Section 1 – Introduction to Food Safety

Introduction
Ever woken up in the middle of the night suffering the symptoms of food poisoning? Stomach cramps, diarrhoea or vomiting? You are not alone. Each year, millions of people are affected by food poisoning, although the majority of cases are not reported.

The most commonly reported causes of food poisoning are: failure to cool food properly, failure to cook and hold food at the proper temperature, and poor personal hygiene.

If your establishment is implicated in a food poisoning outbreak, costs may include increased insurance premiums, as well as lawyer and court fees. You may have to pay for testing.

If you have a quality food safety system in place, you can use a reasonable care defence against a food poisoning related lawsuit. Evidence of written standards, training practices, procedures such as a HACCP plan with documentation, and positive inspection results are the keys to this defence.

This course will look at the procedures that need to be implemented to maintain high standards of food safety. It will also look at the food safety systems. Many basic food handling, hygiene rules and procedures have been discussed in the pre-requisite unit SITXOHS002A Follow workplace hygiene procedures, and will not be covered in detail again in this unit. It is recommended that you review this unit before commencing SITXFSA001A Implement Food Safety Procedures.

This course will cover the following:
Section 1 – Introduction to Food Safety
Section 2 - Food Safety Systems
Section 3 - Micro-Organisms & Food Allergens
Section 4 & 5 - The Safe Food Flow
Section 6 - Maintain a Clean Environment

Your legal responsibility
Food and safety legislation sets the guidelines for practice and defines your responsibilities to customers with regard to food and beverage handling, preparation, processing, service, storage and transportation of foodstuffs. HACCP and food safety plans relate directly to food and safety legislation.

The law also requires you to keep food safe while it is in your care. To achieve this:

- You must have skills in and knowledge of food safety and food hygiene related to your duties.
- You must be skilled in the steps in the production process for which you are responsible.
- You must know about the food safety hazards associated within those steps and when the control measures and critical limits are not achieved.
- You also need to know of and be able to complete the relevant documentation.

Remember, if a food-related illness is traced to your establishment, an investigation will follow. If it is deemed that you did not act in a responsible manner you will be held personally liable. Thus any penalties will revert to you.

**Regulatory Bodies**

The Food Safety Standards Australian New Zealand is the government agency responsible for developing the Food Safety codes of practice which are then administered by each state and territory throughout Australia and New Zealand. The food standards were developed to:

- Provide more effective food safety regulations and reduce the level of food-borne illness in Australia; and
- Provide nationally uniform food safety standards for Australia so businesses operating in more than one State or Territory have only one set of requirements.

Each state and territory in Australia then has responsibility for administering the code in their respective state. The relevant food acts for each state and territory are as follows:

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<thead>
<tr>
<th>State/Territory</th>
<th>Act</th>
<th>Regulatory Body</th>
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**Food Safety Program**

A Food Safety Program (also called Food Safety Plan or Food Safety System) is an organised approach to controlling food safety hazards in a food process.

Its main purpose is to ensure a high standard of food hygiene.

**Why have a Food Safety Program?**

In response to a series of major food poisoning cases, and recent changes in public attitude towards food safety, all Australian states and territories have worked towards a combined approach to food safety.

As a result, the Australia New Zealand Food Standards Code (the Code) was developed by Food Standards Australia New Zealand (FSANZ). This Code now applies to all Australian states and territories with food hygiene standards now
clearly detailed in Federal, State and Local legislation and regulations. This legislation is referred to as The State or Territory Food Act.

While Australia has a comparatively good record when it comes to food safety, the federal government is taking a pro-active approach to this issue. The standards are designed to ensure that Australian food business produce food that is safe to eat.

**What is in a food safety program?**

A food safety Program:

- Identifies potential hazards that may occur in all food handling operations of the food business.
- Identifies where and how each hazard can be controlled.
- Provides for the systematic monitoring of those controls.
- Provides appropriate corrective action when a hazard is found to be not under control.
- Provides for the regular review of the program by the food business to ensure its adequacy.
- Provides for appropriate records to be made and kept by the food business demonstrating action taken in relation to, or in compliance with, the food safety program.

While this may sound very complicated, most states and territories provide food safety program template to help businesses develop a plan appropriate to the type, size and complexity of their operation, while meeting the legislative requirements.

The templates describe the policies and procedures which should be in place and provide examples of documents which can be used to record monitoring systems and corrective actions. The templates can be accessed by visiting the website of your State or Territory’s Health Department.

Food safety programmes are covered in section 2

**Food Safety Program Benefits**

Serving safe food is vital to your establishment’s success. A well designed, food safety program can help protect your establishment’s employees, customers, and reputation.

When food is handled safely, its quality is preserved. Safe food handling will help maintain the appearance, flavour, texture, consistency, and nutritional value of food.

Food that is stored, prepared, and served properly is more likely to provide the quality your customers deserve and demand.

Safe food handling can also lead to lower food costs due to less waste.

**What is Food Hygiene?**

The main purpose of the food safety program is to ensure a high standard of food hygiene.

Food hygiene is the responsible preparation and presentation of food by:

- Protecting food from food poisoning bacteria, spoilage bacteria and foreign objects
- Preventing the growth and multiplication of bacteria that could lead to a food borne-illness (covered in the next slide)
- Properly cooking and processing food to kill harmful bacteria.

**The result of poor food hygiene practices**

The consequences of poor food hygiene practices can be very serious. When a food business does not follow good food hygiene practices, the following may occur:

- Food poisoning
- Complaints from customers
- Increased food wastage
- Pest invasion
- Loss of reputation, which in turn can lead to loss of business
- Premises shut down, either temporarily or permanently
- Fines, prosecution and legal action
Both employers and food handlers can be liable for breaches of food safety. Fines can be issued to both business owners and employees. Civil action can also be taken against workers and employers.

**Food Borne Illness**

Food Poisoning is referred to as a food borne illness. A food borne illness is a disease carried or transmitted to people by food.

A food borne-illness outbreak is an incident in which two or more people experience the same illness after eating the same food.

A food borne illness is confirmed when laboratory analysis shows that a specific food is the source of the illness.

Each year, millions of people are affected by food borne illness, although the majority of cases are not reported.

The most commonly reported causes of food borne illnesses are: failure to cool food properly, failure to cook and hold food at the proper temperature, and poor personal hygiene.

**Costs of Food-borne Illness**

If your establishment is implicated in a food borne-illness outbreak, costs may include increased insurance premiums, as well as lawyer and court fees. You may have to pay for laboratory testing.

If you have a quality food safety system in place, however, you can use a reasonable care defence against a food-related lawsuit.

Evidence of written standards, training practices, procedures such as a HACCP plan with documentation, and positive inspection results are the keys to this defence.

**Food Poisoning High Risk Persons**

Food poisoning can happen to anyone. However, certain groups are more susceptible to food poisoning due to a lowered immune system.

- Babies and preschool-age children (they have not yet built up adequate immune system defence system against illness to combat some diseases).
- Pregnant women
- Elderly people (because their immune systems and resistance may have weakened with age)
- People taking certain medications, such as antibiotics and immunosuppressant
- People who are ill (those who have recently had major surgery, are organ-transplant recipients, or who have pre-existing or chronic illnesses)

**Food Safety Hazards**

A food hazard is any biological, chemical or physical agent that has the potential to cause an injury or illness if no control mechanism is in place. They are the major contributors to food poisoning and could endanger the welfare of the business as well as the quality of different food groups.

Food safety hazards are divided into three categories: Chemical, Physical & Biological.

Each of these categories will be discussed on the next slides.

**Chemical Hazards**

Chemical contamination occurs as a result of food coming into contact with chemicals. Chemical hazards include pesticides, food additives, preservatives, cleaning supplies, and toxic metals that leach from cookware and equipment. Chemical contamination can come from solvents, detergents & sanitisers.

Chemicals can leak, seep or give off toxic residues and potentially contaminate food. Chemicals and cleaning equipment need to be stored separately from food and service areas. They also need to be properly labelled.

As there is a risk of contamination from pesticides and fertilisers used on raw fruit & vegetables, a food handler needs to ensure these items are wash before use.
Physical hazards
A physical hazard is an item you can physically see in the food. It may enter the food at any stage of the production, but most commonly found in the manufacturing or preparation stage.

Physical hazards include items: such as hair, fingernails, metal staples, and broken glass, as, well as naturally occurring objects, such as bones in fillets.

To avoid physical contamination of food:

- Wear hats, gloves and other protective clothing during food preparation to ensure that hair, fingernails and jewellery do not contaminate food.
- Wear blue adhesive bandages, so they are easily visible if they fall off.
- Adhere to the correct dress code standards for the workplace, including clean aprons and shoes,
- Do not wear food preparation clothing to and from work.
- Maintain equipment and machinery regularly to make sure there are no loose nuts and bolts that may fall into the food.

Biological Hazards
By far, biological hazards pose the greatest threat to food safety. Disease-causing micro-organisms are responsible for the majority of food borne-illness outbreaks.

Biological hazards include certain bacteria, viruses, parasites, and fungi, as well as certain plants, mushrooms, and fish that carry harmful toxins.

Food contaminated by bacteria may look completely normal. It cannot be tasted, smelt or seen. However the consequences will be felt.

Biological hazards are covered in depth in section 3 of this course.

High Risk Foods
Although any food can become contaminated, most food borne illnesses are transmitted through food in which micro-organisms are able to grow rapidly. Such food is classified as Potentially Hazardous Food.

Potentially hazardous food typically:
- Has a history of being involved in food borne-illness outbreaks,
- Has a natural potential for contamination due to production and processing methods, and
- Is often moist, contains protein, and has a neutral or slightly acidic pH.

Potentially hazardous foods include any food that consists in whole, or in part, of the following:
- Meats, poultry, fish & shellfish
- Milk and milk products
- Shell eggs except those treated to eliminate Salmonella
- Tofu or other soy-protein food Garlic-and-oil mixtures
- Plant food, including fruit and vegetables, that has been either cooked, partially cooked, or warmed
- Synthetic ingredients e.g. soy protein in meat alternatives

These types of food can generate bacteria at a very fast rate when the conditions are right.

How food becomes unsafe
Food poisoning bacteria are often present naturally in food. Given the right conditions, they can multiply very quickly. Bacteria growth is covered in section 3

Common factors that are responsible for food borne illness include:
- Purchasing food from unsafe sources
• Failing to cook food adequately
• Time Temperature Abuse – when food is held at improper temperatures.
• Cross contamination
• Poor personal hygiene

The keys to food safety lie in controlling time & temperature throughout the flow of food, practicing good personal hygiene, & preventing cross-contamination.

**Key Concept - Time-Temperature Abuse?**

Microorganisms pose the largest threat to food safety and like all living organisms; most cannot survive or reproduce outside certain temperature ranges. Therefore, time and temperature must be controlled throughout the flow of food.

