

Food poisoning in hospitals in Scotland

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SUMMARY

A review of 50 hospital-based outbreaks of food poisoning which were reported in Scotland during 1973-7, is described. At least 1530 persons consuming hospital-prepared food were involved. Thirty-one episodes were associated with *Clostridium perfringens* (*C. welchii*), 11 were due to food-borne salmonella infection, three to enterotoxigenic *Staphylococcus aureus*, and five incidents were of undetermined aetiology. This differs noticeably from the experience in England and Wales where salmonellas appear to predominate as the main cause of hospital outbreaks. Twenty-two incidents occurred in hospitals for psychiatric or mentally subnormal patients, and ten others were located in geriatric units. Only 33 hospitals were involved in the 50 outbreaks as nine hospitals experienced two or more episodes.

The role of the hospital in the occurrence of food poisoning may be over-emphasized in comparison with other catering establishments, as outbreaks are more readily recognized and laboratory facilities are usually available for investigation, but it is also believed that many episodes may not be reported. The peculiar problems of the hospital-catering service and particularly those of the older long-stay hospitals, are discussed in relation to preventive measures which would minimize the hazards of food poisoning.

INTRODUCTION

Last century Florence Nightingale commented that 'the very first requirement of a hospital is that it should do the sick no harm'. Much attention is rightly given nowadays to the safety of drugs and other forms of medical treatment, but one of the basic requirements of hospital care, the provision of safe and wholesome food, still appears to be neglected too often in some hospitals throughout the United Kingdom.

In recent years, many instances of hospital-based outbreaks of food poisoning have been reported (Bone, 1975; Mills, 1976; Thomas *et al.* 1977). The Public Health Laboratory Service has also periodically indicated the prominent role

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Table 1. Annual incidence of food poisoning outbreaks in hospitals reported in Scotland, by organism identified, 1973-7

	1973	1974	1975	1976	1977	Totals
<i>C. perfringens</i>	3	2	11	3	12	31
<i>Salmonella</i> sp.	1	2	1	5	2	11
<i>Staph. aureus</i>	—	1	—	2	—	3
Not identified	—	2	—	3	—	5
Totals	4	7	12	13	14	50

taken by hospitals in England and Wales as the location of outbreaks (Vernon, 1969; Vernon & Tillet, 1974; Vernon 1977), and is currently reviewing the incidence of salmonella infection in hospitals (Public Health Laboratory Service, 1978 - personal communication). A survey throughout England and Wales conducted by the Environmental Health Officers' Association in 1976 (Environmental Health Officers' Association, 1977) revealed that 1119 of 1660 hospital kitchens visited were below the standards required by the Food Hygiene (General) Regulations of 1970, and 153 (13.6%) showed lowered standards sufficiently serious to have warranted prosecution but for the immunity from this legislation afforded to these premises as Crown property.

In Scotland, between 1 January 1973 and 31 December 1977 a total of 188 general outbreaks of food poisoning was reported to the Communicable Diseases (Scotland) Unit, of which 50 (26.6%) occurred in hospitals. This compared with 138 episodes which were associated with catering establishments in the wider community such as hotels, restaurants, shops, dairy-farms and old persons' homes. A review of the 50 hospital-based incidents is given in this paper.

EPIDEMIOLOGY

The bacterial agents identified in the hospital outbreaks during the 5 years are shown in Table 1. This includes one incident in 1976 which although primarily attributable to food poisoning by *Clostridium perfringens* (*C. welchii*) also involved two different salmonella serotypes, but excludes nine episodes of salmonella infection in hospitals which were related to person-to-person spread rather than food-borne. From the clinical and epidemiological evidence available, three of the five episodes in which no organisms were isolated from patients or from suspected foods, resembled food poisoning by *C. perfringens*.

