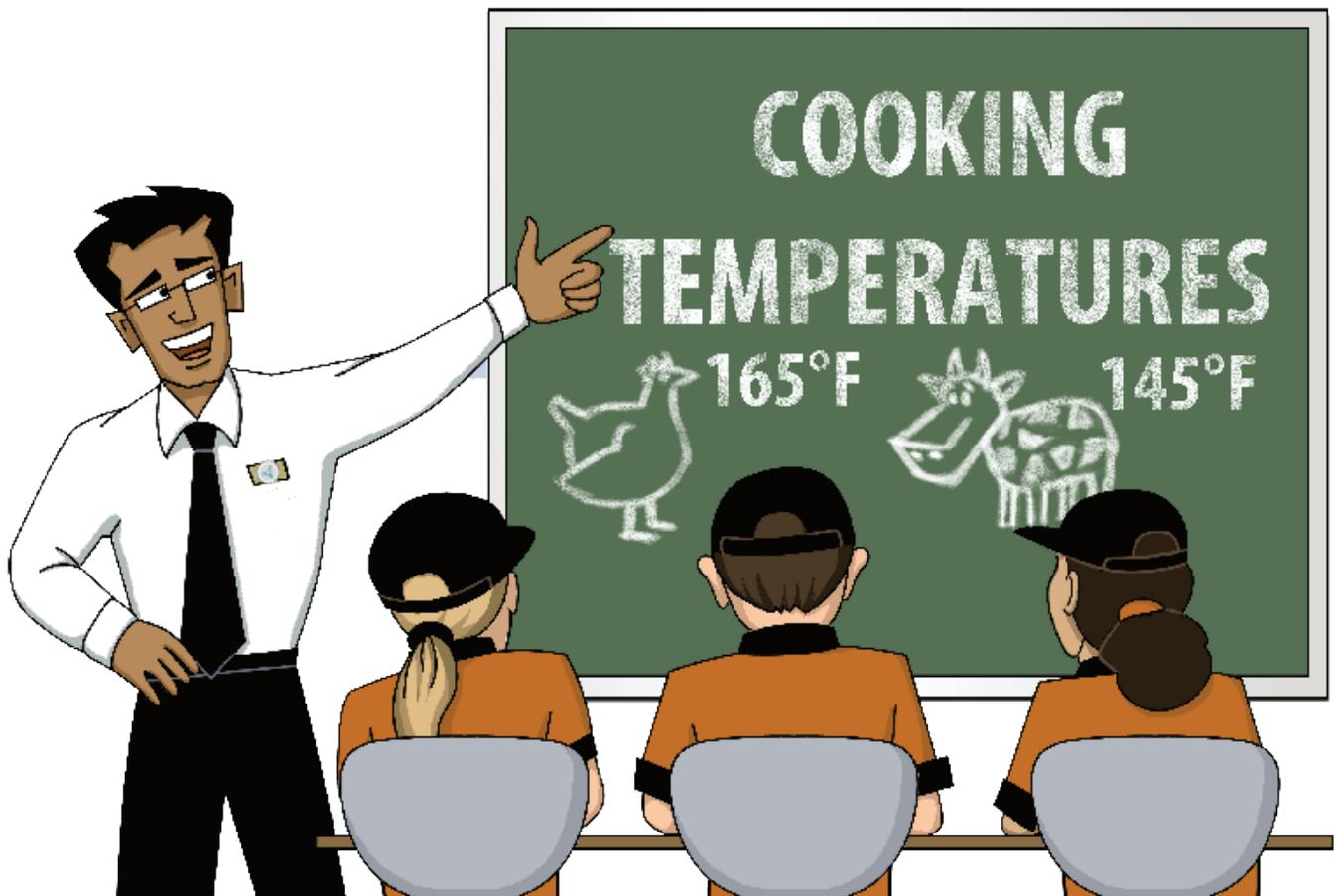


# FOOD HANDLER TRAINING MANUAL



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## Introduction

Recently, in one U.S. city, more than 60 people became seriously ill after eating at one of two franchises of the same national chain restaurant. Investigators determined that the outbreak was caused by unsafe handling of contaminated food products by restaurant employees.

At least 15 lawsuits were filed by those who became sick, and one of those cases alone cost the restaurant and its suppliers 13½ million dollars. In the next quarter, the restaurant chain reported an 85% drop in nationwide earnings and cited the outbreak as one major cause. Today, neither of those franchises is in operation. All of their employees lost their jobs.

But more importantly, those employees' decisions affected the health of the restaurant's customers. In addition to the 64 confirmed cases associated with this outbreak, state officials estimate that as many as 500 additional related cases went unreported. Dozens of those restaurant customers were hospitalized, suffering severe and excruciating symptoms. One of them, a three-year-old girl, died.

The Centers for Disease Control and Prevention (CDC) estimates that 48 million people become ill from food each year in the US, resulting in 128 thousand hospitalizations and more than 3 thousand deaths. Many

of these illnesses could be prevented if people would follow safe food handling practices.

Remember, these statistics represent people—people who trust you to serve them food that is not only delicious, but safe. By learning the procedures that keep food safe and practicing them every time you work with food, you will deserve that trust.

## Food Hazards

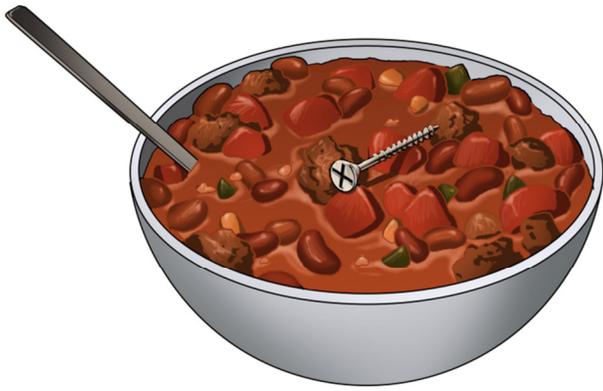
Before you can effectively keep food safe, you must know what you are keeping it safe from. So, let's talk about how food becomes dangerous. To put it simply, food is unsafe when it contains something that may cause illness, choking, internal damage, or other problems. There are three general categories of food hazards: physical, chemical, and biological.

Physical hazards are usually foreign objects that get into food, such as hair, dirt, or pieces of glass or plastic. They can also be unexpected natural objects that have not been properly removed, such as cherry pits or fish bones.

Each facility should have procedures for preventing physical hazards from getting into food. These procedures include covering light bulbs, using hats and hair nets, and thoroughly cleaning up glass fragments when dishes are broken.

Guests who find fingernail clippings in their mashed potatoes won't likely return to your facility. Even worse,





guests who don't find physical hazards present in their food could choke, suffer serious injury, or worse.

Chemical hazards include pesticides, cleaning supplies, and toxic metals that come from using improper cookware. Chemical hazards are especially dangerous, because they are often imperceptible by guests. A guest will often, but not always, find a physical hazard before ingesting it, but guests can't know if the fruit they're eating has been properly washed to remove harmful chemical pesticides. They trust you to protect them from chemical hazards.

Your manager should have processes in place to prevent chemical hazards, including properly labeling all chemicals and storing them separately from food. If you see a problem, be sure to bring it to the attention of your manager.

Biological hazards pose the biggest threat to food safety. These hazards include bacteria, viruses, parasites, fungi, and toxins (poisons) generated by biological processes. Biological hazards can cause serious illness when present in food.

