



ONE HUNDRED YEARS OF VACCINATION

In the December 1996 issue of the *NSW Public Health Bulletin* we foreshadowed that some of the papers presented at the 1996 NSW Public Health Network conference would be published in future issues. The paper leading this issue is based on an address given at the conference by Dr Brian Feery: One hundred years of vaccination.

- Editor

Vaccination has been the most successful medical procedure ever introduced. It has saved more lives than any other intervention, and it has prevented more disability¹. The risk of serious adverse reactions has remained extraordinarily low for all modern vaccines². Within the past 30 to 50 years, the common vaccine-preventable diseases have been controlled and largely eliminated from the developed world, and these successes are being repeated in the developing world. Edward Jenner had predicted that smallpox vaccine would rid the world of smallpox and this was finally achieved in 1977³. In 1978 Albert Sabin stated that poliomyelitis, measles, rubella and mumps could also be eradicated if enough people were willing and able to take the responsibility for doing so³. In addition, it is possible to control and virtually eradicate the bacterial diseases such as pertussis, diphtheria and *Haemophilus influenzae* disease if universal vaccination is achieved and maintained.

Australia embraced vaccination procedures much earlier than many other countries⁴. Smallpox vaccine was imported in 1803, just five years after the publication of Jenner's monograph. The vaccine was produced in Sydney in 1847 and in Victoria in 1882 and used to curtail outbreaks in this country⁵. Soon after the development of bacterial vaccines in Europe in the 1880s and 1890s, plague vaccine was imported to Australia to control an outbreak in Sydney⁶. In the earliest years of this century vaccines and antisera were imported from the Pasteur Institute in France, the British Institute of Preventative Medicine in London, the Behring Institute in Germany, and from Parke Davis in the United States⁷. After the demonstration that typhoid vaccines were effective in the Boer War, the production of this vaccine began in several laboratories in Australia.

When World War I began in 1914 Australia remained dependent on the importation of vaccines, antisera and diagnostic agents.

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TABLE 1

DEATHS IN AUSTRALIA FROM COMMON PREVENTABLE DISEASES, 1926 TO 1995

| Period | Diphtheria | Pertussis | Tetanus | Poliomyelitis | Measles ^a | Population average |
|-----------|--------------------|--------------------|------------------|------------------|----------------------|--------------------|
| 1926-1935 | 4,073 ^b | 2,808 | 879 | 430 | 1,102 | 6,600,000 |
| 1936-1945 | 2,791 | 1,693 ^b | 655 | 618 | 822 | 7,200,000 |
| 1946-1955 | 624 | 429 | 625 ^b | 1,013 | 495 | 8,600,000 |
| 1956-1965 | 44 | 58 | 280 | 123 ^b | 210 | 11,000,000 |
| 1976-1985 | 2 | 14 | 31 | 2 | 62 | 14,900,000 |
| 1986-1995 | 2 | 9 | 21 | 0 | 32 | 17,300,000 |

Notes:

(a) These numbers exclude deaths from subacute sclerosing panencephalitis.

(b) Decade in which community vaccination started for the disease.

Source:

Commonwealth year books. Canberra: Australian Government Publishing Service.

TABLE 2

REDUCTION IN MORTALITY WITH VACCINATION FOR COMMON PREVENTABLE DISEASES IN AUSTRALIA

| Disease | Year of onset of public vaccination | Reduction in mortality rate (%) |
|---------------|-------------------------------------|---------------------------------|
| Diphtheria | 1932 | 100 |
| Pertussis | 1942 | 99 |
| Tetanus | 1953 | 99 |
| Poliomyelitis | 1956 | 100 |
| Measles | 1970 | 91 |

Source:

Commonwealth year books. Canberra: Australian Government Publishing Service.

One hundred years of vaccination

► Continued from page 61

Limited shipping rapidly led to a shortage of these agents, and in 1915 the Commonwealth government decided to start a federal institute in Melbourne on the site of the present Commonwealth Serum Laboratories.

The first stimulus to the production of vaccines and antisera in Australia was the threat of shortages during the war. The second was the decision that all service personnel should be vaccinated with smallpox vaccine and typhoid vaccine. The third was the outbreak of pandemic influenza in Europe in 1918, and the demonstration that a bacterial vaccine containing respiratory pathogens could reduce mortality from secondary pneumonia⁴. A mixed bacterial vaccine was produced at the Serum Laboratories from pathogens derived from throat cultures from some of the earliest cases. Three million doses were used in the course of the epidemic. Interestingly, there was good evidence that the mortality from influenza infection was reduced by vaccination but there was naturally no impact on the incidence of influenza infection.

The widespread use of vaccines during the war and the success of vaccine in the influenza epidemic induced confidence in this form of preventive medicine. In the 20 years between the influenza epidemic and World War II there was a steady increase in the development and use of vaccines.

The outbreak of World War II provided another stimulus to the development of vaccines. There was a fear that a pandemic of influenza might recur and decimate the armed services. The influenza virus had been isolated from swine in 1930 and from humans in 1933. In Australia, Burnet was developing live virus vaccines when Francis and his colleagues in America showed that killed influenza virus vaccines were effective. The armed services decided that killed vaccines should be prepared to protect the armed personnel and so these vaccines were produced in Australia and released for use in the Australian and British services in 1945.

In the 50 years after the end of the war, the introduction of cell culture technology enabled the production of the modern viral vaccines for the prevention of poliomyelitis, measles, rubella, mumps and hepatitis. In addition, the older bacterial vaccines were purified, and standardised according to international requirements to ensure that efficacy,

FIGURE 1

MEASLES NOTIFICATIONS, AUSTRALIA, JAN 1992 TO DEC 1995

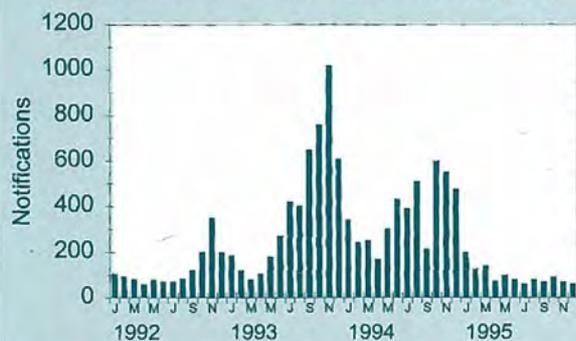
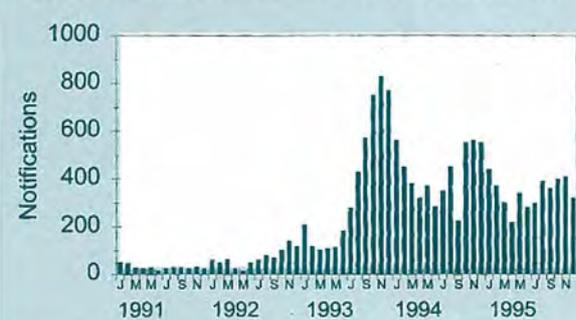


FIGURE 2

PERTUSSIS NOTIFICATIONS, AUSTRALIA, JAN 1991 TO DEC 1995



potency and safety could be maintained. Multi-component vaccines were also formulated to simplify vaccine schedules and reduce the number of doses required. The modern age of vaccination had arrived.

What does the Australian experience reveal about the success of vaccination? The results of the national campaigns are shown in Table 1 and Table 2. It can be seen that soon after community-based campaigns were introduced a dramatic reduction occurred in the number of deaths resulting from the common vaccine-preventable diseases. In the decade in which public vaccination began in Australia 9,292 children died from these diseases where only 29 deaths occurred in the past decade⁸. Notification rates are not available for these diseases over this time. It is important to remember that improvements in nutrition and environmental conditions also contribute to the reduction in death rates and that the sulphonamide drugs and antibiotics have played an important role in the management of complications of these diseases. Nevertheless, the data remain crucial in an evaluation of disease control as do the data which appear when vaccination rates fall and diseases recur. Unfortunately, in the past five or six years, there have been large outbreaks of pertussis and measles^{9,10}. The data from these outbreaks are shown in Figures 1 and 2. These results contrast with the gratifying success of the campaign against *Haemophilus influenzae* which is shown in Figure 3.

