Fatal Outbreak Linked to Incorrect Storage Practices

Two deaths and 68 cases of severe illness were attributed to an E. coli outbreak at a local family operation in the Midwest. An investigation revealed that several 10-pound packages of raw ground beef were incorrectly stored on the top shelf in a walk-in cooler. Authorities determined that the ground beef dripped onto fresh rolls and cartons of chocolate milk that were stored on the shelf below. Guests who had eaten the rolls or were served the cartons of chocolate milk got sick. The operation, which had voluntarily closed for the investigation, never reopened.

You Can Prevent This

In the story above, incorrect storage practices led to contaminated food. Unfortunately, the problem was not found in time to prevent the tragedy.

In this chapter, you will learn about storage practices that can help prevent this type of situation. You will also learn about practices that can be put in place to help ensure the food you receive is safe.

- Purchasing food from approved, reputable suppliers
- Using criteria to accept or reject food during receiving
- Labeling and dating food
- Storing food and nonfood items to prevent time-temperature abuse and contamination
General Purchasing and Receiving Principles

You can’t make unsafe food safe. So, you must make sure you bring only safe food into your operation. Purchasing food from approved, reputable suppliers, and following good receiving procedures will help to ensure the safety and quality of the food your operation uses.

Purchasing

Before you accept any deliveries, you must make sure that the food you purchase is safe. Follow these guidelines.

Approved, reputable suppliers  Food must be purchased from approved, reputable suppliers. These suppliers have been inspected and can show you an inspection report. They also meet all applicable local, state, and federal laws. This applies to all suppliers in the supply chain. Your operation’s chain can include growers (as shown in the photo at left), shippers, packers, manufacturers, distributors (trucking fleets and warehouses), and local markets.

Develop a relationship with your suppliers, and get to know their food safety practices. Consider reviewing their most recent inspection reports. These reports can be from the U.S. Department of Agriculture (USDA), the Food and Drug Administration (FDA), or a third-party inspector. They should be based on Good Manufacturing Practices (GMP) or Good Agricultural Practices (GAP). Make sure the inspection report reviews the following areas.

- Receiving and storage
- Processing
- Shipping
- Cleaning and sanitizing
- Personal hygiene
- Staff training
- Recall program
- HACCP program or other food safety system

Many operations establish supplier lists based on their company specifications, standards, and procedures. However, only approved suppliers should be included on these lists.

Deliveries  Suppliers must deliver food when staff has enough time to do inspections. Schedule deliveries at a time when they can be correctly received.
Receiving and Inspecting

You must take steps to ensure the receiving and inspection process is smooth and safe. Make specific staff responsible for receiving. Train them to follow food safety guidelines. In the photo at left, a manager is training a food handler on inspecting produce. Provide staff with the tools they need, including purchase orders, thermometers, and scales. Then make sure enough trained staff are available to receive and inspect food items promptly. This starts by visually inspecting delivery trucks for signs of contamination. It continues with visually inspecting the food items and checking to make sure they have been received at the correct temperature. Once inspected, food items must be stored as quickly as possible in the correct areas. This is especially true for refrigerated and frozen items.

Key Drop Deliveries

Some foodservice operations receive food after-hours when they are closed for business. This is often referred to as a key drop delivery. The supplier is given a key or other access to the operation to make the delivery. Products are then placed in coolers, freezers, and dry-storage areas. The delivery must be inspected once you arrive at the operation and must meet the following conditions.

- It is from an approved source.
- It was placed in the correct storage location to maintain the required temperature.
- It was protected from contamination in storage.
- It has not been contaminated.
- It is honestly presented.

Rejecting Items

If you must reject an item, set it aside from the items you are accepting. Then tell the delivery person exactly what's wrong with the rejected item. Make sure you get a signed adjustment or credit slip before giving the item back to the delivery person. Finally, log the incident on the invoice or the receiving document.

Occasionally, you may be able to recondition and use items that would have been rejected. For example, a shipment of cans with contaminated surfaces may be cleaned and sanitized, allowing them to be used. However, the same cans may not be reconditioned if they are damaged.
Recalls
Food items you have received may sometimes be recalled by the manufacturer. This may happen when food contamination is confirmed or suspected. It can also occur when items have been mislabeled or misbranded. Often food is recalled when food allergens have not been identified on the label. Most vendors will notify you of the recall. However, you should also monitor recall notifications made by the FDA and the USDA. Follow these guidelines when notified of a recall.

- Identify the recalled food items by matching information from the recall notice to the item. This may include the manufacturer’s ID, the time the item was manufactured, and the item's use-by date.

- Remove the item from inventory, and place it in a secure and appropriate location. That may be a cooler or dry-storage area. The recalled item must be stored separately from food, utensils, equipment, linens, and single-use items.

- Label the item in a way that will prevent it from being placed back in inventory. Some operations do this by including a Do Not Use and Do Not Discard label on recalled food items. Inform staff not to use the product.

- Refer to the vendor’s notification or recall notice for what to do with the item. For example, you might be instructed to throw it out or return it to the vendor.

Temperature
Use thermometers to check food temperatures during receiving. The following examples explain how to check the temperatures of various types of food.

<table>
<thead>
<tr>
<th>Checking the Temperature of Various Types of Food</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Image of temperature checking" /></td>
</tr>
<tr>
<td>Meat, poultry, and fish Insert the thermometer stem or probe directly into the thickest part of the food. The center is usually the thickest part.</td>
</tr>
</tbody>
</table>
Deliveries should also meet the following temperature criteria.

**Cold food**  
Receive cold TCS food, such as the fish in the photo at left, at 41°F (5°C) or lower, unless otherwise specified.

**Live shellfish**  
Receive oysters, mussels, clams, and scallops at an air temperature of 45°F (7°C) and an internal temperature no greater than 50°F (10°C). Once received, the shellfish must be cooled to 41°F (5°C) or lower in four hours.

**Shucked shellfish**  
Receive at 45°F (7°C) or lower. Cool the shellfish to 41°F (5°C) or lower in four hours.

**Milk**  
Receive at 45°F (7°C) or lower. Cool the milk to 41°F (5°C) or lower in four hours.

**Shell eggs**  
Receive at an air temperature of 45°F (7°C) or lower.

**Hot food**  
Receive hot TCS food at 135°F (57°C) or higher.

**Frozen food**  
Frozen food should be frozen solid when received. Reject frozen food for the following reasons.

- Fluids or water stains appear in case bottoms or on packaging.
- There are ice crystals or frozen liquids on the food or the packaging. This may be evidence of thawing and refreezing, which shows the food has been time-temperature abused. The food in the photo at left shows evidence of thawing and refreezing.

**Packaging**

Both food items and nonfood items such as single-use cups, utensils, and napkins, must be packaged correctly when you receive them. Items should be delivered in their original packaging with a manufacturer’s label. The packaging should be intact, clean, and protect food and food-contact surfaces from contamination. Reject food and nonfood items if packaging has any of the following problems.

