

ENVIRONMENTAL MANAGEMENT FOR HOTELS

THE INDUSTRY GUIDE TO SUSTAINABLE OPERATION

6 FOOD SAFETY AND ENVIRONMENTAL HEALTH

6.1	THE ISSUES	2
6.2	MICRO-ORGANISMS AND HOW THEY ARE TRANSMITTED	2
6.3	FOOD SAFETY MANAGEMENT	4
6.3.1	Cleaning and hygiene	5
6.3.2	Avoiding cross-contamination	6
6.3.3	Cooking	7
6.3.4	Chilling, freezing and thawing	8
6.3.5	Essential management practices	9
6.3.6	Suppliers	10
6.4	MORE INFORMATION	11
6.4.1	Contacts	11
6.4.2	Resources	11

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Food hygiene and safety is subject to increasingly rigorous legislation around the world

6



FOOD SAFETY AND ENVIRONMENTAL HEALTH

Each year in the UK alone, as many as 5.5 million people suffer from food-borne illnesses – one in ten of the population.^[1] Whilst some micro-organisms (such as mould on bread) are easily detected, often they do not affect the appearance, smell or taste of food. This section outlines the procedures you should follow to avoid the risk of causing illness.

[1] Source: Foodlink. See www.foodlink.org.uk/factfile.asp?file=1



6.1 THE ISSUES

Food safety and hygiene means taking the necessary precautions in order to ensure that food is fit for human consumption and does not create an environmental health hazard. There are significant legal, ethical and business reasons why it should be part of any restaurant or food service establishment's overall approach to management and meeting quality standards:

- Food safety is subject to increasingly rigorous **legislation** around the world, making it an offence to serve food that is injurious to health or does not comply with safety requirements. Many countries have adopted the internationally-recognised system of food safety management called **Hazard Analysis Critical Control Point (HACCP)**.^[2] This system identifies and monitors critical control points (CCP's) at all stages of the food production and preparation process to ensure that food is safe for human consumption. Regardless of their size, businesses serving food should implement food safety management procedures based on HACCP principles.
- Businesses that do not comply with regulations or that cause illness or food-poisoning can be **prosecuted** and **liable for fines** or **compensation claims**.^[3]
- Food safety is important for managing your **insurance risk**, retaining your **license to operate** and ensuring **repeat business** from customers.
- Some countries, notably in parts of the USA, the UK and in Denmark, have introduced '**Scores on the Doors**' schemes whereby premises that serve food must display a scorecard or symbol indicating the **level of their hygiene standards** to consumers. Establishments that are judged to operate to high standards can gain a competitive advantage. Such schemes are popular with the public and are likely to become more commonplace.
- Not only are restaurants now expected to provide **special diets** such as vegetarian, vegan, low-fat etc. but they also need to include information on menus about ingredients which could cause an **allergic reaction** (anaphylaxis). Recipes containing seafood, nuts and wheat gluten are potentially lethal for those who suffer from food allergies.
- **Food waste is reduced** by not accepting produce in an unfit condition and reducing spoilage through better stock management.
- The provision of food safety training and improvement in staff conditions can improve **staff retention and loyalty**.

6.2 MICRO-ORGANISMS AND HOW THEY ARE TRANSMITTED

The microscopic bacteria, viruses, yeasts, moulds and parasites that can contaminate food are so small that millions of them can fit on the head of a pin. **FIGURE 6.1** shows some of the food-borne micro-organisms which pose the greatest threat to health, where they are found and how they are transmitted.

[2] For example in Europe it is a requirement of Regulation 852/2004 of the European Parliament on the Hygiene of Foodstuffs for food businesses to have an HACCP system and to be registered with the authorities. See: www.fsai.ie/uploadedFiles/Consol_Reg852_2004.pdf

[3] In the UK, under changes brought in by the Food Hygiene Regulations in January 2006, establishments in breach of the regulations (which includes not having an HACCP system in place) face a maximum fine of GBP20,000 and proprietors could serve up to two years in prison.

