

## An outbreak of paratyphoid fever in the UK associated with a fish-and-chip shop

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### SUMMARY

An outbreak of *Salmonella paratyphi* B infection in the UK associated with a fish-and-chip shop is reported. The source of infection for the first three cases was believed to be a food handler who was infected overseas 6 years earlier. His wife whose faeces and urine were originally culture negative continued to run the shop but subsequently her faeces became positive on one occasion. She was considered to have been the source of two further cases, and secondary household spread of infection from these two cases resulted in one symptomatic and two asymptomatic infections. A second household contact of the proprietor also became a faecal excretor 2 months later. We recommend that food handlers living in households or in intimate contact with cases or carriers of *S. paratyphi* B should be put off work until all household contacts cease excreting the organism.

### INTRODUCTION

Foodborne *Salmonella paratyphi* B infection in the UK is believed to be rare, although in 1988 a large foodborne outbreak in Birmingham affected over 59 people (1). Of the 138 indigenous cases identified in England and Wales from 1976–86 only two cases were considered foodborne; both were thought to have been infected from the same Kebab House in London (2). Twenty-nine percent of the indigenous cases were considered to be due to spread from a household case or carrier, but, in 66% of cases the source of infection was unknown. We report an outbreak in the UK associated with a fish-and-chip shop.

### THE OUTBREAK, INVESTIGATION AND CONTROL

*Case 1.* On 23 June 1986 a 14-year-old girl developed abdominal pain and watery diarrhoea lasting 4 days which was followed 7 days later by a fever (103 °F). A faeces sample taken on 30 July yielded *S. paratyphi* B phage type (PT) dundee. She was admitted to hospital 2 days later when a blood culture grew the

same organism. Faeces and urine samples from the rest of the family (four adults) remained negative.

*Case 2.* On 10 October a 14-year-old boy from the same school but a different form, living within half a mile of case 1, developed fever (103 °F), rigors, headache and 'flu-like symptoms followed 3 days later by diarrhoea. A faeces sample taken on 22 October was positive for *S. paratyphi* B PT dundee. All family contacts (five adults) remained faeces negative. Case 2 did not have close contact with case 1. Neither had travelled outside of the town in the 4 weeks before onset.

*Case 3.* On 26 October a 70-year-old woman living in the same neighbourhood as cases 1 and 2 became ill with nausea, fever, giddiness and abdominal pain and was admitted to hospital 7 days later dehydrated and confused. A urine sample taken on 7 November yielded *S. paratyphi* B PT dundee; faeces samples taken on the same day were negative but samples taken on 18 November were positive.

#### *Investigation of cases 1–3 and control measures*

On 3 November general practitioners in the town and surrounding district were alerted and asked to submit faeces samples from all patients with suggestive symptoms. Interviews with cases 1–3 revealed two common food suppliers used in the month before onset, a supermarket and a local fish-and-chip shop. Cases 1 and 2 had eaten fish and chips from there regularly but case 3 bought fish and chips on only one occasion 3 weeks before onset of illness. The shop was visited by an Environmental Health Officer and it was discovered that the proprietor had been admitted to the local hospital in 1980 with *S. paratyphi* B infection on return from holiday in Egypt. He was immediately (12 November) put off work. Laboratory records at the hospital were reviewed and the organism was confirmed to have been *S. paratyphi* B phage type dundee by the CPHL Division of Enteric Pathogens. At the time of his illness the proprietor had not been a food handler and had been discharged from hospital after one negative faeces sample, and follow up samples had not been obtained. From 1982 to 1986 he worked in a fish-and-chip restaurant in a nearby town and no cases of *S. paratyphi* B were detected over this period. In March 1986 3 months before illness in case 1 he purchased the fish-and-chip shop. Faeces samples were obtained from the proprietor, his wife and two casual staff on 13 November. Faeces from the proprietor yielded *S. paratyphi* B PT dundee. Faeces and urine samples from the proprietor's wife were culture negative on 13 and 24 November and she was allowed to continue working, but a faeces sample taken on 3 December was culture positive and she was put off work. Follow-up faeces and urine samples from the two other staff remained culture negative.

*Cases 4 and 5.* On 17 December a 20-year-old man (case 4) living in the same neighbourhood developed 'flu-like symptoms and 2 days later developed anorexia, shivering, abdominal pain and watery diarrhoea lasting 6 days. A faeces sample submitted on 30 December yielded *S. paratyphi* B PT dundee. Case 4 had eaten pie and chips from the previously implicated shop at the beginning of December. This was after the proprietor was put off work, but during the period his wife, who was excreting on 3 December, was still working. Eleven contacts in four households where case 4 had stayed were investigated. Faeces samples taken on

8. 14 and 15 January from the 12-year-old brother of case 4 who was asymptomatic and had not eaten food from the fish-and-chip shop, were culture negative, but a sample taken on 20 January was culture positive (case 5).