Food has been time-temperature abused any time it has been allowed to remain too long at temperatures favourable to the growth of food borne micro-organisms. For example:

• Not held or stored at required temperatures
• Not cooked or reheated to temperatures that kill micro-organisms
• Improperly cooled

High risk foods left at room temperature for long periods of time are most likely to result in food poisoning when eaten.

Time-temperature abuse is also more likely to occur in food that has been prepared a day or more in advance of service since the food may go through several additional processes, including cooling, storage, and reheating.

Safe storage and preparation of food is covered in the section on Food Flow.

**Cross-Contamination**

Cross-contamination occurs when harmful bacteria are transferred from one surface or food to another. A food borne illness can result if cross-contamination is allowed to occur in any of the following ways:

• Raw contaminated ingredients are added to food that receives no further cooking.
• Food-contact surfaces are not properly cleaned and sanitized before touching cooked or ready-to-eat food.
• Raw food is allowed to touch or drip fluids onto cooked or ready-to-eat food.
• A food handler touches contaminated (usually raw) food and then touches cooked or ready-to-eat food.
• Contaminated cleaning cloths are not cleaned and sanitized before being used on other food-contact surfaces.

Food Contact Surfaces may be direct or indirect.

A direct food-contact surface includes any equipment or utensil surface that normally touches food, such as tableware, cutting boards, knives, and other utensils used to prepare food and counters where food is prepared.

An indirect food-contact surface is a surface food might drain, drip, or splash onto during preparation, such as the backsplash of a counter

**Poor Personal Hygiene**

Individuals who do not maintain high levels of personal hygiene can contaminate food or food-contact surfaces, and cause illness by:

• Failing to wash their hands properly after using the restroom, before they touch food, or whenever they become contaminated
• Cough or sneeze on food
• Touch or scratch sores, cuts, or boils, and then touch food they are handling
• Come to work while sick
Good Personal Hygiene
Features of a good personal hygiene program include:

- Proper hand washing. Hands and fingernails should be washed and cleaned thoroughly before and after handling food and between each task.
- Strictly enforced rules regarding eating, drinking, and smoking. These activities should be prohibited while preparing or serving food.
- Preventing employees who are ill from working with food. All illnesses should be reported to the manager.

Section 2 - Food Safety Systems
As mentioned in section 1, a Food Safety Program (also called Food Safety Plan or Food Safety System) is an organised approach to controlling food safety hazards in a food process. It is a key tool in preventing food poisoning.

A food safety management system must be built on a solid foundation of programs that supports our efforts to minimize the risk of food borne illness. These programs include:

- Proper personal hygiene program
- Proper facility-design
- Supplier selection and specification programs
- Proper cleaning and sanitation programs
- Appropriate equipment maintenance programs
- Food safety training programs

The development and maintenance of these programs are crucial for addressing the five most common risk factors responsible for food borne illness. The factors are:

- Purchasing food from unsafe sources
- Failing to cook food adequately
- Holding food at improper temperatures
- Using contaminated equipment
- Poor personal hygiene

Approach to Food Safety
There are specific steps that should be taken when developing a food safety management system.

Step 1: Establish the necessary food safety programs, and support them through your standard operating procedures.

Step 2: Consider the five risk factors as they apply throughout the flow of food, and identify the potential breakdowns that could impact food safety.

Step 3: If necessary, revise policies and procedures to prevent these breakdowns from occurring.

Step 4: Monitor the policies and procedures to ensure that they are being followed.

Step 5: Verify that the policies and procedures you have established are actually controlling the risk factors. Use feedback from internal source, records, temperature logs & inspections.

Flowchart

To help you get a better prospective to what type of program will be needed to comply with the food safety within your business you will need to do a Flowchart. A flow chart shows each step in the operation from purchase of ingredients through to the service of food to the customer.

An example can be seen below
Record Keeping
As part of a food safety system you are required to keep a record of your daily activities to comply with food safety and food handling. By law, the following records must be kept updated by the food safety supervisor or, if instructed, the food handler daily or weekly:

- Approved suppliers list
- Incoming goods
- Food recall
- Customer complaints
- Temperature control log
- The 4 hour/2 hour guide
- Cleaning and sanitising included waste disposal
- Equipment maintenance and calibration
- Pest control
- Staff illness/accident
- Staff instruction and training
- Food safety program review/audit

Templates of these records can be found on your state or territories Health website. Click here for more information.

HACCP

A food safety management system may also include a Hazard Analysis at Critical Control Point (HACCP) system. A HACCP system is based on the idea that if significant biological, chemical, or physical hazards are identified at specific points within a product's flow through an operation, they can be prevented, eliminated or reduced to safe levels.
To be effective, a HACCP system must be based on a written plan that is specific to each facility’s menu, customers, equipment, processes, and operations. A HACCP plan is based on the seven basic principles outlined by the National Advisory Committee on Microbiological Criteria for Foods. The HACCP Principle only applies to large food venues in retail and large restaurants.

A Hazard Analysis is a detailed list of the conditions or circumstances that can cause food hazards.

A Critical Control Point is the point at which action can be taken to prevent or eliminate a food safety hazard or reduce it to an acceptable level.

**Approach**

The HACCP principles are seven sequential steps that outline how to create a HACCP plan. Since each principle builds on the information gained from the previous principle, when developing your plan you must consider all seven principles in order. In general terms:

Principles One and Two help you identify and evaluate your Hazards.

Principles Three, Four, and Five help you establish how you will control those hazards.

Principles Six and Seven help you maintain both your HACCP plan and system and verify their effectiveness.

Each of these principles will be discussed in the next slides.

**The Seven HACCP Principals**

**Principle One**

**Conduct a Hazard Analysis**

Identify and assess potential hazards in the food you serve by taking a look at how the food is processed, or flows through your establishment. Many types of food are processed similarly. The most common processes include:

- Preparing and serving without cooking
- Preparing and cooking for same-day service
- Preparing, cooking, holding, cooling, reheating, and serving which is also called complex food preparation

Once common processes have been identified, you can determine where food safety hazards are likely to occur for each one. Hazards include:

- Biological - Bacterial, viral, or parasitic contamination
- Chemical contamination by cleaning compounds, sanitizers, and allergens
- General physical contamination.

**Principle Two**

**Determine Critical Control Points (CCPs)**

After the hazard analysis has been completed, the next step is to determine the Critical Control Points (CCPs).

A Critical Control Point is a point, or step in the food production process, at which control can and should be applied to prevent or eliminate a food safety hazard or to reduce it to an acceptable level.

A Critical Control Point is usually the last point/step at which the food safety hazard can be controlled.

Most processes will only have a few CCPs, which make it easier to focus attention on parts of the process which are critical to the safety of the food.

One example of critical control point would be Temperature, which needs to be regulated to control the growth of the bacteria on food. This is established by the critical limits or principle three.

**Principle Three**

**Establish Critical Limits**

Each critical control point must have limits, a cut-off point after which food can no longer be deemed safe. These limits may also be called specifications, range or standards.
These limits are the standard that must be met for each critical control point. It determines the difference between what is safe (acceptable) and unsafe (unacceptable).

Limits can be worded in several different ways depending on the critical control point.

For example:  A range eg: 70-75 degrees Celsius

A minimum eg: at least 75 degrees Celsius

**Principle Four:**
**Establish Monitoring Procedures**

Why have monitoring systems? We monitor how much petrol is in our car by checking the petrol gauge; we monitor the temperature of a sick child, we monitor the length of time left in the football game until the final siren.

Companies need to monitor critical control points to make sure they don’t lose control. Monitoring systems are a planned sequence of measurements used to demonstrate that a CCP is under control. They determine whether a product is “safe” or “unsafe”. The monitoring allows us to produce a record for future use. The monitoring may also indicate that there is a trend towards loss of control and we can take action to bring the process back into control. This process will help with the control of the food born diseases which contribute to food poisoning.

**What happens when things go wrong?**

Monitoring enables us to determine when the critical limits have not been met. It is essential that, when these limits have not been met, the product does not enter the market place. This product is often known as non-conforming product. It may also be called out of specification (out of spec, o.o.s.) or non-complying product. The food may be unsafe/ contaminated or have the potential to become unsafe/ contaminated.

**Principle Five:**
**Identify Corrective Actions**

Corrective action is the action to be taken when the results of monitoring at a CCP indicates a loss of control. Corrective actions should be documented in the food safety plan so as it is clear to everyone the necessary steps required.

The corrective action should:

- State how the affected product is to be identified
- Restore process control
- Identify and eliminate the cause of the deviation

Non-conforming product should be isolated; starting from the time monitoring indicated a loss of control until the last acceptable result. This is why an effective monitoring schedule is important and can save you time and money.

**Principle Six:**
**Verify that the System Works**

Determine if the plan is working as intended. Plan to evaluate on a regular basis your monitoring charts, records, how you performed your hazard analysis, etc., and determine if your plan adequately prevents, reduces, or eliminates identified hazards.

Records will include hazard analysis, a written HACCP plan, records documenting the monitoring of critical control points and critical limits. It is important that records are filled out accurately and legibly. Records must be completed in the required format. For example if a log sheet says to record a yes or no, then a tick or cross is not sufficient.

If you are responsible for reviewing check sheets filled out by someone else then you should sign them off to indicate that this has been completed and that the records are satisfactory. Also an audit record log will need to be done every six months to make sure that the system in place is still working and there has not been a change during this period of time.

**Principle Seven:**
**Establish Procedures for Record Keeping & Documentation**
The HACCP system requires the preparation and maintenance of a written HACCP plan together with other documentation. This must records obtained while performing monitoring activities, whenever a corrective action is taken, when equipment is validated (checked to make sure it is in good working condition), and when working with suppliers (i.e., shelf-life studies, specifications, challenge studies, etc.).

Usually, the simplest record keeping system possible to ensure effectiveness is the most desirable

**Section 3 - Micro-organisms & Food Allergens**

There has been much talk in this course about bacteria. In this section we will look at

**Micro-organisms**

Micro-organisms are small, living beings that can be seen only with a microscope. While not all micro-organisms cause disease, some do. These are called pathogens. Eating food contaminated with food borne pathogens or their toxins (poisons) is the leading cause of food borne illness.

**Microbial Contaminants**

There are four types of micro-organisms that can contaminate food and cause food borne illness:

1. Bacteria,
2. viruses,
3. parasites and
4. fungi.

These micro-organisms can be arranged into two groups: Spoilage micro-organisms and pathogens.

Mould is an example of a spoilage micro-organism. While mouldy food has an unpleasant appearance, smell, and taste, it seldom causes illness.

However pathogens, such as *Salmonella spp.* and the hepatitis A virus cannot be seen, smelled, or tasted, but food contaminated by these pathogens often causes some form of illness when ingested.

**Bacteria**

Of all micro-organisms, bacteria are of greatest concern to the kitchen. Knowing what bacteria are and understanding the environment in which they grow is the first step in controlling them.

Bacteria that cause food borne illness have some basic characteristics.

- They are living, single-celled organisms.
- They may be carried by a variety of means: food, water, soil, humans, or insects.
- Under favourable conditions, they can reproduce very rapidly.
- Some can survive freezing.
- Some turn into spores, a change that protects the bacteria from unfavourable conditions.
- Some cause illness by producing toxins as they multiply, die, and break down. These toxins are not typically destroyed by cooking.