**Damage**  
Reject items with tears, holes, or punctures in their packaging. Likewise, reject cans with labels that are not intact or have bulging or swollen ends, rust, or dents. All food packaged in a reduced-oxygen environment, such as vacuum-packed meat, must be rejected if the packaging is bloated or leaking. Items with broken cartons or seals, or items with dirty and discolored packaging should also be rejected. Do **not** accept cases or packages that appear to have been tampered with.
Liquid  Reject items with leaks, dampness, or water stains (which means the item was wet at some point), as shown in the photo at left.

Pests  Reject items with signs of pests or pest damage.

Dates  Food items must be correctly labeled. Do not accept food that is missing use-by or expiration dates from the manufacturer. Reject items that have passed their use-by or expiration dates. Some operations label food items with the date the item was received to help with stock rotation during storage.

Documents
Food items must be delivered with the correct documents. For example, shellfish must be received with shellstock identification tags. These tags indicate when and where the shellfish were harvested. They must be kept on file for 90 days from the date the last shellfish was used from its delivery container.

Fish that will be eaten raw or partially cooked must also be received with the correct documentation. These documents must indicate the fish was correctly frozen before you received it. Keep these documents for 90 days from the sale of the fish. If the fish was farm raised, it must have documentation that states the fish was raised to FDA standards. These documents must also be kept for 90 days from the sale of the fish.

Food Quality
Poor food quality can be a sign that the food has been time-temperature abused and, therefore, may be unsafe. Work with your suppliers to define specific safety and quality criteria for the food items you typically receive. Reject food if it has any of the following problems.

Appearance  Reject food that is moldy or has an abnormal color. Food that is moist when it should be dry, such as salami, should also be rejected. Do not accept any food item that shows signs of pests or pest damage.

Texture  Reject meat, fish, or poultry that is slimy, sticky, or dry. Also reject it if it has soft flesh that leaves an imprint when you touch it.

Odor  Reject food with an abnormal or unpleasant odor.

In addition to the guidelines above, you should always reject any item that does not meet your company’s standards for quality.
Apply Your Knowledge

Accept or Reject?

Write an A next to the food items you should accept. Write an R next to the food items you should reject.

1. Chicken received at an internal temperature of 50°F (10°C)
2. Can of red kidney beans with a small dent on one side of the can
3. Shell eggs received at an air temperature of 45°F (7°C)
4. Fresh salmon with flesh that springs back when touched
5. Bag of flour that is dry but has a watermark on it
6. Live oysters without shellstock identification tags
7. Frozen meat with large ice crystals on the packaging
8. Milk received at 50°F (10°C)
9. Mozzarella cheese with small spots of mold
10. Vacuum-packed bacon with the seal broken but no other obvious damage

For answers, please turn to page 5.18.
Storing

Following good storage guidelines for food and nonfood items will help keep these items safe and preserve their quality. In general, you must label and date mark your food correctly. You must also rotate food and store it at the correct temperature. Finally, you need to store items in a way that prevents cross-contamination.

Labeling

Labeling food is important for many reasons. Illnesses have occurred when unlabeled chemicals were mistaken for food such as flour, sugar, and baking powder.

Customers have also suffered allergic reactions when food was unknowingly prepped with a food allergen that was not labeled.

Labeling Food for Use On-site

- All items that are not in their original containers must be labeled.
- Food labels should include the common name of the food or a statement that clearly and accurately identifies it, as shown in the photo at left.
- It is not necessary to label food if it clearly will not be mistaken for another item. The food must be easily identified by sight.

Labeling Food That Is Packaged On-site for Retail Sale

Food packaged in the operation that is being sold to customers for use at home must be labeled. The label must include the following information.

- Common name of the food or a statement that clearly identifies it.
- Quantity of the food.
- List of ingredients in descending order by weight. This is necessary if the item contains two or more ingredients.
- List of artificial colors and flavors in the food. Chemical preservatives must also be listed.
- Name and place of business of the manufacturer, packer, or distributor.
- Source of each major food allergen contained in the food. This is not necessary if the source is already part of the common name of the ingredient.
**Date Marking**

Refrigeration slows the growth of most bacteria. Some types, such as *Listeria monocytogenes*, grow well at refrigeration temperatures. When food is refrigerated for long periods of time, these bacteria can grow enough to cause illness. For this reason, ready-to-eat TCS food must be marked if held for longer than 24 hours. It must indicate when the food must be sold, eaten, or thrown out.

Ready-to-eat TCS food can be stored for only seven days if it is held at 41°F (5°C) or lower. The count begins on the day that the food was prepared or a commercial container was opened. For example, a food handler that prepared and stored potato salad on October 1 would write a discard date of October 7 on the label.

Operations have a variety of systems for date marking. Some write the day or date the food was prepped on the label. Others write the use-by day or date on the label, as shown in the photo at left.

Sometimes, commercially processed food will have a use-by date that is less than seven days from the date the container was opened. In this case, the container should be marked with this use-by date as long as the date is based on food safety.

When combining food in a dish with different use-by dates, the discard date of the dish should be based on the earliest prepared food.

Here is an example: a food handler is prepping a jambalaya on December 4 using shrimp and sausage. The shrimp has a use-by date of December 8, and the sausage has a use-by date of December 10. So, the use-by date of the jambalaya is December 8.

**Temperatures**

Pathogens can grow when food is not stored at the correct temperature. Follow these guidelines to keep food safe.

- Store TCS food at an internal temperature of 41°F (5°C) or lower or 135°F (57°C) or higher.
- Store frozen food at temperatures that keep it frozen.
- Make sure storage units have at least one air temperature measuring device. It must be accurate to +/- 3°F or +/- 1.5°C. This device must be located in the warmest part of refrigerated units, and the coldest part of hot-holding units. The hanging thermometer in the photo at left is a common type of temperature measuring device used in coolers.
- Do not overload coolers or freezers. Storing too many food items prevents good airflow and makes the units work harder to stay cold. Be aware that frequent opening of the cooler lets warm air inside, which can affect food safety.
- Use open shelving. Do not line shelves with aluminum foil, sheet pans, or paper. This restricts circulation of cold air in the unit.
- Monitor food temperatures regularly. Randomly sample the temperature of stored food to verify that the cooler is working.
Rotation
Food must be rotated in storage to maintain quality and limit the growth of pathogens. Food items must be rotated so that those with the earliest use-by or expiration dates are used before items with later dates.

Many operations use the first-in, first-out (FIFO) method to rotate their refrigerated, frozen, and dry food during storage. Here is one way to use the FIFO method.

1. Identify the food item’s use-by or expiration date.
2. Store items with the earliest use-by or expiration dates in front of items with later dates, as shown in the photo at left.
3. Once shelved, use those items stored in front first.
4. Throw out food that has passed its manufacturer’s use-by or expiration date.

Preventing Cross-Contamination
Food must be stored in ways that prevent cross-contamination. Follow the guidelines throughout this section.

