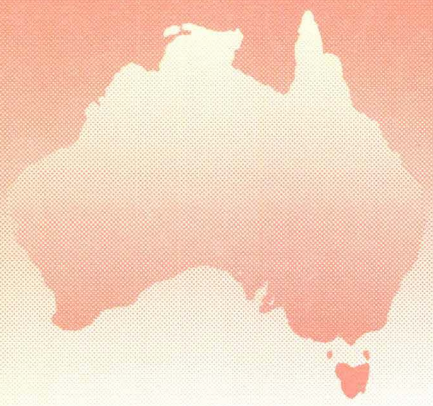


COMMUNICABLE DISEASES INTELLIGENCE

ISSN 0725-3141 VOLUME 19 NUMBER 9 1 May 1995

CONTENTS

Editor: Helen Longbottom
Deputy Editor: Jenny Hargreaves

Editorial and Production Staff: Margaret Curran, Scott Crerar, David Evans, Htoo Myint, Michelle Wood and Monika Fehringer

COMMONWEALTH DEPARTMENT OF HUMAN SERVICES AND HEALTH

CDI is produced fortnightly by:
AIDS/Communicable Diseases Branch
Department of Human Services and Health
GPO Box 9848 Canberra ACT 2601
Fax: (06) 289 7791 Telephone: (06) 289 1555

COMMUNICABLE DISEASES NETWORK-AUSTRALIA
A National Network for Communicable Diseases Surveillance

PROBABLE JAPANESE ENCEPHALITIS ACQUIRED IN THE TORRES STRAIT

J Hanna[1], S Ritchie[1], M Loewenthal[2], S Tiley[2], D Phillips[3], A Broom[4], D Smith[5]

We report three cases of encephalitis probably caused by Japanese encephalitis (JE) virus. The patients were all residents of one island (population approximately 780) in the Torres Strait, between mainland Queensland and Papua New Guinea.

Case reports

Patient 1

A 16 year old male was admitted to Thursday Island Hospital on 22 March 1995 unconscious and only responsive to painful stimuli, febrile to 40°C, with neck stiffness and preferentially moving his right side. He had felt unwell for the previous three days and complained of abdominal pain the previous day. He was known to have been mildly mentally retarded since birth and had had occasional generalised seizures but was generally healthy. He was transferred to Cairns Base Hospital where a cerebral CT scan showed a non-enhancing hypodense lesion in his posterior right basal ganglia. He had a leukocytosis of 17.3 x 10^9/L, neutrophils 15.2 x 10^9/L. CSF contained 150 WBC/μL with a differential of 50% polymorphs and 50% mononuclear cells. He had a generalised seizure and required mechanical ventilation two days after admission. He never regained consciousness and died 17 days after admission on 8 April 1995.

Patient 2

A six year old schoolboy presented to the island health clinic on 2 April 1995 with a 24 hour history of fever (40°C), increasing somnolence, headache and pain in the neck, abdomen and lower back. He became irritable, confused and increasingly drowsy, and was transferred to Cairns Base Hospital on 4 April 1995. His full blood count on admission showed a neutrophil leucocytosis of 19.6 x 10^9/L. CSF contained 364 WBC/μL with a differential of 50% neutrophils and 50% mononuclear cells, raised protein of 0.75g/L and normal glucose. After three days his condition began to improve. Apart from a generalised seizure on day 7 of his illness, he continued to improve. On discharge from Cairns Base Hospital on 20 April 1995 he was alert, responding appropriately to commands, but still disoriented and having difficulty with some simple cognitive tasks.

Patient 3

A 44 year old man, the neighbour of Patient 1, was admitted to Cairns Base Hospital via Thursday Island Hospital on 4 April 1995. He had a two day history of headache and fever; the day prior to admission his headache and fever worsened, he complained of abdominal and chest pain and he became progressively more drowsy. On the morning of admission he was unrousable. On admission he was febrile to 40°C, unresponsive to verbal stimuli with marked neck stiffness but no focal neurological signs. CT brain scan showed a non-enhancing hypodensity in the region of the left thalamic nuclei. His WBC count was normal. CSF contained 125 WBC/μL with a differential of 70% mononuclear cells and 30% polymorphs. CSF protein was 1.03g/L with a normal glucose. He never regained consciousness or became afebrile and he died on his sixteenth hospital day, 20 April 1995.

Laboratory results

Acute phase sera were collected from all three patients soon after the onset of symptoms. No flavivirus antibodies were demonstrated in these acute sera by enzyme immunoassay (EIA). However, convalescent sera collected from all three patients tested positive in a flavivirus IgM capture EIA.

Haemagglutination inhibition (HAI) assays were performed on convalescent serum fractions separated by ultracentifugation (UC). Patient 1 had Kunjin, Murray Valley encephalitis (MVE) and JE virus IgM detected by UC-HAI; the JE IgM titre was significantly higher than that for the two other viruses. Patient 2 showed a similar pattern to Patient 1, with low level IgM detectable to Kunjin and MVE but significantly higher titre IgM to JE virus. Patient 3 had JE IgM, but neither Kunjin nor MVE IgM, detected by UC-HAI. Neutralising antibody to JE but not to MVE was detected in the convalescent serum of Patient 1.

The HAI titres in the paired sera of the three patients is shown in the Table. The rise in total antibody was significantly higher to JE virus than to MVE virus.

The convalescent serum of patient 1 was positive for a flavivirus that was neither Kunjin nor MVE by a blocking EIA using monocloncal antibodies.

1. Tropical Public Health Unit, Cairns, Queensland.
2. Cairns Base Hospital, Cairns, Queensland.
3. Laboratory of Microbiology and Pathology, Brisbane, Queensland.
4. The University of Western Australia, Perth, Western Australia.
5. The Western Australian Centre for Pathology and Medical Research, Perth, Western Australia.

Table. MVE and JE HAI titres in the three patients

	Days post hospitalisation	HAI titres	
		MVE	JE
Patient 1	10	<20	40
	15	40	640
Patient 2	1	<20	<20
	4	40	640
Patient 3	1	<20	<20
	8	<20	80

Initial responses

The outbreak of viral encephalitis was recognised on 5 April 1995 and control activities commenced on 7 April 1995. A considerable effort was made to inform the community about the importance of personal mosquito protection measures.

Mosquito breeding sites, and the associated larval species were identified and a residual larvicide (s-methoprene pellets) applied. Adult mosquitos were collected using CDC-type light-traps. The mosquitos were speciated on a cold-table, and sent on dry ice for virus isolation. High numbers (>100/trap) of *Aedes kochi, Aedes culiciformis* and *Culex annulirostris* were collected. Fogging, using a pyrethrum preparation (Drift) was carried out to kill adult mosquitos.

With permission, blood was taken from 212 asymptomatic island residents; 59 of these residents were EIA flavivirus IgG positive and 22 were EIA flavivirus IgM positive. When tested by UC-HAI, 16 of the IgM positive sera had JE specific IgM only, while five had IgM to JE, MVE and Kunjin. The presence of IgM to JE, MVE or Kunjin could not be confirmed in one sample.

A veterinarian collected blood from 10 horses, and subsequently from 12 domestic pigs, living near the human habitation on the island. All 12 pigs, and nine horses had high JE titres in the HAI assay. Neutralising antibody to JE virus was detectable in the 12 pigs and in four of the horses tested to date. Tests are in progress on the remaining six horses.

Laboratory tests are in progress to identify the virus associated with the outbreak. A flavivirus has been isolated from the sera of each of two asymptomatic island residents. Preliminary results using a panel of monoclonal antibodies in an indirect immunofluorescent assay suggest that the isolated viruses are both JE virus.

Comment

Clinical samples have been forwarded to the Armed Forces Research Institute of Medical Science, Bangkok, Thailand, for further serological and polymerase chain reaction tests.

Short of having this confirmatory information, it is nevertheless probable that the disease has been caused by JE virus. If so, this is the first recognised episode of JE acquired in Australia. JE is a major public health problem in Asia, and there are concerns that the range of epidemic JE is expanding[1].

Further work is in progress in an attempt to determine if persons or animals elsewhere in the Torres Strait have been infected, and to identify potential vectors.

Acknowledgment

We thank the island council for support and assistance with the control responses. Many persons assisted with the responses including staff from the island health clinic, the Torres Sector Public Health Programme and the Tropical Public Health Unit. Thanks to Dr Emma Watkins for professional assistance.

Reference

1. Burke DS, Leake CJ. Japanese encephalitis. In: Monath TP, ed. *The arboviruses: epidemiology and ecology*, Vol 3. Boca Raton: CRC Press, 1988:63-92.

CDI editorial comment

Japanese encephalitis (JE) is a mosquito borne flaviviral disease of humans and animals. Its main reservoirs are water birds, pigs and horses, and a range of mosquitos can act as vectors. As for other flaviviruses, such as Murray Valley encephalitis virus, most human infections with JE virus are inapparent, however, a small proportion of infected persons develop encephalitis and among those, the case fatality rate is about 20%.

About 50,000 human cases are thought to occur each year in Bangladesh, Cambodia, China (except Xinzang/Tibet, Xinjiang/Sinklang and Qinghai), the eastern Provinces of the Commonwealth of Independent States, Hong Kong, India, Indonesia, Japan, Myanmar, North Korea, South Korea, Laos, Malaysia, Nepal, the Philippines, Singapore, Sri Lanka, Taiwan, Thailand and Vietnam. It has been thought that in Indonesia, the disease did not occur east of Bali.

Control of JE in some of these endemic countries has included the widespread use of JE vaccine, incorporated into routine childhood immunisation programs in some areas and used to immunise pigs in others. The vaccine is not, however, used to control epidemics, as three doses of the vaccine (at 0, 7 and 28 days) are required to induce protective immunity in vaccinees who are not continually exposed to the virus from birth.

The National Health and Medical Research Council recommends considering the use of Japanese encephalitis vaccine for travellers spending one month or more in rural areas in countries where Japanese encephalitis is prevalent[1], and also for those spending 12 months or more in urban areas in countries where Japanese encephalitis is prevalent. It has not made recommendations for the use of the vaccine in epidemic situations.

Although the vaccine has been approved for general marketing in Australia, it is not currently available, due to restrictions made by the distributor.

The Torres Strait outbreak is being closely monitored by the Communicable Diseases Network Australia New Zealand, in cooperation with the Queensland and Commonwealth health and primary industries authorities. In addition, the World Health Organization and regional health authorites are being kept informed about the outbreak and further progress in its investigation and control.

Reference

1. National Health and Medical Research Council. *The Australian Immunisation Procedures Handbook*. 5th ed. Canberra: Australian Government Publishing Service, 1994.

EARLY INFLUENZA IN THE NORTHERN TERRITORY

Fay Johnston[1,2], *Christine Connors*[1], *Vicki Krause*[1]

Background

During the last two weeks of March 1995 anecdotal reports of an increase in the number of patients with an influenza-like illness were received from several urban and rural centres across the Top End of the Northern Territory. These reports were investigated by the Darwin Disease Control Centre (DCC) of the Department of Health and Community Services.

Aims of the investigation

1. To establish if an outbreak of an influenza-like illness was occurring in the Northern Territory and to determine its size.
2. To identify the causative agent(s).
3. To implement appropriate public health control measures such as providing appropriate information to health service providers and the general public and, if influenza, expediting early distribution and administration of the vaccine to at risk individuals.

Presence and extent of the outbreak

The first indication of the outbreak was an informal report from the school nurse at a Darwin boarding school of approximately 600 students who had seen 80 students with an influenza-like illness in a single week. Following this report, health service providers across the Territory were contacted by DCC staff and asked to identify and report cases, preferably defined using the clinical component of the Australian Sentinel Practice Research Network case definition for influenza:

Six of the following:

1. sudden onset of symptoms (within 12 hours)
2. cough
3. rigor or chills
4. fever
5. prostration and weakness
6. myalgia or widespread aches and pains
7. no significant respiratory physical signs other than redness of the nasal mucosa and throat
8. influenza in close contacts.

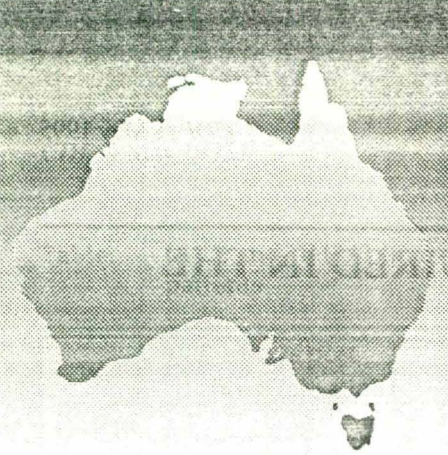
To help identify the causative organism, practitioners were also asked to take specimens from clinical cases for laboratory testing, and repeat serological testing was encouraged.

In response, Darwin general practitioners and Royal Darwin Hospital (RDH) accident and emergency staff reported an approximate fourfold increase in patients presenting with an influenza-like illness in the previous two weeks. Analysis of RDH accident and emergency records over ten weeks confirmed a sudden rise in the number of attendants who had been diagnosed with 'flu' or 'viral illness' and a total of 292 in the latest six weeks (Figure).

Initial reports from other major urban centres indicated that a similar situation existed in both Katherine and Nhulunbuy (in the Top End), but not further south in Tennant Creek or Alice Springs. Virtually all remote Aboriginal communities across the Top End of the Territory reported that large numbers of persons had been presenting with an influenza-like illness, with estimates of attack rates that ranged from ten to twenty per cent of their total populations. This was not reported initially for communities in the Katherine, Barkly or Alice Springs regions, however, reports obtained from these areas during the course of the investigation indicated that the influenza-like illness moved south during this period.

In addition, there were anecdotal reports of increased numbers of possibly associated deaths in remote Arnhem Land communities that had been experiencing this illness.

1. Disease Control Centre, Department of Health and Community Services, Darwin, Northern Territory.
2. National Centre for Epidemiology and Population Health, Australian National University, Canberra, Australian Capital Territory.



