

INVESTIGATING A SUSPECTED OUTBREAK

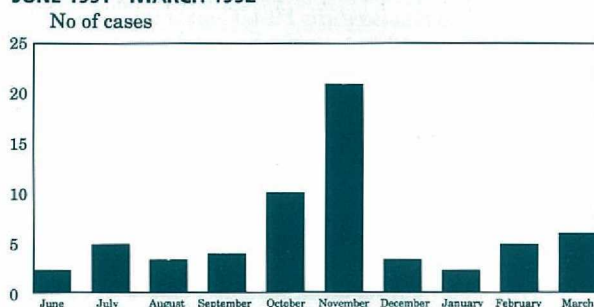
More than 6,000 notifications of *Salmonella* in humans were recorded by the National Salmonella Surveillance Scheme (NSSS) in 1990. The true number of cases is probably much greater as many cases go unreported because of the nature and short duration of the condition. Nearly a quarter of cases occurred in NSW. The most common type of *Salmonella* in 1989 and 1990 was *Salmonella typhimurium*, which was responsible for 38 per cent of cases.

The symptoms of salmonellosis include violent diarrhoea, abdominal cramps, nausea, vomiting and fever. While salmonellosis is rarely fatal, children and the elderly are at particular risk of suffering serious health effects. In 1989-90, 177 people in NSW (about 10 per cent of all notified cases) with salmonellosis were admitted to hospital for treatment.

In November 1991, staff at the Microbiological Diagnostic Unit in Melbourne, who are responsible for the phage typing of *Salmonella typhimurium* notified NSW authorities of an apparent outbreak of *Salmonella typhimurium* phage type 9. The outbreak was investigated by members of the Epidemiology and Health Services Evaluation Branch and the Food Inspection Branch of the NSW Health Department. They determined that although an outbreak may have occurred (see Figure 1) no common factors could be determined apart from most cases reporting that they regularly bought unpackaged cold meats at delicatessens. In December 1991, the Food Inspection Branch was notified by the Victorian Health Department that *Salmonella typhimurium* phage type 9 had been isolated from a sample of salami manufactured in NSW. This information led to a further investigation by the Food Branch of the salami manufacturing processes in NSW.

FIGURE 1

NSW NOTIFICATIONS PER MONTH, JUNE 1991 - MARCH 1992



The time lapse between onset of illness and notification of *Salmonella* infection to the Health Department was identified as the greatest obstacle in the efficient investigation of this outbreak. Experience from a previous outbreak of *Salmonella* in 1985 demonstrated that timely notification was a continuing problem which needed to be addressed.

METHODS AND RESULTS

Salmonella investigation

Cases of *Salmonella typhimurium* phage type 9 were identified using information provided from the Microbiological Diagnostic Unit. This information was matched with data stored on the food poisoning notification database held by the Food Inspection Branch. The branch routinely sends a questionnaire and a stamped, addressed envelope to all patients for whom a notification of an isolation of an organism associated with food poisoning

(such as *Salmonella* spp., *Vibrio parahaemolyticus*, *Shigella* spp., *Yersinia* spp., *Campylobacter* spp.) is received. About 48 per cent of people respond to the questionnaire. If the response from patients or their guardians indicates they associate their illness with a particular food premises or food, an appropriate investigation is made. Notifications received are added to the database, which allows analysis of trends in the incidence of particular types of notifications and the areas in which they are occurring to be detected. Such analysis determines when detailed and urgent investigations are appropriate.

An additional food questionnaire was designed for this investigation and attempts were made to contact and interview each of the cases in order to administer the questionnaire. Most people were interviewed by phone and six were interviewed in their homes.

While most cases were under five years of age and all were under 40, no clear inferences could be drawn from the age distribution. Similarly, although most cases were from the Sydney metropolitan area, cases did not appear to be associated with any particular geographic location.

No common activities, food sources, foods or food premises could be determined by interviewing patients or their guardians. However several people regularly bought cold meats at delicatessens. Inspection of nominated food premises revealed no likely sources of contamination. Food samples collected from these sources were negative for *Salmonella*.

