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# NOTIFIABLE AND OTHER DISEASES IN NEW ZEALAND

# 2008 ANNUAL SURVEILLANCE REPORT

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Source of front cover pathogen images: CDC Public Health Image Library http://phil.cdc.gov/Phil/home.asp

This report is available on the Internet at www.surv.esr.cri.nz

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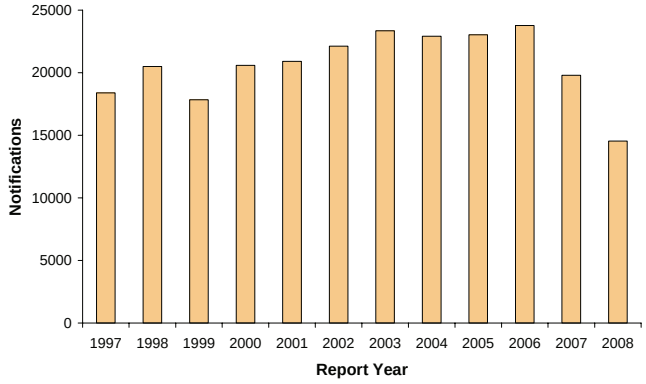
# SURVEILLANCE SUMMARY 2008

### Notifiable Diseases

In 2008, there were 14 549 cases of notifiable diseases reported through EpiSurv (Figure 1). This is lower than the number reported in any of the previous seven years.

**Figure 1. Total disease notifications by year, 1997 - 2008**




Between 2007 and 2008 there were some significant changes in the number of cases reported for individual diseases. There was a statistically significant increase in reported cases of giardiasis (1402 to 1662, 18.5%), hepatitis A (42 to 91, 116.7%), lead absorption (78 to 315, 303.8%), leptospirosis (66 to 121, 83.3%), and pertussis (332 to 433, 30.4%).

There was a statistically significant decrease in reported cases of campylobacteriosis (12 776 to 6693, -47.6%) chemical poisoning from the environment (13 to 1, -92.3%) cryptosporidiosis (924 to 764, -17.3%), hepatitis B (73 to 39, -64.6%), measles (24 to 12, -50.0%), and typhoid fever (48 to 29, -39.6%).

Other non-significant changes in case numbers and rates are listed in Appendix 0.

### Enteric Diseases

Enteric diseases continued to comprise the majority of disease notifications in 2008. In particular, at 6693 notifications, campylobacteriosis contributed 46.0% of all disease notifications. There were statistically significant increases in the notification rate of giardiasis and hepatitis A. In contrast, two enteric diseases, campylobacteriosis, cryptosporidiosis and typhoid fever had statistically significant rate decreases compared to 2007.

### Exotic Diseases

From 2007 to 2008, there were no statistically significant changes in the number of reported cases of exotic diseases. There was no evidence of recent locally acquired hydatid disease and all dengue fever cases with travel history recorded had travelled overseas. For rickettsial disease, none of the murine typhus cases had reported overseas travel during the incubation period.

### Vaccine Preventable Diseases (VPDs)

In 2008 pertussis disease notification rates showed a significant increase compared to 2007. The pertussis rate per 100 000 in 2008 was 10.1, compared with 7.8 the previous year. The 2007 and 2008 pertussis notification rates were below the 2003 rate (14.5 per 100 000), but above the 1998 rate (4.0 per 100 000. These years were chosen for comparison with the most recent rates as 2003 was the year between the current and previous epidemics, and 1998 was the year before the start of the previous epidemic.

The measles disease notification rate showed a significant decrease in 2008, from 0.6 to 0.3 per 100 000.

Acute hepatitis A disease was the only other VPD to show a significant change in notification rate compared to 2007, with a significant increase (1.0 to 2.1 per 100 000).

The meningococcal disease rate (3.3 per 100 000) is well down on the peak annual rate observed during the epidemic (16.7 per 100 000 in 2001), the rate remains higher than before the start of the epidemic in 1989-90 (1.5 per 100 000).

### Influenza

The average weekly consultation rate for 2008, 52.4 per 100 000 patient population, was the fourth lowest rate recorded by the sentinel surveillance system since 1997. The year was characterised by two peaks of activity in July and mid August.

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

### Sexually Transmitted Infections (STI)

In 2008, *Chlamydia trachomatis* infection was again the most commonly diagnosed STI in New Zealand. The number of chlamydia cases detected in sexual health clinics (SHCs), family planning clinics (FPCs) and student and youth health clinics (SYHCs) increased from 2007 levels respectively by 10.3% (4504 to 4970), 3.3% (3433 to 3545) and 10.3% (957 to 1056). For laboratory based surveillance, the Bay of Plenty region had the highest chlamydia rate overall at 1060 per 100 000, compared to 751 and 849 per 100 000 for the Auckland and Waikato regions, respectively.

The number of gonorrhoea cases decreased for all clinic types from 2007 to 2008, by 5.3% (190 to 180), 1.6% (925 to 802), and 8.6% (70 to 64) for FPCs, SHCs, and SYHCs respectively. For laboratory based surveillance, the Auckland region had the highest gonorrhoea rate overall at 126 per 100 000, compared to 91 and 68 per 100 000 for the Bay of Plenty and Waikato regions, respectively.

The number of syphilis cases increased in SHCs from 2007 to 2008 by 25.4% (71 to 89). No cases of syphilis were reported in FPCs or SYHCs.

In 2008, 48 cases of Acquired Immune Deficiency Syndrome were notified. The 2008 notification rate (1.1 per 100 000) is not significantly different to the 2007 rate (0.7 per 100 000, 31 cases).

## Outbreak Surveillance

In 2008, there were 449 reported outbreaks involving 6503 cases. This represented a decrease in the number of outbreaks and cases compared to 2007 figures (492 outbreaks with 7988 cases).

The most common pathogen implicated was norovirus with 152 of the outbreaks and 3917 of the cases, followed by *Giardia* spp. with 50 outbreaks and 184 cases.

The most common setting linked to an outbreak was homes (112 outbreaks, 558 cases) followed by rest/retirement homes (88 outbreaks, 490 cases).

## Antibiotic Resistance

Methicillin resistance among *Staphylococcus aureus* has remained stable at 7-8% each year since 2000. A high prevalence of mupirocin-resistant *S. aureus* has been seen since the mid-1990s and there is a high prevalence of fusidic acid resistance among *S. aureus.* .

Ciprofloxacin resistance in *Neisseria gonorrhoeae* is now more common than penicillin resistance in most parts of New Zealand.

While vancomycin-resistant enterococci remain uncommon in most areas of New Zealand, the first hospital-based outbreak occurred at the end of 2007.

There is a high prevalence of penicillin non-susceptibility among *Streptococcus pneumoniae* and increasing non-susceptibility to third-generation cephalosporins, such as ceftriaxone.

An increasing prevalence of extended-spectrum β-lactamases (ESBLs) in Enterobacteriaceae has been reported in recent years.

# 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 2008 and where data are available, the trend since 1996, 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 of 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

## 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 extraction of data from EpiSurv
- the date used to aggregate data (e.g. date reported or date of onset of illness)
- whether laboratory-reported or 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 (District Health Board).

It should be noted that various factors influence disease notification and therefore the calculation of notifiable disease rates. Cases where the illness is not severe 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 reported for different ethnic groups are presented in this report. However, caution should be exercised in the interpretation of these numbers, as ethnicity 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.

Numbers for different ethnic groups are based on a prioritised classification of ethnicity, with the Maori ethnic group at the top of the hierarchy, followed by Pacific Peoples, Other and European ethnic groups. The Other ethnic group includes all ethnic groups except European, Pacific Peoples and Maori.

Because of the small size of the New Zealand population and the low numbers of cases for some diseases, the rates calculated in this report may be highly variable from year to year. As such it is necessary to interpret trends with caution.

## DATA SOURCES

The key sources of data used in this report are:

### EpiSurv - the national notifiable disease surveillance system

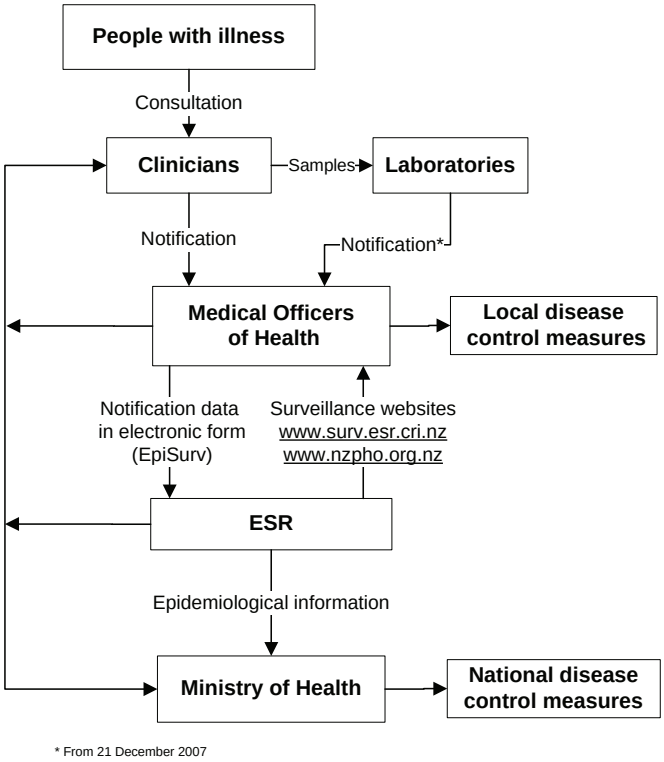
Under the Health Act 1956 and the Tuberculosis Act 1948, health professionals are required to inform their local Medical Officer of Health of any notifiable disease that they suspect or diagnose. From 21 December 2007, laboratories are also required to report notifiable diseases to Medical Officers of 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 e.g. 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.

The major components and information flow of the notifiable disease surveillance system is shown in Figure 2.

**Figure 2. Notifiable disease surveillance system**




* From 21 December 2007

### Laboratory-Based Surveillance

Laboratory-based surveillance is the collection of laboratory data for public health purposes. 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. Also, laboratory-based surveillance sometimes takes place to enhance surveillance data gathered by other methods. Examples of organisms covered by laboratory-based surveillance are antimicrobial-resistant organisms, legionellae, leptospira, meningococci, respiratory syncytial virus (RSV), enteroviruses, adenoviruses, salmonellae and streptococci.

### Surveillance of AIDS in New Zealand

Since 1989, the AIDS Epidemiology Group (AEG) in Dunedin has been contracted to collect information about people diagnosed with AIDS through notification to Medical Officers of Health. Coding ensures that the identity of the patient is known only to the reporting doctor, but is sufficiently specific to allow detection of duplicate reports.

### New Zealand Creutzfeldt-Jakob Disease (CJD) Registry

The New Zealand Creutzfeldt-Jakob Disease (CJD) 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).

### Sexually Transmitted Infection (STI) Surveillance System

Sexually Transmitted Infections (STIs) are not notifiable in New Zealand. Data on STIs of public health importance (chlamydia, gonorrhoea, genital herpes, genital warts, syphilis and non-specific urethritis) are submitted voluntarily from sexual health clinics (SHCs), family planning clinics (FPCs) and student and youth health clinics (SYHCs). This is supplemented by data on chlamydia and gonorrhoea from diagnostic laboratories in the Auckland, Waikato and Bay of Plenty (BOP) regions. Laboratory STI surveillance is being extended to other regions.

### Influenza Sentinel Surveillance System

A sentinel surveillance system, which operates from May to September each year, gathers data on the incidence and distribution of influenza [4]. In 2008, this was based on a network of 85 general practices from all health districts in New Zealand. The number of practices is approximately proportional to the size of the population in each health district. Participating general practitioners are asked to record the number of consultations for influenza-like illness (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.

### New Zealand Health Information Service (NZHIS)

NZHIS in 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 (NMDS). Cases are assigned disease codes using the tenth revision of the International Classification of Diseases (ICD10) coding system. Up to 99 diagnostic, procedure and accident 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 NZHIS 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 NZHIS databases and sent to ESR for analysis and comparison with data from other surveillance systems.

Hospital admission data includes repeated admissions for patients with chronic notifiable diseases, e.g. tuberculosis, or for diseases which have long-term health impacts, e.g. meningococcal disease. For some diseases the criteria for notification, (clinical and laboratory or epidemiological evidence), do not match those required for diagnostic coding. For these reasons hospitalisation numbers and notifications may differ.

### New Zealand Paediatric Surveillance Unit (NZPSU)

NZPSU was established in 1997 to provide active surveillance of acute flaccid paralysis (AFP), to fulfil World Health Organization 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 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 in the previous month they have seen any cases of the conditions under surveillance. The data are then collated and analysed by the NZPSU [5]. Information from the NZPSU is used in this report to enhance notification data on polio, VTEC/STEC infection (HUS data) and rubella (CRS data).

### Outbreak Surveillance

ESR introduced an outbreak surveillance system in July 1996 and has been systematically refining this system since then [6]. 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 public health units on disease outbreaks, rather than individual cases.

### Statistics New Zealand

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

## 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 11 February 2009. 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 2008 have been updated to reflect those in EpiSurv as at 11 February 2009.

Disease numbers are reported according to the date of notification, with the exception of meningococcal disease (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.

### Data Used for Calculating Rates of Disease

Denominator data used to determine all disease rates, except for ethnicity, have been derived from 2008 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.

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 for comparisons.

### Geographical Breakdown

This report provides rates for current District Health Boards (DHBs) where this is available and health districts where data cannot be presented by DHB (owing to collection methods).

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 2 shows the codes for health districts used in some graphs contained in this report.

**Table 1. DHB Population, 2008**

| DHB | Population |
|---|---|
| Northland | 154700 |
| Waitemata | 520700 |
| Auckland | 438100 |
| Counties Manukau | 473400 |
| Waikato | 356203 |
| Lakes | 101500 |
| Bay of Plenty | 205410 |
| Tairawhiti | 45900 |
| Taranaki | 107700 |
| Hawke's Bay | 153320 |
| Whanganui | 63317 |
| MidCentral | 164748 |
| Hutt | 141900 |
| Capital and Coast | 284402 |
| Wairarapa | 39750 |
| Nelson-Marlborough | 135700 |
| West Coast | 32380 |
| Canterbury | 495970 |
| South Canterbury | 55300 |
| Otago | 187277 |
| Southland | 110823 |
| Total | 4268500 |

**Table 2. Health District codes and descriptions**

| Code | Health District |
|---|---|
| NL | Northland |
| NW | NorthWest Auckland |
| CA | Central Auckland |
| SA | South Auckland |
| WK | Waikato |
| TG | Tauranga |
| BE | Eastern Bay of Plenty |
| GS | Gisborne |
| RO | Rotorua |
| TP | Taupo |
| TK | Taranaki |
| RU | Ruapehu |
| HB | Hawke's Bay |
| WG | Wanganui |
| MW | Manawatu |
| WR | Wairarapa |
| WN | Wellington |
| HU | Hutt |
| NM | Nelson-Marlborough |
| WC | West Coast |
| CB | Canterbury |
| SC | South Canterbury |
| OT | Otago |
| SO | Southland |

### Map Classification Scheme

Quantiles have been used to group the disease rate values on the maps i.e. the data have been divided into three groups containing equal numbers of DHBs. The darkest colour represents the highest rates and the lightest colour the lowest rates. The grey colour shows where there are insufficient data to calculate a rate (fewer than five cases).

### 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. Often more than one risk factor is reported for each case.

The reporting of exposure to a risk factor does not imply that this was the source of the infection.

### Statistical Tests

The Mantel-Haenszel 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.

# 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 2008[7].

### Sensitivity

An assessment of sensitivity was made in 2003 using reporting on meningococcal disease [8]. This showed that the sensitivity of meningococcal disease surveillance is probably in excess of 87%. The sensitivity of surveillance for other diseases will often be less, 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 between diseases. Table 3 shows the percentage of notifications for which complete data were provided for selected key EpiSurv variables annually from 1999 to 2008.

The completeness of date of birth, age and sex are generally very high, changing little over the last five years. The completeness of ethnicity has decreased from last year and is now the lowest it has been since 1999.

The National Health Index (NHI) is an important link between notifiable disease records and laboratory records. Significant progress has been made in the completeness of the NHI over the past five years.

**Table 3. Data completeness by year and EpiSurv variable, 1999 - 2008**

| | Completeness of data | | | | |
|---|---|---|---|---|---|
| Reporting Year | Date of Birth % | Age % | Sex % | Ethnicity % | NHI % |
| 1999 | 94.6 | 99.4 | 98.9 | 82.8 | 7.6 |
| 2000 | 96.7 | 99.5 | 98.2 | 82.9 | 10.2 |
| 2001 | 98.3 | 99.1 | 98.2 | 82.5 | 18.2 |
| 2002 | 98.6 | 99.2 | 98.2 | 77.8 | 21.3 |
| 2003 | 98.8 | 99.3 | 98.6 | 80.9 | 30.3 |
| 2004 | 98.8 | 99.1 | 98.2 | 83.2 | 52.5 |
| 2005 | 98.7 | 99.0 | 98.2 | 82.9 | 65.1 |
| 2006 | 98.8 | 99.1 | 97.8 | 82.6 | 63.6 |
| 2007 | 98.7 | 99.1 | 98.9 | 74.6 | 72.5 |
| 2008 | 99.2 | 99.4 | 98.6 | 63.2 | 84.3 |

### Timeliness

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

Of the notifications with an onset date recorded (59.7% of notifications) in 2008, 36.5% were reported to a public health service within one week of the onset of symptoms and 73.9% were reported within two weeks.

In 2008, 97.3% of disease notifications were entered into EpiSurv within one week of being reported to the public health service and 98.5% were entered within two weeks of being reported.

### Accuracy

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

Another limitation is the accuracy of diagnoses of infections made serologically.

# NOTIFIABLE DISEASES

## ACQUIRED IMMUNE DEFICIENCY SYNDROME (AIDS)

Acquired Immune Deficiency Syndrome (AIDS), but not Human Immunodeficiency Virus (HIV) infection, is a notifiable disease in New Zealand. The AIDS Epidemiology Group (AEG) within the University of Otago carries out national AIDS/HIV surveillance and it is their data which is reported here. More detailed information is available in the AEG report from March 2009 [9].

In 2008, 48 cases of AIDS were reported to the AEG compared with 31 cases in 2007. The 2008 AIDS notification rate (1.1 per 100 000) was not significantly higher than the 2007 rate (0.7 per 100 000).

Twenty-two cases (45.8%) were men infected through sex with other men, 19 (39.6%) were infected through heterosexual contact (14 men and five women), two were infected through injecting drug use, two were children infected perinatally overseas, one case was infected through a transfusion received overseas, and the mode of infection was unknown for the remaining two cases.

The distribution of the 2008 cases according to ethnicity was: 25 (52.1%) European, 12 (25.0%) African, 5 (10.4%) Maori, 5 (10.4%) Asian, and 1 (2.1%) Pacific Peoples. The cases ranged from 5 to 57 years of age with a mean age of 38.5 years.

Two deaths due to AIDS were reported to the AEG as having occurred in 2008. 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 was first made a notifiable disease in 1919 with the last case reported in 1940. New Zealand has been considered free of anthrax since the last recorded outbreak among domestic livestock in 1954 [10].

## ARBOVIRAL DISEASES

Please see individual disease sections for dengue fever and yellow fever.

**Barmah Forest Virus**

No cases of Barmah Forest virus infection were notified in 2008.

**Chikungunya Fever**

One case of Chikungunya fever was notified in 2008. The case was a male in the 40-49 years age group. The case was laboratory-confirmed and had travelled overseas to Sri Lanka during the incubation period of the disease.

**Japanese Encephalitis**

No cases of Japanese encephalitis were notified in 2008.

**Kunjin Virus**

No cases of Kunjin virus infection were notified in 2008.

**Lyme Disease**

No cases of Lyme disease were notified in 2008.

**Murray Valley Encephalitis**

No cases of Murray Valley encephalitis (also known as Australian encephalitis) were notified in 2008.

**Ross River Virus**

One case of serologically confirmed Ross River virus infection was notified in 2008. The case was a female in the 60-69 years age group of Maori ethnicity. The case had been in Australia during the incubation period of the disease.

## BOTULISM

There have been no notifications of botulism in New Zealand in humans since two cases were reported in 1985 [11].

## BRUCELLOSIS

Three cases of brucellosis were notified in New Zealand in 2008. Since 1997, a total of 12 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.

Of the three cases notified in 2008, one was in the 20-29 years age group, one was in the 40-49 years age group and one was in the 50-59 years age group. One case was female and two were male. One case was Maori and two cases were of Pacific Peoples ethnicity.

Brucellosis is a common bacterial disease of domesticated animals in many counties, including some Pacific Island Countries and Territories. Brucellosis should be considered in the differential diagnosis of Pacific Peoples presenting with a febrile illness and a history of animal exposure or consumption of unpasteurised milk. *Brucella* species are notifiable organisms under the Biosecurity Act 1993. As such, all cases of brucellosis are reported to the Ministry of Agriculture and Forestry (MAF) for investigation of possible disease reservoirs in New Zealand animals.

## CAMPYLOBACTERIOSIS

There were 6 693 cases of campylobacteriosis notified in 2008. The 2008 rate of 156.8 per 100 000 population was significantly lower than the 2007 rate of 302.2 per 100 000 population (12 778 cases). Campylobacteriosis continues to be the most commonly notified disease comprising 46.0% of all notifications (14 549) in 2008.

Figure 3 shows campylobacteriosis incidence from 1996 to 2008.

**Figure 3. Campylobacteriosis notifications by year, 1996 – 2008**

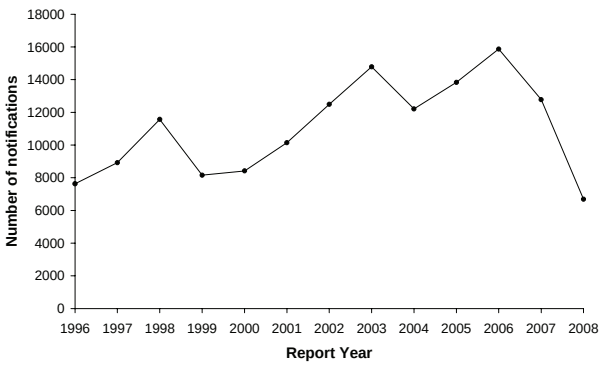
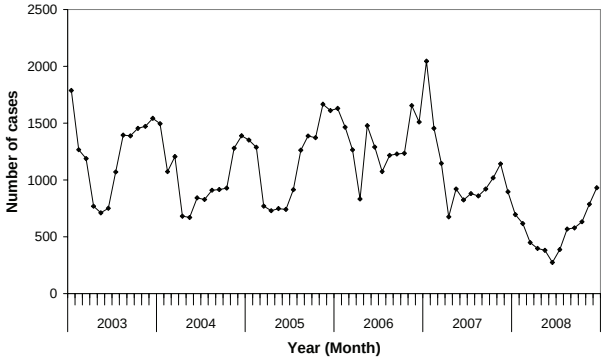


Figure 4 shows the number of cases notified each month since 2003.

**Figure 4. Campylobacteriosis notifications by month, January 2003 – December 2008**




The pattern in 2008 is similar to previous years, highly seasonal with a summer peak and winter trough. The lowest monthly campylobacteriosis total for 2008 was for the month of June with 274 notifications and the highest was for the month of December when 931 cases were notified.

Campylobacteriosis rates varied throughout the country as demonstrated in Figure 5. The highest rates were reported for South Canterbury (262.2 per 100 000 population, 145 cases) and Hutt Valley DHBs (210.0 per 100 000, 298 cases). The lowest rates were reported for Tairawhiti (89.3 per 100 000, 41 cases) and MidCentral DHBs (119.0 per 100 000, 196 cases).

Age was recorded for 99.6% (6 667/6 693) of cases. The highest age-specific rate occurred in children aged 1-4 years, (318.7 per 100 000 population, 752 cases), and in those aged less than 1 year (271.6 per 100 000, 174 cases).

Sex was recorded for 98.6% (6599/6693) of the cases. Similar to previous years, the sex-specific notification rate was higher for males (177.4 per 100 000 population, 3 711 cases) compared with females (132.7 per 100 000 population, 2888 cases).

Ethnicity was recorded for 61.6% (4124/6693) of the cases. Those of European ethnicity made up the majority of notifications (86.6%, 3570 cases), followed by Maori (8.4%, 348 cases), Other ethnicity (3.4%, 139 cases) and Pacific Peoples (1.6%, 67 cases).

Of the 3213 cases for which hospitalisation status was recorded, 312 cases (9.7%) were hospitalised.

The risk factors recorded for campylobacteriosis are shown in Table 4. The most common risk factors are contact with farm animals and consumption of food from retail premises. Note that for approximately 80% of campylobacteriosis cases the risk factors are unknown.

In 2008, 16 outbreaks of campylobacteriosis were reported involving 109 cases.

**Figure 5. Campylobacteriosis notifications by DHB, 2008**

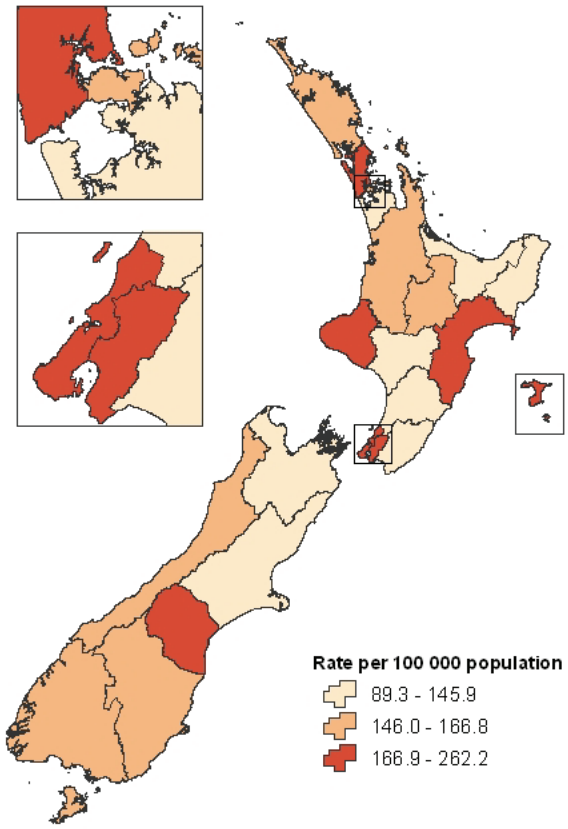



**Table 4. Exposure to risk factors associated with campylobacteriosis, 2008**

| Risk Factor | Yes | No | Unknown | %[a] |
|---|---|---|---|---|
| Contact with farm animals | 793 | 1007 | 4893 | 44.1% |
| Consumed food from retail premises | 684 | 871 | 5138 | 44.0% |
| Consumed untreated water | 392 | 1017 | 5284 | 27.8% |
| Contact with faecal matter | 235 | 1268 | 5190 | 15.6% |
| Contact with other symptomatic people | 230 | 1372 | 5091 | 14.4% |
| Recreational water contact | 179 | 1334 | 5180 | 11.8% |
| Travelled overseas during the incubation period | 173 | 1863 | 4657 | 8.5% |
| Contact with sick animals | 123 | 1377 | 5193 | 8.2% |

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

## CHEMICAL POISONING FROM THE ENVIRONMENT

In 2008, one case was notified as chemical poisoning from the environment. This is significantly lower than the number notified in 2007 (13 cases) and 2006 (28 cases).

A Maori female aged 1-4 years from Northland DHB suffered from a skin rash and seizures and was hospitalised. It is thought that the house she lived in may have previously been a clandestine methamphetamine laboratory.

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 2007, ESR introduced a new case report form to capture hazardous substance injury notifications to Public Health Units (of which there were six notifications in 2008). ESR manages a separate chemical injury surveillance system (CISS) relating to chemical injuries including poisonings. Currently the CISS captures cases of chemical poisoning from the environment where these cases have been reported in the current data sources covered by the CISS. Reports are published on the www.surv.esr.cri.nz website.

## CHOLERA

No cases of cholera were notified in New Zealand in 2008. Since 1997 there have been ten reported cholera cases with the last case reported in 2007. Each of these cases reported a history of overseas travel during the incubation period of the disease. The countries visited included India, China, Indonesia, Thailand and Fiji.

## CREUTZFELDT-JAKOB DISEASE

The New Zealand Creutzfeldt-Jakob Disease (CJD) Registry was established in 1996 to monitor sporadic, familial, iatrogenic and variant CJD. This section is based on the twelfth annual report of the Registry[12].

In 2008, a total of five cases of possible CJD were referred to the Registry. All five cases have been classified as probable sporadic CJD based on clinical, cerebrospinal fluid, electroencephalogram, and/or magnetic resonance imaging findings. Four cases were in the 70-79 years age group and one was in the 80-89 years age group. Four of the cases were female and one was male. Three cases died (autopsy declined for each) and two continue to slowly deteriorate.

Since 1997, there has been a total of 41 cases of CJD documented by the Registry, 14 confirmed and 27 probable. No cases of variant CJD, the form linked with bovine spongiform encephalopathy, have ever been identified in New Zealand.

## CRYPTOSPORIDIOSIS

During 2008, 764 cases of cryptosporidiosis were notified (17.9 per 100 000 population). This is significantly lower than the number notified in 2007 (924 cases, 21.9 per 100 000) (Figure 6).

**Figure 6. Cryptosporidiosis notifications by year, 1996 – 2008**

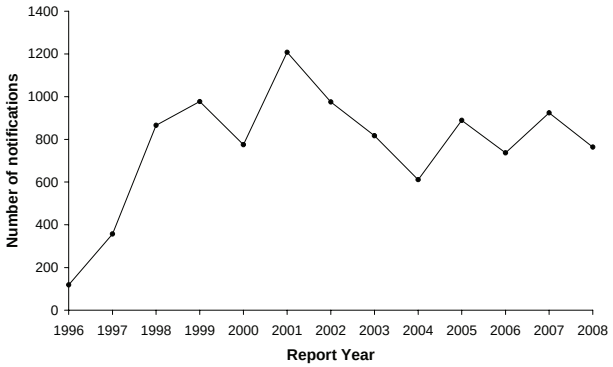
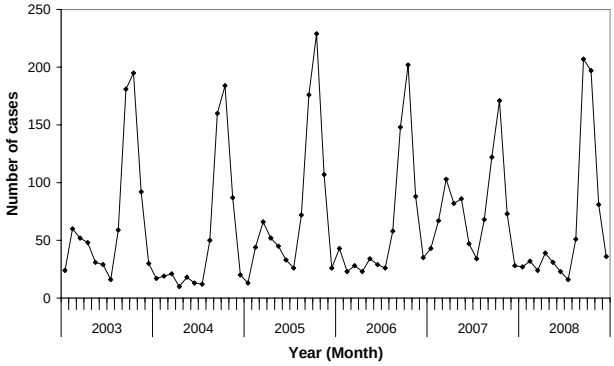



Figure 7 shows cryptosporidiosis cases by month since 2003. There is a distinct seasonal pattern with the largest number of notifications during October each year. However, the highest monthly cryptosporidiosis total for 2008 was for the month of September with 207 cases were notified, followed closely by the month of October with 197 cases.