Supplies
- Store all items in designated storage areas.
- Store items away from walls and at least six inches (15 centimeters) off the floor, as shown in the photo at left.
- Store single-use items (e.g., sleeve of single-use cups, single-use gloves) in original packaging.

Containers
- Store food in containers intended for food.
- Use containers that are durable, leak proof, and able to be sealed or covered.
- **NEVER** use empty food containers to store chemicals. **NEVER** put food in empty chemical containers.

Cleaning
Keep all storage areas clean and dry. Clean floors, walls, and shelving in coolers, freezers, dry-storage areas, and heated holding cabinets on a regular basis, as shown in the photo at left. Clean up spills and leaks promptly to keep them from contaminating other food.
- Clean dollies, carts, transporters, and trays often.
- Store food in containers that have been cleaned and sanitized.
- Store dirty linens away from food. Store them in clean, nonabsorbent containers. They can also be stored in washable laundry bags.
Storage Order

- Wrap or cover food. Store raw meat, poultry, and seafood separately from ready-to-eat food. If raw and ready-to-eat food cannot be stored separately, store ready-to-eat food above raw meat, poultry, and seafood, as shown in the photo below. This will prevent juices from raw food from dripping onto ready-to-eat food.

- Raw meat, poultry, and seafood can be stored with or above ready-to-eat food in a freezer if all of the items have been commercially processed and packaged. Frozen food that is being thawed in coolers must also be stored below ready-to-eat food.

- Store raw meat, poultry, and seafood in coolers in the following top-to-bottom order: seafood, whole cuts of beef and pork, ground meat and ground fish, whole and ground poultry. This order is based on the minimum internal cooking temperature of each food. As an exception, ground meat and ground fish can be stored above whole cuts of beef and pork. To do this, make sure the packaging keeps out pathogens and chemicals. It also must not leak.

Storage Location

Food should be stored in a clean, dry location away from dust and other contaminants. **NEVER** store food in these areas to prevent contamination.

- Locker rooms or dressing rooms
- Restroom or garbage rooms
- Mechanical rooms
- Under unshielded sewer lines or leaking water lines
- Under stairwells
Apply Your Knowledge

Load the Cooler
Next to the number of each food item, write the letter of the shelf it belongs on.


What's Wrong with This Picture?
Find the unsafe storage practices in this picture.

For answers, please turn to page 5.18.
Chapter Summary

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

- Deliveries must be inspected by designated staff trained to follow food safety guidelines. That will include a visual inspection of food as well as checks to make sure the food has been received at the correct temperature.

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

- Cold TCS food must be received at 41°F (5°C) or lower. Hot TCS food must be received at 135°F (57°C) or higher. Frozen food should always be received frozen. Some items have other temperature requirements. Received food should have the correct color, texture, and odor.

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

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

- Food should be labeled before it is stored. The label should include the common name of the food. If TCS food was prepped in-house and will be stored longer than 24 hours, it must also be date marked. This food can be stored for only seven days if held at 41°F (5°C) or lower.

- Food should only be stored in a designated storage area. It should be stored away from walls and at least six inches (15 centimeters) off the floor. Stored food items should always be rotated so that older items are used first.
Chapter Review Case Study

To keep food safe during purchasing, receiving, and storage, you must know how to purchase food from approved, reputable suppliers; use criteria to accept and reject food during receiving; label and date food; and store food and nonfood items to prevent time-temperature abuse and contamination.

Now, take what you have learned in this chapter and apply it to the following case study.

A shipment was delivered to Enrico’s Italian Restaurant on a warm summer day. Alyce, who was in charge of receiving, began inspecting the shipment. First, she inspected the bags of frozen shrimp. Alyce noticed the ice crystals inside the bags and took that as a good sign that the shrimp were still frozen.

Next she used a thermometer to test the temperature of the vacuum-packed packages of ground beef, which was 40°F (4°C). Then Alyce used the same thermometer to measure the temperature of the fresh salmon. The salmon was on ice, although it seemed as though much of the ice had melted. The internal temperature of the salmon was 43°F (6°C), and the flesh sprung back after she touched it. She accepted the ground beef and the salmon and put them on the side to put away.

Not wanting to take the time to clean and sanitize the probe, Alyce felt several containers of sour cream. They felt cold, so Alyce also put them on the side to put away. Finally, Alyce inspected the cases of pasta. One of the cases was torn, but the pasta inside the case didn’t seem to be damaged.

Once she finished receiving the food, Alyce was ready to put it into storage. First, she carried the bags of shrimp to the freezer. She wondered who had left the freezer without making sure the door was completely shut. Alyce then loaded a case of sour cream on the dolly and wheeled it over to the reach-in cooler. When she opened the cooler, she noticed that it was tightly packed. However, she was able to squeeze the case into a spot on the top shelf.

Next, she wheeled several cases of fresh ground beef and the fresh salmon over to the walk-in cooler. She noticed that the readout on the outside of the cooler indicated 39°F (4°C). Alyce pushed through the cold curtains and bumped into a hot stockpot of soup as she moved inside. She moved the soup over and made a space for the ground beef. She was able to put the salmon on the shelf above the soup. Alyce said hello to Mary, who had just cleaned the shelving in the unit and was lining it with new aluminum foil.
What receiving mistakes did Alyce make?

What storage mistakes were made at the operation?

For answers, please turn to page 5.19.
Study Questions

Circle the best answer to each question.

1. **What is the most important factor in choosing a food supplier?**
   A. It has a HACCP program or other food safety system.
   B. It has documented manufacturing and packing practices.
   C. Its warehouse is close to the operation, reducing shipping time.
   D. It has been inspected and complies with local, state, and federal laws.

2. **What is the best method of checking the temperature of a delivery of fresh fish?**
   A. Feel the fish, making sure that it is cold to the touch.
   B. Insert a thermometer probe into the thickest part of the fish.
   C. Place a time-temperature indicator on the surface of the fish.
   D. Use an infrared thermometer to check the fish's temperature.

3. **What is the correct temperature for receiving cold TCS food?**
   A. 32°F (0°C) or lower
   B. 41°F (5°C) or lower
   C. 45°F (7°C) or lower
   D. 50°F (10°C) or lower

4. **Milk can be received at 45°F (7°C) under what condition?**
   A. It is thrown out after 2 days.
   B. It is cooled to 41°F (5°C) or lower in 4 hours.
   C. It is immediately cooled to 41°F (5°C) or lower.
   D. It is served or used in the operation within 2 hours.

