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NOTIFIABLE AND OTHER DISEASES IN NEW ZEALAND

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NOTIFIABLE AND OTHER DISEASES IN NEW ZEALAND
ANNUAL REPORT 2006

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

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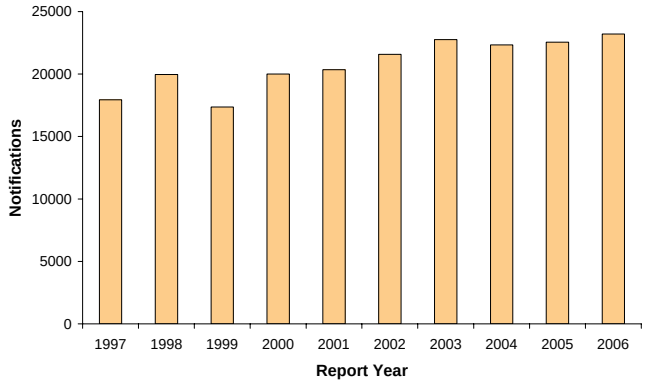
Notifiable Diseases

In 2006 there were 23 213 cases of notifiable disease reported through EpiSurv (Figure 1). This is similar to the number reported in the previous three years (22 559 in 2005, 22 334 in 2004 and 22 756 in 2003).

Figure 1. Total disease notifications by year, 1997 - 2006



Between 2005 and 2006 there were some significant changes to the number of cases reported for individual diseases. There was a statistically significant increase in reported cases of chemical poisoning from the environment (2 to 29, 1350%), hepatitis A (51 to 122, 139%), gastroenteritis (557 to 931, 67%), rheumatic fever (79 to 107, 35%), yersiniosis (407 to 487, 20%) and campylobacteriosis (13 836 to 15 873, 15 %).

There was a significant decrease in reported cases of pertussis (2719 to 1122, 142%), shigellosis (183 to 102, 44%), AIDS (49 to 29, 41%), legionellosis (85 to 52, 39%), meningococcal disease (226 to 160, 29%) and cryptosporidiosis (889 to 736, 17%).

Other non-significant changes in case numbers and rates are to be found in Appendix A.

Vaccine Preventable Diseases (VPDs)

Both the meningococcal disease and pertussis notification rates continue to show significant decreases. In 2006 the meningococcal disease rate dropped from 5.5 to 3.9 per 100 000 and the pertussis rate dropped from 66.3 to 27.1 per 100 000. Although the meningococcal disease rate is well down on the peak year rate, 16.7 per 100 000 in 2001, before the start of the epidemic notification rates were around 1.5 per 100 000. Similarly, the 2006 pertussis notification rate remains high compared with the rates in 2003, the year in between the current and the previous pertussis epidemic.

Acute hepatitis A disease was the only VPD to show a significant increase in notification rate compared with 2005.

Enteric Disease

Enteric diseases continued to form an overwhelming majority of disease notifications in 2006. In particular, at 15873 notifications, campylobacteriosis contributed almost 70% of notifications. Three enteric diseases had statistically significant rate increases compared with 2005: campylobacteriosis, gastroenteritis, and yersiniosis. In contrast, there were statistically significant decreases in the notification rate of shigellosis and cryptosporidiosis.

Exotic Diseases

Cases of malaria, dengue fever, rickettsial disease and Ross River virus were reported during 2006. All of the malaria, dengue fever and Ross River virus cases had a history of travel overseas. One rickettsial case reported overseas travel, three reported no overseas travel and overseas travel was unknown for the remaining three cases.

Outbreak Surveillance

In 2006 there were 495 reported outbreaks involving 6302 cases. This was a increase on 2005 (346 outbreaks with 2436 cases) and 2004 (372 outbreaks with 4897 cases).

The most common pathogen identified was norovirus with 156 of the outbreaks and 3945 of the cases followed by *Campylobacter* with 47 outbreaks and 223 cases.

The most common setting linked to an outbreak was the home (116 outbreaks, 432 cases) followed by retirement/rest homes (96, 3026) and café/restaurants (75, 502).

Sexually Transmitted Infections (STI)

In 2006, *Chlamydia trachomatis* infection was again the most commonly diagnosed STI in New Zealand.

The number of chlamydia cases detected in family planning clinics (FPCs) and student and youth health clinics (SYHCs) increased by around 30% and 40% respectively, whereas sexual health clinic (SHC) case numbers were similar to 2005 levels. Incomplete case data for Auckland SHC may account for the lack of an increase in SHC cases, as the laboratory-based chlamydia rate for Auckland continued its upward trend in 2006.

The laboratory-based rate also increased in the Bay of Plenty (BOP), but decreased in Waikato (although was higher than the 2004 rate).

The number and rate of gonococcal infections increased for all clinic types, and the three main laboratory-based surveillance regions in 2006, with increases ranging from 7.4% to 128.6% compared with 2005 figures. The number of syphilis cases increased by 44.7% in SHCs (68 compared to 47) and 50.0% in FPCs (3 compared to 2).

In 2006, the number of people newly reported with human immunodeficiency virus (HIV) infection was slightly lower than 2005, with 204 and 218 cases reported in each year respectively. Both the number of cases thought to have acquired HIV infection heterosexually and the number of females were the highest ever reported in any year. New immigrant HIV screening regulations are likely to have contributed to these increases. Heterosexual transmission was implicated in slightly more cases than homosexual transmission, with the majority of heterosexual cases having acquired the infection overseas, and conversely homosexual cases mostly exposed in New Zealand. In 2006, five women

tested positive for HIV through antenatal screening. One of these women was diagnosed as a direct result of the antenatal HIV screening programme in Waikato.

Influenza

The average weekly consultation rate for 2006, 49.6 per 100 000 patient population, was the second lowest rate recorded by the sentinel surveillance system, since 1997. The year was characterised by a peak in activity in early July.

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.

Antibiotic Resistance

National surveillance of methicillin-resistant *Staphylococcus aureus* (MRSA) in 2006 was conducted in August. This indicated an annualised incidence rate of 171.9 per 100 000, similar to that reported in recent years. Among the 579 patients with MRSA, 48.7% were categorised as hospital patients and 51.3% as community patients. EMRSA-15 (38.2%), WSPP MRSA (28.3%), AK3 MRSA (3.7%), WR/AK1 MRSA, (3.0%), DN1 MRSA (2.7%) and Akh4 MRSA (2.2%) accounted for most of the cases.

There is increasing antibiotic resistance to ciprofloxacin by *N. gonorrhoeae.* Some other organisms, resistant to antibiotics, emerging in other countries have not become established in New Zealand. Vancomycin resistant enterococci, though isolated here, have not become established in New Zealand hospitals. Multi-drug resistant tuberculosis (MDR-TB) still remains uncommon and there has been no recorded transmission of MDR-TB within New Zealand.

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 2006 and where data are available, the trend over the previous eleven years, 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 sexually transmitted infections (STIs), methicillin-resistant *Staphylococcus aureus* (MRSA), 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 that 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 and
- 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). Reporting practices affect 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 a medical practitioner 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, loose case definitions for some diseases, in particular viral communicable diseases, and the interest, resources and priorities of local public health 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 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 People 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:

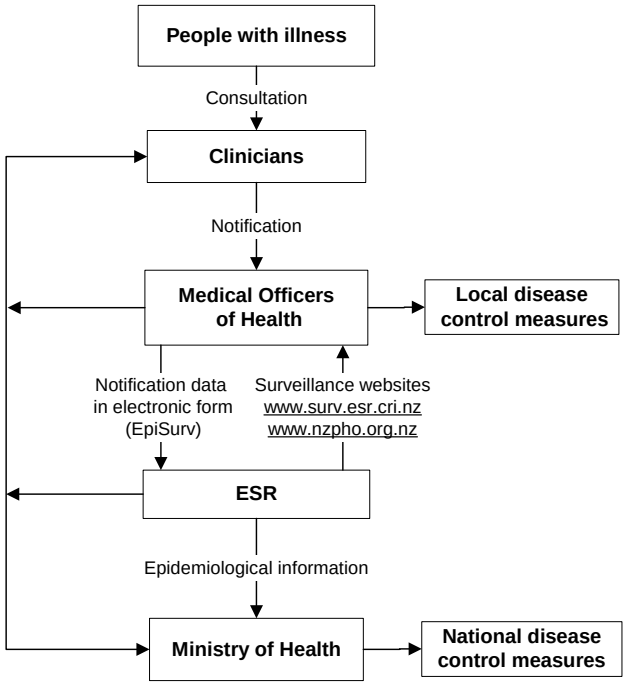
EpiSurv - the national notifiable disease surveillance system

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. These notifications provide the basis for surveillance and hence control of these diseases in New Zealand. Notification data are recorded on a computerised database (EpiSurv) installed in each of 20 public health units (PHUs). Each day, these data are sent to the Institute of Environmental Science and Research (ESR) Ltd where they are collated and analysed on behalf of the Ministry of Health. The data collected on each disease depend on the specific disease but usually include demography, outcome, basis of diagnosis, risk factor and some management information. Some of the diseases e.g. measles, 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.

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

Figure 2. Notifiable disease surveillance system



Laboratory-Based Surveillance

Laboratory based surveillance is the collection of laboratory data for public health purposes. Several of the communicable diseases diagnosed by clinical laboratories are either not covered adequately or not covered at all by the notifiable disease surveillance systems. 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 HIV & 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. Detailed information has also been collected about people infected with HIV since 1996 through a laboratory-based surveillance system involving the two laboratories that perform confirmatory HIV antibody testing using the western blot method (ESR and the Virus Laboratory, Auckland Hospital) [4]. For each confirmed

diagnosis, either the laboratory or the AEG send a letter to the doctor who requested the test seeking information on the likely mode of infection and other demographic data. 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 surveillance is being extended to other regions.

Influenza Sentinel Surveillance System

A sentinel surveillance system, which operates from May to October each year, gathers data on the incidence and distribution of influenza [5]. In 2006 this was based on a network of 81 general practices from all health districts in New Zealand except Northland. The number of practices is proportional to the size of the population in each health district. 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 was 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 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 that 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 [6]. 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 improving this system in a series of planned steps since then [7]. 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 on disease outbreaks, rather than individual cases.

Statistics New Zealand

Data used to calculate rates of disease are supplied by Statistics New Zealand. See analytical methods section for further details.

ANALYTICAL METHODS

Key analytic methods used include:

Dates

Notification data contained in this report are based on information recorded on EpiSurv as at 13 March 2007. 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 2006 has been updated to reflect that in EpiSurv as at 13 March 2007.

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

Data used for calculating rates of disease

All population rates use the census population and are crude rates unless otherwise stated. Rates have not been calculated where there are less than 5 notified cases in any category. Calculating rates from less than 5 cases produces unstable rates for comparisons.

Census: Disease rates have been calculated using mid year population estimates from Statistics New Zealand.

Ethnicity: Disease rates for ethnic groups have not been calculated as 2006 census data was not available from Statistics New Zealand (as at 1 May 2007) to match data ethnicity data collected in EpiSurv. A supplement to this report will be published with ethnic group rates when this data becomes available.

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 used for Health Districts on some graphs.

Table 1. DHB Population, 2006

DHB	Population
Northland	149650
Waitemata	501500
Auckland	430500
Counties Manukau	441900
Waikato	342383
Lakes	101600
Bay of Plenty	198720
Tairawhiti	44500
Taranaki	105160
Hawke's Bay	150570
Whanganui	62096
MidCentral	163262
Hutt	138400
Capital and Coast	279087
Wairarapa	39220
Nelson Marlborough	136700
West Coast	30520
Canterbury	477900
South Canterbury	53600
Otago	182686
Southland	109313
Total	4139500

Table 2. Health District code and description

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

The maps classification for the disease rates is quantiles 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 (less than 5 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 was used to determine statistical significance. P-values less than or equal to 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 2006[8].

Sensitivity

An assessment of sensitivity was made in 2003 using reporting on meningococcal disease [9]. 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 the health system. The system is inherently less sensitive for surveillance of conditions resulting from longer-term environmental exposure.

Completeness

The completeness of data provided in EpiSurv varies between diseases. Table 3 shows the percentage of notifications for which complete data are provided for selected key EpiSurv variables.

The completeness of date of birth, age and sex are generally very high and have changed little over the last five years. The completeness of ethnicity has remained high.

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 three years.

Table 3. Data completeness by year and EpiSurv variable, 1999 - 2006

	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%

Timeliness

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

Of the notifications with an onset date recorded (63.4% of notifications) in 2006, 40.6% were reported to a public health service within one week of the onset of symptoms and 77.7% were reported within two weeks.

In 2006, 98.2% of disease notifications were entered into EpiSurv within one week of being reported to the public health service and 99.1% 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 or clinic may be an estimate.

With the exception of HIV, another limitation is the accuracy of diagnoses of infections made serologically.

NOTIFIABLE DISEASES

ACQUIRED IMMUNE DEFICIENCY SYNDROME (AIDS)

AIDS, but not Human Immunodeficiency Virus (HIV) infection, is a notifiable disease in New Zealand. Both are reported here. The AIDS Epidemiology Group (AEG) within the University of Otago Medical School carries out national AIDS/HIV surveillance. The following report is based on the AEG report of February 2007 [10].

HIV

A total of 204 new people were reported to the AEG as having HIV in 2006, comprising 177 cases newly diagnosed through antibody testing and an additional 27 reported through viral load testing (most of whom had previously been diagnosed overseas). The 2006 figures are slightly lower than for 2005 when 218 people were reported overall, with 183 and 35 from the two reporting categories respectively.

The number of cases thought to have acquired HIV infection heterosexually, 88 people (40 males and 48 females), is the highest ever reported in New Zealand in any one year. Similarly, 2006 saw the highest number of females ever reported. New immigrant HIV screening regulations, introduced in November 2005, are likely to have contributed to these increases. Of the 88 people thought to have acquired HIV infection heterosexually, 84.1% (74 cases) are believed to have been infected overseas.

Homosexual transmission was implicated in 85 cases (41.7% of all cases in 2006), and a further case had both homosexual contact and injecting drug use (IDU) (Table 4). This total of 86 cases is a decrease from the 112 cases for the same exposure categories in 2005, but similar in number to 2004 (91 cases).

Of the 70 cases diagnosed through antibody testing in men who have sex with men (MSM), including one who may have been infected through injecting drug use, almost three-quarters (52) reported that infection occurred within New Zealand. Based on previous HIV testing, at least nine of these men were infected within the previous 12 months indicating ongoing HIV transmission amongst MSM in New Zealand.

Table 4. Risk behaviour category for HIV infections and AIDS notifications, 1983-2006

		HIV Infection[a]				AIDS[b]			
		2006		Total 1985[c] to 2006		2006		Total 1983 to 2006	
Risk category	Sex	Cases	%	Cases	%	Cases	%	Cases	%
Homosexual contact	M	85	41.7	1395	52.1	13	44.8	661	71.8
Homosexual & IDU	M	1	0.5	34	1.3	1	3.4	13	1.4
Heterosexual contact	M	40	19.6	325	12.1	6	20.7	81	8.8
	F	48	23.5	357	13.3	9	31.0	72	7.8
Injecting drug user (IDU)	M	0	0.0	54	2.1	0	0.0	19	2.1
	F	0	0.0	11	0.4	0	0.0	0	0.0
Blood product recipient	M	0	0.0	34	1.4	0	0.0	16	1.7
	F	0	0.0	0	0.0	0	0.0	0	0.0
Transfusion related	M	0	0.0	10	0.4	0	0.0	2	0.2
	F	0	0.0	9	0.4	0	0.0	2	0.2
	NS	0	0.0	5	0.2	0	0.0	0	0.0
Perinatal	M	1	0.5	23	0.9	0	0.0	8	0.9
	F	1	0.5	15	0.6	0	0.0	6	0.7
Awaiting information/ Undetermined	M	21	10.3	340	12.7	0	0.0	36	4.0
	F	7	3.4	37	1.4	0	0.0	2	0.2
	NS	0	0.0	13	0.5	0	0.0	0	0.0
Other	M	0	0.0	6	0.2	0	0.0	0	0.0
	F	0	0.0	9	0.3	0	0.0	2	0.2
Total		204	100.0	2677	100.0	29	100.0	920	100.0

Source: AIDS Epidemiology Group.

[a] Includes people who have developed AIDS. Numbers are recorded by date of diagnosis for those reported through antibody testing and by time of first viral load for those reported through viral load testing. The latter include many who have initially been diagnosed overseas and have not had an antibody test here.

[b] Reported by date of notification.

[c] Testing for HIV infection began in 1985

Two children were diagnosed in 2006 with HIV infection acquired through mother to child transmission. Both children were born overseas. Since 1995, no children have been infected through their mothers when HIV infection was diagnosed prior to giving birth in New Zealand. In 2006, five women tested positive for HIV through antenatal screening. One of these women was diagnosed as a direct result of the antenatal HIV screening programme in Waikato.

For 28 cases diagnosed in 2006, the route of HIV exposure remains unknown. Of these, 21 were male and seven female.

The majority of cases, 174 (85.3%), were aged between 20 and 49 years at time of diagnosis, with 35 (17.2%) in the 20-29 years, 82 (40.2%) in the 30-39 years, and 57 (27.9%) in the 40-49 years age groups.

Of the 204 cases, 79 (38.7%) were of European ethnicity, 12 (5.9%) Maori and 6 (3.0%) Pacific Peoples. There were 91 (44.6%) in other ethnic group categories, mainly of African and Asian ethnicity. The ethnicity of 16 cases (7.8%) is currently unknown.

AIDS

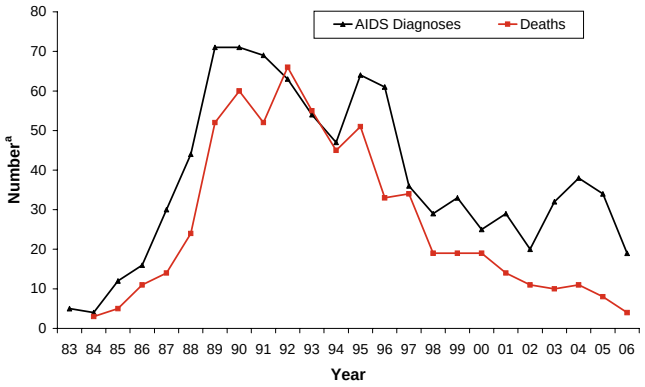
In 2006, 29 cases of AIDS were notified (Figure 3). Of these, 19 were diagnosed during 2006 and 10 were late notifications of people diagnosed in the previous year. The 2006 notification rate (0.7 per 100 000) was significantly lower than the 2005 rate (1.2 per 100 000, 49 cases).

Fifteen of the cases (51.7%) are thought to have acquired the disease heterosexually, 14 (48.3%) through homosexual contact (one case had two risk categories homosexual contact and injecting drug user).

Similar to HIV, 26 cases (89.6%) were aged between 20-49 years at the time of notification. However, the age distribution of AIDS cases was slightly older with three cases (10.3%) aged 20-29 years, 11 cases (37.9%) aged 30-39 years, and 12 cases (41.4%) aged 40-49 years. The distribution according to ethnicity was also similar to the HIV cases, with around 40% of cases each in the European, and Other ethnic groups.

There were four deaths from AIDS during the year, two males and two females. The number of AIDS deaths peaked at 66 in 1992, and has been declining ever since (Figure 4). The number of AIDS deaths in 2006 may increase due to late notifications.

Figure 3. Annual number of diagnoses of AIDS and deaths among people notified with AIDS, 1983 - 2006



Note: the number of AIDS diagnoses and deaths may rise 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 [11]. Human outbreaks of anthrax still occur in countries without widespread livestock immunisation programmes. *Bacillus anthracis* is classified as a Category A bioterrorism agent by the Centers for Disease Control (CDC) [12]. Only one bioterrorism-related outbreak of anthrax has been reported, involving 22 cases and five deaths in the United States in 2001 [13].

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 2006 compared to two cases in 2005.

Japanese Encephalitis

No cases of Japanese encephalitis were notified in 2006.

Kunjin Virus

No cases of Kunjin virus infection were notified in 2006.

Murray Valley Encephalitis

No cases of Murray Valley encephalitis (also known as Australian encephalitis) were notified in 2006.

Ross River Virus

Two cases of serologically confirmed Ross River virus infection were notified in 2006. This was greater than in 2005 (1 case) and 2003 (1 case) and less than the number of notifications in 2004 (5 cases).

Of the two cases, one was in the 40-49 years age group and the other was in the 60-69 years age group. Both cases were female of European ethnicity. The two cases 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 [14].

Botulism in parenteral drug users is a growing public health concern in the UK and USA. Outbreaks are caused by poor hygiene and possible environmental contamination [15].

BRUCELLOSIS

No cases of brucellosis were notified in New Zealand in 2006. Since 1997, a total of five cases of brucellosis have been notified.

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.

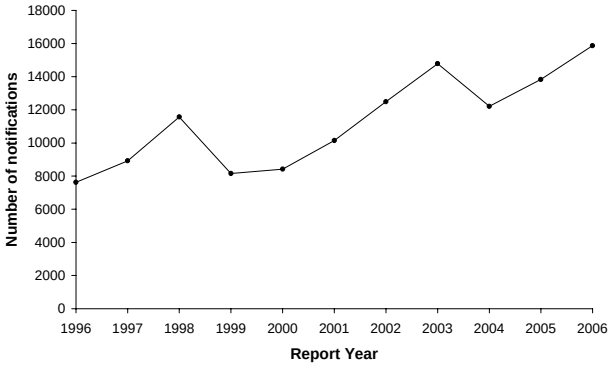
There has been no evidence of locally acquired brucellosis in humans since the declaration of freedom in cattle in New Zealand in 1998.

CAMPYLOBACTERIOSIS

There were 15 873 cases of campylobacteriosis notified in 2006. The 2006 rate of 383.5 per 100 000 population was a significant increase from the 2005 rate of 337.6 per 100 000. Campylobacteriosis continues to be the most commonly notified disease comprising 68.4% of all notifications (23 213) in 2006.

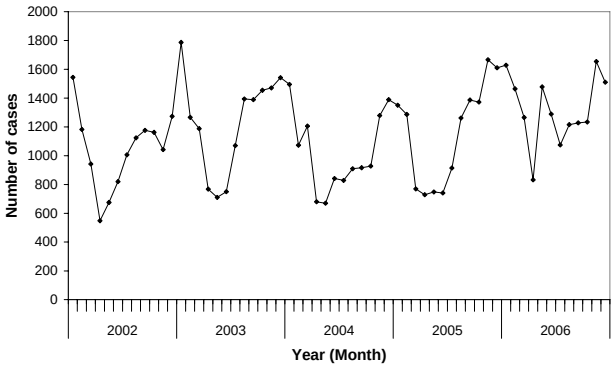
Figure 4 shows campylobacteriosis incidence for the last 11 years and Figure 5 shows the number of cases notified each month since 2002.

Figure 4. Campylobacteriosis notifications by year, 1996 - 2006



Campylobacteriosis is highly seasonal with a summer peak and winter trough. The pattern in 2006 was different in that there was a second peak in early winter. The highest monthly campylobacteriosis total for 2006 was for the month of November when 1654 cases were notified.

Figure 5. Campylobacteriosis notifications by month, January 2002 - December 2006

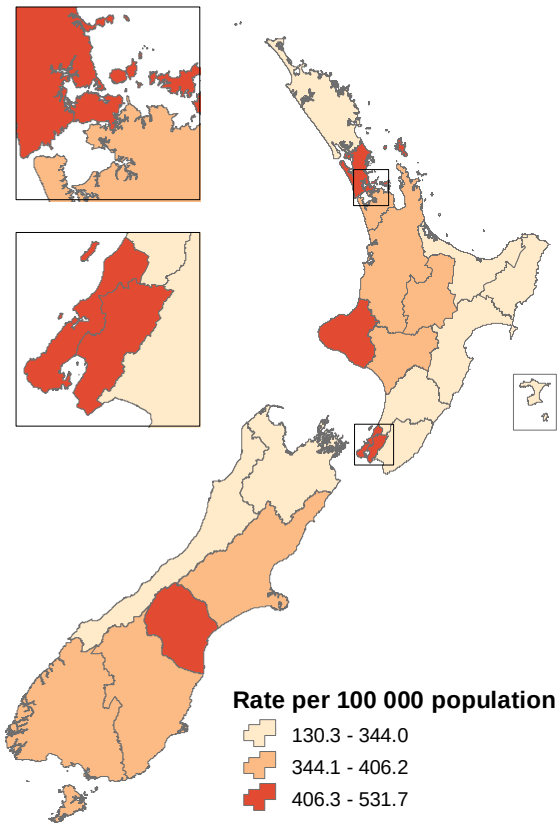


Campylobacteriosis rates varied throughout the country in 2006 as shown in Figure 6.

The highest rates were recorded in South Canterbury (285 cases, 531.7 per 100 000 population), Capital and Coast (1425 cases, 510.6 per 100 000) and Waitemata (2319 cases, 462.4 per 100 000) DHBs.

Sex was recorded for 15 505 (97.7%) of the 15 873 cases. The highest notification rate was for males (8237 cases, 391.9 per 100 000 population), followed by females (7268 cases 356.7 per 100 000).

