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fssai



ESSENTIALS OF FOOD HYGIENE - III

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LEVEL III – SUPERVISORS - CATERING

ESSENTIALS OF FOOD HYGIENE – III FOR SUPERVISORS - CATERING

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INTRODUCTION

Food is an important part of everyday life, and has a significant influence on our culture and tradition. Indian food choices, eating habits as well as cooking methods and practices vary from region to region reflecting the rich diversity of foods in the country. Increasing food choices, advances in food technology and changing lifestyles have influenced the way people buy and consume food. These changes have also increased the risks of food poisoning and have made food safety a priority for all governments. Food poisoning is usually caused by human error. It occurs when people store, handle or prepare food incorrectly.

This book forms part of the reading material for a food safety training programme and has been developed for the Food Safety and Standards Authority of India (FSSAI). The book was written with the intention of providing supervisors in the catering sector, with the essential, practical information to enable them to manage staff to provide safe food to consumers. It is relevant to supervisors working in hotels, resorts, restaurants, bakeries, fast food joints, mobile carts/vans, and anybody involved in catering business or services in India.

This book can be used as a reference to help supervisors make correct decisions with regard to food safety. Emphasis has been placed on the measures necessary to control the most common reasons for food borne illness. Sections related to temperature control, hygiene control, food safety management process, high risk food and storage of food have been included. It is a useful guide and can be read on its own or as part of the FSSAI's level III training programme.

It is the authors' intent to explain the concepts which underlie food safety in a simple and straightforward way. They believe that the main motivation for adopting good working practices is to understand why these practices are necessary.

Knowledgeable and competent supervisors working in a positive food safety culture are the key to food safety.

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Section 1: FOOD POISONING AND ITS CAUSES

This section describes food hygiene, food poisoning and food contamination.

Food safety is the assurance that food will not cause harm to the consumer when it is prepared and/or eaten according to its intended use. Food safety is learnt through several good practices which are the consequence of human culture, history and lifestyle. These are concerned with reducing the acute and chronic hazards that make food injurious to the health of consumers. A **hazard** is any agent in food, which can cause harm to the health of the consumer.

FOOD HYGIENE

Food hygiene is the action taken to ensure the safety and suitability of food at all stages of the food chain to prevent the contamination of food. Good food hygiene is essential to ensure that the food prepared/sold by businesses is safe. Food safety and hygiene are important both to safeguard consumer health and the reputation of food businesses.

FOOD POISONING

Food Poisoning is a common, often mild but sometimes very serious illness resulting from eating contaminated food or drink. The main symptoms are diarrhoea and/or vomiting, often accompanied by nausea (feeling sick) and stomach pains. The onset of symptoms (diarrhoea, vomiting) is usually sudden and may start within 2 hours of food intake but sometimes there may be an interval of several days. The illness typically lasts 1 or 2 days but sometimes can continue for a week or more.

Current definition of food poisoning includes some food and water borne illnesses which may have different symptoms. Some examples of food borne illness include viral gastroenteritis, hepatitis A, and typhoid.

Food poisoning is weakening and extremely unpleasant for anyone. However, certain groups of people like **infants, pregnant women, elderly people and those with weakened immune systems** are at higher risk of serious consequences from food poisoning. Such groups are often referred to as ‘at risk’ groups.

There are more numbers of food poisoning cases being reported in the media every day. Some contributory factors which may have led to this increase are:

- more intensive methods for growing or rearing of primary products;
- partial or full cooking of food before it reaches the consumer and as it proceeds along the distribution chain breakdowns in temperature and general hygiene controls;
- more people buying processed foods. They may not necessarily be aware of the correct handling and storage processes;
- more people eating poultry which is more prone to contamination;
- The culture of eating out – poor standards in food processing and catering businesses can cause illnesses to large numbers of people.

There is general agreement that one of the main strategies for preventing food poisoning lies in the **better education** of all those involved with the various aspects of food handling from the farm to the table.

CONTAMINATION OF FOOD

Food contamination occurs by substances (contaminants) not intentionally added to food. Contaminants are the factors responsible for unhygienic food. They compromise food safety and cause harm to the health of a consumer. Such substances may be chemical, physical or biological.

CHEMICAL (For example, chemical poisons like insecticide)

Chemical poisons such as insecticide get into foods, and toxic metal may enter food during growth, processing, transport and sale. Poisonous plants (and fungi) like some types of mushrooms and seafood produce chemicals or toxins which can cause illnesses if consumed incorrectly.

Unwanted chemicals can enter food through the following ways:

- growth – fertilizers, pesticides, veterinary drugs added during the growth of food products;
- processing – addition of oil, cleaning chemicals, insecticides during food preparation ;
- transport – spillage or leakage during transportation;
- sale – chemicals from the packaging processes.

PHYSICAL (For example, undesirable substances in food)

Reports of ‘foreign bodies’ such as dead rats, insects and pieces of glass in food get wide publicity although they are rare events. Physical contaminants such as these are usually detected by the consumer and the food is not consumed. However, substances like glass or staple pins used for packing can be dangerous. These incidents rarely cause food poisoning but, of course, are highly undesirable.

Most of the illnesses or incidents related to physical contaminants involve complaints of dental/oral injury or cuts, trauma to the oesophagus, abdomen or other organs of the digestive system. These incidents are rarely life-threatening, but are a matter of public health. Good Manufacturing Practices (GMP, dealt with in a later section) are the foundation of a physical hazard approach.

ALLERGENIC

Food allergies are an increasing problem for the food industry. Food allergens cause the body's immune system to react, often within minutes but sometimes this can take hours. In severe cases, a person can have an anaphylactic reaction, which can be life threatening. Groundnuts and other nut allergies are often very severe.

Caterers must be careful during food production to see that allergens do not contaminate other products, for example small amounts of sesame seed dust contaminating a product that normally does not contain sesame.

BIOLOGICAL (Microorganisms like bacteria and their toxins, viruses, moulds, yeasts, and protozoa)

Microorganisms or microbes are small organisms that can only be seen through a microscope. The most common types of microorganisms/ microbes are bacteria, viruses, moulds, yeasts and protozoa.

Bacteria

Bacteria are the most common cause of food poisoning. They are small living organisms often known as 'germs'. They are so small that it is impossible to see them without a microscope. Bacteria are everywhere: in soil, dust, water, the air around us and on our bodies. It may take only a small number of bacteria to cause illness such as typhoid fever or food poisoning.

Bacterial contamination is the cause of most food poisoning cases and thus will be dealt with in more detail in the next section.

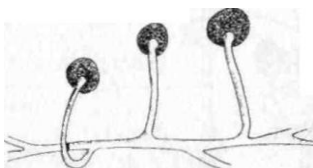
Viruses

Viruses can be seen only under a very powerful microscope as the viruses are even smaller than bacteria. They multiply in living cells, not in food. Some viruses can cause food borne illness; examples include gastroenteritis and hepatitis A.

Although viruses are not considered in detail in this book, it should be noted that many of measures that prevent contamination by bacteria also reduce the risk of viral infection.

Moulds

Moulds are of different colours, often hairy in appearance, and grow on food such as bread, jam and fruit. Under the microscope, moulds appear like a network of thread-like cell material (see picture below).



Moulds are found throughout the year and are spread through dry spores that float in the air. They grow best in warm, humid conditions, but can also grow at refrigerator temperatures. Some moulds which are often found on nuts can produce very dangerous toxins (poisons), especially in damp climates. Other moulds are used in the manufacture of food such as certain kinds of cheeses.

Yeasts

Yeasts have been being used for baking and fermenting alcoholic beverages for thousands of years. However, they can also spoil food and drinks which contain lots of sugar. Yeasts do not cause food poisoning. Under the microscope they are

seen as single living cells. It is important to remember that moulds and yeasts, like bacteria, need food, moisture, warmth and time to grow. The optimum growth temperature for yeast is around 25⁰C to 30⁰C with a maximum of around 47⁰, although a few moulds and yeasts can still grow slowly at or even below 0⁰C.

Protozoa

Protozoa are single-celled organisms which form a basis of the food chain. Some of them like *Entamoeba histolytica* and *Giardia Lamblia* are pathogenic and can result in diarrhoeal illness and intestinal discomfort of varying sensitivity. They are often found in untreated water and can become food borne if water containing these protozoa is used to irrigate plants or wash foods before service. They do not multiply in food but their cysts may remain infectious in food for a long time. Their infective dose is low, which means that only a few cysts are required to cause illness.

Investigations into incidents of food-related illnesses tend to find the cause is due to breaches of simple, well-known rules of food handling. These may include ineffective monitoring of temperatures, poor staff hygiene awareness, contamination resulting from poor practices and inadequate hand-washing facilities. We will discuss the guidelines for safe handling of food and the procedures for ensuring these in the following sections.

Section 2: BACTERIA

This section describes bacteria and the importance of preventing food poisoning for businesses and health of consumers.

BACTERIA

Most bacteria are harmless and some are even beneficial to man like those in our intestines that aid digestion. Certain bacteria are needed to manufacture products such as cheese, curd and for fermentation of batter used in the preparation of *dosas* and *idlis*.

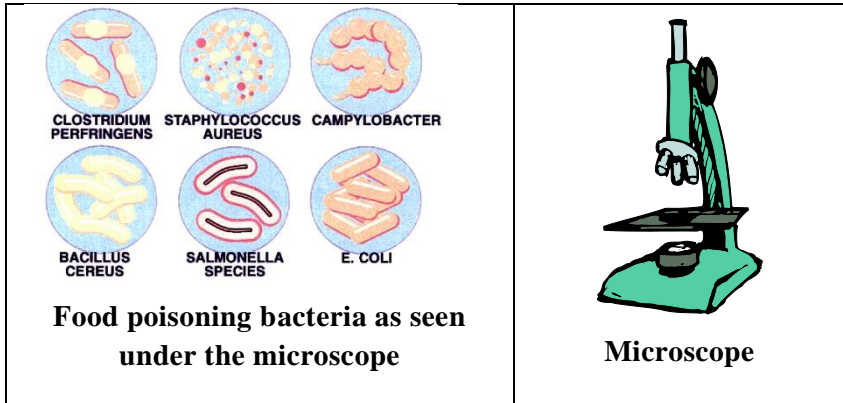
Another group of bacteria can cause food to smell, to lose texture, flavor and generally to decay. The food becomes so unpleasant that people will not eat it. These are referred to as **food spoilage bacteria**. Organisms that cause diseases are called pathogens. Such germs in food, often in relatively small numbers can cause serious illnesses such as typhoid fever.

Often, large numbers of food poisoning bacteria are required to cause illness. A low dose causes infection which can result in serious illnesses especially in vulnerable groups such as young children and elderly people. However the organism is easily destroyed by heat.

SPORES

Some kinds of bacteria are capable of forming protective coverings called spores. This protection enables bacteria to remain alive, but inactive, in situations that normally would kill them. Later, if conditions become suitable, the spores change into the usual form of bacteria that then multiply rapidly. Spores can withstand high cooking temperatures and are able to survive situations where nutrients or moisture are not immediately available.

BACTERIA AND FOOD POISONING



There are a number of different kinds of food poisoning bacteria, each having its own name. *Salmonella*, *E. coli* and *Staphylococcus aureus* are bacteria that are responsible for a large proportion of the reported food poisoning outbreaks in India.

Different bacteria cause food poisoning in different ways. They can act to cause food poisoning in these ways:

- Bacteria that grow throughout the food in large numbers, so that when we eat the food we eat the bacteria too.

For example, **Salmonella** bacteria could be transferred from raw materials to finished products, such as from raw poultry meat to cooked products, and from raw milk to cheese, as the result of bad practices such as using the same equipment to handle both raw and finished products. If the contaminated products are given sufficient time in the temperature danger zone many millions of bacteria will grow.

- Bacteria that is difficult to kill with heat.

An example of this is a bacterium with the long name **Clostridium perfringens**, which is often found in raw meat and poultry. It has the capacity to change into a resistant form called spores. Some of these spores can survive the normal cooking process. A joint of meat in which even a few spores have survived cooking, if left to cool slowly under warm conditions, can result in the spores changing back into the usual form of bacteria which then grow very rapidly.

- Bacteria that release their toxins (poison) into the food before the food is eaten.

One such bacterium is called **Staphylococcus aureus** (found in the nose, throat and wounds) which can produce poisons in milk products and cooked rice as well as in cooked meat and poultry, if allowed time to grow in warm conditions.

- Bacteria which do not grow on food but multiply in the gastrointestinal tract.

Campylobacter is an example. It is usually transmitted by contaminated food or water, can infect the gastrointestinal tract and cause diarrhoea, fever and cramps.

Toxins are poisons produced by some bacteria as they grow in food or in the intestine.

Bacteria are invisible to the naked eye and do not usually cause any change to the appearance, smell or taste of food. People cannot, therefore, rely on any of their senses to tell them whether or not food is contaminated. This means that food handlers must practice very high standards of food hygiene to ensure that food does not become contaminated.

HOW BACTERIA GROW

Bacteria must have the following FOUR conditions to live and grow:

FOOD	MOISTURE	WARMTH	TIME
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1. Food

Certain foods - most of which have high protein content – are particularly rich in nutrients and contain moisture and therefore provide excellent conditions for bacterial growth if kept in warm conditions. These are known as ‘**High Risk**’ foods. Examples of such foods are milk, eggs, meat, sea food and their products and gravy, soup, cut fruits, salads and fresh juices. These foods are implicated in most cases of food poisoning.

Foods containing sugar, salt or acid - such as jam or pickles - discourage the growth of bacteria. Some foods have preservatives (chemical substances) added to them to restrict the growth of bacteria.

Acidity and Alkalinity (pH) - The pH of food is measured on a scale from 1 to 14. Alkaline foods have a pH value above 7, acidic below 7 and a pH value of 7 is neutral. Most of the bacteria will not multiply in an acidic pH of below 4.0, an example being fruit juice. On the other hand, if a large number of food poisoning bacteria are introduced into an acid food, it may take some time for the bacteria to die. For this reason acid food must be protected from contamination at all times. Chicken is an example of a near neutral food: citrus fruiter presents the high acid foods that provide little scope for bacteria to grow.

Bacterial growth may also be affected by the presence or absence of oxygen.

2. Moisture

To grow, bacteria need moisture and this can be found in many foods.

Bacteria are less likely to survive in dried food such as powdered milk or dried eggs but any bacteria that do survive under such dry conditions begin to grow again if fluids are added to the food.

One of the reasons why sugar and salt discourage the growth of bacteria is that they take up the moisture that is then not available to the bacteria. Similarly, when food is frozen its moisture turns into ice and is not available to the bacteria.

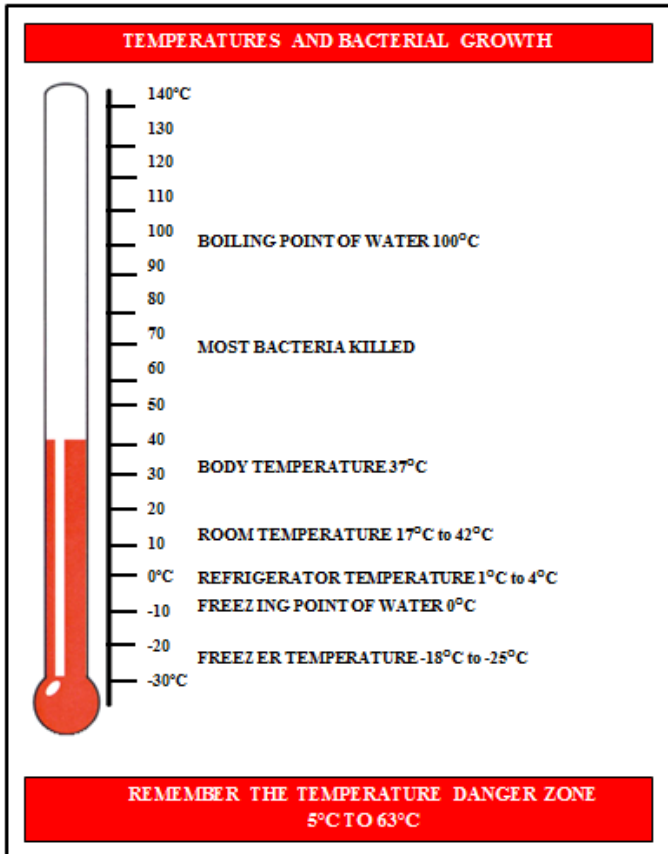
3. Warmth

Bacteria that cause food poisoning will grow at temperatures between 5°C and 63° C; they grow most quickly at a temperature of around 37°C, which is the normal temperature of the human body.

For this reason, the range of temperatures between 5°C and 63°C is known as the **Temperature Danger Zone**.

Bacteria that cause food poisoning will grow rapidly in food that is allowed to remain in the Temperature Danger Zone, for example, at room temperature.

Temperatures outside the Danger Zone are less suitable for these bacteria. Although bacteria grow in warmth they are usually killed by **heat**. Most bacteria are killed by temperatures of **at least 70°C** provided this is reached at the centre of the food and is held **for a sufficient time**.



However, some bacteria and their toxins (poisons) require higher temperatures for a longer period of time before they are destroyed.

Pasteurization is a method of destroying bacteria by rapidly heating the food to a sufficiently high temperature for a specified period of time. Milk and milk products are examples of food treated in this way.

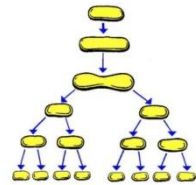
In **cold** conditions, that is below 5°C, bacteria do not grow or grow only very slowly. At very low temperatures some bacteria will die, but many will survive and grow again if warm conditions return.

STORE HIGH RISK FOODS BELOW 5°C OR ABOVE 63°C

4. Time

Given moist, warm food, bacteria simply need **time** to grow. It is often carelessness that allows them the time they need, such as when food is allowed to remain in the Temperature Danger Zone.

Each bacterial cell multiplies by splitting itself into two so that **1** bacterial cell becomes **2** bacterial cells. Each of these **2** bacteria then split to make **4** bacteria. Each of the **4** bacteria split into two again, making **8** bacteria, and so on.



Multiplication of bacteria

If the temperature is suitable, bacteria will reproduce in this way every 10–20 minutes. Some take even less time.

This means that after reproducing at around this rate for only 4 or 5 hours, **one bacterium** will have multiplied into **many thousands**. In reality, the severity of food poisoning will be even greater because contaminated food usually carries considerably more than one bacterium at the outset.

SOURCES OF FOOD POISONING BACTERIA

If food is to be protected from bacteria it is important to know where they come from and how they come to be present in the food we eat.

Most bacteria come from animal and human sources.

1. Raw foods

Many bacteria live in the intestines of animals. The animals concerned usually have no symptoms and just carry the bacteria. Thus bacteria can be transferred to meat that will be used for eating, particularly during faulty slaughter, if the intestines/stomach is ruptured.



For this reason, it is wise to think of all raw meat, poultry and seafood/fish as well as the fluids that come from them, as already carrying many food poisoning bacteria before they arrive in the food area. Raw meat, poultry and seafood/fish are frequent sources of food poisoning outbreaks.

Other raw foods that may carry food poisoning bacteria are eggs – both inside and on the shell - and seafood/fish. Unpasteurized milk may contain dangerous bacteria. Rice can also be contaminated.

In fact, many raw foods, which are delivered to the store/shop, are naturally contaminated by bacteria from the soil, for example, fresh vegetables, unprocessed milk, fruits and meat. When such foods are handled or prepared, it is important to follow the rules for good hygiene practices.