Some signs of biological hazards are easily recognizable. Harmful mold, for example, is often, though not always, visible. A bulging can of food might indicate the presence of bacteria that cause a rare but serious disease called "botulism." Moldy food and bulging cans, therefore, must always be thrown away.



However, most disease-causing agents are too small to be seen with the naked eye, and do not noticeably change the smell, taste, or color of food.

The only way to prevent biological hazards is to follow precise procedures when handling food, and to keep your body and workplace clean and free of harmful germs. When biological hazards are transmitted to patrons of a food facility, it is usually because of failures on the part of the food handling staff. You have a huge part to play in preventing biological hazards and the illnesses they cause.

## Foodborne Illness

A foodborne illness is a disease spread to people through food. As an employee of the food service industry, preventing the spread of foodborne illness will be one of your most important responsibilities.

Most foodborne illnesses are caused by biological hazards, usually microorganisms such as bacteria or viruses. Microorganisms that cause disease are known as "pathogens," though they are often simply called "germs."



Common symptoms of foodborne illness include stomach cramping, diarrhea, fever, headache, vomiting, and severe exhaustion. Symptoms vary according to the type of hazard, and the amount eaten.

Symptoms usually appear a few days after the contaminated food is eaten. However, in rare cases symptoms can appear as soon as half an hour after exposure, or as late as a few weeks after exposure.

The effects of foodborne illness usually last only a day or two, but in some cases they continue for a week or more, and may even have serious long-term consequences such as blurred vision, paralysis, and even death.

Some types of individuals are more susceptible to illness than others. Usually, this is due to the strength of the person's immune system. Those with weak immune systems are more likely to become infected, even when exposed to relatively low levels of germs. They are also

likely to remain infected for longer, allowing for more frequent and more serious complications to occur. Most deaths resulting from foodborne illness occur among these “highly susceptible populations.”

Highly susceptible populations include young children, pregnant mothers, those who are already ill in some way, and the elderly. Serving food to these populations—in a day care center or hospital, for example—requires even stricter compliance with health codes and safe food practices.



Bacteria that cause foodborne illness need food, moisture, and warm temperatures to grow, all of which are easily found in improperly handled food. When they have these things, bacteria multiply rapidly. Because bacteria are microscopic, you cannot know if a food or surface is contaminated simply by looking at it.

Contaminated water and soil, as well as human and animal feces, often contain dangerous bacteria. Open cuts and sores can easily become infected and transmit disease, and even healthy people have harmful bacteria on their hair and skin, and in their mouths, noses, and throats. According to one estimate, nearly 50% of healthy food handlers carry germs that could spread to the food and people they serve. Even if you are healthy, you must use safe

food-handling procedures to prevent the spread of harmful bacteria and foodborne illness.

Most foodborne illness caused by a virus is spread by an infected person who touches food, surfaces, or equipment. Since symptoms may not appear for a few days after a person becomes infected, they could be spreading the illness before they even start to feel sick. The best way to prevent spreading viruses is through good personal hygiene, which we will discuss later. Frequent and thorough hand washing is especially important.

### *The “Big 5”*

Food safety experts have identified five pathogens, or germs, that are easily transmitted through food and cause severe illness. Three are strains of bacteria: Shigella, E. coli, and Salmonella. The other two are viruses: Hepatitis A and Norovirus.

We refer to these organisms and the diseases they cause as “The Big 5.” You should understand what these illnesses are and how they can be avoided.

Shigella are potent bacteria that can cause severe diarrhea, painful stomach cramping, and vomiting. Eating even a tiny amount of shigella-infected food can cause a serious illness, known as shigellosis. Vulnerable individuals with shigellosis, especially small children, may need to be hospitalized and treated aggressively to save their lives. As serious as it is, almost all Shigella transmission can be prevented by proper hand washing, especially after using the restroom.

Disease-causing strains of the infamous E. coli bacteria can cause bloody diarrhea, severe dehydration, and even death. Harmful E. coli are found naturally in the digestive systems of many animals, including cattle. At the beginning of this manual, we shared an example in which more than 60 people became ill and a 3-year-old girl died. In that case, E. coli was the culprit.



The restaurant's suppliers sent them contaminated meat. Had that meat been isolated from other foods and properly cooked, the E. coli would have been killed and the outbreak prevented. Sadly, the restaurant's employees allowed the bacteria to spread around the kitchen and into other foods, eventually infecting their customers. You can help prevent such unnecessary tragedy by following the food safety guidelines you will learn in this manual.

Of all foodborne pathogens, Salmonella bacteria are the most frequent cause of reported illness. In fact, Salmonella infection, or salmonellosis, is the most common bacterial foodborne illness in the United States. Like E. coli, Salmonella are naturally found in animals, particularly poultry. Some of the worst strains of salmonella, specifically Salmonella typhi (or Typhoid Fever) can be fatal. As with the other diseases we've discussed, most salmonellosis can be prevented by good personal hygiene and proper food handling.

Hepatitis A is a serious viral disease affecting the liver. Initial symptoms appear 2 to 6 weeks after exposure to the virus, and may include muscle aches, headache, and fever. After a few days, a yellowing of the eyes and skin may also occur. This condition is known as "jaundice." The symptoms can be excruciatingly painful and debilitating.

A person with Hepatitis A is most likely to spread the illness during the period before symptoms even appear, so food handlers can be carriers of the disease without knowing it. This makes it more difficult to control outbreaks. Hepatitis A is often transmitted through contaminated food. Outbreaks have been traced to infected food workers.

You may not be familiar with the word "norovirus," but you've likely experienced the illness at some point in your life. Perhaps you've heard of the "stomach flu"? The stomach flu is more correctly known as viral gastroenteritis, as it is not related to influenza at all.

Gastroenteritis is an inflammation, or painful swelling, of the stomach and intestines, and is often caused by norovirus. Symptoms include nausea, vomiting, and diarrhea, accompanied by abdominal cramps. Infected persons may also experience headache, fever, chills, or muscle aches.

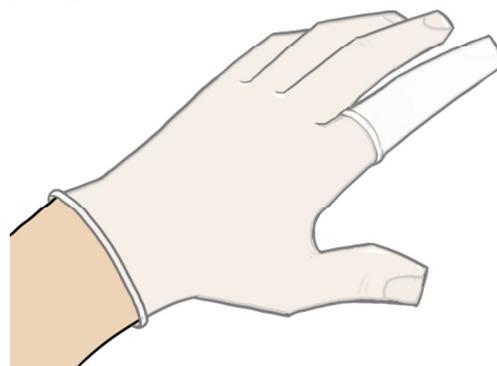
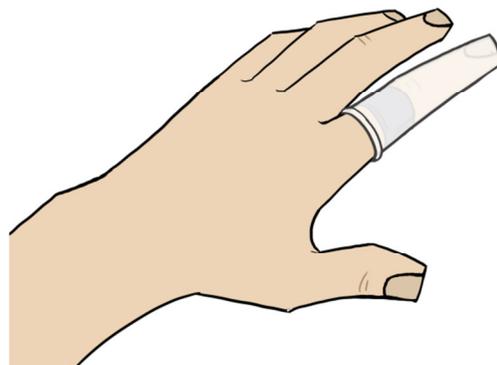
Symptoms usually last for just a day or two; however, during that brief period, people usually feel very ill and vomit many times a day. Like Hepatitis, norovirus spreads very rapidly through contaminated food, and outbreaks have been traced to food that was handled by just one infected person.