In the past 20-30 years vaccination campaigns have been conducted in many developing countries and the control and eradication of vaccine-preventable diseases is being achieved. A summary of some recent data is shown in Table 3¹¹. It can be seen that an estimated three to four million children die each year from the diseases and another four million are disabled. Nevertheless, the World Health Organization anticipates that poliomyelitis can be eliminated by 2000 and measles soon after. In order to achieve these results, high levels of vaccination must be reached and maintained.

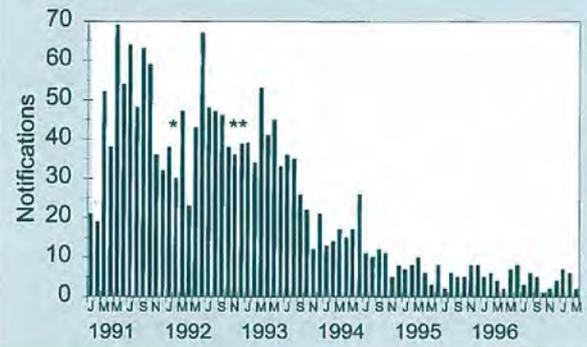
The past century has seen extraordinary success in the control of vaccine-preventable diseases in Australia and throughout the world. With the development of newer technologies in vaccine development in the next few years, it is possible to anticipate great success in the coming century. One can now envisage the production of therapeutic vaccines for infections such as *Helicobacter pylori* and recent evidence suggests the use of vaccines against certain neoplastic diseases is within reach.

ACKNOWLEDGMENT

Data on infectious diseases have been gratefully received from the Communicable Diseases Network – Australia, New Zealand – National Notifiable Diseases Surveillance Systems, personal communication.

FIGURE 3

HAEMOPHILUS INFLUENZAE TYPE B INFECTION NOTIFICATIONS, AUSTRALIA, JANUARY 1991 TO MARCH 1997



* PRP-D vaccine approved February 1992

** Infant vaccine approved September 1992

TABLE 3

ESTIMATES OF WORLDWIDE BIRTHS, DEATHS AND DISABILITIES, INFANTS AND CHILDREN

| Number | Number (million) |
|----------------------------|------------------|
| Births per year | 138 |
| Deaths per year | 15 |
| Vaccine-preventable deaths | 3 to 4 |
| Deaths from measles | 1 |
| Disabled per year | 4 |

Source: World Health Organisation epidemiological data, 1996.

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ARE LETTERS AN EFFECTIVE MEANS OF COMMUNICATING GUIDELINES ABOUT PROPHYLACTIC ANTIBIOTICS FOR MENINGOCOCCAL MENINGITIS TO CLOSE CONTACTS AT A CHILD CARE CENTRE?

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This paper reports on the results of a survey of the effect of letters sent to close contacts of a meningitis case: staff and parents of children at a hospital child care centre. All respondents (72 per cent) complied with the advice that they approach a doctor, usually their general practitioner, for prescription of a prophylactic antibiotic.

During September 1996 a staff member of a child care centre developed clinical signs of meningococcal meningitis. Because meningococcal meningitis is a notifiable disease in NSW, staff of the Northern Sydney Area Health Service Public Health Unit investigated the case¹. The child care centre operated within the grounds of a teaching hospital in the Area, and many of the parents worked as health professionals in the hospital or other health care facilities.

The NSW Health Department's guidelines state that all close contacts of an index case should be advised to take a prophylactic antibiotic². The objective of the survey was to ascertain whether staff and parents had comprehended and acted on the letters of advice they had received.

METHOD

All the centre's staff and enrolled children met the criteria of the NSW Health Department's guidelines of being close contacts of the index case².

Public Health Unit staff distributed letters of advice simultaneously to all child care centre staff and parents of the children attending the centre. The first letter, addressed to parents and centre staff, contained information about the need for close contacts to be prescribed a prophylactic antibiotic. The second letter, to be taken to the recipient's GP, contained information about the need for close contacts to have a prophylactic antibiotic (rifampicin) prescribed, its dosage and possible side-effects. Both letters were based on sample letters contained in guidelines for the control of meningococcal disease and were therefore considered to be understandable and not complex³. The ethnic composition of the recipients did not require the use of letters translated into languages other than English.

One week after the distribution of these letters, all parents and centre staff were asked to fill in an anonymous questionnaire and return it in a reply-paid envelope to the PHU.

RESULTS

The questionnaire was received by 120 parents and staff, and 72 per cent (86/120) responded; of these, 88 per cent (14/16) were staff and 71 per cent (72/104) were parents. Of the respondents, 88 per cent found the letter to be helpful or very helpful, and only 12 per cent thought it was very unhelpful or not at all helpful. All respondents were compliant with the recommendation to take their child or themselves to see a doctor to have rifampicin prescribed.

A sensitivity analysis showed that if none of the non-respondents sought medical attention, then 72 per cent (86/120) of all people sought medical attention, whereas if 50 per cent of non-respondents sought attention the overall

TABLE 4

SURVEY OF COMPLIANCE WITH ADVICE ABOUT PROPHYLAXIS FOR MENINGOCOCCAL MENINGITIS

| Comment | n |
|--|---|
| Wanted more specific advice on dose of rifampicin | 8 |
| Wanted rifampicin supplied by an Area Health Service organisation | 7 |
| Families distressed by the child's exposure to meningococcal disease | 2 |
| Rifampicin was expensive to purchase | 1 |

proportion was 86 per cent (103/120). Seventy-nine per cent of respondents were seen by their usual doctor or another general practitioner, and the remainder used hospital facilities such as an emergency department or a staff health clinic.

Of the 86 respondents, 95 per cent were prescribed rifampicin and 92 per cent reported that the prescribing doctor discussed the recognised side-effects of the drug with them; 81 per cent reported that rifampicin had common side-effects, such as a change in the colour of body fluids and mild gastrointestinal upset; 66 per cent indicated that the full two-day course had been completed; six of the respondents stated that side-effects (unspecified) were the reason for their not completing the course. Fifty-one per cent had had difficulty in obtaining supplies of rifampicin, with the most common problem being the lack of supply at local community pharmacies. Ninety-eight per cent of respondents had received rifampicin within two days of receiving the letter, and the remainder (three respondents) had had to wait three days.

The free comments section of the questionnaire highlighted other issues (Table 4).

DISCUSSION

In Australia meningococcal disease affects mainly children under five years of age and adolescents. A survey in 1995 recorded a 7 per cent mortality rate⁴. Such statistics may explain the considerable public concern and media interest in the disease. According to a recent National Health and Medical Research Council report, PHUs have a role in implementing guidelines to prevent the spread of meningococcal disease⁵. Compliance has been defined as the proportion of the target population who follow the recommendations of the health care provider⁶. The 100 per cent compliance by respondents to our letter's recommendation to seek medical advice may have been a result of concern about the disease as well as the high proportion of our parents who were health professionals. The high level of community concern makes it reasonable to assume (from the sensitivity analysis) that more than 50 per cent of non-responders would have sought medical attention, which means that more than 86 per cent of all people sought medical attention as a result of the letter. The worst-case scenario of none of the non-responders seeking medical attention produces a 72 per cent compliance rate – better than the best response rate of 63 per cent in a report of a mammographic screening program in which GPs sent

personalised invitations to women in the target risk group⁷. This indicates that a letter is an acceptable method of communication for close contacts, although the respondents in our survey were a highly selected group and the results may not be fully transferable to other populations.

