C H A P T E R 2

Prevent Foodborne Illness Understanding Microorganisms

In this chapter, find answers to the following questions:

C H A P T E R 2

Prevent Foodborne Illness—Understanding Microorganisms

In Chapter 1, the three main types of contaminants were described: harmful microorganisms in food, harmful chemicals in foods, and harmful physical objects in food. This chapter will provide a closer look at foodborne illness caused by harmful microorganisms.

Bacteria and other microorganisms are everywhere—in the soil, in saliva, under fingernails, on a doorknob, and on a towel. Some bacteria protect from infection, help digest food inside the body, and break down organic materials in the environment. Penicillin, a powerful antibiotic, was originally developed from mold. However, some microorganisms are dangerous to humans when consumed and are the primary causes of foodborne illness. Harmful bacteria and viruses cause most of the foodborne illness.

What happens in the body after a contaminated food has been eaten?

When a food with harmful microorganisms is ingested, there is a period of time before symptoms of the foodborne illness begin. The amount of time varies with the microorganism, how many were in the food, and the individual's physical condition. Many different harmful microorganisms produce the same symptoms including diarrhea, stomach cramping, nausea, and vomiting. Because symptoms are similar, a laboratory test and a trained health department official are necessary to identify the specific microorganism.

How do harmful microorganisms contaminate foods?

Harmful microorganisms may contaminate food

- During receiving
- During preparation and serving
- During preparation techniques such as cooking and cooling
- By cross-contamination of raw meat, poultry, seafood, or eggs with other foods
- From employees to food by unwashed hands, coughing, or sneezing
- From unsanitary facilities and equipment to people or food
- From disease-spreading pests, such as cockroaches, flies, and mice

How food is handled after it has been contaminated can make a big difference in whether the food will cause a foodborne illness. To control the growth of harmful microorganisms foodservice employees must control the conditions necessary for growth. All foodservice employees are responsible for handling every food according to guidelines

- To prevent contamination, and
- To prevent growth of microorganisms if the food should become contaminated.

What are the main causes of a foodborne illness?

Knowing what can cause a foodborne illness is the first step in preventing it. Foodborne illnesses are caused by one or more of the factors described below.

- Poor personal hygiene
- Abuse of the time-temperature relationship
- Cross-contamination

Poor Personal Hygiene

To prevent foodborne illness, foodservice personnel must follow procedures for good personal hygiene. Everyone has bacteria on skin, hair, eyes, nose, mouth, and hands. Some bacteria cause foodborne illness. Foodservice personnel can contaminate food and food-contact surfaces and cause foodborne illness.

Poor personal hygiene can result in food contamination when

- An employee does not wash hands after using the restroom. See more about handwashing on pages 16 and 17.

  Example: Failure to wash hands properly after using the restroom presents a serious risk of fecal contamination.
- An employee coughs or sneezes on food.

  Example: A cook is preparing chef salad and sneezes on the food.
- An employee prepares food with an open sore or cut, touches the wound, and then touches food.

  Example: An employee burned her forearm and it became infected. While preparing sandwiches, she touches her open wound and then continues preparation of the sandwiches.

Abuse of the Time-Temperature Relationship

To prevent foodborne illness, it is important to control the time that food is in the temperature danger zone. The temperature danger zone is between 41 °F to 140 °F and refers to the internal temperature of food. Check with State or local public health departments for additional information on time and temperature abuse.

Time-temperature relationship problems occur because

- Food is not stored, prepared, or held at required temperatures.

  Example: The holding cabinet in a cafeteria is not set to hold hot foods at 135 °F or above.

- Food is not cooked or reheated to temperatures high enough to kill harmful microorganisms.

  Example: Chili is not reheated to 165 °F or above for 15 seconds.
- Food is not cooled to low enough temperatures fast enough.

  Example: Hot turkey gravy is stored in a deep, one-gallon storage container and is not cooled properly, so the internal temperature of the gravy remains in the temperature danger zone too long for food safety.
- Food is prepared in advance of service and proper temperature control is not maintained.

  Example: Spaghetti sauce is prepared for the next day and when it is removed from the refrigerator to be heated for service, the internal temperature is 60 °F.

Cross-Contamination

To prevent foodborne illness, avoid transferring harmful microorganisms from a surface to food or from one food to another food. This is known as cross-contamination.