**Bacterial Growth**

To grow and reproduce, bacteria need the following:

- Food
- Appropriate level of acidity
- Proper temperature
- Adequate time
- The necessary level of oxygen
- Ample moisture
Their growth can be broken down into four progressive stages (phases):

1. Lag
2. Log,
3. Stationary, and
4. Death.

**Lag Phase**

When bacteria are first introduced to food, they go through an adjustment period, the lag phase. In this phase, their number is stable as they prepare for growth.

To control their number and prevent food from becoming unsafe, it is important to prolong the lag phase as long as possible.

You can accomplish this by controlling the bacteria's requirements for growth in food: time, temperature, moisture, oxygen, and pH. For example, by refrigerating food, you can keep bacteria in the lag phase.

If these conditions are not controlled, bacteria can enter the next phase, the log phase where they will grow remarkably fast.

**Log Phase**

Bacteria reproduce by splitting in two. Those in the process of reproduction are called vegetative micro-organisms.

As long as conditions are favourable, bacteria can grow and multiply very rapidly, doubling their number as often as every twenty minutes. This is called exponential growth, and it occurs in the log phase. Food will rapidly become unsafe during the log phase.

Bacteria can continue to grow until nutrients and moisture become scarce, or conditions become unfavourable.

The time required for bacteria to adapt to a new environment (lag phase) and to begin a rapid rate of growth (log phase) depends on several factors, which are covered on a later slide.

**Vegetative Stages and Spore Formation**

While vegetative bacteria (those in the log phase) may survive low, even freezing temperatures, high temperatures can kill them. For example, pathogenic bacteria can be killed during proper cooking.

Some types of bacteria, however, have the ability to change into a different form, called a spore. The spore's thick wall protects the bacteria against unfavourable conditions, such as high or low temperature, low moisture, and high acidity.

While a spore cannot reproduce, it is capable of turning back into a vegetative organism when conditions again become favourable. For example, bacteria in food may form a spore when exposed to freezer temperatures, allowing the bacteria to survive. As the food thaws...
and conditions improve, the spore can turn back into a vegetative cell and begin to grow in the food.

Since spores are so difficult to destroy, it is important to cook, cool, and reheat food properly.

**Growth of Bacteria at Different Temperatures**

The adjacent graph shows how different temperatures affect the growth rate of Salmonella.

As the graph shows, at warmer temperatures 35°C, Salmonella grows more quickly than at colder temperatures 7°C and 10°C.

At even colder temperatures 6°C, Salmonella does not grow at all—but notice that it does not die either (prolonging the lag phase).

This is why refrigerating food properly helps to keep it safe.

**Stationery & Death**

Eventually the bacteria population reaches a stationary phase, in which just as many bacteria are growing as are dying. When the number of bacteria dying exceeds the number growing, the population declines. This is called the death phase.

**Who is FAT TOM**

The conditions that favour the growth of most food borne micro-organisms can be remembered by the acronym FAT TOM.

Each of these conditions for growth will be explained in more detail in the next several paragraphs.

**Food**

To grow, food borne micro-organisms need nutrients, specifically proteins and carbohydrates. These substances are commonly found in potentially hazardous food items such as meat, poultry, dairy products, and eggs.

**Acidity**

Pathogenic bacteria grow best in food that is slightly acidic or neutral (approximate pH of 4.6 to 7.5), which includes most of the food we eat. Food borne micro-organisms typically do not grow in alkaline or highly acidic foods, such as crackers or lemons.
**Time**

Food borne micro-organisms need sufficient time to grow. This means that even under favourable conditions, micro-organisms need enough time to move from the lag phase (slow growth) to the log phase (rapid growth). Keep in mind that some bacteria can double their population every twenty minutes.

If potentially hazardous food remains in the temperature danger zone for four hours or more, pathogenic micro-organisms can grow to levels high enough to make someone ill. Therefore, it is important to control the amount of time potentially hazardous food remains in the temperature danger zone.

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<td>Green Beans, Green Tea, Garlic, Chives, Red Beets, Avocados, Parsley-Cilantro, Raw Peas, Cayenne Pepper, Red Radish, Lemon Grass</td>
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<td>8.0</td>
<td>Raw Almonds, Avocados, Bell Peppers, Chicory Mushrooms, Turnips, Soybeans, Lima Beans, Radish, Grape Fruit, Brussel Sprouts, Olives</td>
</tr>
<tr>
<td>7.0</td>
<td>Most Tap Water, Spring Water, Sea Water, River Water, Coconut Oil, Most Olive Oils, Human Blood pH is 7.356</td>
</tr>
<tr>
<td>6.0</td>
<td>Bananas, Most Grains, Eggs, Fish, Tea, Liver Cooked Beans, Cooked Spinach, Soy Milk, Oats Cocoa, Oyster, Salmon, Oranges, Watermelon</td>
</tr>
<tr>
<td>5.0</td>
<td>Bread, Cashews, Potatoes, Milk &amp; Cream, White Rice, Honey, Ketchup, Corn Oil, Mayonnaise, Soy Milk, Soft Cheeses, Cooked Beans, Rice Cakes, Distilled, Purified and Reverse Osmosis Water</td>
</tr>
<tr>
<td>4.0</td>
<td>Beer, Coffee, Cranberries, Cream Cheese, Mustard, Hard Cheeses, Popcorn, Ocean Fish, Chocolate, Peanuts, White Sugar, Turkey, Fruit</td>
</tr>
<tr>
<td>3.0</td>
<td>Artificial Sweetner, Fried Foods, Maple Syrup, Beef, Goat, Pork, Pickles, Tobacco, Soy Sauce, Hard Liquors, Canned Foods, Table Salt, Lamb</td>
</tr>
</tbody>
</table>
Temperature

Most food borne micro-organisms grow well between the temperatures of 5°C and 60°C. Refer to slide - Growth of Bacteria at Different Temperatures

This range is known as the temperature danger zone.

However, exposing micro-organisms to temperatures outside the danger zone does not necessarily kill them. Refrigeration temperatures, for example, may only slow their growth.

Some bacteria—such as Listeria monocytogenes and Yersinia enterocolitica—are able to grow at refrigeration temperatures.

Bacterial spores can often survive extreme heat and cold.

Food must be handled very carefully when it is thawed, cooked, cooled, and reheated since it can be exposed to the temperature danger zone during these times.

Oxygen

Some pathogens require oxygen to grow while others grow when oxygen is absent. Pathogens that grow without oxygen can occur in cooked rice, untreated garlic-and-oil mixtures, and foil-wrapped baked potatoes that have been temperature abused.

Moisture

Because most food borne micro-organisms require water to grow, they grow well in moist food.

The amount of moisture available in a food for micro-organisms to grow is called its water activity. It is measured on a scale of 0 through 1.0, with water having a water activity of 1.0.

Most micro-organisms that cause food borne illness grow best in food with water activities between .85 and .97 although some can grow in food with lower water-activity levels.

Potentially hazardous food items typically have a water activity of .85 or higher. These include meats, fruit and vegetables.

Controlling the Growth of Micro-organisms

FAT TOM is the key to controlling the growth of micro-organisms in food since denying any one of these requirements can prevent growth. Food processors use several methods to keep micro-organisms from growing, including:

Adding lactic or citric acid to food to make it more acidic

Adding sugar, salt, alcohol, or acid to a food to lower its water activity

Using vacuum packaging to deny oxygen

While these prevention methods may not be practical for your establishment, there are two important requirements for growth that you can control: time and temperature

Food borne Illness Caused by Bacteria

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>Salmonella</th>
<th>Staphylococcus aureus</th>
<th>Listeria monocytogenes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptoms</td>
<td>Nausea, vomiting, abdominal cramps, headache, fever, and diarrhea; may cause severe</td>
<td>Vomiting/retching, nausea, diarrhoea, abdominal cramps; in severe cases</td>
<td>Fever and diarrhoea are common in individuals. Septicemia, meningitis,</td>
</tr>
</tbody>
</table>
Food borne intoxication occurs when a person eats food-containing toxins. The toxin may have been produced by pathogens found on the food or may be the result of a chemical contamination.

The toxin could also come from a plant or animal that was eaten.

Toxins in seafood, plants, and mushrooms are responsible for many cases of food borne illness. Most of these biological toxins occur naturally and are not caused by the presence of micro-organisms. Some occur in animals as a result of their diet.

### Seaweed Toxins
The ciguatera toxin occurs in certain predatory tropical reef fish.

Ciguatera accumulates in the tissue of these large, predatory fish after they eat smaller fish that have fed upon certain species of toxic algae.

When a person eats fish containing this toxin, an illness may result, requiring weeks or months of recovery.

Symptoms of ciguatera poisoning include vomiting, severe itching, nausea, dizziness, hot and cold flashes, temporary blindness, and, sometimes, hallucinations.

### Mushroom Toxins
Food borne-illness outbreaks associated with mushrooms are almost always caused by the consumption of wild mushrooms collected by amateur mushroom hunters.
Most cases occur when toxic mushroom species are confused with edible species. The symptoms of intoxication vary depending upon the species consumed. Some mushroom toxins will destroy internal organs; others cause convulsions, hallucinations, and coma; still others produce nausea, vomiting, abdominal cramping, and diarrhoea.

**Chemicals, Pesticides and Toxic Metals**
Chemicals such as cleaning products, polishes, lubricants, and sanitizers can contaminate food if they are improperly used or stored. Follow the directions supplied by the manufacturer when using these chemicals.

To avoid contamination of food by toxic metals, only food-grade utensils and equipment should be used to prepare and store food.

Utensils and equipment that contain toxic metals—such as lead, copper, brass, zinc, antimony, and cadmium—can cause a toxic metal poisoning. If acidic food is stored in or prepared with this type of equipment, it can leach these metals from the item and become contaminated.

**Physical Contamination**
Physical contamination can occur when foreign objects are accidentally introduced into food, or when naturally occurring in objects, such as bones in fillets, pose a physical hazard.

Common physical contaminants include metal shavings from cans, blades from plastic or rubber scrapers, fingernails, hair, bandages, dirt, and bones.

**Food Allergens**
Food allergy is a growing problem, particularly amongst children, and can have serious ramifications, causing illness, even death.

The law requires you to provide accurate information when a customer asks about allergens in foods you are serving.

**What is a food allergy?**
A food allergy is an immune system response to a food protein that the body mistakenly believes is harmful. It is not the result of food contaminated by a toxin.

There is no cure for a food allergy. Avoidance is the only way to prevent a reaction.

**What are the symptoms?**
The symptoms of a food allergy vary from person to person. A severe allergic reaction can happen very quickly after eating.

Symptoms can include: hives, swelling of the lips, face and eyes, abdominal pain, vomiting, swelling of the tongue, breathing difficulty, dizziness or collapse.

