NEW SOUTH WALES
Public Health Bulletin

Volume 9
Number 3
March, 1998

NSW HEALTH DEPARTMENT

ISSN 1034 7674
State Health Publication No. 98-0035

SYDNEY 2000 – CHALLENGES AND REWARDS

Andrew Penman
Director, Centre for Disease Prevention and Health Promotion

In less than three years the Sydney 2000 Olympic and Paralympic Games will take place. These Games are expected to attract the largest gathering of people ever in Sydney: estimates of the number range from 600,000 to 6 million.

We know that 14,200 of these will be youthful athletes, and it is expected that, apart from sports-related or other injuries, they will have minimal impact on public health services. The rest, visitors (some in an unfamiliar place and faced with an unfamiliar language) and locals, will form a global village enjoying one of the greatest shows on earth. This group is more likely to use health services.

A commercial bonanza in the food industry has been predicted. Although this heralds no fears for the established operators who will practise under the watchful eye of the Sydney Organising Committee for the Olympic Games, of potential concern is the host of small operators, who are often in the market for only a season. A major outbreak of food-borne illness would make the Sydney Games memorable for the wrong reasons.

So while the stage is being set for the nation's biggest event, the public health strategy for the Games will harness the work of hundreds of people backstage to ensure it is safe as well as enjoyable.

Sydney will be on a world stage, and as for every successful performance, success will depend on those backstage as much as those under lights.

Contents

Correspondence

Please address all correspondence and potential contributions to:

The Editor,
NSW Public Health Bulletin,
Public Health Division,
NSW Health Department
Locked Bag No 961,
North Sydney NSW 2059
Telephone: (02) 9391 9956
Facsimile: (02) 9391 9232

SYDNEY 2000 OLYMPIC AND PARALYMPIC GAMES: THE PUBLIC HEALTH SERVICE STRATEGY

Larissa B. McIntyre, Public Health Officer
Maria Visotina, Acting Manager, Olympic Planning Unit

This is the first in a series describing the public health preparations for the Sydney 2000 Olympic and Paralympic Games.

The Games will begin on September 15, 2000 and will conclude with the closing ceremony of the Paralympic Games on October 29, 2000. From September 2, 2000, the Olympic Village will begin to fill with athletes. At the height of the Olympic Games competition up to half a million people will pass through Sydney Olympic Park in a day, with a peak of 300,000 there at one time.

During this time Sydney will swell with visitors, who will make up the spectator force that will follow the expected 14,200 athletes, over 27 days of competition, at about 35 venues throughout the city. There will be a 17-day interval between the Olympic Games and Paralympic Games when the Olympic Village is renamed the Paralympic Village.

Sydney has never before hosted an event the size of the Olympic Games. The event has been estimated by the Sydney Organising Committee for the Olympic Games (SOCOG) to equal 40 world championships, 34 National Football League Super Bowls or 17 Formula One Grand Prix. It is with this in mind that the Olympic Public Health Service Strategy has been designed.

Through a series of memoranda of understanding, SOCOG is responsible for providing the health and medical services to support the Games, either directly through its planned workforce of about 4,500 medical program volunteers, or through other agencies such as the NSW Department of Health, the Ambulance Service of NSW and other organisations.

The NSW Department of Health will coordinate the planning for hospital care, disaster response, health care interpreters and public health services. The provision of public health services represents a significant commitment by the Department, particularly in the area of food safety and environmental health. An important consideration is to ensure minimal disruption of normal services and to leave a legacy of enhanced systems, procedures and services.

The Olympic Public Health Service Strategy represents the third stage of planning for the Games. A public health services subcommittee, chaired by the Director of the Centre for Disease Prevention and Health Promotion and with representation from SOCOG, departmental policy areas and Public Health Units, has developed a strategy with the following objectives:

- maintenance of the current public health system;
- provision of a supplementary Games service to monitor, rapidly detect and respond to public health threats; and
- a concentrated effort to prevent illness and injuries through encouraging the promotion of healthy behaviours.

The planning, development and implementation of the Public Health Service Strategy for the Olympics incorporates seven focus areas within a surveillance system that will cover all Games venues and allow for the continued monitoring of the remainder of NSW. The focus areas are:

- infectious disease and surveillance
- food safety and nutrition
- environmental health
- injury prevention
- heat, sun exposure and physical activity
- smoking
- cruise ships

The planning and coordination of public health services to support the Games is a significant challenge. There will be opportunities to improve existing systems, such as infectious disease surveillance, and also to highlight the NSW public health system's strengths.

The hosting of the Games provides an unparalleled opportunity to plan and implement programs that have the potential for a positive effect on the community.

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 9232.

Please contact your local Public Health Unit to obtain copies of the *NSW Public Health Bulletin*. The *Bulletin* can be accessed via the Internet from the NSW Health Department's World Wide Website, at http://www.health.nsw.gov.au/public-health/phb/phb.html

Back issues can be obtained from the Better Health Centre, Locked Mail Bag 961, North Sydney 2059.
Telephone: (02) 9954 1193, Facsimile (02) 9955 5196.

STRATEGY FOR POPULATION HEALTH SURVEILLANCE IN NEW SOUTH WALES

Louisa Jorm and Michele Puech, Epidemiology and Surveillance Branch, NSW Health Department

This article reports on the NSW Health Department's discussion paper, Strategy for Population Health Surveillance in New South Wales.

Population health surveillance is the ongoing systematic collection, assembly, analysis and interpretation of population health data and the communication of the information derived from these data to stimulate response to emerging health problems and for use in the planning, implementation, and evaluation of health services and programs[1]. The potential domain of health surveillance is vast (Table 1).

The NSW Health Department's strategy for population health surveillance concentrates on population health status and risks to health. The strategy paper describes the context for population health surveillance in NSW and its current status. Further, it outlines priorities for improving population health surveillance in NSW, identifies areas where development is required, and sets out some recommended next steps.

Initially, the paper was the result of consultation within the Public Health Division. It was then circulated for comments to interested individuals and groups throughout NSW, including Area Health Service chief executive officers, Public Health Unit directors, health promotion coordinators, health planners, interested individuals in universities and non-government organisations, and relevant NSW Health Department staff. The strategy paper was revised accordingly.

MAIN ELEMENTS OF THE POPULATION HEALTH SURVEILLANCE STRATEGY

Ensuring better health for the people of NSW, enabling equity of access to a comprehensive range of services and improving the quality of service are the three principal goals of the NSW Health Department. Population health surveillance is a key element of the Department's role in monitoring and evaluating our progress towards these goals.

Several recent developments have created new demands for information about population health in NSW. First, local Area Health Services in NSW are increasingly focusing attention on population health as they assume responsibility for the health of geographically defined populations, rather than the provision of services in their locality. Therefore, surveillance information is increasingly required at the Area Health Service as well as Statewide level. Second, we have a pressing need to measure progress in national health improvement priority areas (cerebrovascular disease, cancer, injury, mental health and diabetes)[3] and the additional NSW priority area of asthma. Contractual obligations for health improvement specified in the first rounds of Area Health Service performance agreements centre on these priority areas. While we need to maintain and strengthen the traditional areas of surveillance (such as communicable diseases), we must now ensure we also have comprehensive systems to cope with these new information requirements.