Figure 6. Campylobacteriosis notifications by DHB, 2006



Age was recorded for 15 741 (98.3%). The highest age specific rate occurred in children aged 1-4 years (1227 cases, 544.2 per 100 000 population), followed by the 20-29 year age group (2884 cases, 522.7 per 100 000), and infants below 1 year old (237 cases, 415.0 per 100 000).

Ethnicity was recorded for (12 507 cases, 78.8%) of all notifications during 2006. The highest percentage of notifications occurred among those of European ethnicity (10 787 cases, 86.2% of responses), followed by those of Maori ethnicity (818 cases, 6.5% of responses), Other ethnicity (702 cases, 5.6% of responses), and Pacific Peoples (200 cases, 1.6% of responses).

Of the 9231 (58.2%) cases for which hospitalisation status was recorded, 677 (7.3%) were hospitalised. One death from campylobacteriosis was reported during the year.

In 2006, 47 outbreaks of campylobacteriosis were reported involving 223 cases, of which 85 cases are included as individual case reports.

The risk factors recorded for campylobacteriosis are shown in Table 5.

Table 5. Exposure to risk factors associated with campylobacteriosis, 2006

Risk Factor	Yes	No	Unknown	%[a]
Consumed food from retail premises	2096	1903	11874	52.4%
Contact with farm animals	1289	3215	11369	28.6%
Consumed untreated water	679	3451	11743	16.4%
Contact with faecal matter	504	3850	11519	11.6%
Recreational water contact	474	3948	11451	10.7%
Contact with other symptomatic people	442	3901	11530	10.2%
Travelled overseas during the incubation period.	304	4734	10835	6.0%
Contact with sick animals	177	3884	11812	4.4%
Contact with other confirmed cases	185	5210	10478	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.

CHEMICAL POISONING FROM THE ENVIRONMENT

In 2006, 29 cases were notified as poisonings arising from chemical contamination of the environment. This is significantly higher than the number notified in recent years: two (2005), seven (2004), one (2003 and 2002), and four (2001 and 2000).

There were more notifications for males compared with females (24/29, 82.8%) and the majority of notifications were for those aged between 10 and 14 years (20 cases).

Cases were primarily notified from North Island DHBs: Waitemata (eight), Auckland (14), Counties Manukau (one), Waikato (three), Hutt (one), Capital and Coast (one) and Canterbury (one).

Eleven cases were hospitalised as a result of chemical poisoning from the environment, 14 cases were not hospitalised, and it was unknown whether the remaining four cases were hospitalised.

A range of activities and substances resulted in the cases being poisoned, including: cleaning rooms that were previously clandestine methamphetamine laboratories (two), organic phosphate poisoning (one) and reaction to Sassafras oil on skin (one).

In 2006, two outbreaks of chemical contamination of the environment were reported involving 53 cases.

At present, only poisonings arising from chemical contamination of the environment are required to be notified under the Health Act 1956. 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 2006. Since 1997 there have been nine reported cholera cases with the last two cases reported in 2004. Each of these cases reported a history of overseas travel during the incubation period. 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 tenth annual report of the Registry [16].

In 2006, a total of five cases of possible CJD were referred to the Registry. Two cases were confirmed as sporadic CJD by post-mortem (both female, one in the 70-79 and the other in the 80-89 years age groups). The remaining three cases were fatal but none underwent post-mortem examination. These three cases have been classified as probable based on clinical, cerebrospinal fluid, and MRI findings consistent with CJD. One case also had a compatible EEG. Two of the probable cases were male and in the 50-59 and 70-79 years age groups. The remaining probable case was female and in the 40-49 years age group.

Since 1996, there has been a total of 32 cases of CJD reported to the Registry, 13 confirmed and 19 probable. No cases of variant CJD, the form linked with bovine spongiform encephalopathy, have ever been identified in New Zealand.

CRYPTOSPORIDIOSIS

A total of 736 cases of cryptosporidiosis were notified in 2006 (Figure 7). The 2006 rate (17.8 per 100 000 population) is a significant decrease from the 2005 rate (21.7 per 100 000).

Figure 8 shows cryptosporidiosis cases by month since 2001. There is a distinct seasonal pattern with the largest number of notifications occurring in October each year.

Notification rates varied throughout the country as illustrated in Figure 9.

The highest rates were recorded in South Canterbury (41 cases, 76.5 per 100 000 population), Wairarapa (25 cases, 63.7 per 100 000) and West Coast (16 cases, 52.4 per 100 000) DHBs. South Canterbury has had the highest rates for the previous five years.

Figure 7. Cryptosporidiosis notifications by year, 1996 - 2006

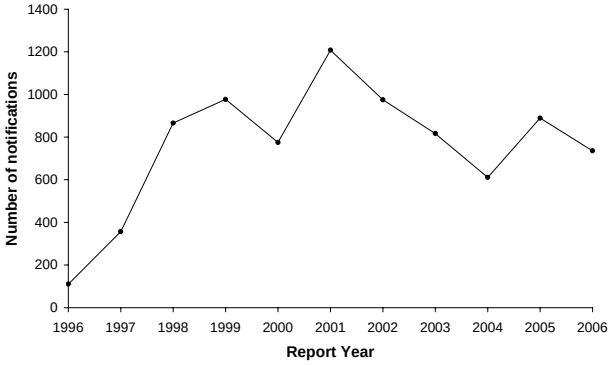
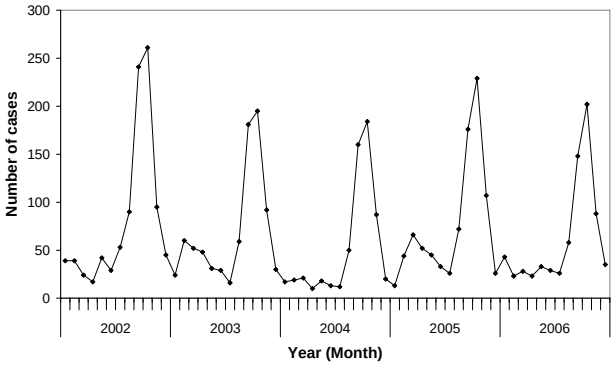


Figure 8. Cryptosporidiosis notifications by month, January 2002 - December 2006

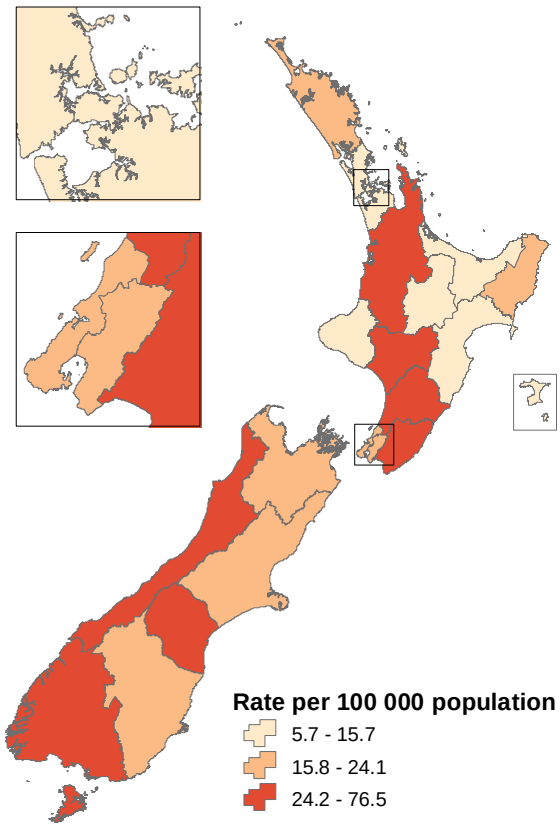


Sex was recorded for 725 (98.5%) of the 736 cases. The male (363 cases, 17.3 per 100 000 population) and female (362 cases, 17.8 per 100 000) rates were similar.

Age was recorded in 99.9% of cases reported (735/736). Age specific notification rates were higher in the 1-4 years age group than in all other age groups (251 cases, 111.3 per 100 000 population) followed by the less than one-year (19 cases, 33.3 per 100 000), 5-9 years (88 cases, 30.5 per 100 000), and 10-14 years (59 cases, 19.4 per 100 000) age groups.

Ethnicity was recorded for 682 (92.7%) cases. Of these, the highest percentage of cases occurred among those of European ethnicity (597 cases, 87.5% of responses), followed by Maori (49 cases, 7.2%), Other ethnicity (28 cases, 4.1%), and Pacific Peoples (8 cases, 1.2%).

Figure 9. Cryptosporidiosis notifications by DHB, 2006



Of the 644 cases for which hospitalisation status was recorded, 23 (3.6%) were hospitalised. There were 25 cryptosporidiosis outbreaks reported in 2006, involving 116 cases, of which 61 cases are included as individual case reports.

The risk factors recorded for cryptosporidiosis are shown in Table 6.

Table 6. Exposure to risk factors associated with cryptosporidiosis, 2006

Risk Factor	Yes	No	Unknown	%[a]
Contact with farm animals	284	250	202	53.2%
Consumed untreated water	152	286	298	34.7%
Contact with faecal matter	151	343	242	30.6%
Recreational water contact	143	337	256	29.8%
Consumed food from retail premises	79	225	432	26.0%
Contact with other symptomatic people	118	365	253	24.4%
Contact with sick animals	107	333	296	24.3%
Travelled overseas during the incubation period.	43	480	213	8.2%
Contact with other confirmed cases	27	417	292	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.

CYSTICERCOSIS

No cases of cysticercosis were notified in New Zealand in 2006. Three cases were reported in 2005. All cases were recent migrants who were overseas during the incubation period. Human infection with *Taenia solium*, a species of tapeworm, is prevalent in parts of Latin America, South and South Eastern Asia, Africa and Eastern Europe. Regions where beef and pork are eaten raw or undercooked and where livestock are in contact with human faecal matter are particularly affected [17].

DECOMPRESSION SICKNESS

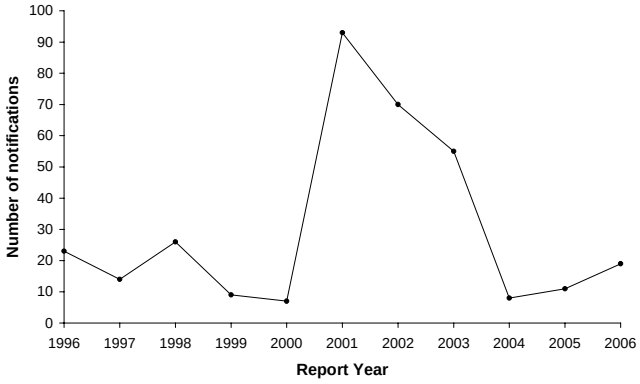
There was one case of decompression sickness notified in 2006. The case was notified to Northland DHB and was hospitalised. This continues the trend of low numbers of decompression sickness notifications in recent years: one (2005), none (2004), and two (2003). The highest number of cases was recorded in 2001 (23).

As with previous years, the annual number of hospitalisations for decompression sickness exceeds the annual number of notifications. Diagnosis of decompression sickness as the primary reason for admission (ICD-10-AM code T70.3) was specified in eight cases (2006), nine cases (2005 and 2004), 14 cases (2003) and 47 cases (2002).

DENGUE FEVER

In 2006, 19 cases of dengue fever were notified compared to 11 cases in 2005 (Figure 10). The 2006 notification rate (0.5 per 100 000 population) was slightly higher than that for 2005 (0.3 per 100 000 population). Between 2001 and 2003 an average of 73 cases per year were notified, peaking with 93 cases in 2001. The number of cases in 2006 is higher than that notified in 2004 (8 cases) and 2005 (11 cases).

Figure 10. Dengue fever notifications, 1996 - 2006



Of the 19 cases, the highest age specific rate was reported in the 20-29 years (1.8 per 100 000 population, 10 cases) age group. One (5.3%) case was in the 15-19 years age group, 10 (52.6%) were in the 20-29 years age group, two (10.5%) were in the 30-39 years age group, three (15.8%) were in the 40-49 years age group, and three (15.8%) were in the 50-59 years age group. Eleven (57.9%) cases were male, and eight (42.1%) were female. Ethnicity was recorded for 89.5% (17/19) of the cases. Twelve (70.6%) cases were of European ethnicity, two (11.8%) were Maori, two (11.8%) were Pacific Peoples, one (5.9%) was Other ethnicity, and two were unknown. Eight (44.4%) cases were hospitalised, and in one case the hospitalisation status was unknown.

All cases recorded overseas travel during the incubation period. Countries visited during the incubation period were Cook Islands (6), Thailand (5), Indonesia (3), Fiji (2), India (2), Vietnam (2), Samoa (1), Bangladesh (1), and Singapore (1). Of the notified cases, 17 were confirmed by serology.

Ten of the cases undertook some protective measures e.g. use of insect repellent, bed nets, protective clothing and staying in screened/air conditioned accommodation. One case undertook no protective measures, and in eight cases no information was recorded.

Hospitalisation data for 2006 record 12 additional cases, nine cases with the primary reason for admission being dengue fever (classical dengue) and three cases with the primary reason being dengue haemorrhagic fever.

DIPHTHERIA

No cases of toxigenic diphtheria were notified in New Zealand in 2006.

In 2006, ESR Special Bacteriology Laboratory received 29 cultures for toxigenicity testing, typing and surveillance purposes. The majority (26) were from cutaneous sources with two cultures from blood and one from respiratory source. The patients ranged in age from 4 years to 67 years.

All the isolates were determined to be non-toxigenic by PCR examination for the toxin gene. Twenty-three (79%) of the isolates were biovar *mitis*, and 6 (21%) were biovar *gravis* including the two blood isolates.

This is similar to 2005 when the ESR laboratory received 35 isolates from cases, of which, 27 (77.1%) isolates were biovar *mitis*, and 8 (22.9%) were biovar *gravis* including the one blood isolate 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 [18].

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. No cases were notified during 2006.

GASTROENTERITIS

Gastroenteritis comprises a variety of communicable diseases and infections. Included in this section are infections by the following pathogens: norovirus, rotavirus, *Clostridium perfringens*, *Staphylococci* and *Bacillus cereus*. Diseases and conditions that are notifiable in their own right (e.g. 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 2006, 933 cases of gastroenteritis (22.5 per 100 000 population) were notified. This is a significant increase from 2005 (557 cases, 36.7 per 100 000), however, the four years prior to 2005 all recorded higher gastroenteritis notifications. In 2006, a causal agent was reported for 352 (37.7%) cases. Where the agent was identified, the most common pathogen was norovirus (352 cases).

Gastroenteritis notifications were highest in MidCentral (234 cases, 143.3 per 100 000 population), followed by Whanganui (45 cases, 72.5 per 100 000) and Canterbury (136 cases, 28.5 per 100 000 population) DHBs.

Overall rates of gastroenteritis were higher in females (553 cases, 27.1 per 100 000) than in males (361 cases, 17.2 per 100 000).

Age specific rates were highest in the 70 years or more age group (219 cases, 61.0 per 100 000), followed by 50-59 years age group (131 cases, 26.2 per 100 000), and 30-39 years age group (139 cases, 23.7 per 100 000).

Ethnicity was recorded for 825 cases (88.5%) of all notifications during 2006. The highest percentage of notifications occurred among those of European ethnicity (737 cases, 89.2% of responses), followed by Maori ethnicity (40 cases, 4.8%), Other ethnicity (33 cases, 4.0%), and Pacific Peoples (16 cases, 1.9%).

Hospitalisation status was recorded for 93.0% of cases. Of these 32 (3.7% of responses) were hospitalised. In 2006, 153 gastroenteritis outbreaks were reported, involving 1415 cases, of which 393 cases are included as individual case reports.

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

Table 7. Exposure to risk factors associated with gastroenteritis, 2006

Risk Factor	Yes	No	Unknown	%[a]
Consumed food from retail premises	512	32	387	94.1%
Contact with other confirmed cases	103	37	791	73.6%
Contact with other symptomatic people	308	344	279	47.2%
Contact with faecal matter	225	255	451	46.9%
Consumed untreated water	27	391	513	6.5%
Contact with farm animals	27	414	490	6.1%
Recreational water contact	27	413	491	6.1%
Travelled overseas during the incubation period.	13	431	487	2.9%
Contact with sick animals	3	302	626	1.0%

[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 8. Gastroenteritis cases where organism was identified, 2006

Organism	Cases	Percentage[a]
Norovirus	314	89.2%
Rotavirus	15	4.3%
Clostridium perfringens	6	1.7%
Staphylococcus aureus	6	1.7%
Vibrio parahaemolyticus	4	1.1%
Bacillus cereus	3	0.9%
Clostridium difficile	2	0.6%
Other[b]	2	0.6%
Total	337	100.0%

[a] percentage of cases where organism was identified

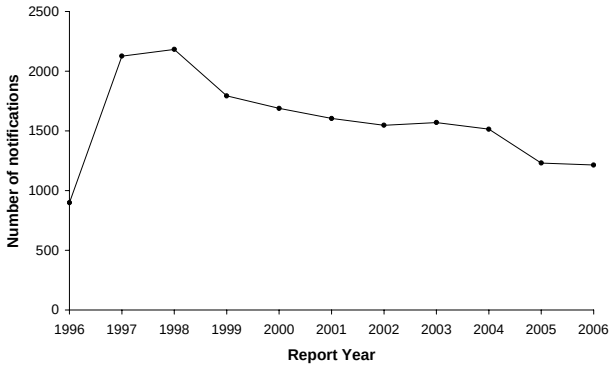
[b] includes a single notification of *Aeromonas* spp and histamine fish poisoning.

GIARDIASIS

There were 1214 cases of giardiasis notified in 2006. The 2006 rate (29.3 per 100 000 population) was not significantly different to the 2005 rate (30.0 per 100 000).

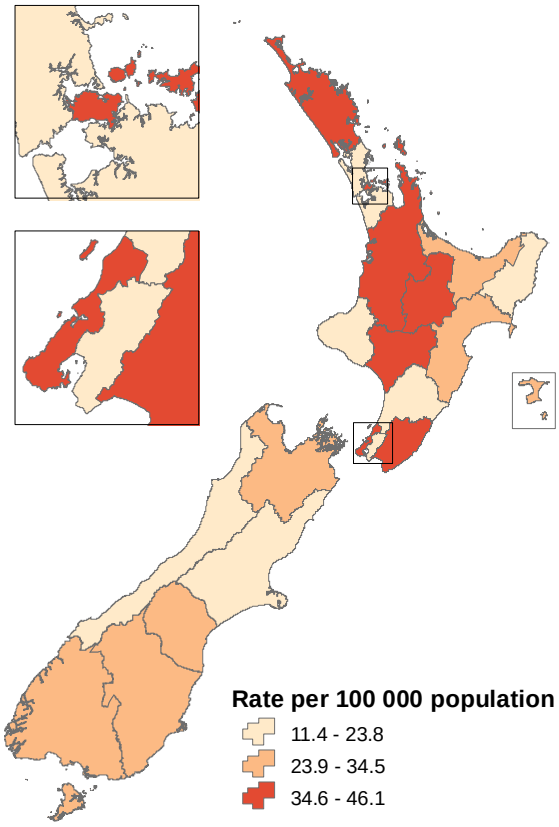
Figure 11 shows giardiasis cases by year since the disease became notifiable in June 1996.

Figure 11. Giardiasis notifications by year, 1996 - 2006



Rates varied throughout the country as illustrated in Figure 12. The highest rates were recorded in Northland (69 cases, 46.1 per 100 000 population), followed by Waikato (134 cases, 39.1 per 100 000) and Whanganui (23 cases, 37.0 per 100 000) DHBs.

Figure 12. Giardiasis notifications by DHB, 2006



Sex was recorded for 1186 (97.7%) of the 1214 cases. Males recorded higher rates (620 cases, 29.5 per 100 000) than females (566 cases, 27.8 per 100 000).

Age specific rates showed two peaks in giardiasis notifications. The highest rates were in the 1-4 years age group (253 cases, 112.2 per 100 000 population), followed by the 30-39 years age group (289 cases, 49.4 per 100 000), and those aged less than 1 years (25 cases, 43.8 per 100 000). This pattern remains consistent across all years from 1996 when the disease became notifiable in New Zealand.

Ethnicity was recorded for 1010 (83.2%) giardiasis cases. The highest percentage of reported cases were in the European ethnicity (866 cases, 85.7% of responses), followed by Maori (69 cases, 6.8%), Other ethnicity (65 cases, 6.4%), and Pacific People (10 cases, 1.0%).

Hospitalisation status was recorded for 69.2% of notifications. Of these 35 (4.2%) were hospitalised.

There were 32 giardiasis outbreaks reported in 2006, involving 98 cases, of which 69 cases are included as individual case reports.

The risk factors recorded for giardiasis are shown in Table 9.

HAEMOPHILUS INFLUENZAE SEROTYPE b DISEASE

Nine cases of *Haemophilus influenzae* serotype b (Hib) were notified in 2006, all but one of which was laboratory confirmed. The unconfirmed case was a child aged less than five years.

Four of the lab confirmed cases were aged less than five years, giving an age specific rate for confirmed cases aged less than five years of 1.4 per 100 000 population, compared to 1.4 per 100 000 population (4 cases) in 2005 and 0.7 per 100 000 population (2 cases) in 2004.

Two of the lab confirmed cases aged less than five years were male and two were female. Three were of Maori ethnicity and one was European. They were from Bay of Plenty (2), Waikato (1) and Capital and Coast (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 at 15 months [19].

Two of the four lab confirmed cases aged less than five years were immunised. Of these, one case reported having received three doses as per the recommended schedule, however only one dose was documented. For the other case, it was reported that one dose was received at 15 months with no documentation of previous doses. All the laboratory confirmed cases aged less than five years were hospitalised (one child with epiglottitis, one child with meningitis, one child with pneumonia and three with septicaemia). Children may present with more than one clinical manifestation.

Table 9. Exposure to risk factors associated with giardiasis, 2006

Risk Factor	Yes	No	Unknown	%[a]
Consumed untreated water	168	293	753	36.4%
Contact with faecal matter	151	324	739	31.8%
Contact with other symptomatic people	146	327	741	30.9%
Recreational water contact	138	359	717	27.8%
Contact with farm animals	139	365	710	27.6%
Consumed food from retail premises	100	270	844	27.0%
Travelled overseas during the incubation period.	157	434	623	26.6%
Contact with other confirmed cases	108	414	692	20.7%
Contact with sick animals	24	412	778	5.5%

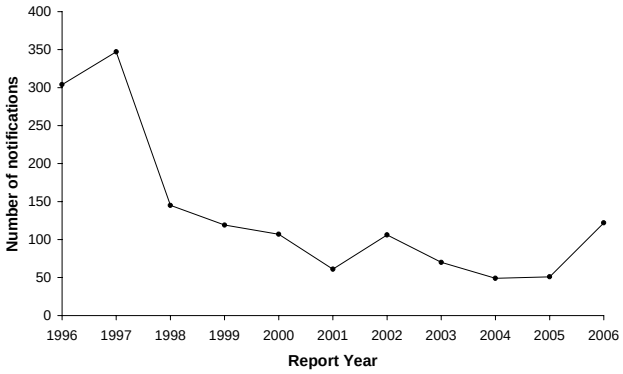
[a] "%" refers to the percentage of cases that answered "yes" out of the total number of cases for which this information was supplied. Cases may have more than one risk factor recorded.

HEPATITIS A

There were 122 cases of hepatitis A notified in 2006, compared to 51 notifications in 2005. Over the last twenty years there has been an overall downward trend in the number of notifications of hepatitis A, though an increase in notifications was observed in 2002, which was attributed to a single outbreak linked to contaminated blueberries [20] (see Figure 13). In 2006, an increase was observed predominantly due to two outbreaks in Canterbury and Auckland PHU areas for which 25 and 18 cases were individually notified respectively. In addition five smaller outbreaks in Auckland (3 outbreaks), Wanganui and Wellington PHU areas accounted for 13 cases.

The national Hepatitis A notification rate in 2006 was 2.9 per 100 000 population which was a significant increase from the 2005 rate of 1.2 per 100 000 population. The highest rate was observed in Counties Manukau (8.6 per 100 000) followed by Canterbury (6.1 per 100 000), Waitemata (3.0 per 100 000) and Auckland (2.3 per 100 000) DHBs.

Figure 13. Hepatitis A notifications by year, 1996 - 2006



The 2006 notification rates were evenly distributed between the sexes (3.0 per 100 000 population for females and 2.7 per 100 000 population for males).

There were no hepatitis A cases in the less than one year age group. Age specific rates were highest in the 1-4 years age group (7.1 per 100 000 population) followed by 5-9 years age group (6.2 per 100 000).

Ethnicity was recorded for 115 (94.3%) cases, with Europeans having the highest number of cases (53 cases), followed by Pacific Peoples (42 cases).

For those cases where history of overseas of travel was recorded (108 cases), 49 cases (45.4%) had travelled overseas during the incubation period.

