Emerging infectious diseases

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Abstract

Over the last two decades, there has been the emergence of previously unknown infectious diseases and the re-emergence of diseases thought to be in decline. This is the result of social, economic, political and ecological factors, and the interactions of organisms, hosts and the environment. In recent years, Australia has experienced a number of significant outbreaks of emerging diseases such as bat paramyxovirus and *Escherichia coli* O111, and there has been a resurgence of vaccine-preventable diseases. Australia is implementing a National Communicable Diseases Surveillance Strategy in response to this public health threat. The Strategy, similar initiatives in other countries, and enhanced international cooperation will contribute to the global response to emerging diseases. *Comm Dis Intell* 1997;21:89-93.

Introduction

Scientific discoveries in the 19th century resulted in an understanding of the natural history of infectious diseases and the development of control measures such as water treatment, vector control and rodent reduction. These measures, combined with the introduction of mass immunisation programs and the discovery of antibiotics meant that by the middle of the 20th century, it appeared that the battle to control infectious diseases was nearly won[1]. The eradication of smallpox in 1979 exemplified the triumph of science and concerted global action over infectious diseases.

However, in the last couple of decades diseases such as malaria, tuberculosis and vaccine-preventable diseases have increased dramatically in incidence in a number of parts of the world[2,3]. Previously unknown infectious diseases such as Ebola haemorrhagic fever, human immunodeficiency virus (HIV) and hepatitis C have emerged (Table 1)[1,4]. Antimicrobial resistance has become a global problem[5]. Infectious diseases remain a leading cause of death worldwide and their management constitutes a major global challenge for public health. The World Health Organization has recognised the urgency of the situation and the need for global action. *Emerging Infectious Diseases - Global Alert, Global Response* has been chosen as the theme for World Health Day 1997 in the hope this will be a catalyst for countries to review their disease surveillance and control strategies.

The concept of emergence

Emerging infectious diseases can be defined as infections that have newly appeared in the population, or have existed but are rapidly increasing in incidence or geographic range[6]. This may be due to the introduction of a new agent or to a change in the environment that has provided an epidemiological bridge[7]. The recognition of an existing agent that has gone undetected is also included in this category.

Dr Stephen Morse states that emergence can be viewed as a two-step process: (1) the introduction of the agent into a new host population;

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(2) followed by establishment and further dissemination within the new host population. Most emerging infections originate in one location and then disseminate[6].

Re-emergence is the term used to describe the reappearance of a known disease after a decline in incidence. It is often the result of deficiencies in public health measures due to complacency, changes in human behaviour that increase person-to-person transmission of an infectious agent, or changes in the way humans interact with their environment[4].

Factors associated with emergence

A 1992 Institute of Medicine report classified emerging infections according to factors associated with their emergence (Table 2). An understanding of the matrix of social, economical, political and ecological factors and the complex interactions between microbes, hosts and the environment is important for the development of successful control strategies[8, 9, 10].

The changing distribution of populations from rural areas to urban communities and the growth in populations has been accompanied by overcrowding, poor hygiene, inadequate sanitation and insufficient water supplies in many parts of the world. These conditions have meant increased opportunities for person-to-person transmission of disease and the proliferation of vectors such as *Aedes aegypti* and rodents.

In many countries the proportion of the population who are immunosuppressed has increased, leading to an increase in opportunistic infections. The incidence of HIV, increasing use of immunosuppressive agents and an aging population have all contributed to this phenomenon.

Human behaviour has an important role in the emergence and re-emergence of disease. Sexual practices and intravenous drug use have facilitated the spread of HIV and hepatitis C. Complacency about vaccine- preventable diseases has led to decreasing immunisation rates in some countries and subsequently to major outbreaks of these diseases. The increased utilisation of child-care centres has been associated with outbreaks of childhood illnesses such as gastroenteritis and respiratory infections.

Throughout the centuries the movements of armies, exploration and colonisation have been associated with the introduction of disease and disease vectors. Today the high volume and speed of international travel increase this potential for introduction of disease. In recent years the vector *Aedes albopictus* has been imported from Asia to parts of Africa, the United States of America and Brazil. Importation of cholera via ship bilge water has been postulated as the cause of the first epidemic of cholera in South America this century[7]. The recent spectre of the introduction of a viral haemorrhagic fever or pneumonic plague via international air travel has resulted in the development of contingency plans in many countries. Each year Australia has over 600 cases of imported malaria and these must be followed up closely in malaria receptive areas to prevent local transmission. The first recognised case of airport malaria in Australia has recently been reported[11].

Ecological change may result in people coming into contact with a natural reservoir or host for an infection that is hitherto unfamiliar but usually already present. The Institute of Medicine report states that the significance of zoonoses in emergent diseases cannot be overstated. Argentine haemorrhagic fever emerged as a result of an agricultural practice; Marburg, Hantaan, and Rift Valley fever viruses are of zoonotic origin. Yellow fever, of which the natural cycle of infection takes place in a jungle habitat and involves monkeys and mosquitoes, is probably an ancient zoonosis[7].

