Chapter 19
Food Hygiene and Gastroenteritis

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Key points

- The Infection Control Team should provide input into the management of outbreaks of foodborne illness and promote safe practices in food hygiene.
- Proper training of staff in food hygiene practices is important.
- Control of microbiological hazards in food production is usually undertaken using temperature control.
- Routine testing of food handler's faeces, blood or rectal swabs is neither cost effective nor generally indicated.
- Inspection and auditing of kitchen practices often reveals deficiencies in catering practices and allows corrective action to be taken.
- All refrigerated items should be labelled, dated and used within 72 hours.

Introduction

The burden of foodborne illness due to toxin and/or infection in low resource countries is well documented. Intestinal diseases are very prevalent in the community and transmission to the hospital setting is common. The prevalence of healthcare-associated foodborne illness in developing countries varies, however healthcare-associated *Salmonella* and *Shigella* rates reaching 3% and 2.5% respectively have been quoted. Significantly fewer healthcare-associated foodborne illnesses occur in developed countries. Nevertheless, 247 outbreaks of *Salmonella* were documented in United Kingdom hospitals over a 10-year study period. Other microbes causing food related illness include hepatitis A and other viruses, *Campylobacter* and *Yersinia*.

Outbreaks of foodborne illness may carry significant costs, requiring considerable manpower interventions and numerous laboratory analyses for investigation and control. The direct cost of a healthcare-associated outbreak of salmonella within an Australian hospital was estimated to be greater than AU $120,000.

Viral gastroenteritis

Outbreaks of viral gastroenteritis in hospitals are often caused by noroviruses, members of the *Caliciviridae* family. Vomiting, often sudden in onset and projectile in nature, is the major symptom, although diarrhoea (mainly mild and short-term) can also be present as well or on its own. Cases often tend to occur in elderly patients. Noroviruses are highly infectious and may be acquired through consumption of contaminated food or water or, more commonly, pass from one patient to another via faeco-oral, fomite or aerosol routes.

Symptomatic individuals should be cohorted or isolated. Healthcare workers should wear gloves and apron for contact with an affected patient or environment and wash hands with soap and water after such contact and after removing gloves and apron. Affected staff should be excluded from the ward immediately and stay away until they have been symptom-free for 48 hours. Staff from affected areas must not work in unaffected areas in the following 48 hours.

If there is continued spread, the ward should be closed to new admissions and the patients should not be transferred to unaffected wards or departments unless urgent specialist care is needed, and then only after consultation with infection control staff. The ward should not be re-opened until 72 hours after the last new case. Terminal disinfection of the ward and changing of bed curtains should be performed before re-opening.

Visitors should be restricted and requested to wash their hands on leaving the unit. Spillages of vomit and faeces must be cleaned and disinfected promptly. The frequency of routine ward cleaning, especially bathrooms and toilets, should be increased and followed by disinfection using freshly prepared 0.1% hypochlorite solution.

Role of Infection Control Teams (ICT)

Hospital ICTs can play diverse roles in the prevention and control of foodborne illness. Of course, prevention is key, however at a minimum, they will intervene wherever there are suspected or confirmed cases of foodborne gastroenteritis. They should collaborate with catering managers and/or environmental health officers in drafting and implementing the hospital food hygiene policy.

ICTs should provide several inputs into the management of outbreaks of healthcare-associated foodborne illness. Their major role is likely to involve cohort isolation of symptomatic individuals and supervision of patient placement to ensure that the risk of cross transmission of any pathogen is minimized. They may also need to contribute toward education of hospital staff and possibly the general public.

The role of ICTs in promoting safe practices in food hygiene in hospitals depends on the type of catering used and the presence or absence of other stakeholders such as catering managers and/or environmental health officers. Where the hospital out-sources catering, the role of ICTs may be limited to contribution toward a due diligence approach through supervision of food distribution within the hospital as well as inspections and audits of the suppliers' kitchen premises. If food is prepared in the hospital the ICTs may need to provide a more significant contribution. Therefore, infection prevention and control personnel need to have a clear understanding of effective food hygiene.

Training

The concepts of food hygiene are similar to those used in other areas of hospital infection prevention and control. Infection prevention and control staff members are ideal candidates to spearhead food hygiene training in hospitals. Numerous tools are available, both on the Internet and in print, to aid development of effective programs. The importance of preventing conditions for temperature and time to allow bacteria to reach infecting doses in food must be stressed. Effective personal and environmental hygiene and potential sources of contamination should also be part of any food hygiene training program.

The dangers of prolonged exposure of food to warm temperatures must be extensively covered, including situations that may lead to it, such as preparation of food too far in advance, storage at room temperature, and slow cooling. The need to avoid possible contamination, whether by under cooking of high risk meat products such as poultry or by cross-contamination between raw and cooked items, must be emphasised.

Hazard Analysis Critical Control Points

Hazard Analysis Critical Control Points (HACCP) analysis was pioneered in the 1960s within the United States' National Aeronautics and Space Administration program and is nowadays incorporated into legislation of food safety both in the United States and the European Union. HACCP analyzes the food production process to determine possible microbiological, physical or chemical hazards that may contaminate food as it is produced. Critical control points (steps in the process after which any contamination cannot be reversed) are identified. Preventive interventions are devised which are then monitored and corrected if any unacceptable deviation takes place. HACCP systems need to be recorded, audited and verified routinely.

