Rabies prophylaxis in Western Australia: the impact of Australian bat lyssavirus

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Abstract

Post-exposure rabies prophylaxis is provided by the Health Department of Western Australia to persons exposed to potentially rabid animals overseas. In addition, since the discovery of Australian bat lyssavirus in 1996, rabies prophylaxis has been provided to persons exposed or likely to be exposed to Australian bats. This article reviews the provision of rabies prophylaxis in Western Australia from July 1991 to December 1997. During this period, 101 persons received rabies post-exposure prophylaxis in Western Australia. Exposure occurred outside Australia in 91% of cases. Dogs were the most frequent source of exposure (62.4%) and Thailand was the most frequent country of exposure (34.7%). However in 1997, Australian bat exposures accounted for 37.5% of all post-exposure prophylaxis. No pre-exposure prophylaxis was given until 1997, when eight persons received rabies vaccine to protect them against possible infection with Australian bat lyssavirus. Until the epidemiology of Australian bat lyssavirus is more clearly defined, the Lyssavirus Expert Group has recommended rabies prophylaxis be given for all Australian bat exposures. In the context of Australian bat lyssavirus as an emerging infectious disease it is important to have baseline data on rabies prophylaxis to allow for future assessment of its impact.

Introduction

Rabies is one of the oldest and most feared human infections. Once symptoms appear, rabies has the highest case fatality rate, virtually 100%, of any known human infection. Illness can be prevented by the use of rabies vaccines and human rabies immunoglobulin (HRIG) when

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Contents

exposures are recognised and treatment initiated before the onset of symptoms.[1] The routine schedule for rabies post-exposure prophylaxis (PEP) recommended by the Commonwealth Department of Health and Family Services is a single dose of 20 IU per kg of body mass of HRIG administered immediately, together with 1.0 ml of the vaccine, and then four further doses of the vaccine administered on days 3,7,14 and 28.[2]

Although Australia is described by the World Health Organization (WHO) as being rabies free,[2] many West Australians travel to rabies endemic countries each year where contact with a rabid animal may occur. In addition, the discovery of Australian bat lyssavirus (ABL), which is closely related to classical rabies virus,[3] in a New South Wales fruit bat in 1996[4] and the subsequent fatal case of ABL infection in a Queensland bat carer later that year,[5] poses a new threat of rabies-like illness to Australians. Laboratory studies suggest that rabies vaccine and rabies immunoglobulin protect against infection with ABL.[6] A multi-disciplinary Lyssavirus Expert Group was established by the National Centre for Disease Control, which developed protocols for pre- and post-exposure prophylaxis,[7] and guidelines for Australian bat surveillance.[3] The recommendations for the provision of rabies PEP for persons bitten or scratched by any bat in Australia and pre-exposure prophylaxis for persons who have ongoing contact with bats are similar to those for travellers exposed to rabies virus overseas (see Box page 153).

This article aims to provide baseline data on the administration of rabies prophylaxis in Western Australia prior to, and since, the recommendation that it be used to protect against ABL infection.

Methods

All rabies vaccines and HRIG treatments are provided by the Central Immunisation Clinic of the Health Department of Western Australia. Since the beginning of July 1991, information about each request for prophylaxis has been collected. For PEP this includes the requesting doctor's name and place of practice, the patient's name, address, date of birth, date of bite, type of animal, anatomical location of the bite, country of exposure, and amount of vaccine and HRIG dispensed. Where rabies vaccines were for pre-exposure prophylaxis, only data regarding the date of distribution, the person's name, date of birth, nationality and place of employment were collected.

The average annual costs for the provision of HRIG and post-exposure rabies vaccine were calculated using total costs for each of these divided by the number of years and persons treated.

Data were analysed using Epi Info 6.04.[8]

Results

From 1 July , 1991 to 31 December, 1997 there were 101 persons considered by a medical practitioner to require rabies PEP (Figure 1). Ninety-two (91%) of the exposures occurred overseas. The nine Australian exposures comprised one person who was bitten by a quarantined tiger in Perth and eight persons who were either bitten or scratched by a bat. The latter eight were treated after November 1996. A further eight persons were considered to require rabies pre-exposure prophylaxis to protect them against ABL.

Dog bites accounted for the greatest proportion of exposures, followed by monkeys and then bats (Table 1).

Thailand accounted for the greatest number of exposures followed by Vietnam, Indonesia, the Philippines, and Australia (Table 2). The frequency of countries of exposure for 1997 varied markedly compared with previous years with the greatest number of exposures occurring in Australia (37.5%), followed by Thailand (31.3%) and then the Philippines (12.5%).

The median age of persons given PEP was 34 years, and the modal age group was 20 to 29 year olds (Figure 2).

No other information, such as the length of stay overseas, whether the animal was domestic or wild or whether the animal was subsequently tested for rabies, was routinely collected. For Australian bat exposures, no data where available to indicate in which State or Territory the person was exposed.

Preliminary analysis of the 1998 data indicate that eight persons had been provided with rabies PEP between January and May 1998. All of these were for Australian bat exposures.

In 54 (54%) cases rabies PEP had commenced in the country/state/territory of exposure and the remaining doses of vaccine were distributed to the patient's doctor for completion of the course. This leaves 47 cases (47%) who had PEP commenced in Western Australia. A total of 33 doses of HRIG and 372 doses of vaccine were distributed, with a median of four doses of vaccine issued for each case.

The average annual cost during the period for HRIG was $2,587 ($510 per person receiving HRIG) and $3,568 ($230 per person treated) for rabies vaccine.

Discussion

The demand for rabies prophylaxis in Western Australia has risen marginally since the discovery of ABL. Fewer persons reported overseas exposures to potentially rabid animals in 1997 than in the preceding two years. However, in 1997 over one third of all PEP was provided to persons exposed to Australian bats, increasing to 100% of all PEP

Contents, ***continued***

Figure 1. Number of persons receiving rabies prophylaxis in Western Australia, July 1991 to December 1997, by reason and year

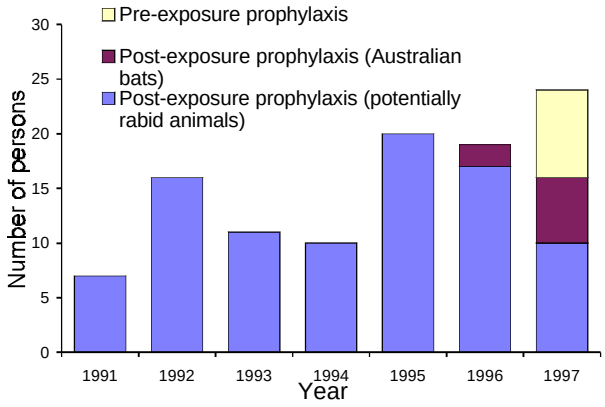
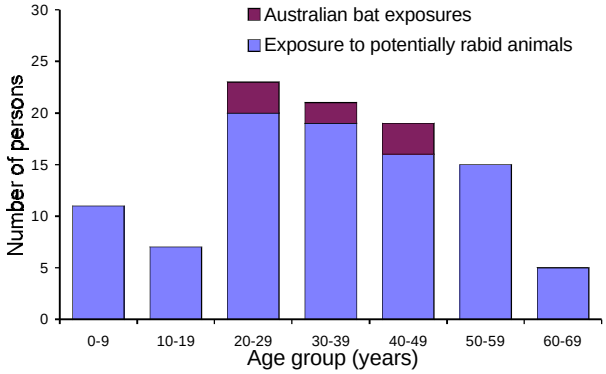


Figure 2. Number of persons receiving rabies post-exposure prophylaxis in Western Australia, July 1991 to December 1997, by reason and age group



provided to date in 1998. In addition, all pre-exposure prophylaxis was provided to persons who have ongoing contact with Australian bats. These data suggest that the use of rabies prophylaxis for protection against ABL infection may continue to rise, at least until the epidemiology of ABL is more clearly defined.

ABL has been reported in bats in the Northern Territory, Queensland, New South Wales and Victoria, but not in Western Australia, South Australia, or Tasmania.[3] Much of the bat sampling so far has been opportunistic and has focused on eastern Australia, not allowing firm conclusions to be drawn about the distribution of ABL.[3] It is likely that West Australians are at a much lower risk of bat exposures than persons living in eastern Australia as a result of lower bat numbers in populated areas of Western Australia (John Edwards, Chief Veterinary Officer, Agriculture Western Australia, personal communication).

Table 1. Percentage of bites causing potential rabies or Australian bat lyssavirus exposure from different animals

	Bites	
Animal	**Number**	**Percentage**
Dog	63	62.4
Monkey	18	17.8
Bat*	8	7.9
Cat	6	5.9
Rat	2	2.0
Camel	1	1.0
Goat	1	1.0
Lion cub	1	1.0
Tiger*	1	1.0
Total	101	100.0

* Australian exposures

Table 2. Percentage of bites causing potential rabies or Australian bat lyssavirus exposure from each country, July 1991 to December 1997.

