Foodborne Illness
Being a caterer is not easy. You have responsibilities to your company, coworkers and everyone who is eating your food. The best way to meet those responsibilities is to keep the food you serve safe.

Challenges to Food Safety
A foodborne illness is a disease transmitted to people by food. A foodborne Illness Outbreak is when two or more people get the same illness after eating the same food. Each year, millions of people get sick from unsafe food.

Preventing Foodborne Illnesses
To prevent foodborne illness, you must recognise the hazards that make food unsafe. These hazards can come from certain unsafe practices in your operation. Most of these hazards can be controlled by focusing on personal hygiene, time and temperature control, and cross-contamination.

Potential Hazards to Food Safety
Unsafe food is usually the result of contamination, which is the presence of harmful substances in food. Some food safety hazards are caused by humans or by the environment. Others can occur naturally. Potential hazards to food safety are divided into three categories.

- Biological: Pathogens are the greatest threat to food safety. They include certain viruses, parasites, fungi and bacteria. Some plants, mushrooms and seafood that carry harmful toxin are also included in this group.

- Chemical: Foodservice chemicals can contaminate food if they are used incorrectly. This group also includes cleaners, sanitizers, polishes, machine lubricants and toxic metal that leach from cookware into food.

- Physical: Foreign objects like hair, dirt, bandages, metal staples, or broken glass can get into food. Naturally occurring objects, like fish bones in fillets, are also physical hazards.

Each of the hazards listed above is a danger to food safety. But the greatest threat to an operation food safety program is biological hazards. Pathogens are responsible for most foodborne illness outbreaks.

How Food Becomes Unsafe: The five most common risk factors that cause foodborne illness:
- Purchasing food from unsafe sources
- Failing to cook food adequately
- Holding food at incorrect temperatures
- Using contaminated equipment
- Practicing poor personal Hygiene

Except for purchasing food from unsafe sources, each cause listed above is related to three main factors. These are time-temperature abused, cross contamination and poor personal Hygiene.

Time and Temperature Abuse: Food has been time and temperature abused when it has stayed at temperatures that are good for the growth of pathogens. A foodborne illness can result if food is time- temperature abused, which can happen in many ways.
• Food is not stored at right temperature
• Food is not cooked or reheated enough to kill pathogens
• Food is not cooled the right way

Cross – Contamination: Pathogens can be transferred from one surface or food to another. Cross-contamination can cause a foodborne illness in many ways.

• Contaminated ingredients are added to food that receives no further cooking
• Ready to eat food touches contaminated surfaces
• Contaminated food touches or drips fluids onto cooked or ready to eat food
• A food handler touches contaminated food and then touches ready to eat food
• Contaminated cleaning towels touch food contact surfaces

Poor personal Hygiene: Food handler can cause a foodborne illness if they do any of the following actions.

• Fail to wash their hands the right way
• Come to work while sick.
• Cough or sneeze on food
• Touch and scratch wounds, and then touch food

The Micro World
Pathogens: Microorganism are small, living organism that can be seen only through a microscope. Many Microorganisms are harmless, but some can cause illness. Harmful microorganisms are called pathogens. Some pathogens can make you sick if you eat them. Others produce poisons – or toxins – that make you sick. Understanding pathogens is the first step to prevent foodborne illness outbreaks.

Types of pathogens: There are four types of pathogens that can contaminate food and cause foodborne illness.

VIRUSES, BACTERIA, PARASITES, FUNGI
Many viruses, bacteria, and parasites make people sick but they cannot be seen, smelled or tasted. On the other hand, some fungi, like mould, change the appearance, smell or taste of food, but may not cause illness.

What Pathogens Need to Grow
Understanding how pathogens grow can help you prevent foodborne illness outbreaks. Pathogens need six conditions to grow. You can remember these conditions by thinking of the words FAT TOM.

Food – To grow pathogens need an energy source, such as carbohydrates or proteins.

Acidity- Pathogens grow best in food that contains little or no acid.

Temperature – pathogens grow well in food held between the temperatures of 41˚ F and 135˚ F (5 °C and 57°C). This range is known as the temperature danger zone.

Time – pathogens need time to grow. When food is in the temperature danger zone, pathogens grow. After four hours they will grow to a level high enough to make someone sick.

Oxygen – Some pathogens need oxygen to grow. Others grow when oxygen is not there.

Moisture – Pathogens need moisture in food to grow.
Food Most Likely to become Unsafe
Any kind of food can be contaminated. But some types are better for the growth of pathogens.

- Milk and dairy products
- Eggs
- Meat and poultry
- Fish
- Seafood
- Baked potatoes
- Heat threatened plant food, such as rice, beans, and vegetables
- Tofu or other soy proteins, Synthetic ingredients, such as textured soy protein in meat alternatives
- Sprouts and sprout seeds
- Sliced melons, cut tomatoes, cut leaf greens (fresh leafy greens that have been cut, shredded, sliced, chopped, or torn)
- Untreated garlic – and – oil mixtures

All these types of food have the right FAT TOM conditions that pathogens need to grow. They have a natural potential for contamination because of the way they are grown, produced, or processed. They are also commonly involved in foodborne illness outbreaks.

Controlling the Growth of Pathogens
You can help keep food safe by controlling FAT TOM. On board, however, you will most likely be able to control only time and temperature. These two conditions are so important that the food listed above is known as food that needs time and temperature control for safety, or TCS food for short.

To control temperature, you must do your best to keep TCS food out of the temperature danger zone. To control time, you must limit how long the TCS food spends in the food temperature danger zone. Like TCS food, Ready-to-eat food also needs careful handling to prevent contamination. Ready-to-eat food is exactly what it sounds like: food that can be eaten without further preparation, washing, or cooking. Here are some examples:

- Washed fruits and vegetables, both whole and cut
- Deli meat
- Bakery items
- Sugar, spices, and seasonings
- Cooked food
Viruses
Viruses are the leading cause of foodborne illness. As a Chief Cook you must understand what viruses are. You must learn how to keep them from making your fellow crew members and officers sick.

