presentation) reported by SHCs, FPCs and SYHCs was 1.0% (856 cases), 0.1% (180 cases) and 0.04% (85 cases), respectively (Table 30).

Table 30. Number and clinic visit rate of genital herpes (first presentation) cases by sex and health care setting, 2010

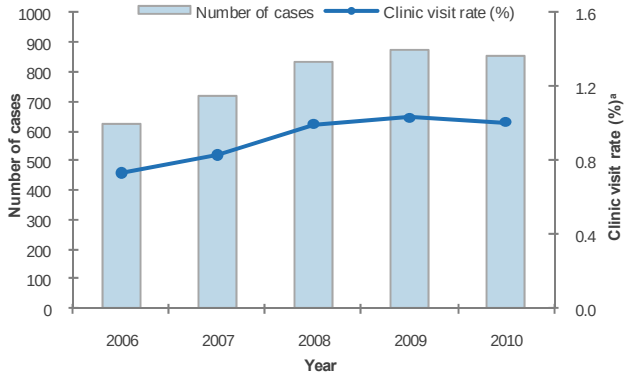
	Clinic type		
	SHC	FPC	SYHC
No. of cases[a]	**856**	**180**	**85**
Male	380	35	20
Female	476	144	65
Clinic visit rate (%)[a,b]	**1.0**	**0.1**	**0.04**
Male	1.1	0.4	0.03
Female	0.9	0.1	0.04

[a] Total includes cases with unknown sex
[b] Cases / total number of clinic visits

Between 2009 and 2010, the genital herpes clinic visit rate decreased by 2.7% in SHCs (875 to 856 cases), 6.0% in FPCs (199 to 180 cases), and 17.1% in SYHCs from (102 to 85 cases).

From 2006 to 2010, the genital herpes clinic visit rate increased by 37.4% in SHCs (626 to 856 cases) and 36.1% in FPCs (125 to 180 cases). It decreased by 1.0% in SYHCs from (69 to 85 cases) (Figure 49). Routine clinic surveillance methods in New Zealand do not facilitate the collection of data on the type of herpes simplex virus (HSV) infection, so it is not possible to determine if the trends in genital herpes differ by type of viral infection.

Figure 49. Number of cases and rates of genital herpes (first presentation) reported at SHCs, 2006–2010



Genital warts (first presentation)

In 2010, the clinic visit rate for genital warts (first presentation) reported by SHCs, FPCs and SYHCs was 3.3% (2787 cases), 0.2% (295 cases) and 0.1% (175 cases), respectively (Table 31).

Table 31. Number and rate of genital warts (first presentation) cases by sex and health care setting, 2010

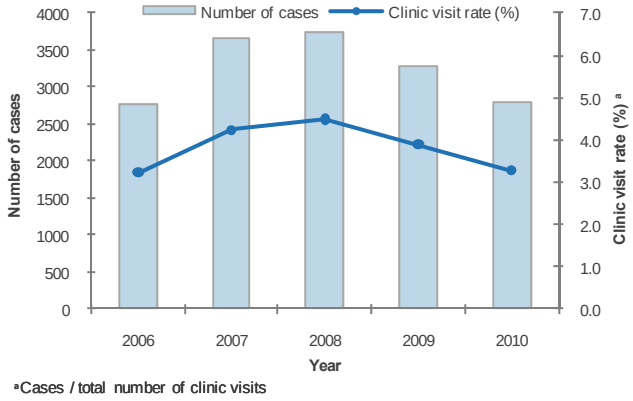
	Clinic type		
	SHC	FPC	SYHC
No. of cases[a]	**2 787**	**295**	**175**
Male	1 462	83	66
Female	1 324	212	109
Clinic visit rate (%)[a,b]	**3.3**	**0.2**	**0.1**
Male	4.3	1.0	0.1
Female	2.6	0.1	0.1

[a] Total includes cases with unknown sex
[b] Cases / total number of clinic visits

Between 2009 and 2010, the genital warts clinic visit rate decreased by 15.8% in SHCs (3294 to 2787 cases), 43.8% in FPCs (546 to 295 cases), and 28.4% in SYHCs (243 to 175).

From 2006 to 2010, the genital warts clinic visit rate increased by 1.4% in SHCs (2762 to 2787 cases). It decreased by 51.1% in FPCs (570 to 295 cases) and 34.0% in SYHCs (213 to 175 cases) (Figure 50).

Figure 50. Number of cases and rates of genital warts (first presentation) reported at SHCs, 2006–2010



Gonorrhoea

In 2010, the gonorrhoea clinic visit rate reported by SHCs, FPCs and SYHCs was 0.9% (774 cases), 0.1% (152 cases) and 0.02% (41 cases), respectively (Table 32).

Table 32. Number and clinic visit rate of gonorrhoea cases by sex and health care setting, 2010

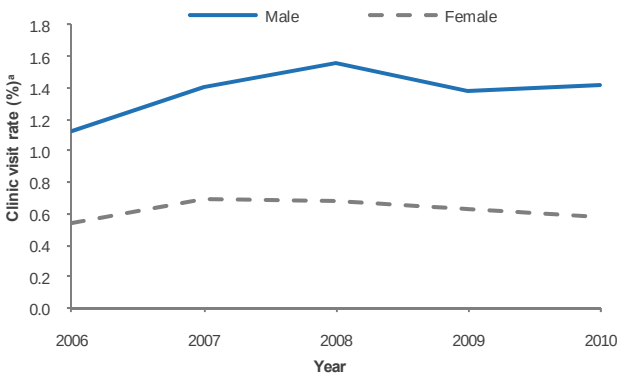
	Clinic type		
	SHC	FPC	SYHC
No. of cases[a]	**774**	**152**	**41**
Male	480	36	20
Female	294	116	21
Clinic visit rate (%)[a,b]	**0.9**	**0.1**	**0.02**
Male	1.4	0.4	0.03
Female	0.6	0.1	0.01

[a] Total includes cases with unknown sex
[b] Cases / total number of clinic visits

Between 2009 and 2010, the gonorrhoea clinic visit rate decreased by 3.3% in SHCs (796 to 774 cases) and 19.4% in FPCs (196 to 152 cases). In SYHCs the gonorrhoea clinic visit rate increased by 23.6% (33 to 41 cases).

From 2006 to 2010, the gonorrhoea clinic visit rate increased by 15.6% in SHCs (673 to 774 cases) and 3.0% in SYHCs (32 to 41 cases). In contrast the clinic visit rate decreased by 21.1% in FPCs (182 to 152 cases). During this period, the gonorrhoea clinic visit rate at SHCs increased by 26.0% in males (405 to 480 cases), and 6.0% in females (268 to 294 cases) (Figure 51).

Figure 51. Rates of gonorrhoea reported at SHCs, 2006–2010



[a] Cases / total number of clinic visits

Infectious syphilis

In 2010, the infectious syphilis clinic visit rate reported by SHCs was 0.1% (119 cases). One case of infectious syphilis was reported by FPCs and two cases by SYHCs (Table 33).

Of the 119 cases of infectious syphilis reported by SHCs in 2010, 94 (79.0%) cases were male and 25 (21.0%) cases were female. The mean age of infectious syphilis cases was 39.6 years (range 16–74 years).

Table 33. Number and clinic visit rate of infectious syphilis cases by sex and health care setting, 2010

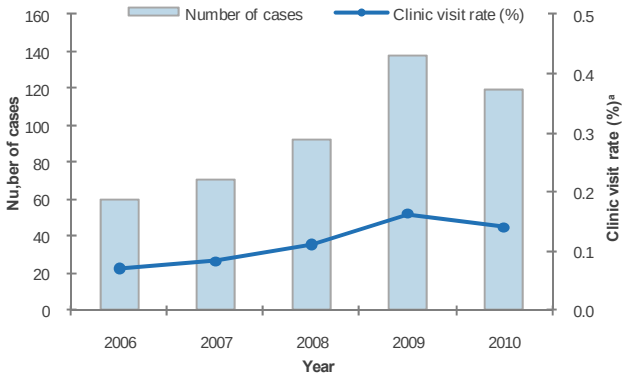
	Clinic type		
	SHC	FPC	SYHC
No. of cases[a]	**119**	**1**	**2**
Male	94	0	2
Female	25	1	0
Clinic visit rate (%)[a,b]	**0.14**	**-**	**-**
Male	0.28	-	-
Female	0.05	-	-

[a] Total includes cases with unknown sex
[b] Cases / total number of clinic visits

Between 2009 and 2010, the infectious syphilis clinic visit rate reported by SHCs decreased by 14.2% (138 to 119 cases).

From 2006 to 2010, the infectious syphilis clinic visit rate reported by SHCs increased by 99.3% (60 to 119 cases) (Figure 52).

Figure 52. Rates of infectious syphilis reported at SHCs, 2006–2010



[a] Cases / total number of clinic visits

Non-specific urethritis (males only)

For surveillance purposes, non-specific urethritis (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 2010, the clinic visit rate for NSU reported by SHCs, FPCs and SYHCs was 2.1% (730 cases), 0.1% (7 cases) and 0.03% (22 cases), respectively.

Between 2009 and 2010, the NSU clinic visit rate reported by SHCs increased by 4.7% (733 to 730 cases).

From 2006 to 2010, the clinic visit rate for NSU reported by SHCs increased by 28.0% (606 to 730 cases).

