

FOOD SERVICE WORKER SELF-STUDY GUIDE



**NAVY AND MARINE CORPS PUBLIC HEALTH CENTER
PORTSMOUTH, VA**

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Why Read This Book?

Training Requirements

The goal of this program is to provide you with a basic understanding of food safety. This will assist your manager, who is responsible for ensuring that you prepare and serve food safely. All food service workers employed in food service must receive four hours of training prior to working in food establishments and annually thereafter. After completion of this self-study guide, your supervisor will administer a test to ensure your comprehension. Supervisors are available to answer questions concerning information in this guide and to provide on-the-job training.

How to Use This book

This book is intended to help you learn what you need to know to understand the basics of safe food receipt, preparation, holding and storage. You will need a score of 75% to pass. Throughout this book you will find study questions that will help you get ready to take the comprehension test your supervisor will administer. Again, any questions should be directed to your manager.

The words that are *italicized* and **bold** are explained in the glossary located in the back of this book.

A “Person in Charge” is Required

Someone at your restaurant must be in charge during all hours of operation. This person in charge (PIC) is responsible for knowing the food sanitation rules and the procedures within your establishment. This person is responsible for providing you with information you need to perform your job.

The PIC is usually a manager or supervisor, but can be anyone who can demonstrate the knowledge listed above, and who is given the authority to oversee other employees.

Note: This self-study guide is not intended to be the sole source of training. Managers are required to provide training through any or all of the following sources: classroom instruction, videos, distance learning, on-the-job training, or any other viable training source.

Food Service Worker Training

Terminal Objective:

Describe how, by proper personal hygiene, use of approved food sources, proper cooking and holding temperatures, and cleaning and sanitizing, you may prepare meals without the occurrence of foodborne illness.

CHAPTER 1: FOODBORNE ILLNESS

Enabling Objectives:

1. Describe foodborne illness.
2. Explain the various symptoms of foodborne illness and understand that not all foodborne illnesses have the same symptoms.
3. Describe the three types of foodborne illness.
4. State the four types of microorganisms that may cause foodborne illness.
5. Explain the acronym FATTOM.

What Makes People Sick From Food?

Foodborne Illness

People can get sick when the food they eat has harmful *microorganisms* called *pathogens*. This includes organisms that we cannot see without a microscope such as *bacteria* and viruses. Pathogens cause *foodborne illness* or food poisoning.

Potentially Hazardous Foods

Pathogens grow easily in foods like meat, fish, poultry, milk, re-fried beans, cooked rice, baked potatoes and cooked vegetables. These are called *potentially hazardous foods (PHFs)*. These are all foods that are moist and they have nutrients that the germs need to grow. Pathogens grow well on these foods at warm temperatures between 41°F and 135°F.

Bacteria

Different kinds of pathogens can make people sick. Bacteria are one kind of pathogen. They grow fast and they may cause *foodborne illness*. Some *bacteria* make toxins that act like a poison. Cooking does not destroy most toxins. Almost always, the food looks and smell good, but it may have enough *bacteria* or toxin to make someone sick. Toxins can occur in many foods that have not been kept cold enough or hot enough. Bacteria is the most common cause of foodborne illness.

Viruses

You can have a virus and not know it. Even before you start feeling sick, you may be passing viruses into the food by not washing your hands after coughing, sneezing or using the toilet. This is one reason why the law **requires** all food workers to wash their hands, using lots of soap and warm water.

Parasites

Tiny worms that live in fish and meat are called *parasites*. Cooking fish and meat to the right temperature will kill *parasites*.

Chemicals

People can also get sick when *chemicals* get into the food. Be sure to keep chemicals away from food.

Physical Contamination

Physical contamination is when foreign objects are accidentally introduced into food. Food items may arrive already contaminated with dirt and pebbles. Physical contamination such as broken glass can also happen at the facility.

Contaminated Food

The food is contaminated. Now what? **Discard** contaminated food, and notify your manager **right away!**

Types of Foodborne Illness

There are three types of foodborne illness:

Illness	Description/Example
Infection	An illness caused by consuming food that contains living disease-causing microorganisms. Salmonella is an infection.
Intoxication	An illness caused by consuming food containing a hazardous chemical or a toxin. Botulism is a bacterial intoxication.
Toxin-mediated infection	An illness caused by consuming food containing live Pathogenic organisms that reproduce in the intestines and produce a toxin. E-Coli is a toxin-mediated infection.

There are four types of microorganisms which may cause foodborne illness:

Bacteria

Viruses

Parasites

Fungi

FATTOM: Stands for food, acidity, temperature, time, oxygen, and moisture. These elements are what disease causing bacteria need to multiply.

Food	Foodborne microorganisms need nutrients to reproduce, especially proteins and carbohydrates (MEATS, DAIRY POULTRY, EGGS, COOKED RICES, COOKED PASTAS).
Acidity	Foodborne microorganisms reproduce best between 7.5 to 4.6 ph.
Temperature	Foodborne microorganisms grow best at temperatures between 41° F and 135 F. Foods exposed to temperatures outside of this range are not necessarily safe. For example, some bacteria actually grow in refrigeration temperatures.
Time	Microorganisms need time to grow. Under optimal conditions, microorganisms can double their population every 20 minutes. If PHFs remain in the temperature danger zone for 4 hours or longer, microorganisms can grow to levels high enough to make you ill
Oxygen	<p>Aerobic bacteria needs oxygen to grow. Campylobacter is an example of aerobic bacteria.</p> <p>Anaerobic bacteria does not need oxygen to reproduce. Clostridium botulinum is an example of anaerobic bacteria.</p> <p>Facultative anaerobic forms of bacteria can survive and reproduce with or without oxygen. Most foodborne disease causing microorganisms are facultative anaerobes. An example of facultative anaerobes bacteria is salmonella.</p>
Moisture	<p>Most foodborne microorganisms require moisture. Disease causing bacteria can only grow in foods that have a A_w (water activity) higher than 0.85. Almost all food is .85 or higher. Dry pasta and some candy would be exceptions. Crispy bacon that has been cooked does not contain a lot of moisture. Commercial mayonnaise is safer than homemade even with the moisture. They add an acidic compound to keep the ph down.</p> <p>Examples: Food with a A_w of 1.0: Dairy products, meats, fish and shellfish, poultry and eggs, cut melons and sprouts, steamed rice, and pasta.</p>

Control: Two of the elements most critical and easiest to control are:

TEMPERATURE and TIME.