Population health surveillance in NSW relies on many data collections planned and conducted independently and generally not aggregated or presented together. Specific surveillance objectives, lacking for most key areas, need to be developed. The document identifies surveillance gaps and deficiencies in data sets used for surveillance, and discusses ways in which surveillance needs might be ranked in priority. It also explores our requirement to develop capacity to respond to emerging issues, and our need to develop surveillance methods (Table 2), improve the dissemination of surveillance information, and evaluate surveillance efforts.

The report makes 14 recommendations. These are listed in Table 3. Some of these recommendations are being

Continued on page 32 ▶

TABLE 1

POTENTIAL DOMAIN OF HEALTH SURVEILLANCE (MODIFIED FROM *KEY ISSUES IN PUBLIC HEALTH SURVEILLANCE FOR THE 1990s*[2])

Population health surveillance			
Population structure and dynamics	**Health status**	**Risks to health**	**Health systems**
A. Size and growth 1. Fertility and mortality 2. "Momentum" of population growth **B. Structure** 1. Sex ratio 2. Population aging 3. Ethnicity **C. Spatial distribution and mobility** 1. Urbanisation 2. Migration **D. Family structure**	**A. Positive health** 1. Quality of life and wellbeing 2. Growth and development 3. Non-morbid processes (e.g., pregnancy, aging) **B. Health losses** 1. Disease 2. Impairment, disability and handicap 3. Death **C. Equity of health status**	**A. Biological** 1. Genetic 2. Physiological 3. Infectious agents **B. Environmental** 1. Physical environment 2. Social and economic environment **C. Behavioural** 1. Risk behaviours 2. Knowledge, attitudes, beliefs, skills	**A. Health services** 1. Accessibility 2. Utilisation 3. Quality 4. Efficiency 5. Equity of access **B. Health care resources** 1. Human 2. Technological 3. Financial **C. Health policies,** including policies in other government departments (e.g., Road Transport Authority, Department of School Education)

Population health surveillance

► Continued from page 31

implemented; strategies to implement others are being incorporated into the NSW Health Department's business plans for 1998-99. We will publish a progress report on the strategy in 12 months.

Copies of the strategy paper are available from Dr Louisa Jorm, Director, Epidemiology and Surveillance Branch, NSW Health Department, Locked Mail Bag 961, North Sydney, NSW, 2059. E-mail: ljorm@doh.health.nsw.gov.au. It can also be downloaded from the NSW Health Internet site (www.health.nsw.gov.au/public-health/epi/popsurv.htm).

1. Thacker SB, Berkelman RL. Public health surveillance in the United States. *Epidemiol Rev* 1988; 10:164-90.
2. Sepulveda J, Lopez-Cervantes M, Frenk J, Gomez de Leon J, Lezana-Fernanndez MA, Santos-Burgoa C. Key issues in public health surveillance for the 1990s. *MMWR* 1992; 41 Suppl: 61-76.
3. Better Health Outcomes for Australians. National Goals, Targets and Strategies for Better Health Outcomes into the Next Century, CDHS & H, Canberra, AGPS, 1994.
4. Public Health Division. The Health of the People of NSW – Report of the Chief Health Officer. Sydney: NSW Health Department, 1996.

TABLE 2

PRIORITIES FOR DEVELOPMENT OF POPULATION HEALTH SURVEILLANCE METHODS IN NSW

Methodologic areas
■ Definition and measurement of disease burden (e.g. disability-adjusted life years [DALYS])
■ Assessment of the accuracy, completeness and timeliness of surveillance data
■ Analysis of incomplete or missing data (e.g. imputation methods)
■ Evaluation of spatial-temporal clusters (e.g. scan statistic)
■ Evaluation and prediction of trends (e.g. time series modelling, projections)
■ Evaluation of small-area data (e.g. use of empirical Bayesian approaches)
■ Graphical display of surveillance data, including mapping
■ Refinement of techniques to detect systematic variation in rates and other measures
■ Maximising the use of record linkage techniques

TABLE 3

RECOMMENDATIONS FOR IMPROVING POPULATION HEALTH SURVEILLANCE IN NSW

1. The following overall objective for population health surveillance in NSW should be adopted:
   To ensure that we have appropriate, timely and valid population health information to monitor health status and respond to health problems and to support planning, implementation and evaluation of health services and programs in NSW.
2. The Epidemiology and Surveillance Branch should coordinate the development of surveillance objectives for specified key surveillance areas.
3. Initial priority should be given to addressing information gaps that relate to national and State health improvement priority areas.
4. The Epidemiology and Surveillance Branch should review objective methods for assessing future surveillance priorities, including use of aetiologic fractions to quantify the burden associated with health risk factors.
5. The NSW Health Department should support the development and implementation of the Coronial Information System in NSW and should negotiate on-line access to this data for surveillance purposes. In the interim, development of the New Children's Hospital Department of Surgical Research's injury death monitoring system for this purpose should be investigated.
6. The Epidemiology and Surveillance Branch should review the use of sentinel events and networks of sentinel providers for surveillance of unexpected trends in severe illness, as part of the current Acute Care Surveillance Project.
7. Public Health Training and Development Branch should consider workforce needs to support population health surveillance, including planning the evolution of the Public Health Officer training program.
8. The Epidemiology and Surveillance Branch and the Public Health Network should jointly develop a research program to address the priorities for surveillance methods listed in Table 2.
9. The Epidemiology and Surveillance Branch and other stakeholders should regularly evaluate the utility of the *NSW Public Health Bulletin* and the *Report of the Chief Health Officer*[4] and other information networks for delivery of population health surveillance information, by survey of their users.
10. The Centre for Research and Development should establish dialogue with editors of relevant peer-reviewed journals about conditions for publication of reports of surveillance information that do not prevent timely dissemination through other mechanisms.
11. The Epidemiology and Surveillance Branch should continue to consolidate and develop the Health Outcomes Information Statistical Toolkit (HOIST) system, with particular emphasis on tools for automated reporting and user interfaces to simplify analysis. HOIST development and modifications should take into account feedback from regular evaluations and consultation with HOIST users and potential users.
12. The Epidemiology and Surveillance Branch should review the training needs of HOIST users and arrange formal training sessions, coordinated through the Public Health Network's Research and Epidemiology special interest group.
13. The Epidemiology and Surveillance Branch should review the strategy for population health surveillance in NSW every three years.
14. The Epidemiology and Surveillance Branch should coordinate regular evaluation of those surveillance systems for which the Public Health Division is responsible. It should also provide feedback and recommendations on issues concerning other surveillance systems outside the Public Health Division.