Laboratory surveillance

This section is based on chlamydia and gonorrhoea data provided voluntarily from 40 participating laboratories across 18 DHBs in New Zealand. Improvements to the reporting of laboratory surveillance data were implemented during 2009. Population-based rates of chlamydia and gonorrhoea for many 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 commenced 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 (ies) was a hospital laboratory undertaking 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 2010.

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, all laboratories in the selected DHB must have provided data for all 12 months of each of the last four years.

3. Individual DHB trend analysis

For a DHB to be included in the individual DHB trend analysis, all laboratories in the selected DHB must have provided data for 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, these DHBs have been combined for reporting purposes, and include, Auckland, Waitemata and Counties Manukau DHBs (Diagnostic Medlab and Labtests), and Hutt Valley and Capital & Coast DHBs (Aotea Pathology).

Chlamydia

Annual 2010 analysis

In 2010, 39 laboratories provided chlamydia data, of these, 35 laboratories from 15 DHBs met the selection criteria for chlamydia reporting. Laboratories in these DHBs tested 288 248 specimens for chlamydia, of which 25 937 (9.0%) specimens tested positive from 25 239 patients. This represents a national rate of 7.8 per 1000 population.

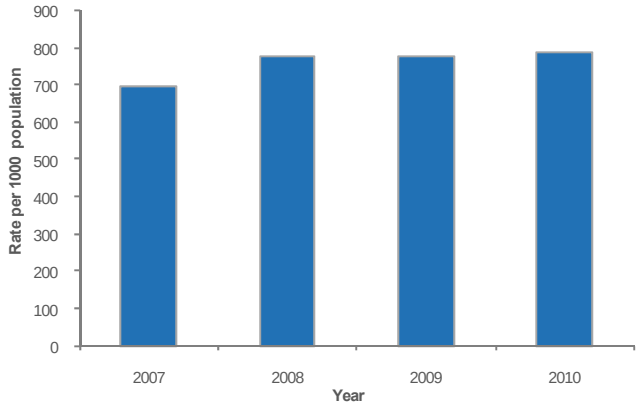
Table 34 presents the percentage of specimens tested for chlamydia that were positive, number of test-positive chlamydia cases and chlamydia population rates by DHB and sex for 2010.

The national rate of chlamydia for females (11.9 per 1000 population) was more than three-times the national rate for males (3.8 per 1000 population). The highest rate of chlamydia was reported for Tairawhiti DHB (13.1 per 1000 population), followed by Lakes (11.9 per 1000 population) and Hawke's Bay (9.9 per 1000 population) DHBs.

Restricted national rate trend analysis

Ten DHBs met the selection criteria for the restricted national rate trend analysis for chlamydia. Between 2009 and 2010, the chlamydia restricted national rate increased by 1.5% (from 7.7 to 7.8 per 1000 population). From 2007 to 2010, the chlamydia restricted national rate increased by 13.1% (from 6.9 to 7.8 per 1000 population). The chlamydia restricted national rates for 2007 to 2010 are shown in Figure 53.

Figure 53. Chlamydia restricted national rate, 2007–2010



Individual DHB trend analysis

Thirteen DHBs met the selection criteria for the individual DHB trend analysis. From 2006 to 2010, the chlamydia rate increased in all DHBs except Bay of Plenty (which decreased slightly from 9.2 to 9.0 per 1000 population).

Although the percentage increase varied widely, the highest percentage increase in rate was reported for West Coast DHB (which rose from 3.8 to 6.7 per 1000 population), followed by Hawke's Bay DHB (7.3 to 9.9 per 1000 population). Chlamydia rates by DHB for 2006 to 2010 are shown in Figure 54.

Table 34: Percentage of specimens tested for chlamydia that were positive, number of test-positive chlamydia cases and chlamydia rates by DHB and sex, 2010

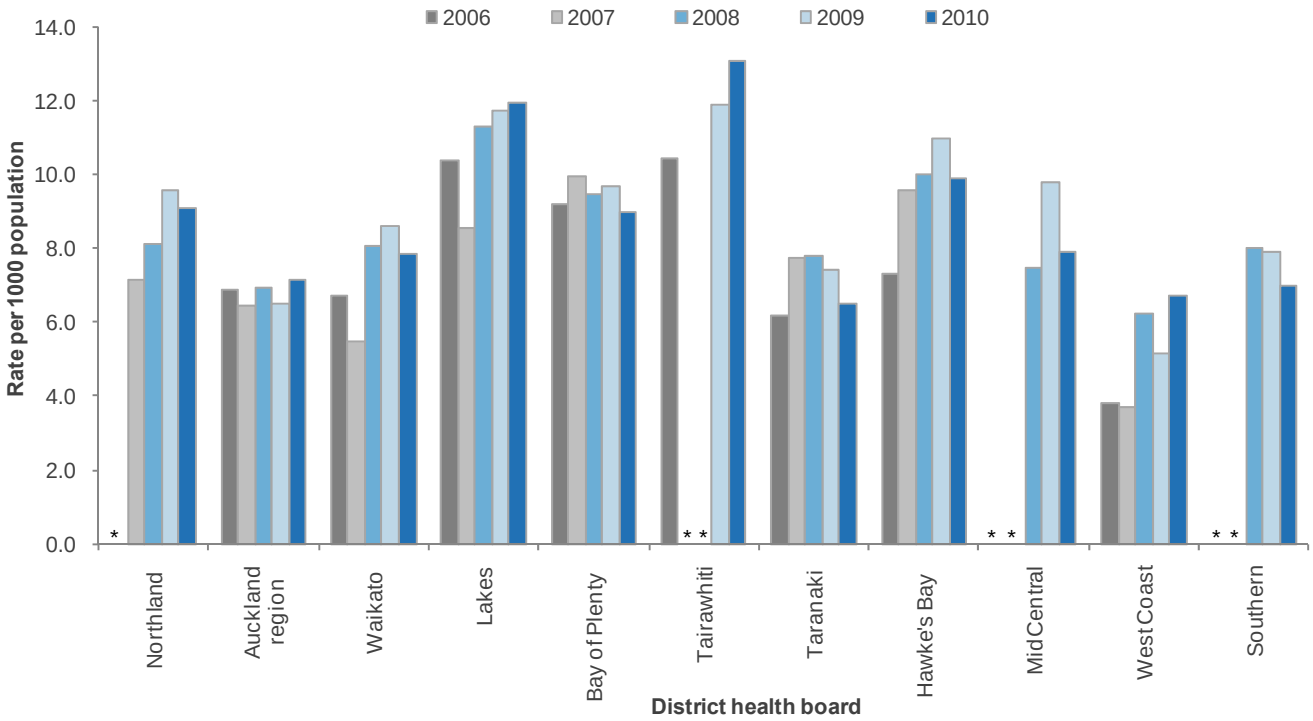
District Health Board	Specimens tested positive (%)	Number of test-positive cases				Rate per 1000 population		
		Male	Female	Unknown	Total	Male	Female	Total
Northland	11.9	302	1 129	-	1431	3.8	14.6	9.1
Auckland region[a]	7.8	2 751	7 825	8	10 584	3.7	10.8	7.2
Waikato	9.8	726	2 133	2	2 861	3.9	11.9	7.9
Lakes	12.0	251	988	2	1 241	4.7	19.3	11.9
Bay of Plenty	10.3	414	1 465	12	1 891	3.8	14.3	9.0
Tairawhiti	13.4	140	466	1	607	5.9	20.6	13.1
Taranaki	8.7	203	505	4	712	3.7	9.4	6.5
Hawke's Bay	11.9	352	1 181	-	1 533	4.4	15.7	9.9
Whanganui	11.6	103	361	3	467	3.3	11.9	7.5
MidCentral	11.4	375	945	5	1 325	4.4	11.6	7.9
Wairarapa	11.8	50	207	2	259	2.4	10.5	6.4
West Coast	11.5	68	146	4	218	4.3	8.8	6.7
Southern	7.4	568	1 533	9	2 110	3.7	10.2	7.0
Other[b]	12.5	523	1 032	-	1 555	-	-	-
Total[c]	**9.0**	**6 303**	**18 884**	**52**	**25 239**	**3.8**	**11.9**	**7.8**

[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 54. Chlamydia rates by DHB, 2006–2010



Auckland region includes Waitemata, Auckland and Counties Manukau DHBs

* Data incomplete

Gonorrhoea

Annual 2010 Analysis

In 2010, 38 laboratories provided gonorrhoea data, of these, 35 laboratories from 17 DHBs met the selection criteria for gonorrhoea reporting. Laboratories in these DHBs tested 341 191 specimens for gonorrhoea, of which 2742 (0.8%) specimens tested positive from 2386 patients. This represents a national rate of 65 gonorrhoea cases per 100 000 population.

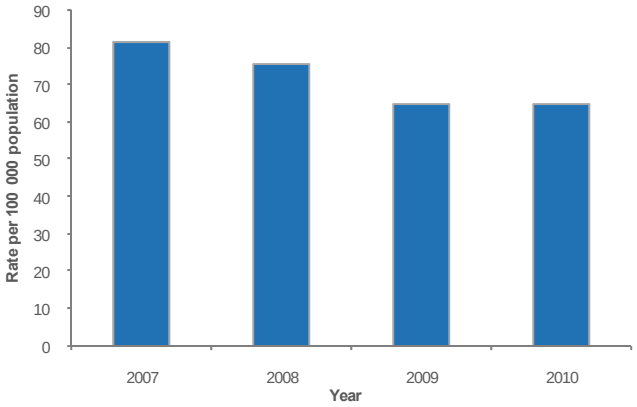
Table 35 presents the percentage of specimens tested for gonorrhoea that were positive, number of test-positive gonorrhoea cases and gonorrhoea population rates by DHB and sex for 2010.

