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YEAR IN REVIEW: COMMUNICABLE DISEASE SURVEILLANCE, 2003

In this issue, we review the trends in reports of notifiable diseases among NSW residents received by the NSW public health units for 2003. Readers interested in the details of notifications for specific diseases are referred to Tables 1–5 where diseases are reported by: year of onset, month of onset, rate per 100,000 population, number of cases by area health service, and number of cases by age group and sex. Table 6 shows the number of people with notifiable conditions who were reported to have died at the time of follow-up by their local public health unit.

TRENDS

Among the 44,834 NSW residents with medical conditions notified by doctors, hospital staff, and laboratories for 2003:

Conditions most frequently reported

- chlamydiosis (7,562 cases [114.0/100,000 population], with the highest rates in Central Sydney, South Eastern Sydney, and Far West Area Health Services);
- hepatitis C (5,277 cases [79.5/100,000 population], with the highest rates in Central Sydney, Far West, and Northern Rivers Area Health Services);
- gastroenteritis in an institution (3,583 cases [54.0/100,000 population], with the highest rates in Central Sydney, Southern, and Far West Area Health Services);
- hepatitis B (2,949 cases [44.5/100,000 population], with the highest rates in Central Sydney and South Western Sydney and Western Sydney Area Health Services);
- pertussis (2,768 cases [41.7/100,000 population], with the highest rates in the Macquarie, Hunter, and Mid North Coast Health Area Health Services);
- *salmonella* infections (1,843 cases [27.8/100,000 population], with the highest rates in the Northern Rivers, Greater Murray, and New England Area Health Services).

Conditions with the most meaningful declines in notifications compared with previous years

- hepatitis C (5,277 cases notified);
- hepatitis A (124 cases notified);
- hepatitis B (2,949 cases notified);
- rubella (24 cases notified).

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Conditions with the most meaningful increases in notifications compared with previous years

- chlamydiosis (7,562 cases, up from 5,649 in 2002) probably related to both better detection of cases through improved screening, and a real increase in disease transmission;
- foodborne illness (1,071 cases, up from 41 in 2002) probably due largely to improved detection and reporting;
- new HIV diagnoses (414 cases, up from 390 in 2002), a continuation of the increase that emerged in 2002, mainly among men who have sex with men;
- outbreaks of gastroenteritis in institutional settings (3,583 cases, up from 1,752 in 2002), probably due largely to improved detection and reporting;
- syphilis (838 cases, up from 648 in 2002), with new infections mainly among inner city men who have sex with men.

Conditions least frequently reported

In 2003, there were no reported cases of botulism, cholera, chancroid, diphtheria, lymphogranuloma venereum, donovanosis, plague, polio, rabies, typhus, viral haemorrhagic fevers, or yellow fever.

Conditions associated with the largest numbers of reported deaths

Deaths reported via the surveillance mechanisms for notifiable conditions may not include all deaths associated with these conditions. Public health units routinely investigate all cases of some notifiable conditions (for example: tuberculosis, measles, and meningoccocal disease) in order to put control measures in place. However, there are other notifiable conditions (for example: chlamydia and gonorrhoea) where no routine investigation takes place but information is collected for surveillance purposes. Where death occurs either after an investigation of a case, or where there has been no routine investigation, these deaths may not be reported in the surveillance systems. Deaths were most frequently reported for the following notifiable conditions:

- invasive pneumococcal disease (68);
- tuberculosis (19);
- HIV infection (27, including 14 who died from AIDS, and 13 in people with HIV infection who died of causes other than AIDS);
- meningococcal disease (12).

OUTBREAKS AND THREATS

In 2003, several notable disease outbreaks and threats were reported in NSW. These include:

- Severe Acute Respiratory Syndrome (SARS): 56 reports of suspected and probable cases of SARS were investigated in early 2003. Only one confirmed case was identified in NSW: a tourist who was diagnosed in July 2003 as part of a worldwide study of people who had been exposed to a source case in a Hong Kong hotel;[1]
- an outbreak of *Salmonella* Typhimurium phage type 135a involving 11 of 24 attendees at a private party in the Illawarra Health Area in February, the source of which remains unclear;[2]
- an outbreak of *Campylobacter* infection in 19 of 96 people at a school camp in the Hunter Health Area in February, probably linked to eating take-away chicken;[2]
- a cluster of meningococcal disease (serogroup B) in two women whose only common exposure was travelling on the same aeroplane flight in May from Los Angeles to Sydney, sitting on the same side but in different sections of the aeroplane;[3]
- an outbreak of *Salmonella* Typhimurium phage type 99 in South Western Sydney Health Area in over 60 people who attended a birthday party at a restaurant in May, ultimately linked to eating contaminated pigeon meat;[3]
- an outbreak of pertussis, affecting 31 students at a boarding school in the Northern Sydney Health Area in May;[3]
- an outbreak of eight measles cases in the Wentworth Health Area beginning in June, linked to a person who was infected while travelling in Nepal;[4]
- an outbreak of *Salmonella* Typhimurium phage type 170 affecting over 20 people in Northern Sydney Health Area in September, associated with eating a restaurant dish made of fried tofu, prawns, and eggplant;[5]
- outbreaks of gastroenteritis in eight nursing homes, five childcare centres, one hospital ward, and two residential colleges in September. Most of these were likely due to norovirus infections, but one of the college outbreaks was due to *Salmonella* Typhimurium phage type 135 infection;[5]
- a large outbreak of gastroenteritis due to norovirus infection affecting over 70 people in the Greater Murray Area Health Service in October, linked to eating ready-to-eat food prepared by an ill food handler (see report in this issue);[6]
- an outbreak of *Salmonella* Typhimurium phage type 170 and one death among several diners who ate at a restaurant in the Western Sydney Health Area on different days in November;[7]
- a food handler with hepatitis A who served ready-to-eat foods at a restaurant in the Central Sydney Health Area while infectious. Seven-hundred-and-sixty-eight patrons received immunoglobulin at a special clinic to prevent further cases. Four secondary cases (who did not receive the recommended immunoglobulin) were subsequently identified;[7]

- a large outbreak of gastroenteritis due to norovirus infection among people on a cruise ship in December;[7]
- detection of Murray Valley encephalitis infection in a chicken during routine monitoring of a chicken flock at Menindee, Far Western NSW, in December. No associated human infections were identified.[7]

SO WHAT DOES IT ALL MEAN?

In 2003, bloodborne viruses (notably hepatitis C, hepatitis B, and HIV), sexually transmissible diseases (notably chlamydiosis, syphilis and gonorrhoea), and enteric diseases (notably norovirus and *Salmonella* infections), were the most commonly notified diseases in NSW. Prevention of these diseases must therefore remain a priority.

It is too early to know whether the decline in people reported with newly diagnosed hepatitis C is part of a longer-term trend. The continuing increase in HIV infection among men who have sex with men is concerning, and efforts continue to promote prevention messages in those at risk.

In response to the high rates of, and deaths from, invasive pneumococcal disease the Commonwealth Department of Health and Ageing has announced funding for invasive pneumococcal disease vaccination from 2005 in children up to two years of age and adults aged 65 years and older.

THANK YOU

The individual cases and numerous outbreaks reported here, as well as the SARS pandemic overseas, underscore the need for both clinicians and public health practitioners alike to maintain vigilance for the emergence of public health threats from communicable diseases. Disease control and prevention depends on effective surveillance in the community. Thanks to all those general and specialist medical practices, laboratories, hospitals, schools, childcare centres, and others, who have notified diseases of public health significance to their local public health units for investigation and control.

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TABLE 1

DISEASE NOTIFICATIONS BY YEAR OF ONSET OF ILLNESS,# NSW, 1991 TO 2003

Conditions	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
AIDS	442	432	482	554	475	371	205	178	122	133	93	95	116
Adverse event after immunisation	9	31	23	40	28	56	70	95	16	42	111	177	217
Arbovirus infection: total*	409	341	656	380	534	1225	1804	780	1217	974	1187	657	1022
Barmah Forest virus infection*	6	6	25	39	271	172	185	134	249	195	402	393	451
Ross River virus infection*	297	324	599	331	236	1031	1598	583	952	749	716	181	494
Arboviral: other*	106	11	32	10	27	22	21	63	16	30	69	83	77
Blood lead level ≥ 15 µg/dl*	not notifiable until December 1996						710	873	691	988	513	517	298
Botulism	0	0	0	0	0	0	0	0	1	0	0	0	0
Brucellosis*	2	2	4	4	2	1	3	3	2	1	1	2	2
Chancroid*	not notifiable until December 1998								1	0	0	0	0
Chlamydia*	not notifiable until August 1998								2467	3499	4494	5658	7562
Cholera*	1	0	1	0	1	3	1	1	2	0	1	1	0
Cryptosporidiosis*	not notifiable until December 1996						157	1130	121	133	195	306	202
Foodborne illness: NOS*	2765	253	106	213	270	211	255	201	151	147	56	41	1071
Gastroenteritis: institutional	158	406	443	296	1359	554	939	738	673	697	775	1752	3583
Giardiasis*	not notifiable until August 1998								1091	978	967	863	1026
Gonorrhoea*	392	491	382	357	428	522	636	1054	1291	1060	1358	1468	1196
H. influenzae type b: total*	212	217	124	61	29	13	17	11	13	8	7	10	6
H. influenzae type b epiglottitis*	15	57	32	21	6	2	5	1	2	2	1	1	0
H. influenzae type b meningitis*	48	103	53	17	11	4	3	3	3	1	1	1	0
H. influenzae type b septicaemia*	11	26	24	12	8	3	1	4	6	4	2	3	1
H. influenzae type b infection: NOS*	138	31	15	11	4	4	8	3	2	1	3	5	5
Hepatitis A*	1119	901	579	585	614	958	1426	927	421	201	197	149	124
Hepatitis B: total*	1492	3171	3604	3983	4008	3511	3171	2959	3515	3984	4575	3552	2949
Hepatitis B: acute viral*	409	113	95	74	61	43	53	58	77	99	94	87	70
Hepatitis B: other*	1083	3058	3509	3909	3947	3468	3118	2901	3438	3885	4481	3465	2879
Hepatitis C: total*	853	3896	5899	7824	6887	7008	6930	7216	8608	8302	8706	6713	5277
Hepatitis C: acute viral*	22	26	22	16	32	18	19	112	112	222	295	153	127
Hepatitis C: other*	831	3870	5877	7808	6855	6990	6911	7104	8496	8080	8411	6560	5150
Hepatitis D*	0	8	12	19	19	9	11	3	14	12	11	9	12
Hepatitis E*	0	0	1	2	0	3	6	4	7	9	6	6	6
HIV infection*	822	695	587	501	533	446	423	401	373	352	338	390	414
Haemolytic uraemic syndrome	not notifiable until December 1996						3	6	11	9	2	7	5
Influenza: total*	not notifiable until December 2000										244	1012	861
Influenza: type A*	not notifiable until December 2000										216	770	767
Influenza: type B*	not notifiable until December 2000										27	241	55
Influenza: NOS*	not notifiable until December 2000										1	1	39
Legionnaires' disease: total*	37	104	66	60	75	74	33	46	41	41	68	44	60
Legionnaires' disease: *L. longbeachae**	0	14	13	8	16	30	9	19	12	12	29	21	37
Legionnaires' disease: *L. pneumophila**	16	80	34	30	35	34	18	22	22	26	38	22	23
Legionnaires' disease: other*	21	10	19	22	24	10	6	5	7	3	1	1	0
Leprosy	1	7	5	3	3	2	0	0	1	2	3	0	1
Leptospirosis*	28	21	16	14	6	33	33	50	56	54	66	39	37
Listeriosis*	11	13	12	10	14	22	23	28	22	18	12	11	28
Malaria*	171	110	174	184	96	203	173	158	174	232	157	105	144
Measles: total	496	805	2348	1484	596	191	273	119	32	36	31	8	18
Measles: laboratory confirmed*	20	76	460	302	138	35	98	19	13	22	18	6	14
Measles: other	476	729	1888	1182	458	156	175	100	19	14	13	2	4
Meningococcal disease (invasive): total	128	121	153	142	113	161	219	186	221	253	234	216	203
Meningococcal disease: type B*	0	3	7	7	23	36	54	55	95	93	92	105	100
Meningococcal disease: type C*	0	4	6	9	8	35	55	55	60	64	38	54	46
Meningococcal disease: type W135*	0	0	0	0	1	0	2	4	4	4	2	2	2
Meningococcal disease: type Y*	0	0	1	1	0	1	0	7	1	7	2	2	5
Meningococcal disease: other	128	114	139	125	81	89	108	65	61	85	100	53	50
Mumps*	8	23	13	11	14	27	29	39	33	92	28	29	35
Paratyphoid*	20	8	9	11	12	15	5	9	5	14	11	13	22
Pertussis	49	217	1533	1405	1369	1156	4246	2309	1415	3686	4438	2012	2768
Pneumococcal disease: invasive*	not notifiable until December 2000										442	863	785
Psittacosis*	not notifiable until December 2000										38	155	87
Q fever*	167	213	403	267	201	287	258	236	164	131	143	309	280
Rubella: total*	60	324	1186	233	2376	636	153	78	46	191	58	35	24
Rubella*	59	324	1184	229	2375	631	153	78	45	191	58	35	23
Rubella: congenital*	1	0	2	4	1	5	0	0	1	0	0	0	1
Salmonellosis*	1171	802	980	1101	1366	1224	1698	1813	1438	1396	1644	2104	1843
Shigellosis*	not notifiable until December 2000										134	85	59
Syphilis: total	579	873	732	967	834	661	512	612	585	581	545	648	838
Syphilis: infectious* [+]	1	3	6	29	132	72	57	45	88	82	67	128	242
Syphilis: congenital	1	1	0	2	6	3	3	0	3	2	1	1	2
Syphilis: other*	577	869	726	936	696	586	452	567	494	497	477	519	594
Tetanus	5	2	5	4	0	1	3	3	1	2	0	0	1
Tuberculosis*	429	394	389	393	443	410	422	382	484	447	416	447	381
Typhoid*	38	20	28	25	27	30	28	18	32	28	32	22	11
Verotoxigenic *Escherichia coli* infections*	not notifiable until December 1996						0	2	0	1	1	5	2

onset = the earlier of patient reported onset date, specimen date, or notification date; * laboratory-confirmed cases only; NOS = not otherwise specified; [+] includes syphilis primary, syphilis secondary, and syphilis <1 year duration.
No case of the following diseases have been notified since 1991: diphtheria, granuloma inguinale, lymphogranuloma venereum, plague, poliomyelitis, rabies, typhus, viral haemorrhagic fever, and yellow fever.