Technological advances have both facilitated the spread of infectious diseases and provided tools to fight

Table 1. Examples of pathogenic microbes and infectious diseases recognised since 1973[1]

Year	Organism	Type	Disease
1973	Rotavirus	Virus	Major outbreaks of infantile diarrhoea
1974	Barmah Forest virus	Virus	Outbreaks of polyarthritis
1976	*Cryptosporidium parvum*	Parasite	Acute and chronic diarrhoea
1977	Ebola virus	Virus	Ebola haemorrhagic fever
1977	Hantaan virus	Virus	Haemorrhagic fever with renal syndrome
1977	*Campylobacter jejuni*	Bacteria	Enteric pathogen
1982	Escherichia coli O157:H7	Bacteria	Haemorrhagic colitis; haemolytic uraemic syndrome
1982	Borrelia burgdorferi	Bacteria	Lyme disease
1983	Human immunodeficiency virus	Virus	Acquired immunodeficiency syndrome
1983	*Helicobacter pylori*	Bacteria	Peptic ulcer disease
1988	Hepatitis E	Virus	Enterically transmitted hepatitis
1989	Hepatitis C	Virus	Parenterally transmitted hepatitis
1992	Vibrio cholerae O139	Bacteria	New strain associated with epidemic cholera
1994	Bat paramyxovirus	Virus	Respiratory and neurological disease
1996	Australian bat lyssavirus	Virus	Neurological disease

1. Adapted from references 1, 4, 17 and 21.

Table 2. Factors contributing to emergence of infectious diseases[1]

Factor	Specific example	Example of disease
Population demographics	Rural/urban distribution; proportion immunosuppressed	Spread of dengue; increased reports of opportunistic infections
Human behaviour	Sexual practices; intravenous drug use; complacency regarding immunisation; use of child-care	Spread of HIV, hepatitis C; increased incidence of vaccine-preventable diseases; outbreaks of enteric illness
International travel and commerce	Worldwide movement of goods and people; air travel	Dissemination of mosquito vectors; dissemination of O139 cholera
Ecological change	Agriculture; dams; changes in water ecosystems; deforestation/reforestation; flood/drought; famine; climate change	Rift Valley fever (dams); Argentine haemorrhagic fever (agriculture); hantavirus pulmonary syndrome, United States of America (weather)
Technology and industry	Globalisation of food supply; changes in food processing; widespread use of antibiotics;	Outbreak of *E. coli* O111, South Australia; antibiotic resistance
Microbial adaption and change	Microbial evolution	Antibiotic resistance; pesticide resistance; antigenic drift in the influenza virus
Breakdown in public health measures	Reduction in prevention programs; inadequate sanitation and vector control measures	Resurgence of tuberculosis in the United States of America; diphtheria in the former Soviet Union

1. Adapted from references 6 and 7.

them. Food production and processing changes have contributed to the increase in food-borne diseases seen in many developed countries. Centralisation of food production, together with modern transportation, has meant that any contamination of manufactured foods can potentially infect many people over a wide area, even internationally[12]. The blood-borne diseases, HIV and hepatitis C, were spread via blood products prior to the development of tests and the introduction of effective screening algorithms. However, technological advances have also led to the development of new diagnostic tests, antimicrobial agents and vaccines. An excellent example is the dramatic decrease in the incidence of *Haemophilus influenzae* type b infection since the introduction of vaccines in Australia in 1992 and 1993 [13].

Microbial pathogens have the ability to evolve and adapt very quickly. Their evolutionary mechanisms allow them to adapt to new host cells or host species, produce new toxins, bypass or suppress inflammatory and immune responses and develop resistance to drugs and antibodies[7]. Antimicrobial resistance has increased worldwide (Table 3). It is associated with both the use of antimicrobials in humans and the use of these agents in veterinary medicine, animal husbandry, agriculture and aquaculture[5]. Vector resistance to pesticides is also increasing[7]. Judicious use of antimicrobial agents and the development of new agents will be necessary for the implementation of successful control strategies.

The Australian perspective

In the last few years Australia has experienced a number of significant outbreaks of emerging infectious diseases, and there has been a resurgence of vaccine-preventable diseases, with widespread outbreaks of measles, pertussis and rubella[13]. There is still a lot to be learnt about some of these events but they illustrate the need for a cooperative national and international approach to infectious disease control.

The first reported outbreak of Japanese encephalitis (JE) in Australia occurred in the Torres Strait in 1995[14]. This was 3,000 kilometres from the nearest known focus of JE in Bali, Indonesia. There were three human cases associated with the outbreak, and two deaths. The local

Table 3. Global emergence of antimicrobial-resistant organisms[1]

Organism	Antimicrobial	Country[2]	Year
Streptococcus pneumoniae	Penicillin	Australia	1967
Neisseria gonorrhoeae	Penicillin	Phillippines	1976
Streptococcus pneumoniae	Multiresistant	South Africa	1977
Klebsiella pneumoniae	Cefotaxime	Germany	1983
Enterococcus faecium	Vancomycin	France	1988
Neisseria meningitidis	Penicillin	Spain	1988
Salmonella Typhi	Multiresistant	India	1990
Mycobacterium tuberculosis	Multiresistant	USA	1990
Shigella dysenteriae	Mulitresistant	Burundi	1992
Vibrio cholerae	Multiresistant	Ecuador	1993

1. Adapted from reference 5.
2. Location does not necessarily represent the first identified resistant isolate of a particular species.

community were vaccinated prior to the 1996 wet season when seroconversions in sentinel pigs on one of the islands confirmed a reappearance of the virus[15]. The potential for the virus to spread to mainland Australia is of considerable public health concern. Details about the route and origin of the JE virus emergence are not understood, although local environmental factors appeared to facilitate the outbreak[16]. However, a surveillance and control strategy needs to be developed in the event of further incursions.

Of considerable interest to both the scientific community and the general public has been the discovery of two novel viruses in fruit bats and humans, bat paramyxovirus and Australian bat lyssavirus[17,18,19,20]. There is still much to be learnt about these viruses, the factors that precipitated their emergence, potential hosts, geographic range, transmissibility and their incidence in fruit and insectivorous bats. A prevention strategy for human lyssavirus infection has been implemented and will be updated as more information becomes available[21].

The first reported outbreak of *E. coli* O111 occurred in South Australia in 1995. Eighteen children required dialysis and one child died. Food manufacturing processes were implicated in the outbreak[22]. In 1996 there was a multi-State outbreak of *Salmonella* Mbandaka associated with a specific brand of peanut butter[23]. The product was distributed to most States and Territories and the investigation required close cooperation between Federal and State and Territory agencies and the private sector.

