NSW Public Health Bulletin

Volume 9, Numbers 6 and 7
June–July 1998

NSW HEALTH

ISSN 1034 7674
State Health Publication PH 980084

EDITORIAL: MONITORING CHILD HEALTH

Victor Nossar
Service Director, Department of Community Paediatrics, South Western Sydney Area Health Service

Garth Alperstein
Community Paediatrician, Community Health Services, Central Sydney Area Health Service

Systematic monitoring of health is not a modern phenomenon. In the late middle ages, governments in Western Europe established rudimentary systems of monitoring 'illness'.[1,2]

These resulted in regulations against polluting the streets and public water, as well as legalisation regarding burials and food handling. Indeed, in 1776, Johann Peter Frank in Germany advocated a further extension of the public health system to cover school health, injury promotion and maternal and child health.[2]

With better understanding of children's health problems and the expansion of the definition of health to include not only physical but also emotional and social dimensions, the monitoring of children's health has had to broaden to incorporate other indicators of health. These indicators (indicators are specific measures which can be used to assess progress towards a goal) include measures such as rates of high-school completion, teenage pregnancy, youth unemployment, homelessness and child care support, to mention a few.

The need to describe the health of child populations more comprehensively has led to the production of a child health report card by the State of California in the United States,[3] and here in NSW by the South Western Sydney Area Health Service.[4] These reports measure not only readily available and commonly used physical health indicators, such as infant mortality, rates of vaccine-preventable disease and hospital separation rates, but also educational and social indicators, such as those mentioned above.

In a similar vein, the NSW Chief Health Officer's Report is a significant step forward. It, too, not only describes measures using traditional health indicators, but also includes analysis of the socioeconomic and educational underpinnings of health. The scope of the report is outlined in the article in this issue, 'Surveillance of child health in NSW: status, gaps and developments' (p. 73).

continued on p. 72

CONTENTS

Monitoring of children's health is important for many reasons. The health needs of the community must be assessed, trends in health status observed, appropriate services developed and the effect of those services assessed to establish the nature of the outcomes and to identify new health issues.

Monitoring of children's health is therefore critical to properly determining the resources required, and the manner in which those resources are to be used, to yield the best possible outcomes. So resources, strategies and outcomes become part of a single process linking data collection with health policy development.

In order to gain a more comprehensive picture of health, this process must be complemented by the development of suitable indicators—in partnership with other departments involved in the care of children and youth, such as Community Services, Education and Training, and even Police, Housing and Juvenile Justice. The value of these partnerships has been well demonstrated in the development of the South Western Sydney Area report, the *Health of Children in South Western Sydney*, which is reported here in the articles, 'Indicators of the health status of children and youth' (p. 75) and 'Adolescent health monitoring at the regional level' (p. 78).

The challenge that now faces Australia is the development of a comprehensive set of child health indicators that can be used by all States and Territories, and which will permit international comparisons. This is currently being addressed by the Australian Institute of Health and Welfare.

The widest possible dissemination of information describing the health of a community's children serves to foster better understanding about the needs of those children and can lead to greater levels of support in that community for interventions addressing high-priority health issues.

REFERENCES

1. Surveillance [editorial]. *J Epidemiol* 1976; 5: 3–6.
2. Hartgerlink MJ. Health surveillance and planning for health care in the Netherlands. *J Epidemiol* 1976; 5: 87–91.

PUBLIC HEALTH EDITORIAL STAFF

The *NSW Public Health Bulletin* is a publication of the NSW Department of Health. The editor is Dr Lynne Madden, Manager, Public Health Training and Development, NSW Health Department. Rhana Pike is production manager.

The *Bulletin* aims to provide its readers with population health data and information to motivate effective public health action.

Submission of articles

Articles, news and comments should be 1000 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 in the Vancouver style, described in the *New England Journal of Medicine*, 1997; 336: 309–315. Send submitted articles on paper and in electronic form, either on disc (Wordperfect or Word for Windows are preferred), or by email. The article must be accompanied by a letter signed by all authors. Full instructions for authors are available on request from the editor.

Editorial correspondence

Please address all correspondence and potential contributions to The Editor, *NSW Public Health Bulletin*, Locked Mail Bag 961, North Sydney NSW 2059 or to Lmadd@doh.health.nsw. gov.au. Tel (02) 9391 9956, Fax (02) 9391 9232.

Distribution

Please contact your local Public Health Unit or telephone (02) 9391 9942 to obtain copies of the *NSW Public Health Bulletin* or to notify us of a change of address. The *Bulletin* can be accessed via the Internet from http://www.health.nsw.gov.au/public-health/phb/phb.html, the Department's Web site.

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

NEW ACCESS TO HEALTH DATABASES

The NSW Health Department's Clinical Information Access Project (CIAP) Web site, at http://www.clininfo.health.nsw.gov.au, was launched in July 1997, and provides free, full-text access to Medline, CINAHL, the full Cochrane Library, Healthstar and MIMS databases. The project was started to meet some of the information requirements of clinicians at the point of care in the public hospital system. The information can be used by general practitioners, public health workers, community health staff and students in the health professions.

For passwords to the database please contact Michelle Wensley, telephone (02) 9391 9742, or email mwens@doh.health.nsw.gov.au.

SURVEILLANCE OF CHILD HEALTH IN NSW: STATUS, GAPS AND DEVELOPMENTS

Louisa Jorm
Director, Epidemiology and Surveillance Branch
NSW Health Department

This article describes the current status of the surveillance of children's health in NSW, identifies some of the major gaps in the scope and quality of the available information and outlines new developments that will provide improved data.

STATUS

Surveillance of child health in NSW historically has relied on many data collections planned and conducted independently and reported erratically. Only a few surveillance reports have appeared regularly, most notably the infectious disease notifications in the *NSW Public Health Bulletin*, the annual reports of the NSW Midwives Data Collection and NSW Birth Defects Register, reports prepared by the NSW Central Cancer Registry and the series of primary-school and secondary-school drug and alcohol surveys conducted by the former Drug and Alcohol Directorate.

The development of a strategy for population health surveillance in NSW has marked the introduction of a more systematic approach.[1] The strategy places particular emphasis on better use of existing data sets and improved communication and dissemination of information.

In 1997, for the first time, the annual reports of the NSW Midwives Data Collection and NSW Birth Defects Register were combined into a single report: *New South Wales Mothers and Babies 1996*.[2] This gives trend data on birth defects and perinatal outcomes, including breakdowns by Area Health Service, maternal Aboriginality and country of birth. This report will be produced yearly and will be expanded as more surveillance data become available.

The strategy for population health surveillance identified the NSW Chief Health Officer's Report is a key mechanism for delivery of statewide health information. The most recent version, published in 1997, includes a chapter on the health of mothers and babies and gives age breakdowns, where appropriate, in chapters focusing on specific health issues, such as injuries and asthma.[3]

The child health data presented include main causes of death (Figure 1) and hospital separations (Figure 2) for children aged 0–14 years, and trends for a range of indicators, including rates of:

- perinatal death
- low birth-weight
- death from sudden infant death syndrome
- birth defects
- self-reported drug and alcohol use
- immunisation coverage
- reported abuse and neglect
- death and hospital separation for drowning and near drowning, falls, unintentional poisoning, and accidents due to fire, burns and scalds.

The Chief Health Officer's Report is available as a 268-page book and also in two electronic formats: downloadable (Adobe Acrobat format) and on-line. Both electronic versions can be accessed at http://www.health.nsw.gov.au/public-health/chorep/chorep.html. The on-line version will be revised and updated progressively as new data sets become available, and a new printed report will be published late in 1999.

GAPS

Although the delivery of child health surveillance information has recently improved, the scope and quality of the information available remain inadequate.

Limitations in available data may relate in part to logistic difficulties in collecting health information about children, particularly those of preschool age and primary-school age. Few opportunities exist to capture data in health care settings. Relatively good data are collected about babies while they and their mothers are in contact with public health services, but older children generally have good physical health and tend to use general practitioners rather than public services. Schools offer a potential setting for gathering data on older children, but competing demands and priorities in schools limit opportunities for health data collection.

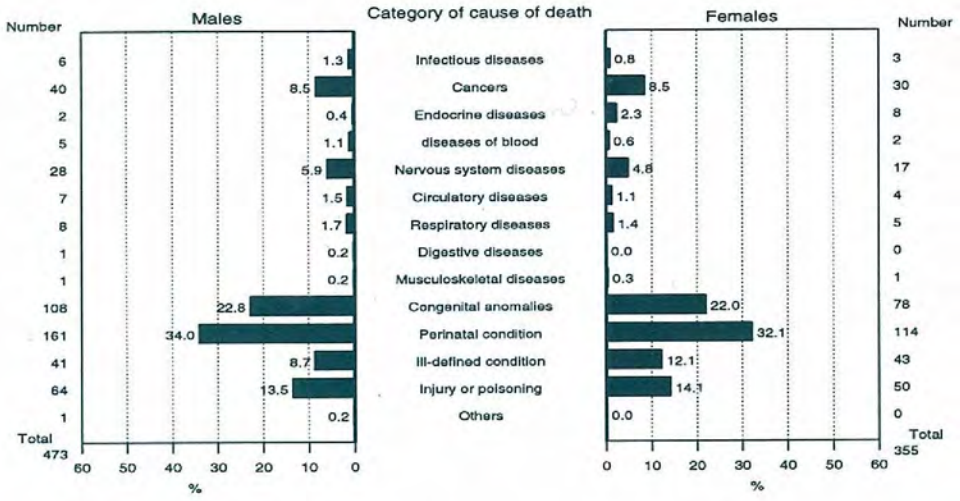
Gathering data about children also involves obtaining access not only to the children themselves, but to their parents and carers. For practical and ethical reasons, they are unable to provide data on their own behalf until they reach the age of 10 years or so, so proxy data must be sought.

