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STUDY OF PUBLIC SWIMMING POOLS AND SPA POOLS IN NSW, 1993

Neil Shaw, Senior Environmental Health Officer,
Western Sector Public Health Unit

Environmental Health Officers of NSW Public Health Units surveyed 1,291 public swimming and spa pools during the 1992-93 financial year. Each pool was tested for compliance with the NSW guidelines on disinfection. While high failure rates of pool disinfection were found in all categories, the survey also identified factors which will be targeted in a response strategy.

INTRODUCTION

There is a wide range of pathogenic bacteria, fungi, viruses and protozoa that may be transmitted through inadequately disinfected swimming pools and spa pools. These microorganisms may cause infection in ears, eyes, skin, mouths, noses, respiratory systems, intestinal and uro-genital tracts or central nervous systems[1]. A powerful and swift disinfection residual in the body of the pool water is necessary to prevent pathogen survival and transmission. Additionally, an oxidising agent is required to oxidise dissolved organic matter and reduce turbidity[2].

The Public Health Regulation 1991 states that people responsible for public swimming pools and spa pools must ensure the pool water has been disinfected to prevent the spread of certain diseases. Under the Public Health Act 1991, the NSW Health Department issued guidelines for disinfecting public swimming pools and spa pools. The guidelines provide pool owners with information about bacteriological and chemical standards for adequate pool disinfection[3].

During the 1992-93 financial year a Statewide survey of public swimming pools and spa pools was carried out to determine compliance with NSW Health Department guidelines for chemical parameters.

METHOD

The survey was conducted over 12 months between July 1, 1992 and June 30, 1993. This period allowed for inspection of pools which were operated either seasonally or continuously.

Environmental Health Officers (EHOs) of all 14 Public Health Units (PHUs) in NSW conducted the inspections and tests. Each PHU compiled a list of known public swimming pools and spa pools. A systematic random sample of pools in NSW stratified by PHU was used to select pools for inclusion in the study. A total of 1,291 pools was tested during the survey.

All PHUs were supplied with a new temperature meter and Palintest Photometer 5000 equipped to carry out the appropriate chemical tests of chemical parameters including free residual chlorine/bromine, total residual chlorine/bromine, combined residual chlorine, pH, reserve (total) alkalinity and cyanurate. Table 1 summarises the significance of each of these chemical parameters.

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Correspondence

Please address all correspondence and potential contributions to:

The Editor,
NSW Public Health Bulletin,
Public Health Division,
NSW Health Department
Locked Bag No 961,
North Sydney NSW 2059
Telephone: (02) 391 9218
Facsimile: (02) 391 9232

TABLE 1

CHEMICAL PARAMETERS MEASURED IN THE SURVEY OF POOLS

Parameter	Significance
Free chlorine/bromine	The active free form of the disinfectant and is proportional to disinfecting power. It is not combined with other molecules. Minimum levels are required.
Total chlorine/bromine	A measure of the total quantity of disinfectant in its various forms. Free chlorine + combined chlorine = total chlorine. Maximum levels are specified.
Combined chlorine	A measure of chlorine or bromine combined with organic or nitrogenous molecules. These compounds generally have a much lower disinfecting power and can be severe irritants of mucous membranes. Maximum levels are specified.
pH	The higher the pH the less disinfectant is available in the free form (i.e. less disinfection power) but the greater the bather comfort. Ideal is 7.5. A range is specified.
Reserve alkalinity	A measure of the pool buffer capacity to prevent rapid swings in pH. A minimum is specified.
Cyanurate	Also known as stabiliser, it reduces the loss of chlorine from a pool due to UV light catalysed reactions. A range is specified.

TABLE 2

FAILURE RATES OF CHEMICAL PARAMETERS OF ALL POOLS (1,291 POOLS)

Parameter	Significance
Free chlorine/bromine	44
Total chlorine/bromine	33
Combined chlorine	10
pH	23
Reserve alkalinity	22
Cyanurate	9
Overall •	65

• = failure due to one or more of the above parameters.

TABLE 3

FAILURE RATE OF EACH CATEGORY

Pool category	No. inspected	% failed
Municipal pools – all •	443	57
– outdoor	401	55
– indoor	42	74
Business pools – all •	676	67
– outdoor	524	68
– indoor	152	66
Business spas – all •	170	79
– outdoor	53	81
– indoor	117	78

• = major pool category

Swimming pools and spa pools

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Tests followed the methods specified in the manual supplied with the photometer. All Senior EHOs received training on the use of the photometer and survey methods. Only one EHO from each PHU was asked to perform the inspections to ensure consistent inspection methods. A data checksheet was developed for ease of data collection and entry. Information was collected on pool classification, location (indoor or outdoor), water temperature, type of dosing, use of stabiliser, log book status and perceived inspection frequency. Completed checksheets were sent to the Western Sector PHU for data entry.

As the sampling fraction was not uniform in all PHUs, data were weighted by the inverse of the sampling fraction to provide adjusted point estimates for NSW as a whole. Tests of significance for proportions were assessed using the Chi-square test for independence. P-values are presented without adjustment for multiple comparisons. Although the sample size is large with a very high sampling fraction, a p-value of less than 0.01 is considered significant.

RESULTS

Failure rates for various parameters are contained in Table 2. The overall failure rate was 65 per cent. Free chlorine/bromine, which is a measure of the disinfection power in the pool and is proportional to the killing rate of pathogenic organisms[2], was the parameter with the highest failure rate.

Pool category results are contained in Table 3. For data analysis purposes municipal pools included municipal spa pools, because there were only nine, while business pools do not include spa pools. Business spa pools had the highest failure rate while municipal pools had the lowest failure rate.