We were concerned by the survey's finding of a delay for some respondents of up to three days before obtaining rifampicin. Current guidelines indicate that close contacts should take a prophylactic antibiotic as soon as possible, owing to the relatively short incubation period of meningococcal disease⁹. Such delays may have occurred because rifampicin is not commonly prescribed by most hospital or community pharmacies, particularly in its paediatric liquid format which has a relatively short shelf life. This issue has been dealt with locally by our arranging for two of the public hospital emergency departments in the Northern Sydney Area to supply liquid and tablet rifampicin on a 24-hour basis.

We were also concerned with the finding that one-third of respondents failed to comply with the recommendation to complete the full two-day course of rifampicin, although the survey indicated that the side-effects of rifampicin may have been the reason in some cases. As a result, we recommend that doctors consider prescribing a single-dose antibiotic, such as ciprofloxacin, for older children and adults, particularly when compliance may be a problem. Further research is needed to ascertain why compliance with taking a full course of rifampicin is a problem.

Getting local doctors to prescribe rifampicin was found by the survey to be an acceptable method of distribution, with less than 10 per cent of respondents commenting that the antibiotic should be distributed from a central supply. Local doctors have available the medical records of individual patients, and provide a more personal approach to prescribing, which may include discussion about

contraindications and possible side-effects and follow-up. Further research would help decide whether letters or, say, personal communication from a member of a PHU is the most effective method of ensuring that close contacts obtain prophylactic antibiotics and that the complete course is taken.

CONCLUSIONS

1. Letters about the risks of the meningococcal disease and the need for close contacts to receive prophylactic antibiotics were found to be an acceptable method of communicating information to close contacts and local doctors. Those surveyed were well-informed health professionals and therefore the results may not be fully transferable to other populations.
2. Doctors should prescribe an alternative (single-dose) prophylactic antibiotic if compliance may be a problem.
3. Measures are being taken to ensure that prophylactic antibiotics for meningococcal disease are readily available to close contacts at all times.

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NEW FOCUS ON LEAD

Health care professionals will receive the first in a new series of five booklets promoting awareness about lead hazards in the environment.

The NSW Minister for the Environment, Ms Pam Allan, announced the publication of the booklet at the launch of the *Lead Education Program*. The Statewide education program is designed to raise awareness of where lead exists in the environment and provide information on how to minimise the community's exposure to lead hazards.

"The first booklet is designed specifically to assist health care professionals in their understanding of lead hazards in the environment, and identify possible cases of lead poisoning," Ms Allan said. "The next four booklets will focus on specific risk groups, including parents, do-it-yourself renovators, the building and construction industry and parents of children with elevated blood lead levels."

Ms Allan said lead hazards are an issue for the environment and public health right across NSW –



wherever older housing still has paint with high lead levels. "Lead stays in the environment in ceiling and house dust particles, in the soils and in the many products which are made with lead. It's not just an issue confined to areas which have well known lead hazards such as Broken Hill and Port Kembla," she said.

The Lead Reference Centre which is coordinating the *Lead Education Program* is equally co-funded by NSW Health, the Environment Protection Authority (EPA), Department of Public Works and Services, Department of Housing, the Roads and Traffic Authority and WorkCover.

For more information call the Lead Reference Centre on (02) 9879 4988, or the EPA's Pollution Line on 131 555.

AN EXTENDED OUTBREAK OF HEPATITIS A

Gerard Finnigan, Tony Kolbe, Kim Gilchrist, Terry Carvan
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This article describes a slowly evolving and widely distributed outbreak of hepatitis A which occurred in the south-west of NSW. The outbreak lasted 20 months and led to 130 disease notifications.

Public health workers face a number of difficulties in controlling such a slowly evolving outbreak of hepatitis A across a large area. The relatively long incubation period (about a month), the difficulty in case recall of possible sources of infection, the high rate of asymptomatic or mild infection in children, the reluctance of cases to nominate possible sources of infection and contacts and the poor notification of cases all contributed to the difficulties.

OUTBREAK DETAILS

A total of 130 notifications for hepatitis A were received between September 1993 and May 1995 for the south-west districts of NSW. The number of cases peaked in November 1994, when 22 cases were notified. In contrast, three notifications were received in 1990, six in 1991 and 14 in 1992.

Seventy-one notifications were received from laboratories, 69 from general practitioners and four from hospitals. Generally, laboratory notifications were received in the week following the specimen collection date, although delays in notifying occurred in some cases. Notifications from doctors were received between two days and three weeks after the time of consultation.

The average age of notified cases was 20.6 years, with 48 per cent of cases aged 14 years or younger and 69 per cent aged 24 years or younger. The age-specific attack rates peaked in the five- to nine-year age group (Table 5). The youngest case notified was aged four months, and the oldest 51 years. Males represented 68 per cent of notifications. One outbreak involved mainly Aboriginal people and Aborigines represented 9 per cent of all notifications. Homosexuality was not identified as a risk factor in any of the outbreaks.

Attack rates varied by location. The local government areas of Temora, Murray, Wakool and Hume had the highest attack rates (Table 6).

The outbreak was characterised by 13 sporadic, localised pockets of disease spread over a wide area. These local outbreaks reflected transmission within families, day care centres, schools and a centre for the intellectually disabled. The distribution of cases and outbreaks was suggestive of person-to-person transmission.

Investigations failed to find a link between 11 of the pockets of infection or the original source of the outbreak, although the pattern of transmission within the pockets of infection was well established.

METHOD OF SPREAD

Transmission within families occurred through person-to-person contact and through contaminated food. Infection of more than one member of an immediate family occurred on 17 occasions and accounted for 43 of the notifications.

In total, nine local outbreaks were traced to person-to-person contact and four to contaminated food.

TABLE 5

NUMBERS OF NOTIFICATIONS AND AGE-SPECIFIC ATTACK RATES:
SOUTH WEST DISTRICTS OF NSW

| Age group | Number of notifications | | | Rate per 100,000 population* |
|-----------|-------------------------|--------|------------------|------------------------------|
| | Male | Female | Total | |
| 0-4 | 6 | 2 | 8 | 38 |
| 5-9 | 21 | 12 | 33 | 156 |
| 10-14 | 14 | 4 | 18 | 86 |
| 15-19 | 6 | 5 | 11 | 55 |
| 20-24 | 12 | 7 | 19 | 106 |
| 25-29 | 7 | 2 | 9 | 52 |
| 30-34 | 7 | 6 | 13 | 63 |
| 35-39 | 6 | 2 | 8 | 40 |
| 40-54 | 8 | 2 | 10 | 21 |
| All ages | 87 | 42 | 129 ^b | |

Notes:

(a) Attack rate = cases x 100,000/population.

(b) For one case age and sex were unknown.

Population source:

Australian Bureau of Statistics. Estimated resident population by age and sex, in statistical local areas, NSW, June 30, 1994 (preliminary).

TABLE 6

DISTRICT AND LOCAL GOVERNMENT AREA ATTACK RATES:
SOUTH-WEST DISTRICTS NSW

| District | Local government area | Number of notifications | Rate per 100,000 ¹ |
|--------------|-----------------------|-------------------------|-------------------------------|
| Hume | Albury | 41 | 99 |
| | Corowa | 2 | 24 |
| | Culcairn | 1 | 22 |
| | Hume | 10 | 145 |
| | Tumut | 1 | 9 |
| Murray | Murray | 20 | 48 |
| | Wakool | 10 | 193 |
| Murrumbidgee | Murrumbidgee | 12 | 24 |
| | Griffith | 11 | 51 |
| | Murrumbidgee | 1 | 41 |
| Riverina | Riverina | 43 | 48 |
| | Junee | 3 | 49 |
| | Lockhart | 3 | 79 |
| | Temora | 15 | 229 |
| | Wagga Wagga | 22 | 39 |
| Total | | 130 | 52 |

Note:

(a) Attack rate = cases x 100,000/population.

Population source:

Australian Bureau of Statistics. Estimated resident population, by age and sex in statistical local areas, NSW, June 30, 1994 (preliminary).