2. Water/ Ice



When used in the preparation of food (including ice) may also be contaminated with biological, chemical or physical hazards. Contaminated water is the usual source of many food-related diseases such as cholera and other diarrhoeal diseases. Contaminated water will create a public health risk, if it is used for drinking, cleaning, processing of food, washing of utensils and work surfaces.

3. People

Bacteria that can cause food poisoning are carried in several areas of the human body – for example, skin, nose, throat, mouth, ears, hair and finger nails. Bacteria that cause food poisoning can also be present in intestines and thus in faeces (stools).



People infected with food poisoning bacteria often have no symptoms and are referred to as ‘carriers’ because, although not feeling ill themselves, they can transfer the infection to foods with their hands unless they are careful in their personal hygiene.

Careless food handling is one of the causes of bacterial contamination – with bacteria being transferred from hands, mouth and nose through coughing, sneezing, smoking, eating, drinking, touching or scratching sections of the body like hair, nose, mouth, ear etc. Bacteria are also present around cuts, grazes, scratches or boils.

A WAY IN WHICH SALMONELLA GETS INTO FOOD



From food handlers due to handling food after using the toilet, without washing hands



4. Places

Bacteria can also harbour in places such as equipment (cutting boards, slicers, mixers, grinders etc.), utensils and work surfaces/counters which may directly come into contact with food.

5. Other sources within the environment

Pests such as insects (flies, cockroaches, ants etc.), rodents (rats, mice) and birds (crows, pigeons) all carry bacteria on their bodies and in their urine and droppings. They can infect food or places where food may be placed. Prevention and control of these pests is essential.

Pets, too, carry bacteria on and in their bodies and should not be allowed into food areas.

Rubbish and waste food provide ideal conditions in which bacteria can live and reproduce because they are warm and are left undisturbed for several hours. Hence waste must be disposed of in a proper manner.



Rubbish as a source of bacteria

Raw material delivered to a premise -Some raw foods can carry bacteria. For example, fresh vegetables, fruits and meat may contain organisms such as Salmonella, Listeria and Campylobacter.

Soiled facilities and equipment - When equipment is left dirty for long periods or are improperly cleaned, then bacteria, which may be naturally present in food residues or which have resulted from cross contamination, can grow.

THE COST OF POOR HYGIENE AND POOR STANDARDS OF FOOD SAFETY TO A CATERING BUSINESS

Supervisors in the catering business have a legal and commercial responsibility to provide safe food. The cost of food poisoning and poor hygiene can be very high, as are those from poor hygiene. These costs, can be both financial and social, and fall on employers, employees as well as ill consumers. Employer costs include the following:

- The loss of working days, caused when employees eating contaminated food and fall sick;
- Closing down of food premises by food regulatory authorities;
- Reputation damage: a loss of business and status, either from bad publicity or from public reaction to poor standards, food poisoning outbreaks and even deaths;
- Greater risk of pest infestation;
- Fines and costs of legal action taken because of breach of legislation because of sale;
- Food losses due to damage because of poor stock rotation, incorrect storage temperature or pest infestations
- Low staff spirit, higher turnover with attendant costs;
- Food complaints and costs of internal investigation and decontamination; and
- Reduction in sales.

Employees may suffer by:

- Losing their jobs, loss of business or they could become long-term carriers of food poisoning organisms, especially *Salmonella*; and
- Losing overtime or bonuses.

THE BENEFITS OF MAINTAINING HIGH FOOD SAFETY STANDARDS

The benefits from a high standard of hygiene at a catering premise are the following:

- Content customers, a better status and improved business;
- Increased brand value;
- Better standards of food safety and compliance with food safety law;
- Less food wastage and longer shelf life;
- Greater staff morale and lower staff turnover, which promotes productivity; and
- Lower food poisoning cases and food complaints.

Section 3: HYGIENE CONTROL

This section discusses how to identify risks from different hazards and the action that should be taken to prevent food becoming contaminated.

Hygiene control is the adoption of practices which will reduce the risk of clean food becoming contaminated. The aim of hygiene control is to *prevent the spread* of bacteria.

The transfer of bacteria from a contaminated source to an uncontaminated (clean) food is called **cross-contamination**.

Direct contamination may occur when high risk food has close contact with a contaminated source, but more frequently **indirect contamination** takes place when something transfers the bacteria, for example, hands, cloths and other examples given in this section.

Clean food can be contaminated:

- through contact with contaminated foods, particularly raw meat, poultry and seafood/fish;
- through contact with work-surfaces and equipment;
- by the food handler;
- by pests and waste.; and
- by water/Ice.

FOOD-TO-FOOD CONTAMINATION

It can be assumed that raw meat, poultry and seafood/fish are heavily infected with bacteria when brought into the food area. So, raw meat, poultry and seafood/fish including their juices should be kept well away from other foods.



Other raw foods also carry bacteria that will infect clean food if they are transferred through contact by touching or spills. Special care is to be taken with **seafood/fish, eggs and soil from vegetables**. Bacteria on the *shell* of an egg will be transferred to the hands of the food handler.

To prevent cross contamination from raw foods the food handler should:

- Identify separate parts of the work area for dealing with
**Raw meat, poultry or seafood/fish
and
Other foods**
- Place other potentially contaminated foods away from foods that are ready to eat;
- Use different refrigerators for storing raw meat and other foods but, if only one refrigerator is available, keep the raw meat on the bottom shelf.

EQUIPMENT-TO-FOOD CONTAMINATION

Equipment and work surfaces can easily become contaminated by **foods** particularly raw meat, poultry and seafood/fish, by **pests** and even by the **food handler**. Then the contaminated surface or equipment will pass on the bacteria to food with which it comes into contact.

Any items that have come into contact with contaminated raw meat, poultry and seafood/fish or their juices should be treated as contaminated. E.g. work-surfaces, chopping boards, utensils, trays and equipment such as mincers, slicers and knives. These items often retain minute particles of raw food that can



harbor bacteria. Equipment and work-surfaces must be cleaned immediately after use.

It is important to remember, that work-surfaces and equipment that look clean may have become contaminated by insects or even humans. The bacteria can never be seen but they may be there!

The Food handler must:

- immediately and thoroughly clean and sanitize work-surfaces where raw meat, poultry and seafood have been handled;
- keep utensils and equipment used in the preparation of raw meat, poultry and seafood separate from those used for other foods; and
- Maintain a high standard of general cleanliness of worktops and equipment.

Colour coding

Separation of utensils and equipment can be achieved through colour coding. With colour coding, items of equipment such as knife handlers, chopping boards and wiping cloths are given different colours to show when and where they should be used.

Example of a colour coding system: Colour coding guidelines for catering frozen products

COLOUR	Knives, chopping boards, cloths etc. to be used only for
RED	Raw meat and poultry
BLUE	Fish
YELLOW	Cooked meats
GREEN	Vegetables
ORANGE	Salad and fruit
WHITE	General purpose/ bakery

Wiping cloths

Wiping cloths pick up bacteria when they are used for cleaning. Once on a cloth, the bacteria can easily be transferred to other parts of the food area. There is a high risk of contamination if the cloth is used for wiping areas where raw meat, poultry and seafood/fish have been lying and is then used somewhere else.

So, although wiping cloths are used as a means of keeping things clean they can just as easily become a means of *spreading* bacteria.

The food handler should always:

- keep separate wiping cloths for use with the different kinds of foods;
- keep wiping cloths used in raw food areas out of other food areas;
- use disposable wiping cloths, if available; and
- work with clean cloths - boil cloths frequently.

Cleaning activities

Special care should be taken during cleaning. All concerned staff should be trained to make sure they do not expose food to risk of contamination by using worn equipment, especially brushes which are likely to lose their bristles, or by using inappropriate methods such as high pressure spraying during the production of open food. Particular care must be applied when using paper towels or cloths to ensure small pieces of paper or cloth do not end up in the product.

FOOD HANDLER-TO-FOOD CONTAMINATION

To reduce the risk of contaminating food, the food handler must:

- use clean tongs, plastic gloves, food bags or food wrapping paper to pick up items of food;
- carry food in containers, or on trays or plates;

- avoid touching parts of dishes and cutlery that will come into contact with food;
- touch food as little as possible with bare hands;
- use cutlery only once for tasting food - then wash it thoroughly before re-using; and
- not lick fingers to separate wrapping paper or blow into a food bag to open it.

Using
clean
tongs to
handle
food



Using
bare
hands to
handle
food

WATER CONTAMINATION

Water contamination can result in health hazards ranging from mild gastrointestinal distress to serious bacterial diseases which can sometimes be fatal for the consumer. Thus, it is important to use safe water. Water which is free from germs, dirt and other harmful chemicals is termed as safe drinking water. Safe water should be used for all of the following purposes:

- drinking;
- cooking;
- processing of all food;
- washing equipment, utensils, containers, kiosks etc;
- washing hands; and
- preparing ice.

Freezing does not remove chemical hazards nor does it prevent several types of biological hazards in water. Further, even if ice is made from clean water originally, incorrect or insanitary crushing procedures, transportation and storage may lead to cross-

contamination. Contaminated ice will introduce hazards to foods and beverages when added to them.

The food handler should:

- Take care not to put hands or fingers in the stored drinking water. Stored water should be kept in a clean place;
- Empty and clean all water containers including water dispensers regularly and dry them (by turning upside down) at the end of a day's sale wherever possible;
- Filter and boil water for ten to twenty minutes, if the quality is doubtful. This will kill the germs that cause cholera and other diseases;
- Make ice with potable water; and
- Not store other food in the same container used to store ice intended for consumption.

Safe use of ice for cooling and drinking

Sometimes, cold drinks are served with crushed ice in a glass, cup or small plastic bag closed with a rubber band. Therefore, ice represents an important risk factor which affects many people. However, crushing procedures, transportation and storage at the stall may have an impact on the quality of the ice. The ice is widely cross-contaminated even if it had been of satisfactory quality when it reached the stalls.

A great emphasis has to be placed on correcting these practices to reduce an obvious risk of biological and physical hazard. Further, ice should be transported and stored in a sanitary manner.

Other items of food should not be stored in the same container used to store ice intended for consumption

OTHER WAYS OF CONTAMINATING FOOD

Prepared food should be safely stored at the correct temperature and removed only a short time before consumption. But even in this short ‘stand out’ time there can be contamination by **pests**, particularly flies and from bacteria in **waste food** or in the atmosphere generally.



Keeping food covered

Therefore prepared food should:

- be kept covered;
- be kept away from a window or waste bin; and
- not be placed where cleaning is taking place.

THE ROLE OF A SUPERVISOR IN PREVENTING CONTAMINATION

- Implement the food hygiene policies and procedures designed to protect food from contamination.
- Train, instruct, supervise and monitor food handlers in practices designed to prevent contamination of foods.

CHECKLIST FOR CONTAMINATION CONTROL

The following points should be practiced to prevent contamination:

- Food and raw materials should be purchased from a well-known, clean and reliable supplier.
- Deliveries should be accepted only when transported in a clean and properly equipped vehicle with drivers wearing satisfactory protective clothing.
- The deliveries should be inspected immediately on arrival. They should be checked for temperature, codes, date markings and reject any damaged or out of date material.
- Delivered goods should be immediately shifted to appropriate storage, refrigerator or cold store, once the check is complete.

- High risk foods should be stored away from raw foods at all times. Colour coding can be used for this purpose. It is also recommended that separate staffs are used if possible.
- Food should be handled as little as possible, along with maintaining thorough personal hygiene at all times.
- Food should be kept covered or protected at all times unless it is being prepared or processed, in which case it should be brought out only when required.
- The premises, equipment and utensils should always be kept clean and in good condition. Any damage should be reported or fixed as soon as possible.
- All the empty containers should be cleaned and disinfected before filling with food.
- Cleaning materials should be kept away from food. The food and containers should have been removed prior to cleaning. Cleaning should take place from high risk areas to low risk areas.
- Waste food and refuse should be removed from food areas as soon as possible.
- An active pest control programme should be sustained.
- Movement of visitors and maintenance workers should be controlled in high risk areas.
- Food areas and processes should be examined regularly, and action should be taken on any defects or unhygienic practices. Staff performance should be properly guided and monitored.
- Ensure sufficient thawing of foods, away from other foods;
- Make proper provisions for cooling food prior to refrigeration.

Section 4: PERSONAL HYGIENE

This section explains why strict standards of personal hygiene are necessary and the role of supervisor in achieving them.

PERSONAL RESPONSIBILITIES

Bacteria live in and on the human body and can enter into food in the work-place if people do not maintain high standards of personal hygiene. Food handlers should be supervised and instructed in food hygiene matters appropriate to their work activity. Persons who are known or suspected to be suffering from or are carriers of disease which can be transmitted through food must be excluded from food business areas.

Any employee can be a direct source of contamination through the following: hands, face, head, clothing, jewellery and practices such as smoking, chewing and spitting.

HANDS

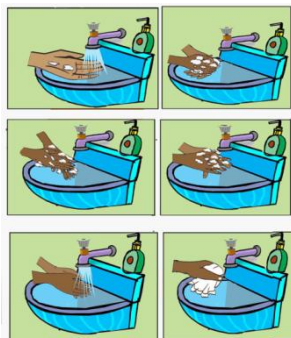
One of the easiest ways for bacteria to spread through the food area is through the hands of the **FOOD HANDLER**.

Hands come into direct contact with food more than any other part of the body. The Food handler's hands also touch and can contaminate work surfaces, utensils, display shelves which in turn may transfer the bacteria to food.

Thus, it is important for the food handler to **always wash hands thoroughly** using hot water and soap (preferably liquid soap). All parts of the hands and wrists must be washed under running water. It is just as important to dry hands thoroughly.

The six steps of hand washing are:

- using warm water and soap;
- making a lather;
- rubbing back of hands and fingers;
- rubbing in between fingers, around thumbs and fingertips;
- rinsing with clean water;
- drying hands thoroughly on a clean towel, and turning off the tap with a towel.



Steps of hand washing

It is best to wash hands with warm water, but if not available cold or lukewarm water is acceptable when used with soap. Though it is ideal to wash hands with soap and water, several people do not have access to soap or even detergent. In their absence, it is acceptable to use coal ash as a substitute for soap to wash hands. A bucket and a pitcher can be used where running water is not available.

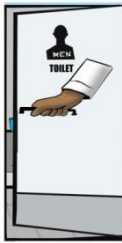
Hands must be washed:

- before entering the food area and before touching any food;
- after handling raw meat, poultry, seafood/fish, eggs or vegetables;
- after using the toilet or touching any surface in a public place;
- after coughing into hands or using a handkerchief;
- after touching the face or hair;
- after handling waste or cleaning (handling chemicals);
- before and after eating;
- after changing a baby's nappy;
- after playing with pets;
- after touching any surface in a public area;
- after handling waste or cleaning; and after smoking.



HANDS MUST BE WASHED

After touching any surface in public area



After Smoking



After Cleaning



After eating



After handling garbage



After playing with pets

Bacteria can collect under finger-nails. Nail polish may flake off and contaminate food and false nails may become 'physical contamination' in food. It is important that the food handler: keeps nails short and clean and does not apply nail polish.

FACE AND HEAD

Bacteria live in the nose, mouth, throat and ears of humans and can be transferred to food, work-surfaces and equipment by the food handler.

Bacteria also live in hair and on the scalp. Unwashed hair carries more bacteria. Bacteria from the food handler's hair can easily fall into food.

The Food handler should:

- avoid coughing or sneezing into the food;
- avoid touching face and head particularly mouth, nose and ears;
- keep hair covered with a net or a cap;
- wash hair frequently; and
- never comb hair in a food area or while wearing protective clothing.

Food handlers must wear suitable clean clothing. Protective clothing should be worn where appropriate, but it must be kept clean.



Everyday clothes can bring bacteria into the food area. The purpose of protective over-clothing or kitchen uniform is to prevent contamination from this source. But bacteria can also be spread if the over-clothing or uniform is soiled.

Food can be protected from the risk of contamination if the food handler:

- wears clean protective clothing where appropriate; and
- does not wear protective clothing (apron) away from work.

Visitors to the food preparation or handling areas should, where necessary also wear protective clothing and adhere to other personal hygiene behaviours.

JEWELLERY

It is not a good idea to wear jewellery in a food area. Bacteria and food can gather on items such as rings and bangles. The area of skin underneath the jewellery warms up thus further encouraging the growth of bacteria. Similar rules apply to watches: if a watch must be worn, it should be removed before washing hands so that the wrists and forearms also can be washed.



Earrings, finger-rings and gemstones may fall into food.

WOUNDS

Wounds - cuts, grazes, scratches and boils - can quickly become infected with germs. The best way to prevent them from spreading to the food that is being handled is to make sure that all such wounds are properly covered.



The Food handler must:

- Keep all wounds covered by waterproof Band-Aids.
- Inform supervisor about wearing a band - aid as they may not be allowed to handle food.

FIRST AID

Food businesses should have a suitable and sufficient supply of first aid materials. And one person should be given responsibility of ensuring that adequate provisions are always available. It is advisable to have atleast one person trained in first aid.

NO SMOKING OR CHEWING OF TOBACCO

One must not smoke cigarette/beedi in an area where food is prepared. This may lead to contamination of food and thus each one has a duty to adopt good personal hygiene practices.



Not only is it harmful to smoke in any enclosed public space, there is also risk of contaminating food from:

- fingers which touch the lips and may transfer bacteria;
- cigarette ends contaminated with saliva being placed on working surfaces;
- cigarette ends and ash (physical contamination); and
- coughing.

There should be legible notices displayed instructing food handlers never to smoke in food rooms. After smoking, food handlers should wash their hands.

One must not smoke cigarette/beedi in an area where food is prepared. Each one has a duty to adopt good personal hygiene practices.

Hands can pick up bacteria either from the mouth or cigarette/beedi end. Bacteria can be transferred to a work surface when the cigarette is laid down. Cigarette ash can fall into food.

REPORTING ILLNESS

If the food handler suffers from illnesses such as a stomach disorder, cold, cough, eye or ear discharge, it is important that she/he be not allowed to handle food. It is also important to report, even if someone else where the food handler lives seems to be suffering from diarrhea



The employer may require other illnesses also to be reported.

EXCLUSION OF FOOD HANDLERS

Supervisors must be aware that in fact healthy, symptom-free staff may be carriers of, and excrete, harmful bacteria. Even though healthy carriers are not likely to cause illness, they may contaminate food with, for example, *Salmonella* or *Shigella*. Organisms may be excreted from time to time. Healthy carriers may have become contaminated with harmful bacteria from contact with raw food with which they work; particularly meat or poultry.

Convalescent carriers are people who have recovered from an illness but still harbor the organism. The convalescent state might be somewhat extended and *Salmonella* are sometimes excreted for several months.

Laboratory testing cannot be relied on to detect small number of intermittently excreted pathogens. High standards of hygiene, and strict adherence to reporting procedures, are the only way to prevent contamination of food from an infected food handler.

Food handlers with food poisoning symptoms, such as diarrhoea or vomiting, or suspected of carrying foodborne organism, e.g. because of close contact with a confirmed typhoid or consuming a meal known to have caused illness, must be disqualified from any work which could expose food to risk of contamination.

If the supervisor has no confidence in the hygiene standards of a food handler who is a carrier of a food poisoning organism, even when symptom- free for 48 hours, they should not be permitted to handle high risk food.

Food handlers with skin infections such as psoriasis, boils or septic cuts, respiratory tract infections, infection of the eyes or ears, or dental sepsis should also be disqualified until medical clearance has been obtained.

VISITORS

Supervisors should make certain visitors adhere to the hygiene rules and do not expose food to risk of contamination. They should wear clean protective clothing and observe all personal hygiene rules applying to staff.

