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NOTIFIABLE AND OTHER DISEASES IN NEW ZEALAND

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NOTIFIABLE AND OTHER DISEASES IN NEW ZEALAND
ANNUAL REPORT 2004

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

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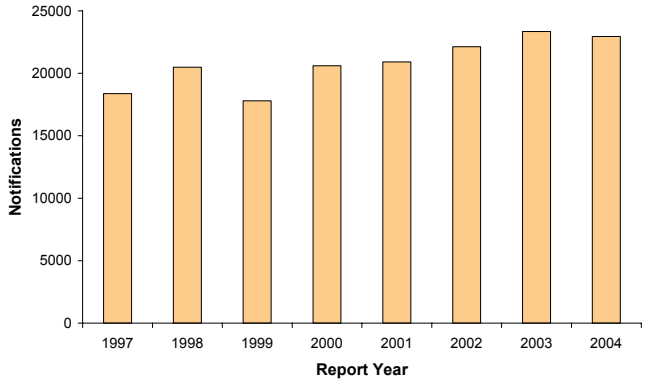
Notifiable Diseases

In 2004 there was a slight decrease in the overall number of reported cases of notifiable disease in New Zealand (Figure 1). In 2003 there had been a total of 23 357 which dropped to 22 944 in 2004. This is the first such decrease since 1999.

Figure 1. Total disease notifications by year, 1997 - 2004



The major factor in this decrease was a fall in the number of notifications of enteric diseases. There was a statistically significant decrease in campylobacteriosis cases (14 790 to 12 213, 17.4%), cryptosporidiosis (817 to 612, 25%) and salmonellosis (1401 to 1080, 22.9%). There was also a significant decrease in cases of dengue fever, hepatitis B, measles, meningococcal disease and rheumatic fever.

In contrast, there were significant increases in reported pertussis cases (585 to 3489, 596%), shigellosis (87 to 140, 161%) and gastroenteritis (1025 to 1370, 33.7%). Other non-significant changes in case numbers and rates are to be found in Appendix 1.

The major feature of 2004 was a pertussis epidemic that started in late 2004. The highest rates of disease were in Southland (592.2 per 100 000) and Nelson-Marlborough (409.9 per 100 000) DHBs. Pertussis epidemics tend to have a periodicity of four to five years. The last pertussis epidemic was in the second half of 1999 and early 2000.

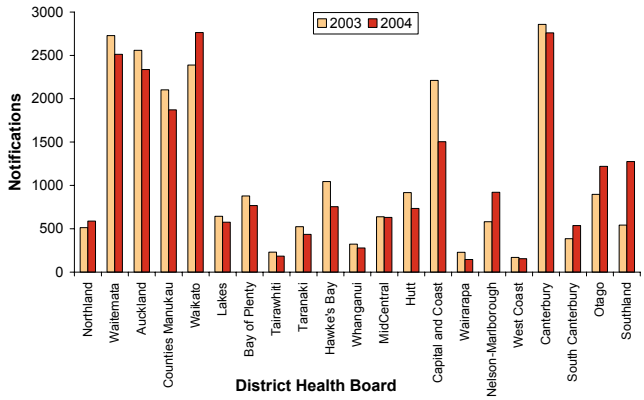
All DHBs, with the exception of Northland, Waikato, Nelson Marlborough, South Canterbury, Otago and Southland showed decreases in the number of notifications in 2004 (Figure 2). In most DHBs where an increase did occur it was primarily due to the pertussis outbreak.

Vaccine Preventable Diseases (VPDs)

All notifications of VPDs, with the exception of pertussis, decreased in 2004. This includes meningococcal disease for which a vaccination programme was launched in the middle of 2004. Though there was a significant decrease in the number of cases of meningococcal disease (542 to 344, 36%) it is too soon to attribute this to the effect of the new campaign.

Statistically significant decreases were also seen in measles (67 to 33 cases, 51%) and hepatitis B (61 to 39 cases, 36%).

Figure 2. Notifications by District Health Board, 2003 and 2004



Exotic Diseases

Cases of malaria, dengue fever, Barmah Forest virus, Japanese encephalitis, rickettsial disease, Ross River virus and cholera were reported during 2004. All of these cases have a history of travel overseas. At the same time the presence and interception of exotic mosquito species capable of transmitting various diseases has been reported in New Zealand in 2004.

Highly Pathogenic Avian Influenza (HPAI)

HPAI was made a notifiable disease in New Zealand in February 2004 in response to the perceived threat from South East Asia. Cases continued to be reported in both humans and birds overseas but no cases were reported in New Zealand.

Outbreak Surveillance

In 2004 there were 327 outbreaks involving 4085 cases. This was an increase on the 2003 figures of 340 outbreaks with 2789 cases. Auckland (199), Canterbury (41) and Wellington (31) accounted for 82.9% of the outbreaks and 85.2% of the cases. Retirement home outbreaks involved the largest proportion of cases (1929 cases, 47.2%).

The most common pathogen identified was norovirus with 126 of the outbreaks and 3022 of the cases. No pathogen was identified for five outbreaks (1.5%).

Sexually Transmitted Infections (STI)

Chlamydia was the most commonly diagnosed STI in 2004 with an increase in clinic surveillance cases of 7.25% though there was a slight decrease of 1.4% in laboratory surveillance cases. The 15-25 years age group had the highest rates.

There was a further increase (71 cases, increase of 39.2%) in the number of infections in infants. This underlines the importance of screening for STIs in the antenatal period.

The number of new diagnoses of infection with the human immunodeficiency virus continued at a high level with 185 cases. Eighty four cases (45.4%) were in homosexual men with 51 (71%) reported to have been infected in New Zealand.

Influenza

The incidence of consultations for influenza like illness was the fifth lowest since sentinel surveillance began in 1991. The year was also characterised by a late peak in activity in the middle of September and the surveillance season was extended for another month until the end of October.

Antibiotic Resistance

National surveillance of methicillin-resistant *Staphylococcus aureus* (MRSA) in 2004 was conducted in August. This indicated an annualised incidence rate of 174.7 per 100 000, a 6.4% increase compared with 2003. Among the 528 patients with MRSA, 52.8% were categorised as hospital patients and 47.2% as community patients. EMRSA (43.3%), WSPP MRSA (27.3%), Akh4 MRSA (6.9%) and WR/AKI MRSA (4.2%) accounted for most of the cases. This was a similar pattern to 2003.

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. 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 2004 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 diseases, 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 are presented by date reported, and not by onset date, with the exception of the meningococcal data. 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:

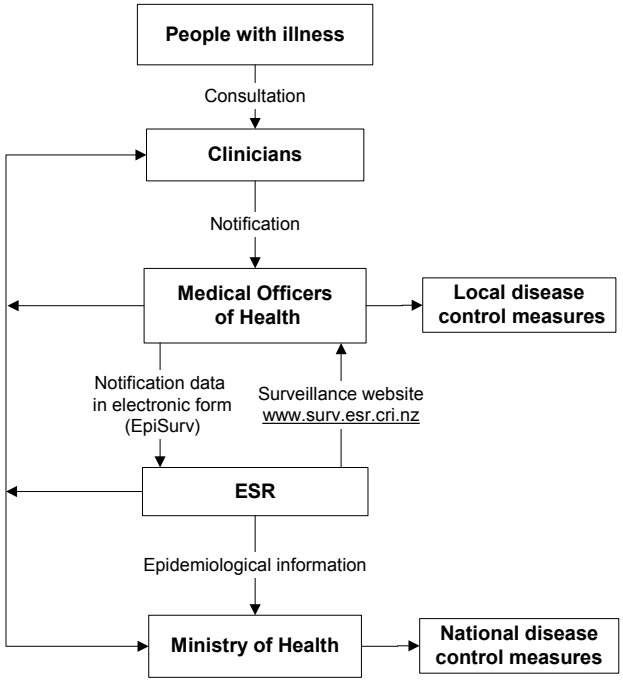
EpiSurv - the national notifiable disease surveillance system

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 services (PHSs). 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 2004 HPAI 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 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 AIDS Epidemiology Group 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.

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]. This is based on a network of 88 general practices from all health districts in New Zealand except Northland and Taupo. The number 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.

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, vitamin K deficiency bleeding, and neonatal herpes simplex infection. 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. In mid 2000, EpiSurv and ESR laboratory reported outbreaks were matched for the first time. 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 23 February 2005. 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 2003 has been updated to reflect that in EpiSurv as at 23 February 2005.

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.

Census: All rates for 2004 and 2003 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 maps classification for the disease rates is quantiles i.e. the data have been divided into three equal sized groups. The darkest colour represents the highest rates and the lightest colour the lowest rates.

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 was prepared on the quality of selected EpiSurv fields in 2004 to assist in the development of a quality assurance programme [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 1 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 two years.

Table 1. Data completeness by year and EpiSurv variable, 1999 - 2004

	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%

Timeliness

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

Of the notifications with an onset date recorded (62.8% of notifications) in 2004, 40.0% were reported to a public health service within one week of the onset of symptoms and 71.4% were reported within two weeks.

In 2004, 95.1% of disease notifications were entered into EpiSurv within one week of being reported to the public health service and 97.0% were entered within two weeks of being reported.

Accuracy

Reliable population denominator data are available, except in the case of sexually transmitted infections.

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 on here. The AIDS Epidemiology Group (AEG) within the Otago Medical School carries out national AIDS/HIV surveillance. This brief report is based on the AEG report of February 2005[10].

HIV

The high number of diagnoses made in 2003, 188 cases, continued into 2004 with 185 cases. Of these 157 were positive on antibody testing. A further 28 cases were identified from viral load testing in people previously diagnosed overseas. This is the highest number of cases reported by antibody testing in any year since testing began in 1985. The previous highest was in 2003 (154 cases).

In 84 (45.4%) cases, HIV was thought to have been acquired homosexually (Table 2). The disease was acquired heterosexually in 35 males (18.9%) and 33 females (17.8%). Six cases were in the perinatal age group. Four cases occurred in homosexuals who were also intravenous drug users (IDU) and the exposure was unknown in 20 cases.

In men who have sex with men (MSM), 51 (71%) reported being infected in New Zealand with a further 9 (12%) in Australia. A much smaller proportion (8%) of heterosexuals acquired the disease within New Zealand. Of the 6 perinatal cases, two were born in New Zealand to mothers who had not been diagnosed antenatally. In the last five years no infected children have been born to mothers with an antenatal diagnosis.

There was a wide range of ages, 0-60+ years, at the time of diagnosis. Of these 67 (43%) were in the 30-39 years age group. Of the 185 cases 82 (44.3%) were European, 11 (6%) were Maori and 6 (3.2%) Pacific People. There were 72 (38.9%) in other ethnic group categories, mainly of African and Asian ethnicity.

Based on previous HIV testing, out of the 51 MSM infected in New Zealand in 2004, 27 were definitely infected in the previous five years and 16 in the previous 12 months.

Table 2. Risk behaviour category for AIDS notifications and HIV infections, 2004

		AIDS[a]				HIV Infection[b]			
		2004		Total 1983 to 2004		2004		Total 1983 to 2004	
Risk category	Sex	Cases	%	Cases	%	Cases	%	Cases	%
Homosexual contact	M	18	47.4	627	74.4	84	45.4	1197	53.0
Homosexual & IDU	M	0	0.0	11	1.3	4	2.2	30	1.3
Heterosexual contact	M	4	10.5	62	7.3	35	18.9	243	10.7
	F	9	23.7	54	6.4	33	17.8	264	11.7
Injecting drug user (IDU)	M	1	2.6	14	1.7	2	1.1	53	2.3
	F	0	0.0	5	0.6	0	0.0	11	0.5
Blood product recipient	M	0	0.0	16	1.9	0	0.0	34	1.5
Transfusion related	M	0	0.0	2	0.2	0	0.0	9	0.4
	F	0	0.0	2	0.2	1	0.5	9	0.4
	NS	0	0.0	0	0.0	0	0.0	5	0.2
Perinatal	M	3	7.9	6	0.7	3	1.6	16	0.7
	F	1	2.6	6	0.7	3	1.6	14	0.6
Awaiting information/ Undetermined	M	2	5.3	35	4.1	17	9.2	319	14.1
	F	0	0.0	2	0.2	3	1.6	31	1.4
	NS	0	0.0	0	0.0	0	0.0	13	0.6
Other	M	0	0.0	0	0.0	0	0.0	4	0.2
	F	0	0.0	1	0.1	0	0.0	7	0.3
Total		**38**	100.0	**843**	100.0	**185**	100.0	**2259**	100.0

[a] Reported by date of notification.

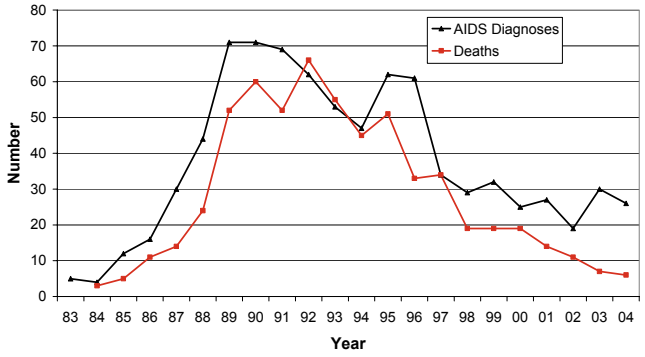
[b] Includes people who have developed AIDS. Numbers are recorded by date of diagnosis for those reported through antibody testing and by time of first viral load for those reported through viral load testing. The latter include many who have initially been diagnosed overseas and have not had an antibody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

Source: [11].

AIDS

In 2004, 38 cases of AIDS were notified. Of these, 26 were diagnosed in 2004 (Figure 4). Eighteen (47.4%) of the cases were homosexual/bisexual, 13 (34.2%) heterosexual, 4 (10.5%) perinatal, 1 (2.6%) IDU and 2 unknown. Age data were similar to HIV with a wide range of ages and 18 cases (47.4%) aged 30-39 years. There were six deaths from AIDS during the year, four males and two females.

Figure 4. AIDS cases and deaths by year of diagnosis, 1983 - 2004



Source: [10]

The time from infection with HIV to the onset of AIDS varies considerably with a mean of ten years in untreated cases. This is now being prolonged by highly active anti-retroviral therapy (HAART). Previously the time from the diagnosis of AIDS to death was about 18 months. This has also been changed with a sustained drop in the number of deaths since the introduction of HAART in 1995-6. Figure 4 shows that the number of deaths has decreased considerably but the number of new diagnoses only slightly.

This illustrates the importance of an early diagnosis of HIV infection. Two thirds of the 127 people notified with AIDS in the five year period from 2000-2004 had their HIV infection diagnosed within one month of their AIDS diagnosis. With an early diagnosis of HIV and HAART most of these people would not have progressed to AIDS.

Given the evidence of ongoing transmission amongst men who have sex with men, there is a need for early diagnosis and treatment together with counselling, with an aim of supporting change away from high-risk behaviours.

ANTHRAX

No cases of anthrax have been recorded in New Zealand for many years. Outbreaks of anthrax occurred in many other countries in 2004 including, Zimbabwe, Indonesia and many parts of the Russian Federation. Anthrax is also considered by the Centers for Disease Control and Prevention in Atlanta to be a high priority aerosolised agent for bio-terrorist use [12].

ARBOVIRAL DISEASES

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

Barmah Forest Virus

There was one case of Barmah Forest virus infection in an eight year old female school child who had been in Queensland during the incubation period of the disease. The case was confirmed by serology. She was not admitted to hospital.

Japanese Encephalitis

There was one case of Japanese encephalitis notified in 2004. This was in a 49 year old female with a history of travel to Hong Kong, China and Japan during the incubation period. The diagnosis was confirmed by positive serology and the case was admitted to hospital.

Ross River Virus

Five cases of Ross River virus infection were notified in 2004, the greatest number for a single year since the disease became notifiable in 1970. Since 1970, 16 cases have been notified; one in 1980 and 15 since January 1997, with greater than one case a year in 2000 (two cases), 2001 (three cases) and 2004.

All five cases in 2004 were female, four of which were European, the other of Other ethnicity. Two were aged 20-29 years, the remainder were aged between 40 and 70 years.

Four of the cases had recently been in Australia. One was an Australian tourist visiting New Zealand and the other three were New Zealand residents visiting Australia (two had been overseas for less than one year, the other for greater than one year). The fifth case became ill while in Fiji.

One case required hospitalisation. All five cases were laboratory confirmed.

In 2004 exotic mosquitoes (*Ochlerotatus camptorhynchus)* capable of transmitting Ross River virus were found at sites on Auckland's Whangaparaoa Peninsular [13, 14] and in the Wairau estuary, Blenheim.

BOTULISM

There have been no notifications of botulism in New Zealand in humans through public health surveillance data since 1987. Hospital discharge data record one case in 1989, two cases in 1994 and one in 1995.

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

Two cases of brucellosis were notified in New Zealand in 2004. In one case the organism *Brucella abortus* was isolated from a 53-year-old male with no current occupational risk factors but who had been employed in an abattoir some 18 years previously.

In the second case the diagnosis was made in a 40-year-old farmer on the basis of positive serology. False positive serology is know to occur as a cross reaction with *Yersinia* and other bacteria. The Ministry of Agriculture and Forestry (MAF) have investigated the case but no animal source was found.

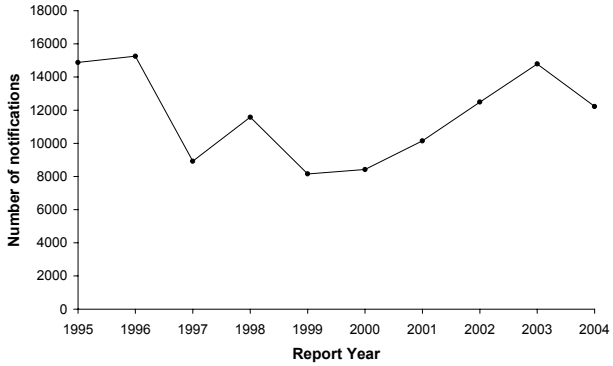
CAMPYLOBACTERIOSIS

There were 12 213 cases of campylobacteriosis notified in 2004. The 2004 rate of 326.8 per 100 000 population was significantly lower than the 2003 rate of 395.7 per 100 000. Campylobacteriosis continues to be the most commonly

notified disease comprising 53.2% of all notifications (22 944) in 2004.

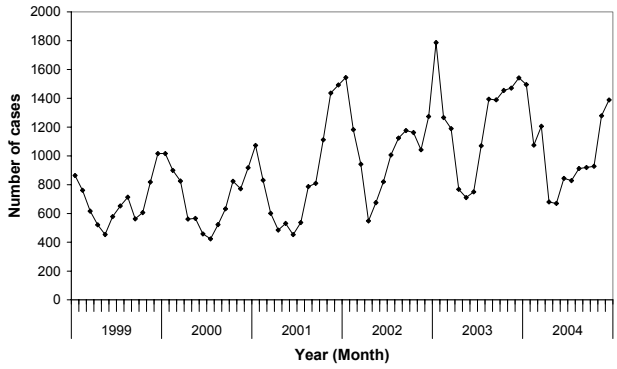
Figure 5 shows campylobacteriosis incidence for the 10-year period and Figure 6 shows the number of cases notified each month since 1999.

Figure 5. Campylobacteriosis notifications by year, 1995 - 2004



Campylobacteriosis is highly seasonal with a summer peak and winter trough. The pattern in 2004 was analogous to 2003, in that a high incidence was sustained for much of winter and early spring. The highest monthly campylobacteriosis total for 2004 was for the month of January when 1495 cases were notified.

Figure 6. Campylobacteriosis notifications by month, January 1999 - December 2004



Campylobacteriosis rates varied throughout the country. The highest rates were recorded in South Canterbury (547.5 per 100 000 population), Southland (452.9 per 100 000) and Auckland (392.9 per 100 000) DHBs. Figure 7 shows the rates of campylobacteriosis by DHB for 2004.

Sex was recorded for 11 962 (97.9%) of the 12 213 cases. Of these 6467 cases were male (354.8 per 100 000 population) and 5495 cases (287.0 per 100 000) were female. Age was recorded for 12 118 (99.1%). The highest age-specific rate occurred among children aged 1-4 years (515.4 per 100 000 population).

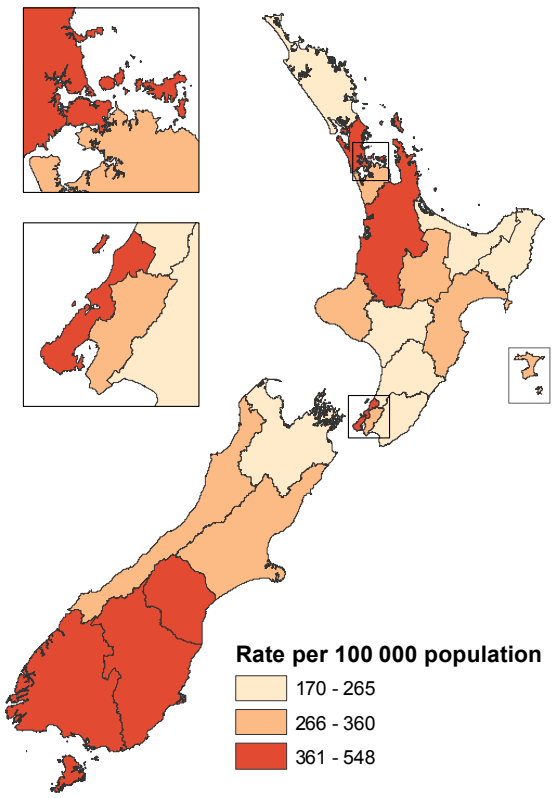
Ethnicity was recorded for 79.8% of all notifications during 2004. As in previous years, the highest rate occurred among those of European ethnicity (8509 cases, 326.0 per 100 000 population), followed by those of Other ethnicity (530 cases, 212.2 per 100 000). Pacific Peoples had the lowest rate (126 cases, 62.9 per 100 000).

Of the 6542 (53.6%) cases for which hospitalisation status was recorded on EpiSurv, 499 (7.6%) were hospitalised.

In 2004, 31 outbreaks of campylobacteriosis were reported in involving 130 cases.

Of the campylobacteriosis cases for which information was recorded, 49.8% (1445/2899) had consumed food from retail premises, 30.9% (1071/3461) had contact with farm animals, 21.1% (626/2970) had consumed untreated water, 14.1% (467/3301) had recreational water contact, 12.2% (387/3177) had contact with faecal matter, 8.3% (343/4108) were food handlers, and 7.3% (283/3871) had been overseas during the incubation period.

Figure 7. Campylobacteriosis notifications by DHB, 2004



CHEMICAL POISONING FROM THE ENVIRONMENT

There were seven cases of chemical poisoning from the environment notified in 2004. Five of these cases were related to the same incident; exposure of a family to domestic gas supplied to a hot water cylinder. All five cases were hospitalised with carboxyhaemoglobin levels ranging from 22% to 33%. The family members were aged from 12 to 46 years. The incident occurred in the Waikato.

A further notification was received from Waikato DHB involving recreational contact with water containing microcystin (2.56 micrograms/litre). The other notification, received from Capital and Coast DHB was related to poisoning by permethrin (flea powder). In both instances the cases were adults and neither were hospitalised.

ESR manages a separate chemical injury surveillance system relating to chemical injuries including poisonings. Reports [16] are published on the www.surv.esr.cri.nz website.

CHOLERA

There were two laboratory confirmed cases of cholera in New Zealand in 2004. Faecal specimens were positive in both cases. There have been 11 cases of cholera notified in New Zealand in the last ten years all of which had a history of overseas travel. Both the cases reported in 2004 had a history of travel to India.

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 eighth annual report of the Registry [17].

In 2004 eight cases of possible CJD were referred to the Registry. Two cases had sporadic CJD confirmed by post-mortem examination.

Two cases left New Zealand after initial investigations. One of these is not thought to be a case because of the chronicity of his cognitive decline. The other had several positive test results including CSF 14-3-3 protein positive, EEG changes and hyperintensities of the basal ganglia. This has been classified as a probable case of CJD.

A 72 year old woman with rapidly progressive ataxia, cognitive decline, myoclonus and basal ganglia with basal ganglia hyperintensities was also considered to be a probable case.

A 50 year old woman is considered to be the sixth case of human growth hormone induced CJD in New Zealand. She presented with rapidly increasing ataxia and myoclonus with a history of receiving American derived human growth hormone between 1964 and 1970. CSF was positive but MRI and EEG were unhelpful. Post-mortem examination was declined.

Two cases, both males in their seventies, were referred late in the year and are still being investigated.

The New Zealand CJD Registry now includes MRI findings in the clinical diagnostic criteria of CJD. The Registry report cautions that even though World Health Organization criteria for the diagnosis of CJD are fulfilled the diagnosis may be incorrect. For a definitive diagnosis of CJD a tissue diagnosis is essential.

Table 3. Cases of CJD, age, sex, location and diagnosis notified in New Zealand, 2004

Age	Sex	Location	Diagnosis
69	M	Wellington	Possible
77	M	Taranaki	Possible
72	F	Auckland	Probable
71	M	Hamilton	Definite
74	M	Auckland	Possible
69	M	Auckland	Definite
58	F	Tauranga	Probable
50	F	South Canterbury	Probable

CRYPTOSPORIDIOSIS

A total of 612 cases of cryptosporidiosis were notified in 2004. The 2004 rate (16.4 per 100 000 population) was significantly lower than the 2003 rate (21.9 per 100 000).