- The process of transferring micro-organisms from one surface to another is called **contamination**. Since there are on average 100,000 bacteria on each square centimetre of human skin, **human hands** are the most frequent means of contamination, but micro-organisms are also spread through contaminated **food** and **water**. Some viruses can also be passed on to the consumer via food prepared by an infected handler.
- **Bacteria** are responsible for the most serious types of food poisoning, and elderly people, babies, toddlers, pregnant women and people who are already unwell are most likely to become seriously ill.
- In order to multiply, bacteria need **moisture, food, warmth and time**. Other factors such as the presence or absence of oxygen, salt, sugar and the acidity of the surroundings can also be important.




Organism	Examples	Cause
 <p>Bacteria</p>	<i>Campylobacter</i>	Found in raw poultry and meat, unpasteurised milk and untreated water. Birds pecking bottle tops and pets with diarrhoea can also be a source of infection
	<i>Clostridium botulinum</i> (Botulism)	Rare but serious illness caused by a toxin produced by the <i>Clostridium botulinum</i> bacterium. Can lead to respiratory failure and paralysis. Has been found in home-canned foods with low acid content, oils infused with garlic or herbs and improperly handled baked potatoes
	<i>Escherichia coli</i> (<i>E. coli</i>)	Flora living in the lower intestines of mammals. Can be found in cheese and contaminated meat that has not been properly cooked
	<i>Listeria monocytogenes</i>	Bacteria can grow at fridge temperature. Can be found in unpasteurised milk and soft cheeses, pâté, uncooked meat and seafood, rice and ready-to-eat delicatessen foods such as sushi
	<i>Salmonella</i>	Potentially fatal bacteria found in poultry, eggs, unpasteurised milk, meat and water. Outbreaks most common in warmer temperatures. Usually transmitted to humans by eating foods contaminated with animal faeces
	<i>Shigella</i>	Shigellosis is generally contracted through water polluted with human faeces. Causes dysentery. As few as 10 bacterial cells can be enough to cause an infection
 <p>Parasites</p>	<i>Cyclospora</i>	Spread by ingestion of water or food contaminated with infected faeces. Outbreaks of cyclosporiasis have been linked to produce such as soft fruit sprayed with pesticides mixed with contaminated water ^[4]
	<i>Giardia intestinalis</i> (also known as <i>Giardia lamblia</i>)	Found in soil, improperly cooked food, water, or on surfaces that have been contaminated with the faeces of infected humans or animals
	<i>Trichinella spiralis</i>	Causes trichinosis (also called trichinellosis, or trichiniasis) a parasitic disease caught by eating raw or undercooked pork and wild game products infected with the larvae of the roundworm <i>Trichinella spiralis</i> or trichina worm. Most common in the developing world and where pigs are fed raw garbage
 <p>Viruses</p>	Hepatitis A	Intestinal virus transmitted by contaminated food. Causes an acute form of hepatitis (inflammation of the liver)
	<i>Norovirus</i>	Causes winter vomiting disease, viral gastroenteritis and acute non-bacterial gastroenteritis. Can be water or food-borne. Shellfish (such as raw or insufficiently steamed clams and oysters) and salad ingredients are most often implicated. Other foods are often contaminated by food handlers with the virus

FIGURE 6.1

Common dangerous food-borne micro-organisms

[4] Sources: 'Spraying could spread food poisoning bacteria', Pesticide Action Network UK, www.pan-uk.org/pestnews/Issue/pn49/pn49p3.htm and University of Florida <http://ufdc.ufl.edu/IR00002057/00001>

- In the right conditions one bacterium can **multiply** to more than four million in just eight hours. The more bacteria in the food, the more likely they are to cause illness.
- Bacteria multiply best at **temperatures** of between 5 and 68°C (41 and 154.4°F). They are killed at temperatures of 70°C (158°F) and above. Below 5°C, most bacteria multiply very slowly, if at all. Some are killed by very low temperatures but many survive and can start to multiply again if warm conditions return. That is why adherence to strict cooking, chilling, freezing and thawing procedures is so essential to food safety.

Note that there is considerable confusion about the H5N1 strain of **bird flu virus** and how it is spread. Bird flu is passed from bird to bird and has not yet mutated into a form that can spread easily from human to human. The **World Health Organization (WHO)** monitors the situation closely and although it is possible for humans to catch the bird flu virus from infected birds, this has so far only happened where the sufferer has had very close and prolonged contact with infected poultry. As long as people keep away from sick birds, and are scrupulous about hand-washing and general hygiene, the risk of infection is minimal.