**What foods are most allergenic?**
Nine foods cause around 90% of food allergic reactions. They are: peanuts, tree nuts (e.g. almonds, cashews), eggs, milk, fish, crustacean (shellfish e.g. prawns, lobster), sesame, soy and wheat.

Consumers have a legal right to receive, on request, written or verbal information on allergen content when buying takeaway foods or eating out. Food businesses breach the code if accurate information is not on a label or is not given by staff selling unpackaged food made at the premises when a customer asks for it.

**Cross contamination**
Cross contamination could occur in the following ways:

- A food handler using the same cutting board to cut a peanut butter sandwich, and then a ham sandwich; or
- A chef preparing cooked prawns and then cutting lettuce without first washing hands thoroughly.
Section 4 – The Safe Food Flow - Storage to Cooking

Your responsibility for the safety of the food in your establishment starts long before you serve meals. Many things can happen to a product on its path through the establishment, from purchasing and receiving, through storing, preparing, cooking, holding, cooling, reheating, and serving. This path is known as flow of food. F low of Food Chart

Before being served as a meal, a product travels a long path from farm to plate. And many things can go wrong. For example, a frozen product that leaves the processor’s plant in good condition, may thaw on its way to the distributor’s warehouse and go unnoticed during receiving. Once in your establishment, the product might not be stored properly or cooked to the correct internal temperature, potentially causing a food borne illness.

Time & Temperature control
Throughout the flow of food, time & temperature remain constant threats to the safety of food. The following diagram illustrates the controls

The best way to avoid time-temperature abuse is to establish procedures employees must follow and then monitor them. Make time and temperature control part of every employee's job. Some suggestions include:

Decide the best way to monitor time and temperature in your establishment. Determine which foods should be monitored, how often, and who should check them. Then assign responsibilities to employees in each area. Make sure employees understand exactly what you want them to do, how to do it, and why it is important.

Make sure the establishment has the right kind of thermometers available in the right places. Give employees their own calibrated thermometers. Thermometers and how to use them are covered later in this section.

Regularly record temperatures and the times they are taken. Print simple forms employees can use to record temperatures and times throughout the shift. Post these forms on clipboards outside of refrigerators and freezers, near prep tables, and next to cooking and holding equipment.

Incorporate time and temperature controls into standard operating procedures.

Store Food Safely
Most businesses use a variety of food products in their production process including raw, processed, pre-packaged, and ready-to-eat foods. Each type of food requires different storage conditions. As part of a food safety plan you will need to identify the types of food requiring storage and their correct storage conditions.

Any business involved in food production will have three basic types of storage areas:

- Dry Storage
- Cold storage
- Freezer storage

Each of these storage types will be covered in the next slides.

Dry storage
Dry products include cereals, flour, rice and canned products.

A dry store should be a cool, dry area with an ideal range temperature between 15-25C. There are a variety of areas which can be used as a dry store:
Food must be stored in an appropriate environment to protect it from contamination and to maintain the safety and suitability of the food. It should be:

- Clean & well ventilated
- Pest proof
- Not exposed to direct sunlight or high levels of humidity
- Relatively stable temperature zone

**Safe Dry Storage**

In the dry store area, contamination can be the result of pests (cockroaches, rats, flies, weevils etc); cleaning chemicals stored above or next to foods; or from excessive humidity.

Here are some basic food safety principles for the dry store.

- Store food in accordance with manufacturer’s specifications
- Store all food off the floor. Storing food on the floor can make it more difficult to keep clean and contamination may occur.
- Check that packaging is not damaged. Damaged packaging can allow pests and other contaminants into food.
- Store open packaged products in clean, sealed food grade containers or adequately reseal the package. Uncovered or unprotected food can become contaminated by pests, micro-organisms and other foreign matter such as glass, hair, etc.
- Clean the dry storage area regularly (for example once a week) and do not overcrowd it. Pests breed in unclean and overcrowded storage areas.
- Bacteria can multiply in old stock and products that have past their ‘best before’ and ‘use by’ date. Use the oldest stock first and that it is still within ‘best before’ or ‘use by’ dates;
- Chemicals and cleaning equipment should not be stored near food items. Foods that are stored near chemicals (above, below or beside) can become contaminated.
- Make it difficult for pests to get into storage areas by sealing all holes, cracks and crevices where pests may breed or enter.
- Look for signs of pest infestation where dry products are stored, for example: droppings, eggs, webs, feathers and odours;
- Have the premises treated regularly by a licensed Pest control operator.

**Corrective actions**

- Discard contaminated food or food that has been identified as unsafe or unsuitable;
- Discard food with damaged packaging;
- Thoroughly clean the dry storage area if unclean.
- Discard food that has signs of pest infestation (for example droppings, eggs, webs or odours);
- If there are signs of pest infestation contact your Pest control operator specialist and arrange a treatment.

**Stock Rotation**

One important method of reducing the risk of food poisoning and spoilage is using stock rotation so that older stock is used before newer, fresher stock. This process is commonly referred to as First in, First out.

An easy method of identifying which foods should be used first is by reading the packaging. Most foods display a ‘best before’ or ‘use by’.

**Best before** – When stored correctly, with packaging intact, this day is the end of the period in which the food will retain the quality standards claimed.

**Use By** - The end of acceptable storage life. Food should be consumed once the use by date has passed.
Records to be updated
As part of safe dry food storage, the following records need to be updated:

- Cleaning and sanitising
- Pest control

Cold storage
The low temperatures of a refrigeration unit slow the growth of bacteria, therefore reducing the rate food will deteriorate and increasing the shelf life of food. This means food will last days or weeks when refrigerated compared to only hours or possibly days when not. Refrigeration only slows the growth, it does not stop or kill the bacteria.

The following foods are potentially hazardous foods, that is, they might contain food poisoning bacteria. These foods should be stored at 5°C or below.

- Raw and cooked meat or foods containing meat: such as casseroles, curries and lasagne;
- Dairy products, for example, milk, custard and dairy based desserts;
- Seafood (excluding live seafood);
- Processed fruits and vegetables, for example, salads;
- Cooked rice and pasta;
- Foods containing eggs, beans, nuts or other protein rich foods, such as quiche and soy products;
- Foods that contain these foods, such as sandwiches and rolls.
- Potentially hazardous foods need to be stored below 5°C when in cold storage.

Safe Cold Storage
Here are some basic food safety principles for the cold store.

- Potentially hazardous food must be stored at 5°C or colder to prevent bacteria from multiplying. Temperatures between 5°C and 60°C allow bacteria to multiply quickly.
- All foods need to be stored in clean and covered food grade containers or wrapped in a protective covering, such as plastic. Contaminants can fall into uncovered or unprotected food.
- Make sure that the cold storage area is not overcrowded with food, as air will not be able to circulate and keep food cold.
- Never store food on the floor of a cold room, it can make it difficult to clean and contamination may occur. It is also not conducive to good air flow around goods.
- Make sure that raw food is separated from ready-to-eat food.
- Check that water and condensation from raw foods will not drip onto ready-to-eat food. Bacteria in juices from raw food can drip onto ready-to-eat food and contaminate it.
- Make sure food does not stay in refrigeration for periods of time that may render the food unsuitable. Identifying and date marking the food will allow you to use the oldest stock first;
- Do not use food that is past its ‘use by’ date and check food that is past its ‘best before’ date to ensure it is not damaged or deteriorated.
- Check that the inside of cold storage equipment is clean and free from mould.
- Clean refrigerators and cool rooms in accordance with your cleaning schedule.

Corrective actions
If cold storage equipment is operating above 5°C, adjust the Temperature controls and recheck the temperature again within one hour;
If cold storage equipment is found to be unable to keep food at 5°C or below, have the equipment serviced/repairs;
Throw away potentially hazardous food that has been above 5°C for four (4) hours or more;
Throw away ready-to-eat food that has been ‘cross contaminated’ by raw food;
Throw away food that is past its ‘use by’ date or food that is damaged, deteriorated or perished;
Throw away contaminated food or food that has been identified as unsafe or unsuitable;
Have a refrigeration mechanic check and service refrigerators and cold rooms in accordance with manufacturer’s instructions or when required.
Frozen storage

Freezing is an excellent way of keeping potentially hazardous foods for long periods. Many perishable foods can be frozen and thawed with little loss of quality when correct storage and defrosting techniques are used.

There is a danger that if frozen food is thawed to above 5°C, and then refrozen, bacteria that have multiplied when the food is thawed can also be frozen. If frozen food begins to thaw, it should be used straight away, and never refrozen.

Safe Freezer Storage

Here are some basic food safety principles for the frozen store.

- A freezer should maintain an internal temperature of minis 18 degrees or colder to ensure food remains frozen.
- Frozen food that is stored for long periods of time can deteriorate, compromising the suitability of the food. If temperature rises, frozen food may start to thaw and allow bacteria to multiply;
- Food should be stored and covered in clean containers. It should be clearly labelled and dated to allow for stock rotation.
- Ensure packaging is not damaged.
- Chemicals or pests can contaminate food if not properly covered or protected;
- Do not store food on the floor can make it more difficult to keep clean and contamination may occur.
- Frozen food needs to be stored frozen hard (not partially thawed), to stop bacteria from multiplying
- Don’t overcrowd frozen storage areas as air will not be able to circulate and keep food cold.
- Check the food in your freezer regularly (eg. weekly) to see if food is contaminated, damaged, deteriorated or perished.
- To defrost frozen food, it be put in the cold room or refrigerator to defrost overnight.

Corrective actions

- Have the freezer serviced if it can’t keep food frozen hard;
- If the freezer stops working and food partly thaws, place the food in the refrigerator until it is completely thawed, then use as a refrigerated food;
- If food is completely thawed, but is colder than 5°C, place food in the refrigerator and use as a refrigerated food, or use straight away;
- If you’re not sure how long the freezer hasn’t been working properly, or you are unsure about the safety of any food, throw the food away;
- Throw away contaminated, damaged, deteriorated or perished food.

Safe Food Preparation

Storing food correctly and ensuring it remains at the appropriate temperature while stored is one important component in food safety. Equally important is the preparation process. If correct food handling procedures are not followed while food is being prepared, then the food could become unsafe. Most cases of food poisoning are caused by incorrect food handling procedures during the food preparation stage.

Incidents of food poisoning are usually attributable to the following factors:

- Cross contamination
- Time in the temperature danger zone
- Food Handler contamination

Time In the Danger Zone
Time plays a critical role in food safety. Micro-organisms need both time and temperature to grow. Food borne micro-organisms grow most rapidly at temperatures between 21°C and 60°C. This is known as the temperature danger zone.

The longer food stays in the temperature danger zone, the more time micro-organisms have to multiply and make food unsafe. To keep food safe throughout preparation, you must minimize the amount of time it spends in the temperature danger zone.

When preparing food it should not remain in the zone for more than four hours.

Here are some basic food safety tips for managing time and temperature when preparing food.