The overall failure rate for all outdoor pools was 63 per cent, and for all indoor pools 71 per cent. No significant difference was found between total indoor and total outdoor pools (x^2_1=6.30, p>0.01). Significant differences were found between outdoor (x^2_2 =23.70, p<0.01) but not indoor pool categories (x^2_2=4.79, p>0.01).

About 74 per cent of pools were continuously dosed. Based on disinfectant levels alone, continuously dosed pools revealed a failure rate of 37 per cent and hand-dosed pools had a failure rate of 58 per cent (x^2_1=47.48, p<0.01).

Outdoor stabilised pools, containing cyanurate, had a higher free chlorine failure rate of 52 per cent than outdoor unstabilised pools which had a 43 per cent failure rate (x^2_1=11.26, p<0.01).

Log books were reported at about half the pools. Where log books were kept a lower free chlorine/bromine failure rate

of 34 per cent was found compared with 54 per cent failure rate where a log book was not kept (x^2_1=43.10, p<0.01).

The failure rate in premises which were "regularly inspected" by an authority was 28 per cent, compared with 39 per cent in premises "infrequently inspected" and 53 per cent in premises "not inspected" (x^2_2=55.26, p<0.01).

Discussion

The three main categories of public pools and spas were chosen to reflect the perceived level of understanding of pool operation by pool supervisors. Municipal pool supervisors receive training through a technical college course supplemented by a form of apprenticeship. Municipal pools therefore should have the lowest failure rate. Business pool and spa supervisors have little formal training, if any, in pool operation and chemistry.

The general trend was that lower failure rates were found in municipal pools. Other pool categories were far worse. The highest failure rates were due to a lack of disinfection agent. Lower failure rates were found when the following operational procedures were followed:

- pools used continuous disinfection rather than hand (slug) dosing;
- stabilising compounds were not used;
- log books were maintained; and
- regular inspections were carried out by an authority.

The high failure rates suggest the present approach based on self-regulation may need to be supplemented with other strategies such as the development of uniform education programs for presentation to non-municipal pool operators. There may also be a case for considering greater legislative control over pool disinfection.

The survey highlights the need for a corrective strategy to be developed. In particular, close attention should be paid to:

- educating pool operators, preferably at a local level;
- insisting on continuously and preferably automatically controlled dosing;
- insisting that log books be maintained by pool operators; and
- where staff resources allow, introduction of regular inspections.

Follow-up action

A training package has been developed and presented to PHU EHOs. Many PHUs have presented the training package to local authorities and some have run training seminars for public pool operators. Simultaneously, the departmental pool guidelines are being reviewed to dovetail with suggested amendments to the Public Health Regulation, 1991.

Copies of the detailed report are available from the author, Western Sector Public Health Unit, 13 New St, North Parramatta, NSW, 2151, (02) 840 3795, fax (02) 840 3817.

Acknowledgments

The data collection and inspections for this study were completed with the co-operation of all 14 NSW Health Department PHUs. The support of the PHU Directors, Senior Environmental Health Officers and Environmental Health Officers is gratefully acknowledged.

The contributions of the following staff from the Western Sector PHU are greatly appreciated: Tien Chey (biostatistician) and Wayne Smith (epidemiologist) for statistical guidance and support; Marea Mears (data entry operator) for accurate data entry; and Bin Jalaludin (Deputy Medical Officer of Health) and Louisa Jorm (epidemiologist) for reviewing the draft paper and making constructive suggestions.

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THE NSW REFUGEE SCREENING PROGRAM

Mitchell Smith, Medical Officer
Greg Stewart, Director
SWS Public Health Unit
Sheila Simpson, Clinical Nurse Consultant
Liverpool Chest Clinic

This report describes the activities and results of the Refugee Screening Program in the first 12 months of operation since its reorganisation and relocation to Liverpool.

Health screening of newly arrived South East Asian refugees migrating to NSW began in 1977 and was extended to include refugees from Central and South America in 1984. An evaluation of this service in 1985 led to some changes in the way screening, then based at Lidcombe Hospital, was conducted – for example, routine anti-malarial therapy was discontinued[1]. A further Health Department review in 1991 supported many of the original recommendations that had not been implemented and made several new ones[2]. As a result, the program was relocated to Liverpool Chest Clinic in April 1993. Various changes to the protocol have been made and a database has been set up to record results of screening.

SCREENING PROTOCOL

The current screening protocol consists of:

- brief medical history and physical examination (both focusing on communicable diseases);
- tuberculin test (unless prior tuberculosis or under three months old);
- chest x-ray (15 years and over[3]);
- venepuncture for syphilis and hepatitis B (15 years and over); and
- immunisation as required (as per National Health and Medical Research Council guidelines).

Certain migrants, such as those with a history of tuberculosis (TB), have signed a conditional entry permit called a health undertaking (known as a TBU). People on TBUs undergo x-ray at a later time at their nearest Chest Clinic, when pre-migration films are available for comparison.

Tuberculin tests are read after 72 hours at the nearest Chest Clinic. Results are explained and information about the health care system and available services is provided. A NSW Personal Health Record is given to children aged under five years, while others receive a card listing test results and vaccinations given.

FIGURE 1

TUBERCULIN POSITIVITY OF REFUGEES BY AGE

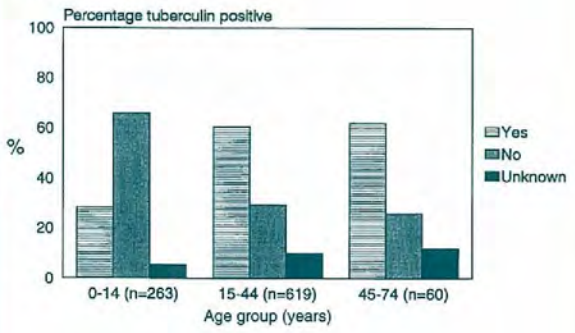

TABLE 4

REASONS FOR REFUGEES SIGNING HEALTH UNDERTAKINGS

TBU reason	No.	%
TB in past	30	(32)
Contact of TB	19	(20)
Abnormal CXR •	25	(26)
Poor quality CXR •	3	(3)
Unknown	18	(19)
Total	95	(100)

• = chest x-ray

METHODS

Since April 1993 routine data collection, recorded using Epi Info, has provided a reference source about individuals and a means of measuring disease detection rates[2,4]. For each person screened, demographic details, test results and vaccines given are recorded. Clinical diagnoses for those referred for abnormal chest x-rays or positive syphilis serology are sought from the appropriate clinic. Data about diseases with less public health significance (e.g. scabies, otitis) are not collated.

