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INVESTIGATION OF SUSPECTED COPPER INTOXICATION IN CHILDREN FROM DRINKING WATER

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BACKGROUND

In September 1993 the supervisor of a tennis club in South Western Sydney reported to the Public Health Unit (PHU) that 15 children became ill at a school holiday tennis clinic after consuming water drawn from a distribution system that supplies potable water to a semi-rural township. In response to a suspected outbreak of a waterborne illness, Environmental Health Officers of the PHU and the local authority investigated the water supply at the tennis clinic and surrounding recreation reserve.

The findings of the investigation suggest that elevated levels of copper in the reticulated town water supply induced symptoms of copper intoxication in children who consumed the water. The consumption of water containing elevated levels of copper drawn from the water distribution system or suicide attempts involving copper sulfate have previously been causally associated with copper toxicity[1].

This report presents the results of an investigation of suspected copper intoxication in children following consumption of drinking water.

INVESTIGATION

Fifteen children became ill at the two-day tennis clinic in September 1993. Three children reported vomiting after consuming water directly from an external tap connected to the reticulated town water supply on the first day of the tennis clinic and 12 children reported vomiting after consuming cordial from a receptacle containing water drawn from the external tap the next day.

The vomiting occurred 15-20 minutes after the children consumed the water. No children visited a general practitioner or required admission to hospital and after the initial episode of vomiting they experienced no further ill health.

Food was ruled out as a possible source of infection as no common foods were consumed by children who reported illness on the first day and on the subsequent day children who reported illness after drinking the cordial mixture had not eaten.

Water samples were collected from the external tap and the receptacle containing cordial mixture for microbiological and chemical analysis by the NSW Health Department Division of Analytical Laboratories. Additional water samples were collected over two months for further microbial and chemical analysis from the implicated tap and other outlets in the surrounding recreation reserve to ascertain copper concentrations in the water supply over a wider area.

RESULTS

The microbiological analysis found water samples were in compliance with the National Health and Medical Research Council and Australian Water Resources Council (NHMRC/AWRC) Guidelines for Drinking Water Quality in Australia (1987).

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Suspected copper intoxication

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Chemical analysis of water samples collected from the external tap and cordial mixture disclosed the presence of elevated levels of copper. All other chemical properties of the water analysed, with the exception of iron, were in compliance with the NHMRC/AWRC Guidelines for Drinking Water Quality in Australia (1987). The iron concentration was found to be 0.66mg/L in the cordial mixture, which is slightly above the NHMRC/AWRC guideline value of 0.3mg/L. However iron levels below 3mg/L have not been shown to produce adverse health effects in humans[2].

TABLE 1

DRINKING WATER QUALITY
TENNIS CLUB EXTERNAL TAP AND CORDIAL MIXTURE

Characteristic	Tennis club external tap	Cordial mixture	NHMRC guideline value
Copper (Cu) mg/L	3.1	17	1
pH	7.1	3.5	6.5-8.5
Hardness ($CaCo_3$) mg/L	17	50	500

TABLE 2

DRINKING WATER QUALITY
TENNIS CLUB – EXTERNAL FAUCET

Days post index day	Copper (Cu) mg/L	pH	Total hardness ($CaCo_3$) mg/L
2 days	2.5	7.6	18
22 days	2.6	6.2	16
28 days	3.3	6.5	13

TABLE 3

DRINKING WATER QUALITY
OTHER LOCATIONS WITHIN RECREATION RESERVE

Source of water	Copper (Cu) mg/L	pH
Tennis club – kitchen tap	2.4	6.4
Tennis club – male WC tap	2.4	6.2
Soccer club – bar sink tap	3.0	6.3
Soccer club – external tap	0.9	6.3
Recreation oval – bubbler	1.8	6.3

Table 1 shows that copper levels in water from the external tap (3mg/L) and the cordial mixture (17mg/L) exceeded the value for copper as stated in the NHMRC/AWRC guidelines. The guideline value for copper in drinking water is 1mg/L[3]. This guideline is based on health and aesthetic considerations. In major Australian reticulated water supplies, total copper concentrations range up to 0.8mg/L, with typical concentrations of about 0.05mg/L reported[2]. The low pH of the cordial mixture was due to the acidic properties of cordial.