At least 1530 persons were involved in the 50 episodes (a mean of 30.6 per outbreak, with a range between 3 and 114). These were mainly patients, but also included members of staff and other persons eating hospital-prepared food. The 31 outbreaks associated with *C. perfringens* involved 834 persons (54.5%) with a mean of 26.9 per incident, and the 11 salmonella outbreaks affected 401 persons (26.2%) - a mean of 36.5. The three episodes attributed to enterotoxigenic *Staph. aureus* affected only small numbers, namely 13, 10, and 10 persons respectively. The five outbreaks of undetermined aetiology affected a total of 262 persons.

Most persons recovered within 24 h of the onset of illness, particularly those

Table 2. Food poisoning organism by type of hospital experiencing two or more outbreaks, 1973-7

Type of hospital	<i>C. perfringens</i>	<i>Salmonella</i> sp.	<i>Staph. aureus</i>	Not identified
Psychiatric	2	—	—	1
Psychiatric	1	1	1	—
General	1	—	—	2
Geriatric	2	1	—	—
Maternity	2	—	—	—
Psychiatric	2	—	—	—
Mentally subnormal	—	1	—	1
Geriatric	2	—	—	—
Psychiatric	6	—	—	—
Totals	18	3	1	4

affected by *C. perfringens*. Severe illness was more commonly experienced with salmonella food poisoning. Seven deaths were reported, six of which were associated with salmonella infection. Of these, five were geriatric patients, including three in one hospital in October 1977, and the other was a 48-year-old mentally subnormal patient, who had also been suffering from a respiratory illness. The one fatality associated with food poisoning by *C. perfringens* was a 52-year-old long-term psychiatric patient.

Outbreaks caused by *C. perfringens* in particular, occurred most frequently (68.0%) during the warmer months of the year from May to October. The types of hospitals experiencing outbreaks were psychiatric/mentally subnormal (22 incidents), geriatric (10), general (9), maternity (5), and four 'others' which included a cottage hospital, an epileptic unit, an ophthalmic unit, and a health board administrative office, meals for which were prepared at a nearby hospital.

Only 33 hospitals however were involved in the 50 outbreaks. Twenty-four hospitals reported one outbreak each, while the other 26 incidents (52.0%) occurred in nine hospitals, each of which experienced two or more outbreaks during the five years. Of these, one psychiatric hospital recorded six episodes of *C. perfringens* food poisoning during the summer and autumn of 1977, four hospitals (two psychiatric, one geriatric and one convalescent unit) each had outbreaks in three different years, and four others (two psychiatric, one geriatric, and one maternity unit) reported two outbreaks each. The food poisoning organisms which were associated with these nine hospitals are shown in Table 2. In addition, two other hospitals which reported outbreaks due to *C. perfringens* in 1975 and 1977 respectively, experienced further episodes during 1978.

In almost all of the 31 episodes caused by C. perfringens, there was a history of pre-heated meat and poultry dishes having been consumed which had been cooked one day and inadequately cooled or stored before serving on the following day. The incriminated foods were stews, pies, rolled and minced meats, chicken dishes, and on occasion various cold or cured meats. In four outbreaks only no specific item of food was apparent.

Among the 11 salmonella outbreaks, frozen poultry which appeared to have been inadequately de-frosted, under-cooked, and/or contaminated after cooking,

was incriminated on five occasions. No specific food item was identified in the other six salmonella episodes, although in one hospital for the mentally subnormal, a contaminated food liquidizer was suspected on the epidemiological evidence available.

Of the three incidents relating to food poisoning by *Staph. aureus*, one involved cold pork, one a dessert, and in the third the vehicle of infection was not established.

DISCUSSION

The hospital as a venue of food poisoning may be exaggerated in comparison with the number of incidents reported from the outside community. In hospitals, given their captive populations, outbreaks are more apparent when they occur and laboratory facilities are usually more readily available for conducting definitive investigations. Conversely, hospitals are semi-closed communities within which the significance of a food poisoning episode and the need for it being reported, might be overlooked. It may also be difficult to recognize or define what is diarrhoea or what is 'normal' for many psycho-geriatric or mentally subnormal patients. The higher incidence of episodes recorded during 1975-7 probably represents a real increase in the number of outbreaks occurring rather than being attributable to improved reporting. Whatever the extent of undue prominence or under-reporting, there is little doubt that food poisoning outbreaks do occur too frequently in hospitals, where the consumers of food are mostly patients, many of whom are already compromised in health and are particularly vulnerable to microorganisms or toxins transmitted via contaminated food.