	Bites	
Country	**Number**	**Percentage**
Thailand	35	34.7
Vietnam	11	10.9
Indonesia	10	9.9
Philippines	10	9.9
Australia	9	8.9
India	6	5.9
Africa	5	5.0
Turkey	3	3.0
Hong Kong	2	2.0
Armenia	1	1.0
Azerbaijan	1	1.0
Borneo	1	1.0
Brazil	1	1.0
China	1	1.0
Jordan	1	1.0
Oman	1	1.0
Singapore	1	1.0
Sri Lanka	1	1.0
USA	1	1.0
Total	101	100.0

There have been two cases of classic rabies reported in Australia.[9,10] In both these cases the diagnosis was only made post-mortem. Even in the United Statesof America where rabies is endemic, rabies was not diagnosed until post-mortem examination in two of four cases detected in 1997.[11,12] Since the discovery of ABL, retrospective reviews of hospital discharge data were undertaken in Queensland, the Northern Territory and Victoria[13-15] and a similar study is underway in New South Wales.[16] No cases of lyssavirus infection have been detected retrospectively to date from these studies. However, the Northern Territory and Victorian studies did identify cases of unexplained fatal encephalitis for which an infectious agent was not excluded as the cause. These findings suggest that rabies-like illness could go undetected in Australia. This, together with the uncertainty about the distribution of ABL and the confirmation of a human case, highlights the need for consideration of Lyssavirus infection in cases of encephalitis of unknown aetiology.

For West Australians, most potential rabies exposures occur in South East Asia, usually from dog or monkey bites. These data may underestimate the number of West Australians who receive, or who should receive, rabies PEP, as they do not include persons who either completed their PEP overseas/interstate or never received any.

With only just over 12 months of West Australian data post-ABL discovery it is difficult to accurately predict the future impact on rabies prophylaxis demand. It is likely that ABL has had a greater effect on rabies prophylaxis demand in States and Territories in which there is a greater probability of bat exposure, and where ABL has been identified in local bats.

All Australians who routinely handle bats should receive rabies immunisation and all bat exposures involving bites or scratches should be given PEP. However, use of the vaccine for local indications must not take precedence over overseas exposures.

Continued surveillance of both bat populations and unexplained serious neurological disease in humans will increase our understanding of the epidemiology of ABL. This understanding is vital for the development and maintenance of appropriate treatment and vaccination recommendations for persons exposed to Australian bats. In the context of this emerging infectious disease it is important to have baseline data on HRIG and rabies vaccine usage to allow for the future assessment of the impact of ABL in Australia.

Acknowledgments

The assistance of Mr Trevor Thorpe in collecting the data is gratefully acknowledged. Thanks to Dr Stephen Lambert and Dr John Edwards for reviewing this paper and to Dr Christine Roberts for reviewing earlier drafts. The Master of Applied Epidemiology program is funded by the Commonwealth Department of Health and Family Services.

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Rabies and Australian bat lyssavirus: recommendations for pre- and post-exposure vaccination[1,2,3,4]

Travellers in rabies endemic countries are advised to avoid feeding and petting animals, particularly feral animals. Because bats can carry a number of serious diseases, persons are strongly discouraged from attempting to handle bats, particularly within Australia, but also overseas.

Pre-exposure vaccination

Recommended for those occupationally or recreationally at risk of being bitten or scratched by bats in Australia or potentially rabid animals overseas:

- Veterinarians, veterinary assistants, veterinary laboratory staff
- Wildlife officers
- Bat handlers, banders, carers, researchers
- Managers of display and research colonies of bats
- Members of indigenous communities who may catch bats for consumption
- Power line workers who frequently remove bats from power lines
- Cavers

Total of 3 doses (1ml each) rabies vaccine - given **intramuscularly*** on days 0, 7 and 28.

Post-exposure management

Recommended where there is a potential risk of transmission of rabies or Australian bat lyssavirus following exposure to a possibly infected animal.

1. Promptly clean the wound by washing thoroughly with soap and water.

2. Immediately administer 20 IU/kg rabies immunoglobulin (HRIG, 150 IU/ml) to those who have not been previously immunised or who do not have an adequate level of rabies immunity. Where the site permits, infiltrate half the dose into the wound and give the remainder **intramuscularly.*** Do NOT administer into adipose tissue. Do not give if post-exposure vaccination commenced more than 7 days previously.

3. Immediately commence post-exposure course of vaccination:

For persons who have not had pre-exposure prophylaxis: a total of 5 doses of rabies vaccine (1ml each) - given **intramuscularly*** on days 0, 3, 7, 14 and 28.

For persons who have had previous rabies vaccination: a total of 2 doses of rabies vaccine (1ml each) - given **intramuscularly*** on days 0 and 3.

Doctors can obtain rabies vaccine and immunoglobulin for post-exposure management through their State or Territory health authority. Neither HRIG nor vaccine should be withheld when there are clear indications for use. However, as HRIG is in short supply globally, each case should be considered individually and doctors should obtain the advice of their State or Territory health authority when assessing the need for vaccination. For exposures to Australian bats, the bat should be submitted for testing wherever possible and, where continuing exposure to bats is unlikely, post-exposure management may be modified in the event of a negative test result.

*** Intramuscularly** = the deltoid area (adults) or anterolateral thigh (young children)

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Lyssavirus Expert Group

The Lyssavirus Expert Group met on 15 June 1998 to consider a number of issues relating to Australian bat lyssavirus (ABL). Characterisation of strains of ABL by the Australian Animal Health Laboratory (AAHL) has shown that they are closely related to classic serotype 1 rabies virus, but form a separate genotype. Diagnostic capability for ABL is improving and a list of available testing facilities is to be prepared by AAHL.

The Communicable Disease Network Australia New Zealand (CDNANZ) will be asked to consider extending the rabies case definition to include ABL as a notifiable disease.

Current recommendations for pre- and post-exposure vaccination with rabies vaccine were reviewed and intradermal vaccination and recommendations for booster doses for persons at continuing risk of exposure were discussed. The meeting also considered the circumstances in which it may be safe to delay administering prophylaxis following a bat exposure, pending the result of testing of the bat.

When finalised, the recommendations from the meeting will be submitted to CDNANZ for endorsement. Once endorsed, they will be published in *Communicable Diseases Intelligence* and on the *Communicable Diseases - Australia* website.

A case of human rabies in Russia (Siberia)

A 51 year old male was attacked by a wolf in Norilsk district of the Krasnoyarsk region (near 69 degrees N) at the end of March 1998. He sustained multiple wounds to the head, face, shin and hand. He was given rabies vaccine (Rabivac, Vnukovo-32) on days 0, 3, and 7. However, the patient declined further immunisation. Rabies immunoglobulin was unavailable because the territory has been considered free of rabies for many years.

The patient became ill on day 25 following the incident, and died six days later with classical rabies symptoms. The virus was isolated from the patient's brain using mouse inoculation and confirmed as arctic rabies by immunofluorescence.

No human rabies cases have been registered in the Krasnoyarsk region since 1955. Only five cases of animal rabies, in dogs, have been reported in the last two decades: three in 1981, one in 1990 and one in 1994. There are a large number of arctic foxes, known to be the main host of arctic rabies, in the north of the region.

Adapted from a report on ProMED-mail, 30 June1998, by Ivan Kuzmin, Rabies Group, Institute for Natural Foci Infections, Prospekt Mira, 7, Omsk, 644080, Russia.

A case of cholera

The Infectious Diseases Unit, Department of Human Services, Victoria, received notification of a case of cholera in a 41 year old male, in early May. The case developed symptoms on 5 May, three days after returning from Bali. The watery diarrhoea ceased on 8 May without treatment, and the faecal culture was confirmed as *Vibrio cholerae* 01 (Ogawa). There were no contacts identified, and the case received appropriate instructions on disinfecting sheets and towels. The case had eaten his meals at a hotel and consumed only bottled water. On April 29 he ate an ice cream, and later prawns and crayfish from a beach barbeque. The seafood meal was the most likely source of infection.

Editorial note

Cholera, caused by *Vibrio cholerae* serogroups O1 and O139, is one of the diseases reportable to the World Health Organization under the current International Health Regulations. Between 3 and 7 cases of cholera are reported each year. Three cases, including the one reported above, have been notified to the National Notifiable Diseases Surveillance System (NNDSS) to date in 1998.

Apart from one case of laboratory acquired cholera in 1996, all cases reported since the commencement of the NNDSS (1991) have been imported. No cases of serogroup O139 have been reported in Australia. Biotypes have included Ogawa and El Tor. As in the case above, most reported cases have been acquired in Bali. Other places of origin over the past 6 years have included: other areas of Indonesia; Nepal; El Salvador; Kuwait; Thailand; Malaysia; The Philippines; and India.

Cholera vaccination is no longer a requirement for international travel and is generally not recommended for travellers because of the low efficacy of current vaccines. To reduce the risk of cholera and other food and waterborne diseases, travellers to countries where the quality of food and water is not as high as in Australia are advised to take the precautions outlined below.

Advice for travellers

Travellers to countries where the quality of food and water are unknown are advised to take the following precautions:

- Boil water for at least ten minutes or use water purification tablets. Canned or commercially bottled beverages, beer, wine and hot drinks such as tea and coffee are generally safe to drink.
- Freezing does not sterilise water, so avoid ice in drinks, ice-cream and ice blocks.
- Ensure food has been well cooked and not stored at room temperature for long periods.
- Avoid salads, raw or cold seafood including shellfish, unpasteurised milk and milk products.
- Only eat fruit or vegetables that you have peeled yourself.

Legionnaires' disease outbreak

The Infectious Diseases Unit of the Human Services Department, Victoria, has received five notifications of Legionnaires' disease, with onset of symptoms in late June and early July. All cases either lived or worked in the same suburban area, and were due to *Legionella pneumophila sero-group 1.* One death, in an elderly woman, was reported on 30 June. Investigations found two air conditioning cooling towers close to the suburban shopping district were positive for the same *Legionella pneumophila* sero-group. One of these towers tested positive for the same molecular sub-type as that found in sputum specimens from two of the cases, one of the cases had a different molecular sub-type, and no bacterial cultures were available from the other two cases. The towers have since been closed, disinfected and reopened, and the associated organisations have been given written recommendations on further treatment to avoid re-infection.