5. **Frozen shrimp is rejected during receiving for having large ice crystals on the food and packaging. What is the problem that caused this?**
   A. Cross-contact
   B. Cross-contamination
   C. Time-temperature abuse
   D. Incorrect cleaning and sanitizing

6. **What is required when receiving fish that will be served raw or partially cooked?**
   A. It must be alive when received.
   B. It must be thawed in the microwave.
   C. It must be used within 24 hours of receiving.
   D. It must be correctly frozen before you receive it.
7. What must be included on the label of TCS food that was prepped in-house?
A. Date that the food was received
B. Name of each TCS ingredient included
C. Date that the food should be thrown out
D. List of all potential ingredients in the food

8. How long can TCS food that was prepped in-house be stored?
A. 3 days
B. 5 days
C. 7 days
D. 9 days

9. When storing food using the FIFO method, where should the food with the earliest use-by dates be stored?
A. Below food with later use-by dates
B. Behind food with later use-by dates
C. In front of food with later use-by dates
D. Alongside food with later use-by dates

10. What is the problem with storing raw ground beef above prepped salads?
A. Cross-contamination
B. Poor personal hygiene
C. Time-temperature abuse
D. Cross-contact with allergens

11. In top-to-bottom order, how should a fresh pork roast, fresh salmon, a container of lettuce, and a pan of fresh chicken breasts be stored in a cooler?
A. Lettuce, fresh salmon, fresh pork roast, fresh chicken breasts
B. Fresh salmon, fresh pork roast, fresh chicken breasts, lettuce
C. Lettuce, fresh chicken breasts, fresh pork roast, fresh salmon
D. Fresh salmon, lettuce, fresh chicken breasts, fresh pork roast

12. How many inches (centimeters) from the floor should food be stored?
A. At least 1" (3 cm)
B. At least 2" (5 cm)
C. At least 4" (10 cm)
D. At least 6" (15 cm)

For answers, please turn to page 5.19.
5.7 Accept or Reject?

1. R
2. R
3. R
4. A
5. A
6. R
7. R
8. R
9. R
10. R

5.12 Load the Cooler

1. C
2. E
3. A
4. D
5. B

5.12 What's Wrong with This Picture?

Here are the unsafe storage practices.

- Chemicals stored with food
- Food stored on the floor
- Boxes of food not labeled
- Spilled food not cleaned up
- Cooler door open
- Overstocked cooler
- Area not clean
- Unlabeled items in cooler
5.14 Chapter Review Case Study

1. Alyce made the following receiving mistakes.
   - She should have rejected the shrimp. The ice crystals are evidence of thawing and re-freezing.
   - She did not clean and sanitize the probe she had used to measure the temperature of the ground beef and the fish.
   - She should have rejected the salmon. The temperature of the fish was above 41°F (5°C) and the melted ice could be evidence of time-temperature abuse.
   - She felt the container of sour cream instead of measuring the internal temperature of the food.
   - She should have rejected the torn carton of pasta.
   - She put the cold food on the side while receiving the dry food.

2. The operation made the following storage mistakes.
   - The freezer door was left open.
   - Alyce placed the case of sour cream into an already overloaded refrigerator.
   - Alyce put the raw salmon above ready-to-eat food (soup).
   - Alyce checked the cooler’s readout temperature which was good, but she also should have spot-checked the internal temperatures of the food stored inside.
   - A hot stockpot of soup was stored in the walk-in refrigerator. Hot food should never be placed in a refrigerator.
   - Mary was lining the refrigerator shelving with aluminum foil. This can restrict airflow in the unit.

5.16 Study Questions

1. D
2. B
3. C
4. B
5. C
6. D
7. C
8. A
9. A
10. B
chapter 6
The Flow of Food: Preparation
### Undercooked Meatballs Result in Fatal Outbreak

A 73-year-old woman died and 51 people were hospitalized after eating undercooked turkey meatballs at a buffet in the southeastern United States. The victims all got sick with *Salmonella* spp. An investigation revealed that the chef had browned the meatballs but failed to finish baking them. This left the centers of the meatballs undercooked.

### You Can Prevent This

The illness in the story above could have been avoided if the chef had made sure that the meatballs were cooked to the correct internal temperature. In this chapter, you will learn about the specific cooking temperatures that can keep food safe. You will also learn other guidelines for keeping food safe during preparation.

- Preventing cross-contamination and time-temperature abuse
- Thawing food correctly
- Cooking food to a minimum internal temperature
- Cooling and reheating food to the correct temperature in the correct amount of time
**Preparation**

Cross-contamination and time-temperature abuse can happen easily when you are preparing food. But, you can prevent pathogens from spreading and growing by making good food-prep choices.

<table>
<thead>
<tr>
<th>Preparation</th>
<th>Cooking Food</th>
<th>Cooling and Reheating Food</th>
</tr>
</thead>
<tbody>
<tr>
<td>- General Preparation Practices</td>
<td>- How to Check Temperatures</td>
<td>- Temperature Requirements for Cooling Food</td>
</tr>
<tr>
<td>- Thawing</td>
<td>- Cooking Requirements for Specific Food</td>
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<td>- Prepping Specific Food</td>
<td>- Consumer Advisories</td>
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<tr>
<td>- Preparation Practices That Have Special Requirements</td>
<td>- Operations That Mainly Serve High-Risk Populations</td>
<td></td>
</tr>
</tbody>
</table>

**General Preparation Practices**

No matter what type of food you are prepping, you should begin by following these guidelines.

**Equipment**  
Make sure workstations, cutting boards, and utensils are clean and sanitized.

**Quantity**  
Only remove as much food from the cooler as you can prep in a short period of time. This keeps ingredients from sitting out for long periods of time. In the photo at left, the food handler has taken out too much tuna salad.

**Storage**  
Return prepped food to the cooler, or cook it as quickly as possible.

**Additives**  
If you use food or color additives when prepping food, follow these guidelines.

- Only use additives that have been approved by your local regulatory authority. **NEVER** use more than is allowed by law. **NEVER** use additives to alter the appearance of the food.

- Do **NOT** sell produce that was treated with sulfites before it was received in the operation. **NEVER** add sulfites to produce that will be eaten raw.

**Presentation**  
Food must be offered to customers in a way that does not mislead or misinform them. Customers must be able to judge the true appearance, color, and quality of food. Do **NOT** use the following to misrepresent the appearance of food.

- Food additives or color additives
- Colored overwraps
- Lights

Food that has not been honestly presented must be thrown out.
Corrective actions  Food that has become unsafe must be thrown out unless it can be safely reconditioned. All food—especially ready-to-eat food—must be thrown out in the following situations.

- When it is handled by staff who have been restricted or excluded from the operation due to illness
- When it is contaminated by hands or bodily fluids from the nose or mouth
- When it has exceeded the time and temperature requirements designed to keep food safe

Sometimes food can be restored to a safe condition. This is called reconditioning. For example, a hot food that has not been held at the correct temperature may be reheated if it has not been in the temperature danger zone for more than two hours. This can return food to a safe condition.

Thawing

When frozen food is thawed and exposed to the temperature danger zone, pathogens in the food will begin to grow. To reduce this growth, **NEVER** thaw food at room temperature. Thaw TCS food in the following ways.

**Refrigeration**  Thaw food in a cooler, keeping its temperature at 41°F (5°C) or lower.

**Running water**  Submerge food under running, drinkable water at 70°F (21°C) or lower. The flow of the water must be strong enough to wash loose food bits into the drain. Always use a clean and sanitized food-prep sink when thawing food this way. **NEVER** let the temperature of the food go above 41°F (5°C) for longer than four hours. This includes the time it takes to thaw the food plus the time it takes to prep or cool it. The photo at left shows the correct way to thaw food under running water.