Foodborne Illness Symptoms

Foodborne illness symptoms may include:

- Abdominal pain
- Vomiting
 - Mild or profuse
- Diarrhea
 - Watery
 - Bloody
 - Acute or chronic
- Fever
- Chills
- Headaches
- Fatigue/weakness
- Neurological problems
 - Dizziness
 - Temporary loss of neurological control
- Death

Size and Number of Bacteria

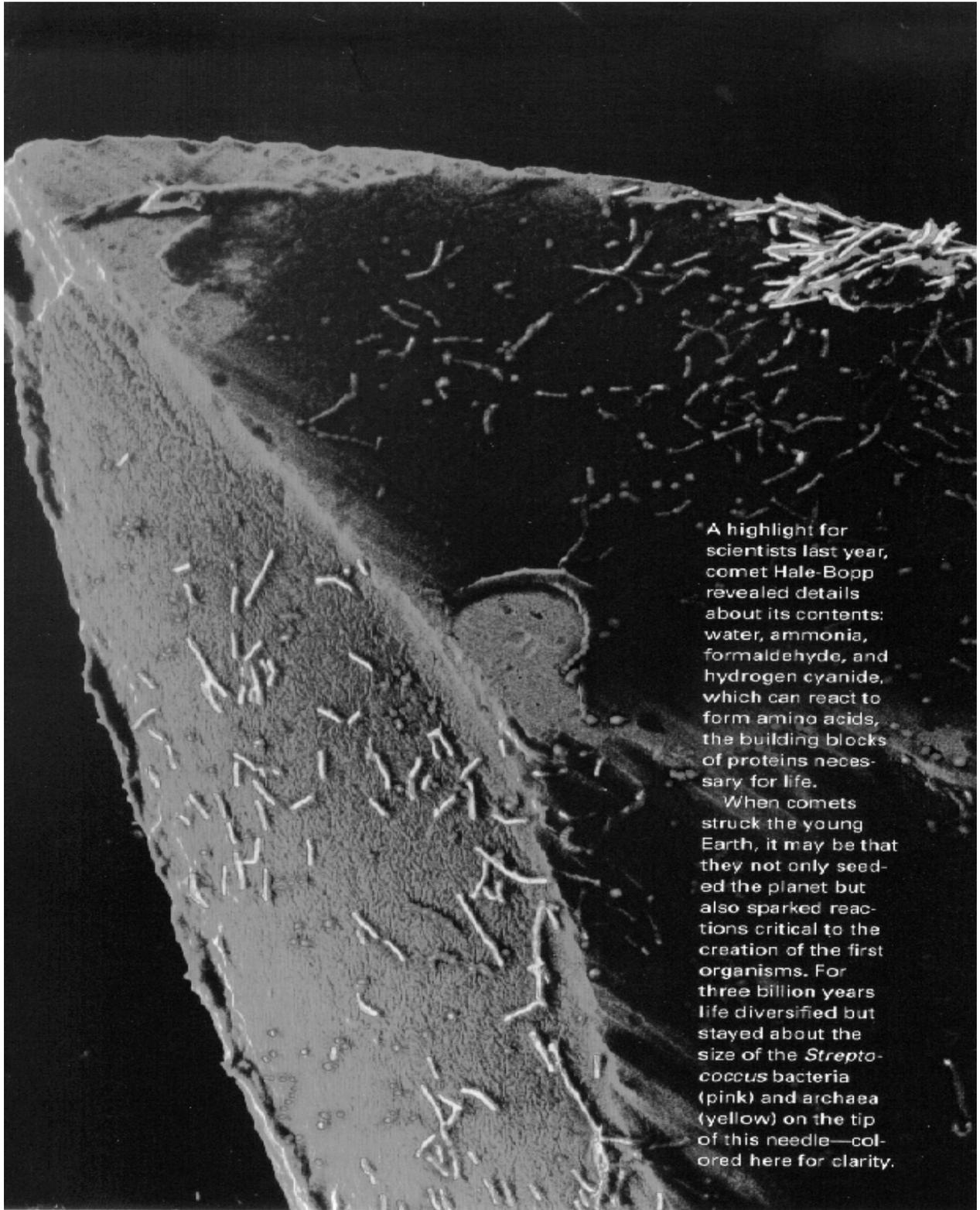


Over 20 colonies of bacteria can fit on surface of a dime.



Each colony contains approximately 37.5 million separate bacterium for a grand total of 750 million bacterium.

Bacteria on the Tip of a Needle



A highlight for scientists last year, comet Hale-Bopp revealed details about its contents: water, ammonia, formaldehyde, and hydrogen cyanide, which can react to form amino acids, the building blocks of proteins necessary for life.

When comets struck the young Earth, it may be that they not only seeded the planet but also sparked reactions critical to the creation of the first organisms. For three billion years life diversified but stayed about the size of the *Streptococcus* bacteria (pink) and archaea (yellow) on the tip of this needle—colored here for clarity.

Your Role in Helping Prevent Foodborne Illness

The food service worker will be able to describe the factors that contribute to Foodborne outbreaks.

- Inadequate hand washing.
- Poor personal hygiene.
- Employees working while they are ill.
- Cross contamination.
- Inadequate cooking times and temperatures.
- Inadequate temperature control (allowing foods to be in the danger zone).
- Inadequate hot holding and improper reheating of leftovers.
- Improper cleaning and sanitization of equipment.
- Improper thawing of frozen foods.
- Multistage food preparation with long time lapses between stages.
- Food products from unsafe sources.

The food service worker will be able to describe the activities performed by food service workers that prevent foodborne illness from happening. Activities preventing foodborne illness include:

- Proper hand washing every time (hands may have become contaminated).
- Food service workers working only when healthy.
- Storing and handling of foods in a manner to prevent contamination.
- Cooking each animal product to its required internal temperature.
- Maintaining hot (135°F) and cold (40°F) temperatures (keeping foods out of the danger zone).

The Role of Management in Helping Prevent Foodborne Illness

The food service worker will know that the manager sets the tone of what food safety activities occur or don't occur within the facility.

The food service worker will know that the food service management is responsible for training and ensuring that food service workers practice activities that prevent foodborne illness.

Review

1. T or F Pathogens cause foodborne illness.

2. Symptoms of foodborne illness may include all except...

- a. Abdominal pain
- b. Diarrhea
- c. Joint pain
- d. Chills

3. Match the description in column A with the illness in column B.

_____ An illness caused by consuming food containing a hazardous chemical or a toxin. A. Intoxication

_____ An illness caused by consuming food containing live Pathogenic organisms that reproduce in the intestines and produce a toxin. B. Toxin-Mediated Infection

_____ An illness caused by consuming food that contains living disease-causing microorganisms. C. Infection

4. Name the 4 types of microorganisms which may cause foodborne illness.

5. FATTOM is the acronym for:

CHAPTER 2: APPROVED SOURCES

Enabling Objectives:

1. Define approved sources.
2. List the Army Vet Inspectors (AVI) responsibilities.
3. Define Acceptance Authority.

Approved Sources

Approved sources are listed in Army Veterinary Services “DoD Directory of Sanitarily Approved Food Establishments for Armed Forces Procurement.”

Prime Vendor:

- Major distributor.
- Serves numerous commands.
- Subsistence directly delivered to customer.
- Selected based on best value criteria.
- VETCOM inspection not required in CONUS.

Army Veterinary Inspectors (AVIs):

- Inspect foods at Subsistence Prime Vendor (SPV) delivery points.
- Inspection for wholesomeness.
- Provide guidance when requested by receiver (acceptance authority – AA) when quality is questionable.
- If PMA or AVI unavailable, apply common sense. Contact them ASAP.

Acceptance Authority:

- Person authorized and trained to accept products.
- Acceptance or rejection must be in writing.
- PMA and AA liaison with Army Vet, USDA, and USDC inspectors.

Review

1. T or F Any food service worker may accept incoming food products.

2. Army Veterinary Inspectors are responsible for all of the following except:
 - a. Inspection of foods at Subsistence Prime Vendor (SPV) delivery points.
 - b. Proper storage of incoming food products.
 - c. Inspection for wholesomeness.
 - d. Provide guidance when requested by receiver (acceptance authority – AA) when quality is questionable.