HEPATITIS B

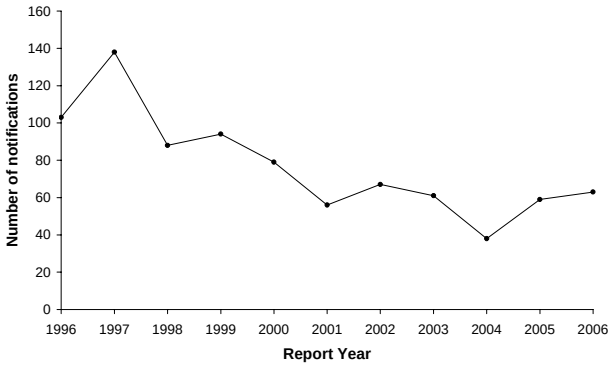
The 2006 national notification rate for acute hepatitis B was 1.5 per 100 000 population compared to 1.4 per 100 000 population in 2005. The highest notification rate by DHB was observed in Canterbury (3.6 per 100 000) followed by Counties Manukau (2.7 per 100 000), Waitemata (2.2 per 100 000) and Auckland (1.4 per 100 000).

The 2006 hepatitis B notification rates were 2.1 per 100 000 population for females and 1.0 per 100 000 population for males.

The age specific incidence rate was highest in the 20-29 years age group (4.2 per 100 000, 23 cases), followed by the 40-49 years age group (2.3 per 100 000, 14 cases).

For those cases where ethnicity was recorded (58 cases), 20 were European, 17 were Pacific peoples, 13 were Other ethnic group and eight were Maori.

Figure 14. Hepatitis B notifications by year, 1996 - 2006



The risk factors recorded for hepatitis B are shown in Table 10.

Table 10. Exposure to risk factors associated with hepatitis B, 2006

Risk Factor	Yes	No	Unknown	%[a]
Overseas during incubation period	9	34	20	13.3%
Body piercing/ tattooing in last 12 months	3	35	25	4.8%
Sexual contact	3	17	43	4.8%
Household contact with confirmed case	3	26	34	4.8%
History of injecting drug use	2	39	22	3.2%
Case child of seropositive mother	0	29	34	0.0%
Occupational exposure to blood	0	41	22	0.0%
Case dialysis patient	0	42	21	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.

Table 11. Exposure to risk factors associated with hepatitis C, 2006

Risk Factor	Yes	No	Unknown	%[a]
History of injecting drug use	16	7	11	47.1%
Household contact with confirmed case	4	11	19	11.8%
Blood product or tissue recipient	4	16	14	11.8%
Sexual contact with confirmed case/carrier	3	9	22	8.8%
Body piercing/ tattooing in last 12 months	3	12	19	8.8%
Occupational exposure to blood	0	20	14	0.0%

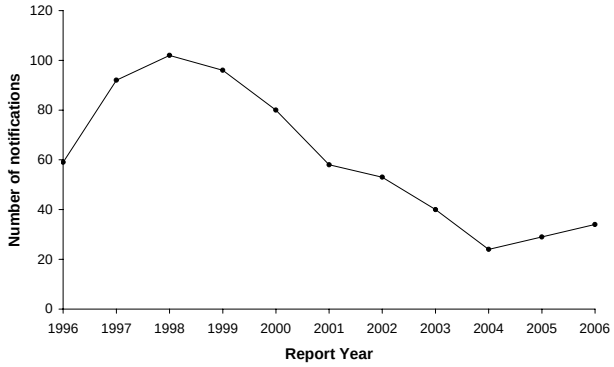
[a] "%" refers to the percentage of cases that answered "yes" out of the total number of cases for which this information was supplied. Several cases had more than one risk factor recorded.

HEPATITIS C

There were 34 cases of hepatitis C notified in 2006, compared to 29 notifications in 2005. Between 1998 and 2004, the number of hepatitis C notifications has been steadily decreasing, while there has been a slight increase in notifications during 2005 and 2006 (Figure 15).

The national hepatitis C notification rate in 2006 was 0.8 per 100 000 population compared to 0.7 per 100 000 population in 2005. The highest rate by DHB was observed in Taranaki (5.7 per 100 000), followed by Canterbury (2.9 per 100 000) DHB.

Figure 15. Hepatitis C notifications by year, 1996 - 2006



In 2006, females had a higher notification rate (1.1 per 100 000) than males (0.5 per 100 000). The majority of cases were aged between 20 and 59 years of age (26 cases, 76.5%). The age specific notification rate was highest in the 20-29 years age group (1.6 per 100 000, 9 cases), followed by the 40-49 years age group (1.3 per 100 000, 8 cases).

Ethnicity was recorded for 32 cases (94.1%). Among these, Europeans had the highest number of cases (22, 68.8%), followed by Maori (7, 21.9%).

The risk factors recorded for hepatitis C are shown in Table 11. The most commonly recorded risk factor was injecting drug use, an observation also noted in 2005.

HEPATITIS (VIRAL) NOT OTHERWISE SPECIFIED (NOS)

There were no notifications of hepatitis NOS in 2006. Two cases were notified both in 2005 and 2004.

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 2006.

Worldwide, during 2006, there were 116 laboratory-confirmed A(H5N1) cases resulting in 80 fatalities. These occurred in Indonesia (56 cases, 46 deaths), Egypt (18 cases, 10 deaths), China (13 cases, 8 deaths), Turkey (12 cases, 4 deaths), Azerbaijan (8 cases, 5 deaths), Thailand (3 cases, 3 deaths), Iraq (3 cases, 2 deaths), Cambodia (2 cases, 2 deaths), Djibouti (1 case, 0 deaths) [21].

HYDATID DISEASE

No cases of hydatid disease, a disease caused by the larval stage of the tapeworm *Echinococcus granulosus*, were notified in 2006. Since 1997, 27 cases have been notified with two cases reported in 2005.

Echinococcus spp. 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. Given the natural history of the disease, cases may occur for some years yet.

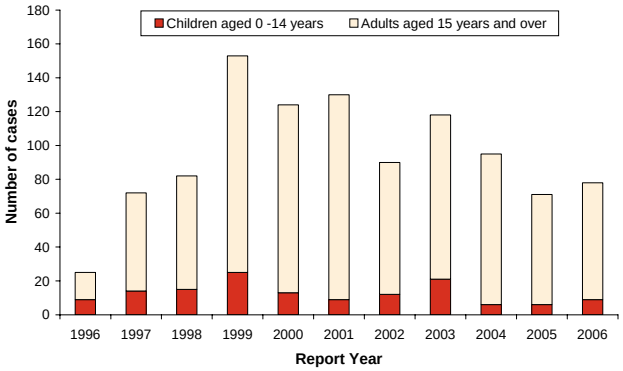
LEAD ABSORPTION

There were 78 cases of lead absorption notified in 2006, this is more than the number notified in 2005 (71) but fewer than the annual number notified since 1997. The highest number of notifications was recorded in 1999 (153). The lead absorption notification rate for 2006 was 1.9 per 100,000 population.

Figure 16 illustrates the annual variability in lead absorption notifications in both children and adults between 1996 and 2006. Subsequent to the peak number of notifications in 1999, there has been a general downward trend in the number of lead absorption notifications with some inter-annual fluctuations.

Of the 78 cases notified in 2006, nine (11.5%) were children aged 14 years or younger; eight were aged between 1-4 years and the remaining child was aged between 10-14 years. The highest number of notifications in children was recorded in 1999 (25) and the lowest (six) in both 2004 and 2005.

Figure 16. Lead absorption notifications in children and adults by year, 1996 - 2006



Similar to previous years, the majority of cases were male (58/78, 74.4%). In terms of ethnicity, the highest numbers of notifications were reported for Europeans (66/78, 84.6%), followed by Unknown ethnicity (seven), Maori (three) and Other ethnicity (two).

Of the 65 cases in 2006 for which hospitalisation status was recorded, two (3.1%) were hospitalised.

Blood lead concentrations were recorded for all nine of the children and ranged from 0.67 to 2.26 µmol/l, with a median of 0.97 µmol/l. For adult notifications, blood lead concentrations were recorded for 89.9% of the cases (62) and ranged from 0.52 to 5.4 µmol/l, with a median of 1.09 µmol/l.

Table 12 and Table 13 summarise risk factor information for lead absorption cases notified in 2006. Several cases had more than one risk factor recorded. Similar to previous years, the most common risk factor for lead absorption for both adults and 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.

Table 12. Exposure to risk factors associated with lead absorption for adults (cases aged 15 years and over), 2006

Risk Factor	Yes	No	Unknown	%[a]
Case lived in or regularly visited a building built prior to 1970 [b]	26	15	28	63.4
Case had exposure to high risk occupation [c]	24	17	28	58.5
Case had exposure to lead through hobbies [d]	13	21	35	38.2
Close contact of case was occupationally exposed to lead	1	34	34	2.9

[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.

[b] Of these, 24 cases lived in or regularly visited a building that had paint chalking/flaking, and/or recently undergone alterations or refurbishment.

[c] Occupations included painter (11), radiator repairs/mechanic (2), foundry worker (2), ship's chandler (1), furniture sander (1), works on gun range (1), lead lighter (1), printer (1), electronic design engineer (1), unspecified (3).

[d] Hobbies were shooting (9), lead lighting (1), home renovations (1), painting and decorating (1) and unspecified (1).

Table 13. Exposure to risk factors associated with lead absorption for children (cases aged less than 15 years), 2006

Risk Factor	Yes	No	Unknown	%[a]
Case lived in or regularly visited a building built prior to 1970 that had paint chalking/flaking, and / or recently undergone alterations or refurbishment.	4	5	0	44.4
Pica behaviour	3	4	2	42.9
Close contacts of case were exposed to lead through occupation	2	4	3	33.3
Case played in soil containing paint debris	1	5	3	16.7
Case lived near an industry that is likely to release lead	1	5	3	16.7

[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.

LEGIONELLOSIS

There were 52 cases (Figure 17) of legionellosis notified in 2006. This represents a rate of 1.3 per 100 000 population and is the lowest annual notification rate since 2002 (1.2 per 100 000, 49).

Legionellosis cases were reported throughout the country with insufficient numbers to calculate notification rates for comparison between DHBs.

The rate was higher in males (1.8 per 100 000, 34) than in females (0.6 per 100 000, 17). The highest age specific rate (4.1 per 100 000, 14) was reported in cases aged 60-69 years followed by those aged 70 and over years (3.6 per 100 000, 13) and those aged 50-59 years (2.4 per 100 000, 12).

Of the 48 cases in 2006 for which hospitalisation status was recorded, 31 (64.6%) were hospitalised.

There were three deaths reported from legionellosis in 2006.

A total of 54 cases of legionellosis were laboratory diagnosed during 2006. Table 14 shows the number of strains identified for the laboratory reported cases in 2006.

Table 15 provides a summary of the risk factors for which data were available. Of the 21 cases with a definite or suspect environmental source of infection recorded, 10 reported contact with compost/potting mix/soil, two reported exposure to showers (one in a hotel), one reported exposure to hot water, one reported exposure to a spa/indoor pool and one reported a water tank as a potential source. For six cases no potential source was reported.

Figure 17. Legionellosis notifications and laboratory reported cases by year, 1996 - 2006

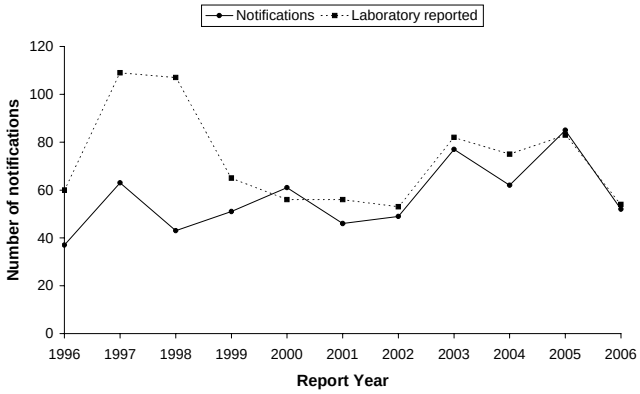


Table 14. Legionellosis strains for laboratory cases, 2006

Legionella species / serogroup	Number	%[a]
L. anisa	1	1.9%
L. dumoffii	3	5.6%
L. gormanii	1	1.90%
L. longbeachae sg 1	6	11.1%
L. longbeachae sg 2	1	1.9%
L. longbeachae sg unknown.	3	5.6%
L. micdadei	4	7.4%
L. pneumophila sg 1	22	40.7%
L. pneumophila sg 4	4	7.4%
L. pneumophila sg 5	1	1.9%
L. pneumophila sg unknown	4	7.4%
L. sainthelensi	1	1.9%
Legionella sp. (non-*L. pneumophila)*	3	5.6%
Total	54	

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

Table 15. Risk factors associated with legionellosis, 2006

Risk Factor	Yes	No	Unknown	% [a]
Contact with definite or suspected environmental source of infection	21	6	25	78.0
Smokers or ex-smokers	10	33	9	23.0
Pre-existing immunosuppressive or debilitating condition	14	30	8	32.0

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

There was one legionellosis outbreak reported in 2006 involving a total of four cases.

LEPROSY

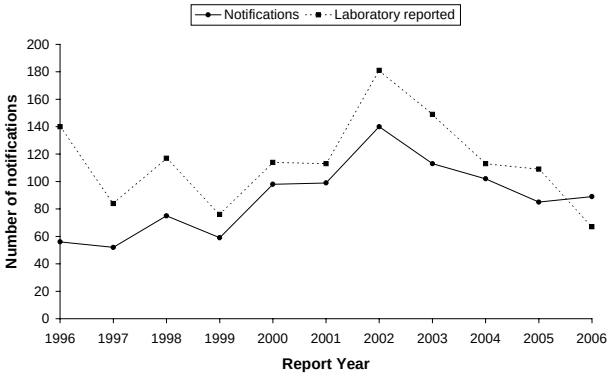
There were three cases of leprosy notified in New Zealand in 2006. One case was confirmed by histology with multibacillary lepromatous disease. This case was in the 20-29 years age group, and returned to a Pacific Island nation before they could be followed up by a public health nurse. The other two cases were classified as probable with one in the 20-29 age group and the other in the 50-50 years age group. Both probable cases were from Asia and had relatives with leprosy.

LEPTOSPIROSIS

A total of 88 cases of leptospirosis were notified in 2006, a rate of 2.1 per 100 000 population, the same notification rate as in 2005 (2.1 per 100 000 population, 85 cases). Of the 88 notified cases, 77 (87.5%) were laboratory confirmed.

Figure 18 shows the number of notified and laboratory-reported cases of leptospirosis each year since 1996.

Figure 18. Leptospirosis notifications and laboratory reported cases by year, 1996 - 2006



The highest age specific rates were reported in the 50-59 years (4.2 per 100 000 population, 21 cases) followed by those in the 30-39 years (4.1 per 100 000, 24 cases) and 40-49 years (4.0 per 100 000, 25 cases) age groups. Sex was recorded for 87/88 cases, where the majority were male (85.1%). Ethnicity was recorded for 88.6% (78/88) of the cases. The majority of the cases were European (74.4%, 58 cases) followed by Maori (23.1%, 18 cases).

No leptospirosis related deaths were reported in 2006. Of the 81 cases for which hospitalisation status was recorded, 35 (43.2%) were hospitalised.

Occupation was recorded for 81 (92.0%) of the 88 notified cases. Of these, 67 cases (82.7%) were recorded as engaged in occupations previously identified as high risk for exposure to *Leptospira spp.* in New Zealand [22]. The proportion of leptospirosis cases in high-risk occupations has decreased compared to the previous two years (91.4% in 2005 and 93.1% in 2004). The proportion in low-risk occupations has experienced a corresponding increase, 8.6% (7 cases) in 2005 to 12.3% (10 cases) in 2006.

Of the 81 cases with recorded occupation, 43 (53.1%) were farmers, farm workers, or a stock drivers and 24 (29.6%) worked in the meat processing industry (as freezing workers, offal cleaner, slaughterman, or meat inspectors). There were 10 other cases that had outdoor/rural exposures.

The *Leptospira* species and serovar was recorded for 77 of the 88 notified cases: *L. borgpetersenii* sv *hardjo* (36 cases), *L. interrogans* sv *pomona* (18), *L. borgpetersenii* sv *ballum* (16), *L. borgpetersenii* sv *tarassovi* (6), and *L. borgpetersenii* sv *copenhagii* (1).

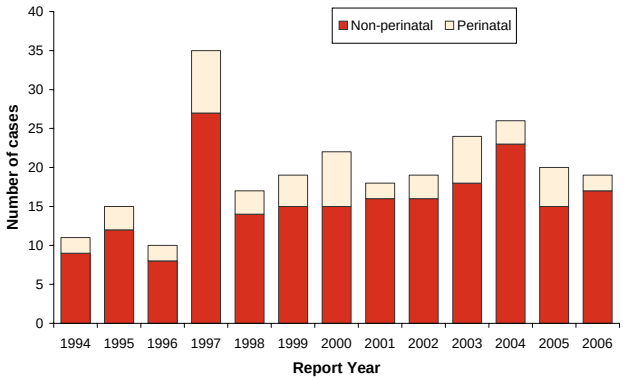
LISTERIOSIS

In 2006, 19 cases of listeriosis were notified, a rate of 0.5 per 100 000 population. Over the preceding five years (2001-2005) the average number of cases per year was 21, peaking with 26 cases (0.6 per 100 000 population) in 2004, the highest since 1997 (35 cases).

Two (10.5%) of the 2006 cases were recorded as perinatal, a decrease from 2005 (5 cases) and similar to 2004 (3 cases). Weeks of gestation were known for both cases: 20 and 24 weeks. The case of 20 weeks gestation died. The mothers were both from the 20-24 years age group and of Pacific ethnicity.

Figure 19 shows listeriosis notifications (perinatal and non-perinatal) each year for the last 13 years.

Figure 19. Listeriosis notifications (perinatal and non-perinatal) by year, 1994 - 2006



The 17 non-perinatal cases were from 11 DHBs with the greatest number from Waitemata (4) and Counties Manukau (3). One case was aged less than five years and all the other non-perinatal cases were aged over 20 years, with six cases aged over 70 years. Sex was recorded for 15 of the 17 cases, of which nine were male and six were female. Ethnicity was recorded for 15 of the 17 cases: European (12 cases), Pacific Peoples (2) and Other ethnicity (1).

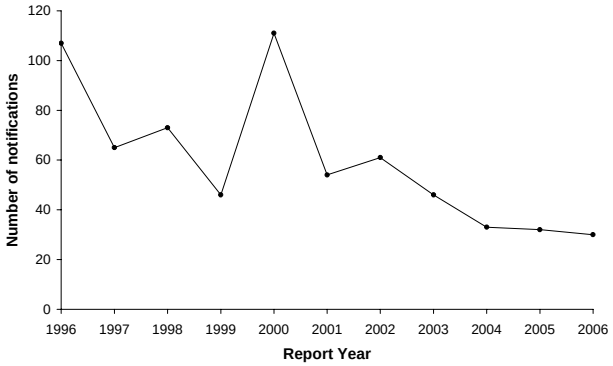
Hospitalisation status was recorded for all non-perinatal cases, of which 16 (94.1%) were hospitalised but seven were hospitalised for treatment of another illness and three were receiving immunosuppressive drugs (note that a case may have more than one risk factor). Nine of the non-perinatal cases had an underlying illness: ulcerative colitis, malnutrition (alcoholism), malignancy, lymphoma, low CD count, cardiac oedema, immunosuppression (influenza), leukaemia and perforated gastric ulcer.

Twenty cultures for typing were received by the ESR Special Bacteriology Laboratory. Twelve (66.7%) were serotype 4; the remainder were serotype 1/ 2, a similar distribution to that in 2005.

MALARIA

There were 30 cases of malaria notified in 2006 compared to 32 cases in 2005 (Figure 20). The 2006 notification rate (0.7 per 100 000 population) was slightly lower than that for 2005 (0.8 per 100 000 population). The number of cases in 2006 is the lowest since 1992 (29 cases).

Figure 20. Malaria notifications by year, 1996 - 2006



Age was recorded for 96.7% (29/30) of the cases. The highest age specific rates were reported in the 30-39 years (1.7 per 100 000 population, 10 cases) and 20-29 years (1.5 per 100 000 population, 8 cases) age groups. The majority of the cases were male (76.7%, 23 cases).

Ethnicity was recorded for 96.7% (29/30) of the cases. Eleven (37.9%) cases were of Other ethnicity, nine (31.0%) were Pacific Peoples, eight (27.6%) were European, one (3.4%) was Maori, and one was unknown. Sixteen (55.2%) cases were hospitalised, and in one case the hospitalisation status was unknown. All cases were laboratory confirmed.

Travel history was recorded for 96.7% (29/30) of the cases. Twenty-seven (93.1%) cases had resided or travelled overseas recently, two (6.9%) had past history of travel to malaria endemic areas, and the travel history of one case was unknown. For eight cases the onset of illness was more than one month after the date returning from overseas. *Plasmodium vivax* was identified for six of these cases. This is in keeping with the natural history of this species, which has a hepatic stage that may persist for six months. *Plasmodium ovale* was identified in one case and in one case no information was recorded.

The overseas areas resided in or travelled to and the *Plasmodium* species identified are listed in Table 16. The most common country visited or resided in was Solomon Islands with 10 cases, and the most common species identified was *P. vivax* with 19 cases. Malaria prophylaxis was used regularly by 10 cases. Five cases did not take any, and prophylaxis use was unknown for 15 cases.

Hospitalisation data for 2006 record 33 additional cases with the primary reason for admission being malaria.

Table 16. Species of malaria and area of overseas travel, 2006

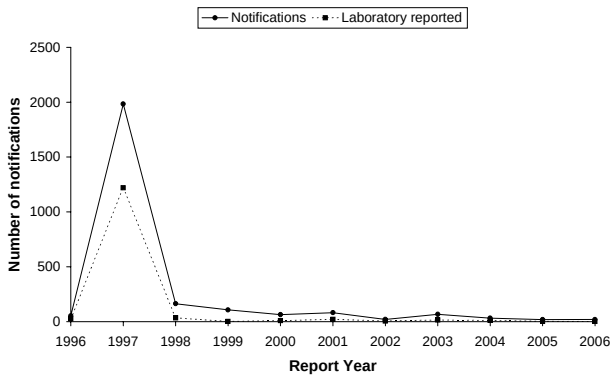
Area resided or visited	*P. falciparum*	*P. vivax*	*P. ovale*	Intermediate	Unknown
Ethiopia	1	1			
Nigeria	2		1		
Mali	1				
Zimbabwe	2				
India		4			
Korea					1
Papua New Guinea		3			1
Solomon Islands	1	8		1	
Vanuatu		2			
None					
Unknown		1			
Total	7	19	1	1	2

MEASLES

In New Zealand measles immunisation was introduced in 1969 and it has been a notifiable disease since June 1996. In 2006 there were 20 measles notifications with one laboratory confirmed case. This is very similar to 2005 when there were 19 notifications with three laboratory confirmed cases.

Figure 21 shows notified and laboratory-reported cases from 1997 to 2006.

Figure 21. Measles notifications and laboratory reported cases by year, 1996 - 2006



The 2006 measles notification rate was 0.5 per 100 000 population. There has been no change in notification rate compared to 2005. Measles notification rate was highest in Canterbury (1.5 per 100 000 population) DHB.

Age specific rates were highest in the less than one year age group with a rate of 14.0 per 100 000 population, followed by the 1-4 years age groups with a rate of 4.9 per 100 000 population.

The 2006 measles notification rate for males was 0.6 per 100 000 population and for females 0.3 per 100 000 population.

Ethnicity was recorded for 18 (90.0%) of all measles notifications during 2006. The highest number of cases occurred among those of European ethnicity (14 cases), followed by those of Maori ethnic group (2 cases).

None of the 19 cases for which hospitalisation status was recorded were admitted to hospital. One measles case reported overseas travel during the incubation period. Of the 18 cases for which the information was recorded, 8 (44.4%) attended school, pre-school or childcare.

The recommended MMR immunisation schedule since January 2001 is to give the first dose at 15 months and the second at four years of age. Vaccination status was recorded for 15 cases. Of these four (26.7%) had received at least one dose of MMR vaccine. Table 17 shows vaccination status by age group.

Table 17. Age and vaccination status of measles notifications, 2006

		Vaccination Status			
Age group	Total cases	1 dose	2 doses	Not vaccinated	Unknown
<15mths	11	0	0	9	2
15mths-3yrs	8	4	0	2	2
4-9 yrs	0	0	0	0	0
10-19 yrs	0	0	0	0	0
20+ yrs	1	0	0	0	1
Total	20	4	0	11	5

It is recommended laboratory confirmation is carried out for every suspected case of measles [19]. From 2002 to 2005 approximately 15% of the notified cases were laboratory confirmed, other than 2004 when over 27% were laboratory confirmed cases. Measles can be a difficult diagnosis to make clinically. It is important that follow-up laboratory information is provided for accurate surveillance.

MENINGOCOCCAL DISEASE

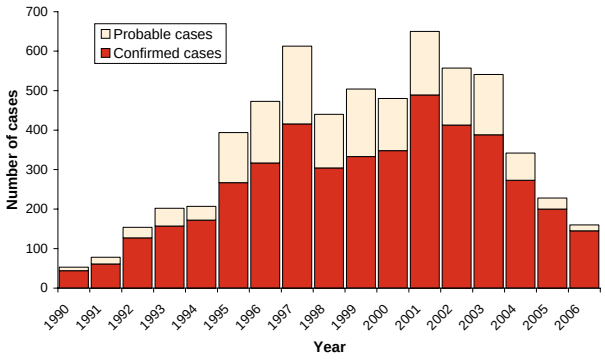
A full description of the epidemiology of meningococcal disease in 2006 is contained in a separate report [23].