COMMUNICABLE DISEASES INTELLIGENCE

ISSN 0725-3141 VOLUME 19 NUMBER 9 1 May 1995

CONTENTS

Editor: Helen Longbottom
Deputy Editor: Jenny Hargreaves

Editorial and Production Staff: Margaret Curran, Scott Crerar, David Evans, Htoo Myint, Michelle Wood and Monika Fehringer

CDI is produced fortnightly by:
AIDS/Communicable Diseases Branch
Department of Human Services and Health
GPO Box 9848 Canberra ACT 2601
Fax: (06) 289 7791 Telephone: (06) 289 1555

Contributions covering any aspect of communicable diseases are invited. Publication does not preclude authors from arranging publication of their material elsewhere.

Opinions expressed in *CDI* are those of the authors and not necessarily those of the Department of Human Services and Health or other Communicable Diseases Network - Australia affiliates. Figures given may be subject to revision.

Parts of *CDI* are also available on the *CDI* Bulletin Board System, accessible with a computer, communications software and a modem on (06) 281 6695.

COMMONWEALTH DEPARTMENT OF HUMAN SERVICES AND HEALTH

COMMUNICABLE DISEASES NETWORK-AUSTRALIA
A National Network for Communicable Diseases Surveillance

PROBABLE JAPANESE ENCEPHALITIS ACQUIRED IN THE TORRES STRAIT

J Hanna[1], *S Ritchie*[1], *M Loewenthal*[2], *S Tiley*[2], *D Phillips*[3], *A Broomi*[4], *D Smith*[5]

We report three cases of encephalitis probably caused by Japanese encephalitis (JE) virus. The patients were all residents of one island (population approximately 780) in the Torres Strait, between mainland Queensland and Papua New Guinea.

Case reports

Patient 1

A 16 year old male was admitted to Thursday Island Hospital on 22 March 1995 unconscious and only responsive to painful stimuli, febrile to 40°C, with neck stiffness and preferentially moving his right side. He had felt unwell for the previous three days and complained of abdominal pain the previous day. He was known to have been mildly mentally retarded since birth and had had occasional generalised seizures but was generally healthy. He was transferred to Cairns Base Hospital where a cerebral CT scan showed a non-enhancing hypodense lesion in his posterior right basal ganglia. He had a leukocytosis of 17.3 x 10^9/L, neutrophils 15.2 x 10^9/L. CSF contained 150 WBC/μL with a differential of 50% polymorphs and 50% mononuclear cells. He had a generalised seizure and required mechanical ventilation two days after admission. He never regained consciousness and died 17 days after admission on 8 April 1995.

Patient 2

A six year old schoolboy presented to the island health clinic on 2 April 1995 with a 24 hour history of fever (40°C), increasing somnolence, headache and pain in the neck, abdomen and lower back. He became irritable, confused and increasingly drowsy, and was transferred to Cairns Base Hospital on 4 April 1995. His full blood count on admission showed a neutrophil leucocytosis of 19.6 x 10^9/L. CSF contained 364 WBC/μL with a differential of 50% neutrophils and 50% mononuclear cells, raised protein of 0.75g/L and normal glucose. After three days his condition began to improve. Apart from a generalised seizure on day 7 of his illness, he continued to improve. On discharge from Cairns Base Hospital on 20 April 1995 he was alert, responding appropriately to commands, but still disoriented and having difficulty with some simple cognitive tasks.

Patient 3

A 44 year old man, the neighbour of Patient 1, was admitted to Cairns Base Hospital via Thursday Island Hospital on 4 April 1995. He had a two day history of headache and fever; the day prior to admission his headache and fever worsened, he complained of abdominal and chest pain and he became progressively more drowsy. On the morning of admission he was unrousable. On admission he was febrile to 40°C, unresponsive to verbal stimuli with marked neck stiffness but no focal neurological signs. CT brain scan showed a non-enhancing hypodensity in the region of the left thalamic nuclei. His WBC count was normal. CSF contained 125 WBC/μL with a differential of 70% mononuclear cells and 30% polymorphs. CSF protein was 1.03g/L with a normal glucose. He never regained consciousness or became afebrile and he died on his sixteenth hospital day, 20 April 1995.

Laboratory results

Acute phase sera were collected from all three patients soon after the onset of symptoms. No flavivirus antibodies were demonstrated in these acute sera by enzyme immunoassay (EIA). However, convalescent sera collected from all three patients tested positive in a flavivirus IgM capture EIA.

Haemagglutination inhibition (HAI) assays were performed on convalescent serum fractions separated by ultracentifugation (UC). Patient 1 had Kunjin, Murray Valley encephalitis (MVE) and JE virus IgM detected by UC-HAI; the JE IgM titre was significantly higher than that for the two other viruses. Patient 2 showed a similar pattern to Patient 1, with low level IgM detectable to Kunjin and MVE but significantly higher titre IgM to JE virus. Patient 3 had JE IgM, but neither Kunjin nor MVE IgM, detected by UC-HAI. Neutralising antibody to JE but not to MVE was detected in the convalescent serum of Patient 1.

The HAI titres in the paired sera of the three patients is shown in the Table. The rise in total antibody was significantly higher to JE virus than to MVE virus.

The convalescent serum of patient 1 was positive for a flavivirus that was neither Kunjin nor MVE by a blocking EIA using monocloncal antibodies.

1. Tropical Public Health Unit, Cairns, Queensland.
2. Cairns Base Hospital, Cairns, Queensland.
3. Laboratory of Microbiology and Pathology, Brisbane, Queensland.
4. The University of Western Australia, Perth, Western Australia.
5. The Western Australian Centre for Pathology and Medical Research, Perth, Western Australia.

Table. MVE and JE HAI titres in the three patients

	Days post hospitalisation	HAI titres	
		MVE	JE
Patient 1	10	<20	40
	15	40	640
Patient 2	1	<20	<20
	4	40	640
Patient 3	1	<20	<20
	8	<20	80

Initial responses

The outbreak of viral encephalitis was recognised on 5 April 1995 and control activities commenced on 7 April 1995. A considerable effort was made to inform the community about the importance of personal mosquito protection measures.

Mosquito breeding sites, and the associated larval species were identified and a residual larvicide (s-methoprene pellets) applied. Adult mosquitos were collected using CDC-type light-traps. The mosquitos were speciated on a cold-table, and sent on dry ice for virus isolation. High numbers (>100/trap) of *Aedes kochi*, *Aedes culiciformis* and *Culex annulirostris* were collected. Fogging, using a pyrethrum preparation (Drift) was carried out to kill adult mosquitos.

With permission, blood was taken from 212 asymptomatic island residents; 59 of these residents were EIA flavivirus IgG positive and 22 were EIA flavivirus IgM positive. When tested by UC-HAI, 16 of the IgM positive sera had JE specific IgM only, while five had IgM to JE, MVE and Kunjin. The presence of IgM to JE, MVE or Kunjin could not be confirmed in one sample.

A veterinarian collected blood from 10 horses, and subsequently from 12 domestic pigs, living near the human habitation on the island. All 12 pigs, and nine horses had high JE titres in the HAI assay. Neutralising antibody to JE virus was detectable in the 12 pigs and in four of the horses tested to date. Tests are in progress on the remaining six horses.

Laboratory tests are in progress to identify the virus associated with the outbreak. A flavivirus has been isolated from the sera of each of two asymptomatic island residents. Preliminary results using a panel of monocloncal antibodies in an indirect immunofluorescent assay suggest that the isolated viruses are both JE virus.

Comment

Clinical samples have been forwarded to the Armed Forces Research Institute of Medical Science, Bangkok, Thailand, for further serological and polymerase chain reaction tests.

Short of having this confirmatory information, it is nevertheless probable that the disease has been caused by JE virus. If so, this is the first recognised episode of JE acquired in Australia. JE is a major public health problem in Asia, and there are concerns that the range of epidemic JE is expanding[1].

Further work is in progress in an attempt to determine if persons or animals elsewhere in the Torres Strait have been infected, and to identify potential vectors.

Acknowledgment

We thank the island council for support and assistance with the control responses. Many persons assisted with the responses including staff from the island health clinic, the Torres Sector Public Health Programme and the Tropical Public Health Unit. Thanks to Dr Emma Watkins for professional assistance.

Reference

1. Burke DS, Leake CJ. Japanese encephalitis. In: Monath TP, ed. *The arboviruses: epidemiology and ecology*, Vol 3. Boca Raton: CRC Press, 1988:63-92.

CDI editorial comment

Japanese encephalitis (JE) is a mosquito borne flaviviral disease of humans and animals. Its main reservoirs are water birds, pigs and horses, and a range of mosquitos can act as vectors. As for other flaviviruses, such as Murray Valley encephalitis virus, most human infections with JE virus are inapparent, however, a small proportion of infected persons develop encephalitis and among those, the case fatality rate is about 20%.

About 50,000 human cases are thought to occur each year in Bangladesh, Cambodia, China (except Xinzang/Tibet, Xinjiang/Sinklang and Qinghai), the eastern Provinces of the Commonwealth of Independent States, Hong Kong, India, Indonesia, Japan, Myanmar, North Korea, South Korea, Laos, Malaysia, Nepal, the Philippines, Singapore, Sri Lanka, Taiwan, Thailand and Vietnam. It has been thought that in Indonesia, the disease did not occur east of Bali.

Control of JE in some of these endemic countries has included the widespread use of JE vaccine, incorporated into routine childhood immunisation programs in some areas and used to immunise pigs in others. The vaccine is not, however, used to control epidemics, as three doses of the vaccine (at 0, 7 and 28 days) are required to induce protective immunity in vaccinees who are not continually exposed to the virus from birth.

The National Health and Medical Research Council recommends considering the use of Japanese encephalitis vaccine for travellers spending one month or more in rural areas in countries where Japanese encephalitis is prevalent[1], and also for those spending 12 months or more in urban areas in countries where Japanese encephalitis is prevalent. It has not made recommendations for the use of the vaccine in epidemic situations.

Although the vaccine has been approved for general marketing in Australia, it is not currently available, due to restrictions made by the distributor.

The Torres Strait outbreak is being closely monitored by the Communicable Diseases Network Australia New Zealand, in cooperation with the Queensland and Commonwealth health and primary industries authorities. In addition, the World Health Organization and regional health authorites are being kept informed about the outbreak and further progress in its investigation and control.

Reference

1. National Health and Medical Research Council. *The Australian Immunisation Procedures Handbook*. 5th ed. Canberra: Australian Government Publishing Service, 1994.

EARLY INFLUENZA IN THE NORTHERN TERRITORY

Fay Johnston[1,2], *Christine Connors*[1], *Vicki Krause*[1]

Background

During the last two weeks of March 1995 anecdotal reports of an increase in the number of patients with an influenza-like illness were received from several urban and rural centres across the Top End of the Northern Territory. These reports were investigated by the Darwin Disease Control Centre (DCC) of the Department of Health and Community Services.

Aims of the investigation

1. To establish if an outbreak of an influenza-like illness was occurring in the Northern Territory and to determine its size.
2. To identify the causative agent(s).
3. To implement appropriate public health control measures such as providing appropriate information to health service providers and the general public and, if influenza, expediting early distribution and administration of the vaccine to at risk individuals.

Presence and extent of the outbreak

The first indication of the outbreak was an informal report from the school nurse at a Darwin boarding school of approximately 600 students who had seen 80 students with an influenza-like illness in a single week. Following this report, health service providers across the Territory were contacted by DCC staff and asked to identify and report cases, preferably defined using the clinical component of the Australian Sentinel Practice Research Network case definition for influenza:

Six of the following:

1. sudden onset of symptoms (within 12 hours)
2. cough
3. rigor or chills
4. fever
5. prostration and weakness
6. myalgia or widespread aches and pains
7. no significant respiratory physical signs other than redness of the nasal mucosa and throat
8. influenza in close contacts.

To help identify the causative organism, practitioners were also asked to take specimens from clinical cases for laboratory testing, and repeat serological testing was encouraged.

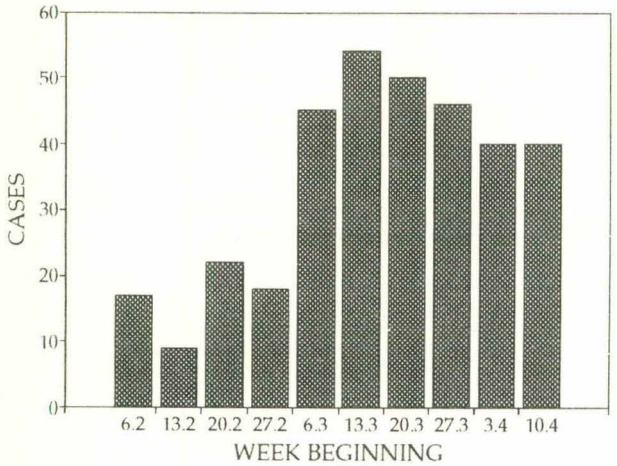
In response, Darwin general practitioners and Royal Darwin Hospital (RDH) accident and emergency staff reported an approximate fourfold increase in patients presenting with an influenza-like illness in the previous two weeks. Analysis of RDH accident and emergency records over ten weeks confirmed a sudden rise in the number of attendants who had been diagnosed with 'flu' or 'viral illness' and a total of 292 in the latest six weeks (Figure).

Initial reports from other major urban centres indicated that a similar situation existed in both Katherine and Nhulunbuy (in the Top End), but not further south in Tennant Creek or Alice Springs. Virtually all remote Aboriginal communities across the Top End of the Territory reported that large numbers of persons had been presenting with an influenza-like illness, with estimates of attack rates that ranged from ten to twenty per cent of their total populations. This was not reported initially for communities in the Katherine, Barkly or Alice Springs regions, however, reports obtained from these areas during the course of the investigation indicated that the influenza-like illness moved south during this period.

In addition, there were anecdotal reports of increased numbers of possibly associated deaths in remote Arnhem Land communities that had been experiencing this illness.