The national rate of gonorrhoea for males (71 per 100 000 population) was 1.2-times the national rate for females (59 per 100 000 population). The highest rate of gonorrhoea was reported for Tairawhiti DHB (360 per 100 000 population) followed by Hawke's Bay DHB (124 per 100 000 population).

Restricted national rate trend analysis

Thirteen DHBs met the selection criteria for the restricted national rate trend analysis for gonorrhoea. Between 2009 and 2010, the gonorrhoea restricted national rate remained almost unchanged (decreasing from 64.6 to 64.5 per 100 000 population). From 2007 to 2010, the gonorrhoea restricted national rate decreased by 20.3% (from 80.9 to 64.5 per 100 000 population). The gonorrhoea restricted national rate for 2007 to 2010 is shown in Figure 55.

Figure 55. Gonorrhoea restricted national rate, 2007–2010



Individual DHB analysis

Fifteen DHBs met the selection criteria for the individual DHB trend analysis. From 2006 to 2010, the change in rates of gonorrhoea varied across the DHBs with some experiencing an increase and others a decrease in rates. The highest percentage increase in rate was reported for West Coast DHB (which rose from 9 to 43 per 100 000 population). The largest percentage decrease in rate was reported for Lakes DHB (which decreased from 138 to 68 per 100 000 population). Gonorrhoea rates by DHB for 2006 to 2010 are shown in Figure 56.

Table 35: Percentage of specimens tested for gonorrhoea that were positive, number of test-positive gonorrhoea cases and gonorrhoea rates by DHB and sex, 2010

District Health Board	Specimens tested positive (%)	Number of test-positive cases				Rate per 100 000 population		
		Male	Female	Unknown	Total	Male	Female	Total
Northland	0.5	46	37	-	83	58	48	53
Auckland region[a]	0.6	554	410	-	964	74	57	65
Waikato	0.7	125	72	-	197	68	40	54
Lakes	0.9	43	28	-	71	81	55	68
Bay of Plenty	1.1	63	80	-	143	59	78	68
Tairawhiti	4.3	85	82	-	167	358	363	360
Taranaki	0.4	11	17	-	28	20	32	26
Hawke's Bay	4.2	97	94	-	191	122	125	124
Whanganui	1.4	25	9	-	34	79	30	55
MidCentral	1.2	59	55	1	115	69	67	69
Wellington region[b]	1.0	169	96	-	265	76	45	61
Wairarapa	1.6	11	14	-	25	53	71	62
West Coast	0.5	8	6	-	14	50	36	43
Southern	0.7	34	53	2	89	22	35	29
Other[c]	1.5	58	50	-	108	-	-	-
Total[d]	**0.8**	**1 330**	**1053**	**3**	**2 386**	**71**	**59**	**65**

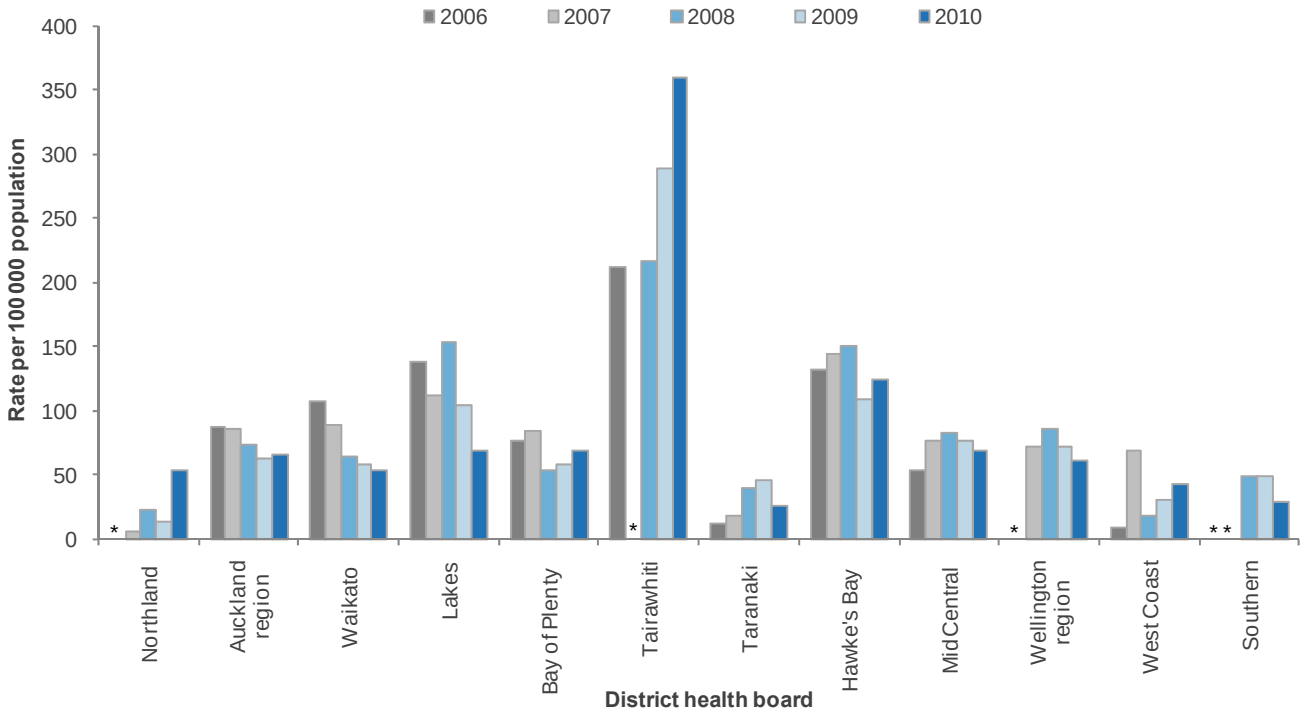
[a] Includes Waitemata, Auckland and Counties Manukau DHBs

[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

Figure 56. Gonorrhoea rates by DHB, 2006–2010



Auckland region includes Waitemata, Auckland and Counties Manukau DHBs
Wellington region includes Hutt Valley and Capital and Coast DHBs
* Data incomplete

OUTBREAKS

OUTBREAKS

Introduction

The following is a summary of surveillance data for outbreaks reported in 2010. A full description on outbreaks is reported separately in the Annual Summary of Outbreaks in New Zealand 2010 report available at www.surv.esr.cri.nz in May 2011.

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 modes of transmission or settings recorded.

Outbreak definition

The Manual for Public Health Surveillance in New Zealand [35] 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 606 outbreaks reported by the PHUs in 2010 involving 6321 cases. Table 36 outlines the number of outbreaks and associated cases reported by each PHU/PHS in 2010.

Note that outbreaks may be reported by one PHU, but the distribution of cases may extend beyond the geographic boundaries of that PHU.

Of these reported outbreaks, 604 were final reports involving 6306 cases, and two were interim reports (final details not yet available) involving 15 cases. According to the case definition for each outbreak, there were 1837 (29.1%) confirmed cases and 4484 probable cases (70.9%).

There were 94 hospitalisations and one death that resulted from outbreaks reported in 2010. The death was related to a norovirus outbreak in a rest home in the Auckland region.

Table 36. Outbreaks and associated cases reported by each public health service (PHS) / public health unit (PHU), 2010

PHS/PHU	Outbreaks	Cases
Northland	8	96
Auckland[a]	288	2140
Waikato	80	617
Bay of Plenty	5	54
Rotorua	8	75
Taranaki	12	75
Hawke's Bay	8	143
Gisborne	2	43
Wanganui	8	142
Manawatu	27	425
Wellington[b]	60	701
Nelson	6	308
Marlborough	1	35
West Coast	4	17
Canterbury	56	1048
South Canterbury	3	41
Otago	19	192
Southland	11	169
Total	**606**	**6321**

[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 agent type is shown in Table 37.

Enteric bacteria

During 2010, enteric bacteria were implicated in 69 (11.3%) reported outbreaks and 278 (4.5%) cases. Approximately 42.0% (29/69) of these outbreaks and 39.5% (113/286) of all cases attributed to enteric bacteria were linked to *Campylobacter* species. Of the 29 *Campylobacter* outbreaks, the most common modes of transmission were person-to-person (17 outbreaks), foodborne (14 outbreaks) and waterborne (9 outbreaks). The most common settings were in homes (13 outbreaks), restaurants/cafés (5 outbreaks), and farms (4 outbreaks).

Of the 23 *Salmonella* outbreaks, the most common modes of transmission were person-to-person (14 outbreaks) and foodborne (10 outbreaks). The most common outbreak setting was the home, which was associated with 17 outbreaks and 63 cases.