Cross-contamination can occur when

- An undercooked food is added to another food that is not cooked further.

  Example: Undercooked scrambled eggs are added to an existing pan of scrambled eggs on a steam table.
- A food-contact surface is not cleaned and sanitized as necessary for food safety.

  Example: Before each use with a different type of raw animal food.

  Example: Each time there is a change from working with raw foods to working with ready-to-eat (RTE) foods.

  Example: Between uses with raw fruits and vegetables and with potentially hazardous foods.
- Raw meat touches or drips fluids onto a prepared food.

  Example: Storing raw meats in a refrigerator on a shelf above cooked or ready-to-eat foods.
- A food employee's hands touch a food and then touch a prepared food that is ready-to-eat and will not be cooked.

  Example: Washing potatoes and then immediately preparing lettuce salad without washing hands.

How can foodborne illness caused by microorganisms be prevented?

The three primary ways of preventing foodborne illness are listed below.

- Practice good personal hygiene.
- Control time and temperature of foods.
- Prevent cross-contamination.

Practice Good Personal Hygiene

Every person who works in or around food has the potential of contaminating a food with bacteria and viruses that are present on our bodies. Not only are bacteria on our bodies, they are present on common items that we handle regularly, such as money, pens, pencils, and doorknobs. These bacteria can easily spread to food. The personal hygiene, dress, and general good health habits of foodservice employees play a crucial role in keeping these bacteria away from the food they prepare and serve.

It is the manager's responsibility to establish procedures for good personal hygiene and make sure that everyone follows them.

Good personal hygiene includes certain practices.

- Bathe daily.
- Shampoo hair frequently.
- Wear freshly laundered work clothes or uniforms daily and change aprons after they become soiled.
- Keep fingernails clean, trimmed, and unpolished. Best practice is not to wear fingernail polish or artificial fingernails.
- Treat and bandage wounds and sores. When hands are bandaged, clean single-use gloves should be worn at all times to protect the bandage and keep it from falling into food.
- Wash hands correctly and often.
- Wash hands before putting on gloves or changing into a new pair.
- Change gloves each time a new task is begun.

More detail about good personal hygiene can be found in Chapter 4, pages 51 to 53.

Control Time and Temperature of Foods

Know the rules of time-temperature control.

The relationship between time and temperature is critical in the prevention of foodborne illness and the assurance of food quality. **Harmful microorganisms grow and multiply at temperatures between 41 °F and 135 °F, the temperature range referred to as the temperature danger zone.** Whenever a food is in the temperature danger zone too long, it can become unsafe. Many authorities suggest that food should remain in the temperature danger zone a minimum amount of time not to exceed four hours.

Best practice is to keep food at or below 41 °F or at 135 °F or above.

Temperature Danger Zone

- The temperature danger zone is between 41 °F and 135 °F. Follow State and local public health department requirements.
- During any point of the food production process when food could be in the temperature danger zone, the internal temperature must be documented. Follow State and local public health department recommendations to control time and temperature at each stage of food production.

- The time period when the food could be in the temperature danger zone includes the receiving process, storage, cooking, preparation, holding, serving, reheating, and cooling.
- When heating or cooling foods, use procedures to pass them through the temperature danger zone as quickly as possible.

Chilling Food

For best practice, chill foods to take them through the temperature danger zone rapidly.

Chill cooked hot food from 135 °F to 70 °F within 2 hours and from 70 °F to 41°F in an additional 4 hours for no more than a total cooling time of 6 hours. If the food has not reached 70 °F within 2 hours, it must be reheated immediately to 165 °F for 15 seconds. For details on safe cooling, see page 83.

Use the right tools to monitor and document the internal temperature of foods.