Visitors with food poisoning symptoms or any other conditions which would result in the exclusion of a food handler should not be allowed in the food area.

THE ROLE OF A SUPERVISOR IN PERSONAL HYGIENE

- Essential supervision is required to make sure that high standards of personal hygiene are maintained. The supervisors should set examples, by following all standards of personal hygiene for example, hand washing and wearing protective clothing.
- The staff should be persistently encouraged by the supervisors to maintain highest standards.
- Supervisors should ensure that proper facilities are provided for maintaining personal hygiene.

- They should provide clear instruction and training of staff including induction training and refresher courses.
- Posters and notice should be provided to remind food handlers of their personal hygiene responsibilities.
- When supervisors interview credible food handlers, they should make sure that the candidates are clean, free of skin infections and have no health problems. They should also demonstrate a good attitude towards hygiene.
- Supervisors should routinely ask food handlers to demonstrate personal hygiene rules like correct hand washing techniques.

Section 5: PEST CONTROL

This section describes pests and discusses effective measures for management of pests.

PESTS AND FOOD

A food pest is a creature living on or in our food, which is capable of directly or indirectly contaminating food. They are destructive noxious or troublesome. Pests are commonly found in places where food for human consumption is prepared or stored.

COMMON PESTS

1. Rats and mice

Mice can enter premises through a hole no larger than the diameter of a pencil and young rats through one not much bigger.



Once established within premises these pests are difficult to get rid of because of their high rate of breeding and resistance to chemical poisons called rodenticides. They will make nests in or near food premises using old packaging and food refuse.

Rats and mice carry bacteria on their fur and feet, and in their droppings and urine. They contaminate and spoil food in addition to eating it. In particular, they will attack stored food and this is one reason why you must frequently check and clean storage areas.

Usually, removal of rodents requires specialist treatment but the food handler can play a major role in ensuring that they are not attracted to the premises in the first place. High standards of cleanliness and food protection make life less easy for them.

2. Houseflies

Houseflies usually enter food premises through open doors, open windows and ventilators. They breed anywhere there is decomposing food, faecal matter or general refuse. Just as they will breed anywhere, houseflies will feed anywhere and may have enjoyed a meal in a sewer minutes before setting on the food. A housefly will vomit and defecate on the food it is eating and its legs and body will further contaminate the food. Then it will depart - usually unseen.



Screens on windows and self-closing doors help to keep out flies and other insects. Sticky fly papers can be of use but require careful positioning, frequent renewal and careful disposal. Do not use insecticides in a food area unless under expert guidance.

The electronic insect killer – Anultra-violet tube lighting equipment - lures and then kills insects that make contact. The dead insects fall into a tray. The wall-mounted/ ceiling hung equipment must be positioned well away from a light source and from any part of the food area where open food is dealt with. Frequent, careful, clearing of the tray is necessary.

3. Cockroaches

These pests are difficult to spot. Cockroaches live behind woodwork and in drains and other inaccessible places. They may be brought into premises with incoming food



supplies so always check these carefully. Cockroaches come out at night.

Removing an infestation of cockroaches is a specialist task requiring the use of dangerous chemicals, but the food handler can play a preventive role by keeping clean all surfaces, floors and walls, and by generally avoiding a build-up of grease or food residues. Dust bins must be thoroughly cleaned otherwise the cockroaches will breed in them.

4. Birds

Birds gain access through doors or windows and through vents. Many commonly found birds scavenge for domestic food and contaminate food supplies through contact with their bodies, beaks or from their excreta.



Milk left outside premises is a common target. Throw away milk if the milk packets have been damaged. Once established, birds are difficult to get rid of and this increases the importance of preventive measures. Outside waste receptacles must be lidded, with no refuse lying around. Birds thrive in the vicinity of take-away food shops and open-air eating places unless you ensure that uneaten food is trashed promptly and the area is kept especially clean.

Cats, kittens, dogs, puppies and cage birds carry food poisoning bacteria and in the wrong place - the food area for instance – pets can become pests.

These pests eat and spoil food. They also transfer to the food the food poisoning bacteria they carry on their bodies and in their excreta.

PREVENTING ACCESS

Pests seek food, warmth and shelter. Steps should be taken to keep them out.

The Food handler should:

- keep doors and windows closed so far as is possible;
- use fly screens on windows;
- inspect the delivery bags, boxes, cartons for signs of pests; and
- find the routes by which pests gain access.

DENYING PESTS FAVOURABLE CONDITIONS

We can never be sure that pests will be kept out. But the pests' opportunities for contaminating food and infesting the workplace can be limited.

To do this, the following good working practices can be adopted:

- promptly remove food particles and spillages from work-surfaces and floors;
- do not leave utensils and equipment lying around that are unclean;
- maintain a high standard of general cleaning;
- cover any food that requires to 'stand out';
- do not leave food out overnight;
- store dried foods in tightly lidded containers (this will also prevent moisture entering the food);
- regularly check all food storage areas; and

- empty waste bins regularly throughout the day and, for certain, by end of the day.

SPOTTING PESTS

Always look for the following *signs*:

- droppings;
- greasy trails at the base of walls and around equipment;
- marks on food or small mounds of food debris;
- nibbled wrappings, holes in cardboard containers;
- pest carcasses;
- unusual smells and noises; and
- damage to woodwork (mice and rats nibble).

The food handler starting work early in the morning should be particularly vigilant in looking for the tell-tale signs - many pests do their work at night. If signs of pests are found or suspicion raised that the work-place is infested the supervisor must immediately be informed.

GET RID OF ANY FOOD THAT YOU SUSPECT MAY HAVE BEEN CONTAMINATED BY PESTS

GETTING RID OF PESTS

Food businesses should carry out integrated pest management, i.e. a control programme involving a series of integrated measures to control pests. Pests require food, shelter, a nesting place, warmth and security. Premises where food businesses are located usually come with these factors. Denying these factors through environmental control is the first step towards pest control.



Buildings should be designed and maintained in such a way that they do not encourage pests. Boxing or ducting of pipes creates ideal conditions for harborage and should normally be avoided. All parts of the structure should be capable of being easily cleaned. No gaps should exist around pipe work passing into cupboards. All structural damage such as holes in walls, broken windows, loose tiles and damaged insulation should be repaired immediately so that there is no potential for insect harborage. All buildings should be adequately proofed: doors should be close fitting and external doors provided with metal kick plates. Defective drains both above and below ground must be made good.

Despite all precautions in the structure of buildings, pests will inevitably get into a building at some time. There is a difference, however, between an occasional pest and the establishment of a stable population. To reduce the risk of an infestation it is important to deny the occasional pest the conditions it likes, and this can be done through good housekeeping practices. Supervisors should ensure that all employees in a the food industry practice good housekeeping procedures to control pests.

On finding signs of pests or suspicion that the work-place is infested one must immediately tell the manager. Expert advice can be obtained from pest control specialists.

The main steps that can be taken are:

- trapping and catching pests such as rats and insects

Many kinds of traps are available but knowledge of the habits of the pest is needed for complete success. NEVER use cats or dogs as 'trappers': they are likely to spread bacteria themselves.

- laying poisons or other chemical substances

Poisoned baits, powders, etc. may be used but only where authorized in the external areas/periphery areas under expert supervision. Special cleaning of floors and surfaces may be necessary after such operations.

Poisons and chemicals must be handled with great care, kept away from food and be stored in a secure place.

THE ROLE OF THE SUPERVISOR IN PEST CONTROL

- The supervisors and their staff should be able to recognise signs of pest's infestation.
- Supervisor should be aware of the actions needed in the event of infestation and be able to identify contamination of food products by pests.
- The supervisor should give instructions to staff concerning signs of pest infestation and importance of good housekeeping.
- The supervisor should contact their pest control contractor as soon as they are aware of this problem.
- The supervisor needs to report to senior manager issues such as ineffective pest contractor, structural defects, conditions that allow pest incursion or inadequate control procedures.

Section 6: TEMPERATURE CONTROL

This section specifies the action needed to ensure systems are available to enable correct temperature maintenance.

TEMPERATURE AND BACTERIA

Bacteria will grow rapidly in foods, particularly in high risk foods, that are left within the Temperature Danger Zone: **5°C - 63°C**.

Bacteria do not grow or grow only very slowly, at temperatures *below* **5°C**.

They do not grow at temperatures *above* **63°C**.

The idea behind correct temperature control is to keep food out of the Temperature Danger Zone. Depending on the kind of food operations undertaken, temperature should be monitored at the time of receiving, processing, cooking, cooling, storage, packaging, distribution and customer service.

Correct temperatures are important in controlling bacterial growth.

The rules for achieving this are quite simple:

- cook food thoroughly
- keep hot food hot
- keep cold food cold
- keep prepared food out of the Temperature Danger Zone
- Reheat cooked food
- Refrigeration

COOKING FOOD

Bacteria are killed by heat. This is why food must be cooked thoroughly - most bacteria will not survive in food that is cooked at a temperature of *at least 70°C*. This temperature must be reached *throughout* the food *including the centre* and be held for *sufficient time*. Food which is cooked outdoors should be protected from dust and sun.

However, some bacterial spores and some bacterial poisons (toxins) are destroyed only if subjected to higher temperatures for a greater length of time.

MEAT AND POULTRY

All meat and poultry - particularly the latter - must be **thoroughly** cooked because of the likelihood of bacterial contamination.

The larger the joint of meat or poultry carcass, the longer it will take for the heat to reach the centre. If the cooking is not at a high enough temperature and for long enough, the centre may not be heated sufficiently to kill the bacteria. However, just enough warmth may reach the centre of the food to keep it *within* the Temperature Danger Zone so enabling food poisoning bacteria to grow rapidly.

The need for sufficiently high temperatures reaching the *centre* of the food must be kept in mind at all times. It is particularly important when cooking:

- large joints of meat

Large, thick joints should be cut into smaller pieces for cooking so that heat sufficient to destroy bacteria will reach the centre of each piece much more quickly.

- rolled meat joints, patties, or samosas

When present in meat, bacteria are usually on the surface and thus are easily killed by cooking heat. However, in a rolled joint

or samosas, meat or chicken patty, bacteria that were on the surface become distributed throughout the food and it becomes more difficult for the heat to reach them.

- poultry - particularly large pieces
Poultry can carry large numbers of bacteria and these are spread through the entire bird. Cooking must ensure that the sufficiently heated to kill the bacteria.

SOUPS, SAMBAR AND GRAVY

It is bad practice to add a freshly made batch of soup, sambar or gravy to a quantity made earlier but only partly used. 'Topping up' is dangerous particularly when it continues over several services. During this time there will almost certainly be occasions when the temperature of the 'ever-on-the-go' pot will drop below the 63°C required for safety. Then the bacteria will multiply rapidly in the rich, warm, liquid food.

It is much safer if the food handler:

- prepares soup, sambar and gravy in small quantities and discard anything left over at the end of the day.

EGGS

Salmonella has been found inside a small percentage of eggs. As a safeguard, eggs should be thoroughly cooked. Recipes based on uncooked or lightly cooked eggs should be avoided.

HOT FOOD SHOULD BE KEPT HOT AND COLD FOODS COLD

Keeping hot foods hot and cold foods cold till they are consumed minimizes the opportunity for harmful bacteria to multiply.

It is ideal to consume food as soon as it is cooked, provided the cooking temperatures have been sufficiently high. If, however a short time should lapse between the time the food is ready and the time it will be eaten, it is necessary to use equipment that can hold the food at temperatures of 63⁰C or above. Examples of such equipment are heated food service counters, thermal hot food containers, steam tables etc.

Many foods that are eaten cold have sufficient nutrients and moisture to enable bacteria to grow quickly. Fresh milk, butter, cheese, frozen vegetables and meat are examples.

The rules for food that will be eaten cold are:

- Refrigerated food should be kept refrigerated until as near as possible to the time of consumption;
- Food should be handled as little as possible;
- Should be kept away from other foods, particularly raw foods; and
- Food should be covered.

KEEPING PREPARED FOOD OUT OF THE TEMPERATURE DANGER ZONE

If food is not to be served within a very short time of its being cooked it should be cooled to **under 10°C within 90 minutes** of the end of cooking. It must be refrigerated immediately once cooling is complete.

Quick cooling is important. In dropping back from its high cooking temperature to the cooled state the food will pass through the Temperature Danger Zone. It must spend as short a period as possible in the 'Zone' because bacteria may have survived the cooking process and will multiply if given time.

Rapid cooling will be aided:

- by dividing food into smaller portions;
- by the cooked foods being transferred to a cold utensil that is then immersed in ice-cold water;
- by the food being placed in the coolest part of the workplace (providing this does not carry the risk of cross-contamination).

RE-HEATING OF COOKED FOODS

Re-heated cooked foods - notably milk products, poultry and meat - are implicated in many cases of food poisoning. Food handlers often make the mistake of thinking that because food has already been cooked it is free of bacteria and that 'warming up' will be sufficient.

In fact, some bacteria may not have been killed by the cooking. Or, following cooking, the food may have become contaminated by a food handler's hands.

If food contaminated by one of these means is *only lightly warmed* - instead of being thoroughly re-heated - bacteria will have ideal conditions for growth.

These guidelines are to be observed for food that is to be re-heated:

- The food from the refrigerator should not be removed in advance of re-heating the food.
- The food should be handled as little as possible and kept covered and clear of other foods.
- Large items should be divided into smaller portions.
- The food should be heated to at least 70°C at its core for at least 2 minutes.
- Food should be served quickly following re-heating.
- Cooked food should not be re-heated more than once.

The idea behind correct temperature control is to keep food out of the Temperature Danger Zone. The rules for achieving this in a retail business are by following proper refrigeration and freezing techniques.

REFRIGERATION

A refrigerator should operate at temperatures between 1°C and 4°C.

Placing food in a refrigerator does not kill the bacteria that the food may be carrying but the low temperature means that *warmth* - one of the requirements for bacterial growth - is not present. If the food is removed from the refrigerator into room temperature the bacteria will begin to grow again.

Foods should be refrigerated for only short periods of time, the duration varying from food to food. Most foods fall within the 1-5 days' range but a few can be refrigerated for longer. Package labels often mention the maximum periods of refrigeration. Food should not be refrigerated beyond its 'use-by' date.

Examples of refrigerated storage period

FOOD	DAYS	FOOD	DAYS
UNCOOKED MEATS	2-3	COOKED MEATS	1-2
Dairy		Fruits & vegetables	
Milk	1-2	Soft fruit	2
Paneer	15-20	Salad vegetables	5
Cheese (hard)	6 months	Greens	3

Always refrigerate high risk foods such as raw meat, poultry, and fish/seafood.

If refrigerators are not available, alternate options to lower temperature can be explored (storing in insulated boxes/thermal containers, using cold water/ice, placing in cool, ventilated places, etc)

Points to remember about refrigeration:

- Raw meat, poultry and seafood /fish are to be kept away from other foods - especially cooked meat and cooked poultry;
- The most perishable foods like meats should be in the coldest part of the refrigerator.
- Perishable foods should be returned to the refrigerator immediately after use.
- Nothing - particularly raw meat, poultry and seafood/fish— should be allowed to drip on to food below. Cooked food should be placed above raw food or separate refrigerators should be used for cooked and raw food, if possible;
- Cooked food should NEVER be placed in the refrigerator immediately after cooking: it should be allowed to cool first;
- All food should be covered as far as possible;
- Food should not be crowded into the refrigerator - Enough room should be allowed for cold air to circulate (When packing refrigerated display units or freezers, ensure that you do not fill above the relevant 'load line' or obstruct air inlets);
- The temperature of the refrigerator should be checked regularly to see that it is between 1°C and 4°C (See Record Chart below)
- Refrigerator doors should be opened as infrequently as possible and quickly closed
- The refrigerator should be defrosted regularly to prevent the build-up of ice. Keep it clean or use frost-free refrigerators where ever possible.

TEMPERATURE RECORD SHEET

Refrigerator No. _____

Temperature range 1°C - 4°C

Date	Time	°C	Comments	Signature

FREEZING

Freezers keep food at a temperature (-18°C to -25°C) well below freezing point. Freezing denies bacteria the warmth they need to grow. The coldness also turns any moisture in the food into ice (water in a form that bacteria cannot use).

Some bacteria will die as a result of freezing but others will survive although unable to grow. However, surviving bacteria will grow if the temperature rises towards the Temperature Danger Zone.

The length of time food can be stored in a frozen state depends on the type of food and the rating of the freezing unit. Although frozen food may not become contaminated it may deteriorate in flavour and character if stored too long. Different foods have different storage times ranging from 2 to 12 months. The supplier of the food can be checked with, if there is no knowledge on how long it can remain frozen.

Points to remember about freezing

- The freezer should lower the temperature of the food to -18°C;

- The temperature of the freezer must not rise above -18°C . Check **daily**;
- All food should be wrapped, labelled and dated;
- Food should be stored neatly within the freezer and not overloaded; and Old stock should be used before new - maximum storage periods should be known.

THAWING FOOD

Small items of food such as thin chops, fish cutlets, vegetables and many convenience foods can be cooked from frozen without being thawed first.

But you cannot do this with **poultry, meat and bulky items of food**. In general, these foods **MUST** be completely thawed before cooking begins. Unless complete thawing occurs, the temperature at the core of the food may not reach a high enough level during the cooking process to kill bacteria.

Food has been completely thawed once it is soft and there are no ice crystals present. The legs of properly thawed poultry can be moved quite easily.

Thawing can cause problems in that when the outer surface of food warms up, bacteria can begin to grow although the centre of the food remains frozen.

Thawing Methods - Raw Meat and Poultry

For small meat joints and chicken, thawing can be carried out in a container in the refrigerator - on the bottom shelf. The method of thawing large birds and joints of meat can give rise to difficulty. Thawing in the ordinary domestic refrigerator is not recommended because of the time this takes and the risk of other foods becoming contaminated. Where possible, large items should be allowed to thaw

in air at a cool place (15°C or below). Special thawing cabinets are also available.

Many microwave ovens have a defrosting facility which must be used strictly according to manufacturer's instructions.

The time required to thaw meat or poultry depends upon the size of the piece and the temperature at which thawing is taking place.

Guidelines on thawing times

	REFRIGERATOR	COOL ROOM
POULTRY		
1.5kg	24hrs	10hrs
4kg	60hrs	20hrs
MEAT		
1 kg	8hrs	4hrs
3kg	42hrs	16hrs

When thawing raw meat and poultry:

- plan well ahead;
- know where the thawing will take place and allow sufficient time for the operation;
- place the frozen meat or poultry in a container to catch any liquid that drains off;
- cover the thawing food;
- keep the thawing food away from other foods, utensils and work-surfaces;
- following thawing, cook the food immediately; and
- once frozen food has been thawed, NEVER RE-FREEZE IT.

Microwave Ovens

Microwave ovens use electromagnetic energy (microwaves) to heat and defrost food.

There are domestic (home) and commercial (catering) models of microwave ovens. Commercial models are more powerful electrically and are constructed to stand up to more intensive use. Domestic models are unsuitable for commercial use.

Most of the rules governing food preparation by conventional ovens apply also to microwave ovens. The cardinal rule remains that food that is being cooked or re-heated must reach at least 70°C at the core and hold this temperature long enough to destroy any bacteria present.

With microwave cooking some parts of the food may receive a concentration of waves and become very hot. Other parts may receive a less intensive barrage and be heated to a much lower temperature. These 'cold' spots may result in bacteria not being destroyed.

To avoid food having 'hot' and 'cold' spots some ovens are fitted with a turntable so that all of the food can receive an equal application of heat. Always check that the food is piping hot throughout; if necessary, move the food around the oven or, if a liquid, stir to ensure adequate heating.