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 160 cases of meningococcal disease was notified in 2006, giving a rate of 4.0 per 100 000 population. This rate is a significant decrease from 2004 (8.5 per 100 000 population, 342 cases) yet is still 2.7 times higher than the rate of 1.5 per 100 000 population occurring in the immediate pre-epidemic years (1989-90). Of the 160 cases for 2006, 145 (90.6%) were laboratory confirmed. 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 to earlier years. All tables in the appendices of this report are based on report date and population estimates hence figures may differ slightly.

Figure 22 shows the number of confirmed and probable cases of meningococcal disease since 1990.

The rate of meningococcal disease varied throughout the country in 2006, with the highest rates recorded in the Waikato (8.0 per 100 000 population), Tairawhiti (6.7 per 100 000) and Otago (6.1 per 100 000) DHBs. The lowest rates were from Waitemata DHB (1.2 per 100 000) and Bay of Plenty DHB (1.5 per 100 000 population). No cases were reported from the West Coast and Whanganui DHBs.

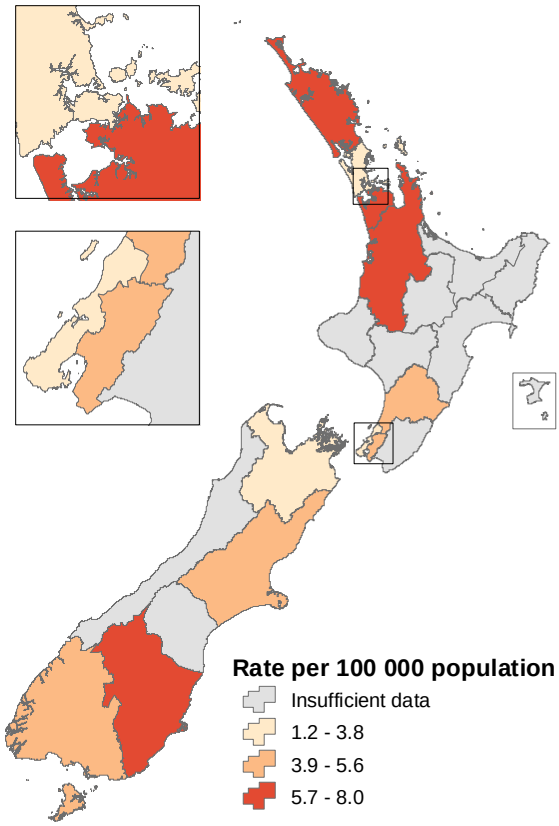
Figure 22. Meningococcal disease notifications by year, 1990 - 2006



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

Figure 23 illustrates the rates of meningococcal disease by DHB.

Figure 23. Meningococcal disease notifications by DHB, 2006



As in previous years, the highest age specific rates occurred in the less than one age group (60.0 per 100 000 population) followed by the 1-4 years age group (12.8 per 100 000).

In 2006 there were 86 cases reported for people of European ethnicity, 44 for Maori, 24 for Pacific Peoples and 6 for people of Other ethnicity.

Seven deaths were reported during 2006 with the associated case fatality rate of 4.4%. This brings the number of deaths since 1991 to 245, with an average case fatality rate of 4.1%.

Data on pre-hospital management were recorded for 160 cases, including all of the fatal cases. These data show that 16.9% (27/160) of cases received antibiotic treatment prior to hospital admission. In 2006, there were two fatalities among cases seen by a doctor prior to hospital admission and given antibiotics. In comparison the there were four 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 2006. However, the number of epidemic strain cases was 74 in 2006 in comparison with 262 in the peak year of 2001.

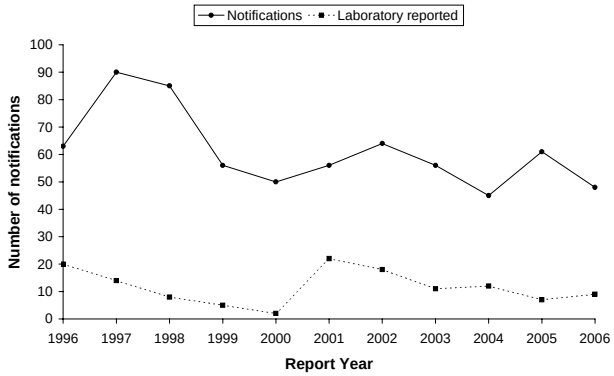
The antimicrobial susceptibility of all 85 viable meningococcal isolates received at ESR from cases of invasive disease in 2006 was tested. All isolates were susceptible to penicillin, ceftriaxone, rifampicin and ciprofloxacin. 11.8% (10/85) of isolates had reduced susceptibility to penicillin, with MICs of 0.12-0.5 mg/L.

MUMPS

A total of 48 cases of mumps were notified and 19 cases were laboratory-confirmed in 2006. In comparison, during 2005, 62 cases of mumps were notified and seven cases were laboratory confirmed.

After the last epidemic in 1994 involving 250 cases, mumps became a notifiable disease in June 1996. Figure 24 shows notified and laboratory-reported cases from 1996 to 2006.

Figure 24. Mumps notifications and laboratory reported cases by year, 1996 - 2006



The 2006 notification rate of 1.2 per 100 000 population has slightly decreased from the 2005 rate of 1.5 per 100 000 population. The highest rate was recorded in Counties Manukau (1.8 per 100 000 population) followed by Canterbury (1.3), Waitemata (1.2) and Auckland (1.2) DHBs.

There were no mumps cases in the less than one-year age group. Age specific rates were highest in the 1-4 years with rates of 4.9 per 100 000 population followed by 5-9 years (3.8), 10-14 years (3.6) and 30-39 years (1.2) respectively.

The 2006 mumps notification rate for males was 1.2 per 100 000 population and for females 1.1 per 100 000 population.

Ethnicity was recorded for 47 (97.9%) notifications. The highest number of cases occurred among those of European ethnicity (24 cases), followed by those of Pacific People ethnic group (9 cases), Other (8 cases) and Maori ethnicity (6 cases).

Of the 48 cases notified during 2006, 43 (89.6%) had hospitalisation information recorded. Of these, three cases were hospitalised. No deaths were reported from the disease in 2006. Of the 36 cases for which this information was recorded, 22 (61.1%) attended school, pre-school or childcare. Seven cases reported overseas travel during the incubation period.

The recommended immunisation schedule for mumps in 2006 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 29 cases notified during 2006. Of these, 15 (51.7%) had received at least one dose of MMR vaccine. Table 18 shows the number of doses of MMR vaccine given to mumps cases in each relevant age group.

PARATYPHOID FEVER

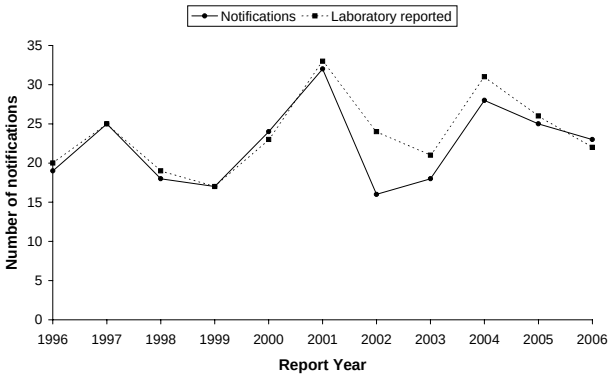
Twenty-three cases of *Salmonella* Paratyphi were notified in 2006. The Enteric Reference Laboratory at ESR received 22 *S.* Paratyphi isolates in 2006. The isolates were identified as *S.* Paratyphi A (10 cases), *S.* Paratyphi B (4 cases), and *S.* Paratyphi B var Java (8 cases). The 2006 rate (0.6 per 100 000 population) was similar to the 2004 and 2005 rates.

Figure 25 shows the number of notified and laboratory-reported cases of paratyphoid each year since 1996.

Sex was recorded for all 23 cases. Males had a slightly lower rate (11 cases, 0.5 per 100 000 population) than females (12 cases, 0.6 per 100 000).

The most frequent age of notification was 20-29 years of age (7/23).

Figure 25. Paratyphoid fever notifications and laboratory reported cases by year, 1996 - 2006



Ethnicity was recorded for 22 (95.7%) of paratyphoid fever cases. The highest percentages total responses occurred in the European ethnicity (13 cases, 59.1% of responses), and Other ethnicity (9 cases, 40.9% of responses). No cases were reported in either Maori or Pacific Peoples.

Of the 22 cases for which hospitalisation status was recorded, 8 (36.4%) were hospitalised.

Table 18. Mumps notifications by age group and vaccination received, 2006

Age group	Total cases	Vaccination Status					
		1 dose	2 doses	3 doses	Vaccinated (no dose info)	Not vaccinated	Unknown
<15mths	0	0	0	0	0	0	0
15mths-3yrs	9	3	0	1	2	1	2
4-9 yrs	13	3	5	0	2	1	2
10-19 yrs	12	1	2	0	2	1	6
20+ yrs	14	0	0	0	0	5	9
Total	48	7	7	1	6	8	19

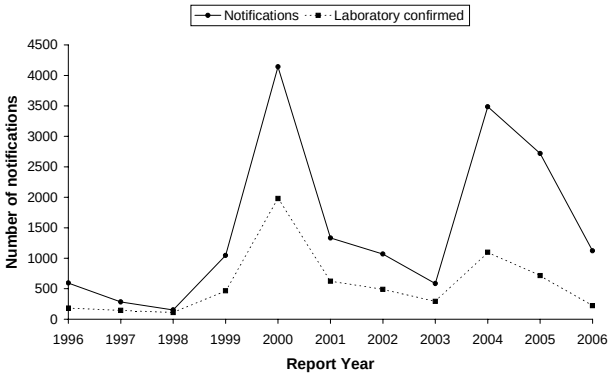
Overseas travel information was recorded for 20 of the 23 cases. 12 of the 20 cases (60.0%) were recorded as having travelled overseas during the incubation period for the disease. The countries visited were: India (7), Indonesia, Singapore, South America, Pakistan and Australia (1 case each).

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 [19]. Childhood vaccination has been routine in New Zealand since 1960, and the disease has been notifiable since 1996.

In 2006 there were 1122 pertussis cases notified (27.1 cases per 100 000 population). The 2006 notification rate is a significant decrease from 2005 (66.3 per 100 000 population, 2719 cases) and 2004 (85.8 per 100 000 population, 3485 cases). During the latter part of 2004 New Zealand experienced an epidemic of pertussis, with monthly cases peaking at 613 in November.

Figure 26. Pertussis notifications and laboratory confirmed cases by year, 1996 - 2006



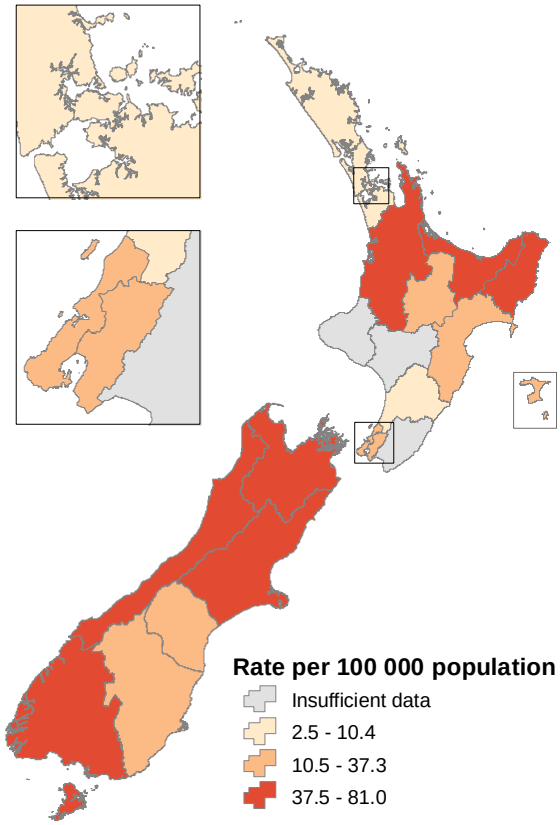
In 2006, the highest rates were reported in Waikato (80.9 per 100 000) and Tairawhiti (74.2 per 100 000) DHBs. The lowest rate was reported in Counties Manukau (2.5 per 100 000) DHB.

Sex and ethnicity were recorded for 99.1% and 95.5% of all pertussis cases, respectively. Sixty percent (671/1072) of cases were female, and 82% (882/1112) were of European ethnicity.

The highest age specific rates were for cases aged less than one year (66.5 per 100 000 population, 38 cases), followed by cases aged 50-59 years (33.3 per 100 000 population, 167 cases). For the past two years, 2005 and 2006, (54-68%) of cases were aged over 20 years, a change in the age distribution of cases since the previous epidemic where only 20.9% of cases in 2000 were aged over 20 years.

In 2006, as in 2005, the rate of pertussis varied by geographic region (Figure 27). The highest rates were reported from the following four DHBs: Waikato, Tairawhiti, Canterbury, and West Coast.

Figure 27. Pertussis notifications by DHB, 2006



Of the 1004 cases for which hospitalisation status was recorded in 2006, 44 (4.4%) were hospitalised. Of those hospitalised, 16 were known to have started the vaccination schedule; one had been given four doses of vaccine, while three had completed the three-dose course of vaccinations. There were no fatal cases of pertussis recorded in 2006.

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 [24]. 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. [19]

Vaccination status was known for 69.9% (784/1122) of the cases notified during 2006. Of these, 633 (80.7%) were recorded as having had at least one dose of vaccine although dose details are only recorded for 491 of these cases.

Table 19 shows the number of doses of vaccine given to cases in each relevant age group. A total of 216 cases had received three or more doses of pertussis vaccine.

Table 19. Pertussis notifications by age group and vaccination received, 2006

Age group	Total Cases	Vaccination status							
		One dose	Two doses	Three doses	Four doses	Five doses	Vaccinated (no dose info)	Not vaccinated	Not known
0 - 5wks	3	-	-	-	-	-	0	2	1
6wk - 2mths	13	4	-	-	-	-	0	5	4
3 - 4mths	7	4	2	-	-	-	0	1	2
5 - 14mths	19	7	6	5	-	-	3	7	2
15mths - 3yrs	36	8	7	7	4	-	5	15	8
4+ yrs	1039	120	115	110	70	18	134	120	665
Unknown	5	1	1	1	1	0	0	1	3
Total	1122	144	131	123	75	18	142	151	685

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 [11].

After a worldwide low of 200 plague cases reported to the WHO in 1981, case numbers continued to increase with a peak of 5 419 cases in 1998 [25]. In 2003, 2 118 cases of human plague were reported globally resulting in 182 fatalities [26]. Global statistics suggest a shift in the geographical distribution of human plague. Africa has reported the vast majority of plague cases since the 1980s, whereas during the 1970s plague cases were predominantly reported in Asia. It is important to note that global statistics on plague are incomplete due to inadequate surveillance and reporting, as well as an unwillingness to notify plague cases officially [25].

POLIOMYELITIS (POLIO)

There were no polio notifications in 2006. The New Zealand Paediatric Surveillance Unit carries out active surveillance of acute flaccid paralysis (AFP). In 2006 there were eight 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.

PRIMARY AMOEBIC MENINGOENCEPHALITIS

Primary amoebic meningo-encephalitis, caused by the amoeboflagellate *Naegleria fowleri,* is a rare communicable disease with over 160 cases reported worldwide, though this may be low due to identification and reporting bias [17].

The last notified case of primary amoebic meningo-encephalitis in New Zealand occurred in 2000. There have been 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 [27].

RABIES

New Zealand is classified as a rabies free country [28]. There were no notifications of rabies in 2006. The majority of human deaths caused by rabies infection occur in Africa and Asia. For both of these continents combined, the estimated human mortality rate from endemic canine rabies is 55 000 deaths per year [29].

RICKETTSIAL DISEASE

Seven cases of rickettsial disease were notified in 2006 (0.2 per 100 000 population) compared to one case in 2005. The number of cases in 2006 is the highest since 2000 (10 cases). Six of the seven cases were reported from Waikato DHB.

Two (28.6%) cases were in the 30-39 years age group, two (28.6%) were in the 40-49 years age group, one (14.3%) was in the 50-59 years age group, one (14.3%) was in the 60-69 years age group, and one (14.3%) was in the 70+ years age group. Five (71.4%) cases were female, and two (28.6%) were male. All cases were of European ethnicity. Four (66.7%) cases were hospitalised, and in one case no information was recorded. Six cases were laboratory confirmed, and the seventh case is under investigation. *R.* Typhi was reported as the pathogen for one case. No laboratory details were provided for the other cases.

No sources of infection were identified. One case was overseas in Western Australia during the incubation period, the travel history of two cases was unknown, and in one case no risk factor information was recorded.

Hospitalisation data for 2006 record 13 additional cases with the primary reason for admission being rickettsial disease.

RHEUMATIC FEVER

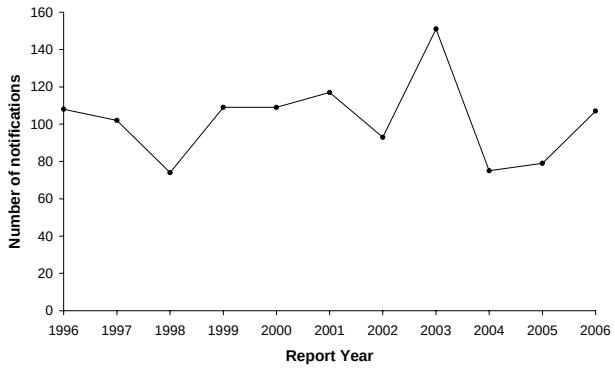
In 2006, 103 initial attack cases (Figure 28) and four recurrent cases of rheumatic fever were notified. For initial cases this represents a population rate of 2.5 per 100 000, higher than the rate of 1.9 per 100 000 observed in 2005 (76 cases).

For recurrent cases there was no change in the notification rate (0.1 per 100 000 population) between 2005 (3 cases) and 2006.

In 2006, the rates of initial attack cases of rheumatic fever varied by geographical region with the highest rates reported in the Northland (8.7 per 100 000 population, 13 cases) and Counties Manukau (7.9 per 100 000, 35 cases) DHBs. The

four recurrent cases were reported in the Northland, Hawke's Bay, Whanganui and Hutt DHBs.

Figure 28. Rheumatic fever (initial attack cases) by year, 1996 - 2006



Of the 103 initial attack rheumatic fever cases for which lab diagnosis was recorded, 96.2% (50/52) had a laboratory confirmed diagnosis for streptococcal infection.

Sex was recorded for 82.5% (85/103) of the cases. The notification rate of initial attack cases was 2.7 per 100 000 (54 cases) in males and 1.5 per 100 000 in females (31 cases). Age was recorded for 99.0% (102/103) of the cases. The majority (89.2%) were aged less than 20 years and the highest rates were in the 10 to 14 year age group (16.1 per 100 000, 49 cases).

Ethnicity was recorded for 86.4% (89/103) of the cases. The majority of the cases were Maori (61.8%, 55 cases) followed by Pacific Peoples (33.7%, 30 cases).

For all rheumatic fever cases (initial and recurrent attack), hospitalisation data was recorded for 59 cases, of which 52 (88.1%) were hospitalised.

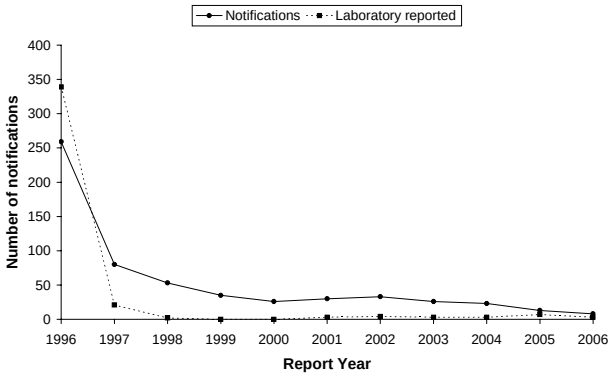
RUBELLA (GERMAN MEASLES)

In New Zealand, rubella immunisation was introduced in 1970 and it has been a notifiable disease since June 1996. A total of eight cases of rubella were notified and two cases were laboratory-confirmed in 2006. In comparison, during 2005, 13 cases of rubella were notified and seven cases were laboratory-confirmed. There were no cases of congenital rubella reported in 2006.

Figure 29 shows notified and laboratory-reported cases from 1997 to 2006.

The 2006 rubella notification rate was 0.2 per 100 000 population which is not significantly lower compared to the 2005 rate of 0.3 per 100 000 population. The cases were from Auckland (2 cases), Hawke's Bay (1), Midcentral (2), Canterbury (1) and Southland (2) DHBs.

Figure 29. Rubella notifications and laboratory reported cases by year, 1996 - 2006



Age data was recorded for all rubella cases. The age distribution varies between eight months and 36 years. Age specific rates were highest in the 1-4 years age group with a rate of 1.8 per 100 000 population. The 2006 rubella notification rate was highest for females with a rate of 0.2 per 100 000 population.

Ethnicity was recorded for seven of the rubella notifications during 2006 with the majority being of European ethnicity (6 cases).

Hospitalisation status was recorded for all the cases and no case was admitted to hospital. None of the notified cases died from the disease. Of the six cases for which information was collected only one case was known to have attended school, pre-school or childcare. Vaccination status was recorded for seven cases of which one was immunised. No 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. Vaccination status was recorded for seven cases notified during 2006. Of these, one had received two doses of MMR vaccine. Table 20 shows the number of doses of MMR vaccine given to rubella cases in each relevant age group.

Data suggest that the incidence of rubella in New Zealand continues to decline after the last national epidemic in 1995. Since 1998, no further cases of congenital rubella syndrome have been reported to the New Zealand Paediatric Surveillance Unit. However, epidemics can occur every six to nine years in populations where vaccinations have not been in use.

Table 20. Age Group of rubella notifications and vaccination received, 2006

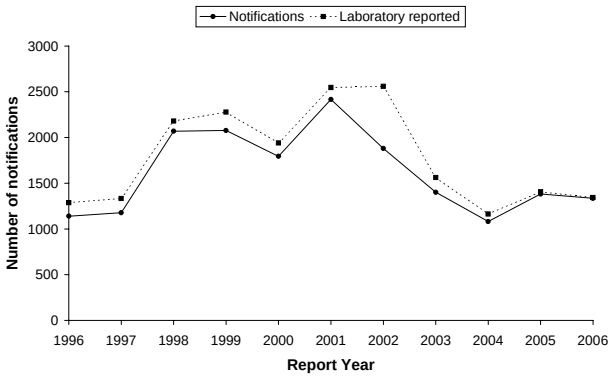
Age group	Total cases	Vaccination Status				
		1 dose	2 doses	3 doses	Not vaccinated	Unknown
<15mths	4	-	-	-	4	0
15mths-3yrs	2	0	-	-	2	0
4-9 yrs	0	0	0	0	0	0
10-19 yrs	1	0	1	0	0	0
20+ yrs	1	0	0	0	0	1
Total	8	0	1	0	6	1

SALMONELLOSIS

A total of 1335 cases of salmonellosis were notified in 2006. The Enteric Reference Laboratory at ESR received 1343 *Salmonella* isolates (exclusive of *S.* Paratyphi and *S.* Typhi reported elsewhere). The 2006 notification rate (32.3 per 100 000 population) is not significantly different from 2005 (33.7 per 100 000).

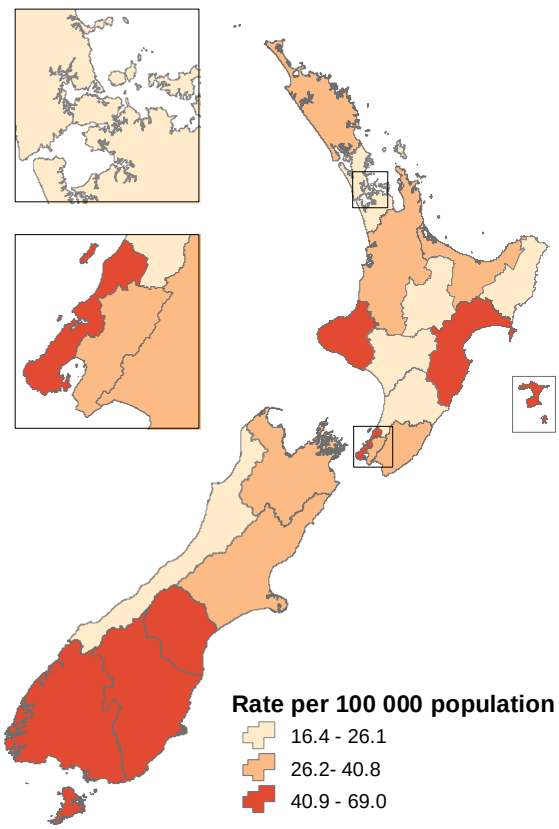
Figure 30 shows the number of notified and laboratory-reported cases of salmonellosis by year since 1996.

Figure 30. Salmonellosis notifications and laboratory reported cases by year, 1996 - 2006



Rates varied throughout the country as illustrated in Figure 31. The highest rates were reported in the lower half of the South Island namely South Canterbury (37 cases, 69.0 per 100 000), followed by Southland (73 cases, 66.8 per 100 000), and Otago (86 cases, 47.1 per 100 000) DHBs.

