

# Typhoid and paratyphoid fever in south-eastern Sydney, 1992-1997

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## Abstract

Notification records of typhoid and paratyphoid cases among residents of south-eastern Sydney during 1992-1997 were reviewed, with particular attention paid to identifying a source of infection and to completeness of follow up. Notifications comprised 30 cases of *Salmonella* Typhi, nine of *S. Paratyphi* A and five of *S. Paratyphi* B. These 44 cases had a median age of 20 years (range 2-62). Of the 39 cases with known country of birth, 30 were born overseas, predominantly in Asian countries. Of 39 cases with a known travel history, 33 were cases of overseas-acquired acute infection and two cases were asymptomatic chronic carriers. A source was identified in only one of four domestically acquired infections. Of eight household contacts in occupations posing a public health risk (seven food-handlers and one health-care worker), complete follow-up information was available for only five. Most cases were in overseas-born individuals who may have been infected when returning to their country of birth. Explicit follow-up protocols need to cover appropriate clinical management (including treatment of chronic carriage) and monitoring of those cases and contacts who could pose a public health risk. *Commun Dis Intell* 2000;24:233-236.

Keywords: typhoid, paratyphoid, surveillance, follow-up, travel, carrier

## Introduction

Typhoid remains a disease of major importance worldwide although improvements in public health have made it an exotic disease in developed countries like Australia. Estimates of the global burden of typhoid suggest an annual incidence of 12.5 million cases with over three-quarters occurring in Africa and South East Asia.<sup>1</sup> In the United States the incidence has been stable at around 0.15-0.2 per 100,000 population since 1966, with an increasing proportion of cases being imported.<sup>2,3</sup>

A similar pattern is seen in Australia where 402 cases of typhoid and paratyphoid were notified to the National Notifiable Diseases Surveillance System (NNDSS) from 1992 to 1997, a crude annual incidence of 0.37 per 100,000 population (Communicable Diseases Network Australia New Zealand and NNDSS, personal communications). The vast majority of cases are acquired overseas; 66 (90%) of the 73 typhoid and paratyphoid cases reported with clinical details to the National Salmonella Surveillance Scheme in 1996 were known to have been acquired overseas.<sup>4</sup>

This report is a retrospective study of typhoid and paratyphoid notifications made to the South Eastern Sydney Public Health Unit (and its predecessors) from January 1992 to December 1997. We detail information on the source of infection and the results of the follow up of cases and contacts in sensitive occupations.

## Methods

Cases of *Salmonella* Typhi and *S. Paratyphi* infection in south-eastern Sydney residents notified from 1992 to 1997 were identified from records held by the South Eastern Sydney Public Health Unit; these records include notifications passed on by other public health units. Records

detail age (based on date of birth), sex, country of birth, history of overseas travel, date of onset of symptoms, date of notification, presumed source, contact screening and follow-up. This information had originally been obtained from each notification and from interviews with the case, the attending doctor and contacts as appropriate.

Cases were individuals from whom *S. Typhi* or *S. Paratyphi* had been isolated from a clinical specimen. The contact definitions and response guidelines used were those described in the May 1995 edition of the Infectious Diseases Manual issued to Public Health Units by New South Wales Health. These guidelines recommend screening of (i) household contacts of cases who have no history of overseas travel, in order to identify a source; and (ii) household contacts who work in sensitive occupations (i.e. food-handlers, health care workers with direct patient contact, and people who work in or attend child-care facilities).

The denominator population data for the calculation of rates were based on the Australian Bureau of Statistics 1996 Census of Population and Housing.

## Results

Fifty-four culture-confirmed cases were notified by hospital and laboratory staff during 1992-1997. Seven visitors in transit and three cases living in other parts of Sydney were excluded from the analysis. This left 44 cases among local residents, 24 (55%) males and 20 (45%) females, including two chronic typhoid carriers found during contact screening of active cases. *S. Typhi* was isolated from 30 (68%) cases, *S. Paratyphi* A from nine (21%) and *S. Paratyphi* B from five (11%). Blood and/or stool cultures were the main source of the organism (Table 1). Cases ranged in age from 2 to 62 years, with a median age of 20 years. The highest

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incidence was in children of primary school age, with relatively high rates among teenagers, and lower rates in children under 5 years and among adults (Table 2). The overall annual incidence of active cases (i.e. excluding the two carriers detected on screening) was 0.94 per 100,000.

Of the 39 cases with known country of birth, nine were Australian born. Of those born overseas, 16 cases were Indonesian, six were from South Asia (Bangladesh, 3; Pakistan, 2; India, 1) and the remainder were born in other Asian countries (China, 2; Hong Kong, 1; Singapore, 1), the Middle East (Lebanon, 1; Saudi Arabia, 1), Chile (1) or Portugal (1). The age distribution of active cases according to place of birth is summarised in Table 2. University students were over-represented among overseas-born cases.

### Source of infection

#### *Presumed overseas-acquired*

Information on previous overseas travel was available for 39 cases. Thirty-three cases were considered to have acquired their infection overseas. Symptoms were first evident between the date of arrival in Sydney and up to 9 months following arrival, with a median onset of 2 weeks after arrival. Of the overseas-acquired cases among those born overseas, there was concordance between country of

birth and country of travel in 25 of 26 cases, suggesting that most infections were acquired during visits to relatives.

