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NOTIFIABLE AND OTHER DISEASES IN NEW ZEALAND

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NOTIFIABLE AND OTHER DISEASES IN NEW ZEALAND
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This report is available on the Internet at www.surv.esr.cri.nz
and selected notifiable disease data is available at www.nzpho.org.nz

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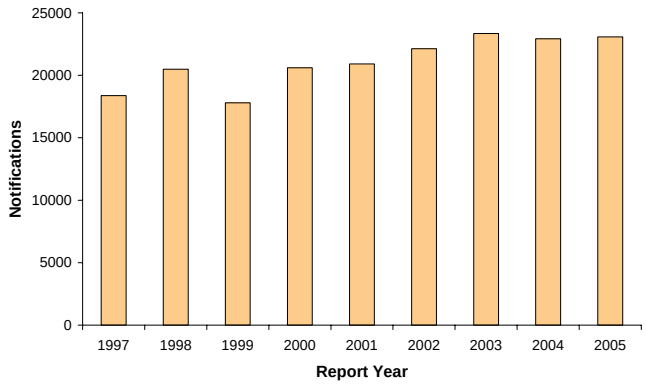
Notifiable Diseases

In 2005 there were 23 083 reported cases of notifiable diseases in New Zealand (Figure 1). This is a small increase on the number reported in 2004 (22 927) but less than the number reported in 2003 (23 356).

Figure 1. Total disease notifications by year, 1997 - 2005



Between 2004 and 2005 there were some significant changes to the number of cases reported for individual diseases. There was a statistically significant increase in reported cases of hepatitis B (38 to 61, 60.5%), cryptosporidiosis (612 to 889, 45.3%), shigellosis (140 to 183, 30.7%) salmonellosis (1081 to 1383, 27.9%) and campylobacteriosis (12 213 to 13 839, 13.3 %).

There was a significant decrease in reported cases of gastroenteritis (1363 to 557, 59.1%), giardiasis (1514 to 1230, 18.8%), meningococcal disease (343 to 227, 33.8%) and pertussis (3485 to 2720, 22.0%).

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

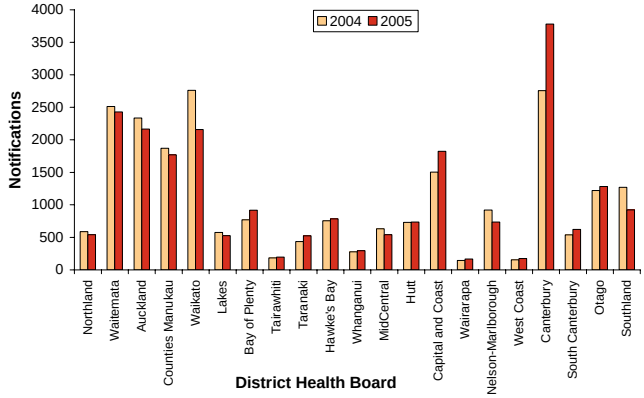
The largest increases in reported notifiable disease cases between 2004 and 2005 (see Figure 2) were seen in Canterbury (2757 to 3781, 37%), Capital and Coast (1504 to 1824, 21%) and Taranaki (435 to 523, 20%) DHBs. In most DHBs where an increase occurred it was primarily due to an increase in campylobacteriosis notifications with the pertussis outbreak also contributing to the increase in notifications in Canterbury DHB.

Vaccine Preventable Diseases (VPDs)

Both the meningococcal disease and pertussis notification rates showed significant decreases in 2005 with the meningococcal disease rate dropping from 9.2 to 6.1 per 100 000, and the pertussis rate dropping from 93.3 to 72.8 per 100 000. Although the meningococcal disease rate is well down on the peak year rate, 17.4 per 100 000 in 2001, before the start of the epidemic notification rates were around 1.5 per 100 000. Similarly, the 2005 pertussis notification rate remains high compared with the rates in 2001 to 2003, the years in between the current and the previous pertussis epidemic.

Acute Hepatitis B disease was the only VPD to show a significant increase in notification rate compared with 2004. However, the total of 61 cases notified in 2005 is similar to that notified in 2002 and 2003, 67 and 61 respectively.

Figure 2. Notifications by District Health Board, 2004 and 2005



Enteric Disease

Enteric diseases continued to form an overwhelming majority of disease notifications in 2005. In particular, at 13 839 notifications, campylobacteriosis contributed almost 60% of notifications. Four enteric diseases had statistically significant rate increases compared with 2004: campylobacteriosis, cryptosporidiosis, salmonellosis, and shigellosis. In contrast, there were statistically significant decreases in the notification rate of gastroenteritis and giardiasis. Norovirus notifications contribute to the gastroenteritis rate and there was a large reduction in the number of reported norovirus cases in 2005 (69) compared with 2004 (423).

Exotic Diseases

Cases of malaria, dengue fever, Barmah Forest virus, rickettsial disease, Ross River virus and cholera were reported during 2005. All of these cases had a history of travel overseas.

Outbreak Surveillance

In 2005 there were 346 reported outbreaks involving 2436 cases. This was a decrease on the 2004 figures of 372 outbreaks with 4897 cases.

The most common pathogen identified was norovirus with 61 of the outbreaks and 1159 of the cases followed by *Campylobacter* with 47 outbreaks and 252 cases. While norovirus was the most common pathogen in 2005 the number of outbreaks and cases was significantly less than reported in 2004 (126 outbreaks, 3022 cases).

The most common setting linked to an outbreak was the home (116 outbreaks, 465 cases) followed by café/restaurants (107, 483) and retirement/rest homes (17, 472).

Sexually Transmitted Infections (STI)

In 2005, *Chlamydia trachomatis* infection again dominated the STI surveillance data, with both an increase in the number of chlamydia cases detected through the clinic-based surveillance, and a continuing upward trend in laboratory confirmation rates in Auckland, Waikato, and the Bay of Plenty (BOP). Since 2000, laboratory chlamydia rates have increased by over 50% in these three regions overall and in 2005 was 744 per 100 000 population. This increase can only be partially explained by increased sensitivity of diagnostic testing.

The number of people newly diagnosed with human immunodeficiency virus (HIV) through antibody testing is the highest number since testing began in 1985. In 2005, 183 were newly diagnosed, 26 more than in 2004. Importantly, for almost three-quarters of the newly diagnosed men who have sex with men infection occurred in New Zealand, compared with 10% who acquired the infection through heterosexual contact in 2005 Four New Zealand-born children were diagnosed with HIV where maternal infection had not been detected antenatally. Routine antenatal HIV screening has now begun in Waikato DHB and will be progressively implemented throughout New Zealand.

Influenza

The incidence of consultations for influenza like illness in 2005 was the fourth highest since sentinel surveillance began in 1991. The year was characterised by a peak in activity in the middle of June.

An influenza B epidemic in school age children resulted in significant school absenteeism. Three children died of complications from influenza.

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 2005 was conducted in August. This indicated an annualised incidence rate of 170.2 per 100 000, similar to that reported in 2003 (174.7 per 100 000). Among the 513 patients with MRSA, 50.9% were categorised as hospital patients and 49.1% as community patients. EMRSA-15 (41.5%), WSPP MRSA (24.0%), Akh4 MRSA (4.9%) and WR/AKI MRSA (5.4%) accounted for most of the cases. This was a similar pattern to 2003 and 2004.

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 2005 and where data are available, the trend over the previous ten 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
- 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.

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.

Disease rates for different ethnic groups are presented. However caution should be exercised in the interpretation of these rates as different ethnic groups have different patterns of health care access and the rates may not reflect the true incidence of disease in the population.

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:

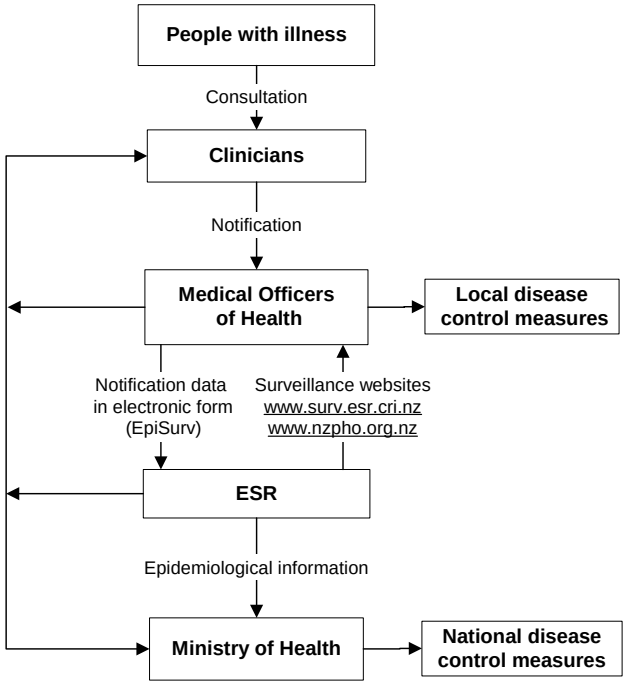
EpiSurv - the national notifiable disease surveillance system

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 week, 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].

During 2005 *Enterobacter sakazakii* was added to the list of notifiable diseases. 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 3.

Figure 3. 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 in theory 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, 2006).

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 2005 this was based on a network of 87 general practices from all health districts in New Zealand except Northland, Gisborne and Taupo (participated for less than 1 month). 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 infectious 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 this reason 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. In 1998, the conditions under surveillance were expanded to include haemolytic uraemic syndrome (HUS), congenital rubella syndrome (CRS), perinatal exposure to HIV and vitamin K deficiency bleeding. 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 16 February 2006. Changes made to EpiSurv data by PHS 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 2005 has been updated to reflect that in EpiSurv as at 16 February 2006.

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 for rates 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: All rates for 2005 and 2004 have been calculated using Usually Resident Population data from the 2001 Census, supplied by Statistics New Zealand.

Ethnicity: Unless otherwise specified, denominators 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.

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 are shown in Table 1.

Table 2 shows the codes used for Health Districts on some graphs.

Table 1. DHB Usually Resident Population, 2001 census

DHB	Population
Northland	140 145
Waitemata	429 762
Auckland	367 749
Counties Manukau	375 555
Waikato	317 721
Lakes	95 982
Bay of Plenty	178 158
Tairawhiti	43 947
Taranaki	103 041
Hawke's Bay	143 574
Whanganui	63 615
MidCentral	154 983
Hutt	131 847
Capital and Coast	245 874
Wairarapa	38 202
Nelson Marlborough	122 478
West Coast	30 264
Canterbury	427 089
South Canterbury	52 782
Otago	170 739
Southland	103 338
Area Outside DHB	408
Total	3737 253

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.

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 2005 [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 chronic infections, notably hepatitis B and C, where initial infection is frequently asymptomatic and for other 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 - 2005

	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%

Timeliness

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

Of the notifications with an onset date recorded (65.1% of notifications) in 2005, 38.9% were reported to a public health service within one week of the onset of symptoms and 74.0% were reported within two weeks.

In 2005, 97.3% of disease notifications were entered into EpiSurv within one week of being reported to the public health service and 98.6% were entered within two weeks of being reported.

Accuracy

Reliable population denominator data are available, except in the case of sexually transmitted infections where not all laboratories and clinics participate in the surveillance programme.

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 2006 [10].

HIV

The number of people diagnosed with HIV in New Zealand increased again in 2005, and at 218 is the highest since testing began in 1985. A total of 183 people were diagnosed through antibody testing (up from 157 in 2004). An additional 35 people (up from 28 in 2004) were reported through viral load testing, most of whom had previously been diagnosed overseas.

HIV infection was thought to have been acquired through homosexual contact in 109 cases (50.0% of all cases in 2005), and a further two cases had both homosexual contact and were intravenous drug users (IDU) (Table 4). This total of 111 cases increased from 86 cases for the same exposure categories in 2004.

Of the 89 cases diagnosed through antibody testing in men who have sex with men (MSM), almost three-quarters (66) reported that infection occurred within New Zealand. In addition, based on previous HIV testing, at least 11 of these men were infected in New Zealand within the previous 12 months.

Heterosexual transmission was implicated in 38 male and 42 female cases reported in 2005, compared with 35 and 33 cases respectively in 2004. In contrast to MSM, a much smaller proportion (10% in 2005) acquired the infection in New Zealand.

All people diagnosed with HIV infection from blood or blood products acquired the infection overseas.

Table 4. Risk behaviour category for HIV infections and AIDS notifications, 1983-2005.

		HIV Infection[a]				AIDS[b]			
		2005		Total 1985[c] to 2005		2005		Total 1983 to 2005	
Risk category	Sex	Cases	%	Cases	%	Cases	%	Cases	%
Homosexual contact	M	109	50.0	1309	52.9	20	40.8	648	72.8
Homosexual & IDU	M	2	0.9	33	1.3	1	2.0	12	1.3
Heterosexual contact	M	38	17.4	284	11.5	13	26.5	75	8.4
	F	42	19.3	309	12.5	9	18.4	63	7.1
Injecting drug user (IDU)	M	0	0.0	53	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	1.8
	F	0	0.0	0	0.0	0	0.0	0	0.0
Transfusion related	M	1	0.5	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	6	2.7	22	0.9	2	4.1	8	0.9
	F	0	0.0	14	0.6	0	0.0	6	0.7
Awaiting information/ Undetermined	M	12	5.5	322	13.0	3	6.1	36	4.0
	F	4	1.8	31	1.2	0	0.0	2	0.2
	NS	0	0.0	13	0.5	0	0.0	0	0.0
Other	M	2	0.9	6	0.2	0	0.0	0	0.0
	F	2	0.9	9	0.4	1	2.0	2	0.2
Total		218	100.0	2474	100.0	49	100.0	891	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

In 2005 six children were diagnosed with HIV infection that occurred through mother to child transmission. Four of these children were born in New Zealand, however, none of their mothers were diagnosed antenatally and therefore the pregnancies were not managed accordingly. Since 1995, no children have been infected through their mothers when HIV infection was diagnosed prior to giving birth. Routine offering of antenatal HIV screening to mothers began in Waikato DHB on 1 April 2006, and will be progressively implemented throughout the rest of the country.

For 16 cases diagnosed in 2005, the route of HIV exposure remains unknown.

The majority of cases, 185 (84.9%), were aged between 20 and 49 years at time of diagnosis, with 92 (42.2%) in the 30-39 years age group.

Of the 218 cases 97 (44.5%) were of European ethnicity, 15 (6.9%) Maori and 8 (3.7%) Pacific Peoples. There were 86 (39.4%) in other ethnic group categories, mainly of African and Asian ethnicity. The ethnicity of 12 cases (5.5%) is currently unknown.

AIDS

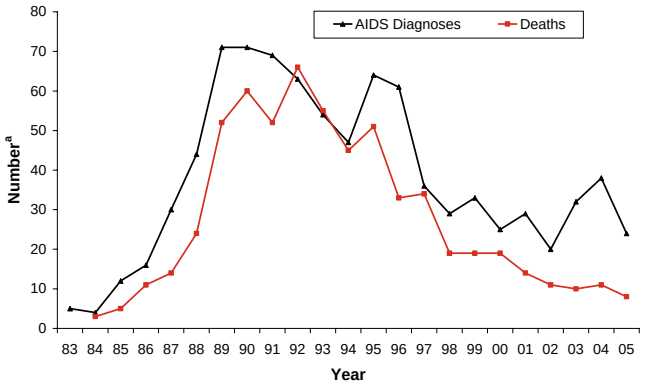
In 2005, 49 cases of AIDS were notified (Figure 4). Of these 24 were diagnosed during 2005 and 25 were late notifications of people diagnosed in previous years. The 2005 notification rate (1.3 per 100 000) was slightly higher than the 2004 rate (1.0 per 100 000, 34 cases).

Twenty-two of the cases (44.9%) are thought to have acquired the disease heterosexually, 20 (40.8%) through homosexual or bisexual contact, two perinatally, one through either homosexual activity or IDU, and the remaining four through other or unknown exposures.

The age distribution of AIDS cases at the time of notification was similar to the HIV cases with 20 cases (40.8%) aged 30-39 years. The distribution according to ethnicity was also similar, with around 40% of cases each in the European, and Other ethnic groups.

There were eight deaths from AIDS during the year, seven males and one female. The number of AIDS deaths peaked at 66 in 1992, and has been declining ever since. For the last four years there have been approximately 10 AIDS deaths each year (Figure 4). The number of AIDS deaths in 2005 may increase due to late notifications.

Figure 4. AIDS cases and deaths by year of diagnosis, 1983 – 2005



[a]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 5 deaths in the United States in 2001 [13].

ARBOVIRAL DISEASES

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

Barmah Forest Virus

Two cases of Barmah Forest virus infection were notified in 2005 compared to one case in 2004. Neither case was admitted to hospital. Both cases had been in Queensland, Australia, during the incubation period for the disease, and were confirmed by serology.

Japanese Encephalitis

No cases of Japanese encephalitis were notified in 2005 compared to one case notified in 2004.

Kunjin Virus

No cases of Kunjin virus infection were notified in 2005 or 2004.

Murray Valley Encephalitis

There were no notifications of Murray Valley encephalitis (also known as Australian encephalitis) in 2005 or in 2004. Hospitalisation data for the same years record one case in 2005 with the primary reason for admission being Australian encephalitis.

Ross River Virus

One case of serologically confirmed Ross River virus infection was notified in 2005. This was less than in 2004 (5 cases) and the same number of notifications as in 2003 and 2002.

The 2005 case had been in Australian (Perth, Darwin, Queensland and Sydney) during the incubation period of the disease. The case was not hospitalised.

Hospitalisation data for 2005 recorded two additional cases with the primary reason for admission being Ross River virus.

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 2005. 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.

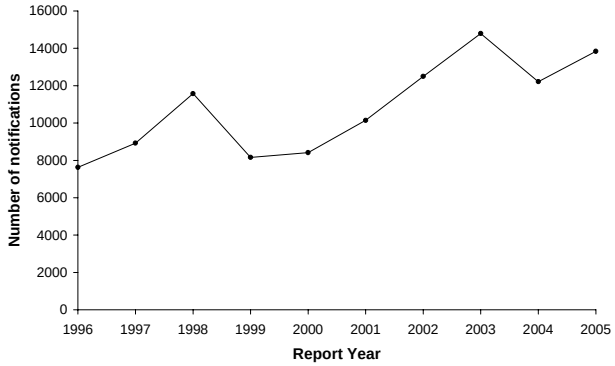
There has been no evidence of locally acquired brucellosis in humans since the declaration of freedom in cattle in New Zealand in 1998.

CAMPYLOBACTERIOSIS

There were 13 839 cases of campylobacteriosis notified in 2005. The 2005 rate (370.3 cases per 100 000 population) was a significant increase from the 2004 rate (326.8 per 100 000, 12 213 cases) but less than the 2003 rate (395.7 per 100 000, 14 790). Campylobacteriosis continues to be the most commonly notified disease comprising 60.0% of all notifications (23 083) in 2005.

Figure 5 shows campylobacteriosis notifications for the 10-year period 1996 to 2005 and Figure 6 shows the number of cases notified each month since 2001.

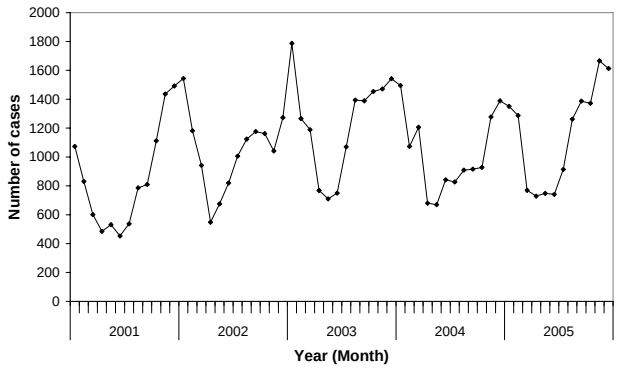
Figure 5. Campylobacteriosis notifications by year, 1996 - 2005



Campylobacteriosis is highly seasonal with a summer peak and winter trough.

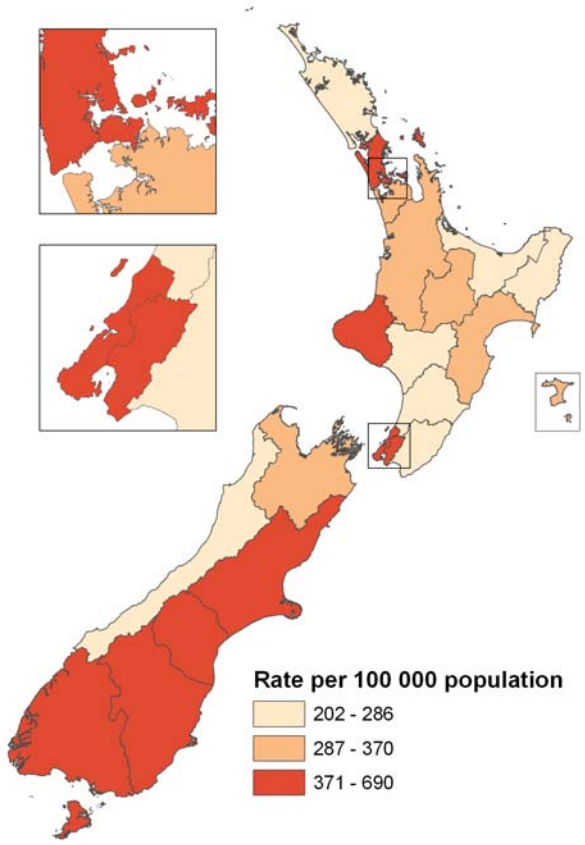
The pattern in 2005 was analogous to 2004, in that a high incidence was sustained for the spring and summer. The highest monthly campylobacteriosis total for 2005 was for the month of November when 1666 cases were notified.

Figure 6. Campylobacteriosis notifications by month, January 2001 - December 2005



Campylobacteriosis rates varied throughout the country. The highest rates were recorded in South Canterbury (689.6 per 100 000 population, 364 cases), Otago (497.8 per 100 000, 850) and Capital and Coast (482.0 per 100 000, 1185) DHBs. Figure 7 shows the rates of campylobacteriosis by DHB for 2005.

Figure 7. Campylobacteriosis notifications by DHB, 2005



Notification rates of campylobacteriosis were higher for males (404.3 per 100 000 population, 7370 cases) than females (323.9 per 100 000, 6200). The highest age-specific rate occurred among cases aged 1-4 years (511.2 per 100 000 population, 1105 cases) followed by those aged 20-29 years (501.8 per 100 000, 2442).

As in previous years, the highest rate occurred among cases of European ethnicity (363.4 per 100 000 population, 9486), followed by those of Other ethnicity (234.2 per 100 000, 585). Maori and Pacific Peoples had the lowest notification rates (124.1 per 100 000 and 65.9 per 100 000 respectively).

Of the 7887 (57.0%) cases for which hospitalisation status was recorded on EpiSurv, 635 (8.1%) were hospitalised. One death from campylobacteriosis was reported during the year.

Of the campylobacteriosis cases for which risk factor information was recorded, 55.0% (2044/3719) had consumed food from retail premises, 28.1% (1198/4261) had contact with farm animals, 16.4% (622/3790) had consumed untreated water, 13.5% (556/4110) had recreational water contact, 12.9% (521/4050) had contact with faecal matter, 8.7% (353/4050) had contact with other symptomatic people and 5.8% (279/4851) had been overseas during the incubation period.

In 2005, 47 outbreaks of campylobacteriosis were reported involving 252 cases (see Outbreak Surveillance).

