

ServSafe Study Guide

Providing Safe Food

As a foodservice manager, you have responsibilities to your operation, staff, and customers. The best way to meet those responsibilities is to keep the food you serve safe.

A foodborne illness is a disease transmitted to people by food. An illness is considered an outbreak when two or more people have the same symptoms after eating the same food.

Three types of contaminants threaten food safety. They are: biological, chemical, and physical. Of these, biological contaminants, such as pathogens, pose the greatest danger.

Food handlers who do not follow the correct procedures can also threaten the safety of food. They can do this when they fail to cook food enough and when they hold it at incorrect temperatures. Food handlers can also cause an illness when they use contaminated equipment and when they practice poor personal hygiene.

Food has been time-temperature abused when it has stayed too long at temperatures that are good for the growth of pathogens. Pathogens can be transferred from one surface or food to another. This is called cross-contamination. Pathogens can also be spread to food if equipment has not been cleaned and sanitized correctly between uses.

Pathogens grow well in TCS food¹. To prevent this growth, this food needs time and temperature control.

Some groups are at a higher risk of getting sick from unsafe food. They include preschool-age children; the elderly; people with cancer or on chemotherapy; people with HIV/AIDS; transplant recipients; and people on certain medications.

Important prevention measures for keeping food safe are: controlling time and temperature; preventing cross-contamination; practicing good personal hygiene; purchasing from approved, reputable suppliers; and cleaning and sanitizing items correctly.

¹ TCS food – Time and Temperature control for safety. TCS foods include: Milk and dairy products, shell eggs, meat: beef, pork, and lamb, poultry, fish, shellfish and crustaceans, baked potatoes, cooked rice; beans, and vegetables, tofu or other soy protein, sprouts and sprout seeds, sliced melons, cut tomatoes and cut leafy greens, untreated garlic-and-oil mixtures.

ServSafe Study Guide

Forms of Contamination

Contamination is the presence of harmful substances in food. Those substances can be biological, chemical, or physical.

Pathogens are disease-causing microorganisms that make you sick when you eat them. Others produce poison-or toxins-that make you sick. These are four types of pathogens that can contaminate food and cause foodborne illness. Viruses, bacteria, parasites, and fungi.

Some common symptoms of foodborne illness include diarrhea, vomiting, fever, nausea, abdominal cramps, and jaundice, Onset times will depend on the type of foodborne illness a person has.

Bacteria cannot be seen, smelled, or tasted. If conditions are correct bacteria will grow rapidly. The most important prevention measure is to control time and temperature. Bacteria need six conditions to grow. They can be remembered by the word FAT TOM. It stands for food, acidity, temperature, time, oxygen, and moisture. You will most likely be able to only control time and temperature.

Salmonella Typhi, nontyphoidal Samonella, Shigella spp., and enterohemorrhagic and shiga toxin-producing E. coli² (STEC) are highly contagious and can cause severe illness. Food handlers diagnosed with illnesses from these bacteria can never work in a foodservice operation while they are sick.

Viruses require a host to grow. People can get viruses from food, water, or contaminated surfaces. Many viruses are transferred though fecal-oral route. Normal cooking temperatures do not destroy most. That's why it's important to practice good personal hygiene when handling food and food-contact surfaces.

Hepatitis A and Norovirus³ are highly contagious and can cause severe illness. Food handlers diagnosed with illnesses from these viruses can never work in a foodservice operation while they are sick.

Parasites require a host to live and reproduce. They are commonly associated with seafood and food processed with contaminated water. The most important measure for preventing parasites from causing a foodborne illness is to purchase food from approved, reputable suppliers. Fungi include mold, yeast, and mushrooms. Like parasites, purchasing food from approved, reputable suppliers prevents them.

² Salmonella Typhi, nontyphoidal Samonella, Shigella spp., and enterohemorrhagic and shiga toxin-producing E. coli. Simply known as Salmonella, nontyphoidal Samonella, Shigella and E coli. Also these are four of the "Big Six" foodborne illnesses.