## Wounds

Wounds that are not properly bandaged can spread disease. Bacteria that cause foodborne illnesses can often infect open cuts, sores, and burns. Therefore, you should

always properly care for your injuries, in order to keep from contaminating any food you might touch. Lesions containing pus—such as boils or infected wounds that are open or draining—are of particular concern.

A wound on the hands or wrists must be covered by an impermeable cover (meaning that it does not allow any fluid, including blood or pus, to pass through it). A finger cot is one example of an impermeable cover. A single-use glove must be worn over the cover. A wound on exposed portions of the arms must be covered by an impermeable cover. A wound on other parts of the body must be covered by a dry, durable, tight-fitting bandage.



Never prepare or serve food with a wound that is not properly treated and covered. If you cut or burn yourself while on the job, stop what you are doing immediately and treat and bandage your injury. Throw away the food you were preparing when you cut yourself, even if you are pretty sure that no blood was allowed to contaminate the food. You can't be too careful.

## Report Any Illness

As you can see, your health is important to the safety of the food you serve. If you are feeling ill, you must tell your manager. Your manager will then determine what action should be taken. This is for your own health and safety, as well as that of your co-workers and customers.

Just a few years ago, 364 customers of a national chain restaurant came down with foodborne illness within the same one-month period. Upon investigation, health department officials discovered that some restaurant employees had been ill during that month; one cook had even vomited into a trash can while on duty. By working with food while ill, the employees were contributing to the outbreak and putting their customers and co-workers at risk.

If you are infected with a cold, flu, foodborne illness, or any respiratory infection, your boss will likely ask you to stay home; even if you go to work, you should not work in or near food preparation areas. And if you are experiencing diarrhea, vomiting, a fever combined with a sore throat, or jaundice, you shouldn't enter your workplace at all. These symptoms suggest you may be ill with one of the "Big 5," which means you could easily contaminate food or other people.

Again, if you are feeling ill, tell your manager and take immediate action to ensure you will not contaminate your workplace.

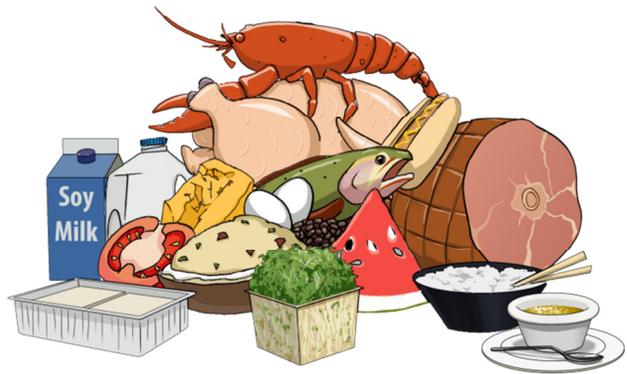


If a doctor diagnoses you with one of the "Big 5" foodborne illnesses, you cannot go in to work, and the illness must be reported to your manager, as he or she may have to notify the local health department.

Staying home from work can be stressful, as you are probably counting on the money you would be earning, but people's health and lives are at stake. Remember: they trust you to help keep them safe.

## Potentially Hazardous Foods

Even when you are healthy enough to work, you should still be careful. Some foods easily spoil and are particularly vulnerable to contamination. In the food



service industry, these are called "potentially hazardous foods" or "PHFs." Because controlling the temperature of these foods can help keep them safe longer, they are also sometimes referred to as "time/temperature control for safety" or "TCS" foods.

Potentially hazardous foods include:

- Meat and meat products, such as chicken, beef, pork, lamb, and fish
- Shellfish, including shrimp, crab, lobster, clams, and oysters
- Dairy products like milk, yogurt, and cheese
- Protein-rich foods such as cooked bean and rice dishes, tofu, and shell eggs
- Melons and tomatoes that have been cut
- Cooked vegetables
- Any food product containing creams or custards
- Potato dishes
- Raw sprouts
- Minced garlic in oil

Dealing with these foods requires additional food safety procedures, which are explained later, in the "Time and Temperature Regulation" section of this manual. Be extra careful to follow these procedures, as this is an important step toward preventing the spread of foodborne illness.

## Food Allergies

Unlike foodborne illness, which is most frequently caused by biological hazards, including the "Big 5" pathogens and bacteria found in wounds, food allergies are not caused by contaminated or poorly handled food.

"Allergens," or the substances that cause allergic reactions, can affect certain people even when the food would be safe for most other people. Many of the food items you serve contain food allergens. For the few people who are "allergic," food allergies can be extremely harmful—even deadly.

An allergic reaction occurs when the human body, specifically the immune system, encounters a substance to which it does not know how to react. Many people have minor allergic reactions on a daily basis because of allergens in the air. Plant pollen or animal dander, for



example, can cause minor symptoms such as watery eyes or a runny nose.

For a smaller portion of the population, food allergies can be very serious. The FDA estimates that each year in the United States, 2,000 people are hospitalized because of an allergic reaction to food. Of those, 7.5%—or about 150 people—do not survive.

### Major Food Allergens

While more than 160 foods have been known to cause allergic reactions in some people, the U.S. Food and Drug Administration lists eight “Major Food Allergens”—types of food that are responsible for 90% of allergic reactions to food. As I list these foods, remember that the Major Food Allergens are often most harmful when they are “hidden” inside larger dishes as ingredients.

The eight foods identified by U.S. law as Major Food Allergens are: Milk, eggs, fish (like bass or cod), crustacean shellfish (like shrimp or oysters), tree nuts (like almonds or walnuts), peanuts, wheat, and soybeans. Please remember that these foods can be just as dangerous when consumed as an ingredient of a meal as when they are eaten whole.

It is your responsibility to be familiar enough with the food you serve to know which items contain Major Food Allergens and which do not. When a customer mentions having a food allergy, follow the four R’s:

*1. Refer food allergy concerns to the person-in-charge, manager, or chef.*

Food allergies should never be taken lightly. Enlisting the aid of knowledgeable supervisors or coworkers will not only help you keep the customer safe from an allergic reaction, but also shows the customer that you care about their welfare and will do all you can to make their dining experience a good one.

*2. Review the food allergy with the customer and check ingredient labels and menu items.*

The customer knows more about their allergy than you do, so start by listening carefully when they tell you about their allergy. It is a good idea to be familiar with the ingredients used in the foods you offer, so you can suggest options from your menu that do not contain the allergen, or answer questions the customer may have about a specific dish.

If you don’t know the information they need offhand, don’t just guess! Talk to the chef, or do whatever other research is necessary. You may find, for example, that a dish that doesn’t obviously contain peanuts might use a sauce that contains peanut oil.

*3. Remember to check for cross-contact during food preparation.*

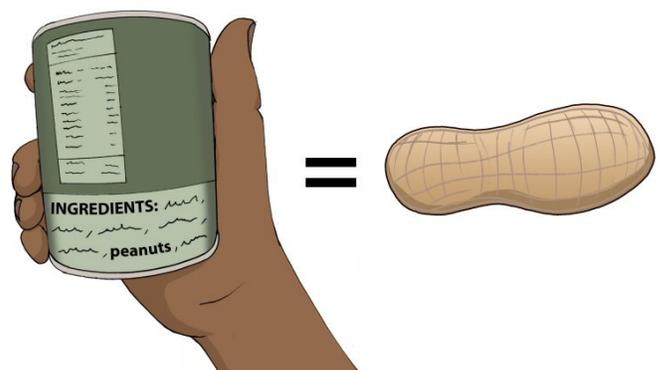
For people with serious allergies, eating food that has even just touched something that contains the allergen is enough to cause a reaction. When an allergen passes from one food to another, it is called cross-contact.