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

Figure 8. Cryptosporidiosis notifications by year, 1996 - 2004

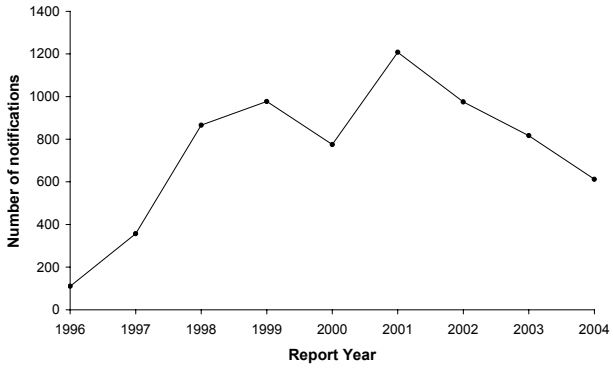
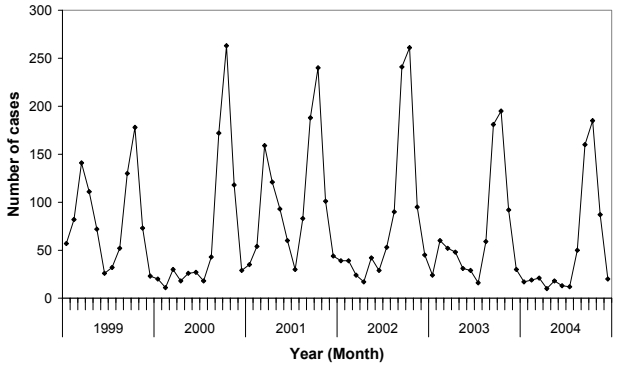


Figure 9 shows cryptosporiodiosis cases by month since 1999. There is a distinct seasonal pattern with the largest number of notifications occurring in October each year.

Rates varied throughout the country as illustrated in Figure 10. The highest rates were recorded in South Canterbury (43.6 per 100 000 population), Waikato (40.9 per 100 000) and MidCentral (37.4 per 100 000) DHBs.

Figure 9. Cryptosporidiosis notifications by month, January 1999 - December 2004



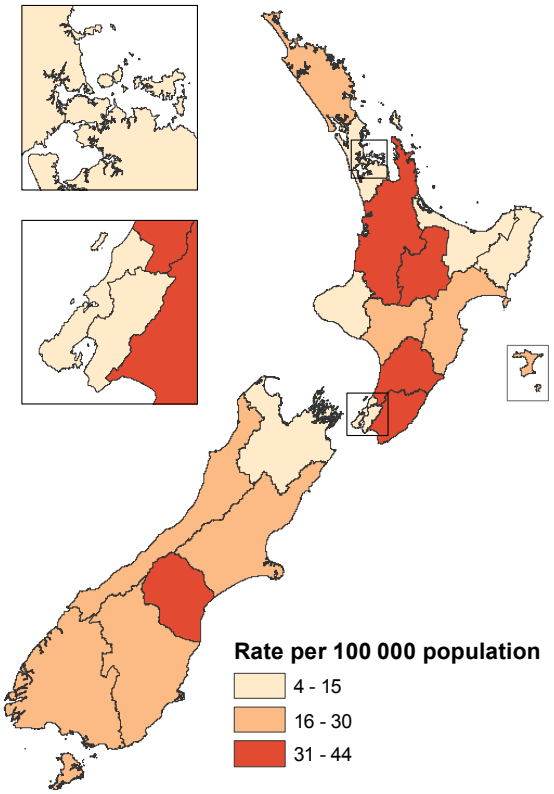
Sex was recorded for 607 (99.2%) of the 612 cases. Of these, 301 cases (16.5 per 100 000 population) were male and 306 (16.0 per 100 000) were female. Ethnicity was recorded for 540 (88.2%) cases. The highest rates occurred among those of European ethnicity (466 cases, 17.9 per 100 000 population), followed by Maori (47 cases, 8.9 per 100 000). Pacific Peoples recorded the lowest rate (7 cases, 3.5 per 100 000 population). Children aged between 1-4 years of European ethnicity experienced the highest rate (160.8 per 100 000).

Age-specific notification rates were higher in the 1-4 years age group than in all other age groups (117.5 per 100 000 population). Rates significantly higher than the national average (16.4 per 100 000) were also seen in the less than one year (47.6 per 100 000), and 5-9 years (30.4 per 100 000) age groups.

Of the 517 cases for which hospitalisation status was recorded, 24 (4.6%) were hospitalised. Five cryptosporidiosis outbreaks were reported in 2004, involving 19 cases.

Among the cases for which this information was recorded, 71.7% (302/421) had contact with farm animals, 47.4% (165/348) had consumed untreated water, 32.5% (111/342) had contact with sick animals, 26.1% (66/253) consumed food from retail premises, 25.9% (89/343) had recreational water contact, 24.0% (94/391) had faecal contact, and 18.0% (72/401) had contact with other symptomatic people during the incubation period.

Figure 10. Cryptosporidiosis notifications by DHB, 2004



CYSTICERCOSIS

No cases of tissue infection with the larval stages of *Taenia solium* have been reported to public health units in New Zealand since 1992. Hospital admission data for 2004 reports three cases of cysticercosis (ICD-10-AM code B69). Two cases were admitted with this as the primary diagnosis and another as a relevant reason for admission.

DECOMPRESSION SICKNESS

There were no notifications of decompression sickness in 2004. This was in contrast to previous years with a high of 23 cases in 2001, 7 cases in 2002 and 2 cases in 2003. Hospitalisation data for the same years presents a different picture 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) and 9 cases (2004).

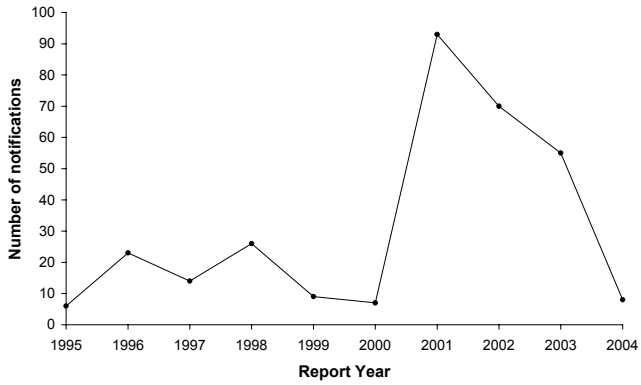
DENGUE FEVER

Eight cases of dengue fever were notified in 2004. The 2004 rate (0.2 per 100 000 population) was significantly lower than that for 2003 (1.5 per 100 000 population, 55 cases) and the preceding two years. Between 2001 and 2003 an average of 73 cases per year were notified, peaking with 93 cases in 2001. The number of cases in 2004 is similar to that notified in 1999 (9 cases) and 2000 (7 cases).

In addition to the eight notifications received in 2004, LabPlus in Auckland diagnosed five non-notified dengue cases, the ESR laboratory a further non-notified case.

Figure 11 shows dengue fever notifications by year since 1995.

Figure 11. Dengue fever notifications, 1995 - 2004



Of the eight notified cases, four were aged 30-39 years, three were aged 50-59 years and the other case was aged 60-69 years. Five cases were male, three female. Six were of European ethnicity; one was recorded as Pacific Peoples and the other as Other ethnicity.

All cases recorded recent overseas travel. Implicated countries were Tonga (3 cases), Fiji (2 cases), and from East Timor, Cook Islands and India (one case each).

Five of the eight cases undertook no recorded protective measures, e.g. use of insect repellent, bed nets, protective clothing and staying in screened/air conditioned accommodation. Protective measures undertaken by the other three cases were varied.

Reported cases of dengue continue to occur in the Pacific and in 2004 reports of occurrence have included Fiji and Australia [18].

DIPHTHERIA

No cases of toxigenic diphtheria were notified in New Zealand in 2004. The last case with a toxigenic strain 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.

Thirty cultures were received at the ESR laboratory for toxigenicity testing, typing and surveillance purposes compared with 9 in 2003. This increase was the result of a raised awareness of the presence of *Corynebacterium diphtheriae* in cutaneous infections. All 30 cultures were from cutaneous sources and all proved to be non-toxigenic by PCR examination. Twenty of the isolates were biovar *mitis* and 10 were biovar *gravis*.

Outbreaks of diphtheria continued to occur overseas in 2004, particularly in Russia, and unimmunised individuals are at risk [19].

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 separately.

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 2004, 1370 cases (36.7 per 100 000) of gastroenteritis were notified. This is a significant increase from 2003 (1025 cases, 27.4 per 100 000). In 2004, a causal agent was reported for 37 (2.7%) cases (Table 4). Where the agent was identified, the most common pathogen was norovirus.

Table 4. Cases of gastroenteritis where the organism was identified, 2004

Organism	Cases	Percentage[a]
Bacillus cereus	1	2.7%
Clostridium perfringens	5	13.5%
Norovirus	25	67.6%
Other[b]	6	16.2%
Total	37	100.0%

[a] Percentage of cases where organism was identified
[b] Includes three cases infected with *Campylobacter*

Gastroenteritis notifications were highest in South Canterbury (145.9 per 100 000 population) and Waikato (131.6 per 100 000) DHBs.

Overall rates of gastroenteritis were higher in females than in males (45.3 and 26.6 per 100 000, respectively). Highest rates in both sexes were in the greater than 70 years age group.

Details of gastroenteritis organisms identified in disease outbreaks are recorded in the Outbreak section of this report.

A definite or suspect source of infection could be assigned to 85.9% of the 787 cases where the source of infection was reported. Hospitalisation data were recorded for 93.6% of cases, and 38 (3.0%) were hospitalised, all with gastroenteritis of unknown causal agent.

GIARDIASIS

There were 1515 cases of giardiasis notified in 2004. The 2004 rate (40.5 per 100 000 population) was slightly lower than the 2003 rate (42.0 per 100 000).

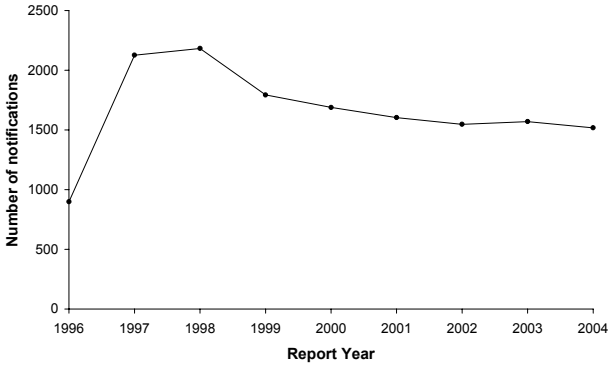
Figure 12 shows giardiasis cases by year since the disease became notifiable in June 1996.

Rates varied throughout the country as illustrated in Figure 13. The highest rates were recorded in Waikato (61.4 per 100 000 population), Auckland (57.9 per 100 000) and Lakes (55.2 per 100 000) DHBs.

Sex was recorded for 1478 (97.6%) of the 1515 cases. Of these, 774 cases (42.5 per 100 000 population) were male and 704 (36.8 per 100 000) were female.

Ethnicity was recorded for 1233 (81.3%) cases. The highest rates were reported among those of Other ethnicity (103 cases, 41.2 per 100 000 population), followed by those of European ethnicity (1054 cases, 40.3 per 100 000). Reported rates were lowest among Maori and Pacific Peoples.

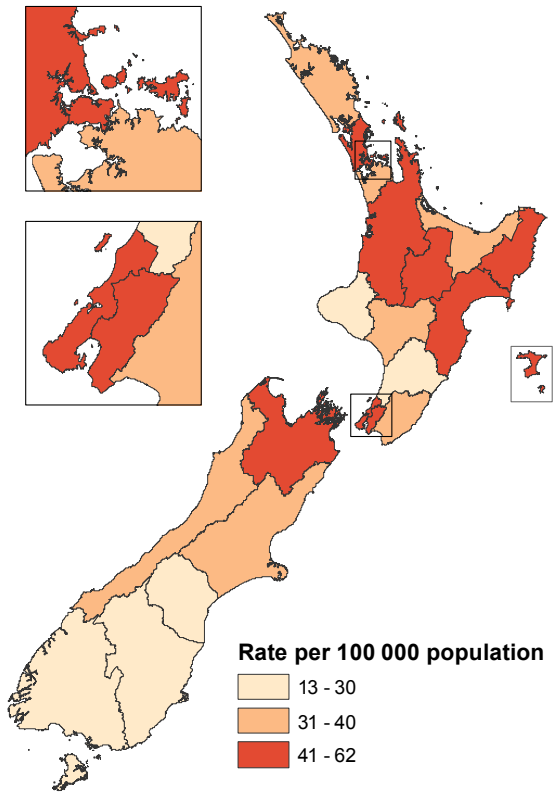
Figure 12. Giardiasis notifications by year, 1996 - 2004



Children in the 1-4 years age group of European ethnicity experienced the highest rate (174.8 per 100 000 population) followed by children in the 5-9 years age group of Other ethnicity (106.5 per 100 000).

There were two peaks in the age-specific rates of giardiasis notifications: the largest one in the 1-4 years age group (136.0 per 100 000 population) and a smaller peak in the 30-39 years age group (64.3 per 100 000).

Figure 13. Giardiasis notifications by DHB, 2004



Of the 898 cases for which hospitalisation status was recorded, 27 (3.0%) were hospitalised. Twenty-five giardiasis outbreaks were reported in 2004, involving 82 cases.

Among the cases for which this information was recorded, 37.3% (193/518) had contact with faecal matter, 35.4% (190/537) had contact with other symptomatic people, 33.2% (170/512) indicated recreational contact with water, 33.2% (126/380) had consumed food from retail premises, 32.7% (143/437) had consumed untreated water, 26.3% (141/537) had contact with farm animals, and 21.6% (117/542) had contact with another case during the incubation period

HAEMOPHILUS INFLUENZAE SEROTYPE B DISEASE

Four cases of *Haemophilus influenzae* serotype b (Hib) were notified in 2004, three of which were laboratory confirmed. The remaining (adult) case was found not to be serotype b.

Two of the cases were aged less than five years, thus the 2004 age specific rate for confirmed cases aged less than five years was 0.7 per 100 000 population, compared to 2.6 per 100 000 population in 2003 (7 cases). No cases aged less than five years were notified in 2002.

Both 2004 cases aged less than five years were European males. One was from Counties Manukau DHB, the other from Waikato DHB.

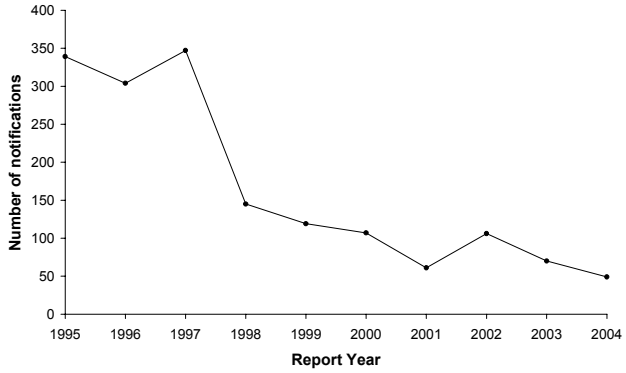
A Hib vaccine was introduced in January 1994. Prior to August 2000, the recommended immunisation schedule consisted of four doses of DTPH vaccine given at six weeks, three months, five months and 15 months of age. The current schedule introduced in mid August 2000 recommends three doses of Hib vaccine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

Of the two cases aged less than five years in 2004, one had received the first two doses of vaccine and the other had received no vaccine.

HEPATITIS A

There were 49 notifications of hepatitis A in 2004 compared with 70 in 2003. This continues a trend of decreasing incidence since 1997 as seen in Figure 14. The increase in 2002 was related to an outbreak linked to consumption of contaminated blueberries.

Figure 14. Hepatitis A notifications by year, 1995 - 2004



The national rate of disease was 1.3 per 100 000. The highest rates by DHB were in Tairawhiti (2.3 per 100 000), Lakes (2.1 per 100 000) and Auckland (1.9 per 100 000). Of the 49 notifications 31 were in females and 18 in males. Twelve cases (24.5%, 1.4 per 100 000) were aged less than 15 years. For those for which ethnicity was recorded (94%), 24 (52.2%, 0.9 per 100 000) were European, 12 (26.1%, 6.0 per 100 000) were Pacific Peoples, 9 (19.6%, 3.6 per 100 000) were Other and 1 (2.2%, 0.2 per 100 000) was Maori.

There was one outbreak of hepatitis A in 2004 involving 3 cases.

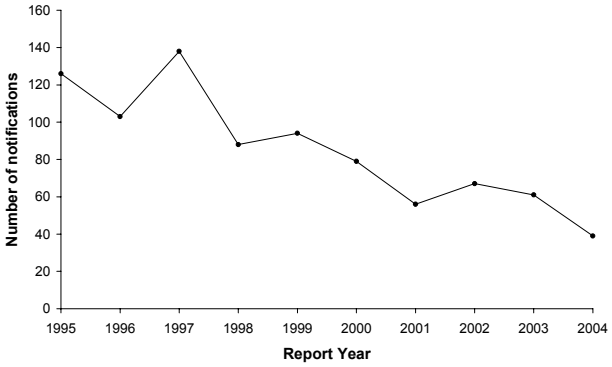
Nineteen cases (39%) had a history of overseas travel. Of these 5 had been to India, 3 to Fiji, 3 to Samoa, 3 to South East Asia, 2 to Egypt and one each for Australia, New Caledonia and Pakistan. With the exception of influenza, hepatitis A is the most frequent vaccine-preventable infection in non-immune travellers visiting developing countries. Amongst people aged more than 50 years the case-fatality rate is 1.8% [20]. Vaccination is highly recommended by WHO and other expert groups.

HEPATITIS B

In New Zealand only acute hepatitis B is notifiable and there are many more chronic cases that those notified in the population. There were 39 notifications (1.6 per 100 000 population) of hepatitis B in 2004. This was a significant reduction on the 61 cases notified in 2003 and continues the trend of decreasing incidence during the last twenty years. Hepatitis B vaccine was added to the immunisation schedule on September 1985 with a catch-up programme in February 1988. In 1984 there were 609 cases and the continuing reduction in incidence is almost certainly due to this intervention.

Figure 15 shows the number of notifications by year since 1995.

Figure 15. Hepatitis B notifications by year, 1995 - 2004



There were no cases in those aged less than 15 years and only one in the 15-19 years age group. There were 13 cases (2.7 per 100 000) in the 20-29 years age group, 12 cases (2.1 per 100 000) aged 30-39 years and 8 cases (1.5 per 100 000) aged 40-49 years. Males accounted for 23 cases (59%, 1.3 per 100 000) and females for 16 cases (41%, 0.8 per 100 000).

Ethnicity was recorded for 97% of cases. Of these 18 (47.4%, 0.7 per 100 000) were European, 11 (29%, 2.1 per 100 000) were Maori, 3 (7.9%, 1.5 per 100 000) Pacific Peoples and 6 (15.8%, 2.4 per 100 000) Other ethnicity.

The highest rates by DHB were to be found in Counties Manukau (2.4 per 100 000), Tairawhiti (2.3 per 100 000) and Lakes (2.1 per 100 000).

The major risk factors recorded for hepatitis B are shown in Table 5. These proportional risks are very similar to those recorded for 2003. The importance of overseas travel is difficult to evaluate because of the primary importance of individual behavioural factors during the time overseas.

Table 5. Exposure to risk factors associated with hepatitis B, 2004

Risk Factor	Yes	No	Unknown	%[a]
Case overseas during incubation period	9	24	6	27.3%
Sexual contact with confirmed case/carrier	5	18	16	21.7%
Body piercing / tattooing in last 12 months	4	25	10	13.8%
Household contact with case	4	25	10	13.8%
Occupational exposure to blood	1	26	12	3.7%

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

Table 6. Exposure to risk factors associated with hepatitis C, 2004

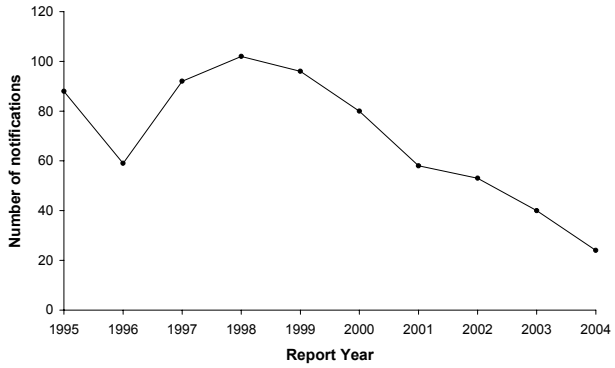
Risk Factor	Yes	No	Unknown	%[a]
History of injecting drug use	12	2	10	85.7%
Sexual contact with confirmed case/carrier	4	6	14	40.0%
Household contact with case	3	10	11	23.1%
Blood products / tissue recipient	1	11	12	8.3%
Body piercing / tattooing in last 12 months	1	3	20	25.0%

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

HEPATITIS C

There were 24 cases of acute hepatitis C notified in 2004 compared with 40 in 2003. This continues the downward trend since the peak of 102 cases in 1998 (Figure 16).

Figure 16. Hepatitis C notifications by year, 1995 - 2004



The national annual rate for 2004 was 0.6 per 100 000 with the highest rates in DHBs occurring in West Coast (3 cases, 9.9 per 100 000), Wairarapa (3 cases, 7.9) and Tairawhiti (2 cases, 4.6 per 100 000). Small numbers distort these rates. Five different DHBs had three cases each. Males accounted for 14 cases (58.3%), females 9 cases (37.5%) and the sex of one case was unknown.

The highest numbers of cases and rates were to be found in the 20-29 years age group (7 cases, 1.4 per 100 000), 40-49 years (7 cases, 1.3 per 100 000) and 15-19 years (3 cases, 1.1 per 100 000).

Ethnicity was recorded for 91.7% of cases with 13 (0.5 per 100 000) in European, 6 (1.1 per 100 000) in Maori, 1 (0.5 per 100 000) in Pacific Peoples and 2 (0.8 per 100 000) in Other.

Table 6 indicates the risk factors for hepatitis C in 2004. In keeping with other years the major risk factor was a history of intravenous drug use followed by sexual contact with a confirmed case. In contrast to 2003 there were no cases reporting accidental occupational exposure to blood.

HEPATITIS (VIRAL) NOT OTHERWISE SPECIFIED (NOS)

There were 2 notifications of hepatitis NOS in 2004 a decrease from the 5 reported in 2003. One case was female and one male. Both cases were in the 20-29 years age group and both had a history of recent overseas travel. Neither had received blood or blood products nor had they been hospitalised.

HIGHLY PATHOGENIC AVIAN INFLUENZA (HPAI)

Early in 2004 the first reports of an outbreak of Highly Pathogenic Avian Influenza (HPAI) were received from East Asia. Cases occurred first amongst birds and then in humans. By the end of 2004 HPAI laboratory confirmed cases in humans had occurred in Thailand (17 cases/12 deaths) and Vietnam (37 cases/29 deaths).

As a response to this threat HPAI was made a notifiable disease in New Zealand on 10 February 2004. The Ministry of Health convened a technical advisory group and a case definition, a case report form and a faxed-based reporting system were developed.

The most important risk factors were travel to a country where HPAI was known to be circulating and contact with poultry. Protocols were developed for the management of cases and contacts. Border controls were also considered. The experience obtained from coping with the 2003 threat of SARS proved to be most useful.

No cases of HPAI were notified in 2004.

HYDATID DISEASE

One case of hydatid disease, caused by the larval stages of the tapeworm *Echinococcus granulosus*, was reported in 2004. This was in an adult female aged more than 45 years who had probably had the disease for some time. The case was confirmed by ultrasound and serology. 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.

According to hospital admission data, no cases were admitted with *Echinococcus granulosus* infection (ICD-10-AM code B67.0-B67.4) as a primary diagnosis but two were admitted with it as an other relevant diagnosis.

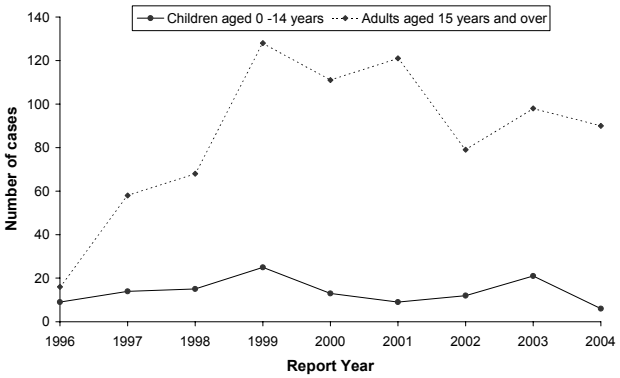
LEAD ABSORPTION

There were 95 cases of lead absorption notified in 2004. This is slightly less than in 2003 (119 cases) and similar to 2002 (91 cases). The 2004 rate was 2.5 per 100 000 population.

Notifications were reported from all DHBs with the exception of Wairarapa. The highest rates were recorded in Otago (10.0 per 100 000 population), Tairawhiti (6.8 per 100 000), Southland (5.8 per 100 000) and MidCentral (4.5 per 100 000). MidCentral and Otago DHBs also had high rates in 2003; ranked second and third respectively.

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

Figure 17. Lead absorption notifications by year, 1996 - 2004



Of the 95 cases notified in 2004, 6 (6.3%) were children aged 14 years or younger, 4 of which were aged 1-4 years, and the other was aged 5-9 years. This is the lowest percentage of cases involving children since 1996. By contrast, the percentage of cases involving children in 2003 (15.3%) was one of the highest recorded.

As in previous years, the majority of cases were male (81.9% of cases) where sex was known (77/94). Ethnicity was recorded for 79 cases (83.2%); 88.6% (70/79) were of European ethnicity.

Of the 80 cases in 2004 for which hospitalisation status was recorded, 7 (8.9%) were hospitalised. Blood lead concentrations were recorded for five of the six children and ranged from 0.8 to 1.4 μmol/l, with a median of 0.93 μmol/l.

Table 7 shows a summary of risk factor information for lead absorption in 2004. 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. The majority of adults had undertaken the renovations themselves.

In addition to those risk factors listed in Table 7, occupational exposure was also analysed. Thirty-three cases were recorded as having had occupational exposure. Occupations included; painter, decorator, builder or renovator (17 cases), leadlighter/leadlight manufacturer (3), fitter/welder (2), mining company employee (2), and one each of mechanic, radiator repairer, used metal recycling employee, aircraft refueller, technical service engineer, fish sinker maker and factory worker (dross remover). The occupation of a further case was not specified. In addition there were a further three cases with high-risk occupations, where occupational exposure was recorded as either unknown or not a risk factor.