TABLE 2

DISEASE NOTIFICATIONS BY MONTH OF ONSET OF ILLNESS,[#] NSW, 2003

Conditions	Month of Onset JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
AIDS	11	7	4	14	13	9	11	9	7	10	13	8	116
Adverse event after immunisation	16	9	24	28	16	18	15	20	22	16	22	11	217
Arbovirus infection: total*	37	59	70	191	340	116	47	27	26	43	30	36	1022
Barmah Forest virus infection*	20	26	28	74	139	48	26	16	16	25	15	18	451
Ross River virus infection*	7	15	37	107	193	62	18	7	7	12	13	16	494
Arboviral: other*	10	18	5	10	8	6	3	4	3	6	2	2	77
Blood lead level ≥ 15 µg/dl*	39	44	23	16	21	21	38	25	25	9	24	13	298
Brucellosis*	1	0	0	0	0	0	0	1	0	0	0	0	2
Chlamydia*	570	597	616	491	626	607	704	673	599	759	699	621	7562
Cryptosporidiosis*	24	22	20	22	17	9	15	6	4	6	21	36	202
Foodborne illness: NOS	25	30	17	2	344	114	0	115	0	107	66	251	1071
Gastroenteritis: institutional	10	103	162	45	359	431	392	304	236	387	592	562	3583
Giardiasis*	71	97	111	79	83	86	87	72	90	70	92	88	1026
Gonorrhoea*	121	109	101	109	112	89	102	90	91	101	85	86	1196
H. influenzae type b: total*	0	1	0	2	1	0	0	0	1	0	1	0	6
H. influenzae type b septicaemia*	0	0	0	1	0	0	0	0	0	0	0	0	1
H. influenzae type b infection: NOS*	0	1	0	1	1	0	0	0	1	0	1	0	5
Hepatitis A*	11	9	21	7	4	6	5	8	7	17	9	20	124
Hepatitis B: total*	255	238	263	220	261	241	239	191	274	259	284	224	2949
Hepatitis B: acute viral*	8	5	8	8	6	1	4	5	8	7	3	7	70
Hepatitis B: other*	247	233	255	212	255	240	235	186	266	252	281	217	2879
Hepatitis C: total*	471	495	496	382	435	365	453	466	395	438	462	419	5277
Hepatitis C: acute viral*	5	13	12	13	5	9	17	19	5	11	12	6	127
Hepatitis C: other*	466	482	484	369	430	356	436	447	390	427	450	413	5150
Hepatitis D*	0	1	1	0	1	2	1	2	1	1	2	0	12
Hepatitis E*	0	1	1	0	0	0	1	1	2	0	0	0	6
HIV infection*	43	40	36	42	31	39	29	36	33	31	31	23	414
Haemolytic uraemic syndrome	1	1	0	0	1	0	0	0	0	0	1	1	5
Influenza: total*	21	7	23	23	10	11	78	469	166	31	11	11	861
Influenza: type A*	19	6	18	19	8	11	71	439	147	17	6	6	767
Influenza: type B*	1	1	1	3	2	0	2	11	10	14	5	5	55
Influenza: NOS*	1	0	4	1	0	0	5	19	9	0	0	0	39
Legionnaires' disease: total*	5	5	12	4	9	6	3	3	2	3	2	6	60
Legionnaires' disease: *L. longbeachae**	4	4	7	4	2	3	3	2	2	3	1	2	37
Legionnaires' disease: *L. pneumophila**	1	1	5	0	7	3	0	1	0	0	1	4	23
Leprosy	1	0	0	0	0	0	0	0	0	0	0	0	1
Leptospirosis*	3	9	7	1	3	2	3	4	2	2	0	1	37
Listeriosis*	1	3	2	4	3	3	4	1	1	2	2	2	28
Malaria*	25	12	13	8	9	12	5	13	14	7	14	12	144
Measles: total	0	0	0	2	0	4	8	1	1	1	0	1	18
Measles: laboratory confirmed*	0	0	0	2	0	2	6	1	1	1	0	1	14
Measles: other	0	0	0	0	0	2	2	0	0	0	0	0	4
Meningococcal disease (invasive): total	11	13	8	13	14	15	27	25	27	17	17	16	203
Meningococcal disease: type B*	7	6	3	5	5	9	14	8	18	10	9	6	100
Meningococcal disease: type C*	1	3	3	2	1	3	6	10	5	4	4	4	46
Meningococcal disease: type W135*	0	0	0	1	0	0	1	0	0	0	0	0	2
Meningococcal disease: type Y*	1	0	1	0	1	0	0	1	0	0	0	1	5
Meningococcal disease: other	2	4	1	5	7	3	6	6	4	3	4	5	50
Mumps*	5	5	3	2	2	0	1	0	5	2	7	3	35
Paratyphoid*	2	3	4	2	0	3	0	0	2	1	1	4	22
Pertussis	172	113	133	114	159	158	258	285	331	338	375	332	2768
Pneumococcal disease: invasive*	23	19	54	43	57	100	92	135	80	69	69	44	785
Psittacosis*	3	2	6	3	8	12	10	9	7	11	10	6	87
Q fever*	38	39	33	28	16	19	14	21	18	24	21	9	280
Rubella: total*	4	1	6	4	3	0	2	2	0	1	1	0	24
Rubella*	4	1	6	4	3	0	2	2	0	0	1	0	23
Rubella: congenital*	0	0	0	0	0	0	0	0	0	1	0	0	1
Salmonellosis*	262	262	226	139	172	98	83	86	78	115	133	189	1843
Shigellosis*	4	8	10	4	2	5	1	3	6	5	6	5	59
Syphilis: total	60	68	76	57	74	65	68	57	60	95	77	81	838
Syphilis: infectious* [+]	27	19	19	11	23	18	23	16	18	27	26	15	242
Syphilis: congenital	0	0	0	0	1	0	0	1	0	0	0	0	2
Syphilis: other*	33	49	57	46	50	47	45	40	42	68	51	66	594
Tetanus	0	1	0	0	0	0	0	0	0	0	0	0	1
Tuberculosis*	46	34	20	27	29	32	34	21	31	48	30	29	381
Typhoid*	1	0	1	0	0	0	2	0	1	3	3	0	11
Verotoxigenic *Escherichia coli* infections*	0	0	0	0	0	0	0	0	0	0	2	0	2

onset = the earlier of patient reported onset date, specimen date or date of notification; * = laboratory-confirmed cases only; NOS = not otherwise specified; + includes syphilis primary, syphilis secondary and syphilis <1 years duration.

TABLE 3

DISEASE NOTIFICATIONS BY AREA HEALTH SERVICE OF RESIDENCE,# CRUDE RATES PER 100,000 POPULATION, NSW, 2003

Condition	CCA	CSA	FWA	GMA	HUN	ILL	MAC	MNC	MWA
AIDS	1.0	5.8	2.1	0.4	0.5	1.1	1.0	0.4	0.0
Adverse event after immunisation	4.2	1.6	6.3	8.9	7.5	0.6	8.7	1.5	13.7
Arbovirus infection: total*	5.5	2.6	37.8	7.7	9.9	3.7	8.7	83.2	5.9
Barmah Forest virus infection*	2.3	0.4	4.2	1.2	3.7	1.1	1.0	45.1	1.8
Ross River virus infection*	2.6	0.6	31.5	5.8	5.3	1.4	7.7	36.2	3.6
Arboviral: other*	0.6	1.6	2.1	0.8	0.9	1.1	0.0	1.8	0.6
Blood lead level ≥ 15 µg/dl*	0.3	2.4	92.3	1.9	19.2	2.5	17.3	3.7	4.2
Brucellosis*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chlamydia*	85.0	158.2	180.5	115.8	124.6	86.1	132.8	103.2	139.0
Cryptosporidiosis*	0.6	2.8	4.2	4.2	2.6	1.7	4.8	7.0	1.8
Food-borne illness: NOS	46.5	11.7	44.1	30.1	15.3	3.1	0.0	39.2	0.0
Gastroenteritis: institutional	136.4	51.1	39.9	0.0	93.7	22.5	44.3	42.2	57.5
Giardiasis*	8.7	14.7	10.5	12.4	16.6	9.6	30.8	10.0	26.7
Gonorrhoea*	3.6	47.3	35.7	5.4	4.9	5.6	3.8	7.0	4.8
H. influenzae type b: total*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
H. influenzae type b: septicaemia*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
H. influenzae type b: NOS*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hepatitis A*	0.6	3.6	0.0	0.8	0.4	0.3	1.0	0.4	4.8
Hepatitis B: total*	15.5	104.2	44.1	5.8	11.0	12.1	16.4	5.5	5.3
Hepatitis B: acute viral*	0.3	0.8	2.1	0.4	1.5	1.7	1.9	0.4	0.6
Hepatitis B: other*	15.2	103.4	42.0	5.4	9.5	10.4	14.4	5.2	4.8
Hepatitis C: total*	74.3	104.0	96.5	52.1	54.8	74.3	89.5	88.7	80.8
Hepatitis C: acute viral*	0.0	6.2	0.0	0.0	2.9	0.0	1.9	0.4	0.0
Hepatitis C: other*	74.3	97.8	96.5	52.1	51.9	74.3	87.6	88.4	80.8
Hepatitis D*	0.0	0.0	2.1	0.0	0.0	0.3	0.0	0.0	0.0
Hepatitis E*	0.0	0.2	0.0	0.4	0.0	0.0	0.0	0.0	0.0
HIV infection*	2.3	16.9	0.0	1.9	2.9	3.7	1.0	2.6	0.6
Haemolytic uraemic syndrome	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.6
Influenza: total*	3.6	9.3	4.2	2.7	3.8	12.4	17.3	4.4	9.5
Influenza: type A*	3.2	1.8	4.2	2.3	3.3	12.1	17.3	4.4	9.5
Influenza: type B*	0.0	0.6	0.0	0.4	0.5	0.3	0.0	0.0	0.0
Influenza: NOS*	0.3	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Legionnaires' disease: total*	3.2	1.4	0.0	1.9	0.0	1.4	0.0	0.0	2.4
Legionnaires' disease: *L. longbeachae**	3.2	0.8	0.0	0.8	0.0	0.8	0.0	0.0	1.8
Legionnaires' disease: *L. pneumophila**	0.0	0.6	0.0	1.2	0.0	0.6	0.0	0.0	0.6
Leprosy	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leptospirosis*	0.0	0.0	0.0	0.0	2.2	0.3	0.0	3.0	0.6
Listeriosis*	0.6	0.8	0.0	0.0	0.5	0.8	1.0	0.0	0.0
Malaria*	0.6	3.8	0.0	0.8	1.6	0.8	1.9	1.5	0.0
Measles: total	0.0	0.2	0.0	0.0	0.0	0.3	0.0	0.0	0.0
Measles: laboratory confirmed*	0.0	0.2	0.0	0.0	0.0	0.3	0.0	0.0	0.0
Measles: other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Meningococcal disease (invasive): total	5.5	2.2	0.0	1.9	3.7	3.7	4.8	3.7	1.2
Meningococcal disease: type B*	2.6	1.0	0.0	0.8	2.0	2.0	2.9	1.8	0.6
Meningococcal disease: type C*	1.6	0.6	0.0	0.4	0.2	1.4	0.0	1.8	0.0
Meningococcal disease: type W135*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Meningococcal disease: type Y*	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Meningococcal disease: other	0.6	0.6	0.0	0.8	1.5	0.3	1.9	0.0	0.6
Mumps*	0.3	1.0	0.0	0.4	0.2	0.0	0.0	0.0	0.0
Paratyphoid*	0.0	0.6	0.0	0.4	0.0	0.0	0.0	0.0	0.0
Pertussis	20.0	40.2	8.4	47.9	41.1	34.6	20.2	37.0	45.7
Pneumococcal disease: invasive*	22.3	13.3	14.7	11.6	15.2	13.2	11.5	11.1	13.1
Psittacosis*	0.0	0.2	0.0	5.4	3.5	0.3	4.8	1.8	0.6
Q fever*	0.0	0.8	42.0	2.3	4.6	1.7	72.2	10.0	7.7
Rubella: total*	0.3	0.6	0.0	0.0	0.4	0.6	0.0	0.0	0.0
Rubella*	0.3	0.6	0.0	0.0	0.4	0.6	0.0	0.0	0.0
Rubella: congenital*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Salmonellosis*	20.4	27.0	25.2	21.2	20.1	20.3	31.8	28.1	27.9
Shigellosis*	0.6	1.6	0.0	0.4	0.2	0.3	0.0	0.7	1.2
Syphilis: total	5.8	31.4	46.2	1.9	2.2	4.2	11.5	6.3	4.2
Syphilis: infectious* +	1.0	8.7	0.0	1.2	0.2	2.3	1.9	2.2	0.6
Syphilis: congenital	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
Syphilis: other*	4.8	22.7	46.2	0.8	2.0	2.0	8.7	4.1	3.6
Tetanus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tuberculosis*	1.0	14.5	2.1	1.5	1.6	2.3	1.0	2.6	0.6
Typhoid*	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Verotoxigenic *Escherichia coli* infections*	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0

onset = the earlier of patient reported onset date, specimen date or date of notification; * = laboratory-confirmed cases only; NOS = not otherwise specified; a = includes cases with unknown public health unit; + includes syphilis primary, syphilis secondary, and syphilis <1 years duration.

Area health service population estimates 2003:

CCA = Central Coast Area (309,425); CSA = Central Sydney Area (503,030); FWA = Far West Area (47,656); CHS = Corrections Health Service (8,000); GMA = Greater Murray Area (258,985); HUN = Hunter Area (547,325); ILL = Illawarra Area (355,533); MAC = Macquarie Area (103,907); MNC = Mid North Coast Area (270,433); MWA = Mid Western Area (168,363).

TABLE 3 *continued*

DISEASE NOTIFICATIONS BY AREA HEALTH SERVICE OF RESIDENCE,# CRUDE RATES PER 100,000 POPULATION, NSW, 2003

Condition	NEA	NRA	NSA	SA	SES	SWS	WEN	WSA	CHS	Total (a)
AIDS	1.2	1.8	0.6	0.5	4.2	0.6	1.2	0.7	0.0	1.7
Adverse event after immunisation	1.7	2.6	1.4	9.5	1.4	1.2	3.4	2.5	12.5	3.3
Arbovirus infection: total*	15.1	198.7	2.3	9.0	1.4	1.1	0.6	1.5	0.0	15.4
Barmah Forest virus infection*	4.6	96.4	0.1	4.8	0.1	0.0	0.3	0.4	0.0	6.8
Ross River virus infection*	9.3	101.2	0.6	3.7	0.1	0.0	0.3	0.0	0.0	7.4
Arboviral: other*	1.2	1.1	1.5	0.5	1.1	1.1	0.0	1.1	0.0	1.2
Blood lead level ≥ 15 µg/dl*	4.6	1.1	2.2	1.1	1.1	4.1	2.4	0.8	0.0	4.5
Brucellosis*	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0
Chlamydia*	149.5	108.5	99.9	99.6	179.1	65.3	72.5	90.3	737.5	114.0
Cryptosporidiosis*	12.7	4.0	2.0	1.6	3.6	1.6	3.1	3.2	0.0	3.0
Foodborne illness: NOS	0.0	8.4	9.4	7.9	43.9	7.4	1.2	6.5	0.0	16.1
Gastroenteritis: institutional	55.1	4.4	88.2	55.1	57.8	15.5	39.4	47.4	0.0	54.0
Giardiasis*	16.2	2.2	17.5	4.2	23.6	8.5	22.3	21.1	0.0	15.5
Gonorrhoea*	13.9	15.7	11.9	3.2	61.7	7.0	7.3	12.2	37.5	18.0
H. influenzae type b: total*	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.1
H. influenzae type b septicaemia*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
H. influenzae type b infection: NOS*	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.1
Hepatitis A*	1.2	1.5	1.0	1.1	2.9	2.7	1.5	3.2	0.0	1.9
Hepatitis B: total*	15.1	9.5	39.2	4.8	50.2	95.5	17.1	73.1	712.5	44.4
Hepatitis B: acute viral*	0.6	0.7	0.9	0.0	2.3	1.1	0.3	0.4	37.5	1.1
Hepatitis B: other*	14.5	8.8	38.3	4.8	47.9	94.4	16.8	72.7	675.0	43.4
Hepatitis C: total*	41.7	90.6	33.0	58.8	76.2	79.9	54.7	65.1	8662.5	79.5
Hepatitis C: acute viral*	0.0	0.4	1.4	2.1	5.6	0.2	0.3	0.3	137.5	1.9
Hepatitis C: other*	41.7	90.2	31.6	56.7	70.6	79.7	54.4	64.8	8525.0	77.6
Hepatitis D*	0.0	0.0	0.1	0.0	0.1	0.2	0.3	0.1	50.0	0.2
Hepatitis E*	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.0	0.1
HIV infection*	2.3	2.6	3.2	0.5	21.0	1.9	1.8	3.1	0.0	6.2
Haemolytic uraemic syndrome	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.1
Influenza: total*	9.3	9.9	8.6	2.6	23.4	22.6	15.9	18.7	75.0	13.0
Influenza: type A*	7.0	9.5	8.2	1.6	20.9	21.1	15.6	17.7	75.0	11.6
Influenza: type B*	0.6	0.4	0.4	1.1	2.5	1.5	0.3	1.0	0.0	0.8
Influenza: NOS*	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
Legionnaires' disease: total*	0.0	0.0	0.3	0.5	0.6	0.0	1.8	2.0	0.0	0.9
Legionnaires' disease: *L. longbeachae**	0.0	0.0	0.0	0.5	0.6	0.0	0.9	0.8	0.0	0.6
Legionnaires' disease: *L. pneumophila**	0.0	0.0	0.3	0.0	0.0	0.0	0.9	1.1	0.0	0.3
Leprosy	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leptospirosis*	6.4	0.7	0.1	0.0	0.0	0.0	0.3	0.0	0.0	0.6
Listeriosis*	0.6	0.0	0.6	0.0	0.4	0.6	0.0	0.1	0.0	0.4
Malaria*	3.5	2.9	2.7	1.1	3.3	1.7	1.5	3.0	0.0	2.2
Measles: total	0.0	0.0	0.0	0.0	0.5	0.1	2.8	0.3	0.0	0.3
Measles: laboratory confirmed*	0.0	0.0	0.0	0.0	0.5	0.1	1.5	0.3	0.0	0.2
Measles: other	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.1
Meningococcal disease (invasive): total	3.5	3.7	1.1	3.7	3.8	2.9	2.1	3.2	0.0	3.1
Meningococcal disease: type B*	1.2	2.2	0.1	2.1	1.4	1.6	1.5	2.0	0.0	1.5
Meningococcal disease: type C*	0.6	0.7	0.5	1.1	0.9	0.6	0.6	0.3	0.0	0.7
Meningococcal disease: type W135*	0.6	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Meningococcal disease: type Y*	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.1
Meningococcal disease: other	1.2	0.7	0.5	0.5	1.3	0.5	0.0	1.0	0.0	0.8
Mumps*	0.0	0.7	1.4	0.0	0.5	0.6	0.3	0.6	0.0	0.5
Paratyphoid*	0.0	1.1	0.4	0.0	0.8	0.1	0.0	0.7	0.0	0.3
Pertussis	30.1	21.2	44.4	67.3	49.3	40.3	35.2	57.1	25.0	41.7
Pneumococcal disease: invasive*	0.6	5.5	9.1	16.4	11.0	11.7	10.1	11.1	0.0	11.8
Psittacosis*	4.6	2.2	0.6	0.5	0.0	0.1	5.5	0.3	0.0	1.3
Q fever*	33.6	10.2	0.1	4.8	0.4	0.2	0.0	0.3	12.5	4.2
Rubella: total*	0.0	0.0	0.3	0.0	0.9	0.1	0.0	0.8	0.0	0.4
Rubella*	0.0	0.0	0.1	0.0	0.9	0.1	0.0	0.8	0.0	0.3
Rubella: congenital*	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Salmonellosis*	31.3	53.7	30.6	21.2	33.1	25.6	25.1	27.0	0.0	27.8
Shigellosis*	1.2	0.4	1.1	0.5	1.8	0.5	0.6	1.0	0.0	0.9
Syphilis: total	19.7	9.1	5.3	4.2	28.9	18.5	2.4	7.6	150.0	12.6
Syphilis: infectious* +	5.8	1.1	1.6	0.0	15.7	1.0	0.3	1.5	12.5	3.6
Syphilis: congenital	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Syphilis: other*	13.3	8.0	3.7	4.2	13.2	17.5	2.1	6.0	137.5	9.0
Tetanus	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Tuberculosis*	0.6	0.4	4.7	2.1	8.7	7.9	2.1	11.1	12.5	5.7
Typhoid*	0.0	0.0	0.1	0.0	0.3	0.2	0.0	0.3	0.0	0.2
Verotoxigenic *Escherichia coli* infections*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0