1. Disease Control Centre, Department of Health and Community Services, Darwin, Northern Territory.
2. National Centre for Epidemiology and Population Health, Australian National University, Canberra, Australian Capital Territory.

Figure. Royal Darwin Hospital Accident and Emergency Department diagnoses of 'flu' or 'viral illness', 6 February to 16 April 1995, by week



Identification of the cause(s) of the outbreak

A. Clinical and epidemiological evidence

The majority of cases reported had a clinical syndrome consistent with the clinical case definition. One inconsistent feature was that a small proportion of urban practitioners reported concurrent gastrointestinal symptoms in some cases.

Hospital staff reported an increase in patients admitted with complications following an influenza-like illness. These included atypical and bacterial pneumonias, exacerbations of asthma and other chronic lung diseases, and severe viral illnesses. There were two respiratory deaths in patients at high risk of complications from influenza.

The high attack rates in the small and relatively confined rural communities were also consistent with the epidemiology of influenza.

B. Laboratory testing

At least 80 patients, most of whom met the clinical case definition, were tested for influenza and other respiratory diseases.

The following criteria were considered to be diagnostic for influenza:

1. culture of an influenza virus from a throat swab or nasopharyngeal aspirate, and/or
2. a fourfold rise in antibody titre in paired sera taken during the acute and convalescent phase of the illness, and/or
3. a single high antibody titre in serum taken at least one week after the onset of an illness that fulfilled the clinical case definition for influenza given above. For specimens tested at the State Health Laboratories in Perth, a titre of 1:320 or greater by complement fixation testing (CFT) was accepted. For serum tested with a different CFT method at the Queensland Medical Laboratories in Brisbane, the accepted titre was 1:32.

Initial laboratory results suggested that a large proportion of the cases in this outbreak could be attributed to either influenza A virus or influenza B virus (Table). At the time of writing influenza A had been cultured from eight cases, and diagnosed serologically in a further 21, influenza B had been cultured in three cases and diagnosed serologically in a further six. One additional case had high antibody titres to both influenza A and B viruses and another had high titre to both influenza A and parainfluenza virus. A probable enterovirus had been cultured from a throat swab in two other cases, which also met the clinical case definition. All serological diagnoses were single high convalescent titres in patients with an appropriate clinical history.

Two influenza A isolates have been characterised by the World Health Organization Collaborating Centre for Influenza Reference and Research as similar to influenza A H_1N_1 Texas/36/91, which is included in the current influenza vaccine. The positive influenza A results came from several locations including urban Darwin and some remote communities across the Top End. The nine cases of influenza B were residents of Aboriginal communities on a group of islands off the north coast of the Territory which have a total population of approximately 2000.

Four cases who had a compatible clinical illness in the previous two to three weeks and for whom acute and convalescent serum samples were tested showed no rise in antibodies to influenza A virus, influenza B virus, parainfluenza viruses or adenoviruses.

Control measures

Information describing the known extent of the influenza-like illnes was distributed to all health practitioners across the Territory with the request for specimens. In addition, as there was sufficient evidence to suspect that the outbreak was influenza, practitioners were advised to administer influenza vaccine promptly to individuals in high risk groups (as defined by the National Health and Medical Research Council) and to health care workers in critical care areas

Table. Positive laboratory results, by virus

Virus	Positive cultures	Positive serology	Total
Influenza A virus	8	21[1]	29
Influenza B virus	3	6	9
Parainfluenza virus	0	2[2]	2
Probable enterovirus	2	0	2
Total	13	29	42

1. Includes one patient who was positive for influenza A and influenza B.
2. Includes one patient who was positive for influenza A and parainfluenza.

(to protect the patients) and in remote facilities (where there were few health care workers).

The local media followed the investigation with interest and accurately conveyed information from DCC which included advice to the public about who should receive influenza vaccine.

Almost all nursing homes and residential institutions for the aged had already administered influenza vaccine to appropriate residents and had offered it to the staff prior to contact from DCC. No illness compatible with influenza was reported from these facilities.

Discussion

Three major issues arose from this investigation.

1. Influenza surveillance

In the Northern Territory there is currently no formal surveillance system for influenza. It is not a notifiable disease, and there are no sentinel general practice schemes for reporting influenza-like illness. DCC was able to recognise this outbreak fairly quickly (although still at least two weeks after it began) through informal channels, made possible by our relatively small population and close links with service providers. A formal surveillance system may, however, allow for earlier recognition of future outbreaks, more rapid implementation of control measures and ideally result in a decrease in the incidence of severe complications.

The epidemiology of influenza in the Northern Territory has not been documented. There is some evidence to suggest that tropical areas may have a peak incidence of influenza in the months that fall between the northern and southern hemisphere winters[1,2,3,4,5]. If this is the case a surveillance system in northern Australia could possibly be useful as an early indication of influenza activity for the rest of Australia.

2. Timing of influenza vaccination

As in other parts of Australia, administration of the influenza vaccine in the Northern Territory usually starts in April. This outbreak was thus well established before the influenza vaccine had been distributed to many remote communities and prior to any formal promotion of its administration. The current timing of vaccine administration in the Northern Territory may therefore need to be reassessed.

3. Laboratory investigations

Very few results of laboratory investigations had been obtained after more than two weeks of investigating this large outbreak. Many factors contributed to this.

- Diagnostic testing for influenza is not routinely requested by practitioners and was delayed until the increase in numbers of clinical cases had been recognised.
- There were often delays associated with transporting specimens to Darwin from remote communities.
- No virology or influenza serology testing is available in the Northern Territory. Specimens were sent to one of three laboratories in Darwin which then send them interstate for testing.
- The majority of specimens went through the Royal Darwin Hospital laboratory which initially sent specimens away weekly. Interstate flights did not necessarily allow next day delivery and batching occurs in the reference laboratory.

Even with close liaison and cooperation with all relevant laboratories timely results were therefore difficult to obtain.

Summary

The recent large outbreak of an influenza-like illness in the Northern Territory is likely to have been predominantly due to a combination of influenza A and influenza B viruses, with an enterovirus or parainfluenza virus possibly contributing to lesser extents. The influenza A H_1N_1 strain identified is included in the current vaccine which was promoted in the public health response. The delays in the identification of the causative agents were largely a consequence of the relative isolation and limited laboratory resources available in the Northern Territory.

Establishing influenza surveillance systems and reassessment of the timing of the administration of influenza vaccinations in the Northern Territory are two issues worthy of further consideration.

References

1. Canil KA, Pratt RD, Sungu MS, et al. An outbreak of influenza A in the highlands of Papua New Guinea. *Southeast Asian J Trop Med Public Health* 1984;**15**:265-269.
2. Hope-Simpson RE. The role of season in the epidemiology of influenza. *J Hyg* 1980;**86**:35.
3. Hope-Simpson RE, Goulubev DB. A new concept of the epidemic process on influenza A virus. *Epidem Infect* 1987;**99**:5-54.
4. Reichelderfer PS, Kendal AP, Shortridge KF, Hampson A, et al. Influenza surveillance in the Pacific Basin. Seasonality of virus occurrence: a preliminary report. In: Chan Doraisingham Ling, editor. *Current Topics in Medical Virology. Invited Papers from the first Asia-Pacific Congress of Medical Virology* 412-437. World Scientific, 1988:412-437.
5. Silarug N, Foy HM, Kupradinon S, et al. Epidemic of fever of unknown origin in rural Thailand, caused by influenza A (H_1N_1) and dengue fever. *Southeast Asian J Trop Med Public Health* 1990;**21**:61-67.

NATIONAL INFLUENZA SURVEILLANCE 1994 - ANNUAL REPORT

Jenny Hargreaves, Helen Longbottom, Margaret Curran, AIDS/Communicable Diseases Branch, Department of Human Services and Health, for the Australian Capital Territory Department of Health and Community Care; Australian Sentinel Practice Research Network; Communicable Diseases Intelligence Virology and Serology Reporting Scheme Contributing Laboratories; New South Wales Department of Health; South Australian Health Commission; Telecom Australia; Victorian Department of Health and Community Services; World Health Organization Collaborating Centre for Influenza Reference and Research

Introduction

Influenza has the potential to cause significant morbidity and mortality especially in persons at high risk of complications. A national surveillance system is an important component of a program for the control of this disease and has as its main objectives:

- early detection of influenza epidemics, enabling efforts for public health actions such as vaccination of at risk persons not previously vaccinated to be appropriately targeted, and planning for possible impacts on the provision of clinical care,
- the collection and analysis of epidemiological information on influenza morbidity and mortality in order to characterise the nature of the epidemic, and to estimate the impact of the disease outbreaks and of control efforts such as vaccination campaigns,
- collection of influenza isolates and analysis of antigenic characteristics of the viruses to provide information on which antigenic variants should be included in the following season's vaccines[1].

Influenza activity has been reorded in Australia by the *CDI* Virology and Serology Laboratory Reporting Scheme since 1978. This Scheme has reported influenza activity each winter in Australia, except in 1986, and has formed the basis of past national influenza surveillance efforts. In 1994, national surveillance was expanded to include information from several other schemes collecting a range of data which can be used to measure influenza activity. Laboratory diagnoses of influenza provide the most specific marker of influenza activity, however, the sensitivity of this type of surveillance is low because only a small proportion of cases is laboratory confirmed. Other schemes were therefore used to provide less specific surveillance information which can be used as surrogate markers of influenza activity.

The results of each of the schemes were published together in *Communicable Diseases Intelligence* as *National Influenza Surveillance 1994*. The reports began in the issue of *CDI* of 30 May 1994 and finished with the issue of 31 October 1994.

This annual report of *National Influenza Surveillance 1994* aims to determine whether the surveillance met the objectives of an influenza surveillance system and to evaluate the surveillance methods used.

Surveillance methods

Five types of surveillance schemes were used to provide data for *National influenza surveillance 1994*. These were general practitioner surveillance, absenteeism surveillance, laboratory surveillance, total deaths surveillance, and hospital admissions for influenza and pneumonia. National coverage was not possible for each of the types of surveillance schemes.

SENTINEL GENERAL PRACTITIONER SURVEILLANCE

Four sentinel general practitioner schemes reporting influenza-like illness were included in the *National Influenza Surveillance 1994*: the Australian Sentinel Practice Research Network (ASPREN), the Australian Capital Territory Sentinel General Practice Scheme, the New South Wales Sentinel General Practitioner Scheme and the Victorian Sentinel General Practitioner

Table. Geographical locations of ASPREN recorders, March 1994

State or Territory	Recorders in major urban areas	Recorders in rural areas	Total
Australian Capital Territory	2	0	2
New South Wales	17	4	21
Northern Territory	0	3	3
Queensland	7	6	13
South Australia	34	9	43
Tasmania	3	1	4
Victoria	6	5	11
Western Australia	2	3	5
Total	71	31	102

Scheme. Analysis of data from these four schemes provides a national picture of influenza-like illness.

Australian Sentinel Practice Research Network

ASPREN is conducted by the Research and Health Promotion Unit of The Royal Australian College of General Practitioners in Adelaide. The Network has about 100 general practitioner recorders in locations throughout Australia (Table 1). Each week (beginning on Mondays) they monitored about 10,000 consultations and reported the number of cases of influenza-like illness, the age group and sex of the patients and the total number of consultations.

The number of influenza consultations and the number per 1000 consultations were reported in *CDI*, as were the major trends by State and Territory, when the data were available.

The ASPREN influenza case definition was

(a) viral culture or serological evidence of influenza virus infection, or

(b) influenza epidemic, plus four of the criteria in (c),

or

(c) six of the following:

- (i) sudden onset (within 12 hours)
- (ii) cough
- (iii) rigors or chills
- (iv) fever
- (v) prostration and weakness
- (vi) myalgia, widespread aches and pains
- (vii) no significant respiratory physical signs other than redness of nasal mucous membrane and throat
- (viii) influenza in close contacts.

Australian Capital Territory Sentinel General Practitioner Scheme

The Australian Capital Territory (ACT) Sentinel General Practitioner Scheme is conducted by the ACT Department of Health and Community Care. Seven general practitioners from the ACT reported the number of consultations for influenza and the total consultations for each week (beginning on Sundays). The rate of influenza reporting per 1000 consultations each week was included each fortnight. The case definition was as for ASPREN.

New South Wales Sentinel General Practitioner Scheme

The New South Wales Department of Health conducts sentinel general practitioner surveillance for influenza-like illness each year. In 1994, surveillance involved about 100 general practitioners monitoring about 15,000 weekly consultations in eight Public Health areas - Illawarra, Central and Southern Sydney, Western Sydney and Wentworth, Hunter, Eastern Sydney, North Sydney, Central Coast and Northern Districts.

The weekly rate of influenza reporting per 1000 consultations was included in the *National Influenza Surveillance 1994* report each fortnight. The case definition was all of the following:

(a) cough

(b) myalgia

(c) no abnormal respiratory physical signs other than inflammation of nasal mucous membranes and throat

(d) two of the following:

- (i) sudden onset (less than 12 hours)
- (ii) rigors, chills or fever
- (iii) prostration or weakness
- (iv) influenza in close contacts.

Victorian Sentinel General Practitioner Scheme

The Victorian Influenza Surveillance System is managed by the Department of Health and Community Services, Victoria. The sentinel general practitioner surveillance involved 30 general practitioners in the metropolitan and rural areas of Victoria. Fortnightly reports were made of the total number of consultations, the number of patients with influenza, the age and sex of the influenza patients and the postcode of the practice; the total number of influenza consultations and the influenza consultation rate were reported in *CDI*. Twelve of the metropolitan practitioners took throat washings from a maximum of four patients each week for laboratory analysis to provide an estimate of the accuracy of the clinical case definition used.

The case definition is at least four of eight criteria listed in (c) of the ASPREN case definition. In addition, practitioners are asked not to record cases of acute tonsillitis, otitis media, chest infections (that is those with pulmonary crepitations or rhonchi), acute sinusitis or coryza (simple head cold).