Although there had been 29 other cases with four deaths in Victoria for the year, earlier cases were sporadic in nature. Due to the proximity in reporting time and location, and the usual low incidence for this time of year, these recent five cases were considered to be a cluster. There are usually about 20 to 40 cases of Legionnaires' disease per year in Victoria.

Salmonellosis outbreak

One hundred and two cases of *Salmonella* Oranienburg infection were notified to the Communicable Disease Control Branch (CDCB), South Australia, from March to June 1998. Food history questionnaires indicated that Italian food, in particular pasta, pizza and gelato featured highly in the food frequency analysis. A case-control study established an association between illness and the consumption of gelato.

Further to the epidemiological evidence, laboratory results identified *Salmonella* Oranienburg in gelato manufactured by a South Australian company. This was also supported by an environmental investigation conducted by the food unit of the South Australian Department of Human Services. Cases notified to the CDCB after the product was recalled had onset dates prior to the recall.

Editorial comment

***Salmonella* Oranienburg in Australia**

Adapted from: National Enteric Pathogens Surveillance Scheme. Know your serovars. NEPSS Human Fourth Quarter Report Vol 2; 1998:10

Background

Samonella Oranienburg was first isolated in 1929 from a child with gastroenteritis, a resident of a Children's Home in Oranienburg near Berlin. The find was first described in Germany in 1930.

The presence of this serovar has been documented in Australia at least since 1950 and has been most commonly isolated in the far north-west of Western Australia from the human populations of the aboriginal communities and the wild animals, particularly the reptiles (lizards, snakes and crocodiles) which form part of their diet. It is also found in water supplies and other native animals in these tropical areas. Between 1950 and 1976 in Western Australia 191 of the 216 human cases notified were from the Pilbara (43) and Kimberley (148) regions.[1,2]

There were 54 cases in Victoria from September to November 1975, with all isolates from persons returning from overseas on two airline flights in September.

Since 1986 the number of cases notified from all states and territories has averaged 61 cases per year and ranged from 37 to 106, the latter recorded in 1989 when elevated case numbers were recorded in New South Wales (Broken Hill and Moree), Western Australia (Perth and Kimberley region) and the Northern Territory where there was an outbreak among visitors to an outback homestead resort near Alice Springs.

The majority of nonhuman isolates since 1990 have been from meat meals, beef meat, raw egg pulp (special survey, Queensland), buffaloes (Northern Territory), reptiles both captive and wild, sewage sludge samples from New South Wales (special survey) and, in low numbers, various companion and farm animals in all States. Isolates of interest prior to 1990 were from imported gum tragacanth (1978), dried yeast (1979, 1980), cinnamon powder (1980) and sesame seeds (1988, ex Mexico).

Situation in 1998

In the first half of 1998 there have been 92 cases notified to the National Enteric Pathogens Surveillance Scheme, 75 of these from South Australia. Initial notifications were from young adults between 20 and 30 years (15), teenagers (11) and children (25, only 3 infants) with a higher proportion of females (65%); there were five males of 30 years and over but no females in this age group.

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Change to the Australian Standard Vaccination Schedule

On 9 July 1998 the National Health and Medical Research Council endorsed a change in the timing of the second dose of measles-mumps-rubella vaccination. This was previously recommended to be given between ages 10-16 years. It is now recommended to be given prior to school entry at age 4-5 years. The first dose should continue to be given at age 12 months.

Change to NHMRC Australian Standard Vaccination Schedule	First MMR dose	Second MMR dose
Old schedule	12 months	10 – 16 years
New schedule	12 months	Prior to school entry at 4 – 5 years

Immunise Australia Program: Measles Control Campaign

The widely publicised Measles Control Campaign vaccinations commenced this week and will run until November 1998. During the Campaign, all primary school age children (5-12 years old) will be offered a one-off free dose of MMR vaccine to ensure that they do not miss out on their second dose because of the recent change in the immunisation schedule (see above).

Vaccination will be provided in school based clinics, but many parents will seek advice from their general practitioners about the Campaign and some may wish their child to be vaccinated by their own health care provider.

As part of the Campaign, parents of children aged 1-4 years who have missed their first dose of MMR have been sent a letter from the Australian Childhood Immunisation Register (ACIR) reminding them that their child's immunisation is overdue. In addition, secondary school principals will remind parents of teenage children (12-18 years old) about the need to ensure that their child has received two doses of MMR vaccine and encourage them to update their child's immunisation with their local general practitioner or health care provider.

General practitioners are encouraged to offer opportunistic vaccination for all recommended vaccine preventable diseases. During the Campaign, general practitioners should:

For primary school children (aged 5 -12 years)

- Encourage parents to have the child vaccinated for MMR through the school-based program

OR

- Offer opportunistic vaccination for MMR

For children aged 1-4 years

- Check immunisation status and offer opportunistic vaccination for MMR if child has missed their first dose.

For secondary school children (aged 12-18 years)

- Check immunisation status and offer opportunistic vaccination for MMR if child has not received two previous doses.

If status is uncertain, it is safe to provide another dose, provided there has been at least a one month interval between doses.

For the duration of the campaign, all immunisation providers should immediately report any serious or unexpected reactions to MMR to the State or Territory Measles contact number listed below.

Australian Capital Territory	(02) 6205 2220
New South Wales	(02) 9845 0726
Northern Territory	(08) 8922 8044
Queensland	(07) 3250 8614
South Australia	(08) 8226 7194
Tasmania	(03) 6233 3775
Victoria	(03) 9637 4136
Western Australia	(08) 9388 4999

Doctors can obtain further information on the Campaign from their local Division of General Practice, or RACGP State faculty. Information can also be obtained from local health authorities or through the *Immunise Australia* website at **http://immunise.health.gov.au**

Moving the second dose of measles-mumps-rubella vaccine to school entry: implications for control of rubella

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Rationale for moving the second dose of measles-mumps-rubella vaccine

Currently, the first dose of measles-mumps-rubella vaccine (MMR1) is given at the age of 12 months, making up to 95% of those vaccinated immune to the measles virus.[1] Children and adolescents receive a second vaccination between the ages of 10-16 years (MMR2). The majority of children who do not respond to a first dose (primary vaccine failure) will respond to a second dose. At least 99% of children who receive two doses of MMR will become immune.[1] In April 1998, The Australian Technical Advisory Group on Immunisation recommended that the MMR2 given at 10-16 years should cease and that the vaccine be brought forward and given prior to school entry. MMR2 will now be given at the same time as acellular DTP and OPV booster vaccinations to children aged 4-5 years. This recommendation has been endorsed by the National Health and Medical Research Council. The principal objective of this schedule change is to improve measles control by strengthening the two-dose MMR strategy and reducing build-up of susceptibles. Currently, MMR coverage in primary school and high school based campaigns is sub optimal and poorly documented. It is hoped that incorporating MMR2 into the Standard Vaccination Schedule prior to school entry will:

- achieve higher measles protection sooner and prevent measles outbreaks in school aged children;
- improve MMR2 coverage by taking advantage of existing strategies to improve immunisation coverage in pre-school children. School entry certificates, the Australian Childhood Immunisation Register (ACIR) recall-reminders, general practice and child care incentives, will now all be applicable to MMR2; and
- improve data regarding MMR2 coverage by administering it at an age at which it can be monitored using the ACIR. Feedback of coverage data to immunisation program managers and providers is also expected to help improve coverage.

Moving MMR2 to preschool age means that all children currently in primary school, and some Year 7 and 8 children, will need to have a second dose of MMR. The Measles Control Campaign, which is being conducted in the second half of this year, will offer MMR vaccination to these children. In addition, by vaccinating a large proportion of the childhood population at once during the Campaign, it should be possible to more rapidly reduce the circulation of measles in the community.[2]

Implications for rubella control

What effect will this schedule change have upon rubella control? The primary objective of rubella immunisation is to prevent congenital rubella syndrome (CRS) by:

- ensuring that women of child-bearing age are immune; and
- reducing the circulation of rubella in the community by vaccinating all children.[3]

Many of the factors that favour moving MMR2 to school entry also apply to rubella control. This schedule change will improve coverage and reduce transmission in school aged children. However, moving the second dose to preschool will lengthen the period between MMR2

Table 1. Notifications of rubella and congenital rubella syndrome in Australia, 1993-1997.

Year	Notifications of rubella to NNDSS[1]	Notifications of congenital rubella to NNDSS[2]	Notifications of congenital rubella to Australian Paediatric Surveillance Unit[3]
1993	3,636	-	4
1994	3,371	3	5
1995	4,589	1	4
1996	2,552	4	5
1997	1,343	0	1

1. National Notifiable Diseases Surveillance System at April 1998.
2. Only NSW and ACT contribute notifications of congenital rubella to NNDSS.
3. Notifications of congenital rubella with a demonstrable clinical defect.

administration and reproductive age. This raises the theoretical concern that rubella titres will be lower in child-bearing women than if they were last boosted in adolescence. It has been demonstrated that rubella titres after MMR1 do wane with time, more so than after natural infection.[4-6] Despite this, booster responses to MMR2 seem to be equivalent whether MMR2 is given at age 6 or 11-13 years.[5]

It is well recognised that single-dose rubella immunisation strategies for children shift susceptibility to older age groups, and paradoxically are capable of increasing congenital rubella syndrome (CRS) rates, especially if coverage is poor.[7] However, seroepidemiogical studies in countries with established two-dose strategies show very low susceptibility amongst women of child-bearing age, whether MMR2 is given at age 6 (Finland) or 11-12 years (Sweden).[8,9] Finland has successfully eliminated congenital rubella syndrome with this strategy, and rubella is now rare in that country.[10] The United States of America has also achieved excellent rubella control using a two-dose strategy with MMR2 given prior to school entry. United States of America notification data suggest that rubella transmission was interrupted altogether in late 1996.[11] Therefore, it appears that concerns about waning immunity following MMR2 are more theoretical than real.