Table 37. Outbreaks and associated cases by agent, 2010

Agent type [a]	Outbreaks	Cases
Enteric bacteria	**69**	**286**
Aeromonas hydrophila	1	2
Campylobacter spp.	29	113
Salmonella spp.	23	100
Salmonella Paratyphi	1	2
Salmonella Typhi	2	5
Shigella spp.	5	16
Plesiomonas shigelloides	1	23
VTEC/STEC infection	5	12
Yersinia	2	13
Enteric protozoa	**140**	**672**
Cryptosporidium spp.	43	294
Giardia spp.	97	378
Enteric viruses	**178**	**3 555**
Hepatitis A virus	1	3
Norovirus	152	3 223
Rotavirus	21	291
Sapovirus	8	127
Enteric (unspecified)	**172**	**1 416**
Gastroenteritis	172	1 416
Respiratory bacteria	**21**	**121**
Bordetella pertussis	17	111
Mycobacterium tuberculosis	3	8
Rheumatic fever	1	2
Respiratory viruses	**8**	**65**
Acute respiratory infection	1	6
Influenza A(H1N1) 09	7	59
Toxins	**14**	**201**
Ciguatera fish poisoning	1	2
Clostridium difficile	1	2
Clostridium perfringens	4	168
Histamine fish poisoning	4	13
Probable MSG poisoning	1	2
Staphylococcus aureus	2	6
Toxic shellfish poisoning	1	8
Other bacteria	**3**	**7**
Leptospira	2	5
Rickettsia typhi	1	2
Other viruses	**2**	**4**
Dengue fever	2	4
Other	**1**	**2**
Chemical poisoning from the environment	1	2
Total	**606**	**6 321**

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

Five *Shigella* outbreaks were reported in 2010, four were associated with person-to-person transmission and one was foodborne. The settings were at home (2 outbreaks), hospital acute care (2 outbreaks) and other food outlet (1 outbreak).

VTEC/STEC infection *(Escherichia coli* O157:H7) was associated with five outbreaks in 2010. Four outbreaks reported person-to-person as the mode of transmission, and the remaining outbreak reported both person-to-person and foodborne modes of transmission. All the outbreaks occurred at home.

In 2010, two outbreaks of typhoid fever due to *Salmonella* Typhi E1a occurred. One outbreak involved person-to-person transmission and the other involved both foodborne and person-to-person transmission. Both outbreaks involved overseas travel (India and Samoa respectively).

Yersinia was identified in two outbreaks, one occurred at a childcare centre and the setting was unknown for the other outbreak. The childcare centre outbreak was associated with consumption of undercooked pork and pork sausages with foodborne and person-to-person transmission.

One outbreak of paratyphoid fever due to *Salmonella* Paratyphi B var. Java with person-to-person mode of transmission was reported. The outbreak setting was the home.

One *Aeromonas hydrophila* outbreak occurred at a hospital (continuing care) with person-to-person transmission.

One *Plesiomonas shigelloides* outbreak occurred at a rest home with person-to-person and environmental modes of transmission.

Enteric protozoa

Enteric protozoa accounted for 140 (23.1%) outbreaks and 672 (10.6%) cases reported in 2010.

Giardia spp. was identified as the infectious agent in 97 outbreaks, 66 of which were reported by Auckland PHU. The most common modes of transmission were person-to-person (90 outbreaks), waterborne (29 outbreaks), environmental (28 outbreaks) and zoonotic (9 outbreaks). The most commonly identified setting for *Giardia* outbreaks was the home, which was associated with 84 outbreaks.

Forty-three outbreaks involving *Cryptosporidium* spp. occurred in 2010, 27 of which were reported by the Auckland PHU. The most common modes of transmission were person-to-person (34 outbreaks), environmental (14), zoonotic (13), and waterborne (11). The most common setting was the home (32 outbreaks), followed by swimming/spa pool (11), and farm (8).

Enteric viruses

Enteric viruses were the infectious agent in 178 (29.4%) outbreaks and 3555 (56.2%) associated cases in 2010.

Hepatitis A was associated with one outbreak involving person-to-person, foodborne, and environmental modes of transmission, while eating raw shellfish and swimming in Vanuatu.

The majority of outbreaks due to enteric viruses were caused by norovirus (85.3%, 152/178), which resulted in 3223 associated cases. The median number of cases per norovirus outbreak was 17 (range 2–247 cases). Person-to-person transmission was involved in 132 outbreaks, 50 of which also included other modes of transmission. Environmental transmission was established in 47 outbreaks and foodborne transmission in 19 outbreaks.

Multiple settings were identified in 22 norovirus outbreaks. An institution was identified as the setting for 107 outbreaks, including continuing care hospitals (38 outbreaks), rest homes (32), acute care hospitals (27), child care (10), school (3), hotel/motel (2), camp (2) and marae (2).

The home was identified as the setting for 21 norovirus outbreaks and restaurants/cafés were implicated in 10 outbreaks.

In 2010, a total of 21 (3.5%) outbreaks of rotavirus occurred resulting in 291 (4.6%) cases reported. All of these outbreaks involved person-to-person transmission although six outbreaks also involved environmental transmission. One outbreak also involved person-to-person and other mode of transmission. The outbreak settings reported were childcare centre (15 outbreaks), acute care hospital (2), continuing care hospital (2) and rest home (2).

Eight (1.3%) sapovirus outbreaks in rest homes were associated with 127 (2.0%) cases. The modes of transmission were person-to-person only (4 outbreaks), person-to-person and environmental (2), person-to-person and foodborne (1), and foodborne only (1).

Four outbreaks were associated with multiple pathogens, norovirus/rotavirus (3 outbreaks, 70 cases) and norovirus/sapovirus (1 outbreak, 19 cases). The modes of transmission of the norovirus/rotavirus outbreaks were person-to-person and environmental (2 outbreaks) and person-to-person only (1 outbreak). The settings were acute care hospital (2 outbreaks) and rest home (1 outbreak). The mode of transmission of the norovirus/sapovirus outbreak was person-to-person at an acute care hospital.

Enteric (unspecified)

During 2010, outbreaks of gastroenteritis where no organism was isolated, accounted for 172 (28.4%) outbreaks and 1416 (22.4%) associated cases.

Respiratory bacteria

Respiratory bacteria resulted in 21 (3.5%) outbreaks and 121 (1.9%) of all associated cases.

There were 17 outbreaks due to *B. pertussis* involving 111 cases reported in 2010. Person-to-person was identified as the only mode of transmission.

The settings associated with these outbreaks included home (13 outbreaks), childcare centre (6), school (4), community gathering (2), doctor's waiting room (1), social setting (1) and workplace (1).

Three outbreaks due to *M. tuberculosis* infection, involving eight cases were reported in 2010. Two of the outbreaks had multiple settings, school and community/church gathering, and home and community/church gathering. The remaining outbreak occurred at home.

There was one outbreak of rheumatic fever reported in 2010. The outbreak occurred at a school and involved two cases.

Respiratory viruses

Respiratory viruses resulted in 8 (1.3%) outbreaks and 65 (1.0%) associated cases.

Seven outbreaks due to pandemic A(H1N1) 09 virus involving 59 cases were reported in 2010. Person-to-person was identified as the only mode of transmission. Three outbreaks occurred at home, one at home and a school, one at a hotel/motel, one at a hostel, and one involved a school-based event at various venues and marae accommodation.

One acute respiratory infection outbreak was reported in 2010 involving six cases with a person-to-person mode of transmission at a rest home.

Toxins

Toxins were involved in 14 (2.3%) outbreaks and 201 (3.2%) associated cases reported in 2010. The most commonly implicated agent was *Clostridium* spp., which accounted for five outbreaks and 170 cases. This was followed by four histamine (scombroid) fish poisoning outbreaks with 13 cases. The other implicated agents were *Staphylococcus aureus* (2 outbreaks), ciguatera fish poisoning (1 outbreak), probable monosodium glutamate (MSG) poisoning (1 outbreak) and toxic shellfish poisoning (1 outbreak).

Of the 14 toxin-related outbreaks, 13 reported foodborne as the mode of transmission. The most common settings were at restaurants/cafés (7 outbreaks), homes (4 outbreaks), and supermarkets (2 outbreaks). The remaining case, with an other mode of transmission, occurred in an acute care hospital setting with contaminated equipment the suspected source.

Other bacteria

Two *Leptospira* outbreaks were reported in 2010, both with a zoonotic mode of transmission that occurred at a farm. One outbreak was associated with handling unvaccinated pigs and the other was due to handling unvaccinated cows.

One *Rickettsia typhi* outbreak was reported with vectorborne transmission. The implicated source was from dust and rat droppings while moving grain stacks.

Other illness

One outbreak due to chemical poisoning from the environment (suspected cyanobacterial poisoning), with two associated cases, was reported in 2010. This outbreak involved environmental transmission while water skiing at a lake.

Modes of transmission

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

Table 38. Outbreaks of infectious disease and associated cases by mode of transmission, 2010

Transmission mode	Outbreaks[a]	Cases[a]
Person-to-person	446	5368
Foodborne	141	936
Environmental	123	1876
Waterborne	56	235
Zoonotic	36	109
Vectorborne	3	6
Parenteral	0	0
Sexual contact	0	0
Other	13	90
Unknown	26	82

[a] More than one mode of transmission was reported for some outbreaks

The primary modes of transmission were person-to-person (446 outbreaks), foodborne (141 outbreaks), and environmental (123 outbreaks). Person-to-person transmission was associated with over 2.5-times as many cases as environmental transmission (5368 versus 1876), and over five times as many cases as foodborne transmission (5368 versus 936). The mode of transmission was unknown in 26 (4.3%) outbreaks and more than one mode of transmission was identified in 193 (31.8%) outbreaks reported in 2010.

Person-to-person was the most common mode of transmission for enteric bacteria (68.7%, 44/67), enteric protozoa (88.4%, 122/138), enteric viruses (88.2%, 157/178), unspecified enteric pathogens (52.9%, 91/172) and respiratory disease (100.0%, 29/29). While foodborne was the principal mode of transmission for toxins (92.9%, 13/14), it also contributed substantially to outbreaks due to enteric bacteria (41.8%, 28/67) and unspecified enteric pathogens (41.9%, 72/172). Environmental transmission was an important contributing factor in outbreaks due to enteric protozoa (30.4%, 42/138) and enteric viruses (30.3%, 54/178). Waterborne was the third highest mode of transmission for enteric protozoa (29.0%, 40/138) and enteric bacteria (20.9%, 14/67).

