

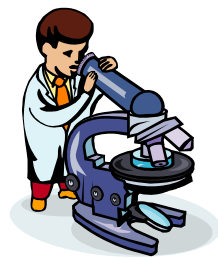
FOOD SAFETY

Learner's Guide

Foodborne Illness

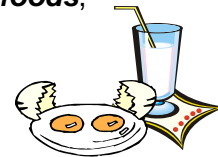


Foodborne diseases are infectious, which means they can be passed on to other people through food. An estimated 76 million foodborne illnesses occur each year in the United States, accounting for 325,000 hospitalizations and 5,000 deaths. The yearly cost of foodborne diseases in the U.S. is an estimated \$5 to \$6 billion in medical expenses and lost productivity.



A foodborne illness is a disease transmitted to people by food. Microorganisms cause most foodborne illnesses. Microorganisms are tiny forms of life that are so small you can't see, taste, or smell them. Foods that allow microorganisms to grow are **potentially hazardous foods**, including the following:

- Milk and milk products
- Sliced melons
- Beef, pork, and lamb
- Poultry
- Shellfish
- Shell eggs



These foods contain many microorganisms, including **bacteria, viruses, parasites, and fungi**. Bacteria are the biggest threat to food safety. There are thousands of types of bacteria naturally present all around us, affecting our health every day. Some bacteria are helpful and good for us, such as the bacteria in yogurt. We need certain "friendly" bacteria in our intestinal systems to help us digest our food. Some bacteria, however, are harmful and can make us sick if they get in the food we eat. **Bacteria** can cause illness in two ways. Some bacteria are **pathogenic**, meaning they cause infections. Some are **toxigenic**, meaning they produce toxins or poisons that cause illness.

Bacteria are all around us and we can never completely eliminate them, so we must control their growth. Bacteria may contaminate food where it is grown, raised, or slaughtered. How food is handled during distribution and delivery may cause contamination. Food may be contaminated during the process of storage, preparation, holding, and service. Food handlers who do not follow appropriate personal hygiene or who cough or sneeze can contaminate food.



Viruses are the smallest microbial contaminant. Viruses cannot reproduce without a living cell. They cannot reproduce in food, but once they are in the body they can reproduce rapidly.

Viruses pass from person to person and from food to person. Norwalk and Norwalk-type viruses are responsible for the largest number of foodborne illnesses.

Foodborne illnesses can make people very ill. They can even be fatal.

People at Special Risk

Some people are more likely than others to get a foodborne illness. Older people, the disabled, and those with chronic illnesses may have difficulties that put them at higher risk, such as:

1. The immune system may not function as well as it should. The immune system helps us fight disease. When this ability decreases, more infections may occur.
2. The digestive process may be slower. Because food does not move through the system as quickly, there is time for disease-causing organisms to grow in the stomach and intestines.
3. Stomach acid may decrease. Stomach acid limits the number of bacteria that enter the intestines, so if there is not enough acid the bacterium can get into the intestines and cause sickness.
4. Nutrition may be poor. Sometimes things like medications, stomach problems, physical disabilities, or depression may result in a loss of appetite. Not eating enough can lead to malnutrition, which causes a higher risk of infections, including foodborne illnesses.
5. Sense of taste or smell may decline. This could make it more difficult to detect the taste or smell of spoiled food that might cause disease.



Signs and Symptoms of Foodborne Illness



Foodborne illnesses usually cause flu-like symptoms such as nausea, vomiting, diarrhea, fever, abdominal pain, cramps, and fatigue. Severe cases can cause bloody diarrhea, dehydration, kidney failure, paralysis, and death.

Sometimes people have a foodborne disease and don't know it. They may think they have a virus, or they may have no symptoms or very mild ones.

Following food safety rules can prevent most cases of foodborne illness.

Four Factors that Cause Food to Become Unsafe

1. **Time-Temperature:** Bacteria can grow in food whenever it remains in the “**temperature danger zone**” between 40°F and 140°F for too long. Food cannot safely remain in that dangerous range for more than two hours.
2. **Cross-Contamination:** Cross-contamination occurs when utensils, hands, or other foods transfer microorganisms from one food or surface to another.
3. **Poor personal hygiene:** This is the biggest cause of foodborne illness. The best personal hygiene practices include hand washing, covering cuts or sores, and covering hair.
4. **Illness:** Report any flu-like symptoms, diarrhea, and/or vomiting to your supervisor. Employees with these symptoms should not prepare food. Instances of *Hepatitis A*, *Salmonella Typhi*, *Shigella*, or *E. Coli* must be reported.