³ Hepatitis A and Norovirus are the other two of the "Big Six" foodborne illnesses.

ServSafe Study Guide

Cooking or freezing cannot destroy some toxins. The most important way to prevent a foodborne illness is to purchase plants, mushrooms, and seafood from approved, reputable suppliers. It is also important to control time and temperature when handling raw fish.

Chemical contaminants include toxic metals, cleaners, sanitizers, polishes, and machine lubricants. To help prevent chemical contamination, store chemicals away from prep areas, food storage areas, and service areas. Always follow the manufactures' directions when using chemicals.

Physical contamination can happen when objects get into food. Naturally occurring objects, such a bones in a fish fillet, are a physical hazard. Closely inspect the food you receive. Make sure no physical contaminants can get into it at any point during the flow of food.

People may try to tamper with food using biological, chemical, physical, or even radioactive contaminants. The key to protecting food is to make it hard for someone to tamper with it.

A food allergen is a naturally occurring protein in a food or ingredient that some people are sensitive to. The most common food allergens include milk, eggs, fish, shellfish, wheat, soy, peanuts, and tree nuts, also known as the big eight food allergens. Service staff must be able to tell customers about menu items that contain potential allergens. Kitchen staff must make sure that allergens are not transferred from food containing an allergen to the food served to the customer with allergies.

The Safe Food Handler

Food handlers can spread pathogens and contaminate food at every step in the flow of food⁴. Good personal hygiene is critical in an operation.

Hands must be washed correctly and at the correct times: before starting work; after using the restroom; after sneezing, coughing, smoking, eating, or drinking; and before and after handling raw meat, poultry, and fish.

Fingernails should be kept short, clean, and without polish.

Before handling food or working in prep areas, food handlers must put on clean clothing and a clean hair restraint. They must remove jewelry from hands and arms. Aprons should be removed and stored when food handlers leave prep areas.

Food handlers should never eat, smoke, or chew gum or tobacco in food prep or service areas, or in areas designated for cleaning utensils and equipment.

⁴ The Flow of Food – The path that food takes through your operation.

ServSafe Study Guide

Staff should report health problems to managers before working with food. Food handlers must be excluded from work if they have been diagnosed with a foodborne illness caused by Salmonella Typhi; nontyphoidal Samonella; Shigella spp.; enterohemorrhagic and shiga toxin-producing E. coli; hepatitis A; or Norovirus⁵. Food handlers also must not come to work if they have symptoms that include diarrhea, vomiting, or jaundice. Staff should not work with or around food if they have a sore throat and a fever.

To keep food handlers from contaminating food, your operation needs a good personal hygiene program. You can minimize the risk of foodborne illnesses by establishing a program, training, and enforcing it. Most important, you must set an example yourself by practicing good personal hygiene.

The Flow of Food: An Introduction

The flow of food is the path food takes in your operation from purchasing to service. Many things can happen to food in its flow through the operation. Two major concerns are cross-contamination and time-temperature abuse.

To prevent cross-contamination, use separate equipment for each type of food. Also, you must clean and sanitize all work surfaces, equipment, and utensils after each task. Prepping ready-to-eat food before raw meat, poultry, and fish is one way to minimize the chance for cross-contamination. Similarly, you can buy food items that don't require much preparation or handling.

Time-temperature abuse happens any time food remains between 41°F and 135°F. This range is called the temperature danger zone. You must try to keep food out of this range.

A thermometer is the most important tool you can use to prevent time-temperature abuse. You should regularly record food temperatures and the times they were taken.

Always put the thermometer stem or probe into the thickest part of the food. A bimetallic-stemmed thermometer should be put into food from the trip to the end of the sensing area. Before you record the temperature, wait for the thermometer reading to steady. Never use glass thermometer with food items unless they are enclosed in a shatterproof casing.

Thermometers should be calibrated regularly. Most important, they must be cleaned and sanitized before and after each use.