- Removing from the refrigerator only the amount of food that can be prepared in a short period of time
- Refrigerating ingredients and utensils before preparing certain recipes, such as tuna or chicken salad
- Use timers in prep areas to monitor how long food is being kept in the temperature danger zone.
- Cooking potentially hazardous food to required minimum internal temperatures. Food needs to reach an internal temperature of 75°C

**Check Food Temperature**

An important method of controlling hazards is checking the temperature of food when it is delivered, stored and later during the cooking and cooling process.

There are a number of different types of thermometers which can be used to check the temperature of refrigerated and frozen foods. However the food standards require that a probe thermometer be used and it must be accurate to within 1°C.

A probe thermometer has a metal probe (a long, thin metal needle) that can be inserted into food to check the internal temperature of the product.

The probe, when inserted into food, measures the temperature in the middle of food. The standard metal probe is able to be used in most situations; however a different, stronger probe may be required if taking internal temperatures of frozen foods so it doesn’t bend when inserted.

Never use glass thermometers filled with mercury or spirits to monitor the temperature of food. They can break and pose a serious danger to employees and customers.

**Hot Tip**

Most thermometers have digital readouts to display temperature readings, however some still have dial indicators. It is important to be very careful when reading dial indicators as glass distortion or unclear numbering can make your assessment of the temperature displayed inaccurate.
How to take a Temperature Reading
Before you start, ensure the thermometer and case is clean.

Insert the sensor area (bottom 5 cm) of the thermometer into the food in the centre and/or thickest part of the food.

Wait for the reading to stop changing. Take the temperature reading after the reading has been still for 15 seconds.

Check the temperature in at least two places.

Measuring tips
If using the thermometer to measure hot and cold food, wait for the thermometer to return to room temperature between measurements otherwise you may not achieve an accurate reading.

Clean and sanitise the thermometer after measuring the temperature of one food and before measuring the temperature of another food. This is reduces the risk of cross-contamination.

Measure the temperature of different foods in different areas of a refrigerator or display unit as there will be colder and hotter spots within the refrigerator or unit.

Checking deliveries
When checking perishable foods upon delivery, check the temperature at the edge of the food as well as the centre.

For flexible packages or soft bulk dispensers, fold the package around the sensing tip of the thermometer. Do not poke a hole in the package.

For individual packages, such as small milk cartons, open one package and insert the thermometer. Throw away the open package or use it immediately for cooking.

For frozen foods, stick the sensing area between packages or tightly packed boxes, or use a frozen product probe.

Checking cooked and cooling foods
When checking foods that are being cooked, take the temperature from the centre of the food. Measure different parts of the food as it cooks. If you get different temperature readings from different parts of the food, stir the food until a steady temperature can be read.

Measure different parts of a food as it cools as the temperature may not be the same.

For example, if food is being cooled in a refrigerator the top of the food may be cooler than the middle of the food.

Thermometer Care Guidelines
It is important to know how to use and care for thermometers found in your establishment.

Keep thermometers and their storage cases clean

Thermometers should be washed, rinsed, sanitized, and air-dried before and after each use to prevent cross-contamination.

Have an adequate supply of clean and sanitized thermometers on hand.

When it comes to maintenance, always follow manufacturers' recommendations.

Calibrate (adjust a measuring instrument in order to make it accurate) thermometers regularly to ensure accuracy. This should be done before each shift or before each day's deliveries.

Thermometers should also be recalibrated any time they suffer a severe shock.

Calibrating Thermometers
There are 2 methods for calibrating thermometers- boiling Point & Ice Point Method

Boiling Point Method

- Heat a pot of freshwater until a rolling boil is achieved.
- Immerse the stem or probe section of the thermometer in the boiling water.
- Wait 2 minutes, and then read the temperatures on the thermometer without removing it from the boiling water.
- While thermometer is in the boiling water adjust the thermometer to 100°C, if necessary, by following the manufacturer’s directions. These thermometers are generally adjusted with a zeroing screw.

**Ice point method**

- Fill a plastic or metal container with chipped or crushed ice, then add clean freshwater to a depth of at least 10cm. You should end up with 50% ice, 50% water.
- Stir the ice and water then wait a minimum of 2 minutes (5 minutes is better) to be certain the water is completely and evenly cooled.
- Suspend the stem or probe section of the thermometer in the ice slurry.
- Wait 2 minutes until the indicator stops changing.
- While thermometer is in the ice water adjust the thermometer to 0°C if necessary.

**Cross Contamination**

The second factor attributable to food poisoning incidents is cross contamination.

A major hazard to the flow of food in your operation is cross contamination, which is the transfer of microorganisms from one food, or surface, to another.

Micro-organisms move around easily in a kitchen. They can be transferred from food or unwashed hands to prep tables, equipment, utensils, cutting boards, dish towels, sponges, or other food.

Cross-contamination can occur at almost any point in an operation. When you know where and how micro-organisms can be transferred, cross-contamination is fairly simple to prevent. Prevention starts with the creation of barriers between food products. These barriers can be physical or procedural.

**Prevent Cross Contamination**

**Assign specific equipment to each type of food product.** For example, use one set of cutting boards, utensils, and containers for poultry, another set for meat, and a third set for produce. Raw & prepared foods should also be stored separately.

Some manufacturers make coloured cutting boards and utensils with coloured handles. Colour coding can tell employees which equipment to use with what products.

Blue – Seafood; White – Cheese; Red - Raw meat; Green – Produce; Yellow - Poultry

Although colour coding is helpful, it does not eliminate the need to follow proper practices (i.e., cleaning and sanitizing, minimizing cross-contamination, etc.). Colour coding helps to minimize the risk from actually occurring.

**Thoroughly rinse all fruits & vegetables** in clean water to remove bacteria, pesticides, soil and insects.

**When using the same prep table, prepare raw and ready-to-eat food at different times.** For example, establishments with limited prep space can prepare lunch salads in the morning, clean and sanitize the utensils and surfaces, and then debone chicken for dinner entrees in the same space in the afternoon.

**Clean and sanitize all work surfaces, equipment, and utensils after each task.** After cutting up raw chicken, for example, it is not enough to simply rinse the cutting board. Cleaning & sanitising is covered in section 6.

**Purchase ingredients that require minimal preparation.** For example, an establishment can switch from buying raw chicken breasts to purchasing precooked breasts.

**Food Handler Contamination**

At every step in the flow of food through the operation—from receiving through final service-food handlers can contaminate food and cause customers to become ill.

Good personal hygiene is a critical protective measure against food borne illness, and customers expect it.

You can minimize the risk of food borne illness by establishing a personal hygiene program that spells out your specific hygiene policies, provides your employees with training on those policies, and enforces established policies.
How Food Handlers contaminate Food
A food handler can cause an illness by transferring micro-organisms to food they touch. Many times these micro-organisms come from the food handlers themselves. Food handlers can contaminate food when they:

Have a food borne illness.
Show symptoms of gastrointestinal illness (an illness of the stomach or intestine).
Have infected lesions (infected wounds or injuries).
Live with or are exposed to a person who is ill.
Touch anything that may contaminate their hands.

Even an apparently healthy person may be hosting food borne pathogens.

With some illnesses, such as hepatitis A, an individual is at the most infectious stage of the disease for several weeks before symptoms appear.

With other illnesses, the pathogens may remain in a person’s system for months after all signs of infection have ceased.

Some people are called carriers because they might carry pathogens and infect others, yet never become ill themselves.

Employees Spreading Food Borne Illnesses
Below are some cases of employees spreading food borne illnesses.

A deli food handler who was diagnosed with salmonellosis failed to inform his manager that he was ill for fear of losing wages. It was later determined that he was the cause of an outbreak that involved more than two hundred customers through twelve different products.

A food borne-illness outbreak was traced to a woman who prepared food for a dinner party. The investigation revealed that the woman was caring for her infant son, who had diarrhoea. The woman could not recall washing her hands after changing the infant’s diaper. As a result, twelve of her dinner guests became violently ill with symptoms that included diarrhoea and vomiting.

Simple acts such as nose picking, rubbing an ear, scratching the scalp, touching a pimple or open sore or running fingers through the hair can contaminate food. Thirty to fifty percent of healthy adults carry Staphylococcus aurous in their noses, and about twenty to thirty-five percent carry it on their skin.

Hand Washing Frequency
One of the best things a food handler can do to prevent contamination of food they are preparing is to wash their hands.

Food handlers must wash their hands before they start work and after the following activities:

- Using the restroom
- Handling raw food (before and after)
- Touching the hair, face, or body Sneezing, coughing, or using a handkerchief or tissue
- Smoking, eating, drinking, or chewing gum or tobacco.
- Handling chemicals that might affect the safety of food
- Taking out garbage or trash
- Clearing tables or bussing dirty dishes touching clothing or aprons
- Touching anything else that may contaminate hands, such as un-sanitised equipment, work surfaces, or washcloths

General Personal Cleanliness
In addition to following proper hand-hygiene practices, food handlers must maintain personal cleanliness. Food handlers should bathe or shower before work. They must also keep their hair clean, since oily, dirty hair can harbour pathogens.
Keep fingernails short and clean. Long fingernails, false fingernails, and acrylic nails should not be worn while handling food since they may be difficult to keep clean and can break off into food.

Hand cuts or sores should be covered with a clean bandage and a glove or finger cot.

**Use of Gloves**

Gloves are another defence in the spread of food borne illnesses. However, gloves must never be used in place of hand washing.

When using gloves the following guidelines should be observed:

- Hands must be washed before putting on gloves and when changing to a new pair.
- Gloves used to handle food are for single use only and should never be washed and re-used.
- They should be removed by grasping them at the cuff and peeling them off inside out over the fingers while avoiding contact with the palm and fingers.

Food handlers should change their gloves:

- As soon as they become soiled or torn.
- Before beginning a different task.
- At least every four hours during continual use, and more often when necessary.
- After handling raw meat and before handling cooked or ready-to-eat food.

**Safe Handling of Raw Egg Products**

Large food borne illness outbreaks have been associated with foods made from raw eggs, including:

- Sauces and spreads such as mayonnaise, aioli, hollandaise and egg butter;
- Desserts made without a cooking step, such as cheesecake, tiramisu and mousse;
- Lightly cooked foods, such as custard, fried ice-cream, some ice-cream and gelato made on the premises; and
- Drinks such as eggnog and egg flip.

Restaurants, cafes, bakeries, caterers and manufacturers that manufacture raw egg dressings and sauces need to follow safe handling practices.

Businesses should try to use alternatives to raw eggs in foods which are not cooked. Alternatives include commercially produced dressings and sauces, or pasteurised egg products.

If businesses continue to use raw egg foods, special attention must be given to the safe preparation of these products.

**Receiving eggs**

When buying or receiving eggs, only accept eggs that are:

- Clean and not cracked, broken or leaking
- Supplied in clean packaging
- Correctly labelled (i.e. with the name of the food, the supplier’s name and address, and lot identification or date marking).

**Handling and storing eggs safely**

- Store eggs in their carton at or below 5°C. This will prevent damage and cross contamination during storage, and maintain their freshness.
- Do not wash eggs. Washing makes them more susceptible to contamination. Discard dirty, broken and cracked eggs.
- Use eggs before their ‘best before’ date.