General Information about Viruses
Viruses share some basic characteristics.
Temperature Viruses can survive cooler and freezer temperatures.
Growth Viruses can’t grow in food. But once eaten, they grow inside persons intestines.
Contamination Viruses can contaminate both food and water.
Transfer Viruses can be transferred from person to person, from people to food, and from people to food contact surface. When people get sick from food contaminated with viruses, it’s usually because their food was handled by an employee who has a virus. This might be the operations employee, an employee of the manufacturer, or any who has the virus and then handles the food.

People carry viruses in their feces and can transfer them to their hands after using the restroom. Ready- to- eat-food can then become contaminated if hands are not washed the right way. Here are the best ways to prevent the spread of viruses in your operation.

- Stay away from work if you are vomiting, have diarrhea or jaundice
- Make sure you and other food handler s follow hand wash rules
- Minimize bare-hand contact with ready-to-eat-food

Bacteria
Most foodborne illnesses are caused by viruses. But bacteria can also make people sick. Knowing what bacteria are and how they grow can help you control them.
Characteristics of Bacteria That Cause Foodborne Illness: Bacteria that cause foodborne illness have some basic characteristics.
Temperature Most bacteria are controlled by keeping food out of the temperature danger zone.
Growth If FAT TOM conditions are right, bacteria will grow rapidly.
Form Some bacteria’s change into a different form, called spores, to keep from dying when they don’t have enough food. They can change back and grow again when food they are on has been time- temperature abused.
Toxin production some bacteria make toxins in food as they grow and die. People who eat the toxins can become sick. Cooking may not destroy these toxins

Parasites
Illnesses from parasites are not common as those caused by bacteria or viruses. But it is still important to understand this group of pathogens so you can prevent the illnesses they cause.
Characteristics for Parasites: Parasites share common characteristics.
Growth Parasites cannot grow in food. They need to be in the meat of another animal to survive.
Transfer Eating food contaminated with parasites will cause illness. Many animals can be hosts. Examples include cows, chicken, pigs, and fresh fish. Parasites can also be found in the feces of animals and people.
Contamination Parasites can contaminate both food and water.

Fungi
So far, you have learned about pathogens that cause foodborne illness. Fungi are pathogens that only sometimes make people sick. Mostly they spoil food. They are found in air, soil, plants, water, and some food. Mold and yeast are examples.
Molds
Molds share some basic characteristics.

Effects Molds spoil food and sometimes cause illness. Toxins some molds produce toxins, such as aflatoxins.

Growth Molds grow under almost any condition. But they grow well in acidic food with little moisture. Examples are jam, jellies, and cured, salty meat such as ham, bacon, and salami.

Temperature Cooler or freezer temperatures may slow the growth of molds, but they don’t kill them. Prevention measure Throw out all moldy food, unless the mold is a natural part of the product (e.g., cheese such as Brie, Camembert, and Blue Cheese).

Yeast: Yeasts share some basic characteristics.
Signs of Spoilage Yeasts can spoil food quickly. Signs of spoilage can include a smell or taste of alcohol. The yeasts itself may look like a white or pink discoloration or slime. It also may bubble.

Growth Like molds, yeasts grow well in acidic food with little moisture, such as jellies, syrup, honey, and fruit or fruit juice.

Prevention Measure Throw out any food that has been spoiled by yeast.

Biological Toxins: You need to be aware of biological toxins that can make people sick. Biological toxins are made by pathogens, or they come from a plant or an animal. Seafood toxins, plant toxins, and mushroom toxins can all cause foodborne illnesses.

Summary
Microorganisms are small, living organism. Harmful organisms are called pathogens. Understanding how pathogens can grow, contaminate food, and affect people will help you understand how to prevent the foodborne illness outbreaks caused by them. The words FAT TOM will help you remember the conditions that pathogens need to grow: food, acidity, temperature, time, oxygen, and moisture. Any type of food can be contaminated. But some types, known as TCS food, are better for pathogen growth. The four kinds of pathogens explained are viruses, bacteria, parasites, and fungi.

Viruses are the leading cause of foodborne illness. They cannot grow in food, but they can survive cooler and freezer temperatures. The key to preventing the spread of viruses is good personal hygiene. Bacteria can usually be controlled by keeping food out of the food temperature danger zone. Some bacteria can change into spores to keep from dying when they don’t have enough food. Others can make toxins in food that will make people who eat the food sick.

Parasites need to be in meat of another animal to survive. They can contaminate both food and water – particularly water used to irrigate produce. Purchasing products from approved, reputable suppliers is important for preventing foodborne illnesses caused by parasites. Fungi only sometimes make people sick. Mostly they spoil food. Examples are mold and yeast. Any food spoiled by mold or yeast should be thrown out, unless the mold is a natural part of the product.

Seafood toxins, plant toxins, and mushroom toxins also can cause foodborne illnesses. Fish toxins can be natural part of the fish or made by pathogens on it. Some occur when fish eat smaller fish that have toxin. Shellfish toxins are caused by marine algae that have toxin, which the shellfish then eats. Foodborne illnesses linked with mushrooms are almost always caused by eating toxic, wild mushrooms collected by amateur hunters. Similarly, foodborne illness caused by plant toxins usually happen because an operation has purchased plants from an unapproved food supplier.

As with Garret's food supplies, purchasing products from approved, reputable suppliers is important for preventing all these types of foodborne illnesses.
Contamination: Biological Contaminants are the leading cause of foodborne illnesses. But there are other contaminants to watch out for too. Chemicals and physical objects are risks to the food you serve.

Chemical Contaminants: Chemicals have caused many cases of foodborne illnesses. These contaminants can come from everyday items found in the operation.

Toxic Metals: Some utensils and equipment contain toxic metals that can contaminate acidic food. A person who then eats this food can get toxic-metal poisoning. This illness is frequently caused by storing or preparing acidic food with equipment containing the following metal.

Lead: This metal is found in pewter, which can be used to make pitcher and other tableware.

Copper: This metal is sometimes found in cookware like pots and pans.