⁵ Salmonella Typhi; nontyphoidal Samonella; Shigella spp.; enterohemorrhagic and shiga toxin-producing E. coli; hepatitis A; or Norovirus – Also know as “The Big Six”.

ServSafe Study Guide

The Flow of Food: Purchasing, Receiving, and Storage

Food must be purchased from approved, reputable suppliers. These suppliers must be inspected and meet applicable local, state, and federal laws.

Designated staff trained to follow food safety guidelines must inspect deliveries. That will include a visual inspection of food as well as checks to make sure the food has been received at the correct temperature.

Sometimes, the manufacturer will recall food items. Identify these items, remove them from inventory, and secure them in an appropriate location. Mark them so that staff does not use them.

Cold TCS food must be received at 41°F or lower. Hot TCS foods must be received at 135°F or higher. Frozen food should always be received frozen. Received food should have the correct color, texture, and odor.

The packaging of delivered food items must be intact and clean, and it must protect food from contamination. There should also be no signs of pest or dampness. Food items should be correctly labeled and contain the correct documentation.

Food must be stored in ways that prevent cross-contamination. Raw meat, poultry, and seafood should be stored separately from ready-to-eat food. If this is not possible, store ready-to-eat food above raw meat, poultry, and seafood.

Food should be labeled before it is stored. The label should include the common name of the food. If TCS food was prepped in-house and will be stored longer than 24 hours, it must also be date marked. This food can be stored only for seven days if held at 41°F or lower.

Food should only be stored in a designated storage area. It should be stored away from walls and at least six inches off the floor. Stored food items should always be rotated so that older items are used first.

The Flow of Food: Preparation

To protect food during preparation, you must handle it safely. The keys are time and temperature control and preventing cross-contamination.

Freezing does not kill pathogens. Pathogens in the food will grow if exposed to the temperature danger zone during thawing. Thaw frozen food in the cooler, under running water, in a microwave oven, or as part of the cooking process. Never thaw food at room temperature.

Prevent cross-contamination and time-temperature abuse when preparing food. Prep food in small batches and keep workstations and utensils clean and sanitized.

ServSafe Study Guide

Prepped food that is not going to be cooked immediately should be put back in the cooler.

Cooking food can reduce pathogens in food to safe levels. You must cool food to minimum internal temperatures for a specific amount of time. These temperatures vary from food. Cooking does not kill the spores or toxins that some pathogens produce.

You must advise customers who order food that is raw or undercooked of the increased risk of foodborne illness. You can do this in different ways. If your menu includes TCS items that are raw or undercooked, you must note it on the menu next to these items. The FDA⁶ advises against offering raw and undercooked food on children's menus.

TCS food must be cooled from 135°F to 70°F within two hours. Then it must be cooled from 70°F to 41°F or lower in the next four hours.

Before food is cooled, you should reduce its size. Cut large food items into smaller pieces. Divide large containers of food into smaller ones. Use an ice-water bath, stir food with ice paddles, or use a blast or tumble chiller to cool food safely.

Reheated TCS food that will be hot-held must be heated to an internal temperature of 165°F for 15 seconds. Make sure the food reaches this temperature within two hours.

The Flow of Food: Service

When holding TCS food for service, keep hot food at 135°F or higher. Never use hot holding equipment to reheat food. Keep cold food at 41°F or lower. Check the internal temperature of food at least every four hours. Throw food out if it is not at the correct temperature.

Review the guidelines for keeping food safe when holding food without temperature control.

Staff should be trained to avoid bare-hand contact with ready-to-eat food, and use separate utensils for serving different food items.

Teach staff the correct ways for handling service items and tableware. Staff should also be trained on the potential hazards of re-serving food such as plate garnishes, breads, or open dishes of condiments.

⁶ FDA- The Food and Drug Administration inspects all food except meat, poultry, and eggs.

ServSafe Study Guide

Staff and customers can contaminate self-services areas. Protect food on display with sneeze guards, packaging, or other tools designed to keep food safe. Post self-service rules. Make it clear to customers that clean plates must be used for refills. Put the correct labels on displayed food and bulk food available for self-service. Make sure equipment holds food at the correct temperature. Follow safety procedures when prepping, delivering, or serving food off-site.

