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PARTNERSHIP OF RURAL SERVICES TO ACHIEVE IMPROVED HEALTH OUTCOMES

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The boards and senior staff of six rural health services in north-western NSW are seriously considering establishing a formal partnership through the development of a single board of management to take the major responsibility for the planning, development and general management of services over an area that stretches 300 kilometres in any direction.

The North West Plains Zone of the New England Region, which includes health services at Moree, Narrabri, Warialda and Wee Waa, has had a history of sharing services which could not be provided to each centre. These have included drug and alcohol services, geriatric assessment services, medical superintendentancy, women's health and mental health services. These shared services had joint management systems permitting each of the centres to participate in their development and implementation. More recently the Zone health services have participated in the joint development of health promotion programs and have, through a process of community consultation, identified key areas which will form the basis of major health promotion programs for the future.

Early work has begun in identifying goals, targets and health indicators for Zone asthma, injury prevention and drug and alcohol programs.

Early in 1991-1992 several factors had the boards of management seriously considering strengthening the networks which already existed and forming a partnership under the umbrella name of Barwon Health Services.

Those factors included:

- difficulties and inefficiencies in the management systems for the individual shared services programs including financial accountability;
- awareness that the costs of providing services at the current level were increasing at a pace outstripping the budget available to the health service and an awareness that further efficiencies would be limited while the health services remained totally autonomous; and
- the changed orientation of the State health system to the achievement of positive health outcomes was accepted by the management of the six health services and endeavours were being made in the health promotion area. However, it was recognised that a more total orientation of management was appropriate which would require more attention to an improved management and information system and examination of the direction in which resources were allocated to determine potential for improving the outcomes with available resources.

In July 1992 a joint meeting of all six boards and their senior executive staff was held at Bellata, a village geographically central to the Zone but whose only major facility was the local hotel. At that stage there was no intention to enter a formal partnership arrangement, rather a generally expressed concern that attention was needed to address the issues identified above. A series of meetings between the boards and working groups established by those boards was held over the next few months. The boards had considered

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Partnership of rural services

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the nature of their communities, aspects of community which are shared and are of importance to the future development of health services and factors not held in common.

The functions of the departments of hospitals were examined in detail to determine whether they were required in each health service site or whether they could be carried out off-site, with a reduction in the cost of those activities, and whether there were benefits to be derived from a partnership in the management of some services.

As discussions progressed a number of issues became clear. These included:

- that significant resources could be freed up by sharing major administrative functions among the six centres. Such freeing up, particularly of human resources, could permit redeployment of staff or resources into health service delivery – either hospital or community or health promotion programs;
- that a number of programs may be enhanced by a shared management. This appeared to be particularly so for some community health programs and where it was believed a joint management may permit a more equitable access to those programs by the smaller communities;
- a partnership for management of the services could provide an opportunity for a more radical reorientation to focus on the achievement of positive health outcomes. The Zone had not had access to a medical records administrator. The filling of this position led to a vast improvement in the records and their coding and subsequent action has moved to develop an improved management information system based on a greatly improved separations data system and improved accident and emergency registration system, and attention is being focused on information about services provided by community health. The program will permit a clear linking between those systems as definitions are being standardised and the information requirement for health outcomes is being identified for inclusion in the system being developed; and
- as clinical indicators are being established for measuring the quality of services provided, these requirements are also being included in the new information system.

The Zone has in the past few years worked closely with the community. Links with the community are not confined to the input provided by the directors on the boards of management. Community action in the areas of asthma and injury is already taking place – but at local and at zone level. The planning for a more formal partnership between the six services has provided further opportunity for involvement of key community representatives and ensured the involvement of key health service providers.

There is nowhere that this is more important than in the area of Aboriginal health. There is a clear commitment to the improvement of Aboriginal health and a determination to improve liaison with the Aboriginal community and Aboriginal health service providers.

The mission statement for a proposed partnership is detailed in the box below and provides an indication of the direction the proposed new organisation will take should all the requirements seen as essential by participating boards be met, with a constitution which will permit local boards with revised responsibilities to enter into a partnership under the umbrella of one district board.

Whatever the outcome, health service managers and boards of directors have been through a process which has clarified the health needs of the community and the requirements for efficient and effective management of services to meet those needs and achieve positive health outcomes. The process has enabled development of more constructive partnership between local health services and the resources available through the wider services of the NSW Health Department.

It is expected "Barwon Health" will become operational July 1993.

EDITORIAL COMMENT

Since work began on forming the Barwon Health Services Network the NSW Health Department has moved to establish 23 District Health Services across rural NSW. The new District Health Services will form partnerships between the existing hospitals and health services across a geographical area to reduce administrative costs and improve services to rural communities.

One of these Districts, the Barwon District Health Service, will take advantage of partnerships described in this article and will include the following centres: Bingara, Boggabri, Moree Plains, Narrabri, Warialda and Wee Waa.

BARWON HEALTH MISSION STATEMENT

"Better health from our health investment"

To achieve the highest levels of health for the people of the shires of Bingara, Moree Plains, Narrabri and Yallaroi, through:

- Adequate definition of the health needs of communities.
- Involvement of the community in decision making for improved health.
- Provision of a wide range of health services in response to need.
- Implementation of effective health improvement programs with communities.
- Improved access by smaller communities to the range of health services.
- Involvement of the Aboriginal community and agencies in provision of health services to achieve improved health of Aboriginals.
- Provision of services which meet or exceed current standards of quality.
- Fostering of an achieving health workforce through encouragement of initiative and involvement of staff at all levels in decision making and through active staff development.
- Regular review of health outcomes gains for resources allocated to health programs.

WHAT'S NEW IN INJURY SURVEILLANCE

Glenn Close and Anthony Capon,
Western Sector Public Health Unit
Kevin Wolfenden, Coastal Public Health Unit

This article highlights how non-inpatient surveillance data have been used in injury control in Australia and announces the development of a new emergency department surveillance tool, Basic Routine Injury Surveillance (BRIS), to enhance our surveillance efforts.

THE INJURY PROBLEM

Injuries have a substantial impact on the lives of the people of NSW, accounting for more deaths in those up to the age of 44 years than any other single cause. Injury mortality is exceeded only by cancer as a cause of potential years of life lost[1]. The significance of injuries as a public health problem has stimulated interest in preventive activity. More recently the importance of timely and accurate information as the essential foundation for effective injury prevention has been recognised.

The National Injury Surveillance Unit (NISU) of the Australian Institute of Health and Welfare has been promoting and supporting the development of information systems to satisfy the demand for data to assist intervention planning and evaluation. In this context it is opportune to discuss what constitutes an effective surveillance system. We should consider the purpose of, the role of existing data collections in, and the relationship of local prevention and control structures to, a proposed surveillance capacity. The importance of data analysis and dissemination to the effectiveness of any surveillance program cannot be overstated.