Settings

Outbreaks reported in 2010 were most commonly associated with homes (37.8%, 229/606), restaurants/cafes (13.4%, 81/606) and rest homes (11.4%, 69/606) (Table 39).

Table 39. Number of cases associated with outbreaks of infectious disease by location, 2010

Outbreak setting	Outbreaks[a]	Cases[a]
Commercial food operators	**138**	**678**
Restaurant/café	81	414
Takeaway	40	120
Caterers	8	105
Other food outlet	5	28
Supermarket/delicatessen	4	11
Institutions	**277**	**4 871**
Rest home	69	1 482
Hospital (continuing care)	64	1 165
Childcare centre	60	821
Hospital (acute care)	39	569
School	19	295
Hotel/motel	10	71
Camp	7	276
Hostel/boarding house	5	111
Marae	4	81
Community	**35**	**380**
Swimming/spa pool	27	251
Community/church gathering	7	101
Tangi/hui	1	28
Workplace	**36**	**201**
Farm	24	78
Workplace	12	123
Home	**229**	**1 034**
Home	229	1 034
Other setting	**39**	**525**

ANTIBIOTIC RESISTANCE

ANTIBIOTIC RESISTANCE

Antimicrobial resistance

The prevalence of resistance among common, important clinical pathogens between 1997 and 2009, is shown in Table 51. Most antimicrobial resistance data are only available in a final, completely analysed form up to the end of 2009. Data from ESR's national surveillance of antimicrobial resistance are available at

www.surv.esr.cri.nz/antimicrobial/antimicrobial_resistance.php

The following trends are of particular note.

- Prevalence of methicillin resistance among *Staphylococcus aureus* has been relatively stable at 7–9% each year since 2000.
- Declining mupirocin resistance in *S. aureus* is evident since a peak of 21.5% in 2000. Mupirocin resistance is lower among methicillin-resistant *S. aureus* (MRSA) than methicillin-susceptible *S. aureus* as the most common MRSA strains in New Zealand are mupirocin susceptible.
- A high prevalence of fusidic acid resistance among *S. aureus,* including MRSA.
- A high prevalence of penicillin non-susceptibility among *Streptococcus pneumoniae*, but a decline in 2009 compared with the average rate in the preceding three years, 2006–2008. However, this decline was only significant (P <0.0001) among non-invasive pneumococci.
- A significant (P = 0.0037) decline in cefotaxime non-susceptibility among invasive pneumococci in 2009, following a trend of increasing resistance since 2000.
- Vancomycin-resistant enterococci (VRE) were infrequently identified in 2009, following the control of outbreaks in Auckland hospitals in 2007 and 2008, and Waikato Hospital in 2008.
- Stable levels of trimethoprim and co-amoxiclav resistance among urinary *Escherichia coli,* continuing low levels of nitrofurantoin resistance, but a trend of increasing fluoroquinolone resistance. The rise in fluoroquinolone resistance to 7.7% in 2009 was significant (P <0.0001) compared with the average rate in the preceding three years, 2006–2008.
- An increasing prevalence of extended-spectrum β-lactamases (ESBLs) in Enterobacteriaceae.

APPENDIX: NATIONAL DATA AND TRENDS

APPENDIX: NATIONAL DATA AND TRENDS

Comparison of notifiable disease cases and rates for 2009 and 2010

Table 40. Number of cases and rates per 100 000 population for common (10 or more cases reported per year) notifiable diseases in New Zealand, 2009–2010

Disease	2009		2010		Change [c, d]
	Cases	Rate	Cases	Rate	
AIDS	28	0.6	39	0.9	→
Campylobacteriosis	7 177	166.3	7 346	168.2	→
Cryptosporidiosis	854	19.8	954	21.8	➔
Dengue fever	139	3.2	51	1.2	←
Gastroenteritis [a]	712	16.5	492	11.3	←
Giardiasis	1 639	38.0	1 985	45.4	➔
Hepatitis A	44	1.0	46	1.1	→
Hepatitis B [b]	55	1.3	51	1.2	←
Hepatitis C [b]	32	0.7	17	0.4	←
Invasive pneumococcal disease	697	16.1	535	12.2	←
Lead absorption	273	6.3	201	4.6	←
Legionellosis	74	1.7	178	4.1	➔
Leptospirosis	69	1.6	81	1.9	→
Listeriosis	28	0.6	23	0.5	←
Malaria	50	1.2	44	1.0	←
Measles	248	5.7	48	1.1	←
Meningococcal disease	133	3.1	97	2.2	←
Mumps	63	1.5	41	0.9	←
Non seasonal influenza A (H1N1)	3 670	85.0	1 826	41.8	←
Paratyphoid fever	25	0.6	19	0.4	←
Pertussis	1 398	32.4	873	20.0	←
Rheumatic fever	140	3.2	168	3.8	→
Rickettsial disease	5	0.1	14	0.3	➔
Salmonellosis	1 128	26.1	1 146	26.2	→
Shigellosis	119	2.8	105	2.4	←
Tuberculosis disease	299	6.9	307	7.0	→
Typhoid fever	34	0.8	31	0.7	←
VTEC/STEC infection	143	3.3	138	3.2	←
Yersiniosis	430	10.0	406	9.3	←

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

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

[c] ←= significant decrease, ➔ = significant increase, -- = no change, ← = not significant decrease, → = not significant increase

[d] The Pearson chi-square test or where necessary Fisher's Exact test 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 2009 and 2010

Table 41. Number of cases of rare (less than 10 cases reported per year) notifiable diseases in New Zealand, 2009–2010

Disease[a]	2009	2010
Barmah Forest virus infection	2	0
Brucellosis	0	1
Chemical poisoning from the environment	6	3
Cholera	0	2
Diptheria	1	0
Enterobacter sakazakii	0	2
Haemophilus influenzae type b	10	8
Hepatitis NOS	2	3
Hydatid disease	3	4
Leprosy	3	3
Ross River virus infection	3	5
Rubella	4	4
Taeniasis	3	3
Tetanus	1	7
Toxic shellfish poisoning	1	9

[a] No cases of the following notifiable diseases were reported in 2009 and 2010: anthrax, congenital rubella, cysticercosis, decompression sickness, HPAI, plague, poliomyelitis, primary amoebic meningo-encephalitis, rabies, SARS, trichinosis, viral haemorrhagic fever and yellow fever.

Deaths from notifiable diseases in EpiSurv, 1997–2010

Table 42. Deaths due to notifiable diseases recorded in EpiSurv, 1997–2010

Disease	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
AIDS [a]	34	19	18	19	14	11	10	13	15	14	5	2	2	8
Campylobacteriosis	2	2	1	3	1	1	0	0	1	1	1	0	0	0
Chemical poisoning from the environment	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Creutzfeldt-Jakob disease [b]	3	0	2	3	1	3	4	3	0	5	0	0	0	0
Gastroenteritis	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Giardiasis	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Haemophilus influenzae type b	1	0	0	0	1	1	2	0	0	0	0	0	0	1
Hepatitis B	2	0	0	0	1	0	0	0	1	0	1	0	0	0
Hydatid disease	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Invasive pneumococcal disease [c]												8	35	27
Legionellosis [d]	4	1	1	5	2	3	1	1	4	3	1	4	2	5
Listeriosis - non perinatal	2	0	1	2	1	0	2	3	1	0	2	3	2	3
Listeriosis - perinatal	6	0	2	4	1	3	2	2	0	1	2	2	2	4
Malaria	1	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
Non seasonal influenza A (H1N1) [e]													34	16
Pertussis	0	0	0	0	1	1	1	1	0	0	0	0	0	0
Primary amoebic meningoencephalitis	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Rheumatic fever [f]	1	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
Shigellosis	0	0	1	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
Tuberculosis disease	15	8	14	8	2	6	6	6	4	5	3	4	4	8
VTEC/STEC infection	1	1	0	0	0	0	0	0	0	0	0	0	1	0
Yersiniosis	0	2	0	0	0	0	0	1	0	0	0	0	0	0

[a] Data source [36]

[b] Data source [14]

[c] Invasive pneumococcal disease became notifiable on 17 October 2008

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

[e] Non seasonal influenza became notifiable on 29 April 2009

[f] The death was a rheumatic fever occurrence

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, 2006–2008 (Ministry of Health, NMDS)

Table 43. Reported deaths from selected notifiable diseases, 2006–2008

Disease	ICD 10 codes	2006		2007		2008 [a]	
		Und [b]	Cont [c]	Und [b]	Cont [c]	Und [b]	Cont [c]
AIDS	B20-B24	17	5	10	8	7	3
Campylobacteriosis	A04.5	3		1			4
Creutzfeldt-Jakob disease	A81.0	3		7		2	
Dengue fever	A90, A91					1	
Hepatitis A	B15				2		1
Hepatitis B	B16		5	2	3	1	3
Hepatitis C	B17.1		1				5
Hydatid disease	B67						1
Legionellosis	A48.1	1		1		3	2
Listeriosis	A32		1	2		1	1
Meningococcal disease	A39	6		7		8	
Salmonellosis	A02	1				1	2
Shigellosis	A03					1	
Tetanus	A33-A35			1			
Tuberculosis	A15-A19, P37.0	11	8	7	8	8	11
Yersiniosis	A04.6					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, 2008–2010 (Ministry of Health, NMDS)