Immediately an oven is switched off microwave production stops and no more heat is received by the food. But the cooking process is not complete: the heat already within the food must be allowed time to spread throughout the food. Therefore always allow sufficient 'standing time' after the oven has been switched off. Different foods require different standing times.

STORAGE OF FOOD

All dry foods, such as flour, rice and pulses and all canned food, should be stored in a room or cupboard that is **cool, dry, clean** and **ventilated**.

Deliveries must be checked to ensure that goods that will be stored are free from odours, dampness or other forms of soiling and do not harbour pests.

Food should be stored on shelves - no food on floor level - to reduce the risk of contamination by pests and to make the floor more accessible for cleaning. It is important to keep food covered at all times. Food that is not pre-packed, such as rice, should be stored in containers with tight fitting lids.

'First in - first out' is one of the 'golden rules' of stock control. Stock should be rotated so that the oldest food is used first. Identifying the order of use will be easier if stocks are date-labelled and are not crowded together on the shelves.

Most canned foods will keep for anything up to 3 years but for a few items - including canned fruit - the storage period is shorter if the food is to be eaten in prime condition. Poisoning from canned food is rare.

Nevertheless, throw away -without opening them - any cans that are rusty, dented, or 'blown' at the ends, and always use the food within the date-mark.

THE ROLE OF A SUPERVISOR

- The supervisor should be well versed with the policies and procedures regarding storage and temperature control.
- The food safety management process should be implemented by the supervisor.

- Proper communication to the staff about correct procedures such as reporting problems like refrigeration or removing out-of-date-foods from display or sale should be conveyed.
- Monitoring of mandatory documentation such as temperature chart and delivery records should be done by supervisor.
- The overall responsibility of cold storage maintenance and its proper functioning rests with supervisor.
- The supervisor should ensure that procedures such as stock rotation and stock control should be implemented correctly.

Section 7: CLEANING AND DISINFECTION

This section describes some of the methods available for cleaning and disinfecting utensils and the work-place and the role of the supervisor in achieving this.

CLEANING THE WORK-PLACE

Cleaning should achieve two things:

- the removal of grease, food debris and dirt; and
- the destruction of (disinfection).

Cleaning of the work-place can be divided into two broad categories:

‘Clean-as-you-go’ and ‘scheduled cleaning’

CLEAN-AS-YOU-GO applies to cleaning that must be done very quickly after the soiling occurs. The aim is to prevent cross-contamination, or injury to staff, or simply to keep working areas clean and tidy. These items should be cleaned and disinfected throughout the work period. Staff should implement a ‘clean-as-you-go’ policy by clearing away and cleaning up as they work, and immediately after completing a task.

Examples of this type of cleaning are:

- washing and sanitizing of a chopping board, knife, spoon etc immediately after use;
- cleaning up a floor spillage just after it has happened.



Clean floor spillage as soon as it occurs

SCHEDULED CLEANING refers to cleaning tasks carried out at regular intervals. Food businesses often have a timetable which specifies all the details for each item to be cleaned. Examples of scheduled cleaning duties are:

- cleaning the kitchen floor (DAILY); and
- cleaning shelves in the dry store (WEEKLY);

Effective cleaning will be achieved if the following are considered:

- what is to be cleaned? Is it '*clean-as-you-go*' or '*scheduled*'? How often must it be cleaned, and at what times?
- who is responsible for the cleaning?
- what is the most appropriate type of energy to be used: physical or mechanical (e.g. elbow grease, machinery), chemical (e.g. cleaning and disinfection solutions) or thermal (e.g. heat, steam or hot water)?
- what cleaning equipment and chemicals are to be used? Where are these materials to be stored?
- how can the cleaning be done safely? Is any special protection needed (e.g. rubber gloves) or are any other precautions necessary?

CLEANING AND DISINFECTION CHEMICALS

Chemicals are available to enable proper standards of cleaning and disinfection to be maintained. Usually the chemical is added to water to make the cleaning solution.

DETERGENTS are chemicals that will dissolve grease and assist the removal of food debris and dirt. Detergents do not kill bacteria.

DISINFECTANTS are chemicals designed to destroy bacteria. They reduce the number of bacteria to a safe level. Disinfectants are not

effective in removing dirt and grease. Disinfectants which have a very strong smell that might taint food must not be used on any surfaces or equipment that comes into direct contact with food. However, it is very important that these surfaces are properly disinfected using a suitable chemical solution or steam or hot water (over 82°C).

SANITIZERS are chemicals combining the role of both detergent and disinfectant. They are designed to remove grease, dirt and destroy microorganisms by disinfecting at the same time.

Disinfection by HEAT is an effective way of killing bacteria for example, using very hot water (80°C-85°C). Chemical disinfectants and sanitizers can be used in addition or in situations where hot water is not available. However they are less effective in water that is not hot and on surfaces that have not received a preliminary clean using hot water and a detergent.

It is a popular myth that the use of disinfectants achieves perfect hygiene. They are useful in reducing the numbers of bacteria on surfaces that come into contact with food, as well as for floors and toilet areas. Disinfectants used must be suitable for work areas and must not taint food.

When using cleaning solutions the food handler should:

- Prepare solutions as per the concentrations/ dilutions mentioned under the Instructions for Use, on the container;
- make up fresh, hot solutions frequently: dirty or cool water makes the chemicals less effective;
- wear rubber gloves or other protective clothing when necessary;
- do not store chemicals within the food area or where they may warm up; and

- NEVER mix different chemicals - they become less effective when mixed and you may produce poisonous gases.



DISH WASHING

Crockery, cutlery and utensils should be cleaned immediately after use. Cleaning can be by hand or by machine.

WASHING BY HAND

- The most hygienic way to wash by hand is with TWO stainless-steel sinks side by side. Wash in one and rinse in the other.
- If you do not have two sinks, you can clean and then rinse in the same sink or wash in the sink and rinse in a separate bowl of hot water.
- If a sink is not available, a bucket with a tap or a bucket and a pitcher can be used.
- Rinse water should be changed frequently, when dirty or cooled. Rinsing is important. Laboratory tests have shown that dishes that are not rinsed are covered with large numbers of bacteria.

The following steps should be adopted when dish-washing:

1. wear rubber gloves

This will protect your hands from scalding and the effects of detergents.

2. remove left-over food

This can be done by scraping and rinsing under running water.

3. wash in hot water and detergent

In the first sink, items are placed into hot water (50°C - 60°C) and detergent, and scrubbed with a tough nylon-bristled brush.

4. rinse in very hot water

In the second sink (or in the bowl) items are rinsed in very hot water (75°C - 80°C) before being stacked to dry. As well as killing bacteria and removing detergent, rinsing in this way makes the items hot enough to dry quickly on contact with the air. This avoids the need for drying cloths which can spread bacteria if they become soiled.

5. dry

After rinsing, the items should be left to drain in a clean, dry area, well away from any dirty washing water, until they are clean, dry and without, smears.

WASHING BY MACHINE

There are several types of dish and utensil washing machines available but they all follow the stages of cleaning just mentioned - left-over food is removed from the items to be washed which are then stacked in the machine. Washing is by very hot water and detergent followed by rinsing and disinfecting by hot water sprays or steam.

Correct loading of these machines is essential. Items should be stacked neatly so that the cleaning solution can reach them. Cups, glasses and jugs should be stacked upside-down to avoid collecting water.

Dishwashers must be properly maintained, and the recommended salts, powders and rinse aids used in the correct amounts.

A machine will only clean effectively if it operates at the correct temperatures. One that fails to do so is a hazard.

CLEANING WORK-SURFACES

It is vital that surfaces upon which food is prepared are kept clean and bacteria-free for each new job. '*Clean-as-you-go*' applies but there may also be a '*scheduled*' requirement to clean the surfaces at the daily start of work. Work-surfaces should be left clean and clear at close of work.

The stages of cleaning are:

1. Removing food particles and spillages using a damp cloth;
2. Using a solution of detergent and hot water to remove grease and general soiling;
3. Rinsing the surface thoroughly using hot water;
4. Applying a suitable disinfectant in hot water; allow sufficient time for the solution to do its work; and
5. Rinsing again using hot water and leave the surface to dry.
Alternatively, dry the surface using clean towels;

If the soiling is very light stages '2' and '3' may be omitted but if the surface has been in contact with raw meat, poultry, seafood/fish or eggs this should not be done.

CLEANING OTHER SURFACES

Telephones, and handles on doors and refrigerators, are examples of surfaces where contaminated hands may deposit bacteria which can be picked up by other hands. Include such surfaces in the cleaning schedule.

CLEANING EQUIPMENT

The food handler should not attempt to clean equipment unless s/he has been trained and authorized to do so.

The basic steps are:

1. Disconnecting the machinery from any power source before commencing cleaning. Extra care has to be taken if blades are removed;
2. All waste foods are removed;
3. All parts are thoroughly washed and disinfected;
4. The machine should be re-assembled taking particular care if there is a moving part that could fly off if not properly refitted;
5. All parts of the machine that will come into contact with food are to be disinfected again; and
6. Care has to be taken to see that all guards have been refitted.

CLEANING FLOORS, WALLS AND CEILINGS FLOORS

Cleaning of floors can be by machine-scrubber or by manual scrubbing using hot water and detergent. Where a hand scrubber or mop is being used, work with two buckets, one holding the hot cleaning solution. The other bucket should hold plain hot water for removing dirty water and soil from the hand scrubber or mop-head as cleaning proceeds.

Following scrubbing, the floor should be rinsed using a cloth, detachable-head mop or machine. Very hot water aids quick drying.

All areas of the floor should be cleaned paying particular attention to parts where food residues may have lodged. Where cleaning is required during the day this can usually be done by mopping.

A wet floor is a hazard to staff: during cleaning and drying a warning notice should be displayed.

It is important that a floor is left clean and free from food residues at the daily close of work. Dirty floors are an invitation to pests to take up residence.

WALLS AND CEILINGS

Walls and ceilings should be free of dirt, litter, and moisture. Corners and places that are hard-to-reach should also be cleaned routinely. Most oil-based painted walls can be satisfactorily cleaned using very hot water and a detergent or sanitizer. A disinfectant should be used daily for wall areas where splashes and stains may occur such as behind sinks or work-surfaces.

Ceilings can be cleaned with a vacuum cleaner, ceiling broom or with the help of a broom tied with an old flannel cloth. These devices can be used to dust the ceiling from one end to the other end. Stained areas can be cleaned with the help of a sponge and detergent.

DUSTING AND SWEEPING

Dry dusting and sweeping can fill the air with dust particles that may well be carrying bacteria. Use a moist cloth - never a dry duster - for ledges and shelves. For floors, wrap a clean damp cloth around the brush head if no better alternative exists.

SCRUBBERS, MOPS AND CLOTHS

Scrubbers, mops and cloths become contaminated with bacteria during cleaning. They must be thoroughly washed and disinfected frequently. Mop heads and floor cloths should be changed regularly.

WASTE BINS

Waste bins can become breeding grounds for insects and rodents, their contents providing the food and shelter these pests need.



WASTE BINS WITHIN THE FOOD AREA

Bins and bin stands must be washed down and disinfected regularly, the task being included in the cleaning schedule. The floor area around bins must be cleaned at least daily.

EXTERNAL WASTE BINS

‘Outside’ waste bins - must be positioned as far away from the food area as is practicable and must have lids or covers to limit access by pests.

Keep the area around the receptacles tidy: do not leave waste material stacked up *outside* the bin. Hose down the area after each collection. During the summer months it may be necessary to disinfect the bins or to spray them with insecticides.

THE ROLE OF THE SUPERVISOR IN CLEANING

- An effective supervision and organization is needed to ensure coordinated and satisfactory cleaning. It is the duty of the supervisors to guarantee that sufficient cleaning materials and suitable facilities are available and staff is given clear instructions. The supervisor should ensure that the appropriate cleaning/disinfecting chemical, concentration and procedure is used.
- The supervisor should check that the cleaning equipment is stored properly.
- If any equipment is found spoiled, it needs to be replaced. For example, worn brushes.

- The staff should be continuously encouraged by the supervisors on the high standards they maintained.
- Regular auditing of the cleanliness of premises and equipment is necessary to verify that cleaning is effective.
- The supervisor should ensure that the appropriate cleaning/disinfecting chemical, concentration and procedure are used.

Section 8: PACKAGING, TRANSPORTATION AND LABELLING

This section develops an appreciation of the importance of supply chain in food safety and procedures for safe packaging, transportation, and labelling.

PACKAGING

Food packaging is the enclosing of food to protect it from damage, contamination, spoilage, pest attacks, and tampering during transport, storage, and retail sale. It is an integral part of food processing. It has two main functions: to advertise foods at the point of sale, and to protect foods to a pre-determined degree for the expected shelf life.

The package is often labeled with information such as amount of the contents, ingredients, nutritional content, cooking instructions (if relevant), and shelf life. The package needs to be designed and selected in such a manner that there are no adverse interactions between it and the food. Packaging types include bags, bottles, cans, cartons, and trays. Sometimes food has to be protected and packed during transportation in corrugated fibre board cases, wooden or metal cases, crates, barrels, drums and sacks. Such containers are used not for marketing but for insulation and protection during transportation.

FUNCTIONS OF FOOD PACKAGING

Food packaging serves many important functions. These are as follows:

- 1. Containment:** For items that are granulated, paper-based packages are the best, with a sealing system to prevent infiltration of moisture into the product. Other products are

packaged using metal cans, plastic bags and bottles, and glass containers.

Containment improves packaging durability—in other words; the packaged food has to survive transport from the food processing facility to the supermarket to the home for the consumer.

- 2. Protection:** The packaging must protect the food from (a) biological agents such as rats, insects, and microbes; (b) mechanical damage such as product abrasion, compressive forces; and (c) from chemical degradation such as oxidation, moisture transfer, and ultraviolet light.

- 3. Communication:** Packaged food must be identified for consumer use, mainly with label text and graphics. It can also be done by using special shapes for the food package, such as a soft drink bottle and potato chip bags.

These packages also detail nutritional information, manufacturer name and address, weight, bar code information, directions/instructions for use. The label may also indicate whether it is safe to put the packaged food through a microwave process. Packages also carry such information as merchandising messages, health messages, recipes and coupons.

- 4. Environmental issues:** To protect the environment, we must be willing to reuse or recycle the packaging or reduce the size of the packaging.

- 5. Package safety:** Before using a particular type of package for food, it must be ensured that it is safe to use that packaging for the food being considered, and that there are no adverse interactions between the package and the food. This includes any metal contamination issues from a can to

the food product or any plastic contamination from a bottle to the food product.

It is necessary that food grade packaging material is in direct contact with the package (primary package), especially in the case of 'Ready to Eat' foods.

6. **Product access:** The packaging must be such that the product is readily accessible when the consumer is ready to use it. For example, pour spouts on milk cartons can make it easy to dispense the milk.

CLASSIFICATION OF PACKAGING MATERIAL

Packaging materials can be classified into rigid and flexible packaging material.

- **Flexible** packaging material is a package capable of being readily deformed by hand, including being bent, flexed or twisted. They range from bags, bubble wraps to tubes and foam cushioning materials.
- **Rigid** packaging materials are used when packages need to be transported to long distances and when extra care is required. Some examples include metal containers, wooden containers, drums and crates.

Types of Packaging Material

Packaging material is classified into primary, secondary and tertiary packaging.

- **Primary** packaging is the main packaging that holds the food that is being processed. For example a bottle or can. In it the food comes in direct contact with the packaging material.
- **Secondary** packaging combines the primary packages into a single box, and do not have direct food contact.

- **Tertiary** packaging combines all of the secondary packages into one pallet. They provide additional food protection during storage and distribution.

Packaging type	Type of container	Examples of foods packaged
Plastic trays	Primary	Portion of fish
Bags	Primary	Potato chips
Boxes	Secondary	Box of soft drink bottles
Cartons	Secondary	Carton of eggs
Pallets	Tertiary	A series of boxes on a single pallet, to transport packaged food from the manufacturing plant to a distribution center.

WRAPPING AND PACKAGING

Packaging and wrapping materials must be stored in clean, dry areas where they are not exposed to risk of contamination

Cling film

Cling film is useful for stopping food drying out and protecting it against contamination. Under certain conditions, however, it can speed up spoilage and mould growth by trapping moisture. It is therefore important that:

- Raw meat or wet food is unwrapped when removed from the refrigerator; and
- Food wrapped in cling film is not left in bright light or sunlight

Because of the risk of chemical migration, cling films should not be used where they could melt into food during heating, or for wrapping

foods with high fat content, unless manufacturers advice indicates their suitability for this purpose.

Vacuum packing

Vacuum-packed food, and modified atmosphere packs, should be refrigerated to prevent the multiplication of anaerobic bacteria. Immediately after opening a vacuum pack, the contents should be removed completely. Slightly darker colors of meat and the acid odour disappear shortly after being removed.

Care must be taken to avoid puncturing packs, for example, with sharp bones or rough handling. Defective seams commonly result in loss of pack integrity. However, air-tight vacuum packaging may blow if the contents ferment. It is advisable to purchase branded vacuum packs from reputable suppliers to avoid receiving low grade meat of dubious origin. Unmarked packs without 'use-by' dates should always be regarded with suspicion.

Points to remember on Packaging:

- Materials used for wrapping are not to be a source of contamination; they must be stored in such a manner that they are not exposed to a risk of contamination.
- Reusable wrapping and packaging material is easy to clean and where necessary to disinfect.
- As far as possible all unpacking and packing should be carried out in areas separate from food production or preparation to prevent contamination of open food.
- String removed from sacks and ties removed from bags should be immediately placed in suitable containers provided specifically for the purpose.
- Paper sacks should be cut open, although care should be taken to ensure paper does not finish up in the food.

- Special care is needed to ensure that staples, which tend to fly considerable distances when boxes are opened, do not contaminate food.
- Suppliers should be requested to use adhesive tape to fasten boxes, instead of staples.
- Packaging materials and gases shall be non-toxic and not pose a threat to the safety of food. Certificates of conformity or other evidence may be used for verification.

LABELLING

Food labelling is a means of communication between the producer and seller of food on one hand, and the purchaser and consumer on the other. It can be written, electronic, or graphic communications on the packaging or on a separate but related label. The symbols used on package labels are generally internationally standardized.

Pre-packaged food must conform to compulsory standards on labelling and advertising. The details that must appear on packaging include the name under which the product is sold, a list of ingredients and quantities, potential allergens (products which may cause allergies), the minimum durability date and conditions for storage, processing and handling. A batch, code or lot number which is a mark of identification by which the food can be traced in manufacture and identified in distribution, should also be given on the label.

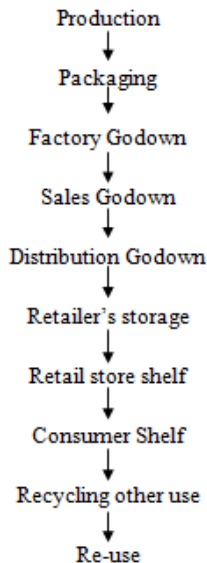
FOOD DISPATCH AND DISTRIBUTION

- All packaged food products shall carry a label to ensure that adequate and accessible information is available to the next person in the food chain to enable them to handle, store, process, prepare and display the food products safely and correctly and that the batch can be easily traced and recalled if necessary.

- First in First Out and First Expire First Out stock rotation system should be applied to release the food products from the store. This means that foods should be used in the order they are delivered and expire. For instance, the newest milk should not be used first if there are still several litres that are good from the last delivery. Expired material should be discarded and not entered into the dispatching process.
- Expired material should be discarded and not enter into the dispatching process.