The most effective approaches to injury prevention emphasise community involvement[2] and strategic planning, taking account of particular host, agent and environmental factors in context rather than focusing exclusively on isolated aetiologic factors[3]. A locally based surveillance system is, then, a potentially valuable source of information for injury prevention. The precise form(s) of this surveillance system will depend on local priorities, resources and available data.

SURVEILLANCE AND INJURY

Injury surveillance can be used to:

- provide quantitative estimates of injury morbidity and mortality;
- detect clusters of injury events;
- identify factors in injury occurrence;
- stimulate further research to focus interventions; and
- evaluate control measures[4].

A number of approaches to surveillance has been adopted. Routinely collected data have the advantage of a low marginal cost and allow historical comparisons to be made. An alternative is to collect information specific to injury prevention. Though having the advantage of providing information of direct relevance to intervention planning and evaluation, such stand-alone systems may have a substantial marginal cost and demands on staff may jeopardise long-term viability.

The paucity of information about injuries that do not result in hospital admission or death has prompted demands for information from, for example, hospital accident and emergency departments and population surveys. Less severe injuries make up the bulk of the community burden of injury morbidity (the base of the so-called injury pyramid[2]). A complete picture of the injury experience, especially at a local level, will be obtainable only from a range of information sources.

WHAT IS BRIS?

The Injury Surveillance and Information System (ISIS) developed by NISU has operated in about 40 hospitals throughout Australia[5]. Information from this source, provided through Childsafe NSW, was used in the characterisation of the problem of childhood burns in NSW. (Childsafe NSW now uses BRIS in the paediatric injury surveillance system it coordinates.) Hospital inpatient data indicated the size of the problem and suggested scalds were the major issue. The ISIS system provided detail about specific issues (e.g. coffee and tea cups were a common source of scalding liquid). The availability of data from a range of sources aided development of an appropriately targeted intervention.

The Moree Agricultural Health Unit used ISIS data collected in local emergency departments to plan a prevention program for farmwork injuries[6].

Though recognising such successes, the limitations of ISIS, and developments in emergency department information systems, have prompted NISU to promote a reduced data collection, Basic Routine Injury Surveillance (BRIS). BRIS is designed to provide basic information relevant to preventive activity by identifying important issues, facilitating comparisons (between data sources, regions and times) and enabling evaluation of interventions. It is also intended to be consistent with other priorities for data collection in emergency departments, maximising the relevance to those involved in data collection[7].

The most recent elaboration of BRIS consists of five core injury data items, more detailed classifications for optional use with the core items, recommendations about general information that should be available on each case and an additional classification for coding free text information. (Previous versions had six core items. Geographic location of injury is now an optional, supplementary, item.)

The five core items are:

- text description of the injury event;
- the main 'external cause' of injury;
- the type of activity of the person when injured;
- the type of place where the injury event occurred; and
- the main injury sustained.

The text field has been considered one of the most useful facets of ISIS. It enables relatively specific data (including products) and additional detail, relevant to local concerns, to be included.

NISU is supporting projects in the Western Sydney Area and the New England Region which will contribute to the development of the methodology for collecting these data. In rural NSW a minimum data set including injury has been developed by the Central West Region and is being implemented across Central West, New England and Orana and Far West Regions. The system operates from a hard copy register, with data entered to computer on-site. The system is being evaluated by the Public Health Unit at Taree with a view to evolving a data set compatible with the BRIS standards.

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The Western Sydney Centre for Health Promotion has supported the collection of ISIS information in a number of local emergency departments. Building on this experience the Paediatric Injury Prevention Group based at Westmead Hospital, in consultation with the Western Sector Public Health Unit, has incorporated BRIS in a database that enables data about all presentations in the emergency departments of two local hospitals to be entered directly onto PC. The BRIS component of this database is to be evaluated according to its accuracy (sensitivity and specificity), simplicity of collection and end user satisfaction.

BEYOND DATA COLLECTION

Two general aims of these projects are to validate a set of data items of relevance to injury surveillance and then to advocate for the inclusion of these items (or a defined subset) in Area patient management information systems or as ongoing stand-alone systems in emergency departments.

We are aware that the potential of a surveillance system may be limited by the perspective of those designing and managing the system. Viewing surveillance as simply data collection and collation neglects the crucial areas of analysis and interpretation. A complete public health surveillance system requires a range of data sources to be linked to intervention programs and services. The Centers for Disease Control (CDC) have defined surveillance as:

> ... the ongoing systematic collection, analysis and interpretation of health data essential to the planning, implementation and evaluation of public health practice, closely integrated with the timely dissemination of these data to those who need to know. The final link in the chain is the application of these data to prevention and control. *A surveillance system includes a functional capacity for data collection, analysis and dissemination linked to public health programs*[8].

Central to this definition of public health surveillance is the focus on populations, rather than selected diseases, and an insistence on a functional connection in any surveillance system between data collection, interpretation and public health policy and action.

To ensure data collected according to standards developed and promoted by NISU will contribute to reductions in injury mortality and morbidity, it will be essential to involve existing health promotional and preventive structures and to place priority on the development of networks spanning intersectoral boundaries. The system must have the expertise to analyse and interpret data in a way that will assist in directing, and evaluating, intervention and control strategies. Good quality information will be of little value if it is not interpreted, disseminated and acted on.

A corollary of this is the necessity to consider the uses to which the information will be put. If there is no intention, or capacity, to make use of relatively detailed data collected on a daily basis then the data should not be collected. It may be better to use existing data to determine rates of injury and perhaps have a sentinel hospital(s) collecting more detailed information, with detailed investigation of specific issues as required.

PREVENTING INJURY IN NSW

Injury surveillance underlies many of the recommendations in the recently published NSW Injury Strategic Plan[1]. A surveillance system comprising comparable local systems and embraced by injury prevention programs and organisations is required. The BRIS data set is oriented to public health information concerns. Advocating for incorporation of data standards such as BRIS into patient information systems should be seen as part of a necessary change in emphasis in development of such systems. We can add value to these information systems by insisting on the relevance of public health concerns in their development.

1. Preventing Injury in NSW. NSW Health Department. 1992.
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5. Vimpani G and Hartley P. National Injury Surveillance and Prevention Project: Final Report. AGPS. Canberra. 1991.
6. Mason J. Rural injuries: an identifiable problem. *Injury Issues* August 1991; 3.
7. Harrison J. Tapping the preventive potential of hospital information systems: the role of a minimum data set for injury surveillance. *Health Promotion J of Aust* 1991; 1(2):57-59.
8. Centers for Disease Control. Comprehensive plan for epidemiologic surveillance: Centers for Disease Control. August 1986. Atlanta, GA.

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ACKNOWLEDGMENT

Injury surveillance activities in the Western Sydney Area and New England Region have been supported by grants from NISU under the Injury Surveillance Development and Support Program.