Table 44. Hospital admissions for selected notifiable diseases, 2008–2010

Disease	ICD 10 codes	2008		2009		2010	
		Prin [a]	Oth [b]	Prin [a]	Oth [b]	Prin [a]	Oth [b]
AIDS	B20-B24	26	266	16	285	16	297
Arboviral diseases	A83, A84, A85.2, A92, A93, A94, B33.1	1	0	1	0	1	0
Brucellosis	A23	2	0	0	0	0	0
Campylobacteriosis	A04.5	388	97	473	101	518	106
Cholera	A00	1	0	0	0	1	0
Creutzfeldt-Jakob disease	A81.0	5	9	4	0	5	2
Cryptosporidiosis	A07.2	19	13	19	4	16	14
Cysticercosis	B69	2	0	1	2	4	1
Decompression sickness	T70.3	12	2	24	3	18	2
Dengue fever	A90, A91	35	5	22	3	15	2
Diphtheria	A36	0	0	0	0	2	0
Giardiasis	A07.1	18	21	21	13	18	15
Hepatitis A	B15	19	18	17	7	20	10
Hepatitis B	B16	33	81	27	27	25	23
Hepatitis C	B17.1	12	21	15	29	13	10
Hydatid disease	B67	0	0	2	1	1	0
Lead absorption	T56.0	2	0	5	0	6	0
Legionellosis	A48.1	37	6	33	9	68	11
Leprosy	A30	5	4	0	1	1	3
Leptospirosis	A27	57	7	46	3	57	3
Listeriosis	A32	13	13	11	17	13	18
Malaria	B50-B54	30	0	34	2	40	2
Measles	B05	3	0	29	1	5	0
Meningococcal disease	A39	125	21	167	23	112	22
Mumps	B26	16	4	9	3	10	3
Paratyphoid	A01.1-A01.4	4	0	3	0	6	1
Pertussis	A37	72	11	124	19	132	23
Poliomyelitis	A80	0	1	0	0	0	0
Rheumatic fever	I00, I01, I02	227	46	230	35	254	55
Rickettsial diseases	A75, A77, A78, A79	7	1	6	3	7	1
Rubella	B06	0	1	0	1	1	1
Salmonellosis	A02	118	40	130	28	120	49
Shigellosis	A03	15	4	14	5	21	4
Taeniasis	B689	0	1	0	0	0	1
Tetanus	A33-A35	1	0	1	0	7	1
Tuberculosis	A15-A19, P37.0	205	121	237	146	255	159
Typhoid	A01.0	19	1	25	1	34	1
VTEC/STEC infection	A04.0-A04.4	26	20	24	11	35	24
Yersiniosis	A04.6	23	30	24	22	13	14

[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, 2010

Table 45a. Number of cases and rates per 100 000 population of notifiable diseases by DHB, 2010

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	183	116.3	843	157.0	655	145.5	534	108.8	680	186.6	183	178.4	322	153.3	37	79.6	265	242.5	317	204.1
Cryptosporidiosis	41	26.1	81	15.1	64	14.2	39	7.9	141	38.7	14	13.6	14	6.7	5	10.8	30	27.5	45	29.0
Dengue fever	2		6	1.1	12	2.7	3		9	2.5	0		3		1		1		0	
Gastroenteritis	4		60	11.2	63	14.0	26	5.3	30	8.2	4		10	4.8	0		13	11.9	4	
Giardiasis	41	26.1	253	47.1	304	67.5	205	41.8	181	49.7	44	42.9	72	34.3	16	34.4	36	32.9	105	67.6
Hepatitis A	1		2		7	1.6	9	1.8	4		1		1		2		0		2	
Hepatitis B	1		2		8	1.8	10	2.0	1		2		1		5	10.8	0		3	
Invasive pneumococcal disease	17	10.8	62	11.5	45	10.0	105	21.4	47	12.9	18	17.5	33	15.7	1		10	9.2	24	15.5
Lead absorption	5	3.2	18	3.4	18	4.0	12	2.4	17	4.7	0		5	2.4	2		4		8	5.2
Legionellosis	10	6.4	24	4.5	16	3.6	14	2.9	6	1.6	1		6	2.9	1		2		4	
Leptospirosis	2		1		0		1		15	4.1	1		3		3		2		11	7.1
Malaria	0		5	0.9	12	2.7	8	1.6	1		0		3		0		1		1	
Measles	31	19.7	2		5	1.1	1		0		1		1		1		0		1	
Meningococcal disease	6	3.8	9	1.7	7	1.6	16	3.3	7	1.9	3		6	2.9	1		1		7	4.5
Mumps	3		7	1.3	1		4		2		0		0		0		4		0	
Non seasonal influenza A (H1N1)	62	39.4	119	22.2	143	31.8	185	37.7	257	70.5	124	120.9	192	91.4	14	30.1	50	45.8	54	34.8
Pertussis	5	3.2	56	10.4	85	18.9	72	14.7	93	25.5	5	4.9	42	20.0	9	19.4	34	31.1	23	14.8
Rheumatic fever	17	10.8	11	2.0	9	2.0	57	11.6	21	5.8	2		7	3.3	7	15.1	2		9	5.8
Salmonellosis	37	23.5	111	20.7	99	22.0	73	14.9	90	24.7	19	18.5	49	23.3	13	28.0	28	25.6	42	27.0
Shigellosis	7	4.4	19	3.5	14	3.1	16	3.3	11	3.0	0		6	2.9	0		0		5	3.2
Tuberculosis disease	6	3.8	34	6.3	64	14.2	62	12.6	22	6.0	3		6	2.9	3		1		11	7.1
Typhoid fever	1		4		9	2.0	7	1.4	2		0		5	2.4	0		0		0	
VTEC/STEC infection	4		14	2.6	8	1.8	7	1.4	24	6.6	8	7.8	13	6.2	8	17.2	4		8	5.2
Yersiniosis	5	3.2	53	9.9	41	9.1	29	5.9	33	9.1	10	9.7	17	8.1	5	10.8	20	18.3	18	11.6

[a] Table is continued on following page

Notifiable disease cases and rates by district health board, 2010

Table 45b. Number of cases and rates per 100 000 population of notifiable diseases by DHB, 2010 (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	98	155.1	248	148.3	343	238.5	592	203.2	73	181.2	235	170.2	66	201.6	931	183.2	122	218.4	619	204.1
Cryptosporidiosis	6	9.5	19	11.4	9	6.3	35	12.0	7	17.4	36	26.1	10	30.6	230	45.3	47	84.1	81	26.7
Dengue fever	1		0		0		6	2.1	0		0		0		3		0		4	
Gastroenteritis	16	25.3	44	26.3	54	37.6	90	30.9	3		8	5.8	7	21.4	44	8.7	0		12	4.0
Giardiasis	23	36.4	29	17.3	51	35.5	146	50.1	17	42.2	48	34.8	10	30.6	282	55.5	20	35.8	102	33.6
Hepatitis A	1		3		1		2		0		0		0		7	1.4	0		3	
Hepatitis B	1		1		2		2		1		1		0		6	1.2	0		4	
Invasive pneumococcal disease	9	14.2	18	10.8	21	14.6	23	7.9	5	12.4	4		1		42	8.3	3		47	15.5
Lead absorption	8	12.7	9	5.4	22	15.3	9	3.1	3		5	3.6	0		24	4.7	7	12.5	25	8.2
Legionellosis	0		3		5	3.5	3		0		1		3		62	12.2	2		15	4.9
Leptospirosis	8	12.7	13	7.8	0		0		2		4		6	18.3	4		0		5	1.6
Malaria	0		0		0		2		0		2		0		7	1.4	0		2	
Measles	0		1		0		2		1		0		1		0		0		0	
Meningococcal disease	0		5	3.0	8	5.6	5	1.7	0		1		1		7	1.4	0		7	2.3
Mumps	0		0		3		4		2		2		0		6	1.2	0		3	
Non seasonal influenza A (H1N1)	33	52.2	60	35.9	21	14.6	107	36.7	12	29.8	31	22.4	17	51.9	273	53.7	43	77.0	29	9.6
Pertussis	5	7.9	41	24.5	35	24.3	99	34.0	5	12.4	27	19.6	14	42.8	166	32.7	12	21.5	45	14.8
Rheumatic fever	2		4		7	4.9	9	3.1	2		0		0		2		0		0	
Salmonellosis	9	14.2	31	18.5	31	21.6	52	17.8	9	22.3	51	36.9	9	27.5	162	31.9	37	66.2	194	64.0
Shigellosis	0		0		2		3		0		2		0		14	2.8	2		4	
Tuberculosis disease	2		9	5.4	13	9.0	28	9.6	1		5	3.6	1		27	5.3	0		9	3.0
Typhoid fever	0		0		0		2		0		0		0		1		0		0	
VTEC/STEC infection	2		1		0		2		2		1		1		24	4.7	0		7	2.3
Yersiniosis	4		11	6.6	23	16.0	56	19.2	3		9	6.5	5	15.3	46	9.1	9	16.1	9	3.0

[a] Table is continued from previous page

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, 2010

Table 46. Number of cases and rates per 100 000 population of notifiable diseases by sex, 2010