Figure 31. Salmonellosis notifications by DHB, 2006



Sex was recorded for 1312 (98.3%) cases. Rates were similar for males (673 cases, 32.1 per 100 000) and females (639 cases, 31.4 per 100 000).

Age was recorded for 1331 (99.7%) of the salmonellosis cases. Age specific rates were highest for the less than 1 years of age group (83 cases, 145.3 per 100 000), followed by the 1-4 years age group (280 cases, 124.2 per 100 000), and the 20-29 year age group (185 cases, 33.5 per 100 000).

Ethnicity was recorded for 1173 (87.9%) cases. The highest percentage were reported for those of European ethnicity (958 cases, 81.7% of responses), followed by Maori (109 cases, 9.3% of responses), Other ethnicity (61 cases, 5.2% of responses), and Pacific Peoples (45 cases, 3.8% of responses).

Of the 1111 (83.2%) cases for which hospitalisation status was recorded, 148 (13.3%) were hospitalised.

In 2006, 22 outbreaks of salmonellosis were reported involving 74 cases, of which 31 cases are included as individual case reports.

The risk factors recorded for salmonellosis are shown in Table 22.

Table 21 shows the number of cases of selected *Salmonella* types reported by the Enteric Reference Laboratory at ESR. The incidence of all *S.* Typhimurium definitive types (DT) increased on 2004 numbers but not to the levels seen in 2003. DT160 remained the most common single type.

Table 21. Selected *Salmonella* serotypes and subtypes of laboratory-confirmed salmonellosis, 2001 - 2005

Subtype [a]	2003	2004	2005	2006
S. Typhimurium	953	580	757	733
DT160	334	221	248	260
DT1	110	65	114	72
DT135	68	30	54	16
DT156	95	56	75	87
DT101	66	31	67	71
Other or unknown	280	177	199	227
S. Enteritidis	137	142	151	107
PT9a	65	50	73	53
PT4	22	24	9	9
Other or unknown	50	68	69	45
S. Infantis	89	63	67	58
S. Brandenburg	55	86	68	55
S. Saintpaul	27	33	65	35
S. Thompson	10	22	16	30
S. Montevideo	37	8	6	8
S. Heidelberg	11	3	7	14
Other or unknown serotypes	282	599	269	303
Total	1601	1164	1406	1343

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

Figure 32 illustrates examples of *Salmonella* types that have emerged in recent years and their changing contribution to the overall *Salmonella* burden in New Zealand.

Table 22. Exposure to risk factors associated with salmonellosis, 2006

Risk Factor	Yes	No	Unknown	%[a]
Consumed food from retail premises	310	364	661	46.0%
Contact with farm animals	217	643	475	25.2%
Consumed untreated water	149	588	598	20.2%
Travelled overseas during the incubation period.	184	770	381	19.3%
Recreational water contact	134	667	534	16.7%
Contact with faecal matter	117	701	517	14.3%
Contact with other symptomatic people	107	705	523	13.2%
Contact with sick animals	37	747	551	4.7%
Contact with other confirmed cases	35	739	561	4.5%

[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.

Figure 32. Laboratory reported cases of *S.* Brandenburg, STM 156 and STM 160 by quarter, 2002 - 2006

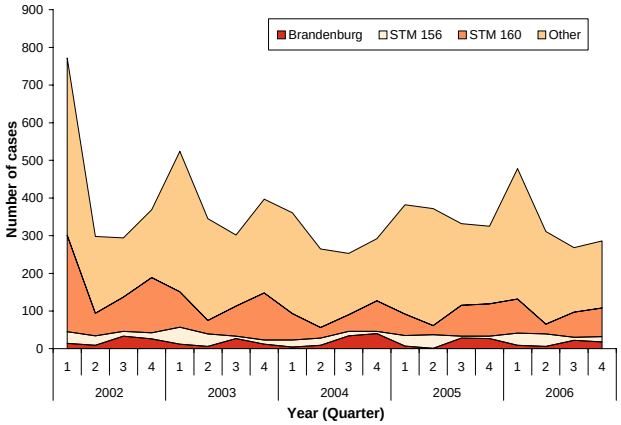
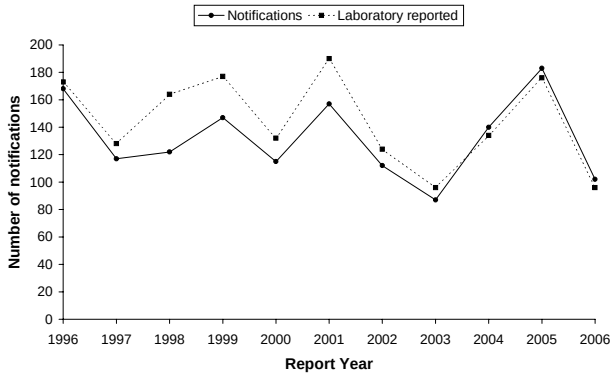


Figure 33. Shigellosis notifications and laboratory reported cases by year, 1996 - 2006



SARS (SEVERE ACUTE RESPIRATORY SYNDROME)

No cases of SARS were reported in New Zealand in 2006.

During the international outbreak of SARS in 2003, there were 13 notifications of suspected SARS cases in New Zealand, however, all of these cases subsequently tested negative for the SARS coronavirus [30]. The last outbreak of SARS occurred in China during April 2004. The index cases were two researchers from the same institution who were linked to the infection of seven others, including one death [31]. Subsequently, two other researchers working at the same facility also tested positive for SARS antibodies [32].

SHIGELLOSIS

A total of 102 cases of shigellosis were notified in 2006. The 2006 notification rate (2.5 per 100 000 population) was significantly lower than the 2005 rate (4.5 per 100 000) and below the annualised rate for the 10 year period 1997-2006 (3.3 per 100 000).

The Enteric Reference Laboratory at ESR received 96 *Shigella* isolates during 2006. The predominant serogroups identified were: *S. sonnei* biotype a (24 cases, 25.0%), *S. sonnei* biotype g (22 cases, 22.9%), *S. flexneri* 2a (9 cases, 9.4%), and *S. flexneri* 1b (8 cases, 8.3%).

Figure 33 shows the number of notified and laboratory reported cases of shigellosis each year since 1997.

The rate of shigellosis varied throughout the country in 2006. The highest rates of shigellosis were reported in the Whanganui (5 cases, 8.1 per 100 000), Auckland (21 cases, 4.9 per 100 000), and Nelson Marlborough (7 cases, 5.1 per 100 000) DHBs.

Sex was recorded for 98 (96.1%) of the 102 cases. Of these, males had the lowest rate (46 cases, 2.2 per 100 000) and female (52 cases, 2.6 per 100 000).

Age was recorded for 101 (99.0%) of the 102 cases. The highest age specific rate occurred among children aged 1-4 years (15 cases, 6.7 per 100 000), followed by the 5-9 year age group (10 cases, 3.5 per 100 000), and the 30-39 year age group (20 cases, 3.4 per 100 000).

Ethnicity was recorded for 80 (78.4%) of the 102 cases reported in 2006. The highest percentage of responses occurred in the European ethnicity (45 cases 56.3% of responses), followed by Other ethnicity (18 cases, 22.5% of responses), Pacific Peoples (11 cases, 13.8% of responses), and Maori (6 cases, 7.5% of responses).

Of the 86 notified cases for which hospitalisation status was recorded, 7 (8.1%) were hospitalised.

Eight shigellosis outbreaks were reported in 2006, involving 27 cases, of which 13 cases are included as individual case reports.

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

Of those cases that reported overseas travel during the incubation period the most frequent overseas destinations were: India (12), Vanuatu (5), Tonga (4) and Fiji (3).

Table 23. Exposure to risk factors associated with shigellosis, 2006

Risk Factor	Yes	No	Unknown	%[a]
Travelled overseas during the incubation period.	49	32	21	60.5%
Consumed food from retail premises	23	24	55	48.9%
Recreational water contact	10	35	57	22.2%
Contact with other symptomatic people	11	46	45	19.3%
Contact with other confirmed cases	8	49	45	14.0%
Consumed untreated water	6	39	57	13.3%
Contact with faecal matter	3	49	50	5.8%
Contact with farm animals	2	43	57	4.4%

[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.

TAENIASIS

No cases of taeniasis were notified in 2006. The most recent case was notified in 2003, and only five cases have been notified in New Zealand since 1997. All of these cases have reported a history of overseas travel.

TETANUS

There was one non fatal case of tetanus notified in 2006 involving the hospitalisation of a nine year old female. The suspected source was an infection through laceration of the knee. The case was not vaccinated against tetanus.

TOXIC SHELLFISH POISONING

There was one case of toxic shellfish poisoning notified in 2006, this confirms the low number of toxic shellfish poisoning notifications in recent years. The 37-year-old Tongan male was poisoned after consuming steamed mussels. He did not require hospitalisation. Diarrhoeic shellfish poisoning toxins were detected.

TRICHINELLOSIS

No cases of trichinellosis were notified in 2006. 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 [33].

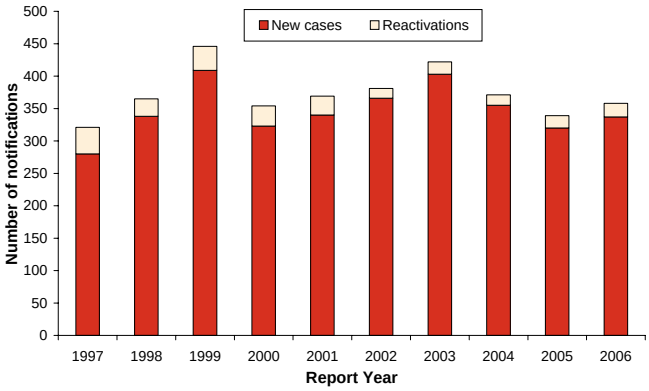
TUBERCULOSIS

Worldwide, tuberculosis infection is one of the most common causes of death from communicable disease. Infection is usually curable with a combination of specific antibiotics but relies upon full compliance.

In 2006, 358 cases of tuberculosis (new and reactivations) were notified, of which 21 (5.9%) were reactivations. (Note that the term reactivation used in this context means cases with second or multiple episodes of symptomatic tuberculosis disease). This represents a population rate of 8.6 per 100 000 population which is similar to that reported in 2005 (8.3 per 100 000, 339 total cases including 19 reactivations). In 2006, a total of 262 (73.2%) cases were reported as laboratory confirmed.

Figure 34 shows the total number of new tuberculosis cases and reactivations reported since 1997.

Figure 34. Tuberculosis notifications - new cases and reactivations by year, 1997 - 2006

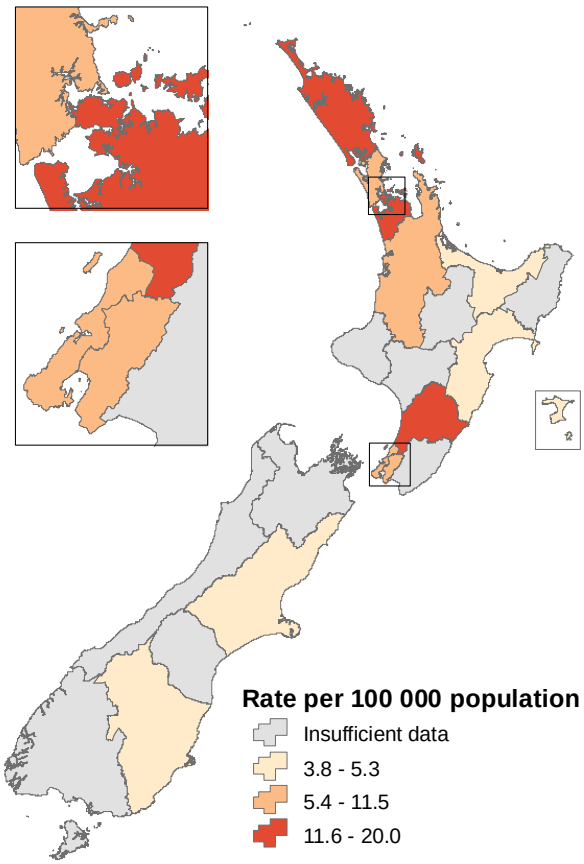


Reports of new tuberculosis cases

In 2006, the rates of new tuberculosis notifications per 100 000 population differed by geographical region (Figure 35). Northland DHB had the highest rate (20.0 per 100 000 population, 30 cases) followed by MidCentral DHB (19.0 per 100 000, 31 cases).

There were 13 cases aged less than five years with another 22 aged between 5 and 14 years. The highest age specific rate was for persons aged 20-29 years (15.6 per 100 000 population, 86 cases). For females, the rate for this age group (18.3 per 100 000 population, 50 cases) was almost twice that of the next highest rate for females aged 70+ years (9.8 per 100 000 population, 20 cases). The 70+ years age group also had the highest rate for males (13.6 per 100 000 population, 21 cases). Overall, for new tuberculosis cases, 163 cases were male and 169 were female.

Figure 35. Tuberculosis notifications (new cases) by DHB, 2006



Ethnicity was recorded for 97.9% (330/337) of the cases. The majority of the cases were classified as Other ethnicity (53.6%, 177 cases) followed by Maori (17.9%, 59 cases), European (14.5%, 48 cases), and those of Pacific Peoples ethnicity (13.9%, 46 cases).

Of the 325 new cases in 2006 for which hospitalisation data were recorded, 172 (52.9%) were hospitalised. Five deaths in 2006 were due to tuberculosis disease (age range 28 to 92 years). BCG vaccination status was recorded for 172 cases and vaccination was confirmed for 98 (57.0%) of those cases. A further 12 (7.0%) cases had unconfirmed positive vaccination status.

In 2006, 213 cases (70.3% of cases for whom this information was recorded) were born outside New Zealand. Of the 90 cases that were known to have been born in New Zealand, 12 (15.4%, 12/78 where information was recorded) had been or were presently residing with a person born outside New Zealand. Of the 237 cases for which these data were recorded, 86 (36.3%) reported contact with a confirmed case of tuberculosis.

Reactivations of tuberculosis

Ten of the 21 reactivations were from the combined Auckland DHBs. Nine cases (42.9%) were aged 50 years or over. There were more male than female reactivations (17 versus four respectively). Sixty-two percent (13/21) of the reactivations were of Other ethnicity.

Hospitalisation data were recorded for all reactivations, and 12 (57.1%) cases were hospitalised. There were no recorded fatalities amongst the reactivation cases. Vaccination status was recorded for 10 cases, of which vaccination was confirmed for four cases, unconfirmed for three cases, and stated as not given for the remaining three cases.

In 2006, information on the place where the diagnosis was made and country of birth was recorded for 16 of the 21 reactivated cases. The first diagnosis of tuberculosis disease was made in New Zealand for five cases and overseas for 11 cases. Table 24 shows the cases treated for tuberculosis disease by place of original diagnosis.

Table 24. Treatment of place of original TB disease diagnosis for reactivations, 2006

Place of TB disease diagnosis	Case treated for TB disease			
	Yes	No	Unknown	Total
Overseas	9	1	1	11
New Zealand	5	0	0	5
Unknown	0	1	4	5
Total	14	2	5	21

Table 25 shows the place 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, 2006

Place of TB disease diagnosis	Country of birth of case		
	New Zealand	Overseas	Total
Overseas	1	10	12
New Zealand	2	3	6
Unknown	2	1	1
Total	5	14	19

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.

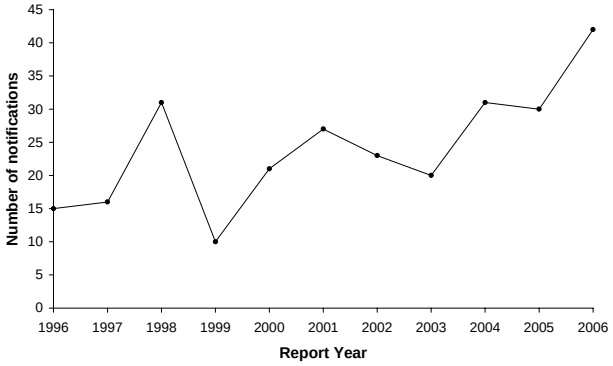
TYPHOID FEVER

Forty-two cases of typhoid were notified in 2006. The 2006 rate (1.0 per 100 000) is not significantly higher than the 2005 rate (0.7 per 100 000).

The Enteric Reference Laboratory at ESR received 39 *Salmonella* Typhi isolates in 2006.

Figure 36 shows typhoid notifications by year since 1996.

Figure 36. Typhoid notifications by year, 1996 - 2006



Most cases were reported in the upper North Island, Counties Manukau (18 cases), Waitemata (9 cases), and Waikato (8 cases).

Sex was recorded for 41 (97.6%) of the 42 cases. 14 (0.7 per 100 000) were male and 27 (1.3 per 100 000) were female.

Age was recorded for all cases. Age specific notification rates were higher in the 1-4 year age group (6 cases, 2.7 per 100 000), followed by the 5-9 year age group (7 cases, 2.4 per 100 000), the 15-19 years age group (5 cases, 1.6 per 100 000), and the 40-49 years age group (8 cases, 1.3 per 100 000).

Ethnicity was recorded for all cases. The highest percentage were reported for Other and Pacific People ethnicities (18 cases, 42.9% of responses, each), followed by Maori and European ethnicities (3 cases, 7.1%. of responses, each).

Hospitalisation status was recorded for 36 cases (85.7%). 25 (69.4%) of these cases were hospitalised.

Overseas travel information was recorded for 23 of the 42 cases. Of these, 13 (56.5%) were recorded as having travelled overseas during the incubation period for this disease. The countries visited were: India (9), Samoa and Thailand (2 each), and Kenya and Malaysia (1 each).

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

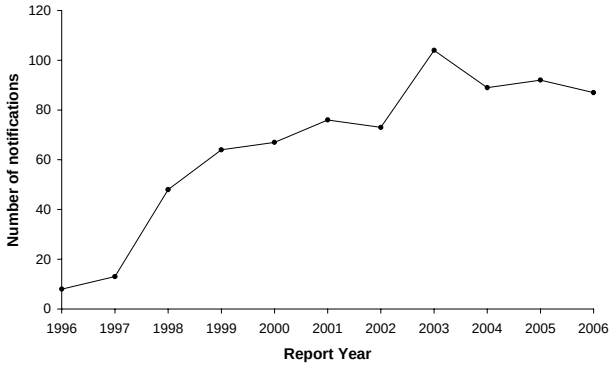
There were 87 cases of Verocytotoxigenic *Escherichia coli* infection (VTEC), also known as Shigatoxigenic *Escherichia coli* infection (STEC), notified in 2006. The 2006 notification rate (2.1 per 100 000 population) is similar to the 2005 rate (2.2 per 100 000). Twelve cases of VTEC/STEC-associated haemolytic uraemic syndrome (HUS) were reported to the New Zealand Paediatric Surveillance Unit (NZPSU) in 2006.

The Enteric Reference Laboratory at ESR received a total of 86 VTEC/STEC isolates: Of these 80 (93.0%) were identified as serotype O157: H7, and six as non-O157: H7.

Figure 37 shows the number of notified cases of VTEC/STEC infection each year since 1996.

Rates varied throughout the country. The highest rates were recorded in Waikato (16 cases, 4.7 per 100 000), Nelson Marlborough (6 cases, 4.4 per 100 000), and Northland (5 cases, 3.3 per 100 000) DHBs.

Figure 37. VTEC/STEC notifications by year, 1996 - 2006



Sex was recorded for 98.9% of VTEC/STEC cases. Of these, males had the same rate (44 cases, 2.1 per 100 000) as females (42 cases, 2.1 per 100 000).

Age was recorded for 85 cases (97.7%) of cases. The highest rates were reported in the 1-4 years age group (38 cases, 16.9 per 100 000), followed by the less than 1year age group (6 cases, 10.5 per 100 000), and 60-69 years ago group (8 cases, 2.4 per 100 000).

Ethnicity was recorded for 95.4% of cases. Of these, the highest percentage were reported for European ethnicity (75 cases, (90.4% of responses), followed by Maori (4 cases, 4.8% of responses), and Pacific Peoples and Other ethnicities (2 cases, 2.4% of responses, each).

Of the 98.9% of notified cases of VTEC/STEC for which hospitalisation status was recorded, 23 (26.7%) were hospitalised.

Five outbreaks of VTEC/STEC were reported in 2006 with a total of 16 cases, of which 14 are included as individual case reports.

The risk factors recorded for VTEC/STEC cases reported in 2006 are shown in Table 26. The foods consumed by cases are shown in Table 27.

Table 26. Exposure to risk factors associated with VTEC/STEC, 2006

Risk Factor	Yes	No	Unknown	%[a]
Contact with recreational water	19	47	21	28.8%
Contact with pets	55	8	24	87.3%
Contact with farm animals	29	29	29	50.0%
Contact with other animals	11	44	32	20.0%
Contact with animal manure	27	28	32	49.1%
Contact with children in nappies	28	36	23	43.8%
Contact with a person with similar symptoms	23	34	30	40.4%
Travelled overseas during the incubation period.	2	70	15	2.8%

[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, 2006

Food	Yes	No	Unknown	%[a]
Consumed raw fruit or vegetables	60	4	23	93.8%
Consumed chicken or poultry	55	10	22	84.6%
Consumed dairy products	54	11	22	83.1%
Consumed beef or beef products	45	18	24	71.4%
Consumed processed meats	44	20	23	68.8%
Consumed fruit or vegetable juice	34	23	30	59.6%
Consumed lamb or hogget or mutton	14	48	25	22.6%
Consumed home kill meat	9	56	22	13.8%
Consumed unpasteurised milk or milk products	6	60	21	9.1%
Consumed pink or undercooked meat	3	58	26	4.9%

[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

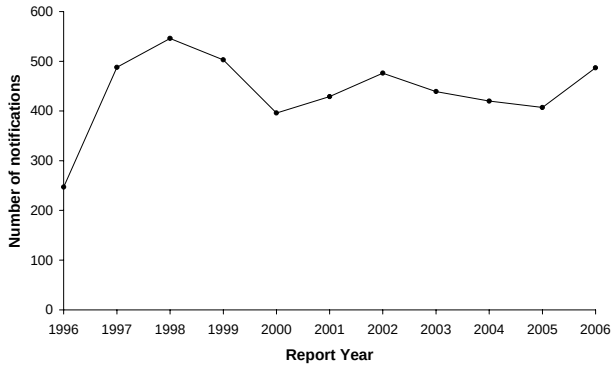
No cases of yellow fever were notified in 2006.

YERSINIOSIS

A total of 487 cases of yersiniosis were notified in 2006. The 2006 rate (11.8 per 100 000 population) is significantly higher than the 2005 rate (9.9 per 100 000).

Figure 38 shows the number of notified cases of yersiniosis by year since 1996.

Figure 38. Yersiniosis notifications by year, 1996 - 2006



Rates varied throughout the country as illustrated in Figure 39. The highest rates were recorded in the West Coast (9 cases, 29.5 per 100 000), Capital and Coast (69 cases, 24.7 per 100 000), and Lakes (20 cases, 19.7 per 100 000 each) DHBs.

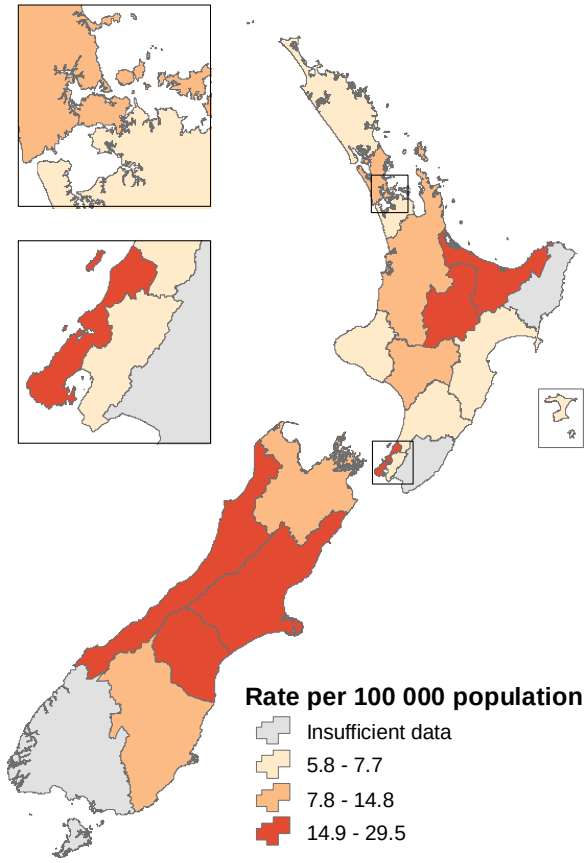
Sex was recorded for 96.3% of the cases. Of these, males had the highest rate (247 cases, 11.8 per 100 000) followed by females (222 cases, 10.9 per 100 000).

Age was recorded for 484 cases (99.4%). Age specific rates were highest in the less than 1-year age group (28 cases, 49.0 per 100 000), followed by the 1-4 years age group (85 cases, 37.7 per 100 000), and the 70+ years age group (46 cases, 12.8 per 100 000).