**Figure 7. Cryptosporidiosis notifications by month, January 2003 – December 2008**




Cryptosporidiosis notifications varied throughout the country as illustrated in Figure 8. The highest rate was recorded for South Canterbury (103.1 per 100 000 population, 57 cases) and West Coast DHBs (58.7 per 100 000, 19 cases), and the lowest rate was recorded for Waitemata DHB (3.5 per 100 000, 18 cases).

Age was recorded for 99.9% of the cases reported (763/764) and of these cases, 56.2% occurred in children aged less than 15 years (429 cases). The highest age-specific rate was for children aged 1 to 4 years (111.9 per 100 000 population, 264 cases) followed by infants aged less than one year (35.9 per 100 000, 23 cases).

Sex was recorded for 98.7% of the cases reported (754/764). Sex-specific notification rates for cryptosporidiosis were similar for males (18.0 per 100 000 population, 377 cases) and females (17.3 per 100 000, 377 cases).

Ethnicity was recorded for 87.6% of the cases reported (669/764). Of these, the majority of cases were European ethnicity (88.0%, 589 cases) followed by Maori (8.4%, 56 cases), Other ethnicity (2.8%, 19 cases) and Pacific Peoples (0.7%, 5 cases).

Of the 613 cases for which hospitalisation status was recorded, 41 cases (6.7%) were hospitalised.

In 2008, 7 cryptosporidiosis outbreaks were recorded, involving 29 cases.

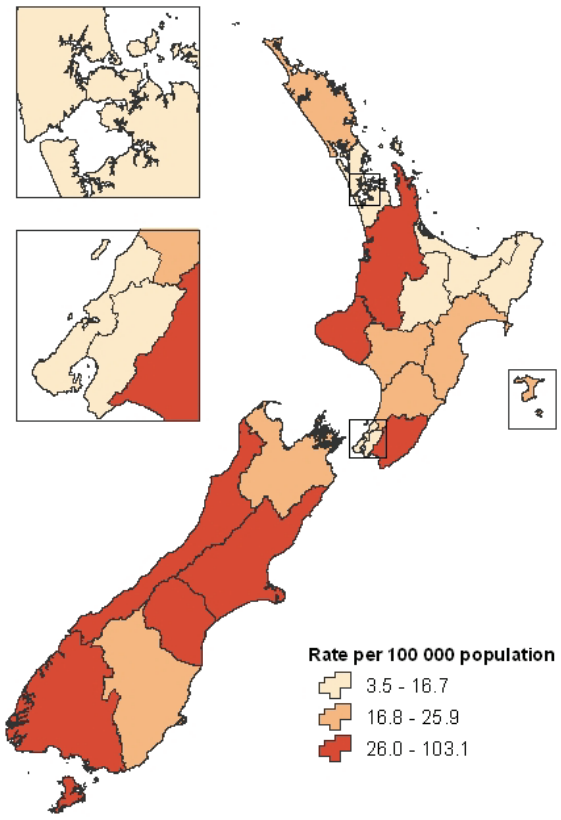
The risk factors for cryptosporidiosis are shown in Table 5. Similar to previous years, contact with farm animals was the most common risk factor associated with cryptosporidiosis cases in 2008.

**Table 5. Exposure to risk factors associated with cryptosporidiosis, 2008**

| Risk Factor | Yes | No | Unknown | %[a] |
|---|---|---|---|---|
| Contact with farm animals | 341 | 153 | 270 | 69.0% |
| Consumed untreated water | 186 | 186 | 392 | 50.0% |
| Contact with sick animals | 113 | 252 | 399 | 31.0% |
| Contact with faecal matter | 103 | 281 | 380 | 26.8% |
| Recreational water contact | 107 | 312 | 345 | 25.5% |
| Contact with other symptomatic people | 106 | 311 | 347 | 25.4% |
| Consumed food from retail premises | 86 | 263 | 415 | 24.6% |
| Travelled overseas during the incubation period | 35 | 441 | 288 | 7.4% |

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

**Figure 8. Cryptosporidiosis notifications by DHB, 2008**




## CYSTICERCOSIS

No cases of cysticercosis were notified in New Zealand in 2008. Since 1997, three cases were reported in 2005 and two cases in 2007. Human infection with *Taenia solium*, the species of tapeworm that causes cysticercosis, is prevalent in parts of Latin America, South and South-Eastern Asia, Africa and Eastern Europe. The risk is higher when beef and pork are eaten raw or undercooked and where livestock are in contact with human faecal matter[13]. NZHIS Hospitalisation data for 2008 record two additional female cases with the primary reason for admission being cysticercosis.

## DECOMPRESSION SICKNESS

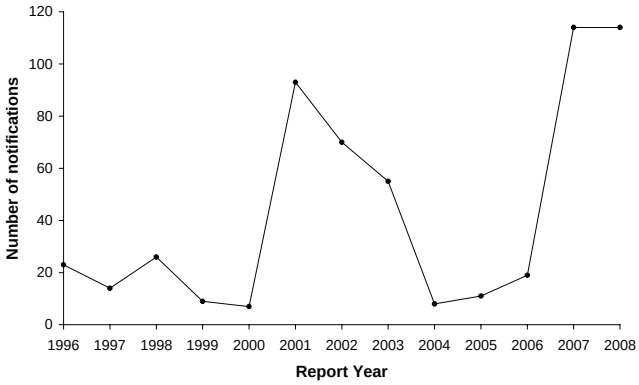
There were no cases of decompression sickness notified in 2008. Over the last five years numbers of decompression sickness notifications have been low: none in 2007, one in 2006, one in 2005, none in 2004 and two in 2003.

As with previous years, the annual number of hospitalisations for decompression sickness exceeds the annual number of notifications, indicating a continued under-reporting. Diagnosis of decompression sickness as the primary reason for admission (ICD-10-AM code T70.3) was specified in 12 cases for 2008. Since 2002, the number of hospitalisations where decompression sickness was recorded as the primary reason for admission ranges from eight in 2005 and 2006 to 45 in 2002.

## DENGUE FEVER

In 2008, 114 cases of dengue fever were notified and the notification rate was 2.7 per 100 000 population. The number of cases reported in 2008 (114 cases) and in 2007 (114 cases) were a significant increase on the number notified in recent years (8 cases in 2004, 11 in 2005, 19 in 2006). Between 2001 and 2003 an average of 73 cases per year were notified, with a peak of 93 cases in 2001 (Figure 9).

**Figure 9. Dengue fever notifications, 1996 - 2008**




The majority of cases were aged between 20 and 69 years of age (94 cases, 82.5%). The age specific rates were highest in the 50-59 years (4.6 per 100 000 population, 24 cases),

followed by the 20-29 years (4.0 per 100 000 population, 23 cases), and the 60-69 years (3.7 per 100 000 population, 14 cases) age groups.

Sex was recorded for all the reported dengue cases. The notification rate was similar for male (2.8 per 100 000 population, 58), and female (2.6 per 100 000 population, 56) cases.

Ethnicity was recorded for 85.1% (97/114) of the cases. Of the 97 cases, the highest number of notifications occurred among those of European ethnicity (40 cases, 41.2%), followed by Pacific Peoples (39 cases, 40.2%), Other ethnicity (14 cases, 14.4%) and Maori (4 cases, 4.1%).

Hospitalisation status was recorded for 80.7% (92/114) of the cases. Of the 92 cases, 44.6% (41 cases) were hospitalised. Of the 114 notified cases, 107 were laboratory-confirmed.

All but one case had overseas travel information recorded (113/114, 99.1%) and of these all had travelled overseas during the incubation period. Cases had most commonly travelled to Tonga (32 cases, 28.3%), Samoa (25 cases, 22.1%), Fiji (20 cases, 17.7%) and Thailand (10 cases, 8.8%).

Sixty (52.6%) cases undertook some protective measures e.g. use of insect repellent, bed nets, protective clothing and staying in screened/air conditioned accommodation. Five (4.4%) cases undertook no protective measures, and for 49 (43.0%) cases no information was recorded.

NZHIS hospitalisation data for 2008 recorded 35 cases where dengue fever was the primary diagnosis on admission. Of these, 32 cases were dengue fever (classical dengue) and three cases were dengue haemorrhagic fever.

## DIPHTHERIA

No cases of toxigenic diphtheria were notified in New Zealand in 2008.

In 2008, 53 cultures of *Corynebacterium diphtheriae* were received by the ESR Special Bacteriology Laboratory for toxigenicity testing, typing and surveillance purposes. The majority (51) were from cutaneous sources with patients ranging in age from 1 month to 67 years. Two cultures were from blood of patients aged 5 and 7 years.

One of the blood culture isolates was positive for the diphtheria toxin gene in PCR testing. All the remaining isolates were determined to be non-toxigenic by PCR examination for the toxin gene. Thirty-five (66%) of the isolates were biovar *mitis*, and 18 (34%) were biovar *gravis* including the blood isolates.

In 2007, the ESR laboratory received 31 non-toxigenic isolates from cases. Of these isolates, 18 (66.7%) were biovar *mitis*, and 13 (33.3%) were biovar *gravis* including three of the four blood isolates received.

## *ENTEROBACTER SAKAZAKII* INVASIVE DISEASE

*Enterobacter sakazakii* (*E.sakazakii)* is naturally present in the environment and has been known to cause disease in people of all ages. However, most international concern has resulted from severe disease (including meningitis, necrotising enterocolitis, and sepsis) and death in premature infants associated with low-level contamination in powdered infant formula.

In New Zealand *E.sakazakii* invasive disease became notifiable on 21 July 2005. This followed a recommendation from the investigation into the death of a premature infant in a neonatal unit from this disease in 2004 who had been receiving powdered infant formula [14].

There have been no notified cases since 2005. One case of *E.sakazakii* invasive disease was notified in 2005 following addition of this disease to the notifiable diseases schedule. The case was an elderly male with peritonitis who was on a renal ward.

## GASTROENTERITIS

Gastroenteritis comprises a variety of communicable diseases and infections. Included in this section are infections by the following pathogens: norovirus, rotavirus, histamine fish poisoning, and *Clostridium perfringens*. Diseases and conditions that are notifiable in their own right (for example salmonellosis, campylobacteriosis, VTEC/STEC infection etc.) are reported separately.

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

In 2008, 690 cases of gastroenteritis (16.2 per 100 000 population) were notified. This is a slight increase from 2007 (14.7 per 100 00, 622 cases). A casual agent was reported for 215 cases (30.3%). Where the agent was identified, the most common pathogen was norovirus (117 cases) (Table 6).

**Table 6. Gastroenteritis cases where organism was identified, 2008**

| Organism | Cases | % |
|---|---|---|
| Norovirus infection | 117 | 54.4 |
| Rotavirus infection | 86 | 40.0 |
| Histamine (scromboid) poisoning | 4 | 1.9 |
| *Bacillus cereus* | 3 | 1.4 |
| Ciguatera fish poisoning | 2 | 0.9 |
| *Clostridium perfringens* | 2 | 0.9 |
| *Clostridium difficile* | 1 | 0.5 |
| Total | 215 | 100.0 |

Gastroenteritis notifications were highest in Whanganui (33.2 per 100 000 population, 21 cases) and West Coast DHBs (30.9 per 100 000, 10 cases). The lowest were in Northland (4.5 per 100 000 population, 7 cases) and Hawke's Bay DHBs (4.6 per 100 000, 7 cases).

Age was recorded 93.2% (643/690) cases. Age-specific rates were highest for infants aged less than one year of age (45.3 per 100 000 population, 29 cases) followed by the 1-4 year age group (42.8 per 100 000, 101 cases). The lowest age specific rate was for those aged 5-9 years (4.5 per 100 000, 13 cases) and 10-14 years (5.0 per 100 000, 15 cases).

Gastroenteritis rates were higher for females (16.5 per 100 000 population, 359 cases) compared with males (14.6 per 100 000, 305 cases). Sex was unknown for 26 of the cases.

Ethnicity was recorded for 95.7% (522/690) cases. Of these responses, the highest percentage of notifications occurred among those of European ethnicity (84.5%, 441 cases) followed by Other ethnicity (6.7%, 35 cases), Maori (6.1%, 32 cases) and Pacific Peoples (2.7%, 14 cases).

Hospitalisation status was recorded for 66.8% (461/690) cases. Of these, 40 cases (8.7%) were hospitalised.

In 2008, 145 gastroenteritis (type unspecified) outbreaks occurred, involving 1 427 cases. The outbreak surveillance section outlines enteric outbreaks where the pathogen is known.

The risk factors recorded for gastroenteritis cases are shown in Table 7. Similar to previous years, consumption of food from retail premises was the most common risk factor associated with gastroenteritis cases during 2008.

**Table 7. Exposure to risk factors associated with gastroenteritis, 2008**

| Risk Factor | Yes | No | Unknown | %[a] |
|---|---|---|---|---|
| Consumed food from retail premises | 246 | 51 | 393 | 82.8% |
| Contact with other symptomatic people | 72 | 243 | 375 | 22.9% |
| Consumed untreated water | 30 | 194 | 466 | 13.4% |
| Contact with farm animals | 38 | 267 | 385 | 12.5% |
| Contact with faecal matter | 27 | 201 | 462 | 11.8% |
| Recreational water contact | 13 | 249 | 428 | 5.0% |
| Travelled overseas during incubation period | 14 | 325 | 351 | 4.1% |
| Contact with sick animals | 7 | 279 | 404 | 2.5% |

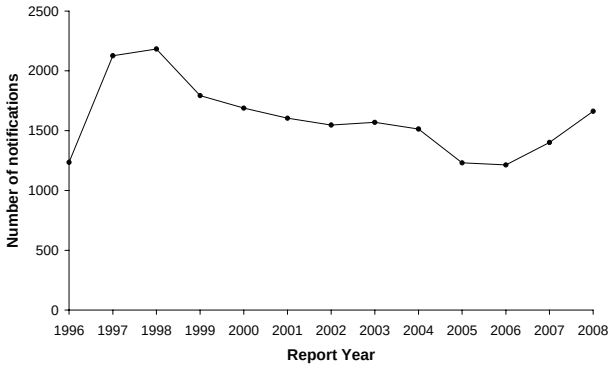
[a] "%" refers to the percentage of cases that answered "yes" out of the total number of cases for which this information was supplied. Cases may have more than one risk factor recorded.

## GIARDIASIS

There were 1 662 cases of giardiasis notified in 2008. The 2008 rate (38.9 per 100 000 population) is significantly higher than the 2007 rate (33.2 per 100 000, 1 402 cases).

Figure 10 shows giardiasis cases by year since the disease became notifiable in June 1996.

**Figure 10. Giardiasis notifications by year, 1996 – 2008**



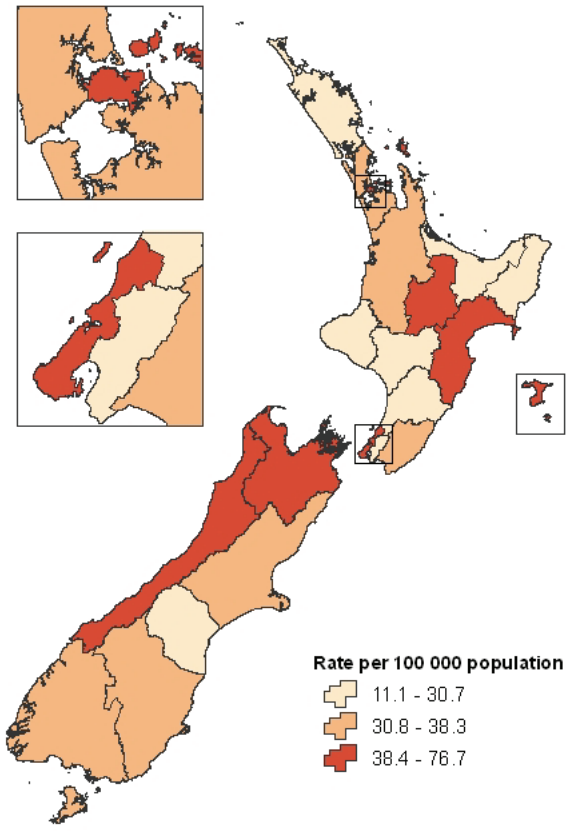

Rates varied throughout the country as illustrated in Figure 11. The highest rates were recorded in Capital and Coast (76.7 per 100 000 population, 218 cases), followed by West Coast (64.9 per 100 000, 21 cases) and Auckland DHBs (59.8 per 100 000, 262 cases). The lowest rate was recorded in Taranaki DHB (11.1 per 100 000, 12 cases).

Age specific notification rates were highest in the 1-4 years age group (134.8 per 100 000 population, 318 cases), followed by the 30-39 years age group (67.4 per 100 000, 393 cases), and those aged less than 1 years (67.1 per 100 000, 43 cases). This pattern remains consistent across all years since 1996 when the disease became notifiable in New Zealand.

Sex was recorded for 98.2% of the cases (1 632/1 662). Rates were slightly lower for females (37.0 per 100 000 population, 805 cases) compared to males (39.5 per 100 000, 827 cases).

Ethnicity was recorded for 977 (58.8%) giardiasis cases. The highest percentage of reported cases were for those of European ethnicity (88.1%, 861 cases), followed by Maori (6.3%, 62 cases), Other ethnicity (4.7%, 46 cases), and Pacific Peoples (0.8%, 8 cases).

**Figure 11. Giardiasis notifications by DHB, 2008**




Hospitalisation status was recorded for 811 (48.8%) notifications. Of these 22 (2.7%) were hospitalised.

There were 50 giardiasis outbreaks reported in 2008, involving 184 cases, of which 120 cases are included as individual notifications.

The risk factors recorded for giardiasis are shown in Table 8.

**Table 8. Exposure to risk factors associated with giardiasis, 2008**

| Risk Factor | Yes | No | Unknown | %[a] |
|---|---|---|---|---|
| Contact with other symptomatic people | 198 | 286 | 1178 | 40.9% |
| Consumed untreated water | 164 | 237 | 1261 | 40.9% |
| Recreational water contact | 162 | 304 | 1196 | 34.8% |
| Contact with faecal matter | 147 | 283 | 1232 | 34.2% |
| Contact with farm animals | 148 | 365 | 1149 | 28.9% |
| Consumed food from retail premises | 113 | 287 | 1262 | 28.3% |
| Travelled overseas during the incubation period | 164 | 475 | 1023 | 25.7% |
| Contact with sick animals | 15 | 423 | 1224 | 3.4% |

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

## *HAEMOPHILUS INFLUENZAE* SEROTYPE b DISEASE

Nine cases of *Haemophilus influenzae* serotype b (Hib) were notified in 2008, all of which were laboratory-confirmed.

Four laboratory-confirmed cases were aged less than five years (giving an age specific rate of 1.3 per 100 000 population) in comparison to eight cases in 2007 and four cases in 2006.

Of the laboratory-confirmed cases aged less than five years, two were male and two were female, all of Maori ethnicity. They were from Bay of Plenty (2), Tairawhiti (1) and Canterbury (1) DHBs.

A Hib vaccine was introduced in January 1994. Prior to August 2000, the recommended immunisation schedule consisted of four doses of DTPH vaccine given at six weeks, three months, five months and 15 months of age. The current schedule introduced in mid August 2000 recommends three doses of Hib vaccine at six weeks, three months and 15 months [15].

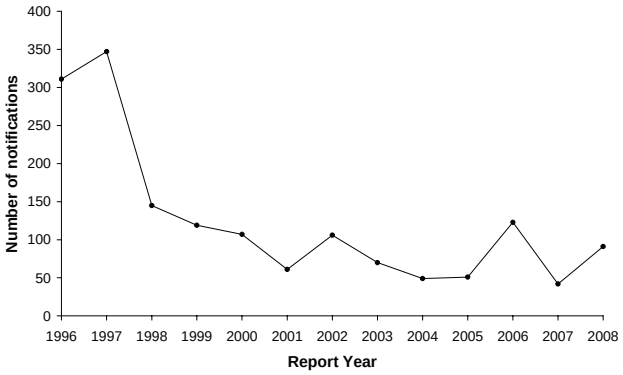
Three of the four laboratory-confirmed cases aged less than five years were recorded as immunised. Of these, one case reported having received the four Hib vaccine doses. The other two had undocumented doses of Hib vaccine. All the laboratory-confirmed cases aged less than five years were hospitalised (one child with meningitis and septicaemia, one child with meningitis and pneumonia, one child with epiglottitis, and one child with septicaemia). Children may present with more than one clinical manifestation.

## HEPATITIS A

There were 91 cases of hepatitis A notified in 2008, compared to 42 notifications in 2007. Over the last ten years there has been an overall downward trend in the number of notifications of hepatitis A, although an increase in notifications was observed in 2002, 2006 and again in 2008 (see Figure 12). The 2008 increase was partially attributed to two outbreaks, one at a childcare centre in the MidCentral DHB that involved 20 people and the other centred on a school in the Whanganui DHB that involved 9 people.

The national hepatitis A notification rate for 2008 was 2.1 per 100 000 population, which was a significant increase from the 2007 rate of 1.0 per 100 000. The highest rate was observed in the Whanganui DHB (14.2 per 100 000, 9 cases) followed by MidCentral (12.1 per 100 000, 20 cases), Northland (3.2 per 100 000, 5 cases) and Counties Manukau (3.2 per 100 000, 15 cases) DHBs.

**Figure 12. Hepatitis A notifications by year, 1996 – 2008**




Age-specific rates were highest in the 1-4 years age group (5.5 per 100 000 population, 13 cases) followed by 5-9 years age group (3.5 per 100 000, 10 cases), 15-19 years age group (2.8 per 100 000, 9 cases) and 20-29 years (2.8 per 100 000, 16 cases).

Sex was recorded for 97.8% of the cases (89/91). In 2008 males (2.8 per 100 000 population, 58 cases) had a higher notification rate than females (1.4 per 100 000, 31 cases).

Ethnicity was recorded for 84 (92.3%) hepatitis A cases. The highest percentage of reported cases were of European ethnicity (33 cases, 39.3%), followed by Other ethnicity (24 cases, 28.6%), Maori (14 cases, 16.7%) and Pacific Peoples (13 cases, 15.5%).

Of the 84 cases (92.3%) for which hospitalisation status were recorded, 20 cases (23.8%) were hospitalised. No deaths due to hepatitis A were reported in 2008.

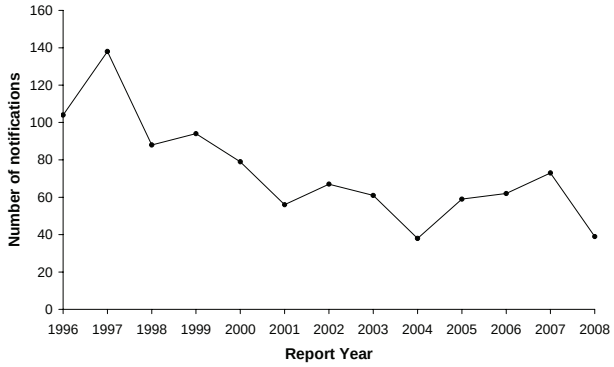
For those cases where history of overseas of travel was recorded (83 cases, 91.2%), 38 cases (45.8%) had travelled overseas during the incubation period of the disease. Countries most frequently visited included: India (8 cases), Fiji (7 cases), Samoa (4 cases) and the Republic of Korea (3 cases). Three outbreaks involving 31 cases were reported in 2008, the largest of these was centred on an early childhood centre in the Manawatu Health District (20 cases) and a school in the Wanganui District (9 cases). See the Outbreak Surveillance Section for more details.

## 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.

There were 39 cases of hepatitis B notified in 2008, compared to 73 notifications in 2007. There has been a general downward trend in the number of hepatitis B notifications reported between 1984 (over 600 notifications) and 2004 (38 notifications). This decrease was primarily attributed to the introduction of the hepatitis B vaccine to the immunisation schedule between 1985 and 1988 (Figure 13) [15].

**Figure 13. Hepatitis B notifications by year, 1996 - 2008**




The 2008 national notification rate for acute hepatitis B was 0.9 per 100 000 population which was a significant decrease from the 2007 rate (1.7 per 100 000). The highest rate was observed in the Auckland (2.3 per 100 000, 10 cases) DHB followed by Waitemata (1.5 per 100 000, 8 cases) and Canterbury (1.4 per 100 000, 7 cases) DHBs.

The age-specific incidence rate was highest in the 30-39 years age group (1.7 per 100 000, 10 cases), followed by the 40-49 years age group (1.4 per 100 000, 9 cases) and the 20-29 years age group (1.1 per 100 000, 6 cases).

Sex was recorded for 97.4% of the cases (38/39). In 2008 hepatitis B notification rate was slightly higher for males (1.1 per 100 000 population, 24 cases) than females (0.6 per 100 000, 14 cases).

Ethnicity was recorded for 35 (89.7%) hepatitis B cases. The highest percentage of reported cases were in the European ethnicity (18 cases, 51.4%), followed by Other ethnicity (7 cases, 20.0%), Pacific Peoples (6 cases, 17.1%) and Maori ethnicity (4 cases, 11.4%).

Of the 35 cases (89.7%) for which hospitalisation status was recorded, 16 cases (45.7%) were hospitalised. No deaths due to hepatitis B were recorded in 2008.

The risk factors recorded for hepatitis B are shown in Table 9. The most commonly associated risk factors were overseas travel (41.9%), sexual contact (18.2%) or household contact with a confirmed case or carrier (11.5%).

**Table 9. Exposure to risk factors associated with hepatitis B, 2008**

| Risk Factor | Yes | No | Unknown | %[a] |
|---|---|---|---|---|
| Overseas during incubation period | 13 | 18 | 8 | 41.9% |
| Sexual contact | 4 | 18 | 17 | 18.2% |
| Household contact with confirmed case | 3 | 23 | 13 | 11.5% |
| History of injecting drug use | 2 | 29 | 8 | 6.5% |
| Case was child of seropositive mother | 1 | 26 | 12 | 3.7% |
| Case dialysis patient | 1 | 29 | 9 | 3.3% |
| Body piercing/ tattooing in last 12 months | 0 | 26 | 13 | 0.0% |
| Occupational exposure to blood | 0 | 27 | 12 | 0.0% |

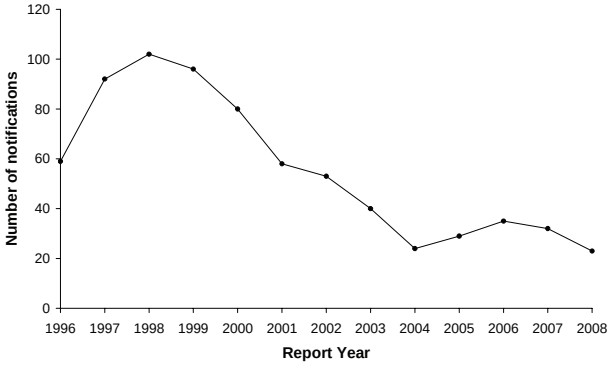
[a] "%" refers to the percentage of cases that answered "yes" out of the total number of cases for which this information was supplied. Several cases had more than one risk factor recorded.

## HEPATITIS C

There were 23 cases of hepatitis C notified in 2008, compared to 32 notifications in 2007. Between 1998 and 2004, the number of hepatitis C notifications had been steadily decreasing, although there was a slight increase in notifications in 2005 and 2006 (Figure 14).

The national hepatitis C notification rate in 2008 was 0.5 per 100 000 population compared to 0.8 per 100 000 in 2007. The greatest number of cases was reported from the Counties Manukau DHB (4 cases) followed by Lakes, Taranaki and Canterbury DHBs (3 cases each).

**Figure 14. Hepatitis C notifications by year, 1996 - 2008**



All but one case (95.7%) were aged between 20 and 59 years. The age-specific notification rate was highest in the 20-29 years age group (2.1 per 100 000 population, 12 cases),all other age groups contained less than 5 cases.

In 2008, males (0.6 per 100 000 population, 12 cases) and females (0.5 per 100 000, 11 cases) had a similar notification rate.

Ethnicity was recorded for 21 (91.3 %) hepatitis C cases. The highest percentage of reported cases were of European ethnicity (15 cases, 71.4 %), followed by Maori (5 cases, 23.8%) and Other ethnicity (1 cases, 4.8 %).

Hospitalisation status was recorded for 78.3 % of cases (18/23). Of these, only 2 cases (11.1 %) were hospitalised. There were no deaths due to hepatits C reported in 2008.

The risk factors recorded for hepatitis C are shown in Table 10. The most commonly recorded risk factor was intravenous drug use, which is consistent with data from 2005 to 2007.

**Table 10. Exposure to risk factors associated with hepatitis C, 2008**

| Risk Factor | Yes | No | Unknown | %[a] |
|---|---|---|---|---|
| History of injecting drug use | 15 | 1 | 7 | 93.8% |
| Household contact with confirmed case | 5 | 3 | 15 | 62.5% |
| Sexual contact | 3 | 5 | 15 | 37.5% |
| Body piercing/ tattooing in last 12 months | 4 | 9 | 10 | 30.8% |
| Case was child of seropositive mother | 2 | 8 | 13 | 20.0% |
| Occupational exposure to blood | 1 | 11 | 11 | 8.3% |
| Case dialysis patient | 0 | 9 | 14 | 0.0% |
| Overseas during incubation period | 0 | 13 | 10 | 0.0% |

[a] "%" 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.

## HEPATITIS (VIRAL) NOT OTHERWISE SPECIFIED (NOS)

Two cases of hepatitis NOS notified in 2008. Both cases were hospitalised following infection with hepatitis E. One case, a 37 year old Indian female from Auckland DHB, had recently returned from travel to India and Malaysia.

The other case, a 57 year old Indian female from Counties Manukau DHB had no risk factor information recorded.

Since 1997 a total of 34 cases of hepatitis NOS have been notified in New Zealand.

## HIGHLY PATHOGENIC AVIAN INFLUENZA (HPAI)

Highly Pathogenic Avian Influenza (HPAI) was made 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 bird populations to the end of 2008.

Worldwide, during 2008, there were 44 laboratory-confirmed A(H5N1) cases resulting in 33 fatalities. These occurred in Indonesia (24 cases, 20 deaths), Egypt (8 cases, 4 deaths), Vietnam (6 cases, 5 deaths), China (4 cases, 4 deaths), Bangladesh (1 case, 0 deaths), and Cambodia (1 case, 0 deaths) [16].