**If making raw egg products, good food handling is essential**

If Salmonella is present on the egg shell, it could be spread throughout the kitchen and onto other foods with your hands. So, to prevent this happening, when separating eggs:

- Wash hands before and after handling raw eggs;
- Do not separate eggs with bare hands;
• Do not separate eggs using the shell;
• Preferably use a sanitised egg separator;
• Use gloved hands with one gloved hand to crack the egg and the other to separate the egg white from the yolk; and
• Minimise contact between the shell and the contents of the egg when cracking and separating eggs.

Preventing Listeria

Listeria is a serious infection caused by eating food contaminated with the bacteria. The disease affects primarily pregnant women, newborns, adults with weakened immune systems, and the elderly.

It has different growth and survival conditions from most other food poisoning micro-organisms and is a particularly dangerous bacteria. It requires a lower infective dose than other food poisoning micro-organisms to cause illness. Aged care and health care residents or patients are very susceptible. Pregnant women and their babies are particularly at risk.

Listeria will grow in a temperature range of 0°C to 65°C and as a result requires the implementation of special time and temperature controls to control its growth.

The following foods should not be used for at risk persons:
- Soft cheeses such as Brie or Camembert;
- Dairy products, tahini, hommos, desserts and cakes containing dairy products unless they have been pasteurised or cooked;
- Herbs, spices or desiccated coconut unless they have been treated by the manufacturer to minimise Listeria or are in a product that will be cooked.

Storage

Foods should be stored at 3°C or below unless they are going to be treated to minimise Listeria before being eaten. Treatments to minimise Listeria include:
- Cooking; or
- Washing vegetables.

Foods that could have been exposed to Listeria and are not going to be treated to minimise Listeria should be stored at 3°C or below for a maximum of 24 hours. This includes:
- Pre-packaged salads, fruit salads, cooked pasta, cooked rice, coleslaws;
- Raw salad vegetables and raw fruit that have been washed and sanitised (high risk groups);
- Manufactured meats and fermented meats after removal from sealed packaging; and
- All products that are prepared on the premises.

Preparation

When preparing vegetables to be served raw, the following steps need to be taken:

1. Wash the fruit and vegetables using a spray type wash treatment and physical rubbing rather than soaking. Some products with internal air spaces (such as celery, apples and tomatoes) may be susceptible to internalisation of food poisoning micro-organisms when the wash water is colder than the produce. It is therefore recommended that for this type of product water temperatures be 5°C warmer than the produce.
2. Place fruit and vegetables in a chlorine solution. The level of chlorine should be 200 mg/kg unless a HACCP system can verify a lower level.
3. Rinse the chlorine from the fruit and vegetables under running water if using a high level of chlorine.

NSW Health recommends that fruit and vegetables that cannot be scrubbed or have all soil removed cannot be served to high-risk persons. This includes: salad vegetables, fruits and garnishes (such as raw mushrooms, parsley, sprouted seeds, strawberries, raspberries and many varieties of lettuce) unless they are to be cooked to a high enough temperature to destroy Listeria.
Examples of vegetables and fruit that can be readily washed, sanitised and/or peeled are:

- Avocados;
- Onions;
- Pineapple;
- Carrot;
- Apricots;
- Apple;
- Tomatoes;
- Peaches;
- Oranges;
- Cucumbers;
- Grapefruit; and
- Bananas.

Cooking

- Do not serve any raw or soft cooked egg dishes (except soft-boiled eggs).
- Cook all meat, poultry, fish, rice, pasta and vegetable and fruit dishes.

Section 5 – The Safe Food Flow – Cooling to Delivery

Cooling food

If you cook potentially hazardous food that you intend to cool and use later, you need to cool the food to 5°C or colder as quickly as possible. There may be food poisoning bacteria in the food even though it has been cooked. Faster cooling times limit the time when these bacteria are able to grow or form toxins.

When cooling cooked potentially hazardous food, cool the food within the following timeframes:

- From 60°C to 21°C within two hours; and
- From 21°C to 5°C within a further four hours.

This means you have a maximum of six hours to cool food from 60°C to 5°C or below. If you don’t know how fast your food is cooling, use a probe thermometer to measure the warmest part of the food – usually in the centre.

To chill food quickly, break it up into smaller portions in shallow containers. Take care not to contaminate the food as you do this.

Cooling Hazards

There are a number of hazards associated with cooling foods.

- Potentially hazardous food that is not cooled quickly enough can allow bacteria to multiply and cause a foodborne illness;
- Foreign objects may fall into uncovered food;
- Unclean food containers used for cooling potentially hazardous food can contaminate the food with food poisoning bacteria.

Controls and monitoring

Below is a list of controls that should be followed when cooling cooked food.

Using a probe thermometer, check that the temperature at the centre of potentially hazardous food reduces from 60°C to 21°C within two (2) hours and from 21°C to 5°C within a further four (4) hours.

Check that the potentially hazardous food is being cooled in an appropriate clean, uncontaminated storage container.
Divide potentially hazardous food into smaller batches and use shallow containers (for example less than 10cm deep) to help it cool quicker.

Protect storage containers from contamination and label with the type of food and the date before placing into the cool room, refrigerator or freezer.

Potentially hazardous food can be left at room temperature until it drops to 60°C (this temperature should be checked with your probe thermometer), the food can then be put in the refrigerator to continue cooling;

Do not put hot food straight from the oven or stove into a refrigerator, cool room or freezer, because it can cause the refrigeration temperature to rise.

A guide to when to put cooked food in the refrigerator is to let it stand for 20-30 minutes prior to placing under refrigeration.

Check that the temperature inside the refrigerator does not rise higher than 5°C while cooling food.

Make sure there is adequate air circulation around containers by not overloading refrigerators, cool rooms or freezers.

Never mix left-over food with a new batch of cooled food;

Separate raw and cooked foods.

**Corrective actions**

Throw away food if the above cooling times and temperatures have not been reached;

If refrigerator temperatures rise above 5°C during the cooling of food, review and modify cooling practices to ensure that temperatures remain below 5°C;

Discard any potentially hazardous food that may have been contaminated during cooling.

Please log the temperatures on to the following record: Record No. 6 –Temperature control log

**Safe Reheating Food**

If you reheat previously cooked and cooled potentially hazardous food, you must reheat it rapidly to 75°C or hotter.

Ideally, you should aim to reheat food to 75°C within a maximum of two hours to minimise the amount of time that food is at temperatures that favour the growth of bacteria or formation of toxins.

Inadequate reheating means that food may be heated to temperatures within the temperature danger zone therefore allowing any bacteria present to multiply.

The food safety procedures for reheating cooked foods are:

- Ensure foods reach an internal temperature of 75°C or above when initially cooked.
- Reheat foods a quickly as possible without destroying the quality, flavour and appearance of the food item.
- Do not reheat food in a bain-marie or similar hot food display unit. These units are designed to hold hot food, not make them hot. The reheating process can exceed the time control limits resulting in food held in the temperature danger zone for a long period of time. Frozen cooked food (for example pies, sausage rolls, lasagne) should not be placed in a hot display unit to defrost and reheat.
- Food can only be reheated once so only reheat the required amount.
- Any unused reheated food must be discarded.

**Safe Hot Food Holding**

Potentially hazardous, hot food must be held at an internal temperature of 60°C or higher. You can also hold it at an even higher temperature than 60°C as an additional safeguard.

Only use hot-holding equipment that can keep food at the proper temperature.

**Never use hot holding equipment to reheat food if it is not designed to do so.** Reheat food to 74°C for fifteen seconds within two hours, then transfer it to holding equipment. Most hot-holding equipment is incapable of passing food through the temperature danger zone quickly enough during the reheating process to prevent the growth of micro-organisms.
Stir food at regular intervals to distribute heat evenly.

**Safe Cold Food Holding**
Potentially hazardous, cold food must be held at an internal temperature of 5°C or lower.

Only use cold holding equipment that can keep food at the proper temperature.

**Do not store food directly on ice.** Whole fruit and vegetables and raw, cut vegetables are the only exceptions. Place food in pans or on plates first. Ice used on a display should be self-draining and drip pans should be cleaned and sanitized after each use.

**Safe Food Display**
When displaying unpackaged ready-to-eat food for self service, eg a buffet, there are a number of rules to be followed to ensure the food remains safe.

Protect food from contaminants with covers or sneeze guards. Covers help to maintain temperature and keep out contaminants.

Provide separate serving utensils for each food.

Prepare food in small batches so it will be used faster. Do not prepare food any further in advance than necessary to minimize the potential for time-temperature abuse.

Check the internal temperature of food using a thermometer. The holding equipment's thermostat measures the temperature of the equipment, not the food.

Check the temperature of food at least every four hours. Food that is not at 60°C or higher or 5°C or lower must be discarded. As an alternative, check the temperature every two hours to leave time for corrective action.

Establish a policy to ensure that food being held for service will be discarded after a predetermined amount of time. For example, a policy may state that a pan of veal can be replenished all day as long as it is discarded at the end of the day.

**Safe Food Serving**
Both kitchen staff & food servers need to be careful not to contaminate food. Kitchen staff can do the following to reduce the risk of contamination.

**Store serving utensils properly.** Serving utensils can be stored in the food, with the handle extended above the rim. They can also be placed on a clean, sanitized food-contact surface.

**Use serving utensils with long handles.** Long-handled utensils keep the server's hands away from food.

**Use clean and sanitized utensils for serving.** Use separate utensils for each food item, and properly clean and sanitize them after each serving task. Utensils should be cleaned and sanitized at least once every four hours during continuous service.

Food servers need to be just as careful as kitchen staff. If they are not, they can contaminate food simply by handling the food-contact surfaces of glassware, dishes, and utensils. Servers should use the following guidelines to serve food safely.

**Glassware and dishes should be handled properly.** The food-contact area of plates, bowls, glasses, or cups should not be touched.

Dishes should be held by the bottom or the edge, and should be free of cracks.

Cups should be held by their handles.

Glassware should be held by the middle, bottom, or stem.

**Glassware and dishes should not be stacked when serving.** The rim or surface of one can be contaminated by the one above it. Stacking china and glassware also can cause it to chip or break. Which then it will have to be disposed in the appropriate manner of wrapping into news paper before placing it in the bin or if it is made out of glass it will be placed in the appropriate glass recycle bin.

**Flatware and utensils should be held at the handle.** Store flatware so servers grasp handles, not food-contact surfaces.
Eliminate bare-hand contact with food that is cooked or ready-to-eat.

**Use ice scoops or tongs to get ice.** Servers should never scoop ice with their bare hands or use a glass since it may chip or break. Ice scoops should always be stored in a sanitary location—not in the ice bin.

**Never use cloths meant for cleaning food spills for any other purpose.** When tables are cleaned between guest seatings, spills should be wiped up with a disposable, dry cloth. The table should then be cleaned with a moist cloth that has been stored in a fresh sanitizer solution.