READMISSIONS TO HOSPITAL: AN INDICATOR OF QUALITY OF CARE BEFORE AND DURING THE WAITING LIST REDUCTION PROGRAM

Kathy Jong, NSW Department of Health
Paul Corben, Mid North Coast Population Health Unit, Port Macquarie

The waiting list reduction program was introduced to improve access to elective surgery in public hospitals throughout NSW. The main aim of the the program was to halve the number of patients awaiting admission for elective surgery within the first 12 months, with particular emphasis on reducing the number of patients waiting more than six months. There is evidence that the program was successful in reducing elective surgery waiting lists and waiting times[1]. This article examines a possible indicator of the quality of care of elective patients in public hospitals, before and after the introduction of the program.

There are no agreed methods of assessing the quality of clinical care. One proposed indicator which is widely used comprises unplanned or 'emergency' readmissions to hospital, which may reflect adverse outcomes of initial hospitalisation. This analysis examined emergency readmissions within 28 days of discharge, where the admission and readmission involved the same hospital. The analysis took account of the types of hospital and patient involved, and covered elective medical and surgical admissions.

METHODS

Data source

Data were obtained from the NSW Inpatient Statistics Collection. This provides information on all discharges and transfers from all NSW public and private hospitals, as well as deaths in hospital. Data on discharges during two six-month periods (July-December 1994 and July-December 1995) were compared. At the time of analysis, data for the latter period were incomplete, and this may have resulted in an underestimate of 1995 readmission rates.

Calculation of readmission rates

For each six-month period, readmission rates were calculated by:

1. determining the number of first emergency readmissions within 28 days of discharge or transfer after an elective episode of care;
2. determining the number of discharges or transfers following elective admissions; and
3. dividing 1. by 2.

Patients admitted repeatedly for continuing renal dialysis or chemotherapy were not counted as emergency readmissions, and patients who died during elective admissions were excluded.

As we were interested in elective admissions completed up to and including December 31 of each of the two years studied (1994 and 1995), it was necessary to identify readmissions beginning up to and including January 28 in each following year (1995 and 1996). Hospitals were placed into seven categories, according to the types of services they provide[2]:

1. *public principal referral hospitals:* large teaching hospitals providing high-level specialty services, located in metropolitan areas;
2. *major public referral hospitals:* either teaching or emerging teaching hospitals providing a less extensive range of specialty services than principal referral hospitals;
3. *major rural base hospitals:* hospitals providing a wide range of specialist services and functioning as referral hospitals for defined populations outside metropolitan areas.

District public hospitals provide a wide range of services to local populations with some subspecialty services. To enable comparison, these hospitals are subgrouped according to size, level of service provision and the range and type of patients in the hospital. These categories include:

4. *district* (high)
5. *district* (medium)
6. *district* (low)
7. *community public:* hospitals providing basic routine and emergency health care for local populations. These hospitals may also provide nursing home-type care.

An emergency readmission may be the result of several factors, including the nature of the preceding elective admission and the condition of the patient. For example, an older patient with diabetes admitted for coronary artery surgery is more likely to have an emergency readmission than a young adult admitted for arthroscopy.

To help in the interpretation of readmission rates, patients were grouped according to the nature of their elective admission (classified into diagnosis-related groups (ANDRGs), five-year age groups, and sex, and also according to the hospital type. Within each hospital type, a readmission rate was calculated for each ANDRG, age and sex group in July-December 1994. These rates were taken as baseline rates. The numbers of patients in each hospital type, ANDRG, age and sex group in 1994 and 1995 were multiplied by these baseline rates, and a summary rate for each hospital type in 1994 and 1995 was calculated. Through this process (known as indirect standardisation) the summary rates for 1994 and 1995 were comparable because differences in the types of elective admissions and patient characteristics between the two periods had been taken into account.

This procedure was repeated for 'medical' and 'surgical' elective admissions separately (according to a classification of admission types developed by Dr Paul Tridgell, Evaluation and Monitoring Branch, NSW Health Department).

Statistical analysis

For each type of hospital and for the totals across all types of hospitals combined, statistical tests of the difference between proportions were used to determine whether the rates (expressed as a percentage) were the same in the two periods[3]. The results, including 95 per cent confidence intervals (CIs) for the rates, are shown in Figures 1 and 2 and Tables 4 and 5.

Continued on page 34 ▶

► Continued from page 33

RESULTS

The unplanned-readmission rate after elective admission showed no significant change between the six-month periods in 1994 and 1995. Adjusted readmission rates were 2.3 per cent in 1994 and 2.2 per cent in 1995.

Elective surgical patients (Figure 1)

For elective surgical patients there was no significant change in the unplanned readmission rate between the two periods. Trends in readmission rates varied among the different types of hospital (Table 1).

Elective medical patients (Figure 2)

For elective medical patients there was a significant reduction in the unplanned readmission rate from 2.2 per cent to 2.0 per cent (Table 2). Again, there was variation in the readmission rates among the different hospital types.

CONCLUSION

According to this analysis there was no consistent change in the average rates of emergency readmissions for elective patients in NSW hospitals between 1994 and 1995. While readmissions after elective medical admission decreased, no significant change was detected after elective surgical admissions.

Emergency readmission rates decreased significantly between 1994 and 1995 for elective surgical and medical patients in the principal referral group of hospitals. However, there were significant increases in emergency readmission rates both for medical and surgical patients in the community public hospital group. Readmission rates decreased significantly for elective medical patients but increased significantly for elective surgical patients in the major referral hospital group.

Our analysis took account of age, sex and ANDRG (version 3) in adjusting for the risk of emergency readmission to hospital. While we would not expect substantial changes in hospital caseload from year to year, it is possible that the DRG system does not adequately account for differences in severity of illness, or other factors which may affect readmission to hospital. Consequently, the fluctuation in readmission rates which we found may have been due to changes in other characteristics of patients as well as random (or chance) variation from one year to the next.

Although the apparent plausibility (face validity) of emergency admission rates is generally accepted, rigorous study is needed to validate readmission rates as an indicator of quality of care. A recent meta-analysis of 16 studies that examined quality of care based on descriptions of the process of care and early readmission rates indicates that care of a relatively low quality increases the odds of readmission by 55 per cent, compared with care of a higher quality (95 per cent CI 1.25 to 1.92). Analysis of the studies that specifically described elements of substandard inpatient care found that, compared with normative care, it increased the odds of readmission by 24 per cent (95 per cent CI 0.99 to 1.57). Only 11 comparisons contributed to this latter analysis, and the wide confidence interval (which includes 1.0) and heterogeneity among the studies indicates that the results should be interpreted cautiously[4].