## HYDATID DISEASE

Seven cases of hydatid disease, a disease caused by the larval stage of the tapeworm *Echinococcus granulosus*, were notified in 2008. The 2008 notification rate was 0.2 per 100 000 population. Since 1997, a total of 40 cases of hydatid disease have been notified.

One (14.3%) case was in the 30-39 years age group, one (14.3%) was in the 40-49 years age group, two (28.6%) were in the 50-59 years age group, two (28.6%) were in the 60-69 years age group and one case was in the 70+ years age group. Five (71.4%) cases were male and two (28.6%) were female. Six cases had an ethnicity recorded: four (75.0%) cases were European, one (12.5%) was Maori and one (12.5%) was Other ethnicity. Two cases were hospitalised and all seven cases were laboratory-confirmed.

One case had a history of farm/meatwork exposure in childhood. Another was born in Turkey and had been diagnosed and treated for hydatid disease two years ago in Australia. Three additional cases reported working on farms during their childhood, of which one was in South Africa. One further case was recorded as acquiring the disease in the Cook Islands. Only one case had no risk factor information at all.

*Echinococcus* species are notifiable organisms under the Biosecurity Act 1993. All cases of hydatid disease are reported to the Ministry of Agriculture and Forestry (MAF) 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 was added to the list of notifiable diseases on 17 October 2008. As the notifications reported do not cover an entire year disease rates have been not been calculated. A full description of the epidemiology of invasive pneumococcal disease in 2008 based on laboratory data is contained in a separate report [17].

A total of 127 cases of invasive pneumococcal disease were notified on EpiSurv from 17 October 2008 to 31

December 2008. Age and sex were recorded for all cases. Cases were distributed by age as follows; less than one year (6 cases), 1 year (9 cases), 2-4 years (8 cases), 5-19 years (10 cases), 20-64 years (45 cases) and 49 cases over the age of 65 years. There were more male cases (71 cases) than females (56 cases) reported.

Ethnicity was recorded for 82.7% (105/127) of the cases and cases were distributed by ethnicity as follows; Maori (26 cases, 24.8% of responses), Pacific Peoples (13 cases, 12.4%), other ethnicities (8 cases, 7.6%), and European (58 cases, 55.2%)

Of the 111 cases (87.4%) for which hospitalisation status was recorded, 106 (95.5%) were hospitalised. Eight deaths were reported during 2008; one of these was in the 1 year age group, one in the 20-64 years age group and the remaining six cases were aged over 65 years.

The risk factors recorded for invasive pneumococcal disease are shown in Table 11.

**Table 11. Exposure to risk factors associated with invasive pneumococcal disease, 2008**

| Risk Factor | Yes | No | Unknown | %[a] |
|---|---|---|---|---|
| Attends childcare (cases <5 years of age) | 3 | 3 | 17 | 50.0 |
| Chronic illness | 45 | 52 | 30 | 46.4 |
| Smoking in the household (cases <5 years of age) | 2 | 4 | 17 | 33.3 |
| Premature (cases <1 year of age) | 1 | 2 | 3 | 33.3 |
| Current smoker | 21 | 54 | 52 | 28.0 |
| Immunocompromised | 19 | 76 | 32 | 20.0 |
| Chronic lung disease or Cystic Fibrosis | 16 | 67 | 44 | 19.3 |
| Resident in long term or other chronic care facility | 8 | 93 | 26 | 7.9 |
| Congenital or chromosomal abnormality | 1 | 84 | 42 | 1.2 |

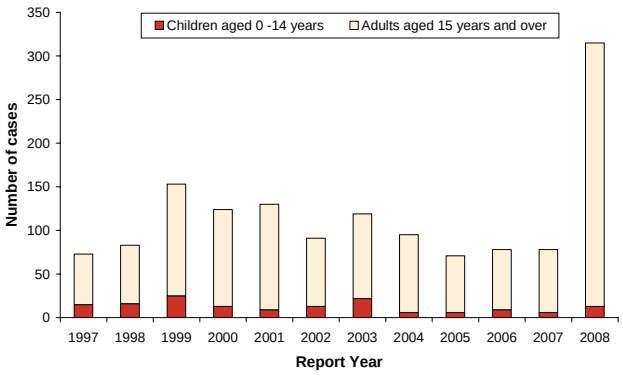
[a] "%" refers to the percentage of cases that answered "yes" out of the total number of cases for which this information was supplied. Several cases had more than one risk factor recorded.

## LEAD ABSORPTION

There were 315 cases of lead absorption notified in 2008 (7.4 per 100 000 population), which is significantly higher than the number notified in 2007 (1.8 per 100 000 population, 78 cases).

Figure 15 illustrates the annual variability in lead absorption notifications in both children and adults between 1997 and 2008. Between 2005 and 2007 the number of notifications has been relatively stable, and the number of notified cases in 2008 is the highest recorded.

**Figure 15. Lead absorption notifications in children and adults by year, 1997-2008**




Of the 315 cases notified in 2008, 13 (4.1%) were aged less than 15 years; two were aged less than 1 year, five cases were aged 1-4 years, four cases were aged 5-9 years and two cases were aged 10-14 years. The highest number of notifications in children was recorded in 1999 (25 cases) and the lowest in 2004, 2005 and 2007 (6 cases each).

Sex was recorded for 98.1% (309/315) of the cases. The majority of lead absorption notifications were for males (89.3%, 276 cases), compared to females (10.7%, 33 cases).

Ethnicity was recorded for 56.5% (178/315) of the cases. Of these responses, the majority of lead absorption notifications were reported for Europeans (82.6%, 147 cases), followed by Maori (7.9%, 14 cases), Pacific Peoples (6.7%, 12 cases) and Other ethnicity (2.8%, 5 cases).

Of the 141 cases for which hospitalisation status was recorded, two (1.4%) were hospitalised.

Table 12 and Table 13 summarise risk factor information for lead absorption cases notified in 2008. Several cases had more than one risk factor recorded. Similar to previous years, the most common risk factor for lead absorption for children was living in, or regularly visiting, a building built prior to 1970 that had paint chalking/flaking, and/or had recently undergone alteration or refurbishment. Unlike previous years, for adults the most common risk factor for lead absorption was exposure to a high-risk occupation.

Blood lead levels were recorded for all of the notifications. For child notifications, blood lead level concentrations ranged from 0.48 to 1.90 µmol/L with a median of 0.70 µmol/L. For adult notifications, blood lead level concentrations ranged from 0.36 to 6.10 µmol/L with a median of 0.71 µmol/L.

Two lead poisoning clusters were reported by Auckland Regional Public Health Service during 2008. One cluster involved four family members who were exposed to lead paint when it was removed from their house. The remaining cluster involved 100 persons who were occupationally exposed to lead during the removal of paint from the Auckland Harbour Bridge. Cases continue to be reported from this cluster.

**Table 12. Exposure to risk factors associated with lead absorption for adults (cases aged 15 years and over), 2008**

| Risk factor | Yes | No | Unknown | %[a] |
|---|---|---|---|---|
| Case had exposure to high-risk occupation[b] | 213 | 58 | 31 | 78.6 |
| Cased lived in or regularly visited a building built prior to 1970[c] | 67 | 51 | 184 | 56.8 |
| Case had exposure through hobbies[d] | 59 | 65 | 178 | 47.6 |
| Close contact of case was occupationally exposed to lead | 4 | 107 | 191 | 3.6 |

[a] "%" 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

[b] Occupations included painter (37), radiator repairer (12), builder/labourer (8), cleaner (5), lead lighter (5), plastics worker (4), metallurgist (3), welder (3), foundry worker (2), laboratory technician (3), supervisor (2), electrician (2), aeronautical engineer (1), aircraft refueller (1), boilermaker (1), engineer (1), factory process worker (1), fitter (1), meat process worker (1), sand stripper (1), yardsman (1) and unspecified (118)

[c] Of these, 32 cases lived in or regularly visited a building that had chalking/flaking paint, and/or had recently undergone alterations or refurbishment

[d] Hobbies were reported as shooting (34), home renovations (6), making sinkers (4), making lead bullets (3), lead lighting (3), boat building (2), car restorer (2), painter (2), antique furniture restorer (1), circuit board repairer (1), figurine maker (1) and unspecified (1)

**Table 13. Exposure to risk factors associated with lead absorption for children (cases aged less than 15 years), 2008**

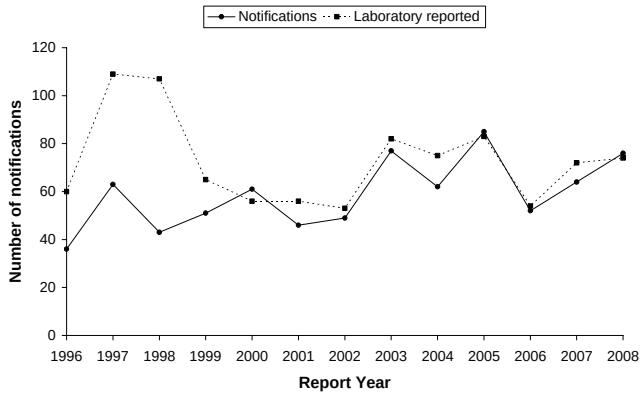
| Risk factor | Yes | No | Unknown | %[a] |
|---|---|---|---|---|
| Cased lived in or regularly visited a building built prior to 1970 that had paint chalking/flaking, and/or had recently undergone alterations or refurbishment | 6 | 1 | 6 | 85.7 |
| Pica behaviour | 4 | 6 | 3 | 40.0 |
| Case played in soil containing paint debris | 1 | 6 | 6 | 14.3 |
| Close contact of case was occupationally exposed to lead | 1 | 8 | 4 | 11.1 |
| Case lived near an industry that is likely to release lead | 0 | 10 | 3 | 0.0 |

[a] "%" 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.

## LEGIONELLOSIS

There were 76 cases of legionellosis notified in 2008. This represents a rate of 1.8 per 100 000 population, which has increased from 2007 (1.5 per 100 000, 64 cases) but is similar to that reported in other recent years (Figure 16).

**Figure 16. Legionellosis notifications and laboratory-reported cases by year, 1996 - 2008**




The highest rates in 2008 were reported from the Bay of Plenty (9 cases, 4.4 per 100 000) and Hawke's Bay (6 cases, 3.9 per 100 000) DHBs.

The highest age specific rate (7.3 per 100 000 population, 27 cases) was reported in cases aged 70+ years followed by those aged 60-69 years (5.3 per 100 000, 20 cases) and those aged 50-59 years (2.5 per 100 000, 13 cases).

Sex was recorded for 98.7% of the cases (75/76). The 2008 legionellosis rate was slightly higher for males (2.0 per 100 000, 41 cases) than for females (1.6 per 100 000, 34 cases).

Of the 67 cases in 2008 for which hospitalisation status was recorded, 56 (83.6%) were hospitalised.

There were four deaths reported from legionellosis in 2008. Three deaths were females aged over 70 years old and one was a male in the 40-49 years old age group.

Table 14 provides a summary of the risk factors for which data were available. Of the 53 cases with a definite or suspected environmental source of infection recorded, 34 (64.1%) reported contact with compost/potting mix/soil, 11 reported exposure to showers/hot water systems, six reported exposure to a spa/indoor pool, six reported exposure to an air conditioning unit (including one during maintenance), and two reported using a water blaster. For some cases more than one potential source was recorded. Six reported cases had a history of overseas travel during the incubation period.

**Table 14. Risk factors associated with legionellosis, 2008**

| Risk Factor | Yes | No | Unknown | %[a] |
|---|---|---|---|---|
| Contact with definite or suspected environmental source of infection | 53 | 3 | 20 | 94.6 |
| Pre-existing immunosuppressive or debilitating condition | 26 | 31 | 19 | 45.6 |
| Smokers or ex-smokers | 11 | 49 | 16 | 18.0 |

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

A total of 74 cases of legionellosis were laboratory diagnosed during 2008. Table 15 shows the strains identified for the laboratory-reported cases in 2008.

There were no legionellosis outbreaks reported in 2008.

**Table 15. Legionellosis strains for laboratory cases, 2008**

| *Legionella* species/serogroup | Number | %[a] |
|---|---|---|
| *L. pneumophila* sg1 | 21 | 28.4 |
| *L. longbeachae* sg1 | 19 | 25.7 |
| *L. longbeachae* sg unknown | 18 | 24.3 |
| *L. dumoffii* | 5 | 6.8 |
| *L. bozemanae* | 2 | 2.7 |
| *L. gormanii* | 2 | 2.7 |
| *L. feeleii* sg1 | 1 | 1.4 |
| *L. longbeachae* sg2 | 1 | 1.4 |
| *L. micdadei* | 1 | 1.4 |
| *L. pneumophila* sg2 | 1 | 1.4 |
| *L. pneumophila* sg5 | 1 | 1.4 |
| *L. pneumophila* sg6 | 1 | 1.4 |
| *L. pneumophila* sg12 | 1 | 1.4 |
| Total | 74 | |

[a] "%" refers to the percentage of laboratory cases with that strain out of the total number of cases for which strains were identified.

## LEPROSY

Five cases of leprosy were notified in New Zealand in 2008. Cases were distributed by age as follows; 20-29 years (2 cases), 30-39 years (1 case), 40-49 years (1 case) and 50-59 years (1 case). Two cases were male, three cases were female. One case was European, one case was Asian and three cases were Pacific Peoples.

The status was notified as confirmed for all five cases. The clinical form of leprosy was recorded as borderline for one case, tuberculoid for one case, lepromatous for two cases and the form of leprosy was not stated for the remaining case. Acid-fast status was reported for four cases: one paucibacillary and three multibacillary. All cases were overseas during the incubation period; one was in South Asia and the remaining four cases were in a Pacific Island nation.

## LEPTOSPIROSIS

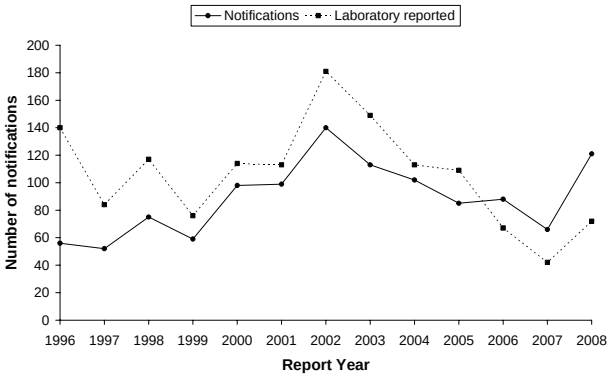
A total of 121 cases of leptospirosis were notified in 2008. The rate of 2.8 cases per 100 000 population was significantly higher than the notification rate in 2007 (1.6 per 100 000 population, 66 cases). Of the 121 notified cases, 89 (73.6%) were laboratory-confirmed.

Figure 17 shows the number of notified and laboratory-reported cases of leptospirosis each year since 1996.

The highest age specific rates were reported in the 20-29 years age group (5.1 per 100 000 population, 29 cases), followed by those in the 50-59 years age group (4.4 per 100 000, 23 cases). Sex was recorded for all cases, where the majority were male (85.1%, 103 cases). Ethnicity was recorded for 86.8% (105/121) of the cases. The majority of the cases were European (74.3%, 78 cases), followed by Maori (24.8%, 26 cases) and Pacific Peoples (1.0%, 1 case).

No leptospirosis-related deaths were reported in 2008. Of the 101 cases for which hospitalisation status was recorded, 46 (45.5%) were hospitalised.

**Figure 17. Leptospirosis notifications and laboratory-reported cases by year, 1996 - 2008**




Occupation was recorded for 107 (88.4%) of the 121 notified cases. Of these, 78 cases (72.9%) were recorded as engaged in occupations previously identified as high risk for exposure to *Leptospira spp.* in New Zealand [18]. The proportion of leptospirosis cases in high-risk occupations was lower than previous years (82.8% in 2007 and 82.7% in 2006). The proportion in low-risk occupations increased from 17.2% (10 cases) in 2007 to 27.1% (29 cases) in 2008.

Of the 107 cases with an occupation recorded, 42 (39.3%) were farmers or farm workers and 36 (33.6%) worked in the meat processing industry (as freezing workers, butchers, slaughtermen, or meat packers). Of the 29 cases where occupation was not reported as a risk factor, 23 reported animal/outdoor exposures.

The *Leptospira* species and serovars (sv) was recorded for 84 of the 121 notified cases: *L. borgpetersenii* sv Hardjo (33 cases), *L. borgpetersenii* sv Ballum (18), *L. interrogans* sv Pomona (16), *L. borgpetersenii* sv Tarassovi (11), *L. interrogans* sv Copenhageni (3), and *L. interrogans* sv Australis (1). Two cases had mixed serovars: *L. borgpetersenii* sv Hardjo and *L. interrogans* sv Copenhageni (1), and *L. borgpetersenii* sv Hardjo *and L. interrogans sv* Pomona (1).

Four outbreaks of *Leptospira* were reported in 2008, involving 20 cases. The largest outbreak involved 13 cases.

## LISTERIOSIS

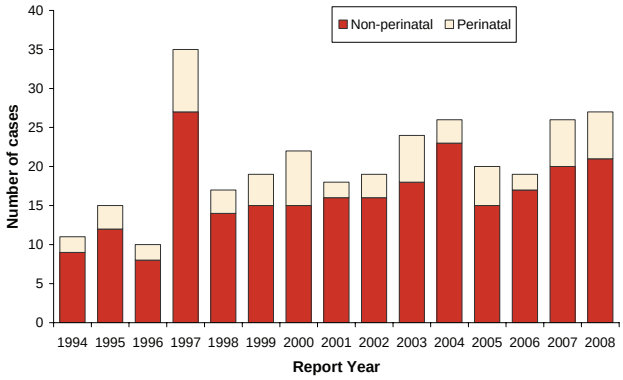
In 2008, 27 cases of listeriosis were notified, a rate of 0.6 per 100 000 population. Figure 18 shows listeriosis notifications (perinatal and non-perinatal) each year for the last 15 years. Over the preceding five years (2003-2007) the average number of cases per year was 23, peaking with 26 cases (0.6 per 100 000 population) in 2004 and 2007, the highest since 1997 (35 cases).

Six (22.2%) of the 2008 cases were recorded as perinatal, the same as in 2007 and an increase from 2006 (2 cases). Weeks of gestation were known for all cases with a range of 20 to 40 weeks. Two cases of 20 and 29 weeks gestation died. The mothers were both from the 20-29 years age group and were of European ethnicity.

The 21 non-perinatal cases were from 12 DHBs, with the greatest number from Waikato (4) and Canterbury (3). One of the non-perinatal cases was aged <1 year and the rest were

aged over 30 years, with 11 cases aged over 70 years. Sex was recorded for all cases, of which 11 were male and 10 were female. Ethnicity was recorded for all cases, of which 16 cases were European, two were Maori, two Pacific Peoples, and one of Other ethnicity.

**Figure 18. Listeriosis notifications (perinatal and non-perinatal) by year, 1994 - 2008**




Hospitalisation status was recorded for 20 non-perinatal cases, of which 17 were hospitalised but nine were hospitalised for treatment of another illness and five were receiving immunosuppressive drugs (note that a case may have more than one risk factor). Three deaths in 2008 were due to non-perinatal listeriosis (age 70+ years). Information on underlying illness was recorded for 81.0% (17/21) of the non-perinatal cases, of which 15 had an underlying illness such as cancer, autoimmune disease, lung disease, and other chronic illnesses.

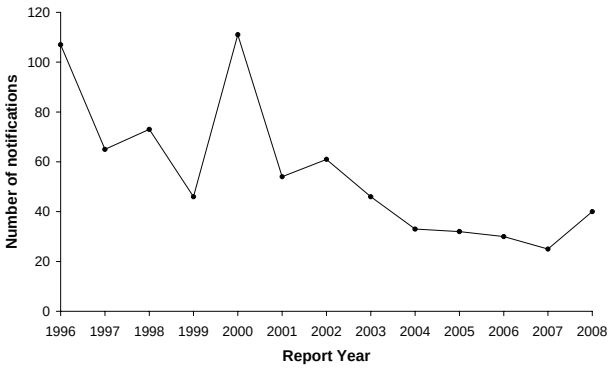
Twenty-three cultures for typing were received by the ESR Special Bacteriology Laboratory. Sixteen (69.6%) were serotype 4; the remaining seven (30.4%) were serotype 1/ 2.

There were no outbreaks of listeriosis reported in 2008.

## MALARIA

There were 40 cases of malaria notified in 2008 compared to 25 cases in 2007 (Figure 19). The 2008 notification rate (0.9 per 100 000 population) was higher than that for 2007 (0.6 per 100 000 population).

**Figure 19. Malaria notifications by year, 1996 - 2008**




Age was recorded for all the reported malaria cases. The highest age specific rates were reported in the 20-29 years (2.5 per 100 000 population, 14 cases) and 30-39 years (1.2 per 100 000 population, 7 cases) age groups.

Sex was recorded for 97.5% (39/40) of the cases. The notification rate was slightly higher for males than females (1.1 per 100 000 population, 22 cases; 0.8 per 100 000 population, 17 cases, respectively).

Ethnicity was recorded for 75.0% (30/40) of the cases. Of the 30 cases the highest number of notifications occurred for those of Other ethnicity (18 cases, 60.0%), followed by European ethnicity (7 cases, 23.3%) and Pacific Peoples (5 cases, 16.7%).

Hospitalisation status was recorded for 82.5% (33/40) of the cases. Of the 33 cases, 54.5% (18 cases) were hospitalised. One case is still under investigation while the remaining 39 cases were laboratory-confirmed.

Travel history was recorded for 97.5% (39/40) of the cases. Thirty-four (87.2%) cases had resided or travelled overseas recently and three cases (7.7%) had past history of travel to malaria endemic areas. The case with "unknown" travel history had a past history of travel to India. The most common countries visited or resided in were India - 33.3% (13/39 cases) and Papua New Guinea - 20.5% (8/39 cases). The overseas areas travelled to or resided in and the *Plasmodium* species identified are listed in Table 16. The most common species identified was *P. vivax* (21 cases), followed by *P. falciparum* (16 cases), *P. ovale* (4 case), *P. malarie* (1 case) and one indeterminate species.

Malaria prophylaxis was used regularly by two cases. Twelve cases did not take any, and prophylaxis use was unknown for 26 cases.

NZHIS Hospitalisation data for 2008 recorded 30 cases with the primary reason for admission being malaria.

## MEASLES

In New Zealand, measles immunisation was introduced in 1969 and it has been a notifiable disease since June 1996. In 2008 there were 12 measles notifications, of which seven were laboratory-confirmed cases. This is less than 2007 when there were 24 notifications with six laboratory-confirmed cases. The number of annual measles notifications has not exceeded 40 since 2004 (Figure 20).

The 2008 measles notification rate was 0.3 per 100 000 population. This rate is a significant decrease from 2007 (0.6 per 100 000). Canterbury was the only DHB where more than five notifications were reported in 2008 (1.4 per 100 000 population, 7 cases).

The highest age-specific rate was seen in the 1 to 4 years age group (3.4 per 100 000 population, 8 cases). All other age groups reported one or less cases for the year.

In 2008 there were more measles notifications for males (9 cases) than females (3 cases).

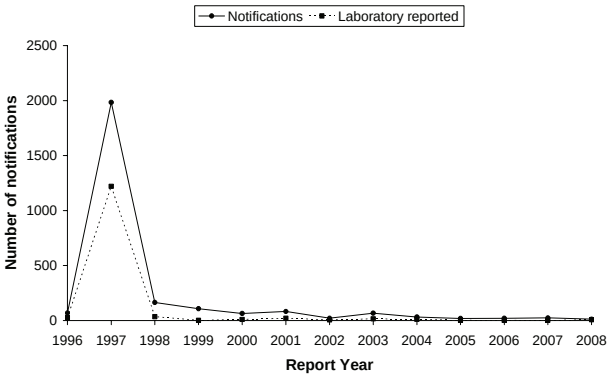
Ethnicity was recorded for all but one (91.7%) of the measles notifications during 2008. The highest number of cases occurred among those of European ethnicity (9 cases, 81.8%), followed by those of Maori and Other ethnicity (1 case each, 9.1%).

**Table 16. Species of malaria and area of overseas travel, 2008**

| Area resided in or visited | *P. falciparum* | *P. vivax* | *P. malarie* | *P. ovale* | Indeterminate |
|---|---|---|---|---|---|
| Cambodia | 1 | | | | |
| Fiji | | 1 | | | |
| India | 2 | 9 | 1 | 1 | |
| Indonesia | | 1 | | | |
| Kenya | 1 | | | | |
| Malaysia | | 1 | | | |
| Mali | 1 | | | 1 | |
| Nigeria | 2 | | | | 1 |
| Pakistan | 1 | | | | |
| Papua New Guinea | 3 | 5 | | | |
| Solomon Islands | | 1 | | | |
| South Africa | | | | 1 | |
| Spain | | | | 1 | |
| Thailand | | 2 | | | |
| Uganda | 5 | | | | |
| Vanuatu | | 1 | | | |
| Total[a] | 16 | 21 | 1 | 4 | 1 |

[a] Cases may have travelled to more than one country during the incubation period.

**Figure 20. Measles notifications and laboratory reported cases by year, 1996 - 2008**




Two of the 12 cases (16.7%) were admitted to hospital. Of the 11 cases for which the information was recorded, six (54.5%) attended school, pre-school or childcare. Two measles cases reported overseas travel during the incubation period. There was one outbreak due to measles reported in 2008. The outbreak occurred at a childhood centre but only involved 2 cases.

The recommended MMR immunisation schedule since January 2001 is to give the first vaccine dose at 15 months and the second at four years of age. Vaccination status was recorded for all 12 cases. Of these 5 (41.7%) had not received any doses of the MMR vaccine. Table 17 shows vaccination status by age group.

**Table 17. Age group and vaccination status of measles notifications, 2008**

| Age Group | Total Cases | Vaccination Status | | | | |
|---|---|---|---|---|---|---|
| | | One Dose | Two Doses | Vaccinated (no dose info) | Not Vaccinated | Unknown |
| <15mths | 2 | 0 | 0 | 0 | 2 | 0 |
| 15mths-3yrs | 5 | 4 | 0 | 0 | 1 | 0 |
| 4-9 yrs | 2 | 0 | 2 | 0 | 0 | 0 |
| 10-19 yrs | 2 | 0 | 0 | 0 | 2 | 0 |
| 20+ yrs | 1 | 0 | 0 | 1 | 0 | 0 |
| Total | 12 | 4 | 2 | 1 | 5 | 0 |

## MENINGOCOCCAL DISEASE

A full description of the epidemiology of meningococcal disease in 2008 is contained in a separate report[19].

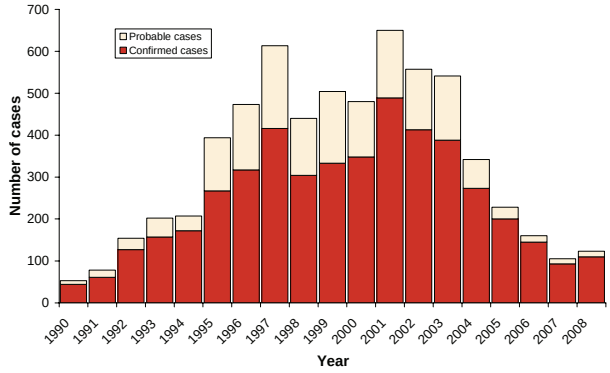
The surveillance of meningococcal disease in New Zealand is based upon the rigorous matching and follow-up of all laboratory and notification data. A total of 123 cases of meningococcal disease were notified in 2008, giving a rate of 3.1 per 100 000 population. This rate is a significant decrease from 2004 (8.5 per 100 000 population, 342 cases) yet is still 2.1 times higher than the rate of 1.5 per 100 000 population occurring in the immediate pre-epidemic years (1989-90). Figure 21 shows the number of confirmed and probable cases of meningococcal disease since 1990.

Of the 123 cases for 2008, 110 (89.4%) were laboratory-confirmed by either culture (78) or DNA testing (32).

These figures are based on the combined laboratory and notification database, which uses earliest date for the case (onset or hospitalisation data rather than report date, if available). The population used to calculate rates in this section is the 2006 census to allow comparison with earlier years. All tables in the appendices of this report are based on report date and population estimates hence figures may differ slightly.

Of the DHBs with more than five cases reported in 2008, the highest rates were recorded in Hawke's Bay (8.1 per 100 000 population) and Whanganui (8.0 per 100 000) DHBs. The lowest rates were from Waitemata DHB (1.5 per 100 000) and Canterbury DHB (1.9 per 100 000 population). No cases were reported from Lakes DHB. Figure 22 illustrates the rates of meningococcal disease by DHB.

**Figure 21. Meningococcal disease notifications by year, 1990 - 2008**




Note: Probable cases are those for whom a meningococcus has not been identified but who fulfil the clinical criteria for meningococcal disease.

As in previous years, the highest age specific rates occurred in the less than 1 year age group (33.6 per 100 000 population, 19 cases) followed by the 1-4 years age group (15.1 per 100 000, 33 cases).

Ethnicity was recorded for 97.6% (120/123) of the cases reported in 2008. The majority of the cases were of European ethnicity (43.3%, 52 cases), followed by Maori (34.2%, 41 cases), Pacific Peoples (17.5%, 21 cases) and Other ethnicity (5.0%, 6 cases).

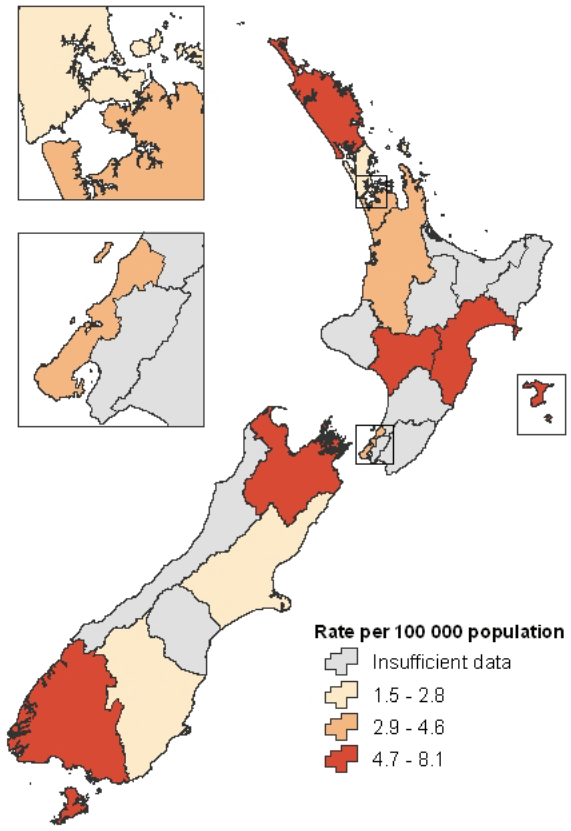
Eight deaths were reported during 2008 with the associated case fatality rate of 6.5%. This brings the number of deaths since 1991 to 260, with an average case fatality rate of 4.2%.