The important areas of child health for which consistent statewide information is lacking include:

- growth and development
- health status and quality of life
- mental health problems and known risk factors for these problems
- disabilities
- chronic diseases, including asthma
- nutrition, including breast-feeding patterns
- physical activity
- overweight and obesity
- exposure to environmental tobacco smoke
- teenage sexual behaviour
- social and economic influences on health, including child care patterns and family circumstances
- the health of Aboriginal and Torres Strait Islander children
- the health of children from families speaking languages other than English

FIGURE 1

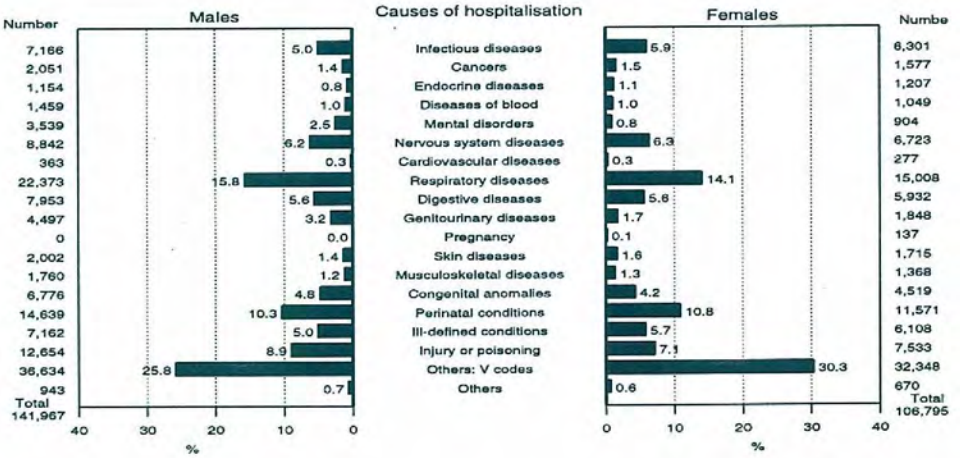
DEATHS BY CATEGORY OF CAUSE AND SEX, FOR PERSONS AGED 0–14 YEARS, NSW, 1994



Source: *The health of the people of New South Wales. Report of the Chief Health Officer.*[3]

FIGURE 2

PRINCIPAL DIAGNOSIS FOR HOSPITALISATION, BY SEX, FOR PERSONS AGED 0–14 YEARS, NSW, 1995–96



Source: *The health of the people of New South Wales. Report of the Chief Health Officer.*[3]

DEVELOPMENTS

Two new developments promise improved data on the health of NSW children in the near future.

First, the NSW component of the 1996 Australian School Students' Alcohol and other Drugs (ASSAD) survey included for the first time questions on a broad range of health issues, including self-rated health, physical activity, nutrition, injury, mental health, sun protection and the use of licit and illicit drugs. Data were collected from more than 10 000 NSW school students in Years 7 to 12. The survey was conducted jointly by the NSW Health Department and the NSW Cancer Council. Several survey reports will be released shortly. Planning for the next round of data collection, due in 1998, is under way.

Second, the Epidemiology and Surveillance Branch proposes to undertake a child health survey in 1999, as part of the NSW Health Survey Program. The survey will target children aged 0–12 years, and information will be collected by telephone from parents and carers. The survey will focus on collecting data that are not available from other sources, particularly on quality of life, disability, health-related behaviours and social and economic influences on health. Future editions of the Bulletin will include updates on the progress of the child health survey.

REFERENCES

1. Jorm L, Puech M. *Strategy for population health surveillance in New South Wales.* Discussion paper. State Health Pubn. (ESB) 970147. Sydney: Epidemiology and Surveillance Branch, NSW Health Department, 1997.
2. Epidemiology and Surveillance Branch and Patient Data Management Unit. *New South Wales mothers and babies 1996.* NSW Public Health Bulletin, supplement no. 1. State Health Pubn. (ESB) 970146. Sydney: NSW Health Department, 1998.
3. Public Health Division. *The health of the people of New South Wales. Report of the Chief Health Officer.* State Health Pubn. (PHD) 970127. Sydney: NSW Health Department, 1997.

Correction

Cooper C, Mira M, Cox M, Maandag A. Infection control in general practice, 1994 and 1995. *NSW Public Health Bulletin* 1998; 9(4): 51–52,55.

The tables were wrongly numbered during production of the April 1998 issue of the Bulletin, and should have read Table 6 (p. 51) and Table 7 (p. 52).

INDICATORS OF THE HEALTH STATUS OF CHILDREN AND YOUTH

Elizabeth A. Sullivan
Australian Institute of Health and Welfare National Perinatal Statistics Unit, University of New South Wales.

Formerly Epidemiology Unit, South Western Sydney Area Health Service

Anthony Hogan

Formerly Public Health Officer
NSW Public Health Officer Training Program.

Current address: School of Communication Science and Disorders, Cumberland College of Health Sciences, Sydney University

This article describes how the Epidemiology Unit, in conjunction with the Department of Community Paediatrics of the South Western Sydney Area Health Service (SWSAHS), used existing sources of data to produce a profile of the health of the children of that Area. The goal was to produce a readily accessible document that provided front-line health care workers and other professionals, planners and the community with up-to-date information to inform their work to improve health outcomes for local children and adolescents. The final report, the *Health of Children in South Western Sydney,* included a summary of the major health indicators that showed how the health of the children of SWSAHS compared with that of the children of NSW.[1]

With a growing focus on health outcomes in Australia there is a need to develop indicators that can be used to measure and monitor the health of populations of children and adolescents cheaply, conveniently and at regular intervals. Although infant mortality and child mortality are well-established measures that provide sensitive indicators of a broad range of factors affecting children's health, there has been a dearth of other data collected routinely and little monitoring of health indicators in children. The notable exceptions for children are the State and Territory collections of perinatal data and the Australian Childhood Immunisation Register. The lack of well-established health data is even more evident for adolescents. Adolescents, despite having a low level of use of health services, experience important health problems, such as unintentional injuries, substance abuse and suicide.

The challenge was to develop a reporting system that used routinely collected data from a variety of traditional and non-traditional sources (including hospitals, government departments and agencies and non-government groups) to describe the health of children and adolescents in the local community. These sources could then be supplemented by periodic surveys on specific health issues

or risk factors. However, to effectively inform health planning for these population groups, these data needed to encompass the key determinants of health from the *Health Goals and Targets for Australian Children and Youth*.[2]

METHODS

The *Health of Children in South Western Sydney* compiled indicators that addressed the Health Goals and Targets for Australian Children and Youth (1992).[2] Once the indicators had been determined, sources of routinely collected population-based data that could be used to monitor the health of children over time were identified. The aim was to use collections such as the perinatal collections and census data to update the report every two years. Depending upon the quality and type of data, statistical analyses included simple descriptive frequencies, population estimates, crude and adjusted rates and odds ratios and 95 per cent confidence limit calculations where applicable.

STRUCTURE OF THE REPORT

The report opens with an overview of the population demographics of South Western Sydney, as defined by age, sex, country of birth, indigenous status and health care allocation per resident. The order of the other sections of the report corresponds wherever possible with the process of child development, commencing with the antenatal period, continuing through childhood and ending with youth unemployment and families on low incomes (Table 1).

Some of the diverse indicators used in the report, and their sources, are:

1. birth rates, rates of maternal smoking, rates of unbooked confinements and rates of low birth-weight at term, which were obtained from the NSW Midwives Data Collection
2. rates of birth defects, from the NSW Birth Defects Register
3. rates of infant death, perinatal death, cancer, injury and suicide death, from the Health Outcomes Information Statistical Toolkit (HOIST, Epidemiology Branch, NSW Health Department), or directly from the Australian Bureau of Statistics' perinatal mortality data or unit mortality data.
4. rates of hearing loss, from Australian Hearing Services
5. dental health data, from the 'Save Our Kids' Smiles' dental program
6. immunisation levels, from local surveys and now the Australian Childhood Immunisation Register
7. numbers of hospital separations, from the NSW Inpatient Statistics Collection
8. numbers of emergency department visits from the Emergency Department Information System (Table 2)
9. child abuse statistics, from the NSW Department of Community Services[3]
10. juvenile crime statistics, from the NSW Department of Juvenile Justice annual Children's Court statistics (Table 3)
11. school retention rates, from the NSW Department of School Education
12. youth unemployment, disability and family payment statistics from the Commonwealth Department of Social Security.

TABLE 1

CONTENTS OF THE SOUTH WESTERN SYDNEY AREA HEALTH SERVICE CHILD HEALTH REPORT

Population profile
Birth rates
Smoking during pregnancy
Unbooked confinements
Low birth-weight at term
Children born with birth defects
Infant mortality
Perinatal deaths
Hearing loss
Dental health
Immunisation
Health of Aboriginal children
Hospital separations
Paediatric (<18 years) emergency department visits
Mortality for cancer, and injury and poisoning
Adolescent health risk factors
Suicide patterns in adolescents and young adults
Child abuse
Young people and the law
School retention rates
Youth unemployment
Families on low incomes

Tables 2 and 3 show how a broad range of indicators, including dimensions of social and physical health status, are presented and integrated into the report. Table 2 describes age-specific injury and poisoning rates per 100 emergency department visits for selected hospitals in South Western Sydney and shows that there are extremely high overall rates for those aged 10-14 years and 15-17 years at Campbelltown, Fairfield and Camden Hospitals. Table 3 shows the proportions of selected offences committed by juveniles for SWSAHS and NSW, indicating that SWSAHS was overrepresented in a number of categories compared with the NSW figures.