Tuberculin positivity was defined as induration of 10mm or greater for children under 15 years, regardless of BCG status; for those 15 years and over, 10mm or greater if no BCG scar, and 15mm or greater for those with a BCG scar[3].

RESULTS

Attendance

In the 12-month period from April 1993, 1,006 people were eligible for screening, of whom 989 (98.3 per cent) attended screening. Three of the 17 refugees who did not attend had signed a TBU pre-migration. Of the 922 people who had tuberculin tests, 839 (91 per cent) had a result recorded.

Demographic details

Ninety-five per cent of refugees screened in this period were Vietnamese, the majority of whom came from camps in Indonesia or the Philippines. The remainder of refugees seen originated from Cambodia, Somalia and El Salvador.

More than 85 per cent of those seen were under 40 years of age. The male:female ratio was 1.1.

Disease detection

i) Tuberculosis

Ninety-five people seen (almost 10 per cent) had signed health undertakings before embarkation. Reasons for these are shown in Table 4. Chest x-ray abnormalities, most of which were detected by the Commonwealth's Migrant Medical Clearances Unit, were generally minor in nature. Information about 18 TBUs was unavailable at the time of screening.

Screening chest x-rays are taken using small (100mm size) films. There were 639 such x-rays taken; 23 (4 per cent) were reported as abnormal. Follow-up of these abnormalities revealed that nine of them (39 per cent) were false positives, the large film being normal. Two abnormalities were non-tuberculous (a bony mass and a vascular abnormality), and the remainder were being

TABLE 5

CLINICAL DIAGNOSES FOR REFUGEES WITH POSITIVE TPHA

Syphilis	No.	%
Inactive	11	(26)
Latent	19	(45)
Partly treated	7	(17)
False positive	2	(5)
Unknown	3	(7)
Total	42	(100)

monitored with Chest Clinic follow-up. No cases of active pulmonary tuberculosis were found among those x-rayed. Outcomes for five people with an abnormal small film were unknown.

Overall, 93 per cent of refugees screened had a tuberculin test. Results are shown in Figure 1. Missing data (9 per cent of tests done) reflect either failures to return for readings, or results not forwarded from other Chest Clinics.

Of 15 tuberculin-positive children (0-14 years) for whom follow-up is known, preventive therapy was judged necessary for only one child.

ii) Syphilis

Forty-two people aged 15 years and over (5.9 per cent) had a reactive Treponema Pallidum Haemagglutination (TPHA) test. The prevalence was higher in males (8.1 per cent) than in females (3.3 per cent).

In contrast, the Reactive Plasma Reagin (RPR) test is used for overseas screening of intending refugee migrants. Only 8 of the above 42 people (20 per cent) had a positive RPR test overseas.

The 42 people with a reactive TPHA test were followed up at Sexual Health Clinics (Table 5). Twenty-six of these (62 per cent) received daily penicillin for 15 days as treatment for presumptive late latent syphilis. Seven of these cases had been detected and treated in the camps overseas, where a weekly regime of penicillin therapy is used. These individuals were treated again to ensure adequate clearance of infection.

iii) Hepatitis B

Routine testing for hepatitis B began in January 1994. For those seen during the four months from January to April 1994 (n=184), the overall prevalence of surface antigen carriage was 15 per cent. Half the carriers were e antigen positive, indicating greater infectivity.

Carriers ranged in age from 15 to 46 years, and 20 of 27 (74 per cent) were male. The stored sera from family members of carriers are tested for hepatitis B surface antibodies. There were 23 such contacts aged 15 years and over, of whom 10 (43 per cent) were non-immune to hepatitis B.

iv) Immunisation status

Vaccination records were available for 83 per cent of refugees seen. Immunisation status of children with records is shown in Table 6.

Hepatitis B vaccination status was not included when measuring completeness of immunisations. However, it was found that 57 of the 79 under-fives (72 per cent) with documentation had received hepatitis B vaccine. In contrast, only 24 of 141 children aged 5-14 years (17 per cent) had received this.

There were 296 women of child-bearing age (15-40 years). Rubella vaccine was required by 131 of these (44 per cent).

v) Leprosy

No confirmed cases were detected.

TABLE 6

IMMUNISATION STATUS OF REFUGEE CHILDREN

	Fully immunised for age			
Age group	Yes (%)	No. (%)	Unk* (%)	Total (%)
0-4	66 (84)	12 (15)	1 (1)	79 (100)
5-14	109 (77)	26 (18)	6 (4)	141 (100)
Total	175 (79)	38 (17)	7 (3)	220 (100)

* missing data

TABLE 7

SUMMARY OF DISEASES DETECTED

Disease	No. tested	No. positive	%
Active pulmonary TB	639	0	(0)
Tuberculin positivity	922	477	(51.7)
Preventive TB therapy in child <15 years	253	1	(0.4)
Latent syphilis	715	26	(3.6)
Hepatitis B carriage	184	27	(14.7)

DISCUSSION

The attendance rate for screening was very high during these 12 months, despite initial concerns that the program's move to Liverpool may affect this. In addition, more than 90 per cent of those given a tuberculin test had their result read; this was a reasonable follow-up rate.