Data on pre-hospital management were recorded for 94.3% (116/123) cases. These data show that 21.6% (25/116) of cases received antibiotic treatment prior to hospital admission. In 2008, there were two fatalities among cases seen by a doctor prior to hospital admission neither of whom were given antibiotics. In comparison there were six fatalities in those cases not seen by a doctor prior to admission and not given pre-hospital antibiotics.

Serogroup B disease and particularly that caused by the epidemic strain, has continued to cause disease in 2008. However, the number of epidemic strain cases in 2008 was less than one-fifth of that in the peak year of 2001 (44 cases compared to 262 cases). Of the 44 epidemic strain cases, 31 were less than 20 years of age.

The antimicrobial susceptibility of 79 viable meningococcal isolates received at ESR from cases of invasive disease in 2008 was tested. All isolates were susceptible to ceftriaxone, rifampicin and ciprofloxacin. 26.6% (21/79) of isolates had reduced susceptibility to penicillin, with MICs of 0.12-0.5 mg/L.

**Figure 22. Meningococcal disease notifications by DHB, 2008**

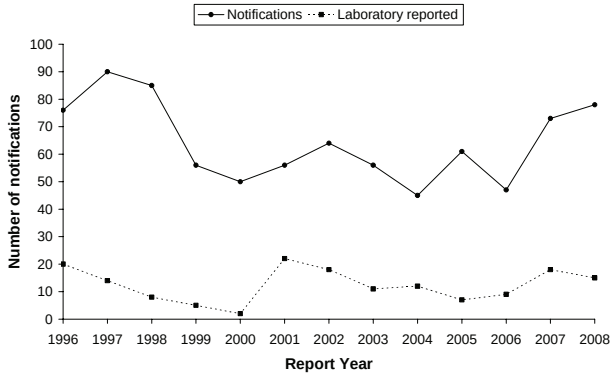



## MUMPS

A total of 78 cases of mumps were notified in 2008, of which 42 cases were laboratory-confirmed. In comparison, 73 cases of mumps were notified in 2007, of which 35 were laboratory-confirmed.

Immunisation against mumps was introduced to the NZ Immunisation Schedule in 1990 as part of the MMR vaccine and mumps became a notifiable disease in June 1996. The last epidemic occurred in 1994. Figure 23 shows notified and laboratory-reported cases from 1996 to 2008.

**Figure 23. Mumps notifications and laboratory-reported cases by year, 1996-2008**




The 2008 notification rate of 1.8 per 100 000 population is similar than the 2007 rate of 1.7 per 100 000 population. The highest rate was recorded in Hawke's Bay (3.3 per 100 000 population, 5 cases) followed by Canterbury (2.6 per 100 000, 13 cases), Waikato (2.5 per 100 000, 9 cases) and Bay of Plenty (2.4 per 100 000, 5 cases) DHBs.

There were no cases of mumps in the less than one year age group. Age-specific rates were highest in the 1-4 years age group (10.2 per 100 000 population, 24 cases) followed by the 5-9 years (4.5 per 100 000, 13 cases), and 10-14 years (4.0 per 100 000, 12 cases) age groups.

Sex was recorded for 94.9% of the cases (74/78). The 2008 mumps notification rate for females was 1.8 per 100 000 population (40 cases) and the rate for males was 1.6 per 100 000 population (34 cases).

Ethnicity was recorded for 67 (85.9%) notifications. Of these the highest number of cases occurred among those of European ethnicity (49.3%, 33 cases), followed by those of Maori (23.9%, 16 cases), Pacific Peoples (17.9%, 12 cases) and Other ethnicity (9.0%, 6 cases).

Of the 78 cases notified during 2008, 68 (87.2%) had hospitalisation information recorded. Of these, seven cases (10.3%) were hospitalised. No deaths were reported from mumps in 2008. Of the 54 cases for which this information was recorded, 22 (40.7%) attended school, pre-school or childcare. Five cases reported overseas travel during the incubation period.

The recommended immunisation schedule for mumps in 2008 was two doses of MMR vaccine, the first given at 15 months of age and the second given at age 4 years of age. Vaccination status was recorded for 50 cases notified during 2008. Of these, 19 (38.0%) had not received any doses of the MMR vaccine. 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, 2008**

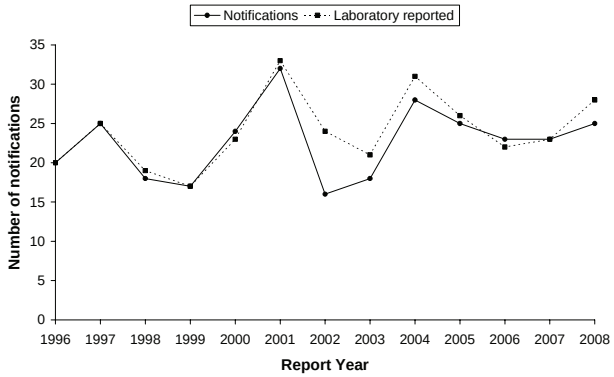
| | | Vaccination Status | | | | |
|---|---|---|---|---|---|---|
| Age Group | Total Cases | One Dose | Two Doses | Vaccinated (no dose info) | Not Vaccinated | Unknown |
| <15mths | 3 | 0 | 0 | 0 | 2 | 1 |
| 15mths-3yrs | 13 | 5 | 0 | 0 | 6 | 2 |
| 4-9 yrs | 21 | 6 | 2 | 4 | 4 | 5 |
| 10-19 yrs | 15 | 2 | 8 | 0 | 3 | 2 |
| 20+ yrs | 26 | 0 | 1 | 3 | 4 | 18 |
| Total | 78 | 13 | 11 | 7 | 19 | 28 |

## PARATYPHOID FEVER

Twenty-five cases of *Salmonella* Paratyphi were notified in 2008. The 2008 rate (0.6 per 100 000 population) was similar to the 2007 rate (0.5 per 100 000 population).

Figure 24 shows the number of notified and laboratory reported cases of paratyphoid each year since 1996.

**Figure 24. Paratyphoid fever notifications and laboratory-reported cases by year, 1996 - 2008**




Age was recorded for all of the cases. The most frequent age of notification was 20-29 years of age (5 cases, a rate of 0.9 per 100 000 population).

Sex was recorded for all of the cases. The age-specific rate was the same for females (0.6 per 100 000 population, 12 cases) as males (13 cases).

Of the 20 cases for which ethnicity was recorded, the highest percentage of cases were reported for Other ethnicity (60%, 12 cases), followed by European (35%, 7 cases) and Maori (5%, 1 case).

Of the 17 cases for which hospitalisation status was recorded, 6 (35.3%) were hospitalised.

Overseas travel was recorded for all cases, 22 cases (88.0%) were recorded as having travelled overseas during the incubation period. The countries visited were: India (11), Thailand (3), Indonesia (2) and Australia, Bangladesh, Cambodia, England, Hong Kong and Singapore (1 case each).

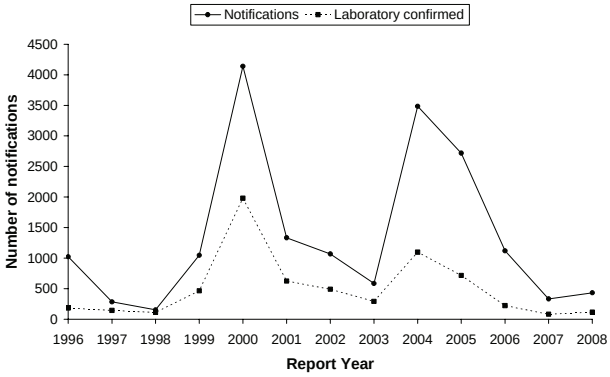
The Enteric Reference Laboratory at ESR received 28 *S.* Paratyphi isolates in 2008. The isolates were identified as Paratyphi A (13), Paratyphi B var. Java (13) and Paratyphi B (2).

## PERTUSSIS (WHOOPING COUGH)

Pertussis is a vaccine preventable disease caused by the bacterial agent *Bordetella pertussis* with epidemics in young children occurring every 3 to 4 years with periodicity unchanged by mass immunisation [15]. Childhood vaccination has been routine in New Zealand since 1960, and the disease has been notifiable since 1996.

In 2008, there were 433 pertussis cases notified, of which 110 were laboratory- confirmed by isolation of *B. pertussis* from the nasopharynx. The 2008 notification rate (10.1 cases per 100 000 population) was a significant increase from 2007 (7.9 per 100 000 population, 332 cases, 78 laboratory-confirmed). In 2000 and again in 2004 New Zealand experienced epidemics of pertussis, with annual cases reported peaking at 4140 and 3485 respectively (Figure 25).

**Figure 25. Pertussis notifications and laboratory-confirmed cases by year, 1996 - 2008**




In 2008, as in 2007, the rate of pertussis varied by geographic region. The highest rates were reported in Nelson-Marlborough (25.1 per 100 000, 34 cases) followed by Waikato (23.9 per 100 000, 85 cases) and Southland (19.9 per 100 000, 22 cases) DHBs (Figure 26). Less than five cases of pertussis were reported in the Lakes, Taranaki, Whanganui and Tairawhiti DHBs.

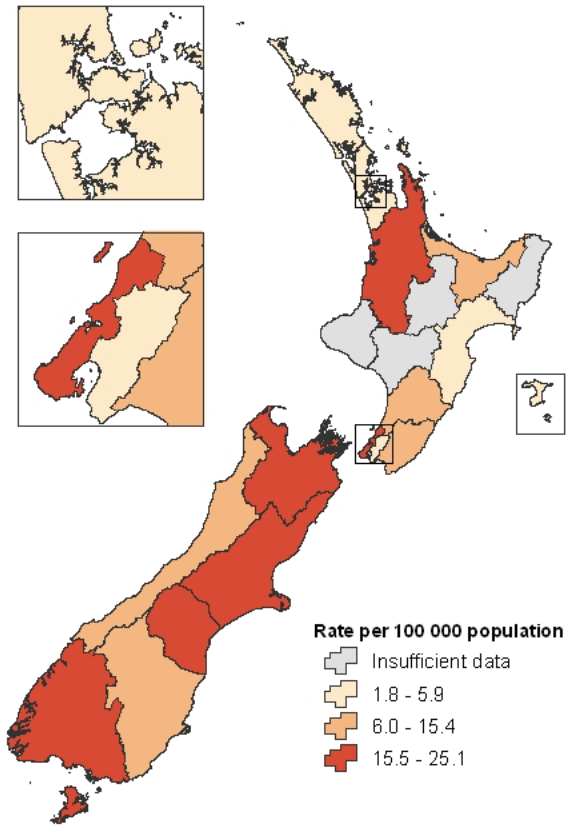
Age was recorded for all cases. The highest age specific rates were for cases aged less than one year (64.0 per 100 000 population, 41 cases), followed by cases aged 10-14 years (13.6 per 100 000 population, 41 cases) and 50-59 years (11.9 per 100 000 population, 62 cases).

Sex and ethnicity were recorded for 99.1% (429/433) and 93.1% (403/433) of all pertussis cases, respectively. In 2008, more females (11.4 per 100 000 population, 248 cases) than males (8.7 per 100 000, 181 cases) were notified. The highest number of cases occurred among those of European ethnicity (324 cases, 80.4%), followed by Maori (61 cases, 15.1%), Pacific Peoples (10 cases, 2.5%) and Other ethnicities (8 cases, 2.0%).

Hospitalisation status was recorded for 406 cases (93.8%) notified in 2008, of which 45 (11.1%) were hospitalised.

There were no deaths due to pertussis recorded in 2008. Of the 269 (62.1%) cases for which the relevant information was recorded, 79 (29.4%) attended school, pre-school or childcare. There were six outbreaks due to *Bordetta pertussis* involving 21 cases reported in 2008. Please see the Outbreak Surveillance section for more details.

**Figure 26. Pertussis notifications by DHB, 2008**




From February 2002 to January 2006 the recommended immunisation schedule for pertussis was a primary course of DTaP-IPV at 6 weeks, 3 months and 5 months of age [20]. A booster was recommended at 15 months with Hib, and a further booster, DTaP-IPV, at 4 years of age prior to beginning school. From February 2006 onwards, the 15-month booster was removed from the schedule, and replaced with an adult dose vaccine DTaP-IPV booster at 11 years. [15]

Vaccination status was recorded for 194 (44.8%) cases notified during 2008. Of these, 109 (56.2%) were recorded as having had at least one dose of vaccine although dose details are only recorded for 68 of these cases (Table 19. shows the number of doses of vaccine given to cases in each relevant age group. A total of 50 cases had received three or more doses of pertussis vaccine.

## 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. Between 1900 and 1911, 21 cases of plague were recorded in New Zealand, nine of which were fatal [10].

## POLIOMYELITIS (POLIO)

There were no polio notifications in 2008. The New Zealand Paediatric Surveillance Unit carries out active surveillance of acute flaccid paralysis (AFP). In 2008 there were seven cases of AFP notified to the Unit. All cases have been reviewed by the National Certified Committee for the Eradication of Polio (NCCEP) and have been classified as non-polio.

**Table 19. Age group and vaccination status of pertussis notifications, 2008**

| Age Group | Total Cases | Vaccination Status: One Dose | Two Doses | Three Doses | Four Doses | Five Doses | Vaccinated (no dose info) | Not Vaccinated | Unknown |
|---|---|---|---|---|---|---|---|---|---|
| 0 - 5wks | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |
| 6wks - 2mths | 22 | 8 | 0 | 0 | 0 | 0 | 1 | 11 | 2 |
| 3 - 4mths | 4 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5 - 14mths | 10 | 1 | 1 | 2 | 0 | 0 | 0 | 5 | 1 |
| 15mths - 3yrs | 14 | 0 | 0 | 3 | 0 | 0 | 0 | 9 | 2 |
| 4+ years | 376 | 5 | 0 | 13 | 20 | 12 | 40 | 53 | 233 |
| Total | 433 | 17 | 1 | 18 | 20 | 12 | 41 | 85 | 239 |

## PRIMARY AMOEBIC MENINGOENCEPHALITIS

Primary amoebic meningo-encephalitis 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 [21].

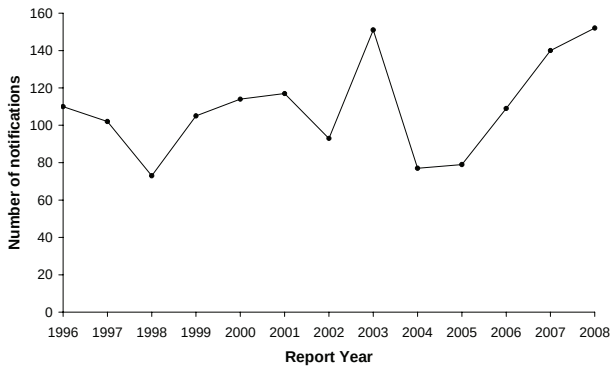
## RABIES

New Zealand is classified as a rabies free country [22]. There were no notified cases of rabies in New Zealand in 2008.

## RHEUMATIC FEVER

In 2008, 137 initial attack cases and 15 recurrent cases of rheumatic fever were notified. For initial attack cases this represents a population rate of 3.2 per 100 000, similar to the rate of 3.1 per 100 000 observed in 2007 (133 cases). For recurrent cases the population rate was 0.4 per 100 000 (0.2 per 100 000, 7 cases in 2007). Figure 27 shows the number of initial attack cases of rheumatic fever reported each year since 1996.

**Figure 27. Rheumatic fever (initial attack cases) by year, 1996 - 2008**




For the 15 recurrent rheumatic fever cases, the age of the cases ranged from less than one year old to over 40 years old. Seven cases were male, six were female, and for two cases the sex was unknown. Eight cases were Maori, five were Pacific Peoples, and two were European.

The following analysis is for initial attack cases of rheumatic fever.

The highest rates of initial attack rheumatic fever were reported in Waikato (7.6 per 100 000 cases, 27 cases) and Northland (7.1 per 100 000 cases, 11 cases) DHBs.

Age was recorded for 100% (137/137) of the cases. Of these responses, 105 were aged less than 15 years (76.6%) and the highest age-specific rate was in the 10-14 years age group (21.5 per 100 000 population, 65 cases).

Sex was recorded for 93.4% (128/137) of the cases. The notification rate of initial attack cases was 3.2 per 100 000 population for males (66 cases) and 2.8 per 100 000 for females (62 cases).

Of the initial attack cases where ethnicity was recorded (125/137, 91.2%), the majority were of Maori ethnicity (72.8%, 91 cases) followed by Pacific Peoples (19.2%, 24 cases), European (6.4%, 8 cases) and Other ethnicity (1.6%, 2 cases).

For all rheumatic fever cases (initial and recurrent attack), hospitalisation data was recorded for 97 cases, of which 88 (90.7%) were hospitalised.

Of the initial attack rheumatic fever cases for which a final case status was recorded (125/137), 87.2% (109/125) were reported as a confirmed case, indicating that the case had a laboratory-confirmed diagnosis for streptococcal infection.

## RICKETTSIAL DISEASE

Ten cases of rickettsial disease, all laboratory confirmed, were notified in 2008. Eight notifications were for murine typhus, one of which is still under investigation, and two cases were for rickettsial disease that was not further specified.

Of the eight murine typhus notifications, seven were hospitalised. No cases died. Five cases were female and three were male with ages that ranged from 29 to 76 years. All cases were of European ethnicity. None of the murine typhus cases travelled overseas during their disease incubation period and are assumed to have acquired their infection in New Zealand. Six of the cases were from Waikato DHB and two were from Waitemata DHB.

Both cases of the unspecified rickettsial disease were notified from Auckland DHB but travelled overseas during their incubation period. One case was a 50-59 yr old male of unknown ethnicity who had been exposed to deer ticks in the USA. He was not hospitalised. The other case was a female

in the 60-69 years age group of European ethnicity who had travelled in North Africa. It is not known whether she was hospitalised.

NZHIS hospitalisation data for 2008 recorded seven hospitalisations where rickettsial disease was the primary reason for the admission. Of these, three were for typhus fever due to *Rickettsia typhi*, two were for spotted fever due to *R. rickettsii*, one was for spotted fever (unspecified) and one for rickettsiosis (unspecified). Note that the NZHIS data may include repeat admissions.

## RUBELLA (GERMAN MEASLES)

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

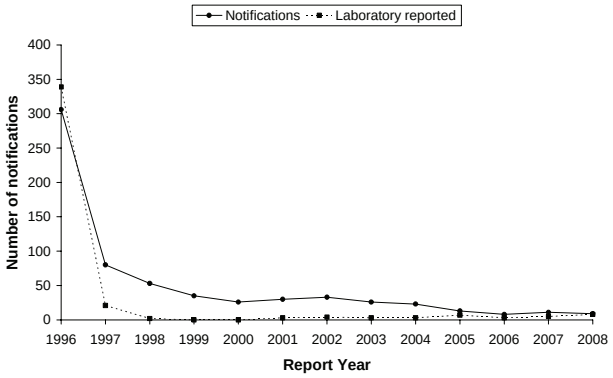
In 2008 a total of nine cases of rubella were notified, of which three cases were laboratory-confirmed. This is similar to 2007 when 11 cases of rubella were notified and three cases were laboratory confirmed. There were no cases of congenital rubella reported in 2008. The last recorded case of congenital 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 [15] (Figure 28).

The 2008 rubella notification rate was 0.2 per 100 000 population which is the similar to the 2007 rate (0.3 per 100 000). The nine cases were from six DHBs, with the greatest number of notifications from the Bay of Plenty, Hawke's Bay and Canterbury (2 cases each) DHBs.

Age and sex data were recorded for all rubella cases. The highest rate was recorded in the 1-4 years age group (2.1 per 100 000 population, 5 cases). Five of the cases were recorded as male and four as female.

Ethnicity was recorded for all but one (88.9%) of rubella notifications during 2008. Seven cases were of European ethnicity and one case was of Maori ethnicity.

**Figure 28. Rubella notifications and laboratory-reported cases by year, 1996-2008**




Of the seven cases (77.8%) for which hospitalisation status were recorded, none were admitted to hospital. None of the notified cases died from rubella in 2008. Of the seven cases for which information was collected four cases were known to have attended school, pre-school or childcare. Two cases reported overseas travel.

The recommended vaccination schedule for rubella is a primary dose at 15 months and a second dose at four years of age. Of the seven cases for which vaccination status was recorded (77.8%), dose information was available for six. Only two of the seven cases (28.6%) had received at least one dose of MMR vaccine. Table 20 shows the number of doses of MMR vaccine given to rubella cases in each relevant age group.

**Table 20. Age group of rubella notifications and vaccination received, 2008**

| | | Vaccination Status | | | | |
|---|---|---|---|---|---|---|
| Age Group | Total Cases | One Dose | Two Doses | Vaccinated (no dose info) | Not Vaccinated | Unknown |
| <15mths | 1 | 0 | 0 | 0 | 1 | 0 |
| 15mths-3yrs | 5 | 1 | 0 | 0 | 2 | 2 |
| 4+ yrs | 3 | 0 | 0 | 1 | 2 | 0 |
| Total | 9 | 1 | 0 | 1 | 5 | 2 |

## SALMONELLOSIS

A total of 1346 cases of salmonellosis were notified in 2008. The Enteric Reference Laboratory at ESR received 1339 *Salmonella* isolates (exclusive of *S.* Paratyphi and *S.* Typhi reported elsewhere). The 2008 notification rate (31.5 per 100 000 population) is slightly higher than the 2007 notification rate of 30.1 per 100 000 (1274 cases) (Figure 29).

Rates varied throughout the country as illustrated in Figure 30. The highest rates were reported in Otago (68.9 per 100 000 population, 129 cases), followed by South Canterbury (66.9 per 100 000, 37 cases) DHBs. The lowest rates were reported in Tairawhiti (15.3 per 100 000, 7 cases) and Counties Manukau DHBs (19.9 per 100 000, 94 cases).

**Figure 29. Salmonellosis notifications and laboratory-reported cases by year, 1996-2008**

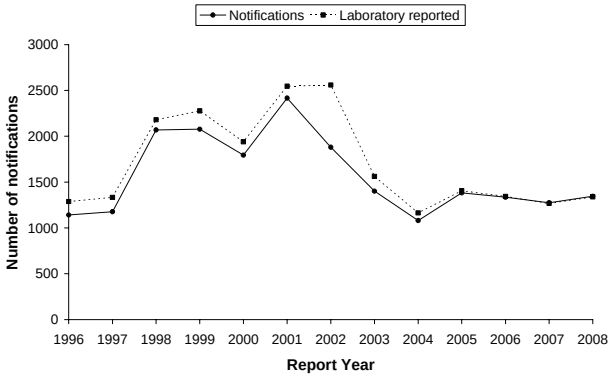
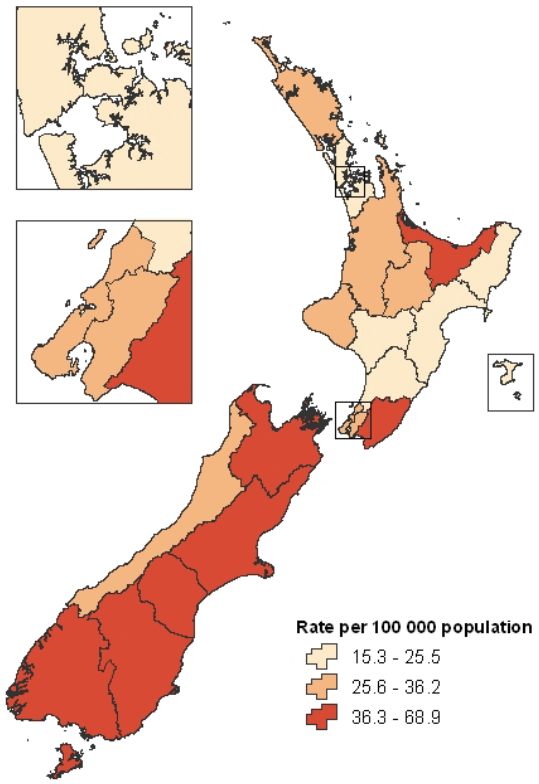


**Figure 30. Salmonellosis notifications by DHB, 2008**




Sex was recorded for 98.5% of the cases (1326/1346). Similar to previous years, rates were slightly higher for males (33.6 per 100 000 population, 704 cases) than females (28.6 per 100 000, 622 cases).

Age was recorded for 1 344 (99.9%) of the salmonellosis cases. Age specific rates were highest for the less than 1 year age group (135.8 per 100 000 population, 87 cases), followed by the 1-4 years age group (108.9 per 100 000 population, 257 cases). The lowest rate was for 10-14 years age group (18.2 per 100 000 population, 55 cases).

Ethnicity was recorded for 998 (74.1%) cases. The highest percentage were reported for those of European ethnicity (820 cases, 82.2% of responses), followed by Maori (108 cases, 10.8% of responses), Other ethnicity (51 cases, 5.1% of responses), and Pacific Peoples (19 cases, 1.9% of responses).

Of the 896 (66.6%) cases for which hospitalisation status was recorded, 123 (13.7%) were hospitalised. One death from salmonellosis was recorded in 2008.

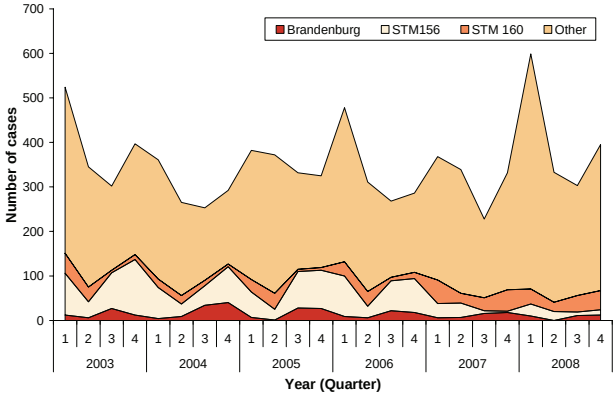
The risk factors recorded for salmonellosis are shown in Table 21.

In 2008, 15 outbreaks of salmonellosis were reported involving 163 cases, of which 18 cases were hospitalised.

Table 22 shows the number of cases of selected *Salmonella* types reported by the Enteric Reference Laboratory at ESR. *S.* Typhimurium definitive type (DT) 160 remained the most common isolate received.

Figure 31 illustrates examples of *Salmonella* types that have emerged in recent years and their seasonal contribution to the overall *Salmonella* burden in New Zealand

**Figure 31. Laboratory-reported cases of *S.* Brandenburg, STM 156 and STM 160 by quarter, 2003 – 2008**




## SEVERE ACUTE RESPIRATORY SYNDROME (SARS)

No cases of SARS were notified in 2008.

**Table 21. Exposure to risk factors associated with salmonellosis, 2008**

| Risk Factor | Yes | No | Unknown | Percentage |
|---|---|---|---|---|
| Consumed food from retail premises | 266 | 329 | 751 | 44.7% |
| Contact with farm animals | 203 | 521 | 622 | 28.0% |
| Consumed untreated water | 120 | 421 | 805 | 22.2% |
| Contact with faecal matter | 119 | 507 | 720 | 19.0% |
| Recreational water contact | 116 | 517 | 713 | 18.3% |
| Travelled overseas during the incubation period | 117 | 668 | 561 | 14.9% |
| Contact with other symptomatic people | 88 | 571 | 687 | 13.4% |
| Contact with sick animals | 41 | 591 | 714 | 6.5% |

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

**Table 22. Selected *Salmonella* serotypes and subtypes of laboratory-confirmed salmonellosis, 2005 – 2008**

| Subtype [a] | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|
| *S.* Typhimurium | 757 | 733 | 596 | 729 |
| DT160 | 248 | 260 | 152 | 135 |
| DT42 | 27 | 28 | 15 | 93 |
| DT101 | 67 | 71 | 43 | 72 |
| DT1 | 114 | 72 | 91 | 72 |
| DT156 | 75 | 87 | 73 | 67 |
| DT74 | 28 | 42 | 29 | 21 |
| Other or unknown | 198 | 173 | 193 | 269 |
| *S.* Enteritidis | 151 | 107 | 151 | 124 |
| PT9a | 73 | 53 | 60 | 45 |
| PT1b | 9 | 9 | 18 | 19 |
| PT26 | 9 | 7 | 17 | 10 |
| Other or unknown | 60 | 38 | 56 | 50 |
| *S.* Infantis | 67 | 58 | 86 | 86 |
| *S.* Chester | 0 | 1 | 37 | 64 |
| *S.* Mbandaka | 8 | 22 | 14 | 39 |
| *S.* Saintpaul | 65 | 35 | 25 | 35 |
| *S.* Brandenburg | 68 | 55 | 47 | 33 |
| *S.* Virchow | 16 | 13 | 34 | 14 |
| Other or unknown serotypes | 274 | 319 | 277 | 215 |
| Total | 1406 | 1343 | 1267 | 1339 |

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

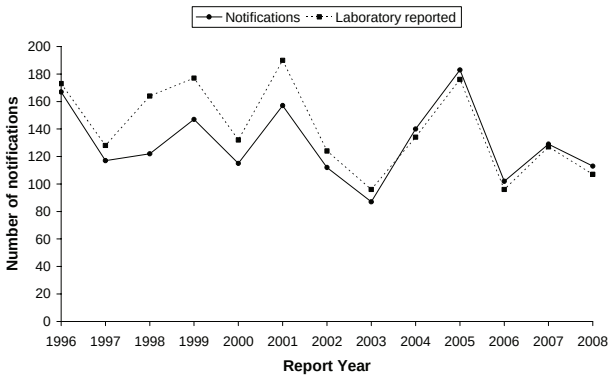
## SHIGELLOSIS

A total of 113 cases of shigellosis were notified in 2008. The 2008 notification rate (2.6 per 100 000 population) was slightly lower than the 2007 rate (3.1 per 100 000, 129 cases) and below the annualised rate for the 10 year period 1998-2007 (3.2 per 100 000 population).

The Enteric Reference Laboratory at ESR received 107 *Shigella* isolates during 2008. The predominant serogroups identified were: *S. sonnei* biotype g (41 cases, 38.3%), *S. sonnei* biotype a (28 cases, 26.2%), *S. flexneri* 2a (12 cases, 11.2%), and *S. flexneri* 6 (6 cases, 5.6%).

Figure 32 shows the number of notified and laboratory reported cases of shigellosis each year since 1996.