EXAMPLE 1:

The following is an example of how a food could be exposed to temperatures in the temperature danger zone at several stages:

- A delivery truck arrives at 9:15 a.m. on Monday morning. The truck driver sees that the manager is on the phone and decides to unload the cases of food and supplies on the dock while he waits. A former employee stops in to visit and the truck driver, manager, and employee reminisce about the past.
- At 10:30 a.m. the manager checks in the order and notices the 100 pounds of ground beef does not feel cold. He accepts the delivery and tells the driver not to worry about it.
- The manager is on his way to get a cart to transport the ground beef to the refrigerator when a cook asks a question about the upcoming menu. The manager stops to talk.
- The cart with the ground beef is rolled into the refrigerator at 11:00 a.m.
- On Tuesday, the cook is making "Maggie's Meatloaf" for lunch on Wednesday. She rolls the cart with the 100 pounds of ground beef to her work area. When she reads the recipe, she discovers she will only need 40 pounds. She decides she will put away the remaining 60 pounds of ground beef in the refrigerator when she is finished making the meatloaf. She decides this is more efficient since it will be one less trip to the refrigerator.
- She places the meatloaf in 6-inch steam table pans, then covers, labels, dates, and places the meatloaf and remaining ground beef in the refrigerator.
- On Wednesday, she cooks the meatloaf. After about 20 minutes of cooking, she opens the oven door and decides it needs about 5 more minutes. She feels it is not necessary to take the internal temperature since this is how she has always cooked it, and it is a favorite among students and staff.

EXAMPLE II:

Cold sandwiches are made and planned for service at a special Saturday meeting with parents and teachers. The sandwiches will be removed from cold temperature control at 11:30 a.m. and chilled on ice until all are consumed or until 1:30 p.m., whichever comes first. Temperatures are monitored and documented every 30 minutes. A foodservice employee will be on hand to serve the food and assure that the written procedures are followed.

It is easy for time in the temperature danger zone to add up quickly. For best practice, a foodservice operation should document temperatures and maintain written procedures. Follow State and local public health department recommendations to control time and temperature at each stage of food production.

TOOL 1: *Food Thermometers*

Accurate food thermometers are the only tools that can judge the internal temperature of a food product. The length of time a food has been cooked or the appearance of a food is not a good indicator of safety and doneness.

Every foodservice employee who is responsible for preparing or serving food should have easy access to a food thermometer and be taught to calibrate it and use it correctly.

The two most common types of food thermometers used to determine the internal temperature of foods are

- **a bi-metallic stemmed thermometer with an instant-read dial that measures temperatures from 0 °F to 220 °F.**
  This type of thermometer is most commonly used in foodservice operations and is referred to as a food thermometer in this document. It should have an adjustable calibration nut and an easy-to-read temperature marking. A dimple marks the end of the sensing area.
- **a digital thermometer that measures temperature with a metal probe and displays the temperature on a digital readout.**
  This type of thermometer is available in various styles from a pocket-size up to a panel-mounted display. Many digital thermometers have interchangeable temperature probes used to measure temperature of different items.

Determine the safe internal temperature when food is

- Received (milk, produce, frozen food, etc.)
- In hot-holding cabinets
- Being cooked
- On the service line

- Cooled for later cold storage
- Leftover
- Reheated

How to use a food thermometer

- Clean and sanitize the stem of the thermometer after every use.
- After washing the stem, sanitize the stem with a sanitizing solution or a sanitizing wipe. Allow to air dry.
- Store in a clean and sanitized case.
- The clean case should be sanitized by immersing in a sanitizing solution.
- For digital thermometers, remember to check and change batteries on a routine basis.
- Measure the internal temperature of a food by inserting the stem of the thermometer into the center and thickest part of the food.
- Insert the thermometer into the center of the food enough to cover the sensor.
- Avoid pockets of fat in meat and touching bone.
- Wait for the dial or digital indicator to stop (about 15 seconds) and then read the temperature.
- Insert the thermometer again in a different part of the food for a second reading and a third time to confirm the internal temperature meets requirements.
- Clean and sanitize the thermometer before inserting it into the next food.
- Use the food thermometer to check the temperature of refrigerated foods during the receiving process. Refrigerated foods should be delivered at or below 41 °F, except as specified in laws governing milk, shell eggs, and molluscan shellfish.
- Packaged foods—Insert the thermometer in between two packages without puncturing the packages.
- Milk—Open a carton and insert the thermometer at least two inches into the milk. If the milk meets temperature requirements, the milk can be used for cooking if kept at proper temperature, or it may be discarded.
- Use a food thermometer to check the temperature of frozen foods if necessary. Insert the stem of the food thermometer between frozen packages. Frozen foods should be delivered frozen solid.
- Calibrate the food thermometer on a routine basis. Teach employees how to calibrate a food thermometer and establish a routine of having each thermometer calibrated at the beginning of the workday. If a food thermometer is dropped, calibrate prior to using it to be sure the temperature reading is accurate.