INVESTIGATION OF CATERPILLAR DERMATITIS IN SCHOOL CHILDREN

In February the South Western Sydney Public Health Unit received reports from a Community Health Centre and two parents indicating a large number of children at a local primary school had developed skin rashes. Further information was sought from senior staff at the school and from GPs. About 40 children aged 5 to 11 years were reported to have developed a rash over a three-day period. Staff noted the school was experiencing a caterpillar infestation, with children complaining of skin irritation after contact with caterpillars in the playground.

PHU INVESTIGATION

In response to a possible association between the caterpillar infestation at the school and the skin rashes, South Western Sydney PHU staff contacted the Medical Entomology Unit of Westmead Hospital to obtain information on the potential association of caterpillars with skin rashes. Environmental Health Officers of the PHU went to the school to ascertain the extent of the infestation and to collect specimens for identification.

The site inspection revealed the presence of dark reddish brown caterpillars on the brick walls of school buildings and caterpillars sheltering on and beneath the bark of *Melaleuca spp* (paperbark) and *Eucalyptus spp* (stringybark) trees in the playground near where children sit at lunchtime.

Caterpillar specimens were collected from the trunk of a *Melaleuca spp* and from a brick wall of a school building. The Medical Entomology Unit identified them as larvae of the mistletoe browntail moth, *Euproctis edwardsi*, from the family Lymantriidae (tussock moths).

DISCUSSION

The purpose of this report is to highlight the need to consider unusual causes of rashes.

The caterpillar (larval) stage of this moth is considered to be one of the most important causes of caterpillar dermatitis in humans in Australia[2]. The chief "infective" agents are the caterpillar hairs which occur in small patches along the dorsal surface of the caterpillar. These minute hairs are tapered with progressively smaller barbs covering the surface of each. Due to their ability to become airborne from disintegrating cast larval skins, and their dart-like structure, the hairs can readily disperse, settle and penetrate skin and clothing.

The hairs of this caterpillar are quite irritant, with most people developing some symptoms after exposure. Symptoms may include skin irritation, rashes, papules, pain and swelling of the infected area[1]. Repeated exposure to the hairs of this caterpillar may result in patients becoming hypersensitive, requiring treatment for allergy.

The hairs may be detected by close examination of the affected area with a magnifying glass. Alternatively, adhesive tape could be applied to the affected area, and then removed. Examination of the tape with the aid of a microscope will often reveal the presence of the dart-like hairs.

Humans may be exposed to the caterpillar hairs in the following ways:

- The caterpillars shed (moult) their skin during the larval stage. The hairs from the skins often disperse through the air and may infect any person who walks through such an infected area.
- Pupation of this moth takes place in sheltered areas such as under the bark of host trees. The pupal case of this moth consists of larval hairs loosely interwoven with webbing. Disturbance of cocoons by lifting and removing bark can dislodge the hairs or fragments of them.

Children playing near the base of trees or climbing on branches that have an infestation of caterpillars readily become infected. Rashes have also resulted from wearing clothes that have been dried near affected trees, where caterpillar hairs have drifted and settled on the clothes.

Adult moths can also cause caterpillar dermatitis. When the adult moth emerges it takes with it some larval hairs from the cocoon on its anal hair tufts which are shed or incorporated in egg laying.

FACTORS THAT CONTRIBUTE TO AN INFESTATION

The mistletoe browntail moth has two generations a year. Adults first appear in mid-November, with the larvae (caterpillar stage) emerging in January. These larvae produce the next generation of adults in April and their larvae hatch in May. The larvae remain relatively quiescent until August, sheltering under a mass of webs[2].

Female mistletoe moths lay their eggs on the branches and leaves of food plants. Emerging larvae live for three to four weeks and, depending on a supply of suitable food sources and prevailing weather conditions, caterpillar populations may become abundant. In areas where mistletoe is heavily attacked, there may be a localised outbreak of dermatitis associated with the caterpillar[3].

The larvae of this moth generally feed on mistletoes *Amyema spp*, which are mostly parasitic on *Eucalyptus spp*. An alternative food source is the native cherry tree, *Exocarpus curpressiformis*. Larvae generally feed at night and seek shelter under bark during the day, though in population outbreaks larvae will wander during the day. This phenomenon was observed by staff of the PHU during the site inspection.

CONCLUSION

The presence of numerous mistletoe browntail moth caterpillars in the school playground implicates them as a possible source of the skin rashes in the children.

Several recommendations have been made to the school executive to control the caterpillar infestation and to minimise the risk to children of contracting caterpillar dermatitis. These include:

- the children to be advised to avoid playing under trees and the school to block access to areas where a known infestation has occurred;
- the school to ensure all mistletoe is removed from trees in the playground; and
- the placement of hessian around the base of trees to provide shelter for caterpillars during the day. The hessian containing the caterpillars can then be removed and burned.

The application of chemical insecticides such as maldison or cabaryl by a licensed pest controller is one option that can be considered when large masses of caterpillars are detected in the foliage or are obvious on the trunks of trees. However

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PUBLIC HEALTH ABSTRACTS

Professor James S. Lawson, Professor and Head of the School of Health Services Management at the University of NSW, has prepared the following public health items from the literature.

CHILD HOMICIDE — THE EXTREME OF ABUSE

In the past 15 years 17 cases of fatal child abuse were cared for at the Children's Hospital at Camperdown. Most of the children were less than three years old and nine were under one. Seventy-six per cent died from head injury and 24 per cent from asphyxia or strangulation. About one-third had evidence of previous physical abuse. A process of review of these deaths may increase awareness of, and help prevent, fatalities from child abuse.

De Silva S and Oates RK. Child homicide — the extreme of child abuse. *Med J Aust* 1993; 158:300-301.

CALCIUM SUPPLEMENT REDUCES BONE LOSS IN WOMEN

The value of supplementation of calcium intake in the prevention of osteoporosis remains uncertain. An American study has demonstrated that if calcium supplements by way of diet are taken by normal women after they have reached menopause, the rate of loss of bone mineral density can be reduced by 43 per cent.

Reid IR, Ames RW, Evans MC and Gamble GD. Effects of calcium supplementation on bone loss in postmenopausal women. *New Engl J Med* 1993; 328:460-464.

IDENTIFYING WOMEN AT RISK FROM RUBELLA IN AUSTRALIA

A West Australian group has found the incidence of congenital rubella syndrome remains below 2 cases per 10,000 live births. This low rate is a direct consequence of the vaccination against rubella of about 86 per cent of Perth schoolgirls. But experience in Western Australia indicates vaccine acceptance has fallen in some country areas. The group also notes that women born in Asia are at greater risk of having a baby affected by congenital rubella syndrome than women born in Australia. The challenge is to develop mechanisms to identify and vaccinate non-immune women.

Condon RJ and Bower C. Rubella vaccination and congenital rubella syndrome in Western Australia. *Med J Aust* 1993; 158:379-382.