Total water hardness was significantly lower than the NHMRC/AWRC guideline value of 500 mg/L. Subsequent water sample results for total hardness and pH (Table 2) show that water collected from the external tap was soft and had a tendency to be acidic. Although pH and hardness are not health-related criteria for drinking water supplies in Australia[3], studies in the United States have demonstrated that soft and acidic waters enhance leaching of copper from the distribution system, resulting in elevated levels of copper in reticulated water supplies[4].

Table 2 shows that copper levels in water samples subsequently collected from the external tap were consistently above the NHMRC/AWRC guideline value for copper of 1mg/L.

Water samples collected from other locations in the reserve (Table 3), demonstrate that acidic pH values and elevated copper levels are prevalent in the reticulated town water supplying the reserve.

DISCUSSION

We suspect the vomiting by the children was the result of acute copper intoxication induced by the consumption of drinking water from the reticulated town water supply containing elevated levels of copper. Previous reports suggest the primary toxicological effect of consuming water containing elevated levels of copper in humans is gastrointestinal irritation, manifested by vomiting[1,3,5], often immediately after consumption[5].

The results of water samples collected on the second day of the tennis clinic disclosed copper levels of 17mg/L in the cordial mixture and 3.1mg/L in water drawn from the external tap. Concentrations of copper above 2mg/L are known to cause ill effects in some people[3] and ingestion of water containing copper levels ranging from 2.8-7.8mg/L has been associated with vomiting among school-age children[5].

Unfortunately we did not interview three children who reported vomiting after consuming water. But it is postulated that fewer children experienced symptoms consistent with copper intoxication on the first day of the tennis clinic due to copper being readily detected in the water on the basis of taste and discolouration, leading to its rejection. It is likely that more children became ill after drinking the cordial mixture because the cordial flavour

masked the bitter taste and discolouration produced by copper. Copper in concentrations above 3mg/L is known to impart a bitter taste to water[2].

The disparity between the level of copper recorded in the cordial mixture (17mg/L) and water drawn from the external tap (3mg/L) may be attributed to the cordial concentrate being mixed with the initial flush of water from the external tap.

Elevated levels of copper in the drinking water most likely resulted from a combination of factors:

- the presence of soft, acidic water enhancing leaching of copper into the water reticulation system; and
- the external tap not being flushed for some time before the tennis clinic.

It is well documented that concentrations of copper in reticulated water supplies can rise substantially when soft, acidic waters remain in stagnant contact with copper pipework[1,6,7].

Conclusion

The findings of this investigation suggest that the symptoms experienced by children at the tennis clinic were the result of acute copper intoxication induced by the consumption of drinking water containing elevated levels of copper. Based on the results of water sampling, it is plausible that elevated copper levels may be more widespread in the distribution system supplying water to the semi-rural township, in circumstances where the water is soft, acidic and in stagnant contact with copper pipework.

In recognition of the problem, the PHU discussed with the Water Board and the local authority appropriate corrective action to reduce copper levels in the town water supply under investigation. The Water Board advised that it was implementing a progressive works program which would enhance water quality throughout the entire reticulated town water supply.

The PHU recommended that the local authority monitor the quality of water connected to public amenities in the local government area to determine whether elevated copper levels were more widespread throughout the reticulated town water supply. A logical extension of this surveillance program would be development of an appropriate public risk communication strategy. Aspects of the strategy should include advising community groups which use public amenities to flush taps before use, and to report illness associated with the reticulated town water supply to a general practitioner, hospital or the PHU.