How to calibrate a food thermometer

Use these methods to calibrate food thermometers.

Ice-Point Method

The ice-point method is used most often unless a thermometer cannot register a temperature of 32 °F (0 °C).

1. Fill a glass with crushed ice. Add water until the glass is full.
2. Place the thermometer in the center of the glass of ice water, not touching the bottom or sides of the glass.
3. Agitate the glass of ice water to assure even temperature distribution throughout. Wait until the indicator stops.

4. The temperature should register 32 °F. If it does not, adjust the calibration nut by holding it with pliers or a wrench and turning the face of the thermometer to read 32 °F. If using a digital thermometer with a reset button, adjust the thermometer to read 32 °F while the metal probe is in the ice water, or replace the battery.

Boiling-Point Method

This method may be less reliable than the ice-point method because of variation due to high altitude.

Use this method to calibrate food thermometers with scales beginning at 32 °F.

1. Using a deep pan, bring water to a boil.
2. Place the thermometer in the center of the boiling water, not touching the bottom or sides of the pan. Wait until the indicator stops.
3. The temperature should register 212 °F. If it does not, adjust the calibration nut by holding it with pliers or a wrench and turning the face of the thermometer to read 212 °F. If using a digital thermometer with a reset button, push it while the metal probe is in the boiling water, or replace the battery. Follow work safety procedures.
4. The boiling point of water is lower at high altitudes. For each 550 feet above sea level, the boiling point of water is 1 °F lower than the standard of 212 °F. For example, a kitchen located at 5,500 feet above sea level water would boil at 202 °F. The pointer on a dial food thermometer inserted into boiling water would need to be adjusted to the temperature 202 °F at the higher altitude of 5,500 feet.

TOOL 2: *Daily Temperature Form – Internal Food Temperatures*

Before food is placed on the service line, it is recommended that the internal temperature be measured and documented to be sure that hot food is at or above the required internal temperature for the type of food product. Hot food placed in a holding cabinet or on the service line should be held at or above 135 °F and cold food should be held at or below 41 °F.

Daily Temperature Form — Internal Food Temperatures

Date	Food Item	Time / Temperature	Time / Temperature	Time / Temperature

If food is held in a holding cabinet or on the service line more than 30 minutes, it is best practice to check and document the internal temperature every 30 minutes to be sure it is at the safe level. Some foodservice operations record the internal temperatures of food in holding cabinets or on the service lines on a temperature form that includes the name of food, time, and internal temperature. A sample Daily Temperature Form – Internal Food Temperatures is provided as Appendix 3, page 118.

Prevent Cross-Contamination

One of the most common causes of foodborne illness is cross-contamination, the transfer of bacteria from

- Hand to food,
- Food to food, or
- Equipment to food.

Microorganisms live throughout the kitchen and can easily move around by attaching themselves to people, food, and equipment. Cross-contamination can occur anywhere in a foodservice operation but can be prevented by physical barriers or by food safety procedures.

Hand-to-Food Cross-Contamination

Hand-to-food cross-contamination occurs when contaminated hands handle cooked or ready-to-eat foods. Bacteria are found throughout the body – on hair, skin, and clothing; in the mouth, nose, and throat; in the intestinal tract; and on open wounds, sores or scabs or scars. These bacteria often end up on the hands where they can easily spread to food. People can also pick up bacteria by touching raw food and then handling cooked or ready-to-eat food.

How to Prevent Hand-to-Food Cross-contamination

Follow these guidelines to prevent hand-to-food cross-contamination:

- Wash hands properly, frequently, and at appropriate times.
- Wash hands before putting on single-use gloves and change gloves frequently.
- Cover cuts, sores, and wounds.
- Keep fingernails short, unpolished and clean (no artificial nails).
- Avoid wearing jewelry except for a plain ring, such as a wedding band.
- Use prosthetic devices safely.

Wash hands properly, frequently, and at appropriate times.

Handwashing is one of the most critical aspects of good personal hygiene in foodservice. Clean hands are necessary to prevent contamination of food during preparation and service.

When to Wash Hands

Wash hands whenever hands are soiled and before

- beginning food preparation,
- putting on disposable gloves, and
- serving customers.