Data sources that report on disability, Aboriginal health and chronic disease in the child and youth populations are still fragmented and limited; nevertheless, local surveys

TABLE 2

AGE-SPECIFIC RATE OF POISONING INJURY PER 100 EMERGENCY DEPARTMENT VISITS FOR SELECTED HOSPITALS IN SOUTH WESTERN SYDNEY, JANUARY 1995–JUNE 1996

	Age group (years)					
Hospital	<1	1–4	5–9	10–14	15–17	Total <18
Liverpool	24.6	26.3	26.9	26.2	24.8	25.8
Fairfield	7.0	22.5	32.3	45.2	41.4	28.5
Campbelltown	6.1	21.8	34.7	49.8	43.7	29.9
Bankstown	5.4	17.8	25.4	36.2	32.0	22.7
Camden[a]	16.3	32.1	41.5	47.3	41.5	38.3

(a) Data available for October 1995 to June 1996.

Source: South Western Sydney Area Health Service Emergency Data Information System (EDIS) 1995–1996.

TABLE 3

SELECTED OFFENCES COMMITTED BY JUVENILES FOR SOUTH WESTERN SYDNEY AND ALL OF NEW SOUTH WALES, 1994–95

	South Western Sydney		NSW
Type of offence	*n*	% of NSW	*n*
Motor theft	317	20.5	1547
Serious assault	177	18.0	967
Receiving or possessing	115	18.0	639
Robbery or extortion	62	17.8	348
Homicide	3	17.6	17
Drugs	99	14.9	663

Source: NSW Department of Juvenile Justice annual Children's Court statistics, Criminal Matters, Information Technology and Services Branch.

in conjunction with national surveys such as the National Health Survey can be used. Other important data sets are those maintained by the NSW Central Cancer Registry, the Spastic Centre and the Royal Blind Society, and COMCAS Community Health Client Administration System data. These data sets are not exhaustive but, when used in conjunction with ABS census data at a statistical local area level, can provide detailed descriptions of the population and its health status.

CONCLUSION

The usefulness of the first report has not been formally evaluated; this could be incorporated into the design of the second report in the series. However, there has been widespread distribution and reported use and referral to the document by SWSAHS personnel, local councils and other professional groups from a variety of disciplines, health and others. The report has also been disseminated at State and national levels as a potential prototype for a population-based report on child health and presented at international forums for comment. Another benefit of the report is that it establishes a baseline for describing child health with which measures from future monitoring can be compared. This should enable practitioners to advocate, with supportive data, changes to programs when outcomes are poor and their maintenance when outcomes are good.

In summary, data describing child and adolescent health is available at local, State and national levels. It is important to allocate sufficient time to obtain these data from disparate sources, and then to extract information for use at the local level. Some data (especially where events are rare or counts small) may not provide precise estimates at the local or regional level.

Information available through routine sources can be enhanced through periodic surveys of specific risk or health issues. These can be accomplished efficiently and economically with intersectoral collaboration and the use or modification of existing validated survey instruments. These strategies, if adopted at a local level, will allow the development of new indicators for measuring and monitoring the health of child and adolescent populations. It will also inform the decision making of front-line health and other professionals, planners and the community. The goal is to improve the health outcomes of children and adolescents.

REFERENCES

1. Sullivan EA, Hogan A, Mohsin, M et al. *Health of children in South Western Sydney.* Sydney: Epidemiology Unit, South Western Sydney Area Health Service, NSW Health Department, 1997. ISBN 1 875909 39 7.
2. *Health goals and targets for Australian children and youth.* Canberra: Department of Health, Housing and Community Services, 1992.
3. *Trends in child protection, NSW Health Areas: 1991–92 to 1994–95.* Sydney: Child and Family Services Directorate, NSW Department of Community Services, 1996.

ADOLESCENT HEALTH MONITORING AT THE REGIONAL LEVEL

Adrian Bauman and Lyndall McLellan[a]
Epidemiology Unit
South Western Sydney Area Health Service

[a] *Current address: Needs Assessment and Health Outcomes Unit, Central Sydney Area Health Service*

Anthony Hogan
Formerly Public Health Officer
NSW Public Health Officer Training Program

Current address: School of Communication Science and Disorders, Cumberland College of Health Sciences, Sydney University

This article explores the lack of routinely collected data to support the monitoring of adolescent health. It describes international and local surveys that have been used to fill this information gap. Surveys undertaken in 1992 and 1996 in South Western Sydney are used to illustrate how the information collected can be used to plan and assess local interventions to improve the health of young people.

Adolescence is a time of transition and development, but is also a time when many adopt unhealthy lifestyles and practices that affect their health status. For example, almost all smokers start to smoke in mid-adolescence. However, as teenagers do not use routine health services as frequently as other population groups, few routine population data are collected to permit the regular monitoring of their health. Further, while substantial health system resources are committed to developing adolescent health programs to address areas such as tobacco control, the reduction of hazardous drinking, the reduction of illicit drug use and responsible sexual behaviour, little effort is made to monitor the overall preventive effort to improve adolescent health.[1]

Overseas, routine data collections on adolescent health are carried out in several countries in Europe, as well as in regions within them. These countries use a standardised protocol for collecting a broad range of information about adolescents. This multicentre monitoring study is known as the European World Health Organization Health Behaviour in School Children (HBSC) surveys.[2] In North America, the routine Youth Risk Behaviour Survey (YRBS) provides State and regional data on diverse adolescent health and behaviour indicators.[3]

Here in Australia, there have been some attempts to collect information describing adolescent health. In NSW, the Health Department conducted a series of drug and alcohol surveys in secondary schools, in 1983, 1986, 1989 and 1992.[4] This survey was repeated in 1996, but the 1996 survey used slightly different questions from the earlier surveys (to enable the standardisation of all drug and alcohol data collection nationally), and consequently comparisons for trend analyses were not possible. No other aspects of adolescent health are monitored at the State and Area Health Service levels, despite the national investment in interventions across the spectrum of adolescent health needs. One exception to this was the Western Australian Child Health Survey, which assessed a range of child and family indicators and outcomes, but did not focus particularly upon adolescents.[5]

In 1992, South Western Sydney Area Health Service (SWSAHS) was the first regional health service in Australia to collect representative sample population data using the established HBSC adolescent health survey instrument. The survey questions and protocol were adapted from the European survey to conditions in Australia. The survey collected data on mental health, sun protection, injury prevention, physical health, dental health, physical activity and the usual adolescent health-compromising behaviours. A similar adolescent health survey was repeated in the Area in 1996 to assess trends in adolescent health and risk factors. Intersectoral collaboration within health was integral in supporting the conduct of the surveys. Local health promotion and community health teams contacted the randomly sampled schools and collected the data, which were entered and analysed by the Area epidemiology unit. In return, benchmark and trend data were provided by the unit for use in health promotion planning, child health services, drug and alcohol services and Area performance agreements.

Similar surveys were conducted by the Illawarra Public Health Unit in 1996, and across the Western Sydney Catholic education system in 1995. In 1996, a statewide survey of a random sample of adolescents across NSW was carried out using a collaborative process with regional health promotion field staff. The statewide project was managed by a consortium of health promotion managers from NSW. These surveys met regional and State needs, provided good quality epidemiological data and were very low in real costs. None of these studies received any additional Area or State funding, indicating the type of research and monitoring that can be achieved with existing resources. These coordinated regional adolescent surveys are consistent with local planning and can be repeated to monitor health (and risk) trends. For SWSAHS, repeating the population survey allows an estimate of the overall effects of adolescent health programs to be monitored.

As an example, the SWSAHS surveys in 1992 and 1996 are briefly described here. These surveys followed the HBSC protocol and covered school pupils in Years 6, 8 and 10 from randomly sampled schools in the Area. The surveys in 1992 and 1996 sampled 4550 and 3315 pupils respectively, with a balance by sex (overall 49 per cent male) and by school year (33 per cent from Year 6, 36 per cent from Year 8, and 31 per cent from year 10). About a fifth were students born in a non-English-speaking country,

TABLE 4

ANALYSIS OF HEALTH TRENDS AMONG YOUTH IN SOUTH WESTERN SYDNEY, 1992–1996

Content area	Variable used as an example	Prevalence rates (%) 1992	1996	Comment
Psychosocial and mental health	Feel lonely (quite or very often)	16.2	10.3	Apparent decline
Sedentariness and psychosocial health	Watch >4 hours TV daily	41.3	37.3	Little change
Injury prevention	Wear bike helmet	25.5	24.7	No change, low rate
Dental health	Visited dentist in the past year	61.4	50.9	Decline in routine dental visits
Chronic disease and management	Medication taken for asthma in past month	17.1	14.6	Slight decline, remains common problem
Social influences	Mother smokes	31.0	28.6	Slight decline in role

Source: *Trends in adolescent health in South Western Sydney: report of the 1992 and 1996 health behaviour among school student surveys.*[6]

reflecting the demographic diversity of the region. The data are more fully described in a report summarising the trends in South Western Sydney youth between 1992 and 1996.[6] A selection of those data are presented in Table 4 to illustrate the type of question asked and some of the trends observed. These are a very small subset of the domains of the questions asked, but indicate some for which health is deteriorating or continuing at a suboptimal level (such as regular dental health check-ups and continuing low rates of bicycle helmet usage), and some for which there may be some evidence of improvement (such as mental health and social influences for tobacco use). The most commonly reported chronic diseases and their management are also monitored.

In summary, monitoring the health of young people by regional and State surveys can provide a useful framework for assessing the overall effects of our efforts to improve adolescent health. This can provide directions for action to Area health services and to others at the regional level, as well as providing evidence-based feedback on overall progress to date. Using shared resources, such comprehensive monitoring may be feasible and inexpensive at the Area level and provide more useful information than smaller and often inconclusive project evaluations. It is expected that this SWSAHS survey will be repeated at four- to five-year intervals in order to establish trends in adolescent health over a longer period.