Another consideration, especially when rubella is well controlled, is the risk of adverse events following MMR vaccination. The risk of adverse events following rubella vaccination, including arthropathy and arthritis, is greater amongst adolescents than in children.[12-14] This argues in favour of earlier booster vaccination.

Screening and surveillance

Regardless of the rubella schedule, there will be a continuing need to screen high-risk groups, and conduct surveillance to evaluate the success of the program. Immigrants from countries where rubella immunisation is not routine will remain a group at high risk.[15] Education about immunisation at the time of immigration is likely to be the most practical intervention. Meanwhile, pregnant women should continue to be screened for rubella antibodies in every pregnancy and receive immunisation after delivery if they are not immune.[16] The National Centre for Immunisation Research and Surveillance of Vaccine Preventable Diseases (NCIRS) is establishing a national serosurveillance system similar to the system established in the United Kingdom.[17] This will monitor the age-specific prevalence of rubella susceptibility, and will allow long-term effects of the new two-dose strategy to be monitored. This surveillance system will also provide data for mathematical modelling, thus allowing long-term predictions regarding rubella control.[17] At present the incidence of congenital rubella is low in Australia. The Australian Paediatric Surveillance Unit has documented 19 CRS cases for the years 1993-7, including only one case in 1997.[18] However, consideration should be given to implementing surveillance for abortions performed because of intrauterine rubella infection, a more sensitive indicator than CRS for monitoring the success of a rubella immunisation program.[3]

In summary, the new two-dose schedule offers substantial benefits for rubella control, as well as for measles. So far, theoretical concerns about waning immunity have not materialised as a problem in countries with established two-dose strategies, but ongoing surveillance of coverage and serological immunity is needed to monitor the success of this strategy. It is essential that we ensure high coverage with both doses of MMR; a half hearted program could worsen control of Congenital Rubella Syndrome.

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Administration of measles-mumps-rubella vaccination with other childhood schedule vaccines

Timothy C Heath,[1] *Margaret A Burgess,*[1]*Edward D O'Brien*[2]

The Measles Control Campaign, which is in progress, will offer measles-mumps-rubella (MMR) vaccination to all primary school children in Australia. In addition, MMR vaccination will be promoted for pre-school and secondary school children who are not already up to date with the Standard Vaccination Schedule. During the Campaign, some children will simultaneously require or will have recently received other vaccinations as part of the Schedule. There is clear evidence that MMR can be administered safely and effectively at any time relative to all inactivated vaccines on the Schedule, such as DTP, Hib, and HBV.[1] However, because oral polio (OPV) is a live vaccine, possible interactions between it and MMR deserve further consideration.

The National Health and Medical Research Council (NHMRC) recommends that OPV and MMR may be safely administered at the same time, but if given on separate days the second live vaccine should be deferred for at least four weeks.[2] This precaution is based on theoretical concerns that response to the first vaccine could, via circulating interferon, reduce immunogenicity of the second. However, there is comparatively little data in support of this recommendation,[3] and there are several empirical and pragmatic arguments against it:

- intercurrent febrile illnesses, including viral infections, are no longer considered a contraindication to MMR vaccination;
- OPV viruses replicate in the intestine and induce local immunity that is unlikely to interfere with MMR response; and
- in the context of a MMR catch-up campaign, most OPV doses will be boosters and diminished responses to these are unlikely to be critical.

Deferring vaccination increases the risk of incomplete immunisation. Theoretical concerns regarding reduced immunogenicity in an individual must be weighed against the objective of achieving high coverage. Outbreak reports have shown that many cases of measles might have been prevented if MMR had been co-administered with another vaccine.[5]

For these reasons, and in the absence of contrary evidence, it is recommended both in the United States of America and the United Kingdom that OPV and MMR vaccines can be administered at any time in relation to each other.[6,7] In view of this, the NHMRC guidelines will be reviewed. In the mean time, for the purposes of the Measles Control Campaign we recommend that MMR vaccination should not be deferred because of recent OPV vaccination.

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The NCIRS was established by the National Centre for Disease Control, Commonwealth Department of Health and Family Services. The Centre analyses, interprets, and evaluates national surveillance data on immunisation coverage and vaccine preventable diseases. NCIRS also identifies research priorities, and initiates and coordinates research on immunisation issues and the epidemiology of vaccine preventable diseases in Australia.

Editor's column

This week we are saying goodbye to one of the longstanding members of our editorial team, Dr Graeme Oliver, who is leaving the Department. Graeme has done a great deal of behind the scenes work in reviewing the surveillance data and has been a regular contributor to the surveillance section of *CDI* and to the annual surveillance reports. We will miss him and wish him well for the future. Dr Edward O'Brien, who is already a regular contributor to *CDI* on vaccine preventable diseases, will be broadening his role in the editorial team following Graeme's departure.

In this issue, the article by Torvaldsen and Watson (page 149) reviews data on the provision of rabies prophylaxis in Western Australia between July 1991 and December 1997. It serves as a reminder to readers of the need to provide advice on appropriate prevention measures to travellers to rabies endemic countries and to those who are at risk of exposure to Australian bat lyssavirus (ABL). A useful summary of the current recommendations for pre- and post-exposure management of rabies and ABL is provided (page 153).

CDI tries to provide timely reports on outbreaks of interest to readers, especially where there has been media attention to the outbreak. In this issue we provide information on the recent outbreak of Legionnaires' disease in Victoria and an earlier outbreak of *Salmonella* Oranienburg infection in South Australia (page 155). We have also included a case report of a traveller who returned from Bali with cholera earlier this year, as a reminder to travellers to developing countries of the need to observe standard food and waterborne disease precautions even when staying in well known resorts (page 154).

The National Health and Medical Research Council has recently recommended that the second dose of measles-mumps-rubella vaccine (MMR2), previously given between 10-16 years of age, be brought forward to school entry (page 156). The Measles Control Campaign, which has commenced this week, will ensure that no child will miss out on their MMR2 following the implementation of the new schedule. While enhanced measles control is the primary aim of the Campaign and the new schedule, what will be the effect of the change on rubella control? The article by Heath et al (page 157) provides reassurance that rubella control will also be improved but stresses the continuing need to screen all pregnant women for rubella immunity status. A second article by Heath et al (page 159) provides confirmation that it is safe and efficacious to administer MMR at any time in relation to other childhood vaccine.

Alert readers will have noted a recent reduction in the cumulative number of HIV diagnoses. This has resulted from a review of the HIV database by the National Centre for HIV Epidemiology and Clinical Research which is explained on page 161.

Changes in the reporting of HIV diagnoses in Australia

Adapted from Law M, McDonald A and Menzies R. New numbers on HIV diagnoses in Australia. Australian HIV Surveillance Report 1998;14(2):9-10.

The number of cases of newly diagnosed HIV infection reported to the *National HIV Database* has been recognised as being affected by multiple reporting of individual cases. From April 1996, an estimate of the number of distinct cases of newly diagnosed HIV infection, adjusted for multiple reporting, has routinely been published in the *Australian HIV Surveillance Report*. The number of distinct HIV diagnoses was estimated using a statistical algorithm based on the reported birth date of each case.[1] Multiple reporting of cases of HIV infection was estimated as occurring most frequently in New South Wales.[2] A substantial change in the number of cases of HIV infection diagnosed in New South Wales is now being reported.

Prior to the establishment of national surveillance for cases of newly diagnosed HIV infection, each State and Territory health authority independently developed procedures for monitoring HIV diagnoses. In some health jurisdictions, the full name of people with newly diagnosed HIV infection was sought whereas in other jurisdictions, no identifying information was collected.

From July 1990, cases of newly diagnosed HIV infection were reported nationally with the person's date of birth and sex only.[3] National reporting of cases with name code (based on the first two letters of the family name and the first two letters of the given name) was introduced in January 1993, to facilitate identification and removal of duplicate diagnoses.

Partly because of the limited identifying information originally sought on cases of newly diagnosed HIV infection, and partly due to confidentiality concerns early in the HIV epidemic, HIV diagnoses in New South Wales have included more than 3,500 records without identifying information including name code and date of birth. Because the majority of these cases were newly diagnosed in the mid 1980s, it is likely that these cases have been, or will again be, diagnosed and notified to the *National HIV Database* and not be recognised as duplicate notifications. For these reasons, records of HIV diagnosis in New South Wales without name code and date of birth have been removed from the *National HIV Database.*

The New South Wales Health Department also indicated that a large number of records of HIV diagnosis had not been notified to the *National HIV Database* as they had been reported as previously diagnosed. These records were matched on birth date with records of HIV diagnosis reported to the *National HIV Database* to identify those records with newly available dates of birth or a previously available date of birth and newly available name codes. A total of 1,165 records of HIV diagnosis reported as previously diagnosed have now been added to the *National HIV Database*, including 976 records with a newly available date of birth.

The net effect of these changes to the *National HIV Database* has been to reduce the number of cases of newly diagnosed HIV infection reported by the end of 1997, from 21,080 to 18,674 in Australia as a whole, and from 13,282 to 10,899 in New South Wales. The estimated number of distinct HIV diagnoses has, however, remained broadly unchanged. Prior to the changes being made, 16,870 distinct cases of HIV infection (plausible range 15,940 to 17,810) were estimated as having been diagnosed in Australia compared to 16,030 cases (plausible range 15,620 to 16,440) after the changes had been made. The estimate of the number of distinct HIV diagnoses in New South Wales has been revised from 10,050 cases (range 9,300 to 10,800) to 9,570 cases (range 9,280 to 9,870).