There is often a delay of 6-12 months from the pre-migration chest x-ray until the refugee's departure for Australia. Despite this, no new cases of active TB were detected here in screened refugees. In addition, a high false positive rate for miniature x-rays was seen. An evaluation should be made of routine chest x-ray use at the initial visit versus x-ray according to tuberculin test result (as occurs at the six-month refugee follow-up).

Overall tuberculin positivity was just over 50 per cent, and tended to increase with age. Children with a positive tuberculin test are generally recalled for assessment by a physician. Available data show that most were not given preventive therapy, as has been found in other settings[5,6].

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INFECTIOUS DISEASES

MEASLES EPIDEMIC, SOUTH COAST NSW

Greg Sam and Paul Van Buynder
South East NSW Public Health Unit
Shanti Raman
National Centre for Epidemiology and Population Health
John Skinner
North Sydney Public Health Unit

Between August 20 and November 8, 1994, 214 measles notifications were received by the South Eastern Public Health Unit from the South Coast District of NSW. The epidemic was centred in the Bega Valley area, with 43 per cent of known cases occurring in students at Bega High School. The outbreak peaked during the week beginning September 25, which was the first week of the Term 3 school holidays (Figure 2).

Measles cases were defined as people having an illness characterised by:

- a generalised maculopapular rash resembling measles
- a high fever (>38C)
- one or more of the following: cough, coryza, conjunctivitis or Koplik spots.

Case notifications

On September 22, two days before the end of the school term, a South Coast general practitioner notified the South Eastern NSW PHU of two cases of clinically diagnosed measles in Bega High School students. Follow-up with the school identified a high level of measles-related absenteeism in the preceding two weeks.

Potential sources for further case identification were contacted throughout the area, including hospitals, GPs, schools, and preschool and child care centres. The need for prompt notification of cases was stressed.

A high attack rate among high school-aged children was identified and questionnaires were distributed to the two local high schools to ascertain the degree of under-reporting of cases.

Serological confirmation was obtained from 35 cases.

Immunisation campaign

The need for measles vaccination for all unimmunised children as well as a recommendation for a booster dose for children aged 10-17 years who had been previously vaccinated was highlighted in school letters and through the local media.

NSW refugee screening

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Improved data collection on the proportion of tuberculin-positive children screened who receive preventive therapy is recommended.

The RPR screening test for syphilis used pre-migration has been shown here to miss 80 per cent of refugees with evidence of past treponemal disease, as previously reported[2]. The TPHA test is more sensitive in this situation as it usually remains reactive lifelong. Some positive TPHA results among refugees may be due to other treponemal diseases such as yaws or pinta, which are indistinguishable from syphilis on serological grounds. However, those who do have latent syphilis are at risk of progression to tertiary disease. The detection of these cases, with assessment for therapy, is therefore important in personal and public health terms.

Hepatitis B tests are not performed pre-migration. Because serum is collected for syphilis testing from those 15 years and older, it was decided to limit hepatitis B tests to the same age group. The prevalence of the carrier state is, as expected, high. Testing allows appropriate advice to be given to carriers and their families; further serological testing of adult contacts determines their need for vaccination. Catch-up immunisation against hepatitis B is offered to all children under 15 years old not previously vaccinated. This is done without prior serological testing, based on cost calculations and the known safety of the vaccine[7].

Immunisation status is well documented for arriving refugees, and coverage for children is high. The screening visit is an excellent opportunity for catch-up vaccination in adults and children. For example, HIB vaccine is not given in the camps, and most adults have never received Sabin.

The current screening program is routinely offered to refugees from South East Asia and Central and South America only. While small numbers from other areas are starting to be seen, routine screening of refugees from Africa, Eastern Europe and the Middle East should be introduced, based on known rates of tuberculosis in the country of origin[2].

In summary, most of the major recommendations of the 1991 review of refugee screening[2] have been implemented, including relocation to a Chest Clinic, increased emphasis on diseases of public health significance, introduction of hepatitis B testing and upgraded data collection. In addition, the program has been streamlined: those with personal health problems are referred to general practitioners as much as possible; there is rapid feedback of results; and routine treatment for intestinal parasites is no longer given, as nearly all South East Asian refugees have received treatment with pyrantel just before their departure for Australia.

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Community Health immunisation clinics were made available after hours and on weekends during the peak of the epidemic. The clinics were well attended and more than 1,200 children were vaccinated over a four-week period. GPs reported large attendances for measles vaccination.

To date, only two notifications of adverse reactions to MMR vaccine have been notified. Both cases were reported as persistent screaming and high fever, and recovered without hospitalisation.

Epidemic demography

During the outbreak, cases were reported from almost all population centres in the South Coast District (Table 8). The epidemic began in, and was initially confined to, the Bega Valley area, but as time progressed cases were reported further north in the Eurobodalla shire. Overall, 76 per cent (n=163) of cases were reported from the Bega Valley area, and 18 per cent (n=39) from Eurobodalla. Secondary cases were subsequently reported in the Monaro and Southern Tablelands Districts.

For the six weeks from the onset of the outbreak, cases occurred mainly in high school-aged children. As the epidemic progressed, the proportion of cases in primary school-aged children increased. The age and sex distribution is shown in Figure 3. There were similar proportions of males and females in each age group.