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HEPATITIS A AND INJECTING DRUG USE IN EASTERN SYDNEY

Between September and December 1994 there was an increase in notifications of hepatitis A (HAV) infection from Eastern Sydney Area Public Health Unit (ESAPHU). ESAPHU reports that 42 cases were notified in that period, and of those only four were acquired overseas. There were 10 cases in September, 10 in October, 18 in November and four in December. Only two cases were in children, one of whom was the child of a methadone client. Of the 36 non-travelling adults, there were eight women, 27 men and one transsexual. Of those, 13 reported injecting drug use (IDU) and one other was a probable IDU. Of the 18 men who reported sexual preference, 13 were bi/homosexual. Nine cases were clients of the same methadone clinic and several cases were in homeless young people.

In reponse to these notifications, PHU staff wrote to hospitals, primary care and methadone clinics and general practitioners in the postcodes affected, and to youth refuges and other youth services. They informed people of the outbreak, stressed that all cases should be notified and recommended that patients be counselled on the mode of transmission and importance of good hygiene, and that institutions with cases should contact the PHU to discuss control measures. Meetings were also held with youth service staff to encourage raising awareness of hepatitis A and hygiene.

The most common mode of HAV transmission is through close person-to-person contact, usually by the faecal-oral route. Percutaneous transmission of HAV has been documented but is regarded as an infrequent mode of transmission. Viraemia usually occurs only during the late incubation period. Because of the short incubation period, the short period of viraemia, and the absence of a carrier state, parenteral transmission of HAV is much less common than for hepatitis B virus. In the current outbreak, it is likely that person-to-person transmission between those reporting IDU was the most common mode of transmission.

HEPATITIS A IN SOUTH WEST NSW

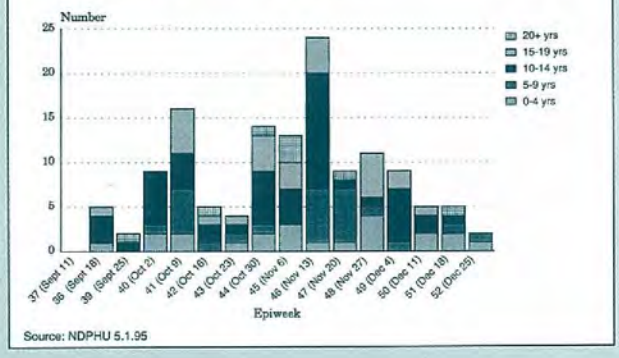
The South West Centre for Public Health has reported a number of small outbreaks of HAV infection in 1994. The notification rate for hepatitis A in the Hume, Murray, Riverina and Murrumbidgee Districts combined was 38.4/100,000 population for 1994, compared with 6.1/100,000 in 1993. Public Health Unit staff have responded to nine small outbreaks usually limited to less than 10 cases, all apparently unrelated and occurring sporadically throughout the year. No increase in HAV is reported from northern Victoria. A full report will appear in a later volume of the *Bulletin*.

MEASLES OUTBREAK IN LOWER NORTH COAST

As mentioned in the December issue of the *Bulletin*, measles outbreaks occurred in four Districts of NSW during 1994, including the Lower North Coast (LNC). More detail on the LNC outbreak is presented in Figure 1.

FIGURE 1

MEASLES – GREATER TAREE LGA CLUSTER NOTIFICATIONS BY WEEK OF ONSET



Source: NDPHU 5.1.95

The first case was notified on September 19, and by the end of December 128 notifications had been received. For this period the LNC District had a notification rate of 317.5/100,000 compared with 15.1/100,000 for NSW over the same period. As was the case in the other outbreaks, child and adolescent cases predominated, the 10-14 age group having the highest notification rate (1,541.9/100,000).

Of those for whom immunisation status was recorded, 32 per cent were unimmunised.

The Northern Districts Public Health Unit responded to the outbreak by targeting general practitioners, who provide the vast majority of immunisations in the District. Letters were sent to all local GPs on three occasions giving information on the outbreak, advising on notification criteria and providing recommendations on the management of contracts. All resident doctors at Manning Base Hospital and the paediatrician at Taree were also advised. All schools in the District received information letters to be sent to all parents. Two articles were published in all school newsletters – Measles in Area and later Measles Warning Continued – Immunise if no written proof. Unimmunised contacts were excluded from attending school or child care centres on three separate occasions. Media releases were issued on seven occasions, followed by newspaper articles and radio and television interviews.