Disease	Sex							
	Male		Female		Unknown		Total	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Campylobacteriosis	4 093	190.9	3 207	144.3	46		7 346	168.2
Cryptosporidiosis	482	22.5	466	21.0	6		954	21.8
Dengue fever	26	1.2	24	1.1	1		51	1.2
Gastroenteritis	217	10.1	261	11.7	14		492	11.3
Giardiasis	995	46.4	979	44.0	11		1 985	45.4
Haemophilus influenzae type b	4		4		0		8	0.2
Hepatitis A	23	1.1	23	1.0	0		46	1.1
Hepatitis B	39	1.8	11	0.5	1		51	1.2
Hepatitis C	10	0.5	7	0.3	0		17	0.4
Hydatid disease	3		1		0		4	
Invasive pneumococcal disease	279	13.0	256	11.5	0		535	12.2
Lead absorption	175	8.2	26	1.2	0		201	4.6
Legionellosis	99	4.6	79	3.6	0		178	4.1
Leprosy	2		1		0		3	
Leptospirosis	69	3.2	12	0.5	0		81	1.9
Listeriosis - non perinatal	8	0.4	9	0.4	0		17	0.4
Malaria	34	1.6	10	0.4	0		44	1.0
Measles	26	1.2	21	0.9	1		48	1.1
Meningococcal disease	48	2.2	49	2.2	0		97	2.2
Mumps	16	0.7	25	1.1	0		41	0.9
Non seasonal influenza A (H1N1)	857	40.0	969	43.6	0		1 826	41.8
Paratyphoid fever	8	0.4	11	0.5	0		19	0.4
Pertussis	351	16.4	522	23.5	0		873	20.0
Rheumatic fever	80	3.7	88	4.0	0		168	3.8
Rickettsial disease	6	0.3	8	0.4	0		14	0.3
Rubella	2		2		0		4	
Salmonellosis	561	26.2	577	26.0	8		1 146	26.2
Shigellosis	50	2.3	55	2.5	0		105	2.4
Tetanus	3		4		0		7	0.2
Toxic shellfish poisoning	3		6	0.3	0		9	0.2
Tuberculosis disease	154	7.2	153	6.9	0		307	7.0
Typhoid fever	18	0.8	12	0.5	1		31	0.7
VTEC/STEC infection	67	3.1	70	3.1	1		138	3.2
Yersiniosis	225	10.5	181	8.1	0		406	9.3

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, 2010

Table 47. Number of cases and rates per 100 000 population of notifiable diseases by age group, 2010

Disease	Age Group																							
	<1		1-4		5-9		10-14		15-19		20-29		30-39		40-49		50-59		60--69		70+		Unknown		Total	
	Cases	Rate	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	178	279.3	780	314.4	367	128.0	278	94.0	498	154.5	1 228	203.4	842	147.6	919	144.9	850	156.6	713	175.4	682	173.6	11		7 346	168.2
Cryptosporidiosis	34	53.4	286	115.3	121	42.2	81	27.4	54	16.7	110	18.2	113	19.8	77	12.1	41	7.6	18	4.4	16	4.1	3		954	21.8
Dengue fever	0		0		0		2		2		15	2.5	10	1.8	9	1.4	6	1.1	7	1.7	0		0		51	1.2
Gastroenteritis	31	48.6	88	35.5	6	2.1	11	3.7	15	4.7	51	8.4	69	12.1	64	10.1	53	9.8	45	11.1	43	10.9	16		492	11.3
Giardiasis	27	42.4	395	159.2	185	64.5	46	15.6	35	10.9	197	32.6	451	79.0	284	44.8	172	31.7	145	35.7	46	11.7	2		1 985	45.4
Haemophilus influenzae type b	4		1		0		0		0		0		1		0		0		2		0		0		8	0.2
Hepatitis A	0		0		6	2.1	4		7	2.2	12	2.0	6	1.1	6	0.9	4		1		0		0		46	1.1
Hepatitis B	0		1		0		0		1		12	2.0	15	2.6	11	1.7	9	1.7	1		1		0		51	1.2
Hepatitis C	0		1		0		0		0		7	1.2	5	0.9	3		1		0		0		0		17	0.4
Hydatid disease	0		0		0		0		0		1		0		0		0		1		2		0		4	
Invasive pneumococcal disease	22	34.5	43	17.3	13	4.5	10	3.4	17	5.3	16	2.7	35	6.1	50	7.9	61	11.2	91	22.4	177	45.0	0		535	12.2
Lead absorption	2		2		3		0		6	1.9	12	2.0	25	4.4	52	8.2	53	9.8	36	8.9	10	2.5	0		201	4.6
Legionellosis	1		0		1		0		2		4		19	3.3	21	3.3	42	7.7	46	11.3	42	10.7	0		178	4.1
Leprosy	0		0		0		0		0		0		0		2		0		1		0		0		3	
Leptospirosis	0		0		1		0		3		13	2.2	20	3.5	21	3.3	14	2.6	8	2.0	1		0		81	1.9
Listeriosis	1		1		0		0		0		3		2		1		2		5	1.2	8	2.0	0		23	0.5
Malaria	0		2		2		1		5	1.6	13	2.2	5	0.9	6	0.9	6	1.1	4		0		0		44	1.0
Measles	3		9	3.6	7	2.4	10	3.4	10	3.1	6	1.0	3		0		0		0		0		0		48	1.1
Meningococcal disease	27	42.4	23	9.3	7	2.4	5	1.7	12	3.7	8	1.3	3		5	0.8	3		1		3		0		97	2.2
Mumps	0		15	6.0	5	1.7	6	2.0	1		7	1.2	4		1		2		0		0		0		41	0.9
Non seasonal influenza A (H1N1)	84	131.8	166	66.9	165	57.5	140	47.3	159	49.3	362	60.0	276	48.4	227	35.8	174	32.1	47	11.6	26	6.6	0		1 826	41.8
Paratyphoid fever	0		0		1		1		1		7	1.2	3		4		2		0		0		0		19	0.4
Pertussis	86	134.9	119	48.0	90	31.4	47	15.9	54	16.7	84	13.9	106	18.6	111	17.5	72	13.3	69	17.0	35	8.9	0		873	20.0
Rheumatic fever	0		0		43	15.0	79	26.7	23	7.1	19	3.1	2		1		1		0		0		0		168	3.8
Rickettsial disease	0		0		0		0		1		0		1		7	1.1	4		0		1		0		14	0.3
Rubella	0		3		0		0		0		0		0		0		1		0		0		0		4	
Salmonellosis	56	87.9	216	87.1	76	26.5	48	16.2	62	19.2	155	25.7	133	23.3	127	20.0	111	20.4	79	19.4	81	20.6	2		1 146	26.2
Shigellosis	1		12	4.8	9	3.1	5	1.7	3		20	3.3	7	1.2	14	2.2	17	3.1	14	3.4	3		0		105	2.4
Tetanus	0		1		0		0		0		0		0		1		0		1		4		0		7	0.2
Tuberculosis disease	1		2		3		7	2.4	17	5.3	61	10.1	68	11.9	43	6.8	31	5.7	40	9.8	34	8.7	0		307	7.0
VTEC/STEC infection	9	14.1	64	25.8	13	4.5	4		2		8	1.3	7	1.2	6	0.9	8	1.5	9	2.2	8	2.0	0		138	3.2
Yersiniosis	44	69.0	108	43.5	12	4.2	20	6.8	14	4.3	39	6.5	31	5.4	35	5.5	53	9.8	29	7.1	21	5.3	0		406	9.3

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, 2010

Table 48. Number of cases and rates per 100 000 population of notifiable diseases by ethnic group, 2010

Disease	Ethnicity													
	Māori		Pacific Peoples		Asian		Other ethnicity		European		Unknown		Total	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Campylobacteriosis	451	79.8	132	58.3	345	101.2	49	144.6	5 556	206.2	813		7 346	182.4
Cryptosporidiosis	69	12.2	12	5.3	22	6.5	8	23.6	790	29.3	53		954	23.7
Dengue fever	1		2		7	2.1	1		36	1.3	4		51	1.3
Gastroenteritis	30	5.3	4		19	5.6	6	17.7	384	14.3	49		492	12.2
Giardiasis	113	20.0	9	4.0	58	17.0	42	124.0	1 519	56.4	244		1 985	49.3
Haemophilus influenzae type b	4		1		0		0		3		0		8	0.2
Hepatitis A	3		10	4.4	18	5.3	0		12	0.4	3		46	1.1
Hepatitis B	10	1.8	7	3.1	7	2.1	1		24	0.9	2		51	1.3
Hepatitis C	4		1		0		0		11	0.4	1		17	0.4
Invasive pneumococcal disease	127	22.5	82	36.2	18	5.3	3		285	10.6	20		535	13.3
Lead absorption	8	1.4	0		3		0		164	6.1	26		201	5.0
Legionellosis	10	1.8	6	2.7	9	2.6	1		146	5.4	6		178	4.4
Leptospirosis	10	1.8	2		0		0		66	2.5	3		81	2.0
Listeriosis	1		5		1		0		16	0.6	0		23	0.6
Malaria	0		7	3.1	21	6.2	2		11	0.4	3		44	1.1
Measles	7	1.2	0		0		0		41	1.5	0		48	1.2
Meningococcal disease	42	7.4	17	7.5	2		0		36	1.3	0		97	2.4
Mumps	5		4		11	3.2	0		21	0.8	0		41	1.0
Non seasonal influenza A (H1N1)	386	68.3	137	60.5	176	51.6	39	115.1	1 051	39.0	37		1 826	45.3
Paratyphoid fever	1		0		7	2.1	0		8	0.3	3		19	0.5
Pertussis	114	20.2	56	24.7	10	2.9	7	20.7	645	23.9	41		873	21.7
Rheumatic fever	104	18.4	58	25.6	1		0		5		0		168	4.2
Rickettsial disease	0		0		1		0		13	0.5	0		14	0.3
Rubella	0		0		0		0		4		0		4	0.1
Salmonellosis	110	19.5	34	15.0	55	16.1	7	20.7	839	31.1	101		1 146	28.5
Shigellosis	17	3.0	15	6.6	15	4.4	4		46	1.7	8		105	2.6
Tuberculosis disease	36	6.4	45	19.9	179	52.5	12	35.4	30	1.1	5		307	7.6
Typhoid fever	0		12	5.3	15	4.4	0		3		1		31	0.8
VTEC/STEC infection	10	1.8	4		1		3		118	4.4	2		138	3.4
Yersiniosis	27	4.8	17	7.5	86	25.2	6	17.7	228	8.5	42		406	10.1