CHEMICAL POISONING FROM THE ENVIRONMENT

In 2005, four cases were notified as poisonings arising from chemical contamination of the environment. One adult case resulted from occupational exposure to methyl bromide and was hospitalised. Of the remaining cases, one (unknown substance) was 10 years old, one adult was exposed to oven cleaner and the other adult was exposed to an unknown substance. The cases were notified from Waitemata, Auckland, Counties Manukau and Nelson Marlborough DHBs.

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 relating to chemical injuries including poisonings. Reports are published on the www.surv.esr.cri.nz website.

CHOLERA

There was one case of cholera notified in 2005. The case was laboratory reported and risk factor information is not yet available. From 1997 to 2004 there have been nine reported cholera cases. Each case has reported a history of overseas travel during the incubation period. The countries visited included India, China, Bali 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 report is based on the ninth annual report of the Registry [16].

In 2005, a total of four cases of possible CJD were referred to the Registry. One of the four was found not to be a case as no evidence of CJD was found on post-mortem examination. Of the three remaining cases, two were confirmed as sporadic CJD by post-mortem (both male, aged 37 and 53 years respectively). The final case could not be confirmed as a post-mortem was declined. This case, a 59-year-old female with a two-month history of rapidly progressive dementia and mild ataxia, has been classified as probable sporadic CJD based on compatible MRI scan and cerebrospinal fluid findings.

Since 1996, there has been a total of 29 possible, probable or confirmed cases of CJD reported to the Registry. No cases of variant CJD, the form linked with bovine spongiform encephalopathy, have ever been identified in New Zealand.

CRYPTOSPORIDIOSIS

A total of 889 cases of cryptosporidiosis were notified in 2005. The 2005 rate (23.8 per 100 000 population) is a significant increase from the 2004 rate (16.4 per 100 000, 612 cases) but similar to 2003 (21.9 per 100 000, 817) and less than 2002 (26.1 per 100 000, 975) and 2001 (32.3 per 100 000, 1208).

Figure 8 shows the number of notified cases of cryptosporidiosis each year since 1996.

Figure 8. Cryptosporidiosis notifications by year, 1996 - 2005

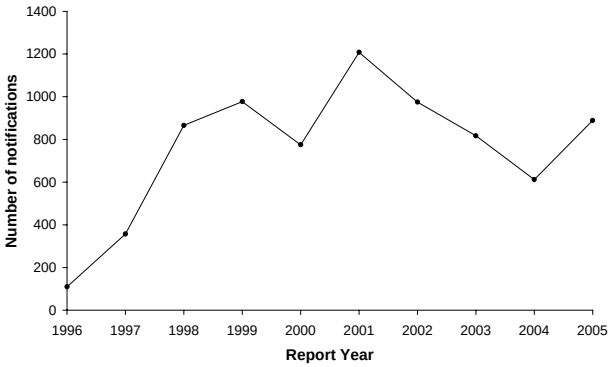
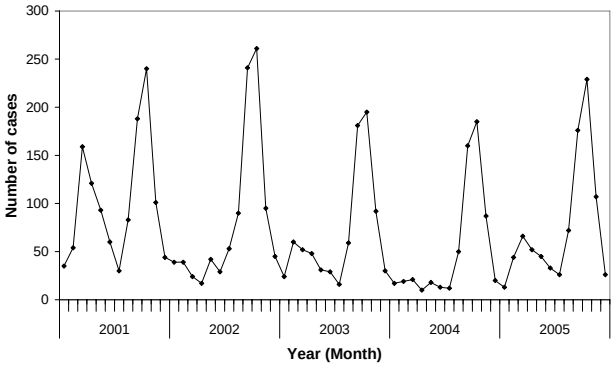


Figure 9 shows cryptosporidiosis cases by month since 2001. There is a distinct seasonal pattern with the largest number of notifications occurring in October each year.

Figure 9. Cryptosporidiosis notifications by month, January 2001 - December 2005



Notification rates varied throughout the country as illustrated in Figure 10. The highest rates were recorded in South Canterbury (85.3 per 100 000 population, 45 cases), Lakes (62.5 per 100 000, 60) and West Coast (49.6 per 100 000, 15) DHBs. South Canterbury has had the highest rates for the three years prior to 2005.

The notification rate for females (24.8 per 100 000 population, 475 cases) was slightly higher than males, (22.2 per 100 000, 404 cases).

Age-specific notification rates were highest in cases aged 1-4 years (144.3 per 100 000 population, 312 cases) followed by those aged less than one-year (56.7 per 100 000, 31), and 5-9 years (46.5 per 100 000, 133).

The highest notification rates were for those of European ethnicity (25.6 per 100 000 population, 669 cases), followed by Other (16.0 per 100 000, 40 cases) and Maori (13.7 per 100 000, 72 cases). The lowest notification rate was recorded for Pacific Peoples (7.0 per 100 000, 14 cases).

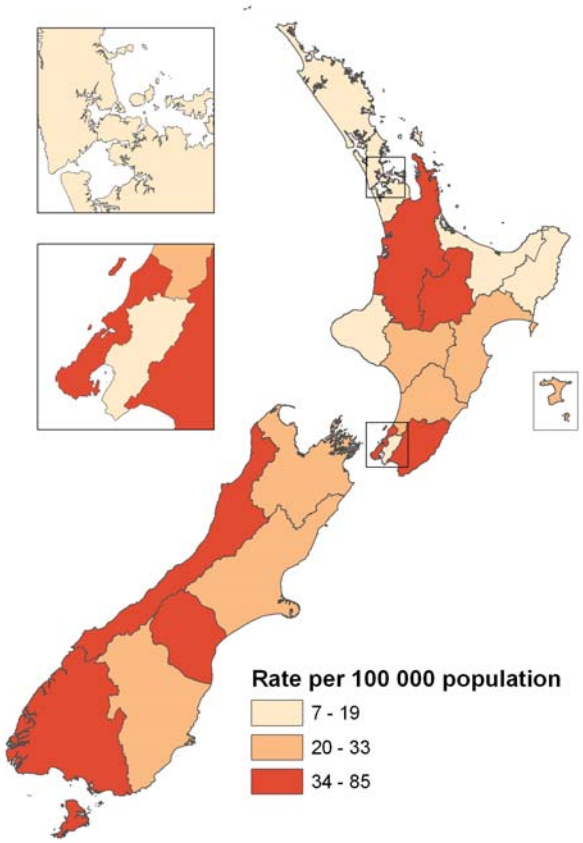
Of the 750 cases for which hospitalisation status was recorded, 47 (6.3%) were hospitalised.

Among the cases for which risk factor information was recorded, 57.7% (342/593) had contact with farm animals, 34.8% (171/492) had consumed untreated water, 20.0% (95/475) had contact with sick animals, 33.9% (130/383) consumed food from retail premises, 32.0% (178/557)) had recreational water contact (of which 26.4% (147/557) had contact with a swimming pool), 26.9% (146/543) had faecal

contact, and 25.2% (137/543) had contact with other symptomatic people during the incubation period.

There were 25 cryptosporidiosis outbreaks reported in 2005, involving 108 cases (see Outbreak Surveillance).

Figure 10. Cryptosporidiosis notifications by DHB, 2005



CYSTICERCOSIS

There were 3 cases of cysticercosis notified in 2005. However, these cases were all late notifications and had been hospitalised for the disease prior to 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

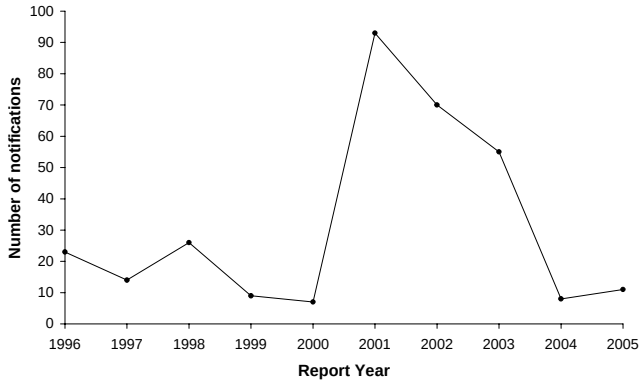
There was one case of decompression sickness notified in 2005. The case was notified to the Hutt Valley DHB and was hospitalised. This was in contrast to previous years with a high of 7 cases in 2002, 2 cases in 2003 and no cases in 2004.

Hospitalisation data for the same years presents a greater number of cases following the same annual pattern with a diagnosis of decompression sickness (ICD-10-AM code T70.3) being given as the primary reason for admission in 41 cases (2002), 13 cases (2003), 9 cases (2004) and 9 cases (2005).

DENGUE FEVER

In 2005, 11 cases of dengue fever were notified compared to 8 cases in 2004 (Figure 11). The 2005 rate (0.3 per 100 000 population) was slightly higher than that for 2004 (0.2 per 100 000 population, 8). Between 2001 and 2003 an average of 73 cases per year were notified, peaking with 93 cases in 2001. The number of cases in 2005 is similar to that notified in 1999 (9 cases), 2000 (7 cases) and 2004 (8 cases).

Figure 11. Dengue fever notifications, 1996 - 2005



Of the 11 cases, one was aged 15-19 years, four were aged 20-29 years, three were aged 40-49 years, and three were aged 50-59 years. Eight cases were female, and three were male. Five cases were of European ethnicity, one was Maori, three were Other ethnicity, and two were unknown. Four cases were hospitalised.

All cases recorded overseas travel during the incubation period. Countries visited were Singapore (4), India (2), Indonesia (2), Malaysia (2), and Thailand and Sri Lanka (1). Of the notified cases, 10 were confirmed by serology.

Six 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 four cases no information was recorded.

Hospitalisation data for 2005 record six additional cases with the primary reason for admission being dengue fever.

DIPHTHERIA

No cases of toxigenic diphtheria were notified in New Zealand in 2005. The last case where a toxigenic strain was isolated was in a 4-year-old child in 2002. This was a pure growth (biovar *gravis*) from a hip aspirate but there were no toxin-related symptoms. The child was fully vaccinated.

In 2005, 35 cultures were received at the ESR laboratory for toxigenicity testing, typing and surveillance purposes. The majority (33) were from cutaneous sources with one culture from each of blood and respiratory sources. The patients ranged in age from 2 months to 72 years.

All the isolates were determined to be non-toxigenic by PCR examination for the toxin gene. Twenty-seven (77.1%) of the isolates were biovar *mitis*, and eight (22.9%) were biovar *gravis*. In 2004, the ESR laboratory received 30 isolates from cases. Of these isolates, 20 (66.7%) were biovar *mitis* and 10 (33.3%) were biovar *gravis*.

Cases of diphtheria continue to occur overseas, and unimmunised individuals are at risk[18].

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 [19].

One case of *E.sakazakii* invasive disease was notified in 2005 following addition of this disease to the notifiable diseases schedule. The case was an elderly male with peritonitis who was on a renal ward.

GASTROENTERITIS

Gastroenteritis comprises a variety of communicable diseases and infections. Included in this section are infections by the following pathogens: norovirus, rotavirus, *Clostridium perfringens*, *Staphylococci* and *Bacillus cereus*. Disease and conditions that are notifiable in their own right (e.g. salmonellosis, campylobacteriosis etc.) are reported under separate headings.

From July 2000, Public Health Services 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 2005, 557 cases (14.9 per 100 000 population) of gastroenteritis were notified. This is a significant decrease from 2004 (1363 cases, 36.5 per 100 000) and is the lowest number of reported gastroenteritis cases since 1998. Where the causative organism was identified, the decrease was primarily due to a large reduction in the number of reported norovirus cases (423 in 2004 to 69 in 2005).

In 2005, a causal agent was reported for 125 (22.5%) cases (Table 5). Where the agent was identified, the most common pathogen was norovirus.

Table 5. Gastroenteritis cases where organism was identified, 2005

Organism	Cases	Percentage[a]
Norovirus	69	55.2%
Rotavirus	49	39.2%
Bacillus cereus	3	2.4%
Other[b]	4	3.2%
Total	125	100.0%

[a] percentage of cases where organism was identified

[b] includes a single notification of each of the following *Clostridium perfringens*, Enteropathogenic *E. coli* (non VTEC), *Staphylococcus aureus* and *Vibrio parahaemolyticus.*

Gastroenteritis notifications were highest in Southland (28.1 per 100 000 population, 29 cases), Capital and Coast (27.7 per 100 000, 68) and Canterbury (24.1 per 100 000, 103) DHBs.

Notification rates of gastroenteritis were higher in females (17.0 per 100 000, 325) than in males (12.1 per 100 000, 221). The highest rates in females were reported in cases aged 70 years and over while the highest rate for males was in those aged less than one year.

Of the 479 cases for which hospitalisation status was recorded, 25 (5.2%) were hospitalised.

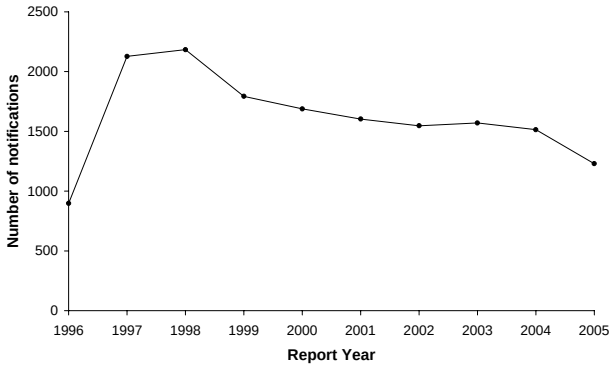
There were 113 outbreaks of gastroenteritis reported in 2005, involving 403 cases (see Outbreak Surveillance).

GIARDIASIS

There were 1230 cases of giardiasis notified in 2005. The 2005 rate (32.9 per 100 000 population) was a significant decrease from the 2004 rate (40.5 per 100 000, 1514). This continues the downward trend for giardiasis notifications since 1999.

Figure 12 shows giardiasis cases by year since the disease became notifiable in June 1996.

Figure 12. Giardiasis notifications by year, 1996 - 2005



Rates varied throughout the country as illustrated in Figure 13. The highest notification rates were recorded in Tairawhiti (52.3 per 100 000 population, 23 cases), Capital and Coast (49.2 per 100 000, 121) and Auckland (47.0 per 100 000, 173) DHBs.

Notification rates for males (34.5 per 100 000 population, 629 cases) were higher than females (29.3 per 100 000, 561).

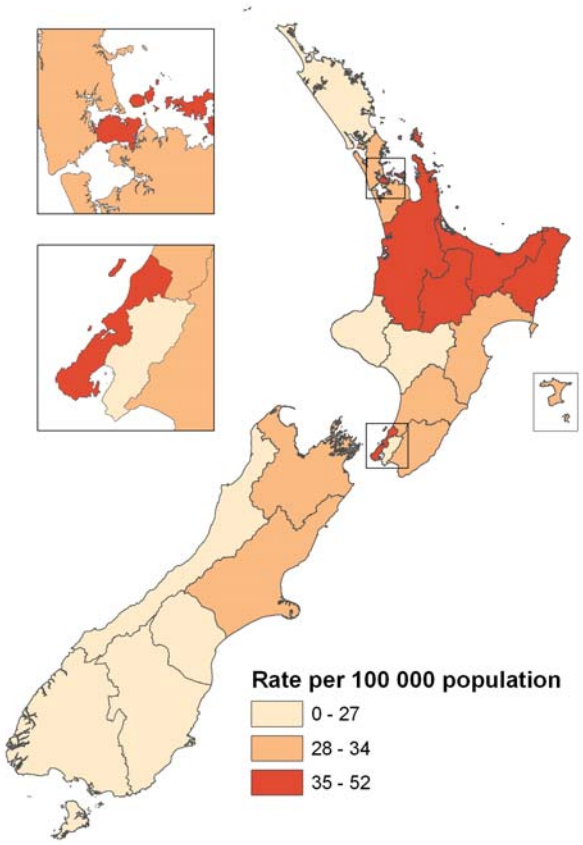
The highest rates were reported among those of European ethnicity (31.6 per 100 000 population, 826 cases), followed by those of Other ethnicity (28.8 per 100 000, 72 cases). Notification rates were lowest among Maori (11.0 per 100 000 population, 58 cases) and Pacific Peoples (10.0 per 100 000, 20 cases).

There were two peaks in the age-specific rates of giardiasis: the larger one in the 1-4 years age group (102.7 per 100 000 population, 222) and a smaller peak in the 30-39 years age group (49.2 per 100 000, 284). This pattern has remained consistent across all years from 1996 when the disease became notifiable.

Of the 727 cases (59.1%) for which hospitalisation status was recorded, 26 (3.6%) were hospitalised.

Among the cases for which risk factor information was recorded 39.2% (183/467) indicated recreational contact with water, 36.7% (151/412) had consumed untreated water, 36.0% (165/458) had contact with faecal matter, 28.6% (132/462) had contact with other symptomatic people, 27.3% (161/589) had travelled overseas during the incubation period, 23.8% (113/474) had contact with farm animals, 22.6% (74/327) had consumed food from retail premises, and 16.9% (76/450) had contact with another case during the incubation period.

Figure 13. Giardiasis notifications by DHB, 2005



There were 23 giardiasis outbreaks reported in 2005, involving 91 cases (see Outbreak Surveillance).

HAEMOPHILUS INFLUENZAE SEROTYPE B DISEASE

Seven cases of *Haemophilus influenzae* serotype b (Hib) were notified in 2005, all but one of which was laboratory confirmed. The unconfirmed case was a child aged less than five years who was airlifted from Rarotonga.

Three of the lab confirmed cases were aged less than five years, thus the 2005 age specific rate for confirmed cases aged less than five years was 1.1 per 100 000 population, compared to 0.7 per 100 000 population (2 cases) in 2004 and 2.6 per 100 000 population (7 cases) in 2003.

Two of the lab confirmed cases aged less than five years were female, one was male and all were of European ethnicity. They were from the Counties Manukau, Bay of Plenty and Canterbury DHBs.

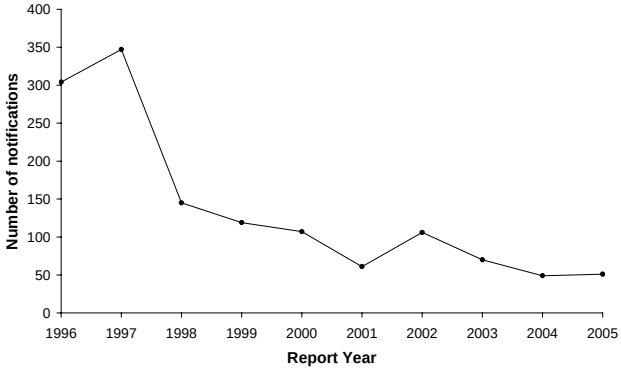
A Hib vaccine was introduced in January 1994. Prior to August 2000, the recommended immunisation schedule consisted of four doses of DTPH vaccine given at six weeks, three months, five months and 15 months of age. The current schedule introduced in mid August 2000 recommends three doses of Hib vaccine at six weeks, three months and a booster at 15 months [20].

None of the three lab confirmed cases aged less than five years or the child from Rarotonga were immunised.

HEPATITIS A

There were 51 cases of hepatitis A notified in 2005, compared to 49 notifications in 2004. Over the last twenty years there has been an overall downward trend in the number of notifications of hepatitis A. There was a small increase in notifications in 2002, which was attributed to a single outbreak linked to contaminated blueberries (Figure 14).

Figure 14. Hepatitis A notifications by year, 1996 - 2005



The notification rate for 2005 for hepatitis A was 1.4 cases per 100 000 population. The highest rates were reported in Canterbury (2.8 per 100 000, 12 cases), Waikato (2.2 per 100 000, 7) and Counties Manukau (1.9 per 100 000, 7) DHBs.

Notified cases of hepatitis A were evenly distributed between the sexes with 25 male cases and 26 female cases reported. Two-thirds of the cases occurred in adults aged 20 years and above (34/51). The highest age specific incidence rate was observed in the 5-9 years age group (2.4 per 100 000, 7 cases).

The highest notification rates in 2005 were for cases of Pacific Peoples ethnicity (5.0 per 100 000, 10 cases) followed by those of Other ethnicity (3.2 per 100 000, 8).

For those cases where a history of overseas of travel was recorded (42/51), 26 cases (61.9%) had travelled overseas during the incubation period for this disease.

There were two reported outbreaks of hepatitis A in 2005, involving a total of four cases in Auckland (see Outbreak Surveillance).

HEPATITIS B

In New Zealand only acute hepatitis B is a notifiable disease.

There were 61 cases of hepatitis B notified in 2005 compared to 38 notifications in 2004. This is a significant increase in notifications between the two years but similar to the number reported in 2002 and 2003. Since 1997 there has been a general downward trend in the number of hepatitis B notifications with some year-to-year fluctuations (Figure 15).

The notification rate in 2005 for hepatitis B was 1.6 cases per 100 000 population.

The number of male cases (39, 63.9%) was almost twice that of female cases (20, 32.8%). The majority of cases were aged between 20 and 59 years of age (51, 83.6%). The age-specific incidence rate was highest in the 30-39 years age group (3.6 per 100 000, 21 cases), followed by the 20-29 years age group (2.5 per 100 000, 12 cases).

The highest notification rates were reported for cases of Other ethnicity (6.8 per 100 000, 17) followed by those of Pacific Peoples ethnicity (5.0 per 100 000, 10) and Maori ethnicity were (2.1 per 100 000, 11).

Figure 15. Hepatitis B notifications by year, 1996 - 2005

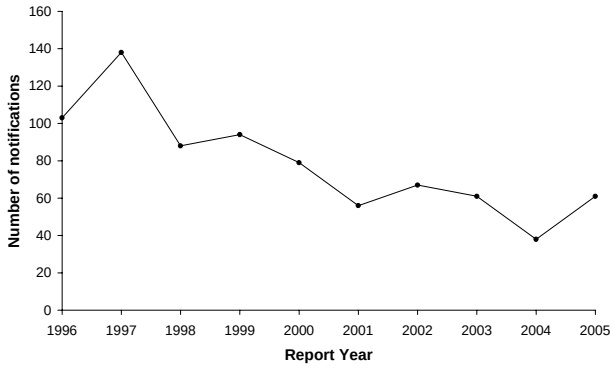
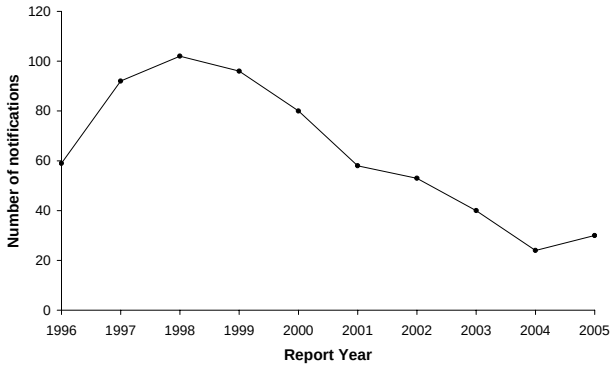


Figure 16. Hepatitis C notifications by year, 1996 - 2005



The major risk factors recorded for hepatitis B are shown in Table 6. No history of sexual contact with a confirmed case or carrier was reported for the cases for which this information was recorded.

HEPATITIS C

There were 30 cases of hepatitis C notified in 2005, compared to 24 notifications in 2004. Between 1998 and 2004, the number of hepatitis C notifications has been steadily decreasing, while there has been a small increase in notifications during 2005 (Figure 16).

The notification rate for hepatitis C in 2005 was 0.8 cases per 100 000 population. The highest rate was reported in the Canterbury DHB (3.5 per 100 000, 15 cases), which was over four times the national rate.

A higher number of cases were female (17, 56.7%) than male (13, 43.3%).