3. What publication lists the approved sources?

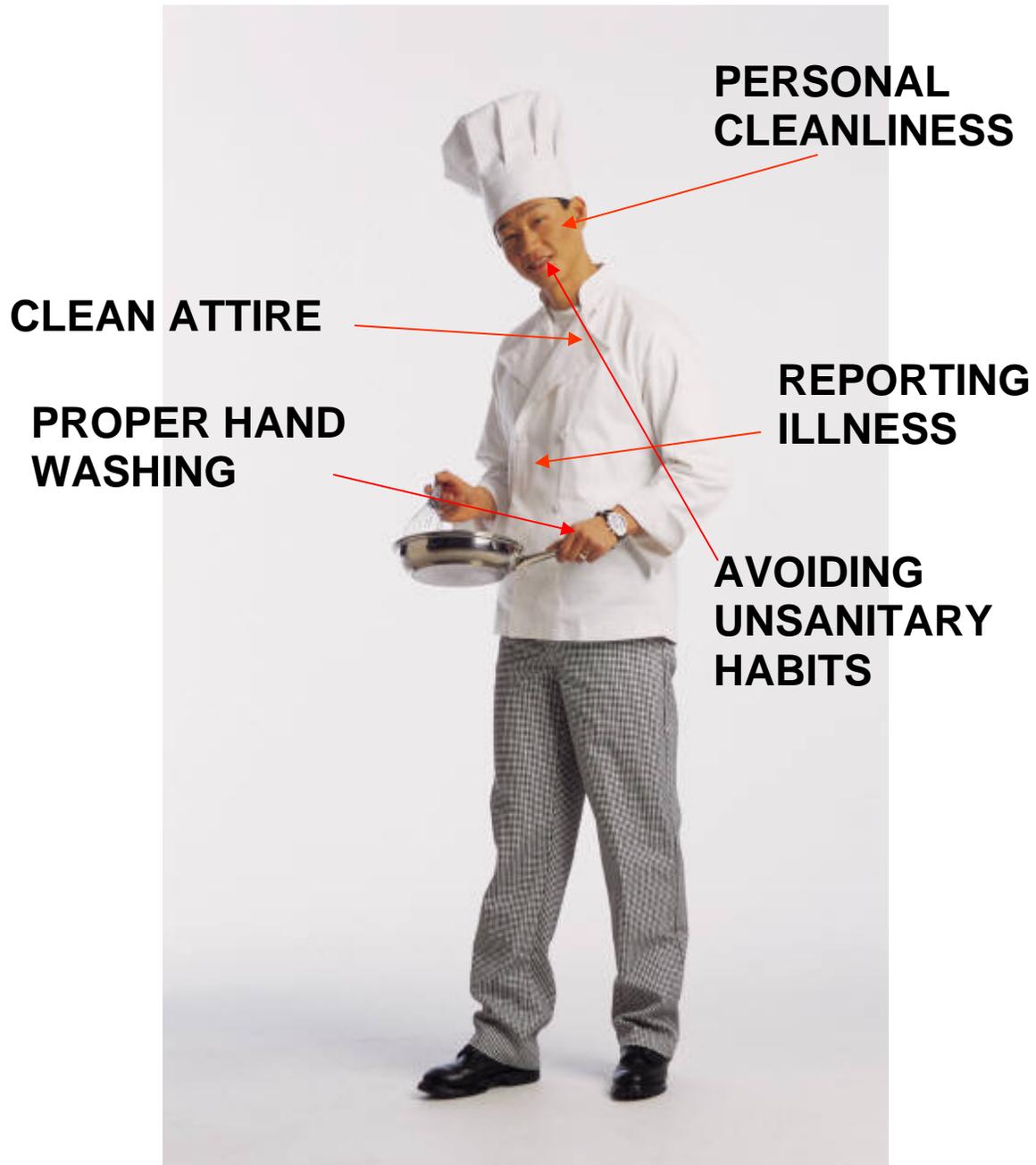
CHAPTER 3: PERSONAL HYGIENE AND EMPLOYEE ILLNESS

Enabling Objectives:

1. Describe the components which make up good personal hygiene.
2. Explain why jewelry may not be worn in food preparation areas.
3. Describe the proper hand washing procedure.
4. Describe when hands should be washed.
5. Explain what symptoms must be present before the PIC is contacted concerning employee illness.
6. Explain why the food service worker cannot handle food with an infected boil, cut, burn, or sore on the hand or wrist.

Personal Hygiene

Good personal hygiene involves more than just bathing regularly. It includes such things as clean clothing, proper hand washing, avoiding unsanitary habits and reporting illness.



- Proper hair and body secretion (sweat) covers or restraints must be worn.
- Clean clothing must be worn every day.
- Remove jewelry. Jewelry, other than a small, plain wedding band, is not permitted in food preparation areas.
- **Jewelry** – Items of jewelry such as rings, bracelets, and watches may act as a hiding place for foodborne illness causing organisms (germs). An additional hazard associated with jewelry is the possibility that pieces of the item or the whole item itself may fall into the food being prepared. Hard foreign objects in food may cause medical problems for consumers, such as chipped and or broken teeth and internal cuts and lesions.



DIRTY HANDS SPREAD DISEASE



**SOAP, LATHER, SCRUB
15 SECONDS**

**RINSE
THOROUGHLY**



**DRY HANDS WITH DISPOSABLE
TOWEL AND USE TO TURN OFF
FAUCET**

**WASH
THEM!!**

The Method of Hand Washing

Use soap and warm running water for at least 15 seconds.

Rub your hands together vigorously.

Wash all surfaces, including:

- **Back of hands.**
- **Wrists.**
- **Between fingers.**
- **Under fingernails.**

Rinse well.

Dry hands with single use paper towels or hot air blowers.

Turn off the water using a paper towel.

WASH YOUR HANDS



BEFORE:

- Starting to work.

DURING:

- Food preparation as often as maybe necessary.

AFTER

- Break periods.
- Using the restroom facility.
- Coughing, sneezing or blowing your nose.
- Smoking, eating, or drinking.
- Touching raw food and raw animal products.
- Using cleaners or chemicals.
- Discarding trash.
- Touching hair, mouth, wounds, or sores.
- Working with dirty dishes, utensils, or other equipment.
- Before putting on food service gloves, and after removing gloves.