The links between the recent outbreaks of Ross River fever and Barmah Forest virus infection and factors such as ecological change and population demographics would be interesting to explore. These diseases have affected significant numbers of people and further research is needed to determine their long term morbidity.

Components of an effective response to emerging infectious diseases

An effective response to the challenge of emerging infectious diseases must be based on an improved understanding of the complex relationships between microbes and the multiplicity of factors that influence emergence[9]. This must be conducted within a supportive and responsive public health infrastructure. Coordination and cooperation across sectors and international boundaries is essential.

The fundamental components of a response include:

- disease surveillance systems capable of early detection of emerging infectious diseases;
- a capacity to investigate outbreaks in the field and manage problems as they occur;
- a laboratory system capable of providing diagnostic and reference tests to assist in the detection and management of infectious diseases;
- applied research capacity to assist in the identification of new pathogens, the development of diagnostic tools and potential treatments;
- fostering of links between human health and animal health practitioners to ensure effective management of zoonoses;
- research into factors associated with emergence including behavioural factors;
- training programs for epidemiologists, researchers, laboratory workers and clinicians;
- effective communication strategies.

Australia has developed a National Communicable Diseases Surveillance Strategy to provide a national framework to monitor infectious diseases and plan and prioritise interventions. The Strategy was developed under the auspices of the Chief Health Officers of Australia and is currently being implemented. As part of this process, public health officials and infectious disease experts from around Australia recently attended an outbreak response workshop at the Australian Institute of Emergency Management.

In recent years, the United States of America, Canada, the Pan American Health Organization and the European Union have also reviewed their communicable disease surveillance and response capacity and are implementing changes.

Conclusions

The experiences of the last decades have shown that public health complacency about infectious diseases was misplaced. The National Communicable Diseases Surveillance Stretegy, similar initiatives in other countries, and the enhanced international cooperation fostered by events such as World Health Day, should assist us in facing the challenges of the future.

References

1. Satcher D. Emerging infections: getting ahead of the curve. *Emerg Infect Dis* 1995;1:1-5.
2. World Health Organization tuberculosis notification update, 1994. *Comm Dis Intell* 1996;20:164-167.
3. World malaria situation in 1993. *Comm Dis Intell* 1996;20:88-90.
4. Report of the National Science and Technology Council Committee on International Science, Engineering, and Technology Working Group on Emerging and Re-emerging Infectious Diseases. Global microbial threats in the 1990s. Washington: National Science and Technology Council, 1994.
5. Trenover F, Hughes J. The challenges of emerging infectious diseases: development and spread of multiple-resistant bacterial pathogens. *JAMA* 1996;275:300-304.
6. Morse S. Factors in the emergence of infectious diseases. *Emerg Infect Dis* 1995;1:7-15.
7. Lederberg J, Shope RE, Oaks SC, editors. Emerging infections: microbial threats to health in the United States. Washington: National Academy Press; 1992.
8. Kilbourne E. The emergence of 'emerging diseases': a lesson in holistic epidemiology. *Mt Sinai J Med* 1996;63:159-166.
9. Krause R. Dynamics of emergence. *J Infect Dis* 1994;170:265-271.
10. Epstein P. Emerging diseases and ecosystem instability: new threats to public health. *Am J Public Health* 1995;85:168-172.
11. Jenkin G, Ritchie S, Hanna J, Brown, G. Airport malaria in Cairns. *Med J Aus*t 1997;166:307-308.
12. Desmarchelier P. Foodborne disease: emerging problems and solutions. *Med J Aust* 1996;165:668-671.
13. Herceg A, Oliver G, Myint H *et al.* Annual report of the National Notifiable Diseases Surveillance

System, 1995. *Comm Dis Intell* 1996;20:440-464.

14. Hanna J, Ritchie S, Loewenthal M. Probable Japanese encephalitis acquired in the Torres Strait. *Comm Dis Intell* 1995;19:206-208
15. Shield J, Hanna J, Phillips D. Reappearance of the Japanese encephalitis virus in the Torres Strait. *Comm Dis Intell* 1996;20:191.
16. Hanna J, Ritchie S, Phillip D *et al.* An outbreak of Japanese encephalitis in the Torres Strait, Australia, 1995. *Med J Aust* 1996;165:256-260.
17. Selvey L, Sheridan J. Outbreak of severe respiratory disease in humans and horses due to a previously unrecognised paramyxovirus. *Comm Dis Intell* 1994;18:499.
18. Halpin K, Young P, Field H. Identification of likely natural hosts for equine morbillivirus. *Comm Dis Intell* 1996;20:476.
19. Crerar S, Longbottom H, Rooney J, Thornber P. Human health aspects of possible lyssavirus in a black flying fox. *Comm Dis Intell* 1996;20:325.
20. Allworth A, Murray K, Morgan J. A human case of encephalitis due to a lyssavirus recently identified in fruit bats. *Comm Dis Intell* 1996;20:504.
21. Lyssavirus Expert Working Group. Prevention of human lyssavirus infection. *Comm Dis Intell* 1996;20:505.
22. Cameron S, Walker C, Beers M *et al.* Enterohaemorrhagic *Escherichia coli* outbreak in South Australia associated with the consumption of mettwurst. *Comm Dis Intell* 1995;19:70-71.
23. Ng S, Rouch G, Dedman R *et al.* Human salmonellosis and peanut butter. *Comm Dis Intell* 1996;20:326.

World Health Day 1997

Emerging Infectious Diseases - Global Alert, Global Response
7 April 1997

The World Health Organization (WHO) has chosen the theme *Emerging Infectious Diseases - Global Alert, Global Response* for World Health Day 1997. This is in recognition of the global public health impact of these diseases.