These changes to the *National HIV Database* reduce the uncertainty surrounding the estimate of the number of distinct HIV diagnoses. Furthermore, the newly available information on name code and date of birth allows more complete identification of cases of repeat diagnosis, especially between State and Territory health authorities, leading to an ongoing improvement in monitoring the extent of diagnosed HIV infection in Australia.

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HIV and AIDS diagnoses for the current reporting period are presented on page 169.

Communicable Diseases Surveillance

Highlights

Communicable Diseases Surveillance consists of data from various sources. The National Notifiable Diseases Surveillance System (NNDSS) is conducted under the auspices of the Communicable Diseases Network Australia New Zealand. The *CDI* Virology and Serology Laboratory Reporting Scheme (LabVISE) is a sentinel surveillance scheme. The Australian Sentinel Practice Research Network (ASPREN) is a general practitioner-based sentinel surveillance scheme. In this report, data from the NNDSS are referred to as 'notifications' or 'cases', whereas those from ASPREN are referred to as 'consultations' or 'encounters' while data from the LabVISE scheme are referred to as 'laboratory reports'.

Meningococcal disease

The number of notifications of meningococcal disease has increased again in this reporting period, as is expected at this time of the year (Figure 1). However, the number of notifications for this reporting period is lower than for the corresponding period in 1997, and the total number for the year (184) is 17% lower than for the same period in 1997 (222). This may reflect delays in reporting, a delay in the peak season of activity or a true decrease in the number of cases.

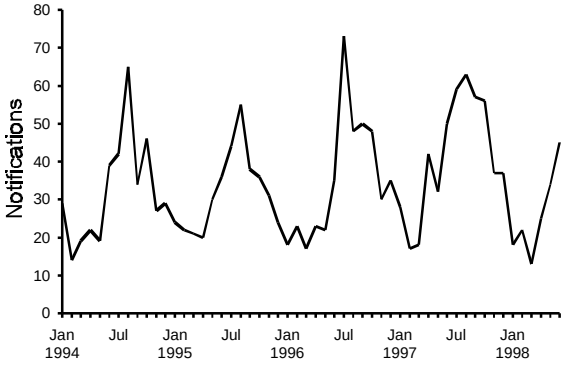
Legionellosis

There have been 25 reports of legionellosis in the current reporting period, compared with 8 reports for the corresponding period in 1997. Of these, 12 were *Legionella longbeachae* infections, 7 were *Legionella pneumophila* infections and in 6 the organism was unknown. Reports of *Legionella longbeachae* were received from New South Wales (2) , Queenslandl (3) and South Australia (7) . Reports of *Legionella pneumophila* were from New South Wales (2), Queensland (1), South Australia (1) and Victoria (3). The Victorian cases form part of the cluster reported on page 155 of this issue.

For the year to 21 July there have been 138 reports of legionellosis with an onset date during 1998. This is higher than reported for the corresponding periods in each year since 1992. The reported organism was *Legionella longbeachae* in 53, *Legionella pneumophila* in 55, 'other' in 1 and unknown in 29.

The geographic distribution of legionellosis was different for the two main organisms. The majority of reports of *Legionella longbeachae* were from South Australia (22) and Queensland (20) with smaller numbers from New South Wales (10) and Victoria (1). *Legionella pneumophila* was predominantly reported from Victoria (32) with smaller numbers from New South Wales (10), South Australia (7) and Queensland (6).

Figure 1. Notifications of meningococcal disease, 1994 to 1998, by month of onset



Males predominated for both organisms. The male:female ratio was 3.4:1 for *Legionella longbeachae* and 4:1 for *Legionella pneumophila*. The age range for *Legionella longbeachae* was 22 years to 85 years and 71% of males and 58% of females were aged 50 years or older. For *Legionella longbeachae*, the age range was 28 years to 76 years and 80% of cases for both males and females were aged 50 years or older.

Respiratory viruses

Reports of parainfluenza virus type 1 have declined in recent weeks after peaking in April (Figure 2). The number of laboratory reports of parainfluenza virus type 3 is low for the time of year. Respiratory syncytial virus reports continue to rise but also remain lower than average for the time of year (Figure 3).

(See also National Influenza Surveillance, page 167).

Vaccine Preventable Diseases

Notifications for vaccine preventable diseases continue to remain low. The epidemic of pertussis which has persisted for the past couple of years has waned further with the number of notifications having onset in June 1998 being the lowest for any month since June 1996. Figure 4 compares notifications in the current period with historical data.

Figure 2. Laboratory reports of parainfluenza viruses, 1996 to 1998, by type and month of specimen collection

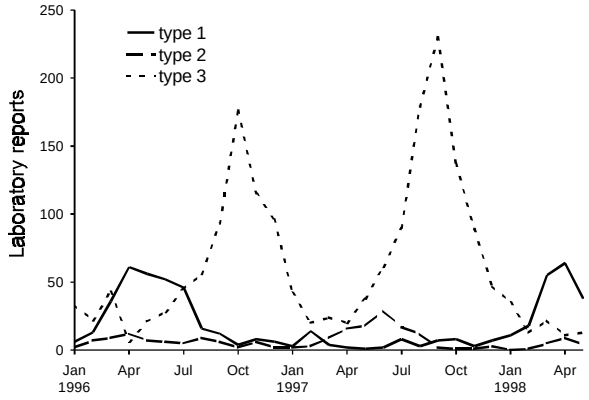
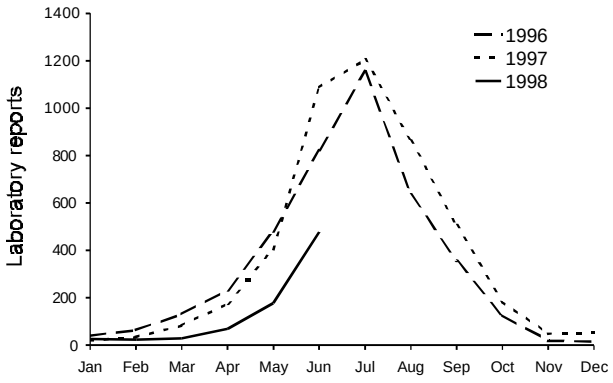


Figure 3. Laboratory reports of respiratory syncytial virus, 1996 to 1998, by month of specimen collection



Tables

There were 3,831 notifications to the National Notifiable Diseases Surveillance System (NNDSS) for this four week period, 24 June to 21 July 1998 (Tables 1 and 2). The numbers of reports for selected diseases have been compared with historical data for corresponding periods in the previous three years (Figure 4).

There were 2,207 reports received by the *CDI* Virology and Serology Laboratory Reporting Scheme (LabVISE) this four week period, 18 June to 15 July (Tables 3 and 4).

The Australian Sentinel Practice Research Network (ASPREN) data for weeks 25 to 27 ending 12 July 1998 are included in this issue of *CDI* (Table 5).

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 24 June 1998 to 21 July 1998

Disease[1,2]	ACT	NSW*	NT	Qld	SA	Tas	Vic	WA	This period 1998*	This period 1997	Year to date 1998*	Year to date 1997
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0
H. influenzae type b infection	0	1	0	0	0	1	0	0	2	5	20	28
Measles	3	10	0	0	1	6	8	2	30	66	271	309
Mumps	0	2	0	3	0	0	0	1	6	17	90	116
Pertussis	0	58	8	72	39	4	59	12	252	519	4,084	4,067
Rubella[3]	5	2	0	20	0	3	6	6	42	72	412	783
Tetanus	0	0	0	0	0	0	0	0	0	0	4	6

NN. Not Notifiable

1. No notification of poliomyelitis has been received 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.
3. Includes congenital rubella.

* Data from NSW are incomplete for the period 8 July to 21 July 1998, as three Public Health Units were unable to provide data.

Table 2. Notifications of diseases received by State and Territory health authorities in the period 24 June 1998 to 21 July 1998 (diseases preventable by routine childhood immunisation are presented in Table 1)