TABLE 8

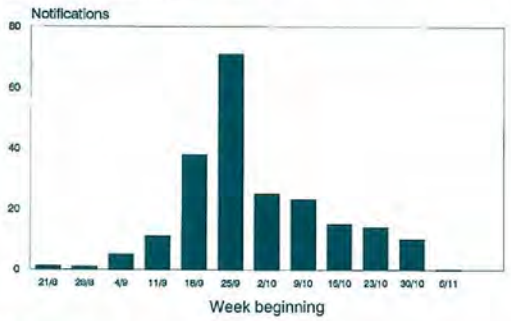
GEOGRAPHIC DISTRIBUTION OF MEASLES CASES NOTIFIED TO THE SOUTH EASTERN PHU, AUGUST 20-NOVEMBER 8, 1994

Residential area	Number	Percentage
Bega	123	57.5
Batemans Bay/ Moruya/Narooma	36	16.8
Eden	22	10.3
Pambula/Merimbula	18	8.4
Queanbeyan*	6	2.8
Bodalla	3	1.4
Crookwell*	3	1.4
Cooma*	2	0.9
Yass*	1	0.5
TOTAL	214	100.0

* not in South Coast District

FIGURE 2

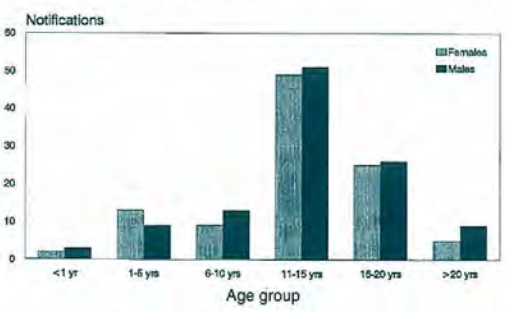
MEASLES NOTIFICATIONS BY WEEK OF ONSET OF ILLNESS AUGUST 20-NOVEMBER 8, 1994



Source: South Eastern Public Health Unit

FIGURE 3

MEASLES NOTIFICATIONS BY AGE GROUP AND SEX AUGUST 20-NOVEMBER 8, 1994



Source: South Eastern Public Health Unit

Hospitalisations

During the epidemic there were 29 hospital admissions. The main reasons for hospital admission were pneumonia/respiratory infection and dehydration. There have been no deaths to date.

Immunisation status of cases

Reporting of the immunisation status of cases during the outbreak was based on parental recall, with 22 per cent of high school-aged children reported as immunised, 36 per cent reported as not immunised and 42 per cent unknown. The large proportion of cases reported as "immunisation status unknown" reflects the inadequacy of parental recall as a measure of immunisation status of children[1]. Data based on questionnaires distributed to high school students will be reported in a follow-up report.

Discussion

The characteristics of this epidemic are similar to other recently described measles outbreaks[2,3] with the highest attack rate occurring in high school students in the Bega Valley area. In the absence of reliable data on the immunisation status of high school students at the time of reporting, the role of vaccine efficacy in determining susceptibility to contracting measles cannot be examined in this report.

Under-reporting was found to occur at all stages of the epidemic despite continued active surveillance. Many GPs were unaware of the requirement to notify measles immediately and some were not aware of the requirement to notify. The importance of prompt notifications for the success of school exclusion policies was also poorly understood. Of eight cases diagnosed in an emergency department, none was notified by the hospital. The delay in notification of early cases until the onset of the school holiday period also made control measures more difficult.

The rapid deployment of immunisation clinics during the early phase of the epidemic by Community Health staff

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TABLE 9

SURVEILLANCE OF NON-NOTIFIABLE SEXUALLY TRANSMITTED DISEASES JANUARY-NOVEMBER 1994
(Diagnoses from sexual health centres unless otherwise stated in footnote)

* First diagnosis
1. 01/01/94-30/04/94
2. 01/01/94-31/01/94
3. 01/01/94-31/10/94
4. 01/01/94-31/03/94
5. 01/01/94-31/09/94
6. 01/01/94-31/06/94
7. 01/01/94-31/08/94
8. No SHC in Region
9. Laboratory and SHC data 01/01/94-31/08/94
10. No data yet received for 1994

AHS[1] Infection		CSA[1]	SSA[2]	ESA[3]	SWS[4]	WSA[4] + WEN	NSA[3]	CCA[3]	ILL[5]	HUN[6]	NC[7]	ND[3]	WNS[5]	CW[8]	SW[9]	SE[10]	Total
Chlamydia trachomatis	Male	1	–	90	2	6	2	1	5	8	–	5	7	–	3	–	130
	Female	1	–	63	5	7	1	3	4	14	1	18	23	–	8	–	148
	Total	**2**	**–**	**153**	**7**	**13**	**3**	**4**	**9**	**22**	**1**	**23**	**30**	**–**	**11**	**–**	**278**
Donovanosis	Male	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Female	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Total	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
*Genital herpes	Male	3	1	299	3	12	10	12	–	15	7	3	1	–	5	–	371
	Female	4	3	186	5	9	9	12	13	15	9	14	6	–	7	–	292
	Total	**7**	**4**	**485**	**8**	**21**	**19**	**24**	**13**	**30**	**16**	**17**	**7**	**–**	**12**	**–**	**663**
*Genital warts	Male	11	6	778	69	74	25	40	75	75	33	8	6	–	8	–	1,208
	Female	8	6	317	32	37	22	23	28	30	11	27	19	–	10	–	570
	Total	**19**	**12**	**1,095**	**101**	**111**	**47**	**63**	**103**	**105**	**44**	**35**	**25**	**–**	**18**	**–**	**1,778**
Nongonococcal urethritis	Male	3	1	584	23	55	17	34	25	43	13	10	7	–	4	–	819
	Female	–	–	–	–	3	3	–	–	–	–	–	2	–	2	–	10
	Total	**3**	**1**	**584**	**23**	**58**	**20**	**34**	**25**	**43**	**13**	**10**	**9**	**–**	**6**	**–**	**829**
Lymphogranuloma venereum	Male	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Female	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Total	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**

† Data from Public Health Unit area of the clinic not the patient.

Infectious diseases

► *Continued from page 137*

enabled large numbers of children throughout a large area to be vaccinated in a relatively short period.

Further clusters of cases continue to occur on the South Coast and a full report will follow.