onset = the earlier of patient reported onset date, specimen date or date of notification; * = laboratory-confirmed cases only; NOS = not otherwise specified; a = includes cases with unknown public health unit; + includes syphilis primary, syphilis secondary and syphilis <1 years duration.

Area health service population estimates 2003:

NEA = New England Area (172,560); NRA = Northern Rivers Area (273,731); NSA = North Sydney Area (788,117); SA = Southern Area (188,744); SES = South Eastern Sydney (785,045); SWS = South Western Sydney (823,429); WEN = Wentworth Area (327,059); WSA = Western Sydney Area (711,165); Total = Total population in NSW (6,634,507).

TABLE 4

NUMBER OF DISEASE NOTIFICATIONS BY AREA HEALTH SERVICE OF RESIDENCE,[#] NSW, 2003

Conditions	CCA	CSA	FWA	GMA	HUN	ILL	MAC	MNC	MWA
AIDS	3	29	1	1	3	4	1	1	0
Adverse event after immunisation	13	8	3	23	41	2	9	4	23
Arbovirus infection: total*	17	13	18	20	54	13	9	225	10
Barmah Forest virus infection*	7	2	2	3	20	4	1	122	3
Ross River virus infection*	8	3	15	15	29	5	8	98	6
Arboviral: other*	2	8	1	2	5	4	0	5	1
Blood lead level ≥ 15 µg/dl*	1	12	44	5	105	9	18	10	7
Brucellosis*	0	0	0	0	0	0	0	0	0
Chlamydia*	263	796	86	300	682	306	138	279	234
Cryptosporidiosis*	2	14	2	11	14	6	5	19	3
Foodborne illness: NOS	144	59	21	78	84	11	0	106	0
Gastroenteritis: institutional	422	257	19	0	513	80	46	114	178
Giardiasis*	27	74	5	32	91	34	32	27	45
Gonorrhoea*	11	238	17	14	27	20	4	19	8
H. influenzae type b: total*	0	0	0	0	0	0	0	0	1
H. influenzae type b septicaemia*	0	0	0	0	0	0	0	0	1
H. influenzae type b infection: NOS*	0	0	0	0	0	0	0	0	0
Hepatitis A*	2	18	0	2	2	1	1	1	8
Hepatitis B (total)*	48	524	21	15	60	43	17	15	9
Hepatitis B: acute viral*	1	4	1	1	8	6	2	1	1
Hepatitis B: other*	47	520	20	14	52	37	15	14	8
Hepatitis C: total*	230	523	46	135	300	264	93	240	136
Hepatitis C: acute viral*	0	31	0	0	16	0	2	1	0
Hepatitis C: other*	230	492	46	135	284	264	91	239	136
Hepatitis D*	0	0	1	0	0	1	0	0	0
Hepatitis E*	0	1	0	1	0	0	0	0	0
HIV infection*	7	85	0	5	16	13	1	7	1
Haemolytic uraemic syndrome	0	0	0	0	3	0	0	0	1
Influenza: total*	11	47	2	7	21	44	18	12	16
Influenza: type A*	10	9	2	6	18	43	18	12	16
Influenza: type B*	0	3	0	1	3	1	0	0	0
Influenza: NOS*	1	35	0	0	0	0	0	0	0
Legionnaires' disease (total)*	10	7	0	5	0	5	0	0	4
Legionnaires' disease: *L. longbeachae**	10	4	0	2	0	3	0	0	3
Legionnaires' disease: *L. pneumophila**	0	3	0	3	0	2	0	0	1
Leprosy	0	0	0	0	0	0	0	0	0
Leptospirosis*	0	0	0	0	12	1	0	8	1
Listeriosis*	2	4	0	0	3	3	1	0	0
Malaria*	2	19	0	2	9	3	2	4	0
Measles: total	0	1	0	0	0	1	0	0	0
Measles: laboratory confirmed*	0	1	0	0	0	1	0	0	0
Measles: other	0	0	0	0	0	0	0	0	0
Meningococcal disease (invasive): total	17	11	0	5	20	13	5	10	2
Meningococcal disease: type B*	8	5	0	2	11	7	3	5	1
Meningococcal disease: type C*	5	3	0	1	1	5	0	5	0
Meningococcal disease: type W135*	0	0	0	0	0	0	0	0	0
Meningococcal disease: type Y*	2	0	0	0	0	0	0	0	0
Meningococcal disease: other	2	3	0	2	8	1	2	0	1
Mumps*	1	5	0	1	1	0	0	0	0
Paratyphoid*	0	3	0	1	0	0	0	0	0
Pertussis	62	202	4	124	225	123	21	100	77
Pneumococcal disease: invasive*	69	67	7	30	83	47	12	30	22
Psittacosis*	0	1	0	14	19	1	5	5	1
Q fever*	0	4	20	6	25	6	75	27	13
Rubella: total*	1	3	0	0	2	2	0	0	0
Rubella*	1	3	0	0	2	2	0	0	0
Rubella: congenital*	0	0	0	0	0	0	0	0	0
Salmonellosis*	63	136	12	55	110	72	33	76	47
Shigellosis*	2	8	0	1	1	1	0	2	2
Syphilis: total	18	158	22	5	12	15	12	17	7
Syphilis: infectious* [+]	3	44	0	3	1	8	2	6	1
Syphilis: congenital	0	0	0	0	0	0	1	0	0
Syphilis: other*	15	114	22	2	11	7	9	11	6
Tetanus	0	0	0	0	0	0	0	0	0
Tuberculosis*	3	73	1	4	9	8	1	7	1
Typhoid*	0	3	0	0	0	0	0	0	0
Verotoxigenic *Escherichia coli* infections*	0	0	0	0	1	0	0	0	0

onset = the earlier of patient reported onset date, specimen date or date of notification; * = laboratory-confirmed cases only; NOS = not otherwise specified; + includes syphilis primary, syphilis secondary and syphilis <1 years duration.

CCA = Central Coast Area; CSA = Central Sydney Area; FWA = Far West Area; CHS = Correction Health Services; GMA = Greater Murray Area; HUN = Hunter Area; ILL = Illawarra Area; MAC = Macquarie Area; MNC = Mid North Coast Area; MWA = Mid Western Area.

TABLE 4 *continued*

NUMBER OF DISEASE NOTIFICATIONS BY AREA HEALTH SERVICE OF RESIDENCE,[#] NSW, 2003

Conditions	NEA	NRA	NSA	SA	SES	SWS
AIDS	2	5	5	1	33	5
Adverse event after immunisation	3	7	11	18	11	10
Arbovirus infection: total*	26	544	18	17	11	9
Barmah Forest virus infection*	8	264	1	9	1	0
Ross River virus infection*	16	277	5	7	1	0
Arboviral: other*	2	3	12	1	9	9
Blood lead level ≥ 15 µg/dl*	8	3	17	2	9	34
Brucellosis*	0	0	0	0	1	0
Chlamydia*	258	297	787	188	1406	538
Cryptosporidiosis*	22	11	16	3	28	13
Foodborne illness: NOS	0	23	74	15	345	61
Gastroenteritis: institutional	95	12	695	104	454	128
Giardiasis*	28	6	138	8	185	70
Gonorrhoea*	24	43	94	6	484	58
H. influenzae type b: total*	0	0	0	0	0	0
H. influenzae type b septicaemia*	0	0	0	0	0	0
H. influenzae type b infection: NOS*	0	0	0	0	0	0
Hepatitis A*	2	4	8	2	23	22
Hepatitis B: total*	26	26	309	9	394	786
Hepatitis B: acute viral*	1	2	7	0	18	9
Hepatitis B: other*	25	24	302	9	376	777
Hepatitis C: total*	72	248	260	111	598	658
Hepatitis C: acute viral*	0	1	11	4	44	2
Hepatitis C: other*	72	247	249	107	554	656
Hepatitis D*	0	0	1	0	1	2
Hepatitis E*	0	0	0	0	0	1
HIV infection*	4	7	25	1	165	16
Haemolytic uraemic syndrome	0	0	0	0	0	0
Influenza: total*	16	27	68	5	184	186
Influenza: type A*	12	26	65	3	164	174
Influenza: type B*	1	1	3	2	20	12
Influenza: NOS*	3	0	0	0	0	0
Legionnaires' disease: total*	0	0	2	1	5	0
Legionnaires' disease: *L. longbeachae**	0	0	0	1	5	0
Legionnaires' disease: *L. pneumophila**	0	0	2	0	0	0
Leprosy	0	0	1	0	0	0
Leptospirosis*	11	2	1	0	0	0
Listeriosis*	1	0	5	0	3	5
Malaria*	6	8	21	2	26	14
Measles: total	0	0	0	0	4	1
Measles: laboratory confirmed*	0	0	0	0	4	1
Measles: other	0	0	0	0	0	0
Meningococcal disease (invasive): total	6	10	9	7	30	24
Meningococcal disease: type B*	2	6	1	4	11	13
Meningococcal disease: type C*	1	2	4	2	7	5
Meningococcal disease: type W135*	1	0	0	0	1	0
Meningococcal disease: type Y*	0	0	0	0	1	2
Meningococcal disease: other	2	2	4	1	10	4
Mumps*	0	2	11	0	4	5
Paratyphoid*	0	3	3	0	6	1
Pertussis	52	58	350	127	387	332
Pneumococcal disease: invasive*	1	15	72	31	86	96
Psittacosis*	8	6	5	1	0	1
Q fever*	58	28	1	9	3	2
Rubella: total*	0	0	2	0	7	1
Rubella*	0	0	1	0	7	1
Rubella: congenital*	0	0	1	0	0	0
Salmonellosis*	54	147	241	40	260	211
Shigellosis*	2	1	9	1	14	4
Syphilis: total	34	25	42	8	227	152
Syphilis: infectious* [+]	10	3	13	0	123	8
Syphilis: congenital	1	0	0	0	0	0
Syphilis: other*	23	22	29	8	104	144
Tetanus	0	0	0	0	1	0
Tuberculosis*	1	1	37	4	68	65
Typhoid*	0	0	1	0	2	2
Verotoxigenic *Escherichia coli* infections*	0	0	0	0	0	0

onset = the earlier of patient reported onset date, specimen date or date of notification; * = laboratory-confirmed cases only; NOS = not otherwise specified; + includes syphilis primary, syphilis secondary and syphilis <1 years duration.

NEA = New England Area; NRA = Northern Rivers Area; NSA = North Sydney Area; SA = Southern Area; SES = South Eastern Sydney; SWS = South Western Sydney; WEN = Wentworth Area; WSA = Western Sydney Area; Total = Total in NSW residents.