For example, slicing vegetables on a cutting board that was used to slice bread can make the vegetables hazardous to someone with a wheat allergy, due to cross-contact between the bread, the cutting board, and the vegetables.

When preparing food for someone with an allergy, be careful to avoid cross-contact. Your facility may even have special equipment for use only for customers with certain allergies.

*4. Respond to the customer and inform them of your findings.*

Help them decide on a dish that either doesn’t contain the allergen or can be prepared without the allergenic ingredients, and that can be prepared in a way that prevents cross-contact.



### Symptoms of Allergic Reaction

Your manager is a great resource for information about food allergens; however, it is important that you are able to recognize the symptoms of food allergic reaction and what actions you should take should one occur in your facility.

When an allergic person suffers a food allergic reaction, the person will commonly display symptoms that include hives; rash; flushed skin; swelling and tingling of the face, tongue, or lips; abdominal cramps; vomiting; and/or diarrhea.

In the most serious cases, a person may go into a life-threatening state called “anaphylactic shock.” This occurs when the lungs and throat swell around the airways and make it difficult for a person to breathe. In addition, a severe drop in blood pressure can occur. Symptoms of anaphylactic shock can come on quickly, and if an allergic person does not receive quick and effective medical aid, death by suffocation is common.



Be aware that a person suffering an allergic reaction may not know he or she is allergic. This is common in the case of small children. When someone is displaying symptoms of allergic reaction, inform your manager and call 911 at once! Even mild allergic symptoms can quickly become life threatening if immediate action is not taken.

Now that you know what you must keep food safe from and which foods pose the greatest threat, the rest of this manual will discuss how to keep food safe.

## Personal Hygiene

Each of us has disease-causing microorganisms on and in our bodies. The contaminants you carry pose a danger to those around you, including your co-workers and those you serve. However, you can prevent these microorganisms from spreading to food and other people by practicing good hygiene.

## Hand Washing

Remember the sad example at the beginning of this manual? In that case, more than 60 people became ill and one little girl died because of food contaminated with a deadly strain of E. coli. After inspections, health department officials cited improper hand washing by restaurant employees as a contributing factor in the outbreak.

As important as it is, many people, including adults, haven't yet learned how to properly wash their hands. Even some of those who have learned still repeatedly neglect important steps in keeping their hands clean. The simple act of frequent and thorough hand washing minimizes food contamination and makes customers and employees healthier.

You might save a few seconds if you skip it every now and then, but following hand washing guidelines every time could save lives. I don't have to tell you which is more important.

Following these five steps will ensure proper hand washing:

1. Wet your hands with running water that is hot but not uncomfortably so.
2. Apply soap to your wet hands.
3. Scrub your hands, wrists, and lower arms vigorously for at least 10 to 15 seconds. Pay particular attention to the areas underneath your fingernails—these are common hiding places for dirt and germs.
4. Once you are done scrubbing, rinse your hands thoroughly under running water.
5. Finally, dry your hands and arms with a warm-air dryer or a disposable paper towel—not a reusable cloth.

The entire hand washing process should take at least 20 seconds.



In certain situations, you should wash your hands twice. This is called “double hand washing.” After working with raw meats, double-wash your hands, repeating steps 2 through 4, prior to drying your hands.

After using the restroom or changing a diaper, you should wash your hands, following all five steps, once in the restroom sink and then again in the kitchen’s designated hand-washing area.

To ensure that proper hand washing occurs, restrooms and other hand-washing areas must have hot and cold running water, hand soap, a wastebasket, and sanitary towels or a working air dryer.

You should always wash your hands regularly throughout the day, but much more often when working with food. Always wash your hands before starting work and before putting on clean gloves.

You should obviously wash your hands before and after handling raw foods, and after using the restroom. Also wash your hands after sneezing or coughing, and after eating, drinking, smoking, or using tobacco. Wash up after you handle chemicals that might affect the safety of food and after you take out the trash.

In addition, you should wash your hands after touching your hair, face, or any part of your body other than recently cleaned hands and arms, including your clothing or apron, and after touching any unsanitized object, such as equipment or washcloths.

Avoid touching animals in food service areas, including service animals and guide dogs. If you do happen to touch an animal, or an object associated with an animal, like a dog dish or fish tank, wash your hands. In general, you should follow the five hand washing steps after any activity that might contaminate your hands or expose them to germs.

When you wash your hands, use the restroom sink or an approved hand-washing sink. Never wash your hands in a sink used for food preparation or washing dishes.

## **Wearing Gloves**

Proper hand washing goes a long way toward preventing foodborne illnesses, but for added safety, you should wear single-use gloves when preparing and cooking food.

Gloves do not replace thorough and proper hand washing, nor should they ever be washed and reused. Rather, gloves are used to help keep food safe from germs that employees may have on their hands, and to protect hands from detergents and chemicals.

Always wash your hands before putting on gloves, even if you are just changing to a fresh pair.

You need to change your gloves before handling cooked or ready-to-eat food, as soon as they become dirty or torn, after handling raw meat, and at least every four hours during continual use. Four hours is the limit



because that is long enough for illness-causing bacteria to multiply and reach dangerous levels.

To safely remove a glove, grab the cuff and pull it inside out over your fingers, making sure to avoid contact with your palm and fingers. Wash your hands and put on a fresh pair.

## **Avoiding Bare Hand Contact**

Because our hands touch so many things that could have germs on them, it is not a good idea to touch food with bare hands. This is important with all food, but particularly critical when handling ready-to-eat food.

Ready-to-eat food will be eaten without additional washing or cooking. This includes raw fruits and vegetables, cheeses, processed meats, breads, products that have been fully cooked, etc.

It is extremely important that you strictly follow the rules regarding bare hand contact with ready-to-eat food,



because if you contaminate ready-to-eat food, it will almost certainly be served in a contaminated state.

There are several ways to avoid bare hand contact with food. Disposable gloves are commonly used, but you may also use deli tissue or appropriate utensils such as tongs, spatulas, and spoons.

## Serving

Now, a word especially to servers. It may seem that most of the information presented in this manual deals with kitchen staff, but the principles of safe food handling are just as important in serving as they are in any other job at a food service facility.

Most servers are not required to wear gloves, which means you have bare hand contact. You may not be touching the food itself, hopefully, but you do handle the dishes and utensils, which do touch the food. You have as high a chance of spreading illness as the cooks; maybe even higher, if you aren't careful. So, let's take a moment to discuss some specific things that you can do, as a server, to prevent contamination.