WHO has recently established the Division of Emerging and Other Communicable Diseases Surveillance and Control in Geneva to assist the global effort to control emerging diseases. In addition WHO is strengthening global monitoring systems which serve as part of the overall detection system for such diseases. If diseases are detected early enough, potential epidemics and pandemics can be prevented or minimised. The global systems include WHO collaborating centres, antimicrobial resistance monitoring and the International Health Regulations.

WHO is also working in countries to strengthen national disease detection and response through improved surveillance and training in epidemic preparedness. WHO also works to ensure a coordinated global response to infectious diseases of international importance.

It is hoped that the 1997 World Health Day will encourage countries to look at the problems of emerging infectious diseases and concentrate on enhancing or rebuilding the foundations of infectious disease surveillance and control.

Information on WHO is available on the World Wide Web at www.who.ch.

Notice to readers

The 2nd National Tuberculosis Conference

On 17 and 18 November 1997 the Public Health Association of Australia Inc. will be hosting The 2nd National Tuberculosis Conference in Sydney, New South Wales.

The conference will focus on Australia's regional role in tuberculosis control. It will also provide an opportunity for workers in the field to consider and discuss the latest developments in epidemiology, diagnostic techniques, vaccine development, infection control and multi-drug resistant tuberculosis.

For further information please contact the PHA Conference Secretariat:

GPO Box 2204, Canberra ACT 2601
Phone: (06) 285 2373
Fax: (06) 282 5438
Email: pha@peg.pegasus.oz.au

Communicable Diseases Surveillance

The decline of Haemophilus influenzae type b

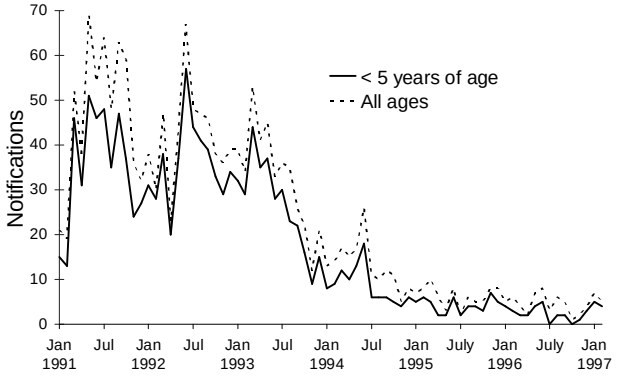
Haemophilus influenzae type b (Hib) has been a major cause of morbidity and mortality, particularly in children under the age of 5 years. Prior to the introduction of vaccination against Hib, the disease caused more than 500 cases per year in Australia.

The most common manifestation of Hib disease (around 60% of all cases) was meningitis. Most cases of Hib meningitis occurred in children under the age of 18 months, and the case fatality rate was 5%. Up to 15% of survivors had neurological sequelae such as deafness and intellectual impairment. Hib also caused virtually all cases of epiglottitis in children. Less common manifestations of Hib include cellulitis, septic arthritis and pneumonia. Around 80% of all cases were in children under the age of 5 years.

The first conjugate vaccine against Hib disease was introduced in Australia in 1992. In 1993 several other vaccines became available, and vaccination for all children under the age of 5 years was included on the National Health and Medical Research Council Standard Vaccination Schedule. Vaccines for children under the age of 5 years were funded by the Commonwealth Government.

Since 1993 there has been a dramatic decline in the number of Hib cases occurring in Australia (Figure 1). In children under the age of 5 years the number of cases decreased by 94% between 1992 and 1996, and for all ages the decrease was 89%. In 1996 the number of cases continued to decrease, with no cases in children under the age of 5 years reported for July or October, and only 28 cases reported for this age group for the whole year. Thirteen cases have been reported with onset dates in 1997, with 9 under the age of 5 years. Improved vaccination rates have the potential to eliminate Hib disease completely in Australia.

Figure 1. *Haemophilus influenzae* type b notifications, 1991 to 1997, by month of onset and age group



National Notifiable Diseases Surveillance System

The NNDSS is conducted under the auspices of the Communicable Diseases Network Australia New Zealand. The system coordinates the national surveillance of more than 40 communicable diseases or disease groups endorsed by the National Health and Medical Research Council (NHMRC). Notifications of these diseases are made to State and Territory health authorities under the provisions of their respective public health legislations. De-identified core unit data are supplied fortnightly for collation, analysis and dissemination. For further information, see CDI 1997;21:5.

Reporting period 5 March to 18 March 1997.

There were 2,677 notifications received for this two-week period (Tables 1, 2 and 3). The number of reports for selected diseases have been compared with average data for this period in the previous three years (Figure 2).

The number of hepatitis A infection notifications received this period has dropped substantially, with 97 reports received. The outbreak that occurred in several States associated with the consumption of oysters from Wallis Lake, New South Wales seems to be declining.

The number of pertussis notifications continues to be high, with 328 reports received for this period (Figure 3). The majority of notifications were received from Victoria (112) and South Australia (85). Seventy and 50 cases were reported for the 5 - 9 and 10 - 14 years age groups respectively. The male:female ratio was 0.9:1.

Five hundred and six reports of Ross River virus infection were received this period. The majority of notifications were reported from Queensland (190) and Victoria (105). Fifty-one per cent of reports were for the 25 - 44 years age range.

There were 370 notifications of salmonellosis reported this period and this was higher than the corresponding historical data for the previous three years (Figure 2). The majority of notifications were from Queensland (138) and New South Wales (67). The 0 - 4 years age group comprised 39% of notifications.