FIGURE 1

ELECTIVE SURGICAL PATIENTS, JULY-DECEMBER 1994 AND JULY-DECEMBER 1995: RATES PER 100 OF EMERGENCY READMISSION WITHIN 28 DAYS (AND 95% CONFIDENCE INTERVALS), STANDARDISED FOR ANDRG, AGE GROUP AND SEX

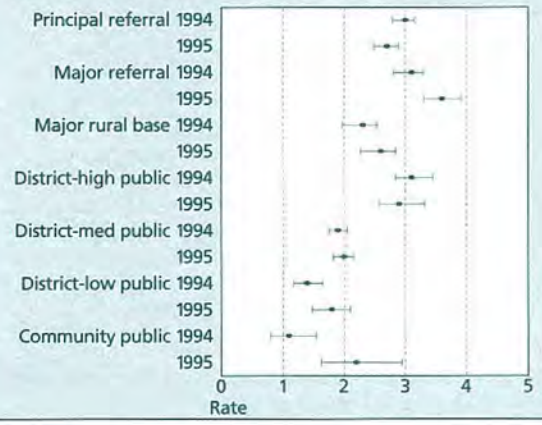
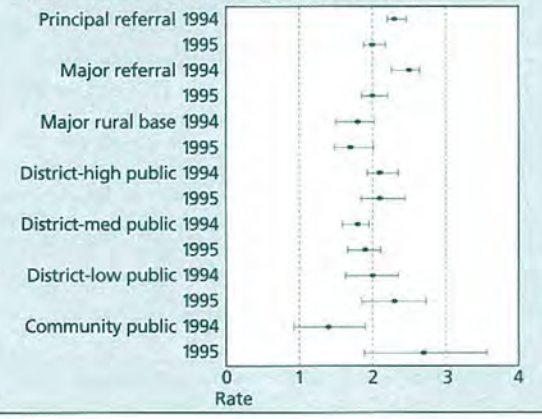


FIGURE 2

ELECTIVE MEDICAL PATIENTS, JULY-DECEMBER 1994 AND JULY-DECEMBER 1995: RATES PER 100 OF EMERGENCY READMISSION WITHIN 28 DAYS (AND 95% CONFIDENCE INTERVALS), STANDARDISED FOR ANDRG, AGE GROUP AND SEX



Epidemiologists at Monash University have recently evaluated this indicator as part of the National Validity & Reliability Study. Their final report is being reviewed by the Commonwealth Department of Health and Family Services[5].

Apart from questions of the validity of this indicator and the limitations of the routinely collected data on which this analysis has been based, other factors operating at the time may have influenced readmission rates in this analysis. Although the observed changes in readmission rates cannot necessarily be attributed to the waiting list reduction program, the methods used here serve as a prototype for further examination of unplanned readmission rates.

TABLE 4

STANDARDISED READMISSION RATES (%) FOR ELECTIVE SURGICAL ADMISSIONS: JULY-DECEMBER 1994 AND JULY-DECEMBER 1995

Hospital role grouping	Emergency readmission rate: 1994 %	Emergency readmission rate: 1995 %	Z[a]	P	
1. Public principal referral	3.0	2.7	2.00	<0.05	↓[b]
2. Public major referral	3.1	3.6	2.51	<0.05	↑[c]
3. Major rural base	2.3	2.6	1.49	0.14	
4. District high	3.1	2.9	0.81	0.42	
5. District medium	1.9	2.0	0.77	0.443	
6. District low	1.4	1.8	1.96	<0.05	↑
7. Community public	1.1	2.2	3.00	<0.01	↑
Total	2.5	2.6	1.27	0.17	

Notes:
(a) Using normal approximation to the binomial distribution.
(b) ↓ = statistically significant decrease.
(c) ↑ = statistically significant increase.

TABLE 5

STANDARDISED READMISSION RATES (%) FOR ELECTIVE MEDICAL ADMISSIONS: JULY-DECEMBER 1994 AND JULY-DECEMBER 1995

Hospital role grouping	Emergency readmission rate: 1994 %	Emergency readmission rate: 1995 %	Z[a]	P	
1. Public principal referral	2.3	2.0	3.16	<0.01	↓[b]
2. Public major referral	2.5	2.0	3.22	<0.01	↓[c]
3. Major rural base	1.8	1.7	0.12	0.90	
4. District high	2.1	2.1	0.00	–	
5. District medium	1.8	1.9	0.76	0.45	
6. District low	2.0	2.3	0.99	0.32	
7. Community public	1.4	2.7	2.85	<0.01	↑
Total	2.2	2.0	3.19	<0.01	↑

Notes:
(a) Using normal approximation to the binomial distribution.
(b) ↓ = statistically significant decrease.
(c) ↑ = statistically significant increase.

1. Caring for health: after the waiting list reduction program: continuous improvement in patient management. State Health pubn no. 96-0016. Sydney: NSW Department of Health, 1996.
2. NSW public hospitals comparison data 1994-95. State Health pubn no. (IDS) 96-0068. Sydney: NSW Department of Health, 1996.
3. Kirkwood BR. Essentials of medical statistics. Oxford: Blackwell Scientific, 1988.
4. Ashton, CM, Del Junco DJ, Souchek J, Wray NP, Mansyur CL. The association between the quality of inpatient care and early readmissions: a meta analysis of the evidence. Med Care 1997; 35: 1044-59.
5. McNeill JJ, Boyce N, de Campo M, Ibrahim J, Majoor J. Literature review: reliability and validity and risk adjustment of a pilot set of hospital wide indicators. Draft report. Canberra: Department of Human Services and Health, 1996.

NEW SOUTH WALES MOTHERS AND BABIES 1996

BACKGROUND

The *New South Wales Mothers and Babies 1996* report combines the previous annual reports of the NSW Midwives Data Collection and the NSW Birth Defects Register. This article presents a summary of the major findings of this report, which covers the period 1990-1996.

Trends in NSW

The number of births in NSW rose from 87,532 in 1990 to a peak of 88,976 in 1992 and then declined to 86,429 in 1996. The number of teenage mothers decreased from 4,850 (5.6 per cent of all mothers) in 1990 to 4,295 (5.0 per cent) in 1996, while the number of mothers aged 35 years and over rose from 8,974 (10.4 per cent) in 1990 to 12,712 (14.9 per cent) in 1996 (Figure 3).

The reported number of confinements among Aboriginal and Torres Strait Islander women rose from 1,202 in 1990 (1.4 per cent) to 1,712 (2.0 per cent) in 1996. Part of this increase is likely to be because of an increased willingness of women to be identified as Aboriginal or Torres Strait Islander.

Since 1990 there has been an increasing number of confinements among women who were born in Asian countries, particularly China and Vietnam, and Pacific Island countries, and a decreasing number of confinements among those who were born in European countries.

There has been a marked decrease in the number of women with private obstetric care since 1990. The proportion of women with private obstetric care decreased from 48.6 per cent to 32.2 per cent.

The number of women planning to give birth in a birth centre rose from 723 in 1990 to 4,015 in 1996, while the reported number of women planning a home birth decreased from 353 in 1990 to 247 in 1996.

The rate of normal vaginal birth in 1996 was 71.8 per cent, the same as in 1990. The caesarean section rate increased from 16.1 to 17.6 per cent, with most of this increase being due to an increased rate of emergency caesarean section. The rate of instrumental delivery (forceps and vacuum extraction) decreased from 12.0 to 10.6 per cent.

The rate of low birth weight (less than 2,500 grams) remained stable at about 6.0 per cent between 1990 and 1996 and the rate of prematurity (less than 37 weeks gestation) was also stable at about 6.5 per cent. The perinatal mortality rate decreased from 10.4 per 1,000 to 8.9 per 1,000. Most of the decrease is because there have been fewer neonatal deaths.