Preventing Foodborne Illness

Hygiene is the first thing that must be controlled to prevent foodborne illness. Good hygiene, hand washing, and cleaning and sanitizing work surfaces help prevent the spread of viruses.

Hygiene

A surface or food that contains bacteria is considered **contaminated**. Careless food handling can cause bacteria from one surface or food to get on another surface or food, causing **cross-contamination**.

For example, uncooked meat may contain harmful bacteria. The bacteria will get on the surface where the meat is prepared. Human hands, utensils, or foods that touch the meat or the preparation surface can carry the bacteria to other foods. When eaten, the contaminated food may cause illness. Proper cooking will kill the bacteria, but not all food is cooked (fruits, salads).

The same thing can happen if hands are not carefully washed between preparing different types of food, or if someone with an infection touches a food, utensils, plates, or a food preparation surface. Preventing contamination and cross-contamination of foods is essential to preventing foodborne disease.

Hand Washing

Wash hands and wrists up to forearms, including under fingernails, vigorously and with soap and water for a minimum of 20 seconds:

- Before work begins.
- Immediately before preparing or serving food.
- As often as necessary, whenever contamination occurs.
- In the restroom after toilet use and upon return to work.
- When switching between working with raw foods and ready-to-eat or cooked foods.
- After touching face, hair, or any body part, and after sneezing or coughing.
- After cleaning duties.
- Between each task performed and after removing disposable gloves.
- Before and after smoking, eating, or drinking.
- Any time you do an unsanitary task, such as taking out garbage, handling cleaning chemicals, wiping tables, picking up a dropped item, and so forth.



Wash hands in porcelain-based or stainless steel sinks designed for that purpose. Dry hands with single use towels. Turn off faucets in a sanitary fashion, using a towel, in order to prevent recontamination of clean hands.

Gloves and Utensils

- Always wear gloves or use utensils to handle all ready-to-eat foods that will not be heat-treated again. Wear gloves when serving food. Change disposable gloves as often as hand washing is required. Wash hands after discarding gloves.
- Use utensils, such as deli-tissue, spatulas, or tongs, as an alternative to gloves.
- Wear gloves and/or use utensils when there are burns or lesions on your hands. Cover cuts and sores on hands, including fingernails, with clean bandages. If bandaged, wear clean gloves at all times to protect the bandage and prevent it from falling into food. Wear disposable gloves if hands have any cuts, sores, rashes, or lesions.



Personal Hygiene

Everyone should maintain good personal hygiene practices to ensure food safety. This means:

- Wear clean clothes
- Have clean hair
- Keep teeth brushed
- Bathe and use deodorant daily
- Maintain short, clean, and polish-free fingernails. No artificial nails.



Proper Attire

Wear appropriate clothing, which includes a clean uniform with sleeves and clean non-skid, closed-toed work shoes (or leather tennis shoes) that are safe and comfortable for standing and working on floors that can be slippery. Wear an apron to cook in. Remove apron before using the restroom. Change apron if it becomes soiled or stained.

Hair Restraints and Jewelry

Cover or restrain hair. Keep beards and mustaches neat and trimmed. Refrain from wearing jewelry in the kitchen. You may wear a plain wedding band and a watch. You should not wear necklaces, bracelets, dangling jewelry, or any removable earrings or piercings.



Cleaning and Sanitizing



Cleaning removes food and other types of soil from a surface such as a countertop. Cleaning with a detergent doesn't kill enough bacteria to sanitize an object that has been in contact with potentially hazardous foods.

Sanitizing means that we have reduced or killed enough of the microorganisms (or germs) on clean food contact surfaces to be at a safe level. Sanitizing removes what you can't see.

Food Contact Surface means those surfaces of equipment and utensils upon which food is placed and those surfaces on which food may drip, drain, or splash during preparation or service. Wash, rinse, and sanitize surfaces that come in contact with food:

- Each time you use them.
- When you begin working with another type of food.
- As often as possible, but at least every four hours if you are using something constantly.