REAPPRAISAL OF HEALTH BENEFITS OF EXERCISE

Two recent studies purport to show improvements in mortality as a consequence of exercise. The studies are by Paffenbarger and colleagues in the United States and by Sandvik in Norway. They do demonstrate a reduction in mortality among physically fit men but, unfortunately, both studies are subject to bias. A review of 27 studies on habitual physical activity in the primary prevention of coronary disease supports the conclusions of Paffenbarger and Sandvik. Again, however, these studies may be biased because it has not been possible to mount a controlled prospective trial. But Curfman, when reviewing all the available literature, has concluded that regular exercise probably does offer some protection against coronary heart disease. Exercise improves work capacity and helps control body weight — both benefits, sufficient in themselves, to encourage regular physical activity. However Curfman argues that when extolling the merits of exercise, health professionals should not overstate the case.

Curfman GD. *New Engl J of Med* 1993; 328:8:574-576. Paffenbarger RS, Hyde RT, Wing AL, Lee I-M et al. The association of changes in physical activity level and other lifestyle characteristics with mortality among men. *New Engl J Med* 1993; 328:538-545. Sandvik L, Erikssen J, Thaulow E, Erikssen G et al. Physical fitness as a predictor of mortality among healthy, middle-aged Norwegian men. *New Engl J Med* 1993; 328:533-537.

SEXUAL LIFESTYLES AND PREVENTION OF AIDS

The availability of laboratory evidence about the human immunodeficiency virus has provided, for the first time, information about sexual lifestyles based on scientific principles in contrast to how people respond to social surveys. Two studies from Britain and France have indicated that many people have a few sexual partners and a few have a great many. Most couples are monogamous, with more than 70 per cent of men and women reporting they had only one partner in the past year in contrast to about 5 per cent of men and 1 per cent of women who reported 10 or more partners in the past five years. The highest rate of partner change is in unmarried urban men and women under the age of 25. The patterns in Britain and France are similar.

The British results show that affluence is associated with partner change and that the top two social classes have a higher rate of partner change than individuals in lower classes in the United Kingdom.

Editorial: Mapping Sexual Lifestyles. *Lancet* 1993; 340:1441-1442.

Caterpillar dermatitis in children

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the application of insecticides must be undertaken to ensure minimal contact to school children and teaching staff. This was not recommended and is generally considered after other options have failed.

The PHU will be advising local GPs through its GP newsletter on the potential of the mistletoe browntail moth to cause dermatitis in humans.

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1. Southcott RV. Lepidopterism in the Australian region. Rec. Adelaide Children's Hospital. 1978; 2:87-173.
2. Southcott RV. Moths and butterflies. Toxic plants and animals. A guide for Australia. 1987; 243-257.
3. Lee DJ. Arthropod bites and stings and other injurious effects. School of Public Health and Tropical Medicine. 1975; 201-203.

INFECTIOUS DISEASES

NOTIFICATIONS

From this month an extra table is included in the routine reporting of infectious diseases notifications. This table updates notifications by month of onset, for the months preceding the month currently reported. It includes information on late notifications. As the table is printed for this first time this month, it includes notifications for January-April 1993 by month of onset. In future editions of the *NSW Public Health Bulletin*, only the preceding three months' notifications will be printed.

TABLE 1

INFECTIOUS DISEASE NOTIFICATION BY MONTH OF ONSET FOR 1993

Condition	Month					
	Jan	Feb	Mar	Apr	May	Total
Adverse event after immunisation	2	1	2	1	1	7
AIDS infection	32	24	27	8	4	95
Arboviral infection	54	247	160	48	10	519
Brucellosis	–	1	–	–	–	1
Foodborne illness (NOS)	5	7	21	18	15	66
Gastroenteritis (instit.)	24	12	3	5	23	67
Gonorrhoea infection	20	36	44	31	7	138
H influenzae epiglottitis	1	4	4	4	6	19
H influenzae meningitis	4	5	7	9	3	28
H influenzae septicaemia	–	3	4	3	3	13
H influenzae infection (NOS)	3	–	3	–	–	6
Hepatitis A – acute viral	56	69	47	43	20	235
Hepatitis B – acute viral	2	10	9	4	5	30
Hepatitis B – unspecified	265	242	305	233	142	1186
Hepatitis C – acute viral	1	3	1	2	–	7
Hepatitis C – unspecified	318	406	431	365	168	1688
Hepatitis D – unspecified	–	–	–	1	–	1
Hepatitis, acute viral (NOS)	–	1	–	–	1	2
HIV infection	–	–	–	–	19	223
Legionnaires' disease	6	5	7	10	4	32
Leptospirosis	–	4	3	1	–	8
Listeriosis	4	1	–	–	–	5
Malaria	5	10	10	2	2	29
Measles	73	65	36	29	30	233
Meningococcal meningitis	3	2	1	7	3	16
Meningococcal septicaemia	1	2	1	4	3	11
Meningococcal infection (NOS)	1	1	1	2	–	5
Mycobacterial – atypical	19	20	20	5	4	68
Mycobacterial tuberculosis	14	21	16	7	7	65
Mycobacterial infection (NOS)	6	3	9	10	2	30
Pertussis	73	32	37	24	9	175
Q fever	25	32	31	26	10	124
Rubella	64	24	24	13	3	128
Salmonella (NOS)	77	74	70	57	25	303
Salmonella bovis morbificans	10	3	1	1	–	15
Salmonella typhimurium	30	22	24	23	6	105
Syphilis infection	60	52	65	48	26	251
Tetanus	2	–	–	–	1	3
Tuberculosis – non active	–	–	8	–	–	8
Typhoid and paratyphoid	7	1	2	2	–	12
Total	1267	1445	1434	1047	563	5960

WHOOPING COUGH

During the first five months of 1993, 15 of 16 Health Areas and Regions, representing 97 per cent of the NSW population, received notifications for whooping cough. As with measles, there has been widespread transmission of *Bordatella pertussis* this year.

The spring/summer epidemic of 1992-3 has diminished since mid-February.

The annual notification rate for the State is 7.1 per 100,000 population. Central West Region has received notifications at a rate of 24.3 per 100,000 population.

MEASLES

In the first five months of 1993, 15 of 16 Health Areas and Regions, representing 97 per cent of the NSW population, received notifications for measles. This indicates widespread transmission of the measles virus throughout NSW.

The annual notification rate for the State is 9.3 per 100,000 population. Orana and Far West Region has received notifications at a rate of 56.6 per 100,000 population.

Measles notifications peaked in epiweeks six to ten. In that five-week period 34 per cent of the year's notifications were received.

RUBELLA

During 1993, 15 out of 16 Health Areas and Regions, representing 98 per cent of the NSW population, have received notifications for rubella.

Notifications for rubella have decreased since the first four weeks of the year. Fifty per cent of the year's notifications were for January.

The notification rate for the State for 1993 is 5.2 per 100,000 population. The notification rate for females between 15-44 years of age is 2.1 per 100,000.