Zinc: This metal is found in galvanized items, which are coated with zinc. Some buckets, tubs, and other items may be galvanized.

To prevent toxic-metal poisoning, you should only use utensils and equipment that are made for handling food.

Foodservice Chemicals: Chemicals can contaminate food if they are used or stored the wrong way. Cleaners, sanitizers, polishes, and machine lubricants pose risks. To keep food safe, follow these guidelines.

• Store chemicals away from food, utensils, and equipment used for food. Keep them in separate storage area in their original container
• Follow the manufacturer’s directions when using chemicals
• Be careful when using chemicals while food is being prepped
• If you transfer a chemical to a new container, you must label it with the common name of chemical
• Only use lubricants that are made for foodservice equipment

Physical Contaminants: Food can become contaminated when objects get into it. It can also happen when natural objects are left in food, like bones in a fish fillet. Here are some common physical contaminants:

• Metal shavings from cans
• Staples from cartons
• Glass from broken light bulbs
• Blades from plastic or rubber scrapers
• Fingernail, hair, and bandages
• Dirt
• Bones
• Fruit pits

Closely inspect the food you receive. Take steps to make sure no physical contaminants can get into it.

How Food handler’s Can Contaminate Food: At every step in the flow of food, food handlers can contaminate food. They might not even realize it when they do it. Something as simple as rubbing an ear while prepping a salad could make a customer sick. Even a food handler who appears healthy and passed the medical, may spread foodborne pathogens.
Situations That Can Lead to Contaminating Food: Food handler can contaminate food in any of the following situations.

- When they have a foodborne illness
- When they have wounds that contain a pathogen
- When they have contact with a person who is ill
- When they touch anything that may contaminate their hands and then don’t wash them
- When they have symptoms such as diarrhea, vomiting, or jaundice – a yellowing of the eyes or skin

With some illnesses, a person may infect others before showing any symptom. For example, a person may infect other before showing any symptoms. For example, a person could spread hepatitis A for weeks before having any symptoms. With other illnesses, a person may infect others for days or even months after symptoms are gone. Some people carry pathogens and infect others without ever getting sick themselves. These people are called carriers.

**Actions That Can Contaminate Food:** People often do things that can spread pathogens without knowing it. To keep from causing a foodborne illness, pay close attention to what you do with your hands and avoid the following actions.

- Scratching the scalp
- Running fingers through the hair
- Wiping or touching the nose
- Rubbing an ear
- Touching an pimple or an infected wound
- Wearing a dirty uniform
- Coughing or sneezing into the hand

**Jeweler and clothing**
- Leave jeweler, including watches, in the cabin or in your locker at work because bacteria can live on and under straps and rings. Also, gemstones and small parts could drop into food.
- Never wear or carry outdoor clothes into a food area because they could contaminate food or surfaces.

**Store outdoor clothes away from food areas.**
- Put on protective clothing before entering the food area. Although protective clothes may keep your own clothes clean, this is not their main purpose.

**Essential Hand Hygiene:** Even if you can avoid touching food by hand, you will touch equipment, utensils and surfaces throughout the work period, so your hands must be scrupulously clean at all times. Wash your hands frequently throughout the day and always wash your hands.

**Handwashing:** Handwashing is the most important part of personal hygiene. It may seem like an obvious thing to do. Even so, many food handlers do not wash their hands the right way or as often as they should.
When to Wash Hands
Food handlers must wash their hands before they start to work. They must do it also after the following activities.

- Using the restroom
- Handling raw meat, poultry, and seafood (before and after)
- Touching the hair, body or face
- Sneezing, coughing, or using tissue
- Eating, drinking, smoking, or chewing gum or tobacco.
- Handling chemicals that might affect food safety.
- Taking out garbage
- Clearing tables or busing dirty dishes
- Touching clothing or aprons.
- Handling money
- Touching anything else that may contaminate hands, such as dirty equipment, work surfaces, or towels

Hand Antiseptics
Hand antiseptics are liquids or gels that are used to lower the number of pathogens on skin. If used, they must comply with food and drug Administration standards. Only use hand antiseptics after handwashing. Never use them in place of it. Wait for a hand antiseptic to dry before you touch food or equipment.

Hand Care: In addition to washing, hands need other care to prevent spreading pathogens.
Fingernail length: Keep fingernails short and clean. Long fingernails may be hard to keep clean.
Hand wounds:

Wear a bandage over wounds on hands and arms. Make sure it keeps the wound from leaking.

You must wear a single-use glove or finger cot (a finger cover) over bandages on hands or fingers. These will protect the bandage and keep it from falling off into food. It will also keep wounds that contain pathogens from contaminating food and cause illness.

Appropriate Clothing

Protective clothing is designed to protect food from contamination, and you from harm. Protective clothing should be:

- Suitable for the task
- Clean and in good condition
- Light colored, so that dirt will show easily, prompting you to change into clean replacement clothing
- Easy to clean

What you need to wear will largely depend upon the type of work you do. Typical examples include:

- Overalls, jackets, trousers, aprons
- Hats, hair nets, beard nets, moustache nets
- Non-slip shoes, boots, safety shoes
- Gloves

A hat or head covering must cover as much of your hair as possible. If your hair is long, it must be tied or clipped back so that it does not hang loose outside the head covering. Beards and moustaches should also be covered. Always put on your head covering before you put on other protective clothing to avoid displacing hair. Never brush or comb your hair in a food area. Do not wear protective clothing outside food areas because that could cause contamination.

Summary

- Keep yourself clean and tidy when working with food
- Wash your hands regularly throughout the work period
- Always wash your hands when they are likely to be contaminated – for instance after going to the toilet or handling raw meat or poultry
- Put on protective clothing before entering a food area
- Keep your hair covered
- Report symptoms of food-borne illness or any illness with similar symptoms to the Master

People are a common source of pathogenic bacteria, so everyone who works with food must have the highest possible standards of personal hygiene and personal habits to avoid contaminating food.
The Flow of Food
The path that food takes through our operation is called the flow of food. It begins when we buy the food and ends when you serve it. Your responsibilities are lying in the following steps:

• Receiving
• Storing
• Preparing
• Cooking
• Holding
• Cooling
• Reheating
• Serving

You are responsible for the food safety of food at every point in this flow – and many things can happen to it.