HACCP systems have been shown to provide significant improvement in the quality and the safety of food served in hospitals. A successful HACCP system consists of a number of good hygiene practices including regular equipment cleaning and maintenance, provision of effective hygiene facilities, systems to control insects and other pests and regular training for staff on food hygiene. (See Table 19.1)

Table 19.1. Adapting HACCP to hospital food production

Step in Process	Foodborne Illness Concern	Prevention Methods
Receipt of food	Ready to eat foods contaminated with food poisoning bacteria or toxins.	Visual and temperature checks on food received. Accept frozen foods at <-18°C and chilled foods at < 4°C
Storage	Growth of food poisoning bacteria, toxins on high-risk (ready to eat) foods. Further contamination.	High-risk perishable foods stored covered and dated at safe temperatures. Rotate stock and use by recommended date. Ensure a pest free environment.
Preparation	Contamination of high-risk (ready to eat) foods. Growth of pathogenic bacteria.	Limit exposure to ambient temperatures during preparation. Prepare with clean equipment used for high-risk (ready to eat) foods only. Separate cooked and raw foods. Wash hands before handling food.
Cooking	Survival of pathogenic bacteria.	Thaw frozen items completely at temperatures <15°C. Cook food (especially chicken and minced meats) to ≥75°C in thickest part for two minutes.
Cooling	Contamination. Growth of pathogens. Toxin production.	Cool foods as quickly as possible. Chill rapidly and refrigerate within 90 minutes. Do not leave out at room temperature to cool.
Chilled storage	Growth of pathogenic bacteria.	Temperature control. Date code high-risk (ready to eat) foods. Use in rotation and always within shelf life. Consume within three days of cooking.
Hot holding/ Distribution	Growth of pathogenic bacteria. Toxin production.	Keep food hot at >63°C.
Reheating	Survival of pathogenic bacteria.	Avoid if possible. Reheat to >75°C.
Serving	Growth of pathogens. Toxin production. Contamination.	Serve cold high-risk foods as soon as possible after removing from refrigerated storage. Serve hot foods quickly. Ensure hands and equipment used to serve food are clean.

Food pathogens will survive and may multiply if food is left within the temperature danger zone (6°C to 63°C). Control of microbiological hazards in food production is usually undertaken by temperature control. Heating food to achieve 75°C for 1-2 minutes in its thickest part will guarantee destruction of any biological hazards. When food is cooked and then cooled, cooling must be rapid, and then the food should be held at temperatures that prevent microbial growth. Temperature control should be maintained until food is served within the hospital wards and units. Therefore cold served food must be served as soon as possible after removal from refrigerated storage. On the other hand, hot food must have reached at least 75°C if re-heated; this temperature should be maintained until served to the client. This is particularly important in systems where food is prepared in the kitchen and transported hot to be served without further re-heating. These systems are particularly risky and ICTs must pay special attention to ensuring that hot holding temperatures are maintained above 63°C.

Testing of food, environment and individuals

Food and environmental testing in the microbiology laboratory is expensive and labour intensive. It is not actually vital to monitor food safety since a complete and functional HACCP system is more than satisfactory. Nevertheless there are occasions when food and environmental testing is useful. It can provide confirmation of microbiological quality and safety. One useful spin-off is the impact such tests often have on food handlers, who can see visual evidence of the theoretical principals that they had been taught. A simple way of quality control that can be performed in all laboratories and is quite cost effective is semi-quantitative testing of environmental swabs taken from the production area. Routine testing for pathogens is of little benefit; it is more cost effective to count indicator microrganisms, especially *E. coli*, to identify poor hygienic food production.

Routine testing of food handler's faeces, blood or rectal swabs is neither cost effective nor generally indicated. An individual who screens negative may become a carrier; more worryingly, a negative screen may induce a false sense of security and result in negligence toward general and personal hygiene practices. It is much more cost effective for any money set aside for food handler testing to be invested in better training of food handling personnel.

Kitchen auditing

Inspection and auditing of kitchen practices often reveals deficiencies in catering practices and allows corrective action to be taken in a timely manner. When undertaking an audit, particularly for the first time, the infection control practitioner would do well to keep in mind the most common causes of foodborne illness already mentioned, and structure the kitchen audit accordingly. Particular attention should be given to evidence of prolonged exposure of food to warm temperatures. Other critical factors include: cross-contamination arising from lack of compliance with hygiene practices for hand or equipment cleaning; undercooking of high risk meat products such as poultry; and cross-contamination between raw and cooked items. If an audit is likely to be repeated regularly, an itemised audit sheet should be formulated and include all the different areas in the kitchen being reviewed. In this way it is easier to achieve standardisation and reproducibility from one audit to the next and variations with time are more easily identified.

Special attention should be directed at items such as blenders. All components must be easy to clean.

Ward kitchens

Ward kitchens should be kept clean. Refrigerators should be sited away from direct heat or sunlight, and have a temperature monitoring device with the internal temperature documented at least once daily. All items should be labelled, dated and used within 72 hours. Any items that are not labelled, outdated or left exposed or unwrapped should be discarded. Attention should be given to separation between raw and cooked items, cooked items always being placed above the raw items if in the same refrigerator.

References and Further Reading

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