Note: Disease rates for ethnic groups and total cases are based on 2006 census data from Statistics New Zealand and should not be compared with disease rates used elsewhere in the report, which have been calculated using 2010 mid-year population estimates from Statistics New Zealand. Where fewer than five caseshave been notified, a rate has not been calculated and the cell has been left blank

Notifiable disease cases by year and source, 1988-2010

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

Disease	Source	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	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

N: Notification, L: Laboratory, S: Sentinel isolates

Notifiable disease cases by year and source, 1988-2010

Table 50. Number of notifiable disease cases by year and source, 2000–2010

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

N: Notification, L: Laboratory, S: Sentinel isolates

Prevalence of antimicrobial resistance, 1997-2009

Table 51. Prevalence of antimicrobial resistance, 1997–2009

Pathogen	Antimicrobial	Percent resistance[a] (number tested)				
		1997-1999	2000-2002	2003-2005	2006-2008	2009
S. aureus [b]	methicillin	4.9 (136 356)	7.2 (251 448)	7.4 (219 363)	8.2 (242 146)	9.0 (94 486)
	erythromycin	10.8 (134 350)	12.0 (221 394)	12.0 (164 220)	12.1 (98 055)	12.2 (75 122)
	co-trimoxazole	0.6 (91 391)	1.2 (149 166)	2.0 (126 840)	1.3 (89 071)	1.2 (68 603)
	fluoroquinolone			7.3 (47 116)	7.9 (28 846)	7.4 (9 243)
	fusidic acid			19.7 (25 609)	15.7 (32 730)	15.1 (19 388)
	mupirocin	18.2 (37 173)	20.0 (91 555)	16.7 (48 423)	12.9 (67 154)	11.6 (20 960)
Methicillin-resistant *S. aureus* [c]	erythromycin	26.2 (1 303)	40.0 (1 409)	46.3 (1 596)	37.5 (3 146)	35.8 (3 343)
	co-trimoxazole	1.8 (1 303)	6.7 (1 409)	7.4 (1 596)	2.8 (3 068)	2.2 (3 324)
	fluoroquinolone		40.0 (1 409)	50.3 (1 596)	37.4 (3 000)	31.0 (3 150)
	fusidic acid		7.0 (1 409)	9.2 (1 596)	11.6 (3 011)	18.2 (3 098)
	mupirocin	6.0 (1303)	8.5 (1 409)	9.5 (1 596)	7.5 (2 926)	8.5 (2 880)
	rifampicin	0.8 (1303)	0.7 (1 409)	0.5 (1 596)	0.7 (1 336)	
S. pneumoniae, non-invasive disease [b]	penicillin[d]	19.0 (10 976)	26.5 (12 859)	27.0 (15 037)	30.0 (14 104)	22.4 (5 732)
	erythromycin	14.5 (11 212)	18.6 (14 404)	19.9 (10 222)	21.3 (7 273)	18.4 (4 526)
	tetracycline	11.2 (5 993)	15.4 (9 476)	18.1 (6 796)	19.0 (5 496)	16.7 (3 664)
S. pneumoniae, invasive disease [e]	penicillin[f]	15.0 (1 182)	15.3 (1 494)	17.2 (1 560)	20.3 (1 707)	17.7 (665)
	erythromycin	5.7 (910)	7.2 (1 494)	9.9 (1 560)	12.2 (1 707)	9.6 (665)
	cefotaxime[f]	7.3 (1 182)	6.2 (1 494)	11.5 (1 560)	13.2 (1 707)	8.9 (665)
Enterococcus spp [b]	amoxicillin[g]	2.4 (17 548)	3.0 (22 566)	2.8 (26 492)	3.7 (35 746)	3.6 (14 525)
	vancomycin	0.5 (4 752)	0.3 (7 505)	0.1 (9 948)	1.3 (20 291)	0.4 (7 346)
E. coli, urinary isolates [b]	amoxicillin[g]	56.0 (138 712)	54.4 (194 799)	50.7 (117 009)	49.9 (117 456)	51.4 (70 396)
	co-amoxiclav	12.2 (136 326)	9.6 (194 950)	8.5 (127 750)	9.6 (117 965)	10.7 (72 636)
	trimethoprim	22.6 (111 710)	22.3 (207 837)	21.5 (138 748)	22.1 (128 276)	24.1 (77 889)
	nitrofurantoin	1.7 (124 362)	1.5 (206 149)	1.4 (139 738)	1.3 (127 682)	1.6 (77 373)
	fluoroquinolone	0.6 (118 917)	1.6 (201 382)	2.4 (135 803)	4.6 (110 769)	7.7 (67 761)
E. coli, non-urinary isolates [b,h]	co-amoxiclav	21.8 (15 948)	17.5 (11 508)	15.2 (5 059)	15.1 (3 249)	20.2 (1 140)
	cefuroxime	4.5 (6 893)	4.2 (6 576)	3.4 (3 956)	4.5 (2 534)	6.4 (956)
	ESBL positive				2.6 (2 307)	3.0 (1 127)
	gentamicin	0.9 (13 789)	2.4 (10 392)	2.6 (5 290)	5.3 (3 896)	4.5 (1 327)
	fluoroquinolone	0.8 (10 800)	2.4 (8 821)	3.9 (4 212)	8.1 (3 808)	9.1 (1 284)
P. aeruginosa [b]	gentamicin	9.5 (20 542)	10.5 (25 561)	6.1 (23 148)	4.3 (23 399)	2.5 (10 088)
	tobramycin	2.8 (11 033)	3.6 (10 421)	3.3 (7 616)	3.4 (9 388)	1.6 (4 757)
	ceftazidime	5.2 (11 147)	3.9 (13 253)	4.3 (16 031)	3.2 (18 163)	1.9 (8 549)
	fluoroquinolone	9.9 (16 551)	9.3 (22 869)	8.3 (23 761)	7.1 (23 961)	6.0 (10 145)
	imipenem/meropenem			4.8 (9 956)	4.9 (13 703)	2.6 (7 178)
	piperacillin/tazobactam			1.5 (4 928)	2.5 (11 960)	1.5 (5 393)
H. influenzae, non-invasive disease [b]	amoxicillin[g]	19.3 (18 852)	21.9 (28 476)	19.9 (19 529)	22.0 (24 823)	26.5 (10 089)
	co-amoxiclav	0.6 (15 040)	0.8 (16 333)	1.0 (14 090)	2.6 (15 123)	
	co-trimoxazole	14.7 (13 964)	17.3 (22 443)	18.2 (15 939)	20.2 (13 098)	21.8 (13 098)
	tetracycline	1.5 (13 007)	1.2 (15 633)	0.8 (12 783)	0.8 (11 263)	1.2 (11 263)
H. influenzae, invasive disease [e]	amoxicillin[g]	11.5 (122)	19.2 (125)	31.6 (155)	36.9 (176)	35.9 (64)
	co-amoxiclav	1.6 (122)	1.6 (125)	9.7 (155)	23.9 (176)	20.3 (64)
	cefuroxime	4.9 (122)	0.8 (125)	9.7 (155)	23.9 (176)	20.3 (64)
N. meningitidis, invasive disease [e]	penicillin[i]	7.9 (431)	7.5 (796)	12.0 (551)	19.5 (231)	22.4 (76)
	rifampicin	0 (431)	0 (796)	0.2 (551)	0.0 (231)	2.6 (76)
N. gonorrhoeae [b,j]	penicillin	10.4 (1 437)	7.1 (2 782)	5.8 (4 700)	7.5 (6 028)	12.4 (1 543)
	fluoroquinolone	1.8 (1 437)	6.3 (2 349)	14.3 (4 195)	20.1 (7 315)	29.9 (2 746)
M. tuberculosis [b]	isoniazid	8.2 (757)	8.5 (811)	8.9 (872)	6.6 (725)	9.0 (245)
	rifampicin	1.3 (757)	0.7 (811)	1.0 (872)	0.6 (725)	2.9 (245)
	MDR[k]	0.9 (757)	0.5 (811)	1.0 (872)	0.4 (725)	2.9 (245)

[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)
[j] data from northern North Island only up until 2000, thereafter national data used
[k] multidrug resistant (ie, resistant to at least isoniazid and rifampicin)

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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
DT	Definitive type
DTaP-IPV	Diptheria, 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
HSV	Herpes simplex virus
HUS	Haemolytic uraemic syndrome
ICD	International Classification of Diseases
ILI	Influenza-like illness
IPD	Invasive pneumococcal disease
MeNZB™	Meningococcal B Outer Membrane vesicle vaccine
MIC	Minimum inhibitory concentration
MMR	Measles, mumps, rubella
MoH	Ministry of Health
MRSA	Methicillin-resistant *Staphylococcus aureus*
MSSA	Methicillin-susceptible *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
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