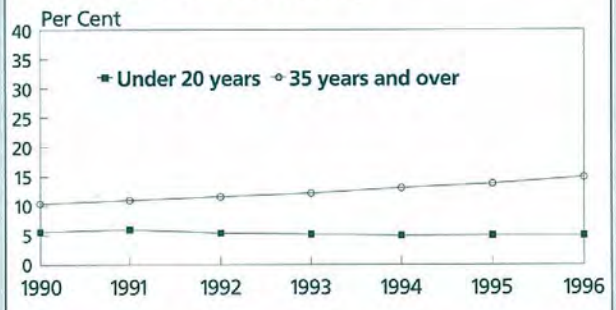
In the period 1990-1996, 54 deaths were reported among pregnant women or women who had given birth less than six weeks previously. Of these, about two-thirds were directly or indirectly related to pregnancy or its management and about one-third were due to incidental causes not related to the pregnancy.

Area Health Services

In 1996 the largest numbers of births occurred to mothers resident in the Western Sydney and South Western Sydney Areas. These two Areas contributed about a quarter of the State's births.

FIGURE 3

CONFINEMENTS AMONG MOTHERS AGED UNDER 20 YEARS AND 35 YEARS AND OVER, NSW 1990-1996



Source: NSW Midwives Data Collection. Epidemiology and Surveillance Branch, NSW Health Department

In 1996, as in previous years, there were large variations between Areas in the age distribution of women giving birth. The proportion of women giving birth at less than 20 years of age varied from 1.2 per cent in the Northern Sydney Area to 10.5 per cent in the Far West Area, while the proportion of women giving birth at 35 years of age or more ranged from 9.6 per cent in the Macquarie Area to 25.5 per cent in the Northern Sydney Area.

The proportion of Aboriginal or Torres Strait Islander mothers varied from 0.1 per cent in the Northern Sydney Area to 18.1 per cent in the Far West Area. The highest proportions of mothers born in non-English speaking countries were in the Central Sydney and South Western Sydney Areas. In South Western Sydney, the highest proportion of mothers born in non-English speaking countries was born in South-East Asia (42.7 per cent). In Central Sydney, most mothers born in non-English speaking countries were born in North-East Asia (25.8 per cent) and the Middle East and Africa (23.5 per cent).

The rate of low birth weight varied from 3.4 per cent in the Southern Area to 6.8 per cent in the Far West Area. The rate of prematurity varied from 3.4 per cent in the Southern Area to 7.8 per cent in the Wentworth Area.

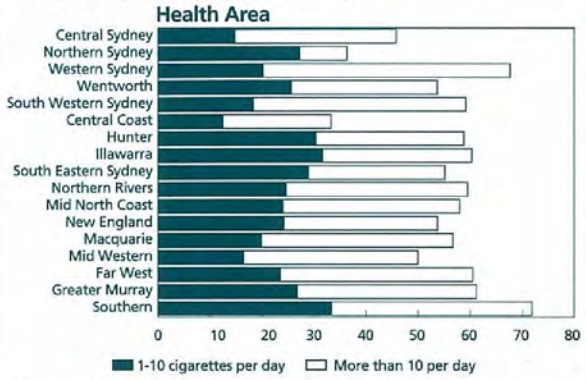
The perinatal mortality rate was 8.9 per 1,000 births in 1996. The rate varied from 6.0 per 1,000 in the Southern Area to 16.4 per 1,000 in the Far West Area.

Aboriginal and Torres Strait Islander mothers and babies

In 1996, 1,724 babies were born to Aboriginal or Torres Strait Islander mothers, 2.0 per cent of all babies born in NSW. A quarter of Aboriginal and Torres Strait Islander women who gave birth in 1996 lived in the Far West or Macquarie Areas and two- thirds lived in rural Areas. About one in five Aboriginal or Torres Strait islander mothers were teenagers and three-quarters were aged 20 to 34 years. More than 60 per cent of Aboriginal and Torres Strait Islander mothers reported smoking during pregnancy, compared with 21.1 per cent of all mothers (Figure 4).

FIGURE 4

SMOKING IN THE SECOND HALF OF PREGNANCY AMONG ABORIGINAL AND TORRES STRAIT ISLANDER MOTHERS, BY HEALTH AREA OF RESIDENCE, NSW 1996



Source: NSW Midwives Data Collection. Epidemiology and Surveillance Branch, NSW Health Department

In 1996, 88.3 per cent of Aboriginal and Torres Strait Islander mothers were booked into the hospital of birth, compared with 98.8 per cent of all mothers in NSW; and 61.0 per cent of Aboriginal and Torres Strait Islander mothers began antenatal care before 20 weeks gestation, compared with 85.3 per cent of all mothers in NSW.

Since 1991 the rate of low birth weight among Aboriginal and Torres Strait Islander babies has been more than 10 per cent. This is about one and a half times higher than the rate for NSW overall, which was 5.8 per cent in 1996. The perinatal mortality rate in babies born to Aboriginal and Torres Strait Islander women was 17.4 per 1,000 in 1996, about twice the rate of 8.9 per 1,000 for NSW overall.

Maternal country of birth

Between 1990 and 1996, the number of mothers born in non-English-speaking countries rose from 14,469 to 17,333, an increase from 16.7 to 20.3 per cent of all confinements. Mothers born in Asia showed the largest increase, from 6.8 per cent to 10.5 per cent of confinements. Small increases were observed in the numbers of mothers born in Central and South America and the Pacific Islands, while the number of mothers born in Southern Europe declined by about one-third over the seven-year period.

Births to teenagers were less common among women born in non-English-speaking countries than English-speaking countries, as was smoking in pregnancy.

In 1996, 85.3 per cent of all mothers began antenatal care before 20 weeks' gestation.

There was some variation between country of birth groups, with 87.6 per cent of mothers born in English speaking countries beginning antenatal care before 20 weeks gestation, compared with 55.6 per cent of those born in Melanesia, Micronesia and Polynesia and 65.4 per cent of those born in the Middle East and Africa.

The highest rates of low birth weight were in babies of women born in Southern Asian countries (8.5 per cent) and Melanesia, Micronesia and Polynesia (7.9 per cent). The highest rates of prematurity and perinatal mortality were in babies of women born in Melanesia, Micronesia and Polynesia: 8.1 per cent and 1.6 per cent respectively.

Birth defects

About 2,000 infants are born with birth defects each year in NSW, and for about half these infants the malformation is detected after birth. Over the period 1990-1996, in stillborn and liveborn infants defects of the cardiovascular system were the most commonly reported, followed by defects of the musculoskeletal system and defects of the genitourinary system.

The reported number of infants born with neural tube defects, such as spina bifida, decreased from 80 in 1992 to 38 in 1996.

In 1996 the number of reported terminations of pregnancy associated with birth defects was 102, less than the 140-150 a year since 1992. About half the reported terminations are associated with chromosomal defects, most commonly Down syndrome, and almost one-third with neural tube defects.