TABLE 2

SUMMARY OF NSW INFECTIOUS DISEASE NOTIFICATIONS MAY 1993

Condition	Number of cases notified			
	Period		Cumulative	
	May 1992	May 1993	May 1992	May 1993
Adverse reaction	5	1	21	7
AIDS	35	4	152	95
Arboviral infection	39	10	282	519
Brucellosis	–	–	–	1
Cholera	–	–	–	–
Diphtheria	–	–	–	–
Foodborne illness (NOS)	10	15	127	66
Gastroenteritis (instit.)	34	23	152	67
Gonorrhoea	49	7	191	138
H influenzae epiglottitis	4	6	14	19
H influenzae B – meningitis	11	3	40	28
H influenzae B – septicaemia	3	3	12	13
H influenzae infection (NOS)	2	–	12	6
Hepatitis A	91	20	522	235
Hepatitis B	263	147	1330	1217
Hepatitis C	458	168	1590	1695
Hepatitis D	3	–	5	1
Hepatitis, acute viral (NOS)	2	1	10	2
HIV infection	69	19	350	223
Hydatid disease	–	–	4	–
Legionnaires' disease	8	4	68	32
Leprosy	1	–	4	–
Leptospirosis	4	–	14	8
Listeriosis	1	–	7	5
Malaria	15	2	64	29
Measles	41	30	186	233
Meningococcal meningitis	2	3	15	16
Meningococcal septicaemia	–	3	3	11
Meningococcal infection (NOS)	–	–	4	5
Mumps	3	–	14	–
Mycobacterial tuberculosis	28	7	227	65
Mycobacterial – atypical	32	4	176	68
Mycobacterial infection (NOS)	3	2	23	30
Pertussis	7	9	63	175
Plague	–	–	–	–
Poliomyelitis	–	–	–	–
Q fever	11	10	65	124
Rubella	1	3	28	128
Salmonella infection (NOS)	72	31	480	423
Syphilis	92	26	398	251
Tetanus	–	1	1	3
Typhoid and paratyphoid	3	–	15	12
Typhus	–	–	–	–
Viral haemorrhagic fevers	–	–	–	–
Yellow fever	–	–	–	–

Infectious diseases

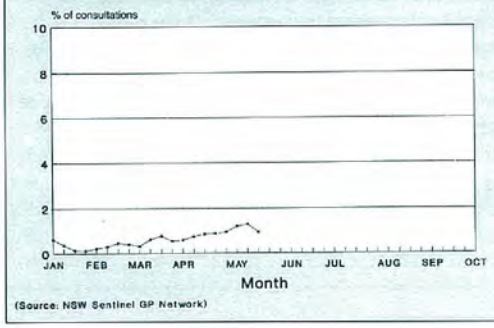
► *Continued from page 67*

INFLUENZA

Influenza surveillance data, now being received from 10 public health units (PHUs), showed influenza activity remaining low during May. The NSW General Practitioner Network reports that rates of influenza-like illness have increased only marginally since April, up to a relatively low peak of 1.3 per cent of consultations. Surveillance of school absentee rates in three PHUs showed little or no increase in May, but the Eastern Sydney Area laboratory surveillance system did report an increased number of isolations of influenza A.

FIGURE 1

INFLUENZA-LIKE ILLNESS NSW 1993



(Source: NSW Sentinel GP Network)

TABLE 3

INFECTIOUS DISEASE NOTIFICATIONS BY HEALTH AREA AND REGION CUMULATIVE 1993

Condition	PHUNUM CSA	SSA	ESA	SWS	WSA	WEN	NSA	CCA	ILL	HUN	NCR	NER	OFR	CWR	SWR	SER	U/K	Total
Adverse event after immunisation	1	2	–	–	2	–	1	–	–	1	–	–	–	–	–	–	–	7
AIDS	19	1	45	2	1	–	8	–	1	1	8	2	1	3	4	–	–	95
Arboviral infection	1	1	1	1	1	3	2	1	–	14	32	14	95	13	336	4	–	519
Foodborne illness (NOS)	1	–	–	14	20	16	–	4	–	–	–	10	–	–	–	–	–	66
Gastroenteritis (instit.)	13	–	–	4	11	4	–	–	–	–	–	13	2	20	–	–	–	67
Gonorrhoea	18	6	62	4	7	2	9	–	2	4	8	6	7	1	1	1	–	138
H. Influenzae epiglottitis	1	4	1	–	–	2	2	1	1	2	–	2	–	–	1	2	–	19
H. Influenzae meningitis	1	2	–	3	2	3	2	2	4	1	2	3	1	1	–	1	–	28
H. Influenzae septicaemia	–	2	–	6	–	–	–	–	1	2	–	2	–	–	–	–	–	13
H. Influenzae infection (NOS)	–	–	1	–	1	1	–	2	–	–	–	–	1	–	–	–	–	6
Hepatitis A — acute viral	15	7	14	26	76	13	17	5	5	7	23	13	5	3	3	3	–	235
Hepatitis B — acute viral	2	1	–	–	4	–	–	–	–	–	20	2	–	–	–	1	–	30
Hepatitis B — unspecified	191	124	11	373	192	13	182	11	9	25	15	16	9	5	7	5	–	1187
Hepatitis C — acute viral	–	–	–	–	–	–	–	1	–	–	1	3	–	–	–	2	–	7
Hepatitis C — unspecified	253	113	250	180	167	25	181	86	40	157	124	26	13	18	29	26	–	1688
Hepatitis D — unspecified	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Hepatitis, acute viral (NOS)	–	–	1	–	–	–	–	–	–	–	–	–	–	1	–	–	–	2
HIV infection	38	4	78	6	4	3	18	4	–	5	4	–	–	–	1	–	57	223
Legionnaires' disease	3	1	–	11	11	–	2	–	1	–	1	–	1	–	–	1	–	32
Malaria	–	–	2	1	4	–	5	1	1	5	–	6	1	–	2	1	–	29
Meningococcal meningitis	–	1	–	5	1	–	1	2	–	–	2	–	1	–	1	2	–	16
Meningococcal septicaemia	3	3	–	1	–	1	–	–	–	–	1	1	–	–	–	1	–	11
Meningococcal infection (NOS)	–	–	1	–	–	–	–	1	–	1	–	–	1	1	–	–	–	5
Mycobacterial atypical	14	4	–	–	12	–	8	1	2	16	6	2	1	–	2	–	–	68
Mycobacterial tuberculosis	9	8	5	–	8	3	12	3	1	9	1	3	2	1	–	–	–	65
Mycobacterial infection (NOS)	7	2	–	–	3	–	10	2	3	–	2	–	1	–	–	–	–	30
Q fever	–	–	1	–	3	–	1	–	–	11	24	34	43	3	1	3	–	124
Salmonella (NOS)	13	27	30	22	9	2	33	22	4	43	34	29	17	5	6	7	–	303
Salmonella bovis morbificans	–	3	–	–	–	–	2	–	–	10	–	–	–	–	–	–	–	15
Salmonella typhimurium	13	13	8	13	2	–	12	–	–	19	4	5	10	–	1	5	–	105
Syphilis	23	7	27	85	9	2	14	3	1	3	25	11	38	2	–	1	–	251
Typhoid and paratyphoid	1	1	4	–	–	2	2	–	–	–	2	–	–	–	–	–	–	12