Table 1. Notifications of diseases preventable by vaccines recommended by the NHMRC for routine childhood immunisation, received by State and Territory health authorities in the period 5 March to 18 March 1997

Disease[1,2]	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	This period 1997	This period 1996	Year to date 1997	Year to date 1996
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0
Haemophilus influenzae type B	0	0	0	1	0	0	0	0	1	0	16	13
Measles	2	0	0	7	2	0	4	2	17	18	101	119
Mumps	0	1	2	NN	0	0	3	2	8	7	32	30
Pertussis	7	60	0	24	85	18	112	22	328	127	1979	808
Rubella	1	4	0	23	2	0	12	4	46	112	402	761
Tetanus	0	0	0	0	0	0	0	0	0	0	2	1

NN Not Notifiable.

1. No notifications of poliomyelitis have been reported since 1986.
2. Totals comprise data from all States and Territories. Cumulative figures are subject to retrospective revision, so there may be discrepancies between the number of new notifications and the increment in the cumulative figure from the previous period.

Table 2. Notifications of other diseases received by State and Territory health authorities in the period 5 March to 18 March 1997

Disease[1,2]	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	This period 1997	This period 1996	Year to date 1997	Year to date 1996
Arbovirus Infection (NEC)[3,4]	0	0	4	0	0	0	7	1	12	8	75	35
Barmah Forest virus infection	0	8	0	26	0	0	3	-	37	59	169	205
Campylobacteriosis[5]	4	-	21	125	83	10	39	47	329	418	2581	2703
Chlamydial infection (NEC)[6]	3	NN	20	130	0	8	70	66	297	286	1717	1538
Dengue	0	1	1	0	0	-	0	0	2	0	95	14
Donovanosis	0	NN	0	0	NN	0	0	0	0	3	2	17
Gonococcal infection[7]	0	3	42	29	0	0	12	39	125	161	807	781
Hepatitis A	3	39	5	24	3	0	20	3	97	102	1056	612
Hepatitis B incident	0	2	0	0	0	0	1	5	8	6	57	54
Hepatitis C incident	0	0	0	-	0	0	-	-	0	0	1	10
Hepatitis C unspecified	15	NN	4	122	NN	2	33	17	193	380	1664	2011
Hepatitis (NEC)	0	0	0	0	0	0	0	NN	0	1	5	7
Legionellosis	0	0	0	0	0	0	7	0	7	8	34	44
Leptospirosis	0	0	0	0	0	0	1	0	1	8	28	53
Listeriosis	0	1	0	0	1	0	0	2	4	1	22	11
Malaria	0	4	1	16	0	0	3	0	24	49	145	166
Meningococcal infection	0	2	0	1	2	1	3	1	10	11	61	58
Ornithosis	0	NN	0	0	0	0	1	0	1	0	19	17
Q Fever	0	7	0	8	0	0	1	0	16	17	117	101
Ross River virus infection	1	67	22	190	67	1	105	53	506	1246	2122	3163
Salmonellosis (NEC)	5	67	21	138	28	7	54	50	370	269	1812	1644
Shigellosis[5]	0	-	20	4	4	0	3	8	39	27	229	163
Syphilis	0	8	10	15	0	0	0	1	34	48	246	285
Tuberculosis	1	4	0	2	0	0	10	4	21	55	189	258
Typhoid[8]	0	0	0	0	0	0	0	0	0	9	15	38
Yersiniosis (NEC)[5]	0	-	0	8	5	0	0	0	13	14	84	78

1. For HIV and AIDS see Tables 4 and 5. For rarely notified diseases, see Table 3
2. Totals comprise data from all States and Territories. Cumulative figures are subject to retrospective revision so there may be discrepancies between the number of new notifications and the increment in the cumulative figure from the previous period.
3. Tas: includes Ross River virus and dengue.
4. NT, Vic and WA: includes Barmah Forest virus.
5. NSW: only as 'foodborne disease' or 'gastroenteritis in an institution'.
6. WA: genital only.
7. NT, Qld, SA and Vic: includes gonococcal neonatal ophthalmia.
8. NSW, Vic: includes paratyphoid.

NN Not Notifiable.

NEC Not Elsewhere Classified.

- Elsewhere Classified.

Table 3. Notifications of rare[1] diseases received by State and Territory health authorities in the period 5 March to 18 March 1997

Disease[2]	Total this period	Reporting States or Territories	Total notifications 1997
Brucellosis	1	Qld	11
Chancroid			1
Cholera			1
Hydatid infection	2	Qld, WA	5
Leprosy	1	WA	4

1. Fewer than 60 cases of each of these diseases were notified each year during the period 1988 to 1995.
2. No notifications have been received during 1997 for the following rare diseases: botulism, lymphogranuloma venereum, plague, rabies, yellow fever or other viral haemorrhagic fevers.

Figure 3. Pertussis notifications, 1994 to 1997, by month of onset

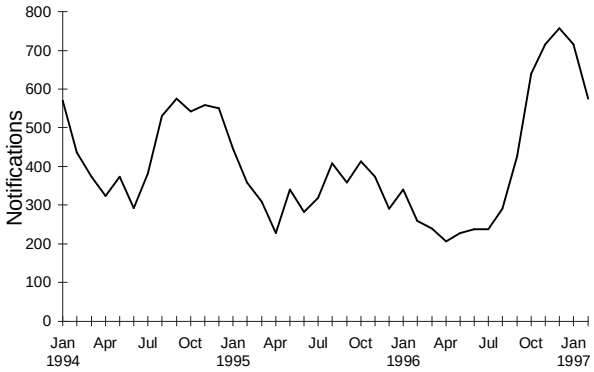
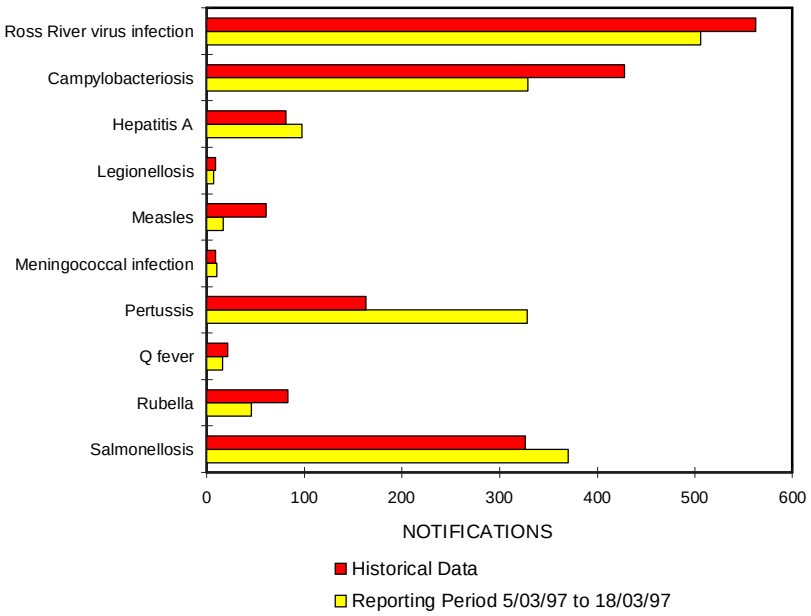