REFERENCES

1. Bauman A, Phongsavan P. Epidemiology of substance use in adolescence: prevalence, trends and policy implications. *Drug Alcohol Depend*. In press.
2. King A, Wold B, Tudor-Smith C, Harel Y. *The health of youth: a cross-national survey. A report of the 1993–94 survey results of health behaviour in school-aged children: a WHO cross-national study*. WHO regional publications, European series no. 69. World Health Organization, 1996.
3. Valois RF, Thatcher WG, Drane JW, Reininger BM. Comparison of selected health risk behaviors between adolescents in public and private high schools in South Carolina. *J School Health* 1997; 67: 434–440.
4. Cooney A, Dobbinson S, Flaherty B. *1992 survey of drug use by NSW secondary students, NSW*. Sydney: Drug and Alcohol Directorate, NSW Health Department, 1994.
5. Institute for Child Health. *WA child health survey*. ABS cat. no. 4303.5. Canberra: AGPS Press, 1995.
6. Bauman A, McLellan L, Young L, Hogan A, et al. *Trends in adolescent health in South Western Sydney: report of the 1992 and 1996 health behavour among school student surveys*. Sydney: Epidemiology Unit, South Western Sydney Area Health Service, NSW Health Department, 1998. In preparation.

INFECTIOUS DISEASES, NSW: JUNE 1998

TRENDS

The onset of winter heralds the arrival of the annual **influenza** season, and recent reports suggest that the A/Sydney virus may be re-emerging in NSW (cases were first identified in Sydney last season). In late autumn we received a report of a cluster of cases of **legionnaire's disease** that prompted further investigation. Winter is also a reminder that the season when **meningococcal** diseases is more common is about to begin (see Figure 3 and below).

Recent media reports have focused on the outbreak of **Ross River virus** in NSW in 1997, when 1619 cases were reported across the State. There are fewer cases this year, with 179 cases reported to the end of May 1998 in NSW. In the same period last year, 1336 cases were reported. Most cases in NSW are acquired in rural areas, but 1997 was unusual in that a small proportion of cases reportedly occurred in the bushland areas on the outskirts of Sydney. In late 1997, the State's mosquito monitoring program was extended into areas of Sydney. However, rural areas of the State continue to carry the most risk for infection.

LEGIONELLOSIS

On Friday 22 May, Northern Sydney Public Health Unit (PHU) received four reports of legionellosis, three relating to residents of northern Sydney. In response, The Unit contacted northern Sydney intensive care units, hospitals and laboratories and other PHUs seeking reports of further cases, and interviewed cases about possible exposures during the 10 days before the onset of their symptoms.

The disease

The clinical syndromes caused by bacteria of the family *Legionellaceae* are collectively called 'legionellosis'. Legionnaires' disease is the pneumonia caused by *Legionella* species.[1] Legionnaires' disease encompasses a broad spectrum of illness, from cough and slight fever to severe illness with stupor, widespread pulmonary infiltrates and multi-organ failure. Ten to fifteen per cent of hospitalised patients die. Being immunocompromised or receiving early appropriate antimicrobial therapy are major determinants of the outcome.[2] The antimicrobial treatment of legionnaires' disease has not been subject to placebo-controlled trial, although erythromycin and tetracycline appear to be effective therapies. Historically, erythromycin has been the drug of choice. However, laboratory data and case reports indicate a role for the newer macrolides (azithromycin, clarithromycin, roxithromycin) and quinolones (for example, ciprofloxacin, pefloxacin).[3]

Legionnaires' disease came to prominence in 1976 following an outbreak of pneumonia among delegates to a convention of the American Legion at a venue known only as 'hotel A'.[4] In NSW, most infections are caused by *L. pneumophila* and *L. longbeachae*. Outbreaks of *L. pneumophila* are often linked to inhalation of water in aerosol form from contaminated cooling towers or other water systems in large buildings. For *L. longbeachae*, exposure to potting mixes is thought to be a prominent risk factor.[6]

Currently, hospitals are required to notify PHUs of patients with a clinical history consistent with legionnaires' disease (see above), and laboratories are required to notify persons with evidence of recent infection with *Legionella* species (isolation of *Legionella* sp. in or detection of antigen from sputum, respiratory secretions, pleural fluid, lung tissue, blood or other normally sterile sites, or detection of a fourfold rise in immunofluorescent antibody titre to $1:128 against *L. pneumophila, L. longbeachae, L. micdadei, L. bozemanii,* **or** a stable titre $1:256 or $1:512 in convalescent serum).

In NSW, 415 cases of legionellosis were reported from 1992 to 1997 (105 in 1992, 69 in 1993, 60 in 1994, 76 in 1995, 74 in 1996, and 31 in 1997, an average of 69 cases per year). Of these, 229 (55 per cent) were reported to be due to *L. pneumophila* (average 38 cases per year) and 89 (21 per cent) to *L. longbeachae* (average 15 cases per year). Before 1 April, five cases of legionellosis had been reported in 1998.

Recent case investigations

Between 1 April and 1 July 1998, seven cases (four male and three female, age range 42–76 years) of *L. pneumophila* and six cases (four male and two female, age range 14–75 years) of other *Legionella* species were reported. Good laboratory evidence of disease (culture or seroconversion) was obtained for three cases of *L. pneumophila* and three cases of *L. longbeachae*. Investigation revealed no likely common source of exposure among cases.

Prevention of legionellosis

L. pneumophila colonises and survives well in water systems. NSW has strict guidelines for cooling tower operators to follow to minimise cooling tower contamination through regular disinfection.

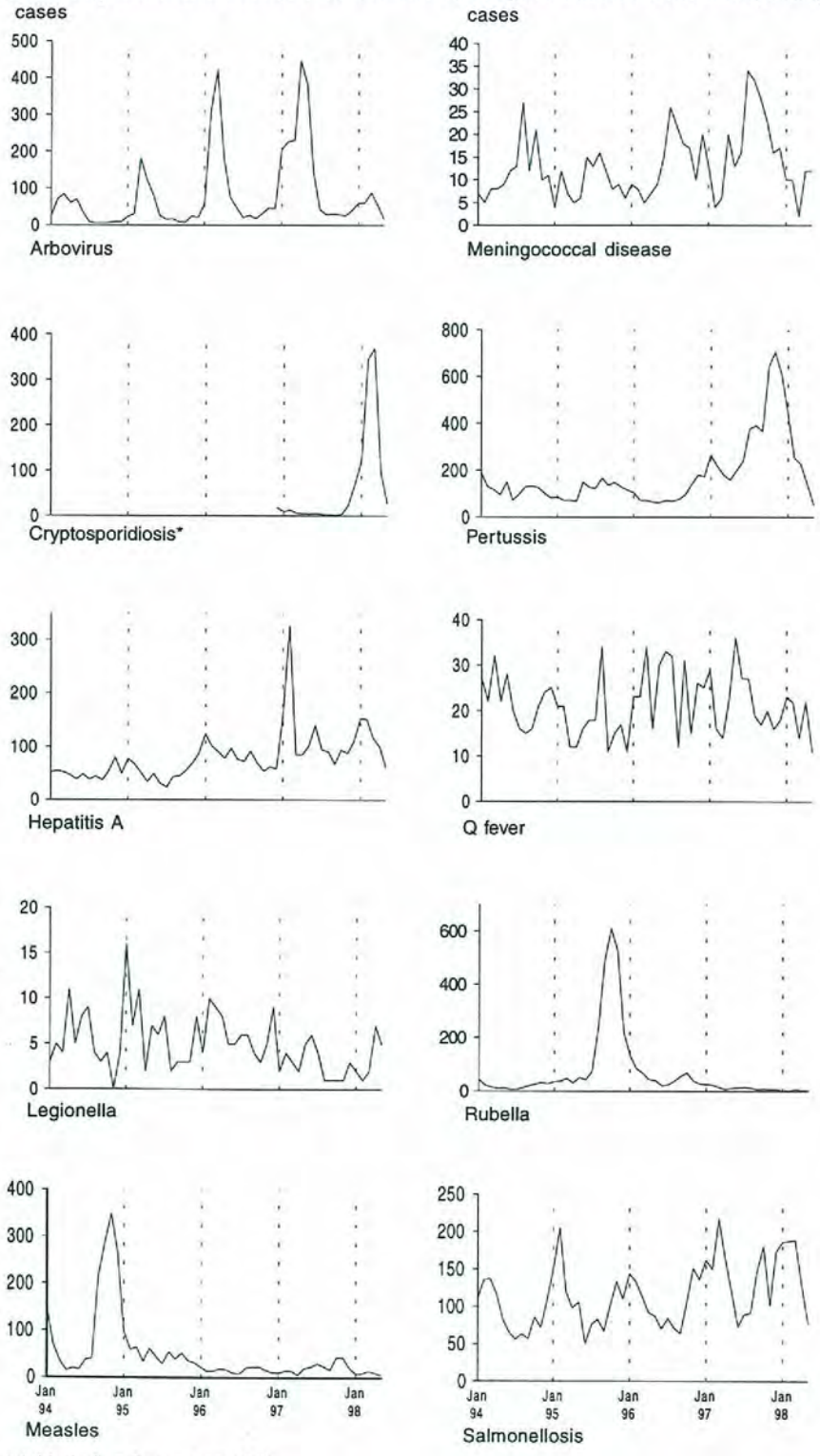
L. longbeachae is common in the soil and has been isolated from potting mix.[7] Persons wishing to reduce their risk of infection (especially the elderly and immuno-compromised) are advised to:

- avoid breathing in potting mix dust when opening bags or working with potting mix
- moisten potting mix before use to minimise dust
- wear dust masks while handling potting mix
- avoid the use of high pressure water streams on areas where potting mix has been used (drip watering systems are considered less likely to create an aerosol)
- wash their hands thoroughly after gardening.

FIGURE 3

REPORTS OF SELECTED INFECTIOUS DISEASES, NSW, JANUARY 1994 TO MAY 1998, BY MONTH OF ONSET

These are preliminary data: case counts in recent months may increase because of reporting delays



* not reportable before December 1996

Major manufacturers of potting mix voluntarily include warning labels on their bags.

Doctors are encouraged to report cases of legionellosis to their local PHU upon provisional diagnosis to expedite the investigation of risk factors. For more information, contact your local PHU.

MENINGOCOCCAL DISEASE SEASON APPROACHING?