TABLE 5

NUMBER OF DISEASE NOTIFICATIONS BY AGE GROUP AND SEX OF THE CASE,[#] NSW, 2003

Conditions	0–4 yrs M	0–4 yrs F	5–24 yrs M	5–24 yrs F	25–44 yrs M	25–44 yrs F	45–64 yrs M	45–64 yrs F	65 + yrs M	65 + yrs F	Total[a] M	Total[a] F	Total[#]
AIDS	0	0	0	0	62	1	46	0	5	0	113	1	116[b]
Adverse event after immunisation	52	54	30	39	1	9	5	12	6	9	94	123	217
Arbovirus infection: total*	2	3	34	46	199	188	206	228	66	49	507	514	1022
Barmah Forest virus infection*	2	1	12	17	83	83	106	99	23	24	226	224	451
Ross River virus infection*	0	2	12	23	99	87	92	116	40	23	243	251	494
Arboviral: other*	0	0	10	6	17	18	8	13	3	2	38	39	77
Blood lead level ≥ 15 µg/dl*	25	24	39	1	130	2	68	3	5	0	267	30	298
Brucellosis*	0	0	0	1	0	0	1	0	0	0	1	1	2
Chlamydia*	15	10	1343	2804	1719	1340	209	77	19	10	3306	4244	7562
Cryptosporidiosis*	41	40	33	32	16	21	7	6	3	3	100	102	202
Giardiasis*	153	133	105	92	193	149	82	72	21	25	554	471	1026
Gonorrhoea*	1	1	210	83	703	68	114	4	8	0	1036	156	1196
H. influenzae type b: total*	2	1	1	0	0	1	0	1	0	0	3	3	6
H. influenzae type b septicaemia*	1	0	0	0	0	0	0	0	0	0	1	0	1
H. influenzae type b infection: NOS*	1	1	1	0	0	1	0	1	0	0	2	3	5
Hepatitis A*	4	3	28	23	30	17	4	8	4	3	70	54	124
Hepatitis B: total*	6	2	227	262	940	702	410	266	69	55	1652	1288	2949
Hepatitis B: acute viral*	1	0	9	9	31	7	7	3	2	1	50	20	70
Hepatitis B: other*	5	2	218	253	909	695	403	263	67	54	1602	1268	2879
Hepatitis C: total*	16	5	499	383	2034	1128	698	336	76	79	3326	1932	5277
Hepatitis C: acute viral*	0	0	20	17	50	28	8	3	1	0	79	48	127
Hepatitis C: other*	16	5	479	366	1984	1100	690	333	75	79	3247	1884	5150
Hepatitis D*	0	0	3	0	5	0	4	0	0	0	12	0	12
Hepatitis E*	0	0	2	0	2	1	0	1	0	0	4	2	6
HIV infection*	0	0	27	13	262	15	75	4	8	0	372	32	414
Haemolytic uraemic syndrome	1	3	1	0	0	0	0	0	0	0	2	3	5
Influenza: total*	265	217	61	37	32	46	43	43	67	50	468	393	861
Influenza: type A*	249	207	53	31	29	34	29	32	59	44	419	348	767
Influenza: type B*	3	2	6	5	3	8	10	9	4	5	26	29	55
Influenza: NOS*	13	8	2	1	0	4	4	2	4	1	23	16	39
Legionnaires' disease: total*	0	0	0	0	3	2	22	8	17	8	42	18	60
Legionnaires' disease: *L. longbeachae**	0	0	0	0	1	1	15	5	10	5	26	11	37
Legionnaires' disease: *L. pneumophila**	0	0	0	0	2	1	7	3	7	3	16	7	23
Leprosy	0	0	0	0	1	0	0	0	0	0	1	0	1
Leptospirosis*	1	0	7	1	11	4	7	3	3	0	29	8	37
Listeriosis*	1	2	0	1	0	0	2	4	8	10	11	17	28
Malaria*	0	3	24	12	48	16	25	4	5	2	102	37	144
Measles: total	6	0	3	3	4	2	0	0	0	0	13	5	18
Measles: laboratory confirmed*	5	0	3	3	2	1	0	0	0	0	10	4	14
Measles: other	1	0	0	0	2	1	0	0	0	0	3	1	4
Meningococcal disease (invasive): total	40	26	46	35	13	8	8	12	6	9	113	90	203
Meningococcal disease: type B*	28	22	13	13	2	4	2	9	4	3	49	51	100
Meningococcal disease: type C*	3	1	18	13	4	2	2	1	1	1	28	18	46
Meningococcal disease: type W135*	0	0	1	1	0	0	0	0	0	0	1	1	2
Meningococcal disease: type Y*	0	0	0	0	0	0	0	1	0	4	0	5	5
Meningococcal disease: other	9	3	14	8	7	2	4	1	1	1	35	15	50
Mumps*	0	1	1	7	12	5	5	3	0	1	18	17	35
Paratyphoid*	0	1	6	1	8	2	3	1	0	0	17	5	22
Pertussis	120	105	574	552	277	413	228	333	72	93	1271	1497	2768
Pneumococcal disease: invasive*	137	112	32	23	61	64	63	57	124	112	417	368	785
Psittacosis*	1	1	2	4	15	14	23	16	7	4	48	39	87
Q fever*	2	0	40	13	70	27	74	27	22	4	208	71	280
Rubella: total*	2	1	5	3	7	3	1	2	0	0	15	9	24
Rubella*	2	0	5	3	7	3	1	2	0	0	15	8	23
Rubella: congenital*	0	1	0	0	0	0	0	0	0	0	0	1	1
Salmonellosis*	269	263	259	269	201	190	104	120	77	85	910	927	1843
Shigellosis*	3	3	4	6	16	13	9	2	1	2	33	26	59
Syphilis: total	0	8	20	38	311	114	192	31	73	50	596	241	838
Syphilis: infectious* [+]	0	0	11	8	151	13	52	4	2	1	216	26	242
Syphilis: congenital	0	2	0	0	0	0	0	0	0	0	0	2	2
Syphilis: other*	0	6	9	30	160	101	140	27	71	49	380	213	594
Tetanus	0	0	0	0	0	0	0	0	1	0	1	0	1
Tuberculosis*	6	6	26	23	80	78	34	56	40	32	186	195	381
Typhoid*	0	0	3	2	5	0	0	0	1	0	9	2	11
Verotoxigenic *Escherichia coli* infections*	0	0	0	0	0	1	0	1	0	0	0	2	2

onset = the earlier of patient reported onset date, specimen date or date of notification; * = laboratory-confirmed cases only; NOS = not otherwise specified; + includes syphilis primary, syphilis secondary and syphilis <1 years duration.

a = includes cases with unknown age and sex; b = includes 2 transgender cases within the 45–64 age group.

TABLE 6

REPORTED DEATHS OF RESIDENTS BY YEAR OF ONSET OF ILLNESS,# NSW, 1991 TO 2003

Conditions	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Adverse event after immunisation	0	1	0	1	0	2	1	0	1	1	2	1	0
Arbovirus infection: total*	2	1	0	0	0	0	0	0	0	0	1	0	0
Ross River virus infections*	2	1	0	0	0	0	0	0	0	0	1	0	0
Blood lead level ≥ 15 µg/dl*	not notifiable until Dec 1996						2	0	0	0	0	0	0
Chlamydia trachomatis infections*	0	0	0	0	0	0	0	0	0	0	0	1	0
Foodborne illness: NOS	1	0	1	0	0	0	0	0	0	0	0	0	0
Gastroenteritis: institutional	0	1	2	0	1	0	0	1	0	2	1	15	0
Giardiasis*	not notifiable until Dec 1998									1	0	0	0
Gonorrhoea*	0	1	0	0	0	0	0	1	0	0	0	0	0
H. influenzae type b: total*	4	4	4	1	0	2	0	0	0	1	1	0	0
H. influenzae type b epiglottitis*	0	1	0	0	0	0	0	0	0	1	0	0	0
H. influenzae type b infection: NOS*	2	0	1	0	0	0	0	0	0	0	1	0	0
H. influenzae type b meningitis*	2	3	3	0	0	0	0	0	0	0	0	0	0
H. influenzae type b septicaemia*	0	0	0	1	0	2	0	0	0	0	0	0	0
Hepatitis A*	2	1	0	0	0	0	1	2	0	0	0	1	0
Hepatitis B: total*	4	5	6	1	1	1	1	1	1	1	4	1	2
Hepatitis B: acute viral*	0	0	1	0	0	0	0	0	0	0	0	0	1
Hepatitis B: other*	4	5	5	1	1	1	1	1	1	1	4	1	1
Hepatitis C: total*	4	12	6	6	8	15	23	13	17	20	18	10	8
Hepatitis C: acute viral*	0	1	0	0	0	0	0	0	0	0	2	0	0
Hepatitis C: other*	4	11	6	6	8	15	23	13	17	20	16	10	8
Hepatitis E*	0	0	0	0	0	0	0	0	0	0	1	0	0
HIV infection*£	444	455	446	424	261	137	53	45	32	31	19	22	27
AIDS	395	368	381	368	228	119	41	37	23	23	12	11	14
Haemolytic uraemic syndrome	not notifiable until Dec 1996						0	0	1	1	0	1	0
Influenza: total*	not notifiable until Dec 2000										0	0	1
Influenza: type A*	not notifiable until Dec 2000										0	0	1
Legionnaires' disease: total*	6	12	8	8	7	9	2	6	4	2	3	1	2
Legionnaires' disease: *L. longbeachae**	0	1	2	0	1	1	0	5	1	1	1	1	0
Legionnaires' disease: *L. pneumophila**	1	10	5	3	4	6	2	0	2	1	2	0	2
Legionnaires' disease: other	5	1	1	5	2	2	0	1	1	0	0	0	0
Leptospirosis*	0	0	0	0	0	0	1	0	0	0	0	1	0
Listeriosis*	0	0	2	2	2	9	1	5	4	4	3	1	6
Malaria*	0	1	0	0	0	0	0	0	0	0	0	0	0
Measles: total	3	2	0	0	0	0	0	0	0	0	0	0	0
Measles: laboratory confirmed*	1	0	0	0	0	0	0	0	0	0	0	0	0
Measles: other	2	2	0	0	0	0	0	0	0	0	0	0	0
Meningococcal disease (invasive): total	0	0	2	2	3	2	6	13	12	11	7	18	12
Meningococcal disease: type B*	0	0	1	1	3	0	4	2	7	6	2	8	6
Meningococcal disease: type C*	0	0	1	1	0	2	2	10	4	4	5	10	6
Meningococcal disease: type W135*	0	0	0	0	0	0	0	0	1	0	0	0	0
Meningococcal disease: type Y*	0	0	0	0	0	0	0	1	0	1	0	0	0
Meningococcal disease: other	3	8	9	13	4	5	1	4	2	3	0	1	2
Pertussis	0	0	0	0	2	2	3	1	1	2	0	0	1
Pneumococcal disease: invasive*	not notifiable until Dec 2000										6	96	68
Psittacosis*	not notifiable until Dec 2000										1	1	0
Q fever*	0	0	0	1	0	1	0	0	2	0	0	1	0
Salmonella infection*	3	0	0	0	4	4	4	3	3	1	2	3	0
Syphilis: total	0	0	0	1	1	0	1	0	1	2	1	1	1
Syphilis: infectious*+	0	0	0	0	0	0	0	0	0	0	0	1	0
Syphilis: congenital	0	0	0	1	1	0	0	0	0	1	0	0	0
Syphilis: other*	0	0	0	0	0	0	1	0	1	1	1	0	1
Tetanus	0	0	1	0	0	0	0	0	0	0	0	0	0
Tuberculosis*	10	26	31	25	23	16	21	25	29	40	33	39	19

onset = the earlier of patient reported onset date, specimen date or date of notification; * = laboratory-confirmed cases only; NOS = not otherwise specified; £ = deaths in people with HIV may be reported as related to AIDS or where the cause is apparently unrelated to their HIV infection; + includes syphilis primary, syphilis secondary and syphilis <1 years duration.

A LARGE OUTBREAK OF NOROVIRUS GASTROENTERITIS LINKED TO A CATERING COMPANY, NEW SOUTH WALES, OCTOBER 2003

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BACKGROUND

Noroviruses (formerly known as Norwalk-like viruses) can cause large outbreaks of gastrointestinal disease in humans.[1] Infection with norovirus is commonly characterised by a sudden onset of diarrhoea and/or vomiting, lethargy, headache, abdominal discomfort, nausea, anorexia, and fever. Symptoms start about 12–36 hours after a person acquires the infection and usually resolve within 72 hours. Most people recover with rest; however, symptoms can sometimes be severe and require treatment in hospital. Illness often results in working days lost and other costs.[2]

Noroviruses are shed in the faeces or vomit of infected people when they are ill and possibly for a few days after symptoms cease. Noroviruses are highly infectious and can survive in food, water, and on environmental surfaces for long periods.[1,3,4] Transmission of noroviruses is usually via the faecal–oral route, through person-to-person contact, consumption of contaminated food or drink, contact with contaminated surfaces or objects, or possibly by aerosol when someone with norovirus infection vomits.[1,3,4,5]

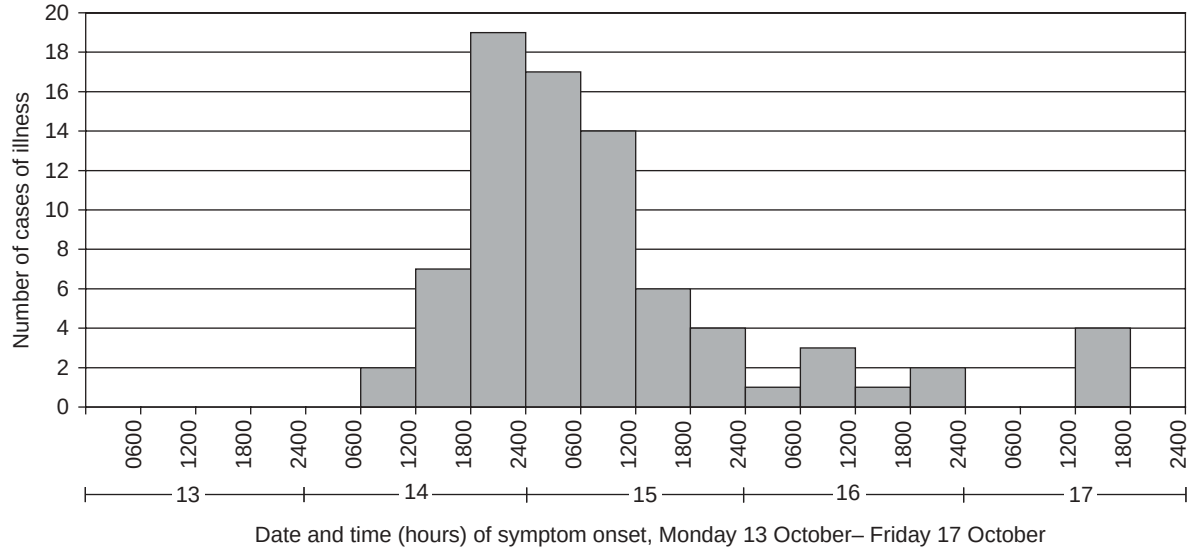
The *NSW Public Health Act 1991* states that clinicians and hospitals must report to public health units any case of gastrointestinal disease occurring in an institution or where two or more cases of foodborne disease that are linked are identified. On 16 October 2003, the Greater Murray Area Health Service in southern NSW was alerted to a suspected outbreak of diarrhoea and vomiting illness among people who had attended a number of events in a rural city from Monday 13 to Wednesday 15 October. One catering company based in that city had provided the food and beverage for these events. Active surveillance through local general medical practitioners and hospital emergency departments did not identify any other clusters of gastrointestinal illness in the city. This article describes an investigation undertaken to determine the extent of the outbreak, the causative agent, risk factors for illness, and measures taken to control the spread of the outbreak.

METHODS

Staff of the catering company were interviewed about the type of foodstuffs used and about the sources of purchase, food handling practices, personal hygiene practices, toilet

FIGURE 1

ONSET OF DIARRHOEA OR VOMITING AMONG CASES OF ILLNESS IN A GASTROENTERITIS OUTBREAK IN A RURAL CITY, NSW, 13–17 OCTOBER 2003



Source: Interviews with event attendees.

and hand-washing facilities at work, days worked in weeks prior to 13 October, and recent history of illness or symptoms of gastroenteritis. We requested that the catering company provide a list of all the events that they had catered between 13 and 15 October. Menus of food and beverage items served at each event were also requested. The organisers of the events were contacted to request a list of the people who attended.

A retrospective cohort study was conducted among people who attended any of the events catered for by the catering company between 13–15 October to identify risk factors associated with cases of illness. We analysed the association between cases of illness and food consumed at each meal at each event. Exposures included food or beverage items provided at morning tea (including sweet slices, cakes and muffins) and lunch items (including different types of sandwiches, sliced fruit, deep-fried foods, and orange juice). Respondents who answered 'don't know' to a particular food exposure were excluded from the analysis of that particular food exposure. A case of illness was defined as diarrhoea and/or vomiting with onset between 13 and 17 October, in a person who attended any of the events catered for by the catering company between 13 and 15 October.

Respondents who at the time of interview reported still having diarrhoea or loose stools, or who still felt unwell, were requested to supply a stool sample for testing. Specimens were examined for organisms including: norovirus by a single tube, reverse transcriptase Polymerase Chain Reaction (PCR) assay;[6,7] rotavirus and adenovirus by antigen detection; *Salmonella*, *Shigella*, *Campylobacter* and other bacteria by culture; and *Cryptosporidium* and *Giardia* by enzyme immunoassay (EIA).

EpiInfo 2002 was used to analyse the interview data. We compared the relative risk of illness among people who reported an exposure (such as eating sweet slices) with that of people without that exposure. Univariate analysis was performed using the chi-square test and when expected cell counts were less than 5, Fisher's exact two-sided *p* value was used.

On 16 October, a food inspector from the Greater Murray Area Health Service inspected the catering company's premises including the toilet and hand washing facilities and the food storage facilities, and observed food handling and hygiene practices. A list of the manufacturers of the foodstuffs used by the catering company was obtained. No food prepared by the caterers between 12–15 October was available for testing.