The majority of cases were aged between 20 and 59 years of age (26, 86.7%). The age-specific incidence rate was highest in 20-29 years age group (2.5 per 100 000, 12 cases), followed by the 40-49 years age group (0.9 per 100 000, 5 cases). The highest notification rate was reported for cases of Maori ethnicity (1.1 per 100 000, 6) followed by those of European ethnicity (0.7 per 100 000, 18).

The risk factors recorded for hepatitis C are shown in Table 7. The most commonly recorded risk factor was intravenous drug use, an observation also noted in the 2004 report.

HEPATITIS (VIRAL) NOT OTHERWISE SPECIFIED (NOS)

There were 2 notifications of hepatitis NOS in 2005. This is the same as for the previous year, 2004. One case was a male dialysis patient aged 49 years, the other was a female aged 27 years, neither of whom were hospitalised. Both cases had a history of overseas travel during the incubation period for the disease.

Table 6. Exposure to risk factors associated with hepatitis B, 2005

Risk Factor	Yes	No	Unknown	%[a]
Overseas during incubation period	8	39	14	17.0%
Body piercing/ tattooing in last 12 months	5	37	19	11.9%
Household contact with confirmed case	2	31	28	6.1%
Case child of seropositive mother	1	36	24	2.7%
Occupational exposure to blood	1	40	20	2.4%
History of injecting drug use	1	45	15	2.2%
Case dialysis patient	1	44	16	2.2%

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

Table 7. Exposure to risk factors associated with hepatitis C, 2005

Risk Factor	Yes	No	Unknown	%[a]
History of injecting drug use	16	6	8	72.7%
Sexual contact with confirmed case/carrier	8	8	14	50.0%
Household contact with confirmed case	8	10	12	44.4%
Body piercing/ tattooing in last 12 months	2	17	11	10.5%
Occupational exposure to blood	1	6	23	14.3%
Blood product or tissue recipient	1	18	11	5.3%

[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.

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 2005. Worldwide, during 2005, there were 95 laboratory-confirmed A(H5N1) cases resulting in 41 fatalities. These occurred in Viet Nam (61 cases, 19 deaths), Indonesia (17 cases, 11 deaths), China (8 cases, 5 deaths), Thailand (5 cases, 2 deaths), and Cambodia (4 cases, 4 deaths)[21].

HYDATID DISEASE

Two cases of hydatid disease, caused by the larval stage of the tapeworm *Echinococcus granulosus*, were notified in 2005 compared to one case in 2004. One case was a 46 year old European female and the second case was a 41 year old European male. One case was admitted to hospital.

Both cases were laboratory confirmed.

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.

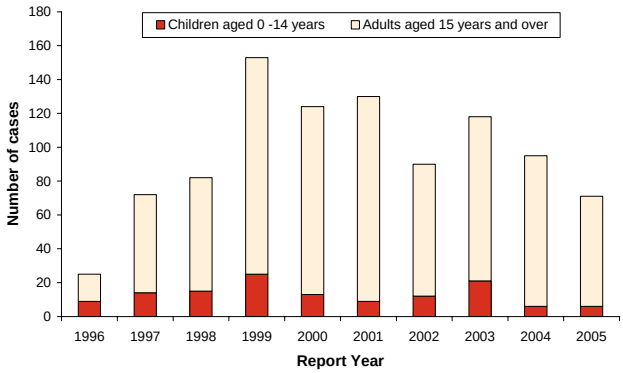
LEAD ABSORPTION

There were 71 cases of lead absorption notified in 2005, the lowest number since the condition became notifiable in 1996. The 2005 rate was 1.9 per 100 000 population, while the annualised rate for the five year period 2000 to 2004 is 3.0 per 100 000 population.

Of the 71 cases notified in 2005, 6 (8.5%) were children aged 14 years or younger, 4 were aged 1-4 years, one 5-9 years and the other 10-14 years. Six cases in children were also recorded in 2004 and this is the lowest number since the condition became notifiable. The highest number of cases in children was recorded in 1999 (25).

Figure 17 shows the number of lead absorption notifications in both children and adults, each year since 1996.

Figure 17. Lead absorption notifications in children and adults by year, 1996 - 2005



As in previous years, the majority of cases were male (55/70, 78.6% of cases where sex was known). The highest notification rate was reported for cases of European ethnicity (2.1 per 100 000, 54 cases).

Of the 61 cases in 2005 for which hospitalisation status was recorded, 4 (6.6%) were hospitalised.

Blood lead concentrations were recorded for all six of the children and ranged from 0.72 to 1.1 μmol/l, with a median of 0.85 μmol/l.

Table 8 and Table 9 show a summary of risk factor information for lead absorption cases in 2005. Some cases had more than one risk factor recorded. For both children and adults the most common risk factor was living in or regularly visiting a building built prior to 1970 that had paint chalking/flaking, and/or had recently undergone alteration or refurbishment.

Table 8. Exposure to risk factors associated with lead absorption for adults (cases aged 15 years and over), 2005

Risk Factor	Yes	No	%[a]
Case lived in or regularly visited a building built prior to 1970 [b]	24	16	60.0
Case had exposure to high risk occupation [c]	34	30	53.1
Case had exposure to lead through hobbies [d]	9	28	24.3
Close contact of case was occupationally exposed to lead	2	38	5.0

[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.

[b] Of these 17 cases lived in building that had paint chalking/flaking, and /or had recently undergone alterations or refurbishment

[c] Occupations included painter/paint stripper (20), lead lighter (3), radiator repair (3), die caster/foundry worker (2), scrap metal/ demolition worker (2), shooter (1) and sinker maker (1), university student (1), not specified (1)

[d] Hobby was shooting/gun club for 5 cases, manufacture of lead sinkers (1), winding long case clocks (2), restoring furniture (1)

Table 9. Exposure to risk factors associated with lead absorption for children (cases aged less than 15 years), 2005

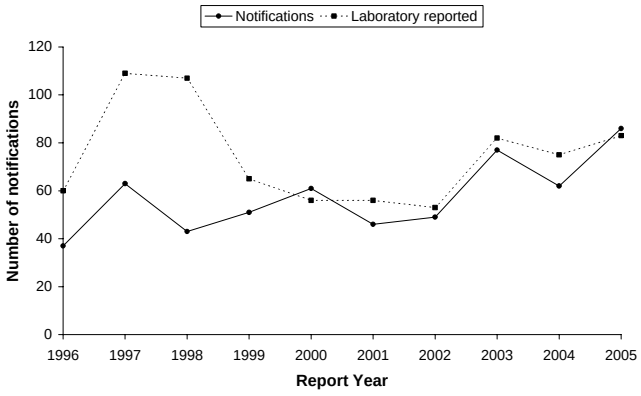
Risk Factor	Yes	No	%[a]
Case lived in or regularly visited a building built prior to 1970 that had paint chalking/flaking, and / or recently undergone alterations or refurbishment.	4	0	100.0
Case played in soil containing paint debris	2	2	50.0
Close contacts of case were exposed to lead through occupation	0	4	0.0
Pica behaviour	1	3	25.3

[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 86 cases (Figure 18) of legionellosis notified in 2005. This represents a rate of 2.3 per 100 000 population which has increased from 2004 (1.7 per 100 000, 62 cases) but is similar to 2003 (2.1 per 100 000, 77).

Figure 18. Legionellosis notifications and laboratory reported cases by year, 1996 - 2005



Legionellosis cases were reported throughout the country with the highest notification rates in Canterbury DHB (6.8 per 100 000, 29), Hutt Valley DHB (6.1 per 100 000, 8), and Waitemata DHB (3.5 per 100 000, 15).

The rate was higher in males (3.0 per 100 000, 54) than in females (1.7 per 100 000, 32). The highest age specific rate (9.3 per 100 000, 30) was reported in cases aged 70 years and over followed by those aged 60-69 years (6.0 per 100 000, 17) and those aged 50-59 years (4.3 per 100 000, 18). There were no cases aged less than 20 years.

Of the 83 cases in 2005 for which hospitalisation status was recorded, 65 (78.3%) were hospitalised.

There were four deaths reported from legionellosis in 2005. Three of these were associated with a legionellosis outbreak in Christchurch.

A total of 83 cases of legionellosis were laboratory diagnosed during 2005. Table 10 shows the number of strains identified for the laboratory reported cases in 2005.

Table 11 provides a summary of the risk factors for which data were available. Some cases had more than one risk factor recorded. Of the 29 cases with a definite or suspect environmental source of infection recorded, 21 reported contact with compost/potting mix/soil, 2 stayed in an overseas hotel, 2 reported exposure to hot water, 2 reported exposure to a spa/indoor pool and 1 reported a cooling tower as a potential source. For two cases no potential source was reported.

Table 10. Legionellosis strains for laboratory cases, 2005

Legionella species / serogroup	Number	%[a]
L. bozemanii sg 1	2	2.0%
L. dumoffii	1	1.0%
L. gormanii	3	4.0%
L. hackeliae sg 2	1	1.0%
L. longbeachae sg 1	14	17.0%
L. longbeachae sg 1/2	6	7.0%
L. longbeachae sg 2	4	5.0%
L. longbeachae /*L. boz.*	1	1.0%
L. micdadei	2	2.0%
L. pneumophila sg 1	40	48.0%
L. pneumophila sg 1/12	2	2.0%
L. pneumophila sg 1/4	1	1.0%
L. pneumophila sg 1/4/15	1	1.0%
L. pneumophila sg 2	1	1.0%
L. pneumophila sg 4	2	2.0%
L. pneumophila sg unknown	2	2.0%
Legionella sp.	2	2.0%
Total	83	

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

Table 11. Risk factors associated with legionellosis, 2005

Risk Factor	Yes	No	%[a]
Contact with definite or suspected environmental source of infection	30	12	71.0
Smokers or ex-smokers	18	52	26.0
Pre-existing immunosuppressive or debilitating condition	37	30	55.0

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

There were two legionellosis outbreaks reported in 2005 involving a total of 21 cases (see Outbreak Surveillance).

LEPROSY

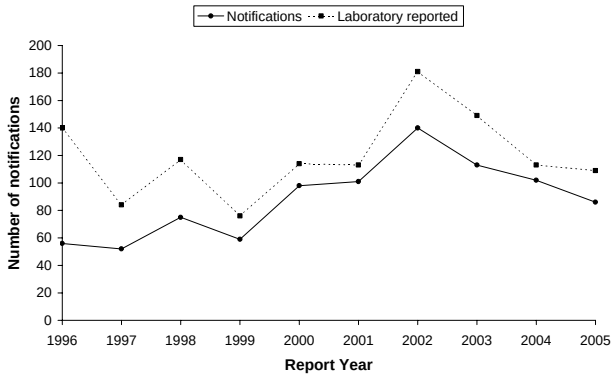
There were two cases of leprosy notified in New Zealand in 2005. One was a child of 14 years with multibacillary leprosy. An overseas health authority notified this case following laboratory confirmation in that country. The other case was a 44 year old classified as probable paucibacillary leprosy as the disease was not laboratory confirmed. Each case had spent time in a Pacific Island nation during the incubation period.

LEPTOSPIROSIS

A total of 86 cases of leptospirosis were notified in 2005, a rate of 2.3 per 100 000 population. This rate is slightly lower than the notification rate for 2004 (2.7 per 100 000 population, 102 cases). Of the 86 notified cases, 67 were laboratory confirmed. In addition, a further 42 cases were laboratory reported but not notified.

Figure 19 shows the number of notified and laboratory-reported cases of leptospirosis each year since 1996.

Figure 19. Leptospirosis notifications and laboratory reported cases by year, 1996 - 2005



The highest age specific rates were reported in the 40-49 years (5.6 per 100 000 population, 30 cases) and 50-59 years (5.0 per 100 000, 21 cases) age groups. The majority of the cases were male (93.0%). Ethnicity was recorded for 86.0% (74/86) of the cases. Rates were highest for the Maori ethnic group (3.0 per 100 000 population, 16 cases).

No leptospirosis related deaths were reported in 2005. Of the 80 cases for which hospitalisation status was recorded, 36 (45.0%) were hospitalised.

Occupation was recorded for 82 (95.3%) of the 86 notified cases. Of these, 75 cases (91.4%) 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 changed little over the last two years (93.1% in 2004 and 86.3% in 2003).

Of the 82 cases with recorded occupation, 36 (43.9%) were farmers, farm workers, or a stock driver and 39 (47.6%) worked in the meat processing industry (as either freezing workers, butchers, meat inspectors, meat processing manager, and meat processing cleaning supervisor). Leptospirosis cases also included one possum hunter, one market gardener (also carried out home kills), one contractor (stock/effluent pond cleaning), one foreman furniture manufacturer (also had contact with animal manure), one coalmine supervisor (also had a hobby farm), one concrete cutter, and one plumber.

The *Leptospira* species and serovar was recorded on EpiSurv for 67 of the 86 notified cases: *L. Borgpetersenii* sv *hardjo* (46 cases), *L. Interrogans* sv *pomona* (13), *L. Borgpetersenii* sv *ballum* (6), and *L. Borgpetersenii* sv *tarassovi* (2).

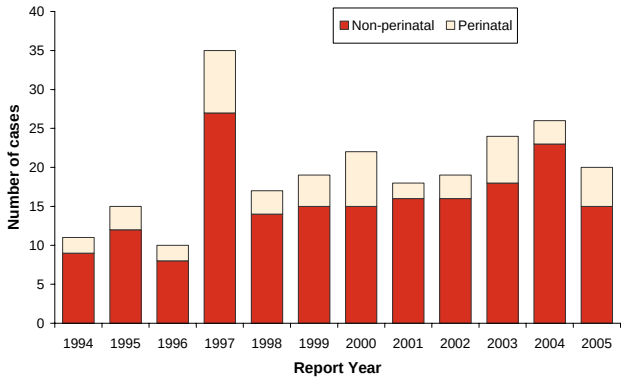
LISTERIOSIS

In 2005, 20 cases of listeriosis were notified, a rate of 0.5 per 100 000 population. Over the preceding five years (2000-2004) the average number of cases per year was 22, peaking with 26 cases (0.7 per 100 000 population) in 2004, the highest since 1997 (35 cases).

Five (25.0%) of the 2005 cases were recorded as perinatal, an increase from 2004 (3 cases) and similar to 2003 (6 cases). Weeks of gestation were known for four of the five cases: 25, 26, 27 and 33 weeks. Only the latter of these five cases survived. The mothers were aged between 21 and 34 years, three of whom were of Pacific Peoples ethnicity and one each of European and Maori ethnicities. A further case, not classified as perinatal, was less than a month old at the time of illness.

Figure 20 shows listeriosis notifications (perinatal and non-perinatal) each year for the last 11 years.

Figure 20. Listeriosis notifications (perinatal and non-perinatal) by year, 1996 - 2005



The 15 non-perinatal cases were from eight DHBs with the greatest number from Auckland and Counties Manukau (3 each). Aside from the case aged less than 1 month mentioned above, all the non-perinatal cases were aged over 40 years, with seven cases aged over 70 years. Eight cases were male and seven were female. Recorded ethnicities were European (9 cases), Pacific Peoples (4) and Maori (2).

Where hospitalisation status was recorded (13/15 cases), all the non-perinatal cases were hospitalised. Nine of the non-perinatal cases had an underlying illness, five were admitted to hospital for treatment of another illness and three were receiving immunosuppressive drugs (note that a case may have more than one risk factor).

Although three of the non-perinatal cases resulted in death, only one death resulted from listeriosis. Other conditions were considered the primary cause of death for the other two cases.

Nineteen cultures for typing were received by the ESR Special Bacteriology Laboratory. Fourteen (73.7%) were serotype 4; the remainder were serotype 1/2, a similar distribution to that in 2004.

MALARIA

There were 32 cases of malaria notified in 2005 compared to 33 cases in 2004 (Figure 21). This is the lowest number of cases since 1995. The 2005 rate (0.9 per 100 000 population) was the same as for 2004 (0.9 per 100 000).

The highest age and sex specific notification rates were reported in male cases aged 20-29 years (3.8 per 100 000, 9 cases) followed by males aged 40-49 years (1.9 per 100 000, 5 cases). The highest rates were reported for cases of Other ethnicity (3.6 per 100 000, 9 cases) followed by those of Pacific Peoples ethnicity (3.0 per 100 000, 6 cases).

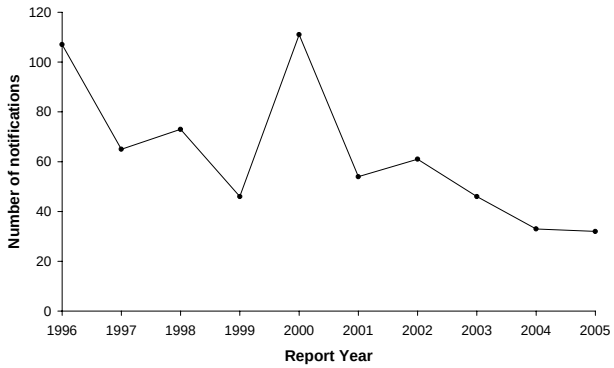
Table 12. Species of malaria and area of overseas travel, 2005

Area resided or visited	*P. falciparum*	*P. vivax*	*P. malariae*	Intermediate	Unknown
Africa	10	3	1	1	
Oceania	3	6		1	1
Asia		3			
South America		1			
None		2			
Unknown		1			
Total	13	16[a]	1	2	1

[a]One case had visited both South America and Oceania.

Thirteen cases were hospitalised. All cases were laboratory confirmed.

Figure 21. Malaria notifications by year, 1996 - 2005



Twenty-nine cases (90.6%) had resided or travelled overseas recently, two (6.3%) had past history of travel to malaria endemic areas, and the travel history of one case was unknown. For 7 cases the time returning from overseas was more than one month after the illness developed. *Plasmodium vivax* was identified for 6 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. The *Plasmodium* species was indeterminate for the seventh case.

The overseas areas resided in or travelled to and the *Plasmodium* species identified are listed in Table 12. The most common country visited or resided in was Tanzania with seven cases, and the most common species identified was *P. vivax* with 16 cases.

Malaria prophylaxis was used regularly by six cases and irregularly by four cases. Seven cases did not take any, and prophylaxis use was unknown for 15 cases.

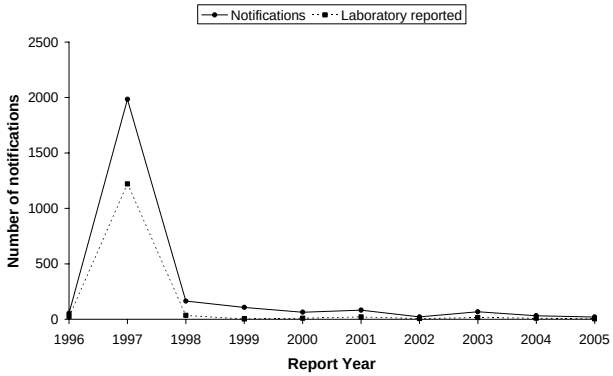
MEASLES

In New Zealand measles immunisation was introduced in 1969 and it has been a notifiable disease since June 1996. In 2005 there were 20 measles notifications, 3 laboratory confirmed cases and one outbreak of 19 cases. This is a decrease on 2004 when there were 32 notifications with 10 laboratory confirmed and one outbreak involving 20 cases.

Figure 22 shows notified and laboratory-reported cases from 1996 to 2005.

The 2005 measles notification rate (0.5 per 100 000 population) was less than the 2004 notification rate (0.9 per 100 000, 32 cases).

Figure 22. Measles notifications and laboratory reported cases by year, 1996 - 2005



Age-specific rates were highest in the less than one year age group with a rate of 12.8 per 100 000 population (7 cases), followed by the 1-4 years age group with a rate of 4.6 per 100 000 population (10 cases).

The 2005 measles notification rate for males was 0.6 per 100 000 population (11 cases) and for females 0.5 per 100 000 population (9 cases).

Of the 18 cases for which hospitalisation status was recorded on EpiSurv, one was admitted to hospital. One measles case reported overseas travel during the incubation period. Of the 16 cases for which this information was recorded, 7 (43.8%) attended school, pre-school or childcare.

The recommended measles immunisation schedule since January 2001 is to give the first dose of the combined measles, mumps, rubella vaccine (MMR) at 15 months and the second at four years of age [20]. Vaccination status was recorded for 15 cases. Of these 4 (26.7%) had received at least one dose of MMR vaccine. Table 13 shows vaccination status by age group.

It is recommended that measles notifications be made on clinical suspicion with laboratory testing for the first cases seen in a community [20]. In 2002 there were 21 notifications with 3 (14.3%) laboratory confirmed cases. In 2003 there were 67 notifications with 11 (16.4%) laboratory confirmed cases. In 2004 there were 32 notifications with 9 (28.1%) laboratory confirmed cases. In 2005 there were 20 notifications with 3 (15.0%) 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.

Table 13. Measles notifications by age group and vaccination received, 2005

Age group	Total cases	Vaccination Status				
		1 dose	2 doses	Vaccinated (no dose info)	Not vaccinated	Unknown
<15mths	8	(0)	(0)	0	6	2
15mths-4yrs	9	3	(0)	1	5	0
5-9 yrs	2	0	0	0	0	2
10-19 yrs	0	0	0	0	0	0
20+ yrs	1	0	0	0	0	1
Total	20	3	0	1	11	5

Note: Numbers in brackets indicate vaccination when the case was ineligible

MENINGOCOCCAL DISEASE

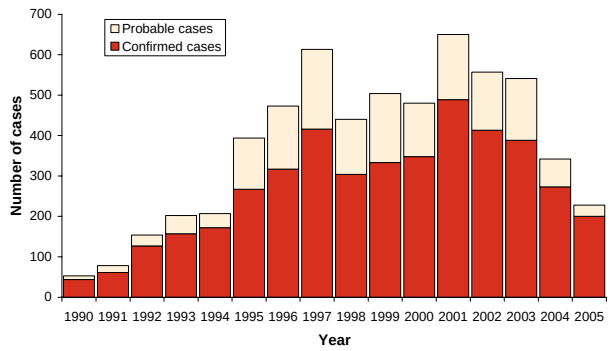
A full description of the epidemiology of meningococcal disease in 2005 is contained in a separate report [23].

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 228 cases of meningococcal disease was notified in 2005, giving a rate of 6.1 per 100 000 population. This rate is a significant decrease from 2004 (9.2 per 100 000 population, 342 cases) yet is still four times higher than the rate of 1.5 per 100 000 population occurring in the immediate pre-epidemic years (1989-90). Of the 228 cases for 2005, 200 (87.7%) 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). All tables in the appendices of this report are based on report date hence figures may differ slightly.

Figure 23 shows the number of confirmed and probable cases of meningococcal disease since 1990.

The rate of meningococcal disease varied throughout the country in 2005, with the highest rates recorded in the Wairarapa (13.1 per 100 000 population), Waikato (10.4 per 100 000) and MidCentral (9.7 per 100 000) DHBs. The lowest rates were from Tairawhiti DHB (2.3 per 100 000) and Hutt DHB (0.8 per 100 000 population) each with only one notified case.