**Microwave**  Thaw food in a microwave oven if it will be cooked immediately after thawing. The food must be cooked in conventional cooking equipment, such as an oven, once it's thawed.

**Cooking**  Thaw food as part of the cooking process.
**Prepping Specific Food**
Special care must be taken when handling ice and when preparing produce, eggs, and salads that contain TCS food.

### Produce
When prepping produce, follow these guidelines.

**Cross-contamination** Make sure fruit and vegetables do **not** touch surfaces exposed to raw meat, seafood, or poultry.

**Washing** Wash produce thoroughly under running water. This is especially important before cutting, cooking, or combining it with other ingredients.

- The water should be a little warmer than the produce.
- Pay special attention to leafy greens such as lettuce and spinach, as the food handler in the photo at left is doing. Remove the outer leaves, and pull the lettuce or spinach completely apart and rinse thoroughly.
- Certain chemicals may be used to wash fruits and vegetables. Also, produce can be treated by washing it in water containing ozone. This treatment helps control pathogens.

**Check your local regulatory requirements.**

**Soaking or storing** When soaking or storing produce in standing water or an ice-water slurry, **do not** mix different items or multiple batches of the same item.

**Fresh-cut produce** Refrigerate and hold sliced melons, cut tomatoes, and cut leafy greens at 41°F (5°C) or lower. Many operations hold other fresh-cut produce at this temperature as well.

**Raw seed sprouts** If your operation primarily serves high-risk populations, **do not** serve raw seed sprouts.

### Eggs and Egg Mixtures
When prepping eggs and egg mixtures, follow these guidelines.

**Pooled eggs** Handle pooled eggs (if allowed by your local regulatory authority) carefully. Pooled eggs are eggs that are cracked open and combined in a container, as shown in the photo at left. Cook them promptly after mixing, or store them at 41°F (5°C) or lower. Clean and sanitize the containers used to hold them before making a new batch.

**Pasteurized eggs** Consider using pasteurized shell eggs or egg products when prepping egg dishes that need little or no cooking. Examples include Caesar salad dressing, hollandaise sauce, tiramisu, and mousse.
High-risk populations If you mainly serve high-risk populations, such as those in hospitals and nursing homes, use pasteurized eggs or egg products when serving dishes that are raw or undercooked. Shell eggs that are pooled must also be pasteurized. You may use unpasteurized shell eggs if the dish will be cooked all the way through, such as an omelet or a cake.

**Salads Containing TCS Food**

Chicken, tuna, egg, pasta, and potato salads have all been involved in foodborne-illness outbreaks. These salads are not usually cooked after preparation. This means you do not have a chance to reduce pathogens, such as *Staphylococcus aureus*, that may have gotten into the salad. Therefore, you must take a few extra steps. Follow these guidelines.

**Using leftovers** TCS food such as pasta, chicken, and potatoes can be used only if it has been cooked, held, and cooled correctly.

**Storing leftovers** Throw out leftover food held at 41°F (5°C) or lower after seven days. Check the use-by date before using stored food items.

**Ice**

Follow these guidelines to avoid contaminating ice in your operation.

**Consumption** Make ice from water that is safe to drink.

**Cooling food** *NEVER* use ice as an ingredient if it was used to keep food cold. For example, if ice is used to cool food on a salad bar, it cannot then be used in drinks.

**Containers and scoops** Use clean and sanitized containers and ice scoops to transfer ice from an ice machine to other containers.

- *NEVER* store ice scoops outside of the ice machine in a clean, protected location, as shown in the photo at left.
- *NEVER* hold or carry ice in containers that have held raw meat, seafood, or poultry; or chemicals.
- *NEVER* touch ice with hands or use a glass to scoop ice.
Preparation Practices That Have Special Requirements

You will need a variance when prepping food in certain ways. A variance is a document issued by your regulatory authority that allows a regulatory requirement to be waived or changed.

When applying for a variance, your regulatory authority may require you to submit a HACCP plan. The plan must account for any food safety risks related to the way you plan to prep the food item.

You will need a variance if your operation plans to prep food in any of the following ways:

- Packaging fresh juice on-site for sale at a later time, unless the juice has a warning label.
- Smoking food as a way to preserve it (but not to enhance flavor), as shown in the photo at left.
- Using food additives or adding components such as vinegar to preserve or alter the food so that it no longer needs time and temperature control for safety.
- Curing food.
- Custom-processing animals for personal use. For example, a hunter brings a deer to a restaurant for dressing and takes the meat home for later use.
- Packaging food using a reduced-oxygen packaging (ROP) method. This includes MAP, vacuum-packed, and *sous vide* food. *Clostridium botulinum* and *Listeria monocytogenes* are risks to food packaged in these ways.
- Sprouting seeds or beans.
- Offering live shellfish from a display tank.
Apply Your Knowledge

What’s the Problem?

1. Reggie filled a clean and sanitized sink with cold water and ice. Then he soaked a partial case of green onions that he had gotten from the cooler and a new case of onions delivered that morning together.
   Was the food prepped correctly? _______
   Why or why not? __________________________

2. Linda needed to make 20 box lunches to be picked up in 3 hours. She got out the bread, meat, and cheese, and left them on the prep table so that she could make the sandwiches in between her other tasks.
   Was the food prepped correctly? _______
   Why or why not? __________________________

3. Brandon trimmed an uncooked roast on the red cutting board. Then he washed his hands and used a different knife to slice tomatoes on the green cutting board.
   Was the food prepped correctly? _______
   Why or why not? __________________________

4. Jessica read an article about sprouting beans. It inspired her to try it in her operation. She used some of the freshly sprouted beans in one of her daily specials.
   Was the food prepped correctly? _______
   Why or why not? __________________________

5. Norris wanted to make his famous Eggs Benedict for the residents at the nursing home where he works. He mixed egg yolks from raw shell eggs with butter and lemon juice and poured the uncooked sauce over several hotel pans of poached eggs.
   Was the food prepped correctly? _______
   Why or why not? __________________________

For answers, please turn to page 6.24.
Apply Your Knowledge

Pick the Correct Way to Prep Food
Write an X next to the correct answer in each pair.

To thaw frozen food:
1. Place the item on a prep table at room temperature.
2. Place the item in a cooler which keeps it at 41°F (5°C) or lower.

To preserve food by smoking it:
1. Make sure the item has been thawed before smoking it.
2. Make sure you contact your local regulatory authority to get a variance.

When using leftovers of TCS food to make salads:
1. Make sure to throw out leftovers held at 41°F (5°C) or lower after 7 days.
2. Make sure to throw out leftovers held at 41°F (5°C) or lower after 10 days.

When using pooled eggs:
1. Cook them promptly after mixing, or store them at room temperature.
2. Cook them promptly after mixing, or store them at 41°F (5°C) or lower.