RESULTS

Retrospective cohort study

Catering company staff reported that from 12 October they prepared 21 meals for 14 events held between 13–15 October. Of the 14 events, three were held over a two-day period and a number of meals were served at each of these events. Many people interviewed had consumed more than one catered meal on one or more days. Two hundred and

TABLE 1

ATTACK RATES AMONG FIVE GROUPS OF PEOPLE WHO CONSUMED MEALS SERVED AT FOUR EVENTS IN A RURAL CITY IN NSW THAT WERE PREPARED BY A CATERING COMPANY, 13 TO 15 OCTOBER 2003

Groups who had consumed catered meals	Meal items	Reported number of people at each meal *N*	Number of people interviewed *N*	People with diarrhoea and/or vomiting *N*	Attack rate among those interviewed %
Group A *Monday morning tea*	Muffins, scones, cakes, slices	99*	72	42	58
Group A *Monday lunch*	Mixed sandwiches, fruit, orange juice	99*	79	46	58
Group A *Tuesday morning tea*	Muffins, scones, cakes, slices	99*	70	44	63
Group B *Monday lunch*	Mixed sandwiches, deep fried food, fruit	11	9	7	78
Group C *Monday lunch*	Mixed sandwiches, fruit, orange juice	15	15	11	73
Group C *Tuesday lunch*	Mixed sandwiches, fruit, orange juice	16	16	12	75
Group D *Wednesday lunch*	Mixed sandwiches, fruit, orange juice	13	13	6	46
Group E† *All Monday lunches*	Mixed sandwiches, fruit, deep fried food, orange juice	139	105	66	63

* Best estimate of number of people in Group A.

† All people interviewed who had a catered lunch on Monday 13 October and comprises of people from Group A, B and C, and two people who attended other lunches.

Source: Event attendance lists and interviews with event attendees.

thirty-five people were reported to have attended these events. We attempted to reach all these people and made contact with 137 (58 per cent) all of whom agreed to be interviewed either by telephone or face-to-face. Eighty reported illness with onset of diarrhoea and/or vomiting between 13–17 October (Figure 1). Cases of illness were identified among people who ate food from 16 of the 21 meals.

Of the 137 people interviewed, most (127) had attended one or more of four particular events (identified as events A, B, C and D). A high proportion of the people who had attended one or more of these four events were interviewed (Table 1). Of the 127 people interviewed from groups A, B, C and D, two were excluded from the analysis due to illness known to be due to another cause. For the 125 people from groups A, B, C and D, their mean age was 42.6 years (range 18–70 years) and 60 per cent were women. Seventy-three (59 per cent) reported illness after attending these events, and all these people had diarrhoea and/or vomiting between 13–17 October. The most common symptoms reported by people who became ill were diarrhoea, fatigue, nausea and vomiting (Table 2). Thirteen (18 per cent) saw a doctor and one person was admitted to hospital. A quarter reported that other members of their households had since become ill with similar symptoms.

In univariate analysis, of 135 different food and beverage items examined, there was no association between illness and food items consumed for any of groups B, C or D. In Group A, illness was statistically associated with passionfruit slices consumed at morning tea on 13 October, with ham sandwiches consumed at lunch that same day, and with any sweet slice consumed at morning tea on 14 October. Among all people interviewed who ate lunches on 13 October (Group E), illness was associated with consumption of ham sandwiches (Table 3).

TABLE 2

SYMPTOMS EXPERIENCED BY 73 PEOPLE WHO ATTENDED FOUR EVENTS IN A RURAL CITY IN NSW THAT WERE CATERED BY A CATERING COMPANY AND WHO HAD ONSET OF VOMITING AND/OR DIARRHOEA BETWEEN 13 AND 17 OCTOBER.

Symptom	*N*	%
Diarrhoea	68	93
Fatigue–lethargy	62	85
Nausea	60	82
Vomiting	59	81
Abdominal cramps	52	71
Chills	50	69
Body aches	49	67
Fever	47	64
Headache	47	64
Bloody diarrhoea	2	3

Source: Responses by event attendees collected by questionnaire.

Laboratory testing

Of four stool specimens submitted by cases for testing, three were confirmed positive for Norovirus by PCR molecular testing, and were negative for other viruses, bacterium, and parasites.

Illness and food handling practices of the catering company

Catering company staff reported that three people were involved with food handling and preparation from 12 October to 15 October and another person assisted in delivering meals to the events. One food handler reported becoming ill with diarrhoea and vomiting around midday 15 October. Although the other two food handlers denied a history of illness in either the week of or prior to the outbreak, it was otherwise reported that these two people had been ill with diarrhoea and vomiting in the two days prior to the outbreak. It was also reported that a family member of one of these food handlers had been sick with diarrhoea and vomiting on 10 October, and also that all sweet slices were prepared in the home of this food handler, rather than at the catering premises.

A leg of corned beef was prepared on the catering premises on 12 October. Cakes and slices served on 13 October were prepared (reportedly in the homes of the caterers) the night before, as were those served on 14 October. Sandwiches were prepared daily by laying the bread and ingredients out on a large bench and combining ingredients to make a variety of sandwich types. All fruits and sandwich ingredients were cut up by hand, and ham, tomato and cucumber were sliced on a machine slicer. Frozen foods were deep fried just prior to delivery.

The caterers reported washing hands using a hand gel prior to handling food but did not use gloves for food preparation. On inspection, hand-washing facilities were inadequate and it was reported that soap and hand towels were not routinely provided.

Public health intervention

The Greater Murray Area Health Service advised the catering company food handlers on health, hygiene, and food handling practices in accordance with the Food Standards Code and NSW Health recommendations.[8,9] The Greater Murray Area Health Service issued local media releases to remind food businesses and the public that ill people should not handle or prepare food while they are sick or for at least 48 hours after their symptoms cease, and that thorough hand washing and disinfecting of surfaces was the best protection against secondary spread of illness among close contacts such as household members. The catering company voluntarily ceased all operations from 16 October for a short period.

DISCUSSION

A large outbreak of gastrointestinal illness occurred among people who had consumed food prepared by a catering company and served at numerous events in mid-October 2003. Epidemiological evidence implicated several foods. Interviews with food handlers and

TABLE 3

FOOD ITEMS PREPARED BY THE CATERING COMPANY WHICH WERE SIGNIFICANTLY ASSOCIATED WITH ILLNESS IN PEOPLE ATTENDING FOUR EVENTS IN A RURAL CITY IN NSW, 13 TO 15 OCTOBER 2003

Group	Number of people interviewed from each meal#	Illness/ Exposed		Illness/ Not exposed		Relative Risk (95% CI)	*P* value
	N	*N*	%	*N*	%		
Group A: *Monday morning tea; passionfruit slice*	61	7/7	100.0	25/54	46.3	2.2 (1.6–2.9)	<0.01
Group A: *Monday lunch; ham sandwich*	67	27/37	73.0	14/30	46.7	1.6 (1.0–2.4)	0.03
Group E: *All Monday lunches; ham sandwich*	91	38/50	76.0	21/41	51.2	1.5 (1.1–2.1)	0.01
Group A: *Tuesday morning tea; any sweet slice*	68	20/26	76.9	22/42	52.4	1.5 (1.0–2.1)	0.04

those who could not recall eating the food item were excluded from the analysis.

Source: Event menus provided by catering company and questionnaire responses of event attendees.

inspections of the catering premises suggested that contamination of the foods by ill food handlers had occurred. Laboratory evidence suggested the causative agent was a norovirus. The onset of illness in cases occurred within a 48-hour period, suggesting a common point source for this outbreak.[2] The shape of the epidemic curve and the investigation findings point towards food contamination of ready-to-eat foods as the source, consistent with the epidemiological findings of previous gastroenteritis outbreaks caused by noroviruses.[1,10]

This investigation had a number of limitations. Some participants in the study reported that it was difficult to recall what they ate at the events due to the smorgasbord-style presentation of the food. Many people interviewed had eaten one or more meals on one or more days. This introduced the potential for multiple exposures and made it difficult to determine an incubation period and interpret the findings of univariate analysis. By the time the investigators had determined the point source, the catering company had cleaned its premises, however interviews with staff alerted the investigators to potential problems within the operation.

During outbreak investigations, it may be helpful to provide managers of food businesses with a fact sheet that describes what they should do when their business is being investigated as a possible source of a disease outbreak. This may facilitate their cooperation with the investigation.

To strengthen prevention of foodborne disease outbreaks in such a setting, the Australian and New Zealand Food Regulation Ministerial Council agreed in December 2003 to mandatory food safety programs in identified high risk areas including catering. The NSW Food Authority will implement the agreement in New South Wales.

CONCLUSION

This outbreak investigation highlighted a number of important food safety issues. To minimise the risk of large-scale foodborne illness outbreaks, businesses that prepare foods must do so in a safe manner.[8,9] Food handlers who have enteric infections should exclude themselves from food handling while sick and for at least 48 hours after complete resolution of symptoms, regardless of the food preparation setting; that is, whether food preparation is done in a commercial premises or a domestic kitchen. The timely collection of stool specimens from all food handlers involved in an outbreak may be useful when a food handler is suspected to be the source of an outbreak.

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RISK FACTORS FOR SPORADIC *SALMONELLA* BIRKENHEAD INFECTION IN QUEENSLAND AND NORTHERN NEW SOUTH WALES: A CASE CONTROL STUDY

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Salmonella Birkenhead is one of the most commonly notified causes of gastroenteritis in southern Queensland and northern New South Wales. It is notified infrequently in other areas of Australia. This limited geographical distribution suggests a possible environmental source. A case control study was conducted to explore risk factors for sporadic infection with *Salmonella* Birkenhead and to inform interventions to reduce the incidence of human infection.

BACKGROUND

Salmonella bacteria are a common cause of human gastroenteritis worldwide. Only a small proportion of cases are diagnosed and reported, with the highest incidence of these being in young children.[1] *Salmonella* bacteria are also carried by a wide range of wild and domestic animals and can be excreted in their faeces.[1] There are more than 2,000 serotypes, with considerable global variation in prevalence and geographic distribution. Data from outbreak investigations of several common *Salmonella* serotypes have identified poultry, eggs, beef, milk, contaminated water, and raw fruit and vegetables, as vehicles of infection.[1–3]

Studies of risk factors for sporadic salmonellosis are uncommon. Risk factors for specific serotypes are usually identified by investigation of outbreaks; however, large case control studies of a common serotype in the United States and the United Kingdom, *Salmonella* Enteritidis, have demonstrated shell eggs (in particular the eggs of intensively-reared hens) to be the main risk factor for disease caused by this serotype in these countries.[4–5]

More than 200 cases of *Salmonella* Birkenhead disease are reported annually in Australia.[6–7] Over 90 per cent of these come from Queensland and New South Wales (NSW),[6–7] with the geographic distribution largely limited to southern Queensland and northern NSW (Figure 1). Between 1996 and 2002, 1,038 cases of *Salmonella* Birkenhead were notified in Queensland and 350 cases were notified in the Northern Rivers Area Health Service of NSW (data from the Queensland Notifiable Conditions Surveillance System and the NSW Notifiable Diseases Database). This represents seven per cent and 30 per cent of all *Salmonella* notifications in these regions respectively. An extensive review of the published literature failed to find any information regarding risk factors for infection due to *Salmonella* Birkenhead.

The specific geographical distribution of *Salmonella* Birkenhead, and the rarity of its isolation from animals involved in the food production chain,[8–12] suggest

FIGURE 1

***SALMONELLA* BIRKENHEAD NOTIFICATIONS BY STATISTICAL SUBDIVISION, QUEENSLAND AND NSW, 1996-2002**

Source: NSW Notifiable Diseases Database, NSW Health and Queensland Notifiable Conditions Surveillance System, Queensland Health

a potential environmental source. Environmental sources of *Salmonella* are thought to be important in the epidemiology of salmonellosis due to some serotypes.[13] Faecal contamination of the environment by native fauna or other animals could provide an opportunity for human exposure.

We conducted a case control study to explore risk factors for sporadic infection with *Salmonella* Birkenhead, in order to better understand the epidemiology of this serotype and to inform interventions to reduce the incidence of human infection. The choice of exposure factors to be investigated was influenced by our study hypothesis of an environmental source of infection; however, other potential sources of exposure were also included.

METHODS

Case and control selection

Cases were identified from notifications of *Salmonella* Birkenhead infection in Queensland and the Northern Rivers Area Health Service of NSW, through the routine notifiable disease reporting systems of each state, for the period October 2001 to December 2002. All the cases from Queensland were included, because Queensland has a centralised notification system simplifying the process for seeking ethics approval by requiring a single application to the Princess Alexandra Hospital Research and Ethics Committee. In NSW, where notifications are coordinated by each area health service, only the Northern Rivers Area Health Service, which had the greatest concentration of cases in NSW, was included. Ethics approval for this part of the study was obtained from the Northern Rivers Area Health Service Ethics Committee. To include all notifications from NSW would have required seeking ethical approval from multiple area health services for the addition of relatively few cases.

Notification of salmonellosis by pathology laboratories is mandatory under public health legislation in both Queensland and NSW. Cases were defined as residents of Queensland or the Northern Rivers Area Health Service of NSW, with a recent history of diarrhoea, and an infection with *Salmonella* Birkenhead confirmed by stool culture that was notified within the study period. To be eligible for the study, cases were required to meet the following criteria: they have adequate English skills; their infection was not acquired overseas; they were interviewed within 30 days of onset of diarrhoea; the onset of their diarrhoea was less than 10 days prior to specimen collection; they were not part of an identified outbreak; there was no other enteric pathogen isolated from the same faecal specimen; and no other member of their household had diarrhoea or was diagnosed with *Salmonella* infection in the four weeks prior to onset of illness.

Each case was matched with two controls using the age categories 0–4, 5–9, 10–19, 20–29, 30–59, and greater than 60 years. Controls were identified using a list of telephone numbers compiled from the electronic residential telephone directory. This list was randomly generated using a weighting system that provided a geographical distribution of telephone numbers approximating that of notifications. Potential controls were excluded if: they had suffered from diarrhoea in the four weeks prior to interview; they had inadequate English skills; or a member of their household had diarrhoea or was diagnosed with *Salmonella* infection in the four weeks prior to interview. Controls were interviewed as soon as possible and within a maximum of 30 days of the case's interview.

Questionnaire administration

Controls and cases were interviewed by telephone. All controls and the Queensland cases were interviewed by Queensland-based interviewers using a Computer Assisted Telephone Interviewing (CATI) system. The NSW cases were interviewed by one NSW-based public health officer using a paper-based version of the questionnaire. This design was selected due to concerns by the NSW researchers that it would be difficult to obtain ethical approval to have NSW cases interviewed by interviewers located interstate.

The questionnaire used was designed for the study. Conversion of the questionnaire to CATI format resulted in several minor differences relative to the paper-based questionnaire administered to NSW cases. Before the study commenced, the CATI interviewers received training that was tailored to the study, and during the study their interview technique was periodically monitored by supervisors. Questionnaire delivery and peer monitoring issues were discussed intensively with the interviewer of the NSW cases prior to the study, to support consistency of approach and minimise potential bias. A call-back protocol was established for the study, which standardised how many times a call was repeated if there was no answer.

For all cases and controls under the age of 15 years, or over 15 years but under 18 where the parent or guardian did not consent to a direct interview, information was obtained from the available parent or guardian who was most familiar with the case–control's diet and behaviour.

As well as demographic details and symptoms of illness, the questionnaire sought comprehensive information about a range of exposures including: contact with native fauna, farm animals and domestic pets; recreational activities involving potential contact with native animals or ingestion of water; and consumption of untreated water. The questionnaire explored food consumption and household food hygiene practices but did not include a detailed list of food items prepared and consumed. Exposure information for cases was sought for the seven days prior to the onset of illness. For controls, exposure information was sought for the seven days prior to interview. A copy of the questionnaire is available on request.

Sample size

The expected number of cases in the study region for a 12-month period, based on historical data, was approximately 170. Based on a case:control ratio of 1:2 with unmatched analysis, this number would enable the detection of an odds ratio of 2.0 at the five per cent significance level with 85 per cent power (assuming a 15 per cent exposure level among controls).

Data management and analysis

De-identified data were collected using EpiInfo version 6.04d.[14] Data quality was checked following entry into the database and prior to analysis. Data analysis was undertaken using SAS version 8.02.[15] We analysed the full range of exposure variables by calculating univariate odds ratios with 95 per cent confidence intervals (CIs). Statistical significance was assessed using the chi-square test for equal proportions. Multivariate analysis was conducted using stepwise logistic regression. All demographic and biologically plausible exposure variables with a univariate *P* value less than 0.2 were included in the initial model. A parsimonious model was arrived at by iterative removal of the variable with the highest *P* value, until only statistically significant parameters ($P < 0.05$) remained in the model. Stratified modelling by selected demographic variables was also undertaken to explore effect modification.