TRANSPORTATION OF FOOD

Damage during transport is one of the commonest problems in packaging. The supply chain of a consumer good is shown below.



The type of the packaging methods used in this distribution system depends on the mode of transportation and method of handling and storage.

Points to Remember in Transportation:

- Vehicles used to transport foods must be maintained in good repair and kept clean.
- The temperature of food when transported in containers should be maintained at the required temperature.
- For bulk transport, containers and conveyances should be designated and marked for food use only and be used only for that purpose.
- Conveyances and containers for transporting food should be kept in an appropriate state of cleanliness, repair and condition.
- The vehicle used for transport should not carry animals, toxic substances or contaminating materials along with the prepared food. Food and non-food should be suitably segregated during transportation. Where the same conveyance or container is used for transporting different foods or non-foods, effective cleaning and where necessary, disinfection should take place between loads.
- Food should be adequately protected during transport.

TRACEABILITY

Traceability is the ability to trace the history, application, or location of an item or activity with the help of documentation. Food businesses must be able to trace foods or any substance that is intended to be part of a food throughout all the stages of production, processing and distribution.

Several examples of food safety incidents show how a single source food contamination can affect an entire business/industry because of a lack of traceability. For example, in a case of food poisoning, if the origin of the contaminated food can be identified quickly, a much

smaller quantity of the food could have been contaminated, less people affected, and consumers given the information much sooner. Food businesses must have written systems and procedures in place to identify all business to which they have supplied products or received products from, and be able to operate internal traceability systems to identify, isolate and correct food safety problems as quickly as possible. Records of recalled products should be maintained.

All food products placed in the market must be adequately labelled or identified to enable full traceability. Food businesses have a legal duty to withdraw products from the market that they identify as unsafe and carry out a full recall of these products.

Section 9: PREMISES DESIGN AND LAYOUT

This section describes guidelines for appropriate design, layout and equipment to minimize potential food safety hazards.

HYGIENIC PREMISES

The design and layout of the premises can affect the standard of food hygiene that is achieved. A hygienic layout is one that allows plenty of space for work and storage, and provides separate working areas for each of the food categories - raw, high risk, vegetables and other. Entry points for materials and personnel should as far as possible be separate. A key objective is to separate ‘**clean**’ from ‘**dirty**’ areas of operation.

WORK-SURFACES

As work-surfaces are constantly in use, they must be strong, durable, and easily cleaned. Examples are stainless steel tables. They should be made of smooth, non-absorbent materials, inert to food, detergents and disinfectants under normal operating conditions. Easily movable work-surfaces and other items of equipment allow the items to be moved out of the way when the floor or walls are being cleaned.

FLOORS

A kitchen floor must be durable, easy to clean, non-absorbent, and non-slip. It should be resistant to acids, fat and grease. Food should be stored away from the wall, nor directly on the floor. It should be stored preferably either on pallets/racks or any other manner to facilitate cleanliness, avoid ingress of moisture etc. The floor should be free of crevices and be coved at the angle with the wall. This will prevent food particles, dirt and grease - all of which can carry bacteria - from accumulating in areas where they are difficult to remove.

WALLS

Walls should be smooth and free from cracks and crevices - smooth plaster provides a suitable surface - with glazed tiles being used in those areas where the walls are likely to be splashed, such as behind sinks and above work-surfaces. Walls should be painted a light colour to show up dirt or grease. The junction of flow with the walls should be such that they are cleanable. E.g. coved (should not be with sharp angles).

CEILINGS

Ceilings should be smooth, light in colour and coved where they meet the walls. They should be built so as to be gap-free, water resistant and finished so as to minimize build-up of dirt and shedding of particles. Ceiling height will vary depending on type of operations being carried out, but should be high enough to allow satisfactory working conditions and allow installation of equipment.

VENTILATION

An effective system of ventilation is essential to remove the heat, steam, condensation and cooking odours of the kitchen - and to provide proper working conditions for the staff. A stuffy, moist room helps bacteria to grow. Ventilation systems should ensure that air does not flow from unclean to clean areas and where necessary, they can be adequately maintained and cleaned.

LIGHTING

Premises must be well lit by natural or artificial lighting including store rooms, passageways and staircase, so employees can identify hazards and carry out tasks correctly. Poor lighting makes it difficult to prepare food hygienically and to clean properly. Artificial light is preferred to natural light because of problems of heat gain, glare and flying insects entering open windows.

The intensity of lighting should be adequate on the nature of operations (e.g., sorting, cleaning, grading, inspection and testing require greater intensity of light). Where necessary lighting should be such that the resulting colour is not misleading.

SINKS

Sinks should be provided for the washing of food. It may be necessary to have a sink available for any hand-washing of dishes and utensils. Sinks should usually provide hot or warm water and preferably be of stainless steel.

If the sink is not available, it will be necessary to have access to clean water and a vessel to wash hands and equipment in.

WASTE DISPOSAL

Food waste and garbage are sources of food contamination and odors which attract insects and rodents. Suitable provision must be made for the removal and storage of waste. Garbage accumulation can be a breeding place for pests. It must not be allowed to accumulate in food handling, food storage, and other working areas and the surrounding environment.

Waste food should be kept separate from paper and cardboard packaging. It is preferable for all waste food to be removed from food premises at least daily and general refuse to be removed at least twice a week. Accumulations of garbage in food rooms will attract pests and encourage the multiplication of bacteria. They also create odor, prevent effective cleaning and expose food to risk of microbiological and physical contamination.

Regular emptying of internal waste bins is important, even if the bins are not full. This will reduce unpleasant odour, maintain adequate capacity and reduce bacterial multiplication and insect problems.

The garbage areas should be secure and not be too far from food rooms to discourage their use but they should not be too close to encourage flies to enter the food rooms.

Hazard that result from poor waste storage include:

- The attraction/ multiplication of pests;
- The contamination of food (microbiological, physical or chemical); and
- The multiplication of bacteria

TOILETS AND WASHING FACILITIES

- Toilets must not lead directly on to food rooms.
- Toilets must be well ventilated with natural or artificial lighting and there must be facilities for washing and drying hands.
- Hand washing is less likely to be overlooked if the hand - wash basins are situated near the exit. A **‘WASH YOUR HANDS’** notice should be posted nearby. There should be at least one hand - wash basin in the kitchen but this should be situated away from food preparation areas.
- Hand wash basins should have running water and be supplied with materials for cleaning and drying hands. Taps should be non-hand operated, if possible.
- Adequate changing facilities for staff should be provided, as appropriate to the operations.

WORK FLOW

Organizing the premises into separate areas for separate jobs lies at the heart of hygienic premises design. The design and layout should ensure that raw materials, ingredients and packaging are received into handling and storage areas which are suitable for preventing the

possibility of dust, dirt and other contaminants, which might be carried with deliveries, from being distributed to other parts of the retail store. The inspection of deliveries should ensure that obviously contaminated products are rejected.

The exact layout will depend upon the size of the premises as well as on the prepares products being sold, but work must flow smoothly:

DELIVERY → STORAGE → PREPARATION → SERVICE

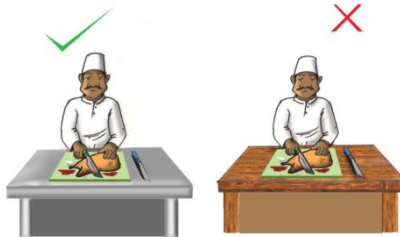
Storage rooms, refrigerators and freezers should be near delivery areas.

Vegetables and fruit should be prepared near their place of storage, away from other preparation areas to prevent the spread of soil. Raw meat and poultry must not be dealt with near other foods. It is very important to keep the work area clean at all times.

WOOD

The use of wood should be avoided in the store. Wood wears quickly, is absorbent and can develop cracks and crevices in which bacteria can lodge.

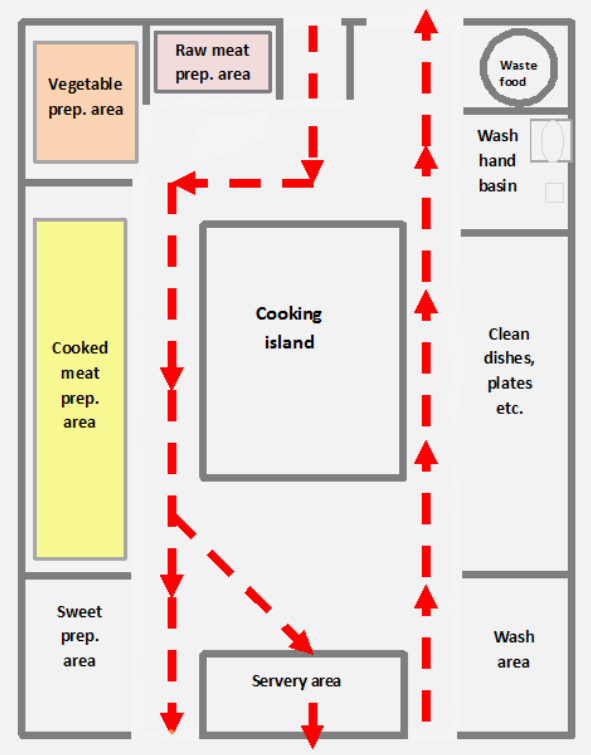
It is therefore unsuitable for use as floors, work-surfaces or as items of equipment (wooden handle knives, wooden pallets, etc.).



Metal table

Wooden table

Layout of a Catering Premise



SEPERATION OF 'CLEAN' and 'DIRTY' AREAS

Section 10: PROCESS FLOW

This section describes the importance and design of process flow to maximize food safety.

In retail food sale and catering operations, foods of all types are handled or produced in one premise at a similar time. Thus, an approach that looks at the preparation process common to a specific operation should be used – process flow.

The different processes/steps that groups of food undergo can be broken down into activities or stages of food preparation or handling. The hazards in each of these processes or steps, then can be analysed and controls put in place for each activity. The control will be suitable for all the products that have similar steps in the process.

The food flow is the route followed by food in any establishment from receipt at the establishment through to sale to a customer whether they are individuals or another company. Each of the stages the food passes through is called an operational step. The steps are the same although different terminology may be applied to them in different situations.

Examples of Operational/Process steps could be any of the following:

- Purchase;
- Storage - refrigerated/frozen/ambient;
- Preparation - ready-to-eat/defrosting;
- Cooking;
- Cooling;
- Reheating; and
- Service - hot and cold on site;

For most retail and catering businesses the process steps usually fall into one of three processes

1. Food Preparation with no cooking. Here the Process steps are:

Receive - Store - Prepare - Hold – Serve

In this example there is no stage at which pathogens that might be present can be destroyed

2. Food Preparation for service on the same day. Here the Process steps are:

Receive - Store - Prepare - Cook - Hold - Serve

In this example the food undergoes one cooking step so pathogens that might be present can be destroyed but the holding temperature must be one that prevents any spores germinating or any pathogens that might have survived multiplying. Contamination must also be prevented.

3. More complex food preparation for service at a future time. Here the process steps are:

**Receive - Store - Prepare - Cook – Cool – Reheat – Hot Hold -
Serve**

In this example the food undergoes several steps where pathogens and spores that might have survived the cooking process have a chance of multiplying. Contamination must also be prevented

It is a good idea to look at the process flow of your business. With the help of a process flow diagram you can identify all the process steps from the point where you purchase food to either process or sell through to the end point which will probably be service to customers.

By drawing up a process flow diagram you can break down all the processes in your business into component parts known as the process steps.

The following is a generic process flow diagram with the parts of the diagram being used indicated and also the links that might be in place to HACCP or Hazard Analysis documents.

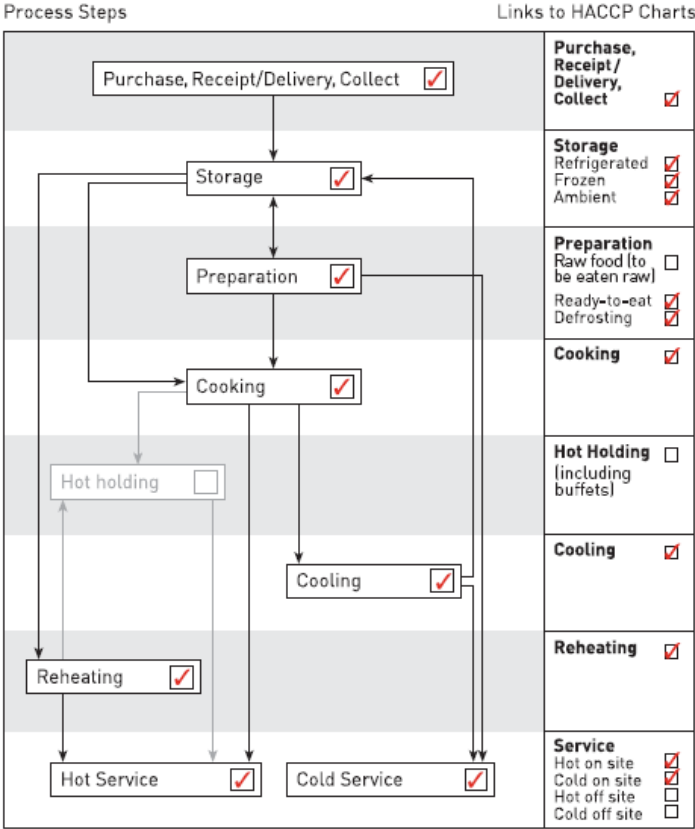


Diagram adapted from http://cooksafedumgal.gov.uk/manual/2.flow_diagrams/2.1.htm

Section 11: FOOD SAFETY MANAGEMENT PROCESS

This section describes the management of food safety hazards by using a of food safety management process.

A fundamental requirement of any food process is that the food produced should be safe for consumption. Food safety is such a basic consumer expectation, that it is 'taken for granted' when we decide our meal from the menu options or purchase products from the retailer. However, there is a real danger to consumers, if essential control measures are overlooked or mismanaged in a busy food operation. Thus, it is important for all food businesses to have a food safety management process in place.

Definition: Food safety management is the application of food policies, systems and processes in a food operation in order to prevent food borne illnesses and protect consumer health.

The focus in food safety standards has shifted from end product requirements and testing to preventive approach in food safety management that addresses physical, chemical and biological risks through the use of Good Manufacturing Practice (GMP), Good Hygiene Practice (GHP) and Hazard Analysis Critical Control System (HACCP).

GOOD MANUFACTURING PRACTICE/GOOD HYGIENE PRACTICES (GHP)

Good manufacturing practices (GMP) are a combination of manufacturing and quality control procedures aimed at ensuring that products are consistently manufactured to their specification. The requirements for maintaining the quality and safety of products are

written down in a GMP manual which becomes the key reference for the operation of a food manufacturing business.

GMP requires a quality approach to manufacturing, enabling food businesses to minimize instances of contamination, mix up, and errors. This in turn, protects the consumer from purchasing unsafe and poor quality products. Failure of firms to comply with GMP can result in very serious consequences including recall, seizure, fines, and imprisonment. It addresses issues including record keeping, personal qualification, sanitation, cleanliness, equipment verification, process validation, and complaint handling. Most GMP requirements are very general and open-ended, allowing each manufacturer to decide individually how to best implement the necessary controls. This provides much flexibility, but also requires that the manufacturer interprets the requirements in a manner which makes sense for each individual business.

The overall combined approach to issues of food quality and safety is consolidated when GMP is put into action. Existing quality assurance procedures are integrated so that food companies are able to demonstrate their commitment to customer requirements as well as their compliance with food safety legislation.

All practices regarding the conditions and measures necessary to ensure the safety and suitability of food at all stages of the food chain

HAZARD ANALYSIS CRITICAL CONTROL POINT (HACCP)SYSTEM

HACCP is a food safety management system designed to control hazards at points critical to food safety.

The Hazard Analysis Critical Control Point (HACCP) system for food safety control was initially developed for the U.S. space

programme. HACCP provided a means of ensuring that food eaten by astronauts was safe and did not contain any food poisoning organisms which may have added to the difficulty of space missions. HACCP is a preventative system of food control. Instead of waiting until a problem arises and then taking action, HACCP seeks to determine what problems might arise and then to prevent them from happening at all. This is clearly a most sensible way of running a food manufacturing process. A system of prevention reduces the likelihood of contaminated products being sent to customers and it reduces the cost of quality assurance because it can often limit time-consuming inspections of the finished product and eliminate the need to reject defective products. Under the new act certification is not essential but its application is encouraged to ensure food safety.

Prerequisite for HACCP

Prior to implementation of HACCP, a business must operate in accordance with GHP and a factory with GMP as well as comply with all relevant food safety legislation. The main purpose of prerequisite programmes was to control bacterial growth, protect products, and maintain equipment. Other benefits include customer satisfaction and ultimately increased sales; employee satisfaction because there is safe and easy working environment resulting in increased productivity; energy safe because the food business is designed to food safety.

These prerequisite programs will need to be reviewed before implementing an effective HACCP Plan

All food businesses should document their basic requirements for food hygiene and food hygiene standards. It is important that all staff can refer to these authorised standards and procedures for guidance on what is expected. It is also important to be able to prove by written documentation that the entire business operates according to established principles for hygiene management.

Development of HACCP Plan

Development of HACCP Plan

1. Assemble and train the HACCP team

2. Describe the products or processes

3. Identify intended use

4. Construct a flow diagram

5. On-site confirmation of a flow diagram

6. Conduct a hazard analysis

7. Determine the critical control points

8. Establish critical limits for each CCP

9. Monitoring of control measures at each CCP

10. Establish corrective actions

11. Establish verification procedures

12. Establish documentation and record keeping

The application of HACCP system involves 12 steps. These steps can be divided into 2 sections, the first five steps are the preliminary steps and next seven are based on the seven principles of HACCP.

Preliminary steps

1) Assemble and train the HACCP team

The team should be aware of all hazards and controls associated with the production of food. But in small scale businesses, one person may be the only team member.

2) Describe the products or processes

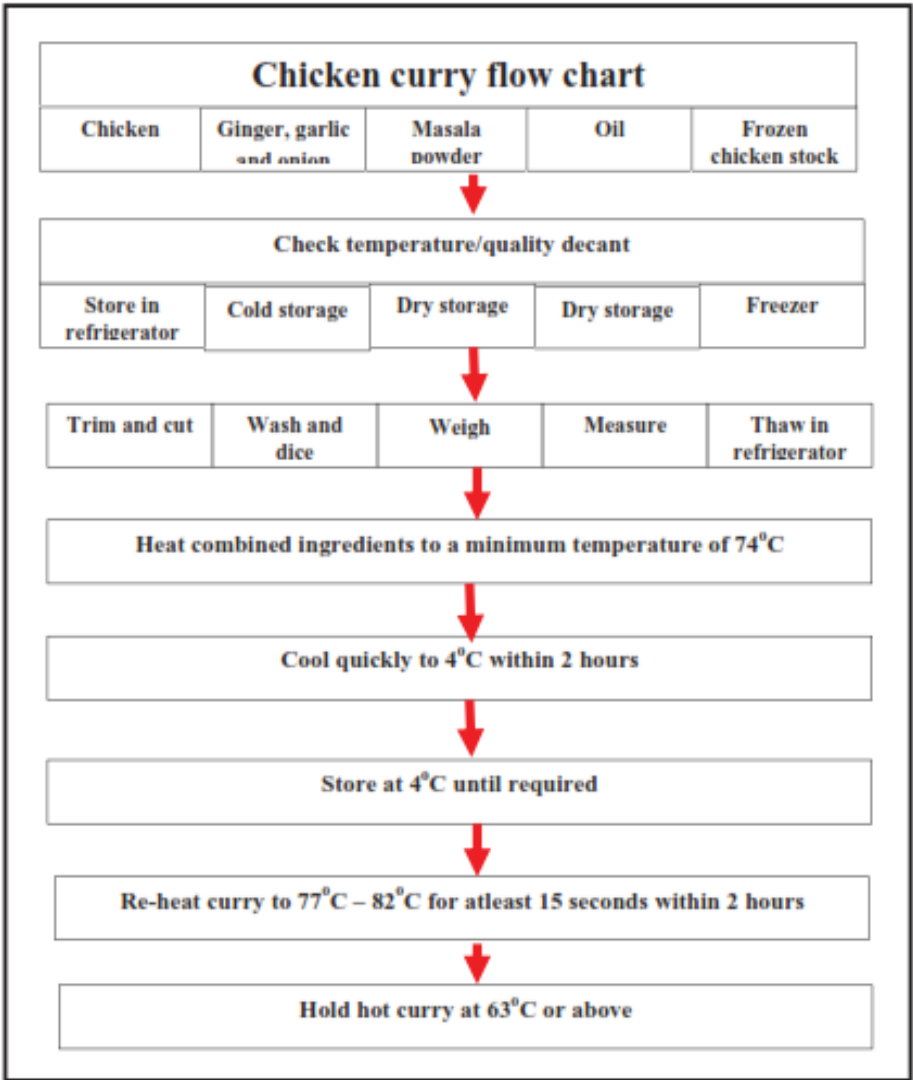
A detailed description of each product is required where multiple products are involved it may be effective to group products with similar characteristics or processing steps for the purpose of developing the HACCP plan. The description should include the major raw materials, food ingredients, preservation and packing materials and their impact on food safety.