TABLE 4

VACCINE PREVENTABLE DISEASE NOTIFICATIONS BY HEALTH AREA AND REGION CUMULATIVE 1993

Condition	PHUNUM CSA	SSA	ESA	SWS	WSA	WEN	NSA	CCA	ILL	HUN	NCR	NER	OFR	CWR	SWR	SER	U/K	Total
Measles	33	15	3	40	38	21	3	8	9	11	16	1	33	1	1	–	–	233
Pertussis	9	4	6	18	24	20	34	1	7	9	10	2	11	17	3	–	–	175
Rubella	5	11	10	9	14	11	21	3	1	8	16	8	–	2	3	6	–	128
Tetanus	–	1	–	–	–	–	–	–	–	–	1	–	1	–	–	–	–	3

TABLE 5

RARELY NOTIFIED INFECTIOUS DISEASES BY HEALTH AREA AND REGION CUMULATIVE 1993

Condition	PHUNUM CSA	SSA	ESA	SWS	WSA	WEN	NSA	CCA	ILL	HUN	NCR	NER	OFR	CWR	SWR	SER	U/K	Total
Brucellosis	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1
Leptospirosis	–	–	–	–	–	–	–	–	–	1	3	1	–	–	3	–	–	8
Listeriosis	2	–	–	1	–	–	–	–	–	1	–	–	–	–	–	1	–	5

TABLE 6

NOTIFICATIONS OF NON-NOTIFIABLE SEXUALLY TRANSMITTED DISEASES JANUARY-MAY 1993
(Diagnoses from sexual health centres unless otherwise stated in footnote)

AHS Infection		CSA + SSA[1]	ESA[1]	SWS[2]	WSA[3] + WEN	NSA[4]	CCA[4]	ILL[5]	HUN[1]	NCR[4]	NER[4]	OFR[4]	CWR[6]	SWR[7]	SER[8]
Chlamydia trachomatis	Male	–	23	2	–	–	–	–	5	2	1	8	–	1	
	Female	1	20	1	–	1	–	–	9	–	4	4	–	4	
	Total	**1**	**43**	**3**	–	**1**	–	–	**14**	**2**	**5**	**12**	–	**5**	**2**
Donovanosis	Male	–	–	–	–	–	–	–	–	–	–	–	–	–	
	Female	–	–	–	–	–	–	–	–	–	–	–	–	–	
	Total	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Genital herpes	Male	2	75	1	–	8	–	–	8	2	2	–	–	1	
	Female	1	59	–	–	2	2	–	14	1	–	–	–	5	
	Total	**3**	**134**	**1**	–	**10**	**2**	–	**22**	**3**	**2**	–	–	**6**	**2**
Genital warts	Male	28	204	–	–	11	15	9	43	15	4	8	–	–	
	Female	15	87	–	–	12	7	6	10	4	9	10	–	–	
	Total	**43**	**291**	–	–	**23**	**22**	**15**	**53**	**19**	**13**	**18**	–	–	**8**
Non-specific urethritis	Male	5	224	2	–	5	6	8	23	4	1	6	–	–	
	Female	–	–	1	–	1	5	–	–	–	–	–	–	–	
	Total	**5**	**224**	**3**	–	**6**	**11**	**8**	**23**	**4**	**1**	**6**	–	–	–
Lymphogranuloma venereum	Male	–	–	–	–	–	–	–	–	–	–	–	–	–	
	Female	–	–	–	–	–	–	–	–	–	–	–	–	–	
	Total	–	–	–	–	–	–	–	–	–	–	–	–	–	–

1. 01/01/93-31/03/93; 2. 01/04/93-30/04/93; 3. No data yet received for 1993; 4. 01/01/93-30/04/93; 5. 01/01/93-31/01/93; 6. No SHC in Region; 7. No SHC in Region. Laboratory data 01/01/93-30/04/93; 8. No SHC in Region. Data from GP network 01/01/93-16/05/93.

There are ten sexual health clinics (SHCs) in the Sydney metropolitan area, of which six have submitted reports in 1993, while data have been received from seven of the nine clinics outside Sydney. Surveillance of non-notifiable STDs through SHCs, as with some other surveillance systems, may reflect levels of health service delivery as well as disease incidence. The large number of reports from the Eastern Sydney Area (ESA) is consistent with the high rates of gonorrhoea in that area and the fact that three large STD clinics from ESA are reporting non-notifiable STDs.

INVASIVE HAEMOPHILUS INFLUENZAE TYPE B SURVEILLANCE IN THE SYDNEY, HUNTER AND ILLAWARRA STATISTICAL DIVISIONS FOR THE SECOND SIX MONTHS OF 1992

Carolyn Penna, Research Nurse, and Peter McIntyre, Staff Specialist in Infectious Diseases, Department of Paediatrics, Westmead Hospital

Aims

1. Continuing Hib surveillance in children 0-14 years of age.
2. Correlation with data received by the NSW Health Department since Hib disease became notifiable.
3. To detect trends in disease incidence with the progressive introduction of Hib immunisation.

Active surveillance for invasive Hib disease, which was established in 1989 and consists of telephone contact with one or two individuals in each hospital laboratory and Intensive Care Unit in the Sydney statistical division, was continued. The surveillance network was extended to include the Hunter and Illawarra Regions from the beginning of 1992. Contact was maintained monthly or bimonthly, depending on the workload of the hospitals.

The NSW Health Department had been notified of 70 cases and the WMC of 77 cases. Sixty-six of the cases were matching, leaving 11 and 4 unmatched cases respectively. This was an improvement from 22 to 4 unmatched cases for WMC and 15 to 11 for the Health Department.

- Total eligible cases from any source was 81.
- Total Health Department cases was 70 (86.4 per cent).
- Total Westmead cases was 77 (95.1 per cent).
- Estimated total cases was 82 (Chandra and Sekar method).

There were nine cases over 60 months of age. Three of these were meningitis, five epiglottitis and one was septicaemia. This left a total of 72 cases in children 0-4 years of age. These 72 were divided into four age categories to reflect the availability of vaccination and its likely age distribution — 1-5 months, 6-18 months, 19-36 months and 37-60 months (Table ?).

The overall disease incidence and the incidence in the four age bands was similar in the two six-month periods of 1992, which marked the introduction of a conjugate Hib vaccine (ProHibit) into the private sector for children 18 months of age and older. Disease incidence showed a downward trend in the age group (18-36 months) expected to have had the highest uptake of ProHibit (the only conjugate vaccine available during this period), with the point estimate decreasing by 32 per cent from 57.2 to 38.8 per 100,000. However, this was not significant at the 5 per cent level in that the confidence limits for these estimates overlapped. Disease incidence remained remarkably constant in the other age groups. It will be important to see if this trend is borne out in the first half of 1993, when conjugate vaccines will also have been marketed for use in infants (PedvaxHib and HibTiter).