Wash hands after

- arriving at work and after breaks;
- using the restroom and then again at the kitchen handwashing sink;
- eating, drinking, smoking, or chewing tobacco or gum;
- using the telephone;

- using a handkerchief or a tissue;
- handling inventory;
- handling raw food;
- touching or scratching areas of the body, such as ears, mouth, nose, or hair;
- coughing or sneezing;
- clearing or cleaning tables;
- clearing, scraping, or washing dirty plates or utensils;
- handling garbage;
- handling money on the cafeteria line;
- after touching dirty aprons, clothing, or dirty surfaces; and
- using cleaning chemicals.

Remember to post appropriate handwashing signs as required by State and local public health departments.

How to Wash Hands

- Use the handwashing sink with running water at approximately 100 °F and liquid soap.
- Lather hands and exposed arms.
- Rub hands together for at least 20 seconds.
- Wash hands thoroughly, paying close attention to fingernails.
- Rinse in clean, running water. Turn off the faucet with the paper towels in your hands.
- Dry hands using a paper towel or air dryer, not a cloth or apron.

An easy way to determine if hands are rubbed and lathered for 20 seconds is to sing one verse of "Old MacDonald."

Wash hands before putting on single-use gloves and change gloves frequently.
Increasing emphasis is being placed on the importance of avoiding bare-hand contact with ready-to-eat food. By using single-use gloves on clean hands, a barrier is placed between the food employee and the food. Gloves are only one kind of barrier; others include tongs and deli paper. Follow the regulations of the State and local public health department.

How to use single-use gloves correctly

- Wash and dry hands.
- Put on clean gloves.
- Use the gloves as if they were a serving utensil.
- Change gloves if they become torn or soiled or if you begin working with a different food.
- Never wash and re-use gloves.

Cover cuts, sores, and wounds.
Cuts, burns, or any kind of break in the skin could harbor harmful microorganisms that can contaminate food and cause a foodborne illness. Cover the wound with a clean impermeable bandage, and then place a clean single-use glove over the bandage. Some

foodservices have a policy that anyone with an open wound cannot work with food until the injury completely heals.

Avoid wearing nail polish and artificial nails.
Fingernails should be kept short, unpolished, and clean. Both nail polish and artificial nails pose considerable danger around food and should not be worn by anyone handling food according to best practices for food safety. The nail polish can harbor microorganisms between the nail and the polish and can also flake off in food. Nail polish can also mask dirty fingernails. Food employees should not wear any type of nail polish or nail ornament. Best practice is that artificial fingernails (fake nails, acrylic nails, press-on nails) should not be worn by anyone handling food. The artificial nail harbors bacteria and other microorganisms between the real nail and artificial nail. Furthermore, the nail can break off in food.

Avoid wearing jewelry except for a plain ring, such as a wedding band.
Preparing and serving food is no place to wear jewelry. Follow State and local public health department or State Agency regulations for what jewelry can be worn when working with food. The *Food Code* states that food employees may not wear jewelry including medical information jewelry on their arms and hands. The only jewelry permitted is a plain ring, such as a wedding band. It is difficult to maintain clean hands when wearing rings because bacteria can hide on the finger underneath the ring and also in a ring setting. Foodservice is not the place to wear costume jewelry. Costume jewelry such as a ring, bracelet, or earrings can get caught in equipment and cause an injury to the wearer.

Use prosthetic devices safely.
A food employee who wears a prosthetic arm or other device should follow the guidance of State and local public health office regulations to ensure that the device is used in a safe and sanitary manner.

Food-to-Food Cross-Contamination

Food-to-food cross-contamination happens when harmful microorganisms from one food, such as unwashed produce, contaminate other foods. Bacteria in raw meat and poultry can be spread to other foods, utensils, and surfaces. A common mistake is to leave thawing meat on a top shelf in the refrigerator where it can drip onto foods stored below.

How to Prevent Food-to-Food Cross-Contamination

- Store cooked foods and foods that will not be cooked in the refrigerator on a higher shelf than raw foods.

  Example: Store cooked spaghetti on a higher shelf than raw ground beef.
- While the FDA *Food Code* does not prohibit mixing leftover food with fresh food in controlled situations, it is strongly recommended and best practice not to mix leftover food and fresh food to protect the quality, appearance, and potential safety of a food.