The school environment represented a second major source of infection. In one outbreak, six children in one class became ill, with the likely source of infection being food prepared by the class about one month earlier. The difficulty of maintaining soap dispensers or keeping soap available in toilets because of vandalism was recognised as a problem in schools. Poor hand-washing practices and lack

of soap are believed to have contributed to cases in school children in a similar community-wide outbreak¹.

PUBLIC HEALTH ACTION

General practitioners and laboratories were contacted and immediate notification for all suspected and confirmed cases was requested. GPs were provided with information and recommendations for at-risk patients.

Case investigations and contact tracing were undertaken when possible. Education about the disease, the mode of spread and immunoglobulin prophylaxis was provided.

Environmental inspections were conducted in households and schools where cases occurred. In each location, a comprehensive history was obtained using a survey form which sought information on food preparation and food sources, contact with other possible cases (including sexual contact), children in the household attending school or pre-school, and problems with water supply or sewage disposal. In schools, the information obtained included communal food preparation and school records of trips or events. Toilets were inspected and the availability of soap and towel facilities for hand washing was determined. Records of absenteeism from school were examined to help identify cases and possible contacts. Generally, the most detailed information was obtained from schools.

The impact of hepatitis A on a centre for the intellectually disabled was significant. Cases occurred in both staff and residents. Immunoglobulin was administered to all staff and residents either by their general practitioners or during a clinic conducted at the centre. Four cases occurred in the week following the administration of immunoglobulin but no further cases were reported. The prompt use of immunoglobulin in this situation is thought to have prevented spread of the infection. Hepatitis A has previously rapidly infected staff and residents of a centre for people with developmental disabilities².

Reticulated water supplies were monitored as a precaution, although these were unlikely to be sources of infection.

Because of the proximity of Victorian communities, health workers in Victoria were contacted, but investigations did not reveal any related increase in cases in Victoria.

As no definite link between outbreaks was established, the potential to predict or confine the outbreak through contact tracing was limited. A media campaign was undertaken

across the area to raise the level of awareness about hepatitis A and to improve reporting. This campaign encouraged good hand-washing practices, particularly for children, and described the method of transmission and the differences between hepatitis A and other types of hepatitis.

DISCUSSION

The outbreak highlighted:

- The need to encourage notification and undertake active surveillance for laboratory, doctor and hospital notifications during a community outbreak of hepatitis A.
- The need to recognise and counter the high level of concern of cases, contacts and the community which arises because of confusion between hepatitis A and other forms of hepatitis, in particular hepatitis B.
- The need to disseminate consistent and simple messages widely to schools and the community about hand washing during an outbreak.
- The potential for hepatitis A to infect a large number of people rapidly, particularly in schools and in centres for the intellectually disabled. (NHMRC recommendations for hepatitis A vaccination include staff and residents of residential facilities for the intellectually disabled³.)
- The need for schools to ensure that soap is available in toilets, to encourage and enforce hand-washing practices, and to be aware of the possible transmission of disease through communal cooking arrangements.
- The need to have a coordinated public health response to an outbreak making use of all appropriate unit staff, local government officers and the media.

ACKNOWLEDGMENTS

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PUBLIC HEALTH EDITORIAL STAFF

The editor of the *NSW Public Health Bulletin* is Dr Michael Frommer, Director, Centre for Research and Development, NSW Health Department. Dr Lynne Madden is production manager.

The *Bulletin* aims to provide its readers with population health data and information to motivate effective public health action. Articles, news and comments should be 1,000 words or less in length and include a summary of the key points to be made in the first paragraph. References should be set out using the Vancouver style, described in the *New England Journal of Medicine* 1997; 336:309-315.

Please submit items in hard copy and on diskette, preferably using WordPerfect, to the editor, *NSW Public Health Bulletin*, Locked Mail Bag 961, North Sydney 2059. Facsimile (02) 9391 9029.

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EVALUATION OF THE 1996 CHIEF HEALTH OFFICER'S REPORT

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Department

This article reports on the evaluation of the 1996 *Chief Health Officer's Report on the Health of the People of NSW*.

The report, the first of its kind in NSW, was launched in July 1996. Its purpose was to provide a detailed account of the health status of the NSW population, with particular emphasis on priority groups. The report also emphasised health priority areas such as cardiovascular disease, cancer, mental health, injury, diabetes and asthma. It used available population health information, bringing together routinely collected data as well as data from occasional surveys and studies conducted to answer specific health questions.

A three-page evaluation questionnaire was sent early in December 1996 to chief executive officers of Area Health Services, Public Health Unit directors, health services planners, health promotion managers and managers included in the NSW Health central administration distribution mailing list. A total of 151 forms was distributed, and 71 (47 per cent) were returned.

USE OF THE REPORT

Only 9 per cent of respondents had not read or used the report; 71 per cent had read and/or used some of it, whereas 20 per cent had read and/or used it extensively. The most common use was as a data reference document: data were used for planning, developing Area Health Service performance agreements, developing policy, program evaluation and to answer public and media inquiries.

PRESENTATION

The ease of finding information in the report was rated "excellent" by 28 per cent of respondents and "good to OK" by another 71 per cent. Similarly, 20 per cent thought the organisation and layout were "excellent" and the other 80 per cent considered them to be "good to OK". Regarding presentation and appearance, 20 per cent judged them "excellent" and another 78 per cent "good to OK".

The number of tables was "about right" for 76 per cent of respondents, and 71 per cent thought the same for the number of figures and graphs.

The amount of verbal description of data was rated "about right" by 66 per cent of respondents. About half of the respondents thought there was the right amount of data interpretation (51 per cent) and breakdown by Area Health Service (44 per cent). However, the need for more was expressed by 35 per cent and 51 per cent, respectively.

The main suggestions made to improve the report presentation were:

- have a title on the spine;
- keep the report brief and concise;
- use a standardised format for each chapter;
- include a detailed index, a glossary (definitions) and a methodology section; and
- add a conclusion including recommendations for action.

CONTENT

General suggestions for improving the report content were to:

- give rates and confidence intervals;
- present more Area Health Service and local government area breakdowns;
- have more interstate and international comparisons and more trend data; and
- include a chapter on the information deficiencies identified in the report.

More than half the respondents (54 per cent) suggested that additional chapters should be included. The following were suggested more than once:

- the health of people of non-English-speaking background;
- socioeconomic differences and their impact on health;
- environmental health;
- health risks;
- health funding in NSW;
- morbidity (for conditions such as headaches, back pain, arthritic conditions and hypertension), perhaps using Health Insurance Commission or Medicare data; and
- emerging health issues.

Individual issues that were felt to warrant more detailed discussion, perhaps as occasional topical chapters, included:

- air quality, water quality, pollution in industrial areas;
- prostate cancer screening, other screening programs;
- impact of influenza;
- equity challenges;
- food safety;
- immunisation;
- psychological wellbeing;
- drugs and alcohol;
- rural health; and
- women's health and men's health.

THE 1997 CHIEF HEALTH OFFICER'S REPORT

Many of these suggestions have been incorporated into the 1997 Chief Health Officer's Report. A summary of this report will be included in a future edition of the *NSW Public Health Bulletin*. The chapters have been regrouped into four sections:

1. Patterns of health and illness
2. Determinants of health
3. Health inequalities
4. Health priority areas

This new edition extensively presents trend data and breakdowns by Area Health Service; rates and confidence intervals are given when possible.

Public Health Division. *The Health of the People of New South Wales - Report of the Chief Health Officer*. Sydney: NSW Health Department, 1996.

Copies of the report are available from the NSW Health Department website at www.health.nsw.gov.au/public-health/chorep/chorep.html. Further details of the evaluation are available on request from Gerard Fitzsimmons, Epidemiology and Surveillance Branch, NSW Health Department, Locked Mail Bag 961, North Sydney NSW 2059.