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HEPATITIS A IN A PRE-SCHOOL IN EASTERN SYDNEY

Lorraine Young and Mark Ferson, Eastern Sydney Area Public Health Unit

On May 17, 1993 the Eastern Sydney PHU was notified of a case of hepatitis A in a three-year-old girl. The child had been admitted to a children's hospital with a gastrointestinal illness. A diagnosis of hepatitis A was made after onset of jaundice on May 10 and a positive blood test for hepatitis A virus (HAV) IgM. No household contacts of this case were affected and it was noted that the child attended a local pre-school.

The second associated case of hepatitis A was notified on May 18. This case, in a seven-year-old child, had onset of jaundice on May 10 and was serologically confirmed. No illness was reported in the household contacts but the younger sibling attended the same pre-school as the index case. We advised blood testing for the younger sibling and this proved to be positive for HAV IgM.

The director of the pre-school was told of the related cases and given information on hepatitis A, including the importance of hygiene and handwashing. All staff were advised to have a normal human immunoglobulin injection as soon as possible. An information letter and consent form for blood testing were distributed to all parents and on May 25 blood was collected for hepatitis A serology.

Serological results were obtained from 19 of the 25 children. Six were HAV IgM positive, a further six were HAV IgG positive but IgM negative, and seven had no antibodies to HAV. Of the 19 children tested, 63 per cent had positive serology for HAV. The high rate of IgG seropositivity suggests the outbreak had occurred over a period of at least two-three months (in time for IgM to become undetectable in some children). Three children, of whom two required hospital admission, had an identifiable illness consistent with hepatitis A.

The use of immunoglobulin was recommended on contacts, comprising:

- all staff of the pre-school;
- household contacts of confirmed cases;
- children attending the pre-school who were HAV antibody negative; and
- children attending the pre-school who were not tested (presumed susceptible).

All parents were informed of their child's blood test results and of the PHU's recommendations. There have been no further reports of illness associated with the pre-school.

M. TUBERCULOSIS SUSCEPTIBILITY TESTING

William Chew, Tom Gottlieb and Lyn Gilbert, ICPMR, Westmead Hospital

Review of the results of MTB susceptibility tests for the years 1988, 1991 and 1992 has shown there has been no increase in the number of isolates referred for susceptibility testing nor in the percentage of resistant isolates. Since 1992 the tests have been performed by the radiometric BACTEC method, which provides results within one week — compared with three for the conventional method. A disadvantage of this method is that unrecognised contamination of the broth by other mycobacteria or a mixed mycobacterial infection can cause apparent MTB resistance which cannot be excluded until two weeks later, when growth on the solid purity plate becomes visible. This occurs infrequently but complicates the demand for rapid recognition of multi-drug-resistant isolates. There has been no increase in the incidence of reported resistance since the BACTEC method has been implemented. Results of BACTEC susceptibility tests indicating resistant MTB (other than to streptomycin) are telephoned immediately to the referring laboratory with the caveat that the results are subject to confirmation of purity of the isolate.

M. tuberculosis isolates 1992

Total number with susceptibility tested	=	250	
Number fully susceptible	=	209	(83.6%)
Number resistant to one of first-line drugs	=	41	(16.4%)
Number resistant to one of first-line drugs, excluding streptomycin	=	27	(10.8%)

TABLE 7

INCIDENCE OF DRUG RESISTANCE — NSW M. TUBERCULOSIS 1988, 1991, 1992 [N(%)]

	1988 (n=246)	1991 (n=248)	1992 (n=250)
Rifampicin	6 (2.4)	8 (3.2)	7 (2.8)
Isoniazid	27 (11.0)	18 (7.3)	22 (8.8)
Ethambutol	12 (4.9)	2 (0.8)	6 (2.4)
Streptomycin	35 (14.2)	38 (15.3)	29 (11.6)

TABLE 8

COMPARISON OF INCIDENCE OF MULTIPLE DRUG RESISTANCE [N(%)] M. TUBERCULOSIS: 1988, 1991, 1992

Streptomycin/Isoniazid	1988	1991	1992
Ethambutol/Streptomycin	9	8	6
Isoniazid/Ethambutol	0	1	2
Isoniazid/Rifampicin	0	0	2
Streptomycin/Isoniazid/Rifampicin	0	1	0
Streptomycin/Isoniazid/Ethambutol	2	2	4
Isoniazid/Rifampicin/Ethambutol	4	0	0
Streptomycin/Isoniazid/Rifampicin/ Ethambutol	3	0	2
Total	18 (7.3)	13 (5.2)	16 (6.4)
Resistance to both INH/RIF	5 (2)	4 (1.6)	6 (2.4)

IMMUNISATION RATES FOR KINDERGARTEN CHILDREN OF THE SOUTH WEST REGION

Kim Gilchrist and Tony Kolbe, South West Region Public Health Unit

Immunisation remains one of the most effective public health activities. Despite this, and the availability of public and private immunisation services, immunisation coverage rates are not sufficient to prevent the transmission of vaccine-preventable diseases. The 1989-1990 National Health Survey (NHS) conducted by the Australian Bureau of Statistics (ABS) found that 53 per cent of children less than six years old had received full age-appropriate immunisation[1].

Data on immunisation coverage for the South West Region (SWR) were lacking. This cross-sectional survey was initiated to provide baseline immunisation coverage data on children in kindergarten in 1992. Although the survey gives little information on age-appropriate immunisation, it does provide a snapshot of immunisation coverage and will provide valuable data against which the impact of initiatives in immunisation will be assessed.

The survey was conducted with the assistance of school health nurses (SHNs) who distributed questionnaires to all eligible kindergarten children in schools in their district. The forms were taken home by the children and returned to the SHN who recorded the numbers of questionnaires sent out and received back.

The questionnaire was in the form of an explanatory letter with tear-off questionnaire. Parents were asked to tick yes, no or unsure to whether their child had been immunised with the stated vaccine. Language spoken at home and Aboriginality of the child were asked as well as the source of the information (i.e. Personal Health Record (PHR), parent's memory, or elsewhere). The questionnaires were returned to the PHU for data entry and analysis.

Of the 4,243 questionnaries given out, 3,666 were returned. The response was 86.4 per cent (95% CI: 85.4-87.4%).

For children returning the questionnaire, 84 per cent were fully immunised, 16 per cent had incomplete immunisation (i.e. one or more of the immunisations missing) and 0.4 per cent had no immunisations.

The rate of complete immunisation varied by Local Government Area (LGA), ranging from 45 per cent in Corowa to 100 per cent in Urana and Jerilderie, with 20 of the 28 LGAs having greater than 85 per cent complete immunisations. The major contributing factor to this difference is the variation in the rate of immunisation for the pre-school/five-year booster.