**Figure 32. Shigellosis notifications and laboratory-reported cases by year, 1996 - 2008**




The rate of shigellosis varied throughout the country in 2008. The highest rates of shigellosis were reported in Auckland (5.5 per 100 000 population, 24 cases), followed by Nelson-Marlborough (5.2 per 100 000, 7 cases), and Counties Manukau (4.4 per 100 000, 21 cases) DHBs. The lowest rate was reported in Canterbury DHB (1.2 per 100 000, 6 cases).

Sex was recorded for 95.6% of the cases (108/113). Of these, 62 cases were male and 46 cases were female.

Age was recorded for all of the 113 cases. The highest age specific rate occurred among children aged 1-4 years (5.5 per 100 000 population, 13 cases), followed by the 50-59 year age group (3.7 per 100 000, 19 cases).

Ethnicity was recorded for 82 (72.6%) of the 113 cases reported in 2008. The majority of the cases were of European ethnicity (64.6%, 53 cases), followed by Pacific Peoples (15.9%, 13 cases), Other ethnicity (14.6%, 12 cases), and Maori (4.9%, 4 cases).

Of the 81 notified cases for which hospitalisation status was recorded, 15 cases (18.5%) were hospitalised.

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

Fifty-eight cases indicated they had travelled overseas during the incubation period. The most frequent overseas destinations were: India (12), Samoa (8), Fiji (7), Thailand (5), and Indonesia (4).

Six shigellosis outbreaks were reported in 2008, involving 27 cases.

**Table 23. Exposure to risk factors associated with shigellosis, 2008**

| Risk Factor | Yes | No | Unknown | %a |
|---|---|---|---|---|
| Travelled overseas during the incubation period | 58 | 20 | 35 | 74.4% |
| Consumed food from retail premises | 17 | 21 | 75 | 44.7% |
| Recreational water contact | 14 | 30 | 69 | 31.8/% |
| Contact with other symptomatic people | 13 | 33 | 67 | 28.3% |
| Consumed untreated water | 6 | 20 | 87 | 23.1% |
| Contact with faecal matter | 7 | 36 | 70 | 16.3% |
| Contact with farm animals | 7 | 42 | 64 | 14.3% |
| Contact with sick animals | 1 | 43 | 69 | 2.3% |

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

## TAENIASIS

Five cases of taeniasis were notified in 2008, bringing the number of cases notified since 1997 to 11. Of these, three have had recent overseas travel to Ethiopia (2 cases), and Afghanistan (1). The remaining two cases had previous overseas travel (2-3 years ago) to Vietnam. All cases that have been notified in New Zealand since 1997 have reported a history of overseas travel.

## TETANUS

No cases of tetanus were notified in New Zealand in 2008. Since 1997 there have been 20 reported tetanus cases and the last case was reported in 2007. Two of these cases were laboratory-confirmed and one case had been vaccinated against tetanus. NZHIS Hospitalisation data for 2008 record one female case with the primary reason for admission being tetanus.

## TOXIC SHELLFISH POISONING

There was one suspected case of toxic shellfish poisoning reported in 2008. This continues the trend of low numbers of toxic shellfish poisoning cases reported in past years. Since 1997, numbers of cases reported ranged from one in 1998, 2002, 2006 and 2008 to seven cases in 1999.

The 2008 notification was a 51 year old male from Nelson Marlborough DHB who collected and consumed mussels from Wainui Bay in the Tasman District. The type of toxic shellfish poisoning was unspecified. The case did not require hospitalisation.

## TRICHINELLOSIS

No cases of trichinellosis were notified in 2008. Trichinellosis is an infection caused by nematode worms of the genus *Trichinella*, which 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. The other three cases were linked to the consumption of infected pork meat in 2001. The global incidence of trichinellosis has been increasing. The main determinants of human infection are the worldwide distribution of *Trichinella* and cultural meat eating practices. However, the increasing trend of trichinellosis is also attributed to international social, political and economic changes, leading to the breakdown in veterinary services in charge of infection control and changes in hunting and eating practices [23].

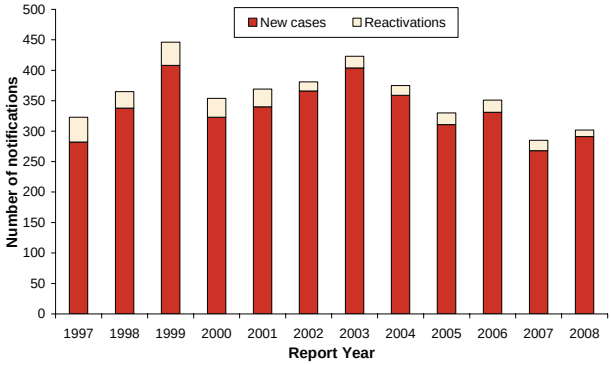
## TUBERCULOSIS

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.

In 2008, 302 cases of tuberculosis (new and reactivations) were notified, of which 11 (3.6%) 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 7.1 per 100 000 population in 2008 is higher than that reported in 2007 (6.7 per 100 000, 285 total cases including 17 reactivations). In 2008, a total of 236 (78.1%) cases were reported as laboratory-confirmed.

Figure 33 shows the total number of new tuberculosis cases and reactivations reported since 1997.

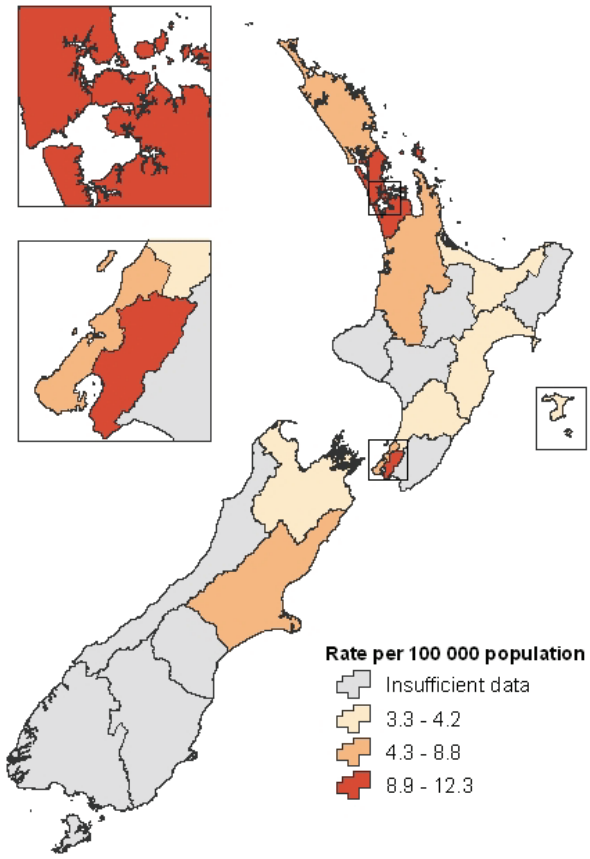
**Figure 33. Tuberculosis notifications (new cases and reactivations) by year, 1997 - 2008**




### Reports of new tuberculosis cases

In 2008, the rates of new tuberculosis notifications per 100 000 population differed by geographical region (Figure 34). Counties Manukau DHB had the highest rate (11.8 per 100 000 population, 56 cases) followed by Auckland DHB (11.6 per 100 000, 51 cases).

**Figure 34. Tuberculosis notifications (new cases) by DHB, 2008**




For the 291 new cases of tuberculosis, age and sex were recorded for all cases. There were four cases aged less than five years with another 12 cases aged between 5 and 14 years. The highest age specific rates were reported for persons aged 70+ years (10.8 per 100 000 population, 40 cases), females aged 20-29 years (12.2 per 100 000

population, 35 cases) and males aged 70+ years (16.7 per 100 000 population, 27 cases). Overall, for new tuberculosis cases, 156 cases were male and 135 were female.

Ethnicity was recorded for 96.6% (281/291) of the cases. The majority of the cases were classified as Other ethnicity (54.1%, 152 cases) followed by Pacific Peoples (18.1%, 51 cases), Maori (15.7%, 44 cases), and European (12.1%, 34 cases).

Of the 273 (93.8%) new cases in 2008 for which hospitalisation data were recorded, 160 (58.6%) were hospitalised. Five deaths in 2008 were due to tuberculosis disease (70+ years (4 cases) and 20-29 years (1)). BCG vaccination status was recorded for 156 cases and vaccination was confirmed for 102 (65.4%) of those cases. A further two (1.3%) cases had unconfirmed positive vaccination status.

In 2008, of the 276 (94.8%) new cases for which place of birth was recorded, 203 (73.6%) were born outside New Zealand. Of the 73 cases that were known to have been born in New Zealand, 27.9% (17/61 where information was recorded) had been or were presently residing with a person born outside New Zealand. Of the 211 cases for which these data were recorded, 62 (29.4%) reported contact with a confirmed case of tuberculosis.

**Reactivations of tuberculosis**

Six of the 11 reactivations were from the combined Auckland DHBs. Four cases were aged between 30-39 years and seven cases (63.6%) were aged over 50 years. There were more male (6) than female (5) reactivations. Forty-five percent (5/11) of the reactivations were of Other ethnicity.

In 2008, information on the place where the diagnosis was made and country of birth was recorded for 10 of the 11 reactivation cases. The first diagnosis of tuberculosis disease was made in New Zealand for five cases and overseas for five cases.

Table 24 shows the cases treated for tuberculosis disease by place of original diagnosis.

**Table 24. Place of original TB disease diagnosis and treatment (for reactivations), 2008**

| Place of TB disease diagnosis | Case treated for TB disease | | | |
|---|---|---|---|---|
| | Yes | No | Unknown | Total |
| Overseas | 5 | 0 | 0 | 5 |
| New Zealand | 1 | 3 | 1 | 5 |
| Unknown | 0 | 0 | 1 | 1 |
| Total | 6 | 3 | 2 | 11 |

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

**Table 25. Country of birth and place of original TB disease diagnosis (for reactivations), 2008**

| Place of TB disease diagnosis | Country of birth of case | | | |
|---|---|---|---|---|
| | New Zealand | Overseas | Unknown | Total |
| Overseas | 0 | 5 | 0 | 5 |
| New Zealand | 4 | 1 | 0 | 5 |
| Unknown | 1 | 0 | 0 | 1 |
| Total | 5 | 6 | 0 | 11 |

Hospitalisation data were recorded for all reactivations, and nine (81.8%) cases were hospitalised. There were no deaths reported amongst the reactivation cases. Vaccination status was recorded for seven cases, of which vaccination was confirmed for four cases, and stated as "not given" for the remaining three cases.

Four outbreaks due to *Mycobacterium tuberculosis* were reported in 2008, involving 12 cases.

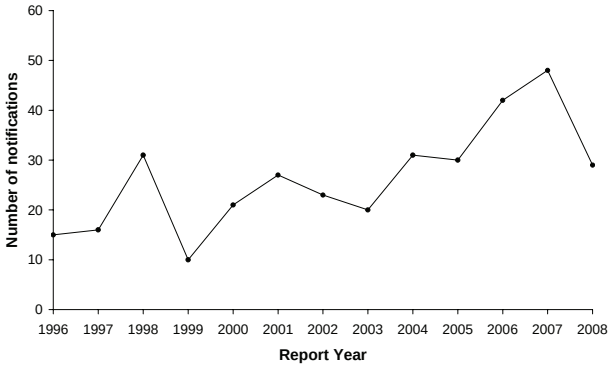
**Antimicrobial drug-resistant tuberculosis**

Data on antimicrobial drug-resistant tuberculosis is published on the www.surv.esr.cri.nz website at www.surv.esr.cri.nz/antimicrobial/tuberculosis.php

## TYPHOID FEVER

Twenty-nine cases of typhoid were notified in 2008 (Figure 35). The 2008 rate (0.7 per 100 000 population) was lower than the 2007 rate (1.1 per 100 000 population, 48 cases).

**Figure 35. Typhoid notifications by year, 1996 – 2008**




The Enteric Reference Laboratory at ESR received 32 *Salmonella* Typhi isolates in 2008.

The highest rates were reported in Counties Manukau DHB (2.7 per 100 000 population, 13 cases) followed by Auckland DHB (1.6 per 100 000 population, 7 cases).

Age was recorded for all of the cases. Age-specific notification rates were highest in the 5-9 years age group (2.4 per 100 000 population, 7 cases), followed by the 20-29 years age group (0.9 per 100 000 population, 5 cases).

Seventeen of the cases were male (0.8 per 100 000 population), 12 were female (0.6 per 100 000 population).

Of the 24 cases (82.8%) for which ethnicity were recorded, the highest number of cases were of Pacific Peoples ethnicity (12 cases) followed by Other ethnicity (10 cases) and Maori (2 cases).

Hospitalisation status was recorded for 93.1% (27/29) of cases, of which 22 (81.5%) were hospitalised.

Overseas travel information was recorded for 96.6% (28/29) of cases. Nineteen cases (67.9%) were recorded as having travelled overseas during the incubation period. The countries most commonly visited included India (9 cases), Fiji (3 cases) and Samoa (2 cases).

## VEROTOXIN OR SHIGA TOXIN PRODUCING *ESCHERICHIA COLI* (VTEC/STEC INFECTION)

There were 128 cases of verocytotoxigenic *Escherichia coli* infection (VTEC), also known as shigatoxigenic *Escherichia coli* infection (STEC), notified in 2008. The 2008 notification rate (3.0 per 100 000 population) is higher than the 2007 rate (2.4 per 100 000, 100 cases). Three cases of VTEC/STEC-associated haemolytic uraemic syndrome (HUS) were reported to the New Zealand Paediatric Surveillance Unit (NZPSU) in 2008.

Figure 36 shows the number of notified cases of VTEC/STEC infection each year since 1996.

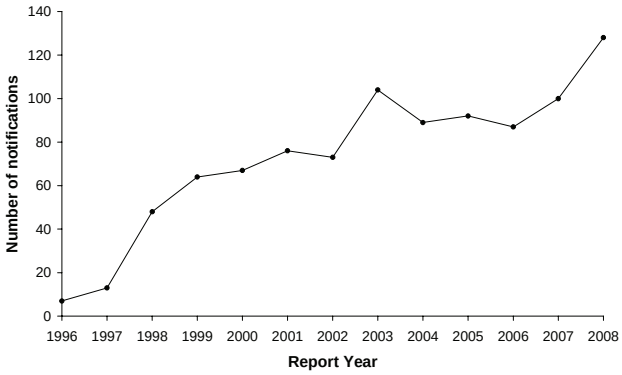
Disease rates for VTEC/STEC varied throughout the country. The highest rates were recorded in Northland (6.5 per 100 000 population, 10 cases), Taranaki (5.6 per 100 000, 6 cases) and Waikato (5.1 per 100 000, 18 cases) DHBs.

Age was recorded for all cases. The highest rates were reported in the 1-4 years age group (16.5 per 100 000 population, 39 cases), followed by the less than 1 year age group (7.8 per 100 000, 5 cases) and the 5-9 years age group (3.5 per 100 000, 10 cases).

Sex was recorded for 99.2% (127/128) of the cases. The rate was similar for males (3.2 per 100 000 population, 67 cases) and females (2.8 per 100 000, 60 cases).

Ethnicity was recorded for 82.8% (106/128) of cases. Of these, the highest percentage was reported for European ethnicity (83.0%, 88 cases), followed by Maori (11.3%, 12 cases) and Other ethnicity (4.7%, 5 cases).

**Figure 36. VTEC/STEC notifications by year, 1996 - 2008**




Of the 105 (82.0%) notified cases for which hospitalisation status was recorded, 37 (35.2%) were hospitalised.

The risk factors recorded for VTEC/STEC cases reported in 2008 are shown in Table 26. The foods consumed by cases are shown in Table 27 .

The Enteric Reference Laboratory at ESR received a total of 120 VTEC/STEC isolates. Of these, 118 (98.3%) were identified as serotype O157: H7, and two as non-O157: H7.

Four outbreaks of VTEC/STEC were reported in 2008, involving 25 cases. The largest outbreak involved 14 cases. See the Outbreak Surveillance section for further details.

**Table 26. Exposure to risk factors associated with VTEC/STEC, 2008**

| Risk Factor | Yes | No | Unknown | %[a] |
|---|---|---|---|---|
| Contact with pets | 54 | 5 | 69 | 91.5 % |
| Contact with farm animals | 37 | 20 | 71 | 64.9 % |
| Contact with animal manure | 22 | 26 | 80 | 45.8 % |
| Contact with recreational water | 23 | 49 | 56 | 31.9 % |
| Contact with children in nappies | 20 | 54 | 54 | 27.0 % |
| Contact with other animals | 13 | 36 | 79 | 26.5 % |
| Contact with a person with similar symptoms | 19 | 55 | 54 | 25.7 % |
| Travelled overseas during the incubation period | 5 | 75 | 48 | 6.3 |

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

**Table 27. Foods consumed by VTEC/STEC cases, 2008**

| Food | Yes | No | Unknown | %[a] |
|---|---|---|---|---|
| Consumed raw fruit or vegetables | 54 | 10 | 64 | 84.4 % |
| Consumed dairy products | 55 | 13 | 60 | 80.9 % |
| Consumed beef or beef products | 48 | 19 | 61 | 71.6 % |
| Consumed chicken or poultry | 41 | 19 | 68 | 68.3 % |
| Consumed processed meat | 41 | 25 | 62 | 62.1 % |
| Consumed fruit or vegetable juice | 26 | 28 | 74 | 48.1 % |
| Consumed lamb or hogget or mutton | 17 | 41 | 70 | 29.3 % |
| Consumed home kill meat | 13 | 51 | 64 | 20.3 % |
| Consumed unpasteurised milk or milk products | 9 | 57 | 62 | 13.6 % |
| Consumed pink or undercooked meat | 6 | 50 | 72 | 10.7 % |

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

## YELLOW FEVER

No cases of yellow fever were notified in New Zealand in 2008.

## YERSINIOSIS

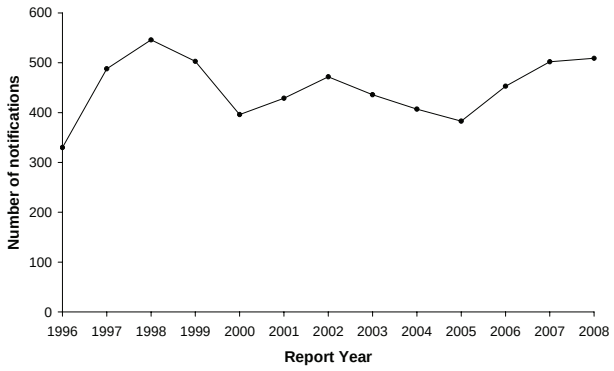
A total of 509 cases of yersiniosis were notified in 2008. The 2008 rate (11.9 per 100 000 population) was the same as the 2007 rate (11.9 per 100 000, 502 cases).

Figure 37 shows the number of notified cases of yersiniosis by year since 1996.

Rates varied throughout the country as illustrated in Figure 38. The highest rates were recorded in the West Coast (43.2 per 100 000 population, 14 cases), Capital and Coast (23.2 per 100 000, 66 cases), South Canterbury (21.7 per 100 000, 12 cases) and Hawke's Bay (20.2 per 100 000, 31 cases) DHBs.

Age was recorded for 99.8% (508/509) of the cases. Age specific rates were highest in the less than 1 year age group (73.4 per 100 000 population, 47 cases), followed by the 1-4 years age group (46.2 per 100 000, 109 cases) and the 70+ years age group (14.8 per 100 000, 55 cases).

**Figure 37. Yersiniosis notifications by year, 1996 - 2008**




Sex was recorded for 97.4% (496/509) of the cases. Of these, males had a higher rate (12.5 per 100 000 population, 262 cases) than females (10.8 per 100 000, 234 cases).

Ethnicity was recorded for 69.5% (354/509) of the cases. The majority of the cases were of European ethnicity (77.1%, 273 cases), followed by Other ethnicity (11.6%, 41 cases), Maori (7.3%, 26 cases) and Pacific Peoples (4.0%, 14 cases).

Of the 299 (58.7%) notified cases for which hospitalisation status was recorded, 67 (22.4%) were hospitalised.

The risk factors recorded for yersiniosis cases reported in 2008 are shown in Table 28.

**Figure 38. Yersiniosis notifications by DHB, 2008**

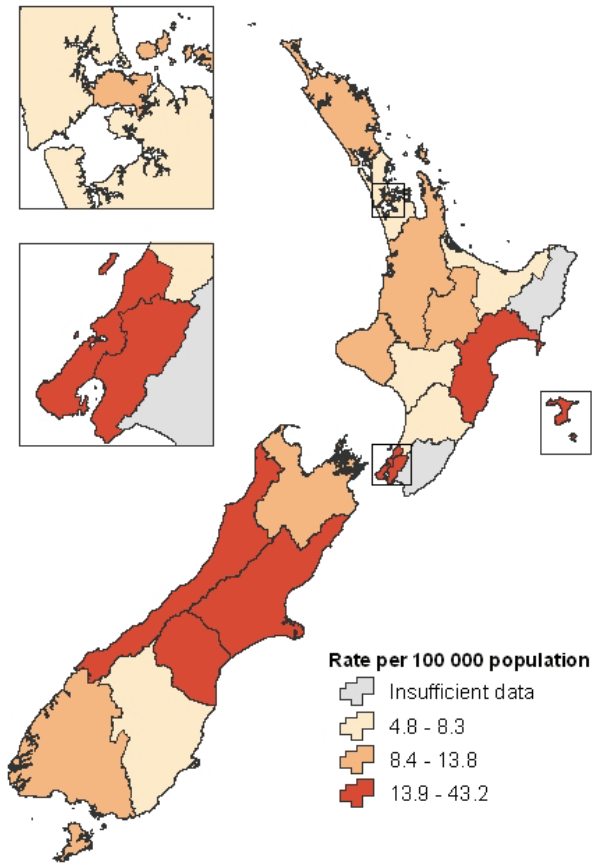



**Table 28. Exposure to risk factors associated with yersiniosis, 2008**

| Risk Factor | Yes | No | Unknown | %[a] |
|---|---|---|---|---|
| Consumed food from retail premises | 66 | 120 | 323 | 35.5 % |
| Contact with farm animals | 56 | 171 | 282 | 24.7 % |
| Consumed untreated water | 38 | 144 | 327 | 20.9 % |
| Recreational water contact | 30 | 170 | 309 | 15.0 % |
| Contact with faecal matter | 29 | 170 | 310 | 14.6 % |
| Contact with other symptomatic people | 18 | 184 | 307 | 8.9 % |
| Travelled overseas during the incubation period | 14 | 216 | 279 | 6.1 % |
| Contact with sick animals | 12 | 186 | 311 | 6.1 % |

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

# NON-NOTIFIABLE DISEASES

## INFLUENZA

National influenza surveillance in 2008 was undertaken between May and September using a sentinel network of 85 general practices. On average, 79 practices, with a total patient roll of 333 150 participated each week. It is estimated that influenza like illness resulting in a visit to a general practitioner affected over 47 697 New Zealanders (1.2% of total population)

During the surveillance period, 3 945 consultations for influenza-like illness (ILI) were reported. The annual cumulative incidence rate was 1184 per 100 000. The average weekly consultation rate was 52.4 per 100 000 patient population. This rate is the seventh highest rate recorded by the sentinel surveillance system since 1997. The lowest rate was recorded in 2000 (32.5 per 100 000) and the highest rate in 1997 (163.7 per 100 000). Overall, influenza activity in 2008 is described as moderate. The consultation rate remained relatively low from May to the middle of July followed by a broad peak of activity for six weeks (week 27 to week 36). The influenza activity peaked in week 33 (mid August), two weeks earlier than the peak in laboratory isolations (week 35) and four weeks earlier than hospitalisations (week 29). Considerable activity continued until the end of the sentinel surveillance period. Figure 39 compares the weekly consultation rates for influenza-like illness in 2008 with 2007 and 2006.

**Figure 39. Weekly sentinel surveillance consultation rates for influenza-like illness, 2006 – 2008**

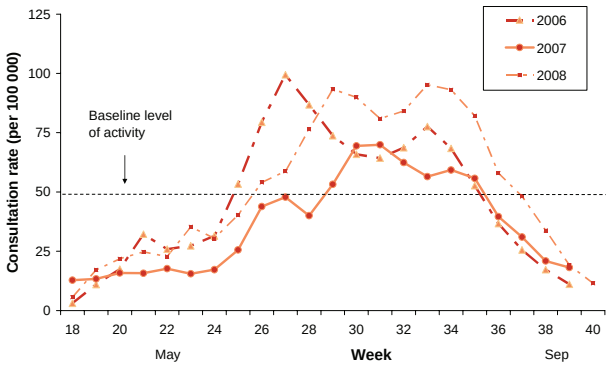
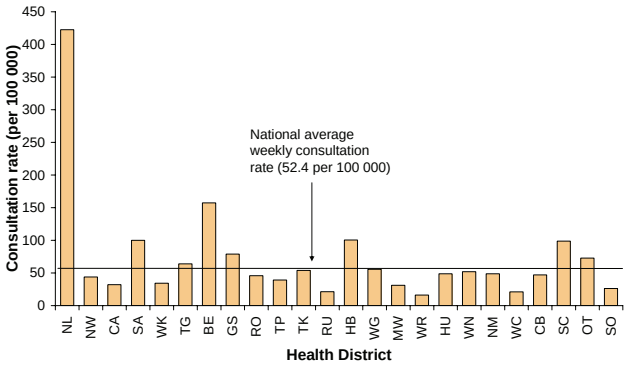



Figure 40 shows the average weekly consultation rates by health district for the influenza season.

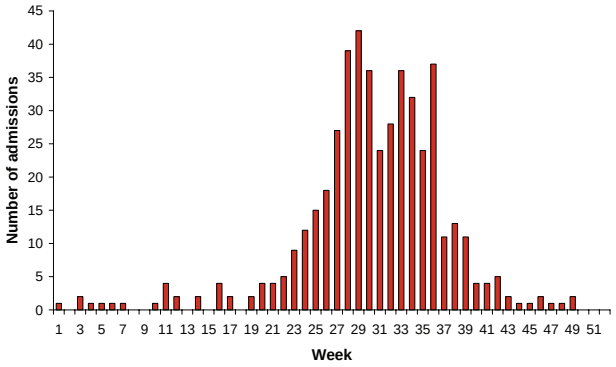
Consultation rates varied between health districts, with rates above the national average in 10 of the 24 health districts that participated and rates more than eightfold the national average in Northland (422.5 per 100 000) where small number of practices with small population denominators might result in the highest consultation rate. Eastern Bay of Plenty (157.2 per 100 000) also recorded three times the national average rate.

**Figure 40. Sentinel average weekly consultation rates for influenza-like illness by health districts, 2008**




In 2008, there were a total of 474 hospital admissions for influenza. This is similar to that of 2006 with 464 admissions and higher than 2007 (347). Figure 41 shows these admissions by week, 87.8% (416) of which occurred during June to September. The highest number of admissions (151) occurred in July and there was a broad high admission period from week 28 to week 36.

**Figure 41. Influenza hospitalisation by week admitted, 2008**

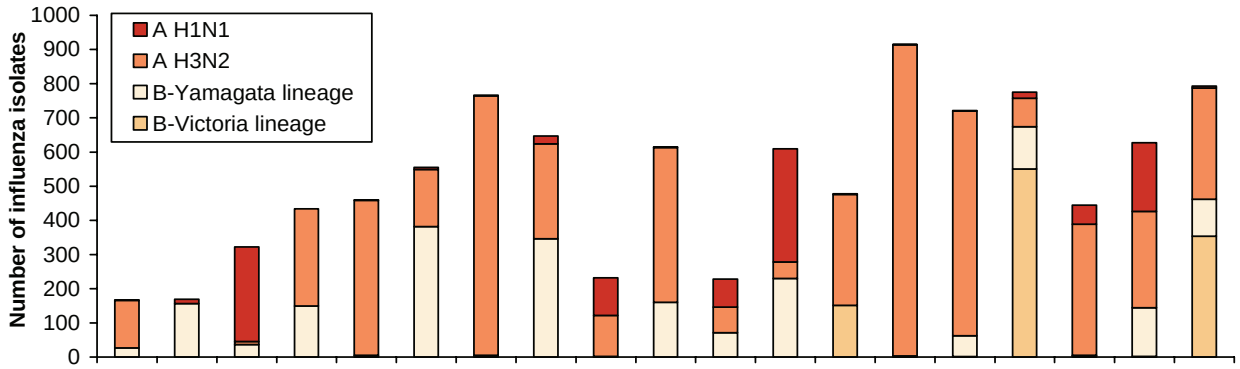



A total of 1 054 influenza viruses were identified in 2008, higher than 744 in 2007 and 768 in 2006. Of the 1 054 viruses, 466 came from sentinel practice surveillance during May to September. This is higher than the 239 sentinel viruses identified in 2007 and 315 in 2006. There were 588 non-sentinel viruses identified in 2008, compared to 505 in 2007 and 453 in 2006.

During 2008, the majority of influenza viruses (630/1054 or 59.8%of all viruses) were characterised as influenza B and represented 58.3% (462/793) of typed and subtyped viruses. Influenza A(H3N2) represented 41.0% (325/793) of the typed and subtyped viruses and 30.8% (325/1054) of the total viruses. Influenza A(H1N1) represented 0.8% (6/793) of the typed and subtyped viruses and 0.6% (6/1054) of the total viruses.

Figure 42 shows the number and percentage of typed and subtyped influenza viruses from 1990 to 2008.

**Figure 42. Influenza viruses by type, 1990 - 2008**




| Percentage | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A H1N1 | 0.6 | 7.7 | 85.7 | 0 | 0.2 | 1.1 | 0.3 | 3.6 | 47.4 | 0.3 | 36 | 54.4 | 0.4 | 0.1 | 0.1 | 2.3 | 12.6 | 32.1 | 0.8 |
| A H3N2 | 83.2 | 0 | 2.8 | 65.7 | 98.7 | 30.1 | 99.1 | 43 | 51.7 | 73.7 | 32.9 | 7.9 | 68 | 99.6 | 91.3 | 10.7 | 86.3 | 45 | 41 |
| B-Yamagata lineage | 16.2 | 92.3 | 11.5 | 34.3 | 1.1 | 68.8 | 0.7 | 53.5 | 0.9 | 26 | 31.1 | 37.8 | 0 | 0.2 | 8.5 | 16 | 0.4 | 23 | 13.6 |
| B-Victoria lineage | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 0 | 0 | 71 | 1 | 0 | 44.6 |

The noticeable changes in predominant patterns are described below.