PHU staff are continuing to monitor the outbreak, which appears to be in decline.

YELLOW FEVER IN NIGERIA

The Ministry of Health in Lagos has reported an outbreak of yellow fever in Imo State. By December 12, 1994, 120 cases and 80 deaths had been reported. At the time of publication no further data were available. In response to the outbreak, 42,000 individuals in affected villages and surrounding areas have been vaccinated.

All travellers to Nigeria are advised to be vaccinated against yellow fever.

TABLE 4

SUMMARY OF NSW INFECTIOUS DISEASE NOTIFICATIONS DECEMBER 1994

Condition	Number of cases notified			
	Period		Cumulative	
	Dec 1993	Dec 1994	Dec 1993	Dec 1994
Adverse reaction	3	3	26	34
AIDS	17	9	355	427
Arboviral infection	17	3	660	373
Brucellosis	–	–	4	4
Cholera	1	–	1	–
Diphtheria	–	–	–	–
Foodborne illness (NOS)	14	1	134	210
Gastroenteritis (instit.)	25	1	431	223
Gonorrhoea	48	–	376	298
H influenzae epiglottitis	5	–	36	21
H influenzae B – meningitis	4	–	57	16
H influenzae B – septicaemia	2	–	25	11
H influenzae infection (NOS)	1	–	15	9
Hepatitis A	40	–	559	503
Hepatitis B	326	54	4,101	4,245
Hepatitis C	660	124	6,722	8,244
Hepatitis D	1	–	12	16
Hepatitis, acute viral (NOS)	–	–	6	5
HIV infection	45	16	558	447
Hydatid disease	–	1	4	19
Legionnaires' disease	6	–	71	56
Leprosy	–	–	3	3
Leptospirosis	2	–	17	12
Listeriosis	1	1	13	8
Malaria	6	4	164	179
Measles	327	148	2,397	1,340
Meningococcal meningitis	10	4	100	78
Meningococcal septicaemia	4	2	43	40
Meningococcal infection (NOS)	–	1	11	20
Mumps	4	–	14	10
Mycobacterial tuberculosis	22	6	410	318
Mycobacterial – atypical	31	–	414	373
Mycobacterial infection (NOS)	3	–	47	102
Pertussis	222	22	1,546	1,299
Plague	–	–	–	–
Poliomyelitis	–	–	–	–
Q fever	24	7	400	234
Rubella	44	–	825	76
Salmonella infection (NOS)	70	28	950	984
Syphilis	79	10	786	916
Tetanus	–	–	5	4
Typhoid and paratyphoid	3	–	31	25
Typhus	–	–	–	–
Viral haemorrhagic fevers	–	–	–	–
Yellow fever	–	–	–	–