1. Goldstein KP, Kviz FJ, Daum RS. Accuracy of immunization histories provided by adults accompanying preschool children to a pediatric emergency department. *JAMA* 1993; 270(18):2190-4.
2. Merianos A, Miller NC, Patel M. Control of a community outbreak of measles which started in a poorly immunised high school population. *Aust J Public Health* 1993; 17:231-236.
3. Cheah D, Lane JM, Passaris I. Measles vaccine efficacy study in a Canberra high school: a study following a measles outbreak. *J Paed Child Health* 1993; 29:455-458.

EDITORIAL COMMENT

In recent years, measles outbreaks have occurred in discrete geographic areas in NSW. The outbreak reported above is an example, and outbreaks have also occurred recently in the Lower and Mid North Coast and Clarence Districts. In 1993, measles outbreaks occurred in the Western Sydney, South Western Sydney and Wentworth Areas. The majority of cases in the outbreaks were in the 10-16 year age group. Immunisation is the only proven control method, and measles immunisation is recommended at the age of 12 months. Surveys by Public Health Units indicate that immunisation rates are in the range 75-85 per cent (short of the 95 per cent required to prevent outbreaks). The NHMRC has recently recommended that rubella immunisation (which previously targeted adolescent girls) should be extended, and that both girls and boys should receive measles-mumps-rubella vaccine in Year 7. Implementation of this has begun in NSW. Parents are encouraged to ensure that children are adequately immunised.

HYDATID DISEASE

John Walker
Department of Parasitology
Centre for Infectious Diseases and Microbiology
Westmead Hospital

Human hydatid disease results from infection with the larval stages of tapeworms of the genus *Echinococcus*. In Australia the species involved is *E. granulosus*, which has a cycle of development usually involving dogs and sheep. The adult worms occur in dogs and the larval stages, hydatid cysts, are found in herbivores which become infected by eating eggs passed in dog faeces. Human infection occurs in the same manner, by the ingestion of eggs, not by eating raw meat or offal containing cysts. In humans the most common sites for development of hydatid cysts are the liver and lungs, but cysts may be found in virtually any organ. Factors such as the site of cysts, their size and number and whether they leak or rupture, determine if infected individuals become symptomatic. Surgery generally is the only reliable method of treatment of hydatid disease but this may not be possible when cysts occur in inaccessible sites. Obviously, prevention of infection is preferable to surgery, especially as there is a significant rate of recurrence of the disease.

Because hydatid disease is a zoonosis usually involving dogs and sheep in Australia, most cases occur in people resident in country regions, especially the relatively cool and moist highlands of south-eastern Australia. This infection was previously highly prevalent in Tasmania, with rates of around 27/100,00, but a control campaign begun in the 1960s has virtually eliminated the parasite from that State. Attempts to mount similar campaigns in mainland States have never been successful and rates of infection as high as 32/100,000 have been reported in some regions, particularly in the Southern Highlands of NSW.

Experience in New Zealand, Tasmania and many other parts of the world has shown that hydatid disease can be controlled with public health measures. A symposium on hydatid disease, its clinical management, epidemiology and

TABLE 10

INFECTIOUS DISEASE NOTIFICATIONS FOR 1994 BY SELECTED MONTH OF ONSET FOR NOTIFICATIONS RECEIVED BY NOVEMBER 30, 1994

Condition	Aug	Sep	Oct	Nov	Total
Adverse event after immunisation	3	2	–	–	5
AIDS	32	26	13	3	74
Arboviral infection	4	4	6	5	19
Brucellosis	2	1	–	–	3
Foodborne illness (NOS)	5	7	5	1	18
Gastroenteritis (instit.)	38	9	11	3	61
Gonorrhoea	27	19	14	4	64
H influenzae epiglottitis	–	2	1	–	3
H influenzae meningitis	2	1	1	1	5
H influenzae septicaemia	1	1	–	–	2
H influenzae infection (NOS)	–	–	1	–	1
Hepatitis A – acute viral	43	31	29	21	124
Hepatitis B – acute viral	10	2	4	–	16
Hepatitis B – chronic/carrier	49	20	12	4	85
Hepatitis B – unspecified	346	348	381	128	1,203
Hepatitis C – acute viral	6	2	–	–	8
Hepatitis C – unspecified	872	740	570	197	2,379
Hepatitis D – unspecified	–	1	1	–	2
Hepatitis, acute viral (NOS)	1	1	–	–	2
HIV infection	35	30	28	21	114
Hydatid disease	2	–	3	–	5
Legionnaires' disease	4	3	1	–	8
Leprosy	1	–	–	–	1
Leptospirosis	2	–	–	–	2
Listeriosis	1	1	1	–	3
Malaria	17	10	8	4	39
Measles	40	209	264	223	736
Meningococcal meningitis	18	4	11	3	36
Meningococcal septicaemia	7	4	5	1	17
Meningococcal infection (NOS)	2	3	4	2	11
Mumps	1	2	4	–	7
Mycobacterial atypical	25	23	7	2	57
Mycobacterial tuberculosis	23	27	13	4	67
Mycobacterial infection (NOS)	8	21	15	5	49
Pertussis	124	115	97	27	363
Q fever	14	15	13	1	43
Rubella	5	6	3	1	15
Salmonella (NOS)	39	45	70	25	179
Salmonella bovis morbificans	1	1	–	–	2
Salmonella typhimurium	22	6	–	–	28
Syphilis	108	76	46	12	242
Tetanus	–	–	1	–	1
Typhoid and paratyphoid	3	3	–	–	6
Total	1,943	1,821	1,643	698	6,105