RESULTS

There were 217 cases of *Salmonella* Birkenhead infection notified during the study period. Of these, 75 were excluded due to: inadequate English skills (*n*=3); no history of diarrhoea (*n*=12); not interviewed within 30 days of onset of diarrhoea (*n*=25); onset of diarrhoea more than 10 days prior to specimen collection (*n*=7); part of an outbreak (*n*=2); infection acquired overseas (*n*=1); another enteric pathogen isolated from the same faecal specimen (*n*=10); household member with diarrhoea or diagnosed *Salmonella* infection in the four weeks prior to onset of illness (*n*=9); deceased (*n*=1), and for unspecified reasons (*n*=5).

Of the 142 eligible cases, 111 were enrolled, 30 from NSW and 81 from Queensland, a response rate of 78 per cent. Reasons for not responding were: physician not contactable or refused consent (*n*=10); refused to participate (*n*=1); no telephone number (*n*=9); and not contactable after six attempts (*n*=11). Diarrhoea was reported by all enrolled cases, fever by 80 per cent, vomiting by 51 per cent, and presence of blood in the stools by 29 per cent.

There were 429 controls identified. Of these, 99 were excluded due to: inadequate English skills (*n*=39); diarrhoea in the four weeks prior to interview (*n*=37); and another household member with diarrhoea or diagnosed *Salmonella* infection in the four weeks prior to onset of illness (*n*=23). Of the 330 eligible controls, 234 agreed to participate, 56 from NSW and 178 from Queensland, giving a response rate of 71 per cent.

Univariate analysis

Table 1 compares the demographic profile of the cases and controls. There was no significant difference between the groups for their age, sex, location of residence (urban or rural) and level of education. Results for selected exposure variables are presented in Table 2. The selection of these variables was informed by the literature and the study hypothesis (full results, stratified by state, are available on request). Fewer cases (69 per cent) than controls (78 per cent) reported eating non-home-cooked food (any food not prepared in their own home, excluding home-cooked meals consumed in another person's house: OR 0.6; 95 per cent CI 0.4–1.0). People who reported eating food not prepared in their own home were asked additional questions about the sources of this food. Specific sources that were associated with a significantly reduced risk included hamburger chains (OR 0.5; 95 per cent CI 0.3–0.9), pizza chains (OR 0.2; 95 per cent CI 0.1–0.6), fish and chip shops (OR 0.5; 95 per cent CI 0.2–1.0), bakeries (OR 0.4; 95 per cent CI 0.2–0.8), and sit-down restaurants (OR 0.4; 95 per cent CI 0.2–0.8). A significantly greater number of cases (17 per cent) than controls (nine per cent) reported not usually washing or peeling fruit or vegetables before eating raw (OR 2.1; 95 per cent CI 1.1–4.2). Of the environmental exposures, cases were more likely to have swum in a lake during the seven-day exposure period compared to controls (OR 3.7; 95 per cent CI 0.9–15.8).

Multivariate analysis

The final multiple logistic regression model included only the variables relating to fruit and vegetable washing–peeling and consumption of non-home-cooked food. Response categories for the non-home-cooked food variable included whether food was obtained from a fast food chicken chain. Cases were significantly more likely to: not usually wash or peel raw fruit or vegetables (OR 2.3; 95 per cent CI 1.1–4.7); have eaten only home-cooked food, that is, no reported consumption of non-home-cooked food (OR 1.9; 95 per cent CI 1.1–3.4); and to have eaten food from a fast food chicken source (OR 2.0; 95 per cent CI 1.0–4.0), compared to controls. As there were differences between the states in the prevalence of these variables, the results are presented stratified by state of residence (Table 3). In NSW, cases were significantly more likely to have eaten food from a fast food chicken source, and to not usually wash or peel raw fruit or vegetables, compared to controls. Eating home-cooked food only (that is, not reporting any consumption of non-home-cooked food) was the only significant risk factor for infection in Queensland residents.

The R-squared measure (a measure of the proportion of disease variation that is explained by a model) for the final model was 0.33 for NSW residents and 0.04 for

TABLE 1

DEMOGRAPHIC PROFILE OF *SALMONELLA* BIRKENHEAD CASES AND CONTROLS, QUEENSLAND AND NORTHERN NSW, OCTOBER 2001 TO DECEMBER 2002

Characteristic	Cases Number	Cases %	Controls Number	Controls %	Odds Ratio	(95% CI)#	*P* value
Sex	(*N*=111)		(*N*=233)				
Female	53	47.7	127	54.5	Reference Group		
Male	58	52.3	106	45.5	1.3	(0.8–2.1)	0.24
Age (Years)	(*N*=111)		(*N*=234)				
0–4	42	37.8	93	39.6	Reference Group		
5–9	7	6.3	14	6.0	1.1	(0.4–2.9)	0.84
10–19	16	14.4	32	13.6	1.1	(0.6–2.2)	0.78
20–29	4	3.6	8	3.4	1.1	(0.3–3.9)	0.72
30–59	29	26.1	58	24.7	1.1	(0.6–2.0)	0.73
60+	13	11.7	29	12.3	1.0	(0.5–2.1)	0.98
Place of residence							
Urban compared to rural	(*N*=109)		(*N*=233)				
Urban–Town	100	91.7	200	85.8	Reference Group		
Rural–Remote	9	8.3	33	14.2	0.5	(0.3–1.2)	0.12
Education level	(*N*=105)		(*N*=233)				
High (university degree)	29	28	83	36	Reference Group		
Medium	59	56	112	48	1.5	(0.9–2.6)	0.13
Low	17	16	38	16	1.3	(0.6–2.7)	0.45

CI = confidence interval

Source: Case Control Study of *Salmonella* Birkenhead infection in Queensland and northern New South Wales, Queensland Health and Northern Rivers Public Health Unit.

TABLE 2

UNIVARIATE ANALYSIS OF RISK FACTORS, SELECTED RESULTS, *SALMONELLA* BIRKENHEAD CASE-CONTROL STUDY, QUEENSLAND AND NORTHERN NSW, OCTOBER 2001 TO DECEMBER 2002

	Cases *N**	Cases %	Controls *N**	Controls %	Odds Ratio	(95% CI)#	*P* value
Animal contact							
Dog ownership	59/111	53	105/233	41	1.4	(0.9–2.2)	0.16
No pets kept	29/111	26	69/233	30	0.8	(0.5–1.4)	0.50
Lives on farm	9/110	8	22/229	10	0.8	(0.4–1.9)	0.67
Visited farm	18/107	17	33/234	14	1.2	(0.7–2.3)	0.51
Touched farm animals	5/111	5	12/234	5	1.0	(0.5–2.1)	0.67
Contact with manure	3/95	3	26/207	13	0.2	(0.1–0.8)	0.01
Touched native animals	1/108	1	13/232	6	0.2	(0.0–1.2)	0.04
Recreation in area with native animals	6/111	5	25/234	11	0.5	(0.2–1.2)	0.11
Water ingestion							
Drank any untreated water	21/105	20	38/231	16	1.3	(0.7–2.3)	0.43
Swam in lake	5/109	5	3/234	1	3.7	(0.9–15.8)	0.06
Food consumption							
Ate any non-home-cooked food	72/105	69	181/232	78	0.6	(0.4–1.0)	0.06
Ate food from fast food chicken chain	18/103	18	28/232	12	1.5	(0.8–2.9)	0.18
Don't usually wash or peel raw fruit–vegetables	18/106	17	20/227	9	2.1	(1.1–4.2)	0.03
Food preparation**							
Inadequate hand washing	43/94	46	76/209	36	1.5	(0.9–2.4)	0.12
Inadequate chopping board hygiene	26/85	31	58/185	31	1.0	(0.6–1.7)	0.90
Inadequate knife hygiene	29/92	32	73/202	36	0.8	(0.5–1.4)	0.44

* Missing and 'don't know' responses excluded.

** Asked only of respondents who reported preparing 2 or more evening meals per week and using meat, fish and poultry ingredients.

CI = confidence interval

Source: Case Control Study of *Salmonella* Birkenhead infection in Queensland and northern New South Wales, Queensland Health and Northern Rivers Public Health Unit.

TABLE 3

MULTIVARIATE ANALYSIS OF RISK FACTORS, *SALMONELLA* BIRKENHEAD CASE-CONTROL STUDY, QUEENSLAND AND NORTHERN NSW, OCTOBER 2001 TO DECEMBER 2002

	NSW			Queensland		
	Odds ratio	(95% CI)	*P*	Odds ratio	(95% CI)#	*P*
Don't usually wash–peel raw fruit–vegetables	8.5	(1.6–44.0)	0.01	1.5	(0.6–3.5)	0.35
Non-home-cooked food variable						
Ate non-home-cooked food (excluding from fast food chicken chain*)	Reference Group			Reference Group		
Ate only home-cooked food	1.4	(0.3–6.6)	0.28	2.1	(1.1–3.8)	0.01
Ate food from fast food chicken chain*	10.0	(2.7–36.7)	0.001	0.7	(0.2–1.9)	0.15

* Worded 'fast food chicken outlet' in questionnaire administered to NSW cases. # CI = confidence interval

Source: Case Control Study of *Salmonella* Birkenhead infection in Queensland and northern New South Wales, Queensland Health and Northern Rivers Public Health Unit.

Queensland residents. No significant change in findings occurred with addition of age group (six categories) to the model, and there was no significant effect modification by sex or rural–non-rural residence.

DISCUSSION

Our study identified three risk factors associated with sporadic *Salmonella* Birkenhead disease; eating food from a fast food chicken chain; not usually washing or peeling fruit and vegetables before eating raw; and consumption of only home-cooked food. Of these factors, eating food from a fast food chicken chain, and not usually washing or peeling fruit and vegetables before eating raw, were both associated with increased risk in NSW residents, while consumption of only home-cooked food was associated with an increased risk in Queensland residents. The questionnaire administered to NSW cases used the wording 'fast food chicken outlet', rather than 'fast food chicken chain', and it is possible that this wording may have led to differential classification of this study factor. However, there was no meaningful disparity between NSW and Queensland residents for the question relating to the fruit washing variable. There was potential for observer bias due to the different means of interviewing NSW cases. Although attempts were made to minimise this potential for bias, it remains an inherent weakness in the study design and illustrates some of the difficulties that may arise in conducting studies across different jurisdictions.

Consumption of takeaway chicken has been associated with an increased risk of sporadic salmonellosis in previous studies,[5] while consumption of raw fruit and vegetables have been implicated in previous salmonella outbreaks.[1] The increased risk observed in Queensland residents with consumption of only home-cooked food, while indirect and non-specific, could indicate an increased risk of acquisition of *Salmonella* Birkenhead from food prepared in the domestic kitchen. Domestic preparation of food has been considered a likely source for many cases of sporadic salmonellosis, although vehicles are seldom identified and domestic kitchen food handling risk factors are largely unknown.[2] While cross contamination from domestically prepared food has been identified as having an important role in *Salmonella* outbreaks,[16] its role in sporadic cases in unknown and our study failed to identify any food handling hygiene risk factors.[2] However, the lower than expected number of cases arising during the study period may have reduced the power of our study to detect significant risk factors. We did not investigate the consumption of specific food items prepared in the domestic setting.

Despite comprehensive investigation of potential environmental exposure pathways, we did not identify any significant environmental risk factors. Although we found an association with lake swimming, this was based on a small number of cases, had very wide confidence intervals and was not statistically significant in the multivariate analysis. Our results therefore fail to provide any evidence supporting our initial study hypothesis of a major role for environmental transmission in the epidemiology of *Salmonella* Birkenhead disease. It is possible that all relevant environmental risk factors may not have been fully captured in our questionnaire design. Contamination of a food source limited to this region is another potential explanation for the specific geographical distribution of this serotype.

Our final model explained 33 per cent of the variation in sporadic *Salmonella* Birkenhead disease in northern NSW residents and four per cent of the variation in Queensland residents. This indicates that major risk factors for *Salmonella* Birkenhead disease were not captured in our study. The reasons for the disparity between states remain unclear but could include different state patterns of contamination of food with *Salmonella* before or after the point of sale. The Queensland–NSW state border is physical as well as jurisdictional (the Border Ranges) and settlement patterns differ considerably between northern NSW and southern Queensland. However, the NSW model results should be interpreted with caution due to the small number of NSW cases and controls and the potential for observer bias from the different method used to interview

NSW cases. With consumption of food from fast food chicken sources identified as a possible risk factor, microbiological analysis of food samples from a random selection of these outlets could be considered. Further areas of exploration might include the investigation of distribution and supply patterns of chicken to fast food outlets in northern NSW and southern Queensland. Fruit and salad vegetables could plausibly be contaminated with *Salmonella* either before or after the point of sale. As the variable 'not usually washing or peeling fruit and vegetables before eating raw' could be a marker for consumption of locally grown fruit and vegetables, any future investigation should consider the consumption of local produce. If further research corroborates these findings, public health education encouraging the washing or peeling of all fruit or vegetables to be eaten raw may be of benefit.

CONCLUSION

This report illustrates some of the difficulties involved in studies of unlinked sporadic cases of salmonellosis, which often fail to fully explain mechanisms of transmission. Despite the largely negative findings of our study, particularly in relation to environmental factors, we did identify three risk factors that were associated with sporadic *Salmonella* Birkenhead disease. While these associations have been demonstrated in previous studies of salmonellosis caused by other serotypes, the associations identified in our study could have arisen due to chance or methodological bias.

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A REVIEW OF *SALMONELLA* SURVEILLANCE IN NEW SOUTH WALES, 1998–2000

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Salmonella is the most common bacterial cause of gastrointestinal disease notifiable in New South Wales.[1] The objectives for *Salmonella* surveillance as listed in the NSW Notifiable Diseases Manual are: to identify the source of infection and to prevent further cases; and to monitor the epidemiology to inform the development of better prevention strategies.[2] This article reviews the process of *Salmonella* surveillance in NSW. The system is described and an evaluation of selected attributes including system simplicity, data completeness and timeliness of notification is presented.

This study was conducted as part of a review of foodborne disease surveillance in NSW for the period 1998–2000 by members of OzFoodNet based at the Hunter Public Health Unit. OzFoodNet is a national network established by the Commonwealth Department of Health and Ageing in 2000 to enhance foodborne disease surveillance in Australia.

METHODS

Evaluation

The guidelines for the evaluation of surveillance systems developed by the Centers for Disease Control and Prevention, Atlanta were used.[3] The attributes of surveillance systems—simplicity, data completeness and timeliness of notification—were evaluated. These attributes were selected because of their importance to *Salmonella* surveillance.

Salmonella notifications with a date of onset of illness between 1 January 1998 and 31 December 2000 were extracted from the Notifiable Diseases Database (NDD) using the Health Outcomes Information Statistical Toolkit (HOIST), a data access and analysis facility maintained by the Centre for Epidemiology and Research, NSW Department of Health. A total of 4,642 notifications were obtained for this period.

Completeness of the data was assessed by examining field completion for each of the mandatory data items, except for name, as this information was not available through HOIST. Completeness of the recording of the results of sub-typing (serovar or phage type) was also assessed for each notification. Mandatory fields are those that must be completed for every notification that is recorded in NDD.[2] The completeness of the data for 2000 was further assessed by comparing NDD data with the database maintained by the National Enteric Pathogens Surveillance Scheme.

As there is no field in NDD to record the date that *Salmonella* serovar and phage type results are received by the public health unit, the timeliness of this information was assessed by a manual examination of paper records held at the Hunter Public Health Unit for all *Salmonella* notifications for the six months July–December 2001, based on specimen collection date. This period was chosen to allow comparison with the electronic transmission of data, which had not been available prior to 2001. There were 59 notifications received in this period.

These data were analysed in Microsoft Excel.

RESULTS

Description of current notification system

The current notification system is a passive surveillance system, with laboratories obliged by the *NSW Public Health Act 1991* to notify all laboratory-confirmed cases of *Salmonella*. Notifications are made directly to public health units (PHUs), which are responsible for both the initial collection of data and for instigating an appropriate response. Laboratories notify their local PHU about cases. If the case is resident outside the PHU's area health service the notification is passed to the relevant PHU. Information is usually mailed to the PHU by the laboratory, as there is no capacity for electronic transfer of this information at present. At the PHU, the standard set of data required by NDD is manually entered. These include: demographic information for the person, pathogen details, date for onset of illness, date of notification by the laboratory, and date of notification receipt at the PHU. For cases that are part of an outbreak, there is limited capacity to link them on the database and no opportunity to record information on suspected food vehicles, contributing factors, or other summary data.