Ninety-eight per cent of respondents came from English speaking households. This is consistent with regional information stating that about 93 per cent of residents of the South West Region were born in Australia. The rate of complete immunisation was significantly higher for children of English speaking households 84 per cent (95% CI: 83-86%) than for respondents from a non-English speaking background at 62 per cent (95% CI: 50-74%).

Aboriginality was unavailable for 285 of the 3,666 respondents. There was variation both in the number of Aboriginal children and coverage rate by LGA. Complete immunisation status was slightly lower for Aborigines (80 per cent) than non-Aborigines (84 per cent) (Table 9).

TABLE 9

IMMUNISATION STATUS BY LANGUAGE SPOKEN AT HOME, ABORIGINALITY AND FOR ALL RESPONDENTS

Immunisation status	Language spoken at home		Aboriginality		All respondents
	English	NESB##	Non-Aboriginal	Aboriginal	
	n (%)	n (%)	n (%)	n (%)	n (%)
Complete	****3,029 (84.3)**	****38 (62.3)**	2,759 (84.1)	82 (80.4)	3,076 (83.9)
Incomplete	550 (15.3)	22 (36.1)	508 (15.5)	19 (18.6)	576 (15.7)
None	13 (0.4)	1 (1.6)	12 (0.4)	1 (1.0)	14 (0.4)
Total	3,592 (100)	61 (100)	102 (100)	3,279 (100)	3,666 (100)

** indicates a significant difference at alpha = 0.05
NESB (Non-English speaking background) component is made up of 23 children from Italian speaking households and the remaining 38 are from 19 other language groups with a frequency of no greater than 4.

TABLE 10

COMPLETE IMMUNISATIONS BY VACCINE TYPE

Vaccine type	Language spoken at home		Aboriginality		All respondents
	English	NESB	Non-Aboriginal	Aboriginal	
	n (%)	n (%)	n (%)	n (%)	n (%)
3 x Triple antigen/Sabin	3,534 (98.4)	55 (90.2)	3,228 (98.4)	99 (97.1)	3,327 (98.2)
Measles/mumps	3,469 (96.9)	55 (91.7)	3,170 (97.0)	95 (93.1)	3,265 (96.7)
TA booster/Sabin	3,446 (96.2)	52 (86.7)	3,144 (96.2)	96 (94.1)	3,240 (96.0)
Preschool entry booster	3,142 (88.5)	41 (69.5)	2,861 (88.4)	87 (86.1)	2,948 (88.2)

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Immunisation rates

► *Continued from page 71*

Excellent coverage rates were achieved for vaccines other than the pre-school booster with most LGAs showing rates above 95 per cent for triple antigen/Sabin, measles/mumps and the 18-month booster. Three LGAs showed coverage rates of less than 95 per cent for measles/mumps immunisation.

Generally, Aboriginal children had lower coverage rates for all vaccines when compared with non-Aboriginal children, although coverage rates were still good.

The majority of parents consulted their child's PHR to complete the survey and in some cases more than one source was indicated. Other sources of information included the child's general practitioner and the SHN (Table 11).

TABLE 11

SOURCE OF CHILD'S IMMUNISATION INFORMATION

Source	Number	Percentage of responses
Parent's memory	1,288	35.1
Personal Health Record	2,253	61.5
Other source	131	3.6

DISCUSSION

Since high immunisation coverage rates are required to prevent transmission of some vaccine-preventable diseases, particularly measles, it is important to attempt to achieve a high response rate in a coverage survey such as this. Our results may be an overestimate of the true immunisation coverage rate if those parents not returning questionnaires were less likely to have had their children immunised.

Generally, the coverage rates for the SWR are better than those reported in the NHS, although direct comparisons are difficult. For 5-6-year-olds in the NHS the immunisation rate ranged from 66 per cent for pertussis to 99 per cent for measles, while 24 per cent had partial polio immunisation and 8.3 per cent had partial immunisation against diphtheria/tetanus. Less than 1 per cent reported no immunisation against diphtheria/tetanus and 7 per cent reported no measles immunisation[1].

The NHS data and the SWR survey data indicate that the lack of the pre-school/five-year booster is a major factor contributing to incomplete immunisation coverage in children aged 5-6. If the pre-school/five-year booster data are not included the coverage rate for the SWR increases to 94 per cent. The National Health and Medical Research Council (NHMRC) recommendation for a pre-school booster[2] should be promoted as pre-school or five years of age, whichever comes first. It is unknown whether the low rate for the pre-school/five-year booster reflects a "missed" immunisation or that the parents are waiting for the child's fifth birthday.

Significantly lower rates of full immunisation coverage were found for children where a language other than English was the main language at home (Table 1). The NHS data showed that children of parents born overseas were less likely to be fully immunised[1]. This emphasises the need for special efforts to achieve full immunisation coverage in children of NESB. Personal follow-up of NESB families may be appropriate as there are small numbers from a wide range of language backgrounds. Interestingly, almost all NESB children without full immunisation had at least commenced the schedule. This indicates some contact with an immunisation provider and must be classed as a breakdown in any follow-up system.

Good immunisation coverage was found for Aboriginal children. The number of questionnaires returned without the section on Aboriginality completed and the potential number of Aboriginal children in the 14 per cent of non-respondents is of concern. This survey may overestimate the immunisation coverage in Aboriginal children because of these factors.

More parents consulted their child's PHR for immunisation information than was reported in the NHS where, in 45 per cent of cases, immunisation records were consulted[1]. There is concern that data based on parental recall may produce an overestimate of immunisation coverage. The PHR, now to be called The Blue Book, must be promoted to parents and immunisation providers as the preferred form of documentation. Parents should be encouraged to take the PHR whenever the child is having contact with the health system and health professionals should be encouraged to check the PHR, to immunise at all appropriate opportunities and to record the details in the child's PHR.

Although the survey indicates good immunisation coverage for children attending kindergarten it gives little indication as to whether these children had been immunised at the ages recommended by the NHMRC. A better assessment of age-appropriate immunisation and immunisation services would be obtained by surveying children about two years of age.

Improvement in age-appropriate immunisation may be achieved through provider-based immunisation registers which could issue reminder notices and facilitate the follow-up of children not being immunised. Innovative and special efforts may be required to immunise children who do not receive immunisation through "normal" public or private immunisation services.

Apart from coverage, other aspects of immunisation services must be addressed. Assessment of the cold chain system, standards of practice for public immunisation services and cooperation with general practitioners are of major importance. The health system must be made aware of missed opportunities for immunisation, there must be improved surveillance of vaccine-preventable disease and adverse events following immunisation and ultimately serological studies need to be conducted to assess vaccine efficacy. The knowledge of parents and immunisation providers must be improved and maintained and the arguments against immunisation effectively and convincingly dismissed.

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1. Australian Bureau of Statistics. 1989-1990 National Health Survey. Children's immunisation, Australia Catalogue No. 4379.0, 1992.
2. National Health and Medical Research Council. Immunisation Providers 4th Edition, Canberra: Australian Government Publishing Service, 1991.

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