TABLE 11

SUMMARY OF NSW INFECTIOUS DISEASE NOTIFICATIONS NOVEMBER 1994

Condition	Number of cases notified			
	Period		Cumulative	
	Nov 1993	Nov 1994	Nov 1993	Nov 1994
Adverse reaction	–	–	23	29
AIDS	23	3	338	323
Arboviral infection	16	5	643	367
Brucellosis	–	–	4	3
Cholera	–	–	–	–
Diphtheria	–	–	–	–
Foodborne illness (NOS)	13	1	120	149
Gastroenteritis (instit.)	73	3	406	220
Gonorrhoea	32	4	329	275
H influenzae epiglottitis	–	–	31	21
H influenzae B – meningitis	1	1	53	15
H influenzae B – septicaemia	–	–	23	11
H influenzae infection (NOS)	–	–	14	9
Hepatitis A	42	21	559	453
Hepatitis B	433	132	3,762	3,851
Hepatitis C	790	197	6,051	7,483
Hepatitis D	–	–	11	15
Hepatitis, acute viral (NOS)	–	–	6	6
HIV infection	41	21	513	399
Hydatid disease	3	–	4	15
Legionnaires' disease	9	–	65	55
Leprosy	–	–	3	3
Leptospirosis	1	–	15	12
Listeriosis	1	–	12	7
Malaria	7	4	158	167
Measles	588	223	2,070	1,088
Meningococcal meningitis	12	3	90	72
Meningococcal septicaemia	5	1	39	35
Meningococcal infection (NOS)	–	2	11	19
Mumps	3	–	9	10
Mycobacterial tuberculosis	32	4	382	287
Mycobacterial – atypical	47	2	382	357
Mycobacterial infection (NOS)	8	5	47	93
Pertussis	315	27	1,304	1,216
Plague	–	–	–	–
Poliomyelitis	–	–	–	–
Q fever	38	1	376	212
Rubella	129	1	782	72
Salmonella infection (NOS)	101	25	880	914
Syphilis	94	12	707	865
Tetanus	–	–	5	3
Typhoid and paratyphoid	1	–	25	25
Typhus	–	–	–	–
Viral haemorrhagic fevers	–	–	–	–
Yellow fever	–	–	–	–

control will be held at Westmead Hospital, Sydney, on Friday, March 3, 1995. For more information, phone (02) 633 7191 or fax (02)893 8659.

SYPHILIS

In the October 1994 edition of the *NSW Public Health Bulletin* it was noted that the notification rate for syphilis was higher this year than last year. The notification rate for the period to the end of November was 11.2 in 1993 and 14.0 in 1994. Consultations with staff from Public Health Units, sexual health clinics and laboratories confirm the increase is probably the result of improved surveillance. There has been no increase in reported cases of newly acquired syphilis.

PERTUSSIS ON THE NORTH COAST

North Coast PHU reports larger than average numbers of pertussis in the Casino area in recent months. The notification rate for the North Coast in 1994 is 56.8/100,000 compared to 19.6/100,000 for NSW. Eight-six per cent of cases in the Casino area occurred in people aged more than five years, most of whom were fully immunised.

Pertussis-related mortality and morbidity is greatest in infants, while in adults symptoms can be limited to a persistent cough.

An accelerated immunisation program has been advised for infants in the Casino area while the outbreak continues. A study is planned to examine the transmission of pertussis in families during the outbreak.

In 1994 the National Health and Medical Research Council has recommended that a pertussis vaccine booster be added to the combined diphtheria and tetanus toxoid (CDT) vaccine given as a preschool booster. The resulting boosted immunity in primary and secondary school age children should result in a decrease in cases in these age groups in future.