Vending machine food should be handled as carefully as any other food. Check product shelf life daily. Hold TCS food at the correct temperature.

Food Safety Management Systems

A food safety management system is a group of procedures and practices intended to prevent foodborne illness. It does this by actively controlling risk and hazards throughout the flow of food.

It is the manager's responsibility to actively control the risk factors for foodborne illness. This is called active managerial control. It can be achieved by incorporating specific actions and procedures into the operation to prevent foodborne illness.

There are six important steps to take when implementing active managerial control into your operation: identify risks, monitor, corrective action, management oversight, training, and re-evaluation.

The FDA provides specific recommendations for controlling the common risk factors for foodborne illness. These are known as public health interventions. They are designed to protect public health.

HACCP⁷ systems are 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.

⁷ HACCP – Hazard Analysis Critical Control Point, a system that can be implemented to achieve active managerial control of foodborne illness risk factors.

ServSafe Study Guide

Safe Facilities and Pest Management

Choose flooring, wall, and ceiling materials that are smooth and durable. This will make cleaning easier. Replace and maintain these materials when necessary.

Make sure equipment that will come in contact with food is smooth, nonabsorbent, and easy to clean. Floor-mounted equipment must be put on legs at least six inches high or sealed to a masonry base. Tabletop equipment must be put on legs that are at least four inches high or sealed to the countertop.

Dishwashing machines must be installed so that they prevent contamination of utensils, equipment, and other food contact surfaces.

Handwashing stations should include hot and cold running drinkable water, soap, and a way to dry hands. They should also include a garbage container if paper towels are provided, and signage reminding staff to wash hands before returning to work.

Plumbing must always be installed and maintained by a licensed plumber. This will help prevent cross-connections from occurring. A cross-connection is dangerous because it can let backflow occur. Backflow is the reverse flow of contaminants through a cross-connection into a drinkable water supply.

Garbage must be removed from prep areas as quickly as possible to prevent odors, pests, and possible contamination. Garbage containers must be leak proof, waterproof and pest proof. They must be cleaned, inside and out, frequently. Facilities must also be regularly maintained. Clean them on a regular basis, and make sure there are no leaks, holes, or cracks in the floors, foundation, or ceilings.

To keep your operation pest free, you must deny pest access to the operation. You can do this by inspecting deliveries before they come into your operation. You also need to eliminate points of access. Deny pest's access to food, water, and shelter.

Cleaning and Sanitizing

Cleaning removes food and other dirt from a surface. Sanitizing reduces the number of harmful pathogens on a surface to safe levels. You must clean and rinse a surface before it can be sanitized. Then the surface must be allowed to air-dry. Surfaces can be sanitized with hot water or a chemical-sanitizing solution.

All surfaces should be cleaned and rinsed. Food-contact surfaces must be cleaned and sanitized after every use. You should also clean and sanitize each time you begin working with a different type of food or when a task is interrupted. If items are in constant use, they must be cleaned and sanitized every four hours.

ServSafe Study Guide

Tableware and utensils can be washed in dishwashers or by hand in a three-compartment sink. Always follow manufacturers' instructions when using dishwashers. Make sure your machine is clean and in good working condition. Check the temperature and pressure of wash-and-rinse cycles daily.

Three-compartment sinks and drain boards must be cleaned and sanitized before they are used for dish washing. Items washed in a three-compartment sink should be rinsed or scraped clean before washing. They should then be washed in a detergent solution and rinsed in clean water. Next, they should be sanitized in either hot water or in a chemical-sanitizing solution for a specific amount of time. Finally, they should be air-dried. Once cleaned and sanitized, tableware and equipment should be protected from contamination.

Make sure chemicals are clearly labeled. Keep MSDS⁸ for each chemical in a location accessible to all staff while on the job.