Food service gloves are capable of spreading contamination and are not a substitute for proper hand washing. **Always change gloves between tasks.**

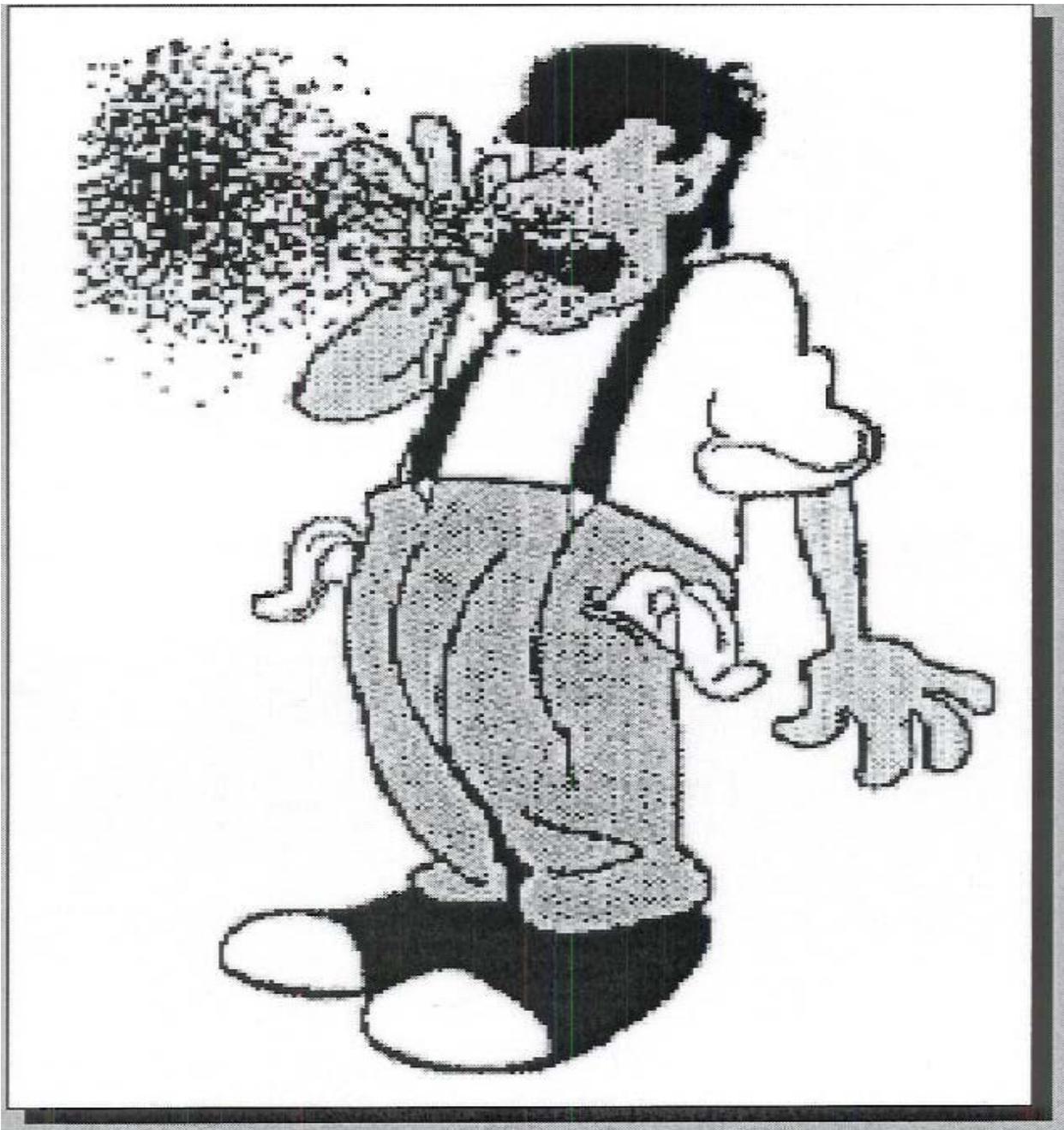
Note: Given the concern with severe latex allergies (possibly life threatening) for certain people, latex gloves in food establishments are not allowed per NAVMED P-5010-1.

Microorganisms are Everywhere

Pathogens such as **bacteria** and **viruses** are everywhere. Think of your hands and fingernails as easily “contaminated.” Just because they look clean does not mean they are clean. Germs are too tiny to see with your eyes. If you do not wash your hands in the right way and keep your fingernails trimmed short, your hands can be a source of contamination of food that will be eaten by your customers. They may get sick from these pathogens. This is called “*foodborne illness*” or “food poisoning.”

Bare hands. No bare hand contact is allowed with ready-to-eat foods. Use methods such as:

- **Gloves.**
- **Tongs.**
- **Forks.**
- **Spoons, etc.**



A cough or sneeze can transmit thousands of microorganisms that may transmit disease.

Employee Illness



To prevent a possible foodborne illness from occurring, food service employees with illness and infections **are restricted from handling food and utensils** within a food facility. It is possible for a sick or infected food service worker to spread foodborne illness or viruses through contact with a food product or utensil. If you feel ill, you must not work as a food preparer in an establishment. **Your customers and co-workers will thank you.**

- Do not work if you have a fever and sore throat
- Do not work if you have loose bowels (diarrhea)
- Do not work if you are throwing up (vomiting)
- Do not work if you have yellowing of the skin or dark tea colored urine (jaundice)

Do not handle food with an *infected* boil, burn, cut or sore on your hand. You may spread germs. Food may be handled if you cover the injury with a clean bandage, and wear a latex-free glove.

Feeling Ill?

Employees are required to report to the PIC and supervisor when ill with any of the diseases listed below, or if they live in the same household as a person with one of these diseases. An employee suffering from diarrhea, fever, vomiting, jaundice, and sore throat with fever must also report this information to the PIC. **The PIC is required to inform employees of this responsibility.**

The Most Common Illnesses Transmitted From Employees to Others through Food and Utensils:

Foodborne Illnesses*	Common Symptoms				
	D	F	V	J	S
Hepatitis A virus		X		X	
Salmonella Typhi		X			
Shigella	X	X	X		
E. coli 0157:H7	X				
Norwalk or Norvo viruses	X	X	X		
Staphylococcus aureus	X		X		
Streptacoccus pyogenes		X			X

Key:

D=Diarrhea	F=Fever	V-Vomiting	J=Jaundice	S=Sore throat w/fever
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Note: *The PIC is required to notify the Preventive Medicine Authority (PMA) when an employee has Hepatitis A, Salmonella Typhi, Shigella or E. coli 0157:H7.



Review

1. What should you do at work when you are sick?

2. What are the five symptoms (if you were to have any one of them) that you must tell your manager?

3. How long must you wash your hands?

4. Provide at least 4 instances when you should wash your hands.

5. Which is not a component of good personal hygiene?

- a. Proper hand washing.
- b. Clean clothing.
- c. Jewelry.
- d. Reporting illness.

6. Why shouldn't the food service worker handle food with an infected boil, cut, burn, or sore on the hand or wrist?

7. Why shouldn't you wear jewelry in food preparation areas?

CHAPTER 4: TEMPERATURE CONTROL

Enabling Objectives:

1. Identify potentially hazardous foods.
2. Identify the “danger zone.”
3. Explain why food being cooled or heated must move through the danger zone as rapidly as possible.
4. State the proper temperature for hot holding potentially hazardous food.
5. State the proper temperature for cold holding potentially hazardous food.
6. Explain when food is considered unsafe to eat.

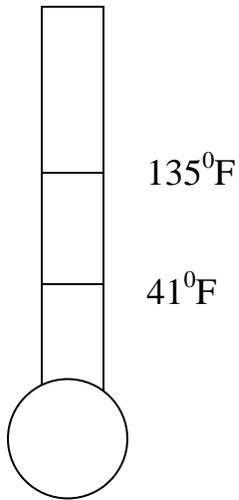
Potentially Hazardous Foods

Potentially Hazardous Foods (PHFs) are moist, nutrient-rich foods that support the rapid growth of microorganisms between the temperatures of 41°F (5°C) and 135°F (57°C). They have a history of being involved in foodborne illness outbreaks, and due to the methods used to produce and process them, they have a natural potential for contamination.