Investigation of salami manufacturing process

In December 1991, the Food Inspection Branch was notified by the Victorian Health Department that *Salmonella typhimurium* phage type 9 had been isolated from a sample of salami made in NSW. The sample had been bought and submitted for analysis by a Victorian competitor of the NSW manufacturer. Initial samples of the salami and its ingredients bought by NSW food inspectors were negative for *Salmonella*. Samples of a range of smallgoods were purchased by food inspectors from delicatessens frequented by patients. Swabs were also taken from slicing machines in the delicatessens. Only one sample was positive for *Salmonella*, and it was of the same type of salami as that sampled in Victoria. A sample of salami bought directly from the manufacturer also proved positive for *Salmonella*. Subsequent serotyping results revealed that the *Salmonella* isolated was *Salmonella chester*.

Investigation of the traditional method of manufacture of the salami revealed that a fermentation process to lower pH (and thereby inhibit the growth of pathogens) is not used and that the cooking used a short time process with a maximum core temperature of 50 degrees Celsius so as not to denature the fat particles in the salami. The process involved considerable handling by staff at all stages. The manufacturer claimed attempts to modify the cooking process using higher temperatures resulted in a product unacceptable to consumers. The finished product is stored at room temperature by the manufacturer and distributor. Subsequent investigations by food inspectors have revealed that many salami manufacturers make a similar product by identical processes. Food inspectors have begun a detailed bacteriological survey of this type of product and are assessing the processes used by manufacturers. Samples taken from products of one of the salami manufacturers

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Investigating a suspected outbreak

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during the survey were found to be infected with *Salmonella heidelberg*. The investigation has led one major manufacturer to modify its cooking process for unfermented salami products.

Investigation of *Salmonella* notification system

Delay between the collection of clinical specimens and notification to investigating officers was determined as a limiting factor in efficient investigation, both in determining whether a specific detailed investigation was required and in limiting the efficiency of normal procedures.

An analysis of the flow of data between the time of collection of clinical specimens and food inspectors receiving results showed an extremely complex flow of data with multiple handling. A meeting of staff from laboratories, public health units, Food Inspection Branch and the Epidemiology and Health Services Evaluation Branch to try to improve the flow of information achieved considerable success, with co-operation from all parties. Food inspection staff now collect notifications directly from the Institute of Clinical Pathology at Westmead Hospital and serotyping results are sent directly to Food Inspection staff pass the notifications on to other interested parties who do not require the information as urgently.

DISCUSSION

The results of the investigation were inconclusive as to the cause of an upsurge in the incidence of *Salmonella typhimurium* phage type 9. It may have been possible for contaminated salami (or possibly cross-contamination from salami through equipment such as slicing machines to other smallgoods) to have been implicated in the transmission of *Salmonella typhimurium* phage type 9.

While the cause of this outbreak remains inconclusive, the investigation was extremely worthwhile. The greatest lesson was the importance of a timely and accurate notification system. The sensitivity and efficiency of the notification and investigation program have now been improved, ensuring that future outbreaks of food poisoning will be detected early, allowing a quick and more effective response in terms of identifying and remedying the cause.

Although few common food sources were identified during the investigation, those that were identified were investigated thoroughly and, as a result, a food production process of considerable public health concern was uncovered. The investigation of this production process has resulted in manufacturers changing their cooking processes and in this way the potential for future outbreaks of *Salmonella* food poisoning from this food source has been reduced.

The benefits obtained from the investigation were in part due to its co-operative, multidisciplinary approach.

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National scheme tracks *Salmonella*

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ALTERNATIVE SOURCES OF DATA

The South Australian Institute of Medical and Veterinary Science's Australian *Salmonella* Reference Laboratory publishes a monthly report detailing cultures typed at the laboratory. The report contains *Salmonella* serotype and phage type isolations from human, veterinary and food sources. This laboratory works in collaboration with MDU and sends *Salmonella* isolations to MDU for phage typing. Although this report is a valuable resource, it is not a complete report of all national isolations; rather it is a report on cultures typed at that laboratory.

The Commonwealth Department of Health, Housing and Community Services' *Communicable Diseases Intelligence (CDI)* contains data on the national incidence of *Salmonellosis*. The August 1992 *CDI* contained the 1991 Annual Report. These data are not specific as to *Salmonella* serotypes or phage typing and contain only human isolations.

No other national resources of data on isolations of enteric pathogens are available.

CONCLUSION

NSSS provides a valuable resource to the NSW Health Department for the surveillance and investigation of foodborne illness caused by enteric pathogens and continued funding is recommended.

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