Disease[1,2,3]	ACT	NSW*	NT	Qld	SA	Tas	Vic	WA	This period 1998*	This period 1997	Year to date 1998[4,*]	Year to date 1997
Arbovirus infection (NEC)[5]	0	0	0	2	0	0	1	0	3	4	62	103
Barmah Forest virus infection	0	2	0	15	0	0	0	1	18	24	376	489
Brucellosis	0	0	0	3	0	0	1	0	4	1	23	17
Campylobacteriosis[4,6]	21	-	13	354	143	25	41	82	679	773	4,616	6,333
Chancroid	0	0	0	0	0	0	0	0	0	0	1	1
Chlamydial infection (NEC)[7]	13	NN	70	307	70	20	8	130	618	646	5,818	5,203
Cholera	0	0	0	0	0	0	0	0	0	1	3	2
Dengue	1	2	0	53	0	0	0	0	56	2	346	192
Donovanosis	0	NN	1	0	NN	0	0	0	1	1	21	17
Gonococcal infection[8]	1	40	96	103	15	2	38	52	347	353	2,970	2,588
Hepatitis A	2	47	1	116	9	3	7	15	200	187	1,801	1,953
Hepatitis B incident[4]	0	4	0	3	1	1	9	0	18	15	112	140
Hepatitis C incident[9]	1	0	0	-	0	0	-	-	1	8	65	45
Hepatitis C unspecified[4]	23	NN	19	207	NN	17	37	76	379	653	3,094	5,300
Hepatitis (NEC)	0	0	0	0	0	0	0	NN	0	0	4	13
Hydatid infection	0	0	0	1	0	0	3	0	4	5	22	24
Legionellosis	0	4	2	4	9	0	4	2	25	8	153	98
Leprosy	0	0	0	0	0	0	0	0	0	0	2	7
Leptospirosis	0	3	0	10	0	0	1	0	14	9	96	75
Listeriosis	0	1	0	0	0	0	2	0	3	3	34	48
Malaria	2	5	2	71	0	1	4	1	86	76	477	484
Meningococcal infection	1	16	0	12	3	1	1	5	39	57	184	222
Ornithosis	0	NN	0	0	0	0	0	0	0	1	20	35
Q Fever	0	8	0	21	3	0	1	2	35	51	301	348
Ross River virus infection	0	4	2	50	1	1	1	4	63	207	2,311	6,175
Salmonellosis (NEC)	6	28	26	363	41	8	30	25	527	293	4,886	4,518
Shigellosis[6]	0	-	9	8	5	0	5	3	30	41	373	502
Syphilis[10]	1	26	18	62	1	1	0	1	110	89	742	721
Tuberculosis	2	9	5	6	4	1	18	2	47	73	524	576
Typhoid[11]	0	0	0	1	0	0	0	1	2	2	48	49
Yersiniosis (NEC)[6]	0	-	0	5	0	0	1	0	6	11	151	159

1. For HIV and AIDS, see Tables 6 and 7.
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. No notifications have been received during 1998 for the following rare diseases: lymphogranuloma venereum, plague, rabies, yellow fever, or other viral haemorrhagic fevers.
4. Data from Victoria for 1998 are incomplete.
5. NT: includes Barmah Forest virus.
6. Not reported for NSW because it is only notifiable as 'foodborne disease' or 'gastroenteritis in an institution'.
7. WA: genital only
8. NT, Qld, SA and Vic: includes gonococcal neonatal ophthalmia.
9. Qld, Vic and WA incident cases of Hepatitis C are not separately reported.
10. Includes congenital syphilis
11. NSW, Qld, Vic: includes paratyphoid.

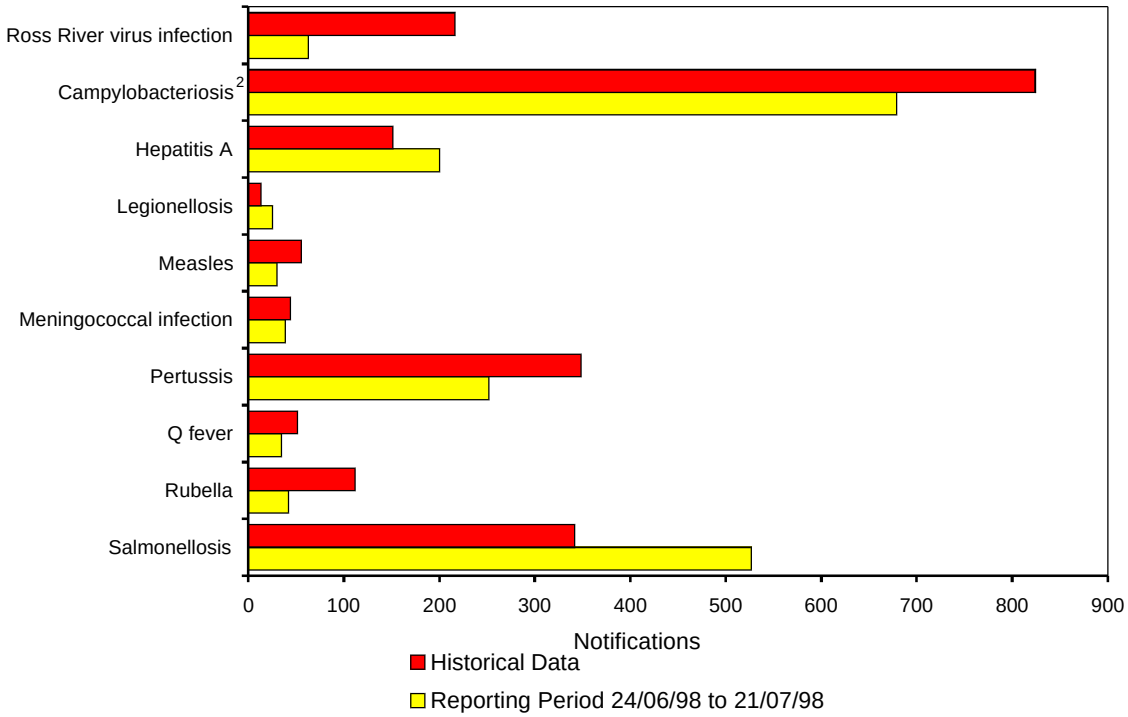
NN Not Notifiable.

NEC Not Elsewhere Classified

\- Elsewhere Classified.

* Data from NSW are incomplete for the period 8 July to 21 July 1998, as three Public Health Units were unable to provide data.

Figure 4. Selected National Notifiable Diseases Surveillance System reports,* and historical data[1]



1. The historical data are the averages of the number of notifications in the corresponding 4 week periods of the last 3 years and the 2 week periods immediately preceding and following those.
2. Data from Victoria for 1998 are incomplete.

* Data from NSW are incomplete for the period 8 July to 21 July 1998, as three Public Health Units were unable to provide data.

Table 3. Virology and serology laboratory reports by State or Territory[1] for the reporting period 18 June 1998 to 15 July 1998, and total reports for the year

	State or Territory[1]								Total this period	Total reported in *CDI* in 1998
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA		
Measles, Mumps, Rubella										
Measles virus		1			1		1		3	39
Mumps virus		1			1			3	5	22
Rubella virus		1							1	63
Hepatitis Viruses										
Hepatitis A virus		6			3		2	9	20	252
Arboviruses										
Ross River virus					3			5	8	529
Barmah Forest virus							1		1	22
Dengue not typed			2					1	3	23
Kunjin virus			1						1	5
Flavivirus (unspecified)							2		2	44
Adenoviruses										
Adenovirus type 1					1		1		2	15
Adenovirus type 2							4		4	15
Adenovirus type 3							1		1	21
Adenovirus type 7					1				1	14
Adenovirus type 11					1				1	1
Adenovirus not typed/pending	1	22	1	1	29		1	10	65	420

Table 3. Virology and serology laboratory reports by State or Territory[1] for the reporting period 18 June 1998 to 15 July 1998, and total reports for the year, continued

	State or Territory[1]								Total this period	Total reported in *CDI* in 1998
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA		
Herpes Viruses										
Cytomegalovirus		14			11		13	7	45	429
Varicella-zoster virus		13			15		29	24	81	715
Epstein-Barr virus		34		1	37		8	20	100	990
Other DNA Viruses										
Contagious pustular dermatitis (Orf virus)								1	1	7
Parvovirus			1		6		18	2	27	114
Picorna Virus Family										
Coxsackievirus A9							2		2	5
Coxsackievirus B2							1		1	3
Coxsackievirus B3							1		1	7
Coxsackievirus B5							1		1	2
Echovirus type 5							1		1	1
Poliovirus type 2 (uncharacterised)		2							2	4
Rhinovirus (all types)		27			4		2	22	55	273
Enterovirus not typed/pending		6	1			1	1	32	41	280
Ortho/paramyxoviruses										
Influenza A virus		178	1		246		44	98	567	1,075
Influenza A virus H3N2							2		2	2
Influenza B virus					19		1		20	109
Influenza virus - typing pending							1		1	1
Parainfluenza virus type 1		10			22		2	3	37	232
Parainfluenza virus type 2		1			1		1		3	26
Parainfluenza virus type 3		2			3			6	11	206
Respiratory syncytial virus		495			71	4	19	99	688	1,201
Other RNA Viruses										
HTLV-1								1	1	12
Rotavirus		29			22	11		50	112	344
Calici virus		1							1	1
Other										
Chlamydia trachomatis not typed		7	3		44	2		115	171	2,286
Chlamydia psittaci							6	3	9	32
Chlamydia species		3							3	35
Mycoplasma pneumoniae		17			18		27	3	65	789
Mycoplasma hominis		1							1	1
Coxiella burnetii (Q fever)		3			3		6	1	13	72
Rickettsia spp - other								2	2	8
Bordetella pertussis						1	9	13	23	710
TOTAL	1	875	10	2	562	19	208	530	2,207	11,464

1. State or Territory of postcode, if reported, otherwise State or Territory of reporting laboratory.

Table 4. Virology and serology laboratory reports by contributing laboratories for the reporting period 18 June 1998 to 15 July 1998

State or Territory	Laboratory	Reports
New South Wales	Institute of Clinical Pathology & Medical Research, Westmead	247
	New Children's Hospital, Westmead	379
	Repatriation General Hospital, Concord	1
	South West Area Pathology Service, Liverpool	251
South Australia	Institute of Medical and Veterinary Science, Adelaide	562
Tasmania	Northern Tasmanian Pathology Service, Launceston	17
Victoria	Royal Children's Hospital, Melbourne	30
	Victorian Infectious Diseases Reference Laboratory, Fairfield	180
Western Australia	PathCentre Virology, Perth	498
	Princess Margaret Hospital, Perth	42
TOTAL		2,207

Table 5. Australian Sentinel Practice Research Network reports, weeks 25 to 27, 1998

Week number	25		26		27	
Week ending on	28 June 1998		5 July 1998		12 July 1998	
Doctors reporting	50		54		55	
Total encounters	6,934		7,137		7,155	
Condition	Reports	Rate per 1,000 encounters	Reports	Rate per 1,000 encounters	Reports	Rate per 1,000 encounters
Influenza	128	18.5	164	23.0	127	17.7
Rubella	1	0.1	0	0.0	0	0.0
Measles	1	0.1	0	0.0	0	0.0
Chickenpox	16	2.3	9	1.3	10	1.4
Pertussis	2	0.3	2	0.3	0	0.0
HIV testing (patient initiated)	10	1.4	13	1.8	8	1.1
HIV testing (doctor initiated)	6	0.9	1	0.1	8	1.1
Td (ADT) vaccine	23	3.3	27	3.8	31	4.3
Pertussis vaccination	19	2.7	44	6.2	41	5.7
Reaction to pertussis vaccine	0	0.0	2	0.3	1	0.1
Ross River virus infection	0	0.0	0	0.0	0	0.0
Gastroenteritis	74	10.7	70	9.8	65	9.1

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 1998;22:4-5.