- Foods considered PHFs typically:
- Contain moisture.
- Contain protein.
- Have a neutral or slightly acidic pH.
- Require time-temperature control to prevent the growth of microorganisms and the production of toxins.

Factors Influencing Rapid Growth of Organisms

1. Temperature



2. Time



Food Temperatures

Temperature

This section is about killing pathogens with cooking and stopping their growth by keeping the food hot or cold. This is called **temperature control**, and your restaurant needs at least one accurate metal-stem probe (food) thermometer to check food temperatures.

The “Danger Zone

Pathogens like *bacteria* need time, food and moisture to grow. **The temperature between 41°F (5°C) and 135°F (57°C)** is called the “*Danger Zone!*” When food sits in the “*Danger Zone*,” *bacteria* can grow fast and make toxins that may make you and others sick.

When to Discard Food

Foods left in the Danger Zone for more than four hours must be discarded. **Reheating** the food may kill the bacteria, but the toxins (produced by certain bacteria types) will remain in the product and cause illness.

Cooking Food

Cooking raw food to the proper temperature will kill pathogens that cause people to become sick.

When is Cooked Food Safe

Different foods have to reach different temperatures to be done or safe. Ask your manager to show you a temperature chart for cooking meats (**see additional information in the back of this guide**). Be sure to cook the food to the temperature that is shown on the chart.

Remember

You can choose several ways to cook food. No matter how you cook the food, it must reach the correct cooking temperature. Using a metal-stem probe thermometer is the only way to know the correct temperature of food. You must place the thermometer in the thickest part of the meat or in the center to get a true reading.

Cold Holding

Always keep cold food at 41°F (5°C) or less. Fish shellfish, poultry, milk and red meat will stay fresh longer and prolong shelf life if you hold them cold at 41°F (5°C) or colder.

Hot Holding

After the food is cooked and ready to serve, you will need to keep it warm enough to stop any harmful organisms from growing. You must turn on steam tables, soup warmers and heated surfaces before you need them so that they will be hot enough when you put the cooked food into them. This equipment is designed for holding, not heating.

Keep hot food at 135°F (57°C) or hotter.

Keep it Hot

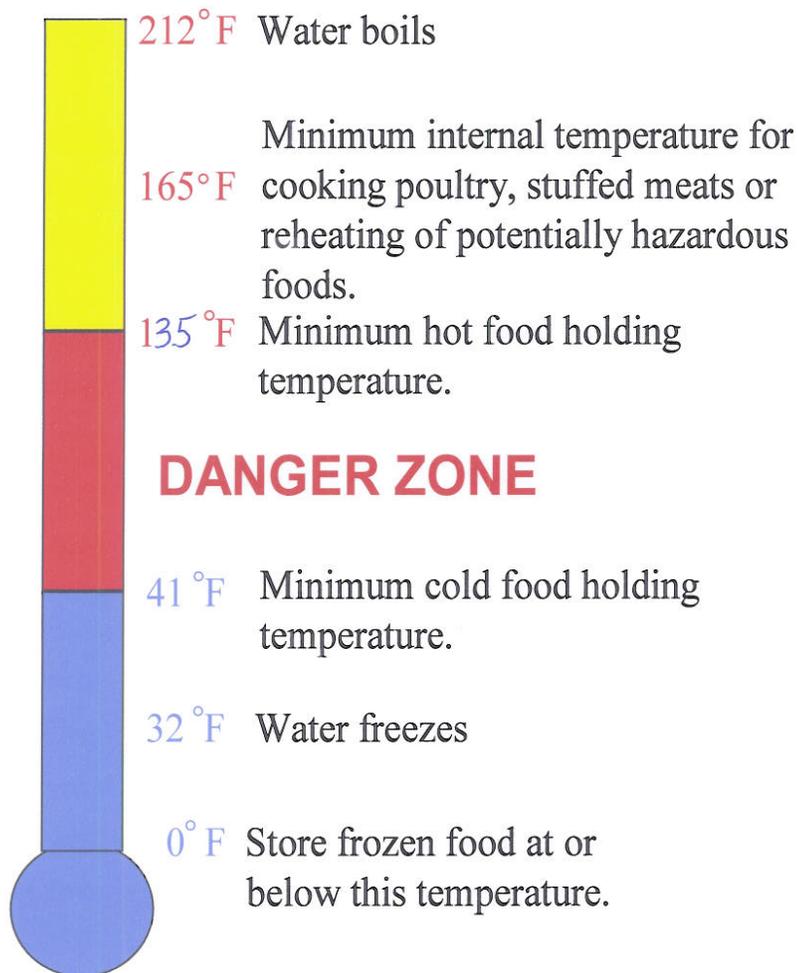
Stir food to help keep the food on top hot. A cover on the pan helps to keep the heat inside.

Keep it Cold

Food being held cold on the top section of a refrigerated preparation unit also benefits from being covered.

Cooking Requirements for Specific Foods		
Animal Product	Minimum Temperature	What to Know?
Poultry, Ground Poultry	165°F (74°C) for 15 seconds	Stuffing should be cooked outside of poultry.
Stuffing, stuffed meats, and casseroles and dishes combining raw and cooked food	165°F (74°C) for 15 seconds	Stuffing acts as an insulator, preventing heat from reaching the meats center. Stuffing should be cooked separately.
Ground or flaked meats: hamburger, ground pork, flaked fish, ground game animals, sausage, injected and pinned meats	155°F (63°C) for 15 seconds	Grinding meat mixes the organisms from the surface into the meat. Alternative minimum internal temperatures for ground meats: 150°F (66°C) for 1 minute and 145°F (63°C) for 3 minutes.
Pork, beef steaks, veal lamb, commercially raised game animals	145°F (63°C) for 15 seconds	This temperature is high enough to destroy Trichinella larvae that may have infested pork.
Beef or pork roasts	145°F (63°C) for 3 minutes	Alternative minimum internal cooking temperatures for beef and pork roasts: 130°F (54°C) for 121 minutes 134°F (57°C) for 47 minutes 138°F (59°C) for 19 minutes 135°F (57°C) for 12 minutes 142°F (61°C) for 8 minutes 144°F (62°C) for 5 minutes.
Fish, foods containing fish, and seafood	145°F (63°C) for 15 seconds	Stuffed fish should be cooked to 165°F (74°C) for 15 seconds. Fish that has been ground, chopped, or minced should be cooked to 155°F (68°C) for 15 seconds.
Shell eggs for immediate service	145°F (63°C) for 15 seconds	Only take out as many eggs as you need. Never stack egg flats near the grill or stove. Eggs cooked for later service must be cooked to 155°F for 15 seconds and held at 135°F.
Foods cooked in microwave: meat, poultry, fish, eggs	165°F (74°C) let it stand for 2 minutes after cooking	Cover food, rotate or stir it halfway through the cooking process.