Cross Contamination
Pathogens can move around easy in your operation. They can be spread from food or unwashed hands to preparation areas, equipment, utensils, or other food. Cross contamination can happen at almost any point in the flow of food. When you know how and where it can happen, it is fairly easy to prevent. The most basic way is to keep raw and ready to eat food away from each other. Here are some guidelines for doing this.

Cleaning and Sanitizing
Clean and sanitize all work surfaces, equipment, and utensils after each task. To prevent pathogens such as Salmonella spp. From contaminating food, you must wash rinse and sanitize the equipment. We recommend using chlorine as sanitizer. You should use a chlorine solution of 50-100ppm (parts per million) for equipment and surfaces.
Preparing Food at Different Times

If you need to use the same table to prepare different types of food, prepare raw meat, fish, and poultry and ready-to-eat food at different times. You must clean and sanitize work surfaces and utensils between each product. For example, by preparing ready to eat food before raw food, you can minimize the chance for cross contamination.

Time- Temperature Abuse

TCS Food

Potentially hazardous food (time/temperature control for safety food) Means a FOOD that requires time/temperature control for safety (TCS) to limit Pathogenic microorganism growth or toxin formation.

Most foodborne illnesses happen because TCS food has been time and temperature abused. Remember, food has been time-temperature abused any time it remains at 40°F to 135°F (4°C to 57°C). This is called the temperature danger zone, because pathogens grow in this range. But they grow much faster at 70°F to 125°F (21°C to 52°C).

Food is being temperature abused whenever it is handled in the following ways
• Cooked to the wrong internal temperature
• Held at wrong temperature
• Cooled or reheated incorrectly

The longer food stays in the temperature danger zone, the more time pathogens have to grow. To keep food safe you must reduce the time it spends in this temperature range. If food is held in this range for four or more hours, you must throw it out.

Storing: following good storage guideline for food and nonfood items will help keep these items safe and preserve their quality. In general you must take steps to keep your storage area in good condition and rotate your stock.

General Storing Guidelines

Labeling: Label all TCS, ready-to-eat food. The label must include the name of the product and the date by which the food should be thrown out. Or the preparation date. You can store all ready-to-eat, TCS food that has been prepared on board for a maximum of 7 days at 39°F (4°C) or lower. After 7 days you must throw it out to prevent bacteria from growing to unsafe levels.

Rotation: Rotate food to use the oldest inventory first. You must use the first-in, first-out method to rotate refrigerated, frozen, and dry food during storage.

Cleaning: Keep all storage areas clean and dry. Clean up spills and leaks right away to keep them from contaminating other food group. Store food only in containers that have been cleaned and sanitized.
Refrigerated and Frozen Storage: As a Chief Cook, you are responsible for making sure that your coolers and freezers are keeping cold food cold and frozen food frozen. When coolers and freezers are not working the right way, the food in them can become time-temperature abused.

• **Temperatures:** Check proper temperatures on a daily base and make sure that the temperature sheets are getting filled out.
• **Airflow:** Do not overload coolers or freezers. Storing too many food items prevents good airflow and makes the unit work harder to stay cold. Be aware that frequent opening of the cooler lets warm air inside, which can affect food safety.

Preventing Cross-Contamination
Store food in ways that prevent cross contamination. Wrap or cover food. Store refrigerated raw meat, poultry, and seafood separately from ready-to-eat food. If raw and ready-to-eat food cannot be stored separately, store ready-to-eat food above raw meat, poultry, and seafood. This will prevent juices from raw food from dripping onto ready-to-eat food. Store raw meat, poultry, and seafood in coolers in the following top to bottom order:

- Seafood
- Whole cuts of beef and pork
- Ground meat and ground fish
- Whole and ground poultry

This order is based on the minimum internal cooking temperatures of each food.

Dry Storage: Follow these guidelines when placing food and other items in dry storage.

- Keep dry-storage areas cool and dry. To keep food at its highest quality and to assure food safety, the temperature of the dry-storage area should be between 50˚F and 70˚F (10˚C and 21˚C).
- Store dry food away from walls and at least six inches off the floor.

Follow always the FIFO rules.

Food Preparation: Cross contamination and time-temperature abuse can happen easily during your flow of food. But you can prevent pathogens from growing during preparation by making good food-preparation choices. It is important to use the right thawing methods. You also need to be aware of special handling practices when preparing specific kinds of food.

General Preparation Practices
**Equipment:** Make sure workstations, cutting boards, and utensils are clean and sanitized
**Quantity:** Remove from the cooler only as much food as you can prepare in a short period of time. Prepare food in small batches.
**Thawing:** Freezing does not kill pathogens. When frozen food is thawed and exposed to the temperature danger zone, any pathogens in the food will begin to grow. To reduce this growth, never thaw food at room temperature. You must thaw TCS food in one of these ways.
**Refrigeration:** Thaw food in a cooler, at product temperature of 39˚F (4˚C) or lower.
**Running water:** Submerge food under running water at 70˚F (21˚C) or lower.
**Microwave:** Thaw food in the microwave oven it will be cooked right after thawing.
**Cooking:** Thaw food as a part of cooking process.

Salad Containing TCS Food
Chicken, tuna, egg, pasta, and potato salads have been involved in foodborne illness outbreaks. These salads usually are not cooked after preparation. This means you do not have a chance to get rid of pathogens, like hepatitis A, that may have gotten into the salad when it was made. Therefore, you must take a few extra steps. Follow these guidelines.
Using leftovers: Make sure leftover TCS food that will be used to make salad has been handled the right way. Food such as pasta, chicken, and potatoes should be used only if it has been cooked, held, and cooled correctly.

Storing leftovers: throw out leftover food held at 39˚F (4˚C) or lower after seven days. Check the use-by date before using stored food items.