Birth defects were more common in premature infants than full-term infants, and more common in male than female infants. The rate of birth defects increased with increasing maternal age, especially after the age of 35. However, as most babies are born to women aged under 35 years, most babies with birth defects were born to younger mothers.

Hospital-specific information

Detailed information is provided for hospitals with more than 200 confinements in 1996. The number of hospital-specific tables has been increased and now includes the following topics:

- onset of labour;
- type of delivery;
- epidural block;
- episiotomy and third degree tears;
- birth weight and gestational age distribution of liveborn babies; and
- discharge status and length of postnatal stay.

FURTHER INFORMATION

The report may be accessed through the Department's World Wide Web site at http://www.health.nsw.gov.au. Requests for further analyses may be directed to a Public Health Unit or the Epidemiology and Surveillance Branch, NSW Health Department.

LETTER TO THE EDITOR

POLLUTANT EXPOSURES: BACK TO BASICS

Paul J Beggs
Lecturer in Physical Geography
School of Earth Sciences
Macquarie University

I read with interest the two abstracts reporting research on air pollution and daily hospital admissions in Sydney[1] and air pollution and daily mortality in Sydney[2]. I was, however, concerned when I read that these studies had "estimated the exposure of the Sydney population to air pollution by averaging the available daily exposure data across the network to get a citywide mean". In doing so, the investigators have ignored the spatial variation that is so apparent in air pollution in the Sydney region.

There is no doubt that air pollution in Sydney varies both spatially and temporally. The importance of this is such that the NSW Environment Protection Authority now supplements its Sydney pollution index (a single number representing pollution levels in the whole of Sydney for a whole day) with a regional pollution index (am and pm values for eastern Sydney, south-western Sydney, and north-western Sydney)[3]. In terms of spatial variation it is clear that ozone (O_3) tends to reach higher levels in Sydney's west and south-west[4] and that nitrogen dioxide (NO_2) is likely to be higher in concentration in the inner areas of Sydney. Particulates, such as lead, are also likely to be in higher concentration in the inner areas of Sydney[5] and indeed higher adjacent to heavily trafficked roads than away from such roads. As such, residents living in Sydney's south-west, for example, are likely to be exposed to a very different cocktail of pollutants (and allergens) than residents living in Sydney's inner suburbs.

Some time ago, Whittemore commented that "investigations comparing acute respiratory events with temporal pollutant fluctuations should continue, using better design, better analysis, and better exposure assessment techniques"[6]. Perhaps a more insightful study design would have broken Sydney into regions corresponding to our knowledge of Sydney's varying air pollution problems. In doing so, perhaps daily hospital admissions to hospitals in Sydney's south-west could have been analysed alongside records of air pollution from the monitors in that region.

Readers should also be aware of the limitations of hospital admission data. Such data are only an indicator of the most severe attacks of diseases such as asthma and will not necessarily reflect lesser changes in morbidity such as would be reflected in measures such as hospital attendances or through the use of symptom diaries or peak expiratory flow-rate diaries.

---

1. Morgan G, Corbett S, Wlodarczyk J. Air pollution and daily hospital admissions in Sydney. *NSW Public Health Bulletin* 1996; 7(12):145.
2. Morgan G, Corbett S, Wlodarczyk J, Lewis P. Air pollution and daily mortality in Sydney. *NSW Public Health Bulletin* 1996; 7(12):146.
3. New South Wales Environment Protection Authority. Quarterly Air Quality Monitoring Report, Part A: EPA Data, October-November-December 1995, 1996; 21(4).
4. Hyde R, Johnson GM. *Pilot study: evaluation of air quality issues for the development of Macarthur South and South Creek Valley regions of Sydney.* Prepared for the NSW Department of Planning; NSW State Pollution Control Commission; Commonwealth Department of Transport and Communications, Domestic Aviation Division. Final Report, December 1990, CSIRO MRL RIR 1885R.
5. Australian Nuclear Science and Technology Organisation, University of New South Wales, Macquarie University. Contributions of Fuel Combustion to Pollution by Airborne Particles in Urban and Non-Urban Environments. Energy Research and Development Corporation, ERDC259, 1995.
6. Whittemore AS. Air pollution and respiratory disease. *Annu Rev Public Health* 1981; 2:397-429.

ADVERTISING CAMPAIGN ON THE DANGERS OF LEAD

In February the NSW Government launched a Statewide television, print and radio advertising campaign addressing lead safety. The theme of this public awareness campaign, which was launched by the Minister for the Environment, Ms Pam Allan, is "Living safely with lead". It is aimed at parents, renovators of older houses, and lead industry workers.

Campaign messages include the importance of being aware of the sources of lead in the environment, and the simple things that can be done to minimise the risk of exposure to lead, such as:

- having a nutritious diet that is high in calcium, iron and zinc;
- using wet sanding and scraping techniques when renovating to prevent the spread of lead dust; and
- washing your hands and face before meals or before smoking if working in a lead industry.

The advertisements focus on the risks associated with different sources of lead, particularly old lead paint in pre-1970 houses and lead dust in and around the home, as well as the risks in the workplace.

There are about 280,000 people in NSW who work with lead or lead products and who are potentially at risk of suffering from the effects from lead. The campaign addresses the potential for exposure at work and from lead taken home from work on clothes, tools and vehicles and which can affect workers' families.

This campaign complements other Lead Reference Centre educational initiatives, including a series of booklets for health care professionals, renovators and parents, and fact sheets targeting individual high-risk groups and ethnic communities. The Lead Reference Centre is also running regional briefings for local government to assist it to develop lead management policies and strategies.

A new Web site on lead (http://www.epa.nsw.gov.au/leadsafe/) and the free-call Lead Pollution Line, 131 555 (during business hours) are available to provide information to the community on lead issues. Any of the above printed materials can be ordered by contacting the Lead Pollution Line or by e-mail info@epa.nsw.gov.au.