Table 7. Exposure to risk factors associated with lead absorption, 2004

Risk Factor	Yes	No	Unknown	%[a]
Adults				
Case lived in or regularly visited a building built prior to 1970.	46	12	32	79.3
Case lived in or regularly visited a building built prior to 1970, that had paint chalking/flaking, and /or recently undergone alterations or refurbishment.	38			
Case had exposure to lead through hobbies	12	42	36	22.2
Hobby is shooting/gun club	5			
Manufactures lead sinkers/bullets	3			
Lead lighting	3			
Restoring furniture	1			
Close contact of case was occupationally exposed to lead	3	48	45	5.9
Children (<15 years)				
Case lived in or regularly visited a building built prior to 1970.	5	0	1	100
Case lived in or regularly visited a building built prior to 1970, that had paint chalking/flaking, and /or recently undergone alterations or refurbishment.	5			
Case played in soil containing paint debris	4	0	2	
Close contacts of case were exposed to lead through hobbies	0	2	4	0.0
Close contacts of case were exposed to lead through occupation	1	2	3	33.3
Pica behaviour	2	0	4	100

[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.

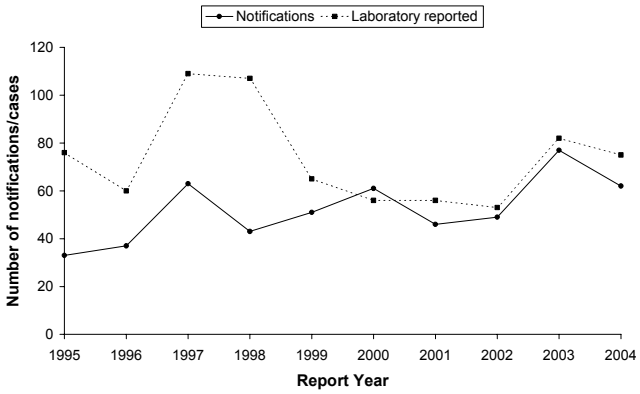
LEGIONELLOSIS

There were 62 cases of legionellosis notified in 2004. This represents a rate of 1.7 per 100 000 which has decreased from 2.1 per 100 000 in 2003 (Figure 18).

The rate was higher in males (2.1 per 100 000) than in females (1.2 per 100 000). The highest age specific rate (7.1 per 100 000) occurred in the 70 and over age group followed by the 60-69 age group (4.2 per 100 000) and the 50-59 age group (3.1 per 100 000). There was one case aged less than 30 years.

Legionellosis cases were reported throughout the country.

Figure 18. Legionellosis notifications and laboratory reported cases by year, 1995 - 2004



There was one death from legionellosis in 2004. The case was laboratory diagnosed with seroconversion to *Legionella micdadei.*

Table 8 provides a summary of the risk factors. Some cases had more than one risk factor recorded.

Table 8. Risk factors associated with legionellosis, 2004

Risk Factor	Yes	No	%[a]
Contact with definite or suspected environmental source of infection	27	10	73
Smokers or ex-smokers	7	40	15
Pre-existing immunosuppressive or debilitating condition	6	42	13

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

Of the cases (27) with a definite or suspect environmental source of infection recorded, 20 reported contact with compost/potting mix/soil, 3 worked or stayed in an air conditioned building, 2 were exposed to spa/indoor pools and 1 each reported aquarium tank cleaning, home showering and hot water on a fishing vessel as potential sources.

There was one legionellosis outbreak reported at the beginning of 2004 involving 3 cases infected with *L. pneumophila* that occurred in November and December of 2003.

A total of 75 cases of legionellosis fitting the case definition were laboratory diagnosed during 2004. Of these 52 fitted the confirmed case definition and 23 fitted the probable case definition. Table 9 shows the number of strains identified for the laboratory reported cases in 2004.

Table 9. Legionellosis strains for laboratory cases, 2004

Legionella species / serogroup	Number	%[a]
L. bozemanii sg 1	3	4%
L. bozemanii sg 2	1	1%
L. dumoffii	3	4%
L. feelii	1	1%
L. gormanii	4	5%
L. hackeliae sg 2	4	5%
L. jordanis	1	1%
L. longbeachae sg 1	8	11%
L. longbeachae sg 1/2	12	16%
L. longbeachae sg 2	3	4%
L. micdadei	4	5%
L. pneumophila sg 1	19	25%
L. pneumophila sg 1/15	1	1%
L. pneumophila sg 11/12	1	1%
L. pneumophila sg 12	1	1%
L. pneumophila sg 12 & *L. longbeachae* sg 2	1	1%
L. pneumophila sg 15	1	1%
L. pneumophila sg 4	3	4%
L. pneumophila sg unknown	2	3%
Legionella sp.	2	3%
Total	75	

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

LEPROSY

Three cases of leprosy were notified in New Zealand in 2004, one child of 14 years and two adults. All were classified as multibacillary. All the cases occurred in Pacific People. Two cases had arrived in New Zealand during the previous twelve months. The arrival date of the third case was not recorded.

LEPTOSPIROSIS

A total of 104 cases of leptospirosis was notified in 2004, a rate of 2.8 per 100 000 population. This rate is not significantly different from that for 2003 (3.0 per 100 000) where 113 cases were notified. Of the 104 notified cases, 95 were laboratory confirmed. In addition, a further 49 cases were laboratory reported but not notified.

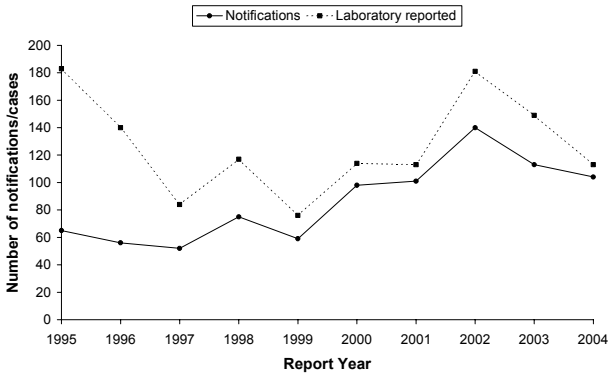
Figure 19 shows the number of notified and laboratory-reported cases of leptospirosis each year since 1994.

The highest DHB specific rates were from Hawke's Bay (13.9 per 100 000 population), West Coast (13.2 per 100 000) and Tairawhiti (11.4 per 100 000).

The 20-29 years (28 cases, 5.8 per 100 000 population) and 40-49 years (28 cases, 5.2 per 100 000) age groups had the highest age specific rates. The majority of the cases were male (95.2%). Ethnicity was recorded for 94.2% (98/104) of the cases. Rates were highest for Maori (26 cases, 4.9 per 100 000 population) followed by European (68 cases, 2.6 per 100 000) and Pacific Peoples (4 cases, 2.0 per 100 000) ethnic groups.

No leptospirosis related deaths were reported. Of the 95 cases for which hospitalisation status was recorded, 43 (45.3%) were hospitalised.

Figure 19. Leptospirosis notifications and laboratory reported cases by year, 1995 - 2004



Occupation was recorded for 102 (98.1%) of the 104 notified cases. Of these, 95 cases (93.1%) were recorded as engaged in occupations previously identified as high risk for exposure to *Leptospira spp*. in New Zealand [21]. The proportion of leptospirosis cases in high-risk occupations has not changed appreciably over the last two years (86.3% in 2003 and 90.1% in 2002).

Of the 102 cases with recorded occupation, 29 (28.4%) were farmers, farm workers, shearers, or stable foreman and 66 (64.7%) worked in the meat processing industry as either freezing workers, butchers, meat inspectors, pelt handlers, or meat processing cleaning supervisor. Leptospirosis cases also included one agricultural contractor, one bushman, one sawmill worker, two policemen (one had contact with pigs and the other had been on a farm), and two retired people (one who lives on a farm, the other reported possible exposure while clearing a tramping track).

The *Leptospira* species and serovar was recorded on EpiSurv for 95 of the 104 notified cases: *L. Borgpetersenii* sv *hardjo* (61 cases), *L. Interrogans* sv *pomona* (25), *L. Borgpetersenii* sv *ballum* (4), *L. Borgpetersenii* sv *tarassovi* (4), and *L. Interrogans* sv *copenhagen*i (1).

LISTERIOSIS

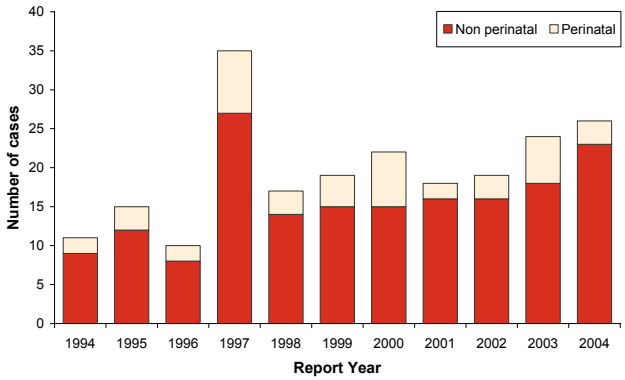
In 2004, 26 cases of listeriosis were notified, a rate of 0.7 per 100 000 population. This rate is not significantly different from the 2003 rate (0.6 per 100 000 population, 24 cases). The 26 cases notified in 2004 is the highest number since 1997 (35 cases) (Figure 20).

Three (11.5%) of the 2004 cases were recorded as perinatal, a decrease from 2003 (6 cases). Two of the 2004 cases were of 24 and 29 weeks gestation (both foetuses/infants died) and a third was at 16 weeks gestation but the child survived. The cases were from Waitemata, MidCentral and Hutt Valley DHBs.

The 23 non-perinatal cases were notified from 12 DHBs with the greatest number from Waikato, Lakes, and Capital and Coast (three each). All of the non-perinatal cases were aged over 40 years, with 12 cases aged over 70 years, five in the 50-59 years age group and a further five in the 60-69 years age group. Eleven cases were female and 12 were male. Of the 22 non-perinatal cases where ethnicity was known, thirteen were recorded as European, five as Maori and three as Pacific Peoples.

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

Figure 20. Listeriosis notifications by year, 1994 - 2004



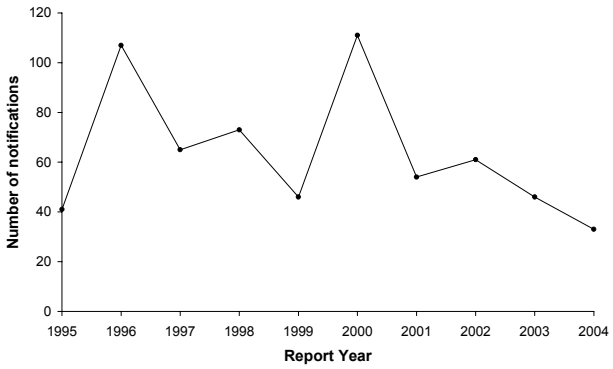
In addition to the two fatal perinatal cases, three of the non-perinatal cases resulted in death. Where hospitalisation status was recorded (all but one case), all cases were hospitalised. Twenty-one of the non-perinatal cases had an underlying illness, ten were admitted to hospital for treatment of another illness and four were receiving immunosuppressive drugs (note that a case may have more than one risk factor).

All but two of the cases were laboratory confirmed. Of these 24 cases, three quarters were serotype 4, the remainder were serotype 1/2.

MALARIA

There were 33 cases of malaria notified in 2004 (Figure 21). This is the lowest number since 1992 when there were 29 cases. Males accounted for the majority of these with 26 cases, females 6 cases and one was of unknown sex.

Figure 21. Malaria notifications by year, 1995 - 2004



Two cases were aged less than 15 years with the highest number (10 cases) in the 20-29 years age group. Of these 9 cases were male.

P. vivax was the most common species identified with 22 cases, *P. falciparum* for 10 cases and one was indeterminate.

All cases had resided overseas. In four cases the time overseas was more than one month after the illness developed. Three of these cases were *P. vivax*, which is in keeping with the natural history of this species, which has an hepatic stage that may persist for 6 months.

The countries identified as the likely source of the infection were India (9 cases), Papua New Guinea (8 cases), Solomon Islands (5 cases), Africa (6 cases), Vanuatu (3 cases) and South East Asia (2 cases). Table 10 shows the species for each area.

The use of malaria prophylaxis was only recorded for 12 (36.4%) of the cases. Amongst these, only 5 had taken it regularly, one irregularly and 6 had not taken any at all. Out of four cases giving their occupation as "soldier" three had *P. vivax* from the Solomon Islands and one had *P. falciparum* from PNG.

Table 10. Species of malaria associated with area of overseas travel, 2004

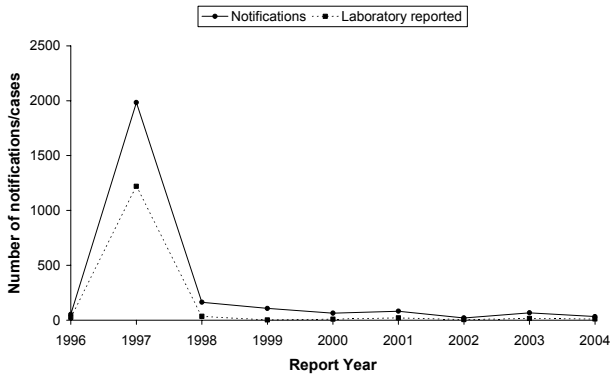
Area visited	*P. falciparum*	*P. vivax*	Indeterminate	Unknown
India[a]	1	7	1	1
PNG	5	3		
Africa	2	4		
Solomon Islands	1	4		
Vanuatu	1	2		
South East Asia		2		
Total	10	22	1	1

[a]One case had both *P. falciparum* and *P. vivax.*

MEASLES

In 2004 there were 33 measles notifications with 10 laboratory confirmed cases. This is a decrease on 2003 when there were 67 notifications with 11 laboratory confirmed cases. Figure 22 shows notified and laboratory-reported cases from 1996 to 2004.

Figure 22. Measles notifications and laboratory reported cases by year, 1996 - 2004



The 2004 measles notification rate (0.9 per 100 000 population) was significantly lower than the 2003 rate (1.8 per 100 000). Measles notification rates varied geographically throughout the country with the highest rates seen in West Coast (9.9 per 100 000 population), MidCentral (2.6 per 100 000) and Wairarapa (2.6 per 100 000) DHBs.

Age-specific rates were highest in the less than one year age group (14.6 per 100 000 population) followed by the 1-4 years age group (6.5 per 100 000).

The 2004 measles notification rates for males was 0.9 per 100 000 population and for females 0.8 per 100 000 population.

Ethnicity was recorded for 29 (87.9%) of all measles notifications during 2004. The highest rate was reported among those of Other ethnicity (1.6 per 100 000 population, 4 cases), followed by Maori (1.0 per 100 000, 5 cases). Pacific Peoples reported the lowest rate of disease (0.5 per 100 000, 1 case).

Of the 27 cases for which hospitalisation status was recorded on EpiSurv, 2 were admitted to hospital. Two measles cases reported overseas travel during the incubation period. Of the 24 cases for which this information was recorded, 9 (37.5%) attended school, pre-school or childcare.

In New Zealand measles immunisation was introduced in 1969. The recommended MMR immunisation schedule since January 2001 is to give the first dose at 15 months and the second at 4 years of age. Vaccination status was recorded for 28 cases. Of these 6 (21.4%) had received at least one dose of MMR vaccine. Table 11 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 [22]. 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 33 notifications with 9 (27.3%) 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 11. Age and vaccination status of measles notifications, 2004

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	14	4	0	0	9	1
5-9 yrs	4	1	1	0	1	1
10-19 yrs	4	0	0	0	4	0
20+ yrs	3	0	0	1	1	1
Total	33	5	1	1	21	5

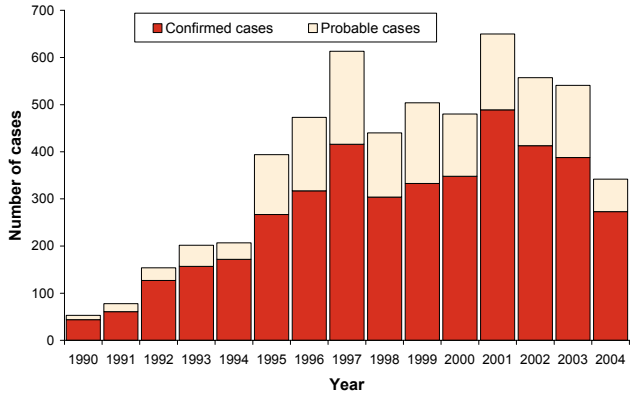
MENINGOCOCCAL DISEASE

A full description of the epidemiology of meningococcal disease in 2004 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 342 cases of meningococcal disease was notified in 2004, giving a rate of 9.2 per 100 000 population. This rate is lower than that for 2003 (14.5 per 100 000, 541 cases) yet is still approximately six times higher than the rate of 1.5 per 100 000 occurring in the immediate pre-epidemic years (1989-90). Of the 342 cases for 2004, 273 (79.8%) were laboratory confirmed. These figures are based on the combined laboratory and notification database, which uses earliest date (onset or hospitalisation date rather than report date, if available) for reporting cases. 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.

Figure 23. Meningococcal disease notifications by year, 1990 - 2004



The rate of meningococcal disease varied throughout the country in 2004, with the highest rates recorded in the Tairawhiti (29.6 per 100 000 population), Lakes (16.7 per 100 000) and Northland (15.0 per 100 000) DHBs. The lowest rates were from Nelson Marlborough DHB (2.4 per 100 000) and Wairarapa DHB (2.6 per 100 000) each with only three and two notified cases respectively.

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

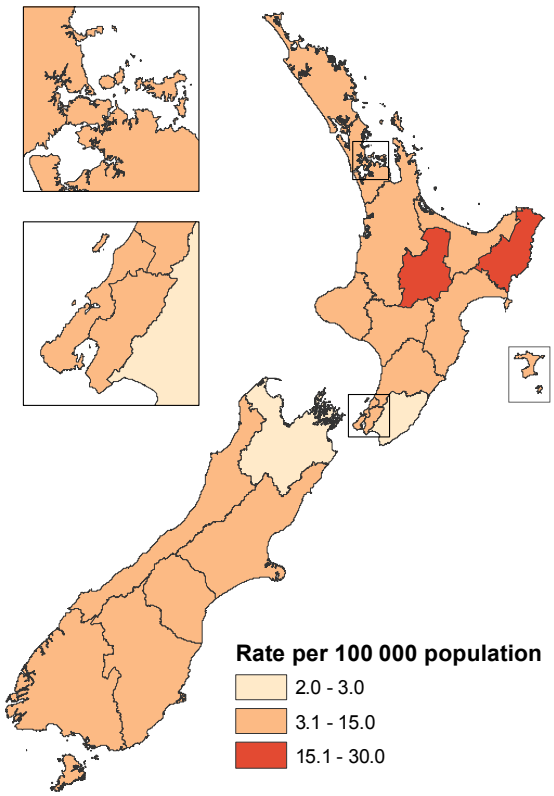
As in previous years, the highest age specific rates occurred in the less than one age group (84.2 per 100 000 population) followed by the 1-4 years age group (44.4 per 100 000). Pacific Peoples had the highest age standardised rate (22.2 per 100 000), followed by Maori (11.9 per 100 000). The age standardised rate for Europeans was 6.9 per 100 000.

For children the risk of disease is strongly associated with increasing deprivation (as measured on the NZDep 2001 scale [9]).

Eight deaths were reported during 2004 with the associated case fatality rate of 2.3% the lowest since the epidemic began. This brings the number of deaths since 1991 to 224, with an average case fatality rate of 4.0%.

Data on pre-hospital management were recorded for 339 cases, including all of the fatal cases. These data show that 61.7% (209/339) of cases were seen by a doctor prior to hospital admission and 21.2% (72/339) of cases received antibiotic treatment prior to hospital admission. In 2004, there were no fatalities among cases seen by a doctor prior to hospital admission and given antibiotics. By comparison the case-fatality rate was 4.6% among those cases not seen by a doctor prior to admission and not given pre-hospital antibiotics.

Figure 24. Meningococcal disease notifications by DHB, 2004



The increase in disease rates since 1991 has almost completely been attributable to serogroup B meningococci expressing the PorA P1.7b,4 protein. Serogroup B disease and particularly that caused by the epidemic strain continued to dominate in 2004. Serotyping and PCR analysis of either isolates or DNA from cases showed that in 2004 83.6% of group B cases possessed the P1.7b,4 PorA protein.

The announcement of regulatory approval for the MeNZB™ vaccine on 8 July 2004 allowed the commencement of the Meningococcal B Immunisation Programme to all people aged six months to 19 years of age.

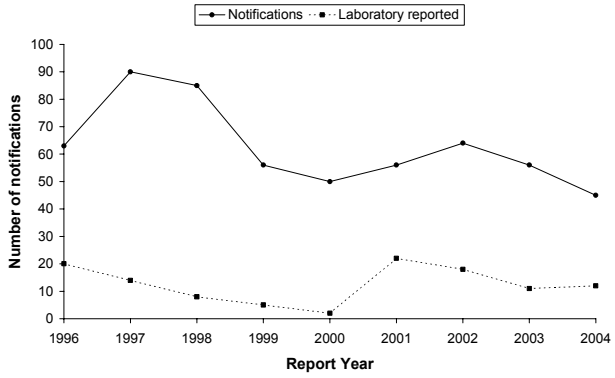
The antimicrobial susceptibility of all 180 viable meningococcal isolates received at ESR from cases of invasive disease in 2004 was tested. All isolates were susceptible to penicillin, ceftriaxone, rifampicin and ciprofloxacin, and 15.6% (28/180) had reduced penicillin susceptibility with MICs of 0.12-0.5 mg/L.

MUMPS

A total of 45 cases of mumps was notified and 12 cases were laboratory-reported in 2004. In comparison, during 2003, 56 cases of mumps were notified and 10 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 2004.

Figure 25. Mumps notifications and laboratory reported cases by year, 1996 - 2004



The 2004 notification rate (1.2 per 100 000 population) was similar to the 2003 rate (1.5 per 100 000). The rates of mumps varied throughout the country in 2004. The highest rates were recorded in Whanganui (9.4 per 100 000 population), South Canterbury (3.8 per 100 000) and Wairarapa (2.6 per 100 000) DHBs.

There were no mumps cases in the less than one year age group. Age-specific rates were highest in the 1-4 years (5.6 per 100 000) and 5-9 years (4.5 per 100 000) age groups.

The 2004 mumps notification rates for males was 1.4 per 100 000 population and for females 1.0 per 100 000 population.

Ethnicity was recorded for 41 (91.1%) notifications during 2004. The highest rate occurred among those of Pacific Peoples ethnicity (2.5 per 100 000 population, 5 cases), followed by those of Other ethnicity (1.6 per 100 000, 4 cases). The Maori ethnic group experienced the lowest rate of disease (0.9 per 100 000 population, 8 cases). In all ethnic groups, rates were higher in males than females.

Of the 45 cases notified during 2004, 36 (80.0%) had hospitalisation information recorded. Of these 2 cases were hospitalised. Of the 34 cases for which this information was recorded, 21 (61.8%) attended school, pre-school or childcare. Six mumps cases reported overseas travel during the incubation period.

The recommended immunisation schedule for mumps in 2004 was two doses of MMR vaccine, the first given at 15 months and the second given at 4 years. Vaccination status was recorded for 33 cases notified during 2004. Of these, 14 (42.4%) had received at least one dose of MMR vaccine. Table 12 shows the number of doses of MMR vaccine given to mumps cases in each relevant age group.

Table 12. Age group of mumps notifications and vaccination received, 2004

Age group	Total cases	Vaccination Status				
		1 dose	2 doses	Vaccinated (no dose info)	Not vaccinated	Unknown
<15mths	0	0	0	0	0	0
15mths-4yrs	12	7	0	1	3	1
5-9 yrs	13	2	4	2	3	2
10-19 yrs	6	1	0	1	2	2
20+ yrs	14	0	0	0	7	7
Total	45	10	3	4	15	12

PARATYPHOID FEVER

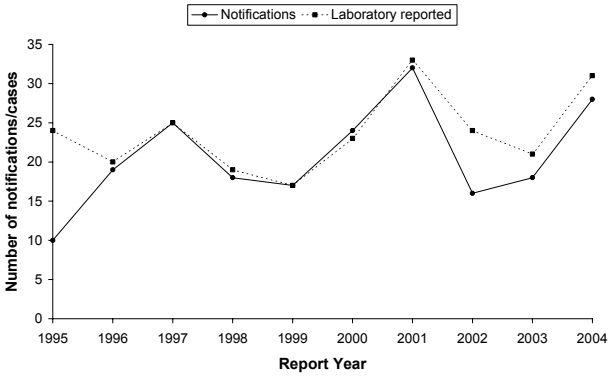
Twenty-eight cases of *Salmonella* Paratyphi were notified in 2004. The Enteric Reference Laboratory at ESR received 31 *S.* Paratyphi isolates in 2004. The isolates were identified as *S.* Paratyphi A (9), *S.* Paratyphi B (4), and *S.* Paratyphi B var Java (18). The 2004 rate (0.7 per 100 000 population) was slightly higher than the 2003 rate (0.5 per 100 000).

Figure 26 shows the number of notified and laboratory-reported cases of paratyphoid each year since 1995.

The majority of the cases 57.1% (16/28) were in the 20-49 years age group. Twenty-one (1.2 per 100 000 population) were male and 7 (0.4 per 100 000) were female. Ethnicity was recorded for 24 (85.7%) cases. Rates were highest in those of Other ethnicity (2.8 per 100 000), followed by Europeans (0.6 per 100 000). Rates were particularly low in the Pacific Peoples (0.5 per 100 000) and Maori (0.2 per 100 000) ethnic groups.

Of the 27 cases for which hospitalisation status was recorded, 12 (44.4%) were hospitalised. One *S.* Paratyphi B outbreak was reported in 2004, involving 11 cases.

Figure 26. Paratyphoid fever notifications and laboratory reported cases by year, 1995 - 2004



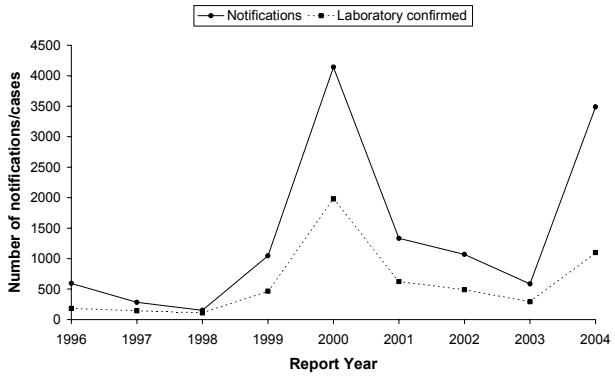
Overseas travel information was recorded for 24 of the 28 cases. Sixteen of the 24 cases (66.7%) were recorded as having travelled overseas during the incubation period for the disease. The countries visited were: India (3), Indonesia (3), Hong Kong (2), Thailand (2), Bangladesh, Borneo, China, Fiji, Malaysia, and Nepal (1 each).