Critical Temperatures for Food Handling and Storage



Cooling Hot Foods

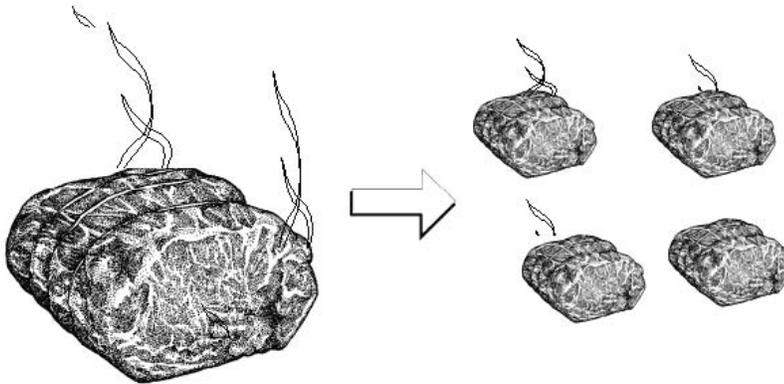
With cooling of foods, it is important to move the food temperature through the “**Danger Zone**” as quickly as possible to keep food safe.

Fresh is Best - You always take a chance that bacteria can grow and produce toxins when you cool food. **It is safest to make fresh food each day, just before you serve it.**

Speed is Important With Cooling – If you must make food in advance or save leftover food, cool it as **fast** as you can to prevent bacteria growth and toxin production. **Reheating will not destroy toxins.**

Cooling Solid Foods – When cooling solid cooked foods such as roast, turkey, and solid cuts of meat, be sure to:

- Cut large roasts and turkeys into smaller portions. This will help them to cool faster.
- Put all meats and other hot food in the refrigerator.



Cooling Soft/Thick Foods

Examples of soft/thick foods are refried beans, rice, potatoes, stews, chili, thick soup or thick sauces.

You can cool soft/thick foods by pouring food into a shallow metal pan. Use a sheet pan for thick foods like refried beans.

Cooling thick food is not easy. Whenever possible use a flat pan and spread the food out as shallow as you can to speed up the cooling.

When cooling food in shallow metal pans, remember:

- Pour hot food into shallow metal pans. The shallower the pan, the faster the food will cool.
- Stirring food speeds up cooling time.
- Once food cools to 41°F (5°C), you can place food in a larger container and cover it.

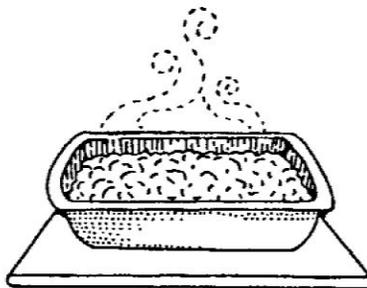
Cooling Times and Temperatures

Cool cooked potentially hazardous food products:

- From 135°F to 70°F within 2 hours
- From 70°F to 41°F within 4 hours

$$\begin{array}{ccccccc} 2 & + & 4 & = & 6 & & \\ \text{Hours} & & \text{Hours} & & \text{Cumulative Time} & & \end{array}$$

Remember: Thaw frozen food products under cold running water or via refrigeration at or below 41°F. Also: When cooling a food product, use shallow pans 2-4 inches in depth.



Attention

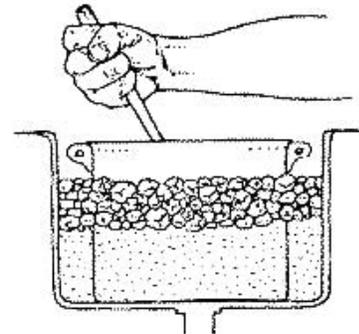
Research has shown that improper (slow) cooling of potentially hazardous foods is the #1 factor contributing to foodborne disease outbreaks. The methods listed below are ways to rapidly cool foods and reduce bacterial growth and/or toxin production:

- Anticipate the volume of food needed and only prepare that amount. – **AVOID LEFTOVERS.**
- Divide large quantities of heated foods into smaller portions.
- Place food in uncovered shallow metal pans (2-4 inches in depth).
- Use ice baths with agitation to rapidly cool foods.

Cooling Liquid Foods

You can use shallow metal pans or you can use the ice and water bath to cool thin soup and sauces. When cooling food with an ice bath, be sure to:

- Close the drain in a large sink. Place the metal pot or pan of hot food in the sink. The sink drain must be indirectly plumbed.
- Fill the sink with ice and cold water **up to the level of food in the pot or pan.**
- Stir the soup or sauce often so that it cools all the way to the center. Ice paddles or cooling wands can be used to speed up the cooling process.
- Add more ice as ice melts.
- The food must reach 41°F (5°C) within 4 hours.



Remember

You can choose several ways to cool food. No matter how you cool the food, it must drop from:

2 hours

135°F (57°C) to 70°F (21°C) within two hours and then the temperature must drop from

4 hours

70°F (21°C) to 41°F (5°C) within four hours.



Use a **food thermometer** to check the temperature while it is cooling. If it isn't cooling fast enough, you will need to do something else to speed up cooling.

Leftovers

Potentially hazardous leftovers can be retained for service at a later meal period no longer than 72 hours from the time it was originally prepared.

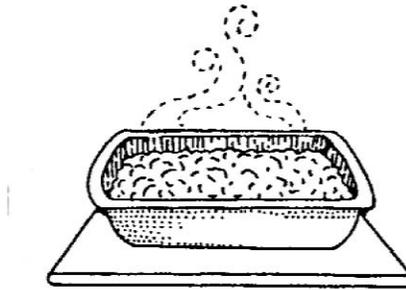
Refrigerated leftovers should be labeled with common product name, date prepared, and use by date. Refrigerator must be 41°F or below.