TRENDS

Reports of **arbovirus** infections declined further in June, the tail end of an extended season for 1997. Meanwhile, reports of **hepatitis A** cases rose, to double the historical average for June (Figure 4). Most cases were reported from South Eastern (17) and Central (10) Sydney Areas in July (Table 7). A large proportion of these people had eaten contaminated prawns at a restaurant (see the *NSW Public Health Bulletin*, June-July 1997). Many reports of hepatitis A have also emanated from northern NSW coastal and inland areas (Table 7). South Eastern Sydney Public Health Unit reported 127 cases of **gastroenteritis** in a long-term care facility in June. The Public Health Unit's investigation identified the likely source of this outbreak to be person-to-person spread of a viral agent (probably a Norwalk-like virus). For a guide to the control of such outbreaks see the *NSW Public Health Bulletin*, October 1996, page 128. Hand washing is the most important way to prevent person-to-person transmission of enteric agents.

Early in August, a 17-week-old infant died of **pertussis** in the Sydney Children's Hospital. The child lived on the NSW mid-north coast. In response, the NSW Health Department issued a media release, which again urged parents to ensure their children were fully immunised, and for people with the symptoms of pertussis to seek treatment. A new acellular pertussis vaccine has been licensed for use in Australia, but (as of the end of August) remains unfunded by the Commonwealth Government. The existing whole-cell vaccine remains freely available, and is thought to be as effective as the acellular vaccine. However, the acellular vaccine may result in fewer local reactions at the injection site. The NSW Health Department is negotiating with the Commonwealth Government to ensure that the new vaccine becomes freely available as soon as possible. NSW Health has bought limited stocks of this vaccine and has restricted its use to children with a history of reactions to the current vaccine.

MENINGOCOCCAL DISEASE CLUSTER

The end of winter usually heralds a sharp rise in **meningococcal disease**. The historical peak observed in July and August has not been as clear-cut this year, perhaps because a new strain of the bacteria seems to have been emerging in Sydney over the past year. In August 1996 an outbreak of meningococcal disease caused by *Neisseria meningitidis* serogroup C was reported in the Wentworth Area in western Sydney. Subsequently, further cases of group C have appeared farther afield. Figure 5 shows crude rates of reported meningococcal disease in NSW for the 12 months to June 1997. Interestingly, there is surprisingly little variation from the State average of 3.0 cases/100,000 population, except in the Wentworth Area, with 11.1 reported cases/100,000.

In August, the South Eastern Sydney Public Health Unit investigated three cases of suspected meningococcal disease among college students at the University of NSW who were admitted to hospital between August 15 and 22. All cases reported fever, rash and acute arthritis, but no meningism. The first two cases were close friends who attended the same college. The third case was an unrelated student who

attended a different college within the same college complex. The two colleges share a dining room.

Neisseria meningitidis serogroup C (NMSC) was identified from throat swabs taken from all three cases and in the blood of one case. The clinicians caring for the cases believe meningococcal disease was the likely diagnosis. Public Health Unit staff ensured that close contacts of cases received the antibiotic rifampicin to prevent further spread of the disease. A college ball planned for August 23 was cancelled to prevent the possible further spread of the disease.

The United States Centers for Disease Control and Prevention (CDC) issued clear guidelines for the control of NMSC in 1997¹. For vaccination to be considered, the CDC recommends that there be:

- at least three unrelated cases within a closed community; and
- confirmation of NMSC in each case either through blood culture or identification of antigen in cerebrospinal fluid.

Studies in Western Sydney in 1996 and in the US indicate that people infected with NMSC do not carry it for very long – they either become ill or clear the infection rapidly.

The NSW Health Department convened a teleconference of national experts and clinicians treating the cases to discuss further public health action. The panel reviewed the available data, including:

- Cases 1 and 2 were definitely close contacts, and case 3 also may have had contact with case 1 or case 2.
- Only case 2 has been confirmed through blood cultures.
- Because all three suspected cases could be considered contacts, CDC's criteria for vaccination were not fulfilled on two grounds (three independent cases have not occurred and only one case has been confirmed).
- It is unlikely that other members of the college community continue to be at increased risk for this disease.

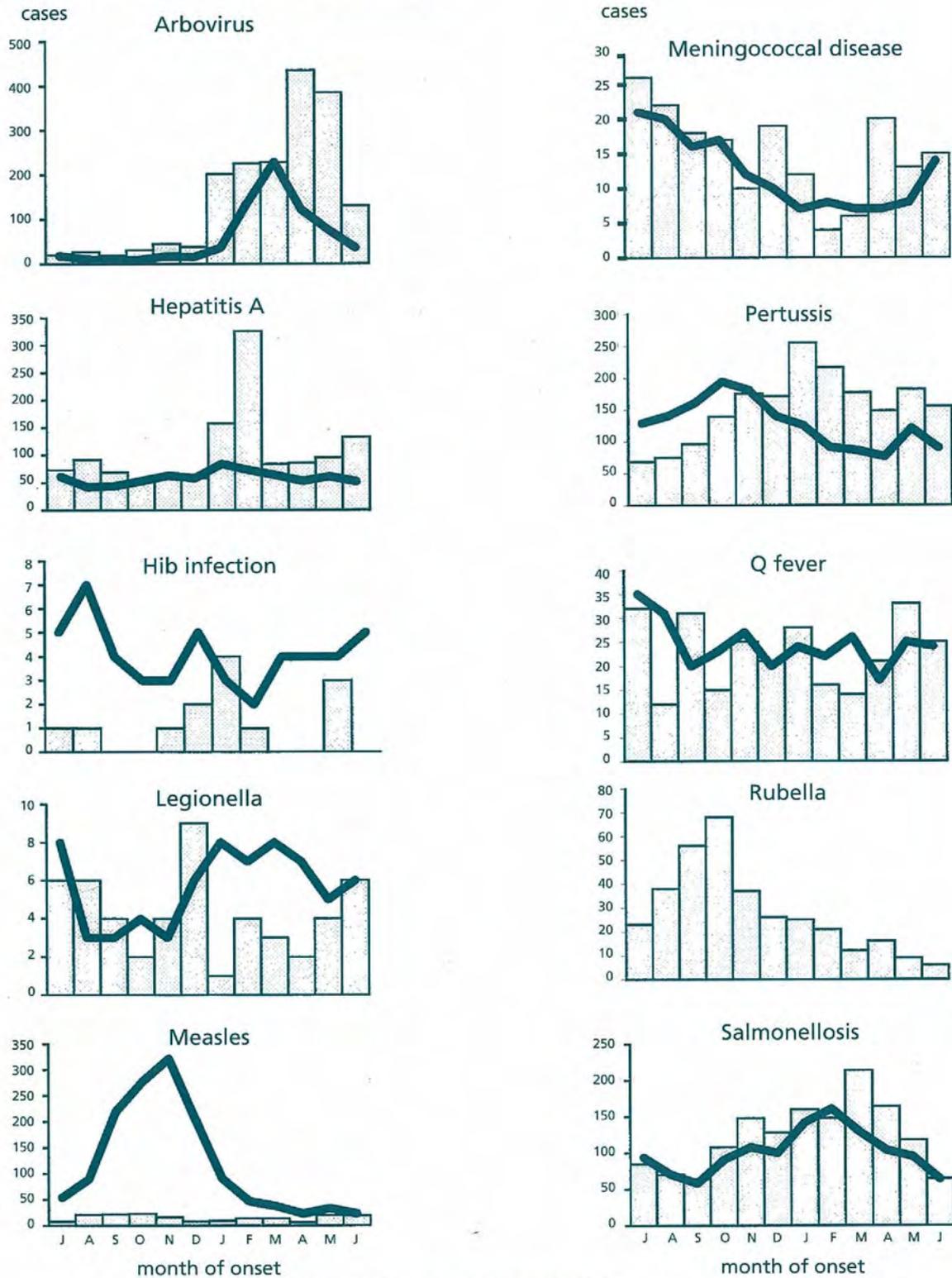
The expert panel agreed that there was no evidence to suggest continuing transmission of NMSC in the college community, and a vaccination program was not indicated.