3) Identify intended use

It is important to identify the intended use of the product, including the intended consumer target group. Is the food intended for the general public; is the food intended for consumption by population susceptible for illness (immunocompromised persons, pregnant women, children or elderly). The intended user may be another processor, who will further process the product. For example intended use may be specified as being for 'fast food' restaurant.

4) Construct a flow diagram

The next step is to develop a systematic flow diagram of the process for which the HACCP plan will be applied. An example for preparation of chicken curry is given.



It will be a systematic diagram showing individual activities in a stepwise manner as well as the interaction of the different activities for the steps involved with a particular food, example from the purchase of raw material to the consumer.

5) **On-site confirmation of a flow diagram**

This can be done by observing the flow diagram in the process area and noticing if any changes are needed. This can be done by going to the process area and comparing the document diagram with the actual process activities noting any changes necessary. This is important to add credibility and accuracy to the process.

Steps based on HACCP principles

6) **Conduct a hazard analysis (Principle 1)**

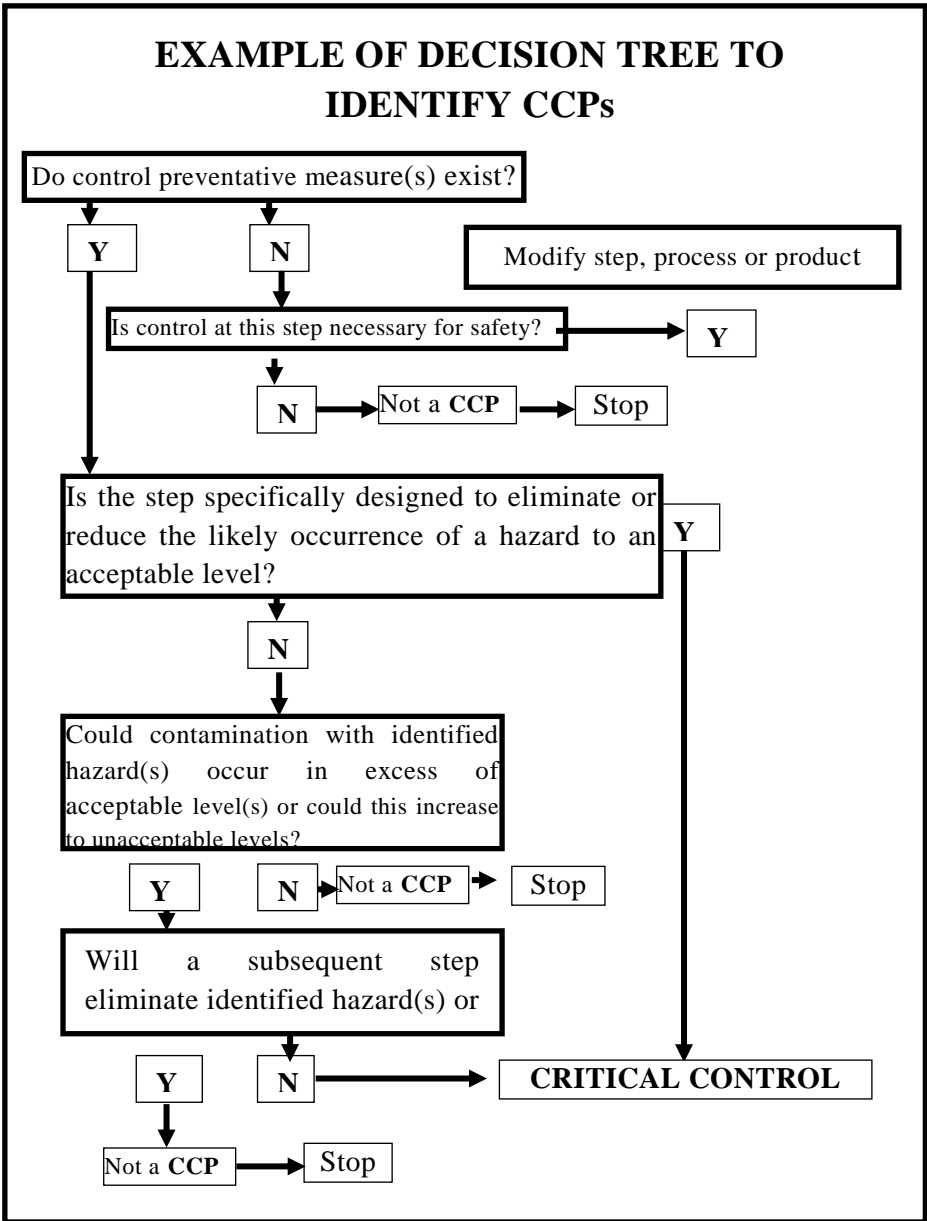
Essentially HACCP is concerned with identifying all the potential hazards associated with a food product and its manufacturing process.

Hazards may be a biological, physical or chemical agent that may cause a food to be unsafe for human consumption. Hazards may be introduced with purchased raw materials, ingredients and cooking, or they may arise throughout the storage and serving processes, or as the result of loss of control of part of the process. For example, a refrigerated product might accidentally be allowed to warm up and microorganisms may then grow.

7) **Determine the critical control points (Principle 2)**

When the hazards have been identified a decision is made as to where in the process each hazard can be controlled. The points or sections of the process at which hazards are controlled are known as **Critical Control Points (CCPs)**, hence the Hazard Analysis Critical Control Point system. It may be that hazards can be eliminated at CCPs, but in some instances they can only be reduced to an acceptable level.

EXAMPLE OF DECISION TREE TO IDENTIFY CCPs



8) Establish critical limits for each CCP (Principle 3)

Critical limits are values which are set for control measures (at each CCP) to ensure that the food is safe. The critical limits include time, temperature, size, weight and appearance.

9) Monitoring of control measures at each CCP (Principle 4)

The monitoring systems should state:

WHAT the critical limits are;

HOW monitoring should be undertaken;

WHERE the monitoring should be undertaken;

WHEN the monitoring should be undertaken and

WHO is responsible for it?

10) Establish corrective actions (Principle 5)

Corrective actions should be taken when a critical limit is breached. Manufacturers, wholesalers and retailers should ensure that all products are clearly labelled and traceable in the event of a recall being necessary.

11) Establish verification procedures (Principle 6)

The commonly used procedures for verification include

- HACCP audits
- review of CCP monitoring records;
- product testing, both chemical and microbiological testing; and
- assessment of deviations, including product disposition and customer complaints

Activity	Frequency
Review certification records	Annual certification
Verify flow charts	During annual internal audits
Review hazards	After changes or annually
Review customer complaints and rejections	After changes or annually
Validate critical limits	Once per year
Review staff training	Induction of new staff or once a year

12) Establish documentation and record keeping (Principle 7)

Documents and record keeping processes that are appropriate to these principles and their application should be launched.

Benefits of HACCP

Many varied benefits of HACCP have been described, including:

- Better understanding of the processes and rationale for food safety controls;
- Personnel understand their roles better and are better trained;
- Provides a systematic approach;
- Control is tightened up, which may also lead to quality benefits;
- Proactive strategy means that controls are built in to prevent problems and these continuously managed;
- Real-time monitoring so problems are quickly identified and actioned straight away; and
- Cost effective by targeting resource to the essential areas.

HACCP for Catering:

Introduction

The first steps in applying HACCP to catering operations is to group the different foods prepared into a number of common processes.

This allows the core processes to be identified and process flow diagrams to be prepared. One of the first steps in applying HACCP to catering operations is to group the different foods prepared into common processes.

The different food categories in catering are:

1. High risk food prepared and served hot
2. Perishable raw food, cooked and served or held hot and served
3. High risk food reheated and served or held hot and served
4. Frozen high risk food, served cold or reheated and served or held hot and served.
5. Low risk food, cooked and served hot or held hot and served or cooled and served cold.
6. Frozen raw food, cooked and served or held hot and served or cooled and served cold.
7. Perishable raw food, cooked, cooled and served cold or reheated and served or held hot or served.

Source and review hazard data

Food safety hazards, which may occur in the catering kitchen, should be identified. The following is a summary of the potential hazards, which may occur in the catering environment.

Biological hazards

The biological hazards are primarily bacterial pathogens but viruses and parasites should also be considered. Bacterial pathogens including *Salmonella*, *Campylobacter*, *Listeria monocytogenes*, *Staphylococcus aureus* and *Escherichia coli* are present in the catering kitchen environment and have been isolated in ready-to-eat foods.

Chemical hazards

Chemical residues may occur in food and in the food service environment. Residues present in food ingredients cannot be removed at this stage in the food chain and their control is reliant on the implementation of suitable chemical residue control programmes at the primary and / or processing stages prior to delivery. Management should seek written assurance from their suppliers that the use of chemicals in meat, fruit and vegetable production was in compliance with the regulations. Every establishment should be aware of the potential presence of allergens in ingredients and these should be stored, prepared and displayed in a separate area so as to prevent cross contamination. Customers should be informed of the potential presence, trace or otherwise, of these substances.

Physical hazards

Most complaints in restaurants relate to physical hazards. Foreign objects in food, such as metal, glass, plastics, knife blades, hairs, etc. are all examples of physical hazards.

The reasons for modifying HACCP applied to catering:

- Smaller numbers of employers, lack of multidisciplinary team;
- Little scientific and technical expertise;
- Little knowledge of the ingredient characteristics;
- Large number of different suppliers;
- Lack of auditing skills;
- Increased potential of cross contamination;
- Large numbers of frequently changing menu items;
- Language, literacy troubles and high staff turnover; and
- No linear product flow

Potential Critical Control Points

The potential critical control points (CCPs) in the catering kitchen including critical limits, monitoring and corrective actions.

CCPs	Critical Limit	Monitoring	Corrective Action
Chilling	Food should be placed in chilled storage within 90 minutes of cooking. less than 10°C within 150 minutes	time between cooking and chilling core temperature	discard the food investigate the cause and rectify accordingly
Chilled storage	-1°C to 5°C	check the core and surface temperature of the food in chilled storage at least twice per day (preferably at a busy time of the day)	rechill (if the surface temperature of the food has not reached 10°C or higher) discard the food (if the surface temperature of the food has reached 10°C or higher)
Frozen storage	at or less than -12°C	check the surface temperature of the food in the freezer at least once per day	place in chilled storage or use immediately (if the surface temperature of the food has not reached 10°C or higher) discard the food (if the surface temperature of the food has reached 10°C or

			higher) investigate the cause and rectify accordingly
Thawing	2°C to 5°C 24 hours or less time between thawing and cooking	core temperature time between thawing and cooking	continue thawing (if the core temperature is less than 2°C) discard the food (if the surface temperature of the food has reached 10°C or higher) investigate the cause and rectify accordingly
Cooking	70°C or higher for at least 2 minutes (core temperature) 75°C or higher (core temperature) the use of lower temperatures is permissible if validated & the food is consumed within 30	core temperature of each batch (this frequency may be reduced if data has been accumulated which demonstrates that cooking at a given oven / grill / other setting for a defined period of time	continue to cook until the critical limit is achieved discard the product investigate the cause and rectify accordingly

	minutes or held at 63°C or higher	consistently achieves the critical limits)	
Hot holding	63°C or higher	core temperature (of each batch) at least once per hour (this frequency may be reduced if data has been accumulated which demonstrates that the hot holding device at a particular setting achieves the critical limits)	increase the temperature of the hot holding device discard the food investigate the cause and rectify accordingly
Reheating food	70°C or above (core temperature) to be achieved immediately serve within 30 minutes or less	core temperature of each batch	increase the temperature until the critical limit is reached discard the food investigate the cause and rectify accordingly

Section 12: HIGH RISK FOODS & STORAGE OF FOOD

This section helps to identify high risk foods and describes techniques of handling and storage of these foods.

Food categories include those of high level of public health risk and those that represent a low level of risk. Food handlers should recognize them so that necessary action can be taken to prevent illness.

LOW-RISK FOODS

Lowrisk foods are those that are rarely implicated in food poisoning and may be stored and suitably packaged, at ambient temperatures. They do not support multiplication of food poisoning bacteria.

Some examples include:

- Preserved food such as jam;
- Dried foods or food with little moisture, such as flour, rice bread or biscuits. But once liquid has been added to powdered food, such as milk, the food becomes high risk;
- Acid foods such as vinegar or products stored in vinegar;
- Fermented products;
- Foods with high fat/sugar content, such as chocolate; and
- Canned foods, whilst unopened.

HIGH RISK FOODS

High risk foods are ready to eat foods that under unfavourable conditions support the multiplication of pathogenic bacteria and are intended for consumption without further treatment that would destroy such organisms. Pathogenic bacteria are those that cause diseases, High risk foods are most likely to be involved in cases of food poisoning.

COMMON CHARACTERISTICS OF HIGH RISK FOODS:

- high in protein;
- high in moisture;
- not subject to further treatment which would destroy organisms, for example, by cooking - 'ready to eat foods';
- bacteria can grow on them easily;
- implicated in most cases of food poisoning, so these are the foods that require special care and strict temperature control.

MAIN CATEGORIES OF HIGH RISK FOODS:

According to the Food Safety and Standards Authority of India, the high risk foods in India include the following Cut fruits/ salads, fresh juices and beverages; Confectionary products; Meat, poultry and fish products; Milk and dairy products; Water based chutneys, sauces etc; Food transported to point of sale from point of cooking; Food with gravy; Fried foods; Post cooked mixing; and Thawing of frozen products. The special requirements and care to be taken with each of these foods is given below.

1. Cut fruits/ salads, fresh juices and beverages

Fruits and vegetables can be contaminated by pesticides or other environmental chemicals. Such hazards can be controlled by using proper agricultural practices and protecting growing crops from sources of environmental contamination. During cultivation, harvest

and storage, fruits and vegetables may become contaminated with pathogens from external sources such as water and soil. On intact fruits or vegetables, bacterial growth will be limited as the plant possesses natural antimicrobial barriers in the form of the skin, shell or rind which protect it from infection life. Thus, a cut fruit or vegetable increases the potential for growth of contaminants and the risk of transmission of food borne illnesses.

The practices that can be used to keep fresh cut fruits and vegetables and their juices safe are:

- They should be used immediately; however, if stored for short time it should be under refrigeration and should be kept in clean and properly covered vessels.
- Fruits and vegetables that are eaten without cooking should be washed thoroughly with clean water.
- The water used for juices and beverages, including that used for making ice, should be potable.
- Food or beverages should not be stored in the same container used to store the ice intended for consumption.
- Juice concentrates must be checked regularly for any fungal growth / change of colour, odour or gas formation in the bottle.
- Juice dispensing machines should be cleaned and rinsed with water regularly.
- Containers made of food grade material should be used for collecting juice.
- Clean and intact utensils/crockery & cutlery / disposables should be used for serving.

2. Confectionary products

The following good hygienic practices should be followed for confectionary products:

- Prepared confectionery products should be kept in airtight

- containers and displayed hygienically.
- The cream to be used in these products should be stored covered under refrigeration.
 - Finished products should be refrigerated with proper labels indicating date of expiry.
 - Products should be properly wrapped/ packaged after proper cooling.
 - Only permitted food additives (colour, preservatives, flavouring agents etc.) should be used.

3. Meat, poultry and fish products

Meat can be derived from a huge variety of birds, mammals and reptiles, though cattle, sheep, goats, pigs and poultry (chickens, ducks, turkeys) are the principal sources. In



many countries, meat is also the product that is most often associated with problems of microbiological food safety. These foods are particularly rich in the nutrients that bacteria need to grow. If kept under warm conditions even a small number of bacteria will become many millions in a short time. Raw food can pose a serious threat of food poisoning, if not heat treated or cooked thoroughly.

Fish, prawns, crabs and mussels may eat food that is contaminated or they may pick up food poisoning bacteria and viruses from polluted water. For example, fish could have been taken from sewage polluted waters. The risk to humans is greatest if seafood is eaten raw or undercooked. E.g.: fish could be contaminated with mercury.

The following are important dos and don'ts for meat, poultry and fish products:

- Non veg. products/raw materials should be purchased (chilled products temperature should be at 5°C or below and

frozen products at -18 °C or below) from authorized/licensed slaughter houses/vendors.

- Processing area should be cleaned and disinfected promptly.
- Preparation and processing of meat, poultry and marine products should be separate.
- Non-veg. products should be washed with potable water before use.
- Non-veg. products are cooked thoroughly (core temperature 75⁰ C) for at least 15 seconds or an effective time/temperature control e.g. 65 °C for 10 minutes, 70 °C for 2 minutes.
- Non-veg. products should be stored covered in refrigerator below the veg. products.
- Raw and cooked products should be stored physically separated with cooked products at the top.
- All refuse/waste should be promptly removed from preparation area.



4. Milk and dairy products

Milk, eggs and their products such as cream, khoa, cakes and infant milk powder are often involved in cases of food poisoning. Milk that is carefully drawn from the healthy animal will have very low levels of bacterial contaminants. But, in actual practice this milk quickly picks up microorganisms from the animal, its immediate environment, milk handlers and from equipment. Proper pasteurization and temperature control will destroy most of the contaminants except the heat-resistant spores such as those of *Bacillus cereus*. Inadequate pasteurization or environmental contamination of milk with *Salmonella* after pasteurization has also caused problems with dried milk and milk products. Thus, extremely high standards are required in the processing of milk.



Milk and dairy products can be kept safe through the use of the following practices:

- All equipments and utensils should be thoroughly washed and rinsed with potable water before starting of work and at the end.
- All mechanical equipments should be routinely cleaned, checked and maintained.
- All products should be routinely checked for spoilage/contamination and shelf life.
- Any spoiled/contaminated product should be promptly removed and discarded.
- Milk should be received in clean and hygienic conditions at temperature below 5° C.
- Milk and milk products should be used immediately or pasteurized and refrigerated.

5. Water based chutneys, sauces:

The following good hygiene practices should be used to keep chutneys, sauces and other items that are water based.