Cooking Food
The only way to reduce pathogens in food to a safe level is to cook it to the minimum internal temperature. This temperature is different for each food. Once reached, you must hold this temperature for a specific amount of time. If a crew member or officer requests a lower temperature (like a rare steak), you need to inform him of the potential risk of foodborne illness.

While cooking reduces pathogens in food, it does not destroy spores or toxins they may have produced. You still must handle food correctly before you cook it.

Cooking Requirements for Specific food
Minimum temperatures have been developed for TCS food. These temperatures are listed below.

- Poultry: 165°F (74°C) for 15 seconds
- Stuffing's / stuffed Meat: 165°F (74°C) for 15 seconds
- Ground Meat or Fish: 155°F (68°C) for 15 seconds Beef, Pork, Lamb, Veal
- Steaks/Chops: 145°F (63°C) for 145°F (63°C) for 4 minute
- Fish: 145°F (63°C) for 15 seconds
- Roasts: 145°F (63°C) for 4 minute
- Shell Eggs for Immediate Service: 145°F (63°C) for 15 seconds
- Shell Eggs That Will Be Hot-Held: 155°F (68°C) for 15 seconds

Cooling and Reheating Food
When you don’t serve cooked food immediately, you must get it out of the temperature danger zone as quickly as possible. That means cooling it quickly. You also need to reheat it correctly especially if you are going to hold it.

Cooling Food
As you know, pathogens grow well in the temperature danger zone. But they grow much faster at temperatures between 125°F and 70°F (52°C and 21°C). Food must pass through this temperature range quickly to reduce this growth. Cool TCS food from 135°F (57°C) to 39°F (4°C) or lower within six hours. First, cool food from 135°F to 70°F (57°C to 21°C) within two hours. Then cool it to 39°F (4°C) or lower in the next four hours. If food has not reached 70°F (21°C) within two hours, it must be thrown out or reheated and then cooled again. If you can cool the food from 135°F to 70°F (57°C to 21°C) in less than two hours, you can use the remaining time to cool it to 39°F (4°C) or lower. However, the total cooling time cannot be longer than six hours. For example, if you cool food from 135°F to 70°F (57°C to 21°C) in one hour, you have the remaining five hours to get the food to 39°F (4°C) or lower.

Methods for Cooling Food
The following factors affect how quickly food will cool.

Thickness or density of the food the denser the food, the more slowly it will cool. For example, refried beans will take longer to cool then vegetable broth because the beans are denser than the broth.
Storage container
Stainless steel transfers heat away from food faster than plastic. Shallow pans let the heat from food disperse faster than deep pans. NEVER place large quantities of hot food in a cooler to cool. Coolers are designed to keep cold food cold. Most are not designed to cool hot food quickly. Also, placing hot food in a cooler or freezer to cool it may not move the food through the temperature danger zone quickly enough.

Before cooling food
You should start by reducing its size. This will let it cool faster. Cut large food items into smaller pieces. Divide large containers of food into smaller containers or shallow pans. The food handler in the photo is doing this. Ice-water bath after dividing food into smaller containers, place them in a clean prep sink or large pot filled with ice water. Stir the food frequently to cool it faster and more evenly. Ice paddle Plastic paddlers are available that can be filled with ice or with water and the frozen. Food stirred with theses paddles will cool quickly. Food cools faster even faster when placed in an ice-water bath and stirred with an ice paddle.

Blast chiller or a tumble chiller
Blast chillers blast cold air across food at high speeds to remove heat. They are typically used to cool large amounts of food. Tumble chillers tumble bags of hot food in cold water. Tumble chillers work well on thick food such as mashed potatoes. Food also can be cooled by adding ice or cold water as an ingredient. This works for soups, stews, and other recipes that have water as an ingredient. When cooling this way, the recipe is made with less water than required. Cold water or ice is then added after cooking to cool the food and provide remaining water.

Safe methods for cooling food include

- Reducing the quantity or size of the food
- Using ice-water baths
- Using a blast chill
- Stirring the food
Reheating Food: How you reheat food depends on how you intend to use the food. Follow these guidelines.

Food reheat for hot-holding
From start to finish, you must heat the food to an internal temperature of 165°F (74°C) within two hours. The food handler in the photo at left is reheating clam chowder for hot-holding. Roasts can be reheated to the alternative temperatures listed below, depending on the type of roast and the oven used.

Check your local regulatory requirements.

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<td>145°C (63°C)</td>
<td>4 minutes</td>
</tr>
</tbody>
</table>

Food reheated for immediate service
You can reheat food that will be served immediately, like beef for a beef sandwich, to any temperature. However, you must make sure the food was cooked and cooled correctly.

HACCP
A HACCP system can also be used to control risks and hazards throughout the flow of food. HACCP (pronounced HASS-ip) is based on identifying significant biological, chemical, or physical hazards at specific points within a product’s flow. Once identified, the hazards can be prevented, eliminated, or reduced to safe levels. An effective HACCP system must be based on a written plan. This plan must be specific to each facility’s menu, customers, equipment, processes, and operations. Since each HACCP plan is unique, a plan that works for one operation may not work for another.

The HACCP Approach
A HACCP plan is based on seven basic principles. They were created by the National Advisory Committee on Microbiological Criteria for Foods. These principles are the seven steps that outline how to create a HACCP plan.

The Seven HACCP Principles
Each HACCP principle builds on the information gained from the previous principle. You must consider all seven principles, in order, when developing your plan.

Here are the seven principles.
1. Conduct a hazard analysis.
2. Determine critical control points (CCPs)
3. Establish critical limits.
4. Establish monitoring procedures.
5. Identify corrective actions.
6. Verify that the system works.
7. Establish procedures for record keeping and documentation.
In general terms, the principles break into three groups.
- Principles 1 and 2 help you identify and evaluate your hazards
- Principles 3, 4 and 5 help you establish ways for controlling those hazards
- Principles 6 and 7 help you maintain the HACCP plan and system, and verify its effectiveness

**Principle 1: Conduct a Hazard Analysis**
First, identify and assess potential hazards in the food you serve. Start by looking at how food is processed in your operation. Many types of food are processed in similar ways. Here are some common processes.