As meningococcal infection is more prevalent in the spring months, clinicians are urged to be particularly vigilant for people with suggestive symptoms and to initiate intravenous antibiotics on clinical suspicion. Culture of blood or cerebrospinal fluid samples is an essential diagnostic aid, but collection of samples should not delay administration of antibiotics. Throat swabs should be taken from all suspected cases (but not their contacts) to assist diagnosis should cultures prove negative. Prince of Wales Hospital Department of Microbiology is also developing serological tests to help confirm the diagnosis. Laboratories isolating *Neisseria meningococcus* are urged to forward samples for further characterisation to the microbiology departments at Prince of Wales or Liverpool Hospital.

Continued on page 72 ▶

FIGURE 4

REPORTS OF SELECTED INFECTIOUS DISEASES, NSW, 12 MONTHS TO JUNE 1997, BY MONTH OF ONSET (WITH HISTORICAL COMPARISON)



Because of data collation problems, historical rubella figures are unavailable.

■ July 96 - June 97 / Mean July 93 - June 96

TABLE 7

INFECTIOUS DISEASE NOTIFICATIONS FOR NSW RECEIVED IN JULY 1997 BY AREA HEALTH SERVICES

| Condition | Area Health Service | | | | | | | | | | | | | | | | | Period | |
|---|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----------------|-----------------|
| | CSA | NSA | WSA | WEN | SWS | CCA | HUN | ILL | SES | NRA | MNC | NEA | MAC | MWA | FWA | GMA | SA | Total for Jul** | Total to date** |
| | Blood-borne and sexually transmitted | | | | | | | | | | | | | | | | | | |
| AIDS | 2 | 4 | - | - | - | - | - | - | 1 | 1 | - | - | - | - | - | - | - | 8 | 167 |
| HIV infection* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 170 |
| Hepatitis B - acute viral* | - | - | - | - | - | 1 | - | - | - | - | - | - | - | 1 | - | - | - | 2 | 36 |
| Hepatitis B - other* | 51 | 51 | - | - | 70 | 6 | 12 | 8 | 48 | 3 | 1 | 8 | 1 | 7 | - | 3 | 3 | 272 | 2,299 |
| Hepatitis C - acute viral* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 6 |
| Hepatitis C - other* | 65 | 49 | - | - | 87 | 29 | 44 | 38 | 112 | 31 | 21 | 17 | 6 | 26 | - | 13 | 32 | 570 | 4,956 |
| Hepatitis D - unspecified* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 5 |
| Hepatitis E | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 5 |
| Hepatitis, acute viral (NOS) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Gonorrhoea* | 8 | 9 | - | - | 2 | 1 | 5 | 3 | 32 | 1 | - | 1 | - | - | - | - | - | 62 | 373 |
| Syphilis | 7 | 6 | - | - | 3 | - | 1 | 1 | 10 | 2 | 1 | 2 | - | - | 2 | - | - | 35 | 343 |
| Vector-borne | | | | | | | | | | | | | | | | | | | |
| Arboviral infection* | 3 | 10 | - | - | 1 | 12 | 15 | 9 | 8 | 4 | 5 | 1 | 5 | 1 | - | 7 | 1 | 82 | 1,670 |
| Malaria* | 3 | 5 | - | - | - | - | - | - | 2 | - | - | - | - | - | - | - | - | 10 | 102 |
| Zoonoses | | | | | | | | | | | | | | | | | | | |
| Brucellosis* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 |
| Leptospirosis* | - | - | - | - | - | - | 2 | - | 1 | - | - | - | - | - | - | 1 | 1 | 5 | 21 |
| Q fever* | - | - | - | - | - | - | 3 | - | - | 5 | 5 | 3 | 6 | - | 1 | - | 1 | 24 | 166 |
| Respiratory/other | | | | | | | | | | | | | | | | | | | |
| Legionnaires' disease | 1 | 1 | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | 3 | 30 |
| Meningococcal (invasive) infection | 5 | 2 | - | - | 3 | 1 | - | 1 | 8 | - | - | 1 | 5 | - | - | - | - | 26 | 94 |
| Leprosy | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| Mycobacterial tuberculosis | 2 | 4 | - | - | 11 | - | - | - | 6 | - | - | - | 1 | - | - | - | - | 24 | 211 |
| Mycobacteria other than TB | 9 | 8 | - | - | - | - | 1 | - | 4 | 2 | 1 | 1 | 1 | - | - | - | 1 | 28 | 228 |
| Vaccine-preventable | | | | | | | | | | | | | | | | | | | |
| Adverse event after immunisation | - | - | - | - | - | - | - | - | - | - | - | 1 | - | 1 | - | - | 1 | 3 | 26 |
| <i>H. influenzae</i> B (invasive) infection | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 10 |
| Measles | 1 | 2 | 3 | - | 1 | - | 9 | 2 | 4 | - | - | - | 1 | - | - | - | - | 23 | 99 |
| Mumps* | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | 1 | 21 |
| Pertussis | 16 | 29 | 1 | 1 | 8 | 2 | 74 | 6 | 24 | 8 | 1 | 3 | 3 | 8 | 1 | 3 | 4 | 192 | 1,371 |
| Rubella* | 1 | 1 | 1 | 1 | - | - | 2 | 1 | 2 | 2 | - | 1 | - | 2 | - | - | 1 | 15 | 102 |
| Tetanus | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | 1 | 3 |
| Faecal-oral | | | | | | | | | | | | | | | | | | | |
| Cholera* | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | 1 | 2 |
| Foodborne illness (NOS) | 6 | - | - | - | - | 1 | - | - | 1 | - | - | - | 2 | - | - | - | 1 | 11 | 67 |
| Gastroenteritis (instit) | - | - | - | - | 12 | 29 | - | - | 127 | - | - | - | - | - | - | - | - | 168 | 463 |
| Hepatitis A | 10 | 5 | - | - | 5 | 3 | 2 | 8 | 17 | 6 | 8 | 8 | 4 | 2 | 4 | - | 1 | 83 | 973 |
| Listeriosis* | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | 1 | 12 |
| Salmonellosis (NOS)* | 5 | 9 | - | - | 12 | 3 | 5 | 1 | 9 | 5 | 2 | 3 | - | 5 | - | 1 | 2 | 62 | 985 |
| Typhoid and paratyphoid* | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 16 |

* lab-confirmed cases only

** includes cases with unknown postcode

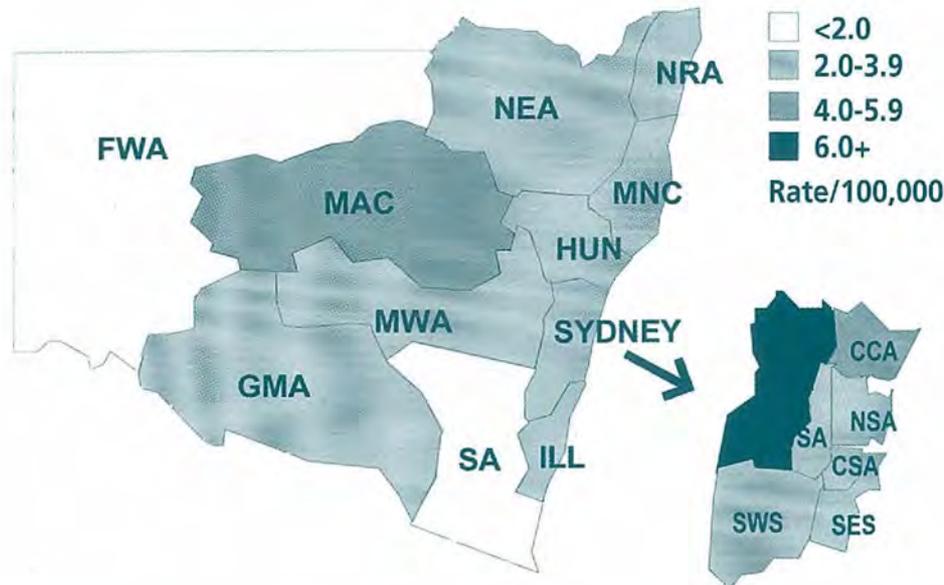
Abbreviations used in this Bulletin:

CSA Central Sydney Health Area, SES South Eastern Sydney Health Area, SWS South Western Sydney Health Area, WSA Western Sydney Health Area, WEN Wentworth Health Area, NSA Northern Sydney Health Area, CCA Central Coast Health Area, ILL Illawarra Health Area, HUN Hunter Health Area, NRA Northern Rivers Health Area, MNC Mid North Coast Health Area, NEA New England Health Area, MAC Macquarie Health Area, MWA Mid West Health Area, FWA Far West Health Area, GMA Greater Murray Health Area, SA Southern Health Area, OTH Interstate/Overseas, U/K Unknown, NOS Not Otherwise Stated.