Refrigerator/Freezer Storage

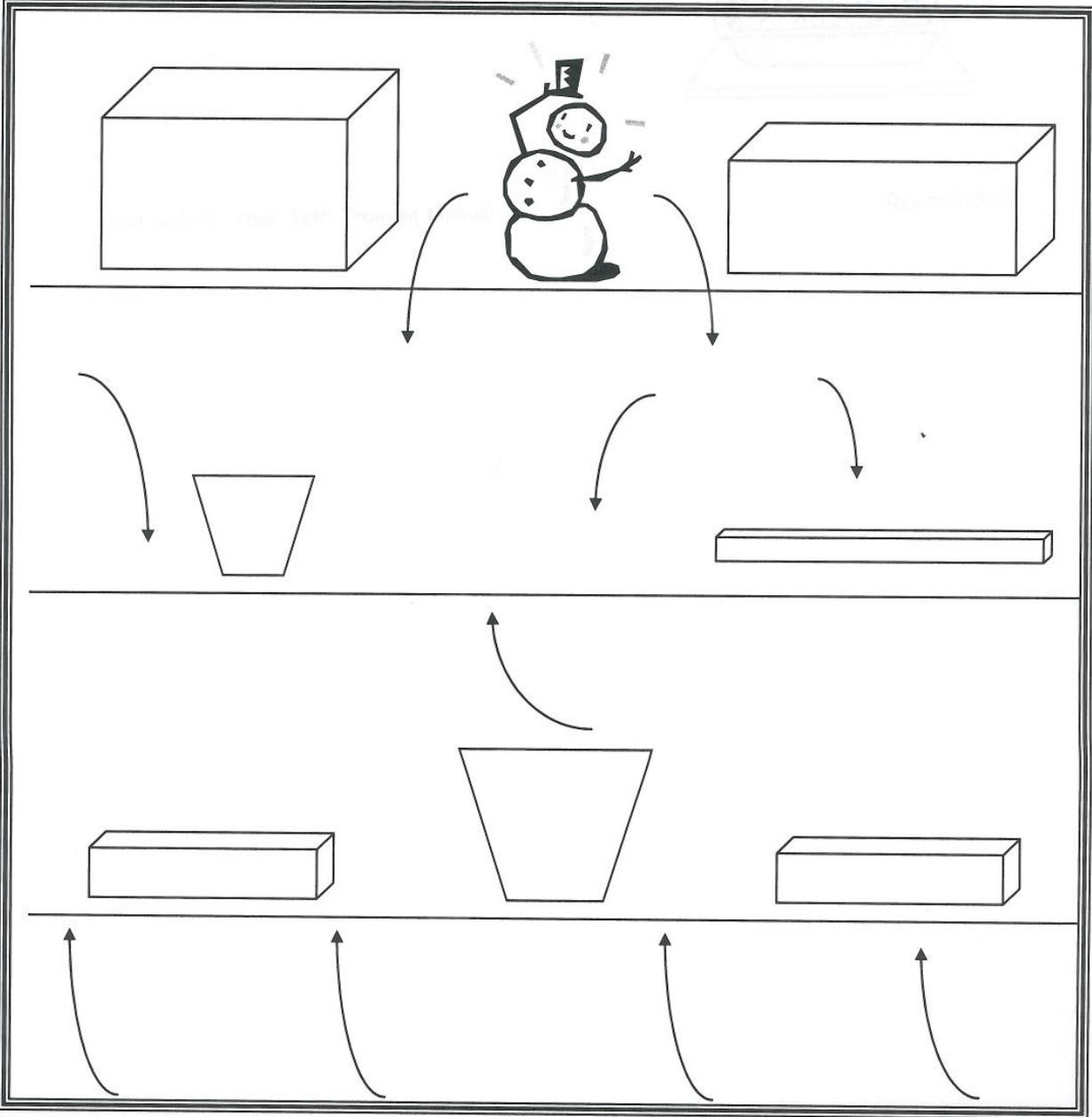
Air Movement – Air in the refrigerator must be able to move around the food. The pans and dishes need to have space between them; **do not** crowd them. Do not stack pans on each other. Do not cover the food while it is cooling. A cover may be put on after the food has fully cooled.

Refrigerator Temperature - 41°F or below.

Freezer Temperature - 0°F or below.



AIR FLOW OF A REFRIGERATOR



Review

1. What is the minimum temperature for holding food hot?

2. What is the temperature for holding food cold?

3. What are some ways to help keep food hot?

4. What is the “danger zone?”

5. What are potentially hazardous foods?

6. How long can food stay in the “danger zone?”

7. T or F Food is unsafe to eat when it has been in the danger zone for over 4 hours.

CHAPTER 5: CROSS CONTAMINATION

Enabling Objectives:

1. Define cross contamination.
2. Identify methods to prevent cross contamination.
3. Identify storage conditions that will minimize the potential for cross contamination.

Safe Storage Practices

You want all the food you use to be healthy and safe. Safe storage practices are a good way to ensure no cross-contamination occurs.

Dry Storage

- Label container
- Rotate stock using *First in First out (FIFO)* method.
- Store 6” off the floor.

Cross Contamination

Cross contamination happens when germs from raw or unclean food get into foods that are ready to serve or that will not be cooked again before you serve them.

Keep Foods Safe From Contamination

As a food service worker, you must prevent **cross contamination**. Here are some important ways that you can prevent **cross contamination**:

- Store raw meat, fish and poultry on the lower shelves of the refrigerator.
- Don't let raw meats; beef, pork, lamb, fish or poultry drip onto foods that will not be cooked before serving. The rule of thumb is that meats which must be cooked at higher temperatures should be stored below meats that are cooked at lower temperatures, i.e., raw poultry should be stored on the bottom shelf.
- Keep different types of raw meat separate from each other.
- Store unwashed food or raw food away from ready-to-eat food.
- Wash your hands between handling raw meat and foods that will not be cooked before eating. Never store foods that will not be cooked before serving in the same container as raw meat, fish or poultry.
- Wash your hands before handling food.

- Wash, rinse and sanitize the cutting surface and all the utensils and knives every time you finish with a job or between preparing different foods.
- Store cleaners and poisons away from food and food preparation areas. If they must be stored in the same area, store cleaners and poisons below food and utensils.

If food becomes contaminated, discard and notify your manager immediately.

CROSS CONTAMINATION

UTENSILS:

Wash and sanitize after every use.

CUTTING BOARDS:

Wash and sanitize after every task.

HANDS:

Wash frequently and thoroughly.

EQUIPMENT:

Clean and sanitize after every use.

A Clean Workplace is Safer

It takes more than soap and water to keep a food business clean and safe. You will likely be using detergents and sanitizers.

Follow These Important Rules

Know what the directions are for using chemicals. Read the labels and talk to your manager about when to use them and how much to use. **Be sure you understand and follow the directions!**

Keep chemicals away from food and clean utensils. If chemicals must be stored in the same room, be sure they are stored in their own area. The area should be below food and utensils, so there is no chance of chemicals splashing onto the food and utensils.

Can you read what the labels say? Are they easy to see? If they are not, tell your manager.

Keep all chemicals in the bottles or boxes they come in. If you put them in a different container, label them clearly.

Utensils, Surfaces and Equipment

Another way to prevent cross contamination is to be sure that utensils, *food contact surfaces* and equipment are washed, rinsed, and sanitized between uses.

- **Wash** them in hot soapy water
- **Rinse** them in clean hot water
- **Sanitize** them with freshly prepared
 - Sanitizer (i.e., 1 or 2 teaspoons of typical household bleach per 1 gallon of water).
Read manufacturer's instructions and warnings before using any approved sanitizer.
- Allow to *air-dry* (common towel is prohibited).

Directions

Follow the cleaning directions for each piece of equipment.

Remember

The correct steps for cleaning utensils, food contact surfaces and equipment are:

- Wash
- Rinse
- Sanitize

Review

1. Where should you store cleaners and poisons in relation to food?

2. Where in the refrigerator should you store raw meat?

3. What is cross contamination?

4. List two ways to prevent cross contamination?

a. _____

b. _____

5. What should you do if food becomes contaminated?

Additional Information

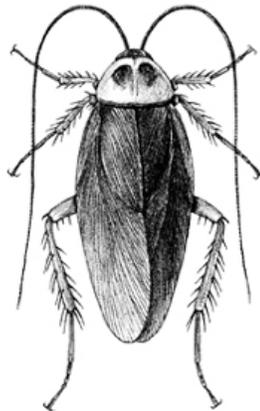
Pests

Cockroaches, flies, mice and rats can carry disease and cause damage. Prevention and control of these pests is essential.

Keep the inside and outside areas clean. Outside garbage must be contained in watertight containers with lids remaining closed when not in use. Exclude flies, especially during the warmer months, by screening open doors and windows screened with 1/16th of an inch mesh.

Pests can come into the facility through small holes or gaps under doors to the outside. A mouse can slip through a space as small as 1/4 inch. Block their entry by eliminating small holes and gaps under and around the door.

If you find pests inside your facility, contact a licensed pest control service.