  Example: Do not mix leftover tuna salad with a fresh batch of tuna salad.

- Wash fresh fruits and vegetables in cold running water before peeling.
  Example: Wash cantaloupes before removing the rind.
- Wash all fresh produce that will be served whole, peeled, or cooked in cold, running water.
  Example: Apples.
- Do not let raw meat and raw fruits or vegetables be prepared on the same surface at the same time. The two foods should not contact each other.
  Example: Do not clean or portion raw chicken on the same surface as lettuce.

Equipment-to-Food Cross-Contamination

Bacteria may pass from equipment to food when the equipment that has touched food has not been properly cleaned and sanitized before being used to prepare another food. For example, cross-contamination can occur when a meat slicer used for slicing deli meats is then used for slicing fresh tomatoes.

How to Prevent Equipment-to-Food Cross-contamination

- Use separate cutting boards for different foods, such as meats and fresh fruits and vegetables. Cutting boards should be cleaned and sanitized after each use.
- If possible, prepare raw foods in a separate area from fresh foods that will not be cooked. For example, designate a special work surface for raw meat preparation away from the work surface used for salads and desserts.
- Clean and sanitize equipment, work surfaces, and utensils after preparing each food.
- Use specific containers for various types of food products. Clearly label the containers with contents and date. For example, designate specific containers for thawing raw chicken, meat salad, and grated cheese.
- If cleaning cloths are permitted for use by the State sanitation code, follow guidelines for use and maintenance in a sanitizing solution. Make sure cloths or towels used for wiping spills are not used for any other purpose. Cleaning cloths should be rinsed after each use and stored in a clean sanitizing solution.
- Wash and sanitize the can opener on a regular schedule every day.
- Clean and sanitize food preparation equipment such as the food slicer after each use. For example, clean and sanitize the slicer after slicing ham for sandwiches.
- Never re-use single-use containers, such as old mayonnaise jars or single-use plastic containers.
- Never re-use plastic wrap or aluminum foil; throw it away after one use.
- Touch dishes, trays, flatware, glasses, or serving utensils by contacting only the outside surface; never touch the surface where food will be placed or where a person's mouth will touch.
- When a new pan of food is added to the steam table, use a clean, sanitized utensil, not the utensil used in the previous pan.

Sanitize wiping cloths during and in-between use so they will not be a source of cross-contamination. A wiping cloth that has been used to clean a surface where raw food has been prepared can easily carry bacteria to other areas, including to cooked food. A good rule is to place wiping cloths in a clean, sanitizing solution when not in use. Remember to check sanitizing solution concentration at different intervals during the day. *Follow State and local public health department regulations for use and concentration levels of sanitizing solutions. Follow manufacturer's label directions for correct mixing procedures, storage, and specific first aid information.*

This section answered the question, "How can foodborne illness caused by microorganisms be prevented?" Prevent foodborne illness by

- practicing good personal hygiene,
- controlling time and temperature of foods, and
- preventing cross-contamination.

What are the responsibilities of the foodservice manager and employees?

Everyone in the foodservice operation plays an important role in the prevention of foodborne illness. Like any other aspect of a job, more knowledge helps prevent problems.

Responsibilities of the Foodservice Manager

The foodservice manager is responsible for

- knowing and implementing the State and local public health department regulations regarding food sanitation and safety;
- solving problems of noncompliance cited on sanitation inspections;
- maintaining up-to-date knowledge regarding food safety and sanitation;
- training and coaching employees regarding food safety; and
- holding employees responsible for following food safety requirements and guidelines.

The foodservice manager should use available resources to learn more about preventing foodborne illness. There are many excellent resources in addition to this book. Appendix 1 – Resources for Food Safety Information provides a list of printed resources and Internet addresses for Web sites; see pages 111 to 115.

Responsibilities of Foodservice Employees

Foodservice employees are responsible for

- learning about food safety, and
- following food safety requirements and guidelines.

Food safety is everyone's responsibility. A foodborne illness can occur in any foodservice facility when food safety requirements and guidelines are not followed.

How should the foodservice manager respond if symptoms of foodborne illness are reported to the foodservice?

The manager is responsible for responding correctly and demonstrating leadership in this emergency situation. It is important to know and follow State and local public health department and school district guidelines. General guidelines are described below.