Handling Ice
Write an X next to each unsafe practice when handling ice.

For answers, please turn to page 6.24.
Cooking Food

The only way to reduce pathogens in food to safe levels is to cook it to its minimum internal temperature. This temperature is different for each food. Once reached, you must hold the food at this temperature for a specific amount of time. If customers request a lower temperature, you need to inform them of the potential risk of foodborne illness. Also be aware of special menu restrictions if you serve high-risk populations.

While cooking reduces pathogens in food, it does not destroy spores or toxins they may have produced. You still must handle food correctly before you cook it.

How to Check Temperatures

To make sure the food you are cooking has reached the correct temperature, you must know how to take the temperature correctly. Follow these guidelines.

- Pick a thermometer with a probe that is the correct size for the food.
- Check the temperature in the thickest part of the food.
- Take at least two readings in different locations.

Cooking Requirements for Specific Food

Monitor the temperature of cooked food to make sure it has reached the correct temperature. Minimum temperatures have been developed for TCS food. These temperatures are listed on the next page. However, your operation or area might require different temperatures.

Check your local regulatory requirements.
<table>
<thead>
<tr>
<th>Minimum Internal Temperature</th>
<th>Type of Food</th>
</tr>
</thead>
</table>
| **165°F (74°C)** for 15 seconds | - Poultry—including whole or ground chicken, turkey, or duck  
- Stuffing made with fish, meat, or poultry  
- Stuffed meat, seafood, poultry, or pasta  
- Dishes that include previously cooked TCS ingredients (raw ingredients should be cooked to their minimum internal temperatures) |
| **155°F (68°C)** for 15 seconds | - Ground meat—including beef, pork, and other meat  
- Injected meat—including brined ham and flavor-injected roasts  
- Mechanically tenderized meat  
- Ralites—including ostrich and emu  
- Ground seafood—including chopped or minced seafood  
- Shelled eggs that will be hot-held for service |
| **145°F (63°C)** for 15 seconds | - Seafood—including fish, shellfish, and crustaceans  
- Steaks/chops of pork, beef, veal, and lamb  
- Commercially raised game  
- Shelled eggs that will be served immediately |
| **145°F (63°C)** for 4 minutes | - Roasts of pork, beef, veal, and lamb  
- Roasts may be cooked to these alternate cooking times and temperatures depending on the type of roast and oven used:  
130°F (54°C) 112 minutes  
131°F (55°C) 89 minutes  
133°F (56°C) 56 minutes  
135°F (57°C) 36 minutes  
136°F (58°C) 28 minutes  
138°F (59°C) 18 minutes  
140°F (60°C) 12 minutes  
142°F (61°C) 8 minutes  
144°F (62°C) 5 minutes |
| **135°F (57°C)** | - Fruit, vegetables, grains (rice, pasta), and legumes (beans, refried beans) that will be hot-held for service |
Cooking TCS Food in the Microwave Oven
Meat, seafood, poultry, and eggs that you cook in a microwave oven must be cooked to 165°F (74°C). In addition, follow these guidelines.

- Cover the food to prevent its surface from drying out.
- Rotate or stir it halfway through the cooking process so that the heat reaches the food more evenly.
- Let the covered food stand for at least two minutes after cooking to let the food temperature even out.
- Check the temperature in at least two places to make sure that the food is cooked through.

Partial Cooking During Preparation
Some operations partially cook food during prep and then finish cooking it just before service. You must follow the steps below if you plan to partially cook meat, seafood, poultry, or eggs; or dishes containing these items.

1. Do not cook the food for longer than 60 minutes during initial cooking.

2. Cool the food immediately after initial cooking.

3. Freeze or refrigerate the food after cooling it. If refrigerating the food, make sure it is held at 41°F (5°C) or lower.

4. Heat the food to at least 165°F (74°C) for 15 seconds before selling or serving it.

5. Cool the food if it will not be served immediately or held for service.
Your local regulatory authority may require you to have written procedures that explain how the food cooked by this process will be prepped and stored. These procedures must be approved by the regulatory authority and describe the following:

- How the requirements will be monitored and documented
- Which corrective actions will be taken if requirements are not met
- How these food items will be marked after initial cooking to indicate that they need further cooking
- How these food items will be separated from ready-to-eat food during storage, once initial cooking is complete

**Consumer Advisories**

You must cook TCS food to the minimum internal temperatures listed in this chapter unless a customer requests otherwise. This might happen often in your operation, particularly if you serve meat, eggs, or seafood.

**Disclosure** If your menu includes TCS items that are raw or undercooked, you must note it on the menu next to these items. This can be done by placing an asterisk next to the item that points customers to a footnote at the bottom of the menu. The footnote must include a statement that indicates the item is raw or undercooked, or contains raw or undercooked ingredients. The menu in the photo at left shows an example of disclosure.

** Reminder** You must advise customers who order food that is raw or undercooked of the increased risk of foodborne illness. You can do this by posting a notice in your menu. You can also provide this information using brochures, table tents, signs, or other written methods.

**Check your local regulatory requirements.**

**Children’s Menus**

The Food and Drug Administration (FDA) advises against offering raw or undercooked meat, poultry, seafood, or eggs on a children’s menu. This is especially true for undercooked ground beef, which may be contaminated with enterohemorrhagic and shiga toxin-producing *E. coli* O157:H7.

**Operations That Mainly Serve High-Risk Populations**

Operations that mainly serve a high-risk population, such as nursing homes or day-care centers, cannot serve certain items. NEVER serve raw seed sprouts or raw or undercooked eggs, meat, or seafood. Examples include over-easy eggs, raw oysters on the half shell, and rare hamburgers.
Apply Your Knowledge

How Do You Check It?
Identify the pictures that show the correct way to check a temperature. Write your answers in the blanks provided.

1. 
2. 

For answers, please turn to page 6.24.
Apply Your Knowledge

What's the Temperature?

Identify the minimum internal cooking temperature for each food. Write the letter in the space provided. Some letters will be used more than once.

A. 135°F (57°C)  
B. 145°F (63°C)  
C. 155°F (68°C)  
D. 165°F (74°C)

1. _______ Salmon steak  
2. _______ Roasted vegetables that will be hot-held  
3. _______ Ground pork  
4. _______ Lamb chops  
5. _______ Eggs for immediate service  
6. _______ Duck  
7. _______ Pasta  
8. _______ Beef steak  
9. _______ Chicken enchiladas made with previously cooked chicken  
10. _______ Pork loin injected with marinade  
11. _______ Broccoli cooked in a microwave oven that will be hot-held  
12. _______ Ostrich filet  
13. _______ Wild rice that will be hot-held  
14. _______ Ravioli stuffed with cheese  
15. _______ Buffalo steak (commercially raised buffalo)

For answers, please turn to page 6.24.
Cooling and Reheating Food

When you don’t serve cooked food immediately, you must get it out of the temperature danger zone as quickly as possible. That means cooling it quickly. You also need to reheat it correctly, especially if you are going to hold it.