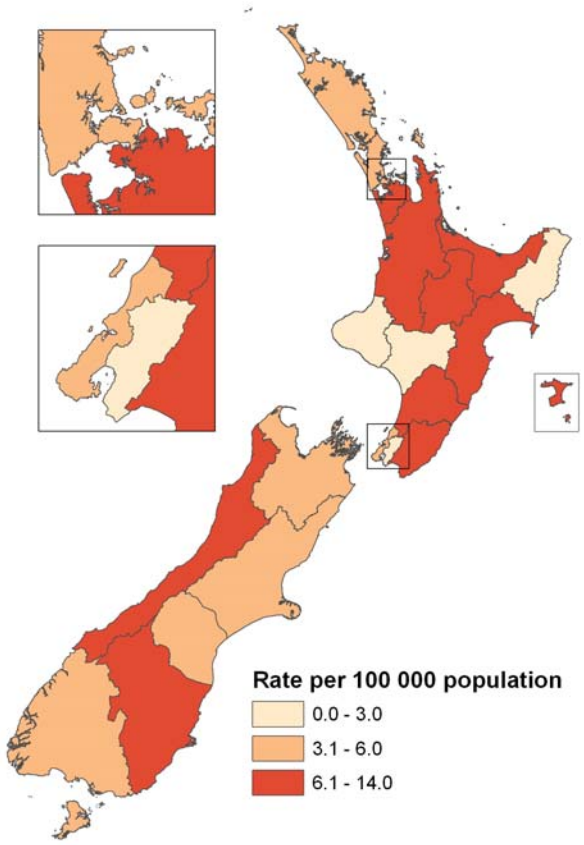
Figure 23. Meningococcal disease notifications by year, 1990 - 2005



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

Figure 24 illustrates the rates of meningococcal disease by DHB. Note that this map uses a different range of rates to that used elsewhere in this report. The legend has been adjusted to show how New Zealand rates differ to those in most industrialised countries where less than 3 cases are reported per 100 000 population per annum.

Figure 24. Meningococcal disease notifications by DHB, 2005



As in previous years, the highest age specific rates occurred in the less than one age group (53.1 per 100 000 population) followed by the 1-4 years age group (18.0 per 100 000). Pacific Peoples had the highest age standardised rate (11.9 per 100 000 population), followed by Maori (8.6 per 100 000). The age standardised rate for Europeans was 5.2 per 100 000 population.

Fourteen deaths were reported during 2005 with the associated case fatality rate of 6.1%. This brings the number of deaths since 1991 to 238, with an average case fatality rate of 4.1%.

Data on pre-hospital management were recorded for 227 cases, including all of the fatal cases. These data show that

23.8% (54/227) of cases received antibiotic treatment prior to hospital admission. In 2005, there were two fatalities among cases seen by a doctor prior to hospital admission and given antibiotics, giving a case-fatality rate among this group of 3.7%. By comparison the case-fatality rate was 10.1% among those cases not seen by a doctor prior to admission and not given pre-hospital antibiotics.

In 2005, information on clinical presentation was available for 217 (95.2%) of the 228 cases. A petechial or purpuric rash was the most common clinical description, (76.5%, 166/217), followed by septicaemia (60.4%, 131/217) and meningitis (57.1%, 124/217). There was one case with conjunctivitis.

The increase in disease rates since 1991 has almost completely been attributable to serogroup B meningococci expressing the P1.7b,4 PorA protein. A mass vaccination programme for all under 20 year olds with a vaccine against the epidemic strain began in July 2004. The programme was rolled out progressively with all DHBs and age groups eligible for vaccine by July 2005.

Serogroup B disease and particularly that caused by the epidemic strain continued to dominate in 2005. Serotyping and PCR analysis of either isolates or DNA from cases showed that in 2005 76.4% of group B cases possessed the P1.7b,4 PorA protein.

The antimicrobial susceptibility of all 128 viable meningococcal isolates received at ESR from cases of invasive disease in 2005 was tested. All isolates were susceptible to penicillin, ceftriaxone, rifampicin and ciprofloxacin. 14.8% (19/128) of isolates had reduced susceptibility to penicillin, with MICs of 0.12-0.5 mg/L.

MUMPS

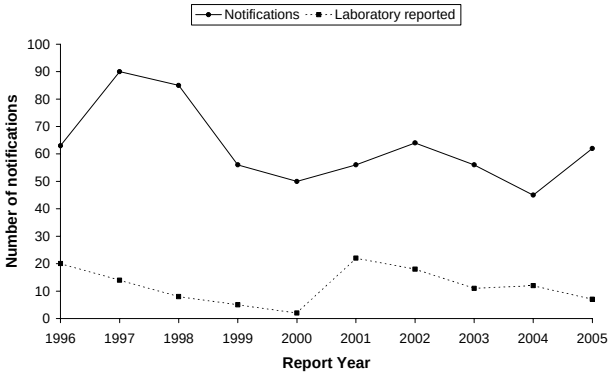
A total of 62 cases of mumps were notified and 7 cases were laboratory-reported in 2005. In comparison, during 2004, 45 cases of mumps were notified and 12 cases were laboratory confirmed.

After the last epidemic in 1994 involving 250 cases, mumps became a notifiable disease in June 1996. Figure 25 shows notified and laboratory-reported cases from 1996 to 2005.

There was a small increase in the 2005 notification rate of 1.7 per 100 000 population from the 2004 rate of 1.2 per 100 000 population (45 cases). The rate has changed little over the last seven years (range 1.2 per 100 000 to 1.7 per 100 000).

There were no mumps cases reported in the less than one-year age group. Age-specific rates were highest in cases aged 1-4 years (10.6 per 100 000 population, 23 cases) and 5-9 years (3.5 per 100 000, 10 cases).

Figure 25. Mumps notifications and laboratory reported cases by year, 1996 - 2005



The 2005 mumps notification rate for males (1.9 per 100 000 population, 34 cases) was higher than for females (1.5 per 100 000, 28 cases).

The highest ethnicity rate occurred among cases of Other ethnicity (3.2 per 100 000 population, 8 cases), followed by those of Maori ethnicity (3.0 per 100 000, 16 cases).

Of the 62 cases notified during 2005, 56 (90.3%) had hospitalisation information recorded. Of these 4 cases were hospitalised. Two mumps cases reported overseas travel during the incubation period. Of the 41 cases for which this information was recorded, 18 (43.9%) attended school, pre-school or childcare.

The recommended immunisation schedule for mumps in 2005 was two doses of MMR vaccine, the first given at 15 months of age and the second given at age 4 years of age [20]. Vaccination status was recorded for 45 cases (72.6%) notified during 2005. Of these, 20 (44.4%) had received at least one dose of MMR vaccine. Table 14 shows the number of doses of MMR vaccine given to mumps cases in each relevant age group.

PARATYPHOID FEVER

Twenty-five cases of *Salmonella* Paratyphi were notified in 2005. The 2005 notification rate (0.7 per 100 000 population) was the same as the 2004 rate, which was higher than 2002 (0.4 per 100 000, 28 cases) and 2003 (0.5 per 100 000, 18 cases) but lower than 2001 (0.9 per 100 000, 32 cases).

Figure 26 shows the number of notified and laboratory-reported cases of paratyphoid each year since 1996.

Table 14. Mumps notifications by age group and vaccination received, 2005

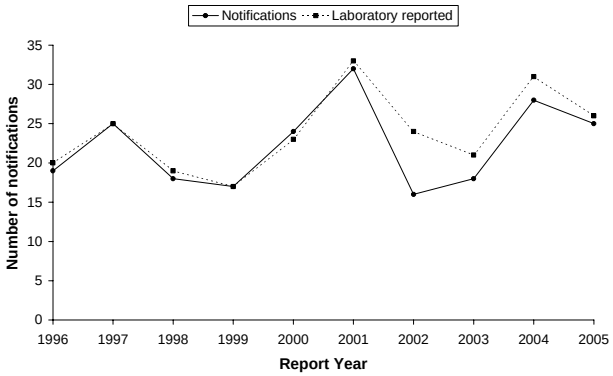
Age group	Total cases	Vaccination Status					
		1 dose	2 doses	3 doses	Vaccinated (no dose info)	Not vaccinated	Unknown
<15mths	1	(0)	(0)	0	0	1	0
15mths-3yrs	16	9	(0)	0	3	2	2
4-9 yrs	16	4	2	1	2	2	5
10-19 yrs	12	2	2	0	2	1	5
20+ yrs	17	0	0	0	2	10	5
Total	62	15	4	1	9	16	17

Note: Numbers in brackets indicate vaccination when the case was ineligible

The highest notification rates were reported for cases aged 20-29 years (2.5 per 100 000, 12 cases) followed by those aged 30-39 years (1.0 per 100 000, 6 cases). Ethnicity specific rates were highest in those of Other ethnicity (2.8 per 100 000, 7 cases).

Of the 19 cases for which hospitalisation status was recorded, 10 (52.6%) were hospitalised.

Figure 26. Paratyphoid fever notifications and laboratory reported cases by year, 1996 - 2005



Overseas travel information was recorded for 18 of the 25 cases. Ten of the 18 cases (55.6%) were recorded as having travelled overseas during the incubation period for the disease. The countries visited were: India (4), Malaysia and Indonesia (2 each) and Cambodia, Singapore and the Middle East (1 case each). Some cases visited more than one country.

The Enteric Reference Laboratory at ESR received 26 *S.* Paratyphi isolates in 2005. The isolates were identified as *S.* Paratyphi A (8), *S.* Paratyphi B (3), and *S.* Paratyphi B var Java (15).

PERTUSSIS (WHOOPING COUGH)

Pertussis is a vaccine preventable disease caused by the bacterial agent *Bordetella pertussis* with epidemics at four to five year intervals. Childhood vaccination has been routine in New Zealand since 1960, and the disease has been notifiable since 1996.

In 2005 there were 2720 pertussis cases notified (72.8 cases per 100 000 population). The 2005 notification rate is a significant decrease from 2004 (93.3 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. The first three months of 2005 saw a steady decline in numbers, dropping from 422 in January to 138 in April. For the remainder of the year, monthly totals were steady with an average of 191 cases per month. By comparison, in 2003, prior to the start of this epidemic, on average 49 cases were notified each month. The annual 2003 rate was 15.7 per 100 000 population (585 cases). The epidemic prior to this one commenced in 1999 (Figure 27).

In 2005, as in 2004, the rate of pertussis varied by geographic region (Figure 28).

For both years the highest rates were reported from the following four South Island DHBs (South Canterbury, Southland, Canterbury, and Nelson-Marlborough) and the Waikato DHB in the North Island. The highest rate in 2005 was 261.5 per 100 000 population (138 cases) in South Canterbury while in 2004, Southland reported a rate of 592.2 per 100 000 population (612 cases).

Figure 27. Pertussis notifications and laboratory confirmed cases by year, 1996 - 2005

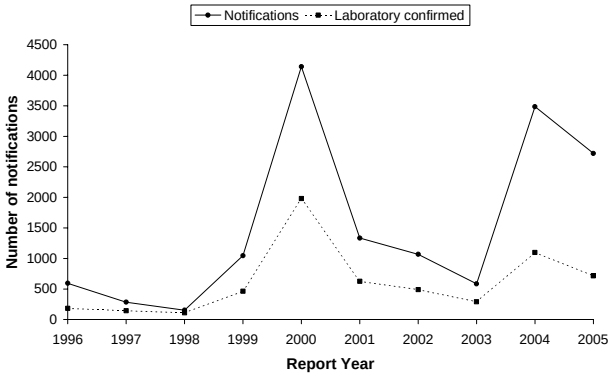
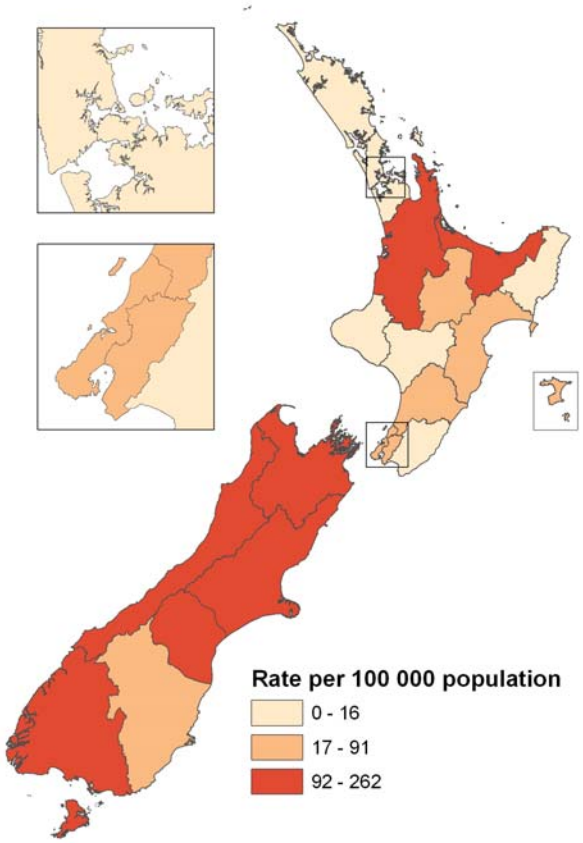


Figure 28. Pertussis notifications by DHB, 2005



The highest age specific rates were for cases aged less than one year (225.1 per 100 000 population, 123 cases), followed by cases aged 10-14 years (123.8 per 100 000 population, 360 cases). In 2005, 54.5% 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 2005, as in 2004 and 2000, a higher proportion of cases were female (61.4%, 1657/2700).

When stratified by age and ethnicity, the highest rates were in Maori children aged less than one year (349.7 per 100 000 population, 49 cases). This rate is only 2% less than that observed in 2004, while rates for European and Pacific

Peoples children aged less than one year are, in 2005, 38.1% and 36.3% less than that for the previous year.

Of the 2391 cases for which hospitalisation status was recorded in 2005, 110 (4.6%) were hospitalised. Of those hospitalised, 31 were known to have started the vaccination schedule; four had been given four doses of vaccine, while two had completed the course of vaccinations. There were no fatal cases of pertussis recorded in 2005.

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

Vaccination status was known for 49.0% (1333/2720) of the cases notified during 2005. Of these, 1060 (79.5%) were recorded as having had at least one dose of vaccine although dose details are only recorded for 641 of these cases. Table 15 shows the number of doses of vaccine given to cases in each relevant age group. A total of 570 cases had received three or more doses of pertussis vaccine.

PLAGUE

The last case of *Yersinia pestis* infection in New Zealand was reported in 1911 during the last plague pandemic, which originated in Hong Kong in 1894. Between 1900 and 1911, 21 cases of plague were recorded in New Zealand, nine of which were fatal [11].

After a worldwide low of 200 plague cases reported to the WHO in 1981, case numbers continued to increase with a peak of 5419 cases in 1998 [24]. In 2003, 2118 cases of human plague were reported globally resulting in 182 fatalities [25]. 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 [24].

POLIOMYELITIS (POLIO)

There were no polio notifications in 2005. The last case of wild-type polio virus infection was in 1962. Cases of vaccine-associated paralytic poliomyelitis (VAPP) have occurred in 1970, 1977, 1990 and 1998 following oral polio vaccine (OPV) administration. Since February 2002 only Inactivated Polio Vaccine (IPV), which cannot cause VAPP, has been available in New Zealand.

The New Zealand Paediatric Surveillance Unit carries out active surveillance of acute flaccid paralysis (AFP). In 2005 there were nine cases of AFP notified to the unit. Seven of the cases were classified as non-polio with classification for the remaining two cases still pending.

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 [26].

RABIES

New Zealand is classified as a rabies free country [27]. There were no notifications of rabies in 2005. 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 [28].

RICKETTSIAL DISEASE

One case of rickettsial disease was notified in 2005 compared to two cases in 2004. The case was a laboratory confirmed 54-year-old European male who was hospitalised. No source of infection was reported, however, the case had an occupational exposure risk (farmer). The travel history of the case was unknown.

Hospitalisation data for 2005 record two additional cases. One case was a 45 year old Indian female and the second case was a 33 year old European male.

Table 15. Pertussis notifications by age group and vaccination received, 2005

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	13	(0)	(0)	(0)	(0)	(0)	0	9	4
6wk - 2mths	39	9	(0)	(0)	(0)	(0)	1	23	6
3 - 4mths	27	7	5	(0)	(0)	(0)	2	8	5
5 - 14mths	58	3	2	24	(0)	(0)	5	11	13
15mths - 3yrs	138	3	0	12	52	(0)	19	36	16
4+ yrs	2443	22	20	153	235	93	391	186	1343
Unknown	2					1	1		
Total	2720	44	27	189	287	94	419	273	1387

Note: Numbers in brackets indicate vaccination when the case was ineligible.

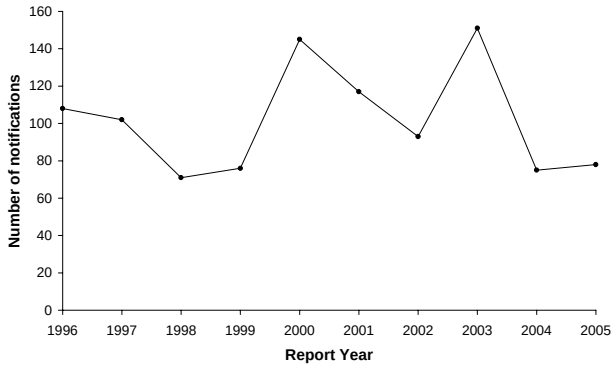
RHEUMATIC FEVER

In 2005, 75 initial attack cases (Figure 29) and 3 recurrent cases of rheumatic fever were notified. For initial cases this represents a population rate of 2.0 per 100 000, the same rate observed in 2004 (73 cases).

For recurrent cases there was also no change in the notification rate (0.1 per 100 000 population) between 2004 (2 cases) and 2005.

In 2005, the rates of initial attack cases of rheumatic fever varied by geographical region with the highest rates reported in the Northland (6.4 per 100 000 population, 9 cases) and Counties Manukau (5.9 per 100 000, 22 cases) DHBs. The three recurrent cases were reported in the Capital and Coast (2 cases) and Hutt (1 case) DHBs.

Figure 29. Rheumatic fever (initial attack cases) by year, 1996 - 2005



Of the 75 initial attack rheumatic fever cases, 31/37 (83.8%) for which lab diagnosis was recorded had a laboratory confirmed diagnosis for streptococcal infection.

The notification rate of initial attack cases was 2.5 per 100 000 (45 cases) in males and 1.3 per 100 000 in females (24 cases). The majority (82.7%) of cases were aged less than 19 years and the highest rates were in the 10 to 14 year age group (11.4 per 100 000, 33 cases).

In 2005 the rates of initial attack cases were highest in Pacific Peoples (9.0 per 100 000, 18 cases) and Maori (7.0 per 100 000, 37 cases) ethnic groups.

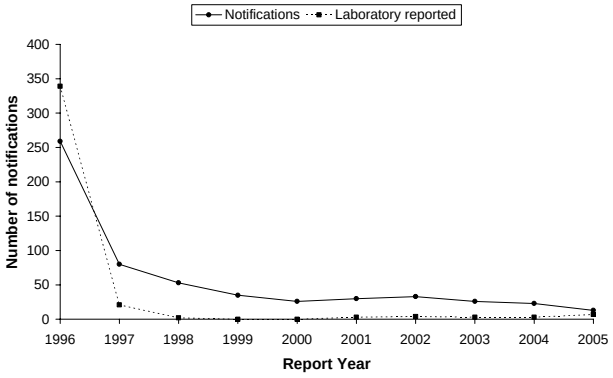
Of the 45 cases where hospitalisation data was recorded in EpiSurv, 41 (91.1%) were hospitalised.

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 13 cases of rubella were notified and 7 were laboratory-reported in 2005. In comparison, during 2004, 23 cases of rubella were notified and 3 were laboratory-reported. No cases of congenital rubella were notified in 2005.

Figure 30 shows notified and laboratory-reported cases from 1996 to 2005. The 2005 rubella notification rate was 0.3 per 100 000 population which is slightly lower than the 2004 rate of 0.6 per 100 000 population.

Figure 30. Rubella notifications and laboratory reported cases by year, 1996 - 2005



All cases were aged less than 9 years. Age-specific rates were highest in the 1-4 years age group with a rate of 4.6 per 100 000 population (10 cases) A total of nine of the notified rubella cases were female and four were male.

Hospitalisation status was recorded for all the cases and one case was admitted to hospital. Of the 10 cases for which this information was reported all of the cases were known to have attended school, pre-school or childcare. 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 [20]. Vaccination status was recorded for 11 cases notified during 2005. Of these, seven had received at least one dose of MMR vaccine. Table 16 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. However, epidemics can occur every six to nine years in populations where vaccinations have not been in use. Since 1998, no further cases of congenital rubella syndrome have been reported to the New Zealand Paediatric Surveillance Unit.

Table 16. Rubella notifications by age group and vaccination received, 2005

Age group	Total cases	Vaccination Status			
		1 dose	2 doses	Not vaccinated	Unknown
<15mths	3	(0)	(0)	3	0
15mths-3yrs	8	5	(1)	1	1
4-9 yrs	2	1	3	0	1
Total	13	6	1	4	2

Note: Numbers in brackets indicate vaccination when the case was ineligible.

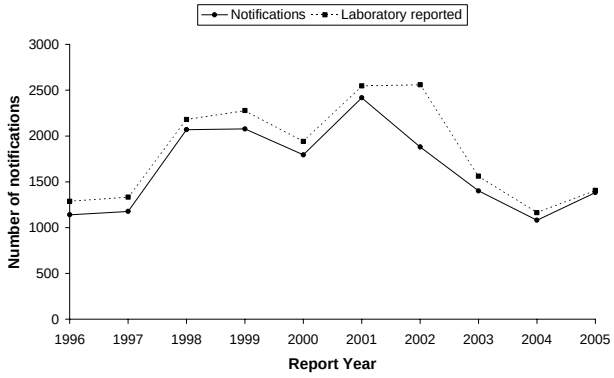
SALMONELLOSIS

A total of 1383 cases of salmonellosis were notified in 2005.

The 2005 notification rate (37.0 per 100 000 population) is a significant increase from the 2004 rate (28.9 per 100 000, 1081 cases) but similar to 2003 (37.5 per 100 000, 1401) and lower than the rates in 2002 (50.3 per 100 000, 1880) and 2001 (64.7 per 100 000, 2417).

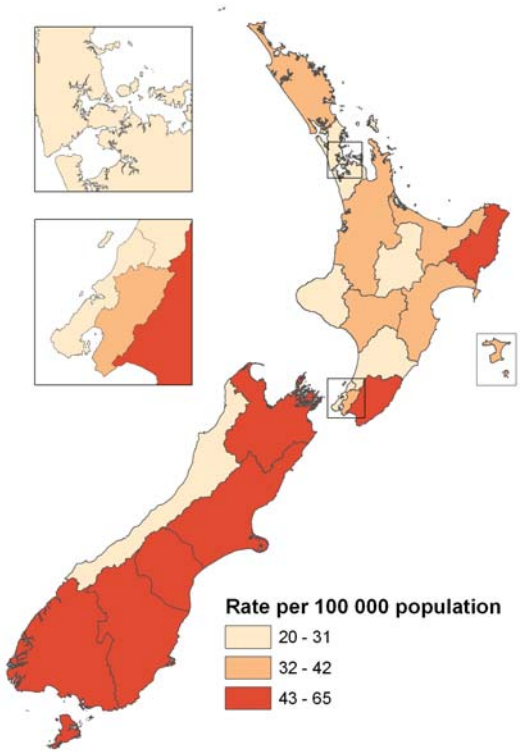
Figure 31 shows the number of notified and laboratory-reported cases of salmonellosis by year since 1996.

Figure 31. Salmonellosis notifications and laboratory reported cases by year, 1996 - 2005



Rates varied throughout the country as illustrated in Figure 32. The highest rates were reported in Wairarapa (65.4 per 100 000 population, 25 cases), Nelson Marlborough (64.5 per 100 000, 79), and Southland (59.0 per 100 000, 61) DHBs.