General Guidelines for the Foodservice Manager When Foodborne Illness is Suspected

Follow school district guidelines and cooperate with State and local officials. The general guidelines described below will be helpful in handling any emergency.

1. **Keep your cool and cooperate with the health department.** Keep a level head; do not panic. There are many reasons that students may not be feeling well other than eating food from the foodservice operation. Remaining calm will help you respond rationally and systematically to the situation and may help keep everyone involved from overreacting.
2. **Talk with your supervisor immediately for additional guidance.** To avoid panic and "sympathy symptoms," ask the principal and teachers not to discuss the problem with anyone except the school nurse.

3. **Stop serving the suspect food.** If you have an idea which food caused a foodborne illness, stop serving it or using it as an ingredient.

4. **Keep samples of suspect foods** in the original containers, in clean containers that have been boiled, or in unused plastic bags. Store the samples of suspect foods in the refrigerator until the health agency evaluates the epidemiological evidence and, if necessary, makes further arrangements to get samples. At least a half-pint or whatever food is remaining must be kept. Having samples of food could help determine the cause of a foodborne illness and could also help determine that the illness was not caused by food from your operation.

   Securely wrap samples of the suspect foods in containers using a heavy plastic bag. Label the bag with contents and date, mark "DO NOT USE AND DO NOT DISCARD," and, store where it will not be mistaken for edible food.

   If possible, save the container, box or case, wrapping, and metal clips used on the original packaging. Save the food label and invoice to help locate the vendor who supplied the suspect foods.

   Be familiar with State and local public health department requirements since some States require that schools routinely keep sample trays of all foods served.

5. **Cooperate with the health department to gather information.** Follow directions from the local health department. Health professionals may ask you to gather information about the foods that were served and how they were handled.

Gather information from your own kitchen.
Determine the foods on the menu and any other foods that were served but were not on the written menu. Have available the daily production record and the temperature forms.

Determine how the foods were handled before and during preparation.
Have available the Storage Temperature Forms from the freezer and refrigerator to document storage temperatures. See Appendix 4 for a sample form.

Ask employees how long the foods were in the preparation process. Have documentation available. Were the suspect foods prepared and then refrigerated or heated quickly as necessary to keep foods out of the temperature danger zone? How were internal temperatures monitored?

6. **Report the information you were asked to assemble.** Report all the information you have gathered to your supervisor/district director and principal or other person in charge, regardless of whether or not it is a good report.

   If you have found a particular area that could have caused a foodborne illness, alert your supervisor/district director and principal to the potential problem.

   If a problem has been identified, you or your supervisor/district director should report this to the local health department. If more than two persons (non-related) who ate a common food report being ill at the same time, it should be reported to the health authorities (local health department).

7. **Only health professionals should give medical advice.** If a foodborne outbreak is suspected, cooperate with the health department and health professionals. Take every report of possible foodborne illness seriously, and follow the appropriate steps. Be careful not to diagnose, interpret symptoms, or suggest treatments.

8. **Direct all media inquiries to the appropriate designated school district representative.**

9. **For those students who have reported symptoms of foodborne illness, parents should be contacted by personnel designated by the school or school district.**

   What is the procedure in your school or school district when there is a report of a potential foodborne illness? Record names and phone numbers of people you should contact.

Summary

CHAPTER 2, **"Prevent Foodborne Illness—Understanding Microorganisms,"** describes how consuming a food or beverage contaminated in harmful microorganisms causes foodborne illness. The main causes of foodborne illness include poor personal hygiene, allowing food to remain in the temperature danger zone too long, and cross-contamination. To prevent foodborne illness every foodservice operation should establish procedures to ensure safe food and make sure everyone follows them. Foodservice employees should wash hands properly, frequently, and at the appropriate times. Understanding the time and temperature relationship helps to implement procedures to reduce microorganism growth. Chill hot foods rapidly. Use a food thermometer to determine the internal temperature of food at every stage of the foodservice process: receiving, storage, preparation, cooking, holding, serving, reheating, and chilling. Document internal temperatures of cold and hot foods and calibrate thermometers often. Remember to check sanitizing solution concentration at different intervals during the day. Follow State and local public health department regulations for the concentration level and use of sanitizing solutions. Follow the manufacturer's label directions for correct mixing procedures, storage, and specific first aid information. Guidelines are provided to prevent cross-contamination through hand-to-food, food-to-food, and equipment-to-food contact. Remember, preventing foodborne illness is the responsibility of the manager and all foodservice employees.