Here are some basic guidelines to follow when serving food:

- Always use tongs, deli tissue, or other appropriate utensils when serving ready-to-eat items
- Never grab, move, or serve food with your bare hands
- When filling a glass with ice, use an ice scoop, not your hands or the glass itself
- When you carry a plate, never let any of your fingers, especially the thumb, touch the top of the plate (hold the plate in the palm of the hand with all fingers tucked below, or just touching the very side of the rim where food will not touch)
- Always carry eating utensils, including knives, forks, and spoons, by the handle (do not use your bare hands to touch any part of any item that diners might reasonably put in their mouths)
- Similarly, when carrying a glass, carry it by the base, or handle if it has one (never carry a glass



by placing a hand or palm over the opening or grasping the rim of the glass with your fingers)

Remember, all of us in the food industry depend on each other to provide safe food. Whether you're a chef, a busser, or a server, your help is needed. It only takes one error by one person to make food dangerous to eat.

## Other Hygiene Tips

Your personal hygiene is important to your health and the health of those around you. Shower or bathe daily. Wear clean clothes.

Keep your fingernails trimmed and filed, so the nails are short and clean and the edges are smooth. Germs can get caught underneath long, unkempt fingernails. Unless you are wearing gloves, you may not wear fingernail polish or artificial fingernails when working with exposed food.

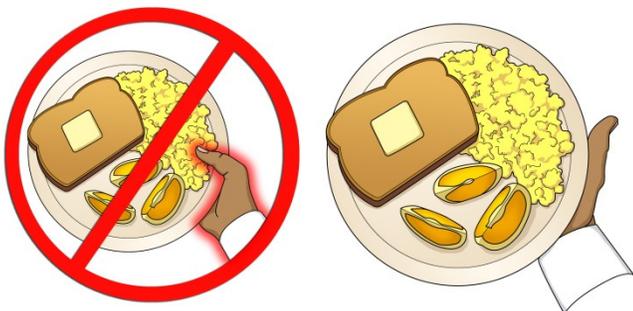
If you are preparing food, you may not wear any jewelry except for a plain ring such as a wedding band. Watches and bracelets provide a harbor for germs, and may cause contamination; rings with stones are likely to tear gloves, also creating potential for contamination; and items such as earrings or necklaces can fall into food, creating a physical hazard.

Anyone in contact with food should also keep their hair covered or pulled back so it does not fall into food or onto food preparation surfaces. Hair nets or hats designed to contain hair are the best ways to keep this from happening.

Guests and co-workers will notice your hygiene, be it good or bad. Take care of yourself accordingly. The way you look affects the reputation of your food facility.

As a food service employee, you should avoid any behavior that could potentially contaminate food or your hands. This means that you should not allow your hands to come into contact with anything that is not sanitized. This can be difficult because some improper behaviors occur naturally or out of habit. Here are a few examples of behaviors to avoid.

Never eat, drink, or chew gum while working with food. When you do these things, tiny droplets of saliva shoot out of your mouth. These droplets can contaminate





food and spread disease. If you must eat during your shift, do so during the breaks allotted you by your employer, not while working with food.

You may be able to drink from a covered cup with a straw, but check with your manager first.

Smoking while cooking is hazardous to food in many ways. Pieces of cigarettes and ash could fall into food, and second-hand-smoke could cause harm to your co-workers or customers.

When you smoke, your hand spends a lot of time close to your mouth and lips, which can lead to contamination via saliva. If you must smoke, do so outdoors, away from any open doors and windows. Your employer may require that you use allotted breaks for smoking. When you finish smoking, always wash your hands thoroughly before returning to work.

Picking your nose is rarely appropriate, especially in public. However, it is especially inappropriate to do while working with food. You carry potentially harmful germs on your body, including on and in your nose, mouth, ears, and hair.

You may have a habit of rubbing your eyes, running your hands through your hair, or scratching your scalp. If so, you must break that habit. Touching any part of your body other than recently-washed hands while working with food can make people sick.

Sneezing and coughing are two of the most common ways to transmit disease. If you have to sneeze or cough, leave the food prep area if possible. If not, turn away from any food, especially food that is ready to be served. Contain the germs by sneezing into the crook of your elbow, rather than your hands. Even if you sneeze into your elbow, you should wash your hands before returning to your food preparation tasks.

Some of these behaviors occur naturally or out of habit—such as touching your face or hair—but they are not appropriate for you, as a food service employee. Because you are working with a potentially dangerous product, you are held to a higher standard. You need to concentrate on avoiding these behaviors, and remind your co-workers to avoid them as well.

Studies have shown that food workers passing on their illnesses through the food they prepare and serve is a contributing factor in two-thirds of foodborne illness outbreaks in restaurants, and one-fifth of all foodborne illnesses reported in the United States. Good hygiene practices, particularly adequate hand washing, are absolutely vital to keeping food safe.

## Cleaning and Sanitizing

Recently, 14 people became ill with salmonella poisoning after eating at a banquet hall. Upon investigation, inspectors were surprised to find that the source of contamination was the iced tea machine. Employees had not been properly cleaning and sanitizing the machine, permitting bacteria to grow on its surface, and guests who drank iced tea at the banquet became infected.

Despite what many people think, cleaning and sanitizing are not the same thing. Cleaning involves removing food, dirt, and other particles from the surface of something, such as a dish or countertop. When you wash a pan with soap and water, you are cleaning it.

Sanitizing, on the other hand, involves reducing the number of germs to a safe level. If you want to sanitize the pan, you will need to submerge it, or dip it entirely, in a sanitizing solution. To maintain a safe food environment, both cleaning and sanitizing are required.

Cleaning and sanitizing a surface is a five-step process:

1. Wipe or scrape off any large food particles.



2. Clean the surface with a detergent.



3. Rinse with clean water.



4. Apply a sanitizing solution.



5. Allow the surface to air-dry. Do not use towels to dry sanitized items.



Common sanitizers include iodine, chlorine, and quaternary ammonium (often called quats). A sanitizing solution is formed by mixing one of these chemicals with water. How well the solution works depends on many factors, including concentration, water temperature, and contact time, among others.

The concentration, or how much sanitizer is added to the water, is very important. If a solution contains too much sanitizer, it can be harmful. For example, utensils submerged in too much sanitizer could present a chemical hazard to those who use them.

On the other hand, if there is too little sanitizer in the water, it won't kill the germs. The concentration can be checked by using test strips, which change color when inserted in the solution. The color of the test strip tells how concentrated the solution is.

The water temperature should usually be close to room temperature, but can vary depending on the type of sanitizer used. The contact time, or how long the item or surface must be submerged in or covered with the sanitizing solution, varies depending on the type of sanitizer, the concentration, and the water temperature.

As you can see, proper sanitizing is rather complicated. Luckily, sanitizer manufacturers do most of the work in figuring out how to make their products effective, so if you follow the directions on the label and use test strips to check the concentration, it'll work just fine. If you have any questions about the specific sanitizer you are using, talk to your manager.

Some areas also allow the use of hot water as a sanitizer. If you manually sanitize with hot water where you work, the water must be at least 171°F and the surface or item must be immersed for at least 30 seconds.

You need to clean and sanitize a surface any time it comes in contact with food. Also, clean and sanitize a surface or an instrument any time you switch from working with one food to another. If you are interrupted while preparing food, clean and sanitize your tools before resuming the task.

Food contact surfaces and utensils, such as counter tops, cutting boards, knives, etc., should be cleaned and sanitized after each use or after four hours of continuous use.

When not in use, detergents, sanitizers, and other chemicals should be stored in a cool, dry location away from areas where food is stored and prepared. Never store food and chemicals together! Chemical containers must always be clearly labeled.

Store washcloths in the solution they are used with, and don't use the same cloths for both cleaning and sanitizing.