Please note that the data contained in this Bulletin are provisional and subject to change because of late reports or changes in case classification. Data are tabulated where possible by area of residence and by the disease onset date and not simply the date of notification or receipt of such notification.

FIGURE 5

REPORTS OF MENINGOCOCCAL DISEASE, NSW, JULY 96 - JUNE 97 BY HEALTH SERVICE AREA



Infectious Diseases – August

► Continued from page 69

INFLUENZA SURVEILLANCE

Reports of influenza appear to have begun to decline a little in August (Figure 6). Between August 1 and 24, sentinel laboratories reported 122 diagnoses of influenza A infections and 33 of influenza B infections. In July there were 164 influenza A and 64 influenza B diagnoses.

Reports of influenza-like illness from the NSW Sentinel General Practice Surveillance Scheme are received through five Public Health Units from 5 to 64 general practitioners carrying out 732 to 7,411 consultations a week. These GPs reported higher rates of flu-like illness among their patients in August 1997 than in previous years (>4 per cent), although the peak seems to have passed (Figure 7).

1. Centers for Disease Control. Control and prevention of meningococcal disease and control and prevention of serogroup C meningococcal disease: evaluation and management of suspected outbreaks: recommendations of the Advisory Committee on Immunisation Practices (ACIP). *MMWR* 1997; 46 (no.RR-5).

FIGURE 6

Influenza A and influenza B virus isolations, by fortnight, 1 January to 30 August 1997

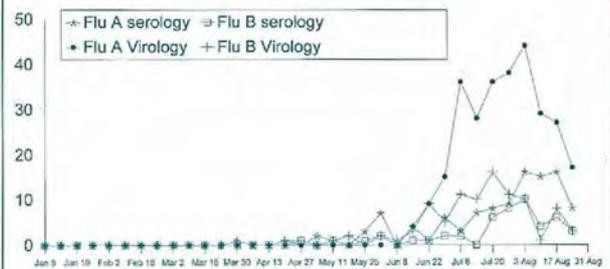
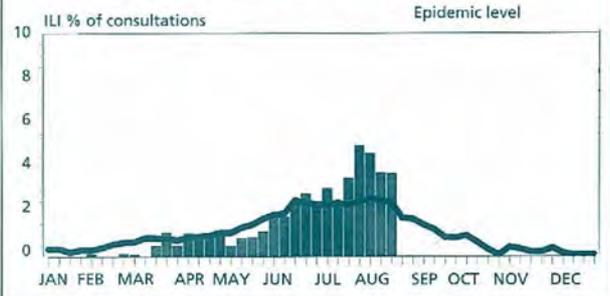


FIGURE 7

NSW general practitioner sentinel surveillance of influenza-like illness, January 1 to August 24, 1997, by week of consultation (columns), with historical comparisons (1993 to 1996, line)



INFECTIOUS DISEASES – SEPTEMBER 1997

TRENDS

The Statewide **pertussis** outbreak continued through to the end of July (Figure 8). In July 249 cases were reported. To the end of August, more than 1,700 cases had been reported in NSW (Table 8). The number of cases of **meningococcal disease** in July was more than the expected number for this time of year. Among the cases reported in August was a cluster of three at a college complex at the University of NSW (see page 69).

Figure 9 shows the reported incidence of **Q fever** by Area for the 12 months to July 1997 and illustrates that this disease is a problem in the northern and western parts of the State. Although an effective vaccine has been available for some years, there is some difficulty in achieving good vaccine coverage among people at risk, particularly those who work with or slaughter farm animals.

SIXTH NSW INFANT DIES FROM WHOOPING COUGH

In September a seven-week-old boy died of pertussis at the New Children's Hospital (Westmead). The child had lived in Blacktown in Western Sydney. He was too young to have been immunised against pertussis. He had a two-week history of coughing and was admitted to hospital late in August. Laboratory tests confirmed pertussis as the cause of death.

Record numbers of pertussis cases have been reported in NSW in the past 12 months. Between January 1 and the

end of August, 1,726 cases had been reported. By contrast, 1,171 cases were reported from January to December in 1996, and 1,389 were reported in 1995.

The death of the child from the Western Sydney Area is the sixth death from pertussis in NSW in the past 12 months.

In response, NSW Health has:

- issued a press release, which again urges parents to ensure their children have been fully immunised;
- continued negotiations with the Commonwealth Government to ensure funding for the new acellular pertussis vaccine (as of September unfunded by the Commonwealth Government);
- begun developing new investigation and prevention protocols for all Public Health Units; and
- developed a new case investigation form that will identify barriers to the prevention of pertussis.

INFLUENZA SURVEILLANCE

Reports of influenza appear to have begun to decline a little in August (Figure 6). During the period August 24 to 30, 25 cases of influenza A and six cases of influenza B were reported. Reports of influenza-like illness from the NSW Sentinel General Practitioner Surveillance Scheme are received through five Public Health Units from 5 to 64 doctors carrying out 732 to 7,411 consultations a week. Surveillance shows a jump in the percentage of consultations for influenza-like illness compared with previous years (Figure 6).