Temperature Requirements for Cooling Food

As you know, pathogens grow well in the temperature danger zone. However, they grow much faster at temperatures between 125°F and 70°F (52°C and 21°C). Food must pass through this temperature range quickly to reduce this growth.

Cool TCS food from 135°F (57°C) to 41°F (5°C) or lower within six hours.

First, cool food from 135°F to 70°F (57°C to 21°C) within two hours.

Then cool it from 70°F to 41°F (21°C to 5°C) or lower in the next four hours.

If food has not reached 70°F (21°C) within two hours, it must be reheated and then cooled again.

If you can cool the food from 135°F to 70°F (57°C to 21°C) in less than two hours, you can use the remaining time to cool it to 41°F (5°C) or lower. However, the total cooling time cannot be longer than six hours. For example, if you cool food from 135°F to 70°F (57°C to 21°C) in one hour, you have the remaining five hours to get the food to 41°F (5°C) or lower.

Check your local regulatory requirements.
Methods for Cooling Food

The following factors affect how quickly food will cool.

**Thickness or density of the food** The denser the food, the more slowly it will cool.

**Size of the food** Large food items cool more slowly than smaller items. To let food cool faster, you should reduce its size. Cut large food items into smaller pieces. Divide large containers of food into smaller containers or shallow pans, as shown in the photo at left.

**Storage container** Stainless steel transfers heat away from food faster than plastic. Shallow pans let the heat from food disperse faster than deep pans.

**NEVER** Cool large amounts of hot food in a cooler. Most coolers are not designed to cool large amounts of hot food quickly. Also, placing hot food in a cooler may not move the food through the temperature danger zone quickly enough. Here are some effective methods for cooling food quickly and safely.

**Ice-water bath** After dividing food into smaller containers, place them in a clean prep sink or large pot filled with ice water. The food handler in the photo at left is cooling a container of meat sauce this way.

Stir the food frequently to cool it faster and more evenly.

**Blast chiller** Blast chillers blast cold air across food at high speeds to remove heat. They are typically used to cool large amounts of food.

**Ice paddle** Plastic paddles are available that can be filled with ice or with water and then frozen. Food stirred with these paddles will cool quickly, as shown in the photo at left.

Food cools even faster when placed in an ice-water bath and stirred with an ice paddle.

**Ice or cold water as ingredient** When cooling soups or stews, the recipe is made with less water than required. Cold water or ice is then added after cooking to cool the food and provide the remaining water.

Storing Food for Further Cooling

Loosely cover food containers before storing them. Food can be left uncovered if stored in a way that prevents contaminants from getting into it. Storing uncovered containers above other food, especially raw seafood, meat, and poultry, will help prevent cross-contamination.
Reheating Food

How you reheat food depends on how you intend to use the food. Follow these guidelines when reheating food.

Food reheated for immediate service  You can reheat food that will be served immediately, such as beef for a beef sandwich, to any temperature. However, you must make sure the food was cooked and cooled correctly.

Food reheated for hot-holding  You must heat TCS food for hot-holding to an internal temperature of 165°F (74°C) for 15 seconds. Make sure the food reaches this temperature within two hours from start to finish. The food handler in the photo at left is reheating clam chowder for hot-holding. These guidelines apply to all reheating methods, such as ovens or microwave ovens.

Reheat commercially processed and packaged ready-to-eat food to an internal temperature of at least 135°F (57°C). This includes items such as cheese sticks and deep-fried vegetables.

Apply Your Knowledge

Cooling Food

Write an X next to each food that has been cooled correctly.

1. Meat sauce was cooled from 135°F to 70°F (57°C to 21°C) in 1 hour and then from 70°F to 41°F (21°C to 5°C) in 4 hours.
2. Chili was cooled from 135°F to 70°F (57°C to 21°C) in 2 hours and then from 70°F to 41°F (21°C to 5°C) in 4 hours.

For answers, please turn to page 6.24.
Apply Your Knowledge

Is It Hot Enough?

Decide if the food in each situation is safe to serve. Explain why or why not.

1. At 9:00 a.m., Lin clocked in, said hello to her manager, and started to set up the buffet. Fifteen minutes later, she headed to the walk-in cooler, where she grabbed a stockpot of chili that had been made a few days earlier. She placed the stockpot on the stove and started reheating it. At 11:30 a.m., she checked the temperature of the chili, which had reached 155°F (68°C). Satisfied, she moved on to her next task.

Is the chili safe to serve? ________

Why or why not? ____________________________

________________________________________

2. Thursday at lunch, a customer ordered a stacked hot roast beef and cheddar sandwich. Mina took precooked slices of beef from the reach-in cooler and put them in a bain of hot au jus. She heated the slices of beef for a few minutes. Then she made the sandwich, topping it with melted cheddar, and placed it on the counter for pickup.

Is the sandwich safe to serve? ________

Why or why not? ____________________________

________________________________________

For answers, please turn to page 6.24.
Chapter Summary

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

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

- Prevent cross-contamination and time-temperature abuse when preparing food. Prep food in small batches and keep workstations and utensils clean and sanitized. Prepped food that is not going to be cooked immediately should be put back in the cooler.

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

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

- TCS food must be cooled from 135°F to 70°F (57°C to 21°C) within two hours. Then it must be cooled from 70°F to 41°F (21°C to 5°C) or lower in the next four hours.

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

- Reheated TCS food that will be hot-held must be heated to an internal temperature of 165°F (74°C) for 15 seconds. Make sure the food reaches this temperature within two hours.
Chapter Review Case Study

You can avoid foodborne-illness outbreaks in your operation if you prepare food safely. Doing this includes following general practices for thawing and prepping food; cooking food thoroughly; and cooling and reheating food correctly.

Now, take what you have learned in this chapter and apply it to the following case study.

Angie had a busy day ahead of her at the Sunnydale Nursing Home. Looking in the freezer, Angie realized that she had forgotten to thaw the chicken breasts she planned to serve for dinner. Moving quickly, she placed the frozen chicken in a prep sink and turned on the hot water. While waiting for chicken to thaw, she grabbed a pan of leftover soup from the cooler and placed it in the steam table to heat up.

By 7:30 p.m., all the residents had eaten dinner. As Angie began cleaning up, she realized she had a lot of cooked chicken breasts leftover. Betty, the new assistant manager, had forgotten to tell Angie that several residents were going to a local festival and would miss dinner. “No problem,” Angie thought. “We can use the leftover chicken to make chicken salad.”

Angie left the still-hot chicken breasts in a pan on the prep table while she started putting other food away and cleaning up. At 9:45 p.m., when everything else was clean, she put her hand over the pan of chicken breasts and decided they were cool enough to handle. She covered the pan with plastic wrap and put it in the cooler.

Three days later, Angie came in to work the breakfast shift. As she started her shift, she decided to make chicken salad from the leftover chicken breasts. Angie took all the ingredients she needed for the chicken salad out of the cooler and put them on a prep table. Then she turned her attention to getting breakfast started.