Figure 32. Salmonellosis notifications by DHB, 2005



There were slightly more male cases (705 cases, 38.7 per 100 000 population) than female (661, 34.5 per 100 000). The highest ethnicity specific rates were reported for cases of European ethnicity (37.0 per 100 000 population, 967 cases), followed by those of Other ethnicity (26.8 per 100 000, 67 cases) followed by Maori (26.4 per 100 000, 139) and Pacific Peoples (16.0 per 100 000, 32). Age-specific rates were highest for the 1-4 years age groups (132.3 per 100 000, 286) followed by the less than one-year age group (124.4 per 100 000, 68 cases).

Of the 1134 cases for which hospitalisation status was recorded, 142 (12.5%) were hospitalised, which is the same rate as 2004. There was one death attributed to salmonellosis in 2005.

Among the cases for which this risk factor information was recorded, 50.5% (357/707) had consumed food from retail premises, 26.1% (239/916) had contact with farm animals, 20.9% (164/784) had consumed untreated water, 18.8% (196/1041) had been overseas, 16.0% (137/858) had recreational water contact, 12.3% (106/862) had contact with faecal matter, and 8.1% (70/859) had contact with symptomatic people during the incubation period.

In 2005 the Enteric Reference Laboratory at ESR received 1406 *Salmonella* isolates (exclusive of *S.* Paratyphi and *S.* Typhi reported elsewhere).

Table 17 shows the number of cases of selected *Salmonella* types reported by the Enteric Reference Laboratory at ESR. In 2005 the incidence of all *S.* Typhimurium definitive types (DT) increased compared with 2004 but was less than the levels seen in 2002 and 2003. DT160 remained the most common single type.

Table 17. Selected *Salmonella* serotypes and subtypes of laboratory-confirmed salmonellosis, 2001 - 2005

Subtype	2002	2003	2004	2005
S. Typhimurium	1267	953	579	757
DT160	561	334	221	248
DT1	225	110	65	114
DT135	155	68	30	54
DT156	85	95	56	75
DT101	44	66	31	67
Other or unknown	197	280	177	199
S. Enteritidis	172	137	142	151
PT9a	88	65	44	73
PT4	41	22	11	9
Other or unknown	43	50	87	69
S. Infantis	94	89	63	67
S. Brandenburg	85	55	86	68
S. Saintpaul	35	27	33	65
S. Thompson	25	10	22	16
S. Mississippi	9	15	10	22
Other or unknown serotypes	380	315	228	260
Total	2020	1560	1163	1406

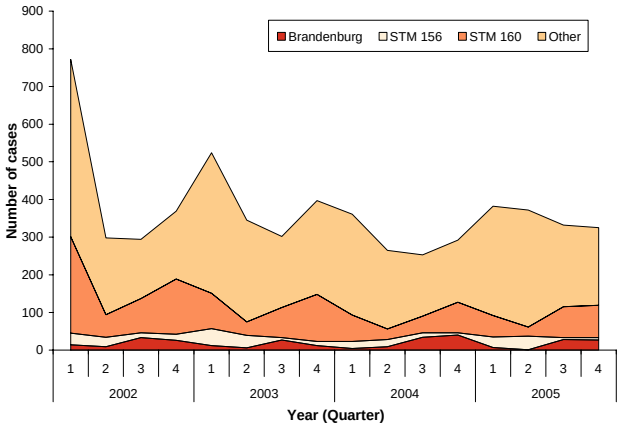
[a] Excludes *S.* Paratyphi and *S.* Typhi already noted elsewhere

Figure 33 illustrates examples of *Salmonella* types that have emerged in recent years and their changing contribution to the overall *Salmonella* burden in New Zealand.

The contribution of *S.* Typhimurium DT160 remained significant throughout 2005.

There were 26 outbreaks of salmonellosis reported in 2005, involving 120 cases (see Outbreak Surveillance).

Figure 33. Laboratory reported cases of *S.* Brandenburg, STM 156 and STM 160 by quarter, 2002 - 2005



SARS (SEVERE ACUTE RESPIRATORY SYNDROME)

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 coronavirus [29]. 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 [30]. Subsequently, two other researchers working at the same facility also tested positive for SARS antibodies [31].

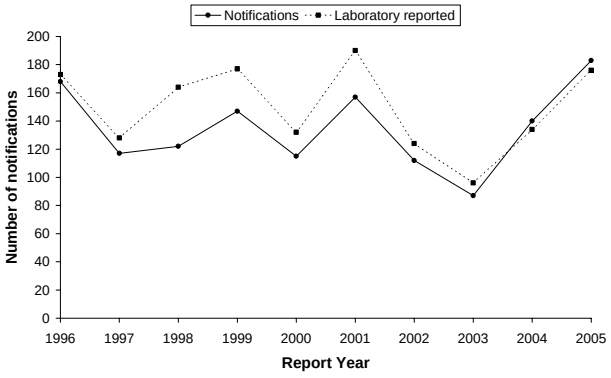
No cases of SARS were reported in New Zealand in 2005.

SHIGELLOSIS

A total of 183 cases of shigellosis were notified in 2005. The 2005 notification rate (4.9 per 100 000 population) is a significant increase from the 2004 rate (3.7 per 100 000, 140 cases). This is the second consecutive year of significant increases in the rate of shigellosis. A major contribution to the increase in 2005 was the 48 cases associated with the Northland outbreak.

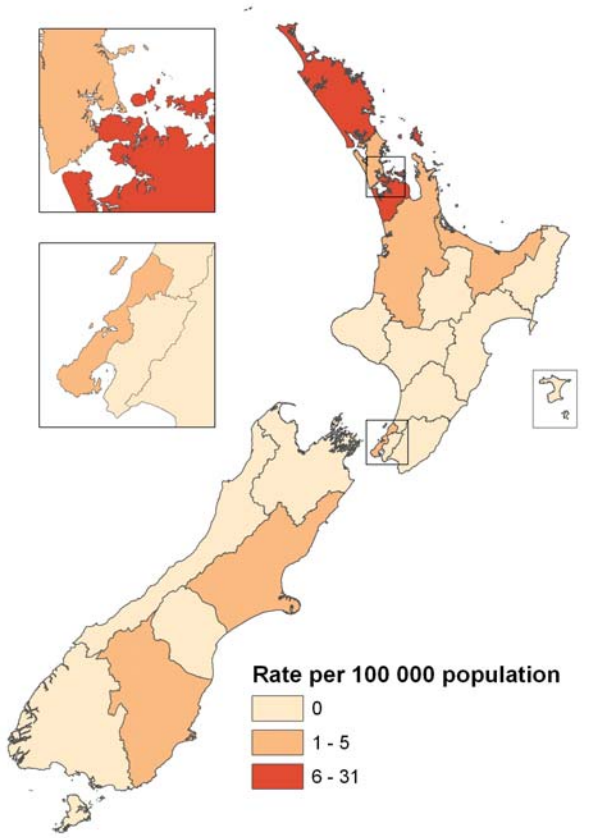
Figure 34 shows the number of notified and laboratory-reported cases of shigellosis each year since 1996.

Figure 34. Shigellosis notifications and laboratory reported cases by year, 1996 - 2005



The rate of shigellosis varied throughout the country in 2005, as Figure 35 illustrates. The highest rates were reported in Northland (31.4 per 100 000 population, 44 cases), Auckland (10.1 per 100 000, 37) and Counties Manukau (6.4 per 100 000, 24) DHBs.

Figure 35. Shigellosis notifications by DHB, 2005



Of the 2005 cases, 91 cases were male (5.0 per 100 000 population) and 87 cases (4.5 per 100 000) were female. The highest age-specific rate occurred among cases aged 1-4 years (8.8 per 100 000, 19) followed by those aged 20-29 years (7.4 per 100 000, 36).

The highest ethnicity specific rate was reported for Pacific Peoples (13.0 per 100 000 population, 26) followed by Maori (8.6 per 100 000, 45). European had the lowest reported rate (2.6 per 100 000, 68).

Of the 138 notified cases for which hospitalisation status was recorded, 24 (17.4%) were hospitalised.

Among cases for which risk factors were recorded, 50.0% (59/118) reported overseas travel during the incubation period, 25.7% (18/70) had consumed food from retail premises, 20.0% (20/100) contact with other symptomatic people, 19.7% (13/66) had consumed untreated water and 16.3% (13/80) contact with a case, and 10.7% (9/84) had contact with faecal matter.

Of those cases that reported overseas travel during the incubation period the overseas destinations were: India (17), Fiji (13), Nepal and Indonesia (3 each), Thailand, Cambodia, Vanuatu, Singapore, Mexico, Samoa, Western Samoa, South Africa, South America and Tonga (2 each).

The Enteric Reference Laboratory at ESR received 176 *Shigella* isolates during 2005. The predominant serogroups identified were: S. *sonnei* biotype a (93, 52.0%), S. *sonnei* biotype g (32, 18.2%), S. *flexneri* (6, 3.4%).

Five shigellosis outbreaks were reported in 2005, involving 58 cases (see Outbreak Surveillance). One outbreak reported in Northland accounted for 48 of these cases. An investigation implicated shellfish as the primary source of the infection.

TAENIASIS

No cases of taeniasis were notified in 2005. 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 case of tetanus notified in 2005 involving the hospitalisation of a 78 year old male. The suspected source was a laceration from a saw. History of prior tetanus vaccination was unknown. Global tetanus cases have been decreasing as worldwide vaccination coverage has increased. In 1980 there were 114 248 tetanus cases reported to the WHO with estimated global vaccination coverage of 20%. In contrast, there were 13 448 reported cases in 2004 with an estimated global vaccination coverage of 78% [32].

TOXIC SHELLFISH POISONING

Three cases of toxic shellfish poisoning were notified in 2005 compared to none in 2004. One of the cases was self-notified. One case was a 52 year old European female, the second case was a 52 year old Maori female, and the third case was a 46 year old Pacific female. Two cases were hospitalised. One case was associated with eating mussels, one case with oysters, and one case with both mussels and cockles. In one case Neurotoxic Shellfish Poisoning toxins were detected.

TRICHINELLOSIS

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 3 notifications [33]. The first case was reported in 1992 and an overseas source of infection was suspected. The other two 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 [34].

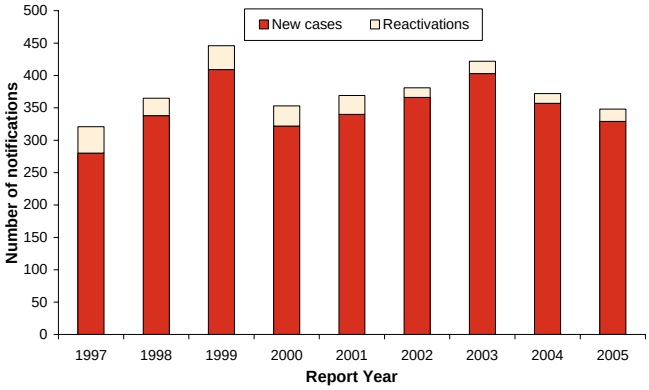
TUBERCULOSIS

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 2005, 348 cases of tuberculosis (new and reactivations) were notified, of which 19 (5.5%) were reactivations. This represents a population rate of 9.3 per 100 000 population which is similar to that reported in 2004 (10.0 per 100 000, 372 total cases including 15 reactivations). In 2005, a total of 252 (72.4%) cases were reported as laboratory confirmed in EpiSurv.

Figure 36 shows the total number of new tuberculosis cases and reactivations reported since 1997.

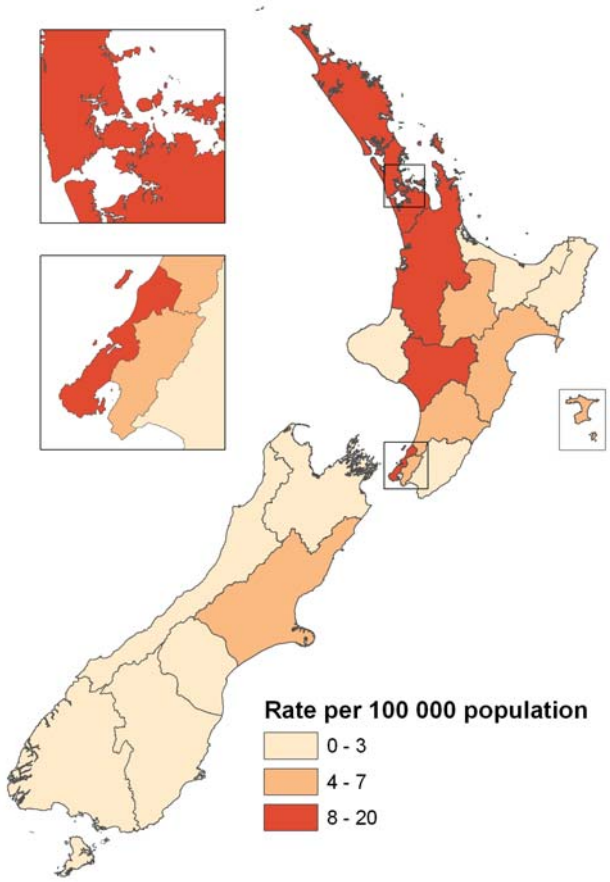
Figure 36. Tuberculosis notifications - new cases and reactivations by year, 1997 - 2005



Reports of new tuberculosis cases

In 2005, the rates of new tuberculosis notifications per 100 000 population differed by geographical region (Figure 37). Auckland DHB had the highest rate (18.5 per 100 000 population, 68 cases).

Figure 37. Tuberculosis notifications (new cases) by DHB, 2005



There were 14 cases aged less than five years with another 17 aged between 5 and 15 years. The highest age specific rate was for persons aged 20–29 years (17.5 per 100 000 population, 85 cases). For females, the rate for this age group (19.2 per 100 000 population, 48 cases) was twice that of the next highest rate for females aged 30-39 years (9.6 per 100 000 population, 29 cases). The 20-29 year age group also had the highest rate for males (15.6 per 100 000 population, 37 cases). Overall, for new tuberculosis cases, 168 cases were male and 160 were female (sex for one case was unknown).

As in previous years, the highest ethnicity specific rate was for those classified as Other ethnicity (76.5 per 100 000 population, 191 cases) followed by those of Pacific Peoples

(23.0 per 100 000, 46) and Maori (8.6 per 100 000, 45) ethnicity.

Of the 302 new cases in 2005 for which hospitalisation data were recorded, 175 (57.9%) were hospitalised. Four deaths in 2005 were due to tuberculosis disease (age range 47 to 73 years). BCG vaccination status was recorded for 176 cases and vaccination was confirmed for 118 (67.0%) of those cases. A further 21 (11.9%) cases had unconfirmed positive vaccination status.

In 2005, 225 cases (76.3% of cases for whom this information was recorded) were born outside New Zealand. Of the 70 cases that were known to have been born in New Zealand, 10 had been or were presently residing with a person born outside New Zealand. Of the 241 cases for which these data were recorded, 74 (30.7%) reported contact with a confirmed case of tuberculosis.

Reactivations of tuberculosis

Fourteen of the 19 reactivations were from the combined Auckland DHBs. Fourteen cases (73.7%) were aged 50 years or over. There were more male than female reactivations (12 versus 7 respectively). Sixty eight percent (13/19) of the reactivations were of Other ethnicity.

Hospitalisation data were recorded for all reactivations, and 15 (78.9%) cases were hospitalised. There were no recorded fatalities amongst the reactivation cases. Vaccination status was recorded for 11 cases, of which vaccination was confirmed for three cases and unconfirmed for an additional case.

In 2005, information on the place where the diagnosis was made and country of birth was recorded for 18 of the 19 reactivated cases. The first diagnosis of tuberculosis disease was made in New Zealand for 6 cases and overseas for 12 cases. Table 18 shows the cases treated for tuberculosis disease by place of original diagnosis.

Table 18. Treatment of place of original TB disease diagnosis for reactivations, 2005

Place of TB disease diagnosis	Case treated for TB disease			
	Yes	No	Unknown	Total
Overseas	10	0	1	12
New Zealand	4	1	1	6
Unknown			1	1
Total	14	1	4	19

Table 19 shows the place where the original tuberculosis disease diagnosis was made stratified by the country of birth.

Table 19. Country of birth and place of original TB disease diagnosis for reactivations, 2005

Place of TB disease diagnosis	Country of birth of case		
	New Zealand	Overseas	Total
Overseas	0	12	12
New Zealand	5	1	6
Unknown	0	1	1
Total	5	14	19

Antimicrobial drug resistant tuberculosis

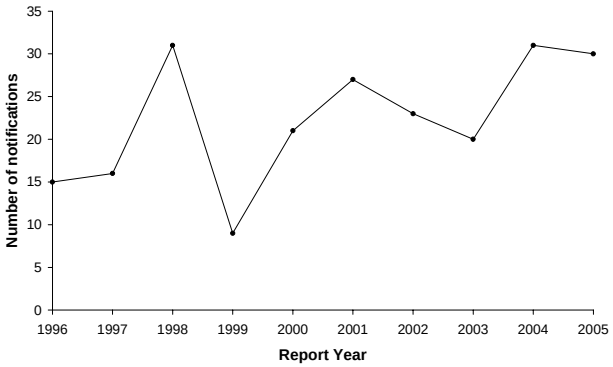
Data on antimicrobial drug resistant tuberculosis is published on the www.surv.esr.cri.nz website at

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

TYPHOID FEVER

Thirty cases of typhoid were notified in 2005. The 2005 rate of 0.8 per 100 000 is the same as the 2004 rate (0.8 per 100 000 population, 31 cases). Figure 38 shows typhoid notifications by year since 1996.

Figure 38. Typhoid notifications by year, 1996 - 2005



Five cases were aged 5-9 years (1.7 per 100 000 population) and 8 cases were aged 20-29 years age group (1.6 per 100 000). Male rates of typhoid fever 1.0 per 100 000, 18 cases) were higher than female rates (0.4 per 100 000, 8 cases).

Hospitalisation status was recorded for 25 cases, of which 20 (80.0%) were hospitalised.

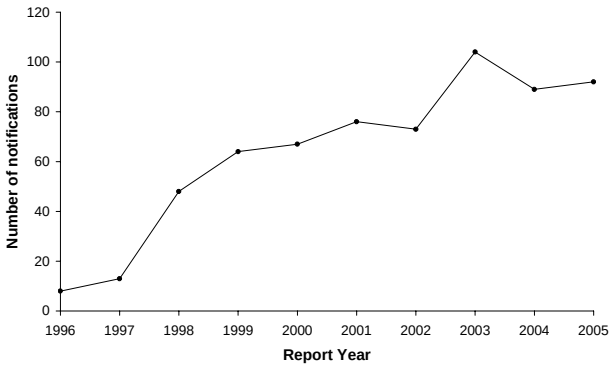
Overseas travel information was recorded for 26 of the 30 cases. Of these, 24 (92.3%) were recorded as having travelled overseas during the incubation period for this disease. The countries visited were: India (11), Samoa (7), Cambodia (4), Western Samoa and Thailand (2 each) and Kiribati (1).

There were 28 *Salmonella* Typhi isolates referred to the Enteric Reference Laboratory at ESR in 2005.

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

There were 92 cases of Verotoxigenic *Escherichia coli* infection (VTEC), also known as Shigatoxigenic *Escherichia coli* infection (STEC), notified in 2005 (Figure 39). The 2005 notification rate (2.5 cases per 100 000 population) is slightly higher than the 2004 rate (2.4 per 100 000, 89 cases). Six cases of VTEC/STEC-associated haemolytic uraemic syndrome (HUS) were reported to the New Zealand Paediatric Surveillance Unit (NZPSU) in 2005.

Figure 39. VTEC/STEC notifications by year, 1996 - 2005



In 2005, 36 cases (2.0 per 100 000 population) were male and 55 (2.9 per 100 000) were female.

The highest age specific rates were reported in cases aged less than 1 year (18.3 per 100 000, 10 cases) followed by those aged 1-4 years (16.7 per 100 000 population, 36 cases). The highest ethnicity specific rates were reported for those of European ethnicity (2.8 per 100 000 population, 73 cases), followed by Maori (2.5 per 100 000, 13 cases).

Among cases for which risk factor information was recorded, 71.6% (53/74) reported contact with animals the week before becoming ill (76.9% (38/50) with pets, 66.7% (34/51) with farm animals, 51.4% (18/35) with animal manure and 35.0% (14/40) with other animals), 36.4% (24/66) had contact with children in nappies 23.6% (17/72) had recreational contact with water, 22.2% (14/63) reported contact with a person with similar symptoms.

Among cases for which food risk factor information was recorded, the most commonly reported risks were 90.9% (60/66) reported consuming raw fruit or vegetables, 77.9% (53/68) reported consuming dairy products and 72.3% (47/65) reported consuming beef or beef products.

The Enteric Reference Laboratory at ESR received a total of 92 VTEC/STEC isolates: Of these 85 (92.4%) were identified as serotype O157: H7, and seven as non-O157: H7.

YELLOW FEVER

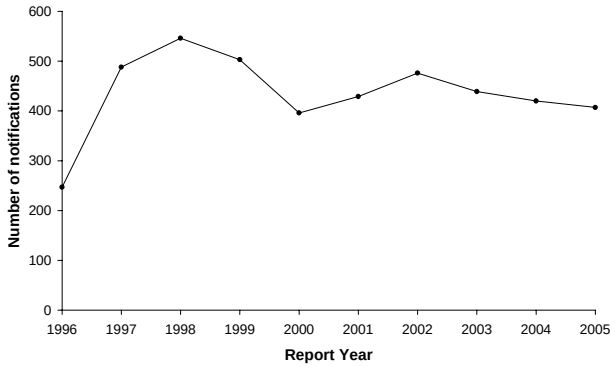
No cases of yellow fever were notified in 2004 or 2005.

YERSINIOSIS

A total of 407 cases of yersiniosis were notified in 2005. The 2005 rate (10.9 per 100 000 population) is slightly lower than the 2004 rate (11.2 per 100 000, 420 cases).

Figure 40 shows the number of notified cases of yersiniosis by year since 1996.

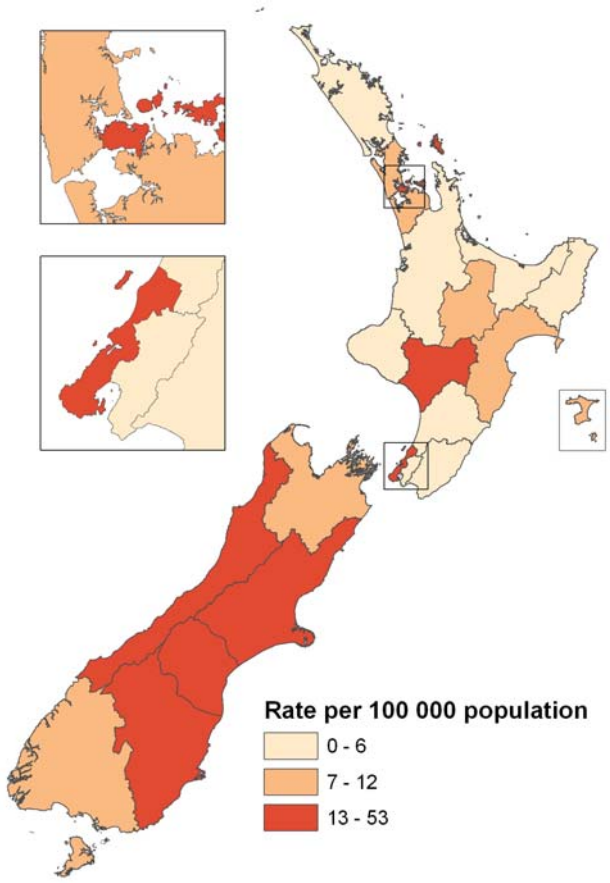
Figure 40. Yersiniosis notifications by year, 1996 - 2005



Notification rates varied throughout the country as illustrated in Figure 41.