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 every four weeks. 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 1998;22:8.

ASPREN currently comprises about 100 general practitioners from throughout the country. Up to 9,000 consultations are reported each week, with special attention to 12 conditions chosen for sentinel surveillance. CDI reports the consultation rates for all of these. For further information, including case definitions, see CDI 1998;22:5-6.

Additional Reports

National Influenza Surveillance, 1998

Three types of data are included in National Influenza Surveillance, 1998. These are sentinel general practitioner surveillance conducted by the Australian Sentinel Practice Research Network, Department of Human Services (Victoria), Department of Health (New South Wales) and the Tropical Influenza Surveillance Scheme, Territory Health (Northern Territory); laboratory surveillance data from the Communicable Diseases Intelligence Virology and Serology Laboratory Reporting Scheme, LabVISE, and the World Health Organization Collaborating Centre for Influenza Reference and Research; and absenteeism surveillance conducted by Australia Post. For further information about these schemes, see CDI 1998; 22:83.

Sentinel General Practitioner Surveillance

Consultation rates for influenza-like illness recorded by ASPREN have peaked at 21.3 per 1,000 for the month of July (Figure 5). This figure is less than that reported for the same time last year, when the seasonal peak reached 50 per 1,000 consultations. The New South Wales and Victorian Sentinel Schemes have reported rates of 32.7 and 26.4 per 1,000 respectively for this reporting period. The Tropical Influenza Surveillance Programme has reported weekly consultation rates that have been consistently less than 10 per 1,000 for the year to date. This contrasts with 1997, when there was an early peak of 30 per 1,000 consultations in the month of March and a late winter peak that reached the same levels.

Laboratory Surveillance

There have been 1,073 laboratory reports of influenza for the year to date. Of these, 991 (92%) were influenza A and 82 (8 %) influenza B (Figure 6). The number of influenza A reports for this year is greater than those reported over the same period for all years dating back to 1993. This however contrasts with the sentinel general practitioner data schemes that are reporting rates of influenza-like

Figure 5. Sentinel general practitioner consultation rates, 1998, by week and scheme.

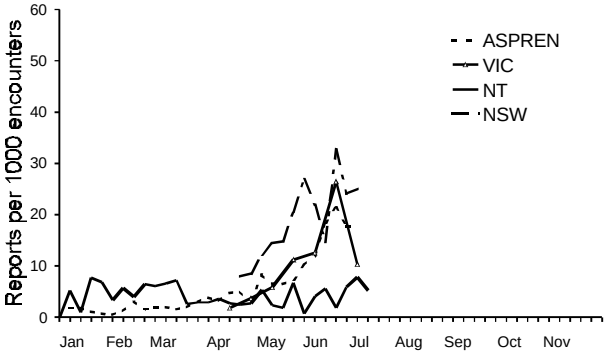


Figure 6. Influenza laboratory reports, 1998, by virus type and week of specimen collection

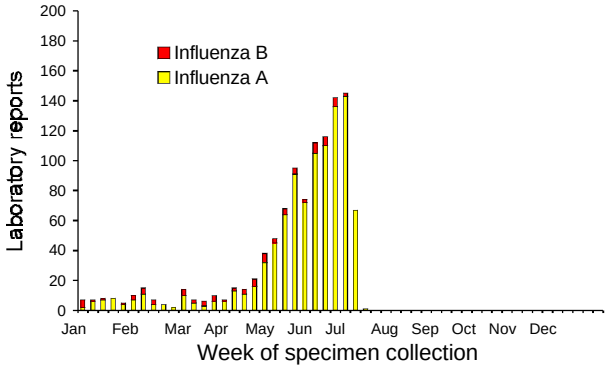


Figure 7. Influenza A and B laboratory reports, 1998, by age group

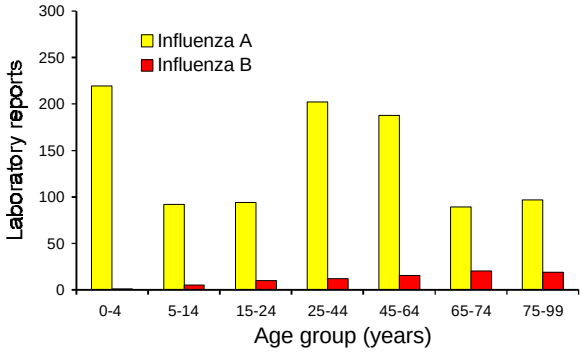
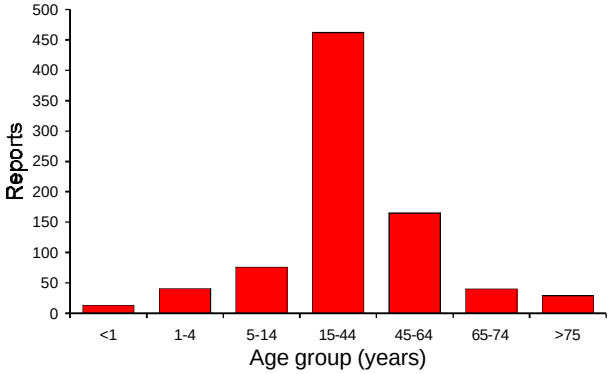


Figure 8. Reports of influenza-like illness, ASPREN Scheme, 1998, by age group



illness that are comparable to those of last year, and which for the most recent reporting period are lower than those reported for 1997. A total of 219 laboratory reports of influenza A were in children less than 4 years of age (Figure 7). Again this is in contrast to the data provided by the ASPREN scheme that reports the largest number of influenza-like illness in the 15 to 44 year old age group (Figure 8).

Absenteeism surveillance

Rates of absenteeism in Australia Post employees for three consecutive days of each week have been reported on a weekly basis since late April. Absenteeism rates for the year have averaged 0.26% per week. Rates for this reporting period have peaked at 0.32% for the first week of July which is the highest reported for the year so far.

Sentinel Chicken Surveillance Programme

Sentinel chicken flocks are used to monitor flavivirus activity in Australia. The main viruses of concern are Murray Valley encephalitis (MVE) and Kunjin which cause the potentially fatal disease Australian encephalitis in humans. Currently 26 flocks are maintained in the north of Western Australia, seven in the Northern Territory, nine in New South Wales and ten in Victoria. The flocks in Western Australia and the Northern Territory are tested year round but those in New South Wales and Victoria are tested only from November to March, during the main risk season.

Results are coordinated by the Arbovirus Laboratory in Perth and reported bimonthly. For more information see CDI 1998;22:7

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Sentinel chicken serology was carried out for 21 of the 28 flocks in Western Australia in June 1998. There were three seroconversions in the Fitzroy Crossing flock to Kunjin virus and six seroconversions in the Derby flocks. There was one seroconversion to Kunjin virus at Derby site 2 (town) and five seroconversions at Derby site 1 (located out of town), three to Kunjin virus and two to a flavivirus that does not appear to be MVE or Kunjin virus. This increase in Kunjin virus activity in the West Kimberley region is unusual at this time of year, particularly after a wet season with below average rainfall and low flavivirus activity.

Seven flocks of sentinel chickens from the Northern Territory were also tested in our laboratory in June 1998. There was one seroconversion to Kunjin virus in the Leanyer flock and one seroconversion to a flavivirus only in the Gove flock. The chicken from Tennant Creek that seroconverted in April 1998 was confirmed as a Kunjin seroconversion.

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.

Table 6. New diagnoses of HIV infection, new diagnoses of AIDS and deaths following AIDS occurring in the period 1 to 28 February 1998, by sex and State or Territory of diagnosis

										Totals for Australia			
		ACT	NSW	NT	Qld	SA	Tas	Vic	WA	This period 1998	This period 1997	Year to date 1998	Year to date 1997
HIV diagnoses	Female	0	1	0	0	1	0	1	1	4	3	5	14
	Male	2	23	0	0	3	0	18	1	47	66	105	144
	Sex not reported	0	2	0	0	0	0	0	0	2	4	3	5
	Total[1]	2	226	0	0	4	0	19	2	53	73	113	163
AIDS diagnoses	Female	0	0	0	0	0	0	0	0	0	2	1	4
	Male	0	2	0	3	0	0	1	1	7	28	16	68
	Total[1]	0	2	0	3	0	0	1	1	7	30	17	72
AIDS deaths	Female	0	0	0	0	0	0	0	0	0	2	0	4
	Male	0	1	0	1	0	0	0	0	2	25	8	53
	Total[1]	0	1	0	1	0	0	0	0	2	27	8	57

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

Table 7. Cumulative diagnoses of HIV infection, AIDS and deaths following AIDS since the introduction of HIV antibody testing to 28 February 1998, by sex and State or Territory

		ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Australia
HIV diagnoses	Female	20	539	7	120	52	4	192	83	1,017
	Male	180	10,229	93	1,772	622	75	3,700	841	17,514
	Sex not reported	0	260	0	0	0	0	28	1	289
	Total[1]	200	11,048	100	1,898	676	79	3,930	928	18,859
AIDS diagnoses	Female	7	157	0	44	19	2	62	23	314
	Male	80	4,332	30	756	318	41	1,517	337	7,411
	Total[1]	87	4,500	30	802	337	43	1,586	362	7,747
AIDS deaths	Female	2	112	0	28	14	2	43	15	216
	Male	52	3,035	23	525	215	27	1,198	241	5,316
	Total[1]	54	3,154	23	555	229	29	1,247	257	5,548

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

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) 9332 4648 Facsimile: (02) 9332 1837.

