Chapter 3

INTRODUCTION TO FOOD SAFETY

TOPICS

- **3.1 Foodborne Illness and Its Costs**
- **3.2 Forms of Contamination**
- **3.3 Cross-Contamination**
- **3.4 Time-Temperature Abuse**
- **3.5 Food Allergies**
- **3.6 Food Defense**
- **3.7 Food Safety Management Systems**

SKILLS

- Ice-Point Method for Calibrating a Thermometer
- **Reducing Risks in Menu Management** **Bonus Essential Skill included in this manual*
- **Identifying Physical Contaminants (Natural Objects)** **Bonus Essential Skill included in this manual*

RECIPES

- **Chicken Salad**
- **Baked Potato Salad** **Bonus recipe included in this manual*

Essential Skills: Reducing Risks in Menu Management

(Bonus skill included in this manual; related to Section 3.1)

You will need

- **Time:** 30 minutes
- **Skills:** Identifying TCS foods, FAT TOM, temperature danger zone, cross-contamination, and vulnerabilities of high-risk populations
- **Materials:** Laptop/tablet, internet connectivity, pencil or pen, textbook

Steps

1. Go online and review two menus from restaurants in your area.
2. Review this list of high-risk populations from Section 3.1 in your text:
   - **Elderly people:** Immune systems weaken with age.
   - **Preschool-age children:** Very young children have not yet built up strong immune systems.
   - **People with compromised immune systems:** People with cancer or on chemotherapy, people with HIV/AIDS, and transplant recipients all have immune systems weakened by illness or treatment. Certain medications can also weaken the immune system.
3. List 3–5 menu items from each menu that might pose a risk to high-risk populations:

   Menu 1: Answers will vary.

   Menu 2: Answers will vary.

4. Choose one item from each menu and explain why it might pose a risk to high-risk populations.

   Menu 1: Answers will vary but might include: Reference to TCS foods, unpasteurized products, products served undercooked or raw, etc.

   Menu 2: Answers will vary but might include: Reference to TCS foods, unpasteurized products, products served undercooked or raw, etc.

Reflection

What were some other common menu items you found that may pose a risk for high-risk populations?

Answers will vary but may include raw or undercooked eggs, raw or undercooked meats, unpasteurized juices.

Provide an example of a dish or procedure in a restaurant that might result in cross-contamination. Be specific about how cross-contamination could occur.

Answers will vary but may include not washing hands after handling raw meat and then touching ready to eat foods. Not washing hands after using the restroom. Not wearing gloves while handling ready-to-eat foods. Using soiled equipment that was used for raw meats for ready-to-eat foods.

For the two restaurants whose menus you researched, what are some menu item swaps you could make and some precautions you would take to reduce the risk of high-risk populations (and others) becoming sick when dining at those places?

Answers will vary but may include only serving well-done burgers, cooking all egg dishes thoroughly, training staff on which menu items to suggest.

Essential Skills: Identifying Physical Contaminants (Natural Objects)

(Bonus Skill included in this manual; related to Section 3.2)

You will need

- **Time:** 30-45 minutes
- **Skills:** Identifying recipes and foods that could contain various physical contaminants that naturally occur.
- **Materials:** Laptop/tablet, internet connectivity, recipes, pen or pencil, highlighters (optional)

Steps

Instructor note: If it makes more sense for your classroom, provide students with 8-10 printed recipes instead of them researching recipes online.)

1. Research online to find eight recipes that contain naturally occurring physical contaminants (pits, seeds, stones, bones, cartilage, shells, etc.).
2. Complete the following table based on your research:

Name of Recipe	Physical Contaminant Risks
1. Example: Cowboy Beans	Stones in beans, onion skins, garlic skins
2. Example: Tart Cherry Pie	Pits in cherries, seeds from lemons
3.	
4.	
5.	
6.	
7.	
8.	

3. Share your findings with the class.

Reflection

What was the most difficult part of this activity?

Answers will vary but may include: being knowledgeable about all the different naturally occurring objects in food that could become possible physical contaminants.

What risks do naturally occurring physical contaminants pose for guests?

Answers will vary but may include: scrapes or cuts, dental damage, choking risk, digestive issues, etc.

What could you do as a restaurant manager/owner to reduce these risks from naturally occurring physical contaminants?

Answers will vary but may include: training employees in food safety, purchase from reputable suppliers; purchase pre-prepped food items.