Figure 2. Selected National Notifiable Diseases Surveillance System reports, and historical data[1]



1. The historical data are the averages of the number of notifications in 9 previous 2-week reporting periods: the corresponding periods of the last 3 years and the periods immediately preceding and following those.

HIV and AIDS Surveillance

National surveillance for HIV disease is coordinated by the National Centre in HIV Epidemiology and Clinical Research (NCHECR), in collaboration with State and Territory health authorities and the Commonwealth of Australia. Cases of HIV infection are notified to the National HIV Database on the first occasion of diagnosis in Australia, by either the diagnosing laboratory (ACT, New South Wales, Tasmania, Victoria) or by a combination of laboratory and doctor sources (Northern Territory, Queensland, South Australia, Western Australia). Cases of AIDS are notified through the State and Territory health authorities to the National AIDS Registry. Diagnoses of both HIV infection and AIDS are notified with the person's date of birth and name code, to minimise duplicate notifications while maintaining confidentiality.

Tabulations of diagnoses of HIV infection and AIDS are based on data available three months after the end of the reporting interval indicated, to allow for reporting delay and to incorporate newly available information. More detailed information on diagnoses of HIV infection and AIDS is published in the quarterly Australian HIV Surveillance Report, available from the National Centre in HIV Epidemiology and Clinical Research, 376 Victoria Street, Darlinghurst NSW 2010. Telephone: (02) 332 4648 Facsimile: (02) 332 1837.

HIV and AIDS diagnoses and deaths following AIDS reported for November 1996 and cumulative diagnoses, as reported to 28 February 1997, are included in this issue of *CDI* (Tables 4 and 5).

Table 4. New diagnoses of HIV infection, new diagnoses of AIDS and deaths following AIDS occurring in the period 1 to 30 November 1996, by sex and State or Territory of diagnosis

		ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Totals for Australia: This period 1996	This period 1995	Year to date 1996	Year to date 1995
HIV diagnoses	Female	0	2	0	0	0	0	0	1	3	1	58	64
	Male	0	29	1	11	5	0	18	4	68	70	661	658
	Sex not reported	0	1	0	0	0	0	0	0	1	0	5	8
	Total[1]	0	32	1	11	5	0	18	5	72	71	725	732
AIDS diagnoses	Female	0	1	0	0	0	0	0	0	1	2	18	27
	Male	0	7	0	1	1	0	0	2	11	59	344	602
	Total[1]	0	8	0	1	1	0	0	2	12	61	362	630
AIDS deaths	Female	0	0	0	0	0	0	0	0	0	6	14	35
	Male	0	6	1	0	0	0	1	2	10	45	318	494
	Total[1]	0	6	1	0	0	0	1	2	10	51	332	530

1. Persons whose sex was reported as transsexual are included in the totals.

Table 5. Cumulative diagnoses of HIV infection, AIDS and deaths following AIDS since the introduction of HIV antibody testing to 30 November 1996, by sex and State or Territory

		ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Australia
HIV diagnoses	Female	15	531	3	102	45	4	169	78	947
	Male	174	10237	85	1679	592	76	3466	794	17103
	Sex not reported	0	2049	0	0	0	0	42	0	2091
	Total[1]	189	12831	88	1786	637	80	3686	875	20172
AIDS diagnoses	Female	7	143	0	30	18	2	48	18	266
	Male	76	4001	26	670	285	32	1373	303	6766
	Total[1]	83	4154	26	702	303	34	1428	323	7053
AIDS deaths	Female	2	106	0	24	13	2	37	11	195
	Male	50	2849	22	470	197	21	1087	224	4920
	Total[1]	52	2961	22	496	210	23	1130	236	5130

1. Persons whose sex was reported as transsexual are included in the totals.

Australian Sentinel Practice Research Network

The Australian Sentinel Practice Research Network (ASPREN) comprises 99 sentinel general practitioners from throughout the country. Approximately 9,000 consultations are recorded each week for 12 conditions. Of these, CDI reports the consultation rates for chickenpox, HIV testing (doctor initiated), HIV testing (patient initiated), influenza, measles, pertussis, Ross River virus infection, rubella and gastroenteritis. For further information including case definitions see CDI 1997;21:6.

Data for weeks 8, 9 and 10 ending 23 February, 2 March and 9 March 1997 respectively are included in this issue of *CDI* (Table 6). The consultation rate for chickenpox during the last two weeks was lower than it has been in previous weeks. The consultation rate for influenza-like illness remained low. The consultation rate for gastroenteritis did not change significantly. The rates for measles, rubella and pertussis remained low, while that for Ross River virus infection showed a slight increase during the most recent week compared with the previous five weeks. Rates for HIV testing, both doctor-initiated and patient-initiated, were similar to previous weeks.