- Prepping and serving without cooking (salads, cold sandwiches, etc.)
- Prepping and cooking for same-day service (grilled chicken sandwiches, hamburgers, etc.)
- Prepping, cooking, holding, cooling, reheating, and serving (chili, soup, pasta sauce with meat, etc.)

Look at your menu and identify items that are processed like this. Next, identify the TCS food. Determine where food safety hazards are likely to occur for each TCS food. There are many types of hazards to look for.

- Biological
- Chemical
- Physical

**Principle 2: Determine Critical Control Points (CCPs)**
Find the points in the process where the identified hazard(s) can be prevented, eliminated, or reduced to safe levels. These are the critical control points (CCPs). Depending on the process, there may be more than one CCP.

**Principle 3: Establish Critical Limits**
For each CCP, establish minimum or maximum limits. These limits must be prevent or eliminate the hazard, or to reduce it to a safe level.

**Principle 4: Establish Monitoring Procedures**
Once critical limits have been created, determine the best way for your operation to check them. Make sure the limits are consistently met. Identify who will monitor them and how often.

**Principle 5: Identify Corrective Actions**
Identify steps that must be taken when a critical limit is not met. These steps should be determined in advance.

**Principle 6: Verify That the System Works**
Determine if the plan is working as intended. Evaluate it on a regular basis. Use your monitoring charts, records, hazard analysis, etc., and determine if your plan prevents, reduces, or eliminates identified hazards.

**Principle 7: Establish Procedures for Record Keeping and Documentation**
Maintain your HACCP plan and keep all documentation created when developing it. Keep records for the following actions.

- Monitoring activities
- Taking corrective action
- Validating equipment (checking for good working condition)
- Working with suppliers (e.g., shelf-life studies, invoices, specifications, challenge studies, etc.)
When a HACCP Plan is Required
A HACCP is required when prepping food in the following ways. Always check with your local regulatory authority to see if a variance is also required.

• Smoking food as a method to preserve it (but not to enhance flavor)
• Using food additives or adding components such as vinegar to preserve or alter it so it no longer requires time and temperature control for safety
• Curing food
• Custom-processing animals. For example, this may include dressing deer in the operation for personal use
• Packaging food using reduced-oxygen packaging (ROP) methods. This includes MAP, vacuum-packed, and sous vide food. Clostridium botulinum and Listeria monocytogenes are risks to food packaged in these ways
• Treat (e.g., pasteurize) juice on-site, and package it for later sale
• Sprouting seeds or beans
• Offering live, molluscan shellfish from a display tank

Cleaning and Sanitizing
Food can easily be contaminated if you don’t keep your facility and equipment clean and sanitized. Surfaces that touch food must be cleaned and sanitized the right way and at the right times. Cleaning includes using the right type of cleaner for a job. Sanitizing involves using a method that works for your operation and following the right steps to make sure it is effective.

How and When to Clean and Sanitize

Cleaning removes food and other dirt from a surface. Sanitizing reduces pathogens on a surface to safe levels
All surfaces must be cleaned and rinsed. This includes walls, storage shelves, and garbage containers. However, any surface that touches food, such as knives, stockpots, and cutting boards, must be cleaned and sanitized.

How to clean and sanitize
To clean and sanitize a surface, follow these steps.

• Clean the surface
• Rinse the surface
• Sanitize the surface
• Allow the surface to air-dry

When to clean and sanitize
All food-contact surfaces need to be cleaned and sanitized at these times.

• After they are used
• Before food handlers start working with a different type of food
• Anytime food handlers are interrupted during a task and the items being used may have been contaminated
• After four hours if items are in constant use

Cleaners
Cleaners are chemicals that remove food, dirt, rust, stains, minerals, and other deposits. Cleaners must be stable, non-corrosive, and safe to use.
Guidelines for Cleaners
To use cleaners correctly, follow these guidelines.

• Follow manufacturers’ instructions carefully. If not used the right way, cleaners may not work and can even be dangerous
• NEVER combine cleaners. Combining ammonia and chlorine bleach, for example, produces chlorine gas. This gas can be fatal
• DO NOT use one type of detergent in place of another unless the intended use is the same. For example, if you use dishwasher detergent to wash dishes by hand, you can burn your skin. Check the label for the intended use.

Types of Cleaners
Cleaners are divided into the following four groups.

Detergents
The detergent you use will depend on your task.

• General-purpose detergents remove fresh dirt from floors, walls, ceilings, prep surfaces, and most equipment and utensils.
• Heavy-duty detergents remove wax, aged or dried dirt, and baked-on grease. Dishwasher detergents are an example.

Degreases
Degreases have ingredients for dissolving grease. They work well where grease has been burned on. This includes grill backsplashes, oven doors, and range hoods.

Delimers
Delimers are acid cleaners used on mineral deposits and dirt that other cleaners can’t remove. Delimers are often used on steam tables and dishwashers.

Abrasive cleaners
Abrasive cleaners have a scouring agent that helps scrub hard-to-remove dirt. They are used to remove baked-on food. Be aware that they can scratch surfaces.

Sanitizing
Food-contact surfaces must be sanitized after they have been cleaned and rinsed. This can be done by using heat or chemicals.

Heat Sanitizing
One way to sanitize items is to soak them in hot water. For this method to work, the water must be at least 171°F (77°C). The items must be soaked for 30 seconds. You may need a heating device to keep the water hot enough for sanitizing. Be sure to check the water with thermometer. Another way to sanitize items is to run them through a high-temperature dishwasher.

Chemical Sanitizing
Tableware, utensils, and equipment can be sanitized by soaking them in sanitizing solution. Or you can rinse, swab, or spray them with sanitizing solution.