To prevent cross-contamination, it is important that you keep different types of foods separate during the food preparation process. This is especially important when working with raw meats and meat products. Keep all raw animal products, including eggs, separate from any other foods, particularly ready-to-eat foods, during every stage of food preparation, including storage, preparation, holding, and display.

When you handle contaminated foods or tools, your hands can become carriers of dangerous microorganisms. You can eliminate this contamination by washing your hands anytime you switch from working with one food to another.

## Cross-Contamination

One important reason for cleaning and sanitizing is that doing so prevents cross-contamination. Cross-contamination refers to germs *crossing* from one food or surface to *contaminate* another. Cross-contamination can occur through hand contact, contaminated utensils or surfaces, and improper food storage.

Cross-contamination is especially dangerous when raw animal products such as meat, poultry, eggs, or seafood—or juices from such foods—come into contact with ready-to-eat food or food that will not be cooked.

Imagine that a green salad is mistakenly placed below a plate of raw chicken in a refrigerator. Liquid from the chicken drips onto the salad and it becomes contaminated with salmonella. The salad is then served, and the person who eats it becomes ill.

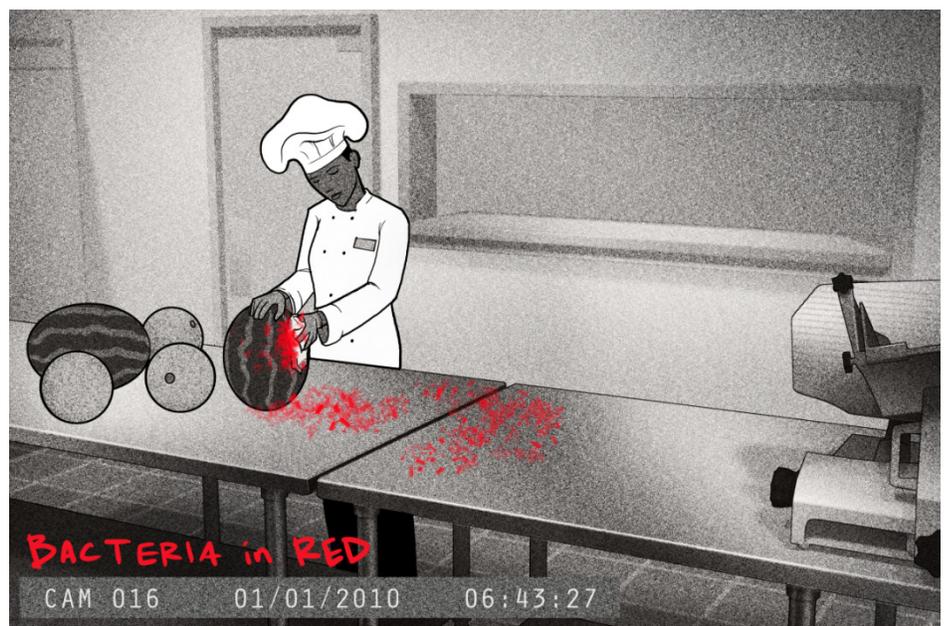
Cross-contamination can also occur on food contact surfaces. For example, it would be unsafe to cut raw pork on a cutting board and then cut tomatoes on the same board without cleaning and sanitizing it between uses.

The E. coli outbreak we discussed at the beginning of this manual—resulting in an estimated 500 unreported illnesses, 64 confirmed illnesses, and 1 death—was caused in part by cross-contamination. Food workers allowed the bacteria in the beef to spread to other foods in the kitchen.

Raw meats are particularly likely to cause cross-contamination. For this reason, double wash your hands after working with raw meats.

Refrigerators can easily become cross-contamination sites if proper storage guidelines are not followed. Never store raw meats or raw meat products over produce or over other ready-to-eat foods. Meat juices containing microorganisms can easily drip onto ready-to-eat foods and cause cross-contamination. Also, make sure to cover all foods in the refrigerator to help prevent the transfer of microorganisms between foods.

Be careful how you use cutting boards, knives, and other utensils. All surfaces and utensils used in food preparation should be properly cleaned and sanitized



after using them to prepare raw meats. Never use the same cutting board for cutting raw meats and other foods without cleaning and sanitizing it in between. This will prevent cross-contamination through those surfaces.

For cleaning and sanitizing reasons, plastic cutting boards should be used instead of wooden ones, and cutting boards should be replaced if they are worn or have deep cuts, as such cutting boards are difficult to keep clean and sanitary.

## Dishwashing

When we say “dishwashing,” we are referring to washing dishes, utensils, and other cookware. This is also often referred to as warewashing.

Your workplace must have a three-compartment sink in order to clean and sanitize dishes and utensils by hand. A three-compartment sink is just what it sounds like; that is, a sink with three separate compartments, or basins, one for each step in the washing process.

Correctly using a three-compartment sink is an effective way to properly clean and sanitize dishes, utensils, and tools. Here’s how it works:

1. Before washing any heavily soiled items, they should be rinsed, scraped, or soaked as necessary in a different sink.
2. Then, wash the items in the first basin, which should be filled with hot water—no less than 110°F—and detergent.
3. After washing, rinse the items in the second sink, which should be filled with clean water.
4. Then, immerse the rinsed items in the third compartment, which should be filled with a sanitizing solution. As always, make sure to use the correct concentration.
5. When finished, air-dry the items. Never dry sanitized items with towels.



To avoid contamination, all three sinks and the drain board must be cleaned and sanitized before each use. Never use this sink for any other purpose. For example, mop water should be disposed of in a mop sink or janitorial sink, not the three-compartment sink.

Your facility may use an automatic dishwasher to clean and sanitize dishes and utensils. If so, follow the manufacturer’s directions for wash and rinse temperatures and chemical concentrations. Scrap trays and water jets should be cleaned regularly, and temperature gauges must function accurately.

If the dishwasher has no chemical sanitizing cycle, the final rinse should be performed at no less than 180°F to properly sanitize, unless you’re using a single-temperature machine, which uses water at 165°F for the entire wash-rinse cycle.

## Waste and Pest Control

Maintaining a clean and sanitary facility also involves properly dealing with waste and pests. Waste, such as food scraps or packaging, is a natural result of food preparation. However, if waste isn’t controlled, it can result in cross-contamination or the presence of pests that happily feed on the waste your kitchen produces.

Because pests carry disease-causing germs, anything they touch becomes unsanitary, potentially leading to disastrous consequences. Recently, passers-by noticed rats the size of kittens scurrying around a national chain restaurant after it had closed for the night. The restaurant was forced to shut down until the problem was resolved.

This was an isolated incident, but the images and videos of the rats that flooded the internet had a long-lasting, negative effect on the restaurant’s reputation. In order to avoid situations like this, follow these proper guidelines for waste and pest control.

For kitchen waste, always use metal or heavy-duty plastic garbage containers. These containers should be



leak-proof, durable, and easily cleaned. Make sure to put plastic liners in all garbage containers. Dumpsters and other containers kept outside the facility should always be covered.

Be sure to place all waste in a garbage container. Never leave it lying around. Trash containers should be emptied often, especially those in food preparation areas. They should only be emptied into adequate waste-storage areas or receptacles, such as properly maintained dumpsters.

Waste-storage areas must be large enough to contain the waste your kitchen will produce, for the amount of time it must be stored. Clean all garbage containers often, both inside and out, as well as all garbage storage areas. All garbage containers and waste-storage areas should be kept as pest-proof as possible.