Meningococcal disease is an uncommon illness caused by infection with *Neisseria meningitides* bacteria. In 1997 there was increased public concern about this disease, prompted in part by the death of a young woman rower in Western Australia. Since cases tend to peak in late winter and early spring, the NSW Health Department released a reminder to the public through the media about the disease and the importance of early diagnosis and treatment.

The disease

Symptoms of meningococcal disease may include sudden onset of fever, headache, stiff neck, nausea, weakness, drowsiness and rash. The disease is spread directly from person to person by droplets or discharges from the nose or throat of a person carrying the bacteria. The bacteria can be carried by some people (perhaps 20 per cent) in the throat without causing illness. The illness is treated effectively with antibiotics in hospital. Death occurs in 7 to 10 per cent of cases. Complications include neurological sequelae and, rarely, gangrene (and amputation) of the limbs, fingers or toes. The number of cases of meningococcal disease generally increases each year in late winter and spring. Young children and young adults are at highest risk, although persons of any age can be infected. Close contacts of cases are also at increased risk of disease.

Public health action

Hospitals and laboratories are required to report all cases to their local PHUs for investigation and follow-up. Follow-up includes interviewing cases about close contacts (household members and others, such as close friends, who may have shared saliva or nasopharyngeal secretions), administering prophylactic antibiotics (usually rifampicin) to close contacts to eradicate pharyngeal carriage of the meningococcus and, because this does not always prevent further transmission, advising close contacts about the disease and the need for early treatment. Vaccination is useful only in special circumstances: for example, for persons travelling to endemic countries, persons without a functioning spleen or with inherited defects of properdin or complement and persons living in a defined community in which cases of disease due to a preventable strain (serogroups A, C, W135 or Y) are continuing at a high rate despite chemoprophylaxis for close contacts.

Recent activity in NSW

To mid-June 1998, 56 cases of meningococcal disease had been reported in NSW for the year. In 1997, 222 cases were reported, compared with 165 in 1996, 113 in 1995, 143 in 1994, 153 in 1993, 124 in 1992 and 136 in 1991. While the increase in cases in 1997 is consistent with expected year-to-year variations in the incidence of this disease (Figure 3), some data suggest that the epidemiology of meningococcal disease in NSW appears to be changing (Figure 4). The number of cases reported in the school-aged (5–14 years) population has increased recently, as have (to a lesser degree) cases in the age groups 0–4 and 15–24 years.

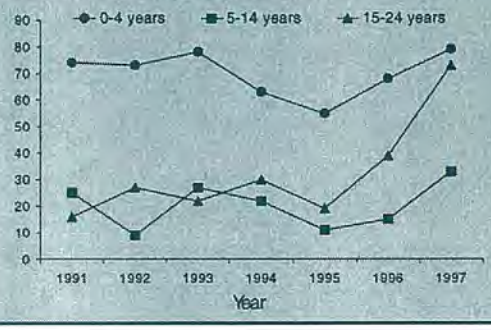
The NSW Neisseria Reference Laboratories at the South Eastern Area Laboratory Service, Prince of Wales Hospital, and at the South Western Area Pathology Service, Liverpool Hospital, are part of the Australian Meningococcal Surveillance Programme (AMSP). They receive isolates of invasive *Neisseria meningitides* disease for capsular serogrouping and outer-membrane protein monoclonal antibody serotyping and serosubtyping. In 1997, laboratories of the Programme received 151 isolates from NSW (representing 68 per cent of the 222 reported cases).[8] Serotyping and serosubtyping showed that serogroup B strains predominated in the age group 0–4 years (32 of the 51 isolates tested) and in the age group 5–14 years (12 of 21 isolates tested), while serogroup C strains predominated in the age group 15–24 years (30 of 50 isolates tested). The most frequently encountered phenotype was serogroup C:2a:P1.5, which caused 25 per cent of cases from which an isolate was tested.

With the meningococcal disease season approaching, clinicians are encouraged to:

- heighten suspicion of cases
- notify suspected cases to the PHU by telephone
- treat suspected cases immediately (even before transfer to hospital)
- if possible, take specimens for culture from suspected cases.

FIGURE 4

MENINGOCOCCAL DISEASE, NSW, 1991 TO 1997, BY SELECTED AGE GROUPS



INFLUENZA ACTIVITY

New South Wales

The number of cases of influenza during the last reporting period (week ending 20 June) was still low but increasing. Reports of influenza-like illness from the NSW Sentinel General Practice Surveillance Scheme appeared to be increasing at a rate similar to that in recent years (Figure 5). The six major public laboratories in NSW that test for influenza reported 10 diagnoses of influenza A and none of influenza B. In the corresponding week last year there were five reports of influenza A and three of influenza B (Figure 6).

FIGURE 5

INFLUENZA-LIKE ILLNESS, BY WEEK OF CONSULTATION FROM APRIL TO JUNE 1998, WITH HISTORICAL COMPARISONS, FROM NSW GENERAL PRACTICE SENTINEL SURVEILLANCE

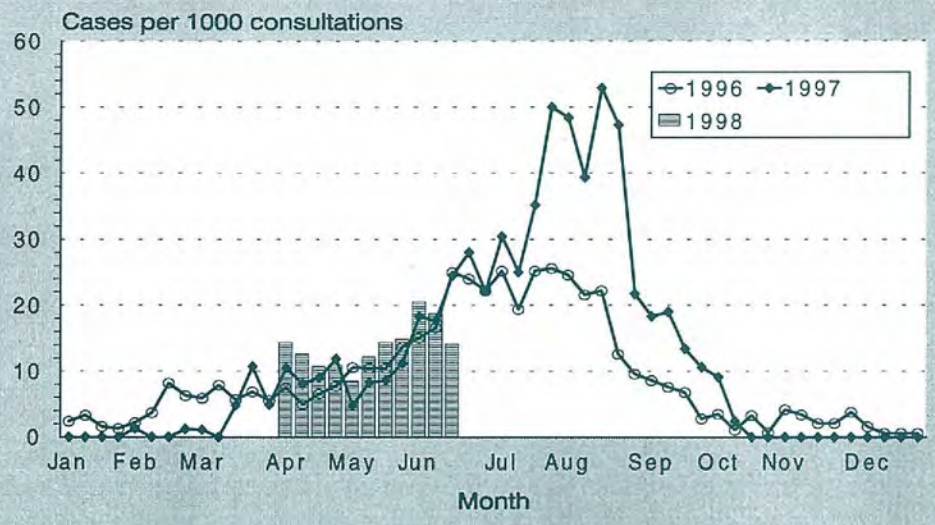
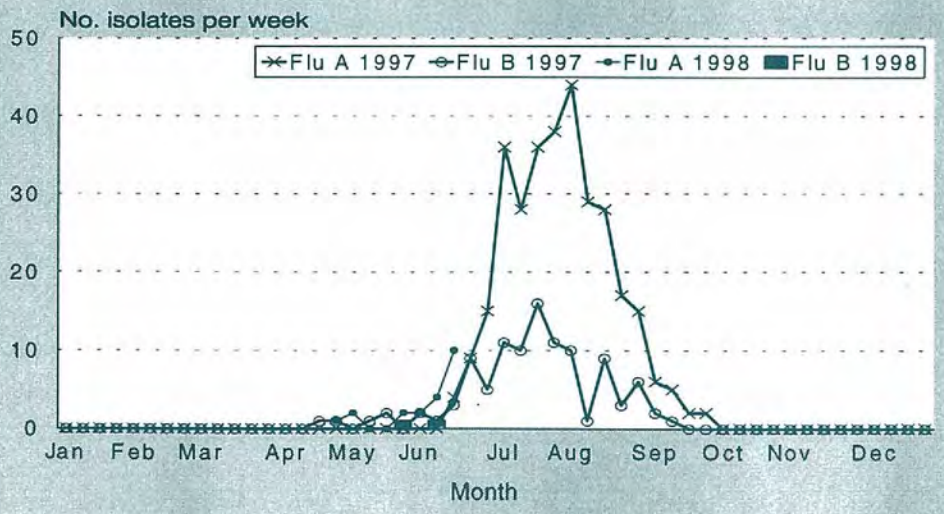


FIGURE 6

INFLUENZA VIRUS ISOLATIONS, NSW, 1997 AND APRIL TO JUNE 1998

Note: Four laboratories reported in 1997, six in 1998.



Australia

The National Centre for Disease Control has reported that up to the week ending 27 May, influenza activity remained low, with general practitioners reporting fewer than nine cases per 1000 consultations. The World Health Organization collaborating centre in Melbourne has reported 36 isolates of influenza A to late May (they were all A/Sydney/5/97-like strain, which is covered by the current vaccine) and six of influenza B. Analysis of the B strains is pending.

International

The World Health Organization reported that influenza activity in all Northern Hemisphere countries had returned to preseason levels by the end of April. The predominant strain isolated during the northern winter was A/H3N2. In the Southern Hemisphere, South Africa reported widespread outbreaks, predominantly of H3N2, in the period 10 May to 11 June, earlier in the season than in previous years. Brazil has reported regional outbreaks. In New Zealand, levels of influenza-like illness have begun to increase but no virological diagnoses have yet been made.

MEETINGS

The **Infectious Diseases Advisory Committee** (IDAC) advises the Department on infectious disease matters related to the *Public Health Act 1991* and Regulations. Highlights from its meeting on 20 April 1998 include:

- Giardiasis should become notifiable by laboratories, once a system for electronic notification is established.
- Donovanosis, chancroid and lymphogranuloma venereum should become notifiable by laboratories as soon as possible.
- The NSW Health Department should write to laboratories requesting that isolates from cases of conjunctival meningococcal be notified.

The **Tuberculosis Advisory Committee** (TBAC) meets quarterly to advise the Chief Health Officer on the priorities in relation to tuberculosis control, to set goals, targets and implementation indicators in relation to tuberculosis and to develop strategies to meet these goals and targets.