According to the **UK's Food Standards Agency (FSA)**, eggs and poultry do not pose a risk to consumers of contracting bird flu as the virus is easily destroyed by cooking and by gastric juices. To be absolutely safe, avoid using raw eggs in dishes that will not be cooked and cook eggs until the whites are solid.

6.3 FOOD SAFETY MANAGEMENT

The most important issues to address are often referred to as 'The Four C's': **Cleaning**, **Cross-contamination**, **Cooking** and **Chilling** (including freezing and thawing). Most aspects of food safety fall into these categories, and your **food safety management programme** should be built around these principles.

The four 'C's' of food safety



CLEANING

CROSS-CONTAMINATION

COOKING

CHILLING

6.3.1 Cleaning and hygiene

- a Your kitchen should be **designed** with cleanliness and hygiene in mind. Floors, walls, ceilings and worktops should be smooth (to prevent dirt accumulating), easy to clean and in good repair. Light levels should be as close to good natural light as possible. There should be sufficient working space to allow for hygienic operation. Toilets must be sited away from areas where food is handled and there should be adequate hand basins and hygienic facilities for drying hands.



A clean kitchen is of paramount importance

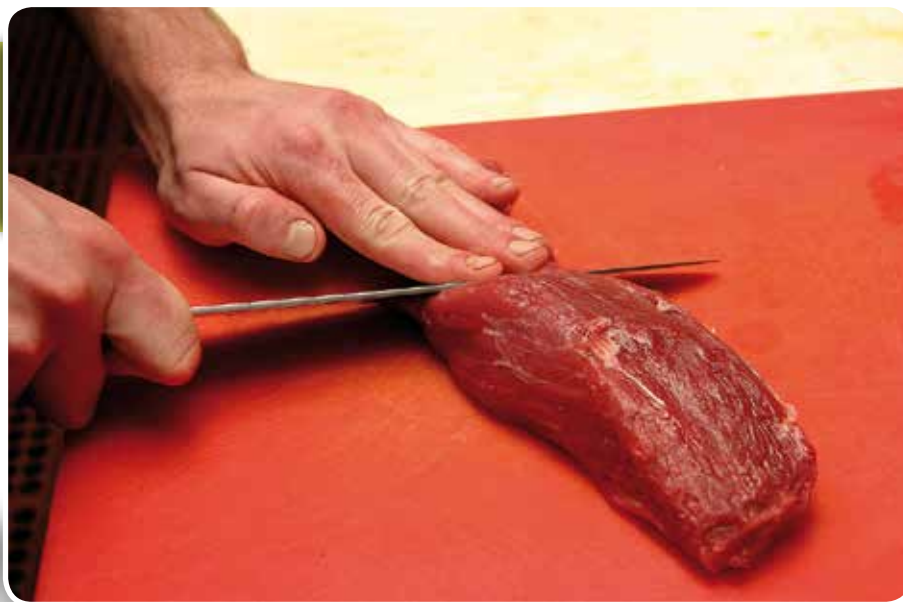
- b Ensure that **ventilation** is sufficient and that air does not flow from a contaminated into a clean area. **Air filters** should be easily accessible to enable regular cleaning and maintenance. Where necessary, windows should be fitted with insect-proof screens.
- c Ensure adequate supplies of **hot and cold water**. Any water that will come into contact with food during preparation or for cleaning must be **potable** (safe for human consumption).
- d Kitchen and restaurant staff should have adequate **changing facilities** and wear clean (preferably light coloured) uniforms. Hair should be tied back and, if necessary, a hairnet worn.
- e Staff should be **fit for work**; anyone suffering from **vomiting** or **diarrhoea** should go home and not resume work until they have had no symptoms for 48 hours. Those with **cuts or sores** should check with their supervisor before commencing work.
- f Ensure that staff **wash and dry their hands** thoroughly before and during work in the kitchen and restaurant. Particular care should be taken after visiting the toilet, blowing the nose, handling rubbish, cleaning and after working with eggs or raw meat. Ideally, disposable gloves should be used in egg and raw meat preparation areas. Staff should also refrain from touching their face, particularly the nose and mouth, while they are working.
- g All **equipment, implements, utensils** and **chopping boards** should be corrosion-resistant and should be cleaned carefully, particularly after working with raw meat, poultry and fish.
- h Clean and replace **cleaning cloths** regularly. Use different coloured cloths to clean areas that have raw and cooked food and do not allow them to be mixed up.
- i Make sure that **probe thermometers** are cleaned and sanitised before use and designate separate thermometers to check raw food and ready-to-eat food temperatures.
- j Remove **packaging materials** from worktops and clean thoroughly before preparing food.
- k Do not store **cleaning materials and chemicals** close to food storage or preparation areas. Use cleaning chemicals with the least environmental impact possible.