Data in NDD is transferred electronically from the PHUs to the NSW Department of Health on a daily basis, and from there data that has been de-identified is sent electronically to the Communicable Diseases Network Australia to contribute to the National Notifiable Disease Surveillance System (NNDSS). Selected data from this system is then sent to the World Health Organization.

Serovar testing and phage typing

Identification of *Salmonella* isolates to the level of serovar and phage type involves a complex network of laboratories. Most isolates are sent to the Institute of Clinical Pathology and Medical Research (IPCMR) in Sydney for serovar testing, but some samples are sent directly to Queensland Health Scientific Services in Brisbane, the Institute of Medical and Veterinary Science (IMVS) in Adelaide, or the Microbiological Diagnostic Unit (MDU) in Melbourne. Most phage typing is done at the MDU, but the IMVS also types some isolates.

Most serovar and phage type results are collated at ICPMR. Hard copies of these results are forwarded to the Western Sydney Public Health Unit and then mailed from there to local PHUs for action and entry on to the NDD. ICPMR also enters these results on to an electronic spreadsheet.

From 2001, extracts from the spreadsheet have been emailed to the Hunter Public Health Unit by ICPMR, and from 2002 relevant extracts have been emailed to all PHUs by the Communicable Diseases Branch of the NSW Department of Health.

PHUs can only access their own data on NDD, which includes personal identification details. De-identified NDD data is available through HOIST for all of NSW but access requires some proficiency with the statistical software SAS.

Summary data is published in the *NSW Public Health Bulletin* and is also available from the National Enteric Pathogens Surveillance Scheme (NEPSS) in quarterly and annual hard copy reports. Electronic updates of aggregated data are also distributed by the NEPSS to OzFoodNet every month.

Evaluation

Simplicity

The NDD is relatively simple to use. It requires limited training, has good quality assurance features at the data entry stage, and the case definitions are clear. However, the overall notification system is complex with multiple data sources and decentralised and duplicated data entry.

Data Completeness

Table 1 presents the number and percentage of missing or invalid entries for each of the mandatory data fields in NDD except for name. There was little missing or invalid data for most items. The exception was the field describing whether the person was Aboriginal, which was incomplete for 35 per cent of cases.

Completeness of serovar and phage type results was also assessed. Approximately eight percent of *Salmonella* isolates had no serovar recorded on NDD (Table 2). Completeness of phage type details was poor in 1998 and had improved substantially by 2000 (Table 3).

The NEPSS database records 1,455 cases of *Salmonella* in NSW for 2000, 62 (4.5 per cent) more than recorded in the NDD for the same period. The NEPSS data was also more complete with phage types recorded for 100 per cent of *S.* Enteritidis, *S.* Hadar and *S.* Virchow isolates and 98 per cent of *S.* Typhimurium isolates from NSW.[4]

Timeliness

The timeliness of *Salmonella* serovar and phage type information is presented in Table 4. Receipt of hard copy serovar and phage type data at the Hunter PHU was not timely with lengthy delays between the availability of

TABLE 1

NUMBER OF MISSING AND INVALID ENTRIES FOR MANDATORY DATA FIELDS IN THE NOTIFIABLE DISEASES DATABASE, NSW, 1998-2000 *N*=4642

Field	Missing or invalid entry	
	N	%
Age	8	0.2
Sex	32	0.7
Aboriginality	2983	64.3
Postcode	6	0.1
Received date	0	0
Disease name	0	0

TABLE 2

COMPLETENESS OF *SALMONELLA* SEROVAR RECORDS, NOTIFIABLE DISEASES DATABASE, NSW, 1998–2000

Year	Salmonella notifications	Serovar recorded
	N	%
1998	1811	93.0
1999	1438	90.3
2000	1393	92.5
Total	4642	92.0

Source: Communicable Diseases Branch, Notifiable Diseases Database (HOIST), Centre for Epidemiology and Research, NSW Department of Health.

TABLE 3

COMPLETENESS OF *SALMONELLA* PHAGE TYPE RECORDS, NOTIFIABLE DISEASES DATABASE, NSW, 1998–2000

Salmonella serovar	1998		1999		2000	
	Notifications	Phage type recorded	Notifications	Phage type recorded	Notifications	Phage type recorded
	N	%	*N*	%	*N*	%
S. Bovismorbificans	41	19.5	22	13.6	39	51.3
S. Enteritidis	92	53.2	88	57.9	55	78.2
S. Hadar	14	0	4	0	18	50
S. Heidelberg	8	0	3	0	13	30.8
S. Typhimurium	852	73.6	663	79.6	691	89.4
S. Virchow	119	0	53	0	54	42.6

Source: Communicable Diseases Branch, Notifiable Diseases Database (HOIST), Centre for Epidemiology and Research, NSW Department of Health.

TABLE 4

***SALMONELLA* NOTIFICATION MILESTONES FROM THE DATE OF SPECIMEN COLLECTION, HUNTER PUBLIC HEALTH UNIT, NSW, JULY–DECEMBER 2001**

Milestone	Elapsed days		Number of notifications included (required dates available)
	Median	Range	
Hard copy data			
Initial species report printed at laboratory	5	2–18	48
Initial species report received at HPHU	7	3–20	50
Serovar report printed at laboratory (ICPMR)	9	6–57	47
Serovar report received at HPHU	22	14–72	47
Phage type report printed at laboratory (MDU, IMVS)	23.5	14–80	31
Phage type report received HPHU	42	3–97	31
Electronic data#			
Serovar entered on ICPMR database	10	7–14	15
Phage type entered on ICPMR database	26.5	7–62	30

Results from samples processed at ICPMR are entered on an electronic spreadsheet and extracts are then emailed to the Hunter PHU. Delay from entry on ICPMR database to receipt at the HPHU is up to two days

HPHU = Hunter Public Health Unit

ICPMR = Institute of Clinical Pathology and Medical Research

IMVS = Institute of Medical and Veterinary Science

MDU = Microbiological Diagnostic Unit.

Source: Hunter Public Health Unit.

serovar and phage type reports at the laboratory and their receipt at the PHU.

To assess the potential impact of electronic transmission of data, the time between the date of specimen collection and the date the isolate results were entered on the electronic spreadsheet at ICPMR was calculated (Table 4). The date of entry was used to assess timeliness as the date the electronic spreadsheet was received at the Hunter Public Health Unit was not recorded. In practice the maximum time between data entry and receipt was two days. Dates were available for 30 of the 37 isolates analysed to phage type level and 15 of the 17 isolates analysed to serovar level. Five isolates were excluded, as they were unable to be typed. Electronic transmission of data resulted in serovar and phage type data being available at the Hunter Public Health Unit approximately two weeks earlier than was the case with hard copy results.

DISCUSSION

The notification system for *Salmonella* in NSW is complex. The system is not a useful repository for outbreak information and consequently dedicated databases for outbreak data have been developed. Databases that record serovar and phage type details are separately maintained at the state and national levels and these are not integrated with the NDD.

The completeness of the data for the mandatory data fields in NDD was good with the exception of the field describing Aboriginality. There was also incomplete recording of serovar and phage type results. The NEPSS database appeared to be a more complete record with a larger number of cases recorded for the period and more information on phage type and serovar. This demonstrated that this information was available for these isolates but had not been recorded in NDD.

Timely access to serovar and phage type information by PHUs is important as it assists the early identification and investigation of clusters and outbreaks. A major contributor to the delay in the receipt of *Salmonella* serovar and phage type details at the public health units was attributed to information being delivered by hard copy through the postal system. Electronic transmission of data has the potential to greatly reduce these delays.

An effective and efficient surveillance system for foodborne disease is important given the substantial burden of foodborne disease and its rapidly changing epidemiology.[5] The capacity for foodborne disease surveillance in NSW has improved recently. The appointment of an additional epidemiologist has expanded the capacity for foodborne disease surveillance in NSW. Most serovar and phage type data is now available electronically to PHUs and PHUs are acting in a coordinated way.

The problems identified with data completeness and timeliness identified by this study would be further improved by:

1. Introducing electronic transmission of data from laboratories directly to NDD. This would reduce the current duplication of data entry and speed data delivery. Alternatively, a single database shared by laboratories and PHUs with appropriate security and access rules could reduce transmission delays and data errors.

2. Reducing the complexity of sample handling. Having fewer laboratories involved in serovar and phage type determination would reduce the complexity of specimen and information flows between laboratories.
3. Routine monitoring of notification timeliness. The addition of further fields to the NDD to record the date of receipt of serovar and phage type results at the PHU would assist the monitoring of timeliness and remove the need for manual audits.

The NDD is currently undergoing a major review of both its structure and function. The feasibility of these and other suggestions for changes to the NDD to improve the surveillance of all notifiable conditions in NSW are being considered.

ACKNOWLEDGEMENT

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CAR AND HOME SMOKE-FREE ZONE

Passive smoking is breathing in other people's smoke. It affects smokers and non-smokers. The process of smoking produces three different types of tobacco smoke:

- mainstream smoke: smoke directly inhaled by the smoker through a burning cigarette, cigar or pipe;
- exhaled mainstream smoke: smoke breathed out by the smoker;
- sidestream smoke: smoke that drifts from the burning end of a cigarette.

Environmental tobacco smoke (ETS) is the combination of exhaled mainstream smoke and sidestream smoke.[1]

Sidestream smoke contains many cancer causing chemicals and other toxic substances. In some cases, their levels are 30 times higher than in the smoke inhaled by the smoker.[2] For example, compared to mainstream smoke, sidestream smoke contains greater amounts of ammonia, benzene, carbon monoxide, nicotine and some carcinogens from the same amount of burnt tobacco.[1] The health effects of exposure to passive smoking are well known. It increases the risk of lung cancer and heart disease as well as throat and chest infections.[1,3,4]

Children are especially vulnerable to passive smoking. Passive smoking by infants is a risk factor for Sudden Infant Death Syndrome (SIDS or 'cot death').[3,5,6,7] The children of parents who smoke also have higher rates of lower respiratory illnesses such as croup, bronchitis, bronchiolitis and pneumonia during their first 18 months of life compared to children of non-smokers.[3,5,6] Children in this age group exposed to tobacco smoke have higher rates of admission to hospital.[3, 8, 9]

Children of smokers also show a small lowering in lung function,[5] with some evidence indicating that this reduced ability of lung function may even persist into adulthood.[5] Children exposed to passive smoking are more likely to suffer from asthma in childhood.[3,5,6]

Children of smokers are more likely to contract otitis media ('glue ear'), which is an infection and swelling of the ear.[1] Passive smoking increases the risk of meningococcal disease among children, which can sometimes cause death, mental disability, hearing loss, or loss of a limb.[10] Exposure to tobacco smoke also makes children more vulnerable to lung complications during and after surgery involving a general anaesthetic.[11,12]

However, over 80 per cent of homes in NSW are now smoke-free, and most enclosed public places in NSW are by law also smoke-free.[13] Bans on smoking in your home and car will not only increase your chances of quitting successfully, but others will also benefit from less exposure to passive smoking.

GOING SMOKE-FREE

Steps to make your home smoke-free are:

- get household members to agree on a date when the house becomes smoke-free;
- remove ashtrays and lighters from indoor areas;
- display no smoking stickers on the fridge and at the front door;
- ask smokers to smoke outside when they visit.

Steps to make your car smoke-free are:

- clean out the ashtray and remove the cigarette lighter;
- display 'no smoking' stickers on the dashboard or ashtray.

It is important to remember that strategies such as smoking in only one part of the house or blowing smoke out an open car window are not effective. There are invisible gases in tobacco smoke that spread quickly to all areas of the house and car. See the fact sheet *Nicotine and other poisons* for more information. To avoid exposure, make your car and home smoke-free.

HOUSEHOLD MEMBERS

By obtaining agreement from everybody in the house, you can avoid disputes. It is important to consider:

- where smoking is permitted outside the house: for example, on the balcony, in the garage, etc.;
- how smokers will be reminded if they forget about the smoke free zones: for example, a firm but polite reminder is usually sufficient.

VISITORS

As 80 per cent of NSW homes are smoke-free, a ban on smoking inside your house and car should be acceptable to most visitors. Clear communication is essential. Try:

- displaying 'no smoking' signs in your car and home;

- explaining to your visitors why your car and home are smoke-free;
- setting a good example by refusing to smoke in the cars and homes of your friends and family.

SMOKE-FREE STICKERS

Smoke-free stickers that say 'Car and Home Smoke-free Zone' are available from the Better Health Centre by phone at (02) 9879 0443. Further information is available from the Car and Home Smoke-free Zone website at www.smokefreezone.org.

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This fact sheet is one of a series on tobacco and health related issues produced by the Tobacco and Health Branch of the NSW Department of Health. The fact sheets respond to frequently asked questions and are designed to be used by both consumers and health professionals to help people to quit smoking.

The fact sheets can be accessed through the NSW Department of Health's website at **www.health.nsw.gov.au/public-health/health-promotion/tobacco/facts/index.html**.

NSW HEALTH
Working as a Team

COMMUNICABLE DISEASES REPORT, NSW, FOR JULY AND AUGUST 2004

For information on communicable diseases in New South Wales that is updated regularly, visit **www.health.nsw.gov.au** and click on **Infectious Diseases**.

TRENDS

Tables 1 and 2 show reports of notifiable conditions for each area health service in NSW received through to the end of July and August 2004. Figure 1 presents trends in reports of communicable diseases for the period 1999 through to the end of August. Note that due to an upgrade in the Notifiable Disease Database, some data entry for cases reported in July may have been delayed resulting in some underreporting of cases for that month.

Analysis of recent case notifications shows a typical late winter pattern of communicable diseases in NSW: low rates of **arboviral** infections, **cryptosporidiosis,** and **salmonellosis**; relatively higher rates of **meningococcal disease** (see **www.health.nsw.gov.au/public-health/alerts/meningococcal/men_update.html**) and **pneumococcal disease**; and increasing **pertussis**. One case of **cholera** was reported in August in a person who had travelled to the Philippines.

In what appears to be a late **influenza** season, relatively little influenza activity was reported through to August. Reports from selected general practitioners and laboratories indicate a modest rise towards the end of the month (see **www.health.nsw.gov.au/living/flureport.html** for a detailed report). Influenza infections are likely to increase further in September.

The epidemic of diarrhoea and vomiting linked to **norovirus** that was evident in late autumn and early winter seems to have abated. Reports of outbreaks across NSW in institutions (mainly nursing homes and some hospitals) peaked in May with 100 outbreaks reported that involved a total of over 3,294 ill people. By the end of August, 17 outbreaks had been reported for that month involving a total of 184 ill people.

HEPATITIS A IN A SYDNEY FOOD HANDLER

The Central Sydney and South Eastern Sydney Public Health Units reported that a food handler working in a Sydney café was diagnosed with hepatitis A in July. Hepatitis A is an acute viral infection of the liver. It is characterised by fever, feeling unwell, poor appetite, abdominal discomfort, and jaundice. The virus is transmitted by the faecal–oral route, through direct contact with an infectious person or the ingestion of contaminated food or contaminated water.

Normal human immunoglobulin is a purified blood product that contains antibodies to the hepatitis A virus. An injection of normal human immunoglobulin can prevent illness if given soon after and within two weeks of exposure to the virus.

While infectious with hepatitis A, the food handler was involved in slicing fresh salad vegetables for sandwiches. The food handler was unaware of their infection at the time. The food handler and other workers at the café, were interviewed and the café was assessed by food inspectors. A risk assessment indicated that there was a small but significant risk that patrons who ate foods that contained raw salad ingredients could contract hepatitis A. NSW Health issued a media release to alert patrons to this risk, a recorded message hotline was set up, and the café proprietors were asked to distribute flyers to all patrons who attended the café. The South Eastern Sydney Public Health Unit provided a clinic located at Sydney Hospital to counsel patrons at risk and administer normal human immunoglobulin for eligible patrons. The hotline received about 280 calls. At Sydney Hospital, 138 patrons were counselled and 91 patrons received normal human immunoglobulin.