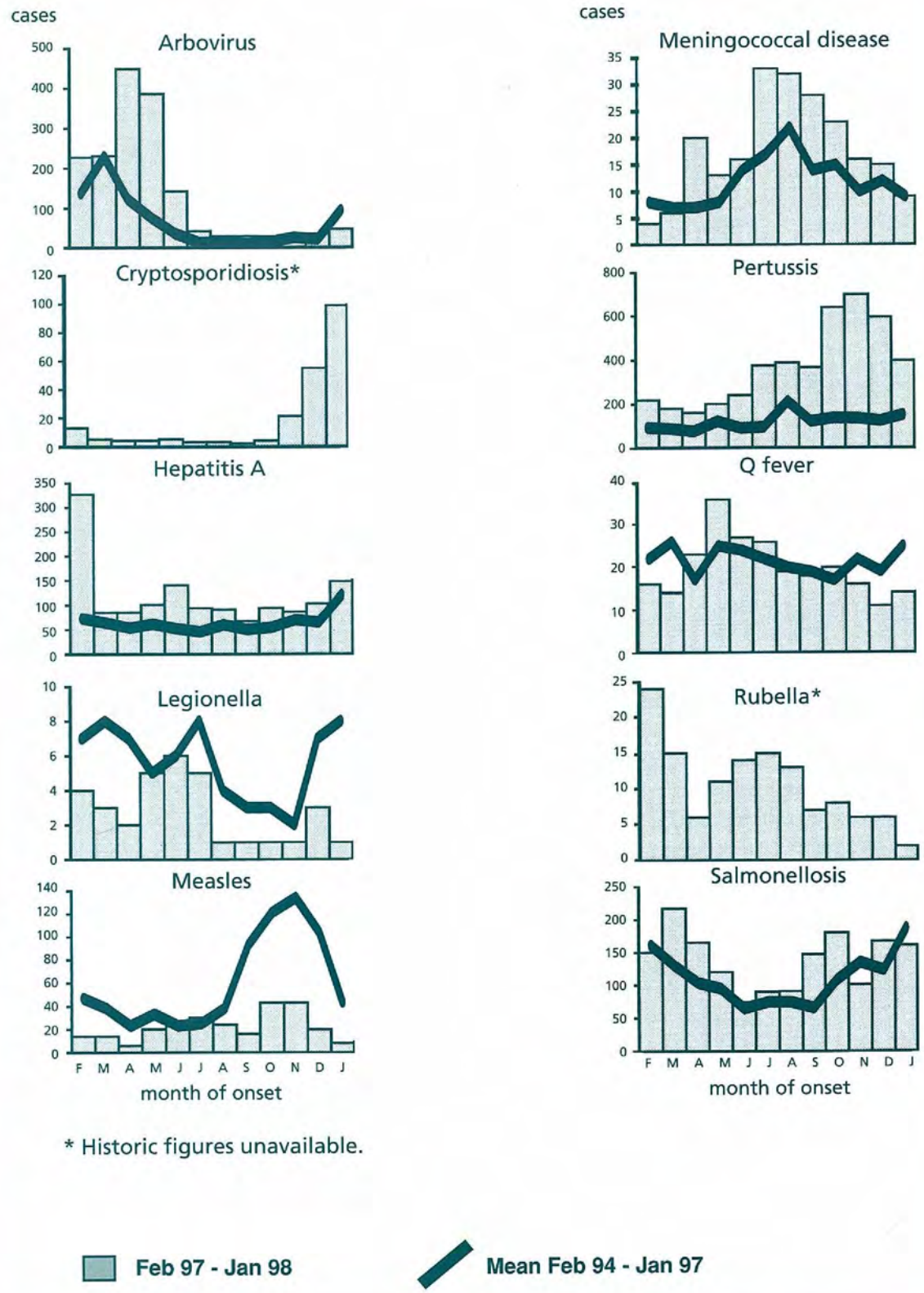
Contact: Richard Birdsey, Lead Reference Centre (02) 9879 4988.

NSW PUBLIC HEALTH OFFICER TRAINING PROGRAM PLACEMENTS, 1998

Year	Name	First placement: February-August	Second placement: August-January
1	Mark Burley	Department of Public Health and Community Medicine, Westmead Hospital	Environmental Health Branch, Public Health Division, NSW Health
1	Anton Clifford	South Western Sydney Public Health Unit, South Western Sydney Area Health Service	South Western Sydney Public Health Unit, South Western Sydney Area Health Service
1	Leon Heron	AIDS and Infectious Diseases Branch, Public Health Division, NSW Health Department	AIDS and Infectious Diseases Branch, Public Health Division, NSW Health Department
1	Lisa Jackson	Needs Assessment and Health Outcomes Unit, Central Sydney Area Health Service	Needs Assessment and Health Outcomes Unit, Central Sydney Area Health Service
1	Margaret Lesjak	Sun Exposure and Physical Activity Unit, Public Health Division, NSW Health Department	Sun Exposure and Physical Activity Unit, Public Health Division, NSW Health Department
1	David Muscatello	Epidemiology and Surveillance Branch, Public Health Division, NSW Health Department	To be determined
1	Allison Salmon	Kirketon Road Centre, South Eastern Sydney Area Health Service	Drug and Alcohol Services/NAHOU, Division of Population Health, Central Sydney Area Health Service
1	Lilian Wan	Illicit Drugs and Health Unit, Public Health Division, NSW Health Department	Drug and Alcohol Centre/Epidemiology Unit, Division of Population Health, South Western Sydney Area Health Service
1	Michael Westbury	Illawarra Public Health Unit, Illawarra Area Health Service	To be determined
2	Mark Bartlett	Cancer Unit, Public Health Division, NSW Health Department	Northern Rivers Institute of Health and Research, Northern Rivers Health Service
2	Larissa McIntyre	Australian Agricultural Health Unit, Public Health Division, NSW Health Department	Maternal and Child Health Unit, Public Health Division, NSW Health Department
2	Julianne Quaine	Epidemiology and Surveillance Branch, Public Health Division, NSW Health	Epidemiology and Surveillance Branch, Public Health Division, NSW Health
2	Sarah Thackway	Mid North Coast Public Health Unit, Mid North Coast Health Services	Division of Population Health, Central Sydney Area Health Service
3	Seham Girgis	South West Centre for Public Health, Greater Murray Health Services	South West Centre for Public Health, Greater Murray Health Services
3	Katherine Jong	Northern Rivers Institute of Health and Research, Northern Rivers Health Service	To be determined
3	Mary Osborn	Cancer Control Information Centre, NSW Cancer Council	Cancer Control Information Centre, NSW Cancer Council
3	Michele Puech	AIDS and Infectious Diseases Branch, Public Health Division, NSW Health Department	AIDS and Infectious Diseases Branch, Public Health Division, NSW Health Department

FIGURE 5

REPORTS OF SELECTED INFECTIOUS DISEASES, NSW, 12 MONTHS TO JANUARY 1998, BY MONTH OF ONSET (WITH HISTORICAL COMPARISON)



* Historic figures unavailable.

Feb 97 - Jan 98 **Mean Feb 94 - Jan 97**

INFECTIOUS DISEASES

TRENDS

Apart from a significant rise in the number of cases of **cryptosporidiosis** reported since late 1997 (see *NSW Public Health Bulletin* January-February 1998), notifications of most seasonal infectious diseases were in decline or at expected levels for this time of year (Figure 5). Rates of **pertussis** are falling, with 187 cases reported in February – down from 701 reported in November.

GONORRHOEA INCREASES

Reports of **gonorrhoea** have increased throughout NSW recently (Figure 6), with 164 cases being reported in the first two months of the year (Table 6) – up from 83 for the same period last year. The 1998 figures represent the continuation of a longer-term trend: 624 cases were reported in 1997, 526 in 1996 and 419 in 1995. Of the 81 cases reported in February 1998, 47 (58 per cent) were residents of South Eastern Sydney (Table 6) – up from 21 (53 per cent) in February 1997. The male-to-female ratio for February 1998 was 40:1 (up from 9:1 in February 1997).