Create a master-cleaning schedule listing all cleaning tasks. Monitor the cleaning program to keep it effective and supervise cleaning procedures. Make adjustments as needed.

⁸ MSDS – Material Safety Data Sheets, It is intended to provide workers and emergency personnel with procedures for handling or working with that substance in a safe manner.

ServSafe Study Guide

“The Big Six” Foodborne Illnesses Information

Bacteria: E. Coli (Enterohemorrhagic and shiga toxin-producing Escherichia coli)
Illness: Hemorrhagic colitis

E. Coli can be found in the intestines of cattle. It is also found in infected people. The bacteria can contaminate meat during slaughtering. Eating only a small amount of the bacteria can make a person sick. Once eaten, it produces toxins in the intestines, which causes the illness. The bacteria are often in a person’s feces for weeks after symptoms have ended.

Food Commonly Linked with the Bacteria	Most Common Symptoms	Prevention Measures
<ul style="list-style-type: none"> • Ground Beef • Contaminated produce 	<ul style="list-style-type: none"> • Diarrhea • Abdominal Cramps • Kidney failure 	<ul style="list-style-type: none"> • Cook food, especially ground beef, to minimum internal temperatures. • Purchase produce from approved, reputable suppliers. • Prevent cross-contamination between raw meat and ready-to-eat food. • Keep staff with diarrhea out of the operation. • Keep staff that has been diagnosed with hemorrhagic colitis out of the operation. • Control time and temperature.

Bacteria: Salmonella Typhi
Illness: Typhoid fever

Salmonella Typhi lives only in humans. People with typhoid fever carry the bacteria in their bloodstream and intestinal tract. Eating only a small amount of these bacteria can make a person sick. The severity of symptoms depends on the health of the person and the amount of bacteria eaten. The bacteria are often in a persons feces for weeks after the symptoms have ended.

Food Commonly Linked with the Bacteria	Most Common Symptoms	Prevention Measures
<ul style="list-style-type: none"> • Ready-to-eat • Beverages 	<ul style="list-style-type: none"> • High fever • Weakness • Abdominal Pain • Headache • Loss of appetite • Rash 	<ul style="list-style-type: none"> • Exclude food handlers who have been diagnosed with an illness caused by Salmonella Typhi from the operation. • Wash Hands • Cook food to minimum internal temperatures. • Prevent cross-contamination.

ServSafe Study Guide

Bacteria: Nontyphoidal Salmonella

Illness: Salmonellosis

Many farm animals carry *Salmonella* spp. naturally. Eating only a small amount of these bacteria can make a person sick. How severe symptoms are depends on the health of the person and the amount of bacteria eaten. The bacteria are often in a person's feces for weeks after symptoms have ended.

Food Commonly Linked with the Bacteria	Most Common Symptoms	Prevention Measures
<ul style="list-style-type: none"> • Poultry and eggs • Dairy products • Produce 	<ul style="list-style-type: none"> • Diarrhea • Abdominal Cramps • Vomiting • Fever 	<ul style="list-style-type: none"> • Cook poultry and eggs to minimum internal temperatures. • Prevent cross-contamination between poultry and ready-to-eat food. • Keep food handlers who have been diagnosed with salmonellosis out of the operation.

Bacteria: Shigella (Shigella spp.)

Illness: Shigellosis

Shigella spp. is found in the feces of humans with the illness. Most illnesses occur when people eat or drink contaminated food or water. Flies can also transfer the bacteria from feces to food. Eating only a small amount of these bacteria can make a person sick. High levels of the bacteria are often in a person's feces for weeks after symptoms have ended.