HIV and AIDS diagnoses and deaths following AIDS reported for 1 to 28 February 1998, as reported to 31 May 1998, are included in this issue of CDI (Tables 6 and 7).

The cumulative Australian totals for HIV diagnoses over recent months has not appeared to follow the expected trend due to changes in the reporting methods. The changes to the HIV reporting system are presented on page 161.

Childhood Immunisation Coverage

Table 8 provides the latest quarterly report on childhood immunisation coverage from the Australian Childhood Immunisation Register (ACIR).

The data show the percentage of children fully immunised at age 12 months for the cohort born between 1 October and 31 December 1996 according to the Australian Standard Vaccination Schedule.

A full description of the methodology used can be found in CDI 1998;22:3;36-37.

Table 8. Percentage of children immunised at 1 year of age, preliminary results by disease and State for the birth cohort 1 October 1996 to 31 December 1996; assessment date 31 December 1997.

	State or Territory								
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Australia
Total number of children	1,086	22,119	837	11,598	4,650	1,652	15,991	6,200	64,133
Vaccine									
DTP (%)	85.8	78.4	67.0	84.3	80.5	82.9	83.1	76.7	80.7
OPV (%)	85.4	78.1	66.8	84.6	80.6	83.3	83.1	76.9	80.7
Hib (%)	82.4	77.9	70.8	85.1	80.6	82.9	82.9	76.9	80.7
Fully Immunised (%)	81.9	75.7	61.6	82.5	78.6	81.7	81.5	75.1	78.6
Change in fully immunised since last quarter (%)	+1.3	+1.0	+6.6	+3.1	-0.3	+2.5	+1.6	+4.6	+1.9

Acknowledgment: These figures were provided by the Health Insurance Commission (HIC), to specifications provided by the Commonwealth Department of Health and Family Services. For further information on these figures or data on the ACIR please contact the Immunisation Section of the HIC: Telephone (02) 6203 6185.

Enterovirus outbreak in Asia

Source: World Health Organization, Centers for Disease Control, United States of America and the Department of Health, Government of Hong Kong Special Administrative Region.

Current situation

Taiwan

To 3 July 1998, 56 infants and young children had died of severe complications during the outbreak of hand, foot, and mouth disease (HFMD) which began in April in Taiwan, Republic of China. A total of 626 cases have been hospitalised with serious complications including viral meningitis or encephalitis. Ninety per cent of those who died and 86% of hospitalised cases were under 6 years of age. Enteroviruses have been isolated from children with HFMD, meningitis or encephalitis, and fatal disease. In particular, enterovirus 71 (EV71) has been identified most frequently but it has not yet been confirmed as the cause of the HFMD outbreak or the deaths. The Taiwan Department of Health has formed a special task force which includes experts from the Centers for Disease Control, United States of America to investigate the outbreak and control its spread.

The greatest risk of death is for Taiwanese children younger than 3 years old. The death rate for this group since the outbreak began in April 1998 has been approximately 1 per 10,000. The risk of death among older Taiwanese children is substantially lower, and no adults have been reported to have died with this clinical syndrome. Risk also seems to differ by geographic region; most of the fatal cases have occurred in central and northern Taiwan. No deaths have been reported among children or adults from other countries visiting or living in Taiwan or in contacts of persons coming from Taiwan.

The World Health Organization recommends that contact between those infected and other children should be limited as much as possible. Infected children must be kept away from school and other public places and should be kept home until all symptoms and signs of HFMD have completely resolved. A high level of hygiene in all schools, pre-schools, hospitals and public places is essential. Children with early signs of complications should be admitted to hospital as soon as possible.

Singapore

A Singaporean boy aged two and a half years died on 25 June following HFMD complicated by encephalitis. The boy had no recent travel history to Taiwan. Laboratory tests for enteroviruses are being carried out. No enterovirus 71 infection has been detected in Singapore this year.

Hong Kong

No cases of the severe form of enterovirus 71 (EV-71) have been confirmed since the Department of Health, Hong Kong introduced a surveillance system in mid-June to monitor HFMD. To 21 July 1998, 19 cases of EV-71 had been confirmed and 11 were suspected pending laboratory confirmation. All patients have recovered and been discharged.

Hand, Foot and Mouth Disease

Hand, foot and mouth disease is a common childhood illness that occurs worldwide, both as individual cases and in outbreaks. It is usually a mild illness characterised by fever, sores in the mouth, and a rash with blisters. The illness usually begins with a mild fever and malaise or fussiness in infants. One or two days after the fever begins, sores develop in the mouth. The skin rash develops over one to two days, with flat or raised red spots, some with blisters. The rash is usually located on the palms of the hands and soles of the feet. It may also appear on the buttocks. A person with HFMD may have only the rash or mouth ulcers.

The most common cause of HFMD is infection with coxsackievirus A16 (CA16), a member of the enterovirus group of viruses. There are usually no complications of HFMD caused by CA16 infection, although viral meningitis may occasionally occur. A second, less common cause of HFMD is infection with EV71. In addition to HFMD, EV71 may also cause viral meningitis, encephalitis, or a poliomyelitis-like paralysis. EV71 meningitis or encephalitis may occasionally be fatal.

Hand, foot and mouth disease is moderately contagious. The enteroviruses that cause HFMD are not spread by airborne transmission or contaminated food or water. Infection is spread from person to person by direct contact with nose and throat secretions or the stool of infected persons. A person is most contagious during the first week of the illness. The usual period from infection to onset of symptoms is 3 to 7 days.

Currently, no specific treatment is available for CA16, EV71, or other enterovirus infections. Treatment of mild cases of HFMD is symptomatic, given to provide relief from fever, aches, or pain from mouth ulcers. Children with meningitis or encephalitis are usually hospitalised.

Link to previous outbreaks

In 1997 more than 600 children were admitted to hospital and 30 died following an outbreak of HFMD in Sarawak, Malaysia.[1,2] The complications and mortality associated with the HFMD outbreak were severe and unusual. Several viruses were identified, most commonly EV71 and adenovirus. From July to September 1997 three deaths were recorded in young children associated with HFMD in Osaka City, Japan. EV71 was isolated from a stool specimen from one of these cases.

The clinical and epidemiological features of the current outbreak in Taiwan and the previous outbreaks in Malaysia and Japan are similar, suggesting that the same aetiological agent (or agents) is involved. Each of these outbreaks has been associated with the isolation of EV71 suggesting that this is the causative agent. The association between EV71 and HFMD is well established and severe clinical manifestations and deaths have been documented

in the past. However, conclusive evidence that EV71 is the causative agent is not yet available.

Editorial note

Reports of EV71 are received in Australia from time to time and several outbreaks have been reported. In 1986 an outbreak amongst infants and young children occurred in southeastern Australia.[3] A large number of cases of HFMD were reported in the community whilst severe disease including central nervous system involvement was also a feature in some cases. The Virus and Serology Laboratory Reporting Scheme, LabVISE collects data from sentinel laboratories on enteroviruses including EV71. No reports of this virus have been made to LabVISE since 1995 when 34 reports were received, mostly in the winter months.

The outbreak in Taiwan now appears to be easing. Investigations are continuing to definitively identify the causative agent. Whilst there is some risk that travellers to Taiwan may be exposed to and possibly infected by the agent of this disease this is very small. Travellers should observe the advice given by the World Health Organization and avoid contact with infected children.

1. Overseas Briefs. *Comm Dis Intell*. 1997;21:188.
2. Overseas Briefs. *Comm Dis Intell*. 1997;21:204.
3. Gilbert G, Dickson K, Waters M et al. Outbreak of enterovirus 71 infection in Victoria, Australia, with a high incidence of neurologic involvement. *Paediatr Infect Dis J.* 1998;7:484-488.

Overseas briefs

Source: World Health Organization (WHO)

Cholera

Uganda. The outbreak of cholera which began in late 1997 is continuing. Reports to WHO continue to show high numbers of cases with case fatality rates ranging from 4% to 5.5%. At the end of June 1998 a total of 38,697 cases and 1,576 deaths had been officially reported since the beginning of the outbreak. The total number of affected districts is now 39, covering a large part of the country. Most of the neighbouring countries have also been affected by major cholera outbreaks since late 1997 and continue to report cases.

Cambodia. The Ministry of Health has reported a cholera outbreak in Banteay Manchey Province in the north-west of the country. The outbreak started on 14 June 1998 and has so far affected three villages. Up to 29 June, 69 cases and 15 deaths had been reported. Control measures are being carried out by the Ministry of Health. These include enhanced surveillance and a health education campaign.

In 1997 a total of 155 cholera cases were reported in Cambodia. In 1996 and 1995, 4,190 and 3,085 cases were reported respectively.

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