Prevent Foodborne Illness Questionnaire

Rate your foodservice facility using the Pr event Foodborne Illness Questionnaire. Make plans to improve procedures to prevent foodbome illness. Check the box that best describes the current status of each item in your foodservice program.

OK: This is being done right now and no changes are needed.

Improve: This is not being done and improvement is needed. Write your plans for improving this food safety procedure on the back of this page.

	OK	Improve
Practice good personal hygiene		
Rules for good personal hygiene have been established; all foodservice employees have been informed of the rules, and follow the rules.	☐	☐
Employee personal hygiene practices are observed and follow-through for correction is made on a routine basis.	☐	☐
Control time and temperature of foods		
Procedures are in place to minimize the time that a food is in the temperature danger zone during receiving, storage, preparation, cooking, holding, and service.	☐	☐
Every foodservice employee who is responsible for the receiving, storage, preparation, cooking, or service of food has access to a food thermometer and has been taught how to calibrate it and use it correctly.	☐	☐
A food thermometer is used to determine the internal temperatures of certain foods during the receiving process.	☐	☐
Internal temperatures for hot and cold foods are documented.	☐	☐
A food thermometer is used to determine the internal temperatures of foods in hot-holding cabinets on a regular basis.	☐	☐
A food thermometer is used to determine the internal temperatures of cooked foods to determine when cooking is complete.	☐	☐
A food thermometer is used to determine the internal temperatures of foods held on the service line on a regular basis.	☐	☐
A food thermometer is used to determine the internal temperatures of foods that are being chilled for later cold storage.	☐	☐
A food thermometer is used to determine the internal temperatures of foods that are reheated.	☐	☐

	OK	Improve
Hot foods are chilled correctly. (Chill cooked hot food from 135 °F to 70 °F within 2 hours and from 70 °F to 41 °F or below in an additional 4 hours for a total cooling time of 6 hours. If the food has not reached 70 °F within 2 hours, it must be reheated immediately to 165 °F for 15 seconds.)	☐	☐
Prevent cross-contamination		
Best practice (includes WHEN and HOW TO) for handwashing is followed by everyone.)	☐	☐
Single-use gloves are used correctly.	☐	☐
Cuts, sores, and wounds are cleaned and covered, and the employee wears a clean single-use glove.	☐	☐
Employees avoid wearing nail polish and artificial nails.	☐	☐
Employees avoid wearing jewelry except a plain ring, such as a wedding band.	☐	☐
An employee who wears a prosthetic device follows the guidance of the State and local public health department to ensure food safety.	☐	☐
Employees who are ill do not work with food.	☐	☐
Prepared foods or ready-to-eat foods are stored on higher shelves in the refrigerator than raw foods (meat, poultry).	☐	☐
A leftover food is never mixed with a freshly prepared food.	☐	☐
All fresh produce that will be served whole, peeled, or cooked is washed in cold, running water.	☐	☐
Cutting boards are cleaned and sanitized after each use.	☐	☐
A separate preparation area has been designated for the preparation of raw meats and other foods, such as fresh fruits and vegetables; or the preparation area is sanitized before being used.	☐	☐
Equipment, work surfaces, and utensils are cleaned and sanitized after each use. State sanitation guidelines are followed for the use of wiping cloths.	☐	☐
A regular schedule is set up for washing and sanitizing the can opener.	☐	☐
Single-use food containers are not re-used.	☐	☐
Plastic wrap and aluminum foil are used once.	☐	☐
Employees touch dishes, trays, flatware, glasses, or handles of serving utensils by contacting only the outside surface.	☐	☐

When to Wash Hands

Wash hands whenever hands are soiled and before

- beginning food preparation,
- putting on disposable gloves, and
- serving customers.

How to Wash Hands

- Use the handwashing sink with running water at approximately 100 °F and liquid soap.
- Lather hands and arms up to the elbow.
- Rub hands together for at least 20 seconds.
- Clean between fingers.
- Rinse in clean, running water. Turn off the faucet with the paper towels in your hands.
- Dry hands using a paper towel or air dryer, not a cloth or apron.