- l Wash **fruit and vegetables** carefully to ensure there are no pesticide or other chemical residues. Use a bowl and then rinse them rather than washing under running water.
- m Conduct regular tests to ensure that **surfaces** such as floors and worktops are hygienic. There are a variety of systems available such as colour-changing wipes and swabs to detect bacteria.
- n **Replace** worn and scratched chopping boards and work surfaces, damaged utensils and cracked china and dishes as they can collect harmful bacteria.
- o **Smoking, eating and gum-chewing** should never be allowed anywhere near food preparation or serving areas, neither should **pets**.
- p Check regularly for signs of **pest infestation**. Use pest control methods that do not in themselves pose a danger to human or animal health or harm the environment.

6.3.2 Avoiding cross-contamination

- a Organise the **layout** of the kitchen to enable a **work-flow** which will avoid cross-contamination between foods.
- b **Regularly disinfect** the items people touch frequently such as work surfaces, sinks, taps, door handles, switches and can openers.
- c Where possible use **separate storage and chilling facilities** for vegetables, dairy products, raw and cooked foods. In smaller operations where this may not be possible, follow the storage guidelines for multi-purpose refrigerators shown in **FIGURE 6.2**.
- d If possible **designate** certain areas, equipment and sinks for **raw food** only.
- e Always use **separate chopping boards** and **utensils** for preparing raw meat and poultry. A colour coded system can be helpful.

Designate separate areas and implements for working with raw meats



- f Keep **eggs** separate from other foods, both when in their shells and once they have been cracked open. Never use eggs that are cracked or damaged. Avoid splashing raw egg on to other foods, surfaces or dishes.
- g Store items in chillers, fridges and dry stores in **separate, re-sealable bags** and **plastic containers** to avoid cross-contamination or access by pests.



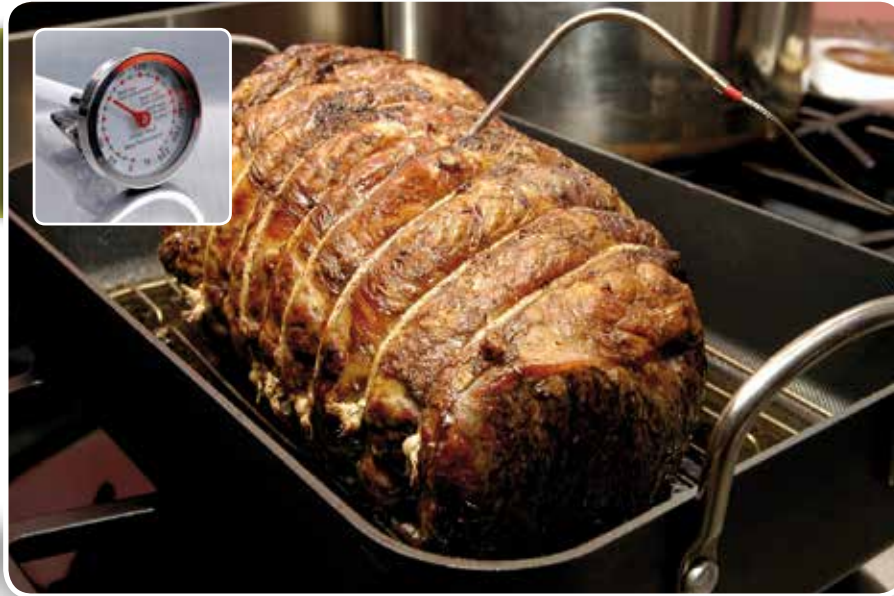
- h** **Wrapping materials** such as aluminum foil, plastic bags and cling film must be kept in clean storage to avoid contamination. Hands should be washed and dried before reaching for wrapping materials.
- i** Ensure areas where meat and other raw foods have been **defrosted** are scrupulously cleaned.
- j** Always use potable water for making **ice**. Similarly, **steam** used in direct contact with food must not contain any substance that could be a hazard to health.
- k** Use **foot-operated bins** in preference to lids that have to be removed by hand.
- l** How you handle and dispose of **waste food** can have important food safety and environmental health implications:

 - **Food waste, non-edible by-products and other refuse** should be removed from rooms where food is present as quickly as possible.
 - **Rinse** glass, aluminium and plastic containers thoroughly before putting them into recycling bins.
 - If you are donating **leftover food** to local charities such as homeless shelters, only send food that has been **untouched by consumers**, such as sandwiches and salads from serveries etc. Ensure that the food is within its 'consume-by' period and that food safety principles are adhered to.
 - **Bins for food waste and composting** must be properly made and in good condition with a well-fitting lid. They should be easy to clean, sited in a separate area from where food is delivered and prepared and clearly marked.
 - The use of food waste **compactors** can reduce the volume of waste that needs to be stored prior to removal for landfill, incineration or composting, reducing environmental health risks, cutting transport energy and saving space.
 - Make sure that **compost is rotted down** properly before using it in the hotel grounds. Partially-decomposed matter can attract vermin and create an environmental health hazard.

6.3.3 Cooking

- a** **Cook thoroughly** until food is piping hot throughout (particularly meat, poultry, fish and rice) and **keep it hot** until it is served to the consumer.
- b** Never **reheat** food more than once. Reheating should mean cooking again, not just warming up, and food should be hot throughout.
- c** Cook **eggs** and **recipes containing egg** thoroughly and use pasteurised egg for raw or lightly-cooked foods such as mayonnaise, Béarnaise and hollandaise sauces, salad dressings, ice cream, icing, mousse, tiramisu and other desserts. Pasteurised egg can be bought in frozen, liquid or powder form.
- d** If you serve **rare beef** or **lamb steaks and joints** make sure all the outside surfaces are fully cooked, for example by searing in a pan. Turn meat and poultry during cooking.
- e** **Prawns** should change colour from blue-grey to pink when they are cooked, **scallops** should become white and firm. **Ready-cooked (pink) prawns**, should be served cold, or reheated until they are piping hot all the way through. Throw away any **mussels and clams** with open or damaged shells before cooking. If the shells do not open during cooking they should be discarded.
- f** When using **microwave** cookers, ensure the food is heated properly throughout, following the manufacturers instructions regarding standing times and stirring during cooking.
- g** **Barbecues** must be thoroughly cleaned and disinfected both after and before use. Do not let raw food touch or drip onto cooked food when adding food to the barbecue.

Use a probe thermometer to ensure the proper cooking temperature is reached



- h** Check the **accuracy** of your probe thermometer regularly. This can be done by immersing it in boiling water and checking it records 100°C (212°F) or into a slurry of ice to check it records 0°C (32°F).