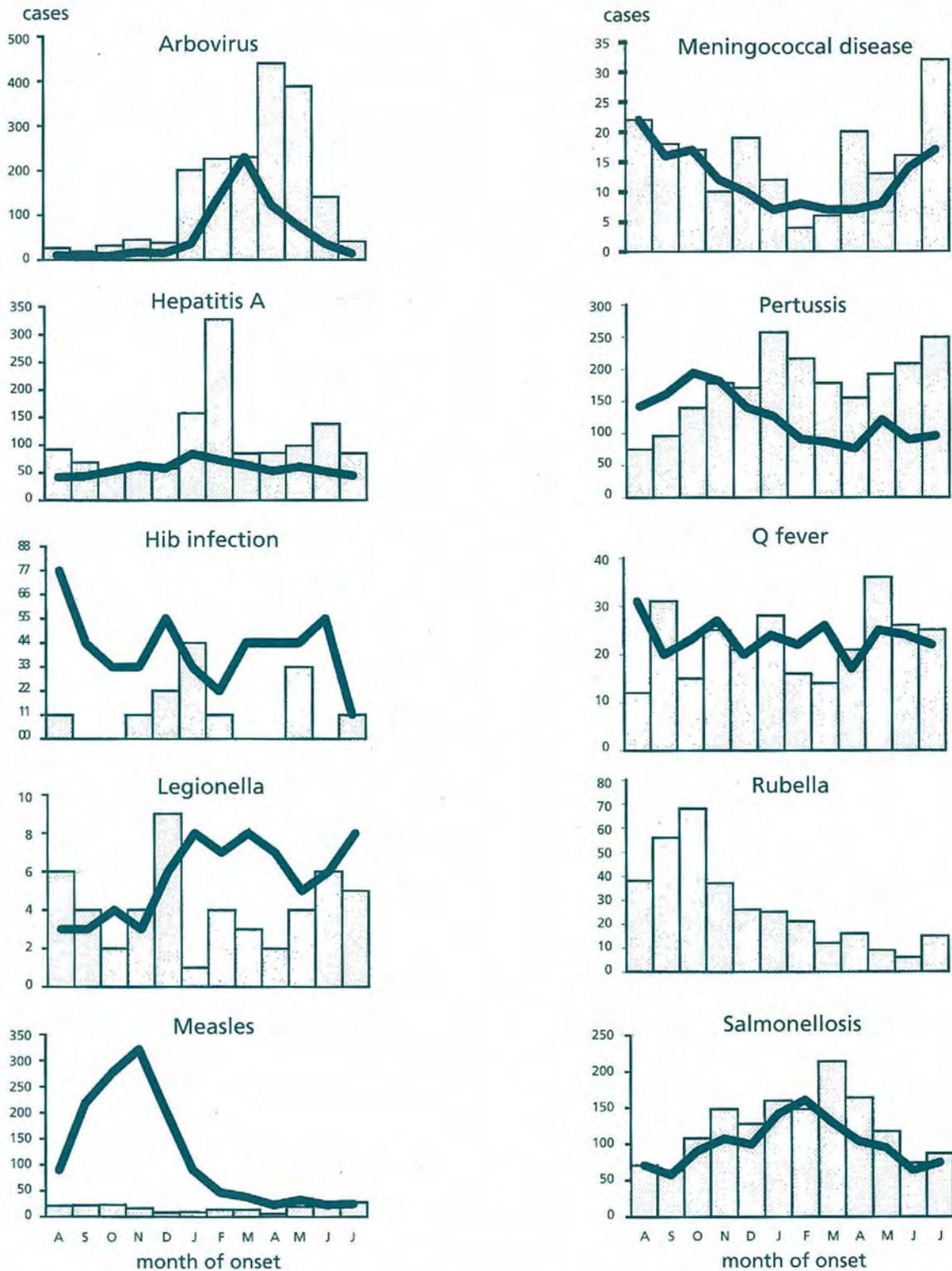
FIGURE 9

REPORTS OF Q FEVER, NSW, AUG 96 - JULY 97 BY HEALTH SERVICE AREA



FIGURE 8

REPORTS OF SELECTED INFECTIOUS DISEASES, NSW, 12 MONTHS TO JULY 1997, BY MONTH OF ONSET (WITH HISTORICAL COMPARISON)



Because of data collation problems, historical rubella figures are unavailable.

■ Aug 96 - July 97 / Mean Aug 93 - July 96

TABLE 8

INFECTIOUS DISEASE NOTIFICATIONS FOR NSW RECEIVED IN AUGUST 1997 BY AREA HEALTH SERVICES

| Condition | Area Health Service | | | | | | | | | | | | | | | | | Period | | |
|---|---------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----------------|-----------------|--|
| | CSA | NSA | WSA | WEN | SWS | CCA | HUN | ILL | SES | NRA | MNC | NEA | MAC | MWA | FWA | GMA | SA | Total for Aug** | Total to date** | |
| | | | | | | | | | | | | | | | | | | | | |
| Blood-borne and sexually transmitted | | | | | | | | | | | | | | | | | | | | |
| AIDS | - | - | - | - | - | - | 1 | 1 | 1 | - | - | - | - | - | - | - | - | 3 | 173 | |
| HIV infection* | - | - | - | - | - | - | - | - | 2 | - | - | - | - | - | - | - | - | 2 | 211 | |
| Hepatitis B - acute viral* | 1 | - | - | - | - | - | - | - | 2 | - | - | - | - | - | - | - | - | 3 | 40 | |
| Hepatitis B - other* | 41 | 38 | 1 | - | 11 | 7 | 5 | 6 | 26 | 2 | 4 | 4 | - | 3 | 1 | 2 | 2 | 153 | 2,523 | |
| Hepatitis C - acute viral* | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | 1 | 9 | |
| Hepatitis C - other* | 68 | 41 | 2 | - | 11 | 33 | 34 | 23 | 110 | 31 | 17 | 15 | 11 | 23 | 2 | 21 | 20 | 463 | 5,564 | |
| Hepatitis D - unspecified* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 6 | |
| Hepatitis E | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 6 | |
| Hepatitis, acute viral (NOS) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | |
| Gonorrhoea* | 7 | 2 | - | - | 2 | 2 | - | - | 25 | 3 | 1 | - | 2 | - | 1 | - | - | 45 | 429 | |
| Syphilis | 11 | 2 | - | - | 1 | - | 2 | 1 | 15 | - | - | - | 2 | 3 | 1 | - | - | 38 | 385 | |
| Vector-borne | | | | | | | | | | | | | | | | | | | | |
| Arboviral infection* | 1 | - | 1 | 1 | - | 3 | 2 | 6 | 3 | 2 | 1 | 5 | 4 | 2 | 2 | 3 | - | 36 | 1,723 | |
| Malaria* | - | 6 | - | 1 | 2 | - | 1 | - | 2 | 1 | - | 1 | 1 | - | - | - | - | 15 | 119 | |
| Zoonoses | | | | | | | | | | | | | | | | | | | | |
| Brucellosis* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 3 | |
| Leptospirosis* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | 1 | 22 | |
| Q fever* | - | - | - | - | - | - | 1 | - | - | 2 | 4 | 5 | 9 | 3 | 1 | 1 | 1 | 27 | 193 | |
| Respiratory/other | | | | | | | | | | | | | | | | | | | | |
| Legionnaires' disease | 3 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 4 | 34 | |
| Meningococcal (invasive) infection | 1 | 4 | 1 | 2 | 1 | 5 | - | - | 5 | - | 1 | - | - | 4 | - | 2 | - | 26 | 128 | |
| Leprosy | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | |
| Mycobacterial tuberculosis | 1 | 7 | - | - | - | - | - | - | 6 | - | - | 1 | - | - | - | 1 | - | 16 | 251 | |
| Mycobacteria other than TB | 11 | 3 | - | - | - | 2 | - | - | 3 | - | 2 | - | - | - | - | - | - | 21 | 243 | |
| Vaccine-preventable | | | | | | | | | | | | | | | | | | | | |
| Adverse event after immunisation | - | - | - | - | - | - | - | - | 4 | 1 | - | 1 | - | - | - | - | - | 6 | 33 | |
| <i>H. influenzae</i> B (invasive) infection | - | - | - | 1 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 11 | |
| Measles | 3 | 5 | 1 | 1 | - | - | 2 | - | 5 | - | 1 | 1 | - | 1 | - | 1 | - | 21 | 130 | |
| Mumps* | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 22 | |
| Pertussis | 17 | 45 | 19 | 11 | 13 | 4 | 57 | 21 | 19 | 25 | 15 | 1 | 4 | 19 | - | 2 | 7 | 279 | 1,726 | |
| Rubella* | 3 | - | 1 | - | 1 | - | - | 1 | 2 | 4 | - | - | - | 1 | - | - | 1 | 14 | 123 | |
| Tetanus | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 3 | |
| Faecal-oral | | | | | | | | | | | | | | | | | | | | |
| Cholera* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | |
| Foodborne illness (NOS) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 2 | - | - | 2 | 69 | |
| Gastroenteritis (insti) | - | - | - | - | - | 60 | - | - | - | - | - | - | - | - | - | - | - | 60 | 600 | |
| Hepatitis A | 12 | 4 | 7 | - | 3 | 2 | 4 | 2 | 10 | 5 | 6 | 10 | 4 | 6 | 3 | - | - | 78 | 1,074 | |
| Listeriosis* | - | - | - | - | - | 1 | - | - | - | - | - | - | - | 1 | - | 1 | - | 3 | 15 | |
| Salmonellosis (NOS)* | 7 | 10 | 7 | 9 | 5 | 3 | 5 | 6 | 8 | 1 | 6 | 3 | 3 | 1 | - | - | 1 | 75 | 1,083 | |
| Typhoid and paratyphoid* | 1 | - | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | 2 | 18 | |

* lab-confirmed cases only

** includes cases with unknown postcode