**Safe Food Serving – Cross Contamination**

To prevent cross-contamination, it is a good idea to schedule staff so they are not assigned to do more than one job during a shift. Serving food, setting tables, and bussing dirty dishes are separate tasks with different responsibilities.

Servers and kitchen staff should also know the rules about re-serving food. In general, only unopened, pre-packaged food can be re-served.

**Never re-serve plate garnishes, such as fruit or pickles, to another customer.** Served, but unused, garnishes must be discarded. Never re-serve uncovered condiments. Do not combine previously served food with fresh food.

**Uneaten bread or rolls may not be re-served to other customers.** Linens used to line bread baskets must be changed after each customer.

The personal hygiene of servers is very important. Servers should be neat and clean, and their hair should be pulled back. They should avoid touching their hair or face when serving food, and should refrain from habits such as chewing fingernails or licking their fingers.

**Safe Single Use Items**

Single use items are designed to be used only once. They may be used by an establishment to package food items for display, sale or transportation. Or they may be provided for customers to customize their order or assist in its consumption.

The use of single use items is increasing as more businesses provide take away and pre-packaged food items. Therefore it is important to understand how misuse can lead to breaches of food safety.

**Examples of Single Use items**

- Hot and cold beverage items - cups and lids, spoons, stirrers, straws, napkins, portion control sugar and sugar supplements.
- Take away containers - plastic sandwich, roll and wrap containers, polystyrene, cardboard or plastic containers, pizza boxes.
- Service equipment - plates, bowls, cutlery, beverage containers (wine, beer, soft drink), napkins, scented wipes.
- Portion control food items - sugar, condiments (tomato/BBQ sauce), spreads (jam, vegemite), UHT milk.

**How single use items become unsafe**

Single use items can contaminate food if not stored or used correctly.

Exposure to dust, dirt, insects and chemicals when stored can lead to cross-contamination of food when it is placed in the container.

Containers can become damaged during storage or when used, leading to potential exposure to other foods.

They should not be used more than once! They are often difficult to clean, leading to food residue, and become weakened and damage easily on repeated use.

**Contamination prevention – Single Use Items**

The following guidelines will reduce the risk of contamination of single use items

- Store single use items in their original packaging until required to ensure the items remain clean and reduce exposure to foreign objects.
- Store in a dry, well ventilated, pest free area.
- Make sure items are stored away from cleaning chemicals, wet areas and rubbish storage.
• When storing containers in the display area ready for service, make sure the storage area is clean and food or other items cannot be spilt, dripped or dropped into the clean packaging.
• Handle the single use items as little as possible to reduce the potential for cross-contamination.
• Check the cleanliness and quality of each item before food is placed in it.
• Package food in the appropriate type of single use item and how the packaged item is to be stored; for example don’t place moist or wet items that require refrigeration in thin paper or cardboard containers.
• Make sure packaged food items are clearly labelled, identifying the contents and, where appropriate, the day and/or time packaged.
• Dispose of used single use items immediately.
• Regularly check display containers for cleanliness; clean out sugar stick, and spoon containers, wipe over napkin dispensers.
• Drinking straws should be either individually pre-wrapped or dispensed singly from a straw dispensing unit. Customers should not be able to touch multiple unwrapped straws.

**Safe Food Delivery**
When transporting food from a central kitchen, or from a store the customer, the following safety procedures should be followed:

**Use rigid, insulated food containers capable of maintaining food temperatures above 60°C or below 5°C.** Containers should be sectioned so that food does not mix, leak, or spill. Containers must also allow air circulation to keep temperatures even, and should be kept clean and sanitized.

**Check internal food temperatures regularly.** Take corrective action if food is not at the proper temperature. If containers or delivery vehicles are not maintaining proper food temperatures at the end of each route, re-evaluate the length of delivery routes or the efficiency of the equipment being used.

Label food with storage, shelf life, and reheating instructions for employees at off-site locations.

Clean and sanitize the insides of delivery vehicles regularly.

Make sure employees practice good personal hygiene when distributing food.

**Provide food safety guidelines for consumers.** If you or your employees will not be serving the food you deliver, provide customers with information on which items should be eaten immediately, which items may be saved for later, and how to serve all items.

**Section 6 – Maintain a Clean Environment**
In this section you will learn about the three main areas of premises hygiene:

Cleaning & Sanitizing

Pest control

Garbage & waste disposal

In the previous sections, we learned that a good food safety system depends on food safety programs. A cleaning and sanitation program is one of the most important of these.

The only way to prepare clean, safe food is in a clean premise. If you do not maintain a high standard of cleanliness and sanitation, food can easily become contaminated. No matter how carefully you prepare and cook food, without a clean and sanitary environment, bacteria and viruses—such as those that cause salmonellosis and Hepatitis A, can spread quickly to both cooked and uncooked food. Cleaning and sanitizing must be done carefully and correctly and in accordance with a cleaning schedule.

However, if not used properly, cleaning and sanitizing chemicals, cleaning tools and equipment, can be just as harmful to customers and employees as the illnesses they help prevent.

**Difference between cleaning & sanitising**
It is important to understand the difference between cleaning and sanitising.
Cleaning is the process of removing food and other types of soil from a surface, such as a countertop or plate.

Sanitizing is the process of reducing the number of micro-organisms on that surface to safe levels. To be effective, cleaning and sanitizing must be a two-step process.

Surfaces must first be cleaned and rinsed before being sanitized.

**When do I clean & sanitise?**

Everything in your operation must be kept clean; however, any surface that comes in contact with food must be cleaned and sanitized. All food-contact surfaces must be washed, rinsed, and sanitized after each use.

Any time you begin working with another type of food.

Any time you are interrupted during a task and the tools or items you have been working with may have been contaminated.

At four-hour intervals, if the items are in constant use.

**Cleaning**

Most food contact items and surfaces should be cleaned using the following basic steps.

- Pre-clean – remove excess dirt & food scraps
- Wash – remove grease and dirt using hot water and detergent
- Rinse – remove loose dirt & detergent with hot water
- Dry – buff dry with a clean cloth or drip dry.

Some items require both cleaning & sanitising.

**Using the dishwasher?**

Most tableware, utensils, and even pots and pans can be cleaned and sanitized in ware (dish) washing machines. Ware washing machines sanitize by using either hot water or a chemical sanitizing solution.

High-temperature machines rely on hot water to clean and sanitize. Water temperature is critical and may vary by model. The temperature of the final sanitizing rinse must be at least 82°C.

For stationary-rack, single-temperature machines, the temperature of the final sanitizing rinse must be at least 74°C.

Water that is too hot might vaporize before sanitizing items, or might bake food onto tableware and utensils, making it even harder to get them clean. You may need a booster heater to provide enough hot water to sanitize a high volume of tableware. Make sure your ware washer has a built-in thermometer to measure the temperature of water at the manifold, where it sprays into the tank.

All ware washing machines should be operated according to manufacturers' instructions. These instructions will typically be located on the machine. No matter what type of machine you use, listed below are general procedures to follow to clean and sanitize tableware, utensils, and related items.

Check the machine for cleanliness at least once a day, cleaning it as often as needed. Fill tanks with clean water. Clear detergent trays and spray nozzles of food and foreign objects. Use an acid cleaner on the machine whenever necessary to remove mineral deposits caused by hard water.

Make sure detergent and sanitizer dispensers are properly filled.

Scrape, rinse, or soak items before washing. Pre-soak items containing dried-on food.

Load ware washer racks correctly and use racks designed for the items being washed. Make sure all surfaces are exposed to the spray action. Never overload racks.

Check temperatures and pressure. Follow manufacturers' recommendations.

Check each rack as it comes out of the machine for soiled items. Run dirty items through again until they are clean. Most items will need only one pass if the water temperature is correct and proper procedures are followed.
Air-dry all items. Towels can re-contaminate items.

Keep your ware washing machine in good repair.

**Cleaning Agents**
Cleaning agents work best when used as directed. The instruction on how to use the chemicals in a correct manner including the right PPE(Personal Protective Equipment) needed to perform the job is found in the Material Safety Data Sheet (MSDS) on each chemical bottles been used. They can also be found in your establishment’s Food Safety Manual.

Cleaning agents can be ineffective and even dangerous if misused. Follow manufacturers' instructions carefully. Employees should never combine compounds or attempt to make up their own cleaning agents.

**Detergents**
There are different types of detergents for different types of cleaning jobs. All detergents contain surfactants (surface acting agents) that reduce surface tension between the soil and the surface, so the detergent can quickly penetrate and soften the soil.

**General-purpose detergents** are mildly alkaline and are used to clean fresh soil from floors, walls, ceilings, prep surfaces, and most equipment and utensils.

**Heavy-duty detergents** are highly alkaline and are used

**Solvent cleaners** solvent cleaners, often called degreasers, are alkaline detergents containing a grease-dissolving agent. These cleaners work well in areas where grease has been burned on, such as grill backsplashes, oven doors, and range hoods.

**Acid cleaners** are used on mineral deposits and other soils alkaline cleaners cannot remove. These cleaners are often used to remove scale in ware washing machines and steam tables, as well as rust stains and tarnish on copper and brass. The type and strength of the acid varies with the cleaner’s purpose. Follow the instructions carefully and use acid cleaners with caution.

**Abrasive cleaners** contain a scouring agent like silica that helps scrub off hard-to-remove soil. These cleaners are often used on floors or to remove baked-on food in pots and pans. Use abrasives with caution since they can scratch surfaces.

**Sanitising**
Sanitising is a more powerful process that destroys harmful bacteria. There are two methods used to sanitize surfaces: heat sanitising and chemical sanitising. Which you use depends on the application.

**Heat Sanitizing**
The higher the heat, the shorter the time required to kill micro-organisms.

The most common way to heat-sanitize tableware, utensils, or equipment is to immerse or spray the items with hot water.

Use a thermometer to check water temperature when heat sanitizing by immersion.

To check water temperature in a high-temperature ware washing machine, attach a temperature sensitive label or tape, or a high-temperature probe to items being run through the machine.

**Chemical Sanitizing**
Chemical sanitisers are widely used in establishments because they are effective, reasonably priced, and easy to use. The three most common types are chlorine, iodine and quaternary ammonium compounds (Quats). It is important to read the application instructions before using any chemical sanitisers.

**Effectiveness of Sanitisers**
The 3 factors that affect the effectiveness of sanitisers are: contact time, temperature, concentration.

**Contact Time**
In order for a sanitizing solution to kill micro-organisms, it must make contact with the object for a specific amount of time. Since minimum times may differ for each sanitizer, check with your supplier.
Temperature

Generally, sanitizers work best at temperatures between 13°C and 49°C. Some may not be effective at temperatures lower than 13°C, while others may corrode metals or evaporate at temperatures higher than 49°C.

Concentration

Chemical sanitizers are mixed with water until the proper concentration-ratio of sanitizer to water-is reached. Concentration is measured using a sanitizer test kit and is expressed in parts per million (ppm). The test kit should be designed for the sanitizer being used and is usually available from the manufacturer or supplier.