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.

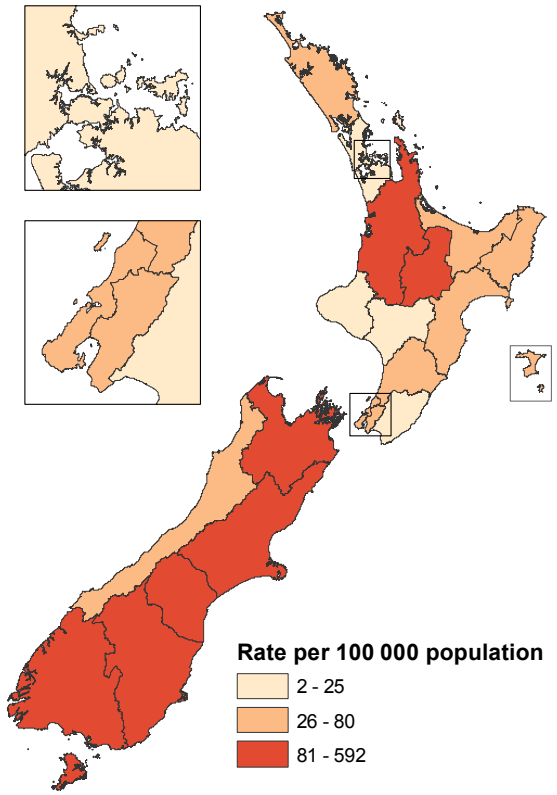
In 2004, there were 3489 cases of pertussis notified, representing a population rate of 93.4 cases per 100 000. Thirty one percent (1085 cases) of all cases were laboratory confirmed. The number of cases in 2004 is significantly more than in 2003 (585 cases). During the latter part of 2004 New Zealand experienced a large epidemic of pertussis as shown in Figure 27.

Figure 27. Pertussis notifications and laboratory confirmed cases by year, 1995 - 2004



In 2004, the rate of pertussis varied by geographical region (Figure 28).

Figure 28. Pertussis notifications by DHB, 2004



The highest rates were reported in Southland (592.2 per 100 000) and Nelson Marlborough (409.9 per 100 000) DHBs. The lowest rate was reported in Whanganui (1.6 per 100 000) DHB.

Sex and ethnicity were recorded for 99% and 94% of all pertussis cases, respectively. Age data were missing for one case. Fifty seven percent (1983/3489) of cases were female, and 79% (2750/3489) were of European ethnicity. Highest rates were reported in those aged less than one year (333 per 100 000 for females, and 315.1 per 100 000 for males).

Although the reported rates were highest in those of European ethnicity (105.3 per 100 000), when stratified by age, the highest rates were in Pacific Peoples aged less than one year (427.8 per 100 000).

Of the 3194 cases for which hospitalisation status was recorded in 2004, 159 (4.9%) were hospitalised. Of those hospitalised, 56 (35.2%) were known to have started the vaccination schedule, 15 (9.4%) had been given 4 doses of vaccine, while 2 (1.3%) had completed the course of vaccinations. There was one fatal case of pertussis in 2004; a two-month old hospitalised male who had been immunised as recommended.

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. 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. During 2004, data were captured for up to five vaccine doses.

Vaccination information was recorded for 2181 (62.5%) cases. A total of 34 cases had received all five doses of vaccine, 146 had received four doses and 285 were in receipt of three vaccine doses. Across all age groups, the proportion of cases vaccinated was 49.4% (1725/3489). Surveillance data show that only 47.5% (47/99) of those aged 4 months or less, had received the vaccines for which they were eligible (see Table 13).

Table 13. Pertussis notifications by age group and vaccination received, 2004

Age group	Total cases	Vaccination Status[a] 1 dose	2 doses	3 doses	4 doses	5 doses	Unknown
0 - 5wks	19	(0)[a]	(0)	(0)	(0)	(0)	19
6wk - 2mths	66	26	(1)	(0)	(0)	(0)	39
3 - 4mths	33	10	10	(1)	(1)	(0)	11
5 - 14mths	95	7	7	31	(0)	(0)	50
15mths - 3yrs	238	3	7	22	92	(4)	110
4+ yrs	3037	30	28	337	423	128	2091
Unknown	1				1		
Total	3489	76	53	391	517	132	2320

[a] Numbers in brackets indicate vaccination when the case was ineligible or age or vaccination data have been incorrectly recorded.

In 2004, there were 5 outbreaks of pertussis recorded occurring in Hutt, Manawatu, North West Auckland, Southland and West Coast health districts. Overall, these outbreaks involved 14 cases. In the context of a national epidemic, reports of outbreaks no longer serve a useful purpose.

The epidemic of pertussis that began in April 2004 had not ended in December 2004.

There appeared to be some demographic differences between the 2004 and the 2000 epidemics, notably a change in age distribution of cases (Table 14). Though this table presents raw numbers the population since 2000 has changed very little, consequently, the numbers are comparable.

Between the epidemics in 2000 and 2004 there has been an increase in the proportion of cases occurring in those aged 20+ years and consequently a decrease in proportion of cases in the younger age groups. The largest change was within adult females (11.9% increase) who often have greater contact with young children. In 2004 the increase in cases in the adult female population occurred despite the decrease in pertussis cases in small children.

Table 14. Comparison of the number of cases by age and sex for the pertussis epidemics of 2000 and 2004

	2000	%	2004	%	% Change
Cases 0-19 years	3272	79.0	2067	59.2	-19.8
Cases 20 + years	864	20.9	1421	40.7	+19.9
Male cases	1816	43.9	1476	42.3	-1.6
Female cases	2275	55.0	1983	56.8	+1.9
Females 0-19 years	1669	40.3	1061	30.4	-9.9
Females 20+ years	603	14.6	922	26.4	+11.9
Males 0-19 years	1561	37.7	989	28.3	-9.4
Males 20+ years	254	6.1	487	14.0	+7.8
Total Cases	4140		3489		

The immunity provided by vaccination does not last through adulthood and is not 100% effective. Therefore it is important that children are immunised on time according to the immunisation schedule. The 2004 epidemic has highlighted the need for a strategy to control the persisting pool of infection in the adult population.

PLAGUE

No cases of plague have been notified in New Zealand for many years. The infection continues to persist in wild rodent populations over large rural areas of the Americas, Africa and Asia. A mean of 13 cases occur each year in the USA [24]. Adventure tourists may be at risk of contracting the disease and need to take particular care to minimise contact with sick animals [25].

POLIOMYELITIS (POLIO)

There were no polio notifications in 2004. 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. In February 2002 New Zealand introduced the Inactivated Polio Vaccine to avoid these problems in the future.

The New Zealand Paediatric Surveillance Unit carries out active surveillance of acute flaccid paralysis (AFP). In 2004 there were 12 cases of AFP notified to the unit. All of these were negative for polio on investigation.

PRIMARY AMOEBIC MENINGOENCEPHALITIS

Naegleria fowleri is a free-living amoeboflagellate which invades the brain and meninges via the nasal mucosa and olfactory nerve. No cases of this disease were notified in New Zealand in 2004. Only one case of primary amoebic meningoencephalistis has been reported in the last 20 years and that was in 2000 [26]. A 10 year old girl became ill and died after putting her head underwater in two thermal pools. Culture and PCR of cerebro-spinal fluid were positive for *Naegleria fowleri.*

The organism is globally distributed in the environment and care needs to be taken to avoid infection when swimming in untreated water.

RABIES

New Zealand has long been a rabies-free country and no cases were reported in 2004. The disease is still occurring in many countries overseas with over 50 reports of disease in humans and other animals including a large outbreak caused by vampire bat bites in Brazil. Four transplant recipients died in the USA after receiving organs from an unsuspected case of rabies [27].

RICKETTSIAL DISEASE

Two cases of rickettsial disease were notified in New Zealand in 2004. One of these was a laboratory confirmed case of Q fever with a history of three months residence in Australia during the incubation period. The other was a case of typhus, also laboratory confirmed, and with a history of overseas travel to Thailand. Both were notified by hospital-based practitioners.

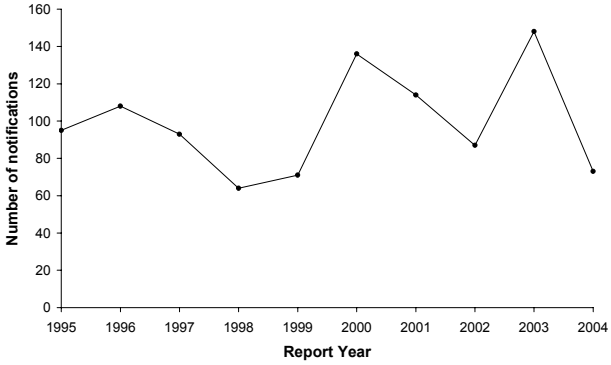
RHEUMATIC FEVER

In 2004, 73 initial cases and two recurrent cases of rheumatic fever were notified (Figure 29). This represents a population rate of 2.0 per 100 000 for initial cases, a significant decrease from 2003 (4.0 per 100 000).

This decrease may not be a true decrease in the burden of disease but rather due to delayed reporting of cases. Some healthcare facilities report rheumatic fever in batches at irregular intervals.

There was no change in the rate of recurrent cases between 2003 and 2004 (0.1 per 100 000).

Figure 29. Rheumatic fever (initial cases) by year, 1995 - 2004



In 2004, the rates of initial cases of rheumatic fever varied by geographical region with the highest rates reported in the Tairawhiti (11.4 per 100 000) and Northland (6.4 per 100 000) DHBs. The two recurrent cases occurred in the Auckland and Capital and Coast DHBs.

Of the 73 initial rheumatic fever cases, 45.2% had a laboratory confirmed diagnosis for streptococcal infection.

Complete data on age was recorded in EpiSurv, but sex and ethnicity were only completed for 96% and 74% respectively, of cases. The rate of initial cases was 1.8 per 100 000 in males and 1.1 per 100 000 in females. The majority (90.4%) of cases were aged less than 19 years and the highest rates were in the 10 to 14 year age group (12.7 per 100 000).

Differences in disease burden by ethnic group are shown in the appendix E.

The rate of initial cases was more than ten times higher in Pacific Peoples (10.5 per 100 000) and Maori (8.2 per 100 000) compared to the European population (0.2 per 100 000).

Of the 47 cases where hospitalisation data were recorded in EpiSurv, 87.2% were hospitalised. No cases were recorded as having died of rheumatic fever in 2004.

The incidence of rheumatic fever can be greatly reduced through early detection of streptococcal infections, appropriate antibiotic treatment and addressing socioeconomic determinants of health e.g. reducing overcrowding.

RUBELLA (GERMAN MEASLES)

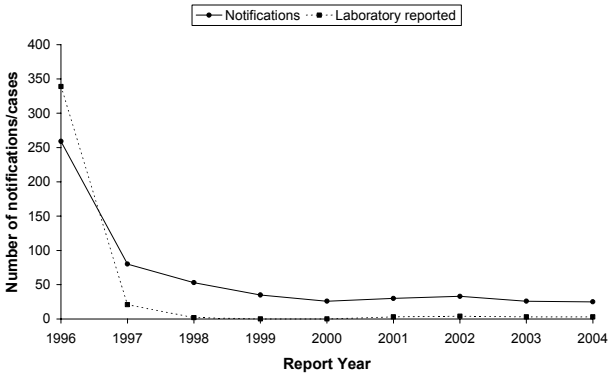
In New Zealand, rubella immunisation was introduced in 1970 and it has been a notifiable disease since June 1996. A total of 25 cases of rubella was notified and 3 cases were laboratory-reported in 2004. In comparison, during 2003, 26 cases of rubella were notified and 3 cases were laboratory confirmed. There were no cases of congenital rubella in 2004.

Figure 30 shows notified and laboratory-reported cases from 1996 to 2004.

The 2004 rubella notification rate (0.7 per 100 000) did not differ compared to the 2003 rate (0.7 per 100 000). The rates of rubella varied throughout the country in 2004. The highest rates were recorded in West Coast (6.6 per 100 000 population), Taranaki (2.9 per 100 000) and Wairarapa (2.6 per 100 000) DHBs.

Age and sex data were recorded in all rubella cases. There were no cases aged more than 15 years. Age-specific rates were highest in the less than one year age group (22.0 per 100 000 population) followed by the 1-4 years age group (3.2 per 100 000). The 2004 rubella notification rate for males (0.6 per 100 000) was similar to that for females (0.7 per 100 000).

Figure 30. Rubella notifications and laboratory reported cases by year, 1996 - 2004



Ethnicity was recorded for 24 (96%) of all rubella notifications during 2004. The highest rate was reported among those of European ethnicity (0.8 per 100 000 population, 21 cases), followed by Maori ethnicity (0.4 per 100 000, 2 cases) and Other ethnicity (0.4 per 100 000, 1 case).

None of the 20 cases, for which hospitalisation status was recorded, were admitted to hospital. Of the 24 cases for which risk factor information was collected 10 were known to have attended school, pre-school or childcare. Of these five were not immunised. No cases reported overseas travel.

The recommended vaccination schedule for rubella is a primary dose at 15 months and a second dose at four years of age. Vaccination status was recorded for 17 cases notified during 2004. Of these, 3 (17.6%) had received at least one dose of MMR vaccine. Table 15 shows the number of doses of MMR vaccine given to rubella cases in each relevant age group.

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

Table 15. Age group of rubella notifications and vaccination received, 2004

Age group	Total cases	Vaccination Status					
		1 dose	2 doses	3 doses	Vaccinated (no dose info)	Not vaccinated	Unknown
<15mths	12	0	0	0	0	8	4
15mths-3yrs	6	2	0	0	1	1	2
4-9 yrs	5	0	3	0	1	0	1
10-19 yrs	2	0	0	1	0	0	1
Total	25	2	3	1	2	9	8

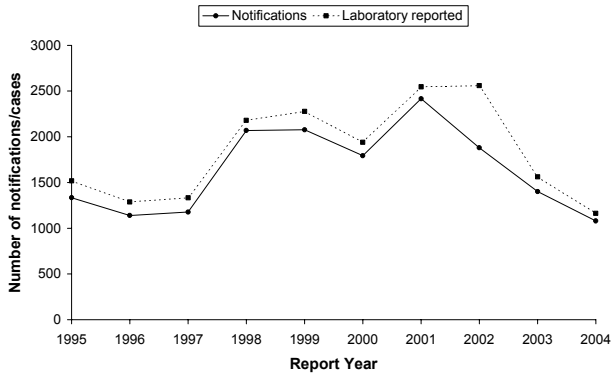
SALMONELLOSIS

A total of 1080 cases of salmonellosis were notified in 2004. The Enteric Reference Laboratory at ESR received 1164 *Salmonella* isolates (exclusive of *S.* Paratyphi and *S.* Typhi reported elsewhere).

The 2004 notification rate (28.9 per 100 000 population) is significantly lower than the 2003 rate (37.5 per 100 000).

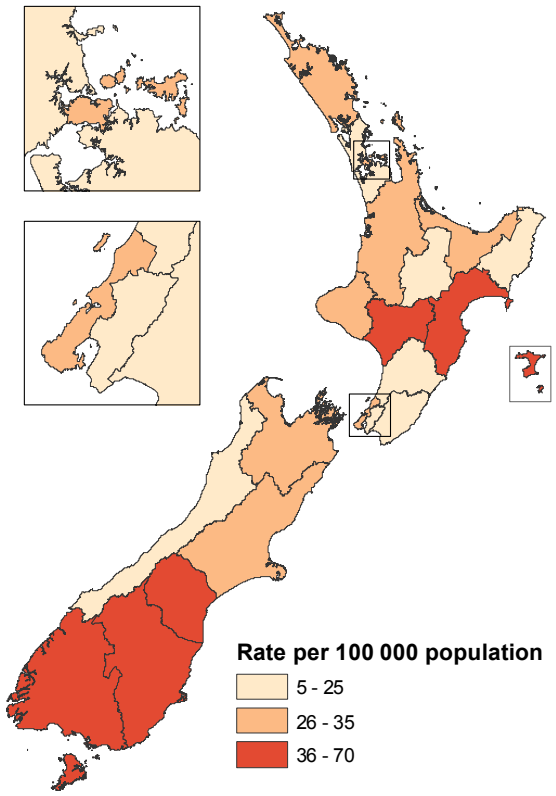
Figure 31 shows the number of notified and laboratory-reported cases of salmonellosis by year since 1995.

Figure 31. Salmonellosis notifications and laboratory reported cases by year, 1995 - 2004



Rates varied throughout the country as illustrated in Figure 32. The highest rates were reported in Southland (68.7 per 100 000 population), South Canterbury (54.9 per 100 000), and Otago (42.2 per 100 000) DHBs.

Figure 32. Salmonellosis notifications by DHB, 2004



Sex was recorded for 1066 (98.7%) cases. Of these, 565 cases (31.0 per 100 000 population) were male and 501 (26.2 per 100 000) were female. Ethnicity was recorded for 939 (86.9%) cases. The highest rates were reported for those of European ethnicity (29.2 per 100 000 population, 761 cases), followed by those of Other ethnicity (27.2 per 100 000, 68 cases). The lowest reported rates were for Maori (16.9 per 100 000, 89 cases) and Pacific Peoples (10.5 per 100 000, 21 cases).

Age was recorded for 1083 (99.8%) of the salmonellosis cases. Age-specific rates were highest for the less than one year (122.6 per 100 000 population) and the 1-4 years age groups (106.4 per 100 000). The rate of 37.7 per 100 000 in the 5-9 years age group was higher than the overall rate of 28.9 per 100 000.

Of the 871 cases for which hospitalisation status was recorded, 109 (12.5%) were hospitalised. Five outbreaks of salmonellosis were reported in 2004, involving 74 cases.

Among the cases for which this information was recorded, 42.4% (212/500) had consumed food from retail premises, 28.9% (205/710) had contact with farm animals, 23.1% (134/579) had consumed untreated water, 21.8% (174/800) had been overseas, 14.6% (98/671) had contact with faecal matter, 14.2% (90/635) had recreational water contact, and 13.9% (95/684) had contact with symptomatic people during the incubation period.

Table 16 shows the number of cases of selected *Salmonella* types reported by the Enteric Reference Laboratory at ESR. The incidence of all *S.* Typhimurium definitive types (DT) declined. DT160 remained the most common single type, despite a decline in incidence.

Table 16. Selected *Salmonella* serotypes and subtypes of laboratory-confirmed salmonellosis, 2001 - 2004

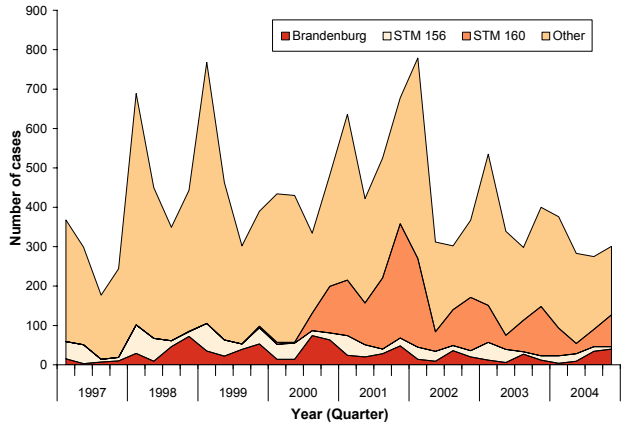
Subtype	2001	2002	2003	2004
S. Typhimurium	1666	1267	953	580
DT160	791	561	334	221
DT1	171	225	110	65
DT135	264	155	68	30
DT156	111	85	95	56
DT101	77	44	66	31
Other or unknown	252	197	280	177
S. Enteritidis	170	172	137	142
PT9a	73	88	65	44
PT4	24	41	22	11
Other or unknown	73	43	50	87
S. Infantis	73	94	89	63
S. Brandenburg	137	85	55	86
S. Saintpaul	16	35	27	33
S. Thompson	16	25	10	22
S. Montevideo	5	21	37	8
S. Heidelberg	127	15	11	3
Other or unknown serotypes	395	353	282	599
Total	2605	2607	1601	1164

[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 2004, whereas the contribution of *S.* Heidelberg declined rapidly from its peak in 2001. There was a prominent spring peak in the incidence of *S.* Brandenburg in 2004, as in the past six years.

Figure 33. Laboratory reported cases of *S.* Brandenburg, STM 156 and STM 160 by quarter, 1997 - 2004



SARS (SEVERE ACUTE RESPIRATORY SYNDROME)

There have been no notified cases of SARS in 2004 in New Zealand. The major outbreak of SARS in 2004 was in China and was thought to have been caused by a breach in laboratory protocol. Staff failed to test a supposedly inactivated virus before working with it. This led to the contamination of the environment with live SARS coronavirus. One person died and nine others were infected [28].

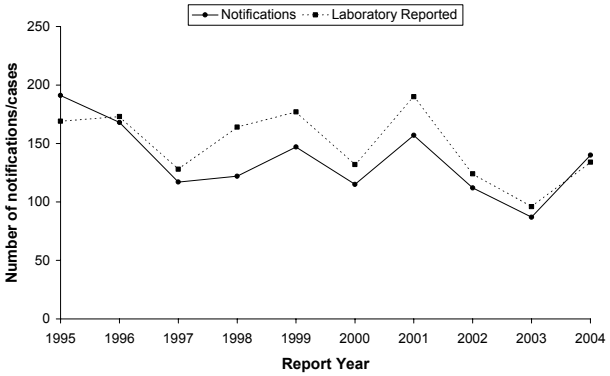
SHIGELLOSIS

A total of 140 cases of shigellosis were notified in 2004. The 2004 notification rate (3.7 per 100 000 population) was significantly higher than the 2003 rate (2.3 per 100 000).

The Enteric Reference Laboratory at ESR received 134 *Shigella* isolates during 2004. The predominant serogroups identified were: *S. flexneri* 2a (20.9 %), *S. flexneri* 3a (20.1%), and *S. sonnei* Biotype g (19.4%).

Figure 34 shows the number of notified and laboratory-reported cases of shigellosis each year since 1995.

Figure 34. Shigellosis notifications and laboratory reported cases by year, 1995 - 2004

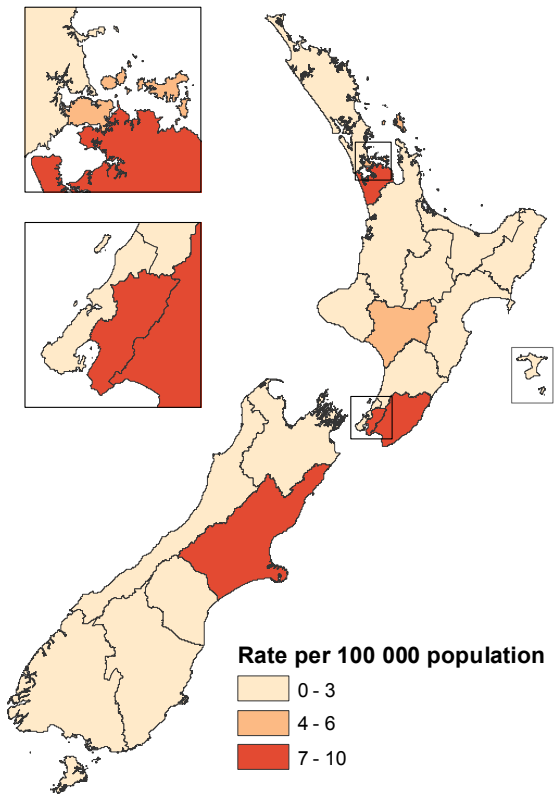


The rate of shigellosis varied throughout the country in 2004, as Figure 35 illustrates. The highest rates were recorded in Hutt Valley (9.9 per 100 000 population), Counties Manukau (8.5 per 100 000) and Wairarapa (7.9 per 100 000) DHBs.

Sex was recorded for 138 (98.6%) of the 140 cases. Of these 54 cases were male (3.0 per 100 000 population) and 84 cases (4.4 per 100 000) were female. Age was recorded for 99.3% of cases. The highest age-specific rate occurred among children aged 1-4 years (6.9 per 100 000 population) followed by the children in the 5-9 years age group (6.3 per 100 000).

Ethnicity was recorded for 88.6% of all notifications during 2004. The highest rate occurred among Pacific Peoples (17.0 per 100 000 population) followed by those of Other ethnicity (6.0 per 100 000). Maori had the lowest rate (1.7 per 100 000).

Figure 35. Shigellosis notifications by DHB, 2004



Among cases for which risk factors were recorded, 43.2% (32/74) had contact with a case, 40.5% (34/84) contact with other symptomatic people, 35.9% (28/78) had consumed untreated water, 30.1% (22/73) had consumed food from retail premises, 23.6% (17/72) had contact with faecal matter, 15.4% (12/78) had recreational water contact, and 5.4% (4/74) had contact with farm animals during the incubation period.

Of the 117 notified cases for which hospitalisation status was recorded, 29 (24.8%) were hospitalised.

Six shigellosis outbreaks were reported in 2004, involving 46 cases.

Overseas travel information was recorded for 109 of the 140 notified cases. Of these, 49 (45.0%) reported travelling overseas during the incubation period. Overseas destinations were: India (5), Indonesia (5), Thailand (5), United States of America (5), Samoa (4), Cambodia (2), Egypt (2), Fiji (2), Malaysia (2), Vanuatu (2), American Samoa, Argentina, Australia, Bangladesh, Burkina Faso, China, Cuba, Ethiopia, Vietnam, England, Mexico, Morocco, Pakistan, Portugal, and Tonga (1 each).

TAENIASIS

No cases of taeniasis were notified in 2004. There have been six cases of taeniasis notified in New Zealand since 1997. All of them had a history of overseas travel.

TETANUS

One case of tetanus was notified in New Zealand in 2004. It was in a 62 year old woman who fell and developed an infected haematoma for which she was hospitalised. The patient's immunisation status was unknown. Even individuals who have received five doses of tetanus vaccine in childhood may have insufficient antibody to protect against a wound heavily infected with *Clostridium tetani.*

In the UK there is a persistent problem with tetanus in injecting drug users particularly related to "skin popping" (subcutaneous injection of heroin). This seems to be more severe amongst older injectors and waning immunity may also be a factor [29].