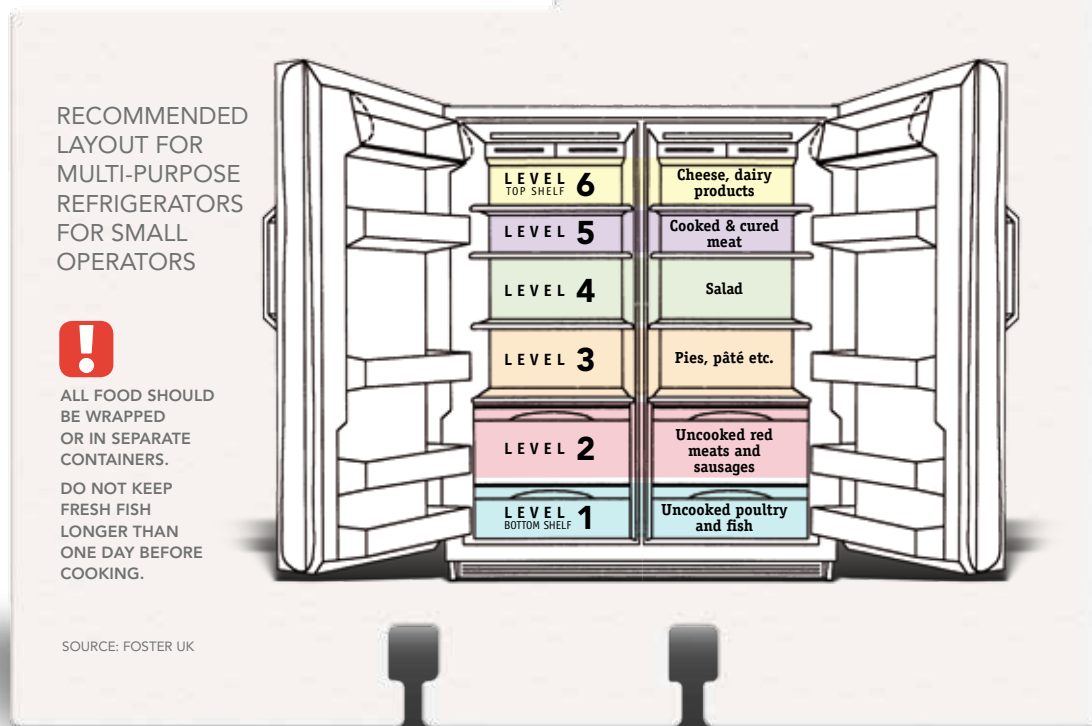
6.3.4 Chilling, freezing and thawing

- a** Small operators should **beware of purchasing cheaper domestic fridges**. Unlike commercial fridges they are not powerful enough to chill down the interior quickly to compensate for the door being frequently opened and closed. Commercial fridges are also designed to work in the warmer ambient temperature of a commercial kitchen.
- b** Refrigerators should operate at a **temperature** of between 1°C and 4°C (33.8°F and 39.2°F). Freezers should be kept at -18°C (-64°F) or below. Make sure you have a reliable **fridge thermometer** (ideally an automatic monitoring system) and make regular checks to ensure it is functioning correctly.
- c** **Set maximum temperatures** for each item of refrigeration equipment and ensure that these are never exceeded.
- d** All cooked food that is being prepared in advance must be **cooled as quickly as possible** so that it spends as little time as possible in the 'danger zone' between 5°C and 68°C, where bacteria multiply most quickly. Divide food into smaller batches to enable it to cool more quickly and put it in a cooler place. Stirring at intervals will also help speed up the cooling process.
- e** **Blast chilling** and **blast freezing** use high-powered refrigeration equipment with fans to chill the food down. Because the chilling is rapid, it also helps to retain the colour, texture, flavour, structure and nutritional value of the food.
- f** You should **chill food from 70°C to 3°C or below within a period of 90 minutes**. If you are preparing the food for freezing, it should be chilled from 70°C to -18°C in no more than 240 minutes.
- g** Keep the **batches** of food you prepare to a **manageable size**.
- h** **Do not overload** refrigeration equipment or pack food in too tightly. If the cold air cannot circulate it will impair chilling performance (and energy efficiency).
- i** **Check seals and gaskets** on fridges and freezers regularly. This will also help you save energy.

- j** Check the **temperature** of refrigerated food as it is delivered and do not accept it if it is above food safe levels as it could already be contaminated. Put **frozen food** into the freezer as soon as it is delivered.
- k** Mark the **date** you put food in refrigerators and freezers and **set a maximum safe date** by which it should be used.
- l** Keep **cold food cold**. If it is not to be served immediately, put it back in the refrigerator.
- m** **Clean and defrost** refrigeration equipment regularly and according to the manufacturer's instructions.
- n** **Defrost frozen food thoroughly** and check it has thawed properly. Never use warm water to speed up the process and ensure that any run-off liquid is properly drained away.

Refrigeration

FIGURE 6.2



6.3.5 Essential management practices

- a** **Understand and comply with** all relevant national and regional **food safety and hygiene regulations**. Aim also to meet international best practice and to minimise your environmental impact at the same time.
- b** Ensure all kitchen and restaurant staff and anyone coming into contact with food (e.g. staff who oversee receipt of goods or handle food waste) are **aware of food safety issues**. Food safety awareness should be part of **induction, regular training** and attainment of **relevant qualifications**. An example is the **Royal Institute of Public Health's Foundation Certificate in HACCP Principles**.
- c** **Appoint a QA manager** who has sufficient knowledge and training to identify hazards and record and monitor the temperatures of refrigeration and cooking equipment.
- d** Draw up a **flow chart** of your food preparation processes. **Identify** where food safety and environmental health **hazards** could occur and what can be done to control them. You will need to **review** this each time a new recipe is added to the menu.