**Influenza A(H1N1)**

During the period from 1990 to 2008, influenza A(H1N1) viruses predominated for three seasons in 1992 (85.7%), 2000 (36.0%) and 2001 (54.4%). Influenza A(H1N1) viruses circulated in significant proportion in 2007 (32.1%). In 2008, only six A(H1N1) viruses (0.8%) were detected, of which, only four were available for antiviral susceptibility testing at the WHO National Influenza Centre (NIC) at ESR. The results of the fluorometric neuraminidase inhibition assay indicated that the four viruses had highly reduced sensitivity to oseltamivir with IC50 values in the range of 500-1700 nM, typical of the recently global emerging oseltamivir-resistant A(H1N1) viruses. Genetic analysis of the neuraminidase gene confirmed that the four viruses had the H274Y mutation (histidine-to-tyrosine at codon 274 in N2 nomenclature), conferring resistance to oseltamivir. These four viruses were isolated from a 2-month-old male infant, a 15-year-old female and two 49-year-old females. None of the patients or their close contacts had received Tamiflu prior to sample collection. NIC has reported the findings to the WHO.

(http://www.who.int/csr/disease/influenza/NICsummaryreport_NZ_2008.pdf).

**Influenza A(H3N2)**

Influenza A(H3N2) viruses have often been associated with more severe disease and with excess pneumonia and influenza mortality. During 1990-2008, 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%), 2007 (45.0%). The highest number of deaths (94) in 1996 in New Zealand was recorded during an A(H3N2) epidemic. The highest hospitalisations (591) were recorded in 2003 due to a A(H3N2) predominant season.

**Influenza B**

During the period from 1990 to 2008, influenza B viruses predominated for five years; 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 1980's. The B/Yamagata/16/88 lineage (most recently 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/Malaysia/2504/2004). For reasons not wholly understood, the B/Victoria/2/87 lineage viruses remained geographically restricted to Asia until 2001. 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 B/Shanghai lineage virus. Since 2003, the two lineages viruses have been co-circulating in New Zealand with the B/Victoria lineage predominating every three years in 2005 and 2008. The influenza B was associated with high disease burden in young children and the B/Victoria lineage viruses tended to be associated with more explosive school outbreaks than the B/Yamagata lineage viruses in New Zealand.

**Summary**

Characterisation of the influenza viruses isolated during the 2008 winter indicated a need for a change in the influenza A(H1N1) component of the vaccine for the 2009 winter. Accordingly, the 2009 southern hemisphere winter influenza vaccine has the following composition:

- A(H1N1) an A/Brisbane/59/2007 (H1N1) - like strain
- A(H3N2) an A/Brisbane/10/2007 (H3N2) - like strain
- B a B/Florida/4/2006 - like strain

Influenza immunisation is recommended for those at increased risk of complications from influenza due to either age or medical condition. 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. Influenza A/Brisbane/59/2007 (H1N1) vaccine strain is protective against oseltamivir resistant influenza A(H1N1) viruses.

A full report on influenza in New Zealand for 2008 can be found at www.surv.esr.cri.nz

## SEXUALLY TRANSMITTED INFECTIONS

This brief report summarises the epidemiology of sexually transmitted infections for the year 2008, and examines trends since 2004. A more detailed account is to be found in the STI Annual Report for 2008 available at www.surv.esr.cri.nz.

The AIDS Epidemiology Group carries out HIV/AIDS surveillance and a summary of the figures for 2008 may be found in the AIDS section under notifiable diseases in this report.

Sexually Transmitted Infections (STIs) are not notifiable in New Zealand. Data on STIs of public health importance, chlamydia, gonorrhoea, genital herpes, genital warts, syphilis and non-specific urethritis are submitted voluntarily from sexual health clinics (SHCs), family planning clinics (FPCs) and student and youth health clinics (SYHCs). This is supplemented by data on chlamydia and gonorrhoea from diagnostic laboratories in the Auckland, Waikato and Bay of Plenty (BOP) regions. Since June 2004, efforts have been made to extend STI surveillance to additional laboratories across New Zealand, data from these laboratories can be found in the STIs in New Zealand Annual Surveillance Report for 2008.

It is important to be aware of the different denominators used to calculate the rates in the clinical as compared with the laboratory settings. Data from the clinics uses the total number of clinic visits ("clinic visit rate"). In the case of FPCs and SYHCs many visits are not related to STIs. For laboratory data the denominator is the population of the area covered by the laboratory.

Comparison of data has shown that the number of cases reported by laboratories is triple the number of cases reported from the clinics. STI cases reported through the clinic-based surveillance system underestimate 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, provide a useful, complementary source of STI incidence data.

### CLINIC BASED SURVEILLANCE

#### Chlamydia

In 2008, genital *Chlamydia trachomatis* infection was the most commonly reported STI in New Zealand.

Between 2007 and 2008 the number of cases of chlamydia has increased by 10.3% in SHCs (4 504 to 4 970), 3.3% in FPCs (3 433 to 3 545) and 10.3% in SYHCs (957 to 1 056).

From 2004 to 2008, the number of cases of chlamydia has increased by 25.8% in SHCs (3 951 to 4 970), doubled in FPCs (1 598 to 3 545) and tripled in SYHCs (390 to 1 056).

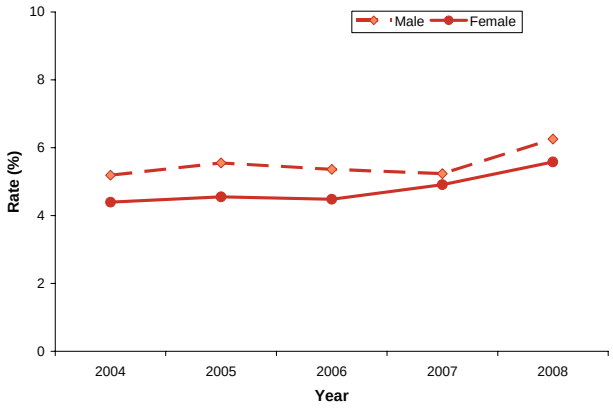
In 2008, SHCs, FPCs and SYHCs reported chlamydia clinic visit rates of 5.9%, 1.9% and 0.4%, respectively (Table 29). From 2004 to 2008, the clinic visit rate of chlamydia diagnosed at SHCs has increased by 20.5% in males and 27.0% in females (Figure 43). These trends may reflect changes in sexual behaviour, but may also be accounted for by advances in the sensitivity and specificity of new diagnostic techniques.

**Table 29. Number and clinic visit rate of chlamydia cases by sex and health care setting, 2008**

| | | Clinic type | | |
|---|---|---|---|---|
| | Sex | SHCs | FPCs | SYHCs |
| No. of cases | Female | 2750 | 3079 | 795 |
| | Male | 2219 | 466 | 261 |
| | Total | 4970 | 3545 | 1056 |
| Clinic visit rate (%)[a] | Female | 5.6 | 1.7 | 0.5 |
| | Male | 6.3 | 5.1 | 0.4 |
| | Total | 5.9 | 1.9 | 0.4 |

[a] Cases/ total number of clinic visits

**Figure 43. Rates of chlamydia diagnosed at SHCs, 2004 to 2008**




Note: Denominator is the number of clinic visits

#### Gonorrhoea

Between 2007 and 2008, the number of cases of gonorrhoea decreased by 1.6% in SHCs (925 to 910), 5.3% in FPCs (190 to 180) and 8.6% in SYHCs (70 to 64).

From 2004 to 2008, the number of cases of gonorrhoea reported increased by 29.1% in SHCs (705 to 910), 41.7% in FPCs (127 to 180) and increased by almost five times in SYHCs (12 to 64).

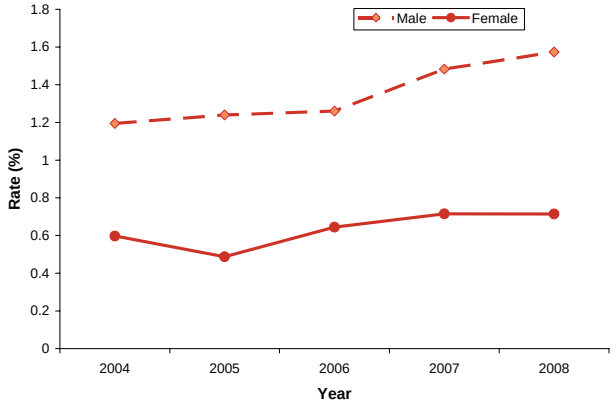
In 2008, SHCs, FPCs and SYHCs reported gonorrhoea clinic visit rates of 1.1%, 0.1% and 0.03%, respectively (Table 30). From 2004 to 2008, the clinic visit rate of gonorrhoea diagnosed at SHCs has increased by 31.6% in males and 19.5% in females (Figure 44).

**Table 30. Number and clinic visit rate of gonorrhoea cases by sex and health care setting, 2008**

| | | Clinic type | | |
|---|---|---|---|---|
| | Sex | SHCs | FPCs | SYHCs |
| No. of cases | Female | 352 | 148 | 35 |
| | Male | 558 | 32 | 29 |
| | Total | 910 | 180 | 64 |
| Clinic visit rate (%)[a] | Female | 0.7 | 0.1 | 0.02 |
| | Male | 1.6 | 0.4 | 0.04 |
| | Total | 1.1 | 0.1 | 0.03 |

[a] Cases/ total number of clinic visits

**Figure 44. Rates of gonorrhoea diagnosed at SHCs, 2004 to 2008**




Note: Denominator is the number of clinic visits

### Genital Herpes (first presentation)

The number of cases of genital herpes (first presentation) and clinic visit rate by sex and health care setting for 2008 is shown in Table 31.

Between 2007 and 2008, the number of cases of genital herpes increased by 11.5% in SHCs (746 to 832) and decreased by 2.7% in FPCs (149 to 145) and 6.7% in SYHCs (90 to 84).

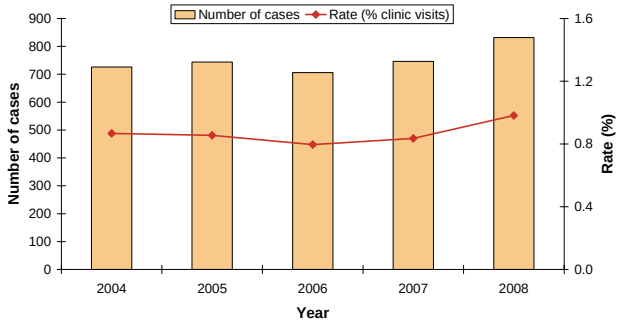
**Table 31. Number and clinic visit rate of genital herpes (first presentation) cases by sex and health care setting, 2008**

| | Sex | Clinic type | | |
|---|---|---|---|---|
| | | SHCs | FPCs | SYHCs |
| No. of cases | Female | 449 | 123 | 65 |
| | Male | 383 | 22 | 19 |
| | Total | 832 | 145 | 84 |
| Clinic visit rate (%)[a] | Female | 0.9 | 0.1 | 0.04 |
| | Male | 1.1 | 0.2 | 0.03 |
| | Total | 1 | 0.1 | 0.03 |

[a] Cases/ total number of clinic visits

From 2004 to 2008, the number of genital herpes cases reported by SHCs has fluctuated (Figure 45). However, the clinic visit rate of genital herpes has remained between 0.8% and 0.9%. Routine clinic surveillance methods in New Zealand do not facilitate the collection of data on the type of HSV infection, and so it is not possible to determine if the trends in genital herpes differ by type of viral infection.

**Figure 45. Number of cases and rates of genital herpes (first presentation) diagnosed at SHCs, 2004 to 2008**




Note: Denominator is the number of clinic visits

### Genital Warts (first presentation)

The number of cases of genital warts (first presentation) and clinic visit rate by sex and health care setting for 2008 is shown in Table 32.

Between 2007 and 2008, the number of cases of genital warts decreased by 1.8% in SHCs (3 797 to 3 728) and 7.7% in FPCs (621 to 573). In contrast there was an increase of 17.4% in SYHCs (207 to 243).

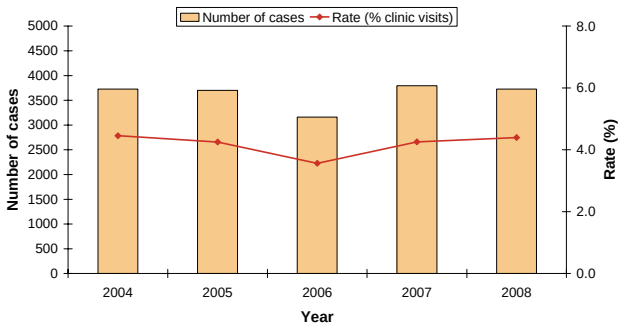
**Table 32. Number and rate of genital warts (first presentation) cases by sex and health care setting, 2008**

| | Sex | Clinic type | | |
|---|---|---|---|---|
| | | SHCs | FPCs | SYHCs |
| No. of cases | Female | 1996 | 434 | 161 |
| | Male | 1731 | 138 | 82 |
| | Total | 3728 | 573 | 243 |
| Clinic visit rate (%)[a] | Female | 4.1 | 0.2 | 0.1 |
| | Male | 4.9 | 1.5 | 0.1 |
| | Total | 4.4 | 0.3 | 0.1 |

[a] Cases/ total number of clinic visits

From 2004 to 2008, the number of cases of genital warts reported by SHCs has remained the same. However the clinic visit rate has decreased from 4.5% to 4.4% (Figure 46).

**Figure 46. Number of cases and rates of genital warts (first presentation) diagnosed at SHCs, 2004 to 2008**




Note : Denominator is the number of clinic visits

### Infectious Syphilis

Between 2007 and 2008, the number of cases of syphilis increased by 25.4% in SHCs (71 to 89). No cases of syphilis were reported in FPCs or SYHCs. In 2008, the

rate of syphilis at SHCs was 0.1%. From 2004 to 2008, the number of syphilis cases diagnosed at SHCs has almost doubled (46 to 89).

The mean age of cases of syphilis was 37 years (range 18 to 74 years). Of the 89 cases of syphilis reported in 2008, 76 (85.4%) were male and 13 (14.6%) were female.

### Non-specific Urethritis (Males only)

For surveillance purposes, non-specific urethritis 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 2008, there were 691 reported cases of NSU in SHCs, 11 cases in FPCs and 11 cases in SYHCs. From 2004 and 2006, the number of cases of NSU diagnosed at SHCs steadily decreased. The clinic visit rate of NSU reported by SHCs was 2.7% in 2004, 2.4% in 2005 and 1.9% in 2006. In 2007, the clinic visit rate of NSU increased to 2.1% and then reduced to 1.9% in 2008.

## LABORATORY SURVEILLANCE

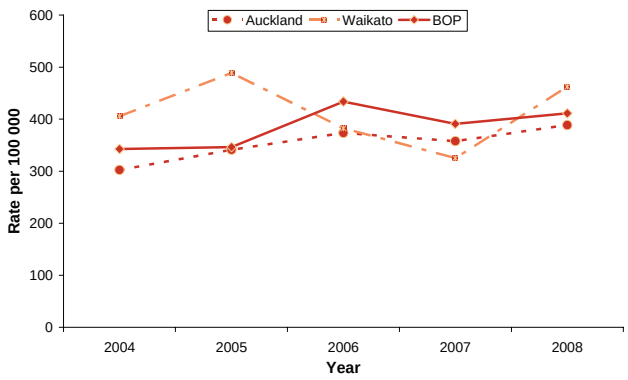
This section is based on data from participating laboratories in the Auckland, Waikato and Bay of Plenty regions.

### Chlamydia

In general, from 2004 to 2008, the overall rate of chlamydia diagnosed by participating laboratories in the Auckland, Waikato and BOP regions has risen more or less steadily by 39.4%, from 584 per 100 000 in 2004 to 815 per 100 000 in 2008.

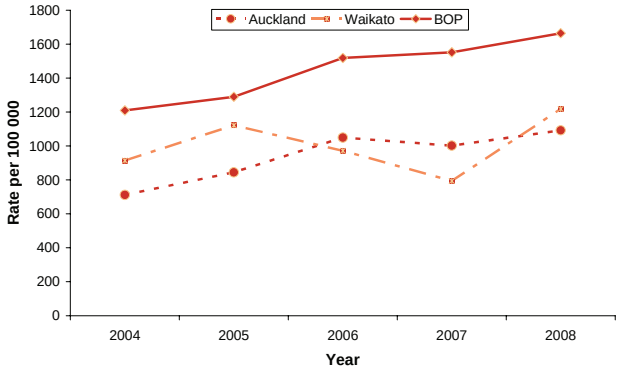
Figure 47 and Figure 48 shows the chlamydia rates from 2004 to 2008. From 2007 to 2008, the Waikato region had the highest increase in male and female rates (42.2% and 53.4%, respectively). The Auckland region had an increase of 8.7% in males and 9.0% in females. The BOP region had an increase of 5.2% in males and 7.2% in females. The BOP region has the highest rate overall at 1 060 per 100 000 population, compared with 751 and 849 per 100 000 population for the Auckland and Waikato regions, respectively.

**Figure 47. Male chlamydia rates diagnosed in the Auckland, Waikato and BOP regions: 2004 to 2008**




Note: Denominator is the population in each region

**Figure 48. Female chlamydia rates diagnosed in the Auckland, Waikato and BOP regions: 2004 to 2008**




Note: Denominator is the population in each region

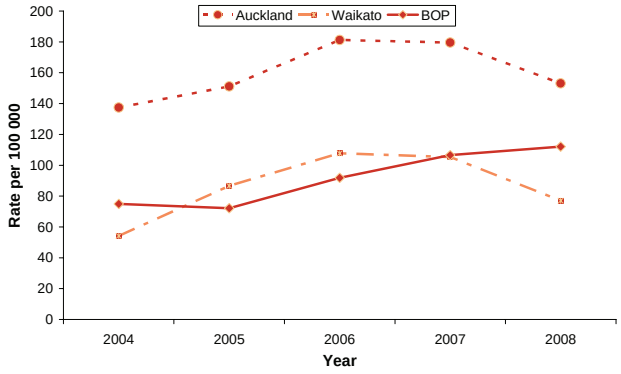
### Gonorrhoea

Over the last five years gonorrhoea rates in the Auckland, Waikato and BOP regions have increased by 11.4% from a rate of 95 per 100 000 in 2004 to 106 per 100 000 in 2008.

Figure 49 and Figure 50 shows the gonorrhoea rates from 2004 to 2008. From 2007 to 2008, the Waikato region had the highest decrease in the male and female rates (26.9% and 24.3%, respectively). The Auckland region had a decrease of 14.7% in males and 9.6% in females. The BOP region had a decrease of 19.4% in females. The only increase from 2007 to 2008 was seen in the male rate in the BOP region (5.3 %). The Auckland region had the highest rate overall at 126 per 100 000 population, compared with 91 and 68 per 100 000 population for the BOP and Waikato regions, respectively.

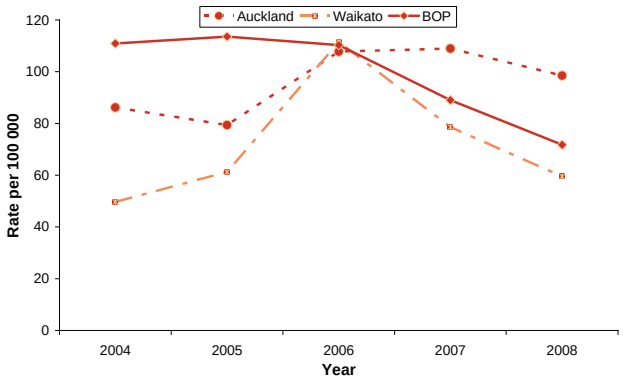
The number of laboratories reporting in these regions has not changed from 2004 to 2008. Therefore the overall trends suggest a true increase in the rate of gonorrhoea.

**Figure 49. Male rates of gonorrhoea in the Auckland, Waikato and BOP regions: 2004 to 2008**




Note : Denominator is the population in each region

**Figure 50. Female rates of gonorrhoea in the Auckland, Waikato and BOP regions: 2004 to 2008**




Note: Denominator is the population in each region

# OUTBREAK SURVEILLANCE

## Introduction

The following is a summary of surveillance data for outbreaks reported in 2008. A full report on outbreaks can be found in the Annual Summary of Outbreaks in New Zealand 2008 available at www.surv.esr.cri.nz.

This summary presents outbreak data by Public Health Unit (PHU), agent type, mode of transmission and setting. It is important to note that a single outbreak may have multiple modes of transmission or multiple settings recorded.

## Outbreak definition

The Manual for Public Health Surveillance in New Zealand [24] states that the following types of outbreaks should be reported:

1) Two or more cases linked to a common source

2) A community-wide or person-to-person outbreak (except when the source has become well established as a national epidemic)

3) Any other situation where outbreak investigation or control measures are undertaken or considered

Outbreak reporting is not required for single cases due to a specific contaminated source, and secondary cases, with the exception of secondary cases in an institution.

## Characteristics

There were 449 outbreaks reported by the PHUs in 2008 involving 6503 cases.

Table 33 outlines the number of outbreaks and associated cases reported by each Public Health Unit in 2008.

**Table 33. Outbreaks and associated cases reported by each Public Health Service (PHS)/ Public Health Office (PHO) in 2008.**

| PHS/PHO | Outbreaks | Cases |
|---|---|---|
| Northland | 1 | 10 |
| Auckland | 210 | 1538 |
| Waikato | 22 | 222 |
| Eastern Bay of Plenty | 1 | 26 |
| Rotorua | 6 | 34 |
| Tauranga | 14 | 201 |
| Taranaki | 18 | 349 |
| Hawke's Bay | 4 | 47 |
| Gisborne | 3 | 46 |
| Wanganui | 7 | 277 |
| Manawatu | 13 | 517 |
| Wellington [a] | 47 | 794 |
| Marlborough | 1 | 3 |
| Nelson | 4 | 120 |
| West Coast | 10 | 56 |
| Canterbury | 40 | 898 |
| South Canterbury | 3 | 110 |
| Otago | 38 | 1105 |
| Southland | 7 | 150 |
| Total | 449 | 6503 |

[a] Wairarapa data is included with Wellington.

Note that as outbreaks can occur across geographic boundaries the Public Health Office may not indicate the geographical distribution of outbreaks reported.

Of these reported outbreaks, 447 were final reports involving 6390 cases and two were interim reports (final details not yet available) involving 113 cases. According to the case definition for each outbreak, there were 1774 (27.3%) confirmed cases and 4729 probable cases (72.7%).

There were 180 hospitalisations and 13 deaths that resulted from outbreaks reported in 2008. Six deaths were related to norovirus outbreaks in Auckland (3), Wellington (2), and Canterbury (1). Three deaths were related to a gastroenteritis outbreak in Taranaki, two deaths to a carbon monoxide outbreak in Waikato, one death to a *Mycobacterium tuberculosis* outbreak in Wellington and one death to a *Salmonella* outbreak in Nelson.

## Pathogens/Agents

A summary of outbreaks and associated cases by agent type is shown in Table 34.

*Enteric Bacteria*

During 2008, enteric bacteria were implicated in 9.4% (42/449) of all reported outbreaks and 5.1% (329/6503) of all cases. Approximately 40% of these outbreaks and 33% of all cases attributed to enteric bacteria were linked to *Campylobacter* species (16/42 and 109/329 respectively). Of the 16 *Campylobacter* outbreaks, eight were attributed to foodborne transmission and seven to person-to-person transmission. The most common settings were in institutions (ten outbreaks) or in the home (four outbreaks).

*Salmonella* species accounted for approximately half of all cases linked to outbreaks due to enteric bacteria (49.5%, 163/329), even though *Salmonella* was only associated with 15 of the 42 outbreaks due to enteric bacteria. Person-to-person transmission was identified in seven *Salmonella* outbreaks and foodborne transmission in an additional four outbreaks. The most common setting was in the home which was linked to nine outbreaks and 119 cases.

In 2008 there was one outbreak of typhoid fever due *Salmonella typhi* phage types E1a and E7. The outbreak occurred in a household where crowded living conditions and poor hygiene facilitated person-to-person spread amongst the five cases.

Five of the six *Shigella* outbreaks reported in 2008 involved person-to-person transmission and four were set in the home. Two outbreaks occurred following overseas travel to India or China and had an unknown mode of transmission and/or setting.

Verotoxin or shiga toxin producing *Escherichia coli* (VTEC/STEC) was associated with four outbreaks in 2008. The mode of transmission was reported as person-to-person (2), zoonotic (2) or foodborne, environmental or eaterborne (1 each). Two outbreaks were set on a farm, and one at home. The remaining outbreak involving 14 cases from multiple health districts was believed to have been caused by a common food source dispersed in the community.

**Table 34. Outbreaks and associated cases by agent type, 2008**

| Agent Type | Outbreaks | Cases |
|---|---|---|
| Enteric bacteria | | |
| *Campylobacter* spp. | 16 | 109 |
| *Salmonella* spp. | 15 | 163 |
| *Shigella* spp. | 6 | 27 |
| VTEC/STEC | 4 | 25 |
| *Salmonella* Typhi | 1 | 5 |
| Total | **42** | **329** |
| Enteric protozoa | | |
| *Giardia* spp. | 50 | 184 |
| *Cryptosporidium* spp. | 7 | 29 |
| Total | **57** | **213** |
| Enteric viruses | | |
| Norovirus | 152 | 3917 |
| Rotavirus | 16 | 128 |
| Total | **168** | **4045** |
| Enteric (unspecified) | | |
| Gastroenteritis | 145 | 1427 |
| Total | **145** | **1427** |
| Respiratory bacteria | | |
| *Bordetella pertussis* | 6 | 21 |
| *Mycobacterium tuberculosis* | 4 | 12 |
| *Mycoplasma pneumoniae* | 1 | 11 |
| Total | **11** | **44** |
| Respiratory viruses | | |
| Influenza A H3 | 1 | 26 |
| ILI | 1 | 9 |
| Total | **2** | **35** |
| Toxins | | |
| *Clostridium perfringens* | 7 | 215 |
| Histamine | 2 | 6 |
| Tutin | 1 | 22 |
| *Bacillus cereus* | 1 | 3 |
| Blue green algae | 1 | 2 |
| Wax ester fish poisoning | 1 | 2 |
| Total | **13** | **250** |
| Poison | | |
| Lead poisoning | 2 | 104 |
| Carbon monoxide | 1 | 3 |
| Total | **3** | **107** |
| Other bacteria | | |
| *Leptospira* spp. | 4 | 20 |
| Total | **4** | **20** |
| Other viruses | | |
| Hepatitis A | 3 | 31 |
| Measles | 1 | 2 |
| Total | **4** | **33** |
| Total | **449** | **6503** |

*Enteric Protozoa*

Enteric protozoa accounted for 12.7% (57/449) of all outbreaks reported in 2008.

*Giardia* species was identified as the infectious agent in 50 outbreaks, 45 of which involved person-to-person transmission, 14 involved waterborne transmission and 11 involved environmental transmission. The most commonly identified setting for *Giardia* outbreaks was the home, which was associated with 38 outbreaks.

There were seven outbreaks involving *Cryptosporidium parvum* in 2008, three of which occur in the West Coast health district. Person-to-person transmission was established in six outbreaks, and four outbreaks involved both waterborne and environmental transmission. Four outbreaks occurred in the home only, and the remaining three occurred on a farm, at a childcare centre and in a community setting.

*Enteric viruses*

Enteric viruses were the infectious agent in 37.4% (168/449) of all outbreaks and 62.2% (4045/6503) of all associated cases in 2008.

The vast majority of outbreaks due to enteric viruses were caused by norovirus (152/168), which resulted in 3917 associated cases. The median number of cases per norovirus outbreak was 16 (range two to 354 cases). Person-to-person transmission was ascertained in 125 outbreaks, 63 of which also involved other modes of transmission. Environmental transmission was established in 41 outbreaks and foodborne transmission in 26. An institution was identified as a setting for 107 outbreaks including: rest homes (52), continuing care hospitals (18), acute care hospitals (18), child care (7) and hostels (5). The home was identified as the setting of 21 outbreaks and restaurants or cafés were implicated in 17 outbreaks.

There were 16 outbreaks of rotavirus resulting in 128 cases reported in 2008. All of these outbreaks involved person-to-person transmission although five outbreaks also involved environmental transmission and one outbreak involved transmission by fomites and surfaces. The outbreak settings were at childcare centres (13), in the home (4) or at another setting (1).

*Enteric (unspecified)*

During 2008, outbreaks of gastroenteritis (where no organism was isolated) accounted for 32.3% (145/449) of all outbreaks and 21.9% (1427/6503) of all associated cases.

*Respiratory Diseases*

Respiratory diseases resulted in 2.9% (13/449) of all outbreaks and 1.2% (79/6503) of all associated cases.

There were six outbreaks due to *Bordetta pertussis* involving 21 cases reported in 2008. Person-to-person was identified as the only mode of transmission in all six outbreaks. Four of the outbreaks occurred in the home, one of which also occurred at a childcare centre. The remaining two outbreaks were set in a school and a tertiary training institute.

Four outbreaks due to *Mycobacterium tuberculosis* infection and involving 12 cases were reported in 2008. Three of the outbreaks were set in the home and one at a school. *Mycoplasma pneumoniae* was identified as the infectious agent in one outbreak set in a Wellington office building and involving 11 cases.

*Influenza* A H3 caused one reported outbreak in the Wellington area in 2008. The outbreak occurred in a rest home where most of the 26 cases were immunised against

influenza but not the A H3 strain. An outbreak of influenza-like-illness involving 9 cases was also reported in Wellington rest home in 2008.

*Toxins*

Toxins were involved in 2.9% (13/449) of all outbreaks reported in 2008. The most commonly implicated agent was *Clostridium perfringens*, which accounted for 7 outbreaks and 215 cases. Other implicated agents included histamine (2), tutin poisoning of honey (1), *Bacillus cereus* (1), blue green algae poisoning (1) and wax ester fish poisoning (1). Of the 13 toxin-related outbreaks 12 involved foodborne transmission and eight of these were related to commercial food operators.

*Poison*

During 2008, there were three reported outbreaks involving 107 cases due to chemical poisoning of the environment. One reported outbreak of lead poisoning involving 100 cases occurred in Auckland during the removal of paint from the Auckland Harbour bridge. An outbreak due carbon monoxide poisoning involving 4 cases and causing two deaths occurred in Waikato, a coroners report found that the outbreak occurred as a result of accidental poisoning from a gas cooker taken into the cabin where the cases were staying.

*Other Bacteria*

Four outbreaks due to *Leptospira* involving 20 cases were reported in 2008. All outbreaks were set in the workplace. Of these three reported the setting as a farm and two reported abattoir. Exposure to infected animals or carcasses was confirmed or suspected as the source of infection in all outbreaks.

*Other Viruses*

Hepatitis A caused three reported outbreaks in 2008, involving 31 cases in total. All three outbreaks involved person-to-person transmission although one also involved foodborne transmission. The largest outbreak involving 20 cases was set at a childcare centre, the remaining outbreaks were set in the home and at a school.