Concentration Sanitizer solution is a mix of chemical sanitizer and water. The concentration of this mix the amount of sanitizer to water – is critical. Too much water may make the solution too strong and unsafe. It could also leave a bad taste on items or corrode metal. Concentration is measured in parts per million (ppm). To check the concentration for a sanitizer solution, use a test kit. Make sure it is made for the sanitizer being used.
Hard water, food bits, and leftover detergent can reduce the solution’s effectiveness. Change the solution when it looks dirty or its concentration is too low. Check the concentration often.

**Temperature** The water is sanitizing solution must be at right temperature. Follow the manufacturers’ recommendations.

**Contact time** for a sanitizer solution to kill pathogens, it must make contact with the object being sanitized for a specific amount of time.

**Manual Dish washing**
Preparations often use a three-compartment sink to wash items. The sink station should have the parts shown in the illustration below.

- Area for rinsing away food or scraping it into garbage containers.
- Drain board to hold dirty items.
- Drain board to hold clean items.
- Thermometer to measure water temperature
- Clock with a second hand to time how long items have been in the sanitizer

Before washing tableware, utensils, and equipment in a three-compartment sink, each sink and all work surfaces must be cleaned and sanitized.

**How to Clean and Sanitize in a Three-Compartment Sink**
Follow these steps to clean and sanitize items in a three-compartment sink.

- Rinse, scrape, or soak items before washing them.
- Clean items in the first sink. Wash them in a detergent solution at least 110°F (43°C). Use a brush, cloth or nylon scrub pad to loosen dirt. Change the detergent solution when the suds are gone or the water is dirty.
- Rinse items in the second sink. Spray them with water or dip them in it. Make sure you remove all traces of food and detergent. If dipping the items, change the rinse water when it becomes dirty or full of suds.
- Sanitize items in the third sink
- NEVER rinse items after sanitizing them. This could contaminate their surfaces. The only exception to this rule is when you are washing items in a dishwasher that can safely rinse items after they have been meet these requirements.
- Air-dry items. Place items upside down so they will drain.
Storing Tableware and Equipment
Once utensils, tableware, and equipment have been cleaned and sanitized, they must be stored in a way that will protect them from contamination. Follow these guidelines.

Storage
Store tableware and utensils at least six inches (15 centimeters) off the floor. Protect them from dirt and moisture.

Storage Surfaces
Clean and sanitize drawers and shelves before storing clean items.

Glasses and Flatware
Store glasses and cups upside down on a clean and sanitized shelf or rack. Store flatware and utensils with handles up. Staff can then pick them up without touching food-contact surfaces, which will help prevent the transfer of pathogens such as Norovirus.

Trays and carts
Clean and sanitize trays and carts used to carry clean tableware and utensils. Check them daily, and clean as often as needed. Stationary equipment Keep the food-contacts surfaces of stationary equipment covered until ready for use.

Cleaning and Sanitizing in the Operation
Keeping your operation clean, means using the right tools and supplies. You also must store these items after using them to prevent contamination. Many of the chemicals you will use are hazardous, so you also have to know how to handle them to prevent injury.

Cleaning the Premises
Nonfood-contact surfaces must be cleaned regularly. Examples include floors, ceilings, equipment exteriors, restrooms, and walls. Regular cleaning prevents dust, dirt, food residue, and the other debris from building up.

Cleaning Tools and Supplies
You need many tools and supplies to keep the operation clean. You must also know how to use and store these items.

Choosing the Right Tools
Even a cleaning tool can contaminate surfaces if it is not handled carefully. Cleaning tools before putting them away can help prevent this. So does assigning tools for specific tasks. For example, you could use one set of tools to clean food-contact surfaces and another set for nonfood-contact surfaces. You could also use one set of tools for cleaning and another for sanitizing (three bucket System).

Brushes
Brushes loosen dirt better than towels because they let you apply more pressure. However, worn brushes will not clean well and can contaminate surfaces. Throw them away. Always use the right brush for the job.

Scouring pads
Steel wool and other scouring pads are sometimes used to clean very dirty pots, pans, and equipment’s. However, metal scouring pads can break apart. If they are used on food-contact surfaces, bits of the pad can get into food. Nylon scouring pads are alternative.
**Mops and brooms**
Keep both light- and heavy-duty mops and brooms on hand. Mop heads can be all cotton or synthetic blends. Both vertical and push-type brooms are also useful.

**Towels**
NEVER use towels meant for cleaning food spills for any other purpose. Store towels in a sanitizer solution between uses. Keep towels that come in contact with raw meat, fish, or poultry separate from other cleaning towels.

**Storing Cleaning Tools and Supplies**
Store cleaning tools and chemicals in a separate area away from food and prep areas. The storage area should have the following.

- Good lightning so you can see chemicals easily
- Hooks for hanging mops, brooms and other cleaning tools
- Utility sink for filling buckets and washing cleaning tools
- Floor drain for dumping dirty water

To prevent contamination, NEVER clean mops, brushes, or other tools in sinks used for hand washing, food prep, or dishwashing

**When storing cleaning tools, consider the following:**

- Air-dry towels overnight
- Hand mops, brooms, and brushes on hooks to air-dry
- Clean and rinse buckets. Let them air-dry, and then store them with other tools

**Using Foodservice Chemicals**
Many of the chemicals used in the operation can be hazardous, especially if they are used the wrong way. To reduce your risk, you should only use chemicals that are approved for use in a foodservice operation. You should also follow these guidelines.

**Storage and Labelling**
Store chemicals in their original containers away from food prep areas. If the chemicals are transferred to a new container, the label on that container must list the common name of the chemical.

**Material Safety Data Sheets**
The Occupational Safety and Health Administration (OSHA) has requirements for using chemicals. OSHA requires chemical manufacturers and suppliers to provide a Material Safety Data Sheet (MSDS) for each hazardous chemical they sell. An MSDS contains the following information about the chemical.

- Safe use and handling
- Physical health, fire, and reactivity hazards
- Precautions
- Appropriate personal protective equipment (PPE) to wear when using the chemical
- First-aid information and steps to take in an emergency
- Manufacturer’s name, address, and phone number
- Preparation date of MSDS
- Hazardous ingredients and identity information
MSDS are often sent with the chemical shipment. You also can request them from your supplier or the manufacturer. You have a right to see an MSDS for any hazardous chemical you work with.