TOXIC SHELLFISH POISONING

No cases of toxic shellfish poisoning were notified in 2004. Since 1997 a total of 20 cases has been notified. Hospitalisation data (ICD-10-AM code T612) have consistently shown that there are many more cases of TSP than are notified to the public health units. In 2004 16 cases were reported as a primary reason for hospital admission. Note that ICD-10-AM code T612 includes fish and shellfish poisoning.

TRICHINELLOSIS

No cases of infection with the larval form of the intestinal nematode *Trichinella spiralis* have been notified to public health units since 2001 when there were three cases related to the consumption of wild pork. One case of trichinellosis (ICD-10-AM code B75) was reported in hospital admission data. Trichinellosis is widespread in Russia where outbreaks are related to home slaughtered pigs. Denmark also had an outbreak caused by home-made sausages imported from Romania [30].

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 2004, 372 cases of tuberculosis (new and reactivations) were notified, of which 16 (4.3%) were reactivations. This represents a population rate of 10.0 per 100 000 which is not significantly different to that reported in 2003 (11.3 per 100 000). In 2004, a total of 320 (86.0%) cases were reported as laboratory confirmed in EpiSurv.

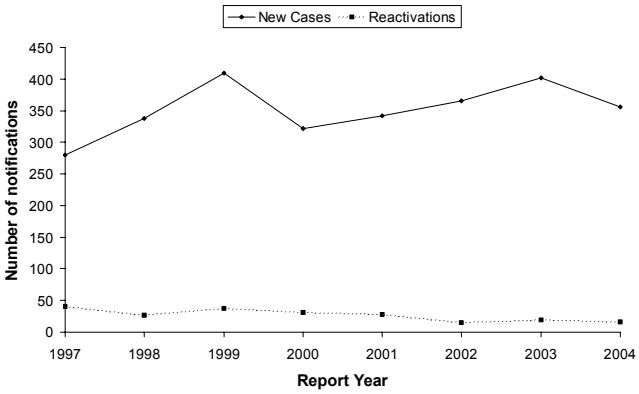
Figure 36 shows the total number of new tuberculosis cases and reactivations reported since 1997.

Reports of new tuberculosis cases

In 2004, the rates of new tuberculosis per 100 000 population differed by geographical region (Figure 37).

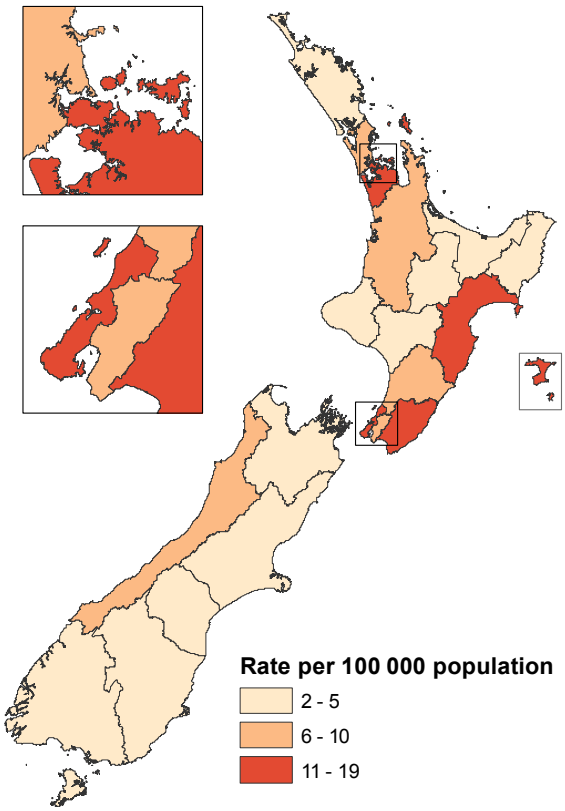
For the 356 new cases of tuberculosis, age was recorded for all cases; ethnicity was 98.9% complete and 3 cases were of unknown sex. There was little difference in the rate of new cases between sexes (9.4 and 9.5 per 100 000 in males and females, respectively). There were 27 cases (3.2 per 100 000) reported in children aged 0-15. Highest age specific rates were reported in females aged 20-29 years (52 cases, 20.8 per 100 000) and in males over 70 years (21 cases, 15.7 per 100 000).

Figure 36. Tuberculosis notifications - new cases and reactivations by year, 1997 - 2004



Overall, rates were higher in the Other ethnic group (74.1 per 100 000) than in all other ethnic groups, though when stratified by age, Pacific Peoples over 70 years had the highest rate (248.8 per 100 000). Rates were lowest in the European population. In all ethnic groups, the rate increased with age, though in the Other ethnic group, the distribution appeared bimodal, a peak occurring between 20-49 years as well.

Figure 37. Tuberculosis notifications (new cases) by DHB, 2004



Of the 322 new cases in 2004 for which hospitalisation data were recorded, 203 (63.0%) were hospitalised. Five deaths

were due to tuberculosis disease (1.5% of 323 cases where death data were recorded). All of these cases were older than 65 years. BCG vaccination status was recorded for 168 cases and vaccination was confirmed in 60.0% of new cases.

Birth country was recorded for 308 of the new cases and of these 70.1% were born overseas. A smaller proportion of new cases were currently residing with a person born outside of New Zealand (65.4% of 263 cases where data were recorded). Of the 249 cases for which data were recorded, 65 (26.1%) reported contact with a confirmed case of tuberculosis.

Reactivations of tuberculosis

For the 16 reactivations, complete data on age and ethnicity was recorded, and sex was recorded for 15 (93.8%) cases. Thirty percent of reactivation cases occurred in females, rates were highest in males over 70 years (1.5 per 100 000 population) and in females aged 50-59 years (0.8 per 100 000). The majority (62.5%) of reactivations occurred in those of Other ethnicity.

Hospitalisation data were recorded for all but one reactivation case in 2004, and six (60%) cases were hospitalised. Data on deaths were only available for one case, the fatality recorded for an 80 year old male. Vaccination status was recorded for 5 cases, of which 4 were vaccinated. The vaccination status of the fatal case is unknown.

In 2004, information on the place where the diagnosis was made and country of birth was recorded for 13 of the 16 reactivated cases. The first diagnosis of tuberculosis disease was made in New Zealand for 7 cases and overseas for 6 cases. Table 17 shows the cases treated for tuberculosis disease by place of original diagnosis.

Table 17. Treatment and place of original TB disease diagnosis for reactivations, 2004

Place of TB disease diagnosis	Case treated for TB disease			
	Yes	No	Unknown	Total
New Zealand	4	1	2	7
Overseas	4	1	1	6
Unknown			3	3
Total	8	2	6	16

Table 18 shows the place where the original tuberculosis disease diagnosis was made stratified by the country of birth.

Table 18. Country of birth and place of original TB disease diagnosis for reactivations, 2004

Place of TB disease diagnosis	Country of birth of case			
	Overseas	New Zealand	Unknown	Total
Overseas	6			6
New Zealand	3	2	2	7
Unknown	1	1	1	3
Total	10	3	3	16

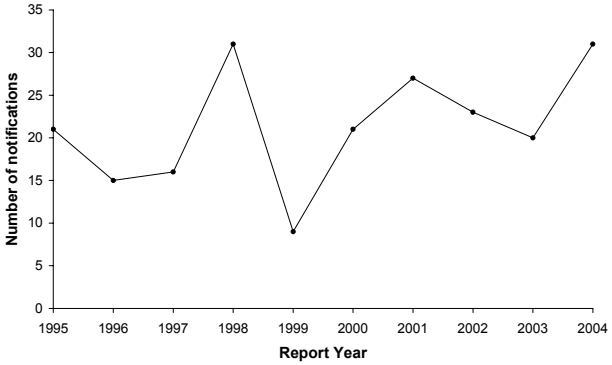
Antimicrobial drug resistant tuberculosis

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. Data for 2004 will be available in June 2005.

TYPHOID FEVER

Thirty-one cases of typhoid were notified in 2004. The Enteric Reference Laboratory at ESR received 34 *Salmonella* Typhi isolates. The 2004 rate of 0.8 per 100 000 is higher than the 2003 rate of 0.5 per 100 000 population. Figure 38 shows typhoid notifications by year since 1995.

Figure 38. Typhoid notifications by year, 1995 - 2004



Eleven of the cases were in the 20-29 years age group (2.3 per 100 000 population). Sex was recorded for all cases with male and female rates of 0.9 and 0.8 per 100 000 population respectively. Ethnicity was recorded for all cases. The highest rates were reported for Pacific Peoples (9.5 per 100 000 population) followed by those of Other ethnicity (4.4 per 100 000).

Hospitalisation status was recorded for 25 cases, of which 18 (72.0%) were hospitalised.

Overseas travel information was recorded for 25 of the 31 cases. Of these, 18 (72.0%) were recorded as having travelled overseas during the incubation period for this disease. The countries visited were: Samoa (9), India (8), and Cambodia (1). Six of the seven cases had no recorded history of overseas travel, two had sewage contact, and four had suspected contact with other symptomatic people.

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

There were 89 notified cases of Verocytotoxigenic *Escherichia coli* infection (VTEC), also known as Shigatoxigenic *Escherichia coli* infection (STEC), in 2004. The Enteric Reference Laboratory at ESR received and laboratory confirmed a total of 82 VTEC/STEC isolates for these cases. Of the 82 isolates, 75 (91.5%) were identified as serotype O157:H7, and 7 were non-O157:H7.

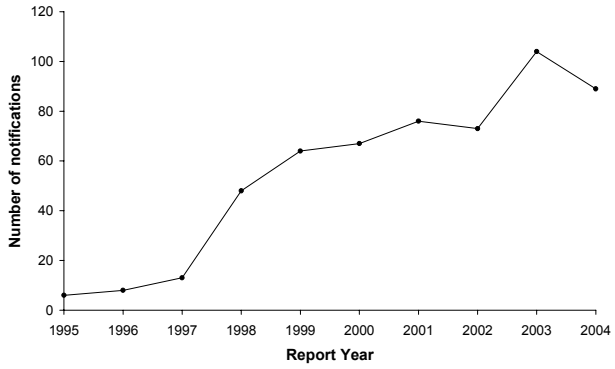
The 2004 notification rate (2.4 cases per 100 000 population) is significantly lower than the 2003 rate (2.8 per 100 000). Three cases of VTEC/STEC-associated haemolytic uraemic syndrome (HUS) were reported to the New Zealand Paediatric Surveillance Unit (NZPSU) in 2004. All three were notified as VTEC/STEC cases to public health units. One further case with HUS was reported to the NZPSU but was not notified or laboratory-confirmed.

Figure 39 shows the number of notified cases of VTEC/STEC infection each year since 1995.

Rates varied throughout the country as illustrated in Figure 40. The highest rates were recorded in Waikato (9.4 per 100 000 population), Bay of Plenty (8.4 per 100 000), and Tairawhiti (4.6 per 100 000) DHBs.

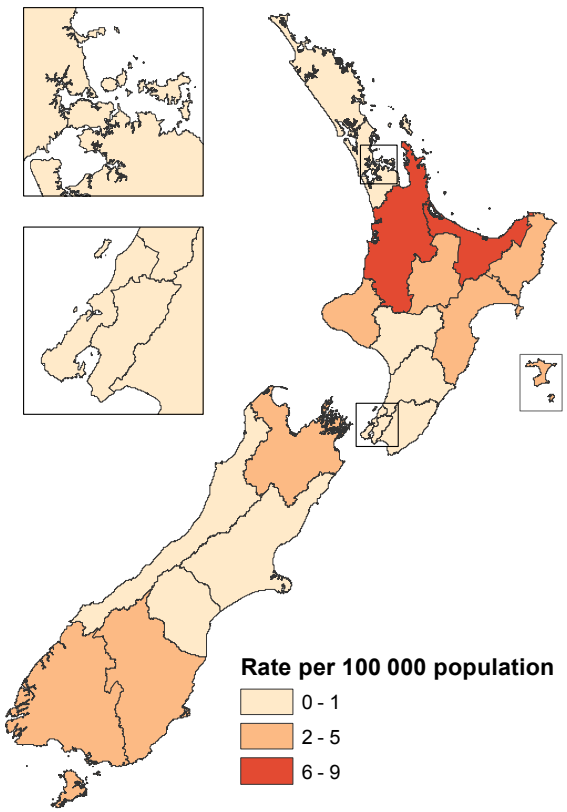
Sex was recorded for all cases. Of these, 36 cases (2.0 per 100 000 population) were male and 53 (2.8 per 100 000) were female. Age specific rates were highest among children aged four years or less, with a rate of 20.1 per 100 000 in the less than one year age group, and 16.2 per 100 000 in the 1-4 years age group. Notification rates were highest in the European (2.6 per 100 000) and Pacific Peoples (1.5 per 100 000) ethnic groups.

Figure 39. VTEC/STEC notifications by year, 1995 - 2004



Of the 94.3% of notified cases of VTEC/STEC for which hospitalisation status was recorded, 27 (32.1%) were hospitalised.

Figure 40. VTEC/STEC notifications by DHB, 2004



Among cases for which risk information was recorded, 83.9% (52/62) reported contact with animals (89.8% with pets) the week before becoming ill, 64.3% (27/42) reported contact with farm animals, 52.4% (22/42) reported contact with animal manure, 35.6% (16/45) had consumed non-habitual water supply, 35.5% (22/62) had recreational contact with water, 26.4% (14/53) had contact with children in nappies, 25.7% (9/35) had contact with other animals, 5.4% (3/56) reported contact with sewage. Three VTEC/STEC outbreaks were reported in 2004, involving six cases.

YELLOW FEVER

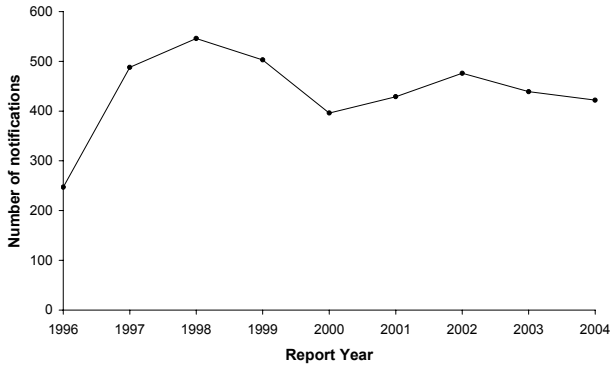
No cases of yellow fever were notified in New Zealand in 2004. Worldwide outbreaks have been reported from Liberia, Burkina Faso, Mali and Venezuela.

YERSINIOSIS

A total of 420 cases of yersiniosis were notified in 2004. The 2004 rate (11.2 per 100 000 population) is slightly lower than the 2003 rate (11.7 per 100 000).

Figure 41 shows the number of notified cases of yersiniosis by year since 1996.

Figure 41. Yersiniosis notifications by year, 1996 - 2004



Rates varied throughout the country as illustrated in Figure 42. The highest rates were recorded in the West Coast (46.3 per 100 000 population), South Canterbury (20.8 per 100 000), and Hutt Valley (17.4 per 100 000) DHBs.

Sex was recorded for 98.3% of the cases. Of these, 211 cases (11.6 per 100 000 population) were male and 202 (10.6 per 100 000) were female. Ethnicity was recorded for 83.4% of the cases. The highest rates were reported for those of Other ethnicity (18.8 per 100 000 population, 47 cases) followed by those of European ethnicity (10.0 per 100 000, 261 cases). The lowest rates were reported among Maori and Pacific Peoples.

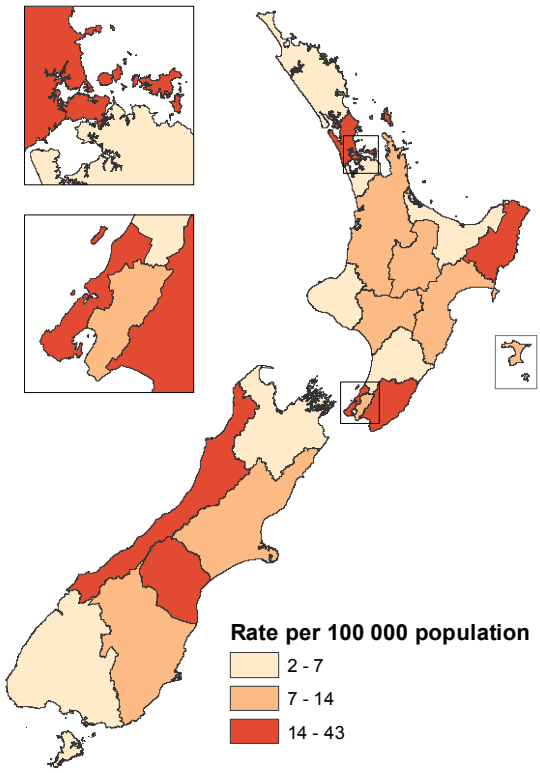
Of the 241 cases for which hospitalisation status was recorded, 26 (10.8%) were hospitalised. One death from yersiniosis was reported.

One yersiniosis outbreak was reported in 2004, involving four cases.

Of the yersiniosis cases for which information was recorded, 42.6% (55/129) had consumed food from retail premises, 37.0% (74/200) had contact with farm animals, 25.7% (39/152) had consumed untreated water, 22.6% (38/168) had recreational water contact, 20.8% (38/183) had contact with faecal matter, 7.8% (15/193) had contact with other symptomatic people, and 6.4% (10/156) had contact with sick animals during the incubation period.

Overseas travel information was recorded for 218 cases. Of these, 11 (5.0%) were recorded as having travelled overseas during the incubation period for this disease. The countries/region visited were: Australia (6), Chile, Fiji, India, New Caledonia, and Tonga (1 each).

Figure 42. Yersiniosis notifications by DHB, 2004



NON NOTIFIABLE DISEASES

INFLUENZA

National influenza surveillance in 2004 was undertaken between May and October (a month longer than in previous years) using a sentinel network of 86 general practices. On average 82 practices, with an average total patient roll of 348 091 participated each week.

During the surveillance period, 3277 consultations for influenza-like illness were reported, and the average weekly consultation rate was 35.5 per 100 000 patient population. This rate is the fifth lowest rate recorded by the sentinel surveillance system, which began in 1991. The 2004 rate was lower than the 2003 (56.6 per 100 000) and 2002 (43.2 per 100 000) rates. The consultation rate remained relatively low throughout the sentinel surveillance period but peaked in week 38 (middle of September). This pattern was consistent with isolations of influenza virus in the five regional virus laboratories, where peak activity appeared a week later in week 38, and considerable activity continued almost until the end of the sentinel surveillance period, which was extended for four weeks longer than usual. Figure 43 compares the weekly consultation rates for influenza-like illness in 2004 with 2003 and 2002.

Figure 43. Weekly sentinel surveillance consultation rates for influenza-like illness, 2002-2004

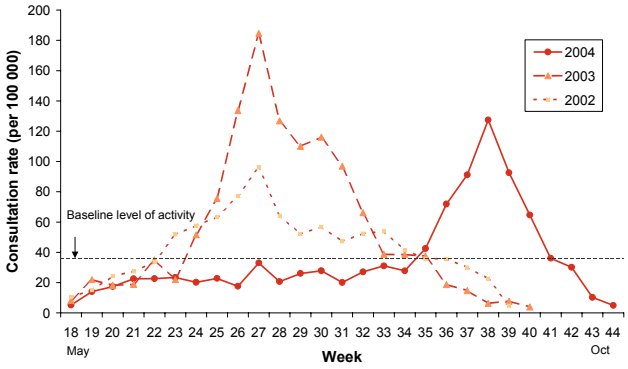
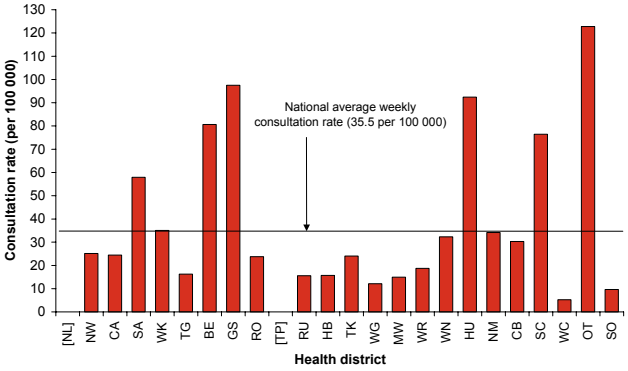


Figure 44 shows the average weekly consultation rates by health district for the influenza season.

Figure 44. Sentinel average weekly consultation rates for influenza-like illness by health districts, 2004[a]

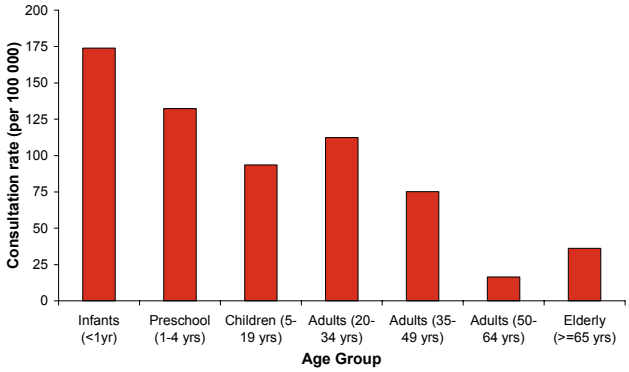


[a] Northland and Taupo health districts did not participate in 2004

Consultation rates varied between health districts, with rates above the national average in six of the 22 health districts and rates of more than threefold the national average in Otago (122.8 per 100 000) and over twofold in Gisborne (97.5 per 100 000) health districts.

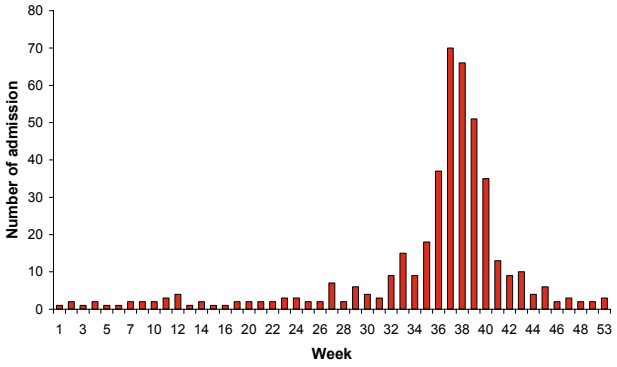
Pre-schoolers (aged 1-4 years) and infants (less than one year) were the most likely to be seen by a general practitioner for an influenza-like illness, with respective age-specific average weekly consultation rates of 173.9 and 132.3 per 100 000 population. The lower rate of 36.2 per 100 000 in those aged 65 years or over was likely to be due, at least in part, to higher levels of vaccination in this age group. Figure 45 shows the average weekly consultation rate in 2004 by age group.

Figure 45. Sentinel average weekly consultation rates for influenza-like illness by age group 2004



In 2004, there was a total of 430 hospital admissions for influenza. This compares with 593 admissions in 2003 and 490 in 2002. Figure 46 shows these admissions by week, 89.8% (386) of which occurred during May to October. The highest number of admissions (70) occurred in week 37 early September.

Figure 46. Influenza hospitalisation by week admitted, 2004

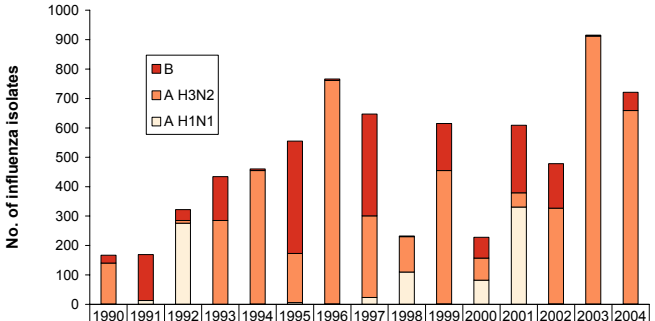


A total of 864 influenza isolates were identified in 2004. This is lower than the 1108 isolates in 2003 but higher than the 702 isolates in 2002. Of the 864 isolates, 231 came from sentinel practice surveillance during May to October. This is slightly higher than the 230 sentinel isolates identified in 2003 but lower than the 241 isolates in 2002. There were 633 non-sentinel isolates identified in 2004, compared to 878 in 2003, and 461 in 2002.

During 2004, the majority of influenza isolates (790 or 91.4% of all isolates) were characterised as influenza A. Influenza B made up 8.6% of all isolates.

Figure 47 shows the number and percentage of typed and subtyped influenza isolates from 1990 to 2004.

Figure 47. Influenza isolates by type, 1990 - 2004



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
B	27	156	37	149	5	382	5	346	2	160	71	230	151	3	62
A H3N2	139	0	9	285	454	167	759	278	120	453	75	48	325	911	658
A H1N1	1	13	276	0	1	6	2	23	110	2	82	331	2	1	1

Three noticeable changes in predominant patterns are described below.

Influenza A(H1N1)

During 1990 to 1999, influenza A(H1N1) predominated or co-dominated only in 1992 (86% of typed/subtyped isolates) and 1998 (47% of typed/subtyped isolates). However in 2000 and 2001, influenza A(H1N1) predominated consecutively, which is an unusual feature. There were 82 A(H1N1) isolates in 2000 (36% of typed/subtyped isolates) and 331 in 2001 (54% of typed/subtyped isolates). This is in contrast to 2003, and 2004 when only one each of A/New Caledonia/20/99-like (H1N1) was isolated. The epidemiological, antigenic, genetic and serological data indicated that there was no evidence of a need to change the vaccine strain from an A/New Caledonia/20/99-like (H1N1)-like virus for year 2005 vaccine formulation for the southern hemisphere.