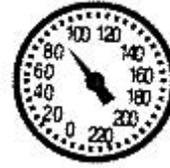


Fresh Fruits and Vegetables

In recent years FF&V have increasingly been associated with foodborne outbreaks. We can reduce the risk by following these recommendations:

- FF&V should be purchased from an approved source.
- Avoid cross-contamination with raw meat, poultry, pork or fish products.
- Ensure preparation surfaces are clean and sanitize prior to use.
- Due to operational commitments, you may receive FF&V from questionable sources which may be contaminated with pathogenic organisms. They may be chemically washed as a further food safety protection measure. Please review these procedures with the PIC or supervisor.

“Is It Done Yet?” How to Use a Food Thermometer



A thermometer that works best shows a range of 0°F (-18°C) to 220°F (104°C).

Check the internal temperature of the food toward the end of the cooking time.

Place the thermometer in the thickest part of the meat or in the center of the food to get a true reading. (Do not touch the bone with the stem of the thermometer. This will provide a false reading).

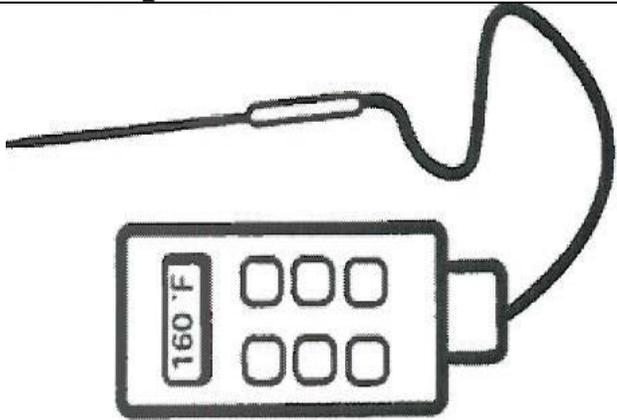
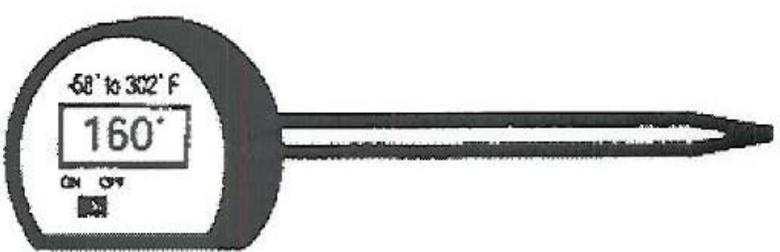
When taking temperatures of a large amount of food like a big piece of meat, be sure to take the temperature in two or more locations.

Compare your thermometer reading to the Required Cooking Temperature to determine if your food has reached a safe temperature.

Wash and sanitize the thermometer each time you check the temperature of a food.

Refrigerator Thermometer – Every refrigerator is required to have a thermometer. This thermometer must be located where it is easy to see when you open the refrigerator door. Every refrigerator should be operating at 41°F or less as indicated by the thermometer. If the thermometer reads above 41°F, then use a metal-stem probe food thermometer to check the temperature of food inside the refrigerator (see above).

Types of Food Thermometers

Thermometers	Speed	Placement
<p>Thermocouple</p>  <p style="text-align: center;">Most models can be calibrated</p>	2-5 seconds	1/4" or deeper in the food as needed
<p>Thermistor</p>  <p style="text-align: center;">Some models can be calibrated</p>	10 seconds	At least 1/2" deep in the food
<p>Instant – Read Bimetal</p>  <p style="text-align: center;">Most models can be calibrated</p>	15-20seconds	2-2 1/2" deep

Refer to manufacturer instructions to find out if your thermometer can be calibrated. Check the web or your food supplier to obtain the best thermometer for your establishment.

Calibrating a Food Thermometer

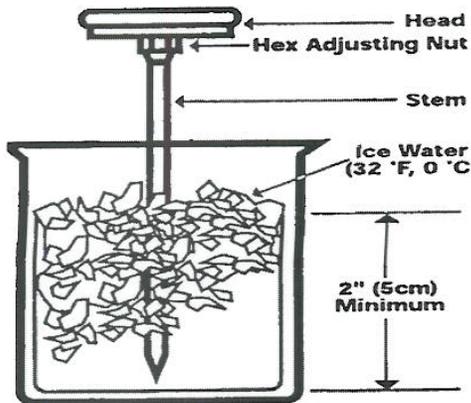
When you use a food thermometer you need to make sure the temperature it gives you is accurate. An easy way to do this is to use ice and water.

Pack a large cup to the top with crushed ice and water.

Put the thermometer at least 2 inches into the ice slurry. After 30 seconds, read the dial. It should read 32°F (0°C).

If it does not read 32°F (0°C) after 30 seconds, you need to:

- Leave it in the ice slurry. Add ice as it melts.
- Use pliers or a wrench and turn the nut on the back of the thermometer until the needle reads 32°F (0°C).
- Wait 30 seconds. Keep repeating these steps until the thermometer reads 32°F (0°C).



Daily

Calibrate your **food thermometer** every day and whenever it is bumped or dropped.

This way you will know that it is telling you the correct temperature.

Glossary

Air Dry – A method to dry by air after cleaning, washing, or sanitizing.

Bacteria – Bacteria are pathogens with only one cell that can multiply into large numbers when food is in the danger zone for more than 4 hours.

Chemicals – In this guide, chemicals are referred to as ingredients in cleaning, sanitizing, or pesticide products that make people sick if eaten.

Cold Holding – Cold holding is when you keep food cold by using refrigeration or ice.

Cross Contamination – When germs from one food item are passed to another food item, usually raw food to ready-to-eat food.

Danger Zone – Temperature of food is between 41°F (5°C) and 135°F (57°C). This is called the danger zone because bacteria will grow quickly between these temperatures.

First in First out (FIFO) – A method of stock rotation to ensure that older dated stock is used first.

Foodborne Illness – Sickness caused from pathogens or toxins in food. This is also called food poisoning.

Food Contact Surface – Any part of a piece of equipment that normally comes in contact with raw or cooked foods.

Food Thermometer – A metal-stem probe thermometer used to take temperatures of food.

Hot Holding – Holding food hot after it has been properly cooked or reheated. Food must maintain a temperature of 135°F (57°C) or hotter.

Infected – A cut or burn that is swollen, red, or has pus.

Microorganisms – A microscopic organism, including bacteria, fungi, viruses and parasites.

Parasites – Tiny worms that live in fish, meat, and humans.

Pathogens – Any disease producing agent or microorganism, such as bacteria, fungi, parasites or viruses.

Potentially Hazardous Foods (PHFs) – Moist, nutrient-rich foods that support the growth of bacteria when the temperature is between 41°F (5°C) and 135°F (57°C).

Reheating – Process of making a cold food hot. Food must be heated from 41°F (5°C) to 165°F (74°C) within two hours.

Sanitize – The final step to removing bacteria from food contact surfaces that have just been cleaned. Many places use a solution made up of one teaspoon of bleach to one gallon of water to sanitize equipment and utensils.

Virus – Pathogens that can only reproduce inside of a living cell. It takes a small number of viruses to make someone sick. Many viruses get into the food from the lack of hand washing, especially after using the toilet and then touching food.