- All fruits/vegetables should be washed properly before processing.
- Clean and disinfected chopping boards/grinding stone/machine should be used.
- Personal hygiene of food handlers need to be ensured.
- Water used in the chutneys should be safe and potable.
- Only permitted food additives should be used, if required, and added in recommended quantities only.
- Spoiled products should be discarded immediately after confirmation of spoilage (change in colour/ texture/ odour).
- Sauces and chutneys should be stored in glass/food grade plastic containers with proper lids.
- Clean and intact containers should be used for storing sauces

and chutneys.

- Sauces and chutneys should be stored in refrigerator when not in use.
- Perishable/uncooked chutneys should be consumed immediately.

6. Food transported to point of sale from point of cooking

Food is cooked in one place and is transported to another as is commonly done for catering services during marriages and other functions, for mid-day meal schemes to schools etc, This may include many cooked items like biryanis, fried rice, curries,



Cooked rice

gravy based items, sweets etc. To give the example of how spoilage occurs, let us consider the rice based items. Bacterial spores can be found in dry rice. Once water is added to the rice during cooking the bacteria became active. Some of the bacteria may survive the cooking temperature. If, after cooking, the rice is not eaten immediately or not refrigerated; these particular bacteria will grow profusely and produce a toxin (poison) which may persist even if the rice is re-heated before being consumed.

The following should be practiced with such food:

- Food should be reheated up to 70°C before consumption.
- Food should be consumed within 4 hours of reheating.

7. Food with gravy

In the case of foods with gravy it is important that:

- Food products should not be stored at room temperature for more than 2 hours during display or sale.
- For prolonged storage, foods should be stored in refrigerators or kept for hot holding at or above 60 °C.
- No water should be added after cooking/reheating/boiling.

8. Fried Foods

The following good practices should be adopted in the case of fried foods:

- Proper quality / branded oils/fats should be used for food preparation, frying etc.
- Use packaged oil only.
- Use of oils with high trans fats (like vanaspati) should be avoided as far as possible.
- Re-heating and reuse of oil should be avoided as far as possible. Therefore, avoid having leftover oil wherever possible.

9. Post Cooked Mixing

When mixing ingredients after cooking, it is important to follow these practices:

- Ingredients added to the cooked food should be thoroughly washed/ cleaned.
- After cooking or post cooked mixing, the food should be used immediately.
- Garnishes etc., if added should be prepared using fresh, thoroughly washed and freshly cut vegetables and used immediately.

10. Thawing of Frozen Products

- Frozen products should be thawed in refrigerator/microwave/convection oven or under running potable water well before cooking.
- Only required portion of the food should be thawed at a time.
- Thawed products should be used immediately and not refrozen or kept in chillers.

DISTRIBUTION OF HIGH RISK FOOD

Vehicles used for distribution of high risk food must always be insulated and preferably refrigerated, even for short journeys. Insulation of the roof and floor is just as important as the insulation of the walls. Properly located thermometers should be fitted to all the vehicles.

DELIVERY AND UNLOADING OF RAW MATERIAL

- Effective documentation checking system should be in place for selecting suppliers and dealing with deliveries
- Deliveries should be accepted from approved suppliers
- All deliveries should be checked before storage
- The delivery vehicle should be clean and if necessary refrigerated
- All outer packaging should be in a good condition and not be discoloured or contaminated, example, from bird droppings
- The food should be labelled and date coded
- The food should have sufficient shelf life to enable it to be used.
- Chilled food is delivered below 5⁰C and frozen food at or below -18⁰C
- A satisfactory delivery should be transferred within 15 minutes of unloading
- Where the same conveyance or container is used for transportation high risk foods such as fish, meat, poultry, eggs etc., effective cleaning and disinfections should be carried out between loads to avoid the risk of cross-contamination.
- If food comes from an unapproved source, out of date food, damaged packaging or food with evidence of pests should be rejected

- The delivery area should be kept clean and staff should always be available to accept deliveries

STORAGE OF FOOD

RAW MEAT AND POULTRY

Raw meat joints should be stored between -1°C and $+1^{\circ}\text{C}$, with a relative humidity of 90%. They should not touch the wall surface and only approved suppliers should be used.

EGGS

Raw eggs are a source of *Salmonella*; it can be present both inside the egg and on the shell, especially if contaminated with chicken faeces. Manufacturers should store eggs at a constant temperature of 20°C . Fluctuations in temperature will result in condensation on the egg, leading to *Salmonella* being sucked into the egg from the surface. Stock rotation is necessary.

FRUITS AND VEGETABLES

Although different fruits and vegetables have their own optimal storage conditions, a general guide is to store cut or peeled fruits and vegetables under refrigeration. Usually dry stores are used to store fruits and vegetables. Fruit should be examined regularly and mouldy items are removed to prevent rapid mould spread.

A stock rotation system to ensure that older products are used first must be implemented. Vigorous washing, turbulence and brushing will all help to reduce the levels of bacteria as well as remove soil, dust, insects and chemicals.

MILK AND CREAM

They need to be stored under refrigeration (below 5°C) and should be placed in it or in a cold store as soon as they are received. Milk crates should not be stored below raw meat

ICE CREAM

Ice creams need to be stored in a clean, dedicated freezer. They should be kept away from raw products. It should be discarded if ice cream has defrosted. Defrosted ice cream is a hazard, because at high temperatures it provides ideal conditions for Salmonella growth.

FLOUR AND CEREALS

They need to be stored in stainless steel containers with tight fitting lids. Large stocks of flour kept in original sacks must be stored clear of the ground and free from damp. Condensation can result on mould growth on wet flour.

STAFF RESPONSIBILITIES

Staff should be given clear instructions on how to use refrigerators. They should open doors for as little, and for as short a time, as possible. The temperature of the refrigerator should be checked regularly. Spillages should be cleared up immediately.

UNFIT FOOD OR DAMAGED STOCK

All damaged stock should be thoroughly examined and segregated before use. The suspect food should be clearly marked as 'unfit' or 'not to be sold'. A dustbin should be designated for this purpose.

Food with damaged packaging should not be used for food processing or offered for sale. Damaged food can expose food to physical or microbiological contamination.

Section 13: SUPERVISION OF STAFF

This section describes the role of the supervisor to monitor and supervise the staff to ensure they comply with food safety.

WHAT IS SUPERVISION?

Supervision refers to the activity carried out by supervisors to oversee the productivity and progress of employees who report directly to them. Supervision is a management activity and supervisors have a management role in the organization. Supervisors and managers are responsible and accountable for food safety in the establishment. They have a primary responsibility for food safety and hygiene training in a food establishment. The role often involves training employees in their tasks and providing continuous supervision.

Supervisors cannot train or monitor food safety and hygiene unless they are familiar in these matters. Thus, it is important for supervisors themselves to be trained and to understand how to prevent foodborne disease outbreaks.

RESPONSIBILITIES OF A SUPERVISOR:

The responsibility of a supervisor is:

1. training of the food handler;
2. ensuring certain tasks are completed;
3. monitoring activities related to food hygiene;
4. communicating and clarifying food safety priorities, and expectations;
5. establishing and communicating food hygiene performance standards and
6. providing food safety training and constructive feedback in timely manner.

PERFORMANCE PROBLEMS

The reasons why employees don't perform well are the following:

- Lack of food hygiene skills;
- Lack of food safety and food hygiene information;
- Personal Issues; and
- Food safety environmental issues.

IMPROVING STAFF PERFORMANCE

These steps can be taken to improve staff performance:

- Identify the performance problems.
- Deal with these problems. Begin by talking with the relevant staff.
- Manage the conflict. The ultimate goal is to come up with "win-win" situation
- Address staff motivation.
- Provide effective feedback.

MONITORING

Monitoring is the process of routinely gathering information on all aspects of the job.

Monitoring provides managers with information needed to:

- Analyze current situation
- Identify problems and find solutions
- Discover trends and patterns
- Keep project activities on schedule
- Measure progress towards objectives and formulate/revise future goals and objectives
- Make decisions about human, financial, and material resources

Monitoring is continuous. Monitoring activities should be scheduled on the project work plan. The first level of monitoring is done by staff. Supervisors are responsible for monitoring the staff and tasks under them, and the manager is responsible for monitoring all aspects of the work place.

Monitoring can be carried out through field visits, review of service delivery and commodities records.

USE A SUPERVISORY CHECKLIST:

- It's a means to ensure a systematic approach to supervision by reminding the supervisors to focus on the knowledge, skill, major activities, plans and performance of the worker
- No checklist format ideal for all situations. It has to be developed to suit his/her specific needs
- It should have two essential parts:
 1. List of activities and skills to be supervised.
 2. Space for the supervisor to make notes on his observations, assessment, recommendations, or actions taken.

Section 14: FOOD HYGIENE AND THE LAW

This section describes the Food safety and Standards Act, 2006.

Every country has its own food laws which supervisors in Food establishments need to understand as they relate to their work and themselves. In India, a new era in Food safety began with the Food Safety and Standards (FSS) Act, 2006 which became operational from August 5th, 2011 throughout the country. (More information on this act is available from the Food Safety & Standards Authority of India website <http://fssai.gov.in>).

THE FOOD SAFETY AND STANDARDS ACT, 2006

The FSS Act consolidates the earlier laws relating to food. As part of the process of consolidation, the eight earlier food laws in the country have been repealed since this Act came into being on August 5th, 2011. It moves from a multi-departmental and multi-level control to a single reference point for all food safety and standards related matters. It lays more emphasis on science based and participatory decisions in both standard setting and implementation. The Act enables unidirectional compliance and addresses the need for a single regulatory body.

The Food Safety and Standards Authority of India

To this effect, the Act establishes an independent statutory Authority – the Food Safety and Standards Authority of India (FSSAI) with head office at Delhi. FSSAI and the State Food Safety Authorities enforce various provisions of the FSS Act. The Ministry of Health & Family Welfare, Government of India is the Administrative Ministry for the implementation of FSSAI.

The Act aims to achieve an appropriate level of protection of human life and health and the protection of consumer's interests, including

fair practices in all kinds of food trade with reference to food safety standards and practices. Food business operators should thus ensure that the articles of food satisfy the requirements of this Act, at all stages of production, processing, import, distribution and sale within their business.

This section describes relevant points of the Act that are related to food hygiene.

RESPONSIBILITIES OF FOOD BUSINESS OPERATOR

1. Every food business operator shall ensure that the articles of food satisfy the requirements of this Act and the rules and regulations made thereunder at all stages of production, processing, import, distribution and sale within the businesses under his control.
2. No food business operator shall himself or by any person on his behalf manufacture, store, sell or distribute any article of food –
 - which is unsafe; or
 - which is misbranded or sub-standard or contains extraneous matter; or
 - for which a license is required, except in accordance with the conditions of the license; or
 - which is for the time being prohibited by the Food Authority or the Central Government or the State Government in the interest of public health; or
 - in contravention of any other provision of this Act or of any rule or regulation made thereunder.
3. No food business operator shall employ any person who is suffering from infectious, contagious or loathsome disease.

4. No food business operator shall sell or offer for sale any article of food to any vendor unless he also gives a guarantee in writing in the form specified by regulations about the nature and quality of such article to the vendor:

Provided that a bill, cash memo, or invoice in respect of the sale of any article of food given by a food business operator to the vendor shall be deemed to be a guarantee under this section, even if a guarantee in the specified form is not included in the bill, cash memo or invoice.

5. Where any food which is unsafe is part of a batch, lot or consignment of food of the same class or description, it shall be presumed that all the food in that batch, lot or consignment is also unsafe, unless following a detailed assessment within a specified time, it is found that there is no evidence that the rest of the batch, lot or consignment is unsafe:

Provided that any conformity of a food with specific provisions applicable to that food shall be without prejudice to the competent authorities taking appropriate measures to impose restrictions on that food being placed on the market or to require its withdrawal from the market for the reasons to be recorded in writing where such authorities suspect that, despite the conformity, the food is unsafe.

LIABILITY OF THE MANUFACTURERS, PACKERS, WHOLESALERS, DISTRIBUTORS AND SELLERS

1. The manufacturer or packer of an article of food shall be liable for such article of food if it does not meet the requirements of this Act and the rules and regulations made thereunder.

2. The wholesaler or distributor shall be liable under this Act for any article of food which is–
 - Supplied after the date of its expiry; or
 - Stored or supplied in violation of the safety instructions of the manufacturer; or
 - Unsafe or misbranded; or
 - Unidentifiable of manufacturer from whom the article of food have been received; or
 - Stored or handled or kept in violation of the provisions of this Act, the rules and regulations made thereunder; or
 - Received by him with knowledge of being unsafe.

3. The seller shall be liable under this Act for any article of food which is –
 - sold after the date of its expiry; or
 - handled or kept in unhygienic conditions; or
 - misbranded; or
 - unidentifiable of the manufacturer or the distributors from whom such articles of food were received; or
 - Received by him with knowledge of being unsafe.

FOOD RECALL PROCEDURES

1. If a food business operator considers or has reasons to believe that a food which he has processed, manufactured or distributed is not in compliance with this Act, or the rules or regulations, made thereunder, he shall immediately initiate procedures to withdraw the food in question from the market and consumers indicating reasons for its withdrawal and inform the competent authorities thereof.
2. A food business operator shall immediately inform the competent authorities and co-operate with them, if he considers

- or has reasons to believe that a food which he has placed on the market may be unsafe for the consumers.
3. The food business operator shall inform the competent authorities of the action taken to prevent risks to the consumer and shall not prevent or discourage any person from cooperating, in accordance with this Act, with the competent authorities, where this may
 4. Prevent, reduce or eliminate a risk arising from a food.
 5. Every food business operator shall follow such conditions and guidelines relating to food recall procedures as the Food Authority may specify by regulations.

ENFORCEMENT OF THE ACT

AUTHORITIES RESPONSIBLE FOR ENFORCEMENT OF ACT

1. The Food Authority and the State Food Safety Authorities shall be responsible for the enforcement of this Act.
2. The Food Authority and the State Food Safety Authorities shall monitor and verify that the relevant requirements of law are fulfilled by food business operators at all stages of food business.
3. The authorities shall maintain a system of control and other activities as appropriate to the circumstances, including public communication on food safety and risk, food safety surveillance and other monitoring activities covering all stages of food business.
4. The Food Safety Officers shall enforce and execute within their area the provisions of this Act with respect to which the duty is not imposed expressly or by necessary implication on some other authority.
5. The regulations under this Act shall specify which of the Food Safety Officers are to enforce and execute them, either generally or in relation to cases of a particular description or a particular

area, and any such regulations or orders may provide for the giving of assistance and information by any authority concerned in the administration of the regulations or orders, or of any provisions of this Act, to any other authority so concerned, for the purposes of their respective duties under them.

6. The Commissioner of Food Safety and Designated Officer shall exercise the same powers as are conferred on the Food Safety Officer and follow the same procedure specified in this Act.

LICENSING AND REGISTRATION OF FOOD BUSINESS

1. No person shall commence or carry on any food business except under a licence.
2. Nothing contained in sub-section 1. shall apply to a petty manufacturer who himself manufactures or sells any article of food or a petty retailer, hawker, itinerant vendor or a temporary stall holder or small scale or cottage or such other industries relating to food business or tiny food business operator; but they shall register themselves with such authority and in such manner as may be specified by regulations, without prejudice to the availability of safe and wholesome food for human consumption or affecting the interests of the consumers.
3. Any person desirous to commence or carry on any food business shall make an application for grant of a licence to the Designated Officer in such manner containing such particulars and fees as may be specified by regulations.
4. The Designated Officer on receipt of an application under sub-section (3), may either grant the licence or after giving the applicant an opportunity of being heard and for reasons to be recorded in writing, refuse to grant a licence to any applicant, if he is satisfied that it is necessary so to do in the interest of public health and shall make available to the applicant a copy of the order:

Provided that if a licence is not issued within two months from the date of making the application or his application is not rejected, the applicant may start his food business after expiry of the said period and in such a case, the Designated Officer shall not refuse to issue a licence but may, if he considers necessary, issue an improvement notice, under section 32 and follow procedures in that regard.

5. Every licence shall be in such form and subject to such conditions as may be specified by regulations.
6. A single licence may be issued by the Designated Officer for one or more articles of food and also for different establishments or premises in the same area.
7. If the articles of food are manufactured, stored, sold or exhibited for sale at different premises situated in more than one area, separate applications shall be made and separate licence shall be issued in respect of such premises not falling within the same area.
8. An appeal against the order of rejection for the grant of licence shall lie to the Commissioner of Food Safety.
9. A licence unless suspended or cancelled earlier shall be in force for such period as may be specified by regulations: Provided that if an application for a renewal of licence is made before the expiry of the period of validity of the licence, the licence shall continue to be in force until orders are passed on the application.
10. The licence shall subsist for the benefit of the deceased's personal representative or any other member of his family, until the expiry of –
 - (a) the period of three months beginning with his death; or
 - (b) such longer period as the Designated Officer may allow.

OFFENCES AND PENALTIES

GENERAL PROVISIONS RELATING TO OFFENCES

1. A person may render any article of food injurious to health by means of one or more of the following operations, namely:-
 - a. adding any article or substance to the food;
 - b. using any article or substance as an ingredient in the preparation of the food;
 - c. abstracting any constituents from the food; or
 - d. subjecting the food to any other process or treatment, with the knowledge that it may be sold or offered for sale or distributed for human consumption.
2. In determining whether any food is unsafe or injurious to health, regard shall be to –
 - a.
 - (i) the normal conditions of use of the food by the consumer and its handling at each stage of production, processing and distribution;
 - (ii) the information provided to the consumer, including information on the label, or other information generally available to the consumer concerning the avoidance of specific adverse health effects from a particular food or category of foods not only to the probable, immediate or short-term or long-term effects of that food on the health of a person consuming it, but also on subsequent generations;
 - (iii) to the probable cumulative toxic effects;
 - (iv) to the particular health sensitivities of a specific category of consumers where the food is intended for that category of consumers; and
 - (v) also to the probable cumulative effect of food of substantially the same composition on the health of a person consuming it in ordinary quantities;

- b. the fact where the quality or purity of the article, being primary food, has fallen below the specified standard or its constituents are present in quantities not within the specified limits of variability, in either case, solely due to natural causes and beyond the control of human agency, then such article shall not be deemed to be unsafe or sub-standard or food containing extraneous matter.

Explanation – For the purposes of this section, “injury”, includes any impairment, whether permanent or temporary, and “Injurious to health” shall be construed accordingly.

GENERAL PROVISIONS RELATING TO PENALTY

While adjudging the quantum of penalty under this Chapter, the Adjudicating Officer or the Tribunal, as the case may be, shall have due regard to the following:-

- (i) The amount of gain or unfair advantage, wherever quantifiable, made as a result of the contravention,
- (ii) The Amount of loss caused or likely to cause to any person as a result of the contravention,
- (iii) The repetitive nature of the contravention,
- (iv) Whether the contravention is without his knowledge, and
- (v) Any other relevant factor,

PENALTY FOR SELLING FOOD NOT OF THE NATURE OR SUBSTANCE OR QUALITY DEMANDED

Any person who sells to the purchaser’s prejudice any food which is not in compliance with the provisions of this Act or the regulations made thereunder, or of the nature or substance or quality demanded by the purchaser, shall be liable to a penalty not exceeding five lakh rupees.

Provided that the persons covered under sub-section (2) of section 31, shall for such non-compliance be liable to a penalty not exceeding twenty five thousand rupees.

PENALTY FOR SUB-STANDARD FOOD

Any person who whether by himself or by any other person on his behalf manufactures for sale or stores or sells or distributes or imports any article of food for human consumption which is sub-standard, shall be liable to a penalty which may extend to five lakh rupees.