Catering malpractice in the handling, cooking and storage of food is undoubtedly an important contributory factor in causing outbreaks. This is especially true of food poisoning by *C. perfringens* when meat is pre-cooked and inadequately cooled before or during storage. The practice of re-heating meat dishes is not uncommon in hospital catering, in marked contrast to the school meals service for example whose official policies discourage re-heating and thereby, significantly, remain relatively free from outbreaks by *C. perfringens*. In contrast, salmonella food poisoning is more often related to inadequate de-frosting and cooking of poultry, and in particular to possible post-cooking contamination within the kitchen from raw meats, utensils, preparation surfaces, or hands of personnel, as well as inadequate cooling or storage facilities. Such dangers may be further compounded in the older long-stay hospitals where kitchen premises may not have been modernized, and where ambulant patients may assist in food preparation areas. The relatively high incidence of outbreaks reported from the long-stay hospitals, particularly those reporting multiple episodes, tends to support this view. In addition, with salmonella infections patients and staff may also be exposed to the further risk of direct person-to-person spread.

Between 1973 and 1977, hospitals have been involved in nearly 60% of general outbreaks in Scotland due to *C. perfringens* in contrast to 11% only with salmonella food poisoning. In Scottish hospitals food poisoning by *C. perfringens* appears to present the greatest hazard numerically, being responsible for 62.0%

of outbreaks and 54.5% of persons affected in the present series, and accounting for 18 of the 26 incidents reported by hospitals experiencing multiple outbreaks. This differs noticeably from the experience in England and Wales where during the 4-year period 1973-6, salmonellas predominated over *C. perfringens* as the cause of hospital outbreaks in a ratio of approximately three to one (Vernon, 1977; Public Health Laboratory Service, 1978 - unpublished data).

In defence of the hospital catering service, it differs greatly from most other establishments in having to prepare and serve at least three meals every day throughout the entire year with all the consequent problems which this entails such as those relating to staff recruitment, training and supervision. The shortage of funds available for the modernization or replacement of old and unsatisfactory kitchen premises may also present problems in many hospitals, while the Health Service's immunity from prosecution under food hygiene legislation has possibly to some extent helped to perpetuate this situation. It is now widely accepted however, that hospital kitchens should be no less satisfactory than those elsewhere, and in recent years the Scottish Home and Health Department has drawn attention to the desirability of inspection by the environmental health staff of the appropriate local authorities. Such inspections are now well established throughout Scotland and there are encouraging signs that reported defects and deficiencies are being remedied by health boards.

The occurrence of food poisoning in hospitals could also be further reduced by a number of measures such as the prohibition of the re-heating of foods, the extension of 'in-post' staff instruction, the removal of Crown exemption, and the increased adoption by environmental health officers of 'in-depth' inspection where practices are scrutinized in detail over a period of several days rather than by 'spot' checks. Of these, the improved education of staff is probably the single most effective means of minimizing the risk of food poisoning and this need is increasingly being emphasized by the Scottish Health Service Catering School in its training programmes.

If an outbreak does occur, a full investigation should always be carried out as laboratory facilities are readily accessible in most areas of Scotland. In addition, reference laboratories for the serotyping and phage-typing of salmonellas are available at the Scottish Salmonella Reference Laboratory, Glasgow, and at the Public Health Laboratory Service, Division of Enteric Pathogens, Colindale, London respectively. Isolates of *C. perfringens* for serotyping and *Staph. aureus* for enterotoxin tests can be sent also to the Public Health Laboratory Service, Food Hygiene Laboratory, Colindale. It is essential that outbreaks are reported promptly if they are to be properly investigated, the cause established, and the necessary preventive measures taken, as it is only in this way that the dangers of food poisoning in hospitals can be reduced to a more acceptable level.

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