ABSENTEEISM SURVEILLANCE

Absenteeism surveillance provides a non-specific measure of the effects of influenza epidemics. The *National Influenza Surveillance 1994* included Telecom Australia sick leave absenteeism surveillance, which had the potential to measure national influenza activity affecting working age adults. Total absenteeism in a selection of schools in the Australian Capital Territory and in New South Wales[2] was also included, and had the potential to measure activity in children, which is more common with strains which have circulated in previous years.

Telecom Australia Absenteeism Surveillance

Telecom Australia has about 65,000 employees in locations throughout Australia. Each Wednesday, the number of employees absent on sick leave was recorded by the Office of the Chief Medical Officer in Melbourne, and published as part of the *National Influenza Surveillance 1994* report. Telecom processed sick leave forms fortnightly. Avalability of final data for a period was dependent on receipt of finalised sick leave

information; interim data were published with a delay of only 12 days, and finalised data with a delay of about two months.

New South Wales Schools Absenteeism Surveillance

The New South Wales Department of Health conducted schools absenteeism surveillance. Each week, about 17 schools, with about 11,000 students, reported their total student absenteeism for the week. The daily average percentage of students absent each week was included in the *National Influenza Surveillance 1994* report.

Australian Capital Territory Schools Absenteeism Surveillance

Schools absenteeism surveillance is conducted by the ACT Department of Health and Community Care. Six schools from throughout the ACT reported the total number of students absent and the total enrolled on each Tuesday. The percentage of students absent each Tuesday was included in the *National Influenza Surveillance 1994* report.

LABORATORY SURVEILLANCE

Laboratory diagnoses of influenza, and in particular influenza virus isolates, constitute the gold standard in influenza diagnosis and the gold standard in surveillance specificity[3]. In 1994, the *CDI* Virology and Serology Reporting Scheme's influenza reports were incorporated into the *National Influenza Surveillance 1994* reports as the most specific measure of influenza activity. The World Health Organization (WHO) Collaborating Centre for Influenza Reference and Research contributed reports on the results of subtyping of influenza viruses isolated during the season in Australia and elsewhere in the region, providing information on their antigenic characteristics and their relatedness to vaccine strains and strains detected elsewhere in the world.

CDI Virology and Serology Reporting Scheme

There were 18 sentinel laboratories from around Australia that contributed reports to the *CDI* Virology and Serology Reporting Scheme. Each influenza report included the laboratory identification, the date of specimen collection, the type of influenza virus (and subtype if known), the source specimen and information on the methods of isolation, direct identification and/or serology used to make the diagnosis. The age and sex of the patient, postcode and coded clinical information are also usually included. Influenza diagnoses were reported by type and diagnostic method, by week of specimen collection. Some age and sex, State, and clinical information was also included.

WHO Collaborating Centre for Influenza Reference and Research typing results

In 1994, the WHO Collaborating Centre for Influenza Reference and Research located at CSL Limited, Melbourne received virus isolates from throughout Australia and New Zealand, and from South Africa. Detailed antigenic analysis of all isolates was carried out using panels of polyclonal and monoclonal antisera and a panel of internationally agreed antigens. Updates on information collated about the strains were published in *CDI* at the beginning and the end of the season.

TOTAL DEATHS SURVEILLANCE

During influenza epidemics, there are increases in the number of deaths attributed to influenza, the number attributed to pneumonia and the total number of deaths[4,5]. Monitoring of total deaths can therefore provide influenza surveillance information which is sensitive to outbreaks caused by strains, such as influenza A H_3N_2, which are associated with high levels of mortality. These data were only collected for Victoria in 1994.

Victorian Total Deaths Surveillance

In 1994, data on fortnightly total numbers of deaths were collected by the Victorian Department of Health and Community Services, and they were reported as a rate per 10,000 population for each fortnight.

HOSPITAL ADMISSIONS FOR INFLUENZA AND PNEUMONIA

Hospital admissions for influenza and pneumonia rise during influenza epidemics, and can therefore be used in influenza surveillance.

Victorian hospital admissions

The Victorian Department of Health and Community Services monitored hospital admissions for influenza and/or pneumonia as part of its influenza surveillance system. In 1994, three hospitals documented all cases admitted with a provisional diagnosis of influenza and/or pneumonia each fortnight. The number of admissions and the rate per 100 admissions were reported in the fortnightly *National Influenza Surveillance* 1994 reports.

Results

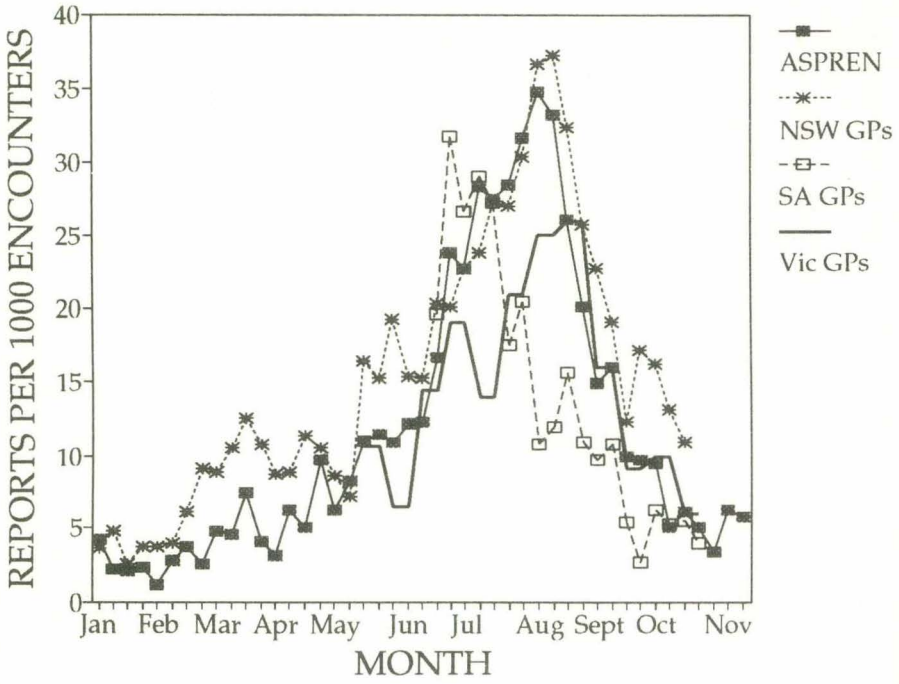
SENTINEL GENERAL PRACTITIONER SURVEILLANCE

The reports of consultations for influenza-like illness by sentinel general practitioners showed a peak in late August in the ASPREN scheme and in the New South Wales scheme and a peak in early September in the Victorian scheme. This surveillance provided a useful marker of influenza activity, demonstrated by the coinciding of the peaks measured by the schemes with the peaks in laboratory influenza isolates. It provided more timely information than the laboratory reporting scheme.

Australian Sentinel General Practice Research Network

The peak influenza activity in 1994, as measured by this scheme, was in late August (Figure 1), and the seasonal pattern was very similar to those recorded by the New South Wales and Victorian sentinel schemes. ASPREN data for South Australia showed a peak in late June coinciding with an outbreak of influenza A in Mount

Figure 1. Influenza cases per 1000 encounters: ASPREN, ASPREN for South Australia only, New South Wales and Victoria, by week



Gambier[6]. Age and sex information was not usually reported; most ASPREN influenza reports have been for persons in the 15 to 44 years age group. The reporting delay (between the last day of the reporting period to the date of publication in *CDI*) was usually 15 days, so this scheme provided very timely information.

Australian Capital Territory Sentinel General Practitioner Scheme

The peak influenza activity measured by this scheme was in late July (data not shown). The rates reported by this scheme fluctuated more widely than those reported by other schemes, perhaps due to the smaller number of practitioners contributing. The reporting delay was only about nine days, so this scheme provided very up to date information.

New South Wales Sentinel General Practitioner Scheme

The New South Wales scheme measured a peak in influenza activity at the same time as ASPREN did for Australia (late August), although there were higher reporting rates in autumn from the New South Wales scheme. The reporting delay was from 14 days, similar to the delay for ASPREN.

Victorian Sentinel General Practitioner Scheme

The Victorian sentinel general practitioners reported a peak in the influenza reports in early September, slightly later than in the ASPREN and New South Wales schemes. The reporting delay was usually 14 days, as for the New South Wales scheme. Reports were based on fortnights, rather than on weeks.

ABSENTEEISM SURVEILLANCE

Telecom Australia Absenteeism Surveillance

The interim data did not seem to identify any peak in influenza activity in 1994 (Figure 2). There was a slightly higher rate of sick leave absenteeism in the finalised data over the winter period in general, with a small peak at the beginning of August. Reporting delays for interim data were small.

Figure 2. Proportion of Telecom Australia staff on sick leave, by week and data type

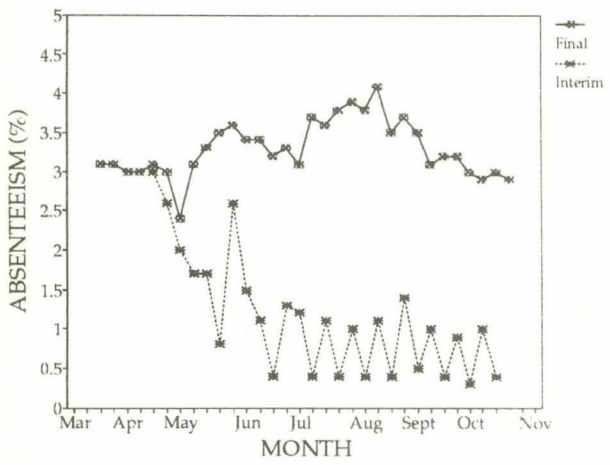
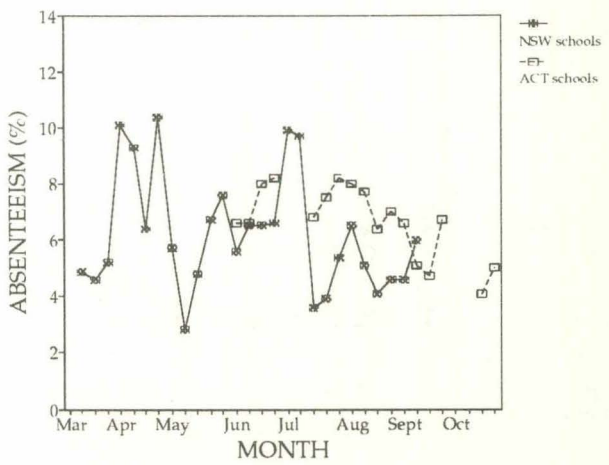


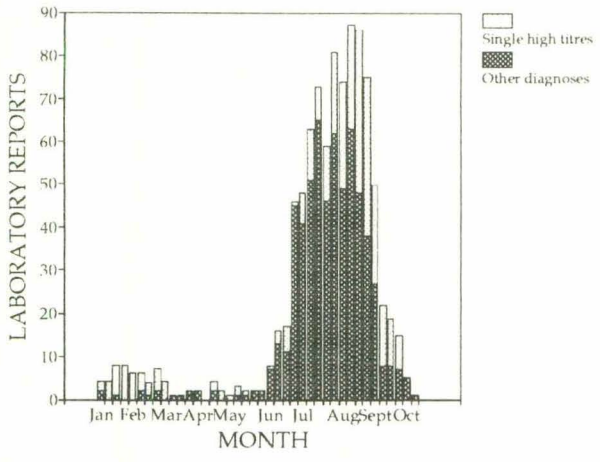
Figure 3. New South Wales and Australian Capital Territory school absenteeism surveillance, by week and scheme



New South Wales Schools Absenteeism Surveillance

The New South Wales schools absenteeism showed no apparent influenza-associated peak in absenteeism in 1994 (Figure 3). There was a reporting delay of between 10 and 22 days.

Figure 4. CDI influenza A laboratory reports, by method of diagnosis and week of specimen collection



Australian Capital Territory Schools Absenteeism Surveillance

As for the New South Wales schools, this surveillance did not reveal any influenza-associated increases in absenteeism (Figure 3). There were breaks in the data at times of school holidays, but the reporting delay was only six days.

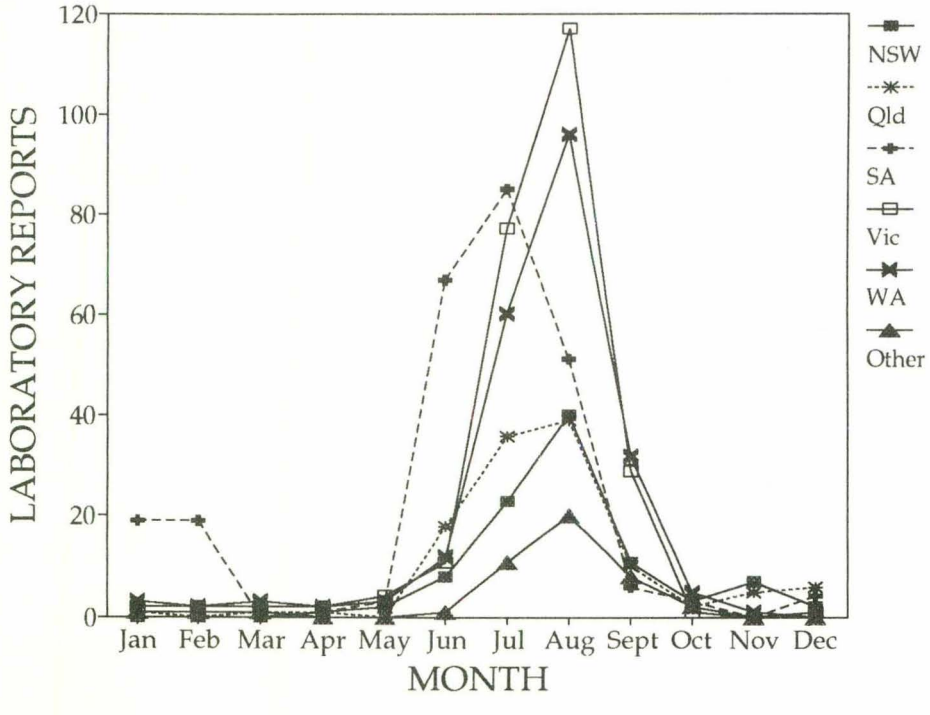
LABORATORY SURVEILLANCE

CDI Virology and Serology Reporting Scheme

The CDI scheme recorded an influenza season in which influenza A (H_3N_2) dominated. Compared with previous years, it was a moderate season. There were fewer influenza A and A H_3N_2 reports than in 1992, but more than in all the other years in which influenza A H_3N_2 predominated. Markedly increased numbers of reports were received in June, July, August and September, later than in 1992 but about the same as in other years.