Ethnicity was recorded for 82.8% of the cases. The highest percentage of those notified were reported in the European ethnicity (316 cases, 78.4% of responses), followed by Other ethnicities (48 cases, 11.9% of responses), Maori (31 cases, 7.7% or responses), and Pacific Peoples (8 cases, 2.0% of responses).

Of the 71.1% of cases for which hospitalisation status was recorded, 56 (16.0%) were hospitalised.

Figure 39. Yersiniosis notifications by DHB, 2006



The risk factors recorded for VTEC/STEC cases reported in 2006 are shown in Table 27.

Table 28. Exposure to risk factors associated with yersiniosis, 2006

Risk Factor	Yes	No	Unknown	%[a]
Consumed food from retail premises	72	136	279	34.6%
Contact with farm animals	58	210	219	21.6%
Consumed untreated water	47	187	253	20.1%
Contact with faecal matter	49	202	236	19.5%
Recreational water contact	29	222	236	11.6%
Contact with other symptomatic people	24	222	241	9.8%
Travelled overseas during the incubation period.	19	266	202	6.7%
Contact with sick animals	11	230	246	4.6%
Contact with other confirmed cases	1	201	285	0.5%

[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.

NON-NOTIFIABLE DISEASES

INFLUENZA

National influenza surveillance in 2006 was undertaken between May and September using a sentinel network of 90 general practices. On average, 81 practices, with an average patient roll of 350 593, participated each week.

During the surveillance period, 3587 consultations for influenza-like illness (ILI) were reported. The average weekly consultation rate was 49.6 per 100 000 patient population. This rate is the second lowest rate recorded by the sentinel surveillance system since 1997. The 2006 rate was lower than the 2005 rate but higher than that in 2002, 52.5 and 35.5 respectively. The consultation rate remained relatively low throughout the sentinel surveillance period but peaked in week 27 (early July), two weeks earlier than the peak in laboratory isolations and hospitalisations in week 29. Considerable activity continued almost until the end of the sentinel surveillance period. Figure 40 compares the weekly consultation rates for influenza-like illness in 2006 with 2005 and 2004.

Figure 40. Weekly sentinel surveillance consultation rates for influenza-like illness, 2004-2006

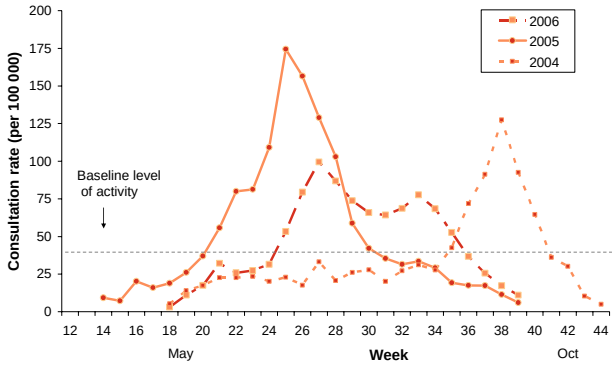
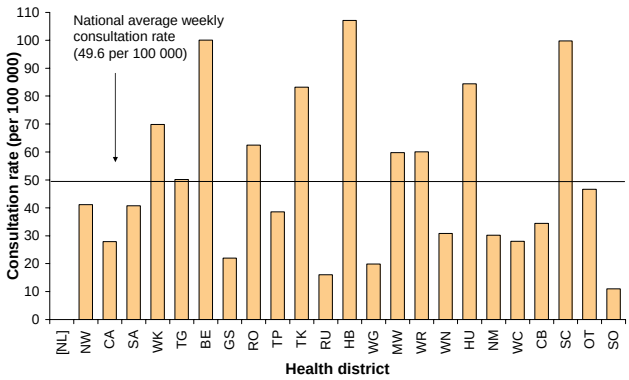


Figure 41 shows the average weekly consultation rates by health district for the influenza season.

Figure 41. Sentinel average weekly consultation rates for influenza-like illness by health districts, 2006

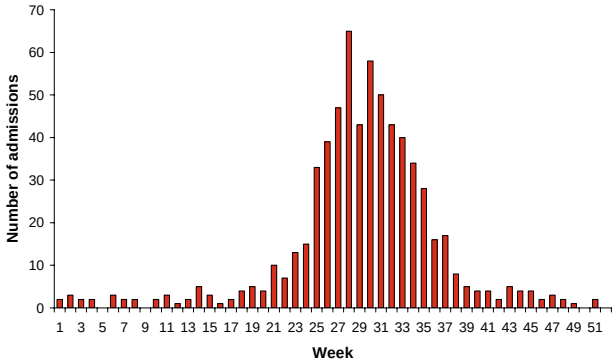


Note: Northland health district did not participate in 2006

Consultation rates varied between health districts, with rates above the national average in 10 of the 23 health districts and rates of more than twofold the national average in Hawke's Bay (107.1 per 100 000), Eastern Bay of Plenty (100.1 per 100 000) and in South Canterbury (99.7 per 100 000) health districts.

In 2006, there were a total of 652 hospital admissions for influenza. This compares with 528 admissions in 2005 and 430 in 2004. Figure 42 shows these admissions by week, 85.3% (556) of which occurred during June to September. The highest number of admissions (61) occurred at the end of June (week 28). The highest age specific rate of hospitalisations due to influenza-like illness occurred in children aged <1 years (data not shown).

Figure 42. Influenza hospitalisation by week admitted, 2006

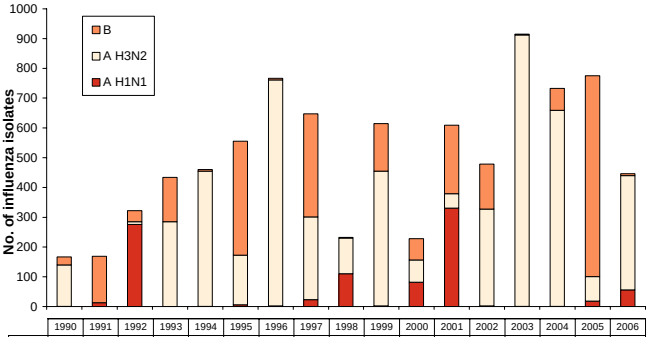


A total 768 of influenza isolates were identified in 2006 - lower than the 845 and 864 isolates in 2005 and 2004 respectively. Of the 768 isolates, 315 came from sentinel practice surveillance during May to September. This is higher than the 273 sentinel isolates identified in 2005 and 231 isolates in 2004. There were 453 non-sentinel isolates identified in 2006, compared 572 in 2005, and 633 in 2004.

During 2006, the majority of influenza isolates (762/768 or 99.2% of all isolates) were characterised as influenza A. Influenza B made up 0.8% of all isolates.

Figure 43 shows the number and percentage of typed and subtyped influenza isolates from 1990 to 2006.

Figure 43. Influenza isolates by type, 1990 - 2006



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
B	16%	92%	11%	34%	1%	69%	1%	53%	1%	26%	31%	38%	32%	0%	10%	87%	1%
A H3N2	83%	0%	3%	66%	99%	30%	99%	43%	52%	74%	33%	8%	68%	100%	90%	10%	86%
A H1N1	1%	8%	86%	0%	0%	1%	0%	4%	47%	0%	36%	54%	0%	0%	0%	2%	13%

Three noticeable changes in predominant patterns are described below.

Influenza A(H1N1)

During the period from 1990 to 1999 influenza A(H1N1) emerged as predominant circulating strain in 1992 (86%) and six years later in 1998 (47%). However in 2000 and 2001, influenza A(H1N1) featured uncharacteristically in two consecutive years occurring in 36% and 54% of isolates tested. This is in contrast to 2003 and 2004, when only one A(H1N1) was isolated each year. Since 2005, more A(H1N1) viruses were isolated with 18 isolates (2.3%) and 56 isolates (13%) in 2006.

Influenza A(H3N2)

Influenza A(H3N2) viruses have often been associated with more severe disease and with excess pneumonia and influenza mortality. For example, the highest number of deaths (94) in 1996 in New Zealand was recorded during an A(H3N2) epidemic[5]. During 1993 to 2000, A(H3N2) had been the predominant circulating influenza A strain, however in 2001, A(H3N2) constituted only 8% of typed/subtyped isolates. Influenza A(H3N2) percentage of isolates in 2004 was very similar to that in 1994, 1996, and 2003 with over 90% of typed/subtyped isolated as A(H3N2). Influenza A(H3N2) was not the predominant strain in 2005 but it co-circulated at lower levels (10%) with influenza B throughout the winter season. In 2006, A(H3N2) was the predominant strain (86.3% of typed and subtyped isolates).

Influenza B

It is well documented that influenza B predominates or co-dominates every second year in southern hemisphere. In New Zealand, influenza B predominated or co-dominated in 1991, 1993, 1995, 1997, 1999 and 2001. However, this pattern has changed since 2001. Influenza B has been the co-predominant strain consecutively in 2001 and 2002, while very low influenza B activity was observed in 2003 and 2004. In 2003, there were only three (0.3%) influenza B isolations but this increased to 10% (74) in 2004. In 2005, influenza B was the predominant strain with 734 isolations (87%) the highest percentage of influenza B isolations over the last fifteen years and exceeding levels detected in 1995 (69%) and 1997 (53%). In 2006, influenza B activity was recorded at low level (0.8% of typed and subtyped isolates).

In summary, characterisation of the influenza viruses isolated during the 2006 winter indicated a need for a change in the Influenza A(H3N2) and B component of the vaccine for the 2007 winter. Accordingly, the 2007 Southern Hemisphere winter influenza vaccine has the following composition:

A(H1N1)	-	an A/New Caledonia/20/1999-like strain
A(H3N2)	-	an A/Wisconsin/67/2005-like strain
B	-	a B/Malaysia/2506/2004-like strain

Influenza immunisation is recommended for those at increased risk of complications from influenza due to either age or medical condition [24]. 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.

A full report on influenza in New Zealand for 2006 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 2006, and examines trends since 2002. A more detailed account is to be found in the STI Annual Report for 2006 available at www.surv.esr.nz.

The Aids Epidemiology Group carries out HIV/AIDS surveillance and a summary of the figures for 2006 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 2006.

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 to produce a clinic visit rate. In the case of FPCs and SYHCs many visits are not related to STIs. For laboratory data the denominator is the population of the area covered by the laboratory.

Comparison of data has shown that the number of cases reported by laboratories is nearly four times higher than that 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.

During the later half of 2006 the Auckland SHC experienced difficulties in providing complete case data to ESR. Therefore, caution is required when comparing and interpreting SHC case data and rates.

CLINIC BASED SURVEILLANCE

Chlamydia

In 2006, genital *Chlamydia trachomatis* infection was the most commonly reported STI in New Zealand.

Between 2005 and 2006 the number of confirmed chlamydia cases decreased by 0.4% in SHCs (4 295 compared to 4 313). In contrast there was an increase of 31.9% in FPCs (3 037 compared to 2 303) and 41.2% in SYHCs (751 compared to 532). In 2006, the number of probable cases accounted for a further 769 cases in SHCs, 630 in FPCs and 48 in SYHCs.

From 2002 to 2006, the number of confirmed chlamydia cases has increased by 27.7% in SHCs (4 295 compared to 3 363) and more than doubled in FPCs (3 037 compared to 1 231) and SYHCs (751 compared to 374).

In 2006, SHCs, FPCs and SYHCs reported chlamydia clinic visit rates of 4.8%, 1.7% and 0.4%, respectively (Table 29).

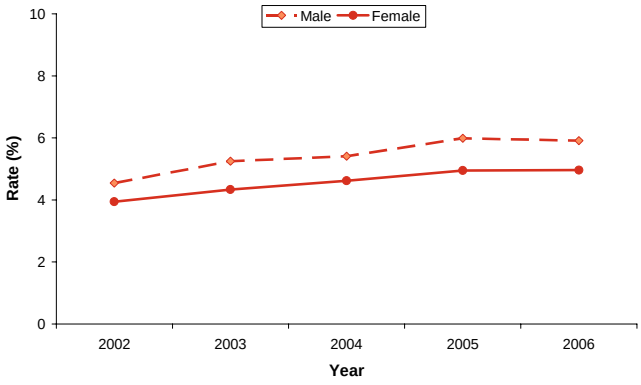
Table 29. Chlamydia cases and clinic visit rate by sex and health care setting, 2006

Clinic type	Sex	SHCs	FPCs	SYHCs
No. of confirmed cases	Female	2 345	2 600	596
	Male	1 950	437	155
	Total	4 295	3 037	751
Clinic visit rate[a] (%)	Female	4.5	1.5	0.4
	Male	5.3	5.1	0.3
	Total	4.8	1.7	0.4

[a] confirmed cases/number of clinic visits

From 2002 to 2006, the clinic visit rate of chlamydia diagnosed in both males and females combined at SHCs has increased by 15.6% (see Figure 44). 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.

Figure 44. Rates of chlamydia diagnosed at SHCs, 2002 - 2006



[a] Denominator is the number of clinic visits

Gonorrhoea

Between 2005 and 2006, the number of confirmed cases of gonorrhoea increased by 16.0% in SHCs (803 compared to 692), 29.8% in FPCs (196 compared to 151) and 128.6% in SYHCs (48 compared to 21). In 2006, the number of probable cases accounted for a further 87 cases in SHCs, 45 in FPCs and four in SYHCs.

From 2002 to 2006, the number of confirmed gonorrhoea cases reported increased by 52.1% in SHCs (803 compared to 528), 19.5% in FPCs (196 compared to 164) and more than doubled in SYHCs (48 compared to 18).

In 2006, SHCs, FPCs and SYHCs reported gonorrhoea clinic visit rates of 0.9%, 0.1% and 0.02%, respectively (Table 30).

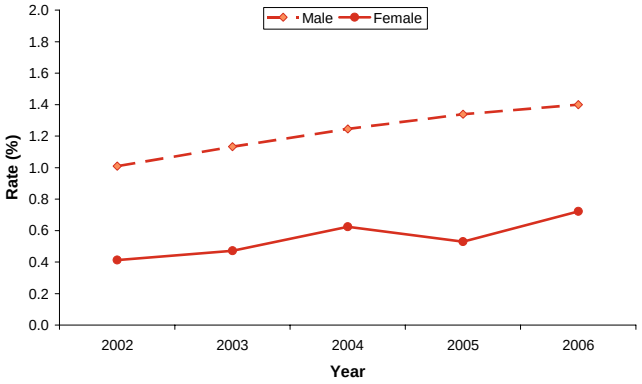
Table 30. Gonorrhoea cases and clinic visit rate by sex and health care setting, 2006

Clinic type	Sex	SHCs	FPCs	SYHCs
No. of confirmed cases	Female	341	156	31
	Male	462	40	17
	Total	803	196	48
Clinic visit rate[a] (%)	Female	0.7	0.1	0.02
	Male	1.3	0.5	0.03
	Total	0.9	0.1	0.02

[a] confirmed cases/number of clinic visits

From 2002 to 2006, the clinic visit rate of gonorrhoea diagnosed in both males and females combined at SHCs has increased by 37.6% (see Figure 45).

Figure 45. Rates of gonorrhoea diagnosed at SHCs, 2002 - 2006



[a] 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 2006 is shown in Table 31.

Table 31. Genital herpes (first presentation) cases and clinic visit rate by sex and health care setting, 2006

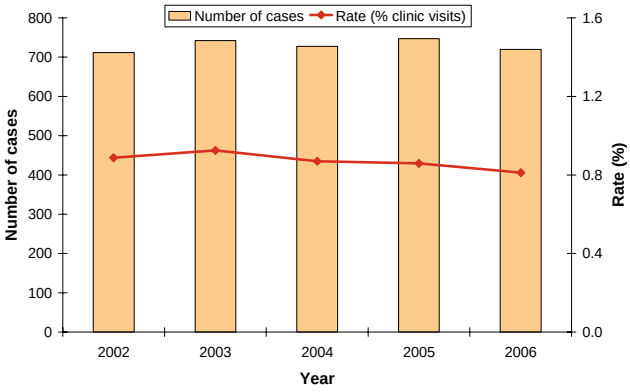
Clinic type	Sex	SHCs	FPCs	SYHCs
No. of confirmed cases	Female	393	116	45
	Male	327	21	23
	Total	720	137	68
Clinic visit rate[a] (%)	Female	0.8	0.1	0.03
	Male	0.9	0.2	0.04
	Total	0.8	0.1	0.03

[a] confirmed cases/number of clinic visits

Between 2005 and 2006, the number of cases of genital herpes decreased by 3.6% in SHCs (720 compared to 747) and 16.0% in FPCs (137 compared to 163). In contrast there was an increase of 126.7% in SYHCs (68 compared to 30).

From 2002 to 2006, the number of genital herpes cases reported by SHCs has fluctuated (Figure 46). 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 46. Number of cases and rate of genital herpes (first presentation) diagnosed at SHCs, 2002 - 2006



Genital Warts (first presentation)

The number of cases of genital warts (first presentation) and clinic visit rate by sex and health care setting for 2006 is shown in Table 32.

Table 32. Genital warts (first presentation) cases and clinic visit rates by sex and health care setting, 2006

Clinic type	Sex	SHCs	FPCs	SYHCs
No. of confirmed cases	Female	1 753	473	139
	Male	1 448	138	67
	Total	3 201	611	206
Clinic visit rate[a] (%)	Female	3.4	0.3	0.1
	Male	4	1.9	0.2
	Total	3.6	0.3	0.1

[a] confirmed cases/number of clinic visit

Between 2005 and 2006, the number of cases of genital warts decreased by 14.2% in SHCs (3 201 compared to 3 732). In contrast there was an increase of 14.6% in FPCs (611 compared to 533) and 104.0% in SYHCs (206 compared to 101).

Between 2002 and 2005 the clinic visit rate of genital warts reported by SHCs was relatively stable, between 4.3% and 4.5%, but decreased in 2006 to 3.6%.

Infectious Syphilis

Between 2005 and 2006, the number of cases of syphilis increased by 44.7% in SHCs (68 compared to 47) and 50.0% in FPCs (3 compared to 2). No cases of syphilis were reported in SYHCs. In 2006, the rate of syphilis at SHCs was 0.1%. Between 2002 and 2005, the number of cases diagnosed at SHCs has varied, though there was a definite increase in 2006. Case numbers for 2002-2006 were as follows: 46 (in 2002), 30 (in 2003), 44 (in 2004), 47 (in 2005) and 68 (in 2006).

The mean age of syphilis cases was 32 years (range 16 to 80 years). Of the 71 syphilis cases reported in 2006, 47 (66.2%) were male and 24 (33.8%) 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 2006, there were 687 reported cases of NSU in SHCs, 11 cases in FPCs and six cases in SYHCs. Between 2002 and 2006 the number of NSU cases diagnosed at SHCs has decreased by 38.2% (687 compared to 1 112).

LABORATORY SURVEILLANCE

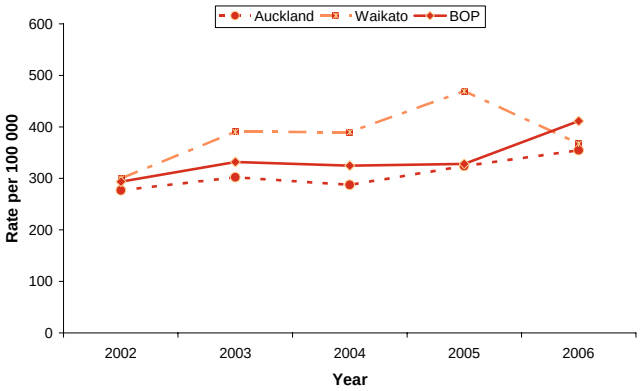
This section is based on data from participating laboratories in the Auckland, Waikato and Bay of Plenty regions.

Chlamydia

In general, from 2002 to 2006, the overall rate of chlamydia diagnosed by participating laboratories in Auckland, Waikato and BOP has risen more or less steadily by 43.3%, from 528 per 100 000 to 757 per 100 000. This increase is significant and has been seen in all three regions and both sexes. This trend can be explained, only in part, by the introduction of more sensitive diagnostic techniques.

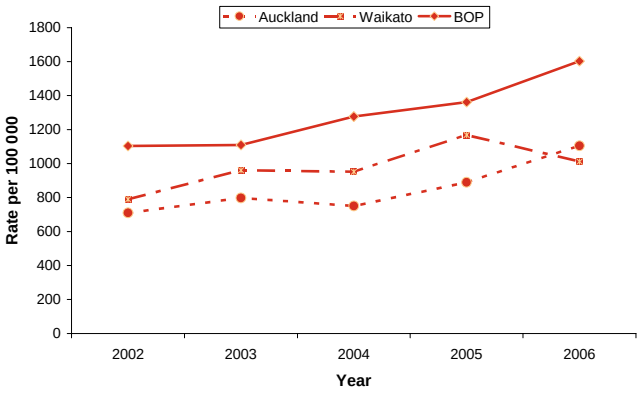
Figure 47 and Figure 48 show the chlamydia rates from 2002 to 2006 for males and females respectively. From 2005 to 2006, the chlamydia rates for males and females increased in Auckland and BOP regions. The Waikato region had a decrease in both male and female rates. The BOP region had the highest rate overall at 991 per 100 000 compared with 722 and 691 per 100 000 for Auckland and Waikato, respectively.

Figure 47. Male chlamydia rates diagnosed in the Auckland, Waikato and BOP regions, 2002 - 2006



[a] Denominator is the population in each region

Figure 48. Female chlamydia rates diagnosed in the Auckland, Waikato and BOP regions, 2002 - 2006



[a] Denominator is the population in each region

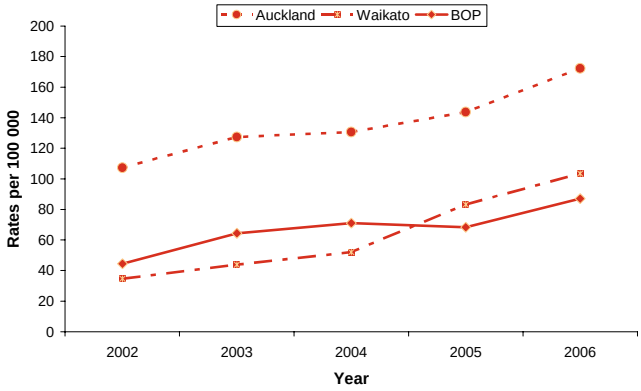
Gonorrhoea

Over the last five years gonorrhoea rates in Auckland, Waikato and BOP have doubled from a rate of 63 per 100 000 in 2002 to 128 per 100 000 in 2006.

Figure 49 and Figure 50 show the gonorrhoea rates from 2002 to 2006. From 2005 to 2006, the gonorrhoea rates for males and females increased in Auckland and Waikato regions. The BOP region had an increase in the male rate and a decrease in the female rate. The Auckland region had the highest rate overall at 144 per 100 000 compared with 110 and 101 per 100 000 for Waikato and BOP, respectively.

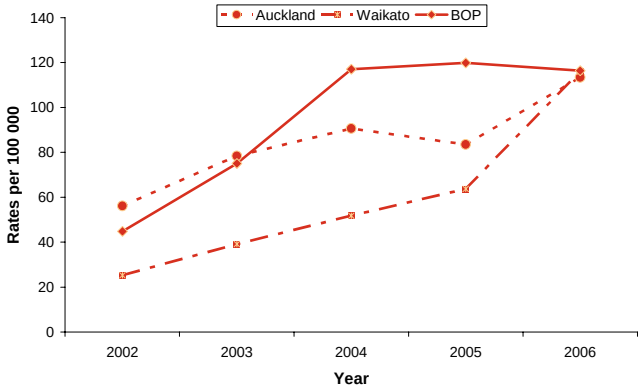
The number of laboratories reporting in these regions has not changed from 2002 to 2006. Therefore the overall trends suggest a true increase in the rate of gonorrhoea.

Figure 49. Male rates of gonorrhoea in the Auckland, Waikato and BOP regions, 2002 - 2006



[a] Denominator is the population in each region

Figure 50. Female rates of gonorrhoea in the Auckland, Waikato and BOP regions, 2002 - 2006



[a] Denominator is the population in each region

OUTBREAK SURVEILLANCE

Introduction

The following is a summary of surveillance data for outbreaks reported in 2006. A full report on outbreaks can be found in the Annual Summary of Outbreaks in New Zealand 2006 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 [34] 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 495 outbreaks reported by PHUs in 2006 involving 6302 cases.

Table 33 outlines the number of outbreaks and associated cases reported by each PHU in 2006.

Table 33. Outbreaks of infectious disease and associated cases by reporting PHU, 2006

PHU	Outbreaks	Cases
Northland	0	0
Auckland	271	1469
Waikato	11	118
Eastern Bay of Plenty	0	0
Rotorua	6	64
Tauranga	8	31
Gisborne	1	58
Hawke's Bay	15	424
Taranaki	4	37
Manawatu	18	361
Wanganui	6	130
Wairarapa	0	0
Wellington	55	1111
Marlborough	3	33
Nelson	9	173
Canterbury	37	1064
South Canterbury	4	143
West Coast	6	162
Otago	31	523
Southland	10	401
Total	**495**	**6302**

Note: As outbreaks can occur across geographic boundaries this may not indicate the geographical distribution of outbreaks reported.