It is not necessary to sanitize non-food contact surfaces; however, keep the cloths used for wiping the surfaces in a sanitizing solution between uses. Change the solution when it becomes dirty. A sanitizer is only effective when you have proper water temperature, correct concentration of sanitizer, and when the sanitizer stays in contact with the surface for enough time.



Kitchen Sanitation

It is important to clean food preparation and serving areas on a regular basis.

- Kitchen cleaning cloths should be stored in a sanitizing solution and washed separately from cloths used for cleaning other areas. Prepare a sanitizing solution using 1 tablespoon of bleach per gallon of clean water, or ¼ cup of bleach per five gallons of water.



- Wash, rinse, and sanitize sinks before using them for food preparation or dishwashing.
- Keep garbage container covered and clean.
- Store bowls and receptacles either upside down or covered with lids.



Follow the Ten Hygiene Commandments at all times.

Ten Hygiene Commandments

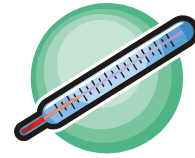
1. Wash hands with hot soapy water before touching or preparing food.
2. Wash hands thoroughly after using the bathroom or providing personal care.
3. Cover or restrain hair. Many state sanitation laws require that those who prepare food must keep hair covered or tied back. Keeping hair out of the way helps prevent contaminating the food.
4. Do not work around food if you have any infection or infectious disease. This includes a boil, an infected wound, or an acute respiratory infection.
5. Wash your hands, utensils, cutting boards, plates, and all work surfaces thoroughly with hot soapy water after they touch raw meat, fish, or poultry.
6. Utensils and surfaces used for food preparation must be cleaned, rinsed, and sanitized before use.
7. Keep fresh foods separate from each other. Use different surfaces and utensils when preparing each one, or thoroughly wash utensils and surfaces between foods.
8. Prepare and serve food with the least possible manual contact, meaning that it should be touched as little as possible.
9. Wash fruits and vegetables thoroughly.
10. Keep unserved food covered at all times.





Temperature

The temperature at which food is stored and cooked is critical to controlling and destroying bacteria that cause foodborne illnesses. Bacteria that cause illness can grow rapidly in perishable foods of all kinds. Proper cooking and cold storage will hinder the growth of bacteria.



Harmful bacteria can multiply in food at temperatures between 40°F and 140°F.

Keep cold foods cold and hot foods hot during storage, preparation, and serving.
Keep cold foods at 40°F or lower. Keep hot foods at 140°F or higher.

The Two-Hour Rule

- Refrigerate or freeze all perishable food immediately. Food must not be left out of refrigeration longer than two hours.
- Foods that will spoil at room temperature should be prepared last when you are preparing a meal. Time your preparations so perishable foods will be ready to eat just before serving.
- Throw away any food that has been left at room temperature longer than two hours. If the room temperature is over 90°F, discard food after one hour.

Cold Storage Requirements



Place a thermometer in the warmest part of both the refrigerator and the freezer so you can measure the temperature. Refrigerators should be 40°F or less. Freezers should be 0°F or less. Don't pack food tightly—air needs to circulate around it. Keep different types of foods separate from each other.

This chart shows how long certain foods can be kept safely in a refrigerator or freezer.

Food	Refrigerator (40°F)	Freezer (0° F)
Eggs in shell, uncooked	3 weeks	No
Eggs, hard cooked	1 week	No
Egg or macaroni salad	3-5 days	No
Lunch meats, opened	3-5 days	1-2 months
Lunch meats, unopened	2 weeks	1-2 months
Bacon	7 days	1 month
Sausage	1-2 days	1-2 months
Ground meat and poultry	1-2 days	3-4 months
Soups and stews	3-4 days	2-3 months
Ham, fully cooked—whole	7 days	1-2 months
Ham, full cooked—half	3-5 days	1-2 months
Ham, full cooked—slices	3-4 days	1-2 months
Beef, pork, lamb, and veal: Steaks, chops, roasts	3-5 days	Beef: 6-12 mo; Pork: 4-6 mo; Lamb: 6-9 mo; Veal: 4-8 mo
Meat leftovers	3-4 days	2-3 months
Chicken or turkey, whole	1-2 days	1 year
Chicken or turkey pieces	1-2 days	9 months
Poultry leftovers	3-4 days	4 months
Hot dogs, opened	1 week	1-2 months
Hot dogs, unopened	2 wks; less than 1 wk after "sell-by" date	1-2 months