There was a peak in influenza A reports diagnosed by methods other than single high titre (which is not as specific) in July and August 1994 (Figure 4). There were 929 reports to 31 October, 617 other than single high titre, and 67 isolates were identified as H_3N_2 subtype, some as A/Guangdong/25/93-like. Peaks were recorded in July in South Australia and in August in New South Wales, Victoria, Western Australia and Queensland. Most 1994 reports were for persons aged less than 25 years (Figure 6).

Figure 5. CDI influenza A laboratory reports, by month of specimen collection and State or Territory



There were 45 reports of influenza B in the season, 22 with diagnoses other than single high titres, and no seasonal peak (Figure 7). This was the smallest number of influenza B reported received by the Scheme since 1990.

The reporting delay was up to one to two months, depending on factors such as the method of diagnosis.

WHO Collaborating Centre for Influenza Reference and Research

The majority of influenza isolates received in the 1994 season by the Centre from Australia and New Zealand were influenza A H_3N_2 subtype. A total of 389 isolates were analysed. All showed some antigenic drift away from the 1994 vaccine strain A/Beijing/32/92 and reduced reactivity with A/Beijing antiserum. The vast majority (351) were demonstrated to be most

Figure 6. CDI influenza A laboratory reports, by age group and sex

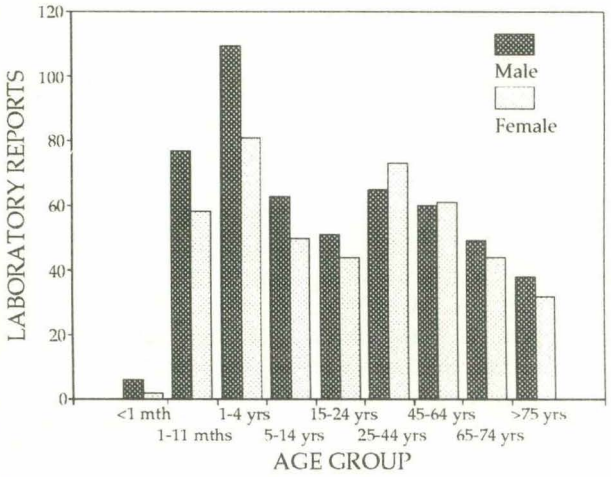
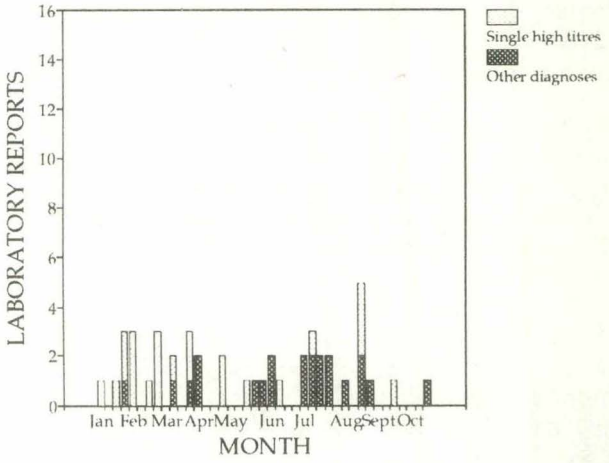


Figure 7. CDI influenza B laboratory reports, by method of diagnosis and week of specimen collection



closely related to the reference strain A/Guangdong/25/93. Small numbers of isolates (eight) were A/Shangdong/9/93-like and some strains were intermediate between these two reference strains.

The Collaborating Centre received only one influenza A H_1N_1 isolate, from New Zealand. It was characterised as A/Texas/36/91-like.

Local influenza B isolates were most closely related to B/Sichuan/8/92 but continued to react strongly with B/Panama antiserum.

TOTAL DEATHS SURVEILLANCE

Victorian Total Deaths Surveillance

Victorian total deaths surveillance data did not reveal a seasonal peak or a peak which seemed to be associated with influenza (Figure 8). The reporting delay was 14 days.

HOSPITAL ADMISSIONS FOR INFLUENZA AND PNEUMONIA

Victorian Hospital Admissions Surveillance

There was no apparent influenza-associated peak in hospital admissions for influenza and pneumonia measured in this scheme in 1994 (Figure 9). The reporting delay was 14 days.

SUMMARY OF THE 1994 RESULTS

Influenza activity was documented at levels above background by the sentinel general practitioner schemes from mid-June to mid-September with a peak in July-August and reporting delays of about two weeks.

Absenteeism surveillance had a small reporting delay but did not document increased absenteeism which appeared to be associated with influenza activity.

Laboratory reports monitored a moderate season, compared with previous years, with reports peaking in July-August. Most diagnoses were of influenza A, subtype H_3N_2, some characterised as

Figure 8. Victorian total deaths per 10,000 population, by fortnight

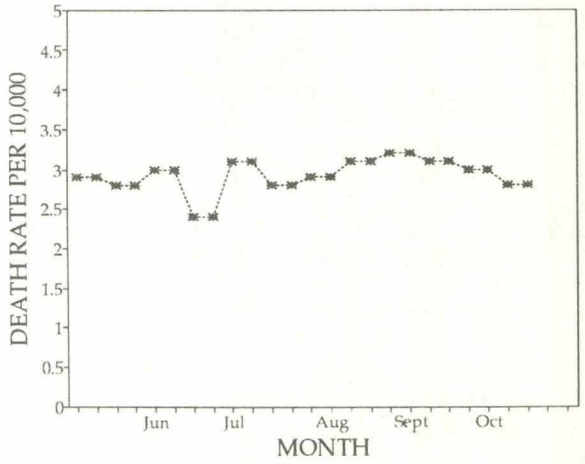
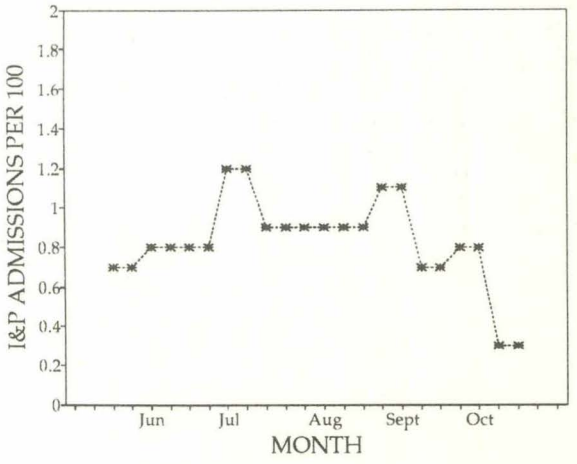


Figure 9. Victorian hospital influenza and pneumonia hospital admissions per 100 admissions, by fortnight



A/Guangdong/25/93-like, and thus drifted slightly from the 1994 vaccine strain.

Victorian total deaths surveillance and influenza and pneumonia admission surveillance revealed no increases that could be attributed to influenza.

Discussion

National influenza surveillance 1994 provided a timely national perspective on influenza activity in Australia in 1994. Retrospective comparison of data from the sentinel general practitioner schemes with data from the specific laboratory schemes show corresponding trends and thus provides some validation of the non-specific Schemes. Some of the surveillance systems are still in the developmental stage with respect to methods or national coverage. However, with time they will provide important baseline information to inform public health action in an epidemic year.

The sentinel general practitioner schemes provided timely information and there was good coverage for New South Wales, Victoria, the ACT and South Australia. The data from the ACT (not shown) demonstrated that if there is a small number of general practitioners contributing to a system there is a potential for the rates to be biased by a localised outbreak of influenza-like illness or individual diagnostic techniques. The data from the sentinel general practitioner schemes could be enhanced in 1995 by the use of uniform case definitions by all participating schemes, increased participation of general practitioners from all jurisdictions, and laboratory validation of a proportion of reported cases.

The utility of data from Telecom Australia absenteeism surveillance was limited by the fortnightly reporting cycles and the delay in receipt of final sick leave reports. While these data and data for school absenteeism showed no apparent trend for 1994, they did provide baseline information on absenteeism that may be useful in an epidemic year.

The laboratory reports continued to provide the most specific information on influenza for the year and to inform the development of the vaccine for the following season. However, these data are limited because of the small number of reports and delays in reporting. In addition there is a testing bias in a sentinel laboratory system, with the young and the elderly probably more likely to be tested for the virus. The *CDI* Virology and Serology Laboratory Reporting Scheme now has data on laboratory confirmed influenza activity since 1978. These data provide a unique baseline by which to measure seasonal influenza activity.

The Victorian total death data were timely. While no seasonal peak was observed this is not unexpected as there was not a severe epidemic in 1994, and possibly because of the relatively small population base involved. This surveillance method has been validated elsewhere[4,5] and the system will continue and be evaluated over time. The utility of the information may be enhanced if this information were collected for the whole year, allowing for better seasonal comparisons. Data could also be provided from other jurisdictions to improve national coverage and increasethe denominator population.

National influenza surveillance will commence next fortnight and incorporate a number of the revisions discussed in this report.

References

1. National influenza surveillance 1994. *Comm Dis Intell* 1994;**18**:261-267.
2. Sentinel school surveillance of influenza. *NSW Public Health Bulletin* 1993;**4**:33.
3. Dab W, Quenel P, Cohen JM, Hannoun C. A new influenza surveillance system in France: the Ile de France "GROG". 2. Validity of the indicators (1984-1989). *Eur J Epidemiol* 1991;**7**:579-589.
4. Scragg R. Effect of influenza epidemics on Australian mortality. *Med J Aust* 1985;**142**:98-102.
5. Curwen M, Dunnell K, Ashley J. Hidden influenza deaths. *BMJ* 1990;**300**:896.
6. Selden S, Cameron S. Influenza A outbreak at a Mount Gambier junior primary school, South Australia. *Comm Dis Intell* 1994;**18**:357-360.

CDI editorial comment

Reports from the northern hemisphere in 1994-1995 showed influenza A H_3N_2, influenza A H_1N_1 and influenza B viruses continued to circulate in many countries in Asia, the Americas and Europe[1]. There were few reports of influenza in October-December, but in January and February 1995 influenza activity increased.

Influenza was confirmed for the first time in the 1994-1995 season in an outbreak of influenza B in northern Portugal in October 1994. Elsewhere in Europe, a few cases of influenza A and influenza B were reported during Ocotber, November and December 1994. Outbreaks of influenza A H_3N_2 were reported in the United States and in several regions of China during December 1994 and January 1995. By mid-February 1995, 33 countries had reported influenza A and/or influenza B, including eight countries in Asia, four in the Americas and 20 in Europe.

Reference

1. Recommended composition of influenza virus vaccines for use in the 1995-1996 season. *WHO Wkly Epidemiol Rec* 1995;**70**:53-56.

WHO COLLABORATING CENTRE FOR INFLUENZA REFERENCE AND RESEARCH REPORT

Alan Hampson, WHO Collaborating Centre for Influenza Reference and Research, Melbourne

Preliminary antigenic analysis has been completed for a number of early influenza virus isolates received this season by the Centre. These include sporadic isolates of influenza A and B from Victoria, influenza A isolates from a school outbreak in a Melbourne suburb, a small number of both influenza A and influenza B isolates from the Northern Territory outbreaks and a single influenza A strain from Perth. Additional isolates of influenza A from South Australia and Queensland are currently being tested.

The influenza B strains have been characterised as B/Beijing/184/93-like - variants of B/Panama/45/90 (included in this year's vaccine) which show some lowering of reactivity with B/Panama antisera. (At its recent consultative meeting the WHO recommended that a B/Beijing-like strain should replace the B/Panama-like component of vaccines for the next Northern winter.) All of the Australian influenza A isolates studied to date are H_1 subtype viruses which on first analysis are A/Texas/36/91-like.

With the exception of an outbreak in New Zealand in 1993 there has been little activity by H_1 influenza viruses worldwide in recent years and the last significant activity in Australia was during 1988. Recent reports from the Northern Hemisphere and Asia indicate increasing activity by viruses of this subtype. As population immunity would be expected to be low in Australia, more widespread outbreaks of H_1 influenza would not be unexpected.

OVERSEAS BRIEFS

In the last two weeks, the following information has been supplied by the World Health Organization.

Meningococcal meningitis in Africa

There have been reports of recent resurgence of meningococcal meningitis in areas within the 'meningitis belt' in Africa. Higher than usual numbers of cases have been reported since November from areas of Niger, Benin, Nigeria and Sierra Leone.

Influenza in the Northern Hemisphere

Several countries of the Northern Hemisphere have reported late influenza seasons, as measured by a variety of indicators. Austria reported spread throughout the country in the two weeks ending 6 March, Belgium reported increases from the beginning of March, Canada reported increasing cases from the end of February and a peak in early March, Italy reported a peak in mid-February, Norway reported increased acitivity in late March, Romanian and Swiss activity was elevated in March, and there was a February peak in the United States.

Influenza A H_3N_2 has predominated in most areas, but influenza B has been common in some countries (Belgium in December-January, Norway, United Kingdom), and there have been several recent isolates of influenza A H_1N_1 (Canada, Norway, United Kingdom and United States).

Cholera update

Cholera cases have been reported for January, February and March from Cambodia, Cape Verde, El Salvador, Guinea Bissau, India, Kenya, Laos, Philippines, Singapore and in Rwandan refugee camps in Tanzania and Zaire.