Of these reported outbreaks, 491 were final reports involving 6222 cases and four were interim reports (final details not yet available) involving 80 cases. According to the case definition for each outbreak, 1470 cases (23.3%) were confirmed, 4811 cases (76.3%) were probable and 21 cases (0.3%) were unknown.

There were 160 hospitalisations and nine deaths that resulted from outbreaks reported in 2006. Five deaths were related to norovirus outbreaks in Auckland (2), Manawatu (1), Otago (1), and West Coast (1). Three deaths were related to a gastroenteritis outbreak in Southland, and one death was due to *Legionella* outbreak in Auckland.

Pathogens

The pathogens or agents that caused the outbreaks are listed in Table 34.

Enteric Bacteria

During 2006, enteric bacteria were implicated in 16.6% (82/495) of all reported outbreaks and 5.4% (340/6302) of all associated cases. Over half of the outbreaks attributed to enteric bacteria were linked to *Campylobacter* species (47/82). Of these *Campylobacter* outbreaks, 32 were attributed to foodborne transmission, most frequently in a restaurant/café setting (15 outbreaks) or the home (9 outbreaks).

Salmonella species accounted for 22 of the 82 outbreaks linked to enteric bacteria. Foodborne transmission was identified in almost half (10/22) of *Salmonella* outbreaks, though three of these outbreaks involved additional modes of transmission. Ten outbreaks resulted from person to person transmission as well. The most common setting was the home, which was linked to 10 outbreaks, followed by restaurants or cafés, which were linked to two outbreaks.

There were eight *Shigella* outbreaks reported in 2006. Six of the outbreaks involved person-to-person transmission, and two involved foodborne transmission. An outbreak setting was identified in all the eight outbreaks. These settings were home (7 outbreaks) and other food outlet (1). The food outlet outbreak was associated with ham or chicken filled rolls (contamination from an infected food handler).

For the five outbreaks of VTEC, the mode of transmission was reported as person-to-person for two outbreaks. The mode of transmission was unknown for the remaining three outbreaks.

Enteric Protozoa

Enteric protozoa accounted for 11.5% (57/495) of all outbreaks reported in 2006. *Giardia* species was the infectious agent in 32 outbreaks, 22 of which involved person-to-person transmission. The most commonly identified setting for *Giardia* outbreaks was the home, which was associated with 17 outbreaks. Two outbreaks were linked to an outbreak in another country (one each in India and Fiji).

There were 25 outbreaks involving *Cryptosporidium parvum* in 2006. Person-to-person transmission was established in 15 outbreaks, however, five of these outbreaks involved multiple modes of transmission. Two outbreaks were linked to both a farm and a home. One outbreak was linked to both home and

swimming /spa pool, while 10 outbreaks occurred in the home only.

Table 34. Outbreaks and associated cases by agent type, 2006

Agent Type	Outbreaks	Cases
Enteric Bacteria		
Campylobacter spp.	47	223
Salmonella spp.	22	74
Shigella spp	8	27
VTEC/STEC	5	16
Total	**82**	**340**
Enteric Protozoa		
Cryptosporidium parvum	25	116
Giardia spp.	32	98
Total	**57**	**214**
Enteric Viruses		
Norovirus	156	3945
Hepatitis A virus	8	81
Rotovirus	6	78
Total	**170**	**4104**
Enteric (unspecified)		
Gastroenteritis	153	1415
Total	**153**	**1415**
Respiratory Diseases		
Bordetella pertussis	5	57
Mycobacterium tuberculosis	5	24
Legionella pneumophilia	1	4
Total	**11**	**85**
Toxins		
Clostridium perfringens	12	62
Histamine	4	12
Bacillus cereus	2	11
Scromboid	1	4
Total	**19**	**89**
Poison		
Chlorine	2	53
Total	**2**	**53**
Other		
Neisseria meningitidis	1	2
Total	**1**	**2**
Total	**495**	**6302**

Enteric viruses

Enteric viruses were the infectious agent in 34.3% (170/495) of all outbreaks and 65.1% (4104/6302) of all associated cases in 2006. The vast majority of outbreaks due to enteric viruses were caused by norovirus (156/170), which resulted in 3945 associated cases. The average number of cases per norovirus outbreak was 25, the second highest for any agent reported in 2006 following chlorine. Person-to-person transmission was ascertained in 131 outbreaks, 64 of which also involved other modes of transmission. An institution was identified as a setting for 87 outbreaks including: rest homes (66), continuing care hospitals (24), acute care hospitals (13), child care (2), camps (3), hotel/motel (3), hostel (2), and a school (2). Restaurants or cafés were implicated in 17 outbreaks.

There were eight outbreaks of Hepatitis A virus resulting in 81 cases. All of these outbreaks involved person-to-person transmission although two outbreaks also involved foodborne and sexual transmission. The outbreak settings included: homes, hostel, child care, and restaurant or café. Two outbreaks were linked to an outbreak in another country (Vanuatu and Samoa).

Rotavirus caused six outbreaks in 2006, involving 78 cases. All of these outbreaks involved person-to-person transmission although two also involved environmental transmission. The outbreak settings included: child care centres, continuing hospital care, acute care hospital, rest home, and elderly persons residential home.

Enteric (unspecified)

During 2006 outbreaks of gastroenteritis (where no organism was isolated) accounted for 30.9% (153/495) of all outbreaks and 22.5% (1415/6302) of all associated cases.

Respiratory Diseases

Respiratory diseases resulted in 2.2% (11/495) of all outbreaks and 1.3% (85/6302) of all associated cases.

There were five outbreaks of *Mycobacterium tuberculosis*, involving 24 cases. Three outbreaks were reported from the Wellington PHU, two of which had overseas transmission. One outbreak was reported in Auckland involving two cases in a hospital (acute care) setting. The fifth outbreak was linked to a Manawatu school and has resulted in 16 cases thus far.

Bordetella pertussis caused five of the reported outbreaks in 2006, all in Wellington. Four of the outbreaks were institutional, and one involved community-wide person-to-person transmission. One of the outbreaks, which occurred in a training institution, involved 40 cases.

Legionella pneumophila was implicated in an outbreak in Auckland, which resulted in four cases including one fatality. The mode of transmission was reported as environmental from contaminated water tanks.

Toxins

Toxins were involved in 3.8% (19/495) of all outbreaks reported in 2006. The implicated agents included *Clostridium perfringens* (12), Histamine (4), *Bacillus cereus* (2), and Scromboid (1). Almost all toxin-related outbreaks involved foodborne transmission related to commercial food operators.

Poison

During 2006, there were two reported outbreaks of chlorine poisoning attributed environmental contamination of swimming pools.

The first outbreak occurred in the Capital and Coast DHB when students were exposed to high concentrations of chlorine at a local swimming pool. Contamination occurred due to over-chlorination of the pool water. Thirty students aged eleven years were affected by chlorine poisoning.

The second outbreak occurred in Waitemata DHB where again, students were exposed to high concentrations of chlorine at a local swimming pool. Contamination occurred when the pool was shock chlorinated following a cryptosporidiosis outbreak associated with the pool.

However, this was carried out incorrectly and poisoned the subsequent swimmers. Twenty three individuals aged between seven and twenty years were affected, of which eleven were hospitalised.

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 285 outbreaks, and foodborne transmission, recorded in 146 outbreaks. Person-to-person transmission was associated with over five times as many cases as foodborne transmission (5002 versus 909). More than one mode of transmission was identified in 117 (23.6%) of all outbreaks reported in 2006.

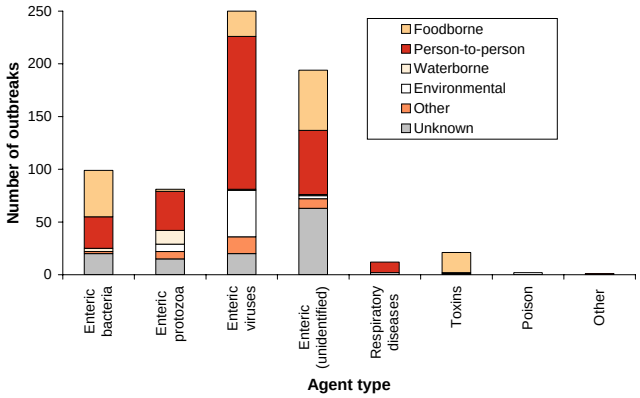
Table 35. Outbreaks of infectious disease and associated cases by mode of transmission, 2006

Transmission Mode	Outbreaks[a]	Cases[a]
Foodborne	146	909
Person to Person	285	5002
Waterborne	18	284
Environmental	58	1595
Zoonotic	7	47
Sexual contact	1	3
Other	26	774
Unknown	81	300

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

Foodborne transmission was the principal mode of transmission for enteric bacteria and toxins (Figure 51). Person-to-person transmission was the most common mode of transmission for enteric protozoa, unspecified enteric pathogens, enteric viruses and respiratory diseases but also contributed substantially to enteric bacteria outbreaks. Although person-to-person transmission was most commonly reported for outbreaks of respiratory diseases, environmental transmission was involved in two outbreaks (*Mycobacterium tuberculosis* and *Legionella pneumophila*).

Figure 51. Number of outbreaks by agent type and mode of transmission, 2006



Setting

Outbreaks reported in 2006 were most commonly linked to the home and institutions with rest/retirement homes involved in 19.4% (96/495) of total outbreaks. (Table 36).

Table 36. Number of cases arising as a result of outbreaks of infectious disease by location, 2006

Outbreak Setting	Outbreaks[a]	Cases[a]
Commercial Food Operators		
Restaurant/Café	75	502
Takeaway	23	86
Caterer	5	63
Other food outlet	5	37
Supermarket/deli	4	12
Institutions		
Rest/Retirement Home	96	3026
Hospital (continuing care)	34	1306
Hospital (acute care)	19	334
Childcare centre	12	151
Camp	8	216
School	7	181
Hotel/Motel	7	141
Hostel/Boarding house	5	105
Community		
Swimming/spa pool	8	102
Community/Church gathering	4	87
Workplace		
Workplace	13	121
Farm	4	14
Home	116	432
Other setting	36	832
Setting unknown	94	244

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

ANTIBIOTIC RESISTANCE

ANTIMICROBIAL RESISTANCE

The prevalence of resistance among common, important clinical pathogens between 1991 and 2005, is shown in Appendix J. Most antimicrobial resistance data are only available in a complete analysed form up to the end of 2005. 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* has remained between 7-8% each year since 2000. However, an increasing proportion of MRSA are multiresistant (i.e. resistant to at least two antibiotic classes in addition to β-lactams), as the hospital-associated British EMRSA-15 strain accounts for an increasing proportion of MRSA isolations while the non-multiresistant community-based WSPP MRSA accounts for a decreasing proportion.
- A high prevalence of mupirocin-resistant *Staphylococcus aureus* since the mid-1990s, although there is some evidence of a small decrease in the prevalence over the last three years.
- A high prevalence of penicillin non-susceptibility among *Streptococcus pneumoniae*, and increasing non-susceptibility to third-generation cephalosporins, such as ceftriaxone.
- Stable levels of trimethoprim resistance among urinary *Escherichia coli*, continuing low levels of nitrofurantoin resistance, but a gradual increase in fluoroquinolone resistance.
- An increasing prevalence of extended-spectrum β-lactamases (ESBLs) in Enterobacteriaceae.
- Ciprofloxacin resistance in *Neisseria gonorrhoeae* is now about three times as common as penicillin resistance, although resistance varies throughout the country.

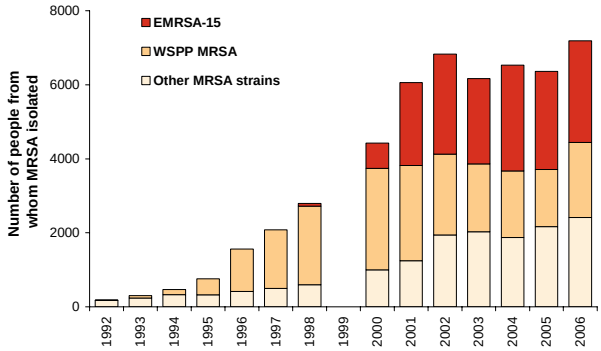
However, some other important resistances emerging in other countries remain uncommon in New Zealand. Of particular note, vancomycin-resistant enterococci (VRE), while isolated in small numbers, have not become established in New Zealand hospitals. In addition, multidrug-resistant tuberculosis (MDR-TB) remains uncommon, and there does not appear to have been any transmission of MDR-TB within New Zealand.

METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS*

Since 2000, national surveillance of methicillin-resistant *Staphylococcus aureus* (MRSA) has been based on annual one-month surveys. The 2006 survey was conducted in August 2006.

In August 2006, MRSA were referred from 593 people (579 patients and 14 staff). This number of referrals equates to an annualised incidence rate of 171.9 per 100 000. There has been no significant ($P<0.05$) overall change in the incidence of MRSA since 2002. Among the 579 patients with MRSA, 48.7% were categorised as hospital patients and 51.3% as community patients. Patients were classified as hospital patients if they were in a healthcare facility (including residential-care facility) when MRSA was isolated or had been in a healthcare facility in the previous three months. MRSA was reported as causing infection in 85.7% of the 421 patients for whom this information was provided.

Figure 52. MRSA isolations, 1992-2006[a]



[a] Data for 1992 to 1998 are based on continuous surveillance of all MRSA isolations. Data for 2000 to 2006 are annualised and based on one-month surveys conducted in these years. No survey was undertaken in 1999.

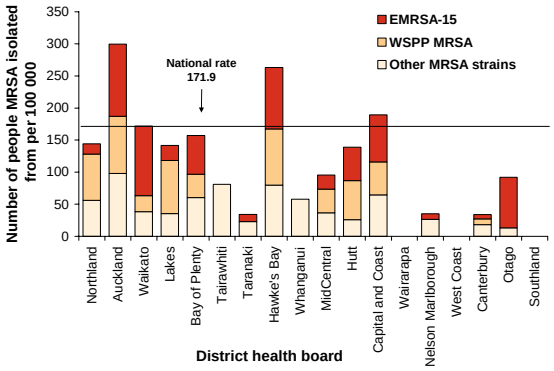
Six MRSA strains were predominant in 2006 and represented 78.1% of all MRSA isolations:

- EMRSA-15, a British epidemic MRSA strain, accounted for 38.2% of the MRSA isolations. Each year since 2002, EMRSA-15 has been the most commonly isolated MRSA strain (Figure 52). It is typically isolated from elderly patients in hospital or other healthcare facilities. In 2006, 65.4% of the EMRSA-15 isolations were from patients classified as hospital patients or from healthcare staff.
- WSPP MRSA, a non-multiresistant community strain of MRSA, accounted for 28.3% of the MRSA isolations, with the majority (72.8%) being isolated from people in the community. The increase in MRSA in New Zealand from the mid-1990s to 2000 was driven by the spread and almost total dominance of this strain. However, since 2001 the WSPP MRSA has represented a smaller proportion of the MRSA isolations (Figure 52).
- AK3 MRSA, a non-multiresistant strain resistant to only fusidic acid in addition to β-lactams, accounted for 3.7% of the MRSA isolations. The majority (63.6%) were isolated from people in the community. This strain was first identified during the 2005 survey among isolates from the Auckland area, and has subsequently been isolated in several areas in the upper half of the North Island. It is usually isolated from children and young adults.
- WR/AK1 MRSA, a multiresistant community strain of MRSA, accounted for 3.0% of the MRSA isolations, with the majority (77.8%) being isolated from people in the community. This strain is now typically isolated from children and young adults in the North Island.
- DN1 MRSA, a multiresistant strain resistant to ciprofloxacin and erythromycin in addition to β-lactams, accounted for 2.7% of the MRSA isolations. The majority (68.8%) were isolated from people in the

community. This strain was first identified in 2004 in the Dunedin area and has subsequently been isolated throughout New Zealand.

- AKh4 MRSA, a multiresistant MRSA typical of multiresistant MRSA isolated in Australia, accounted for 2.2% of the MRSA isolations. Like EMRSA-15, this strain is most commonly isolated from hospital patients, with 84.6% of the isolations in 2006 being from hospital patients or healthcare staff.

Figure 53. Annualised incidence of MRSA by district health board, 2006[a]



[a] Data for the three district health boards (DHBs) in the greater Auckland area (Waitemate/Auckland/Counties Manukau) are combined and similarly data for the Canterbury and South Canterbury DHBs are combined.

There are marked geographic variations in the incidence of MRSA in New Zealand (Figure 53). In 2006, the highest annualised incidence rates were in Auckland/Counties Manukau/Waitemata (299.6 per 100 000), Hawke's Bay (263.0), Capital and Coast (189.2), Waikato (171.7), Bay of Plenty (157.0), Northland (144.3), Lakes (141.7) and Hutt (138.7) District Health Boards (DHBs). Differences in screening policies may contribute to some of the apparent differences in incidence.

The typical antimicrobial resistance patterns of the six MRSA strains most commonly isolated in 2006 are shown in Table 37. Overall, 34.3% of MRSA isolates were multiresistant, that is, resistant to ≥2 classes of antibiotics in addition to β-lactams.

Table 37. Typical resistance patterns of the most common MRSA strains, 2006

Strain	Resistant to:
EMRSA-15	ciprofloxacin and erythromycin[a]
WSPP MRSA	not usually resistant to any antibiotics other than β-lactams
AK3 MRSA	fusidic acid
WR/AK1 MRSA	fusidic acid and high-level mupirocin
DN1 MRSA[b]	ciprofloxacin and erythromycin
AKh4 MRSA	ciprofloxacin, clindamycin, co-trimoxazole, erythromycin, gentamicin and tetracycline

[a] Some isolates of EMRSA-15 are erythromycin-susceptible; in 2006, 38.4% of the EMRSA-15 isolates tested were erythromycin susceptible. Erythromycin-resistant isolates of EMRSA-15 have inducible clindamycin resistance.

[b] Could be confused with EMRSA-15 on the basis of its susceptibility pattern, but does not have inducible clindamycin resistance.

APPENDIX: NATIONAL SURVEILLANCE DATA AND TRENDS

A. COMPARISON OF NOTIFIABLE DISEASE CASES AND RATES FOR 2005 AND 2006

Table 38. Cases and rates per 100 000 population of notifiable diseases in New Zealand during 2005 and 2006

Disease[a]	2005		2006		Change[d,e]
	Cases	Rates	Cases	Rates	
AIDS	49	1.2	29	0.7	←
Barmah Forest virus infection	2	0.0	0	0.0	←
Campylobacteriosis	13836	337.6	15873	383.5	→
Chemical poisoning from the environment	2	0.0	29	0.7	→
Creutzfeldt-Jakob disease	3	0.1	5	0.1	→
Cryptosporidiosis	889	21.7	736	17.8	←
Cysticercosis	3	0.1	0	0.0	←
Decompression sickness	1	0.0	1	0.0	
Dengue fever	11	0.3	19	0.5	→
Enterobacter sakazakii	1	0.0	0	0.0	←
Gastroenteritis[b]	557	13.6	931	22.5	→
Giardiasis	1231	30.0	1214	29.3	←
Haemophilus influenzae type b	7	0.2	9	0.2	→
Hepatitis A	51	1.2	122	2.9	→
Hepatitis B[c]	59	1.4	65	1.6	→
Hepatitis C[c]	29	0.7	34	0.8	→
Hepatitis NOS	2	0.0	0	0.0	←
Hydatid disease	2	0.0	0	0.0	←
Lead absorption	71	1.7	78	1.9	→
Legionellosis	85	2.1	52	1.3	←
Leprosy	2	0.0	3	0.1	→
Leptospirosis	85	2.1	88	2.1	→
Listeriosis	20	0.5	19	0.5	←
Malaria	32	0.8	30	0.7	←
Measles	19	0.5	20	0.5	→
Meningococcal disease	226	5.5	160	3.9	←
Mumps	61	1.5	49	1.2	←
Paratyphoid fever	25	0.6	23	0.6	←
Pertussis	2719	66.3	1122	27.1	←
Rheumatic fever	79	1.9	107	2.6	→
Rickettsial disease	1	0.0	7	0.2	→
Ross River virus infection	1	0.0	2	0.0	→
Rubella	13	0.3	8	0.2	←
Salmonellosis	1382	33.7	1335	32.3	←
Shigellosis	183	4.5	102	2.5	←
Tetanus	1	0.0	1	0.0	
Toxic shellfish poisoning	3	0.1	3	0.1	
Tuberculosis disease	339	8.3	359	8.7	→
Typhoid fever	30	0.7	42	1.0	→
VTEC/STEC infection	92	2.2	87	2.1	←
Yersiniosis	407	9.9	487	11.8	→

[a] No cases of the following notifiable diseases were reported in 2005: anthrax, botulism, plague, poliomyelitis, rabies, taeniasis, trichinosis, primary amoebic meningoencephalitis

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

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

[d] ←= Significant decrease, → = Significant increase, -- = No change, ← = Not significant decrease, → = not significant increase

[e] The Mantel-Haenszel chi-square test was used to determine statistical significance. P-values less than or equal to 0.05 are considered to be significant at the 95% level of confidence.

B. DEATHS FROM NOTIFIABLE DISEASES RECORDED IN EPISURV, 1997-2006

Table 39. Deaths due to notifiable diseases recorded in EpiSurv from 1997 to 2006

Disease	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
AIDS [a]	34	19	19	19	14	11	10	11	8	4
Campylobacteriosis	2	2	1	3	1	1	0	0	1	1
Creutzfeldt-Jakob disease [b]	3	0	2	3	1	3	4	3	0	5
Gastroenteritis	0	0	0	0	0	1	0	0	0	0
Giardiasis	1	0	0	0	0	0	0	0	0	0
Haemophilus influenzae type b	1	0	0	0	1	1	2	0	0	0
Hepatitis B	2	0	0	0	1	0	0	0	1	0
Hydatid disease	0	0	0	1	0	0	0	0	0	0
Legionellosis [c]	4	1	1	5	2	3	1	1	4	3
Listeriosis - non perinatal	2	0	1	2	1	0	2	3	1	0
Listeriosis - perinatal	6	0	2	4	1	3	2	2	0	1
Malaria	1	0	0	0	0	0	0	0	0	0
Meningococcal disease	24	23	23	17	26	18	13	8	14	7
Pertussis	0	0	0	0	1	1	1	1	0	0
Primary amoebic meningoencephalitis	0	0	0	1	0	0	0	0	0	0
Rheumatic fever [d]	1	0	0	0	0	0	0	0	0	0
Salmonellosis	2	2	1	7	2	1	0	0	1	1
Shigellosis	0	0	1	0	0	0	0	0	0	0
Tetanus	0	0	0	0	1	0	0	0	0	0
Tuberculosis	15	8	14	8	2	6	6	6	4	5
VTEC infection	1	1	0	0	0	0	0	0	0	0
Yersiniosis	0	2	0	0	0	0	0	1	0	0

[a] Data source [10]

[b] Data source [16]

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

[d] 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.

C. NZHIS MORTALITY DATA FOR SELECTED NOTIFIABLE DISEASES, 2001-2003

Table 40. Reported deaths from selected notifiable diseases, 2001 - 2003

Disease	ICD 10 Codes	2001		2002		2003 [a]	
		Underlying[b]	Contributory[c]	Underlying[b]	Contributory[c]	Underlying[b]	Contributory[c]
AIDS	B20-B24	13	4	11	1	10	5
Campylobacteriosis	A04.5	2	0	0	0	1	0
Creutzfeldt-Jakob disease	A81.0	4	0	1	0	4	0
Cryptosporidiosis	A072					1	0
Giardiasis	A07.1	1	0	0	0		0
Hepatitis A	B15	0	1	1	0		0
Hepatitis B	B16	3	4	0	1	1	1
Hepatitis C	B17.1	0	3	1	0		
Hydatid disease	B67.0-B67.4	1	0	0	0		
Legionellosis	A48.1	2	0	1	0		
Leptospirosis	A27	1	0	1	0		
Listeriosis	A32	1	0	1	0	2	
Meningococcal disease	A39	24	0	16	0	14	0
Meningoencephalitis - primary amoebic	B602						1
Pertussis	A37	1	0	1	0		
Rheumatic fever	I00, I01, I02	0	0	0	0		
Salmonellosis	A02	2	0	0	0	1	0
Tetanus	A33-A35	1	0	0	0		
Tuberculosis	A15-A19, P37.0	5	14	9	19	10	22

[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)

D. NZHIS MORBIDITY DATA FOR SELECTED NOTIFIABLE DISEASES, 2004-2006

Table 41. Hospital admissions for selected notifiable diseases, 2004 - 2006

Disease	ICD 10 Codes	2004		2005		2006	
		Principal diagnosis	Other relevant diagnosis	Principal diagnosis	Other relevant diagnosis	Principal diagnosis	Other relevant diagnosis
AIDS	B20-B24	16	263	16	296	35	282
Arboviral diseases	A83, A84, A85.2, A92, A93, A94, B33.1	4	0	4	2	2	0
Brucellosis	A23	0	1	0	0	0	1
Campylobacteriosis	A04.5	747	173	871	199	969	212
Cholera	A00	0	1	0	0	0	1
Creutzfeldt-Jakob disease	A81.0	12	2	3	0	6	0
Cryptosporidiosis	A07.2	16	8	34	8	20	10
Cysticercosis	B69	2	1	0	0	2	1
Decompression sickness	T70.3	9	0	8	1	8	0
Dengue fever	A90, A91	3	1	8	0	11	3
Diphtheria	A36	0	2	0	1	0	1
Giardiasis	A07.1	30	25	27	25	43	28
Hepatitis A	B15	12	16	21	15	33	14
Hepatitis B	B16	46	69	53	67	35	89
Hepatitis C	B17.1	6	14	8	6	11	13
Hydatid disease	B67.0-B67.4	0	2	0	0	0	0
Lead absorption	T56.0	8	1	1	2	5	0
Legionellosis	A48.1	10	3	33	7	12	10
Leprosy	A30	2	2	0	4	2	0
Leptospirosis	A27	69	4	52	11	50	8
Listeriosis	A32	13	18	8	11	13	10
Malaria	B50-B54	43	5	55	2	42	4
Measles	B05	4	1	3	0	1	1
Meningococcal disease	A39	401	64	266	59	175	31
Mumps	B26	7	1	17	2	9	2
Paratyphoid fever	A01.1-A01.4	10	0	4	0	4	0
Pertussis	A37	229	53	142	31	60	10
Poliomyelitis	A80	0	0	0	4	0	0
Rheumatic fever	I00, I01, I02	181	45	191	44	186	42
Rickettsial diseases	A75, A77, A78, A79	2	1	4	0	16	1
Rubella	B06	1	0	1	1	1	4
Salmonellosis	A02	105	42	130	36	123	39
Shigellosis	A03	26	5	20	2	13	2
Tetanus	A33-A35	2	3		1	2	2
Trichinellosis	B75	1	0	2	3	0	0
Tuberculosis	A15-A19, P37.0	503	198	394	148	301	151
Typhoid fever	A01.0	18	1	26	2	30	2
Yersiniosis	A04.6	17	13	12	15	29	26

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.