Food Commonly Linked with the Bacteria	Most Common Symptoms	Prevention Measures
<ul style="list-style-type: none"> • Food that is easily contaminated by hands, such as salads containing TCS food (potato, tuna, shrimp, macaroni, and chicken) • Food that has made contact with contaminated water, such as produce 	<ul style="list-style-type: none"> • Bloody diarrhea • Abdominal pain and cramps • Fever 	<ul style="list-style-type: none"> • Exclude food handlers who have been diagnosed with an illness caused by <i>Shigella</i> spp. from the operation. • Exclude food handlers who have diarrhea from the operation. • Wash hands • Control flies inside and outside the operation. • Practice personal hygiene

Virus: Hepatitis A

Illness: Hepatitis A

Hepatitis A is mainly found in the feces of people infected with it. The virus can contaminate water and many other types of food. It is commonly linked with ready-to-eat food. However, it has also been linked with shellfish from contaminated water.

ServSafe Study Guide

The virus is often transferred to food when infected food handlers touch food or equipment with fingers that have feces on them. Eating only a small amount of the virus can make a person sick. An infected person may not show symptoms for weeks but can be very infectious. Cooking does not destroy hepatitis A.

Food Commonly Linked with the Bacteria	Most Common Symptoms	Prevention Measures
<ul style="list-style-type: none"> • Ready-to-eat food • Shellfish from contaminated water 	<ul style="list-style-type: none"> • Fever • General weakness • Nausea • Abdominal pain • Jaundice 	<ul style="list-style-type: none"> • Exclude staff that has been diagnosed with hepatitis A from the operation. • Exclude staff that has jaundice from the operation. • Wash hands. • Avoid bare-hand contact with ready-to-eat food. • Purchase shellfish from approved, reputable suppliers. • Practice personal hygiene.

Virus: Norovirus

Illness: Norovirus gastroenteritis

Like hepatitis A, Norovirus is commonly linked with ready-to-eat food. It has also been linked with contaminated water. Norovirus is often transferred to food when infected food handlers touch food or equipment with fingers that have feces on them.

Eating only a small amount of Norovirus can make a person sick. It is also very contagious. People become contagious within a few hours after eating it. The virus is often in a person's feces for days after symptoms have ended.

Food Commonly Linked with the Bacteria	Most Common Symptoms	Prevention Measures
<ul style="list-style-type: none"> • Ready-to-eat food • Shellfish from contaminated water 	<ul style="list-style-type: none"> • Vomiting • Diarrhea • Nausea • Abdominal cramps 	<ul style="list-style-type: none"> • Exclude staff that has been diagnosed with Norovirus from the operation. • Exclude staff with diarrhea and vomiting from the operation. • Wash hands • Avoid bare-hand contact with ready-to-eat food. • Purchase shellfish from approved, reputable suppliers. • Practice personal hygiene.

ServSafe Study Guide

Pathogens (Biological Contamination)

They contaminate food and cause foodborne illness; there are four of them.

1. Bacteria

2. Viruses

3. Parasites

4. Fungi

	1. Bacteria	2. Viruses	3. Parasites	4. Fungi
What is it?	Tiny living being. They can be good and bad.	Small infectious agent that can replicate only inside living cells.	An organism that lives in another organism called the host and often harms it.	A group of simple plants that have no chlorophyll. Some can be eaten and some can kill you.
Example:	Salmonella Typhi, Nontyphoidal Salmonella, Shigella and E. coli.	Hepatitis A, Norovirus.	Tape worms, round worms. How: Worm to fish to humans.	Mold, yeast, mushrooms.
Where is it? /What does it need to survive?	Found everywhere, you cannot see it, smell it or taste it. Will grow rapidly if FATTOM is met. *FATTOM	Carried by humans and animals, require a living host, do not grow in food. Found on food, water and contaminated surfaces. Typically found in fecal-oral routes.	Require a host to live and reproduce (seafood, wild game, contaminated water).	Some molds and mushrooms produce toxin.
How to prevent?	Time and Temperature.	Not destroyed by normal cooking temperatures, use good personal hygiene. Quick removal of vomit.	Cook food to required minimum internal temperatures. The manufacturer must freeze fish that will be served raw or undercooked correctly.	Throw out moldy food unless mold is a natural part of the food.

What bacteria need to grow, referred to as FAT TOM.

- F- Food
- A- Acidity
- T- Temperature
- T- Time
- O- Oxygen
- M- Moisture