CDI NOTICES TO READERS

International Influenza Conference, 4-9 May 1996, Cairns, North Queensland

The Third International Conference in the series Options for the Control of Influenza will be held in Cairns in May 1996. This will be a multidisciplinary meeting catering for workers involved in all aspects of influenza from basic research through development and licensing of new vaccines and therapeutics, to epidemiology and control programs. The Chairman of the Organising Committee is Alan W Hampson, WHO Collaborating Centre for Influenza Reference and Research, Melbourne, fax (03) 388 2063.

For further information and copies of the First Announcement contact:

Influenza '96 Conference Secretariat
GPO Box 128
SYDNEY NSW 2001

Fax: (02) 262 2323
Email: Tour Hosts@Tour Hosts.COM.AU.

Hepatitis C notifications in the Australian Capital Territory, January to June 1994 - addendum

An addendum has been received for 'Hepatitis C notifications in the Australian Capital Territory, January to June 1994', published in *CDI* 1995;**19**:183-188, from the author, Shriyash Mistry:

Acknowledgments

I wish to convey thanks to my supervisor, Ms Robyn Moroney, for her guidance, encouragement and support in the completion of this study. I also wish to thank Dr Aileen Plant, the co-supervisor of all aspects of the work, Mr Alec Percival of the Public and Environmental Health Service for his support, my colleagues, Ms Irene Passaris of the ACT Communicable Disease Section for assistance, guidance and the use of facilities, Dr Cathy Mead for permissions and support, Dr R Hall for guidance and my wife Hunsa.

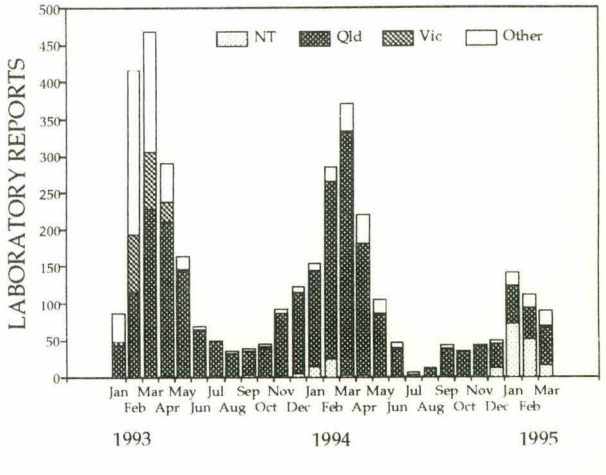
COMMUNICABLE DISEASES SURVEILLANCE

Virology and Serology Reporting Scheme

There were 997 reports received in the *CDI* Virology and Serology Reporting Scheme this fortnight (Tables 6, 7 and 8).

- **Rubella** was reported for 14 patients this fortnight including 4 females, 3 of whom were of childbearing age, and 9 males (one sex not stated). Diagnosis was by IgM detection (13) and fourfold rise in titre (one).
- Eleven reports of **hepatitis A** were received this period, all for patients under the age of 44 years. Included were 5 males and 5 females (one sex not stated).
- Positive **hepatitis B** serology was reported for 61 patients this fortnight, 31 males and 30 females. Thirty patients were in the 25 to 44 year age group, and 20 in the 15 to 24 year age group. Included were 5 pregnant females and one injecting drug user.
- Ninety reports of positive **hepatitis C** serology were received this period. Included were 54 males and 36 females. Sixty-three reports were for the 25 to 44 year age group. Included were 6 injecting drug users, 4 immunosuppressed patients and one pregnant female.
- **Hepatitis E** was reported for 2 patients, a 23 year old pregnant female from Victoria and a 31 year old Queensland male.
- **Ross River virus** was reported for 37 patients this fortnight, from the Australian Capital Territory (one), New South Wales (2), Northern Territory (3), Queensland (29), South Australia (one), and Tasmania (one). All diagnoses were presumptive (IgM detected). Included were 21 males, 16 females and one patient for whom sex was not stated. Specimen collection dates ranged from mid-March to early April. The number of reports remains low for the time of year (Figure 1).

Figure 1. Ross River virus laboratory reports, 1993 to 1995, by State and month of specimen collection



- Ten reports of **Barmah Forest virus** were received this period, from Queensland (8), the Northern Territory (one) and Victoria (one, a 40 year old female who developed arthritis, fever and rash after camping in Gippsland).
- **Flavivirus (unspecified)** was reported for 3 patients this period, 22 and 23 year old males and a 24 year old female, all of whom had recently returned from overseas travel (2 from Thailand, other unknown)
- Thirty-four reports of **adenovirus** were received this fortnight, 23 virus isolations and 11 antigen detections. Included were 3 reports each of adenovirus types **3, 7** and **8**.
- **Herpes simplex virus type 1** was reported for 133 patients this fortnight. Diagnosis was by virus isolation (126) and antigen detection (7). Included was virus isolation from the eye of a 4 year old male.
- One hundred and thirty-seven reports of **herpes simplex virus type 2** were received, diagnosed by virus isolation (135), antigen detection (one) and single high titre (one).
- There were 56 reports of **cytomegalovirus** this fortnight, 39 virus isolations, one antigen detection, 14 IgM detections and 2 single high titres. Included was virus isolation from the nasopharynx of a 6 week old female with microcephaly. Also included were 3 transplant recipients and one HIV positive patient.
- **Varicella-zoster virus** was reported for 41 patients this period. Method of diagnosis included virus isolation (14), antigen detection (19), nucleic acid detection (one), IgM detection (6) and single high titre (one). Included was a 62 year old male with encephalitis (nucleic acid detection in CSF) and a 6 month old female with suspected encephalitis and a recent history of varicella. More reports were received for the month of January than for any month recorded by this Scheme (Figure 2).
- **Papovavirus** was reported for 2 patients this period including detection by electron microscopy in the urine of a 29 year old transplant recipient.
- Twenty reports of **rhinovirus** were received this period including 17 patients under the age of 4 years.
- **Enterovirus** type 71 was isolated from the skin of a 16 month old male with suspected hand, foot and mouth disease.
- Thirty-one reports of **rhinovirus** were received this period, 16 for children under the age of 4 years.
- **Influenza A** was reported for 13 patients this fortnight. Included were 10 males and 3 females, 3 of whom were over the age of 65 years. Method of diagnosis included virus isolation (5, specimen collection dates mid-March to mid-April), antigen detection (4, specimens collected early to mid-April) and single high titre (4). A total of 44 reports has been received so far this year from New South Wales (10), Queensland (10), South Australia (4), Victoria (9), Western Australia (9) and the Northern Territory (2).
- Two reports of **influenza B** were received this period, for a 29 year old male and a 41 year old female, both from Victoria. Thirteen reports have been received so far this year from New South Wales (2), Queensland (5), South Australia (one) and Victoria (5).
- Twenty-four reports of **parainfluenza virus type 2** were received this period, 17 of which were for children under the age of 4 years. Fifteen reports have been received so far for the month of April, more than for any month since April of last year (Figure 3).

Figure 2. Varicella-zoster virus laboratory reports, 1993 to 1995, by method of diagnosis and month of specimen collection

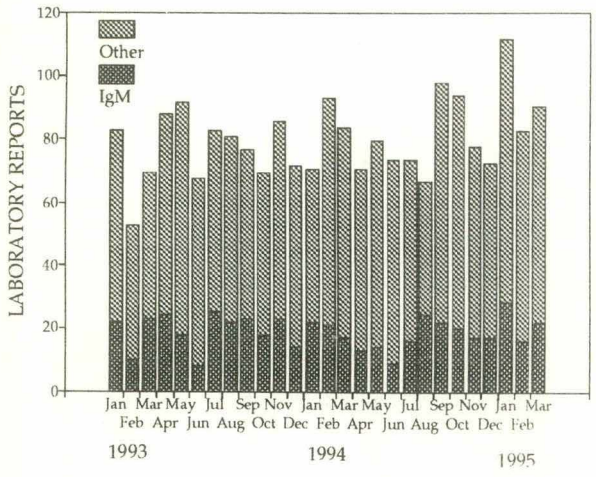
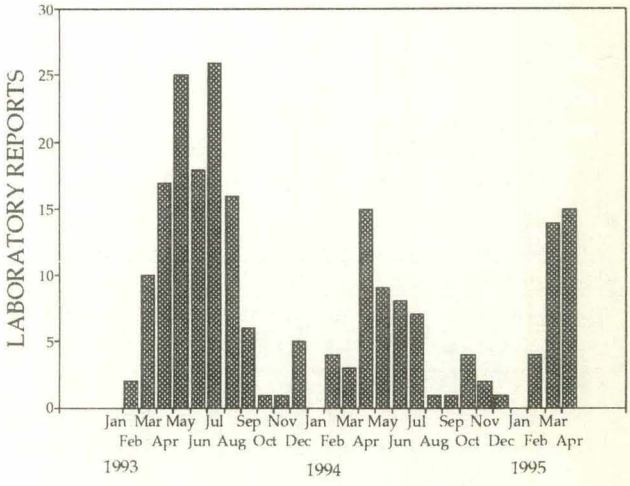


Figure 3. Parainfluenza virus type 2 laboratory reports, 1993 to 1995, by month of specimen collection



- **Parainfluenza virus type 3** was reported for 19 patients this fortnight, 15 in the under 4 years age group. Diagnosis was by virus isolation (8) and antigen detection (16). The number of reports has declined in recent months (Figure 4).
- Forty-three reports of **respiratory syncytial virus (RSV)** were received this fortnight, 32 for patients under one year of age. Diagnosis was by virus isolation (14) and antigen detection (29).
- **Rotavirus** was reported for 22 patients this period including 9 males and 13 females. Seventeen patients were under the age of 4 years.
- Forty-five reports of ***Chlamydia trachomatis*** were received this fortnight, including 11 males and 34 females. One patient was in the 5 to 14 year age group. Diagnosis was by culture (11), antigen detection (19), nucleic acid detection (14) and single high titre (one).
- **Q fever** was reported for 2 patients this period, a 32 year old Queensland male and a 64 year old Victorian male.
- Eleven reports of ***Bordetella*** were received this period including 6 ***Bordetella pertussis*** and 5 ***Bordetella*** species. Included were 5 males and 6 females. More reports were received for the month of February than for any month recorded by this Scheme (Figure 5).

Australian Sentinel Practice Research Network

Data for week 14 (ending 9 April) and week 15 (ending 16 April) are included in this issue of *CDI* (Table 1). There were 8449 consultations reported for week 14 and 6471 for week 15. The influenza reporting rate increased during this fortnight, with high rates reported in particular from the Northern Territory and Victoria. The rate of pertussis reporting has fallen over the last few weeks compared with earlier this year.

Figure 4. Parainfluenza virus type 3 laboratory reports, 1994 to 1995, by month of specimen collection

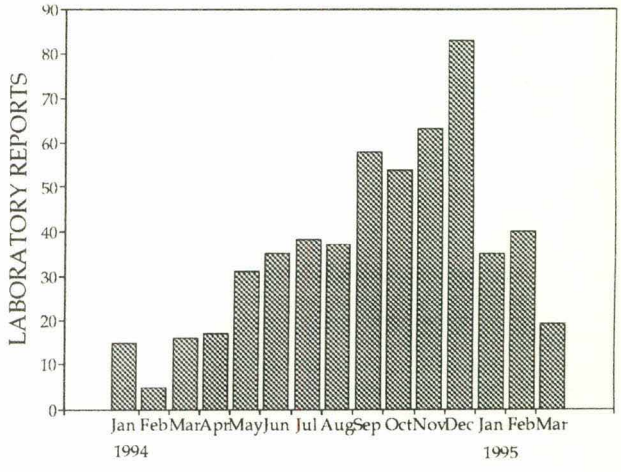


Figure 5. *Bordetella* laboratory reports, 1993 to 1995, by month of specimen collection

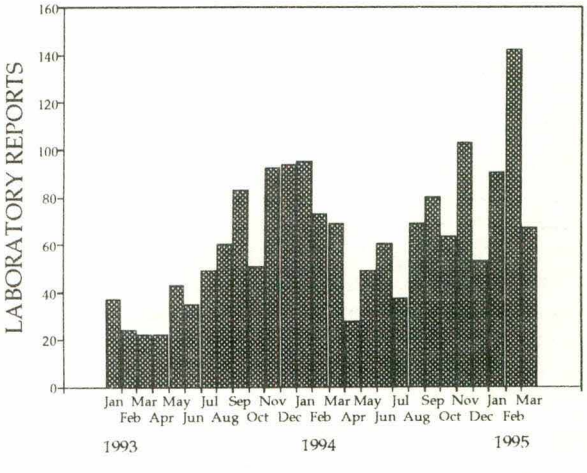


Table 1. Australian Sentinel Practice Research Network, weeks 14 and 15, 1995

Condition	Week 14, to 9 April 1995		Week 15, to 16 April 1995	
	Reports	Rate per 1000 encounters	Reports	Rate per 1000 encounters
Influenza	66	7.8	55	8.5
Rubella	7	0.8	2	0.3
Measles	2	0.2	0	0
Chickenpox	11	1.3	21	3.2
Pertussis	3	0.4	0	0
Gastroenteritis	110	13.0	87	13.4

Sterile Sites Surveillance (LabDOSS)

Data for this fortnight have been provided by 7 laboratories. There were 143 reports of recent significant sepsis:

New South Wales: John Hunter Hospital 20; Royal Prince Alfred Hospital 10.
Tasmania: Northern Tasmanian Pathology Service 1.
Western Australia: Princess Margaret Hospital for Children 11; Sir Charles Gairdner Hospital 15.
Northern Territory: Alice Springs Hospital 20.
South Australia: Institute of Medical and Veterinary Science 66.

An additional 91 reports of sepsis with specimen collection dates from October 1994 to February 1995 were received. Included was *Haemophilus influenzae* reported for 3 patients (all blood culture isolates), a 5 year old female (type b, patient unimmunised) and a 6 year old male both of whom had pneumonia and were from the Northern Territory. Also included was a 28 year old South Australian female (no diagnosis given). MRSA was reported for 42 and 53 year old males both of whom had IV central lines. Also included were 2 reports of *Streptococcus pneumoniae* meningitis, a one month old and a 3 year old, both females from the Northern Territory. *Bacteroides fragilis* was reported isolated from the CSF of a 12 year old female with meningitis. Reports with specimen collection dates prior to the first day of last month are not included in the fortnightly report in *CDI* but are added to the annual data.

