

## **An outbreak of salmonella food poisoning attributed to bakers' confectionery**

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### INTRODUCTION

Elsewhere (Harvey & Phillips, 1955; Harvey & Phillips, 1961) the point has been stressed that salmonellae are regularly introduced into bakehouses without any spread of infection to the general public who consume the bakery products. During 1955-58, in Glamorgan, there was no major incident of salmonella food poisoning spread by bakers' confectionery, despite the fact that infected raw materials were found in regular use in bakeries, and that in our previous survey 27.9% of all samples from floor gullies of the bakeries yielded salmonellae. The incident described here, therefore, serves as a contrast to the previous paper (Harvey & Phillips, 1961) and records an outbreak of the classical kind. One other small incident was also seen in the summer of 1959 involving similar items of bakers' confectionery, but these two incidents were the first to occur in a period of 5 years.

### THE OUTBREAK

On 10 December 1959, in the afternoon, approximately 270 children of a junior school attended a school Christmas party. On Friday, 11 December, only 219 children attended school and of these many were taken ill during the morning with vomiting and diarrhoea. By the afternoon the school attendance was reduced to 163 and several of the remaining children had to be sent home owing to sickness. The food consumed at the party consisted of bakers' confectionery from a single bakery and luncheon meat sandwiches. Remnants of both types of food eaten were obtained.

Clinically the outbreak was a severe one with diarrhoea as the main symptom, many suffering from vomiting and complaining of headache and colic. Minor degrees of delirium in the children were not uncommon. Twenty-five children were sufficiently ill to be admitted to hospital, mainly because of dehydration. One child sent to hospital had anuria for 36 hr.

Some items of confectionery from the party had been taken home and the total

number at risk was approximately 280. In all, there were 209 persons with positive faecal swabs. Fourteen persons who ate trifle from the party at home produced positive faecal specimens. The incubation period ranged from 8 to 78 hr. with an average duration of 26 hr.

#### INVESTIGATION OF THE OUTBREAK

It was found that the majority of persons who were taken ill after the party had eaten bakers' confectionery. Several persons who had eaten confectionery brought back from the party also became ill. It was, therefore, natural to start investigations at the bakery. Suspicion fell upon a trifle consisting of cake, crumbled by hand, set in jelly, and topped with custard. The only item of the trifle containing egg was the cake. The trifles were sold in individual paper cartons and at least one trifle was allowed for each child. The jelly used was poured on to the cake crumbs at a high temperature.

Faecal swabs were taken from the bakery staff, and Moore's gauze swabs were inserted in the bakery sewers and in a drain receiving rinsings from the washing of bakehouse utensils. Faecal swabs were also taken from the staff in the grocer's shop which provided the luncheon meat.

#### RESULTS

*Salmonella typhimurium* phage-type 2c and *S. thompson* phage-type 4 were isolated from the remnants of trifles eaten at the party. No salmonellae were cultured from the luncheon meat. *S. typhimurium*, phage-type 2c, was isolated from four of the bakery staff, two of whom had had symptoms, and from the two drain swab specimens. From faecal specimens of the patients *S. typhimurium* was isolated from 117, *S. thompson* from 23, and both serotypes were isolated from 69. Representative cultures from these specimens showed the type of *S. typhimurium* to be 2c, and that of *S. thompson* to be type 4. These particular phage-types are common in egg products. *S. typhimurium*, phage-type 2c, has not hitherto been common, however, either in abattoir swabs or in human infections in the past 15 months in Glamorgan, and the only culture of *S. thompson* recently isolated from an abattoir swab belonged to phage-type 1. The girl in the bakery mainly concerned with the manufacture of trifles did not produce a positive stool for salmonellae, although she was one of the staff giving a history of diarrhoea before the outbreak. On the other hand, the girl in the grocery shop, who had handled the luncheon meat eaten at the party, produced a stool positive for *S. typhimurium*. Further stools from this girl were also positive.

#### DISCUSSION

Although the isolation of one of the infecting organisms from the girl in the grocer's shop confuses the epidemiological picture, it is nevertheless true to say that the main concentration of infection lay in the bakery. Four bakery staff were

excreting *S. typhimurium*; both bakery drain swab samples were positive for *S. typhimurium*; there was a double salmonella infection in the trifle eaten; and the identical double infection occurred in many of the victims of the outbreak. Further, the phage-types of the infecting serotypes were common in egg products and uncommon in our local abattoir survey. We feel that this evidence points strongly to the bakery as the source of this outbreak.

The method of infection is in doubt. If the cake base of the trifle was infected, the question arises whether the addition of jelly at a high temperature would have sterilized it. A laboratory experiment demonstrated that it was possible to isolate *S. typhimurium* from infected cake crumbs even after pouring jelly at a temperature near 100° C. over them. It is noteworthy that some of the trifles prepared for the party were 30 hr. old before they were eaten, thus allowing ample time for bacterial multiplication to occur. The work of Heller & Salter (1958) would make it unlikely that salmonellae survived the baking process. It is not possible, or profitable, from the evidence available to suggest the means whereby the bakers' confectionery became infected, but elsewhere Harvey & Phillips (1961) have indicated that various salmonellae, depending on the serotypes contaminating some of the essential ingredients used by confectionery bakers, are so frequently to be found in bakehouses that there is almost constant opportunity for infection of this type of product.

#### SUMMARY

1. An outbreak of food poisoning due to *S. typhimurium* and *S. thompson* is described.
2. These same two serotypes were found in trifle eaten by the victims.
3. *S. typhimurium* was found in the stools of four members of the bakery staff and in the stool of one member of the grocery staff handling luncheon meat eaten by those affected.
4. *S. typhimurium* was isolated from drains in the bakery.
5. The phage-type of *S. typhimurium* found in the food handlers, drains, trifle and victims of the outbreak was the same.
6. The phage-type of *S. thompson* found in the trifle was identical with that found in the victims of the outbreak.
7. The phage-type of both salmonellae suggested an egg product source.
8. It is surprising how infrequent these outbreaks are, having regard to the very frequent opportunity for the contamination of confectionery products in bakehouses.

We are indebted to Dr E. S. Anderson and the staff of the Central Enteric Reference Laboratory and Bureau, Colindale, for phage-typing the culture of *S. typhimurium* and *S. thompson*. This made it possible to implicate an egg product source, the food eaten by the victims, and the food establishment where it was prepared.

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