The highest rates were recorded in the West Coast (52.9 per 100 000 population), Capital and Coast (19.5 per 100 000), and Whanganui (18.9 per 100 000) DHBs.

Figure 41. Yersiniosis notifications by DHB, 2005



In 2005, 216 cases (11.8 per 100 000 population) were male and 180 (9.4 per 100 000) were female.

The highest ethnicity specific rates were reported for those of Other ethnicity (20.8 per 100 000 population, 52 cases) followed by those of European ethnicity (9.1 per 100 000, 238 cases). The lowest rates were reported among Maori and Pacific Peoples.

Of the 253 cases for which hospitalisation status was recorded, 41 (16.2%) were hospitalised.

Of the yersiniosis cases for which risk factor information was recorded 45.5% (75/165) had consumed food from retail premises, 24.1% (52/216) had contact with farm animals, 20.2% (36/178) had consumed untreated water, 17.1% (35/205) had recreational water contact, 10.5% (24/228) had travelled overseas during the incubation period, 10.1% (20/198) had contact with faecal matter and 8.4% (17/202) had contact with other symptomatic people.

Two yersiniosis outbreaks were reported in 2005, involving eight cases.

NON-NOTIFIABLE DISEASES

INFLUENZA

National influenza surveillance in 2005 was undertaken between April and September using a sentinel network of 87 general practices. On average, 79 practices, with an average patient roll of 311 724 participated each week.

During the surveillance period, 3929 consultations for influenza-like illness (ILI) were reported. The average weekly consultation rate was 52.5 per 100 000 patient population. This rate is the fourth highest rate recorded by the sentinel surveillance system, since 1997. The 2005 rate was higher than the 2004 but lower than the 2002 rate of 35.5 and 56.6 respectively. The consultation rate remained relatively low throughout the sentinel surveillance period but peaked in week 25 (middle of June), two weeks earlier than the peak in laboratory isolations and hospitalisations in week 27. Considerable activity continued almost until the end of the sentinel surveillance period. Figure 42 compares the weekly consultation rates for influenza-like illness in 2005 with 2004 and 2003.

Figure 42. Weekly sentinel surveillance consultation rates for influenza-like illness, 2003-2005

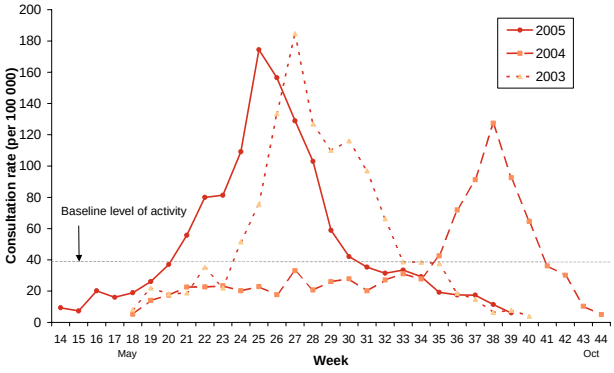
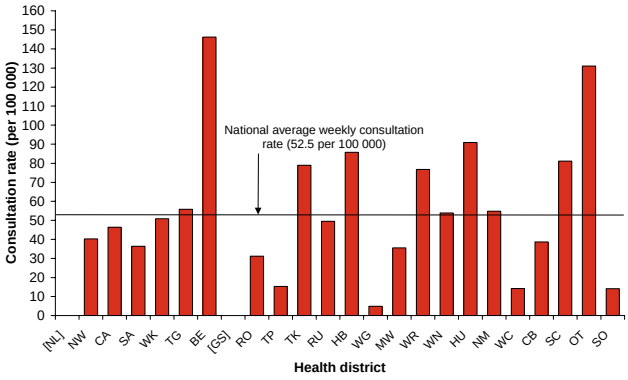


Figure 43 shows the average weekly consultation rates by health district for the influenza season.

Figure 43. Sentinel average weekly consultation rates for influenza-like illness by health districts, 2005

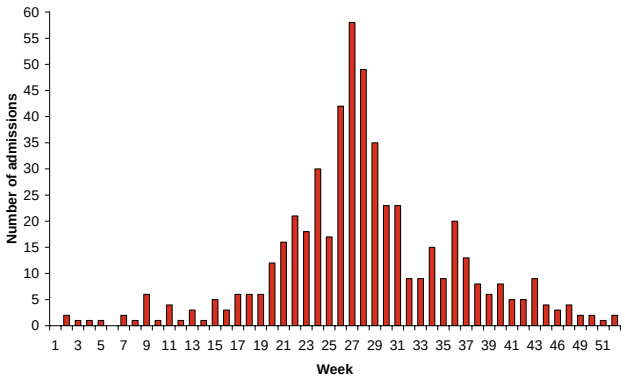


Note: Northland and Gisborne health districts did not participate in 2005 and Taupo participated for less than one month

Consultation rates varied between health districts, with rates above the national average in 10 of the 22 health districts and rates of more than twofold the national average in Eastern Bay of Plenty (146.3 per 100 000) and in Otago (131.0 per 100 000) health districts.

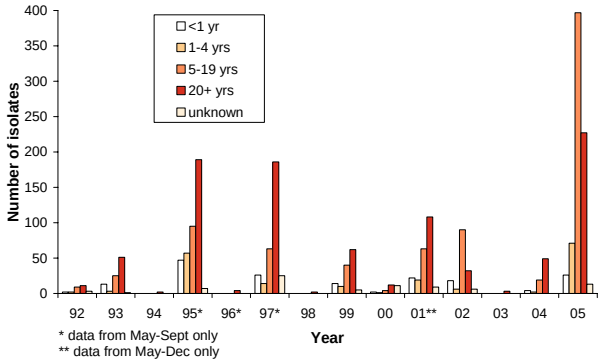
In 2005, there were a total of 528 hospital admissions for influenza. This compares with 430 admissions in 2004 and 593 in 2003. Figure 44 shows these admissions by week, 89.4% (472) of which occurred during May to August. The highest number of admissions (58) occurred at the end of June (week 27). The highest percentage (32%) of hospitalisations due to influenza-like illness occurred in school age children aged 5-19 years (data not shown).

Figure 44. Influenza hospitalisation by week admitted, 2005



New Zealand experienced an influenza B epidemic in school age children in the North Island in 2005. Influenza B has been the cause of the second and third largest influenza outbreaks since influenza surveillance began in 1992. These outbreaks occurred in 1995 and 1997. In 2005, Influenza B isolations in the 5-19 years age group were 4 to 6 times higher than those observed in 1995 and 1997 (Figure 45). In addition, the highest percentage of ILI consultations (35%) and isolations (60%) were in the 5-19 years age group. The epidemic was also associated with significant morbidity, as illustrated by reports in the media of significant school absenteeism. In some schools, particularly in Wellington and Auckland regions, the school absenteeism rate reached more than 20% in June. One Wellington school was closed due to a high rate of respiratory illness. During this epidemic, three children aged 7, 11 and 16 years died of complications from influenza [35].

Figure 45. Influenza B Isolates by age group by year, 1992-2005

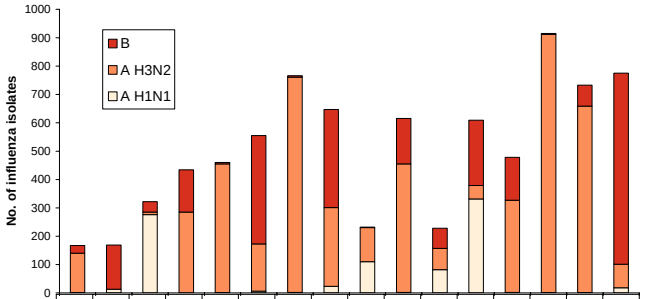


A total 845 of influenza isolates were identified in 2005 - lower than the 864 and 1108 isolates in 2004 and 2003 respectively. Of the 845 isolates, 273 came from sentinel practice surveillance during April to September. This is higher than the 231 sentinel isolates identified in 2004 and 230 isolates in 2003. There were 572 non-sentinel isolates identified in 2005, compared 633 in 2004, and 878 in 2003.

During 2005, the majority of influenza isolates (734 or 86.9% of all isolates) were characterised as influenza B. Influenza A made up 13.1% of all isolates.

Figure 46 shows the number and percentage of typed and subtyped influenza isolates from 1990 to 2005.

Figure 46. Influenza isolates by type, 1990 - 2005



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
B	16%	92%	11%	34%	1%	69%	1%	53%	1%	26%	31%	38%	32%	0%	10%	88%
A H3N2	83%	0%	3%	66%	99%	30%	99%	43%	52%	74%	33%	8%	67%	100%	90%	10%
A H1N1	1%	8%	86%	0%	0%	1%	0%	4%	47%	0%	36%	54%	0%	0%	0%	2%

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. In 2005 there were 18 isolates in which A(H1N1) was detected (2.3%).

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.

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 summary, characterisation of the influenza viruses isolated during the 2005 winter indicated a need for a change in the Influenza A(H3N2) and B component of the vaccine for the 2006 winter. Accordingly, the 2006 Southern Hemisphere winter influenza vaccine has the following composition:

A(H1N1) - an A/New Caledonia/20/1999-like strain

A(H3N2) - an A/California/7/2004-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 [20]. 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 2005 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 2005, and examines trends since 2000. A more detailed account is to be found in the STI Annual Report for 2005 available at www.surv.esr.nz.

The Aids Epidemiology Group carries out HIV/AIDS surveillance and a summary of the figures for 2005 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 STI Annual Report for 2005.

It is important to note the different denominators used to calculate rates in the clinical and laboratory settings. Data from the clinics uses the total number of clinic visits as the denominator. 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 laboratories report more than double the number of cases reported from clinics in the same geographical area. STI cases reported through the clinic-based surveillance system underestimate the true burden of disease in New Zealand because other health providers, particularly general practitioners, diagnose a substantial percentage of STIs. Laboratories receive specimens from all health providers, and so, provide a useful, complementary source of STI incidence data.

CLINIC BASED SURVEILLANCE

Chlamydia

In 2005, genital *Chlamydia trachomatis* infection was the most commonly reported STI in New Zealand.

Table 20. Chlamydia cases and rate by sex and health care setting, 2005

Clinic type	Sex	SHC	FPC	SYHC
Confirmed cases	Female	2 336	1 957	452
	Male	1 976	346	105
	Total	4 312	2 303	557
Total cases[a]	Female	2 556	2 109	456
	Male	2 446	511	110
	Total	5 002	2 620	566
Rate[b] (% of clinic visits)	Female	5.0%	1.2%	0.5%
	Male	6.9%	6.3%	0.3%
	Total	5.7%	1.5%	0.4%

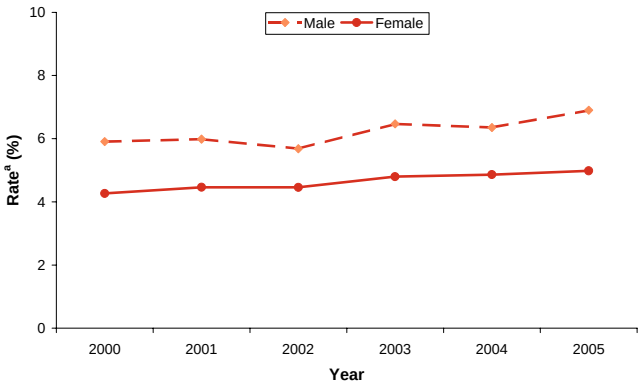
[a] Total number of confirmed and probable cases
[b] Total confirmed and probable cases/number of clinic visits

Between 2004 and 2005, the number of confirmed chlamydia cases increased by 8.7% in SHCs (4312 compared to 3968), 43.7% in FPCs (2303 compared to 1603) and 38.2% in SYHCs (557 compared to 403). In 2005, the number of probable cases accounted for a further 690 cases in SHCs, 317 in FPCs and 9 in SYHCs.

From 2000 to 2005, the total number of chlamydia cases (confirmed and probable) has increased by 38.9% in SHCs (3602 to 5002), by nearly five fold in FPCs (565 to 2620) and by nearly three fold in SYHCs (220 to 566).

In 2005 SHCs, FPCs and SYHCs reported chlamydia rates of 5.7%, 1.5% and 0.4%, respectively. From 2000 to 2005, the rate of chlamydia diagnosed in both males and females at SHCs has increased by 16.8% (see Figure 47).

Figure 47. Rates of chlamydia diagnosed at SHCs, 2000 - 2005



[a] Denominator is the number of clinic visits

These trends may reflect changes in sexual behaviour, but may also be somewhat accounted for by advances in the sensitivity and specificity of new diagnostic techniques.

Gonorrhoea

Between 2004 and 2005, the number of confirmed cases of gonorrhoea increased by 14.4% in FPCs (151 compared to 132) and 50.0% in SYHCs (21 compared to 14). In contrast there was a decrease of 2.0% in SHCs (692 compared to 706). In 2005, the number of probable cases accounted for a further 56 cases in SHCs and 20 in FPCs (Table 21)

Table 21. Gonorrhoea cases and rate by sex and health care setting, 2005

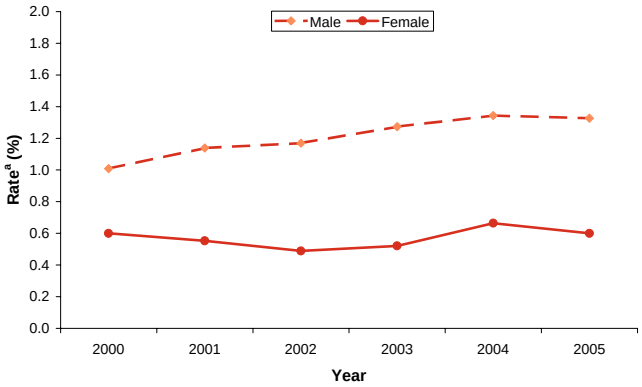
Clinic type	Sex	SHC	FPC	SYHC
Confirmed cases	Female	250	115	12
	Male	442	36	9
	Total	692	151	21
Total cases[a]	Female	274	129	12
	Male	474	42	9
	Total	748	171	21
Rate[b] (% of clinic visits)	Female	0.6%	0.1%	0.1%
	Male	1.3%	0.7%	0.1%
	Total	0.9%	0.1%	0.0%

[a] Total number of confirmed and probable cases
[b] Total confirmed and probable cases/number of clinic visits

From 2000 to 2005, the total number of gonorrhoea cases reported increased by 32.2% in SHCs (566 to 748), 87.9% in FPCs (91 to 171) and almost doubled in SYHCs (6 to 21).

In 2005 SHCs, FPCs and SYHCs reported gonorrhoea rates of 0.9%, 0.1% and 0.01%, respectively. From 2000 to 2005, the rate of gonorrhoea diagnosed in males at SHCs has increased by 31.5% and was unchanged in females (Figure 48).

Figure 48. Rates of gonorrhoea diagnosed at SHCs, 2000 - 2005



[a] Denominator is the number of clinic visits

Genital Herpes (first presentation)

Between 2004 and 2005, the number of cases of genital herpes increased by 2.7% in SHCs (748 compared to 728), 19.0% in FPCs (163 compared to 137) and 50.0% in SYHCs (33 compared to 22) (Table 22).

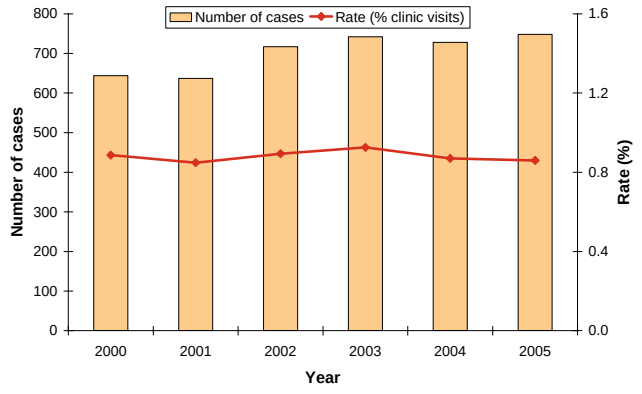
Table 22. Genital herpes (first presentation) cases and rate by sex and health care setting, 2005

Clinic type	Sex	SHC	FPC	SYHC
Total cases	Female	423	140	30
	Male	325	23	3
	Total	748	163	33
Rate[a] (% of clinic visits)	Female	0.9%	0.1%	0.1%
	Male	1.0%	0.6%	0.1%
	Total	0.9%	0.1%	0.0%

[a] Number of cases/number of clinic visits

From 2000 to 2005, the total number of genital herpes cases reported by SHCs has fluctuated. However the rate of genital herpes has remained around 0.9% (Figure 49).

Figure 49. Number of cases and rate of genital herpes (first presentation) diagnosed at SHCs, 2000 - 2005



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.

Genital Warts (first presentation)

Between 2004 and 2005, the number of cases of genital warts remained virtually the same in SHCs (3733 compared to 3732), while increasing by 12.2% in FPCs (533 compared to 475). In contrast there was a slight decrease of 15.6% in SYHCs (103 compared to 122).

Table 23. Genital warts (first presentation) cases and rates by sex and health care setting, 2005

Clinic type	Sex	SHC	FPC	SYHC
Total cases	Female	2 019	424	84
	Male	1 714	109	19
	Total	3 733	533	103
Rate[a] (% of clinic visits)	Female	3.9%	0.3%	0.1%
	Male	4.8%	1.6%	0.1%
	Total	4.3%	0.3%	0.1%

[a] Number of cases/number of clinic visits

From 2000 to 2005, the rate of genital warts reported by SHCs has increased from 4.3% and 4.5%. Though this appears insignificant the very large number of clinic visits in the denominator masks the effect of the increasing number of cases.

Infectious Syphilis

Between 2004 and 2005, the number of cases of syphilis increased slightly in SHCs (44 to 47). FPCs reported 2 cases of syphilis and no cases were reported in SYHCs. In 2005, the rate of syphilis at SHCs was 0.1%. Between 2000 and 2005 the number of cases diagnosed at SHCs has varied, but the numbers remain low: 13 (in 2000), 18 (in 2001), 47 (in 2002), 30 (in 2003), 44 (in 2004) and 47 (in 2005).

The mean age of syphilis cases was 34 years (range 17-71 years). Of the 49 syphilis cases reported in 2005, 34 (69%) were male and 15 (31%) 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 2005, there were 858 reported cases of NSU in SHCs, 13 cases in FPCs and 6 cases in SYHCs. Between 2000 and 2005 the number of cases diagnosed at SHCs has fluctuated: 800 (in 2000), 1 055 (in 2001), 1 123 (in 2002), 1 054 (in 2003), 948 (in 2004) and 858 (in 2005).

LABORATORY SURVEILLANCE

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

Chlamydia

In general, from 2001 to 2005, the overall rate of chlamydia diagnosed by participating laboratories in Auckland, Waikato and BOP has risen more or less steadily by 51.6%, from 491

per 100 000 to 744 per 100 000. This increase is significant and has been seen in all three regions and both sexes.

This trend in chlamydia rates and numbers can be explained, in part, by increasing test volumes and the introduction of more sensitive diagnostic techniques. However, the slight increase in the numbers of specimens tested cannot explain all of the reported increase.

Figure 50 and Figure 51 shows the chlamydia rates from 2000 to 2005. From 2004 to 2005, the chlamydia rates for males and females increased in all three regions. The Waikato region had the highest increase in both male and female rates (20.5% and 22.7%, respectively). However, the BOP region has the highest rate overall at 892 per 100 000 compared with 871 and 672 per 100 000 for Waikato and Auckland, respectively.

Figure 50. Male chlamydia rates diagnosed in the Auckland, Waikato and BOP regions, 2000 - 2005

[a] Denominator is the population in each region

Figure 51. Female chlamydia rates diagnosed in the Auckland, Waikato and BOP regions, 2000 - 2005

[a] Denominator is the population in each region

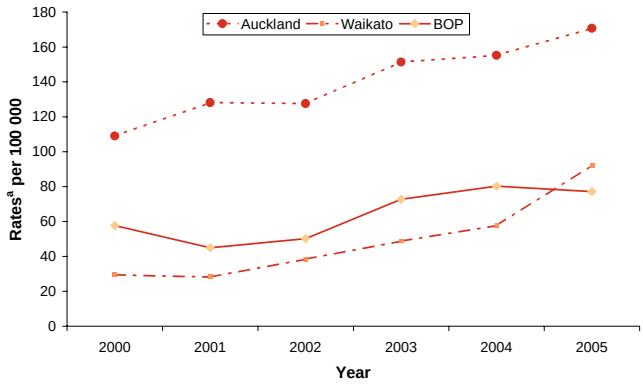
Gonorrhoea

Over the last six years laboratory reported gonorrhoea rates in Auckland, Waikato and BOP have been trending upwards, with a significant increase of 57.0% from 2000 to 2005.

Figure 52 and Figure 53 show the gonorrhoea rates from 2000 to 2005. From 2004 to 2005, Waikato region had the highest increase in both male and females rates (60.0% and 23.3%, respectively). However, the overall rate was highest in Auckland at 129 per 100 000, followed by BOP then Waikato at 101 and 79 per 100 000 respectively.

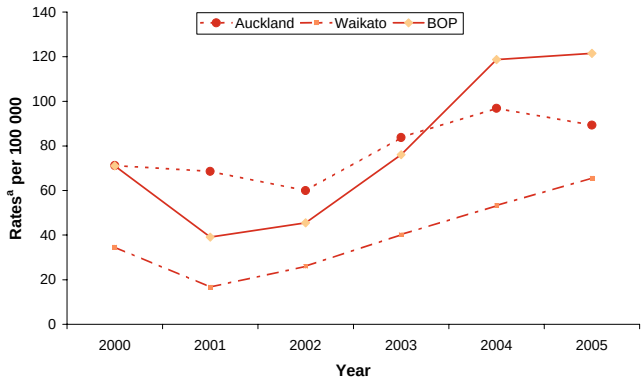
The number of laboratories reporting in these regions has not changed from 2000 to 2005. Therefore the overall trends suggest a true increase in the rate of gonorrhoea.

Figure 52. Male rates of gonorrhoea in the Auckland, Waikato and BOP regions, 2000 - 2005



[a] Denominator is the population in each region

Figure 53. Female rates of gonorrhoea in the Auckland, Waikato and BOP regions, 2000 - 2005



[a] Denominator is the population in each region

OUTBREAK SURVEILLANCE

Introduction

The following is a summary of surveillance data for outbreaks reported in 2005. A full report on outbreaks can be found in the Annual Summary of Outbreaks in New Zealand 2005 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 [36] 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 346 outbreaks reported by PHUs in 2005 involving 2436 cases.

Table 24 outlines the number of outbreaks and associated cases reported by each PHU in 2005.

Table 24. Outbreaks of infectious disease and associated cases by reporting PHU, 2005

PHU	Outbreaks	Cases
Northland	2	50
Auckland	244	1081
Waikato	2	33
Eastern Bay of Plenty	0	0
Rotorua	1	2
Tauranga	4	27
Gisborne	1	8
Hawke's Bay	8	112
Taranaki	2	31
Manawatu	3	37
Wanganui	2	33
Wairarapa	0	0
Wellington	27	353
Marlborough	1	13
Nelson	3	56
Canterbury	25	458
South Canterbury	4	39
West Coast	6	28
Otago	9	67
Southland	2	8
Total	**346**	**2436**

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

Of these reported outbreaks, 343 were final reports involving 2377 cases and 3 were interim reports (final details not yet available) involving 59 cases. According to the case definition for each outbreak, 667 cases (27.4%) were confirmed, 1767 cases (72.5%) were probable and two cases (0.1%) were unknown.

