An outbreak of *Salmonella* Typhimurium phage type 99 linked to contaminated bakery piping bags

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In October 2002, the Communicable Disease Control Branch investigated an outbreak of *Salmonella* Typhimurium phage type 99. Cases (13 male, 9 female, age range: 2 to 83 years) were residents of metropolitan Adelaide. Of these, 20 cases were available for interview. Hypothesis generating interviews sought demographic, illness, food purchasing practices, food consumption, social activities and animal contact information for the 7-day period prior to the onset of symptoms. Seven cases were hospitalised, and one case died. There were two secondary cases.

Hypothesis generating interviews identified three distinct groupings. The first consisted of six community cases reporting consumption of sweet bakery items. Of these, five had eaten cream-filled buns or cakes. These items were all traced back to the point of manufacture identified as bakery A.

The second grouping consisted of six cases that had attended a self-catered birthday party. A cohort study was initiated using a telephone administered structured questionnaire. In total, 53 (93%) of 57 party attendees were interviewed. Of these, 22 (42%) experienced an onset of gastrointestinal illness within three days of attending the party. Of the ill party attendees, 15 (68%) reported fever, 20 (91%) abdominal pain, 20 (91%) diarrhoea, 3 (14%) bloody diarrhoea, 13 (59%) nausea and 8 (36%) vomiting. Three party attendees reported gastrointestinal illness prior to attending the party, however, none were involved in subsequent food preparation or food handling practices.

The analytical study revealed males were 8 (RR=8.48, 95%CI 2.19-32.84) times more likely to have experienced illness after attending the party. Univariate analyses identified pork (RR=2.41, 95%CI 1.11-5.24) and cream puffs (RR=3.73, 95%CI 2.11-6.59) as statistically significant risk factors for illness. Thirteen

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assorted desserts from a variety of sources were served at the party. Of these, 10 dozen small individual cakes had been purchased the previous day from a local bakery. After purchase, the cakes were stored un-refrigerated until required the following evening. Included in the purchase, was a selection of cream filled cakes. The risk ratio for small individual cream-filled cakes was 3.02 (95%CI 1.39-6.57). These cakes were traced back to the point of manufacture, bakery A.

The third grouping consisted of four cases that reported no apparent links to the consumption of sweet bakery products.

An environmental investigation was conducted. There were two reports of gastrointestinal illness in bakery employees. Both employees reported involvement in the production of cream filled bakery products. Moreover, both employees reported eating sweet bakery items produced by bakery A. Stool specimens provided by both employees yielded *Salmonella* Typhimurium phage type 99.

In total, 111 environmental swabs and food samples were collected from bakery A. Of these, a composite sample of six piping bags yielded *Salmonella* Typhimurium phage type 99. Initially, unrecognised cross-contamination of piping bags from staff, ingredients or environmental sources was considered. Of particular importance, the environmental investigation focussed on inadequate procedures for cleaning and sanitising piping bags. Subsequent questioning of staff directly involved in food production procedures identified that non-disposable piping bags were being used to pipe both raw meat for sausage rolls and cream for sweet bakery items.

The epidemiological and microbiological investigations identified an association between human infection with *Salmonella* Typhimurium phage type 99 and the consumption of bakery items from bakery A.

This outbreak illustrates the dangers of using non-disposable piping bags for multiple purposes. To minimise cross-contamination, separate piping bags for raw meat and cream processes were introduced. In addition, correct procedures for cleaning and sanitising non-disposable piping bags were instituted. A Food Industry Bulletin highlighting correct procedures for maintaining piping bags was issued.

Clearly, temperature abuse of cream products by some customers may have increased the likelihood of human illness. Nonetheless, *Salmonellae* are an undesirable contaminant in any commercial food product that is sold ready-to-eat. Procedures should be in place in all commercial bakeries to minimise the risk of infection to members of the public.

Figure. Epidemic curve illustrating an outbreak of *Salmonella* Typhimurium phage type 99, 27 September to 24 October 2002