Table 6. Australian Sentinel Practice Research Network reports, weeks 8, 9 and 10, 1997

	Week 8, to 23 February 1997		*Week 9, to 2 March 1997*		*Week 10, to 9 March 1997*	
Condition	Reports	Rate per 1,000 encounters	Reports	Rate per 1,000 encounters	Reports	Rate per 1,000 encounters
Chickenpox	20	2.7	13	2.1	12	1.8
Gastroenteritis	82	11.0	86	13.6	73	10.8
HIV testing (doctor initiated)	5	0.7	12	1.9	7	1.0
HIV testing (patient initiated)	16	2.2	18	2.8	18	2.7
Influenza	18	2.4	5	0.8	15	2.2
Measles	0	0.0	1	0.2	0	0.0
Pertussis	3	0.4	3	0.5	2	0.3
Ross River virus infection	2	0.3	2	0.3	4	0.6
Rubella	5	0.7	4	0.6	6	0.9

Figure 4. Epstein-Barr virus infection laboratory reports, 1994 to 1997, by month of specimen collection

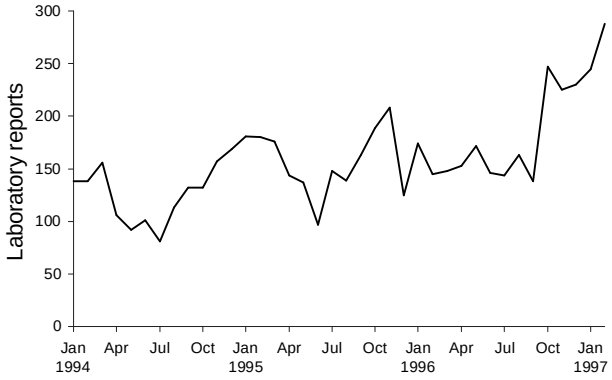
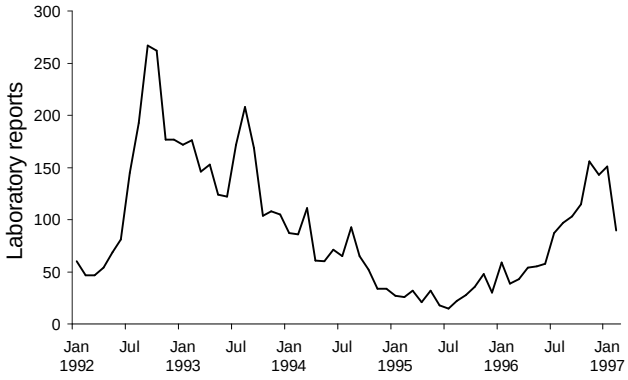


Figure 5. *Mycoplasma pneumoniae* laboratory reports, 1992 to 1997, by month of specimen collection



LabVISE

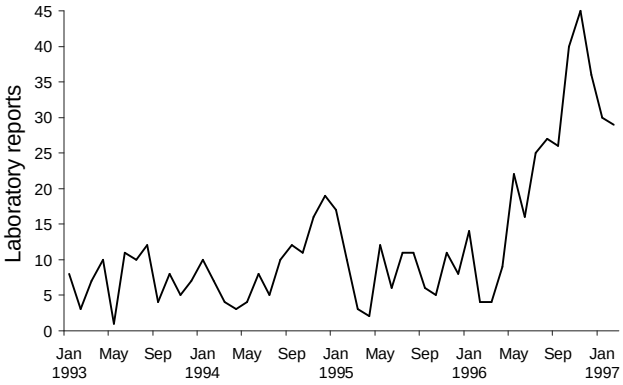
The Virology and Serology Laboratory Reporting Scheme, LabVISE, is a sentinel reporting scheme. Twenty-one laboratories contribute data on the laboratory identification of viruses and other organisms. Data are collated and published in Communicable Diseases Intelligence each fortnight. These data should be interpreted with caution as the number and type of reports received is subject to a number of biases. For further information, see CDI 1997;21:8-9.

There were 1,046 reports received in the *CDI* Virology and Serology Reporting Scheme this period (Tables 7 and 8).

Epstein-Barr virus infection was reported for 116 patients this period; diagnosis was by IgM detection (115) and total antibody (1). The number of reports received with specimen collection dates in February is the highest on record (Figure 4).

There were 41 reports of *Mycoplasma pneumoniae* received in this period. The male:female ratio was 1:1.7 with most reports (22) for children aged 5 - 14 years. The total number of reports appears to be declining after peaking over the November to January period (Figure 5).

Figure 6. Parvovirus laboratory reports, 1993 to 1997, by month of specimen collection



Laboratory reports of parvovirus remain relatively high although they appear to be declining (Figure 6). There were 16 reports received this period, all but one were from Victoria. Diagnosis was by IgM detection (15) and nucleic acid detection (1).

Table 7. Virology and serology laboratory reports by State or Territory[1] for the reporting period 27 February to 12 March 1997, historical data[2], and total reports for the year

	State or Territory[1]								Total this fortnight	Historical data [2]	Total reported in *CDI* in 1997
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA			
Measles, mumps, rubella											
Measles virus			1		2				3	7.3	20
Rubella virus				4	12		1	1	18	21.3	327
Hepatitis viruses											
Hepatitis A virus		7	9	1	3		1	4	25	22.0	315
Hepatitis D virus				2					2	0.2	9
Arboviruses											
Ross River virus			16	82	60		16	19	193	271.5	703
Barmah Forest virus			5	2				6	13	16.0	85
Dengue type 2				7					7	0.0	36
Dengue not typed				5					5	1.0	33
Adenoviruses											
Adenovirus type 1					4				4	0.2	12
Adenovirus type 2					5				5	1.2	18
Adenovirus type 4							1		1	0.0	3
Adenovirus not typed/pending		1		11	11		6	5	34	36.3	286