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 peak of deaths, 94 in 1996, in New Zealand was recorded during an A(H3N2) epidemic *(28)*. During 1993 to 2000, A(H3N2) had been the predominant or co-dominant strain for each year. In 2001, A(H3N2) constituted only 8% of typed/subtyped isolates. However, from 2002 to 2004, A(H3N2) has been the predominant strain again. The drifting of influenza A(H3N2) virus was observed in New Zealand in 2004. ESR national influenza reference laboratory detected 73.9% (122/665) of A(H3N2) viruses as A/Fujian/411/2002-low reactors. This phenomenon was also observed by the WHO Collaborating Centre for Influenza in Melbourne who had analysed 464 influenza A(H3N2) viruses from 13 countries and 41% of the isolates had reduced reactivity (8 fold or greater) with A/Fujian/411/2002-like viruses. As a result, A/Wellington/1/2004 was recommended by WHO and Australia Influenza Vaccine Committee to be the H3 component of the influenza vaccine for southern hemisphere in 2005. A/Wellington/1/2004 was isolated in ESR from a 57 year old New Zealander who developed influenza-like illness soon after his return from Guangzhou, a southern Chinese city.

Influenza B

Influenza B predominates or co-dominates every second year from 1991 to 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. There have been two distinct lines of influenza B circulating in recent years, one is represented as B/Sichuan/379/99-like strain and another is B/HongKong/330/2001-like virus. Before 2002, all influenza B isolates from New Zealand belonged to the B/Sichuan/379/99 lineage. In 2002, they were replaced almost exclusively by B/HongKong/330/2001-like viruses. In 2003, three influenza B viruses were isolated (two B/Sichuan/379/99-like and one B/Hong Kong/330/01-like virus). In 2004, almost all except one influenza B isolates from New Zealand belonged to B/Sichuan/379/99 lineage viruses. They have undergone genetic shift and were antigenically closer to B/Shanghai/361/2002-like strain.

In summary, characterisation of the influenza viruses isolated during the 2004 winter indicated a need for a change in the Influenza A(H3N2) and B component of the vaccine for the 2005 winter. Accordingly, the 2005 Southern Hemisphere winter influenza vaccine has the following composition:

- A(H1N1) - an A/New Caledonia/20/1999-like strain
- A(H3N2) - an A/Wellington/1/2004-like strain
- B - a B/Shanghai/361/2002-like strain

Influenza immunisation is recommended for those at increased risk of complications from influenza due to either age or medical condition [22]. Influenza vaccination has been free for people ≥65 years of age 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 2004 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 2004, and examines trends since 2000. A more detailed account is to be found in the STI Annual Report for 2004 available at www.surv.esr.cri.nz.

The AIDS Epidemiology Group carries out HIV/AIDS surveillance and a summary of the figures for 2004 may be found in the AIDS section under notifiable diseases in this report.

It is important to be aware of the different denominators used to calculate the rates in the clinical as compared with the laboratory settings. Data from the clinics uses the total number of clinic visits. 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 the clinics. 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 2004, genital *Chlamydia trachomatis* infection was the most commonly reported STI in New Zealand.

Between 2003 and 2004 the number of confirmed chlamydia cases increased by 6.8% in SHCs (4061 compared to 3800) and 44.0% in SYHCs (445 compared to 309) (Table 19). In contrast there was a decrease of 5.0% in FPCs (1607 compared to 1691). In 2004, the number of probable cases accounted for a further 623 cases in SHCs, 392 in FPCs and 11 in SYHCs.

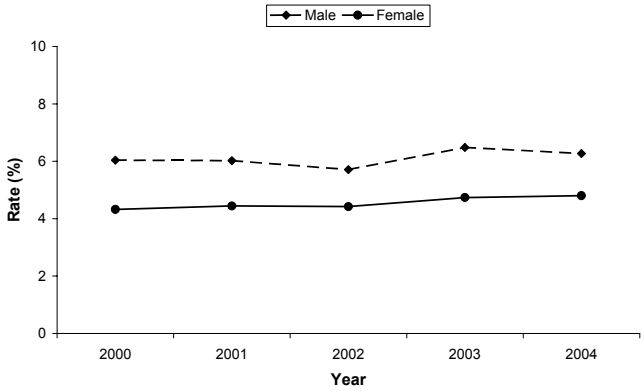
Table 19. Chlamydia cases and rate by sex and health care setting, 2004

Clinic type	Sex	SHC	FPC	SYHC
Confirmed cases	Female	2 228	1 398	357
	Male	1 833	209	88
	Total	4 061	1 607	445
Total cases[a]	Female	2 454	1 621	364
	Male	2 230	378	92
	Total	4 684	1 999	456
Rate[b] (% of clinic visits)	Female	4.80%	0.90%	0.30%
	Male	6.30%	5.30%	0.20%
	Total	5.40%	1.10%	0.30%

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

Over the past five years, the total number of chlamydia cases (confirmed and probable) has increased by 28.2% in SHCs, 208.5% in FPCs and 49.0% in SYHCs. The rate of chlamydia diagnosed in males and females at SHCs has increased by 3.9% and 11.2%, respectively (see Figure 48).

Figure 48. Rates[a] of chlamydia diagnosed at SHCs, 2000 - 2004



[a] Denominator is the number of clinic visits

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

Gonorrhoea

Between 2003 and 2004, the number of confirmed cases of gonorrhoea increased by 22.9% in SHCs (735 compared to 598) (Table 20). In contrast there was a decrease of 32.1% in FPCs (131 compared to 193) and a decrease of 20.8% in SYHCs (19 compared to 24). In 2004, the number of probable cases accounted for a further 84 cases in SHCs and 28 in FPCs.

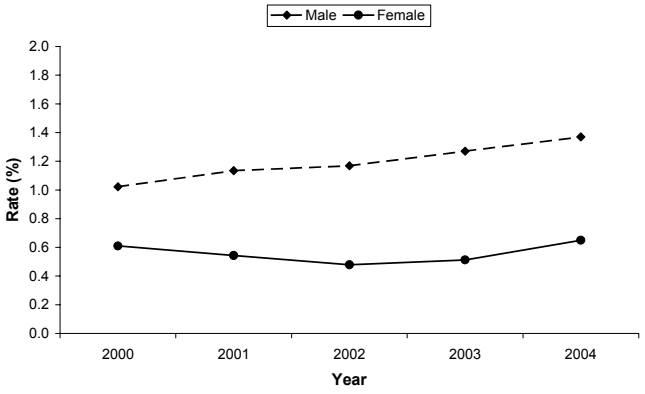
Table 20. Number and rate of gonorrhoea cases by sex and health care setting, 2004

Clinic type	Sex	SHC	FPC	SYHC
Confirmed cases	Female	299	106	13
	Male	436	25	6
	Total	735	131	19
Total cases[a]	Female	332	122	13
	Male	487	37	6
	Total	819	159	19
Rate[b] (% of clinic visits)	Female	0.60%	0.10%	0.00%
	Male	1.40%	0.50%	0.00%
	Total	0.90%	0.10%	0.00%

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

Over the past five years, the total number of gonorrhoea cases reported increased by 44.4% in SHCs, 55.9% in FPCs and 171.4% in SYHCs. The rate of gonorrhoea diagnosed in males and females at SHCs has increased by 34.0% and 6.6%, respectively (see Figure 49).

Figure 49. Rates[a] of gonorrhoea diagnosed at SHCs, 2000 - 2004



[a] Denominator is the number of clinic visits

Genital Herpes (first presentation)

Between 2003 and 2004, the number of cases of genital herpes decreased by 0.5% in SHCs (742 compared to 746) and 11.6% in FPCs (137 compared to 155) (Table 21). In contrast there was an increase of 33.3% in SYHCs (28 compared to 21).

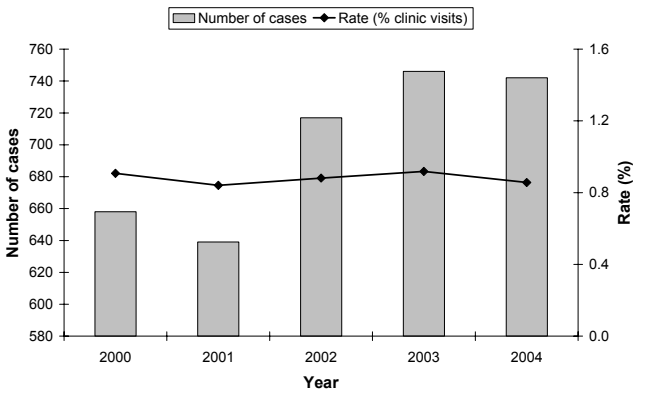
Table 21. Genital herpes (first presentation) cases and rate by sex and health care setting, 2004

Clinic type	Sex	SHC	FPC	SYHC
Total cases	Female	389	127	23
	Male	353	10	5
	Total	742	137	28
Rate[a] (% of clinic visits)	Female	0.80%	0.10%	0.00%
	Male	1.00%	0.10%	0.00%
	Total	0.90%	0.10%	0.00%

[a] Number of cases/number of clinic visits

Over the past five years, the total number of genital herpes cases reported by SHCs has fluctuated (Figure 50). However the rate of genital herpes has remained around 0.9%. Routine clinic surveillance methods in New Zealand do not facilitate the collection of data on the type of HSV infection, and so it is not possible to determine if the trends in genital herpes differ by type of viral infection.

Figure 50. Number of cases and rate of genital herpes (first presentation) diagnosed at SHCs, 2000 - 2004



Genital Warts (first presentation)

Between 2003 and 2004, the number of cases of genital warts increased by 9.6% in SHCs (3 822 compared to 3 488) and 63.8% in SYHCs (131 compared to 80) (Table 22). In contrast there was a decrease of 2.4% in FPCs (478 compared to 490).

Table 22. Number and rate of genital warts (first presentation) cases by sex and health care setting, 2004

Clinic type	Sex	SHC	FPC	SYHC
Total cases	Female	2 029	367	90
	Male	1 793	111	41
	Total	3 822	478	131
Rate[a] (% of clinic visits)	Female	4.00%	0.20%	0.10%
	Male	5.00%	1.60%	0.10%
	Total	4.40%	0.30%	0.10%

[a] Number of cases/number of clinic visits

Over the past five years, the rate of genital warts has varied between 4.3% and 4.4 %. Though this appears insignificant the very large number of clinic visits, used as the denominator, masks the effect of the increasing number of cases.

Infectious Syphilis

In 2004, a total of 46 syphilis cases were reported at SHCs, representing an increase of 53.3% compared to 2003. In 2004, the rate of syphilis at SHCs was 0.1%. In 2004, no cases of syphilis were reported at FPCs or SYHCs. Over the past five years 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), 46 (in 2004).

The mean age of syphilis cases was 37 years (range 19-70 years). Of the 46 syphilis cases reported in 2004, 34 (73.9%) were male and 12 (26.1%) 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 2004, there were 995 reported cases of NSU in SHCs, 7 cases in FPCs and 3 cases in SYHCs. Over the past five years the number of cases diagnosed at SHCs has fluctuated: 825 (in 2000), 1056 (in 2001), 1123 (in 2002), 1057 (in 2003), 995 (in 2004).

LABORATORY SURVEILLANCE

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

Chlamydia

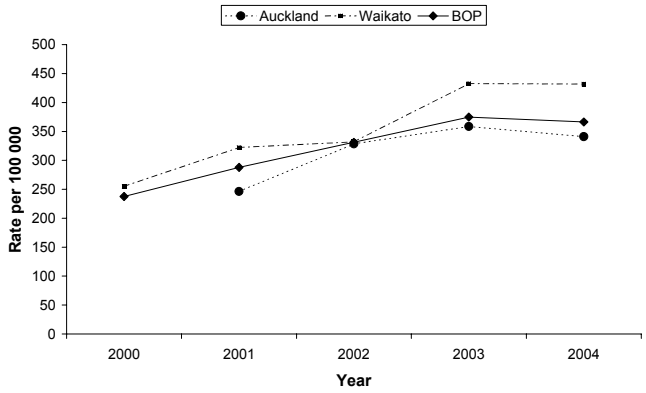
The overall rate of chlamydia diagnosed by participating laboratories across all regions had risen steadily from 2000 to 2003 but declined slightly (1.4%) between 2003 and 2004. In 2004, the chlamydia rate in the Auckland region was 581 per 100 000 population, the Waikato region was 712 per 100 000 population and the Bay of Plenty (BOP) region was 847 per 100 000 population.

Figure 51 and Figure 52 show chlamydia rates from 2000 to 2004. From 2003 to 2004, there was a slight decrease in the

rate of chlamydia for males in all regions. The rate of chlamydia for females decreased in the Auckland and Waikato regions. In the BOP region chlamydia rates for females in 2004 (1294 per 100 000 population) were significantly higher than the previous year (1125 per 100 000 population).

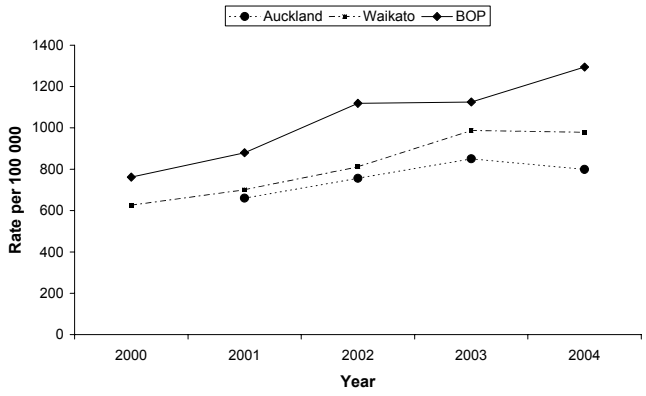
Although there has been a slight decrease in incidence in 2004 chlamydia rates have increased by nearly 1.5 times more than 2001, in all regions. This trend can be explained, in part, by increasing test volumes and the introduction of more sensitive diagnostic techniques.

Figure 51. Male chlamydia rates[a] diagnosed in the Auckland, Waikato and BOP regions, 2000 - 2004



[a] Denominator is the population in each region

Figure 52. Female chlamydia rates[a] diagnosed in the Auckland, Waikato and BOP regions, 2000 - 2004



[a] Denominator is the population in each region

Gonorrhoea

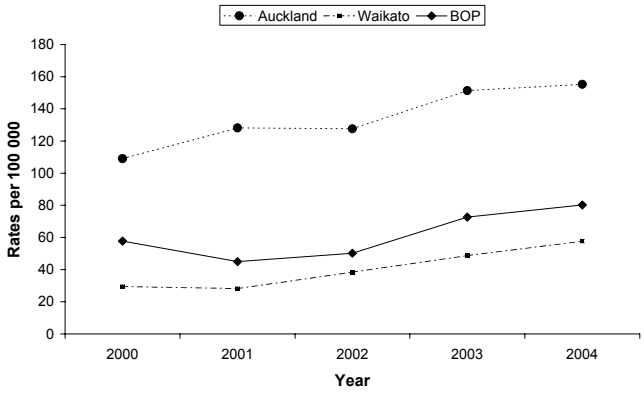
The rates of gonorrhoea diagnosed by participating laboratories across all regions have risen steadily over the past five years. In 2004, the gonorrhoea rate in the Auckland region was 127 per 100 000 population, the Waikato region was 56 per 100 000 population and the BOP region was 100 per 100 000 population.

Figure 53 and Figure 54 show gonorrhoea rates from 2000 to 2004. From 2003 to 2004, rate of gonorrhoea for males and females increased in all regions. The highest increase was observed in females from the BOP region.

Trends in gonorrhoea rates from 2000 to 2004 vary by geographical region. Gonorrhoea rates have been steadily increasing in the Auckland region, apart from the small drop from 2001 to 2002. In the Waikato and BOP regions gonorrhoea rates decreased from 2000 to 2001, followed by a steady increase, year on year, between 2001 and 2004.

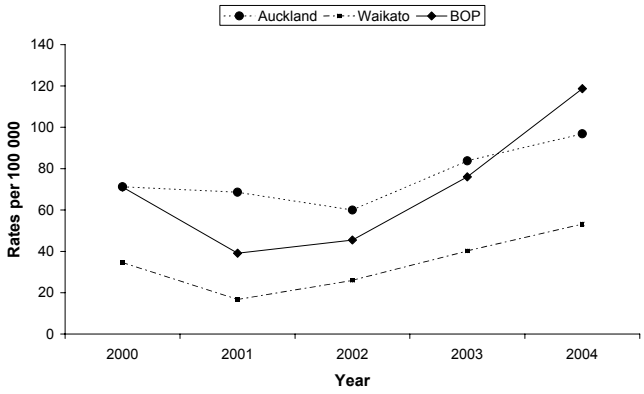
The number of laboratories reporting in these regions has not changed from 2000 to 2004. Therefore the overall trends suggest a true increase in the rate of gonorrhoea.

Figure 53. Male rates[a] of gonorrhoea in the Auckland, Waikato and BOP regions, 2000 - 2004



[a] Denominator is the population in each region

Figure 54. Female rates[a] of gonorrhoea in the Auckland, Waikato and BOP regions, 2000 - 2004



[a] Denominator is the population in each region

OUTBREAK SURVEILLANCE

Introduction

Since July 1996, ESR has been collecting surveillance data on all reported outbreaks of infectious disease in New Zealand. These data are reported by Public Health Units (PHUs), and sent to ESR for analysis.

Information in the national dataset is analysed to estimate the burden of illness caused by outbreaks, identify high-risk groups in the population and estimate the workload involved in the management of outbreaks. This information can be used to inform public health personnel about the causes and factors contributing to outbreaks, to target prevention strategies and monitor the effectiveness of such strategies.

Outbreak Definition

An outbreak is defined as two or more cases thought to be linked by a common exposure, except when this common source is well established as a national epidemic.

It is not an outbreak if a single, or small number of secondary cases, has resulted from person-to-person transmission from a primary case.

Results

There were 327 outbreaks reported during 2004 involving 4085 cases. These outbreaks resulted in 181 cases being hospitalised and five deaths. Four of the deaths were associated with an influenza outbreak and the other with a norovirus outbreak. Both of these outbreaks occurred in rest homes.

The distribution of outbreaks by PHU is shown in Table 23.

Table 23. Outbreaks of infectious disease and associated cases by PHU, 2004

PHU	Outbreaks	Cases
Auckland	199	1454
Canterbury	41	1172
Gisborne	0	0
Hawke's Bay	10	55
Manawatu	4	70
Marlborough	0	0
Nelson	2	53
Northland	1	3
Otago	8	42
Rotorua	2	72
South Canterbury	3	78
Southland	6	39
Taranaki	4	83
Tauranga	1	2
Waikato	2	10
Wanganui	2	17
Wellington	31	853
West Coast	11	82
Total	327	4085

Pathogens

The pathogens or agents that caused the outbreaks are listed in Table 24.

Table 24. Outbreaks and associated cases by agent type, 2004

Agent by Type	Outbreaks	Cases
Enteric Bacteria		
Campylobacter spp.	31	130
Shigella spp.	6	46
Salmonella spp.	5	74
VTEC/STEC	3	6
Salmonella Paratyphi	1	11
Yersinia enterocolitica	1	4
Total	**47**	**271**
Enteric Protozoa		
Giardia spp.	25	82
Cryptosporidium parvum	5	19
Total	**30**	**101**
Enteric Viruses		
Norovirus	126	3022
Hepatitis A virus	1	3
Total	**127**	**3025**
Enteric (unspecified)	**99**	**514**
Respiratory Diseases		
Bordetella pertussis	5	14
Influenza virus	1	50
Legionella pneumophilia	1	3
Mycobacterium tuberculosis	1	6
Total	**8**	**73**
Toxins		
Clostridium perfringens	4	45
Histamine	3	15
Staphylococcus aureus	2	6
Total	**9**	**66**
Other		
Neisseria meningitidis	1	3
Measles[a]	1	20
Total	**2**	**23**
Unidentified agent	**5**	**12**
Total	**327**	**4085**

[a] Initial serology indicated measles but the diagnosis has not been confirmed by culture.

Enteric Bacteria

Enteric bacteria caused a total of 47 outbreaks (14.4%), 31 (66.3%) of which were caused by *Campylobacter* spp. Of these, 16 were foodborne, occurring at cafés (6), homes (4), takeaways (2), rest homes (1), workplaces (1), other (1) and unknown settings (1).

One outbreak of *Shigella flexneri* occurred in a Wellington hospital in 2004, one in a hostel and the remaining four outbreaks occurred in the home.

Only one *Salmonella* outbreak was foodborne, occurring in a hotel. The remaining four occurred in the home spread by exposure to infected persons and environments. The outbreak of *Salmonella* Paratyphi was foodborne and occurred as a result of consumption of unsafe prawns in an Auckland café.

The three VTEC outbreaks were caused by person-to-person transmission, two by additional modes (one waterborne, one environmental, waterborne and zoonotic. All three occurred in the home, although one was a home on a farm/workplace, so the exact setting is unclear.

The *Yersinia enterocolitica* outbreak transmission was spread by foodborne, person-to-person, waterborne and zoonotic transmission, and occurred on a farm following exposure to animals, the environment and people.

Enteric Protozoa

Of the 25 *Giardia* outbreaks, 14 occurred in the home, 6 in unknown settings, 2 in workplace/farms and one each at a childcare, a camp and other setting. Two *Giardia* outbreaks were spread only by waterborne transmission, 10 only by person-to-person transmission, 1 only by environmental transmission and 3 were spread by unknown means. The remaining 9 were spread by multiple methods with all but one including person-to-person transmission.

Two *Cryptosporidium* outbreaks occurred on farms/workplaces. One was spread via zoonotic transmission, and the other through foodborne, waterborne and zoonotic transmission. Two occurred in homes, one was spread by environmental and person-to-person transmission, the other via person-to-person transmission. The remaining outbreak was in an unknown setting spread by unknown modes of transmission.

Enteric Viruses

Of the 126 norovirus outbreaks, 49 were spread by person-to-person transmission, and occurred in rest homes (23), acute care hospitals (7), continuing care hospitals (6), homes (5), caterers (1), hostels (1), other (including one rehabilitation centre, 3) and unknown settings (3). Environmental and person-to-person transmission was implicated in 30 outbreaks that occurred in: rest homes (21), acute care hospitals (6), continuing care hospitals (2) and the home (1). Foodborne and person-to-person transmission was implicated in 8 outbreaks, 3 from takeaways, 2 in cafés, 1 in the home, 1 in a rest home, and 1 in another setting. Where the mode of transmission was unknown (25), outbreaks occurred in: unknown settings (20), the community, a hotel, a workplace and takeaways (1 each). There was also one norovirus outbreak amongst members of a bus tour group.

Person-to-person transmission was responsible for the single Hepatitis A outbreak that occurred in a home.

Toxins

All toxin-associated outbreaks were spread by foodborne transmission. Two of the *Clostridium perfringens* outbreaks occurred at a café, one was linked to a caterer and the other to a workplace. Two histamine outbreaks occurred at takeaway shops and one in another food outlet. One *Staphylococcus aureus* outbreak occurred at a takeaway shop, the other in a café.

Respiratory Diseases

Although a number of individual *Bordetella pertussis* outbreaks were reported in 2004, in the context of a national epidemic further reports of outbreaks no longer serve a useful purpose. Person-to-person transmission was involved in the four *Bordetella pertussis* outbreaks that occurred in the home and one that occurred in a school.

The outbreak of *Mycobacterium tuberculosis* resulted from person-to-person contact within more than one household. In May 2004 a Maori beneficiary was hospitalised with the Rangipo strain. Contact tracing identified four contacts with TB infection and one schoolboy contact with TB disease.

There was one influenza outbreak, in a rest home, spread by person-to-person transmission.

The *Legionella pneumophila* outbreak was spread by environmental transmission, and occurred at a display shop with working spa pools. As a result of this outbreak, spa pool shop managers have been advised of the importance of adequately treating spa pool water to minimise the risk of *Legionella* infection. Even when spa pools are only on display it is recommended that they are operated and maintained in accordance with NZS5826:2000 Pool Water Quality.

Other

An outbreak of a highly infectious disease spread by person-to-person transmission occurred in a childcare setting. Serological testing suggested that this was a measles outbreak but further testing has not supported this diagnosis.

The outbreak of *Neisseria meningitidis* occurred in a childcare centre, as a result of person-to-person transmission.

Mode of Transmission

Table 25 shows that a similar number of outbreaks were spread by foodborne (97) and person-to-person transmission (96). However person-to-person outbreaks caused almost 6 times as many cases.

The route of transmission was unknown for 57 (20.5%) of the outbreaks.

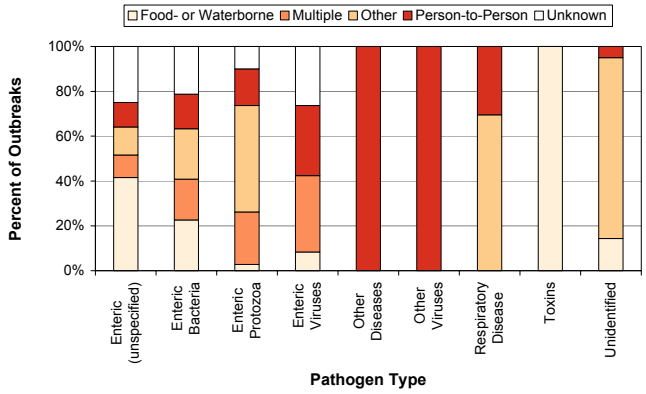
Table 25. Outbreaks of infectious disease and associated cases by mode of transmission, 2004

Transmission Mode	Outbreaks	Cases
Foodborne	97	357
Person to Person	96	2046
Multiple	67	1432
Unknown	57	202
Environmental	5	30
Waterborne	4	15
Zoonotic	1	3
Total	327	4085

When the mode of transmission was examined by pathogen (Figure 55), person-to-person transmission was the principal mode causing enteric virus outbreaks. Most outbreaks (34.0%) caused by enteric bacteria were spread via foodborne or waterborne transmission.

Of the outbreaks spread via multiple transmission routes (20.5%), most (56.7%) were spread via environmental and person to person contact. The majority of these 38 (78.9%) outbreaks were caused by enteric viruses.

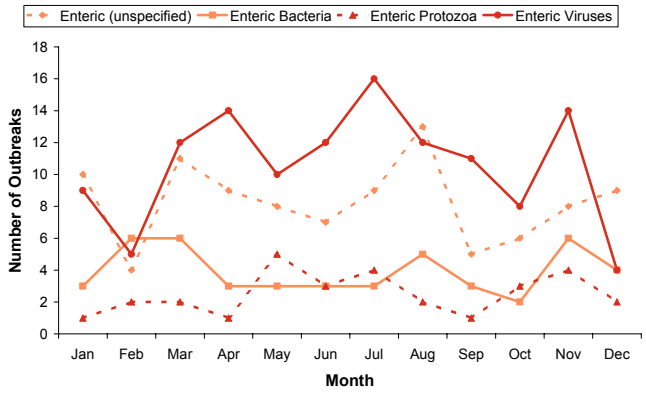
Figure 55. Outbreaks of infectious disease by pathogen type and mode of transmission, 2004



Seasonality

Figure 56 shows the seasonality of outbreaks by enteric pathogen type. Outbreaks caused by enteric bacteria seem to occur more frequently in the warmer months, whereas those caused by enteric viruses occur during winter. The seasonal pattern shown by the enteric unclassified pathogens follows that for the enteric viruses.