There was one outbreak due to measles reported in 2008. The outbreak occurred at a childcare centre but only involved 2 cases.

**Mode of Transmission**

The modes of transmission recorded for outbreaks are detailed in Table 35. The primary modes of transmission were person-to-person transmission, recorded in 312 outbreaks, foodborne transmission, recorded in 89 outbreaks and environmental transmission, recorded in 85 outbreaks. Person-to-person transmission was associated with two and a half times as many cases as environmental transmission (5293 versus 2190) and over four times as many cases as foodborne transmission (5293 versus 1206). The mode of transmission was unknown in 14.5% (65/449) of outbreaks and more than one mode of transmission was identified in 30.7% (138/449) of all outbreaks reported in 2008.

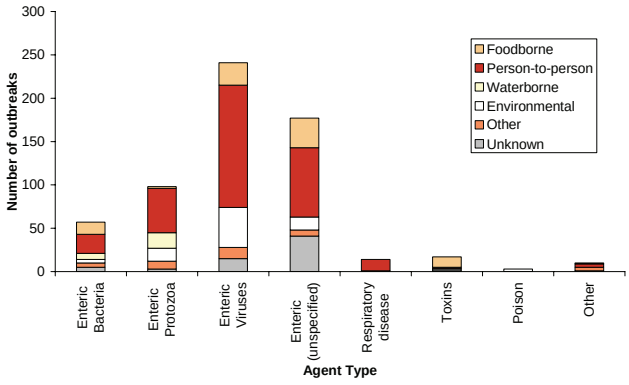
**Table 35. Outbreaks of infectious disease and associated cases by mode of transmission, 2008**

| Transmission Mode | Outbreaks [a] | Cases [a] |
|---|---|---|
| Person-to-person | 312 | 5293 |
| Foodborne | 89 | 1206 |
| Environmental | 85 | 2190 |
| Waterborne | 26 | 159 |
| Zoonotic | 15 | 74 |
| Sexual contact | 0 | 0 |
| Other | 25 | 769 |
| Unknown | 65 | 345 |

[a] Note: more than one mode of mode of transmission was reported for some outbreaks

Person-to-person transmission was the most common mode of transmission for enteric bacteria (52.4%, 22/42), enteric protozoa (89.5%, 51/57), enteric viruses (83.9%, 141/168), unspecified enteric pathogens (55.2%, 80/145), and respiratory pathogens (100%, 13/13). Foodborne transmission was the principal mode of transmission for toxins (92.3%, 12/13) but also contributed substantially to outbreaks due to enteric bacteria (33.3%, 14/42) and unspecified enteric pathogens (23.4%, 34/145) (Figure 51).

**Figure 51. Number of outbreaks by agent type and mode of transmission, 2008**




Environmental transmission was an important contributing factor in 27.4% (46/168) of outbreaks due to enteric viruses and 26.3% (15/57) of outbreaks due to enteric protozoa.

**Setting**

Outbreaks reported in 2008 were most commonly linked to the home (24.9%, 112/449) and institutions (43.7%, 196/449), with rest/retirement homes involved in 19.6% (88/449) of total outbreaks (Table 36).

**Table 36. Number of cases arising as a result of outbreaks of infectious disease by location, 2008**

| Outbreak Setting | Outbreaks[a] | Cases[a] |
|---|---|---|
| Commercial Food Operators | | |
| Restaurant/Café | 55 | 547 |
| Takeaway | 17 | 373 |
| Other food outlet | 12 | 73 |
| Supermarket/deli | 6 | 49 |
| Caterer | 4 | 78 |
| Institutions | | |
| Rest/Retirement Home | 88 | 1920 |
| Childcare centre | 40 | 490 |
| Hospital (continuing care) | 35 | 756 |
| Hospital (acute care) | 28 | 886 |
| Camp | 9 | 138 |
| Hostel/Boarding house | 8 | 767 |
| School | 7 | 151 |
| Hotel/Motel | 6 | 31 |
| Prison | 2 | 20 |
| Community | | |
| Swimming/spa pool | 3 | 8 |
| Community/Church gathering | 3 | 63 |
| Workplace | | |
| Farm | 14 | 60 |
| Workplace | 11 | 256 |
| Abattoir | 2 | 16 |
| Home | 112 | 558 |
| Other setting | 47 | 1229 |
| Setting unknown | 33 | 133 |

[a] Note: more than one mode of setting was reported for some outbreaks

# ANTIBIOTIC RESISTANCE

## ANTIMICROBIAL RESISTANCE

The prevalence of resistance among common, important clinical pathogens between 1994 and 2007, is shown in Appendix J. Most antimicrobial resistance data are only available in a complete analysed form up to the end of 2007. Data from ESR's national surveillance of antimicrobial resistance is available at http://www.surv.esr.cri.nz/antimicrobial/antimicrobial_resistance.php.

Of particular note are the following trends:

- Methicillin resistance among *Staphylococcus aureus* stable at 7-8% each year since 2000.
- A high prevalence of mupirocin-resistant *S. aureus* since the mid-1990s, although the prevalence appears to have decreased from a peak of 20% in the 2000-2002 period. Mupirocin resistance is lower among methicillin-resistant (MRSA) than methicillin-susceptible *S. aureus* (MSSA), as the most common MRSA strains in New Zealand are mupirocin susceptible.
- A high prevalence of fusidic acid resistance among *S. aureus.* As for mupirocin, fusidic acid resistance is more common among MSSA than MRSA.
- A high prevalence of penicillin non-susceptibility among *Streptococcus pneumoniae* and increasing non-susceptibility to third-generation cephalosporins, such as ceftriaxone.
- An increase in vancomycin-resistant enterococci (VRE), with the first hospital outbreak in this country in 2007.
- 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.
- An increasing prevalence of extended-spectrum β-lactamases (ESBLs) in Enterobacteriaceae.
- Ciprofloxacin resistance in *Neisseria gonorrhoeae* now more common than penicillin resistance in most parts of New Zealand.
- Multidrug-resistant tuberculosis (MDR-TB) remains uncommon and there does not appear to have been any transmission of MDR-TB within New Zealand. No extensively drug-resistant TB (XDR-TB) has been identified in New Zealand. XDR-TB is MDR-TB with additional resistance to any fluoroquinolone and at least one of the following second-line drugs: capreomycin, kanamycin or amikacin.

# APPENDIX: NATIONAL SURVEILLANCE DATA AND TRENDS

## COMPARISON OF NOTIFIABLE DISEASE CASES AND RATES FOR 2007 AND 2008

**Table 37. Number of cases and rates per 100 000 population of notifiable diseases in New Zealand, 2007 - 2008**

| Disease[a,b] | 2007 | | 2008 | | Change[e,f] |
|---|---|---|---|---|---|
| | Cases | Rates | Cases | Rates | |
| AIDS | 31 | 0.7 | 48 | 1.1 | → |
| Brucellosis | 4 | 0.1 | 3 | 0.1 | ← |
| Campylobacteriosis | 12778 | 302.2 | 6693 | 156.8 | ↞ |
| Chemical Poisoning | 13 | 0.3 | 1 | 0.0 | ↞ |
| Chikungunya Fever | 1 | 0.0 | 1 | 0.0 | - |
| Cholera | 1 | 0.0 | 0 | 0.0 | ← |
| Cryptosporidiosis | 924 | 21.9 | 764 | 17.9 | ↞ |
| Cysticercosis | 2 | 0.0 | 0 | 0.0 | ← |
| Dengue fever | 114 | 2.7 | 114 | 2.7 | |
| Gastroenteritis[c] | 622 | 14.7 | 690 | 16.2 | → |
| Giardiasis | 1402 | 33.2 | 1662 | 38.9 | ↠ |
| *Haemophilus influenzae* type b | 15 | 0.4 | 9 | 0.2 | ← |
| Hazardous Substances Injury | 3 | 0.1 | 6 | 0.1 | → |
| Hepatitis A | 42 | 1.0 | 91 | 2.1 | ↠ |
| Hepatitis B[d] | 73 | 1.7 | 39 | 0.9 | ↞ |
| Hepatitis C[d] | 32 | 0.8 | 23 | 0.5 | ← |
| Hepatitis NOS | 1 | 0.0 | 2 | 0.0 | → |
| Hydatid Disease | 6 | 0.1 | 7 | 0.2 | → |
| Lead Absorption | 78 | 1.8 | 315 | 7.4 | ↠ |
| Legionellosis | 64 | 1.5 | 76 | 1.8 | → |
| Leprosy | 8 | 0.2 | 5 | 0.1 | ← |
| Leptospirosis | 66 | 1.6 | 121 | 2.8 | ↠ |
| Listeriosis | 26 | 0.6 | 27 | 0.6 | → |
| Malaria | 25 | 0.6 | 40 | 0.9 | → |
| Measles | 24 | 0.6 | 12 | 0.3 | ↞ |
| Meningococcal Disease | 104 | 2.5 | 122 | 2.9 | → |
| Mumps | 73 | 1.7 | 78 | 1.8 | → |
| Murine Typhus | 2 | 0.0 | 8 | 0.2 | → |
| Paralytic Shellfish Poisoning | 1 | 0.0 | 0 | 0.0 | ← |
| Paratyphoid Fever | 23 | 0.5 | 25 | 0.6 | → |
| Pertussis | 332 | 7.9 | 433 | 10.1 | ↠ |
| Rheumatic Fever | 140 | 3.3 | 152 | 3.6 | → |
| Rickettsial disease | 0 | 0.0 | 2 | 0.0 | → |
| Ross River Virus Infection | 0 | 0.0 | 1 | 0.0 | → |
| Rubella | 11 | 0.3 | 9 | 0.2 | ← |
| Salmonellosis | 1274 | 30.1 | 1346 | 31.5 | → |
| Shigellosis | 129 | 3.1 | 113 | 2.6 | ← |
| Taeniasis | 1 | 0.0 | 5 | 0.1 | → |
| Tetanus | 1 | 0.0 | 0 | 0.0 | ← |
| Toxic Shellfish Poisoning | 2 | 0.0 | 1 | 0.0 | ← |
| Tuberculosis Disease | 285 | 6.7 | 302 | 7.1 | → |
| Typhoid Fever | 48 | 1.1 | 29 | 0.7 | ↞ |
| VTEC/STEC Infection | 100 | 2.4 | 128 | 3.0 | → |
| Yersiniosis | 502 | 11.9 | 509 | 11.9 | → |

[a] No cases of the following notifiable diseases were reported in 2007 & 2008: anthrax, Barmah Forest Virus, botulism, Creutzfeldt-Jakob disease, decompression sickness, diphtheria, *E. sakazakii*, HPAI, Japanese encephalitis, Kunjin virus, Lyme disease, Murray Valley encephalitis, plague, poliomyelitis, primary amoebic meningo-encephalitis, rabies, SARS, trichinellosis, yellow fever.

[b] Invasive pneumococcal disease became notifiable from 17 October 2008 and is therefore not included in this table.

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

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

[e] ↞= Significant decrease, ↠ = Significant increase, -- = No change, ← = Not significant decrease, → = not significant increase

[f] The Mantel-Haenszel 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.

## DEATHS FROM NOTIFIABLE DISEASES RECORDED IN EPISURV, 1997 - 2008

**Table 38. Deaths due to notifiable diseases recorded in EpiSurv, 1997 - 2008**

| Disease | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AIDS[a] | 34 | 19 | 18 | 19 | 14 | 11 | 10 | 13 | 15 | 14 | 5 | 2 |
| Campylobacteriosis | 2 | 2 | 1 | 3 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 |
| Creutzfeldt-Jakob disease[b] | 3 | 0 | 2 | 3 | 1 | 3 | 4 | 3 | 0 | 5 | 0 | 0 |
| Gastroenteritis | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Giardiasis | 1 | 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 |
| Hepatitis B | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| Hydatid disease | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Invasive pneumococcal disease[c] | - | - | - | - | - | - | - | - | - | - | - | 8 |
| Legionellosis[d] | 4 | 1 | 1 | 5 | 2 | 3 | 1 | 1 | 4 | 3 | 1 | 4 |
| Listeriosis - non perinatal | 2 | 0 | 1 | 2 | 1 | 0 | 2 | 3 | 1 | 0 | 2 | 3 |
| Listeriosis - perinatal | 6 | 0 | 2 | 4 | 1 | 3 | 2 | 2 | 0 | 1 | 2 | 2 |
| Malaria | 1 | 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 |
| Pertussis | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| Primary amoebic meningoencephalitis | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rheumatic fever[e] | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Salmonellosis | 2 | 2 | 1 | 7 | 2 | 1 | 0 | 0 | 1 | 1 | 1 | 1 |
| Shigellosis | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tetanus | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Tuberculosis | 15 | 8 | 14 | 8 | 2 | 6 | 6 | 6 | 4 | 5 | 3 | 5 |
| VTEC infection | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Yersiniosis | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

[a] Data source [9]

[b] Data source [12]

[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] The death was a rheumatic fever recurrence

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 reported by Public Health Services when it occurs close to the time of notification and investigation.

## NZHIS MORTALITY DATA FOR SELECTED NOTIFIABLE DISEASES, 2004 - 2006

**Table 39. Reported deaths from selected notifiable diseases, 2004 - 2006**

| Disease | ICD 10 Codes | 2004 | | 2005 | | 2006[a] | |
|---|---|---|---|---|---|---|---|
| | | Underlying[b] | Contributory[c] | Underlying[b] | Contributory[c] | Underlying[b] | Contributory[c] |
| AIDS | B20-B24 | 15 | 2 | 13 | 7 | 17 | 5 |
| Campylobacteriosis | A04.5 | 1 | 1 | | 3 | 3 | |
| Creutzfeldt-Jakob Disease | A81.0 | 4 | | 4 | | 3 | |
| Hepatitis B | B16 | | 6 | 3 | 5 | | 5 |
| Hepatitis C | B17.1 | | 3 | | 1 | | 1 |
| Legionellosis | A48.1 | 1 | 1 | 2 | 1 | 1 | |
| Listeriosis | A32 | 1 | | | | | 1 |
| Meningococcal Disease | A39 | 8 | | 13 | | 6 | |
| Pertussis | A37 | 1 | | 1 | | | |
| Salmonellosis | A02 | | 1 | | 1 | 1 | |
| Tuberculosis | A15-A19, P37.0 | 13 | 13 | 5 | 14 | 11 | 8 |
| VTEC/STEC Infection | A44 | | 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)

## NZHIS MORBIDITY DATA FOR SELECTED NOTIFIABLE DISEASES, 2006 - 2008

**Table 40. Hospital admissions for selected notifiable diseases, 2006 - 2008**

| | | 2006 | | 2007 | | 2008 | |
|---|---|---|---|---|---|---|---|
| Disease | ICD 10 Codes | Principal diagnosis | Other relevant diagnosis | Principal diagnosis | Other relevant diagnosis | Principal diagnosis | Other relevant diagnosis |
| AIDS | B20-B24 | 35 | 282 | 28 | 261 | 26 | 266 |
| Arboviral diseases | A83, A84, A85.2, A92, A93, A94, B33.1 | 2 | | | 2 | 1 | |
| Brucellosis | A23 | | 1 | | 2 | 2 | |
| Campylobacteriosis | A04.5 | 969 | 212 | 752 | 185 | 388 | 97 |
| Creutzfeldt-Jakob Disease | A81.0 | 6 | | 2 | 5 | 5 | 9 |
| Cryptosporidiosis | A07.2 | 20 | 10 | 26 | 14 | 19 | 13 |
| Cysticercosis | B69 | 2 | 1 | 4 | 2 | 2 | |
| Decompression sickness | T70.3 | 8 | | 12 | 1 | 12 | 2 |
| Dengue fever | A90, A91 | 11 | 3 | 45 | 9 | 35 | 5 |
| Diphtheria | A36 | | 1 | | 3 | | |
| Giardiasis | A07.1 | 43 | 28 | 20 | 14 | 18 | 21 |
| Hepatitis A | B15 | 33 | 14 | 17 | 18 | 19 | 18 |
| Hepatitis B | B16 | 35 | 89 | 41 | 90 | 33 | 81 |
| Hepatitis C | B17.1 | 11 | 13 | 12 | 19 | 12 | 21 |
| Lead absorption | T56.0 | 5 | | 12 | | 2 | |
| Legionellosis | A48.1 | 12 | 10 | 18 | 7 | 37 | 6 |
| Leprosy | A30 | 2 | | 4 | 6 | 5 | 4 |
| Leptospirosis | A27 | 50 | 8 | 41 | 2 | 57 | 7 |
| Listeriosis | A32 | 13 | 10 | 12 | 17 | 13 | 13 |
| Malaria | B50-B54 | 42 | 4 | 37 | 5 | 30 | |
| Measles | B05 | 1 | 1 | 5 | 1 | 3 | |
| Meningococcal disease | A39 | 175 | 31 | 120 | 21 | 125 | 21 |
| Mumps | B26 | 9 | 2 | 13 | 2 | 16 | 4 |
| Paratyphoid fever | A01.1-A01.4 | 4 | | 13 | | 4 | |
| Pertussis | A37 | 60 | 10 | 51 | 10 | 72 | 11 |
| Poliomyelitis | A80 | | | | | | 1 |
| Rheumatic fever | I00, I01, I02 | 186 | 42 | 206 | 34 | 227 | 46 |
| Rickettsial diseases | A75, A77, A78, A79 | 16 | 1 | 4 | | 7 | 1 |
| Rubella | B06 | 1 | 4 | | 1 | | 1 |
| Salmonellosis | A02 | 123 | 39 | 123 | 27 | 118 | 40 |
| Shigellosis | A03 | 13 | 2 | 27 | 1 | 15 | 4 |
| Taeniasis | B689 | | | | 2 | | 1 |
| Tetanus | A33-A35 | 2 | 2 | 1 | | 1 | |
| Tuberculosis | A15-A19, P37.0 | 301 | 151 | 229 | 154 | 205 | 121 |
| Typhoid fever | A01.0 | 30 | 2 | 42 | 2 | 19 | 1 |
| VTEC/STEC Infection | A40-A44 | 16 | 23 | 22 | 24 | 26 | 20 |
| Yersiniosis | A04.6 | 29 | 26 | 19 | 31 | 23 | 30 |

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 ETHNIC GROUP, 2008

**Table 41. Number of cases and rates per 100 000 population of notifiable diseases by ethnic group, 2008**

| | Ethnicity | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | European | | Maori | | Pacific Peoples | | Other Ethnicity | | Unknown | | Total | |
| Disease | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Campylobacteriosis | 3570 | 132.5 | 348 | 61.6 | 67 | 29.6 | 139 | 37.1 | 2569 | | 6693 | 166.2 |
| Cryptosporidiosis | 589 | 21.9 | 56 | 9.9 | 5 | 2.2 | 19 | 5.1 | 95 | | 764 | 19.0 |
| Dengue fever | 40 | 1.5 | 4 | | 39 | 17.2 | 14 | 3.7 | 17 | | 114 | 2.8 |
| Gastroenteritis | 441 | 16.4 | 32 | 5.7 | 14 | 6.2 | 35 | 9.3 | 168 | | 690 | 17.1 |
| Giardiasis | 861 | 32.0 | 62 | 11.0 | 8 | 3.5 | 46 | 12.3 | 685 | | 1662 | 41.3 |
| Haemophilus influenzae type b | 2 | | 6 | 1.1 | 1 | | | | | | 9 | 0.2 |
| Hepatitis A | 33 | 1.2 | 14 | 2.5 | 13 | 5.7 | 24 | 6.4 | 7 | | 91 | 2.3 |
| Hepatitis B | 18 | 0.7 | 4 | | 6 | 2.7 | 7 | 1.9 | 4 | | 39 | 1.0 |
| Hepatitis C | 15 | 0.6 | 5 | 0.9 | | | 1 | | 2 | | 23 | 0.6 |
| Hydatid disease | 4 | | 1 | | | | 1 | | 1 | | 7 | 0.2 |
| Lead absorption | 147 | 5.5 | 14 | 2.5 | 12 | 5.3 | 5 | 1.3 | 137 | | 315 | 7.8 |
| Legionellosis | 59 | 2.2 | 3 | | 1 | | 1 | | 12 | | 76 | 1.9 |
| Leprosy | 1 | | | | 3 | 1.3 | 1 | | | | 5 | 0.1 |
| Leptospirosis | 78 | 2.9 | 26 | 4.6 | 1 | | | | 16 | | 121 | 3.0 |
| Listeriosis | 20 | 0.7 | 2 | | 4 | 1.8 | 1 | | | | 27 | 0.7 |
| Malaria | 7 | 0.3 | | | 5 | 2.2 | 18 | 4.8 | 10 | | 40 | 1.0 |
| Measles | 9 | 0.3 | 1 | | | | 1 | | 1 | | 12 | 0.3 |
| Meningococcal disease | 52 | 1.9 | 40 | 7.1 | 21 | 9.3 | 6 | 1.6 | 3 | | 122 | 3.0 |
| Mumps | 33 | 1.2 | 16 | 2.8 | 12 | 5.3 | 6 | 1.6 | 11 | | 78 | 1.9 |
| Paratyphoid fever | 7 | 0.3 | 1 | | | 0.0 | 12 | 3.2 | 5 | | 25 | 0.6 |
| Pertussis | 324 | 12.0 | 61 | 10.8 | 10 | 4.4 | 8 | 2.1 | 30 | | 433 | 10.7 |
| Rheumatic fever | 10 | 0.4 | 99 | 17.5 | 29 | 12.8 | 2 | | 12 | | 152 | 3.8 |
| Rickettsial disease | 1 | | | | | | | | 1 | | 2 | |
| Rubella | 7 | 0.3 | 1 | | | 0.0 | | | 1 | | 9 | 0.2 |
| Salmonellosis | 820 | 30.4 | 108 | 19.1 | 19 | 8.4 | 51 | 13.6 | 348 | | 1346 | 33.4 |
| Shigellosis | 53 | 2.0 | 4 | | 13 | 5.7 | 12 | 3.2 | 31 | | 113 | 2.8 |
| Tuberculosis disease | 35 | 1.3 | 48 | 8.5 | 52 | 23.0 | 157 | 41.9 | 10 | | 302 | 7.5 |
| Typhoid fever | | | 2 | | 12 | 5.3 | 10 | 2.7 | 5 | | 29 | 0.7 |
| VTEC/STEC infection | 88 | 3.3 | 12 | 2.1 | 1 | | 5 | 1.3 | 22 | | 128 | 3.2 |
| Yersiniosis | 273 | 10.1 | 26 | 4.6 | 14 | 6.2 | 41 | 10.9 | 155 | | 509 | 12.6 |

Note: Disease rates for ethnic groups and total cases are based on 2006 census data from Statistics New Zealand and should not be compared to disease rates used else-where in the report, which have been calculated using 2008 mid-year population estimates from Statistics New Zealand. 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, 2008

**Table 42. Number of cases and rates per 100 000 population of notifiable diseases by sex, 2008**

| | Sex | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Male | | Female | | Unknown | | Total | |
| Disease | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Campylobacteriosis | 3711 | 177.4 | 2888 | 132.7 | 94 | | 6693 | 156.8 |
| Cryptosporidiosis | 377 | 18.0 | 377 | 17.3 | 10 | | 764 | 17.9 |
| Dengue fever | 58 | 2.8 | 56 | 2.6 | | | 114 | 2.7 |
| Gastroenteritis | 305 | 14.6 | 359 | 16.5 | 26 | | 690 | 16.2 |
| Giardiasis | 827 | 39.5 | 805 | 37.0 | 30 | | 1662 | 38.9 |
| *Haemophilus influenzae* type b | 3 | | 6 | 0.3 | | | 9 | 0.2 |
| Hepatitis A | 58 | 2.8 | 31 | 1.4 | 2 | | 91 | 2.1 |
| Hepatitis B | 24 | 1.1 | 14 | 0.6 | 1 | | 39 | 0.9 |
| Hepatitis C | 12 | 0.6 | 11 | 0.5 | | | 23 | 0.5 |
| Hydatid disease | 5 | 0.2 | 2 | | | | 7 | 0.2 |
| Lead absorption | 276 | 13.2 | 33 | 1.5 | 6 | | 315 | 7.4 |
| Legionellosis | 41 | 2.0 | 34 | 1.6 | 1 | | 76 | 1.8 |
| Leprosy | 2 | | 3 | | | | 5 | 0.1 |
| Leptospirosis | 103 | 4.9 | 18 | 0.8 | | | 121 | 2.8 |
| Listeriosis - non perinatal | 11 | 0.5 | 10 | 0.5 | | | 21 | 0.5 |
| Malaria | 22 | 1.1 | 17 | 0.8 | 1 | | 40 | 0.9 |
| Measles | 9 | 0.4 | 3 | | | | 12 | 0.3 |
| Meningococcal disease | 72 | 3.4 | 50 | 2.3 | | | 122 | 2.9 |
| Mumps | 34 | 1.6 | 40 | 1.8 | 4 | | 78 | 1.8 |
| Paratyphoid fever | 13 | 0.6 | 12 | 0.6 | | | 25 | 0.6 |
| Pertussis | 181 | 8.7 | 248 | 11.4 | 4 | | 433 | 10.1 |
| Rheumatic fever | 73 | 3.5 | 68 | 3.1 | 11 | | 152 | 3.6 |
| Rickettsial disease | 1 | | 1 | | | | 2 | |
| Rubella | 5 | 0.2 | 4 | | | | 9 | 0.2 |
| Salmonellosis | 704 | 33.6 | 622 | 28.6 | 20 | | 1346 | 31.5 |
| Shigellosis | 62 | 3.0 | 46 | 2.1 | 5 | | 113 | 2.6 |
| Tetanus | 0 | | 0 | | | | 0 | |
| Tuberculosis disease | 162 | 7.7 | 140 | 6.4 | | | 302 | 7.1 |
| Typhoid fever | 17 | 0.8 | 12 | 0.6 | | | 29 | 0.7 |
| VTEC/STEC infection | 67 | 3.2 | 60 | 2.8 | 1 | | 128 | 3.0 |
| Yersiniosis | 262 | 12.5 | 234 | 10.8 | 13 | | 509 | 11.9 |

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, 2008

**Table 43. Number of cases and rates per 100 000 population of notifiable diseases by age group, 2008**

| | Age Group | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <1 | | 1 to 4 | | 5 to 9 | | 10 to 14 | | 15 to 19 | | 20 to 29 | | 30 to 39 | | 40 to 49 | | 50 to 59 | | 60 to 69 | | 70+ | | Unknown | | Total | |
| Disease | 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 | 174 | 271.6 | 752 | 318.7 | 327 | 113.7 | 271 | 89.8 | 467 | 144.8 | 1060 | 186.1 | 814 | 139.5 | 814 | 128.4 | 734 | 141.1 | 643 | 170.3 | 611 | 164.3 | 26 | | 6693 | 156.8 |
| Cryptosporidiosis | 23 | 35.9 | 264 | 111.9 | 95 | 33.0 | 47 | 15.6 | 57 | 17.7 | 98 | 17.2 | 86 | 14.7 | 37 | 5.8 | 31 | 6.0 | 18 | 4.8 | 7 | 1.9 | 1 | | 764 | 17.9 |
| Dengue fever | | | 1 | | 1 | | 5 | 1.7 | 8 | 2.5 | 23 | 4.0 | 13 | 2.2 | 20 | 3.2 | 24 | 4.6 | 14 | 3.7 | 5 | 1.3 | | | 114 | 2.7 |
| Gastroenteritis | 29 | 45.3 | 101 | 42.8 | 13 | 4.5 | 15 | 5.0 | 30 | 9.3 | 67 | 11.8 | 85 | 14.6 | 108 | 17.0 | 79 | 15.2 | 45 | 11.9 | 71 | 19.1 | 47 | | 690 | 16.2 |
| Giardiasis | 43 | 67.1 | 318 | 134.8 | 151 | 52.5 | 33 | 10.9 | 43 | 13.3 | 154 | 27.0 | 393 | 67.4 | 218 | 34.4 | 130 | 25 | 120 | 31.8 | 56 | 15.1 | 3 | | 1662 | 38.9 |
| *Haemophilus influenzae* type b | 1 | | 3 | | 1 | | 2 | | | | | | 1 | | | | | | | | 1 | | | | 9 | 0.2 |
| Hepatitis A | 1 | | 13 | 5.5 | 10 | 3.5 | 8 | 2.7 | 9 | 2.8 | 16 | 2.8 | 15 | 2.6 | 7 | 1.1 | 6 | 1.2 | 3 | | 3 | | | | 91 | 2.1 |
| Hepatitis B | 2 | | | | | | | | 1 | | 6 | 1.1 | 10 | 1.7 | 9 | 1.4 | 5 | 1.0 | 3 | | 3 | | | | 39 | 0.9 |
| Hepatitis C | | | | | | | | | 1 | | 12 | 2.1 | 4 | | 4 | | 2 | | | | | | | | 23 | 0.5 |
| Hydatid disease | | | | | | | | | | | | | 1 | | 1 | | 2 | | 2 | | 1 | | | | 7 | 0.2 |
| Lead absorption | 2 | | 5 | 2.1 | 4 | | 2 | | 16 | 5.0 | 46 | 8.1 | 61 | 10.5 | 71 | 11.2 | 68 | 13.1 | 31 | 8.2 | 9 | 2.4 | | | 315 | 7.4 |
| Legionellosis | | | 1 | | | | | | | | 2 | | 6 | 1 | 7 | 1.1 | 13 | 2.5 | 20 | 5.3 | 27 | 7.3 | | | 76 | 1.8 |
| Leprosy | | | | | | | | | | | 2 | | 1 | | 1 | | 1 | | | | | | | | 5 | 0.1 |
| Leptospirosis | | | | | | | | | 5 | 1.6 | 29 | 5.1 | 25 | 4.3 | 26 | 4.1 | 23 | 4.4 | 10 | 2.6 | 2 | | 1 | | 121 | 2.8 |
| Listeriosis | 1 | | | | | | | | 1 | | 4 | | 2 | | 3 | | 2 | | 3 | | 11 | 3.0 | | | 27 | 0.6 |
| Malaria | 1 | | | | 2 | | 1 | | 4 | | 14 | 2.5 | 7 | 1.2 | 6 | 0.9 | 3 | | 2 | | | | | | 40 | 0.9 |
| Measles | | | 8 | 3.4 | 1 | | 1 | | 1 | | 1 | | | | | | | | | | | | | | 12 | 0.3 |
| Meningococcal disease | 18 | 28.1 | 33 | 14.0 | 13 | 4.5 | 9 | 3.0 | 13 | 4.0 | 7 | 1.2 | 4 | | 11 | 1.7 | 4 | | 5 | 1.3 | 5 | 1.3 | | | 122 | 2.9 |
| Mumps | | | 24 | 10.2 | 13 | 4.5 | 12 | 4.0 | 3 | | 6 | 1.1 | 11 | 1.9 | 6 | 0.9 | | | | | 3 | | | | 78 | 1.8 |
| Paratyphoid fever | 1 | | 3 | | 1 | | | | 1 | | 5 | 0.9 | 4 | | 4 | | 4 | | 1 | | 1 | | | | 25 | 0.6 |
| Pertussis | 41 | 64.0 | 21 | 8.9 | 26 | 9.0 | 41 | 13.6 | 32 | 9.9 | 41 | 7.2 | 55 | 9.4 | 54 | 8.5 | 62 | 11.9 | 37 | 9.8 | 23 | 6.2 | | | 433 | 10.1 |
| Rheumatic fever | 2 | | 1 | | 38 | 13.2 | 68 | 22.5 | 20 | 6.2 | 14 | 2.5 | 6 | 1.0 | 3 | | | | | | | | | | 152 | 3.6 |
| Rickettsial disease | | | | | | | | | | | | | | | | | 1 | | 1 | | | | | | 2 | |
| Rubella | 1 | | 5 | 2.1 | | | | | 1 | | 1 | | | | | | 1 | | | | | | | | 9 | 0.2 |
| Salmonellosis | 87 | 135.8 | 257 | 108.9 | 80 | 27.8 | 55 | 18.2 | 75 | 23.3 | 185 | 32.5 | 164 | 28.1 | 145 | 22.9 | 120 | 23.1 | 86 | 22.8 | 90 | 24.2 | 2 | | 1346 | 31.5 |
| Shigellosis | | | 13 | 5.5 | 4 | | 7 | 2.3 | 4 | | 15 | 2.6 | 18 | 3.1 | 21 | 3.3 | 19 | 3.7 | 6 | 1.6 | 6 | 1.6 | | | 113 | 2.6 |
| Tetanus | | | | | | | | | | | | | | | | | | | | | 1 | | | | 1 | |
| Tuberculosis disease | 1 | | 3 | | 6 | 2.1 | 6 | 2.0 | 15 | 4.7 | 59 | 10.4 | 60 | 10.3 | 29 | 4.6 | 37 | 7.1 | 41 | 10.9 | 45 | 12.1 | | | 302 | 7.1 |
| Typhoid fever | | | 4 | | 7 | 2.4 | 1 | | 3 | | 5 | 0.9 | 3 | | 2 | | 3 | | 1 | | | | | | 29 | 0.7 |
| VTEC/STEC infection | 5 | 7.8 | 39 | 16.5 | 10 | 3.5 | 5 | 1.7 | 11 | 3.4 | 17 | 3.0 | 10 | 1.7 | 10 | 1.6 | 4 | | 12 | 3.2 | 5 | 1.3 | | | 128 | 3.0 |
| Yersiniosis | 47 | 73.4 | 109 | 46.2 | 15 | 5.2 | 18 | 6.0 | 20 | 6.2 | 52 | 9.1 | 47 | 8.1 | 49 | 7.7 | 56 | 10.8 | 40 | 10.6 | 55 | 14.8 | 1 | | 509 | 11.9 |

Note: Where fewer than five cases have been notified a rate has not been calculated and the cell has been left blank.