The Integrated Pest Management (IPM) Program
Rodents, insects, birds, and other pests are more than just unsightly. They can damage food, supplies, and facilities. But the greatest danger comes from their ability to spread diseases, including food borne illnesses. The best way to deal with pests is to have an IPM program.

Rules of an IPM Program
An IPM Program has two parts. First, it uses prevention measures to keep pests from entering the operation. Second, it uses control measures to eliminate any pests that do manage to get inside.

Prevention is critical in pest control. Don’t wait until you find pests in your operation. If you do see them, they may already be present in large numbers. Once this happens you have an infestation, and an infestation can be very difficult to eliminate.

There are three basic rules for an IPM program.
- Deny pests access to the operation
- Deny pests food, water, and a hiding or nesting place
- Work with a licensed PCO to eliminate pests that do enter the operation

Keeping Pests Out of the Operation
Pests can enter an operation in one of two ways. Sometimes they are brought inside with deliveries. They can also enter through openings in the building. Prevent pests from entering by paying attention to the following areas.

Deliveries
- Use approved reputable suppliers
- Check all deliveries before they enter your operation
- Refuse shipments in which you find pests or signs of pests. This includes egg cases and body parts (legs, wings, etc.)

Pipes
- Mice, rats, and insects use pipes as highway through a facility
- Use concrete to fill holes or sheet metal to cover openings around pipes.
- Install screens over ventilation pipes and ducts on the roof.
- Cover floor drains with hinged grates to keep rodents out. Rats are very good swimmers and can enter through drainpipes.

Floors and Walls
- Rodents can burrow into buildings. They can dig through decaying masonry or cracks in building foundations. They also move through floors and walls in the same way. Mice can squeeze through holes the size of a nickel. Rats can pass through holes the size of a half dollar.
- Seal all cracks in floors and walls. Use a permanent sealant recommended by your PCO or local regulatory authority.
- Seal spaces or cracks where stationary equipment is fitted to the floor. Use an approved sealant or concrete, depending on the size of the gaps

Denying Pests Food and Shelter
Pests are usually attracted to damp, dark, and dirty places. A clean operation offers them little access to food and shelter. The stray pest that might get in cannot survive or breed in a clean kitchen. Besides sticking to your master cleaning schedule, follow these guidelines.
Garbage Disposal
Throw out garbage quickly and correctly. Garbage attracts pests and provides them with a place to breed. Keep garbage containers clean and in good condition. Keep outdoor containers tightly covered. Clean up spills around garbage containers immediately, and wash containers regularly.

Food and Supplies
Store all food and supplies the right way and as quickly as possible.

- Keep food and supplies away from walls and at least six inches (15 centimeters) off the floor
- Consider refrigerating food such as powdered milk, cocoa, and nuts after opening. Most insects that might be attracted to this food become inactive at temperatures below 41°F (5°C)
- Use FIFO to rotate products so pests do not have time to settle into them and breed

Cleaning
- Careful cleaning eliminates the pest’s food supply and destroys insect eggs. It also reduces the places pests can take shelter
- Clean up food and beverage spills immediately, including crumbs and scraps
- Clean toilets and restrooms as often as necessary, at least once a day
- Mess room areas clean. Food and dirty clothes should not be kept in or around lockers. Remove garbage and food debris from mess rooms regularly
- Empty water from buckets to keep from attracting rodents

Identifying Pests
As Chief Cook you must know how to determine the type of pests you are dealing with. Record the time, date and location of any signs of pests and report them to the Master.

Cockroaches
Roaches often carry pathogens such as Salmonella spp., fungi, parasite eggs, and viruses. Most live and breed in dark, warm, moist and hard to clean areas. If you see a cockroach in daylight, you may have a major infestation. Check for the following signs.

- Strong oily odor
- Droppings, which look like grains of black pepper
- Capsule shaped egg cases that are brown, dark red or black

Rodents
Rodents are a serious health hazard. They eat and ruin food, damage property and spread diseases. A vessel might be infested with both rats and mice at the same time. Look for the following sings:

- Gnaw marks  Rats and mice gnaw to get food and to wear down their teeth, which grow continuously
- Dropping and urine stains  Fresh droppings are shiny and black. Older droppings are gray. Rodent urine will “glow” when exposed to a black (ultraviolet) light
- Tracks  Rodents tend to use the same pathways through your operation. If rodents are a problem in your operation, you may see dirt tracks along light-colored walls
- Nests  Rats and mice use soft materials, such as scraps of paper, cloth, hair, feathers, and grass, to build their nests
- Holes  Rats usually nest in holes located in quiet places. Nests are often found near food and water
Using Pesticides
Sometimes it may seem more cost effective to purchase and apply pesticides yourself. However, there are many reasons NOT to do this.

- Pesticides that are applied the wrong way may be ineffective or harmful
- Pests can develop resistance and immunity to pesticides
- Each region has its own pest-control problems, and some control measures are more effective than others
- Pesticides are regulated by federal, state, and local laws. Some pesticides are not approved for use in foodservice operations

If in doubt speak with your Captain or Chief Officer to decide how pesticides should be used in your operation. They are trained to determine the best pesticide for each pest, and how and where to apply it. Follow these guidelines whenever pesticides are applied.

- Prepare the area to be sprayed by removing all food and movable food-contact surfaces
- Cover equipment and food-contact surfaces that cannot be moved as shown in the photo at left
- Wash, rinse, and sanitize food-contact surfaces after the area has been sprayed

Storing Pesticides If pesticides are stored, use the following guideline
- Keep pesticides in their original containers.
- Store pesticides in a secure location away from areas where food, utensils, and food equipment are stored.

Garrets Food Hygiene Management Support
Garrets Superintendent department are available to offer additional Food Hygiene Management guidance on any of the subjects mentioned in this document.

If you have any enquires please email the Operations Manager: chris.little@garrets.com