- e Undertake **regular monitoring and testing** and **follow up** the results with corrective action as necessary.
- f **Review the system** after a year and implement any appropriate improvements.
- g Retain all **documents and records**.
- h Put in place a programme for regular **maintenance and replacement of equipment**.
- i Implement **international standards** such as **ISO 22000:2005 Food Safety Certification**. This standard defines the requirements of a food safety management system covering all organisations in the food chain 'from farm to fork' and covers issues such as communication, management, HACCP plans and continual improvement.
- j **Have your premises audited** regularly and **samples taken** by an external specialist.
- k Ensure you have a **procedure** in place for following up should you receive a **complaint**.

6.3.6 Suppliers

- a Use **reputable suppliers** who maintain high food safety standards. Visit their premises to ensure that their own procedures are satisfactory and insist that delivery drivers wear clean overalls, especially where they are dealing with foodstuffs that are not fully wrapped (e.g. vegetables and fruit).
- b **Vehicles** used for transporting foodstuffs should not be used to transport other materials, and should be kept clean.
- c **Carry out checks** before you purchase or take delivery of food produce. If it is not delivered at the right temperature or the packaging is damaged, dirty or shows evidence of pest attack you should not accept it.

Establish good relationships with **reputable suppliers**





6.4 MORE INFORMATION

6.4.1 Contacts

1. **Catering for Allergy**
www.cateringforallergy.org
2. **Chartered Institute of Environmental Health (CIEH)**
www.cieh.org
3. **European Food Safety Authority (EFSA)**
www.efsa.europa.eu
4. **Food and Drink Federation**
www.fdf.org.uk
5. **Food Standards Agency**
www.food.gov.uk
6. **Institute of Hospitality (formerly HCIMA)**
www.instituteofhospitality.org
7. **International Association for Food Protection**
www.foodprotection.org
8. **Royal Institute of Public Health**
www.riph.org.uk
9. **Society of Food Hygiene Technology (SOFHT)**
www.sofht.co.uk
10. **World Health Organisation (WHO)**
www.who.int
11. **US Environmental Protection Agency (USEPA)**
www.epa.gov
12. **US Food and Drug Administration**
www.foodsafety.gov

6.4.2 Resources

1. **FHRAI HACCP and Food Safety Manual for Hotels & Restaurants**
www.fhrai.com/PublicationsDetails.asp
2. **Food Hygiene (England) Regulations 2006**
www.opsi.gov.uk/si/si2006/20060014.htm
3. **Foodlink guide to food safety**
<http://webarchive.nationalarchives.gov.uk/20070705125253/http://www.foodlink.org.uk>
4. **Journal of Food Protection**
www.foodprotection.org/publications/journal-of-food-protection/
5. **Guidance on Allergen Management and Consumer Information**
<http://multimedia.food.gov.uk/multimedia/pdfs/maycontainguide.pdf>
6. **ISO 22000:2005 Food Safety Certification**
www.iso.org/iso/catalogue_detail?csnumber=35466
7. **Prevention of foodborne disease: Five keys to safer food**
www.who.int/foodsafety/consumer/5keys/en/index.html
8. **Regulation 852/2004 of the European Parliament on the Hygiene of Foodstuffs**
http://ec.europa.eu/food/food/biosafety/hygienelegislation/guidance_doc_852-2004_en.pdf
9. **Safe Food Storage in Your Fridge**
www.fosterrefrigerator.co.uk/downloadsMCL/0898-Safe-food-storage-in-your-fridge-Feb-2013.pdf
10. **Safer Food, Better Business for Caterers**
www.food.gov.uk/business-industry/caterers/sfbb/sfbbcaterers/
11. **The Safe Way to Blast Chill, Freeze and Thaw**
www.fosterrefrigerator.co.uk/downloadsMCL/NJB0497%20Blast%20Chill%20Freeze%20And%20Thaw%20Blue%20Paper%20Nov%202009.pdf
12. **WHO Food safety**
www.who.int/foodsafety/publications/newsletter/en