Many of the café patrons who attended the clinic reported multiple possible exposures over the 19-day period in which the food handler was working while infectious. As of 24 August, no secondary cases of hepatitis A have been identified related to the consumption of food from the café. In an unrelated outbreak, four secondary cases were reported among people who ate food prepared by a food handler with hepatitis A in Sydney in late 2003 (see 'A food handler diagnosed with hepatitis A' at **www.health.nsw.gov.au/public-health/phb/HTML2004/march04html/cdrp44.htm**).

SALMONELLOSIS OUTBREAK IN A MID NORTH COAST RESIDENTIAL FACILITY

The Mid North Coast Public Health Unit reported an outbreak of *Salmonella* Typhimurium 135 infection at a residential facility in June 2004. Of the 57 people who worked or lived at the facility, 43 (75 per cent) became ill with vomiting, diarrhoea, and fever. Symptoms lasted between eight hours and 11 days. Twenty-one people, including two children, were admitted to hospital, four of whom developed septicaemia. The hospital staff reported the outbreak to the Mid North Coast Public Health Unit.

Eighteen stool samples were obtained. *Salmonella* was identified in all samples; rotavirus was not detected. Stool samples were not tested for norovirus.

Reliable food histories could not be obtained from the residents. However, investigation by the Mid North Coast Public Health Unit suggested that transmission of *Salmonella* was initially due to person-to-person contact, based on the onset of the initial cases ranging over several

days. A subsequent rapid rise in cases suggested that consumption of contaminated food was responsible for transmission between people later in the outbreak. Further investigation found that a neighbour of one of the facility's food-handlers became ill after consuming custard prepared at the facility. A stool sample from the neighbour and a sample of the remaining custard from the facility were also found to contain *Salmonella* Typhimurium 135.

The NSW Food Authority and the Mid North Coast Public Health Unit jointly assessed the facility's hygiene and food handling procedures. They identified a lack of hand washing facilities and evidence of rodent infestation. The facility had no food safety plan and no training for food handlers was provided.

To halt the spread of the bacteria, the Mid North Coast Public Health Unit advised that: residents and staff practice careful hand-washing; environmental cleaning be enhanced; group activities among the residents cease; ill residents be isolated from others; meals be taken in individual rooms; and the facility be closed to admissions for the duration of the outbreak. Food handlers with symptoms of salmonellosis were excluded from work until *Salmonella* was no longer detected in their stool samples (as per Salmonellosis Draft Response Protocol for NSW public health units at **www.health.nsw.gov.au/living/salmonella.pdf**).

Although in this outbreak the pre-existing poor health status of many residents may have contributed to the high attack rate and the severity of illness, outbreaks of salmonellosis in any setting can be severe. Early identification and intervention are vital for the successful control of outbreaks. Such outbreaks may be avoided or contained through improved knowledge among staff of safe food handling procedures, and early reporting of outbreaks by facility managers and attending medical practitioners.

FIGURE 1

REPORTS OF SELECTED COMMUNICABLE DISEASES, NSW, JAN 1999 TO AUG 2004, BY MONTH OF ONSET

Preliminary data: case counts in recent months may increase because of reporting delays.

Laboratory-confirmed cases only, except for measles, meningococcal disease and pertussis

BFV = Barmah Forest virus infections, RRV = Ross River virus infections

lab+ = laboratory confirmed

Men Gp C and Gp B = meningococcal disease due to serogroup C and serogroup B infection, other/unk = other or unknown serogroups.

NB: multiple series in graphs are stacked, except gastroenteritis outbreaks.

NB. Outbreaks are more likely to be reported by nursing homes & hospitals than from other institutions

NSW population	
Male	50%
<5	7%
5–24	28%
25–64	52%
65+	13%
Rural*	42%

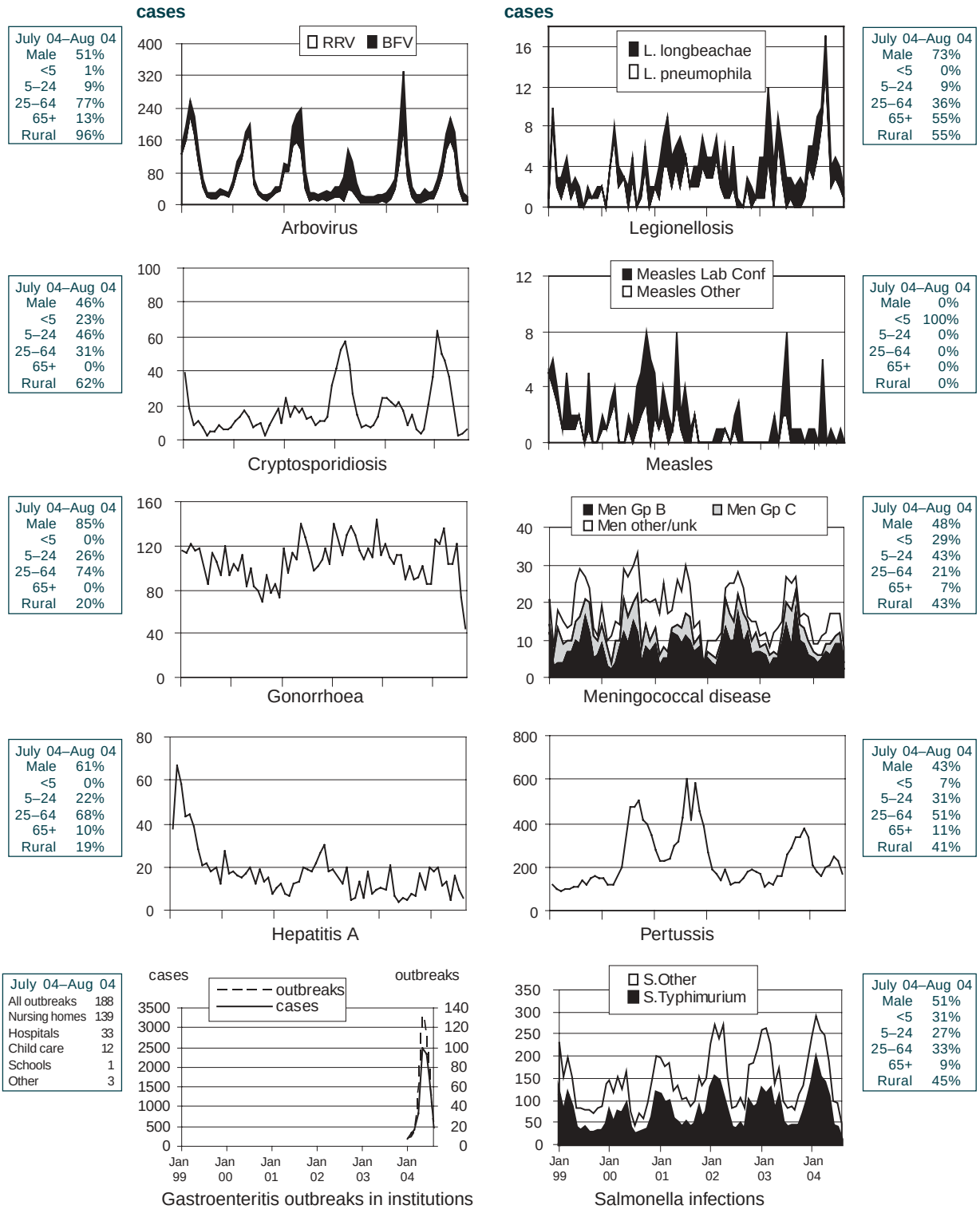

TABLE 1 REPORTS OF NOTIFIABLE CONDITIONS RECEIVED IN JULY 2004 BY AREA HEALTH SERVICES

Condition	Area Health Service																		Total	
	CSA	NSA	WSA	WEN	SWS	CCA	HUN	ILL	SES	NRA	MNC	NEA	MAC	MWA	FWA	GMA	SA	CHS	for July†	To date†
Blood-borne and sexually transmitted																				
Chancroid*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlamydia (genital)*	79	54	70	15	69	32	73	25	100	28	27	30	9	16	1	32	13	2	691	5,618
Gonorrhoea*	19	5	7	1	7	1	3	3	38	4	3	1	-	1	-	1	-	-	94	799
Hepatitis B - acute viral*	-	1	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	3	37
Hepatitis B - other*	66	35	51	4	78	2	7	3	40	3	3	4	2	1	-	-	-	-	301	2,282
Hepatitis C - acute viral*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15
Hepatitis C - other*	61	19	62	12	70	21	35	20	58	25	20	8	10	21	-	9	11	6	475	3,953
Hepatitis D - unspecified*	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	6
Syphilis	10	8	9	2	15	1	2	2	30	-	1	-	-	-	-	-	-	-	80	665
Vector-borne																				
Barmah Forest virus*	-	-	-	-	-	-	-	-	-	7	8	-	-	-	-	1	-	-	16	252
Ross River virus*	-	1	-	1	-	2	2	1	-	2	12	1	-	1	-	-	-	-	23	597
Arboviral infection (Other)*	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	2	24
Malaria*	-	-	5	-	-	-	-	1	1	-	-	-	-	-	-	1	-	-	8	48
Zoonoses																				
Anthrax*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brucellosis*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Leptospirosis*	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	18
Lyssavirus*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Psittacosis*	1	-	-	-	-	-	1	1	1	-	-	-	-	-	-	-	-	-	4	35
Q fever*	-	1	-	-	-	-	-	-	-	-	-	5	4	-	-	-	-	-	10	120
Respiratory and other																				
Blood lead level*	3	2	-	1	2	1	3	3	1	1	-	-	4	-	-	-	-	-	21	157
Influenza*	4	-	5	1	6	-	-	1	10	-	-	-	1	1	-	-	-	-	29	175
Invasive pneumococcal infection*	9	14	27	5	15	4	15	3	21	1	3	1	2	3	-	9	2	-	134	479
Legionella longbeachae infection*	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	17
Legionella pneumophila infection*	2	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	36
Legionnaires- disease (Other)*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Leprosy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Meningococcal infection (invasive)*	2	1	1	1	3	1	2	1	4	1	-	1	-	-	-	-	-	-	18	94
Tuberculosis	2	4	3	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	11	192
Vaccine-preventable																				
Adverse event after immunisation**	1	-	1	-	2	2	-	-	-	-	1	-	-	-	-	1	1	-	9	116
H. *Influenzae b* infection (invasive)*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Measles	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	9
Mumps*	1	1	-	-	1	1	1	-	1	-	-	-	-	-	-	-	-	-	6	34
Pertussis	9	19	27	15	19	8	37	5	26	7	4	2	24	9	-	7	11	-	230	1,534
Rubella*	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	13
Tetanus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Enteric																				
Botulism	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Cholera*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cryptosporidiosis*	-	-	-	-	1	-	-	-	-	-	1	1	1	-	-	-	-	-	4	243
Giardiasis*	6	15	16	1	6	7	5	5	19	-	2	2	1	4	-	-	3	-	92	791
Haemolytic uraemic syndrome	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	5
Hepatitis A*	2	3	1	-	3	-	-	-	2	-	-	-	1	-	-	-	-	-	12	105
Hepatitis E*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Listeriosis*	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	20
Salmonellosis*	7	16	5	2	10	2	3	1	7	11	2	4	3	3	-	3	1	-	80	1,470
Shigellosis*	-	1	1	-	1	-	1	-	2	2	-	1	-	-	-	-	-	-	9	56
Typhoid and paratyphoid*	-	1	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	3	32
Verotoxin producing *E. coli**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2

* lab-confirmed cases only + includes cases with unknown postcode * * HIV and AIDS data are reported separately in the *NSW Public Health Bulletin* each quarter

** AEFIs notified by the school vaccination teams during the National Meningococcal C Program are not included in these figures. These notifications are reviewed regularly by a panel of experts and the results will be published quarterly in the *NSW Public Health Bulletin* in 2004.

Note that due to an upgrade in the Notifiable Disease Database, some data entry for cases reported in July may have been delayed resulting in some underreporting of cases for that month.

CSA = Central Sydney Area
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FWA = Far West Area
GMA = Greater Murray Area
SA = Southern Area
CHS = Corrections Health Service

TABLE 2 REPORTS OF NOTIFIABLE CONDITIONS RECEIVED IN AUGUST 2004 BY AREA HEALTH SERVICES

Condition	Area Health Service																		Total	
	CSA	NSA	WSA	WEN	SWS	CCA	HUN	ILL	SES	NRA	MNC	NEA	MAC	MWA	FWA	GMA	SA	CHS	for Aug†	To date†
Blood-borne and sexually transmitted																				
Chancroid*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlamydia (genital)*	73	-	62	38	53	37	83	23	130	45	19	33	15	30	1	26	23	2	709	6412
Gonorrhoea*	-	-	2	-	5	1	4	4	40	6	-	-	1	1	-	1	-	-	67	867
Hepatitis B - acute viral*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37
Hepatitis B - other*	8	1	4	4	73	4	3	3	39	-	-	2	1	4	2	3	3	-	155	2493
Hepatitis C - acute viral*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15
Hepatitis C - other*	56	-	56	15	77	38	46	18	67	25	7	9	17	13	14	5	14	11	492	4502
Hepatitis D - unspecified*	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	7
Syphilis	25	3	8	3	19	3	3	2	30	4	1	2	1	1	-	-	1	-	106	794
Vector-borne																				
Barmah Forest virus*	-	-	-	-	-	1	-	-	-	9	3	-	-	-	-	2	-	-	15	267
Ross River virus*	-	1	-	-	-	-	3	-	-	3	3	-	1	1	-	2	-	-	14	611
Arboviral infection (Other)*	-	-	1	-	-	-	1	-	1	-	-	-	-	2	-	-	-	-	5	29
Malaria*	1	2	2	-	3	-	1	-	-	-	-	-	-	-	-	1	-	-	11	59
Zoonoses																				
Anthrax*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brucellosis*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Leptospirosis*	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	2	26
Lyssavirus*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Psittacosis*	-	1	1	2	-	-	1	-	1	-	1	3	-	-	-	-	-	-	10	45
Q fever*	-	-	-	-	1	-	1	1	-	-	-	9	5	1	1	-	1	-	20	140
Respiratory and other																				
Blood lead level*	-	-	-	2	5	-	4	-	-	1	-	-	1	1	-	-	-	-	14	173
Influenza*	-	4	22	1	14	1	-	-	17	5	-	-	-	-	-	1	3	-	68	245
Invasive pneumococcal infection*	-	15	8	8	12	8	25	7	21	-	4	2	-	2	-	5	4	-	121	600
Legionella longbeachae infection*	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	19
Legionella pneumophila infection*	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	2	38
Legionnaires- disease (Other)*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Leprosy	1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	4
Meningococcal infection (invasive)*	-	2	-	1	-	-	1	2	1	1	-	-	-	-	-	1	-	-	9	103
Tuberculosis	-	2	11	3	1	-	1	-	4	-	-	-	1	-	-	-	-	-	23	231
Vaccine-preventable																				
Adverse event after immunisation**	2	-	1	2	-	-	1	-	-	1	-	-	-	-	-	1	-	-	8	127
H. *Influenzae b* infection (invasive)*	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3
Measles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9
Mumps*	-	-	-	-	-	1	-	-	2	-	-	-	-	-	-	-	-	-	3	36
Pertussis	23	28	45	20	30	8	31	9	50	12	-	3	9	8	-	7	8	-	291	1832
Rubella*	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	14
Tetanus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Enteric																				
Botulism	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Cholera*	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
Cryptosporidiosis*	-	-	1	-	1	-	-	-	-	1	1	1	1	-	-	1	-	-	7	250
Giardiasis*	-	7	17	8	3	2	4	1	15	-	3	2	4	2	-	1	6	-	75	866
Haemolytic uraemic syndrome	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Hepatitis A*	-	-	1	-	-	-	-	1	1	-	2	-	-	-	-	-	-	-	5	111
Hepatitis E*	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	6
Listeriosis*	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	2	22
Salmonellosis*	1	8	12	8	8	2	3	3	16	8	3	3	4	1	-	-	5	-	85	1567
Shigellosis*	-	1	2	-	1	-	-	-	1	1	-	-	-	-	-	-	-	-	6	63
Typhoid and paratyphoid*	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	2	26
Verotoxin producing *E. coli**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2

* lab-confirmed cases only + includes cases with unknown postcode * * HIV and AIDS data are reported separately in the *NSW Public Health Bulletin* each quarter

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Dr Michael Giffin is the managing editor.

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