TABLE 5

INFECTIOUS DISEASE NOTIFICATIONS FOR 1994 BY SELECTED MONTH OF ONSET FOR NOTIFICATIONS RECEIVED BY DECEMBER 31, 1994

Condition	Sep	Oct	Nov	Dec	Total
Adverse event after immunisation	2	–	2	3	7
AIDS	41	35	21	9	106
Arboviral infection	4	6	8	3	21
Brucellosis	2	–	–	–	2
Foodborne illness (NOS)	7	6	54	1	68
Gastroenteritis (instit.)	9	11	5	1	26
Gonorrhoea	19	18	10	10	57
H influenzae epiglottitis	2	1	–	–	3
H influenzae meningitis	2	1	1	–	4
H influenzae septicaemia	1	–	–	–	1
H influenzae infection (NOS)	–	1	–	–	1
Hepatitis A – acute viral	32	39	50	9	130
Hepatitis B – acute viral	3	7	1	–	11
Hepatitis B – chronic/carrier	30	31	32	6	99
Hepatitis B – unspecified	351	444	308	48	1,151
Hepatitis C – acute viral	2	–	2	–	4
Hepatitis C – unspecified	763	657	674	124	2,218
Hepatitis D – unspecified	1	2	–	–	3
Hepatitis, acute viral (NOS)	1	–	–	–	1
HIV infection	34	35	39	16	124
Hydatid disease	–	3	3	1	7
Legionnaires' disease	3	2	–	–	5
Listeriosis	1	1	–	1	3
Malaria	11	10	9	4	34
Measles	209	269	322	148	948
Meningococcal meningitis	4	11	5	4	24
Meningococcal septicaemia	5	5	3	2	15
Meningococcal infection (NOS)	3	4	2	1	10
Mumps	2	4	–	–	6
Mycobacterial atypical	32	11	3	–	46
Mycobacterial tuberculosis	31	18	11	6	66
Mycobacterial infection (NOS)	16	21	13	–	50
Pertussis	121	110	68	22	321
Q fever	15	16	13	7	51
Rubella	6	3	4	–	13
Salmonella (NOS)	47	79	57	28	211
Salmonella bovis morbificans	1	–	–	–	1
Salmonella typhimurium	5	–	–	–	5
Syphilis	80	52	40	10	182
Tetanus	–	1	1	–	2
Typhoid and paratyphoid	3	–	–	–	3
Total	1,900	1,914	1,762	464	6,040

TABLE 6

INFECTIOUS DISEASE NOTIFICATIONS FOR 1994
BY PUBLIC HEALTH UNIT, RECEIVED BY DECEMBER 31, 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	–	3	2	2	6	4	–	1	–	1	2	1	–	–	3	9	–	34
AIDS	73	20	169	15	38	16	25	11	13	15	23	7	–	1	1	–	–	427
Arboviral infection	–	3	3	–	–	–	11	4	6	45	198	58	26	4	12	3	–	373
Brucellosis	–	1	–	–	2	–	–	–	–	–	–	1	–	–	–	–	–	4
Foodborne illness (NOS)	6	12	19	33	15	8	47	19	1	9	23	2	3	7	2	4	–	210
Gastroenteritis (instit.)	70	14	–	10	41	30	1	1	–	13	10	–	–	30	1	2	–	223
Gonorrhoea	39	18	101	9	14	1	15	4	15	11	10	20	25	5	6	5	–	298
H. influenzae epiglottitis	2	3	1	2	1	3	2	3	2	–	2	–	–	–	–	–	–	21
H. influenzae meningitis	1	1	–	4	2	–	2	–	1	–	2	–	1	2	–	–	–	16
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	30	29	47	42	34	7	33	3	8	25	47	51	6	38	100	3	–	503
Hepatitis B – acute viral	4	2	31	3	3	–	–	–	2	4	9	2	6	1	3	3	–	73
Hepatitis B – chronic/carrier	–	–	307	1	103	7	14	22	–	26	34	10	6	11	–	3	–	544
Hepatitis B – unspecified	487	520	89	1,193	527	37	457	31	110	58	38	16	10	7	33	15	–	3,628
Hepatitis C – acute viral	1	–	–	1	–	–	1	–	2	–	1	–	6	–	1	4	–	17
Hepatitis C – unspecified	946	524	1,332	870	790	180	722	292	435	477	890	167	45	149	185	223	–	8,227
Hepatitis D – unspecified	3	2	2	–	1	2	1	–	–	–	5	–	–	–	–	–	–	16
Hepatitis E – acute viral	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Hepatitis, acute viral (NOS)	–	–	3	–	–	–	–	–	–	1	–	–	–	–	1	–	–	5
HIV infection	64	24	150	19	16	5	26	4	5	7	6	1	–	1	2	1	116	447
Hydatid disease	1	4	3	–	–	–	–	1	3	1	–	1	1	1	1	2	–	19
Legionnaires' disease	4	3	2	7	11	2	13	–	3	8	–	–	–	2	1	–	–	56
Leprosy	–	–	–	3	–	–	–	–	–	–	–	–	–	–	–	–	–	3
Leptospirosis	1	–	–	–	–	–	–	–	–	3	5	2	–	–	1	–	–	12
Listeriosis	–	–	2	–	1	–	–	–	1	1	–	1	1	–	–	1	–	8
Malaria	19	11	20	12	11	4	44	4	6	8	13	8	–	3	7	9	–	179
Measles	38	22	16	37	58	41	39	40	95	76	263	188	31	66	15	315	–	1,340
Meningococcal meningitis	5	8	2	10	5	2	5	3	13	6	7	2	3	4	1	2	–	78
Meningococcal septicaemia	3	4	1	7	3	1	5	1	1	9	2	1	1	1	–	–	–	40
Meningococcal infection (NOS)	–	1	2	1	2	–	1	–	1	–	–	4	2	1	5	–	–	20
Mumps	–	–	1	1	–	–	3	–	1	2	1	–	–	–	1	–	–	10
Mycobacterial atypical	58	25	85	50	13	20	47	8	4	44	12	3	–	1	2	1	–	373
Mycobacterial tuberculosis	43	47	35	48	43	6	34	2	19	15	8	5	3	2	5	3	–	318
Mycobacterial infection (NOS)	10	4	3	15	10	1	36	8	1	4	4	3	2	–	2	–	–	102
Other venereal	–	–	–	–	–	–	–	–	–	–	–	–	4	–	1	–	–	5
Pertussis	28	88	59	102	122	45	74	30	80	65	483	34	24	22	13	30	–	1,299
Q fever	2	2	–	1	1	1	–	1	–	25	29	88	55	18	8	3	–	234
Rubella	13	3	15	–	10	2	5	1	1	–	7	6	10	–	3	–	–	76
Salmonella (NOS)	30	48	33	55	59	29	76	32	17	49	81	65	25	14	31	15	–	659
Salmonella bovis morbificans	–	2	1	1	1	3	2	–	1	2	–	–	–	–	–	–	–	13
Salmonella typhimurium	22	25	21	11	51	14	36	17	20	23	14	12	9	10	25	2	–	312
Syphilis	137	63	209	142	60	8	58	14	18	9	33	37	103	13	9	3	–	916
Tetanus	–	1	–	–	–	–	–	–	–	–	1	–	–	–	–	2	–	4
Typhoid and paratyphoid	5	2	3	3	3	1	1	–	–	–	2	3	–	–	–	2	–	25