There were 69 hospitalisations and four deaths that resulted from outbreaks reported in 2005. Three deaths were related to a *Legionella* outbreak in Christchurch, while the fourth was related to an influenza outbreak in a continuing care hospital.

Pathogens

The pathogens or agents that caused the outbreaks are listed in Table 25.

Enteric Bacteria

During 2005, enteric bacteria were implicated in 24.0% (83/346) of all reported outbreaks and 18.3% (446/2436) of all associated cases. Over half of the outbreaks attributed to enteric bacteria were linked to *Campylobacter* species (47/83). Of these *Campylobacter* outbreaks, 28 were attributed to foodborne transmission, most frequently occurring in the home (12 outbreaks) or a restaurant/café setting (12 outbreaks).

Salmonella species accounted for 26 of the 83 outbreaks linked to enteric bacteria. Foodborne transmission was identified in approximately three-quarters (20/26) of *Salmonella* outbreaks, though 14 of these outbreaks involved additional modes of transmission. The most common setting was the home, which was linked to 13 outbreaks, followed by restaurants or cafés, which were linked to 7 outbreaks.

There were five *Shigella* outbreaks reported in 2005. All of these outbreaks involved person-to-person transmission, though two also involved foodborne transmission. An outbreak setting was identified in four outbreaks. These settings included an early childhood centre, a church gathering, a home and a marina, the last of which was associated with contaminated oysters.

For the three outbreaks of VTEC, the mode of transmission was reported as zoonotic, foodborne and unknown. The zoonotic outbreak was associated with infected calves on a farm, the foodborne outbreak was not linked to a specific setting, while the remaining outbreak occurred in a home.

There were two outbreaks of *Yersinia enterocolitica* reported in 2005. One was a suspected foodborne outbreak with no identified setting. The second outbreak occurred during an outdoor training exercise, though no mode of transmission was established.

Enteric Protozoa

Enteric protozoa accounted for 13.9% (48/346) of all outbreaks reported in 2005. *Cryptosporidium parvum* was the infectious agent in 25 outbreaks, 22 of which involved person-to-person transmission. The most commonly identified setting for Cryptosporidium outbreaks was the home, which was associated with 17 outbreaks.

There were 23 outbreaks involving *Giardia* species in 2005. Person-to-person transmission was established in 19 outbreaks, however, 10 of these outbreaks involved multiple modes of transmission. Two outbreaks were linked to both a

farm and a home, while 17 outbreaks occurred in the home only.

Table 25. Outbreaks and associated cases by agent type, 2005

Agent Type	Outbreaks	Cases
Enteric Bacteria		
Campylobacter spp.	47	252
Salmonella spp.	26	120
Shigella spp	5	58
VTEC/STEC	3	8
Yersinia enterocolitica	2	8
Total	**83**	**446**
Enteric Protozoa		
Cryptosporidium parvum	25	108
Giardia spp.	23	91
Total	**48**	**199**
Enteric Viruses		
Norovirus	61	1159
Rotovirus	6	53
Hepatitis A virus	2	4
Total	**69**	**1216**
Enteric (unspecified)		
Gastroenteritis	113	403
Total	**113**	**403**
Respiratory Diseases		
Mycobacterium tuberculosis	3	39
Influenza virus	2	30
Legionella pneumophilia	2	21
Total	**7**	**90**
Toxins		
Clostridium perfringens	11	38
Staphylococcus aureus	5	21
Bacillus spp.	5	10
Histamine	3	7
Ciguatera	1	3
Total	**25**	**79**
Poison		
Lead	1	3
Total	**1**	**3**
Total	**346**	**2436**

Enteric viruses

Enteric viruses were the infectious agent in 19.9% (69/346) of all outbreaks and 49.9% (1216/2436) of all associated cases in 2005. The vast majority of outbreaks due to enteric viruses were caused by norovirus (61/69), which resulted in 1159 associated cases. The average number of cases per norovirus outbreak was 19, the highest for any pathogen reported in 2005. Person-to-person transmission was ascertained in 46 outbreaks, 18 of which also involved other modes of transmission. An institution was identified as a setting for 23 outbreaks including: rest homes (14), acute care hospitals (3), continuing care hospitals (2), camps (2), hotel/motel (2), a childcare centre (1) and a prison (1). Restaurants or cafés were implicated in 18 outbreaks.

There were 6 outbreaks of rotavirus resulting in 53 cases. All of these outbreaks involved person-to-person transmission although 2 also involved environmental transmission. The outbreak settings included: rest homes, childcare centres, restaurants/cafés and the home.

Hepatitis A virus caused two outbreaks in 2005, each involving 2 cases. The mode of transmission for these outbreaks was unknown, though both were linked to exposure in Fiji.

Enteric (unspecified)

During 2005 outbreaks of gastroenteritis (where no organism was isolated) accounted for 32.7% (113/346) of all outbreaks and 16.5% (403/2436) of all associated cases.

Respiratory Diseases

Respiratory diseases resulted in 2.0% (7/346) of all outbreaks and 3.7% (90/2436) of all associated cases. All four deaths associated with outbreaks in 2005 were linked to respiratory diseases.

There were three outbreaks of *Mycobacterium tuberculosis*, two of which involved isolates with the same molecular typing. However no link has yet been established between these outbreaks. The third outbreak was linked to a boarding school and resulted in 27 cases with latent tuberculosis infection.

Influenza viruses caused two of the reported outbreaks in 2005. One outbreak was caused by an influenza type B virus and occurred in a school. An Influenza type A virus was the cause of the second outbreak that occurred in a continuing care hospital. The outbreak resulted in one death.

Legionella pneumophila was implicated in an outbreak in Christchurch, which resulted in 19 cases and 3 fatalities. The mode of transmission was reported as environmental but no definite source of the outbreak was determined. A second *Legionella* outbreak, involving 2 cases, occurred as the result of exposure to a contaminated domestic spa pool.

Toxins

Toxins were involved in 7.2% (25/346) of all outbreaks reported in 2005. The implicated agents included *Clostridium perfringens* (11), *Staphylococcus aureus* (5), *Bacillus species* (5), Histamine (3) and Ciguatera (1). Almost all toxin-related outbreaks involved foodborne transmission related to commercial food operators, with the exception of two outbreaks that solely occurred in the home.

Poison

During 2005, there was one reported outbreak of lead poisoning attributed to the environmental transmission of lead paint. All three cases involved in this outbreak lived in the same house.

Mode of Transmission

The modes of transmission recorded for outbreaks are detailed in Table 26. The primary modes of transmission were foodborne transmission, recorded in 183 outbreaks, and person-to-person transmission, recorded in 170 outbreaks. However, person-to-person transmission was associated with over twice as many cases as foodborne transmission (1721 versus 753). More than one mode of transmission was identified in 117 (33.8%) of all outbreaks reported in 2005.

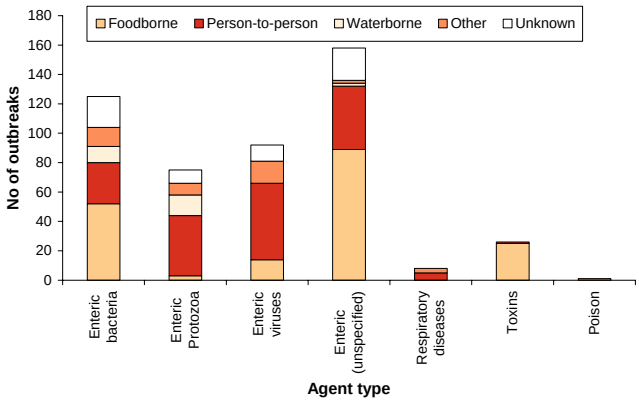
Table 26. Outbreaks of infectious disease and associated cases by mode of transmission, 2005

Transmission Mode	Outbreaks[a]	Cases[a]
Foodborne	183	753
Person to Person	170	1721
Waterborne	27	184
Environmental	22	412
Zoonotic	11	43
Other	9	240
Unknown	63	212

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

Foodborne transmission was the principal mode of transmission for enteric bacteria, unspecified enteric pathogens and toxins (Figure 54). Person-person transmission was the most common mode of transmission for enteric protozoa, enteric viruses and respiratory diseases but also contributed substantially to enteric bacteria and unspecified enteric outbreaks. Although person-to-person transmission was most commonly reported for outbreaks of respiratory diseases (5 outbreaks), environmental transmission was involved in the two *Legionella* outbreaks.

Figure 54. Number of outbreaks by agent type and mode of transmission, 2005



Setting

Outbreaks reported in 2005 were most commonly linked to the home or restaurants/cafés (see Table 27).

Table 27. Number of cases arising as a result of outbreaks of infectious disease by location, 2005

Outbreak Setting	Outbreaks[a]	Cases[a]
Commercial Food Operators		
Restaurant/Café	107	483
Takeaway	27	71
Supermarket/Deli	11	44
Other food outlet	2	6
Caterer	1	7
Institutions		
Rest/Retirement Home	17	472
Childcare centre	11	80
Camp	6	112
Hotel/Motel	5	48
Hospital (acute care)	3	115
Hospital (continuing care)	3	107
School	2	39
Hostel/Boarding house	2	36
Prison	1	18
Community		
Tangi/Hui	4	29
Community/Church gathering	3	26
Swimming/spa pool	1	26
Workplace		
Workplace	10	104
Farm	8	47
Home	116	465
Other setting	29	381
Setting unknown	30	75

[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 2004, is shown in Appendix J. Most antimicrobial resistance data are only available in a complete analysed form up to the end of 2004. 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 two years.
- A high prevalence of penicillin non-susceptibility (resistance and intermediate resistance to penicillin) 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 continuing to increase and is now more common than penicillin resistance.

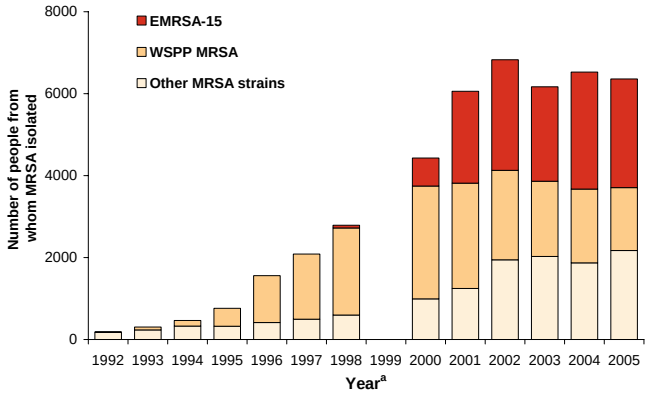
However, some other important resistances emerging in other countries remain uncommon in New Zealand. Of particular note, vancomycin-resistant enterococci (VRE), while isolated in small numbers, have not become established in New Zealand hospitals. In addition, multidrug-resistant tuberculosis (MDR-TB) 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 2005 survey was conducted in August 2005.

In August 2005, MRSA were referred from 530 people (513 patients and 17 staff). This number of referrals equates to an annual incidence rate of 170.2 per 100 000, similar to the 2004 rate of 174.7 per 100 000. Among the 513 patients with MRSA, 50.9% were categorised as hospital patients and 49.1% 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 76.5% of the 366 patients for whom this information was provided.

Figure 55. MRSA isolations, 1992-2005

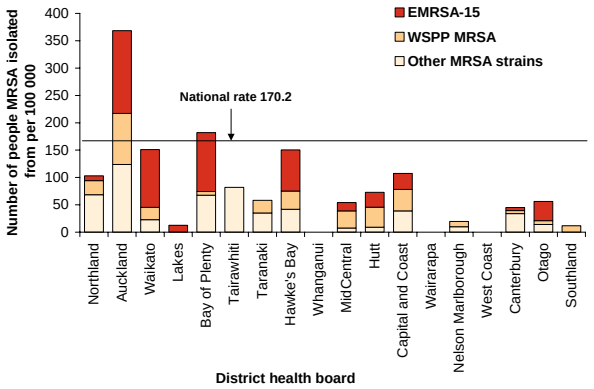


[a] Data for 1992 to 1998 are based on continuous surveillance of all MRSA isolations. Data for 2000 to 2005 are annualised and based on one-month surveys conducted in these years. No survey was undertaken in 1999.

Four MRSA strains were predominant in 2005:

- EMRSA-15, a British epidemic MRSA strain, accounted for 41.5% of the MRSA isolations. In recent years, this strain has become increasingly common (Figure 55). It is typically isolated from elderly patients in hospital or other healthcare facilities. In 2005, 73.8% 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 24.0% of the MRSA isolations, with the majority (70.3%) 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 2000 the WSPP MRSA has represented a decreasing proportion of the MRSA isolations, and since 2001 the actual number of WSPP MRSA isolations has also decreased (Figure 55).
- WR/AK1 MRSA, which is a multiresistant community strain of MRSA, accounted for 5.4% of the MRSA isolations, with the majority (72.4%) being isolated from people in the community. This strain is typically isolated from children and younger adults in the Whangarei and Auckland areas.
- AKh4 MRSA, which is a multiresistant MRSA typical of multiresistant MRSA isolated in Australia, accounted for 4.9% of the MRSA isolations. Like EMRSA-15, this strain is most commonly isolated from hospital patients, with 69.2% of the isolations in 2005 being from hospital patients or healthcare staff.

Figure 56. Annualised incidence of MRSA by health district, 2005



There continue to be marked geographic variations in the incidence of MRSA in New Zealand (Figure 56). In 2005 the highest annualised incidence rates were in the Auckland (368.3 per 100 000), Bay of Plenty (181.9), Waikato (151.1), Hawke's Bay (150.5), Capital and Coast (107.4), and Northland (102.8) District Health Boards. Differences in screening policies may contribute to some of the apparent differences in incidence.

The typical antimicrobial resistance patterns of the four MRSA strains most commonly isolated in 2005 are shown in Table 28. Overall, 46.3% of the MRSA tested were multiresistant, that is, resistant to ≥2 classes of antibiotics in addition to β-lactams.

Table 28. Typical resistance patterns of the most common MRSA strains, 2005

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

[a] Some isolates of EMRSA-15 are erythromycin-susceptible; in 2005, 29.9% of the EMRSA-15 isolates tested were erythromycin susceptible. Erythromycin-resistant isolates of EMRSA-15 have inducible clindamycin resistance.

APPENDIX: NATIONAL SURVEILLANCE DATA AND TRENDS

A. COMPARISON OF NOTIFIABLE DISEASE CASES AND RATES FOR 2004 AND 2005

Table 29. Cases and rates per 100 000 population of notifiable diseases in New Zealand during 2004 and 2005

Disease[a]	2004		2005		Change[d,e]
	Cases	Rates	Cases	Rates	
AIDS	38	1.0	49	1.3	→
Barmah Forest virus infection	1	0.0	2	0.1	→
Brucellosis	2	0.1	0	0.0	←
Campylobacteriosis	12213	326.8	13839	370.3	➔
Chemical poisoning from the environment	7	0.2	4	0.1	←
Cholera	2	0.1	1	0.0	←
Creutzfeldt-Jakob disease	8	0.2	3	0.1	←
Cryptosporidiosis	612	16.4	889	23.8	➔
Cysticercosis	0	0.0	3	0.1	→
Decompression sickness	0	0.0	1	0.0	→
Dengue fever	8	0.2	11	0.3	→
Gastroenteritis[b]	1363	36.5	557	14.9	➔
Giardiasis	1514	40.5	1230	32.9	➔
Haemophilus influenzae type b	4	0.1	7	0.2	→
Hepatitis A	49	1.3	51	1.4	→
Hepatitis B[c]	38	1.0	61	1.6	➔
Hepatitis C[c]	24	0.6	30	0.8	→
Hepatitis NOS	2	0.1	2	0.1	--
Hydatid disease	1	0.0	2	0.1	→
Lead absorption	95	2.5	71	1.9	←
Legionellosis	62	1.7	86	2.3	→
Leprosy	3	0.1	2	0.1	←
Leptospirosis	102	2.7	86	2.3	←
Listeriosis	26	0.7	20	0.5	←
Malaria	33	0.9	32	0.9	←
Measles	32	0.9	20	0.5	←
Meningococcal disease	343	9.2	227	6.1	➔
Mumps	45	1.2	62	1.7	→
Paratyphoid fever	28	0.7	25	0.7	←
Pertussis	3485	93.3	2720	72.8	➔
Rheumatic fever	75	2.0	78	2.1	→
Rickettsial disease	2	0.1	1	0.0	←
Ross River virus infection	5	0.1	1	0.0	←
Rubella	23	0.6	13	0.3	←
Salmonellosis	1081	28.9	1383	37.0	➔
Shigellosis	140	3.7	183	4.9	➔
Tetanus	1	0.0	1	0.0	--
Toxic shellfish poisoning	0	0.0	3	0.1	→
Tuberculosis disease	372	10.0	348	9.3	←
Typhoid fever	31	0.8	30	0.8	←
VTEC/STEC infection	89	2.4	92	2.5	→
Yersiniosis	420	11.2	407	10.9	←

[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 FROM 1997 TO 2005

Table 30. Deaths due to Notifiable Diseases recorded in EpiSurv from 1997 to 2005

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

Table 31. Reported deaths from selected notifiable diseases, 2001 - 2002

		2001		2002[a]	
Disease	ICD 10 Codes	Underlying[b]	Contributory[c]	Underlying[b]	Contributory[c]
AIDS	B20-B24	13	4	11	1
Campylobacteriosis	A04.5	2	0	0	0
Creutzfeldt-Jakob disease	A81.0	4	0	1	0
Giardiasis	A07.1	1	0	0	0
Hepatitis A	B15	0	1	1	0
Hepatitis B	B16	3	4	0	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
Meningococcal disease	A39	24	0	16	0
Pertussis	A37	1	0	1	0
Rheumatic fever	I00, I01, I02	0	0	0	0
Salmonellosis	A02	2	0	0	0
Tetanus	A33-A35	1	0	0	0
Tuberculosis	A15-A19, P37.0	5	14	9	19

[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, 2003-2005

Table 32. Hospital admissions for selected notifiable diseases, 2003 - 2005

Disease	ICD 10 Codes	2003		2004		2005	
		Principal diagnosis	Other relevant diagnosis	Principal diagnosis	Other relevant diagnosis	Principal diagnosis	Other relevant diagnosis
AIDS	B20-B24	26	260	16	263	16	296
Arboviral diseases	A83, A84, A85.2, A92, A93, A94, B33.1	1	0	4	0	4	2
Brucellosis	A23	0	1	0	1	0	0
Campylobacteriosis	A04.5	764	193	747	173	871	199
Cholera	A00	0	0	0	1	0	0
Creutzfeldt-Jakob disease	A81.0	4	2	12	2	3	0
Cryptosporidiosis	A07.2	35	11	16	8	34	8
Cysticercosis	B69	4	0	2	1	0	0
Decompression sickness	T70.3	13	1	9	0	8	1
Dengue fever	A90, A91	24	4	3	1	8	0
Diphtheria	A36	0	1	0	2	0	1
Giardiasis	A07.1	27	21	30	25	27	25
Hepatitis A	B15	19	26	12	16	21	15
Hepatitis B	B16	41	92	46	69	53	67
Hepatitis C	B17.1	10	8	6	14	8	6
Hydatid disease	B67.0-B67.4	1	2	0	2	0	0
Lead absorption	T56.0	6	1	8	1	1	2
Legionellosis	A48.1	24	6	10	3	33	7
Leprosy	A30	5	13	2	2	0	4
Leptospirosis	A27	60	11	69	4	52	11
Listeriosis	A32	13	16	13	18	8	11
Malaria	B50-B54	48	3	43	5	55	2
Measles	B05	9	1	4	1	3	0
Meningococcal disease	A39	548	125	401	64	266	59
Mumps	B26	8	2	7	1	17	2
Paratyphoid fever	A01.1-A01.4	7	0	10	0	4	0
Pertussis	A37	120	22	229	53	142	31
Poliomyelitis	A80	0	1	0	0	0	4
Rheumatic fever	I00, I01, I02	226	59	181	45	191	44
Rickettsial diseases	A75, A77, A78, A79	1	1	2	1	4	0
Rubella	B06	1	1	1	0	1	1
Salmonellosis	A02	157	46	105	42	130	36
Shigellosis	A03	24	7	26	5	20	2
Tetanus	A33-A35	1	2	2	3		1
Trichinellosis	B75	0	0	1	0	2	3
Tuberculosis	A15-A19, P37.0	549	266	503	198	394	148
Typhoid fever	A01.0	14	0	18	1	26	2
Yersiniosis	A04.6	7	11	17	13	12	15

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 AND RATES BY ETHNICITY, 2005

Table 33. Cases and rates per 100 000 population in 2005 by ethnic group

	Ethnicity											
	European		Maori		Pacific Peoples		Other Ethnicity		Unknown		Total	
Disease	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Campylobacteriosis	9486	363.4	653	124.1	132	65.9	585	234.2	2983		13839	370.3
Cryptosporidiosis	669	25.6	72	13.7	14	7.0	40	16.0	94		889	23.8
Dengue fever	5	0.2	1		0		3		2		11	0.3
Gastroenteritis	410	15.7	32	6.1	6	3.0	23	9.2	86		557	14.9
Giardiasis	826	31.6	58	11.0	20	10.0	72	28.8	254		1230	32.9
Haemophilus influenzae type b	4		0		3		0		0		7	0.2
Hepatitis A	28	1.1	4		10	5.0	8	3.2	1		51	1.4
Hepatitis B	21	0.8	11	2.1	10	5.0	17	6.8	2		61	1.6
Hepatitis C	18	0.7	6	1.1	1		3		2		30	0.8
Hydatid disease	2		0		0		0		0		2	
Lead absorption	54	2.1	5	1.0	1		2		9		71	1.9
Legionellosis	74	2.8	2		1		2		7		86	2.3
Leprosy	0		0		2		0		0		2	
Leptospirosis	58	2.2	16	3.0	0		0		12		86	2.3
Listeriosis	10	0.4	3		7	3.5	0		0		20	0.5
Malaria	16	0.6	0		6	3.0	9	3.6	1		32	0.9
Measles	15	0.6	1		1		2		1		20	0.5
Meningococcal disease	121	4.6	63	12.0	34	17.0	9	3.6	0		227	6.1
Mumps	27	1.0	16	3.0	4		8	3.2	7		62	1.7
Paratyphoid fever	12	0.5	3		0		7	2.8	3		25	0.7
Pertussis	2183	83.6	247	46.9	52	26.0	77	30.8	161		2720	72.8
Rheumatic fever	1		38	7.2	20	10.0	1		18		78	2.1
Rickettsial disease	1		0		0		0		0		1	
Rubella	10	0.4	0		0		1		2		13	0.3
Salmonellosis	967	37.0	139	26.4	32	16.0	67	26.8	178		1383	37.0
Shigellosis	68	2.6	45	8.6	26	13.0	14	5.6	30		183	4.9
Tetanus	1		0		0		0		0		1	
Tuberculosis disease	44	1.7	47	8.9	47	23.5	204	81.7	6		348	9.3
Typhoid fever	2		0		14	7.0	14	5.6	0		30	0.8
VTEC/STEC infection	73	2.8	13	2.5	1.0		3		2		92	2.5
Yersiniosis	238	9.1	26	4.9	3.0		52	20.8	88		407	10.9

Note : Where less than 5 cases have been notified no rate has been calculated and the cell has been left blank.