## NOTIFIABLE DISEASE CASES AND RATES BY DISTRICT HEALTH BOARD, 2008

**Table 44. Number of cases and rates of notifiable diseases per 100 000 population by DHB, 2008**

| Disease | Campylobacteriosis | | Cryptosporidiosis | | Dengue Fever | | Gastroenteritis | | Giardiasis | | Hepatitis A | | Hepatitis B | | Hepatitis C | | Lead Absorption | | Legionellosis | | Leptospirosis | | Listeriosis | | Malaria | | Measles | | Meningococcal Disease | | Mumps | | Paratyphoid Fever | | Pertussis | | Rheumatic Fever | | Rubella | | Salmonellosis | | Shigellosis | | Tuberculosis | | Typhoid Fever | | VTEC/STEC Infection | | Yersiniosis | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| District Health Board | 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 | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate | Cases | Rate |
| Northland | 249 | 161.0 | 40 | 25.9 | 1 | | 7 | 4.5 | 42 | 27.1 | 5 | 3.2 | | | | | 4 | | | | 8 | 5.2 | 1 | | 2 | | | | 9 | 5.8 | 4 | | | | 9 | 5.8 | 12 | 7.8 | | | 43 | 27.8 | 2 | | 8 | 5.2 | | | 10 | 6.5 | 14 | 9.0 |
| Waitemata | 881 | 169.2 | 18 | 3.5 | 19 | 3.6 | 129 | 24.8 | 189 | 36.3 | 7 | 1.3 | 8 | 1.5 | 1 | | 56 | 10.8 | 5 | 1.0 | 3 | | 2 | | 5 | 1.0 | | | 7 | 1.3 | 7 | 1.3 | 5 | 1 | 21 | 4 | 12 | 2.3 | 1 | | 110 | 21.1 | 18 | 3.5 | 50 | 9.6 | 1 | | 14 | 2.7 | 43 | 8.3 |
| Auckland | 699 | 159.6 | 16 | 3.7 | 31 | 7.1 | 107 | 24.4 | 262 | 59.8 | 12 | 2.7 | 10 | 2.3 | 2 | | 103 | 23.5 | 10 | 2.3 | | | 3 | | 13 | 3.0 | 2 | | 10 | 2.3 | 8 | 1.8 | 3 | | 8 | 1.8 | 10 | 2.3 | | | 98 | 22.4 | 24 | 5.5 | 54 | 12.3 | 7 | 1.6 | 14 | 3.2 | 47 | 10.7 |
| Counties Manukau | 624 | 131.8 | 17 | 3.6 | 30 | 6.3 | 59 | 12.5 | 174 | 36.8 | 15 | 3.2 | 1 | | 4 | | 36 | 7.6 | 9 | 1.9 | 3 | | 6 | 1.3 | 8 | 1.7 | | | 15 | 3.2 | 11 | 2.3 | 5 | 1.1 | 28 | 5.9 | 24 | 5.1 | 1 | | 94 | 19.9 | 21 | 4.4 | 57 | 12.0 | 13 | 2.7 | 12 | 2.5 | 35 | 7.4 |
| Waikato | 574 | 161.1 | 113 | 31.7 | 2 | | 31 | 8.7 | 113 | 31.7 | 4 | | 1 | | 1 | | 19 | 5.3 | 6 | 1.7 | 18 | 5.1 | 4 | | | | | | 11 | 3.1 | 9 | 2.5 | 3 | | 85 | 23.9 | 32 | 9.0 | | | 127 | 35.7 | 5 | 1.4 | 20 | 5.6 | 1 | | 18 | 5.1 | 33 | 9.3 |
| Lakes | 154 | 151.7 | 17 | 16.7 | 3 | | 4 | | 44 | 43.3 | 1 | | 1 | | 3 | | 6 | 5.9 | 1 | | 4 | | | | | | | | | | 3 | | | | 4 | | 8 | 7.9 | | | 26 | 25.6 | 1 | | 4 | | | | 4 | | 14 | 13.8 |
| Bay of Plenty | 257 | 125.1 | 31 | 15.1 | 4 | | 23 | 11.2 | 59 | 28.7 | 1 | | | | 2 | | 3 | | 9 | 4.4 | 7 | 3.4 | 2 | | 3 | | | | 3 | | 5 | 2.4 | | | 14 | 6.8 | 11 | 5.4 | 2 | | 75 | 36.5 | 5 | 2.4 | 8 | 3.9 | | | 3 | | 17 | 8.3 |
| Tairawhiti | 41 | 89.3 | 5 | 10.9 | | | 2 | | 11 | 24.0 | | | 1 | | | | 1 | | | | 17 | 37.0 | | | | | | | 1 | | | | | | 2 | | 4 | | | | 7 | 15.3 | | | 2 | | | | 2 | | 3 | |
| Taranaki | 204 | 189.4 | 29 | 26.9 | | | 3 | | 12 | 11.1 | 2 | | 2 | | 3 | | 3 | | 2 | | 6 | 5.6 | | | 1 | | | | 4 | | | | | | 2 | | 1 | | | | 39 | 36.2 | 1 | | 3 | | | | 6 | 5.6 | 12 | 11.1 |
| Hawke's Bay | 305 | 198.9 | 28 | 18.3 | 3 | | 7 | 4.6 | 64 | 41.7 | 1 | | | | | | 6 | 3.9 | 6 | 3.9 | 9 | 5.9 | | | | | 2 | | 12 | 7.8 | 5 | 3.3 | | | 8 | 5.2 | 10 | 6.5 | 2 | | 36 | 23.5 | 2 | | 5 | 3.3 | 1 | | 1 | | 31 | 20.2 |
| Whanganui | 89 | 140.6 | 12 | 19.0 | | | 21 | 33.2 | 15 | 23.7 | 9 | 14.2 | 1 | | | | 9 | 14.2 | 1 | | 9 | 14.2 | 1 | | | | | | 5 | 7.9 | 1 | | | | 2 | | 1 | | | | 14 | 22.1 | | | 3 | | 1 | | 1 | | 5 | 7.9 |
| MidCentral | 196 | 119.0 | 33 | 20.0 | 2 | | 41 | 24.9 | 27 | 16.4 | 20 | 12.1 | 1 | | | | 11 | 6.7 | 1 | | 3 | | 1 | | | | | | 3 | | 1 | | | | 14 | 8.5 | 7 | 4.2 | | | 42 | 25.5 | | | 7 | 4.2 | | | 1 | | 8 | 4.9 |
| Hutt | 298 | 210.0 | 18 | 12.7 | 1 | | 31 | 21.8 | 41 | 28.9 | 1 | | 1 | | 1 | | 4 | | 2 | | | | | | 1 | | | | 4 | | 3 | | | | 7 | 4.9 | 4 | | | | 49 | 34.5 | 4 | | 17 | 12 | 2 | | 1 | | 24 | 16.9 |
| Capital and Coast | 578 | 203.2 | 26 | 9.1 | 4 | | 64 | 22.5 | 218 | 76.7 | 4 | | 2 | | 2 | | 10 | 3.5 | 3 | | | | 1 | | 1 | | | | 8 | 2.8 | 6 | 2.1 | 2 | | 51 | 17.9 | 14 | 4.9 | | | 91 | 32.0 | 10 | 3.5 | 25 | 8.8 | 2 | | 6 | 2.1 | 66 | 23.2 |
| Wairarapa | 50 | 125.8 | 18 | 45.3 | | | 3 | | 13 | 32.7 | 2 | | 1 | | 1 | | 4 | | | | 1 | | 1 | | | | | | 2 | | | | | | 6 | 15.1 | 1 | | | | 23 | 57.9 | | | | | | | 1 | | 1 | |
| Nelson-Marlborough | 198 | 145.9 | 31 | 22.8 | 1 | | 7 | 5.2 | 53 | 39.1 | 1 | | 1 | | | | 1 | | 2 | | 4 | | | | | | | | 6 | 4.4 | 1 | | | | 34 | 25.1 | | | | | 67 | 49.4 | 7 | 5.2 | 5 | 3.7 | | | 3 | | 14 | 10.3 |
| West Coast | 54 | 166.8 | 19 | 58.7 | | | 10 | 30.9 | 21 | 64.9 | | | | | | | | | 1 | | 5 | 15.4 | | | | | 1 | | 1 | | | | | | 5 | 15.4 | | | | | 10 | 30.9 | 1 | | | | | | 1 | | 14 | 43.2 |
| Canterbury | 661 | 133.3 | 136 | 27.4 | 13 | 2.6 | 123 | 24.8 | 190 | 38.3 | 4 | | 7 | 1.4 | 3 | | 26 | 5.2 | 12 | 2.4 | 15 | 3.0 | 3 | | 3 | | 7 | 1.4 | 9 | 1.8 | 13 | 2.6 | 4 | | 89 | 17.9 | 1 | | 2 | | 186 | 37.5 | 6 | 1.2 | 28 | 5.6 | 1 | | 22 | 4.4 | 97 | 19.6 |
| South Canterbury | 145 | 262.2 | 57 | 103.1 | | | 6 | 10.8 | 17 | 30.7 | | | | | | | 2 | | 3 | | | | | | | | | | 2 | | | | | | 9 | 16.3 | | | | | 37 | 66.9 | 1 | | 4 | | | | 3 | | 12 | 21.7 |
| Otago | 274 | 146.3 | 43 | 23.0 | | | 12 | 6.4 | 61 | 32.6 | 1 | | | | | | 6 | 3.2 | 2 | | 7 | 3.7 | 2 | | 2 | | | | 5 | 2.7 | 1 | | | | 13 | 6.9 | | | 1 | | 129 | 68.9 | 3 | | 1 | | | | 4 | | 9 | 4.8 |
| Southland | 162 | 146.2 | 57 | 51.4 | | | | | 36 | 32.5 | 1 | | 1 | | | | 5 | 4.5 | 1 | | 2 | | | | 1 | | | | 5 | 4.5 | | | 3 | | 22 | 19.9 | | | | | 43 | 38.8 | 2 | | 1 | | | | 1 | | 10 | 9.0 |
| Total | 6693 | 156.8 | 764 | 17.9 | 114 | 2.7 | 690 | 16.2 | 1662 | 38.9 | 91 | 2.1 | 39 | 0.9 | 23 | 0.5 | 315 | 7.4 | 76 | 1.8 | 121 | 2.8 | 27 | 0.6 | 40 | 0.9 | 12 | 0.3 | 122 | 2.9 | 78 | 1.8 | 25 | 0.6 | 433 | 10.1 | 152 | 3.6 | 9 | 0.2 | 1346 | 31.5 | 113 | 2.6 | 302 | 7.1 | 29 | 0.7 | 128 | 3.0 | 509 | 11.9 |

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 BY YEAR AND SOURCE, 1988 - 2008

### Table 45. Number of notifiable disease cases by year and source, 1988 - 2008

Note: Cell is blank where data are unavailable.

| Disease | Source | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AIDS | Notification | 38 | 59 | 73 | 78 | 50 | 70 | 44 | 49 | 76 | 43 | 29 | 33 | 26 | 26 | 17 | 33 | 38 | 49 | 29 | 31 | 48 |
| Campylobacteriosis | Notification | 2796 | 4187 | 3850 | 4148 | 5144 | 8101 | 7714 | 7442 | 7635 | 8924 | 11572 | 8161 | 8418 | 10146 | 12494 | 14788 | 12215 | 13836 | 15873 | 12778 | 6693 |
| Cholera | Notification | 0 | 0 | 5 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 1 | 1 | 0 | 3 | 1 | 1 | 2 | 0 | 0 | 1 | 0 |
| Creutzfeldt-Jakob Disease | Notification | | | | | | | | | 2 | 1 | 0 | 2 | 3 | 1 | 3 | 6 | 8 | 3 | 5 | 8 | 5 |
| Cryptosporidiosis | Notification | | | | | | | | | 119 | 357 | 866 | 977 | 775 | 1208 | 975 | 817 | 611 | 889 | 737 | 924 | 764 |
| Dengue Fever | Notification | 1 | 3 | 2 | 3 | 1 | 1 | 0 | 6 | 23 | 14 | 26 | 9 | 7 | 93 | 70 | 55 | 8 | 11 | 19 | 114 | 114 |
| Gastroenteritis | Notification | | | | | | | | | 555 | 310 | 492 | 601 | 727 | 940 | 1087 | 1026 | 1363 | 557 | 937 | 622 | 690 |
| Giardiasis | Notification | | | | | | | | | 1235 | 2127 | 2183 | 1793 | 1688 | 1604 | 1547 | 1570 | 1514 | 1231 | 1214 | 1402 | 1662 |
| *H. influenzae* type b | Notification | | | | | | | | | 26 | 9 | 11 | 10 | 13 | 11 | 3 | 12 | 4 | 7 | 9 | 15 | 9 |
| | Laboratory | 107 | 121 | 143 | 148 | 166 | 118 | 75 | 14 | 24 | 8 | 10 | 9 | 10 | 8 | 3 | 9 | 3 | 6 | 8 | 13 | 4 |
| Hepatitis A | Notification | 176 | 134 | 150 | 224 | 288 | 257 | 179 | 338 | 311 | 347 | 145 | 119 | 107 | 61 | 106 | 70 | 49 | 51 | 123 | 42 | 91 |
| Hepatitis B | Notification | 370 | 309 | 242 | 227 | 221 | 145 | 133 | 125 | 104 | 138 | 88 | 94 | 79 | 56 | 67 | 61 | 38 | 59 | 62 | 73 | 39 |
| Hepatitis C | Notification | 20 | 13 | 11 | 25 | 89 | 91 | 79 | 88 | 59 | 92 | 102 | 96 | 80 | 58 | 53 | 40 | 24 | 29 | 35 | 32 | 23 |
| Hydatid Disease | Notification | 2 | 0 | 4 | 0 | 4 | 4 | 1 | 5 | 3 | 2 | 2 | 8 | 3 | 7 | 2 | 0 | 1 | 2 | 0 | 6 | 7 |
| Influenza | Sentinel isolates | 136 | 119 | 343 | 183 | 317 | 423 | 441 | 521 | 673 | 743 | 127 | 425 | 73 | 313 | 241 | 230 | 231 | 273 | 315 | 239 | 466 |
| Legionellosis | Notification | 62 | 17 | 20 | 14 | 11 | 24 | 66 | 33 | 36 | 63 | 43 | 51 | 61 | 46 | 49 | 77 | 62 | 85 | 52 | 64 | 76 |
| | Laboratory | | | 21 | 42 | 60 | 76 | 121 | 76 | 60 | 109 | 107 | 65 | 56 | 56 | 53 | 82 | 75 | 83 | 54 | 72 | 74 |
| Leprosy | Notification | 2 | 4 | 1 | 4 | 5 | 3 | 1 | 1 | 10 | 3 | 3 | 10 | 4 | 3 | 4 | 4 | 3 | 2 | 4 | 8 | 5 |
| Leptospirosis | Notification | 99 | 90 | 117 | 106 | 70 | 116 | 70 | 65 | 56 | 52 | 75 | 59 | 98 | 99 | 140 | 113 | 102 | 85 | 88 | 66 | 121 |
| | Laboratory | 192 | 182 | 229 | 176 | 218 | 234 | 168 | 183 | 140 | 84 | 117 | 76 | 114 | 113 | 181 | 149 | 113 | 109 | 67 | 42 | 72 |
| Listeriosis | Notification | 7 | 10 | 16 | 26 | 16 | 11 | 8 | 13 | 10 | 35 | 17 | 19 | 22 | 18 | 19 | 24 | 26 | 20 | 19 | 26 | 27 |
| Malaria | Notification | 25 | 27 | 32 | 39 | 29 | 58 | 34 | 41 | 107 | 65 | 73 | 46 | 111 | 54 | 61 | 46 | 33 | 32 | 30 | 25 | 40 |
| Measles | Notification | | | | | | | | | 68 | 1984 | 164 | 107 | 64 | 82 | 21 | 67 | 32 | 19 | 20 | 24 | 12 |
| | Laboratory | 5 | 5 | 7 | 355 | 53 | 4 | 4 | 15 | 25 | 1220 | 35 | 2 | 9 | 21 | 6 | 15 | 10 | 3 | 1 | 3 | 7 |
| Meningococcal Disease | Notification | 83 | 49 | 53 | 71 | 153 | 202 | 208 | 394 | 473 | 609 | 439 | 507 | 477 | 648 | 555 | 542 | 343 | 226 | 160 | 104 | 122 |
| Mumps | Notification | | | | | | | | | 76 | 90 | 85 | 56 | 50 | 56 | 64 | 56 | 45 | 61 | 47 | 73 | 78 |
| | Laboratory | 5 | 105 | 26 | 23 | 10 | 25 | 245 | 66 | 20 | 14 | 8 | 5 | 2 | 22 | 18 | 11 | 12 | 7 | 9 | 18 | 15 |
| Paratyphoid Fever | Notification | 2 | 0 | 1 | 1 | 2 | 10 | 7 | 24 | 20 | 25 | 18 | 17 | 24 | 32 | 16 | 18 | 28 | 25 | 23 | 23 | 25 |
| Pertussis | Notification | | | | | | | | | 1022 | 284 | 153 | 1046 | 4140 | 1334 | 1068 | 585 | 3485 | 2719 | 1120 | 332 | 433 |
| Rheumatic Fever (initial attack) | Notification | 153 | 148 | 90 | 97 | 70 | 81 | 98 | 88 | 110 | 93 | 66 | 97 | 108 | 114 | 87 | 148 | 75 | 76 | 104 | 133 | 137 |
| Rubella | Notification | | | | | | | | | 306 | 80 | 53 | 35 | 26 | 30 | 33 | 26 | 23 | 13 | 8 | 11 | 9 |
| | Laboratory | 95 | 114 | 168 | 81 | 27 | 244 | 104 | 1581 | 339 | 21 | 2 | 0 | 0 | 3 | 4 | 3 | 3 | 7 | 3 | 5 | 8 |
| Salmonellosis | Notification | 1128 | 1860 | 1619 | 1244 | 1239 | 1340 | 1522 | 1334 | 1141 | 1177 | 2069 | 2077 | 1795 | 2417 | 1880 | 1401 | 1081 | 1382 | 1335 | 1274 | 1346 |
| Shigellosis | Notification | 145 | 137 | 197 | 152 | 124 | 128 | 185 | 191 | 167 | 117 | 122 | 147 | 115 | 157 | 112 | 87 | 140 | 183 | 102 | 129 | 113 |
| Tetanus | Notification | 1 | 0 | 0 | 0 | 8 | 2 | 2 | 2 | 3 | 0 | 2 | 6 | 1 | 4 | 1 | 2 | 1 | 1 | 1 | 1 | 0 |
| Tuberculosis | Notification | 295 | 303 | 348 | 335 | 327 | 323 | 352 | 391 | 352 | 323 | 365 | 446 | 354 | 369 | 381 | 423 | 375 | 330 | 351 | 285 | 302 |
| Typhoid Fever | Notification | 15 | 17 | 7 | 9 | 11 | 14 | 24 | 21 | 15 | 16 | 31 | 10 | 21 | 27 | 23 | 20 | 31 | 30 | 42 | 48 | 29 |
| VTEC/STEC Infection | Notification | | | | | | 3 | 3 | 6 | 7 | 13 | 48 | 64 | 67 | 76 | 73 | 104 | 89 | 92 | 87 | 100 | 128 |
| Yersiniosis | Notification | | | | | | | | | 330 | 488 | 546 | 503 | 396 | 429 | 472 | 436 | 407 | 383 | 453 | 502 | 509 |

## PREVALENCE OF ANTIMICROBIAL RESISTANCE, 1994 - 2007

**Table 46. Prevalence of antimicrobial resistance, 1994 – 2007**

| | | Percent resistance[a] (number tested) | | | | |
|---|---|---|---|---|---|---|
| Pathogen | Antimicrobial | 1994-1996 | 1997-1999 | 2000-2002 | 2003-2005 | 2006-2007 |
| *S. aureus*[b] | methicillin | 2.8 (58283) | 4.9 (136356) | 7.2 (251448) | 7.4 (219363) | 7.9 (149622) |
| | erythromycin | 8.0 (54870) | 10.8 (134350) | 12.0 (221394) | 12.0 (164220) | 11.6 (68204) |
| | co-trimoxazole | 0.8 (32926) | 0.6 (91391) | 1.2 (149166) | 2.0 (126840) | 1.3 (59911) |
| | fluoroquinolone | | | | 7.3 (47116) | 7.2 (21919) |
| | fusidic acid | | | | 19.7 (25609) | 15.6 (25669) |
| | mupirocin | 10.1 (9291) | 18.2 (37173) | 20.0 (91555) | 16.7 (48423) | 13.0 (55979) |
| Methicillin-resistant *S. aureus*[c] | erythromycin | 31.5 (2249) | 26.2 (1303) | 40.0 (1409) | 46.3 (1596) | 37.7 (597) |
| | co-trimoxazole | 8.6 (2249) | 1.8 (1303) | 6.7 (1409) | 7.4 (1596) | 2.5 (597) |
| | fluoroquinolone | | | 40.0 (1409) | 50.3 (1596) | 44.2 (597) |
| | fusidic acid | | | 7.0 (1409) | 9.2 (1596) | 9.7 (597) |
| | mupirocin | 6.4 (2244) | 6.0 (1303) | 8.5 (1409) | 9.5 (1596) | 7.0 (597) |
| | rifampicin | 0.3 (2249) | 0.8 (1303) | 0.7 (1409) | 0.5 (1596) | 0.8 (597) |
| *S. pneumoniae*, non-invasive disease[b] | penicillin[d] | 9.5 (7076) | 19.0 (10976) | 26.5 (12859) | 27.0 (15037) | 32.3 (8598) |
| | erythromycin | 8.3 (6832) | 14.5 (11212) | 18.6 (14404) | 19.9 (10222) | 22.6 (3782) |
| | tetracycline | 10.5 (5019) | 11.2 (5993) | 15.4 (9476) | 18.1 (6796) | 20.3 (2931) |
| *S. pneumoniae*, invasive disease[e] | penicillin[d] | 3.4 (989) | 15.0 (1182) | 15.3 (1494) | 17.2 (1560) | 19.2 (1077) |
| | erythromycin | 2.6 (989) | 5.7 (910) | 7.2 (1494) | 9.9 (1560) | 12.4 (1077) |
| | cefotaxime[d] | 1.8 (989) | 7.3 (1182) | 6.2 (1494) | 11.5 (1560) | 12.1 (1077) |
| *Enterococcus* spp[b] | amoxicillin[f] | 1.5 (7373) | 2.4 (17548) | 3.0 (22566) | 2.8 (26492) | 3.5 (20789) |
| | vancomycin | 0.2 (1141) | 0.5 (4752) | 0.3 (7505) | 0.1 (9948) | 1.0 (11410) |
| *E. coli*, urinary isolates[b] | amoxicillin[f] | 55.9 (48706) | 56.0 (138712) | 54.4 (194799) | 50.7 (117009) | 49.1 (68330) |
| | co-amoxiclav | 10.6 (42666) | 12.2 (136326) | 9.6 (194950) | 8.5 (127750) | 8.6 (64121) |
| | trimethoprim | 19.6 (48098) | 22.6 (111710) | 22.3 (207837) | 21.5 (138748) | 21.7 (68288) |
| | nitrofurantoin | 1.6 (48123) | 1.7 (124362) | 1.5 (206149) | 1.4 (139738) | 1.1 (69295) |
| | fluoroquinolone | 0.5 (40032) | 0.6 (118917) | 1.6 (201382) | 2.4 (135803) | 4.9 (58480) |
| *E. coli*, non-urinary isolates[b,g] | co-amoxiclav | 22.8 (7358) | 21.8 (15948) | 17.5 (11508) | 15.2 (5059) | 13.4 (2082) |
| | cefuroxime | 3.2 (6309) | 4.5 (6893) | 4.2 (6576) | 3.4 (3956) | 4.5 (1693) |
| | ESBL positive | | | | | 2.3 (1252) |
| | gentamicin | 0.8 (10352) | 0.9 (13789) | 2.4 (10392) | 2.6 (5290) | 5.4 (2491) |
| | fluoroquinolone | 0.5 (4717) | 0.8 (10800) | 2.4 (8821) | 3.9 (4212) | 8.1 (2446) |
| *P. aeruginosa*[b] | gentamicin | 12.5 (9556) | 9.5 (20542) | 10.5 (25561) | 6.1 (23148) | 4.6 (13776) |
| | tobramycin | 3.9 (6757) | 2.8 (11033) | 3.6 (10421) | 3.3 (7616) | 3.9 (5087) |
| | ceftazidime | 5.0 (4832) | 5.2 (11147) | 3.9 (13253) | 4.3 (16031) | 3.0 (10711) |
| | fluoroquinolone | 8.8 (8123) | 9.9 (16551) | 9.3 (22869) | 8.3 (23761) | 6.9 (13985) |
| *H. influenzae*, non-invasive disease[b] | amoxicillin[f] | 12.0(12244) | 19.3 (18852) | 21.9 (28476) | 19.9 (19529) | 20.0 (14440) |
| | co-amoxiclav | 1.1 (9839) | 0.6 (15040) | 0.8 (16333) | 1.0 (14090) | 1.8 (8199) |
| | co-trimoxazole | 11.9 (6605) | 14.7 (13964) | 17.3 (22443) | 18.2 (15939) | 20.3 (6840) |
| | tetracycline | 1.0 (7810) | 1.5 (13007) | 1.2 (15633) | 0.8 (12783) | 0.9 (6106) |
| *H. influenzae*, invasive disease[e] | amoxicillin[f] | 21.8 (179) | 11.5 (122) | 19.2 (125) | 31.6 (155) | 33.9 (112) |
| | co-amoxiclav | 3.4 (179) | 1.6 (122) | 1.6 (125) | 9.7 (155) | 18.8 (112) |
| | cefuroxime | 3.4 (179) | 4.9 (122) | 0.8 (125) | 9.7 (155) | 18.8 (112) |
| *N. meningitidis*, invasive disease[e] | penicillin[h] | 3.9 (659) | 7.9 (431) | 7.5 (796) | 12.0 (551) | 15.8 (152) |
| | rifampicin | 0 (659) | 0 (431) | 0 (796) | 0.2 (551) | 0 (152) |
| *N. gonorrhoeae*[b,i] | penicillin | 11.6 (879) | 10.4 (1437) | 7.1 (2782) | 5.8 (4700) | 7.7 (3996) |
| | fluoroquinolone | 0.7 (864) | 1.8 (1437) | 6.3 (2349) | 14.3 (4195) | 16.8 (4479) |
| *M. tuberculosis*[b] | isoniazid | 4.6 (438) | 8.2 (757) | 8.5 (811) | 8.9 (872) | 7.9 (483) |
| | rifampicin | 0.7 (438) | 1.3 (757) | 0.7 (811) | 1.0 (872) | 0.6 (483) |
| | MDR[j] | 0.7 (438) | 0.9 (757) | 0.5 (811) | 1.0 (872) | 0.6 (483) |

[a] intermediate resistance not included in resistant category unless otherwise stated (refer footnotes d and h below)
[b] collated clinical laboratory data
[c] MRSA isolates tested by ESR
[d] includes intermediate resistant and resistant isolates
[e] invasive disease isolates tested by ESR
[f] ampicillin used in laboratory testing
[g] from 2004, data based on *E. coli* from bacteraemia
[h] reduced susceptibility (MIC 0.12-0. 5 mg/L)
[i] data from northern North Island only up until 2000, thereafter national data used
[j] multidrug resistant (ie, resistant to at least isoniazid and rifampicin)

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