Organisms reported 5 or more times from blood are detailed in Table 2. Other blood isolates not included in Table 2 were:

Gram positive: 1 *Corynebacterium* species, 2 *Enterococcus faecalis*, 1 *Streptococcus* Group A, 1 *Streptococcus* Group B, 1 *Streptococcus* group G, 1 *Streptococcus* 'viridans', 3 *Streptococcus* species.

Gram negative: 2 *Acinetobacter* species, 1 *Enterobacter aerogenes*, 1 *Enterobacter* species, 2 *Haemophilus influenzae* (57 and 80 year old females, both with pneumonia), 3 *Klebsiella oxytoca*, 3 *Klebsiella* species, 3 *Proteus mirabilis*, 1 *Pseudomonas* species, 1 *Salmonella* species, 1 *Serratia marcescens*, 2 *Xanthomonas maltophilia*.

Anaerobes: 1 *Bacteroides disiens*, 1 *Bacteroides* species, 1 *Clostridium perfringens*, 1 *Peptostreptococcus* species.

Fungi: 1 *Candida* species.

There were 85 blood isolates from patients over the age of 45 years (Figure 6).

Hospital acquired blood isolates

A total of 43 isolates was reported as being hospital acquired. The most commonly reported organisms were: *Staphylococcus aureus* (12, including 1 MRSA), *Pseudomonas aeruginosa* (6), and *Staphylococcus epidermidis* (4).

Meningitis and/or CSF isolate reports

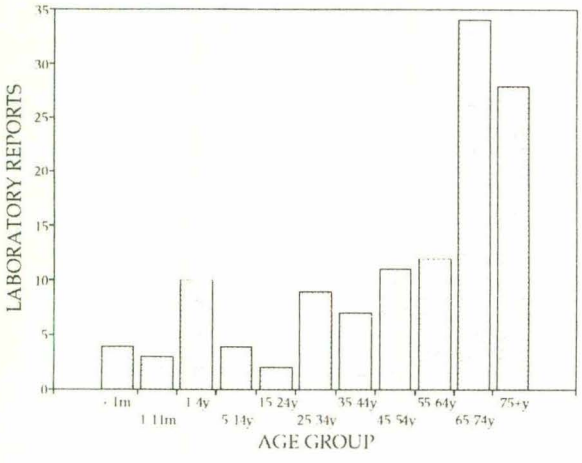
There were 4 reports of meningitis and/or CSF isolates. Included was 1 *Enterococcus faecalis* (5 week old Western Australian male who died), 1 *Haemophilus influenzae* (type b, one year old Western Australian male who died), 2 *Streptococcus pneumoniae* (18 month old male from New South Wales and 11 month female from the Northern Territory).

Table 2. LabDOSS reports of blood isolates, by organism and clinical information

Organism	Clinical information						Risk factors			Total[1]
	Bone/Joint	Lower respiratory	Endocarditis	Gastrointestinal	Urinary tract	Skin	Surgery	Immunosuppressed	IV line	
Staphylococcus aureus	3					5	3	11	3	24[2]
Staphylococcus epidermidis			1	1			1	6	3	13
Staphylococcus coagulase negative								1	1	6
Streptococcus pneumoniae		5				1				9
Escherichia coli				5	11			1		18
Klebsiella pneumoniae			1	1	1			2	1	6
Enterobacter cloacae				3			1		1	5
Pseudomonas aeruginosa		1		2	3	1	1	2	1	9

1. Only organisms with 5 or more reports are included in this table.
2. MRSA 2.

Figure 6. LabDOSS reports of blood isolates, by age group



Isolates from sites other than blood or CSF

Joint fluid: 1 *Enterobacter cloacae*, 1 *Escherichia coli*, 1 *Haemophilus influenzae* (5 year old unimmunised female with septic arthritis), 1 *Klebsiella pneumoniae*, 1 *Proteus mirabilis*, 1 *Staphylococcus* coagulase negative, 1 *Staphylococcus epidermidis*, 1 *Streptococcus* Group A, 1 *Streptococcus* Group G

Other: 1 *Fusobacterium* species, 1 *Proteus mirabilis*, 2 *Staphylococcus* coagulase negative, 1 *Streptococcus* species.

National Notifiable Diseases Surveillance System, 2 April 1995 to 15 April 1995

There were 1785 reports received in the period (Tables 3, 4 and 5 and Figure 9).

- There were 177 notifications of **Ross River virus infection** received; 81 cases were male and 96 cases were female. Recorded ages were between the 10-14 and the 80-84 years age groups with 75 % of cases in the 25-54 years age group. Statistical Divisions with the highest proportion of reports were Far North Queensland (26%), Northern Queensland (14%), the Northern Territory excluding Darwin (12%) and Brisbane, Queensland (12%). Recorded onset days were February (4), March (154), and April (19).
- A single notifications of **dengue** was reported for a female in the 30-34 years age group resident in a rural Statistical Division of Queensland.
- A single notification of **brucellosis** was received for a male in the 15-19 years age group resident in rural Queensland.
- There were 336 notifications of **campylobacteriosis** received; 176 cases were male, 157 cases were female, and the sex of 3 cases was not recorded. The cases were aged between the 0-4 and the 85-89 years age groups.
- Eighty-five case of **gonococcal infection** were reported; 54 cases were male, 29 cases were female, and the sex of 2 cases was unrecorded. Recorded ages were between the 0-4 and the 65-69 years age groups with a single case aged less than one year.
- Three notifications of ***Haemophilus influenzae* type b** were reported; one case was male and 2 cases were female. The case were aged between the 0-4 and the 45-49 years age group with a single case aged less than 5 years. Recorded onset dates were in April.
- There were 29 notifications of **hepatitis A** received; 18 cases were male and 11 cases were female. The cases were aged between the 0-4 and the 65-69 years age groups.
- Eleven incident cases of **hepatitis B** were reported; 5 cases were male and 6 cases were female. Recorded ages were between the 15-19 and the 75-79 years age groups.
- Twelve incident cases of **hepatitis C** were reported in the period. Seven cases were male and 5 cases were female. The cases were aged between the 15-19 and the 30-34 years age groups.
- A single notification of **hydatid infection** were received for a female in the 80-84 years age group.
- There were 4 cases of **legionellosis** reported; 3 cases were male and one case was female. Recorded ages were between the 35-39 years and the 50-54 years age groups. Onset dates were in December (one) and March (3).
- Five cases of **leptospirosis** were reported; 3 cases were male and 2 cases were female. The cases were aged between the 10-14 and the 45-49 years age groups. All cases were residents of rural Statistical Divisions in Queensland.
- There were 5 notifications of **listeriosis** received; 2 cases were male and 3 cases were female. Recorded ages were between the 0-4 and the 55-59 years age groups with a single case aged less than one year.

- Forty-one cases of **malaria** were reported; 25 cases were male and 14 cases were female. Seventeen of the cases were resident in the Statistical Division of Brisbane, Queensland. Recorded onset dates were in September (one), November (one), January (one), February (18), March (15), and April (4) (Figure 7).
- The number of reports of **measles** continues to decrease with 29 reports received for the period. Eighteen cases were male and 11 cases were female. Recorded ages were between the 0-4 and the 30-34 years age groups with a mean age of 8.3 years. There were 3 apparent clusters of between 2 and 4 cases each resident in the same postcode area. Apparent clusters were in the Northern Territory, New South Wales, and Queensland.
- Five cases of **meningococcal infection** were reported; 3 cases were male and 2 cases were female. Recorded cases between the 0-4 and the 25-29 years age group with 2 cases aged less than 5 years (Figure 8).
- There were 93 cases of **pertussis** reported; 43 cases were male, 49 cases were female, and the sex of one case was unrecorded. Cases were aged between the 0-4 and the 80-84 years age groups with mean age of 24 years. There was one case age less than one year. There were 10 apparent clusters of between 2 and 6 cases each in the same postcode area. Apparent clusters were in the Nothern Territory (one), News South Wales (one), Victoria (one), Queensland (five), Western Australia (one), and Tasmania (one).
- Nine notifications of **Q fever** were received; 7 cases were male and 2 cases were female. Cases were aged between the 20-24 years and the 55-59 years age groups. All cases were resident in Queensland.
- There were 52 cases of **rubella** reported; 35 cases were male and 17 cases were female. Recorded ages were between the 0-4 and the 75-79 years age group with a mean age of 22 years. There were 11 cases reported for females in the 15-44 years age group.
- There were 256 notifications of **salmonellosis** received; 132 cases were male, 118 cases were female, and the sex of 6 cases was not recorded. Forty-three per cent of cases were in the 0-4 years age group.
- Sixty cases of **syphilis** were reported; 26 cases were male, 31 cases were female, and the sex of a three cases was unrecorded. Cases were aged between the 15-19 and the 80-84 years age groups with 13 cases in the 15-19 years age group.
- There were 33 cases of **tuberculosis** reported; 23 cases were male, 9 cases were female, and the sex of one case was unrecorded.
- There were 11 notifications of **yersiniosis** received; 5 cases were male and 6 cases were female. Recorded ages were between the 0-4 and the 45-49 years age groups.

Figure 7. Notifications of malaria, January 1993 to April 1995, by State and month of onset

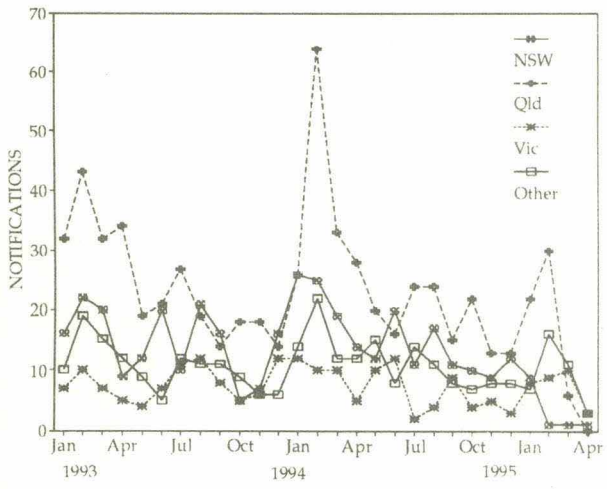


Figure 8. Notifications of meningococcal infection, January 1993 to April 1995, by age group and sex

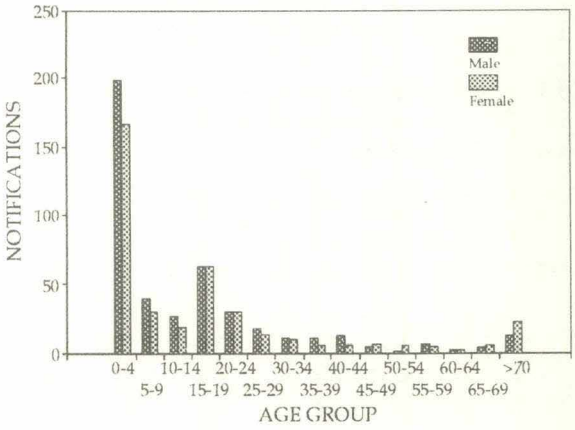
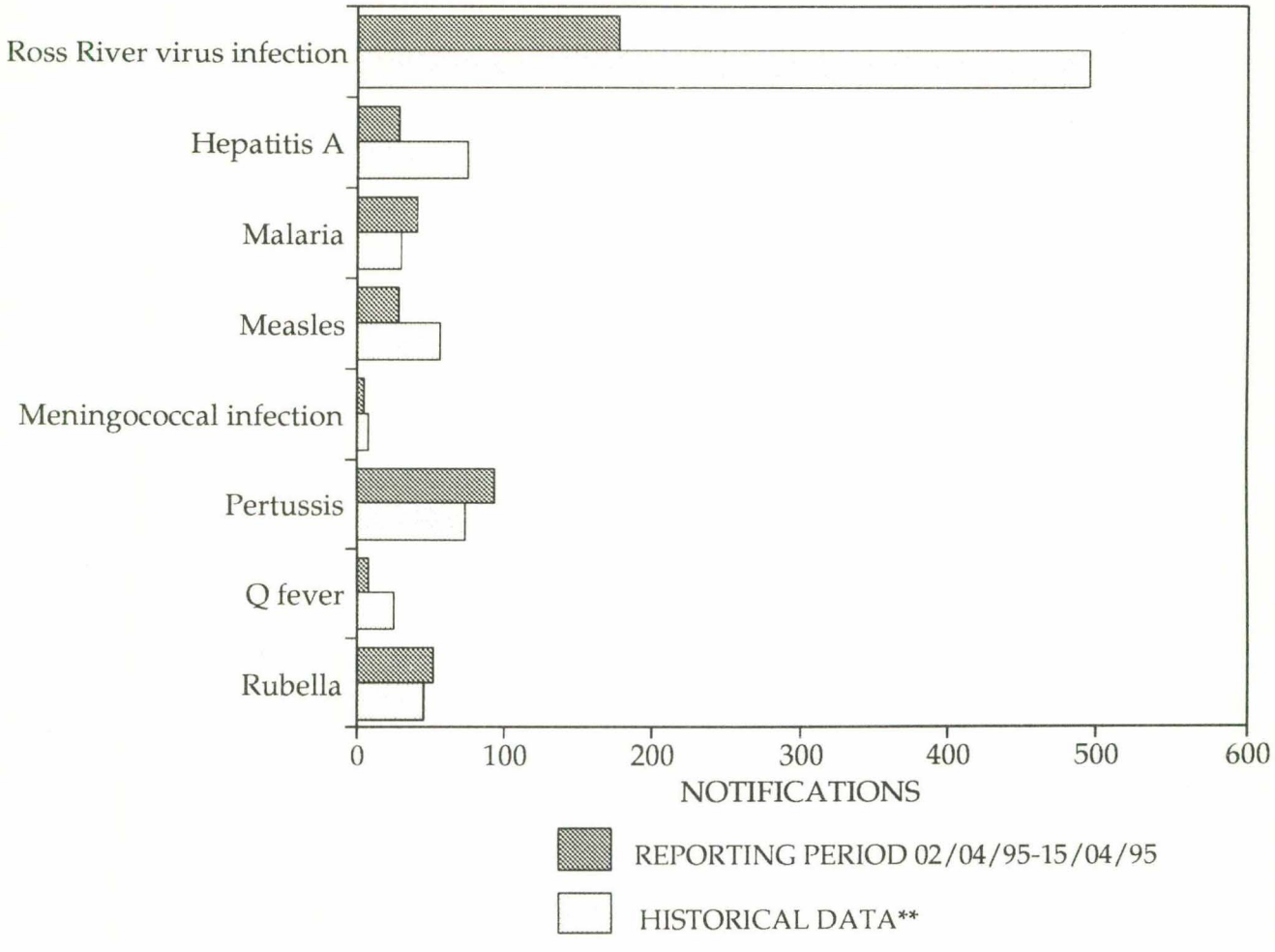


Figure 9. Selected National Notifiable Diseases Surveillance System reports, and historical data[1]



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.