Two cases with apparently prolonged incubation periods are summarised below:-

**Case 1:** This 19-year-old woman was hospitalised in December 1996 after 3 days of fever and rigours. She was notified on the basis of serology and a blood-culture positive for *S. Typhi*. She had been in Australia for 9 months since her arrival from Saudi Arabia.

**Case 2:** *S. Typhi* was isolated from a liver abscess and stool of a 62-year-old Chilean man who had presented to hospital in June 1992 with a three-week history of pyrexia of unknown origin. He had been in Australia for five-and-a-half months since his last travel to Chile.

A further two cases were asymptomatic carriers found on screening contacts of symptomatic cases. Both were overseas-born males, one a 53-year-old Portuguese, and the other a 58-year-old from East Timor.

#### *Domestically-acquired cases*

Of the four cases with no history of overseas travel, one was the wife of a typhoid carrier, one child was presumed to have acquired the infection from relatives who had returned from a typhoid-endemic country, and in two other cases no source was found.

### Cases in sensitive occupations

For the 22 of 29 adult cases for whom an occupation was recorded, only three were in sensitive occupations, and all were food-handlers. Following receipt of the notification, Public Health Unit staff ensured that the attending doctor of each case was aware of the criteria for return to work (i.e. two negative stool cultures at least 24 hours apart after cessation of antibiotic therapy). Copies of follow-up culture results were not available in the Public Health Unit's files.

#### *Screening of contacts in sensitive occupations*

Of the 103 household contacts identified, eight were in a sensitive occupation (seven food-handlers and one health care worker) (Table 3). The files of three food-handlers and

**Table 1. Source of culture confirmation, typhoid and paratyphoid cases, south-eastern Sydney residents, 1992-97**

Specimen	No.	%
Blood only	26	59.1
Stool only	12	27.3
Blood + stool	4	9.1
Others*	2	4.5
Total	44	100

\* Liver abscess, 1; sternoclavicular joint aspirate, 1

**Table 2. Active typhoid and paratyphoid cases, south-eastern Sydney residents, 1992-1997, by age and region of birth**

Age group (y)	Born overseas	Australian born	Country of birth unknown	Total cases	Annual incidence/100,000*
0-4	3	0	0	3	1.2
5-9	5	1	1	7	2.9
10-14	2	3	0	5	2.1
15-19	6	0	0	6	2.2
20-29	5	3	1	9	1.1
30-39	1	1	1	3	0.4
40-49	4	1	1	6	0.9
50-59	1	0	1	2	0.4
60-69	1	0	0	1	0.3
Total	28	9	5	42	0.94

\* Incidence based on estimated resident population, 1996 Census

**Table 3. Follow up of typhoid and paratyphoid contacts in sensitive occupations, south-eastern Sydney, 1992-1997**

Case	Case date	Occupation	Sex	Stool culture
1	Jun 1992	Health care worker	F	2 negative
2	Dec 1993	Food-handler	M	n/a*
3	Feb 1994	Waitress	F	2 negative
4	Apr 1995	Chicken shop proprietor	M	Chronic carrier 3 positive
5	Apr 1995	Food-handler	M	2 negative
6	Apr 1995	Food-handler	M	2 negative
7	May 1995	Restaurant supervisor	M	n/a
8	May 1995	Kitchenhand	F	n/a

\* n/a: not available

the health care worker contained references to two negative stool cultures; a fourth food-handler was found to be a chronic typhoid carrier and was referred for specialist management. The files of the remaining three food-handlers contained no information on follow-up culture results.

### Discussion

Under the New South Wales Public Health Act 1991, all salmonella infections are to be notified by pathology laboratories, whilst typhoid and paratyphoid are to be notified on a clinical basis by hospital chief executives or their delegates. Annual notifications fluctuated, with most cases (11) notified in 1995 and the fewest (3) in 1997. The 42 active cases - of which two thirds were of typhoid fever - equated to an annual incidence of 0.94 cases per 100,000. The mean age of 20 years was similar to that of 24 years reported from the United States<sup>3</sup> and 20 years from England.<sup>5</sup> Peak incidence was in the 5-9 year age group, with very few cases under 5 years, consistent with descriptions of typhoid fever in other populations.<sup>6</sup>

It was felt that 75% of cases were infected overseas, similar to the 72% of US cases reported in the period 1985-1994.<sup>3</sup> Two cases with apparently prolonged incubation after overseas residence may, in fact, have been infected in Australia from unknown sources. We were also unable to determine a source for a number of the domestically acquired cases, either as a result of incomplete follow up or insensitivity of screening methods. In their analysis of

Birmingham cases, Braddick and colleagues found that urine cultures substantially increased the rate of detection of infected contacts,<sup>5</sup> and screening urine may be a valuable modification to the current New South Wales protocol.

When the public health records of three cases (all food-handlers) and eight household contacts (seven food-handlers and one health care worker) in sensitive occupations were reviewed, documentation of follow-up arrangements were found in most, but follow-up stool culture results were lacking in some. This highlights the importance of follow-up protocols covering identification of high-risk contacts, securing of stool specimens with culture results, referral arrangements, results of follow-up of any found to be carriers, and, most importantly, good documentation of all these steps.

The purpose of typhoid and paratyphoid surveillance is to minimise the risk to public health by identifying cases and carriers and guiding them to appropriate treatment, and by locating and eliminating any environmental sources. In particular, undetected carrier food-handlers pose a potential source for prolonged outbreaks of typhoid or paratyphoid fever.<sup>7</sup> Thorough investigation and follow up of new cases and their contacts is required if further transmission of typhoid and paratyphoid is to be avoided.

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