Table 7. Virology and serology laboratory reports by State or Territory[1] for the reporting period 27 February to 12 March 1997, historical data[2], and total reports for the year, continued

	State or Territory[1]								Total this fortnight	Historical data[2]	Total reported in *CDI* in 1997
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA			
Herpes viruses											
Cytomegalovirus		3		9	6		8	14	40	65.2	362
Varicella-zoster virus				8	19		8		35	46.8	464
Epstein-Barr virus		9	6	6	62		12	21	116	78.3	971
Other DNA viruses											
Papovavirus group							1		1	0.2	2
Parvovirus					1		15		16	4.2	133
Picornavirus family											
Rhinovirus (all types)		2		14	9		3		28	20.5	195
Enterovirus not typed/pending				17					17	38.0	200
Ortho/paramyxoviruses											
Influenza A virus		1		12				1	14	6.3	132
Influenza B virus		1		1	2		2	1	7	1.8	82
Influenza virus - typing pending					15				15	0.0	74
Parainfluenza virus type 1				1					1	3.8	30
Parainfluenza virus type 2				1	1		2	1	5	2.5	16
Parainfluenza virus type 3		2		2	3		3		10	16.2	313
Parainfluenza virus typing pending					38				38	1.2	92
Respiratory syncytial virus		19			1		3	8	31	26.5	223
Other RNA viruses											
Rotavirus					12	4	5	17	38	15.2	275
Astrovirus							1		1	0.0	3
Small virus (like) particle							1		1	0.5	1
Other											
Chlamydia trachomatis not typed	1	12	38	30	39		8	53	181	109.3	1,473
Chlamydia psittaci							2		2	4.7	31
Mycoplasma pneumoniae		13		7	5		9	7	41	15.7	557
Coxiella burnetii (Q fever)		4		6			1		11	5.2	84
Rickettsia australis				1					1	0.5	9
Bordetella pertussis		1	1	7			76		85	35.2	772
Leptospira hardjo				1					1	0.2	7
TOTAL	1	75	76	237	310	4	185	158	1,046	874.8	8,348

1. State or Territory of postcode, if reported, otherwise State or Territory of reporting laboratory.
2. The historical data are the averages of the numbers of reports in 6 previous 2 week reporting periods: the corresponding periods of the last 2 years and the periods immediately preceding and following those.

Table 8. Virology and serology laboratory reports by contributing laboratories for the reporting period 27 February to 12 March 1997

State or Territory	Laboratory	Reports
New South Wales	Institute of Clinical Pathology & Medical Research, Westmead	28
	Royal Alexandra Hospital for Children, Camperdown	5
	Royal Prince Alfred Hospital, Camperdown	8
	South West Area Pathology Service, Liverpool	31
Queensland	Queensland Medical Laboratory, West End	54
	State Health Laboratory, Brisbane	186
South Australia	Institute of Medical and Veterinary Science, Adelaide	310
Tasmania	Northern Tasmanian Pathology Service, Launceston	4
Victoria	Microbiological Diagnostic Unit, University of Melbourne	8
	Monash Medical Centre, Melbourne	10
	Royal Children's Hospital, Melbourne	105
	Victorian Infectious Diseases Reference Laboratory, Fairfield	62
Western Australia	Princess Margaret Hospital, Perth	49
	Western Diagnostic Pathology	186
TOTAL		1046

Overseas briefs

Source: World Health Organization (WHO)

Monkeypox, Zaire

Increased activity of monkeypox was reported in Katako-Kombe health zone, Sankuru sub-region, Kasai Orental during 1996. Médecins Sans Frontières investigated those cases which could be traced in September 1996. Samples were obtained from 11 cases, all of which were subsequently confirmed as monkeypox by the WHO Collaborating Centre for Smallpox and other Poxvirus Infections at the Centers for Disease Control and Prevention (CDC) in Atlanta, United States of America. Concern about the unusually high number of cases and the apparent increased transmission between human cases triggered a multidisciplinary investigation in February 1997. A team was set up composed of national experts, local WHO staff, and staff from CDC and Epiet, Paris, France. The report of the investigations will be published simultaneously in forthcoming issues of the *Weekly Epidemiological Record*, the *Morbidity and Mortality Weekly Report* and the *Eurosurveillance Bulletin*.

Lassa fever, Sierra Leone

Lassa fever continues to occur in Kenema District following the outbreak during 1996. Between November 1996 and 11 March 1997 a total of 239 cases were admitted to hospital in Kenema District and 39 (16%) died. Of these cases, 140 with 23 deaths had occurred since 1 January 1997. A WHO mission investigated the situation in Kenema District from 14 to 21 February to redirect control activities, review existing surveillance activities, identify future needs and prepare a plan of action. The cooperation of non-government organisations based in the area has resulted in improved communications and rapid patient referral. Clinical care has also improved which has reduced the case fatality rate among hospitalised cases. However, ribavirin for treatment of cases is in short supply and WHO is seeking sources for additional supplies.

Meningitis

Ghana. The number of cases of meningitis more than doubled in Ghana since 22 February, with 3,757 cases and 411 deaths (case fatality rate 11%) by 13 March. The total population in districts where the weekly attack rate exceeds 5 cases per 100,000 population is 1,771,539 and the population under 30 years of age in these districts is approximately 1,240, 000.

The Ministry of Health is basing its control strategy on health education, case management and vaccination activities. A task force has been created to coordinate reporting and the support to the affected regions. External support has been obtained to purchase vaccine, injection material and drugs.

The latest cumulative figures from other countries in west Africa are: **Burkina Faso** 10,000 (1,200 deaths, case fatality rate 12%), **Chad** 38 cases (6 deaths, 16%), **Gambia** 151 cases (17 deaths, 11%), **Mali** 1,549 cases (160 deaths, 10%) and **Togo** 2,380 cases (329 deaths, 14%).

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