Concentrations below either that required in your jurisdiction or recommended by the manufacturer could fail to sanitize objects. Concentrations higher than recommended can be unsafe, leave an odour or bad taste on objects, and might corrode metals.

Pest control

A pest is any animal that could contaminate food, either directly or indirectly. It includes, but is not limited to, birds, rodents, insects and arachnids (spiders).

You must prevent pests, to the extent that it is practicable, from entering your premises and eradicate any pests that do enter. Excluding pests reduces the opportunities for contamination of food. Pests transmit spoilage and food poisoning micro-organisms, damage food and food packaging and might contaminate food with their bodies, faeces, urine and hair. In addition to contaminating food, rats and mice might nest in roof spaces and damage cables and pipes by gnawing.

Flies & cockroaches spread disease by cross-contamination. They have bacteria on their feet and other parts of their bodies and as they touch food, spread bacteria.

Rats & mice carry salmonella bacteria in their stomach. The bacteria is transferred onto food and surfaces in their urine and faeces.

How do I keep pests away?

The type of pest-proofing measures required will vary across Australia. However, there are many well-known measures that will limit access by pests, such as:

- Pest-proof doors and entrances into the building with flyscreen doors or self-closing doors
- Install mesh screens at opening windows or other ventilation openings
- Install a blue light zapper to keep flies away
- Ensure drains, grease traps and ventilation pipes are sealed; seal openings where pipes pass through external walls to prevent pests such as rats and mice entering food handling areas
- Install appropriate flashing to the base of wooden doors if there is a problem with mice gaining access through doorways.

It is not intended that premises be pest-proofed when there is no likelihood of pests gaining access.

In some instances the exclusion measures may be more appropriate to the whole complex, as in the case of a shopping mall containing a food hall.

The provision of harbourage for pests must also be prevented. Places in the premises that may provide harbourage should be eliminated. For example, where practicable, boxed-in areas those are difficult to completely seal should be opened up or provided with access for inspection and cleaning. Due to the nocturnal habits of most pests, contamination of food may go unnoticed for some time until the infestation is large enough for pests to be spotted.

In addition, it is difficult to eliminate large infestations.

How often do I need to spray?

Regular treatment by a professional Pest control operator is strongly recommended as they are skilled in the safe application of pesticides in a food premises. There is no prescribed frequency for treatment, as this will vary depending on the requirements of the premises and the product used by the Pest control operator. And they will fill out a Pest Control monitoring record to identify the number of applications throughout the year.
Safe Waste Disposal

Garbage & waste areas provide the perfect environment for bacteria to breed and multiply, and hospitality establishments produce a lot of waste everyday!

The following guidelines will help prevent the spread of bacteria in the garbage area.

- Waste and rubbish bins must be clearly identifiable from storage containers
- Waste disposable bins are to have tight fitting lids and should be durable fly-proof and rodent proof containers that do not leak or absorb odours.
- Place waste disposable bins conveniently around the work area of the premises
- Use plastic liners in waste disposal bins
- Empty waste disposal bins on a regular basis to avoid overfilling
- Clean and sanitize bins daily and drain overnight
- Regularly clear waste pits or grease traps of any build up
- Provide a separate area for garbage storage and ensure regular collection of refuse.
- Contaminated food must be disposed promptly and in the appropriate bins to lower the risk of cross contamination with other food staff.
- Wash your hands after handling garbage

Bacteria grows readily on humans, therefore it is paramount staff and workers practice exceptional personal hygiene.

Safe Food Disposal

There will always be some waste products that cannot be utilised, not matter how cost conscience a business may be. These include product packaging, rotted foodstuffs, fats and some trimmings.

These waste products need to be disposed of in a safe and environmentally responsible manner to prevent pests, unwanted odours and bacterial growth.

- Dispose of food items as quickly as possible.
- Ensure food to be disposed is not exposed to or stored with uncontaminated food; for example in the same area of the fridge or in food preparation areas.
- Place food items in the appropriate lined rubbish bin or disposal area such as a food recycling container for later composting, food disposal units or incinerators
- Remove any packaging which may tear bin liners, hurt staff when removing rubbish bags or cannot be processed by the designated disposal method (for example a waste disposal unit).
- When appropriate, label foods ‘Not fit for human consumption’; for example if food past its use-by date must be stored for a period of time before disposal

Types of food to dispose

The following types of food need to be disposed:

- Food which has been contaminated by physical, chemical or biological contaminates.
- Food held for too long in the temperature danger zone and falls outside the two hour four hour rule.
- Items leftover from the service period which cannot be reused, stored, refrigerated or sold.
- Reheated food items which cannot be re-refrigerated.
- Food with damaged packaging.
- Food which has passed it’s ‘use-by’ or ‘best before’ dates.

Cleaning Schedule

What is a cleaning schedule? It is a written schedule that documents the detailed procedures for cleaning & sanitising. It ensures that all surfaces and equipment are cleaned on a regular basis. It details:

- What needs to be cleaned
- Location of the cleaning
- Person responsible for cleaning
- Details of cleaning tasks
- Frequency of cleaning
• Cleaning agents to be used
• Precautions for preventing chemical contamination of food

What is the importance of cleaning & maintenance?

One of the main causes of food contamination is poor equipment maintenance. An effective maintenance program, helps to identify problems before they occur, and also avoids expensive repairs – not to mention expensive product recalls.

Maintenance programs should be documented, including the dates and times of scheduled visits, copies of maintenance reports and any follow-up action taken. Items such as dishwashers and cold holding equipment are examples of equipment that requires some preventative maintenance.

Damaged small equipment such as crockery, glassware, service equipment and utensils should be disposed of. Chipped, cracked and broken equipment is both a hygiene and occupational health and safety issue. Immediate disposal stops the damaged item from being returned to the service area.
Need more information? Government Departments

FEDERAL LEGISLATION

Food Standards Australia New Zealand (FSANZ) is an independent statutory agency established by the *Food Standards Australia New Zealand Act 1991*. FSANZ is part of the Australian Government's Health and Ageing portfolio.

The [Parliamentary Secretary to the Minister for Health and Ageing](http://www.health.gov.au/hpa/), Catherine King, has executive responsibility for FSANZ.

There is an agreement or Treaty between the Governments of Australia and New Zealand that establishes FSANZ's role in setting joint food standards, i.e. standards that apply in both countries.

STATE LEGISLATION

Within Australia the state or territory Food act is the legislation that governs food safety. The following list shows the contacts found in Australia.

Australian Capital Territory

ACT Health – Health Protection Service

![Contact details](http://www.health.act.gov.au/c/health?a=da&did=10054021)

Contact the Health Protection Service if you have an inquiry about:

- The production of food for direct sale, sale, preparation or service of food
- Registrations of food businesses
- Inspections
- Food safety programs
- Complaints about a food or food premises
- Complaints about suspected food-borne illness, contamination of food, labelling, advertising and composition of food
- Urgent food safety responses including urgent food recalls
- Publications
- Legislation
New South Wales
NSW Food Authority

📞 1300 552 406
Website: www.foodauthority.nsw.gov.au/
Email: contact@foodauthority.nsw.gov.au

Contact the NSW Food Authority if your inquiry relates to:

- General food compliance issues
- Complaints about a food or food premises
- Complaints about suspected food-borne illness, contamination of food, Labelling, advertising and composition of food
- Urgent food safety responses including urgent food recalls
- Businesses licensed by the NSW Food Authority – including retail meat premises
- Manufacturers and processors
- Wholesalers
- Food transport vehicles
- Very high risk food businesses e.g. dairy factories, meat processors and seafood
- Non-licensed manufacturers e.g. bakeries
- Food safety including food handling practices
- Publications
- Licensing of food businesses
- Approval of laboratories or analysts
- Food safety programs, auditing and inspections
- Complaints about labeling, advertising and composition of food.
- Food Safety Supervisors, RTO training providers for retail food handlers
- Regulatory food safety auditors (3rd party auditors)
Queensland


Local Government


Search the Local Government Directory to find contact details and locality maps for Queensland’s 73 local councils.

Contact your Local Council (ask for an Environmental Health Officer) if your enquiry relates to:

- Licensing of food businesses (both making and selling of food)
- Mobile food premises
- Complaints about food safety and hygiene matters in food premises
- Food safety programs (except those in Queensland Government facilities).

Queensland Health – Public Health Units

The following website includes email, telephone and address details for Queensland Health Public Health Units:


Contact your closest Queensland Health Public Health Unit if your inquiry relates to:

- Food composition and labelling issues
- Queensland food safety publications
- Information on food legislation
- Complaints about suspected food-borne illness, contamination of food and food recalls
- Food safety programs in Queensland Government facilities.

Queensland Health – Food Safety Policy and Regulation Unit

📞 +61 7 3328 9310 (Office hours)
    +61 1800 128 962 (After hours)

Email: foodsafety@health.qld.gov.au

Contact the Queensland Health Food Safety Policy and Regulation Unit if your enquiry relates to:

State-wide policies on food issues and enforcement
Regulatory implementation and enforcement issues
Approval of and complaints about food safety auditors
Initiating a food recall
General advice on current and proposed food standards.

Safe Food Production Queensland

📞 +61 7 3253 9800 or 1800 300 815

Website: [www.safefood.qld.gov.au](http://www.safefood.qld.gov.au)
Email: info@safefood.qld.gov.au

Contact Safe Food Production Queensland if your enquiry relates to:

The production and processing of primary produce (that is, dairy, meat, seafood and eggs)
Monitoring of hygiene standards and operating procedures of premises, vehicles, plant and equipment used for the production of primary produce
Accrediting primary production and processing businesses
Approval of food safety programs for accredited businesses
Complaints about food safety at businesses producing or processing primary produce
Victoria

Dairy Food Safety Victoria

☎ + 613 9810 5900

Website: www.dairysafe.vic.gov.au
Email: info@dairysafe.vic.gov.au

Contact Dairy Food Safety Victoria if your inquiry relates to the selling, transport, or preparation of mainly dairy products (like a cheese maker or dairy).

Prime Safe Victoria

☎ +61 3 9685 7333

Website: www.primesafe.vic.gov.au
Email: enquiries@primesafe.vic.gov.au

Contact Prime Safe Victoria if your inquiry relates to the selling, transport, or preparation of mainly meat (like a butcher) or seafood (like a fishmonger).

Local Government

Website: http://www.dvc.vic.gov.au/web20/dvclgv.nsf/headingpagesdisplay/find+your+local+council

Contact your Local Council (ask for an Environmental Health Officer) if your inquiry relates to:

The selling, transport, or preparation of all other foods
Registrations of food businesses (both making and selling of food)
Food safety programs
Mobile food premises
Complaints about a food or food premises.
Department of Health
Food Safety and Regulation

☎ 1300 364 352 (Free Call within Australia)

Website: www.health.vic.gov.au/foodsafety
Email: foodsafety@health.vic.gov.au

Contact the Department of Health if your inquiry relates to general food compliance issues (and you don’t know where to start) or you are looking for publications on food safety or information on legislation.