This steady increase in the number of cases of gonorrhoea is also reflected in data from the World Health Organisation Western Pacific Region Gonococcal Reference Laboratory, South Eastern Area Laboratory Service, Randwick. The reference laboratory data also indicate that an increasing number of gonorrhoea isolates are resistant to quinolone, from 53 in 1996 to 146 in 1997. Quinolone resistance has been associated with cases arising from heterosexual contact in Australia and South-East Asia (Professor John Tapsall, personal communication).

These data, combined with clinic-based surveillance (Professor Basil Donovan, personal communication) indicate that gonorrhoea is re-emerging as an important issue for gay men. In response, the NSW Health Department is working closely with the AIDS Council of NSW and specialist sexual health services to provide targeted prevention messages.

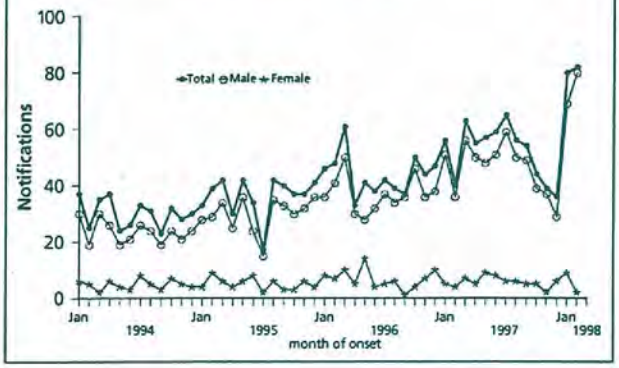
Early detection and treatment of cases and their contacts is vital in preventing transmission. NSW Health Department information circular 93/96 provides useful advice for health care workers on contact tracing. A Commonwealth Department of Health and Family Services contact tracing manual is available from the Australasian Society for HIV Medicine (fax your name, organisation and address to (02) 9382 3699, or phone (02) 9382 1657).

HEPATITIS A ON THE NORTH COAST

In February the NSW Health Department received reports of 127 cases of **hepatitis A,** of whom 54 (43 per cent) were residents of the Northern Rivers Area. An investigation of

FIGURE 6

GONORRHOEA NOTIFICATIONS
BY MONTH OF ONSET, NSW, 1994 TO 1998



reported cases by the Northern Rivers Public Health Unit has identified person-to-person contact as the most likely mode of transmission for most cases. No point source has been identified. The PHU has worked closely with patients, health care providers and schools, recommending careful hygiene to prevent the further spread of the disease and early use of immunoglobulin to protect close contacts.

ACTIVE AIDS SURVEILLANCE REPORT 1997

Active surveillance in the last quarter of 1997 identified 1,285 people living with AIDS in NSW at November 1, including 150 previously unreported people. Between 1993 and 1996, the number of additional cases found through active surveillance increased from 80 to 256.

Under the Commonwealth AIDS Medicare agreement, the Federal Government contributes about $42,000 to services for each person notified to be living with AIDS on November 1 each year. Health care providers report AIDS cases confidentially to Public Health Units, using a unique patient identifier rather than name. An accurate count of these cases is essential to ensure sufficient funding for HIV-related services in NSW. Since 1994, Area Health Service personnel have played an increasing role in working with the affected community and health care providers to optimise identification of cases.

Continued on page 42 ▶

TABLE 6

INFECTIOUS DISEASE NOTIFICATIONS FOR NSW RECEIVED IN FEBRUARY 1998 BY AREA HEALTH SERVICES

Condition	Area Health Service 1998																	Period	
	CSA	NSA	WSA	WEN	SWS	CCA	HUN	ILL	SES	NRA	MNC	NEA	MAC	MWA	FWA	GMA	SA	Total for Feb**	Total to date**
Blood-borne and sexually transmitted																			
AIDS	1	–	1	–	–	–	1	–	2	–	–	1	–	–	–	–	–	6	12
HIV infection*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Hepatitis B – acute viral*	1	–	–	–	–	–	–	–	3	–	–	–	–	–	1	–	–	5	10
Hepatitis B – other*	40	37	2	1	2	6	4	8	44	–	4	3	2	–	–	–	1	154	387
Hepatitis C – acute viral*	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	1	5
Hepatitis C – other*	56	27	15	23	10	30	26	30	109	48	26	17	6	20	–	15	11	469	1,042
Hepatitis D – unspecified*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Hepatitis, acute viral (NOS)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Gonorrhoea*	15	6	3	–	1	–	2	1	47	–	2	3	–	–	1	–	–	81	164
Syphilis	3	2	4	–	–	1	–	–	14	1	3	–	2	–	–	–	–	30	74
Vector-borne																			
Arboviral infection*	2	1	1	–	–	3	8	2	1	12	8	3	5	–	2	3	2	53	100
Malaria*	1	3	–	–	1	–	–	1	–	–	–	1	–	–	–	–	1	8	27
Zoonoses																			
Brucellosis*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Leptospirosis*	–	–	–	–	–	–	–	–	–	–	1	2	–	–	–	–	–	3	4
Q fever*	–	–	–	–	–	1	2	–	1	2	1	2	6	1	1	–	–	17	31
Respiratory/other																			
Blood Lead Level	6	1	–	–	–	1	7	1	1	12	–	1	–	–	–	–	7	37	58
Legionnaires' disease	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	1	2
Leprosy	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Meningococcal (invasive) infection	1	1	1	2	2	1	1	–	1	–	–	–	–	–	–	–	–	10	19
Mycobacterial tuberculosis	–	2	2	–	–	1	–	–	5	–	–	–	–	–	–	–	–	10	26
Mycobacteria other than TB	–	–	–	–	–	3	1	–	–	–	–	–	–	–	–	–	–	4	28
Vaccine-preventable																			
Adverse event after immunisation	–	–	–	2	1	–	–	–	3	–	3	2	–	–	–	–	2	13	36
H.influenzae B (invasive) infection	–	–	–	–	–	–	–	–	1	–	-	-	–	–	–	–	-	1	1
Measles	1	–	–	1	1	–	1	–	1	–	2	–	–	1	1	–	–	9	17
Mumps*	–	–	–	–	–	1	–	–	2	–	1	–	–	–	–	–	–	4	6
Pertussis	13	20	12	6	12	21	16	27	14	8	22	5	3	2	2	1	3	187	585
Rubella*	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1	3
Tetanus	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Faecal-oral																			
Botulism	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Cholera*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Cryptosporidiosis	23	17	24	–	12	6	15	14	48	50	24	9	3	–	–	–	24	269	368
Foodborne illness (NOS)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3
Gastroenteritis (instit)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1	27
Haemolytic Uraemic Syndrome	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Hepatitis A	9	6	5	1	5	5	6	1	22	54	8	2	–	–	1	2	–	127	275
Hepatitis E	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Listeriosis*	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	2	9
Salmonellosis (NOS)*	21	30	–	–	1	25	7	9	23	31	8	10	5	2	1	4	3	180	341
Typhoid and paratyphoid*	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	1	6
Verotoxin Producting Ecoli	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1	1

* 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.