The Committee is in the process of reviewing State tuberculosis policies and developing guidelines for the management of multi-drug-resistant tuberculosis, and has recommended that a panel be formed to review all cases of multi-drug-resistant tuberculosis identified in NSW.

An index of NSW physicians who currently manage patients with tuberculosis is being compiled with the aim of unifying and supporting such physicians by improving communication, providing rapid access to peer advice and circulating up-to-date information on tuberculosis.

REFERENCES

1. Yu VL. *Legionella pneumophila* (legionnaires' disease). In: Mandell GL, Bennett JE, Dolin R, editors. *Mandell Douglas and Bennett's principles and practice of infectious disease.* 4th edn. New York: Churchill Livingstone, 1995.
2. Heath CH, Grove DI, Looke DF. Delay in appropriate therapy of Legionella pneumonia associated with increased mortality. *Eur J Clin Microbiol Infect Dis* 1996; 15: 286–290.
3. Edelstein PH. Antimicrobial chemotherapy for legionnaires' disease: a review. *Clin Infect Dis* 1995; 21(Suppl. 3): 5265–5276.
4. Fraser DW, Tsai TR, Orenstein W, et al. Legionnaires' disease. Description of an epidemic of pneumonia. *N Engl J Med* 1977; 297: 1189–1197.
5. Thomas G, Morgan-Witts M. *Anatomy of an epidemic.* New York: Doubleday, 1982.
6. Cameron S, Walker C, Roden D, et al. Epidemiological characteristics of *Legionella* infection in South Australia: Implications for disease control. *Aust N Z J Med* 1991; 21: 65–70.
7. Steele TW, Moore CX, Sangster N. Distribution of *Legionella longbeachae* serogroup 1 and other legionellae in potting soils in Australia. *Appl Environ Microbiol* 1990; 56: 2984–2988.
8. *NSW Neisseria Reference Laboratories' report to the Director-General of Health, NSW for the year 1997.* Sydney: NSW Health Department, 1998.

continued from p. 89

INFLUENZA IN 1919

particularly that it caused the highest death rates among young adults, contrast starkly with those of the strains of more recent years. Figures 10 and 11 (p. 89) show the hospitalisation and death rates for the influenza season of 1995, illustrating how young adults tend to have the lowest complication rates during non-pandemic years.

The 1919 pandemic serves as an unpleasant reminder of just how serious influenza can be. More recent developments, of surveillance systems and of effective vaccines, will, we hope, put NSW in a better position to cope should another pandemic arise.

REFERENCES

1. Legislative Assembly NSW. *Report of the Director-General of Public Health NSW for the year 1919 and the report on the influenza epidemic 1919.* Sydney: William Applegate Gullick, Government Printer, 1920.
2. *International Classification of Diseases, 9th revision, clinical modification.* Ann Arbor: ICD-9-CM, Commission on Professional and Hospital Activities, 1989.

TABLE 5

INFECTIOUS DISEASE NOTIFICATIONS RECEIVED IN MAY 1998, BY AREA HEALTH SERVICES

Condition	Area Health Service (1998)																	Total for May* to date**	
	CSA	NSA	WSA	WEN	SWS	CCA	HUN	ILL	SES	NRA	MNC	NEA	MAC	MWA	FWA	GMA	SA		
Blood-borne and sexually transmitted																			
AIDS	–	–	–	–	–	1	–	–	4	1	–	–	–	–	–	–	–	6	46
HIV infection*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	114
Hepatitis B: acute viral*	–	–	–	1	–	–	–	–	1	1	–	–	–	–	–	–	–	3	24
Hepatitis B: other*	59	17	21	9	22	4	3	5	39	1	–	2	–	1	2	5	–	190	1512
Hepatitis C: acute viral*	–	–	–	1	–	–	–	–	–	1	–	–	–	–	–	–	–	2	19
Hepatitis C: other*	66	27	80	41	57	47	40	17	112	29	4	18	7	19	–	16	13	593	3890
Hepatitis D: unspecified*	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1	1
Hepatitis: acute viral (not otherwise specified)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2
Gonorrhoea*	11	2	1	–	–	–	1	1	33	–	2	1	–	1	1	1	–	55	383
Syphilis	7	3	5	–	1	–	3	–	4	2	–	5	–	1	1	–	–	32	226
Vector-borne																			
Arboviral infection*	–	–	1	1	–	–	4	1	1	3	4	2	–	–	–	2	–	19	284
Malaria*	1	2	–	–	–	2	2	–	3	1	–	–	–	–	–	–	1	12	71
Zoonoses																			
Brucellosis*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Leptospirosis*	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1	11
Q fever*	–	–	–	–	–	–	1	–	–	–	–	2	7	1	–	–	1	12	96
Respiratory and other																			
Blood lead level	10	1	5	–	–	1	13	–	–	2	2	–	1	1	–	–	–	36	356
Legionnaires' disease	1	2	–	–	1	–	1	–	–	–	–	–	–	–	–	–	–	5	17
Leprosy	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	1	1
Meningococcal (invasive) infection	–	1	2	2	1	1	–	–	2	2	–	–	–	1	–	1	–	13	48
Mycobacterial tuberculosis	–	1	–	–	3	1	–	1	3	–	1	–	–	–	–	–	–	10	116
Mycobacteria other than TB	5	2	–	–	–	–	1	–	1	–	–	–	–	–	–	–	1	10	86
Vaccine–preventable																			
Adverse event after immunisation	–	–	–	–	3	–	–	–	1	–	1	3	–	1	–	–	–	9	98
H. influenzae b (invasive) infection	–	–	–	–	1	–	–	–	–	1	–	–	–	–	–	–	–	2	5
Measles	1	–	1	–	–	–	–	2	–	–	–	–	1	2	–	–	1	8	52
Mumps*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	18
Pertussis	3	2	3	11	5	2	6	12	6	–	5	–	–	1	1	2	–	59	1156
Rubella*	–	2	–	–	–	–	–	–	1	–	1	–	–	–	–	–	1	5	22
Tetanus	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Faecal–oral																			
Botulism	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Cholera*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Cryptosporidiosis	4	1	2	2	–	–	2	–	9	5	3	1	–	–	–	2	–	31	1023
Food-borne illness (not otherwise specified)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1	10
Gastroenteritis (in an institution)	–	–	–	–	–	–	5	–	–	–	–	–	–	–	–	–	–	5	129
Haemolytic uraemic syndrome	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2
Hepatitis A	11	2	2	9	6	6	2	2	9	3	5	6	1	2	1	–	2	69	606
Hepatitis E	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4
Listeriosis*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	16
Salmonellosis (not otherwise specified)*	10	18	–	–	9	6	9	1	10	6	5	3	–	2	1	5	–	85	805
Typhoid and paratyphoid*	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	1	16
Verotoxin-producting *E. coli*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1

* lab–confirmed cases only ** includes cases with unknown postcode

CSA = Central Sydney Area
NSA = Northern Sydney Area
WSA = Western Sydney Area
WEN = Wentworth Area
SWS = South Western Sydney Area
CCA = Central Coast Area
HUN = Hunter Area
ILL = Illawarra Area
SES = South Eastern Sydney Area
NRA = Northern Rivers Area
MNC = North Coast Area
NEA = New England Area
MAC = Macquarie Area
MWA = Mid Western Area
FWA = Far West Area
GMA = Greater Murray Area
SA = Southern Area

INFECTIOUS DISEASES, NSW: JULY 1998

TRENDS

Reports of most notifiable infectious diseases through to June are largely on the decline, in line with seasonal expectations (Figure 7).

INFLUENZA SURVEILLANCE ACTIVITY UPDATE

Influenza activity during July continued to increase, as for this period in previous years.

Clinical activity

Reports of influenza-like illness from the NSW Sentinel General Practitioner Surveillance Scheme were received through four Public Health Units (PHUs) from approximately 30 general practitioners (GPs). Influenza-like illness activity has been variable but generally increasing to levels similar to those for the same period in previous years (25 to 30 cases per 1000 consultations).

Virological activity

Laboratory reports of influenza also continued to increase. In the third week of July there were 42 reported diagnoses of influenza A and one of influenza B. The number of influenza A diagnoses reported per week increased to the highest recorded during last year; however, there are more laboratories reporting this year (six compared with four). Diagnoses of respiratory syncytial virus appear to have peaked, with 159 in the in the third week of July compared with 181 the week before.

Directed virological surveillance

Directed virological surveillance, in which GPs each week submit swabs from up to five patients who are suffering from influenza-like illness, commenced early in July. Fifteen participating GPs submitted 108 swabs during this month from people with influenza-like illness. Eighteen (17 per cent) were positive for influenza A, none for influenza B and three for respiratory syncytial virus. Samples were received from patients with a wide range of ages. Children under five years of age had a higher rate of positive results for influenza A (32 per cent). No subtyping information is available yet.

Australian surveillance

The following data have been reported by the National Centre for Disease Control. Influenza-like illness activity reported by sentinel general practices peaked in July for the ASPREN scheme (Australian Sentinel Practice Research Network) at 21 per 1000 consultations, a rate considerably lower than the 1997 peak of 50. Results under the Victorian Department of Health's sentinel general practice network also peaked in July at 26 per 1000. However, the number of whole-of-Australia laboratory reports of influenza A this year was higher than in recent years (as was the case for NSW). There may be higher rates of testing or reporting of laboratory results this year. Eight per cent of laboratory-reported influenza cases this year were influenza B and 92 per cent influenza A. All influenza A isolates typed this year by the World Health Organization reference laboratory in Melbourne were H3N2.

International surveillance

Reports are being received by few countries at this time of year, as it is summer in the northern hemisphere and therefore it is a low period for influenza activity in many countries. South Africa reported only local outbreaks in early July following widespread outbreaks in May. Chile reported sporadic activity in early July. All virological reports of influenza to the World Health Organization worldwide since mid-June have been for influenza A; there have been none for influenza B.