Seven Important Food Preparation Rules

1. **Store food** at 40°F or lower. Freezing prevents pathogens from growing.
2. **Select food** with good color and smell. Reject foods that don't look or smell right.
3. **Thaw food** using one of the four acceptable methods and cook it before it reaches room temperature.
4. **Prepare food types** separately. Prepare meats separately from all other foods, following sanitary precautions, because the bacteria in the meat can contaminate other foods prepared on the same surface.
5. **Cook food** to an internal temperature that is high enough to kill pathogens.
6. **Serve food** immediately, at a temperature of at least 165°F. Do not allow food to stay at 40°F to 140°F for over an hour.
7. **Cool leftovers** quickly in the refrigerator so they will reach the safe temperature of 40° F or less as soon as possible. Divide large amounts of meat into smaller portions in small, shallow containers so it cools rapidly.

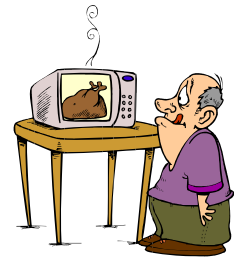
Four Acceptable Methods for Thawing Food



1. Thaw food in the **refrigerator** at 40°F or lower.
2. Submerge food under **running water** that is 70°F or lower.
3. Thaw food in the **microwave** only if the food will be cooked **immediately**.
4. Thaw food as part of the **cooking process**.

Never thaw food at room temperature.

- Always thaw food in the refrigerator, in cold water, or in a microwave. If you thaw it in a microwave, you must cook the food immediately.
- Thaw food quickly and cook it before it reaches room temperature.



Before Cooking, Check the Food and Don't Use It If:

- Meat or poultry has brown, white, or green spots, or a slimy, sticky, or dry surface.
- The temperature of perishable food is warm or room temperature.
- Fish has a dull gray skin or a strong fishy or ammonia odor.
- Eggs have an abnormal smell or shells that are cracked or dirty.

Reject anything that doesn't smell right!

Cooking Temperatures


- Use a clean meat thermometer to measure the internal temperature of food.
- Meat, meat products, and eggs must always be thoroughly cooked. Be especially careful to cook ground meat or hamburger completely. **Never partially cook food.**
- Use a constant heat source when cooking.
- When cooking in the oven, always set the oven at 325°F or higher





MINIMUM INTERNAL COOKING TEMPERATURES

To kill pathogens, you must cook foods until they reach the appropriate temperature for a minimum of 15 seconds.



This chart tells you what temperature certain foods should reach on the inside before serving.

Food	Minimum Internal Temp.
Ground beef, pork, veal, or lamb	165°F (or until it is not pink inside)
Beef, veal, lamb, pork: Roast, steak, chops	165°F (medium) 170°F (well done)
Ham, uncooked	165°F
Ham, fully cooked	140°F
Ground chicken or turkey	165°F
Whole chicken or turkey (unstuffed)	180°F
Breasts, poultry roasts	170°F
Thighs and wings	Until juices run clear
Fish	145°F, or until opaque, flaky
Egg dishes, casseroles	160°F (Cook eggs until yolk and white are firm)
Leftovers	165°F



Keeping Food Warm & Reheating

If food is not eaten immediately, it is not enough to just keep it warm. Set the temperature high enough to keep the hot food at 140°F or above. Cover the food with foil to keep it moist.

When reheating, reheat food thoroughly to an internal temperature of 165°F, or until the food is hot and steaming. Soups, sauces, and gravies should be brought to a boil.

In a microwave oven, cover the food and rotate it for even heating. Stir the food and allow stand time for more even, thorough heating.

Storing Leftovers

You should not try to keep cooked food hot any longer than two hours. Store leftovers carefully:

- Get leftovers into cold storage quickly
- Divide large amounts into smaller portions (so the food will quickly reach 40°F or less.)
- Place food in small, shallow containers
- Date and label the containers
- Cover loosely and refrigerate at once

Storing Staple Foods

- Any food that could spoil must be kept in a sealed, labeled, and dated container.
- If you remove food from its original container, such as when you divide larger packages of cereal into smaller ones, it must be kept in a sealed container that is labeled and dated.
- Store foods in plastic containers with tight fitting lids.

TO PREVENT FOODBORNE ILLNESS: SAFETY FIRST!