*Cases 6, 7, 8.* On 28 December 1986 a 10-month-old boy (case 6) living in a village a few miles from the town became ill with diarrhoea and fever and was admitted to hospital. A faeces sample taken on day 8 of the illness yielded *S. paratyphi* B PT dundee. Investigation of ten close contacts in three households revealed that a 19-year-old man had developed diarrhoea on 15 December 1986 for a few days and he did not go to his GP. A faeces sample taken from him on 17 January 1987 yielded *S. paratyphi* B PT dundee (case 7). He regularly ate fish and chips from the implicated shop. A faeces sample from the mother of case 6 (case 8) taken on 14 January 1987 was culture negative, but a sample taken on 20 January 1987 yielded *S. paratyphi* B PT dundee.

*Case 9.* Since both the proprietor and his wife had been put off work, the proprietor's relatives took over the shop and residence. Faeces samples taken on 24 January 1987 were negative but a faeces sample taken from the proprietor's mother on 8 March 1987 was culture positive (case 9). Both relatives were put off work. Case 9 had close family contact with both the proprietor and his wife during the previous weeks.

The proprietor sought medical advice about the possibility of eliminating the carrier state. He was found to have gall stones and a cholecystectomy was performed on 25 February 1987. A swab from the gall bladder yielded *S. paratyphi* B PT dundee. Follow up faeces samples were culture positive on 3 March 1987 but negative thereafter.

Inspection of the shop premises did not reveal any faults and environmental swabs from the kitchen, refrigerator and toilets were culture negative, as were samples of stored sauces, pie, sausage, chicken, cooking oil and curry.

#### DISCUSSION

Foodborne outbreaks of *Salmonella paratyphi* B in the UK in the 1940s were traced to confectionary products made from contaminated Chinese frozen bulk egg and Ceylonese desiccated coconut (2). In 1965 a milkborne outbreak was associated with infection in cattle (3). Since then indigenous cases of infection have declined and imported cases have increased (4). Thirty-five percent of all cases from 1973–86 in England and Wales were acquired in Mediterranean countries and 18% in the Middle East. Foodhandlers returning to the UK with paratyphoid infection must be considered a potential source of indigenous cases.

In this outbreak five patients almost certainly acquired paratyphoid infection from one fish-and-chip restaurant owned by a man who became a chronic excretor after infection in Egypt 6 years earlier. Fish and chips have never to our knowledge been implicated as a vehicle of food poisoning in the UK and are unlikely vehicles given the very high temperatures achieved in cooking, and their minimal handling and storage times. Post-cooking contamination of food or wrapping paper from the hands of carriers seems the only explanation since no alternatives source of infection could be identified. Foodborne infection appeared

in two stages, firstly, between 18 June and 12 November 1986 when the proprietor was put off work, and secondly from about 24 November to 3 December 1986 when the wife was excreting the organism in faeces and before she was put off work.

The decision to allow the wife to continue working despite known infection in her husband was taken after careful consideration. The PHLS Salmonella Subcommittee's recommendation at the time for this situation was that 'it is usually unnecessary to exclude contacts unless symptoms develop, but in persons posing a special risk exclusion should be considered if they are known to have been exposed to the same source of infection as the case' (5). The wife presumably was exposed to the same source of infection in 1980 in Egypt but she was not considered to pose a special risk. Her faeces and urine samples were initially culture negative and personal and household hygiene appeared to be good. She may have been an intermittent excretor infected from the same source as her husband in Egypt but it is equally probable that she was a secondary household case infected after her husband was put off work. Certainly the mother of the proprietor did acquire infection, presumably through household contact, 2 months after she took over the shop, and there was secondary household spread in two other households. The question raised by this incident is whether food handlers who are household contacts of known infected cases or carriers should be put off work whilst they are in close contact with that infected person. Assessment of household hygiene in all cases did not indicate there was any special cause for concern. We conclude that household contacts of cases of paratyphoid infection who are food handlers should not continue to handle food until all household members cease excreting.

A second point in assessing control policy is that since the index case was not a food handler when first infected he was not followed up microbiologically. All patients infected with *S. typhi* and *S. paratyphi* should be advised to seek advice from the Public Health physician if they ever consider working as food handlers. Thirdly, the outbreak investigation illustrated the value of phage typing of salmonellas (as conducted by the Division of Enteric Pathogens, Central Public Health Laboratory) and maintaining a central register of infections which allowed the source of the outbreak to be confirmed at an early stage.

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