INFLUENZA IN 1919

> On 3 May [1919], Mr EAB, a 30-year-old man, became ill with pains in the head and back. He was admitted to the City Road Emergency Hospital in Sydney on 9 May, and on examination his doctors found that he had a high fever (104 deg F), a rapid pulse (112 beats per minute), and rapid breathing (32 breaths per minute). He was cyanosed (blue from lack of oxygen) with rhonchi all over his chest and crepitations at the left base indicating lung infection. He deteriorated and died on 13 May. At autopsy the same day, his left lung was plum-coloured, with petechial haemorrhages throughout. Blood stained fluid filled the air sacs of the lower lobe rendering it solid.
>
> The next day, DO, a 15½-year-old-girl was admitted with a week's history of illness. Examination found that she also had a high fever (103 deg F), a rapid pulse (128) and rapid breathing (40). Her sputum was rusty, and rales and crepitations were heard throughout her lungs. On May 12, the doctors caring for her noted that she had developed air hunger and water logging, and she died. At autopsy, her lungs were found to have had a similar pathology to those of Mr EAB.

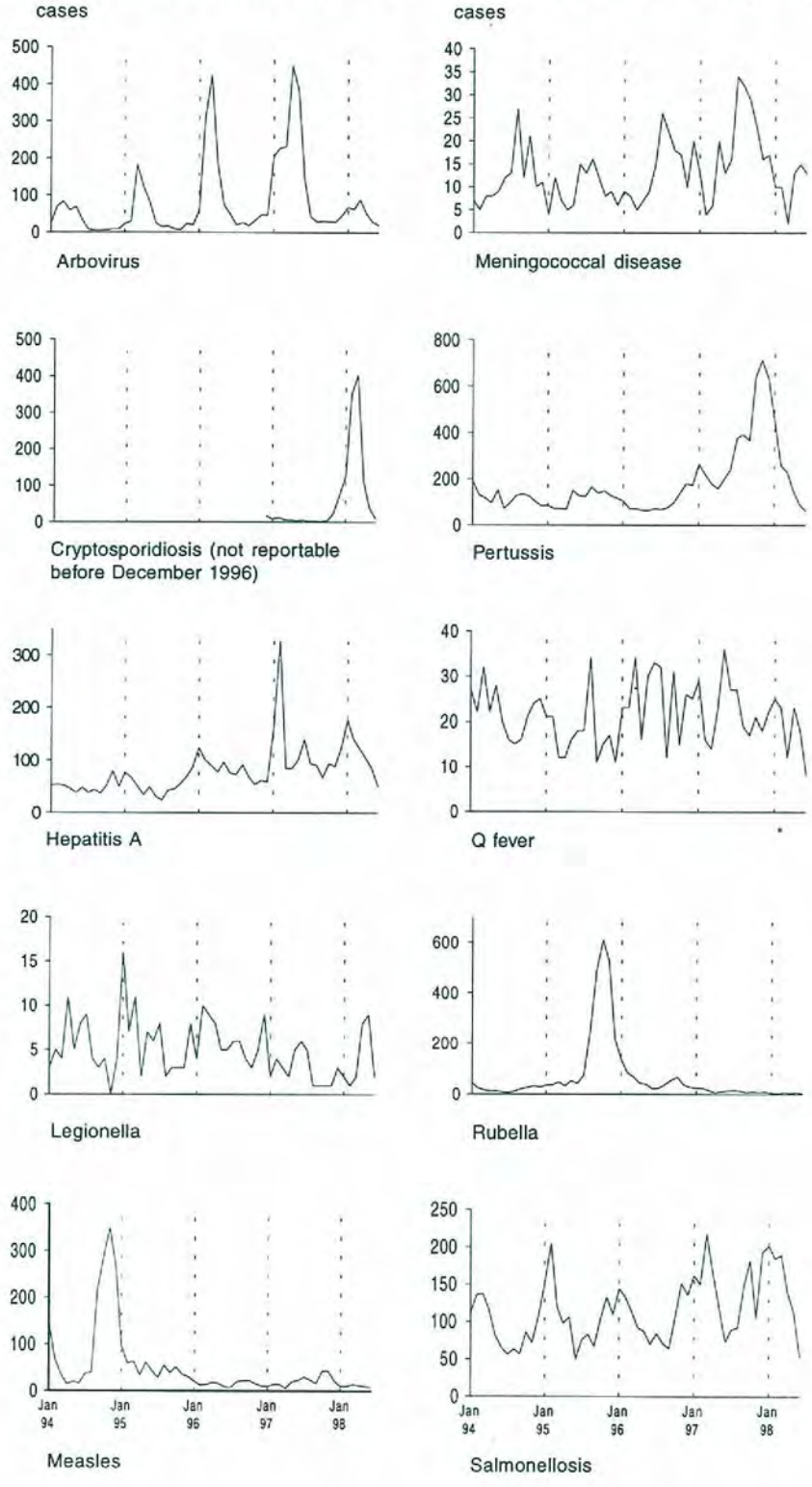
These are just two of the 130 case reports listed in the NSW Department of Public Health's report on the influenza epidemic in 1919.[1] Here we present some highlights of their report, which provide a rather chilling account of just how devastating this tragedy was to the people of NSW.

Having received reports of a pandemic of influenza raging in Europe and North America, in his 1918 annual report, Robert T. Paton, NSW Director-General of Public Health, outlined precautionary and preventive measures that might prevent influenza from taking hold in the State. These measures included opening 2500 extra hospital beds, closing and converting country schools into emergency hospitals, diversion of the Civil Ambulance and Transport Brigade for influenza activities, installation of inhalation sprays, recommending the wearing of masks, preparation of vaccine, and establishing depots from which to vaccinate the population. For three months the government imposed a sea quarantine that for a while seemed destined to save the State.

FIGURE 7

REPORTS OF SELECTED INFECTIOUS DISEASES, NSW, JANUARY 1994 TO JUNE 1998, BY MONTH OF ONSET

These are preliminary data: case counts in recent months may increase because of reporting delays



Then, on 24 January 1919, the Randwick Military Hospital reported 'a suspicious case of illness' in a man who had arrived in Sydney after travelling overland from Melbourne. The illness soon showed all the hallmarks of pneumonic influenza.

Over the next few days, several more cases of influenza were reported in others who had travelled from Melbourne, and the disease began to spread through the city in two 10-week waves (Figure 8).

Dr W.G. Armstrong, the Deputy Director-General of Public Health, described the syndrome thus:

> The onset was sudden, sometimes fulminant in its character. Instances occurred in which individuals were suddenly attacked by giddiness, muscular weakness, and severe headache while walking in the street, and frequently patients stated that they had gone to bed feeling perfectly well, and a few hours later had awakened in a state of miserable illness.[1]

Other reported symptoms included chills, coryza, a flushed face, conjunctival injection, sore throat, bleeding nose, chest pain, headache, nausea, sweating and high temperature. Among the 12 786 hospitalised cases, 61 per cent were complicated by pneumonia, sometimes right from the very first influenzal attack, but more usually on the third or fourth days. Doctors were struck by the lilac or lavender hue that patients took on because of cyanosis.

In all, the 1919 flu epidemic infected an estimated 36 per cent of Sydney's population. In a single week in mid-June, 1315 patients were hospitalised with influenza. In country areas, ambulance officers sometimes resorted to carrying patients on foot through the bush or over sand for over a mile. The first wave from 19 March to 27 May killed 1892 people; the second more severe wave, from 28 May to 25 August, killed 2989 people. The epidemic killed at least 6387 NSW residents (or 24 per cent of all deaths that year), including several health workers, one of whom was the principal medical officer with the Education Department, Dr C.S. Willis. The age-specific death rate showed highly unusual characteristics: fatalities were highest among young adults (Figure 9), and in 1919, it was the second wave that proved most deadly (Figure 8).

FIGURE 8

INFLUENZA-RELATED ADMISSIONS TO METROPOLITAN HOSPITALS, AND DEATHS IN NSW, 1919

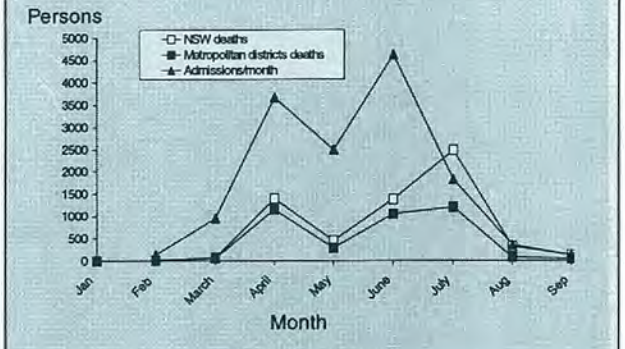
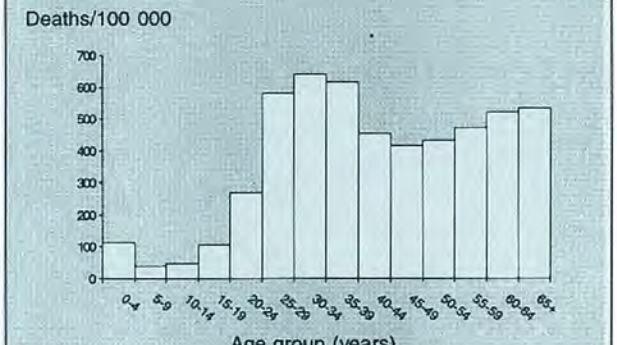


FIGURE 9

INFLUENZA-RELATED DEATH RATES, NSW, 1919, BY AGE GROUP



The Public Health Department responds

In desperation, authorities first restricted travel from Victoria, and then travel from Sydney to country areas. At first, all land traffic was prohibited, and later, quarantine detention camps were set up on the Victorian border, requiring prospective travellers from Victoria to undergo at first seven, and later, four days of quarantine. Ships from Victoria were quarantined for four days after leaving the infected port, after which crew and passengers were medically inspected. Influenza was made a notifiable disease, and patients and contacts were placed in compulsory isolation. Schools and churches were closed and public meetings restricted, and authorities ordered the wearing of masks by the population. Early in the outbreak, persons exposed to the infection were invited to enter one of several chambers set up across the city for a 120-minute disinfection session, in which a mist containing sulphate of zinc was inhaled for 10 minutes. Portable versions of these machines were used early in the epidemic to disinfect houses occupied by influenza victims.