TABLE 7

SELECTED INFECTIOUS DISEASE NOTIFICATIONS FOR 1994
BY PUBLIC HEALTH UNIT, RECEIVED BY DECEMBER 31, 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	–	3	2	2	6	4	–	1	–	1	2	1	–	–	3	9	–	34
H. influenzae epiglottitis	2	3	1	2	1	3	2	3	2	–	2	–	–	–	–	–	–	21
H. influenzae meningitis	1	1	–	4	2	–	2	–	1	–	2	–	1	2	–	–	–	16
H. influenzae septicaemia	–	–	–	1	1	1	2	1	–	1	2	–	1	–	–	1	–	11
H. influenzae infection (NOS)	–	–	–	–	1	–	1	3	1	–	1	–	–	–	2	–	–	9
Measles	38	22	16	37	58	41	39	40	95	76	263	188	31	66	15	315	–	1,340
Mumps	–	–	1	1	–	–	3	–	1	2	1	–	–	–	1	–	–	10
Pertussis	28	88	59	102	122	45	74	30	80	65	483	34	24	22	13	30	–	1,299
Rubella	13	3	15	–	10	2	5	1	1	–	7	6	10	–	3	–	–	76
Tetanus	–	1	–	–	–	–	–	–	–	–	1	–	–	–	–	2	–	4