Figure 56. Outbreaks of infectious disease by month, 2004



Setting

The largest proportion of outbreaks (16.8%) and cases (47.2%) occurred in rest/retirement homes.

Table 26. Number of cases arising as a result of outbreaks of infectious disease by location, 2004

Outbreak Setting	Outbreaks	Cases
Commercial Food Operators		
Café/Restaurant	51	177
Takeaway	29	83
Other food outlet	9	33
Hotel	3	82
Caterer	2	21
Supermarket/Deli	1	2
Total	*95*	*398*
Institutes		
Rest/Retirement Home	55	1929
Hospital (acute care)	17	684
Hospital (continuing care)	9	280
Childcare centre	5	38
Hostel	2	66
Camp	2	22
School	1	6
Total	*97*	*3025*
Community		
Community unspecified	1	23
Swim/Spa Pool	1	3
Total	*2*	*26*
Workplace		
Farm	7	26
Workplace unspecified	5	47
Total	*12*	*73*
Household	54	180
Other	15	187
Unknown	58	196
Total	327	4085

A full report on outbreaks in New Zealand for 2004 can be found on www.surv.esr.cri.nz.

ANTIBIOTIC RESISTANCE

ANTIMICROBIAL RESISTANCE

The prevalence of resistance among common, important clinical pathogens between 1991 and 2003, is shown in Appendix J. Most antimicrobial resistance data are only available in a complete analysed form up to the end of 2003. Data from ESR's national surveillance of antimicrobial resistance is now available at http://www.surv.esr.cri.nz/antimicrobial/antimicrobial_resistance.php.

Of particular note are the following trends:

- A decrease in the prevalence of MRSA since 2002. However, an increasing proportion of MRSA are multiresistant (that is, 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.
- In 2003 there was a complete reversal of the decrease in penicillin resistance among invasive pneumococci observed during the four years 1999-2002, and resistance reached the highest rate ever recorded (7.5%). There has been an increase in resistance to third-generation cephalosporins (such as ceftriaxone) since 2001.
- Recent increases in ampicillin resistance among invasive *Haemophilus influenzae.*
- Stable levels of trimethoprim resistance among urinary *Escherichia coli,* and continuing low levels of nitrofurantoin resistance.
- An increasing prevalence of extended-spectrum β-lactamases (ESBLs) in Enterobacteriaceae.
- Increasing ciprofloxacin resistance in *Neisseria gonorrhoeae*.

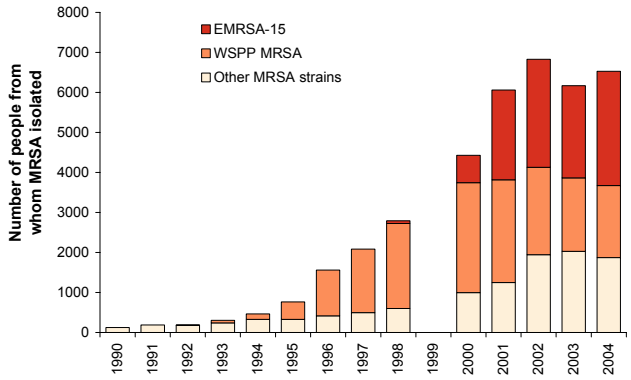
However, some other important resistances emerging in other countries remain uncommon in New Zealand. Of particular note, vancomycin-resistant enterococci (VRE), while isolated in small numbers, have not become established in New Zealand hospitals. In addition, multidrug-resistant tuberculosis (MDR-TB) 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 all methicillin-resistant *Staphylococcus aureus* (MRSA), that is, multiresistant and non-multiresistant isolates, has been based on annual one-month surveys. The 2004 survey was conducted in August 2004.

In August 2004, MRSA were referred from 544 people (528 patients and 16 staff). This number of referrals equates to an annual incidence rate of 174.7 per 100 000; a 6.1% increase on the rate in 2003 (164.7 per 100 000) (Figure 57). Among the 528 patients with MRSA, 52.8% were categorised as hospital patients and 47.2% 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 74.4% of the 395 patients for whom this information was provided.

Figure 57. MRSA isolations, 1990-2004[a]

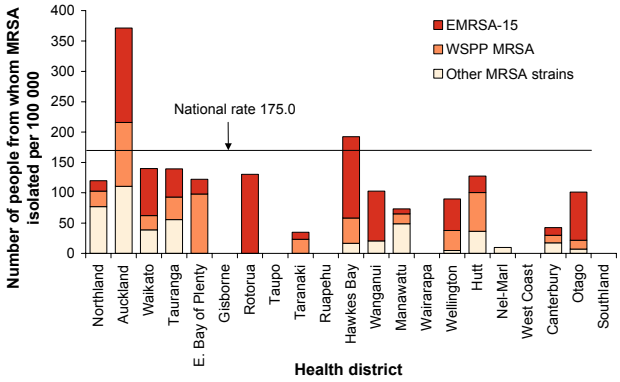


[a] Data for 1990 to 1998 are based on continuous surveillance of all MRSA isolations. Data for 2000 to 2004 are annualised and based on one-month surveys conducted in these years. No survey was undertaken in 1999.

Four MRSA strains were predominant in 2004:

- EMRSA-15, a British epidemic MRSA strain, accounted for 43.3% of the MRSA isolations. In recent years, this strain has become increasingly common (Figure 57). It is typically isolated from elderly patients in hospital or other healthcare facilities. In 2004, 72.3% 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 27.3% of the MRSA isolations, with the majority (67.3%) 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 57).
- AKh4 MRSA, which is a multiresistant MRSA typical of multiresistant MRSA isolated in Australia, accounted for 6.9% of the MRSA isolations. Like EMRSA-15, this strain is most commonly isolated from hospital patients, with 84.2% of the isolations in 2004 being from hospital patients or healthcare staff.
- WR/AK1 MRSA, which is a multiresistant community strain of MRSA, accounted for 4.2% of the MRSA isolations, with the majority (69.6%) being isolated from people in the community. This strain is typically isolated from children and young adults in the Whangarei and Auckland areas.

Figure 58. Annualised incidence of MRSA by health district, 2004



There continue to be marked geographic variations in the incidence of MRSA in New Zealand. In 2004 the highest annualised incidence rates were in the Auckland (371.3 per 100 000), Hawke's Bay (192.3), Waikato (140.0), Tauranga (139.4), Rotorua (130.2), Hutt Valley (127.4), Eastern Bay of Plenty (122.3), Northland (119.9), Wanganui (102.8), and Otago (101.1) Health Districts (Figure 58).

The typical antimicrobial resistance patterns of the four MRSA strains most commonly isolated in 2004 are shown in Table 27. Overall, 51.8% of the MRSA tested were multiresistant, that is, resistant to ≥2 classes of antibiotics in addition to β-lactams.

Table 27. Typical resistance patterns of the most common MRSA strains, 2004

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

[a] Some isolates of EMRSA-15 are erythromycin-susceptible; in 2004, 19.3% 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 2003 AND 2004

Table 28. Cases and rates per 100 000 population of notifiable diseases in New Zealand during 2003 and 2004

Disease[a]	2003		2004		Change[d,e]
	Cases	Rates	Cases	Rates	
AIDS	33	0.9	38	1.0	→
Barmah Forest virus infection	0	0.0	1	0.0	→
Brucellosis	0	0.0	2	0.1	→
Campylobacteriosis	14790	395.7	12213	326.8	↞
Chemical poisoning from the environment	1	0.0	7	0.2	→
Cholera	1	0.0	2	0.1	→
Creutzfeldt-Jakob disease	6	0.2	8	0.2	→
Cryptosporidiosis	817	21.9	612	16.4	↞
Decompression sickness	2	0.1	0	0.0	←
Dengue fever	55	1.5	8	0.2	↞
Gastroenteritis[b]	1025	27.4	1370	36.7	↠
Giardiasis	1570	42.0	1515	40.5	←
Haemophilus influenzae type b	12	0.3	4	0.1	←
Hepatitis A	70	1.9	49	1.3	←
Hepatitis B[c]	61	1.6	39	1.0	↞
Hepatitis C[c]	40	1.1	24	0.6	←
Hepatitis NOS	5	0.1	2	0.1	←
Hydatid disease	0	0.0	1	0.0	→
Japanese encephalitis	0	0.0	1	0.0	→
Lead absorption	119	3.2	95	2.5	←
Legionellosis	77	2.1	62	1.7	←
Leprosy	4	0.1	3	0.1	←
Leptospirosis	113	3.0	104	2.8	←
Listeriosis	24	0.6	26	0.7	→
Malaria	46	1.2	33	0.9	←
Measles	67	1.8	33	0.9	↞
Meningococcal disease	542	14.5	344	9.2	↞
Mumps	56	1.5	45	1.2	←
Paratyphoid	18	0.5	28	0.7	→
Pertussis	585	15.7	3489	93.4	↠
Rheumatic fever	151	4.0	75	2.0	↞
Rickettsial disease	1	0.0	2	0.1	→
Ross River virus infection	1	0.0	5	0.1	→
Rubella	26	0.7	25	0.7	←
Salmonellosis	1401	37.5	1080	28.9	↞
Shigellosis	87	2.3	140	3.7	↠
Taeniasis	1	0.0	0	0.0	←
Tetanus	2	0.1	1	0.0	←
Toxic shellfish poisoning	4	0.1	0	0.0	←
Tuberculosis disease	421	11.3	372	10.0	←
Typhoid	20	0.5	31	0.8	→
VTEC/STEC infection	104	2.8	89	2.4	←
Yersiniosis	439	11.7	420	11.2	←

[a] No cases of the following notifiable diseases were reported in 2004: anthrax, botulism, plague, poliomyelitis, rabies, cysticercosis, 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 2004

Table 29. Deaths due to notifiable diseases recorded in EpiSurv from 1997 to 2004

Disease	1997	1998	1999	2000	2001	2002	2003	2004
AIDS [a]	27	15	19	13	12	5	6	6
Campylobacteriosis	2	2	1	3	1	1	0	0
Creutzfeldt-Jakob disease[b]	3	0	2	3	1	3	4	3
Gastroenteritis	0	0	0	0	0	1	0	0
Giardiasis	1	0	0	0	0	0	0	0
Haemophilus influenzae type b	1	0	0	0	1	1	2	0
Hepatitis B	2	0	0	0	1	0	0	0
Hydatid disease	0	0	0	1	0	0	0	0
Legionellosis[c]	4	1	1	5	2	3	1	1
Listeriosis - non perinatal	2	0	1	2	1	0	2	3
Listeriosis - perinatal	6	0	2	4	1	3	2	2
Malaria	1	0	0	0	0	0	0	0
Meningococcal disease	24	23	23	17	26	18	13	8
Pertussis	0	0	0	0	1	1	1	1
Primary amoebic meningoencephalitis	0	0	0	1	0	0	0	0
Rheumatic fever (acute)[d]	1	0	0	0	0	0	0	0
Salmonellosis	2	2	1	7	2	1	0	0
Shigellosis	0	0	1	0	0	0	0	0
Tetanus	0	0	0	0	1	0	0	0
Tuberculosis	15	8	14	8	2	6	6	6
VTEC infection	1	1	0	0	0	0	0	0
Yersiniosis	0	2	0	0	0	0	0	1

[a] Data source [17]

[b] Data source [10]

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

C. NZHIS MORTALITY DATA FOR SELECTED NOTIFIABLE DISEASES, 2000-2001

Table 30. Reported deaths from selected notifiable diseases, 2000 - 2001

		2000		2001[a]	
Disease	ICD 10 Codes	Underlying[b]	Contributory[c]	Underlying[b]	Contributory[c]
AIDS	B20-B24	19	1	13	4
Campylobacteriosis	A04.5	0	0	2	0
Creutzfeldt-Jakob disease	A81.0	6	0	4	0
Giardiasis	A07.1	0	0	1	0
Hepatitis A	B15	0	1	0	1
Hepatitis B	B16	1	7	3	4
Hepatitis C	B17.1	0	10	0	3
Hydatid disease	B67.0-B67.4	2	0	1	0
Legionellosis	A48.1	2	0	2	0
Leptospirosis	A27	0	0	1	0
Listeriosis	A32	1	0	1	0
Meningococcal disease	A39	15	0	24	0
Pertussis	A37	1	0	1	0
Rheumatic fever	I00, I01, I02	1	0	0	0
Salmonellosis	A02	3	0	2	0
Tetanus	A33-A35	0	0	1	0
Tuberculosis	A15-A19, P37.0	11	19	5	14

[a] Latest year data are available.

[b] Underlying cause of death

[c] Selected contributory cause of death

D. NZHIS MORBIDITY DATA FOR SELECTED NOTIFIABLE DISEASES, 2002-2004

Table 31. Hospital admissions for selected notifiable diseases, 2002 - 2004

Disease	ICD 10 Codes	2002		2003		2004	
		Principal diagnosis	Other relevant diagnosis	Principal diagnosis	Other relevant diagnosis	Principal diagnosis	Other relevant diagnosis
AIDS	B20-B24	11	185	26	260	16	263
Arboviral diseases	A83, A84, A85.2, A92, A93, A94, B33.1	1	0	1	0	4	0
Brucellosis	A23	1	1	0	1	0	1
Campylobacteriosis	A04.5	584	146	764	193	747	173
Cholera	A00	1	0	0	0	0	1
Creutzfeldt-Jakob disease	A81.0	6	0	4	2	12	2
Cryptosporidiosis	A07.2	36	8	35	11	16	8
Cysticercosis	B69	1	0	4	0	2	1
Decompression sickness	T70.3	45	2	13	1	9	0
Dengue fever	A90, A91	25	4	24	4	3	1
Diphtheria	A36	1	1	0	1	0	2
Giardiasis	A07.1	27	18	27	21	30	25
Hepatitis A	B15	30	17	19	26	12	16
Hepatitis B	B16	53	116	41	92	46	69
Hepatitis C	B17.1	15	21	10	8	6	14
Hydatid disease	B67.0-B67.4	1	2	1	2	0	2
Lead absorption	T56.0	5	1	6	1	8	1
Legionellosis	A48.1	15	12	24	6	10	3
Leprosy	A30	4	3	5	13	2	2
Leptospirosis	A27	69	10	60	11	69	4
Listeriosis	A32	6	14	13	16	13	18
Malaria	B50-B54	53	2	48	3	43	5
Measles	B05	5	2	9	1	4	1
Meningococcal disease	A39	532	82	548	125	401	64
Mumps	B26	9	6	8	2	7	1
Paratyphoid	A01.1-A01.4	1	0	7	0	10	0
Pertussis	A37	142	32	120	22	229	53
Plague	A20	1	0	0	0	0	0
Poliomyelitis	A80	0	1	0	1	0	0
Rheumatic fever	I00, I01, I02	177	44	226	59	181	45
Rickettsial diseases	A75, A77, A78, A79	4	0	1	1	2	1
Rubella	B06	4	2	1	1	1	0
Salmonellosis	A02	148	60	157	46	105	42
Shigellosis	A03	23	6	24	7	26	5
Tetanus	A33-A35	1	1	1	2	2	3
Trichinellosis	B75	0	0	0	0	1	0
Tuberculosis	A15-A19, P37.0	460	211	549	266	503	198
Typhoid	A01.0	21	1	14	0	18	1
Yersiniosis	A04.6	15	16	7	11	17	13

E. NOTIFIABLE DISEASE CASES AND RATES BY ETHNICITY, 2004

Table 32. Cases and rates per 100 000 population in 2004 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	8509	326.0	581	110.4	126	62.9	530	212.2	2467		12213	326.8
Cryptosporidiosis	466	17.9	47	8.9	7	3.5	20	8.0	72		612	16.4
Dengue fever	6	0.2	0	0.0	1	0.5	1	0.4	0		8	0.2
Gastroenteritis	764	29.3	47	8.9	9	4.5	36	14.4	514		1370	36.7
Giardiasis	1054	40.4	69	13.1	7	3.5	103	41.2	282		1515	40.5
Haemophilus influenzae type b	2	0.1	2	0.4	0	0.0	0	0.0	0		4	0.1
Hepatitis A	24	0.9	1	0.2	12	6.0	9	3.6	3		49	1.3
Hepatitis B	18	0.7	11	2.1	3	1.5	6	2.4	1		39	1.0
Hepatitis C	13	0.5	6	1.1	1	0.5	2	0.8	2		24	0.6
Hydatid disease	0	0.0	1	0.2	0	0.0	0	0.0	0		1	0.0
Lead absorption	70	2.7	4	0.8	0	0.0	5	2.0	16		95	2.5
Legionellosis	50	1.9	1	0.2	1	0.5	5	2.0	5		62	1.7
Leprosy	0	0.0	0	0.0	3	1.5	0	0.0	0		3	0.1
Leptospirosis	68	2.6	26	4.9	4	2.0	0	0.0	6		104	2.8
Listeriosis	13	0.5	5	1.0	4	2.0	3	1.2	1		26	0.7
Malaria	12	0.5	2	0.4	3	1.5	14	5.6	2		33	0.9
Measles	19	0.7	5	1.0	1	0.5	4	1.6	4		33	0.9
Meningococcal disease	163	6.2	104	19.8	62	31.0	14	5.6	1		344	9.2
Mumps	24	0.9	8	1.5	5	2.5	4	1.6	4		45	1.2
Paratyphoid	15	0.6	1	0.2	1	0.5	7	2.8	4		28	0.7
Pertussis	2750	105.3	339	64.4	66	32.9	120	48.0	214		3489	93.4
Rheumatic fever	5	0.2	44	8.4	22	11.0	1	0.4	3		75	2.0
Rickettsial disease	2	0.1	0	0.0	0	0.0	0	0.0	0		2	0.1
Rubella	21	0.8	2	0.4	0	0.0	1	0.4	1		25	0.7
Salmonellosis	761	29.2	89	16.9	21	10.5	68	27.2	141		1080	28.9
Shigellosis	66	2.5	9	1.7	34	17.0	15	6.0	16		140	3.7
Tetanus	0	0.0	1	0.2	0	0.0	0	0.0	0		1	0.0
Tuberculosis disease	39	1.5	73	13.9	61	30.5	195	78.1	4		372	10.0
Typhoid	0	0.0	1	0.2	19	9.5	11	4.4	0		31	0.8
VTEC/STEC infection	69	2.6	6	1.1	3	1.5	3	1.2	8		89	2.4
Yersiniosis	261	10.0	37	7.0	6	3.0	47	18.8	69		420	11.2

F. CASES AND RATES PER 100 000 POPULATION IN 2004 BY SEX

Table 33. Cases and rates per 100 000 population in 2004 by sex

	Sex							
	Male		Female		Unknown		Total	
Disease	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Campylobacteriosis	6467	354.8	5495	287.0	251		12213	326.8
Cryptosporidiosis	301	16.5	306	16.0	5		612	16.4
Dengue fever	5	0.3	3	0.2	0		8	0.2
Gastroenteritis	485	26.6	868	45.3	17		1370	36.7
Giardiasis	774	42.5	704	36.8	37		1515	40.5
Haemophilus influenzae type b	3	0.2	1	0.1	0		4	0.1
Hepatitis A	18	1.0	31	1.6	0		49	1.3
Hepatitis B	23	1.3	16	0.8	0		39	1.0
Hepatitis C	14	0.8	9	0.5	1		24	0.6
Hydatid disease	0	0.0	1	0.1	0		1	0.0
Lead absorption	77	4.2	17	0.9	1		95	2.5
Legionellosis	38	2.1	23	1.2	1		62	1.7
Leprosy	2	0.1	1	0.1	0		3	0.1
Leptospirosis	99	5.4	5	0.3	0		104	2.8
Listeriosis – non perinatal	12	0.7	11	0.6	0		23	0.6
Malaria	26	1.4	6	0.3	1		33	0.9
Measles	16	0.9	15	0.8	2		33	0.9
Meningococcal disease	182	10.0	159	8.3	3		344	9.2
Mumps	26	1.4	19	1.0	0		45	1.2
Paratyphoid	21	1.2	7	0.4	0		28	0.7
Pertussis	1476	81.0	1983	103.6	30		3489	93.4
Rheumatic fever	34	1.9	22	1.1	19		75	2.0
Rickettsial disease	1	0.1	1	0.1	0		2	0.1
Rubella	11	0.6	14	0.7	0		25	0.7
Salmonellosis	565	31.0	501	26.2	14		1080	28.9
Shigellosis	54	3.0	84	4.4	2		140	3.7
Tetanus	0	0.0	1	0.1	0		1	0.0
Tuberculosis disease	181	9.9	187	9.8	4		372	10.0
Typhoid	16	0.9	15	0.8	0		31	0.8
VTEC/STEC infection	36	2.0	53	2.8	0		89	2.4
Yersiniosis	211	11.6	202	10.6	7		420	11.2

G. NOTIFIABLE DISEASE CASES AND RATES BY AGE GROUP, 2004

Table 34. Cases and rates per 100 000 population in 2004 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	245	448.3	1114	515.4	562	196.4	524	180.2	833	314.0	2199	451.8	1796	311.4	1571	292.3	1420	339.4	944	334.2	901	279.4	104		12213	326.8
Cryptosporidiosis	26	47.6	254	117.5	87	30.4	37	12.7	42	15.8	60	12.3	60	10.4	23	4.3	14	3.3	4	1.4	4	1.2	1		612	16.4
Dengue fever	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	4	0.7	0	0.0	3	0.7	1	0.4	0	0.0	0		8	0.2
Gastroenteritis	8	14.6	29	13.4	17	5.9	18	6.2	44	16.6	126	25.9	195	33.8	217	40.4	173	41.3	98	34.7	382	118.4	63		1370	36.7
Giardiasis	22	40.3	294	136.0	104	36.3	42	14.4	26	9.8	174	35.8	371	64.3	194	36.1	147	35.1	87	30.8	37	11.5	17		1515	40.5
H. influenzae type b	0	0.0	2	0.9	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.5	0	0.0	0	0.0	0		4	0.1
Hepatitis A	0	0.0	1	0.5	8	2.8	3	1.0	5	1.9	5	1.0	7	1.2	6	1.1	4	1.0	5	1.8	5	1.6	0		49	1.3
Hepatitis B	0	0.0	0	0.0	0	0.0	0	0.0	1	0.4	13	2.7	12	2.1	8	1.5	4	1.0	1	0.4	0	0.0	0		39	1.0
Hepatitis C	0	0.0	0	0.0	0	0.0	0	0.0	3	1.1	7	1.4	4	0.7	7	1.3	2	0.5	0	0.0	0	0.0	1		24	0.6
Hydatid disease	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.2	0	0.0	0	0.0	0		1	0.0
Lead absorption	0	0.0	5	2.3	1	0.3	0	0.0	2	0.8	10	2.1	22	3.8	32	6.0	14	3.3	7	2.5	2	0.6	0		95	2.5
Legionellosis	0	0.0	0	0.0	1	0.3	0	0.0	0	0.0	0	0.0	4	0.7	9	1.7	13	3.1	12	4.2	23	7.1	0		62	1.7
Leprosy	0	0.0	0	0.0	0	0.0	1	0.3	0	0.0	1	0.2	0	0.0	1	0.2	0	0.0	0	0.0	0	0.0	0		3	0.1
Leptospirosis	1	1.8	0	0.0	0	0.0	0	0.0	3	1.1	28	5.8	28	4.9	28	5.2	8	1.9	7	2.5	1	0.3	0		104	2.8
Listeriosis – non perinatal	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.2	5	1.2	5	1.8	12	3.7	0		23	0.6
Malaria	0	0.0	0	0.0	2	0.7	0	0.0	3	1.1	10	2.1	6	1.0	4	0.7	6	1.4	2	0.7	0	0.0	0		33	0.9
Measles	8	14.6	14	6.5	4	1.4	3	1.0	1	0.4	0	0.0	2	0.3	0	0.0	0	0.0	1	0.4	0	0.0	0		33	0.9
Meningococcal disease	46	84.2	96	44.4	43	15.0	35	12.0	40	15.1	32	6.6	13	2.3	15	2.8	10	2.4	8	2.8	6	1.9	0		344	9.2
Mumps	0	0.0	12	5.6	13	4.5	1	0.3	5	1.9	4	0.8	4	0.7	2	0.4	1	0.2	2	0.7	1	0.3	0		45	1.2
Paratyphoid	1	1.8	2	0.9	4	1.4	1	0.3	1	0.4	11	2.3	3	0.5	2	0.4	2	0.5	1	0.4	0	0.0	0		28	0.7
Pertussis	179	327.5	360	166.5	659	230.3	602	207.1	267	100.6	213	43.8	356	61.7	379	70.5	236	56.4	133	47.1	104	32.2	1		3489	93.4
Rheumatic fever	0	0.0	2	0.9	23	8.0	37	12.7	6	2.3	5	1.0	2	0.3	0	0.0	0	0.0	0	0.0	0	0.0	0		75	2.0
Rickettsial disease	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.2	1	0.2	0	0.0	0	0.0	0		2	0.1
Rubella	12	22.0	7	3.2	4	1.4	2	0.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0		25	0.7
Salmonellosis	67	122.6	230	106.4	108	37.7	55	18.9	48	18.1	124	25.5	103	17.9	109	20.3	105	25.1	71	25.1	58	18.0	2		1080	28.9
Shigellosis	2	3.7	15	6.9	18	6.3	8	2.8	3	1.1	15	3.1	19	3.3	17	3.2	20	4.8	17	6.0	5	1.6	1		140	3.7
Tetanus	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.4	0	0.0	0		1	0.0
Tuberculosis disease	1	1.8	8	3.7	9	3.1	9	3.1	17	6.4	92	18.9	76	13.2	36	6.7	42	10.0	33	11.7	49	15.2	0		372	10.0
Typhoid	0	0.0	2	0.9	3	1.0	1	0.3	2	0.8	11	2.3	5	0.9	3	0.6	3	0.7	1	0.4	0	0.0	0		31	0.8
VTEC/STEC infection	11	20.1	35	16.2	8	2.8	3	1.0	0	0.0	5	1.0	6	1.0	5	0.9	7	1.7	5	1.8	4	1.2	0		89	2.4
Yersiniosis	36	65.9	111	51.4	29	10.1	18	6.2	13	4.9	39	8.0	43	7.5	48	8.9	38	9.1	19	6.7	17	5.3	9		420	11.2