TABLE 12

INFECTIOUS DISEASE NOTIFICATIONS FOR 1994
BY PUBLIC HEALTH UNIT, RECEIVED BY NOVEMBER 30, 1994

Condition	CSA	SSA	ESA	SWS	WSA	WEN	NSA	CCA	ILL	HUN	NC	ND	WNS	CW	SW	SE	U/K	Total
Adverse event after immunisation	–	2	2	2	6	4	–	1	–	–	2	1	–	–	2	7	–	29
AIDS	55	18	99	15	37	16	23	6	12	15	19	6	–	1	1	–	–	323
Arboviral infection	–	3	3	–	–	–	11	4	6	45	195	58	26	4	10	2	–	367
Brucellosis	–	1	–	–	1	–	–	–	–	–	–	1	–	–	–	–	–	3
Foodborne illness (NOS)	3	12	10	31	15	8	5	14	1	9	23	2	3	7	2	4	–	149
Gastroenteritis (instit)	70	14	–	10	41	27	1	1	–	13	10	–	–	30	1	2	–	220
Gonorrhoea	34	16	98	8	13	1	13	4	10	10	8	20	25	5	6	4	–	275
H. influenzae epiglottitis	2	3	1	2	1	3	2	3	2	–	2	–	–	–	–	–	–	21
H. influenzae meningitis	1	–	–	4	2	–	2	–	1	–	2	–	1	2	–	–	–	15
H. influenzae septicaemia	–	–	–	1	1	1	2	1	–	1	2	–	1	–	–	1	–	11
H. influenzae infection (NOS)	–	–	–	–	1	–	1	3	1	–	1	–	–	–	2	–	–	9
Hepatitis A – acute viral	25	21	45	42	25	6	30	3	7	23	46	50	5	33	89	3	–	453
Hepatitis B – acute viral	4	2	27	4	3	–	–	–	2	4	8	2	6	1	3	3	–	69
Hepatitis B – chronic/carrier	–	–	240	1	103	7	14	19	–	26	33	10	6	10	–	3	–	472
Hepatitis B – unspecified	450	417	83	1,096	508	36	429	26	99	58	36	13	10	7	29	13	–	3,310
Hepatitis C – acute viral	1	–	–	1	–	–	1	–	–	–	1	–	6	–	1	4	–	15
Hepatitis C – unspecified	873	437	1,185	802	724	163	661	252	395	460	831	150	45	120	166	204	–	7,468
Hepatitis D – unspecified	3	2	2	–	1	1	1	–	–	–	5	–	–	–	–	–	–	15
Hepatitis E – acute viral	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Hepatitis, acute viral (NOS)	–	–	3	–	–	–	–	–	–	1	–	–	–	–	1	–	–	5
HIV infection	57	20	141	19	16	5	24	4	3	7	6	–	–	1	2	1	93	399
Hydatid disease	1	3	2	–	–	–	–	–	2	1	–	1	1	1	1	2	–	15
Legionnaires' disease	3	3	2	7	11	2	13	–	3	8	–	–	–	2	1	–	–	55
Leprosy	–	–	–	3	–	–	–	–	–	–	–	–	–	–	–	–	–	3
Leptospirosis	1	–	–	–	–	–	–	–	–	3	5	2	–	–	1	–	–	12
Listeriosis	–	–	2	–	1	–	–	–	1	1	–	1	1	–	–	–	–	7
Malaria	17	10	16	11	11	4	43	4	6	8	12	8	–	3	6	–	–	167
Measles	34	19	14	35	40	37	31	13	49	62	239	156	31	50	5	273	–	1,088
Meningococcal meningitis	5	8	2	9	5	2	4	3	11	6	6	1	3	4	1	2	–	72
Meningococcal septicaemia	2	4	1	7	3	–	4	1	1	8	2	–	1	1	–	–	–	35
Meningococcal infection (NOS)	–	1	2	2	2	–	–	–	–	–	–	4	2	1	5	–	–	19
Mumps	–	–	1	1	–	–	3	–	1	2	1	–	–	–	1	–	–	10
Mycobacterial atypical	52	21	85	53	13	17	44	8	3	42	12	3	–	1	2	1	–	357
Mycobacterial tuberculosis	38	43	30	44	36	6	33	2	17	14	6	5	3	2	5	3	–	287
Mycobacterial infection (NOS)	11	2	3	8	10	1	37	5	–	5	4	3	2	–	2	–	–	93
Other venereal	–	–	–	–	–	–	–	–	–	–	–	–	4	–	1	–	–	5
Pertussis	25	79	58	99	115	39	69	24	71	60	463	34	24	18	9	29	–	1,216
Q fever	2	2	–	1	1	1	–	1	–	24	27	72	55	18	7	1	–	212
Rubella	13	3	14	–	9	2	5	1	–	–	6	6	10	–	3	–	–	72
Salmonella (NOS)	27	41	33	49	51	26	65	23	16	44	72	63	25	11	29	13	–	588
Salmonella bovis morbificans	–	2	1	1	1	3	2	–	1	2	–	–	–	–	–	–	–	13
Salmonella typhimurium	23	25	21	11	51	14	36	17	20	23	14	12	9	10	25	2	–	313
Syphilis	126	50	206	135	54	7	55	12	16	9	31	36	103	13	9	3	–	865
Tetanus	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	2	–	3
Typhoid and paratyphoid	5	2	3	3	3	1	1	–	–	–	2	3	–	–	–	2	–	25

TABLE 13

SELECTED INFECTIOUS DISEASE NOTIFICATIONS FOR 1994
BY PUBLIC HEALTH UNIT, RECEIVED BY NOVEMBER 30, 1994

Condition	CSA	SSA	ESA	SWS	WSA	WEN	NSA	CCA	ILL	HUN	NC	ND	WNS	CW	SW	SE	U/K	Total
Adverse event after immunisation	–	2	2	2	6	4	–	1	–	–	2	1	–	–	2	7	–	29
H. influenzae epiglottitis	2	3	1	2	1	3	2	3	2	–	2	–	–	–	–	–	–	21
H. influenzae infection (NOS)	–	–	–	–	1	–	1	3	1	–	1	–	–	–	2	–	–	9
H. influenzae meningitis	1	–	–	4	2	–	2	–	1	–	2	–	1	2	–	–	–	15
H. influenzae septicaemia	–	–	–	1	1	1	2	1	–	1	2	–	1	–	–	1	–	11
Measles	34	19	14	35	40	37	31	13	49	62	239	156	31	50	5	273	–	1,088
Mumps	–	–	1	1	–	–	3	–	1	2	1	–	–	–	1	–	–	10
Pertussis	25	79	58	99	115	39	69	24	71	60	463	34	24	18	9	29	–	1,216
Rubella	13	3	14	–	9	2	5	1	–	–	6	6	10	–	3	–	–	72
Tetanus	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	2	–	3

TABLE 14

FOODBORNE INFECTIOUS DISEASE NOTIFICATIONS FOR 1994
BY PUBLIC HEALTH UNIT, RECEIVED BY NOVEMBER 30, 1994

Condition	CSA	SSA	ESA	SWS	WSA	WEN	NSA	CCA	ILL	HUN	NC	ND	WNS	CW	SW	SE	U/K	Total
Foodborne illness (NOS)	3	12	10	31	15	8	5	14	1	9	23	2	3	7	2	4	–	149
Gastroenteritis (instit.)	70	14	–	10	41	27	1	1	–	13	10	–	–	30	1	2	–	220
Hepatitis A – acute viral	25	21	45	42	25	6	30	3	7	23	46	50	5	33	89	3	–	453
Listeriosis	–	–	2	–	1	–	–	–	1	1	–	1	1	–	–	–	–	7
Salmonella (NOS)	27	41	33	49	51	26	65	23	16	44	72	63	25	11	29	13	–	588
Salmonella bovis morbificans	–	2	1	1	1	3	2	–	1	2	–	–	–	–	–	–	–	13
Salmonella typhimurium	23	25	21	11	51	14	36	17	20	23	14	12	9	10	25	2	–	313
Typhoid and paratyphoid	5	2	3	3	3	1	1	–	–	–	2	3	–	–	–	2	–	25