Table 3. Notifications of diseases preventable by vaccines recommended by the NHMRC for routine childhood immunisation, received by State and Territory health authorities in the period 2 to 15 April 1995

DISEASES	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	TOTALS FOR AUSTRALIA[1]			
									This period 1995	This period 1994	Year to date 1995	Year to date 1994
Diphtheria	0	0	0	0	0	0	0	0	0	2	1	13
Haemophilus influenzae b infection	0	1	0	0	0	1	1	0	3	11	29	62
Measles	1	9	3	7	0	0	5	4	29	90	605	1003
Mumps	1	0	NN	NN	0	0	0	0	1	0	13	5
Pertussis	2	14	6	34	3	6	7	21	93	130	1415	1922
Poliomyelitis	0	0	0	0	0	0	0	0	0	0	0	0
Rubella	0	1	0	33	5	0	11	2	52	38	764	556
Tetanus	0	0	0	0	0	0	0	0	0	1	2	6

1. 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.

NN Not Notifiable.

Table 4. Notifications of other diseases[1] received by State and Territory health authorities in the period 2 to 15 April 1995

DISEASES	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	TOTALS FOR AUSTRALIA[2] This period 1995	This period 1994	Year to date 1995	Year to date 1994
Arbovirus infection												
Ross River virus infection	0	17	21	136	0	-	0	3	177	350	829	2422
Dengue	0	0	0	1	0	-	0	0	1	3	7	9
NEC[3]	0	28	2	20	0	2	6	0	58	27	286	225
Campylobacteriosis[4]	8	-	21	92	88	18	71	38	336	344	3106	2800
Chlamydial infection (NEC)[5]	1	NN	31	84	7	5	36	19	183	217	1783	1923
Donovanosis	0	NN	1	1	NN	0	0	0	2	3	27	31
Gonococcal infection[6]	2	10	21	30	1	0	3	18	85	113	836	923
Hepatitis A	0	8	0	6	1	1	6	7	29	71	526	590
Hepatitis B incident	0	1	0	1	3	0	3	3	11	27	88	377
Hepatitis C incident	-	0	0	-	12	-	-	-	12	0	27	3
Hepatitis C unspecified	11			90		0	102	33	236	326	2334	1623
Hepatitis (NEC)	0	0	0	0	0	0	0	NN	0	0	11	16
Legionellosis	0	2	0	0	1	0	1	0	4	10	66	59
Leptospirosis	0	0	0	5	0	0	0	0	5	6	39	66
Listeriosis	2	0	0	1	0	0	2	0	5	4	31	11
Malaria	1	1	6	23	0	0	6	4	41	12	180	154
Meningococcal infection	0	0	0	3	0	1	1	0	5	11	83	83
Ornithosis	1	NN	0	0	1	0	1	0	3	6	47	34
Q fever	0	0	0	9	0	0	0	0	9	19	132	193
Salmonellosis (NEC)	0	33	23	67	30	5	83	15	256	298	2554	2255
Shigellosis[4]	0	-	10	9	3	0	5	4	31	49	291	272
Syphilis	0	27	2	20	0	0	9	2	60	72	606	678
Tuberculosis	2	9	5	3	2	0	12	0	33	34	327	311
Typhoid[7]	0	0	0	0	0	0	0	0	0	1	14	15
Yersiniosis (NEC)[4]	0	-	0	5	6	0	0	0	11	20	130	178

1. For HIV and AIDS, see Tables 2 and 3 *CDI* 1995;19:168. For rarely notified diseases, see Table 6.
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. NSW: only as 'foodborne disease' or 'gastroenteritis in an institution'.
5. WA: genital only.
6. NT, Qld, SA and Vic: includes gonococcal neonatal ophthalmia.
7. NSW, Vic: includes paratyphoid.

NN Not Notifiable.

NEC Not Elsewhere Classified.

\- Elsewhere Classified.

Table 5. Notifications of rare[1] diseases received by State and Territory health authorities in the period 2 to 15 April 1995

DISEASES	Total this period	Reporting States or Territories	Year to date 1995
Botulism	0		0
Brucellosis	1	Qld	10
Chancroid	0		2
Cholera	0		0
Hydatid infection	1	NSW	9
Leprosy	0		2
Lymphogranuloma venereum	0		1
Plague	0		0
Rabies	0		0
Yellow fever	0		0
Other viral haemorrhagic fevers	0		0

1. Fewer than 50 cases of each of these diseases were notified each year during the period 1988 to 1993.

Table 6. Virology and serology laboratory reports by State or Territory[1] for the reporting period 6 to 19 April 1995, historical data[2], and total reports for the year

	State or Territory[1]								Total this fortnight	Historical data[2]	Total reported this year
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA			
MEASLES, MUMPS, RUBELLA											
Measles virus			1	1					2	14.8	227
Rubella virus		5		8	1				14	14.0	454
HEPATITIS VIRUSES											
Hepatitis A virus		3		4	1		3		11	14.8	167
Hepatitis B virus	2	1	3	26			29		61	103.3	775
Hepatitis C virus	6	9	5	32	18		20		90	179.7	2,052
Hepatitis E virus				1			1		2	.0	5
ARBOVIRUSES											
Ross River virus	1	2	3	29	1	1			37	151.0	447
Barmah Forest virus			1	8			1		10	12.2	90
Dengue type 1		1							1	.0	3
Flavivirus (unspecified)							3		3	2.0	17
ADENOVIRUSES											
Adenovirus type 1							1		1	1.5	13
Adenovirus type 3					1		2		3	10.8	29
Adenovirus type 7					3				3	.5	12
Adenovirus type 8							3		3	3.0	5
Adenovirus not typed/pending	1	4		6	3		6	4	24	40.8	315
HERPES VIRUSES											
Herpes simplex virus type 1		4		68	19		41	1	133	140.5	1,674
Herpes simplex virus type 2		4	3	66	25		37	2	137	172.2	1,589
Herpes simplex not typed/pending	11	3		1	1			1	17	23.7	185
Cytomegalovirus		3		18	1	4	23	7	56	56.2	523
Varicella-zoster virus		2		19	5		14	1	41	36.0	411
Epstein-Barr virus		5	1	22	10	2	10		50	56.2	751
OTHER DNA VIRUSES											
Papovavirus group					1		1		2	.0	4
Parvovirus					1				1	3.3	51
PICORNA VIRUS FAMILY											
Coxsackievirus B2	1								1	1.0	6
Coxsackievirus B3	1	1							2	.5	18
Echovirus type 6					1				1	2.7	30
Echovirus type 23					1				1	.0	2
Echovirus type 30	1								1	8.2	30
Poliovirus type 1 (uncharacterised)	1				1				2	1.3	10
Poliovirus type 3 (uncharacterised)		1							1	.8	3
Rhinovirus (all types)		1		4			15		20	24.3	239
Enterovirus type 71 (BCR)							1		1	.0	1
Enterovirus not typed/pending		1		17			9		27	35.0	325

Table 6. Virology and serology laboratory reports by State or Territory[1] for the reporting period 6 to 19 April 1995, historical data[2], and total reports for the year, continued

	State or Territory[1]								Total this fortnight	Historical data[2]	Total reported this year
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA			
ORTHO/PARAMYXOVIRUSES											
Influenza A virus		3	2	2			5	1	13	3.5	69
Influenza B virus							2		2	2.5	18
Parainfluenza virus type 1							5		5	19.2	11
Parainfluenza virus type 2				3	2	1	17	1	24	5.7	35
Parainfluenza virus type 3		2		5			8	4	19	12.2	211
Respiratory syncytial virus		12		11			17	3	43	42.5	199
OTHER RNA VIRUSES											
HIV-1				5					5	5.3	23
Rotavirus					3	1	1	17	22	28.5	302
OTHER											
Chlamydia trachomatis not typed	5	3	3	22	9		3		45	102.0	802
Chlamydia psittaci							4		4	3.2	69
Mycoplasma pneumoniae				4			1		5	48.2	116
Coxiella burnetii (Q fever)				1			1		2	11.5	89
Streptococcus group A		4	1	8					13	10.3	141
Yersinia enterocolitica		1							1	.2	18
Bordetella pertussis				1			5		6	12.0	312
Bordetella species			1	4					5	2.8	57
Cryptococcus neoformans		1							1	.0	7
Cryptococcus species				1					1	.3	11
Leptospira species				1					1	1.0	11
Treponema pallidum		9	3	2			1		15	18.2	255
Entamoeba histolytica		1							1	.2	6
Toxoplasma gondii		2					2		4	2.3	33
TOTAL	30	89	27	400	108	9	292	42	997	1,441.8	13,264

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 7. Virology and serology laboratory reports by clinical information for the reporting period 6 to 19 April 1995

	Encephalitis	Meningitis	Respiratory	Gastrointestinal	Hepatic	Skin	Eye	Muscle/joint	Genital	Other/unknown	Total
MEASLES, MUMPS, RUBELLA											
Measles virus										2	2
Rubella virus			1			4				9	14
HEPATITIS VIRUSES											
Hepatitis A virus				1	4					6	11
Hepatitis B virus					23					38	61
Hepatitis C virus				1	40				1	48	90
Hepatitis E virus					1					1	2
ARBOVIRUSES											
Ross River virus						2		10		25	37
Barmah Forest virus						1		1		8	10
Dengue type 1										1	1
Flavivirus (unspecified)										3	3
ADENOVIRUSES											
Adenovirus type 1										1	1
Adenovirus type 3			1				2				3
Adenovirus type 7			3								3
Adenovirus type 8							3				3
Adenovirus not typed/pending			10	11			1			2	24
HERPES VIRUSES											
Herpes simplex virus type 1			7			68	5		47	6	133
Herpes simplex virus type 2						34			95	8	137
Herpes simplex not typed/pending			2			4			3	8	17
Cytomegalovirus			21	1	1	1	1		1	30	56
Varicella-zoster virus	2					28				10	41
Epstein-Barr virus			2							48	50
OTHER DNA VIRUSES											
Papovavirus group										2	2
Parvovirus								1			1
PICORNA VIRUS FAMILY											
Coxsackievirus B2										1	1
Coxsackievirus B3			1							1	2
Echovirus type 6			1								1
Echovirus type 23			1								1
Echovirus type 30										1	1
Poliovirus type 1 (uncharacterised)			2								2
Poliovirus type 3 (uncharacterised)										1	1
Rhinovirus (all types)			15							5	20
Enterovirus type 71 (BCR)						1					1
Enterovirus not typed/pending		2	11	5		4				5	27

Table 7. Virology and serology laboratory reports by clinical information for the reporting period 6 to 19 April 1995, continued

	Encephalitis	Meningitis	Respiratory	Gastrointestinal	Hepatic	Skin	Eye	Muscle/joint	Genital	Other/unknown	Total
ORTHO/PARAMYXOVIRUSES											
Influenza A virus			7							6	13
Influenza B virus			1							1	2
Parainfluenza virus type 1			5								5
Parainfluenza virus type 2			21							3	24
Parainfluenza virus type 3			17							2	19
Respiratory syncytial virus			38							5	43
OTHER RNA VIRUSES											
HIV-1										5	5
Rotavirus				22							22
OTHER											
Chlamydia trachomatis not typed									34	11	45
Chlamydia psittaci			3							1	4
Mycoplasma pneumoniae			3							2	5
Coxiella burnetii (Q fever)										2	2
Streptococcus group A			4							9	13
Yersinia enterocolitica										1	1
Bordetella pertussis			6								6
Bordetella species			2							3	5
Crytococcus neoformans										1	1
Cryptococcus species										1	1
Leptospira species										1	1
Treponema pallidum									1	14	15
Entamoeba histolytica										1	1
Toxoplasma gondii										4	4
TOTAL	2	2	185	41	69	147	12	12	182	344	997

Table 8. Virology and serology laboratory reports by contributing laboratories for the reporting period 6 to 19 April 1995

STATE OR TERRITORY	LABORATORY	REPORTS
Australian Capital Territory	Woden Valley Hospital, Canberra	33
New South Wales	Prince Henry/Prince of Wales Hospitals, Sydney	31
	Royal Alexandra Hospital for Children, Camperdown	32
Queensland	Queensland Medical Laboratory, West End	327
	State Health Laboratory, Brisbane	118
South Australia	Institute of Medical and Veterinary Science, Adelaide	108
Tasmania	Northern Tasmanian Pathology Service, Launceston	1
Victoria	Microbiological Diagnostic Unit, University of Melbourne	3
	Monash Medical Centre, Melbourne	57
	Royal Children's Hospital, Melbourne	76
	Victorian Infectious Diseases Reference Laboratory, Fairfield Hospital	167
Western Australia	Princess Margaret Hospital, Perth	44
TOTAL		997