First, she cracked three-dozen eggs into a large bowl, added some milk, and set the bowl near the stove. Then she took bacon out of the cooler and put it on the prep table next to the chicken-salad ingredients. She peeled off strips of bacon onto a sheet pan and put the pan into the oven. Then she went back to the stove to whisk the eggs and pour them onto the griddle. When they looked ready, Angie checked the temperature. The eggs had reached 145°F (63°C). Angie scooped the scrambled eggs into a hotel pan and put it in the steam table.

1. What did Angie do wrong?

2. What should Angie have done differently?

For answers, please turn to page 6.25.
Study Questions

Circle the best answer to each question.

1. What is the maximum water temperature allowed when thawing food under running water?
   A. 70°F (21°C)
   B. 65°F (18°C)
   C. 60°F (16°C)
   D. 55°F (13°C)

2. What must food handlers do to food immediately after thawing it in the microwave oven?
   A. Hold it.
   B. Cook it.
   C. Cool it.
   D. Freeze it.

3. What can occur if prep tables are not cleaned and sanitized between uses?
   A. Off flavors in food
   B. Cross-contamination
   C. Toxic-metal poisoning
   D. Time-temperature abuse

4. A food handler thaws several frozen turkeys on a prep table. What is the danger that this poses to the food?
   A. Off flavors in food
   B. Cross-contamination
   C. Toxic-metal poisoning
   D. Time-temperature abuse

5. A food handler pulled a hotel pan of tuna salad from the cooler and used it to prepare six tuna salad sandwiches. What is the problem with this situation?
   A. Cross-contamination
   B. Poor personal hygiene
   C. Time-temperature abuse
   D. Poor cleaning and sanitizing

6. What is the minimum internal cooking temperature for stuffed pork chops?
   A. 135°F (57°C) for 15 seconds
   B. 145°F (63°C) for 15 seconds
   C. 155°F (68°C) for 15 seconds
   D. 165°F (74°C) for 15 seconds

Continued on the next page
7. What is the minimum internal cooking temperature for eggs, meat, poultry, and seafood cooked in a microwave oven?
   A. 135°F (57°C)
   B. 145°F (63°C)
   C. 155°F (68°C)
   D. 165°F (74°C)

8. What is the minimum internal cooking temperature for eggs that will be hot-held for service?
   A. 135°F (57°C) for 15 seconds
   B. 145°F (63°C) for 15 seconds
   C. 155°F (68°C) for 15 seconds
   D. 165°F (74°C) for 15 seconds

9. What is the minimum internal cooking temperature for ground beef?
   A. 135°F (57°C) for 15 seconds
   B. 145°F (63°C) for 15 seconds
   C. 155°F (68°C) for 15 seconds
   D. 165°F (74°C) for 15 seconds

10. Which food should not be offered on a children’s menu: a rare hamburger, fried chicken tenders, grilled cheese sandwich, or spaghetti with meat sauce?
    A. Rare hamburger
    B. Fried chicken tenders
    C. Grilled cheese sandwich
    D. Spaghetti with meat sauce

11. A food handler can cool a stockpot of clam chowder by placing it into a
    A. cooler.
    B. freezer.
    C. sink of ice water.
    D. cold-holding unit.

12. What temperature must TCS food be reheated to if it will be hot-held?
    A. 135°F (57°C) for 15 seconds
    B. 145°F (63°C) for 15 seconds
    C. 155°F (68°C) for 15 seconds
    D. 165°F (74°C) for 15 seconds
A food handler is reheating commercially processed cheese sticks, which will be hot-held on a buffet. What temperature must the cheese sticks be reheated to?

A. 135°F (57°C)
B. 145°F (63°C)
C. 155°F (68°C)
D. 165°F (74°C)

When reheating partially cooked food for service, what minimum internal temperature must be reached?

A. 135°F (57°C) for 15 seconds
B. 145°F (63°C) for 15 seconds
C. 155°F (68°C) for 15 seconds
D. 165°F (74°C) for 15 seconds

For answers, please turn to page 6.25.
Answers

6.7 What's the Problem?

1 No. One batch of green onions could cross-contaminate the other. Between batches, he should have emptied the sink, cleaned and sanitized it, and changed the ice water.

2 No. The meat and cheese are being time-temperature abused. She should take out of the cooler only what she can use within a short amount of time.

3 Yes. He used separate equipment for the meat and the produce.

4 No. She should have contacted her local regulatory authority before sprouting the beans. She would have needed a variance to do this.

5 No. Because he serves food at a nursing home, he cannot use raw shell eggs in dishes that will be served raw or undercooked. Also, poached shell eggs are undercooked and should not be served in a nursing home unless the eggs have been pasteurized.

6.8 Pick the Correct Way to Prep Food

1 B  3 A
2 B  4 B

6.8 Handling Ice

1, 2, and 4 should be marked.

6.13 How Do You Check It?

1 A
2 A

6.14 What's the Temperature?

1 B  5 B  9 D  13 A
2 A  6 D  10 C  12 D
3 C  7 A  11 A  13 B
4 B  8 B  12 C

6.17 Cooling Food

1 and 2 should be marked.

6.18 Is It Hot Enough?

1 No. The chili did not reach an internal temperature of 165°F (74°C) within two hours.

2 Yes. Assuming the roast beef was cooked and cooled correctly, it can be reheated to any temperature because it is being served immediately.
6.20 Chapter Review Case Study

1. Here is what Angie did wrong.
   - She thawed the chicken breasts the wrong way. She should not have thawed them under hot water.
   - She cooled the leftover chicken breasts the wrong way. She should not have left them out to cool at room temperature.
   - She subjected the chicken salad ingredients to time-temperature abuse when she left them on the prep table.
   - She pooled shell eggs when prepping the scrambled eggs. If shell eggs are going to be pooled when serving a high-risk population, such as the residents of a nursing home, they must be pasteurized. This became a bigger problem when Angie undercooked the eggs.
   - She did not handle the pooled eggs correctly. She left the bowl in the temperature danger zone by putting it near a warm stove.
   - She did not cook the scrambled eggs to the correct temperature before storing them on the steam table.
   - She did not clean and sanitize the prep table after she made the bacon and before she chopped the celery and chicken.

2. Here is what Angie should have done differently.
   - If Angie needed to thaw the chicken breasts quickly, she should have either used a microwave or placed them under running water at 70°F (21°C) or lower.
   - To cool the chicken breasts quickly for two-stage cooling, she could have used a blast chiller or placed the container of chicken breasts in an ice-water bath. Then she could move them to the cooler.
   - She should have left the chicken salad ingredients in the cooler until she was ready to prep the salad.
   - She should have used pasteurized shell eggs or egg products.
   - She should have held the eggs in the cooler until she was ready to cook them.
   - She should have cooked the eggs to be held for later service to at least 155°F (68°C) for 15 seconds.
   - She should have cleaned and sanitized the prep table after she made the bacon and before she chopped the celery and chicken.

6.21 Study Questions

chapter 7
The Flow of Food: Service