Of course, you'll always remember to wash your hands after taking out the trash or dealing with garbage containers in any way.

Taking care of your trash will help prevent the presence of pests in and around your facility. However, additional steps should be taken to prevent, discover, and eliminate possible infestations. Keep all outside doors to your facility closed, and store all food at least 6 inches off the floor.

Even when you do everything right, some common pests, such as rats and cockroaches, may get in. Management should conduct regular self-inspections, and hire pest extermination experts when needed. Do your part to help by reporting any signs of pests that you notice.

Unexplained holes or gnaw marks, nests, and small, pellet-like, black droppings all suggest a rodent problem. A strong oily odor or droppings that look like grains of black pepper indicate a roach problem.

## Time and Temperature Regulation

The safety of food often depends on the temperature at which it is stored, cooked, and served, and the amount of time it takes to do it. Time and temperature influence the growth of dangerous germs. Most bacteria that cause foodborne illness grow best at temperatures close to 98°F, the human body temperature.

The more time bacteria have to multiply, the more dangerous they become. If you do not manage time and temperature correctly, the food you serve becomes much more likely to cause serious illness. This is known as "time and temperature abuse."

## Thermometers

Because controlling the temperature of foods is so important in limiting the growth of bacteria, you should frequently use a thermometer to check the temperature of foods, and you should know how to use that thermometer correctly.

The surface of food always heats or cools more quickly than the inside, so to get an accurate temperature reading, place the thermometer's sensor near the center of a food item or container of food.



When cooking, stir the food before checking the temperature (assuming the food can be stirred). This will evenly distribute the heat and give a more accurate temperature, to help ensure that the entire container of food reaches the correct temperature.

When checking food that is being hot-held (on a buffet table, for example) take the temperature in several places without stirring. If any part of the food is below the proper temperature, you need to know, and stirring before taking the temperature could mix food that is too cold with food that is hot, making you think that the food is safe when it really isn't. After checking the temperature to ensure that the food is safe, it is a good idea to stir it, to help keep the temperature uniform.

### Types of Thermometers

Bimetallic stem thermometers consist of a metal probe with a dial on the top. They should be used to measure large, thick foods, within the range of zero to 220°F. The probe on a bimetallic thermometer has a dimple about two inches from the end. From the dimple to the end of the probe is the sensing area. To check a temperature, insert the thermometer into the food all the way to the dimple.

Thermocouples and thermistors measure temperature through a probe at the end of a wire, which is connected to a digital display. The probe is put into the food, and the sensing tip sends a message to the display. The sensing area is the very tip of the probe, so these are excellent thermometers for use with thin foods like hamburger patties, as well as with thicker foods.

Thermocouples can use many different kinds of probes, including immersion probes used for liquids, flat probes for surface temperatures, penetrating probes for internal temperatures, and air probes for the inside of coolers and ovens.

Infrared thermometers are used to take surface temperature, and are fairly uncommon in food service. Surface temperatures should not be used to judge cooking and holding temperatures; the internal temperature of the food is required.

Remember: thermometers are food handling utensils. If not used correctly, they can cause cross-contamination. Thermometers must be cleaned and sanitized before each use, especially any time you switch to measure a different food or food source.

If you are unsure how to use a thermometer, read the manufacturer's instructions and talk with your manager. If a thermometer is used incorrectly, you run the risk of serving unsafe food.

### Calibration

The thermometers you use at work should be calibrated often. To “calibrate” means to make sure an instrument is accurate. If a thermometer is not calibrated before use, the temperature reading it gives you is not guaranteed to be correct.

Calibrate thermometers before each shift, and anytime they get bumped or dropped. There are several



methods for calibrating thermometers, but the principle behind calibration is always the same: to calibrate a thermometer, put it in a substance with a known temperature and adjust the thermometer's calibration mechanism as necessary to arrive at the known correct reading.

For example, a glass of ice water will always settle at a temperature of 32°F. To use the ice-point calibration method, fill a glass with ice, then add water. Let it sit for a few minutes so the ice and water can reach the same temperature.

Place the thermometer in the ice water and allow enough time for the reading to stabilize. Hold the thermometer so that the sensing area is underwater, but it doesn't touch the sides or bottom of the glass.

If it does not read 32°F, you'll need to adjust it until it does. Bimetallic stem thermometers use a calibration nut located beneath the dial, whereas digital models will use different calibrating mechanisms. Just make sure to read the instructions for the thermometer you will be using and follow your manager's directions.

You can also use the boiling-point method for calibration, in which you put the thermometer in boiling water and adjust the reading until it reads 212°F—the temperature at which water boils at sea level. You'll have to adjust the thermometer differently if your elevation differs greatly from sea level, as water will boil at a significantly lower temperature at high elevations. Ask your manager if you are unsure of the boiling point at your elevation.

Remember: a thermometer is only as useful as it is accurate. Make sure your thermometers are as accurate as possible by calibrating them often.



never store thawing meat above ready-to-eat foods in the refrigerator.

You may also thaw food by submerging it under running water that is 70°F or lower (approximately room temperature). Do not use hot water. Only use water that is safe for drinking.

You may use a microwave to thaw food, if the food will then be cooked immediately. But know that large items such as turkeys or roasts do not thaw well in the microwave. You may also

## The Danger Zone

The “Temperature Danger Zone” is the temperature range where TCS food can become deadly: between 41 and 135°F. When the temperature of TCS food falls within this range, bacteria can grow on it, making it unsafe to eat.

Most bacteria that cause illness grow most rapidly at the upper end of the danger zone, between 70 and 135°F, and any TCS food that stays in this temperature range for 4 hours or longer **MUST** be discarded.

Bacteria grow slightly less quickly at the lower end of the danger zone, and so TCS foods that are removed from refrigeration but kept under 70°F, like chilled fruits and vegetables, may be sold or served for a period of 6 hours, at which time they must be discarded.

To avoid time and temperature abuse, keep all hot foods hot and all cold foods cold, as much as possible. There are times when food must pass through the danger zone, such as during preparation, cooling, and reheating, but you must minimize the time food spends at unsafe temperatures during these activities.

## Thawing Food

One of the worst ways to thaw food is by letting it sit at room temperature. This will almost guarantee that it remains in the danger zone too long. The safest way to thaw food is in a refrigerator. This way, the food does not pass through the danger zone during thawing.

This method requires advance planning, as it can take days for larger food items to completely thaw. Generally, you should allow one day for every five pounds of food. For example, a 20-pound turkey will take about four days to thaw in a refrigerator. Remember: in order to prevent cross-contamination,

thaw food as part of the cooking process. For instance, you may place frozen ground beef in a skillet and let it thaw while it cooks.

## Cooking Food

When cooking food, monitor its temperature with a probe thermometer. Many foods need to reach certain internal temperatures to kill bacteria and viruses and make the food safe. Cook pork, beef, and fish to at least 145°F and keep it at that temperature for at least 15 seconds. If the meat is ground, cook it to at least 155°F for at least 15 seconds. Poultry, whether ground or not, should be cooked to at least 165°F for at least 15 seconds.



If shell eggs will be served immediately, they must be cooked to 145°F. If they will be held for service (in a buffet line, for example), they must be cooked to 155°F.