E. NOTIFIABLE DISEASE CASES BY ETHNIC GROUP, 2006

Table 42. Cases reported in 2006 by ethnic group

Ethnic Group	European	Maori	Pacific People	Other	Unknown	Total
Campylobacteriosis	10787	818	200	702	3366	15873
Cryptosporidiosis	597	49	8	28	54	736
Dengue fever	12	2	2	1	2	19
Gastroenteritis	737	40	16	33	107	933
Giardiasis	866	69	10	65	204	1214
Haemophilus influenzae type b	6	3				9
Hepatitis A	53	7	42	13	7	122
Hepatitis B	20	8	17	13	5	63
Hepatitis C	22	7	1	2	2	34
Lead absorption	66	3		2	7	78
Legionellosis	42		4	2	4	52
Leprosy			1	2		3
Leptospirosis	58	18		2	10	88
Listeriosis	12		4	1	2	19
Malaria	8	1	9	11	1	30
Measles	14	2	1	1	2	20
Meningococcal disease	86	44	24	6		160
Mumps	24	6	9	8	1	48
Paratyphoid fever	13			9	1	23
Pertussis	882	121	20	49	50	1122
Rheumatic fever	4	56	32	1	14	107
Rickettsial disease	7					7
Rubella	6	1			1	8
Salmonellosis	958	109	45	61	162	1335
Shigellosis	45	6	11	18	22	102
Tetanus	1					1
Tuberculosis disease	51	63	47	190	7	358
Typhoid fever	3	3	18	18		42
VTEC/STEC infection	75	4	2	2	4	87
Yersiniosis	316	31	8	48	84	487

F. NOTIFIABLE DISEASE CASES AND RATES BY SEX, 2006

Table 43. Cases and rates per 100 000 population in 2006 by sex

	Sex							
	Male		Female		Unknown		Total	
Disease	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Campylobacteriosis	8237	391.9	7268	356.7	368		15873	383.5
Cryptosporidiosis	363	17.3	362	17.8	11		736	17.8
Dengue fever	11	0.5	8	0.4			19	0.5
Gastroenteritis	361	17.2	553	27.1	19		933	22.5
Giardiasis	620	29.5	566	27.8	28		1214	29.3
Haemophilus influenzae type b	5	0.2	4				9	0.2
Hepatitis A	63	3.0	56	2.7	3		122	2.9
Hepatitis B	44	2.1	19	0.9			63	1.5
Hepatitis C	24	1.1	10	0.5			34	0.8
Lead absorption	58	2.8	20	1.0			78	1.9
Legionellosis	34	1.6	17	0.8	1		52	1.3
Leprosy	2		1				3	
Leptospirosis	74	3.5	13	0.6	1		88	2.1
Listeriosis	10	0.5	7	0.3	2		19	0.5
Malaria	23	1.1	7	0.3			30	0.7
Measles	7	0.3	13	0.6			20	0.5
Meningococcal disease	83	3.9	76	3.7	1		160	3.9
Mumps	23	1.1	24	1.2	1		48	1.2
Paratyphoid fever	11	0.5	12	0.6			23	0.6
Pertussis	441	21.0	671	32.9	10		1122	27.1
Rheumatic fever	57	2.7	32	1.6	18		107	2.6
Rickettsial disease	2		5	0.2			7	0.2
Rubella	4		3		1		8	0.2
Salmonellosis	673	32.0	639	31.4	23		1335	32.3
Shigellosis	46	2.2	52	2.6	4		102	2.5
Tetanus			1				1	
Tuberculosis disease	180	8.6	173	8.5	5		358	8.6
Typhoid fever	14	0.7	27	1.3	1		42	1.0
VTEC/STEC infection	44	2.1	42	2.1	1		87	2.1
Yersiniosis	247	11.8	222	10.9	18		487	11.8

Note : Where less than 5 cases have been notified a rate has not been calculated and the cell has been left blank.

G. NOTIFIABLE DISEASE CASES AND RATES BY AGE GROUP, 2006

Table 44. Cases and rates per 100 000 population in 2006 by age group

	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	237	415.0	1227	544.2	680	235.3	713	234.8	1251	400.8	2884	522.7	2218	378.9	2034	329.4	1889	377.2	1395	412.7	1213	338.1	132		15873	383.5
Cryptosporidiosis	19	33.3	251	111.3	88	30.5	59	19.4	39	12.5	88	16.0	90	15.4	54	8.7	32	6.4	9	2.7	6	1.7	1		736	17.8
Dengue fever									1		10	1.8	2		3		3								19	0.5
Gastroenteritis	4		22	9.8	10	3.5	19	6.3	36	11.5	82	14.9	139	23.7	132	21.4	131	26.2	79	23.4	219	61.0	60		933	22.5
Giardiasis	25	43.8	253	112.2	76	26.3	24	7.9	17	5.4	122	22.1	289	49.4	160	25.9	117	23.4	83	24.6	41	11.4	7		1214	29.3
Haemophilus influenzae type b	1		4		2														1		1				9	0.2
Hepatitis A			16	7.1	18	6.2	11	3.6	14	4.5	11	2.0	17	2.9	11	1.8	10	2.0	5	1.5	8	2.2	1		122	2.9
Hepatitis B							1		4		23	4.2	13	2.2	14	2.3	5	1.0	3						63	1.5
Hepatitis C							1		3		9	1.6	6	1.0	8	1.3	3		2		2				34	0.8
Lead absorption			8	3.5			1		5	1.6	8	1.5	11	1.9	20	3.2	15	3.0	5	1.5	5	1.4			78	1.9
Legionellosis							1				1		4		7	1.1	12	2.4	14	4.1	13	3.6			52	1.3
Leprosy											2						1								3	0.1
Leptospirosis									3		12	2.2	24	4.1	25	4.0	21	4.2	3						88	2.1
Listeriosis	1		1								2		1		2		2		4		6	1.7			19	0.5
Malaria					1		1		2		8	1.5	10	1.7	1		1		2		3		1		30	0.7
Measles	8	14.0	11	4.9							1														20	0.5
Meningococcal disease	34	59.5	28	12.4	9	3.1	6	2.0	31	9.9	17	3.1	4		10	1.6	9	1.8	3		9	2.5			160	3.9
Mumps			11	4.9	11	3.8	11	3.6	1		3		7	1.2	3						1				48	1.2
Paratyphoid fever			2		2		1		2		7	1.3	3		1		4		1						23	0.6
Pertussis	38	66.5	52	23.1	77	26.6	94	31.0	93	29.8	116	21.0	161	27.5	160	25.9	167	33.3	109	32.2	50	13.9	5		1122	27.1
Rheumatic fever					29	10.0	49	16.1	16	5.1	9	1.6	3										1		107	2.6
Rickettsial disease													2		2		1		1		1				7	0.2
Rubella	2		4				1						1												8	0.2
Salmonellosis	83	145.3	280	124.2	93	32.2	55	18.1	67	21.5	185	33.5	132	22.5	119	19.3	143	28.6	101	29.9	73	20.3	4		1335	32.3
Shigellosis			15	6.7	10	3.5	2		3		18	3.3	20	3.4	13	2.1	10	2.0	7	2.1	3		1		102	2.5
Tetanus					1																				1	0.0
Tuberculosis disease	3		10	4.4	4		19	6.3	20	6.4	88	16.0	58	9.9	49	7.9	33	6.6	27	8.0	47	13.1			358	8.6
Typhoid fever			6	2.7	7	2.4	3		5	1.6	5	0.9	6	1.0	8	1.3			2						42	1.0
VTEC/STEC infection	6	10.5	38	16.9	5	1.7	3		1		7	1.3	4		5	0.8	3		8	2.4	5	1.4	2		87	2.1
Yersiniosis	28	49.0	85	37.7	10	3.5	12	4.0	14	4.5	60	10.9	69	11.8	60	9.7	63	12.6	37	10.9	46	12.8	3		487	11.8

Note : Where less than 5 cases have been notified a rate has not been calculated and the cell has been left blank.

H. NOTIFIABLE DISEASE CASES AND RATES BY DISTRICT HEALTH BOARD, 2006

Table 45. Disease notifications and incidence rates per 100 000 population by District Health Board, 2006

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 disease		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	374	249.9	24	16.0			3		69	46.1	4		1				2		2		13	8.7	1						9	6.0	1				6	4.0	14	9.4			45		3		30		1		5	3.3	9	6.0
Waitemata	2319	462.4	50	10.0	1		79	15.8	118	23.5	15	3.0	11	2.2	1		5	1.0	5	1.0	1		4		1		2		6	1.2	6	1.2	2		14	2.8	3				131		19		31		9	1.8	12	2.4	41	8.2
Auckland	1813	421.1	34	7.9	1		83	19.3	158	36.7	10	2.3	6	1.4	1		5	1.2	4				1		4		1		15	3.5	5	1.2	2		15	3.5	6	1.4	2		109		21		57		1		3		45	10.5
Counties Manukau	1548	350.3	25	5.7			53	12.0	103	23.3	38	8.6	12	2.7			3		7	1.6	1		3		7				26	5.9	8	1.8	10	2.3	11	2.5	35	7.9			96		14		67		18	4.1	4		34	7.7
Waikato	1220	356.3	96	28.0			59	17.2	134	39.1	3		2				8	2.3	2		8	2.3	1		5				27	7.9	2		1		277	80.9	10	2.9			132		4		34		8	2.3	16	4.7	33	9.6
Lakes	410	403.5	16	15.7			14	13.8	37	36.4	3		1		1		7	6.9	1		1				1				2		2		1		23	22.6	4				17		2		3				3		20	19.7
Bay of Plenty	650	327.1	25	12.6	2		17	8.6	66	33.2	3				1		3		4		8	4.0	1				1		3		4		1		80	40.3	3				53		2		8		1		2		30	15.1
Tairawhiti	58	130.3	8	18.0					10	22.5	1		1		1		2		1		2								3						33	74.2	3				10								1		4	
Taranaki	472	448.8	16	15.2			6	5.7	12	11.4	1		2		6	5.7	3		1		6	5.7							3						4		1				47				4				2		7	6.7
Hawke's Bay	518	344.0	16	10.6			20	13.3	52	34.5			2		1		3		2		9	6.0	2		1				4		2		1		19	12.6	7	4.6	1		69		3		8				3		10	6.6
Whanganui	233	375.2	19	30.6			45	72.5	23	37.0	3		1				1				5	8.1									2				3		3				15		5		2						9	14.5
MidCentral	359	219.9	58	35.5			234	143.3	33	20.2	2		1				3				6	3.7	1				1		7	4.3	3				17	10.4	1		2		35				31				1		10	6.1
Hutt	606	437.9	28	20.2	1		35	25.3	33	23.8	2		1		2		5	3.6	3		2		1		2				6	4.3	1		1		42	30.3	4				40		1		8		2				8	5.8
Capital and Coast	1425	510.6	52	18.6	8	2.9	72	25.8	98	35.1	4		2		3		5	1.8	4		1		1		1		2		7	2.5	2		1		95	34.0	11	3.9			118		9		32						69	24.7
Wairarapa	89	226.9	25	63.7			1		14	35.7	1		1				1		2		5	12.7							2		1				4						16				2						1	
Nelson Marlborough	359	262.6	24	17.6	2		23	16.8	38	27.8	1		1				1		2		3		1		1		3		5	3.7			2		64	46.8					48		7		4		2		6	4.4	18	13.2
West Coast	74	242.5	16	52.4			5	16.4	5	16.4					1						2				1		2								16	52.4					5		1		2						9	29.5
Canterbury	1904	398.4	88	18.4	2		136	28.5	110	23.0	29	6.1	17	3.6	14	2.9	15	3.1	5	1.0	9	1.9			4		7	1.5	18	3.8	6	1.3			303	63.4	1		1		153		9		24				15	3.1	89	18.6
South Canterbury	285	531.7	41	76.5			4		16	29.9			1				1				3		1		1				1		1				20	37.3					37				2				4		10	18.7
Otago	742	406.2	44	24.1	1		29	15.9	52	28.5	1				2		5	2.7	5	2.7	2				1				10	5.5	2		1		26	14.2					86		2		7				6	3.3	27	14.8
Southland	415	379.6	31	28.4	1		15	13.7	33	30.2	1								2		1		1				1		6	5.5					50	45.7	1		2		73				2				4		4	
Total	15873	383.5	736	17.8	19	0.5	933	22.5	1214	29.3	122	2.9	63	1.5	34	0.8	78	1.9	52	1.3	88	2.1	19		30		20	0.5	160	3.9	48	1.2	23	0.6	1122	27.1	107	2.6	8		1335		102		358		42	1.0	87	2.1	487	11.8

Note : Where less than 5 cases have been notified a rate has not been calculated and the cell has been left blank.

I. NOTIFIABLE DISEASE CASES BY YEAR AND SOURCE, 1987-2006

Table 46. Notifiable disease cases by year and source, 1987-2006

Note: cell is blank where data are unavailable

Disease	Source	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
AIDS	Notification	28	38	59	72	78	50	70	44	49	76	43	29	33	26	26	17	33	38	49	29
Campylobacteriosis	Notification	2921	2796	4187	3850	4148	5144	8101	7714	7442	7635	8924	11572	8161	8418	10146	12494	14787	12215	13836	15873
Cholera	Notification	2	0	0	5	0	0	0	2	2	0	0	1	1	0	3	1	1	2	1	0
Creutzfeldt-Jakob disease	Notification										2	1	0	2	3	1	3	6	8	3	5
Cryptosporidiosis	Notification										119	357	866	977	775	1208	975	817	611	889	736
Dengue fever	Notification	0	1	3	2	3	1	1	0	6	23	14	26	9	7	93	70	55	8	11	19
Gastroenteritis	Notification										555	310	492	601	726	940	1087	1025	1363	557	933
Giardiasis	Notification										1235	2127	2183	1793	1688	1604	1547	1570	1514	1231	1214
H. influenzae serotype b	Laboratory	93	107	121	143	148	166	118	75	14	24	8	10	9	10	8	3	9	3	6	9
	Notification										26	9	11	10	13	11	3	12	4	7	9
Hepatitis A	Notification	158	176	134	150	224	288	257	179	338	311	347	145	119	107	61	106	70	49	51	122
Hepatitis B	Notification	474	370	309	242	227	221	145	133	125	104	138	88	94	79	56	67	61	38	59	63
Hepatitis C	Notification	18	20	13	11	25	89	91	79	88	59	92	102	96	80	58	53	40	24	29	34
Hydatid disease	Notification	2	2	0	4	0	4	4	1	5	3	2	2	8	3	7	2	0	1	2	0
Influenza	Sentinel isolates	18	136	119	343	183	317	423	441	521	673	743	127	425	73	313	241	230	231	273	315
Legionellosis	Notification	91	62	17	20	14	11	24	66	33	36	63	43	51	61	46	49	77	62	85	52
	Laboratory				21	42	60	76	121	76	60	109	107	65	56	56	53	82	75	83	54
Leprosy	Notification	8	2	4	1	4	5	3	1	1	10	3	3	10	4	3	4	4	3	2	3
Leptospirosis	Notification	129	99	90	117	106	70	116	70	65	56	52	75	59	98	99	140	113	102	85	88
	Laboratory		192	182	229	176	218	234	168	183	140	84	117	76	114	113	181	149	113	109	67
Listeriosis	Notification	12	7	10	16	26	16	11	8	13	10	35	17	19	22	18	19	24	26	20	19
Malaria	Notification	22	25	27	32	39	29	58	34	41	107	65	73	46	111	54	61	46	33	32	30
Measles	Notification										68	1984	164	107	64	82	21	67	32	19	20
	Laboratory	26	5	5	7	355	53	4	4	15	25	1220	35	2	9	21	6	15	10	3	1
Meningococcal disease	Notification	179	83	49	53	71	153	202	208	394	473	609	439	507	477	648	555	542	343	226	160
Mumps	Notification										76	90	85	56	50	56	64	56	45	61	48
	Laboratory	28	5	105	26	23	10	25	245	66	20	14	8	5	2	22	18	11	12	7	9
Paratyphoid fever	Notification		23	13	30	22	13	23	30	24	20	25	18	17	24	32	16	18	28	25	23
Pertussis	Notification										1022	284	153	1046	4140	1334	1068	585	3485	2719	1122
Rheumatic fever (initial attack)	Notification	215	153	148	90	97	70	81	98	88	110	95	65	71	136	114	87	148	75	76	103
Rubella	Notification										306	80	53	35	26	30	33	26	23	13	8
	Laboratory	50	95	114	168	81	27	244	104	1581	339	21	2	0	0	3	4	3	3	7	3
Salmonellosis	Notification	1140	1128	1860	1619	1244	1239	1340	1522	1334	1141	1177	2069	2077	1795	2417	1880	1401	1081	1382	1335
Shigellosis	Notification	143	145	137	197	152	124	128	185	191	167	117	122	147	115	157	112	87	140	183	102
Tetanus	Notification	4	1	0	0	0	8	2	2	2	3	0	2	6	1	4	1	2	1	1	1
Tuberculosis	Notification	296	295	303	348	335	327	323	352	391	352	321	365	446	354	369	381	422	371	339	358
Typhoid fever	Notification	4	15	17	7	9	11	14	24	21	15	16	31	10	21	27	23	20	31	30	42
VTEC/STEC infection	Notification							3	3	6	7	13	48	64	67	76	73	104	89	92	87
Yersiniosis	Notification										330	488	546	503	396	429	476	439	420	407	487

J. PREVALENCE OF ANTIMICROBIAL RESISTANCE, 1991-2005

Table 47. Prevalence of antimicrobial resistance, 1991-2005

		Percent resistance[a] (number tested)				
Pathogen	Antimicrobial	1991-1993	1994-1996	1997-1999	2000-2002	2003-2005
S. aureus[b]	methicillin	0.6 (42839)	2.8 (58283)	4.9 (136356)	7.2 (251448)	7.4 (219363)
	erythromycin	6.8 (40425)	8.0 (54870)	10.8 (134350)	12.0 (221394)	12.0 (164220)
	co-trimoxazole	1.1 (27469)	0.8 (32926)	0.6 (91391)	1.2 (149166)	2.0 (126840)
	mupirocin	NA[c]	10.1 (9291)	18.2 (37173)	20.0 (91555)	16.7 (48423)
Methicillin-resistant *S. aureus*[d]	erythromycin	58.2 (701)	31.5 (2249)	26.2 (1303)	40.0 (1409)	46.3 (1596)
	co-trimoxazole	24.8 (701)	8.6 (2249)	1.8 (1303)	6.7 (1409)	7.4 (1596)
	mupirocin	2.0 (701)	6.4 (2244)	6.0 (1303)	8.5 (1409)	9.5 (1596)
	rifampicin	13.0 (701)	0.3 (2249)	0.8 (1303)	0.7 (1409)	0.5 (1596)
S. pneumoniae, non-invasive disease[b]	penicillin[e]	0.8 (3720)	9.5 (7076)	19.0 (10976)	26.5 (12859)	27.0 (15037)
	erythromycin	1.3 (3554)	8.3 (6832)	14.5 (11212)	18.6 (14404)	19.9 (10222)
	tetracycline	1.7 (3376)	10.5 (5019)	11.2 (5993)	15.4 (9476)	18.1 (6796)
S. pneumoniae, invasive disease[f]	penicillin[e]	1.4 (694)	3.4 (989)	15.0 (1182)	15.3 (1494)	17.2 (1560)
	erythromycin	1.9 (694)	2.6 (989)	5.7 (910)	7.2 (1494)	9.9 (1560)
	cefotaxime[e]	0.1 (694)	1.8 (989)	7.3 (1182)	6.2 (1494)	11.5 (1560)
Enterococcus spp[b]	amoxicillin[g]	2.3 (2573)	1.5 (7373)	2.4 (17548)	3.0 (22566)	2.8 (26492)
	vancomycin	0 (148)	0.2 (1141)	0.5 (4752)	0.3 (7505)	0.1 (9948)
E. coli, urinary isolates[b]	amoxicillin[g]	56.2 (29394)	55.9 (48706)	56.0 (138712)	54.4 (194799)	50.7 (117009)
	co-amoxiclav	6.9 (27249)	10.6 (42666)	12.2 (136326)	9.6 (194950)	8.5 (127750)
	trimethoprim	18.8 (29340)	19.6 (48098)	22.6 (111710)	22.3 (207837)	21.5 (138748)
	nitrofurantoin	2.2 (28331)	1.6 (48123)	1.7 (124362)	1.5 (206149)	1.4 (139738)
	fluoroquinolone	0.2 (7014)	0.5 (40032)	0.6 (118917)	1.6 (201382)	2.4 (135803)
E. coli, non-urinary isolates[b,h]	co-amoxiclav	18.3 (2318)	22.8 (7358)	21.8 (15948)	17.5 (11508)	15.2 (5059)
	cefuroxime	2.3 (1158)	3.2 (6309)	4.5 (6893)	4.2 (6576)	3.4 (3956)
	gentamicin	0.5 (3200)	0.8 (10352)	0.9 (13789)	2.4 (10392)	2.6 (5290)
	fluoroquinolone	0.1 (728)	0.5 (4717)	0.8 (10800)	2.4 (8821)	3.9 (4212)
P. aeruginosa[b]	gentamicin	5.8 (5918)	12.5 (9556)	9.5 (20542)	10.5 (25561)	6.1 (23148)
	tobramycin	3.1 (2535)	3.9 (6757)	2.8 (11033)	3.6 (10421)	3.3 (7616)
	ceftazidime	6.6 (1006)	5.0 (4832)	5.2 (11147)	3.9 (13253)	4.3 (16031)
	fluoroquinolone	8.4 (1652)	8.8 (8123)	9.9 (16551)	9.3 (22869)	8.3 (23761)
H. influenzae, non-invasive disease[b]	amoxicillin[g]	8.4 (4131)	12.0(12244)	19.3 (18852)	21.9 (28476)	19.9 (19529)
	co-amoxiclav	1.1 (1136)	1.1 (9839)	0.6 (15040)	0.8 (16333)	1.0 (14090)
	co-trimoxazole	11.4 (1581)	11.9 (6605)	14.7 (13964)	17.3 (22443)	18.2 (15939)
	tetracycline	1.7 (2082)	1.0 (7810)	1.5 (13007)	1.2 (15633)	0.8 (12783)
H. influenzae, invasive disease[f]	amoxicillin[g]	13.2 (478)	21.8 (179)	11.5 (122)	19.2 (125)	31.6 (155)
	co-amoxiclav	0.2 (478)	3.4 (179)	1.6 (122)	1.6 (125)	9.7 (155)
	cefuroxime	0.8 (478)	3.4 (179)	4.9 (122)	0.8 (125)	9.7 (155)
N. meningitidis, invasive disease[f]	penicillin[i]	2.1 (291)	3.9 (659)	7.9 (431)	7.5 (796)	12.0 (551)
	rifampicin	0.3 (291)	0 (659)	0 (431)	0 (796)	0.2 (551)
N. gonorrhoeae[b,j]	penicillin	16.4 (85)	11.6 (879)	10.4 (1437)	7.1 (2782)	5.8 (4700)
	fluoroquinolone	0 (85)	0.7 (864)	1.8 (1437)	6.3 (2349)	14.3 (4195)
M. tuberculosis[b]	isoniazid	NA	4.6 (438)	8.2 (757)	8.5 (811)	8.9 (872)
	rifampicin	NA	0.7 (438)	1.3 (757)	0.7 (811)	1.0 (872)
	MDR[k]	NA	0.7 (438)	0.9 (757)	0.5 (811)	1.0 (872)

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

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