Vaccination

In November 1918 the Department of Public Health began developing a vaccine to protect people against the complications of influenza (rather than the infection itself). Vaccines were prepared using as many strains as possible of pneumococci, streptoccocci, *Staphylococcus aureus*, Pfeiffer's influenza bacilli and other organisms believed at the time to be associated with the disease, derived from postmortem material from two fatal cases at the North Head Quarantine Station and over 100 other sources. A course

FIGURE 10

INFLUENZA-RELATED (ICD9 480–487[2]) HOSPITAL SEPARATION RATES, NSW, 1995, BY AGE GROUP

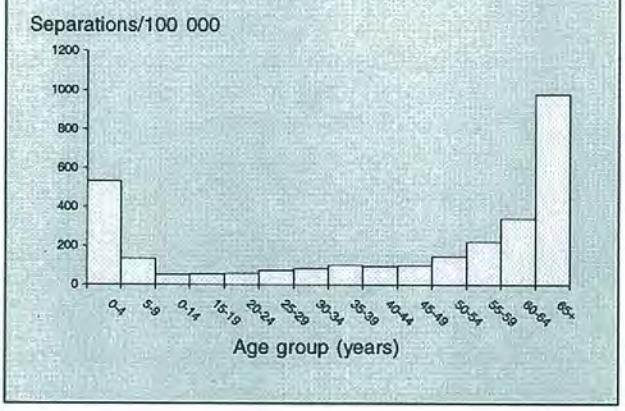
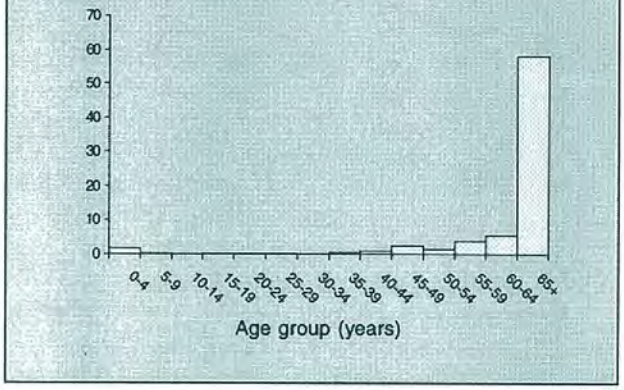


FIGURE 11

INFLUENZA-RELATED (ICD9 480–487[2]) DEATH RATES, NSW, 1995, BY AGE GROUP



of two or three doses over two to three weeks was recommended. Free inoculations were offered from November 1918 to May 1919, from 1265 depots open day and night throughout Sydney and others in most country towns. Over 819 000 inoculations were given, with many depots rushed when news of the first cases began to appear, especially by people believing it helped unrelated conditions such as rheumatic disease and catarrh (some of whom submitted themselves to regular injections at two- to three-week intervals).

Health outcomes?

The Health Department realised fairly early on that many of these interventions were of dubious value, especially once the epidemic was in full swing, although at the time it was felt that restricting assembly and the use of masks in confined spaces might have been useful.

To evaluate the effect of vaccination, the Department asked several Sydney hospitals to provide cards on each patient admitted with influenza. These cards gathered information on name, age, sex, date of inoculation (as reported by the patient), dates of onset and admission, severity of disease, complications, outcome, and postmortem results. The vaccination status of patients treated at Sydney hospitals is shown in Table 6.

While there was little evidence that vaccinations actually prevented influenza infection, health authorities did think that vaccines were able to prevent serious complications. The data in Table 6

indicate that persons who had received vaccine were significantly less likely to die from influenza than those who did not receive vaccine (odds ratio 0.60, 95 per cent confidence interval 0.53-0.68). There are doubtless many provisos to these conclusions: selection and information biases and possible confounding factors could have resulted in a false association. Nonetheless, these data are tantalisingly suggestive that perhaps something in the vaccine (possibly pneumococcal antigens) afforded some protection against serious complications of influenza.

Back to the future

Some 80 years later, mystery still surrounds the exact nature of the influenza virus that caused the devastating pandemic, of which the NSW experience was just a part. In 1998, researchers are attempting to recover remnants of the 1919 pandemic virus that may have persisted in six young Norwegian miners who died in October 1918 and were buried in the permafrost of Longyearbyen, north of the Arctic circle. Some features of that virus noted above,

continued on p. 84

TABLE 6

VACCINATION STATUS PRIOR TO ADMISSION TO HOSPITAL AND TYPE OF DISEASE (OR DEATH) OF 11 972 PATIENTS TREATED FOR INFLUENZA IN 25 SYDNEY HOSPITALS, 27 JANUARY TO 30 SEPTEMBER 1919

Patient's vaccination status	Simple		Mild or severe		Dead		Total
	n	%	n	%	n	%	n
Vaccinated	1740	42	1973	48	442	11	4 155
Not vaccinated	2130	34	3086	49	1033	17	6 249
Unknown	534	34	617	39	417	27	1 568
Total	4404	37	5676	47	1892	16	11 972

TABLE 7

INFECTIOUS DISEASE NOTIFICATIONS RECEIVED IN JUNE 1998 BY AREA HEALTH SERVICES

Condition	Area Health Service (1998) CSA	NSA	WSA	WEN	SWS	CCA	HUN	ILL	SES	NRA	MNC	NEA	MAC	MWA	FWA	GMA	SA	Total for Jun**	Total to date**
Blood-borne and sexually transmitted																			
AIDS	–	–	1	–	–	–	–	–	6	1	1	–	–	–	–	–	–	9	81
HIV infection*	HIV data provided on alternate months																		169
Hepatitis B: acute viral*	–	–	–	–	–	–	–	–	2	1	–	–	–	–	–	–	–	4	31
Hepatitis B: other*	22	33	103	3	74	2	6	7	73	5	2	5	1	1	3	2	1	350	2051
Hepatitis C: acute viral*	–	–	–	–	–	–	1	–	1	–	–	–	–	1	–	–	–	3	34
Hepatitis C: other*	29	38	147	37	121	74	56	23	135	37	23	20	9	25	1	14	23	819	4985
Hepatitis D: unspecified*	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1	2
Hepatitis: acute viral (not otherwise specified)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2
Gonorrhoea*	5	3	6	–	–	2	1	–	42	1	2	1	–	–	–	2	3	69	463
Syphilis	2	3	5	–	–	1	–	–	13	1	1	1	3	1	5	–	–	39	281
Vector-borne																			
Arboviral infection*	–	2	–	1	1	–	1	2	2	6	6	2	1	–	3	2	1	30	354
Malaria*	–	2	1	–	1	–	2	–	2	3	3	–	–	–	–	–	–	14	94
Zoonoses																			
Brucellosis*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Leptospirosis*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	12
Q fever*	–	–	–	1	–	–	1	–	1	2	3	2	6	–	–	–	1	17	113
Respiratory and other																			
Blood lead level	3	1	12	9	15	3	6	1	1	1	1	1	2	2	–	–	–	58	539
Legionnaires' disease	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	2	23
Leprosy	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Meningococcal (invasive) infection	–	–	3	1	1	2	3	–	2	1	–	–	–	1	–	–	–	14	63
Mycobacterial tuberculosis	2	3	6	–	5	–	–	4	7	–	–	–	–	–	–	–	–	27	205
Mycobacteria other than TB	1	10	–	–	–	–	2	–	4	–	1	–	–	–	–	–	–	18	143
Vaccine-preventable																			
Adverse event after immunisation	1	1	1	1	–	–	–	2	–	–	3	–	1	–	1	1	12	135	
H. influenzae b (invasive) infection	–	1	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	2	6
Measles	–	–	–	–	1	–	2	4	–	–	2	–	1	1	–	–	–	11	66
Mumps*	–	–	1	–	–	–	1	–	1	–	–	–	–	–	–	–	–	3	21
Pertussis	1	2	1	9	7	1	16	7	12	4	1	2	2	3	5	3	3	79	1654
Rubella*	–	1	–	–	–	–	1	–	1	1	1	–	–	1	–	–	–	6	31
Tetanus	1	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	2	4
Faecal–oral																			
Botulism	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Cholera*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Cryptosporidiosis	3	5	4	1	2	4	5	1	6	3	6	2	–	–	1	3	1	47	1070
Food-borne illness (not otherwise specified)	–	–	–	–	–	–	–	–	–	–	1	–	–	–	1	–	–	2	13
Gastroenteritis (in institution)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1	132
Haemolytic uraemic syndrome	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2
Hepatitis A	3	1	1	6	12	6	1	6	9	16	6	–	–	–	–	–	1	68	711
Hepatitis E	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4
Listeriosis*	–	–	–	–	–	–	1	1	–	–	–	–	–	–	–	–	–	2	20
Salmonella (not otherwise specified)*	4	13	–	–	8	3	5	5	10	9	2	5	1	2	–	2	–	70	970
Typhoid and paratyphoid*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	22
Verotoxin-producing *E. coli*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1

* lab-confirmed cases only ** includes cases with unknown postcode

CSA = Central Sydney Area
NSA = Northern Sydney Area
WSA = Western Sydney Area
WEN = Wentworth Area
SWS = South Western Sydney Area
CCA = Central Coast Area
HUN = Hunter Area
ILL = Illawarra Area
SES = South Eastern Sydney Area
NRA = Northern Rivers Area
MNC = North Coast Area
NEA = New England Area
MAC = Macquarie Area
MWA = Mid Western Area
FWA = Far West Area
GMA = Greater Murray Area
SA = Southern Area