Remember the E. coli outbreak from the introduction? If the food handlers had prevented cross-contamination, and then cooked the infected beef to the proper internal temperature, the outbreak would have been avoided.

### *Holding Food*

Even after food has been thawed and cooked, remember to keep it out of the danger zone. If it will not be served immediately, you must “hold” it at a safe temperature; if it spends too long in the danger zone, it must be discarded. Holding procedures are particularly important when running a buffet.



Once foods have been cooked to the required temperatures, keep hot foods at or above 135°F until serving. This is called “hot-holding.” When holding hot foods, check the internal food temperature at least every two hours.

As mentioned previously, check the temperature in several places before stirring. After checking the temperature, stir the food to distribute the heat evenly. Never mix freshly prepared food with food being held for service, so that you can easily track how long each batch has been held.

Hold cold food at 41°F or lower. Check the internal temperature of the food regularly to make sure it does not become too warm.

If you use ice for cold-holding, do not use the ice for any other purpose (in drinks, or as an ingredient in food, for example). Avoid holding food directly on ice, unless it is in a water-proof package. Instead, place the food in pans or on plates that rest on the ice.

### *Cooling Food*

After food has been served, either discard leftovers or properly cool them so they can safely be stored. Improper cooling of foods is one of the main contributing factors to the spread of foodborne illness.

Remember: the key is to keep food out of the danger zone as much as possible. Thus, hot foods should be cooled as rapidly as possible.

Do not leave food to cool at room temperature, as this is in the danger zone. Not a problem, just put it in the fridge, right? It would be nice if it was that simple, but it isn't.

Refrigerators and walk-in coolers can handle small amounts of hot food without a problem. However, they aren't able to cool large amounts of food as quickly as they need to be cooled in order to remain safe.

Imagine that a large stock pot filled with hot soup is placed in a walk-in cooler. It could take as long as 24 hours to completely cool, and by then, bacteria could multiply to dangerous levels, making the soup dangerous to eat. Also, the heat from the pot could raise the temperature of nearby foods in the cooler, placing them at risk as well.

To avoid these problems and ensure that food cools quickly enough to remain safe, follow a two-stage cooling method. In the first stage, cool food from 135 to 70°F. Bacteria grow the most rapidly in this range, and so the first stage should take no

longer than two hours.

In the second stage, cool food from 70 to 41°F or lower. The second stage should take no longer than four hours. Total cooling time must not exceed six hours.

There are a variety of techniques for cooling food within the two-stage method; here are a few of the common ones.

Divide food into smaller portions. The surface of a food cools faster than the inside. By dividing it, you give food more surface and less interior, so it will cool more quickly. Place the divided portions into small stainless steel pots or pans, with a maximum depth of two inches for solid foods or three inches for liquids, and then transfer them to the cooler. Leave food uncovered while



it cools to allow heat to escape, but remember to cover it when it has finished cooling.

You can also cool food using an ice water bath. Fill a sink or large pan with ice water. Then, push the bottom of a container of hot food into the ice water to cool it. Don't push it in so far that the water flows into the food, but far enough so that the water on the outside of the container rises higher than the level of the food on the inside. Stirring the food will also help heat escape.

Other methods include adding ice or cool water to the food as an ingredient, using cooling paddles, positioning pans to allow air to circulate around them, or using a blast or tumble chiller, if one is available. Your facility probably has a preferred method or combination of methods, so if you have questions ask your supervisor.

### **Storing Food**

After food has been cooled properly, storing it is not as simple as throwing it in a fridge or freezer, or sticking it somewhere on a shelf. There are guidelines for food storage, and they apply to both leftovers and food that has not yet been used.

To keep stored food safe, follow these rules: Always label and date all stored food with a "use-by" date. For leftovers, the use-by date should be within seven days of when the food was prepared. Discard any food that has not been used by its labeled date, as well as any food that has been opened for seven or more days.

Minimize waste by using older products first, as long as they're still

safe to use; this is called "first-in, first-out." To protect against pests, keep storage areas clean and dry, with all food at least six inches off the floor and away from walls. Do not store chemicals near food.

Regularly check food temperatures in refrigerators. Keep food, particularly TCS food, in covered containers or properly wrapped. Remember: raw food should be stored below cooked or ready-to-eat foods, to prevent cross-contamination.

### **Reheating Food**

When reheating food for hot-holding, heat it to a minimum internal temperature of 165°F within two hours. Do not use hot-holding equipment to reheat food. Instead, rapidly reheat the food with appropriate cooking equipment. Once it has reached at least 165°F, it can then be placed in hot-holding equipment.

Any reheated food that does not reach 165°F within two hours must be thrown away.

### **Receiving Deliveries**

So far, you've learned how to control the temperature and safety of food through the storage, preparation, service, cooling, and reheating stages of food handling. It is important that you also understand that safe food handling begins the moment that foods and ingredients arrive at your facility.

Properly receiving and inspecting deliveries will help ensure that the food you serve will be excellent, both in terms of quality and safety. Inspect deliveries immediately when they arrive at your facility, before the driver leaves, so that any spoiled or contaminated food can be rejected.

Inspect food items for any signs of time and temperature abuse, as well as any visible signs of spoilage or contamination. Take temperatures of TCS foods to ensure they are in the safe temperature range.



For meat, poultry and fish, insert the thermometer stem directly into the thickest part of the food to get an accurate reading of the temperature of the food itself, and not the box in which it is delivered.

For reduced oxygen packaged food, take a temperature reading between two packages, or if the packaging allows, fold the product around the thermometer.

For other packaged food, open a container and insert the thermometer. If receiving milk, for example, open one of the containers and take the internal temperature of the milk. Remember to be careful to avoid cross-contamination while taking temperatures.

Cold TCS foods need to be received at 41°F or lower, except for shell eggs, which can be received as high as 45°F.

Hot TCS foods need to be received at 135°F or higher.

Frozen foods need to be received frozen. Your facility should reject them if there are fluids or frozen liquids at the bottom of the case, or ice crystals in the packaging or product. These are indicators of thawing.

Product quality is just as critical as product safety. Your facility should reject food with any abnormal coloring: for example, meat, fish, or poultry that feels slimy, sticky, or dry. If the flesh is soft or leaves the imprint of your finger when you push on it, reject it. Reject any food with abnormal or unpleasant odors.

Eggs must be clean and unbroken. Liquid frozen eggs and dehydrated egg products must be pasteurized. Egg products must have a USDA inspection mark.

Meat and poultry packaging must have a USDA or State Department of Agriculture stamp on it; if not, reject the product.

If you receive sliced melons and cut tomatoes, make sure that they are securely wrapped.

## Conclusion

What you have learned in this food handling manual applies not only to your work, but to your personal life as well. Safe food guidelines are important whether you are catering a convention or barbecuing in your backyard.

But remember: they take on added importance in a food service facility, because failure to follow them can have wide-reaching consequences. As we saw in our first example of the E. coli outbreak, serving unsafe food can lead to legal action or health department sanctions against your facility. You could lose your job, and many people could become very ill or even die.

On the other hand, serving safe, delicious food is fun and fulfilling. Your employment in the food service industry can and should be an enriching and joyful experience. You choose the consequences by choosing to follow safety guidelines, or not.

Your employer, co-workers, and customers are all counting on you to do your part. For all these reasons and more, please be careful. Simply knowing these rules isn't enough. Follow them every time you work with food, and you can be sure that your actions are contributing to the health and safety of those around you.