F. NOTIFIABLE DISEASE CASES AND RATES BY SEX, 2005

Table 34. Cases and rates per 100 000 population in 2005 by sex

	Sex							
	Male		Female		Unknown		Total	
Disease	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Campylobacteriosis	7370	404.3	6200	323.9	269		13839	370.3
Cryptosporidiosis	404	22.2	475	24.8	10		889	23.8
Dengue fever	3		8	0.4	0		11	0.3
Gastroenteritis	221	12.1	325	17.0	11		557	14.9
Giardiasis	629	34.5	561	29.3	40		1230	32.9
Haemophilus influenzae type b	2		5	0.3	0		7	0.2
Hepatitis A	25	1.4	26	1.4	0		51	1.4
Hepatitis B	39	2.1	20	1.0	2		61	1.6
Hepatitis C	13	0.7	17	0.9	0		30	0.8
Hydatid disease	1		1		0		2	
Lead absorption	55	3.0	15	0.8	1		71	1.9
Legionellosis	54	3.0	32	1.7	0		86	2.3
Leprosy	2		0		0		2	
Leptospirosis	80	4.4	6	0.3	0		86	2.3
Listeriosis – non perinatal	8	0.4	7	0.4	0		15	0.4
Malaria	23	1.3	7	0.4	2		32	0.9
Measles	11	0.6	9	0.5	0		20	0.5
Meningococcal disease	125	6.9	101	5.3	1		227	6.1
Mumps	34	1.9	28	1.5	0		62	1.7
Paratyphoid fever	11	0.6	12	0.6	2		25	0.7
Pertussis	1043	57.2	1657	86.6	20		2720	72.8
Rheumatic fever	46	2.5	26	1.4	6		78	2.1
Rickettsial disease	1		0		0		1	
Rubella	4		9	0.5	0		13	0.3
Salmonellosis	705	38.7	661	34.5	17		1383	37.0
Shigellosis	91	5.0	87	4.5	5		183	4.9
Tetanus	1		0		0		1	
Tuberculosis disease	180	9.9	167	8.7	1		348	9.3
Typhoid fever	18	1.0	8	0.4	4		30	0.8
VTEC/STEC infection	36	2.0	55	2.9	1		92	2.5
Yersiniosis	216	11.8	180	9.4	11		407	10.9

Note : Where less than 5 cases have been notified no rate has been calculated and the cell has been left blank.

G. NOTIFIABLE DISEASE CASES AND RATES BY AGE GROUP, 2005

Table 35. Cases and rates per 100 000 population in 2005 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	228	417.2	1105	511.2	614	214.5	576	198.1	969	365.3	2442	501.8	2004	347.5	1895	352.6	1642	392.5	1131	400.3	1078	334.2	155		13839	370.3
Cryptosporidiosis	31	56.7	312	144.3	133	46.5	57	19.6	42	15.8	111	22.8	88	15.3	62	11.5	29	6.9	18	6.4	3		3		889	23.8
Dengue fever	0		0		0		0		1		4		0		3		3		0		0		0		11	0.3
Gastroenteritis	11	20.1	44	20.4	10	3.5	6	2.1	22	8.3	72	14.8	86	14.9	72	13.4	78	18.6	40	14.2	73	22.6	43		557	14.9
Giardiasis	19	34.8	222	102.7	87	30.4	20	6.9	25	9.4	140	28.8	284	49.2	188	35	103	24.6	82	29	48	14.9	12		1230	32.9
H. influenzae type b	1		3		0		0		0		0		1		1		0		0		1		0		7	0.2
Hepatitis A	0		3		7	2.4	3		4		9	1.8	8	1.4	8	1.5	3		3		3		0		51	1.4
Hepatitis B	1		0		0		0		4		12	2.5	21	3.6	12	2.2	6	1.4	4		1		0		61	1.6
Hepatitis C	0		0		1		0		3		12	2.5	4		5	0.9	2		0		3		0		30	0.8
Hydatid disease	0		0		0		0		0		0		0		2		0		0		0		0		2	
Lead absorption	0		4		1		1		1		14	2.9	16	2.8	17	3.2	6	1.4	7	2.5	4		0		71	1.9
Legionellosis	0		0		0		0		0		3		3		15	2.8	18	4.3	17	6	30	9.3	0		86	2.3
Leprosy	0		0		0		1		0		0		0		1		0		0		0		0		2	
Leptospirosis	1		0		0		0		0		14	2.9	15	2.6	30	5.6	21	5	5	1.8	0		0		86	2.3
Listeriosis – non perinatal	1		0		0		0		0		0		0		1		4		2		7	2.2	0		15	0.4
Malaria	0		2		2		0		1		11	2.3	4		7	1.3	2		2		0		1		32	0.9
Measles	7	12.8	10	4.6	2		0		0		0		1		0		0		0		0		0		20	0.5
Meningococcal disease	29	53.1	39	18	20	7	31	10.7	41	15.5	27	5.5	10	1.7	12	2.2	7	1.7	6	2.1	5	1.6	0		227	6.1
Mumps	0		23	10.6	10	3.5	5	1.7	7	2.6	9	1.8	6	1	0		2		0		0		0		62	1.7
Paratyphoid fever	0		4		1		2		0		12	2.5	6	1	0		0		0		0		0		25	0.7
Pertussis	123	225.1	208	96.2	333	116.3	360	123.8	212	79.9	205	42.1	342	59.3	331	61.6	261	62.4	199	70.4	144	44.6	2		2720	72.8
Rheumatic fever	0		0		22	7.7	34	11.7	7	2.6	14	2.9	0		0		0		0		0		1		78	2.1
Rickettsial disease	0		0		0		0		0		0		0		0		1		0		0		0		1	
Rubella	2		10	4.6	1		0		0		0		0		0		0		0		0		0		13	0.3
Salmonellosis	68	124.4	286	132.3	110	38.4	69	23.7	78	29.4	178	36.6	159	27.6	158	29.4	117	28	78	27.6	79	24.5	3		1383	37
Shigellosis	2		19	8.8	17	5.9	6	2.1	7	2.6	36	7.4	28	4.9	27	5	23	5.5	10	3.5	8	2.5	0		183	4.9
Tetanus	0		0		0		0		0		0		0		0		0		0		1		0		1	
Tuberculosis disease	5	9.1	9	4.2	6	2.1	11	3.8	17	6.4	86	17.7	62	10.8	51	9.5	32	7.6	29	10.3	39	12.1	1		348	9.3
Typhoid fever	0		2		5	1.7	2		2		8	1.6	4		3		3		1		0		0		30	0.8
VTEC/STEC infection	10	18.3	36	16.7	10	3.5	6	2.1	3		4		3		4		7	1.7	2		7	2.2	0		92	2.5
Yersiniosis	25	45.7	79	36.5	14	4.9	21	7.2	12	4.5	50	10.3	36	6.2	58	10.8	43	10.3	24	8.5	35	10.9	10		407	10.9

Note : Where less than 5 cases have been notified no rate has been calculated and the cell has been left blank.

H. NOTIFIABLE DISEASE CASES AND RATES BY DISTRICT HEALTH BOARD, 2005

Table 36. Disease notifications and incidence rates per 100 000 population by District Health Board, 2005

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	303	216.2	20	14.3	1		5	3.6	35	25.0	2		1		3		1		4		7	5.0	0		0		5	3.6	5	3.6	0		16	11.4	9	6.4	0		51	36.4	44	31.4	18	12.8	0		4		6	4.3
Waitemata	1668	388.1	30	7.0	2		72	16.8	138	32.1	7	1.6	13	3.0	0		5	1.2	15	3.5	0		2		4		5	1.2	21	4.9	7	1.6	4		69	16.1	3		3		134	31.2	21	4.9	55	12.8	2		3		41	9.5
Auckland	1364	370.9	36	9.8	2		80	21.8	173	47.0	5	1.4	10	2.7	2		6	1.6	3		0		4		1		1		16	4.4	6	1.6	3		34	9.2	1		4		112	30.5	37	10.1	73	19.9	5	1.4	7	1.9	47	12.8
Counties Manukau	1077	286.8	34	9.1	2		50	13.3	114	30.4	7	1.9	11	2.9	0		1		2		2		6	1.6	11	2.9	2		29	7.7	8	2.1	4		59	15.7	22	5.9	1		114	30.4	24	6.4	56	14.9	15	4.0	2		31	8.3
Waikato	1151	362.3	141	44.4	1		40	12.6	126	39.7	7	2.2	2		0		9	2.8	4		10	3.1	2		5	1.6	1		33	10.4	1		1		403	126.8	8	2.5	0		117	36.8	7	2.2	25	7.9	1		15	4.7	20	6.3
Lakes	289	301.1	60	62.5	0		5	5.2	37	38.5	0		0		2		1		0		1		1		0		0		7	7.3	1		0		70	72.9	1		0		29	30.2	2		6	6.3	1		3		9	9.4
Bay of Plenty	509	285.7	34	19.1	0		7	3.9	62	34.8	1		2		1		1		5	2.8	8	4.5	2		0		2		12	6.7	3		1		162	90.9	4		2		62	34.8	6	3.4	4		0		10	5.6	9	5.1
Tairawhiti	125	284.4	5	11.4	0		0		23	52.3	1		3		1		3		0		3		0		0		0		1		0		0		4		1		0		20	45.5	0		0		0		1		4	
Taranaki	422	409.5	19	18.4	0		4		9	8.7	3		0		0		3		2		3		0		0		0		3		1		0		14	13.6	0		0		29	28.1	1		3		0		1		5	4.9
Hawke's Bay	497	346.2	47	32.7	0		3		49	34.1	0		0		0		2		2		12	8.4	0		1		0		13	9.1	5	3.5	1		42	29.3	7	4.9	0		58	40.4	0		7	4.9	0		5	3.5	15	10.4
Whanganui	153	240.5	19	29.9	0		13	20.4	17	26.7	0		0		0		4		0		1		0		0		1		0		2		0		3		0		0		26	40.9	1		7	11.0	0		1		12	18.9
MidCentral	313	202.0	39	25.2	1		20	12.9	46	29.7	1		0		0		6	3.9	3		9	5.8	0		0		1		15	9.7	0		0		33	21.3	3		0		31	20	0		9	5.8	0		0		8	5.2
Hutt Valley	494	374.7	17	12.9	0		17	12.9	28	21.2	1		0		3		3		8	6.1	0		0		1		0		1		0		4		52	39.4	6	4.6	0		46	34.9	4		9	6.8	1		1		6	4.6
Capital and Coast	1185	482.0	87	35.4	2		68	27.7	121	49.2	0		3		0		9	3.7	2		1		1		5	2	0		10	4.1	6	2.4	2		65	26.4	12	4.9	1		77	31.3	12	4.9	32	13.0	1		4		48	19.5
Wairarapa	90	235.6	14	36.6	0		6	15.7	12	31.4	0		0		1		1		0		4		0		0		0		5	13.1	0		1		4		0		0		25	65.4	0		2		0		0		1	
Nelson Marlborough	398	325.0	30	24.5	0		12	9.8	33	26.9	0		1		1		1		0		3		2		1		0		6	4.9	2		0		139	113.5	1		1		79	64.5	2		4		0		1		15	12.2
West Coast	86	284.2	15	49.6	0		4		4		1		0		0		0		1		4		0		0		3		2		1		0		28	92.5	0		0		7	23.1	0		1		0		1		16	52.9
Canterbury	2011	470.9	117	27.4	0		103	24.1	137	32.1	12	2.8	8	1.9	15	3.5	5	1.2	29	6.8	4		0		3		3		25	5.9	9	2.1	2		981	229.7	0		1		187	43.8	12	2.8	27	6.3	2		12	2.8	69	16.2
South Canterbury	364	689.6	45	85.3	0		5	9.5	8	15.2	0		0		0		3		1		4		0		0		1		3		0		0		138	261.5	0		0		30	56.8	4		2		2		4		9	17.1
Otago	850	497.8	46	26.9	0		14	8.2	37	21.7	2		6	3.5	1		7	4.1	3		4		0		0		0		15	8.8	4		1		155	90.8	0		0		88	51.5	5	2.9	5	2.9	0		12	7.0	26	15.2
Southland	490	474.2	34	32.9	0		29	28.1	21	20.3	1		1		0		0		2		6	5.8	0		0		0		5	4.8	1		1		249	241.0	0		0		61	59	1		3		0		5	4.8	10	9.7
Total	13839	370.3	889	23.8	11	0.3	557	14.9	1230	32.9	51	1.4	61	1.6	30	0.8	71	1.9	86	2.3	86	2.3	20	0.5	32	0.9	20	0.5	227	6.1	62	1.7	25	0.7	2720	72.8	78	2.1	13	0.3	1383	37	183	4.9	348	9.3	30	0.8	92	2.5	407	10.9

Note : Where less than 5 cases have been notified no rate has been calculated and the cell has been left blank.

I. NOTIFIABLE DISEASE CASES BY YEAR AND SOURCE, 1985 – 2005

Table 37. Notifiable disease cases by year and source, 1985 – 2005

Note: cell is blank where data are unavailable

Disease	Source	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
AIDS	Notification	11	19	28	38	59	72	78	50	70	44	49	76	43	29	33	26	26	17	33	38	49
Campylobacteriosis	Notification	2390	2786	2921	2796	4187	3850	4148	5144	8101	7714	7442	7635	8924	11573	8161	8417	10146	12494	14790	12213	13839
Cholera	Notification	0	0	2	0	0	5	0	0	0	2	2	0	0	1	1	0	3	1	1	2	1
Creutzfeldt-Jakob disease	Notification												2	1	0	2	3	1	3	6	8	3
Cryptosporidiosis	Notification												119	357	866	977	775	1208	975	817	612	889
Dengue fever	Notification	1	3	0	1	3	2	3	1	1	0	6	23	14	26	9	7	93	70	55	8	11
Gastroenteritis	Notification												555	310	492	601	726	940	1087	1025	1363	557
Giardiasis	Notification												1235	2127	2183	1793	1688	1603	1547	1570	1514	1230
H. influenzae serotype b	Laboratory			93	107	121	143	148	166	118	75	14	24	8	10	9	10	8	3	9	3	6
	Notification												26	9	11	10	13	11	3	12	4	7
Hepatitis A	Notification	380	251	158	176	134	150	224	288	257	179	338	311	347	145	119	107	61	106	70	49	51
Hepatitis B	Notification	530	488	474	370	309	242	227	221	145	133	125	104	138	88	94	79	56	67	61	38	61
Hepatitis C	Notification	31	17	18	20	13	11	25	89	91	79	88	59	92	102	96	80	58	53	40	24	30
Hydatid disease	Notification	4	5	2	2	0	4	0	4	4	1	5	3	2	2	8	3	7	2	0	1	2
Influenza	Sentinel isolates	6	8	18	136	119	343	183	317	423	441	521	673	743	127	425	73	313	241	230	231	273
Legionellosis	Notification	87	95	91	62	17	20	14	11	24	66	33	36	63	43	51	61	46	49	77	62	86
	Laboratory						21	42	60	76	121	76	60	109	107	65	56	56	53	82	75	83
Leprosy	Notification	5	7	8	2	4	1	4	5	3	1	1	10	3	3	10	4	3	4	4	3	2
Leptospirosis	Notification	174	139	129	99	90	117	106	70	116	70	65	56	52	75	59	98	101	140	113	102	86
	Laboratory				192	182	229	176	218	234	168	183	140	84	117	76	114	113	181	149	113	109
Listeriosis	Notification	6	6	12	7	10	16	26	16	11	8	13	10	35	17	19	22	18	19	24	26	20
Malaria	Notification	44	31	22	25	27	32	39	29	58	34	41	107	65	73	46	111	54	61	46	33	32
Measles	Notification												68	1984	164	107	64	82	21	67	32	20
	Laboratory	145	135	26	5	5	7	355	53	4	4	15	25	1220	35	2	9	21	6	15	10	3
Meningococcal disease	Notification	107	190	179	83	49	53	71	153	202	208	394	473	609	439	507	477	648	555	542	343	227
Mumps	Notification												76	90	85	56	50	56	64	56	45	62
	Laboratory	61	132	28	5	105	26	23	10	25	245	66	20	14	8	5	2	22	18	11	12	7
Paratyphoid fever	Laboratory				23	13	30	22	13	23	30	24	20	25	18	17	24	32	16	18	28	25
Pertussis	Notification												1022	284	153	1046	4140	1334	1068	585	3485	2720
Rheumatic fever (initial attack)	Notification		12	215	153	148	90	97	70	81	98	88	110	95	65	71	136	114	87	148	73	75
Rubella	Notification												306	80	53	35	26	30	33	26	23	13
	Laboratory	120	30	50	95	114	168	81	27	244	104	1581	339	21	2	0	0	3	4	3	3	7
Salmonellosis	Notification	1234	1335	1140	1128	1860	1619	1244	1239	1340	1522	1334	1141	1177	2069	2077	1794	2417	1880	1401	1081	1383
Shigellosis	Notification	192	189	143	145	137	197	152	124	128	185	191	167	117	122	147	115	157	112	87	140	183
Tetanus	Notification	3	3	4	1	0	0	0	8	2	2	2	3	0	2	6	1	4	1	2	1	1
Tuberculosis	Notification	359	320	296	295	303	348	335	327	323	352	391	352	321	365	446	353	369	381	422	372	348
Typhoid fever	Notification	6	28	4	15	17	7	9	11	14	24	21	15	16	31	9	21	27	23	20	31	30
VTEC/STEC infection	Notification									3	3	6	7	13	48	64	67	76	73	104	89	92
Yersiniosis	Notification												330	488	546	503	396	429	476	439	420	407

J. PREVALENCE OF ANTIMICROBIAL RESISTANCE, 1991-2004

Table 38. Prevalence of antimicrobial resistance, 1991-2004

		Percent resistance[a] (number tested)				
Pathogen	Antimicrobial	1991-1993	1994-1996	1997-1999	2000-2002	2003-2004
S. aureus[b]	methicillin	0.6 (42839)	2.8 (58283)	4.9 (136356)	7.2 (251448)	7.6 (142259)
	erythromycin	6.8 (40425)	8.0 (54870)	10.8 (134350)	12.0 (221394)	12.1 (112948)
	co-trimoxazole	1.1 (27469)	0.8 (32926)	0.6 (91391)	1.2 (149166)	2.4 (85208)
	mupirocin	NA[c]	10.1 (9291)	18.2 (37173)	20.0 (91555)	16.8 (24659)
Methicillin-resistant *S. aureus*[d]	erythromycin	58.2 (701)	31.5 (2249)	26.2 (1303)	40.0 (1409)	46.8 (1063)
	co-trimoxazole	24.8 (701)	8.6 (2249)	1.8 (1303)	6.7 (1409)	8.4 (1063)
	mupirocin	2.0 (701)	6.4 (2244)	6.0 (1303)	8.5 (1409)	8.8 (1063)
	rifampicin	13.0 (701)	0.3 (2249)	0.8 (1303)	0.7 (1409)	0.6 (1063)
S. pneumoniae, non-invasive disease[b]	penicillin[e]	0.8 (3720)	9.5 (7076)	19.0 (10976)	22.8 (12047)	27.1 (10955)
	erythromycin	1.3 (3554)	8.3 (6832)	14.5 (11212)	18.6 (14404)	19.9 (8088)
	tetracycline	1.7 (3376)	10.5 (5019)	11.2 (5993)	15.4 (9476)	18.4 (5111)
S. pneumoniae, invasive disease[f]	penicillin[e]	1.4 (694)	3.4 (989)	15.0 (1182)	15.3 (1493)	17.3 (1068)
	erythromycin	1.9 (694)	2.6 (989)	4.1 (853)	7.3 (1492)	8.9 (1068)
	cefotaxime[e]	0.1 (694)	1.8 (989)	7.3 (1182)	6.1 (1493)	12.5 (1068)
Enterococcus spp[b]	amoxicillin[g]	2.3 (2573)	1.5 (7373)	2.4 (17548)	3.0 (22566)	3.2 (16290)
	vancomycin	0 (148)	0.2 (1141)	0.5 (4752)	0.3 (7505)	0.1 (6602)
E. coli, urinary isolates[b]	amoxicillin[g]	56.2 (29394)	55.9(48706)	56.0(138712)	54.4 (194799)	51.5 (82334)
	co-amoxiclav	6.9 (27249)	10.6(42666)	12.2(136326)	9.6 (194950)	8.9 (90992)
	trimethoprim	18.8 (29340)	19.6(48098)	22.6(111710)	22.3 (207837)	22.0 (97065)
	nitrofurantoin	2.2 (28331)	1.6 (48123)	1.7 (124362)	1.5 (206149)	1.4 (97580)
	fluoroquinolone	0.2 (7014)	0.5 (40032)	0.6 (118917)	1.6 (201382)	1.8 (95925)
E. coli, non-urinary isolates[b,h]	co-amoxiclav	18.3 (2318)	22.8 (7358)	21.8 (15948)	17.5 (11508)	15.5 (4299)
	cefuroxime	2.3 (1158)	3.2 (6309)	4.5 (6893)	4.2 (6576)	3.4 (3428)
	gentamicin	0.5 (3200)	0.8 (10352)	0.9 (13789)	2.4 (10392)	2.6 (4414)
	fluoroquinolone	0.1 (728)	0.5 (4717)	0.8 (10800)	2.4 (8821)	3.7 (3368)
P. aeruginosa[b]	gentamicin	5.8 (5918)	12.5 (9556)	9.5 (20542)	10.5 (25561)	6.7 (16531)
	tobramycin	3.1 (2535)	3.9 (6757)	2.8 (11033)	3.6 (10421)	3.2 (5354)
	ceftazidime	6.6 (1006)	5.0 (4832)	5.2 (11147)	3.9 (13253)	4.3 (11579)
	fluoroquinolone	8.4 (1652)	8.8 (8123)	9.9 (16551)	9.3 (22869)	8.6 (16588)
H. influenzae, non-invasive disease[b]	amoxicillin[g]	8.4 (4131)	12.0(12244)	19.3 (18852)	21.9 (28476)	21.5 (11929)
	co-amoxiclav	1.1 (1136)	1.1 (9839)	0.6 (15040)	0.8 (16333)	1.0 (10304)
	co-trimoxazole	11.4 (1581)	11.9 (6605)	14.7 (13964)	17.3 (22443)	18.3 (12286)
	tetracycline	1.7 (2082)	1.0 (7810)	1.5 (13007)	1.2 (15633)	0.9 (9134)
H. influenzae, invasive disease[f]	amoxicillin[g]	13.2 (478)	21.8 (179)	11.5 (122)	19.2 (125)	28.7 (115)
	co-amoxiclav	0.2 (478)	3.4 (179)	1.6 (122)	1.6 (125)	6.1 (115)
	cefuroxime	0.8 (478)	3.4 (179)	4.9 (122)	0.8 (125)	6.1 (115)
N. meningitidis, invasive disease[f]	penicillin[i]	2.1 (291)	3.9 (659)	7.9 (431)	7.5 (796)	11.1 (423)
	rifampicin	0.3 (291)	0 (659)	0 (431)	0 (796)	0.2 (423)
N. gonorrhoeae[b,j]	penicillin	16.4 (85)	11.6 (879)	10.4 (1437)	7.1 (2782)	6.0 (3339)
	fluoroquinolone	0 (85)	0.7 (864)	1.8 (1437)	6.3 (2349)	13.1 (2679)
M. tuberculosis[b]	isoniazid	NA	4.6 (438)	8.2 (757)	8.5 (811)	9.5 (610)
	rifampicin	NA	0.7 (438)	1.3 (757)	0.7 (811)	0.8 (610)
	MDR[k]	NA	0.7 (438)	0.9 (757)	0.5 (811)	0.8 (610)

[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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