PENALTY FOR MISBRANDED FOOD

- (i) Any person who whether by himself or by any other person on his behalf manufactures for sale or stores or sells or distributes or imports any article of food for human consumption which is misbranded, shall be liable to a penalty which may extend to three lakh rupees.
- (ii) The Adjudicating Officer may issue a direction to the person found guilty of an offence under this section, for taking corrective action to rectify the mistake or such article of food shall be destroyed.

PENALTY FOR MISLEADING ADVERTISEMENT

1. Any person who publishes, or is a party to the publication of an advertisement, which—
 - (a) Falsely describes any food; or
 - (b) is likely to mislead as to the nature or substance or quality of any food or gives false guarantee, shall be liable to a penalty which may extend to ten lakh rupees.
2. In any proceeding the fact that a label or advertisement relating to any article of food in respect of which the contravention is alleged to have been committed contained an accurate statement

of the composition of the food shall not preclude the court from finding that the contravention was committed.

PENALTY FOR FOOD CONTAINING EXTRANEOUS MATTER

Any person whether by himself or by any other person on his behalf manufactures for sale or stores or sells or distributes or imports any article of food for human consumption containing extraneous matter, shall be liable to a penalty which may extend to one lakh rupees.

PENALTY FOR FAILURE TO COMPLY WITH THE DIRECTIONS OF FOOD SAFETY OFFICER

If a food business operator or importer without reasonable ground, fails to comply with the requirements of this Act or the rules or regulations or orders issued thereunder, as directed by the Food Safety Officer, he shall be liable to a penalty which may extend to two lakh rupees.

PENALTY FOR UNHYGIENIC OR UNSANITARY PROCESSING OR MANUFACTURING OF FOOD

Any person who, whether by himself or by any other person on his behalf, manufactures or processes any article of food for human consumption under unhygienic or unsanitary conditions, shall be liable to a penalty which may extend to one lakh rupees.

PENALTY FOR POSSESSING ADULTERANT

(1) Subject to the provisions of this chapter, if any person who whether by himself or by any other person on his behalf, imports or manufactures for sale, or stores, sells or distribute any adulterant shall be liable –

- (i) where such adulterant is not injurious to health, to a penalty not exceeding two lakh rupees;
- (ii) where such adulterant is injurious to health, to a penalty not exceeding ten lakh rupees.

(2) In a proceeding under sub-section (1), it shall not be a defense that the accused was holding such adulterant on behalf of any other person.

PENALTY FOR CONTRAVENTIONS FOR WHICH NO SPECIFIC PENALTY IS PROVIDED

Whoever contravenes any provisions of this Act or the rules or regulations made thereunder, for the contravention of which no penalty has been separately provided in this Chapter, shall be liable to a penalty which may extend to two lakh rupees.

PUNISHMENT FOR UNSAFE FOOD

Any person who, whether by himself or by any other person on his behalf, manufactures for sale or stores or sells or distributes or imports any article of food for human consumption which is unsafe, shall be punishable,—

(i) where such failure or contravention does not result in injury, with imprisonment for a term which may extend to six months and also with fine which may extend to one lakh rupees;

(ii) where such failure or contravention results in a non-grievous injury, with imprisonment for a term which may extend to one year and also with fine which may extend to three lakh rupees;

(iii) where such failure or contravention results in a grievous injury, with imprisonment for a term which may extend to six years and also with fine which may extend to five lakh rupees;

(iv) where such failure or contravention results in death, with imprisonment for a term which shall not be less than seven years but which may extend to imprisonment for life and also with fine which shall not be less than ten lakh Rupees.

PUNISHMENT FOR INTERFERING WITH SEIZED ITEMS

If a person without the permission of the Food Safety Officer, retains, removes or tampers with any food, vehicle, equipment, package or labelling or advertising material or other thing that has

been seized under this Act, he shall be punishable with imprisonment for a term which may extend to six months and also with fine which may extend to two lakh rupees.

PUNISHMENT FOR FALSE INFORMATION

If a person, in connection with a requirement or direction under this Act, provides any information or produces any document that the person knows is false or misleading, he shall be punishable with imprisonment for a term which may extend to three months and also with fine which may extend to two lakh rupees.

PUNISHMENT FOR OBSTRUCTING OR IMPERSONATING A FOOD SAFETY OFFICER

If a person without reasonable excuse, resists, obstructs, or attempts to obstruct, impersonate, threaten, intimidate or assault a Food Safety Officer in exercising his functions under this Act, he shall be punishable with imprisonment for a term which may extend to three months and also with fine which may extend to one lakh rupees.

PUNISHMENT FOR CARRYING OUT A BUSINESS WITHOUT LICENSE

If any person or food business operator (except the persons exempted from licensing under sub-section (2) of section 31 of this Act), himself or by any person on his behalf who is required to obtain license, manufacturers, sells, stores or distributes or imports any article of food without license, shall be punishable with imprisonment for a term which may extend to six months and also with a fine which may extend to five lakh rupees.

PUNISHMENT FOR SUBSEQUENT OFFENCES

(1) If any person, after having been previously convicted of an offence punishable under this Act subsequently commits and is convicted of the same offence, he shall be liable to -

- (i) twice the punishment, which might have been imposed on a first conviction, subject to the punishment being maximum provided for the same offence;
 - (ii) a further fine on daily basis which may extend up to one lakh rupees, where the offence is a continuing one; and
 - (iii) his license shall be cancelled.
- (2) The Court may also cause the offender's name and place of residence, the offence and the penalty imposed to be published at the offender's expense in such newspapers or in such other manner as the court may direct and the expenses of such publication shall be deemed to be part of the cost attending the conviction and shall be recoverable in the same manner as a fine.

COMPENSATION IN CASE INJURY OF DEATH OF CONSUMER

- 1) Without prejudice to the other provisions of this Chapter, if any person whether by himself or by any other person on his behalf, manufactures or distributes or sells or imports any article of food causing injury to the consumer or his death, it shall be lawful for the Adjudicating Officer or as the case may be, the court to direct him to pay compensation to the victim or the legal representative of the victim, a sum—
- (a) not less than five lakh rupees in case of death;
 - (b) not exceeding three lakh rupees in case of grievous injury; and
 - (c) not exceeding one lakh rupees, in all other cases of injury:
 - a) Provided that the compensation shall be paid at the earliest and in no case later than six months from the date of occurrence of the incident:
 - b) Provided further that in case of death, an interim relief shall be paid to the next of the kin within thirty days of the incident:

(2) Where any person is held guilty of an offence leading to grievous injury or death, the Adjudicating Officer or the court may cause the name and place of residence of the person held guilty, the offence and the penalty imposed to be published at the offender's expense in such newspapers or in such other manner as the Adjudicating Officer or the court may direct and the expenses of such publication shall be deemed to be part of the cost attending the conviction and shall be recoverable in the same manner as a fine.

(3) The Adjudicating Officer or the court may also,—

(a) Order for cancellation of licence, re-call of food from market, forfeiture of establishment and property in case of grievous injury or death of consumer;

(b) Issue prohibition orders in other cases.

OFFENCES BY COMPANIES

(1) Where an offence under this Act which has been committed by a company, every person who at the time the offence was committed was in charge of, and was responsible to, the company for the conduct of the business of the company, as well as the company, shall be deemed to be guilty of the offence and shall be liable to be proceeded against and punished accordingly:

Provided that where a company has different establishments or branches or different units in any establishment or branch, the concerned Head or the person in-charge of such establishment, branch, unit nominated by the company as responsible for food safety shall be liable for contravention in respect of such establishment, branch or unit:

Provided further that nothing contained in this sub-section shall render any such person liable to any punishment provided in this Act, if he proves that the offence was committed without his knowledge or that he exercised all due diligence to prevent the commission of such offence.

(2) Notwithstanding anything contained in sub-section (1), where an offence under this Act has been committed by a company and it is proved that the offence has been committed with the consent or connivance of or is attributable to any neglect on the part of, any director, manager, secretary or other officer of the company, such director, manager, secretary or other officer shall also be deemed to be guilty of that offence and shall be liable to be proceeded against and punished accordingly. Explanation.—For the purpose of this section,—

(a) “Company” means anybody corporate and includes a firm or other association of individuals; and

(b) “Director” in relation to a firm, means a partner in the firm.

PENALTY FOR CONTRAVENTION OF PROVISIONS OF THIS ACT IN CASE OF IMPORT OF ARTICLES OF FOOD TO BE IN ADDITION TO PENALTIES PROVIDED UNDER ANY OTHER ACT

(1) Any person who imports any article of food which is in contravention of the provisions of this Act, rules and regulations made there under, shall, in addition to any penalty to which he may be liable under the provisions of the Foreign Trade (Development and Regulation) Act, 1992 (22 of 1992) and the Customs Act, 1962 (52 of 1962) be also liable under this Act and shall be proceeded against accordingly.

(2) Any such article of food shall be destroyed or returned to the importer, if permitted by the competent authority under the Foreign Trade (Development and Regulation) Act, 1992 (22 of 1992) or the Customs Act, 1962 (52 of 1962), or any other Act, as the case may be.

APPENDIX

BACTERIA AND OXYGEN

To grow, some bacteria require the presence of oxygen: these are classified as “aerobic”. Others that will not grow if oxygen is present are classified as “anaerobic”. There are also bacteria that can tolerate either condition.

Sometimes it is possible to deny bacteria the environment they favour. For example, the risk from aerobic- type bacteria can be reduced by vacuum packaging, i.e. the air is extracted from the wrapper containing the food.

BACTERIA AND ACIDS

Bacteria do not like acid and if enough is present in food they will not grow. The extent to which foods are acidic is measured on the “pH” scale.

A measurement of pH 7.0 denotes that a food is “neutral”. Bacteria grow best in neutral foods.

Measurements lower than pH 7.0 indicate that acid is present; the lower the figure, the more acid there is in the food. Foods measuring pH 3.7 or lower are known as “high acid” foods. Bacteria do not find such foods suitable for their growth.

Chicken (pH 6.3) is an example of a neat neutral food; grapefruit (pH 3.0) exemplifies the high acid foods that provide little scope for bacteria to grow.

Few foods are alkaline, i.e., have pHs above 7.0.

HYGIENE RULES

‘WHAT SHOULD I DO?’

WASH YOUR HANDS

- Before entering the food area
- After using the toilet
- Between handling raw meat/ poultry/ fish/seafood/ eggs
- Before and after touching food
- After coughing into your hands or using a handkerchief
- After touching your face or hair
- After carrying out any cleaning or handling rubbish



‘WHY SHOULD I DO IT?’

To stop bacteria from spreading and contaminating food.

Avoid touching your nose or coughing or sneezing over food



Many of us carry *bacteria* in our nose and throats which can cause illness. Don't add your own bacteria to food

Try not to touch food with your hands. Whenever possible use clean tongs to handle food and plates or trays to carry it



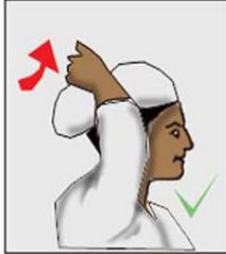
The less your hands are in direct contact with food, the less chance there is of contamination occurring

Avoid touching those parts of dishes or cutlery that come into direct contact with food



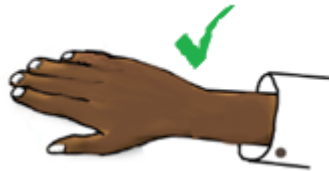
Bacteria on your hands may be transferred to food via the dish or cutlery

Keep your hair covered with a net or hat and do not comb your hair in a food area



Your hair and scalp carry many bacteria that can fall into food

Keep finger-nails short and clean and do not wear nail polish



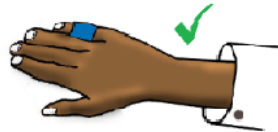
Bacteria can collect beneath long nails and get into the food you handle. Nail polish can come off in the food

Do not wear jewellery (watches, bangles, earrings and rings with stones).



Bacteria can collect on items of jewellery or stones or metal may fall into the food. Hand/wrist washing is more thorough if you do not wear a watch or bangles.

Keep cuts, grazes and boils covered with a waterproof bandage



Wounds such as these are often infected with bacteria. They must be properly covered to prevent the spread of bacteria.

Inform your supervisor if you have:

- A stomach upset
- Cough, cold or eye or ear discharges
- A sore or a wound (even if it is covered by a waterproof dressing)
- Family or close friends have diarrhoea



If you are suffering from any of these conditions you may contaminate food

Wear clean protective over-clothing



Your own clothing may carry bacteria

Do not smoke or eat in a food area



Bringing cigarettes or food to your mouth contaminates your hands. This spreads to food. Also, cigarette ash may fall into food

Keep raw and cooked ready-to-eat foods separate, especially raw meat/poultry and cooked meat/poultry



Raw foods can spread bacteria to other foods that will be eaten without further cooking. Keep raw and cooked ready-to-eat foods apart when handling and storing them

Keep food at the correct temperature during storage and preparation.



Ready-to-eat foods (e.g. meat, poultry, gravy etc.) provide bacteria with the nutrients and moisture needed to grow. Bacteria multiply at a very fast rate in the Temperature Danger Zone (5°C to 63°C)

Cook food thoroughly so that the centre is heated to a temperature of at least 70°C for a sufficient length of time and the juices run clear



This is necessary to kill bacteria that may cause illnesses

When food is cooked, serve at once or keep it really hot until it is served, or cool it quickly and refrigerate if it is to be eaten later

To limit the time the food spends in the Temperature Danger Zone and thus prevent the growth of bacteria

Plan ahead: do not prepare food too far in advance or take it out of the refrigerator too soon

To reduce the risk of food being held at temperatures in the Temperature Danger Zone

- Frozen foods should be thoroughly thawed such as, raw meat, poultry, fish/seafood.



- They should not be refrozen after thawing.

Meat may be cooked on the outside but, if it is not completely defrosted, the center of the food may not reach the temperature required to destroy bacteria during cooking

Bacteria in the food will have multiplied during thawing. These bacteria will not be killed by refreezing and they will become active when the raw food is thawed again for a second time

Keep food covered whenever possible



To protect it against contamination

Always ensure that the workplace is clean before preparing food



Thorough cleaning is necessary to kill any bacteria already present

Only use clean kitchen utensils and equipment and clean them thoroughly, before and after use.
Use clean wiping cloths

Utensils and equipment may have become contaminated by bacteria which can be transferred to food.
Dirty cloths spread bacteria

Never mix different cleaning chemicals



This can make the mixture ineffective and may also produce poisonous gases

'Clean as you go'. Any surfaces or equipment that have been in contact with raw food and any spillages must be cleaned up at once



To avoid the risk of contamination

Compile a cleaning schedule for the entire work-place

You should have a list of ALL tasks that must be done, how and by whom, and a timetable for doing them

Find out about food safety controls in your workplace and carefully follow instructions relating to hazard analysis and safe catering procedures



Physical



Chemical

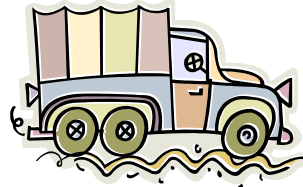


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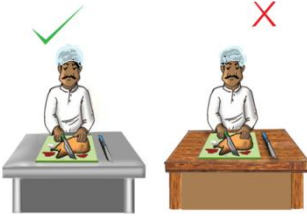
Biological

All food handlers must play their part to reduce the risks of bacterial, chemical or physical hazards contaminating food because they could cause harm to the consumers

Vehicles used for distribution of high-risk foods must always be insulated and refrigerated even for short journeys



High-risk foods are high in protein and moisture, requiring strict temperature control and protection from contamination.

<p>Do not use wood tables in the work area. Instead use metal tables</p>		<p>Wood wears quickly, is absorbent and can develop cracks and crevices in which bacteria can lodge. It is therefore unsuitable for use as floors, work-surfaces or as items of equipment.</p>
<p>Decide in a Hazard Analysis, where the hazard can be controlled.</p>	<p>HACCP</p>	<p>The Critical Control Points are points during which the hazards can be controlled and eliminated</p>

GLOSSARY

1. **Bacteria** are small living organisms often known as ‘germs’. They are so small that it is impossible to see them without a microscope. Bacteria are everywhere: in soil, dust, water, the air around us and on our bodies. It may take only a small number of bacteria to cause illness such as typhoid fever or food poisoning.
2. **Clean-As-You-Go** applies to cleaning that must be done very quickly after soiling occurs. The aim is to prevent cross-contamination or injury to staff, or simply to keep working areas clean and tidy.
3. **Contamination** is the presence of unwanted substances in the food. These can be physical, chemical or biological contaminants.
4. **Critical Control Points** are points or sections of the process at which hazards are controlled.
5. **Cross-contamination** is the transfer of bacteria from a contaminated food to an uncontaminated (clean) food.
6. **Detergents** are chemicals that will dissolve grease and assist the removal of food debris and dirt.
7. **Disinfectants** are chemicals designed to destroy bacteria. They reduce the number of bacteria to a safe level. Disinfectants are not effective in removing dirt and grease.
8. **Food Handler** is any person working in or for a food service establishment who engages in food preparation or service, who transports food or food containers, or who comes in contact with any food utensils or equipment.
9. **Food Hygiene** is the action taken to ensure the safety and suitability of food at all stages of the food chain to prevent the contamination of food.
10. **Food labelling** is a means of communication between the producer and seller of food on one hand, and the purchaser and consumer on the other. It can be written, electronic, or graphic communications on the packaging or on a separate but

related label. The symbols used on package labels are generally internationally standardized.

11. **Food packaging** is the enclosing of food to protect it from damage, contamination, spoilage, pest attacks, and tampering during transport, storage, and sale.
12. **Food poisoning** is a common, often mild but sometimes very serious illness resulting from eating contaminated food or drink. The main symptoms are diarrhoea and/or vomiting, often accompanied by nausea (feeling sick) and stomach pain.
13. **Food safety** is the assurance that food will not cause harm to the consumer when it is prepared and/or eaten according to its intended use.
14. **HACCP** (Hazard Analysis Critical Control Points) is a systematic approach to identification, evaluation and control of food safety hazards.
15. **Hazard** is defined as anything that can cause harm to a consumer.
16. **High-risk foods** are ready to eat foods that under unfavourable conditions support the multiplication of pathogenic bacteria and are intended for consumption without further treatment that would destroy such organisms.
17. **Hygiene control** is the adaptation of practices which will reduce the risk of clean food becoming contaminated.
18. **Low-Risk Foods** are rarely implicated in food poisoning and may be stored, suitably packaged, at ambient temperatures. They do not support multiplication of food poisoning bacteria.
19. **Microorganisms/microbes** are small organisms that can be seen only through a microscope. The most common types of microorganisms are bacteria and viruses.
20. **Pasteurization** is a method of destroying bacteria by rapidly heating the food to a sufficiently high temperature for a specified period of time.

21. **Sanitizers** are chemicals combining the role of both detergent and disinfectant. They are designed to remove grease, dirt and destroy microorganisms by disinfecting at the same time.
22. **Scheduled Cleaning** refers to cleaning tasks carried out at regular intervals. Food businesses should have a timetable which specifies all the details for every piece of equipment to be cleaned and all parts of the structure to be cleaned.
23. **Temperature Danger Zone-** The range of temperatures (between 5 to 63°C) at which most bacteria multiply rapidly. Keep food out of the temperature danger zone.
24. **Traceability** is the ability to trace the history, application, or location of an item or activity with the help of documentation. Food businesses must be able to trace foods or any substance that is intended to be part of a food throughout all the stages of production, processing and distribution.
25. **Virus** can be seen only under a very powerful microscope as the viruses are even smaller than bacteria. They multiply in living cells, not in food. Some viruses can cause foodborne illness; examples include gastroenteritis and hepatitis A.

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