H. NOTIFIABLE DISEASE CASES AND RATES BY DISTRICT HEALTH BOARD, 2004

Table 35. Disease notifications and incidence rates per 100 000 population by District Health Board, 2004

Disease	Campylobacteriosis		Cryptosporidiosis		Dengue fever		Gastroenteritis		Giardiasis		Hepatitis A		Hepatitis B		Hepatitis C		Lead absorption		Legionellosis		Leptospirosis		Listeriosis		Malaria		Measles		Meningococcal disease		Mumps		Paratyphoid		Pertussis		Rheumatic fever		Rubella		Salmonellosis		Shigellosis		Tuberculosis disease		Typhoid		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	326	232.6	25	17.8	0	0.0	2	1.4	49	35.0	0	0.0	1	0.7	0	0.0	3	2.1	3	2.1	2	1.4	0	0.0	0	0.0	0	0.0	21	15.0	2	1.4	1	0.7	89	63.5	9	6.4	2	1.4	41	29.3	2	1.4	5	3.6	0	0.0	1	0.7	4	2.9
Waitemata	1630	379.3	24	5.6	0	0.0	93	21.6	176	41.0	6	1.4	5	1.2	3	0.7	6	1.4	8	1.9	1	0.2	3	0.7	3	0.7	2	0.5	45	10.5	2	0.5	4	0.9	97	22.6	1	0.2	1	0.2	96	22.3	12	2.8	47	10.9	3	0.7	6	1.4	61	14.2
Auckland	1445	392.9	13	3.5	0	0.0	91	24.7	213	57.9	7	1.9	3	0.8	3	0.8	5	1.4	10	2.7	1	0.3	2	0.5	6	1.6	2	0.5	39	10.6	2	0.5	2	0.5	90	24.5	5	1.4	1	0.3	102	27.7	19	5.2	67	18.2	4	1.1	4	1.1	57	15.5
Counties Manukau	1133	301.7	22	5.9	0	0.0	60	16.0	118	31.4	15	4.0	9	2.4	1	0.3	1	0.3	8	2.1	2	0.5	2	0.5	3	0.8	1	0.3	49	13.0	3	0.8	5	1.3	76	20.2	23	6.1	1	0.3	86	22.9	32	8.5	71	18.9	16	4.3	5	1.3	34	9.1
Waikato	1204	378.9	130	40.9	4	1.3	418	131.6	195	61.4	2	0.6	5	1.6	0	0.0	11	3.5	4	1.3	19	6.0	3	0.9	5	1.6	1	0.3	23	7.2	3	0.9	2	0.6	473	148.9	10	3.1	0	0.0	107	33.7	8	2.5	28	8.8	2	0.6	30	9.4	46	14.5
Lakes	281	292.8	34	35.4	0	0.0	52	54.2	53	55.2	2	2.1	2	2.1	1	1.0	2	2.1	0	0.0	4	4.2	3	3.1	0	0.0	1	1.0	16	16.7	0	0.0	3	3.1	81	84.4	1	1.0	1	1.0	21	21.9	1	1.0	3	3.1	0	0.0	2	2.1	7	7.3
Bay of Plenty	446	250.3	10	5.6	0	0.0	2	1.1	57	32.0	1	0.6	3	1.7	2	1.1	1	0.6	5	2.8	3	1.7	1	0.6	0	0.0	2	1.1	13	7.3	1	0.6	1	0.6	121	67.9	7	3.9	2	1.1	47	26.4	2	1.1	7	3.9	1	0.6	15	8.4	16	9.0
Tairawhiti	86	195.7	6	13.7	0	0.0	0	0.0	24	54.6	1	2.3	1	2.3	2	4.6	3	6.8	1	2.3	5	11.4	0	0.0	0	0.0	0	0.0	13	29.6	1	2.3	0	0.0	26	59.2	5	11.4	0	0.0	2	4.6	0	0.0	1	2.3	0	0.0	2	4.6	5	11.4
Taranaki	314	304.7	13	12.6	1	1.0	7	6.8	20	19.4	1	1.0	1	1.0	0	0.0	2	1.9	1	1.0	2	1.9	0	0.0	0	0.0	1	1.0	7	6.8	0	0.0	0	0.0	16	15.5	0	0.0	3	2.9	32	31.1	0	0.0	4	3.9	0	0.0	4	3.9	6	5.8
Hawke's Bay	425	296.0	24	16.7	0	0.0	7	4.9	64	44.6	2	1.4	1	0.7	1	0.7	2	1.4	0	0.0	20	13.9	1	0.7	0	0.0	2	1.4	15	10.4	1	0.7	2	1.4	37	25.8	6	4.2	3	2.1	55	38.3	0	0.0	26	18.1	0	0.0	3	2.1	20	13.9
Whanganui	167	262.5	18	28.3	0	0.0	9	14.1	20	31.4	0	0.0	0	0.0	0	0.0	4	6.3	1	1.6	2	3.1	0	0.0	1	1.6	1	1.6	6	9.4	6	9.4	0	0.0	1	1.6	0	0.0	1	1.6	24	37.7	3	4.7	2	3.1	0	0.0	0	0.0	7	11.0
MidCentral	264	170.3	58	37.4	0	0.0	110	71.0	42	27.1	1	0.6	0	0.0	1	0.6	7	4.5	2	1.3	14	9.0	1	0.6	0	0.0	4	2.6	16	10.3	3	1.9	0	0.0	53	34.2	0	0.0	0	0.0	21	13.5	0	0.0	16	10.3	0	0.0	0	0.0	11	7.1
Hutt Valley	465	352.7	9	6.8	0	0.0	35	26.5	64	48.5	0	0.0	0	0.0	1	0.8	2	1.5	1	0.8	0	0.0	1	0.8	0	0.0	2	1.5	5	3.8	1	0.8	0	0.0	49	37.2	1	0.8	2	1.5	23	17.4	13	9.9	12	9.1	3	2.3	1	0.8	23	17.4
Capital and Coast	932	379.1	22	8.9	2	0.8	67	27.2	135	54.9	5	2.0	1	0.4	0	0.0	4	1.6	6	2.4	1	0.4	3	1.2	7	2.8	0	0.0	17	6.9	5	2.0	2	0.8	67	27.2	7	2.8	1	0.4	67	27.2	7	2.8	45	18.3	1	0.4	1	0.4	36	14.6
Wairarapa	77	201.6	14	36.6	0	0.0	8	20.9	13	34.0	0	0.0	0	0.0	3	7.9	0	0.0	1	2.6	1	2.6	1	2.6	0	0.0	1	2.6	1	2.6	1	2.6	0	0.0	2	5.2	0	0.0	1	2.6	9	23.6	3	7.9	4	10.5	0	0.0	0	0.0	3	7.9
Nelson Marlborough	253	206.6	18	14.7	0	0.0	17	13.9	50	40.8	2	1.6	1	0.8	1	0.8	2	1.6	2	1.6	3	2.4	2	1.6	0	0.0	3	2.4	3	2.4	3	2.4	1	0.8	502	409.9	0	0.0	2	1.6	36	29.4	1	0.8	5	4.1	1	0.8	3	2.4	4	3.3
West Coast	82	270.9	8	26.4	0	0.0	5	16.5	10	33.0	0	0.0	0	0.0	3	9.9	1	3.3	1	3.3	4	13.2	0	0.0	0	0.0	3	9.9	2	6.6	0	0.0	0	0.0	9	29.7	0	0.0	2	6.6	6	19.8	1	3.3	2	6.6	0	0.0	0	0.0	14	46.3
Canterbury	1307	306.0	73	17.1	0	0.0	206	48.2	144	33.7	3	0.7	5	1.2	2	0.5	14	3.3	3	0.7	7	1.6	0	0.0	4	0.9	5	1.2	27	6.3	4	0.9	4	0.9	694	162.5	0	0.0	2	0.5	133	31.1	31	7.3	19	4.4	0	0.0	4	0.9	40	9.4
South Canterbury	289	547.5	23	43.6	0	0.0	77	145.9	7	13.3	0	0.0	0	0.0	0	0.0	2	3.8	3	5.7	1	1.9	0	0.0	0	0.0	0	0.0	2	3.8	2	3.8	0	0.0	90	170.5	0	0.0	0	0.0	29	54.9	0	0.0	1	1.9	0	0.0	0	0.0	11	20.8
Otago	619	362.5	44	25.8	1	0.6	67	39.2	36	21.1	1	0.6	1	0.6	0	0.0	17	10.0	2	1.2	1	0.6	2	1.2	2	1.2	0	0.0	18	10.5	4	2.3	0	0.0	304	178.0	0	0.0	0	0.0	72	42.2	5	2.9	5	2.9	0	0.0	6	3.5	12	7.0
Southland	468	452.9	24	23.2	0	0.0	37	35.8	25	24.2	0	0.0	0	0.0	0	0.0	6	5.8	0	0.0	11	10.6	1	1.0	2	1.9	2	1.9	6	5.8	1	1.0	1	1.0	612	592.2	0	0.0	0	0.0	71	68.7	0	0.0	2	1.9	0	0.0	2	1.9	3	2.9
Total	12213	326.8	612	16.4	8	0.2	1370	36.7	1515	40.5	49	1.3	39	1.0	24	0.6	95	2.5	62	1.7	104	2.8	26	0.7	33	0.9	33	0.9	344	9.2	45	1.2	28	0.7	3489	93.4	75	2.0	25	0.7	1080	28.9	140	3.7	372	10.0	31	0.8	89	2.4	420	11.2

I. NOTIFIABLE DISEASE CASES BY YEAR AND SOURCE, 1984 - 2004

Note: cell is blank where data are unavailable

Disease	Source	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
AIDS	Notification	3	11	19	28	38	59	73	78	50	70	44	50	76	43	29	33	27	26	17	33	38
Campylobacteriosis	Notification	1915	2390	2786	2921	2796	4187	3850	4148	5144	8101	7714	7442	7635	8924	11573	8161	8417	10146	12494	14790	12213
Cholera	Notification	0	0	0	2	0	0	5	0	0	0	2	2	0	0	1	1	0	3	1	1	2
Creutzfeldt-Jakob disease	Notification													2	1	0	2	3	1	3	6	8
Cryptosporidiosis	Notification													119	357	866	977	775	1208	975	817	612
Dengue fever	Notification	1	1	3	0	1	3	2	3	1	1	0	6	23	14	26	9	7	93	70	55	8
Gastroenteritis	Notification													555	310	492	601	726	940	1087	1025	1370
Giardiasis	Notification													1235	2127	2183	1793	1684	1603	1547	1570	1515
H. influenzae serotype b	Laboratory				93	107	121	143	148	166	118	75	14	24	8	10	9	10	8	3	9	3
	Notification													26	9	11	10	13	11	3	12	4
Hepatitis A	Notification	539	380	251	158	176	134	150	224	288	257	179	338	311	347	145	119	107	61	106	70	49
Hepatitis B	Notification	609	530	488	474	370	309	242	227	221	145	133	125	104	138	88	94	79	56	67	61	39
Hepatitis C	Notification	29	31	17	18	20	13	11	25	89	91	79	88	59	92	102	96	80	59	53	40	24
Hydatid disease	Notification	6	4	5	2	2	0	4	0	4	4	1	5	3	2	2	8	3	7	2	0	1
Influenza	Sentinel isolates	9	6	8	18	136	119	343	183	317	423	441	521	673	743	127	425	73	313	241	230	231
Legionellosis	Notification	48	87	95	91	62	17	20	14	11	24	66	33	36	63	43	51	61	46	49	77	62
	Laboratory							21	42	60	76	121	76	60	109	107	65	56	56	53	82	75
Leprosy	Notification	9	5	7	8	2	4	1	4	5	3	1	1	10	3	3	10	4	3	4	4	3
Leptospirosis	Notification	201	174	139	129	99	90	117	106	70	116	70	65	56	52	75	59	98	101	140	113	104
	Laboratory					192	182	229	176	218	234	168	183	140	84	117	76	114	113	181	149	113
Listeriosis	Notification	6	6	6	12	7	10	16	26	16	11	8	13	10	35	17	19	22	18	19	24	26
Malaria	Notification	48	44	31	22	25	27	32	39	29	58	34	41	107	65	73	46	111	54	61	46	33
Measles	Notification													68	1984	164	107	64	82	21	67	33
	Laboratory	11	145	135	26	5	5	7	355	53	4	4	15	25	1220	35	2	9	21	6	15	10
Meningococcal disease	Notification	34	107	190	179	83	49	53	71	153	202	208	394	473	609	439	507	477	648	555	542	344
Mumps	Notification													76	90	85	56	50	56	64	56	45
	Laboratory	0	61	132	28	5	105	26	23	10	25	245	66	20	14	8	5	2	22	18	11	12
Paratyphoid	Laboratory					23	13	30	22	13	23	30	24	20	25	19	17	23	33	24	21	31
Pertussis	Notification													1022	284	153	1046	4140	1334	1068	585	3489
Rheumatic fever (initial attack)	Notification			12	215	153	148	90	97	70	81	98	88	110	95	65	71	136	114	87	148	73
Rubella	Notification													306	80	53	35	26	30	33	26	25
	Laboratory	155	120	30	50	95	114	168	81	27	244	104	1581	339	21	2	0	0	3	4	3	3
Salmonellosis	Notification	1138	1234	1335	1140	1128	1860	1619	1244	1239	1340	1522	1334	1141	1177	2069	2077	1796	2417	1880	1401	1080
Shigellosis	Notification	127	192	189	143	145	137	197	152	124	128	185	191	167	117	122	147	115	157	112	87	140
Tetanus	Notification	7	3	3	4	1	0	0	0	8	2	2	2	3	0	2	6	1	4	1	2	1
Tuberculosis	Notification	404	359	320	296	295	303	348	335	327	323	352	391	352	321	365	445	353	370	381	421	372
Typhoid	Notification	2	6	28	4	15	17	7	9	11	14	24	21	15	16	31	9	21	27	23	20	31
VTEC/STEC infection	Notification										3	3	6	7	12	48	64	67	76	73	104	89
Yersiniosis	Notification													330	488	546	503	396	429	476	439	420

J. PREVALENCE OF ANTIMICROBIAL RESISTANCE, 1991-2003

Pathogen	Antimicrobial	Percent resistance[a] (number tested)				
		1991-1993	1994-1996	1997-1999	2000-2002	2003
S. aureus[b]	methicillin	0.6 (42839)	2.8 (58283)	4.9 (136356)	7.2 (251448)	7.5 (62782)
	erythromycin	6.8 (40425)	8.0 (54870)	10.8 (134350)	12.0 (221394)	12.2 (60633)
	co-trimoxazole	1.1 (27469)	0.8 (32926)	0.6 (91391)	1.2 (149166)	2.2 (42028)
	mupirocin	NA[c]	10.1 (9291)	18.2 (37173)	20.0 (91555)	17.5 (14032)
Methicillin-resistant *S. aureus*[d]	erythromycin	58.2 (701)	31.5 (2249)	26.2 (1303)	40.0 (1409)	43.5 (513)
	co-trimoxazole	24.8 (701)	8.6 (2249)	1.8 (1303)	6.7 (1409)	9.4 (513)
	mupirocin	2.0 (701)	6.4 (2244)	6.0 (1303)	8.5 (1409)	9.8 (513)
	rifampicin	13.0 (701)	0.3 (2249)	0.8 (1303)	0.7 (1409)	0.8 (513)
S. pneumoniae, non-invasive disease[b]	penicillin[e]	0.8 (3720)	9.5 (7076)	19.0 (10976)	22.8 (12047)	27.6 (2912)
	erythromycin	1.3 (3554)	8.3 (6832)	14.5 (11212)	18.6 (14404)	20.6 (5118)
	tetracycline	1.7 (3376)	10.5 (5019)	11.2 (5993)	15.4 (9476)	18.9 (2761)
S. pneumoniae, invasive disease[f]	penicillin[e]	1.4 (694)	3.4 (989)	15.0 (1182)	15.3 (1493)	16.4 (523)
	erythromycin	1.9 (694)	2.6 (989)	4.1 (853)	7.3 (1492)	9.4 (523)
	cefotaxime[e]	0.1 (694)	1.8 (989)	7.3 (1182)	6.1 (1493)	12.1 (523)
Enterococcus spp[b]	amoxicillin[g]	2.3 (2573)	1.5 (7373)	2.4 (17548)	3.0 (22566)	3.2 (8391)
	vancomycin	0 (148)	0.2 (1141)	0.5 (4752)	0.3 (7505)	0.03 (3671)
E. coli, urinary isolates[b]	amoxicillin[g]	56.2 (29394)	55.9(48706)	56.0(138712)	54.4 (194799)	51.8 (38706)
	co-amoxiclav	6.9 (27249)	10.6(42666)	12.2(136326)	9.6 (194950)	9.4 (44848)
	trimethoprim	18.8 (29340)	19.6(48098)	22.6(111710)	22.3 (207837)	22.2 (46823)
	nitrofurantoin	2.2 (28331)	1.6 (48123)	1.7 (124362)	1.5 (206149)	1.5 (46970)
	fluoroquinolone	0.2 (7014)	0.5 (40032)	0.6 (118917)	1.6 (201382)	3.1 (45217)
E. coli, non-urinary isolates[b]	co-amoxiclav	18.3 (2318)	22.8 (7358)	21.8 (15948)	17.5 (11508)	15.4 (3337)
	cefuroxime	2.3 (1158)	3.2 (6309)	4.5 (6893)	4.2 (6576)	3.6 (2568)
	gentamicin	0.5 (3200)	0.8 (10352)	0.9 (13789)	2.4 (10392)	2.4 (3318)
	fluoroquinolone	0.1 (728)	0.5 (4717)	0.8 (10800)	2.4 (8821)	3.2 (2356)
P. aeruginosa[b]	gentamicin	5.8 (5918)	12.5 (9556)	9.5 (20542)	10.5 (25561)	6.4 (8881)
	tobramycin	3.1 (2535)	3.9 (6757)	2.8 (11033)	3.6 (10421)	3.7 (3100)
	ceftazidime	6.6 (1006)	5.0 (4832)	5.2 (11147)	3.9 (13253)	3.6 (6260)
	fluoroquinolone	8.4 (1652)	8.8 (8123)	9.9 (16551)	9.3 (22869)	7.5 (8902)
H. influenzae, non-invasive disease[b]	amoxicillin[g]	8.4 (4131)	12.0(12244)	19.3 (18852)	21.9 (28476)	23.4 (6407)
	co-amoxiclav	1.1 (1136)	1.1 (9839)	0.6 (15040)	0.8 (16333)	0.8 (5760)
	co-trimoxazole	11.4 (1581)	11.9 (6605)	14.7 (13964)	17.3 (22443)	19.2 (7868)
	tetracycline	1.7 (2082)	1.0 (7810)	1.5 (13007)	1.2 (15633)	0.7 (4876)
H. influenzae, invasive disease[f]	amoxicillin[g]	13.2 (478)	21.8 (179)	11.5 (122)	19.2 (125)	31.4 (70)
	co-amoxiclav	0.2 (478)	3.4 (179)	1.6 (122)	1.6 (125)	5.7 (70)
	cefuroxime	0.8 (478)	3.4 (179)	4.9 (122)	0.8 (125)	5.7 (70)
N. meningitidis, invasive disease[f]	penicillin[h]	2.1 (291)	3.9 (659)	7.9 (431)	7.5 (796)	7.8 (243)
	rifampicin	0.3 (291)	0 (659)	0 (431)	0 (796)	0.4 (243)
N. gonorrhoeae[b,i]	penicillin	16.4 (85)	11.6 (879)	10.4 (1437)	7.1 (2782)	5.1 (1426)
	fluoroquinolone	0 (85)	0.7 (864)	1.8 (1437)	6.3 (2349)	8.1 (994)
M. tuberculosis[b]	isoniazid	NA	4.6 (438)	8.2 (757)	8.5 (811)	9.9 (322)
	rifampicin	NA	0.7 (438)	1.3 (757)	0.7 (811)	0.6 (322)
	MDR[j]	NA	0.7 (438)	0.9 (757)	0.5 (811)	0.6 (322)

[a] intermediate resistance not included in resistant category unless otherwise stated (refer footnotes e and h 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] reduced susceptibility (MIC 0.12-0. 5 mg/L)
[i] data from northern North Island only up until 2000, thereafter national data used
[j] multidrug resistant (i.e., resistant to at least isoniazid and rifampicin)

REFERENCES

1. Thacker, S.B. and R.L. Berkelman, *Public Health Surveillance in the United States.* Epidemiol Rev, 1988. **10**: p. 164.
2. Thacker, S.B., *Historical Development*, in *Principles and Practice of Public Health Surveillance*, S.M. Teutsch and R.E. Churchill, Editors. 2000, Oxford University Press: New York. p. 1.
3. Baker, M. and A. Roberts, *A new schedule of notifiable diseases for New Zealand.* NZ Public Health Report, 1996. **3**(5): p. 33-37.
4. Paul, C., et al., *Enhanced surveillance of HIV infections in New Zealand, 1996-1998.* New Zealand Medical Journal, 2000. **113**: p. 390.
5. Jennings, L., et al., *Influenza surveillance and immunisation in New Zealand, 1990-1999.* NZ Public Health Report, 2001. **8**(2): p. 9-12.
6. Dow, N., N. Dickson, and B. Taylor, *The New Zealand Paediatric Surveillance Unit: Establishment and first year of operation.* NZ Public Health Report, 1999. **6**(6): p. 41-44.
7. Boxall, N.S. and J. Ortega-Benito, *Annual Summary of Outbreaks in New Zealand 2002*. 2003, Institute of Environmental Science & Research Ltd (ESR): Wellington, NZ.
8. Pirie, R., M. Eglinton, and G. MacBride-Stewart, *EpiSurv Data Quality Report 2003*. 2004, Institute of Environmental Science and Research Ltd (ESR): Wellington, NZ.
9. Sneyd, E. and M. Baker, *Infectious Diseases in New Zealand: 2002 annual surveillance summary*. 2003, Institute of Environmental Science & Research Ltd (ESR): Wellington, NZ.
10. *HIV/AIDS in New Zealand - 2004*. AIDS - New Zealand 2005 Feb [accessed 16 Mar 2005]; Available from: www.moh.govt.nz.
11. *Risk behaviour categories for AIDs and HIV, 2004*. 2005, AIDS Epidemiology Group.
12. *Anthrax: What You Need To Know*. 2005 [accessed 16 Mar 2005]; Available from: http://www.bt.cdc.gov/agent/anthrax/needtoknow.asp.
13. ProMED-mail. *Exotic Mosquitoes - New Zealand*. ProMED-mail 2001 [accessed Mar 16 2005]; Archive Number 20040203.0403. Available from: http://www.promedmail.org.
14. *Disease-risk mosquito at new site*, in *New Zealand Herald*. 29 Jan 2004: Auckland.
15. *Infections among Injecting Drug Users in the UK*. 2004 [accessed Mar 16 2005]; Available from: http://www.hpa.org.uk/hpa/news/articles/press_releases/2004/041013_idu.htm.
16. McDowell, R., J. Fowles, and D. Phillips, *Chemical Injury Surveillance For New Zealand, 2003*. 2004, Institute of Environmental Science & Research Ltd (ESR).
17. Pollock, M., *Eighth Annual Report. Creutzfeldt-Jacob Disease Surveillance in New Zealand. 1 January 2004 – 31 December 2004*. 2005, NZ Creutzfeldt-Jacob Registry, University of Otago: Dunedin.
18. ProMED-mail. *Dengue/DHF update 2004 (07)*. ProMED-mail 2004 [accessed 16 Mar 2005]; Archive Number 20040308.0655. Available from: http://www.promedmail.org.
19. ProMED-mail. *Diphtheria - Russia (South Urals)*. ProMED-mail 2004 [accessed 16 Mar 2005]; Archive Number 20040320.0778. Available from: http://www.promedmail.org.
20. Steffen, R. and B.A. Conne, *Vaccines in Travel Health: From Risk Assessment to Priorities.* J Travel Med, 2005. **12**(1): p. 26-35.
21. Thornley, C., et al., *Changing epidemiology of human leptospirosis in New Zealand.* Epidemiology and Infection, 2002. **128**: p. 29-36.
22. *Immunisation Handbook 2002*. 2002, Wellington, NZ: Ministry of Health.
23. Martin, D., L. Lopez, and R. McDowell, *The Epidemiology of Meningococcal Disease in New Zealand, 2004. Report to the Ministry of Health (unpublished report)*. 2005.
24. ProMED-mail. *Plague Identified in Rodents in West Texas, Panhandle*. ProMED-mail 2004 [accessed 16 Mar 2005]; Archive Number: 20040506.1241. Available from: http://www.promedmail.org.
25. Gage, K. *Health Information for International Travel 2003-2004: Plague*. The Yellow Book [accessed 16 Mar 2005]; Available from: http://www.cdc.gov/travel/diseases/plague.htm.
26. *First case of primary amoebic meningoencephalitis in over 20 years.* NZ Public Health Report, 2000. **7**(9/10): p. 43.
27. *Update: investigation of rabies infection in organ donor and transplant recipients - Alabama, Arkansas, Oklahoma and Texas, 2004.* MMWR Morb Mortal Wkly Rep, 2004. **53**: p. 615-616.
28. ProMED-mail. *SARS - worldwide (29): China, cases*. ProMED-mail 2004 [accessed 16 Mar 2005]; Archive Number 20040522.1373. Available from: http://www.promedmail.org.
29. Hahné, S., et al., *Ongoing outbreak of tetanus in injecting drug users in the UK.* Eurosurveillance Weekly, 2004. **8**(4).
30. ProMED-mail. *Trichinellosis, Denmark ex Romania (02)*. ProMED-mail 2004 [accessed 16 Mar 2005]; Archive Number 20040405.0932. Available from: http://www.promedmail.org.