TABLE 8

FOODBORNE INFECTIOUS DISEASE NOTIFICATIONS FOR 1994 BY PUBLIC HEALTH UNIT, RECEIVED BY DECEMBER 31, 1994

Condition	CSA	SSA	ESA	SWS	WSA	WEN	NSA	CCA	ILL	HUN	NC	ND	WNS	CW	SW	SE	U/K	Total
Foodborne illness (NOS)	6	12	19	33	15	8	47	19	1	9	23	2	3	7	2	4	–	210
Gastroenteritis (instit.)	70	14	–	10	41	30	1	1	–	13	10	–	–	30	1	2	–	223
Hepatitis A – acute viral	30	29	47	42	34	7	33	3	8	25	47	51	6	38	100	3	–	503
Listeriosis	–	–	2	–	1	–	–	–	1	1	–	1	1	–	–	1	–	8
Salmonella (NOS)	30	48	33	55	59	29	76	32	17	49	81	65	25	14	31	15	–	659
Salmonella bovis morbificans	–	2	1	1	1	3	2	–	1	2	–	–	–	–	–	–	–	13
Salmonella typhimurium	22	25	21	11	51	14	36	17	20	23	14	12	9	10	25	2	–	312
Typhoid and paratyphoid	5	2	3	3	3	1	1	–	–	–	2	3	–	–	–	2	–	25

TABLE 9

SURVEILLANCE OF NON-NOTIFIABLE SEXUALLY TRANSMITTED DISEASES JANUARY-DECEMBER 1994
(Diagnoses from sexual health centres unless otherwise stated in footnote.)
Unlike tables of notifiable diseases, Public Health Unit Areas in this table refer to the location of the clinic, not the residence of the patient.

* 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. 01/01/94-31/12/94
6. 01/01/94-31/09/94
7. 01/01/94-30/06/94
8. 01/01/94-30/11/94
9. No SHC in Region
10. Laboratory and SHC data 01/01/94-31/08/94
11. No data yet received for 1994

AHS[1] Infection		CSA[1]	SSA[2]	ESA[3]	SWS[4]	WSA[4] + WEN	NSA[5]	CCA[5]	ILL[5]	HUN[7]	NC[6]	ND[8]	WN[8]	CW[9]	SW[10]	SE[11]	Total
Chlamydia trachomatis	Male	1	–	90	2	6	4	1	5	8	2	5	7	–	3	–	134
	Female	1	–	63	5	7	2	4	4	14	3	19	30	–	9	–	161
	Total	**2**	**–**	**153**	**7**	**13**	**6**	**5**	**9**	**22**	**5**	**24**	**37**	**–**	**12**	**–**	**295**
Donovanosis	Male	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Female	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Total	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
*Genital herpes	Male	3	1	299	3	12	10	12	–	15	14	3	1	–	5	–	378
	Female	4	3	186	5	9	12	13	13	15	12	14	8	–	8	–	302
	Total	**7**	**4**	**485**	**8**	**21**	**22**	**25**	**13**	**30**	**26**	**17**	**9**	**–**	**13**	**–**	**680**
*Genital warts	Male	11	6	778	69	74	33	44	75	75	57	9	6	–	15	–	1,252
	Female	8	6	317	32	37	27	25	28	30	19	29	19	–	14	–	591
	Total	**19**	**12**	**1,095**	**101**	**111**	**60**	**69**	**103**	**105**	**76**	**38**	**25**	**–**	**29**	**–**	**1,843**
Nongonococcal urethritis	Male	3	1	584	23	55	20	35	25	43	24	12	7	–	9	–	841
	Female	–	–	–	–	3	6	–	–	–	–	–	2	–	2	–	13
	Total	**3**	**1**	**584**	**23**	**58**	**26**	**35**	**25**	**43**	**24**	**12**	**9**	**–**	**11**	**–**	**854**
Lymphogranuloma venereum	Male	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Female	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Total	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**

Abbreviations used in this Bulletin:
CSA Central Sydney Health Area, SSA Southern Sydney Health Area, ESA Eastern Sydney Health Area, SWS South Western Sydney Health Area, WSA Western Sydney Health Area, WEN Wentworth Health Area, NSA Northern Sydney Health Area, CCA Central Coast Health Area, ILL Illawarra Health Area, HUN Hunter Health Area, NC North Coast Public Health Unit, ND Northern District Public Health Unit, WN Western New South Wales Public Health Unit, CW Central West Public Health Unit, SW South West Public Health Unit, SE South East Public Health Unit, OTH Interstate/Overseas, U/K Unknown, NOS Not Otherwise Stated.

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