Part 2: ACTIVITIES

Math Activity

You own a small bakery and pay your pastry cooks $15 per hour. One of your pastry cooks worked for 4 hours to make two batches of frosted brownies. The ingredients for each batch cost $20. Each batch yields 48 brownies, and you sell each brownie for $1.50. Unfortunately, you received a recall notice for the eggs used in the brownies. You had not sold them yet, so no one got sick, but now you can't sell them. What did the egg recall cost you in potential profit for these brownies? Find out by calculating the following:

1. **Total Loss (Labor and Supplies):** Determine the total amount of money lost on labor and supplies due to the egg recall.

$15 Hourly rate for pastry cooks	×	4 Hours worked	=	$60 Labor cost
$20 Food supply costs for a batch of brownies	×	2 Number of batches	=	$40 Total food supply costs
$60 Labor costs	+	$40 Food supply cost	=	$100 Total loss

2. **Lost Profit:** Calculate the potential profit you have lost because you cannot sell the brownies.

48 Number of brownies in a batch	×	2 Number of batches made	=	96 Total number of brownies made
$1.50 Brownie price point	×	96 Number of brownies	=	$144 Total potential revenue
$144 Potential revenue from brownies	−	$100 Labor and food supply costs	=	$ 44 Potential profit (Lost profit)

Research Activity

In this activity, you will conduct online research to find out about food allergies. Then, you will draw a Food Allergy Awareness poster in your Lab Manual to highlight your findings and educate people about food allergies. You will share your posters with the class, and your instructor will lead you in a discussion about them. Follow these steps:

1. **Investigate and research.**
   - Begin by researching food allergies online, focusing on the "Big Nine" food allergens: milk, soybeans (soy), eggs, wheat, fish, crustacean shellfish, peanuts, tree nuts, and sesame.
   - Research the symptoms of allergic reactions and the importance of preventing cross-contact.
   - Investigate how to prevent cross-contact in food preparation, including handwashing, glove use, using separate equipment, and proper storage.
   - Consider what information is the most important to share with the public about food allergies.

2. **Design your poster.**

   Tip: *You may want to design and sketch your poster out on a separate piece of paper before you finalize it here in your Lab Manual.*

   - In the space provided, draw your Food Allergy Awareness Poster.
   - Your poster should clearly present information about food allergens, their impact, and ways to prevent allergic reactions.
   - Include information from your research, using text and/or illustrations as appropriate. Focus on the clarity and accuracy of your message over artistic creativity.
   - Your poster should include the following information:
     - The "Big Nine" food allergens
     - Symptoms of an allergic reaction
     - At least three methods to prevent cross-contact

3. **Share and discuss your posters.**
   - Participate in a class discussion led by your instructor.
   - Your instructor will ask several students to share their posters with the class.
   - During each presentation, pay attention to the content, clarity, and accuracy of the information presented on the posters, as well as the effectiveness of the design.
   - Do the posters effectively communicate the importance of food allergy awareness and prevention of cross-contact? Why or why not? Be kind and constructive in your comments

Food Allergy Awareness Poster

Part 3: RECIPES

Chicken Salad

You will need

- **Time:** 15 minutes
- **Skills:** Identifying TCS foods, proper cooling and storage of TCS foods

Check each item off as you collect it.

Equipment

- ☐ Dry measuring cups
- ☐ Measuring spoons
- ☐ Cutting board
- ☐ Chef's knife
- ☐ Forks
- ☐ Hand-held juicer
- ☐ Medium bowl
- ☐ Rubber spatula

Ingredients

Yield: 12 servings

- ☐ 4 cups Cooked chicken, diced or shredded
- ☐ 1 cup Mayonnaise
- ☐ ½ cup Sour cream
- ☐ ½ cup Onions, finely chopped
- ☐ 2 ribs Celery, finely chopped
- ☐ 2 Green onions, thinly sliced
- ☐ 2 tsp. Dijon mustard
- ☐ 2 tsp. Lemon juice, fresh (or to taste)
- ☐ ¼ tsp. Worcestershire sauce
- ☐ 3–4 dashes Hot sauce
- ☐ 1 tsp. Seasoned salt
- ☐ ¼ tsp. Black pepper, ground (or to taste)
- ☐ 2 tsp. Fresh dill, finely chopped

Mise en Place

- Dice or shred chicken.
- Finely chop onions, celery, and dill.
- Thinly slice green onion.
- Juice lemon.

Steps

1. Combine all ingredients in a medium bowl.
2. Mix well to combine.
3. Season with additional salt and pepper.

Chicken Salad Questions

Tasting notes

Answers will vary.

Did anything surprise you while preparing this item?

Answers will vary.

What would you change if you prepared this item again?

Answers will vary.

Which foods in this recipe are considered TCS foods? What are some serving ideas for this chicken salad?

TCS foods: Cooked chicken, mayonnaise, sour cream

Answers will vary, but may include: You could serve this chicken salad over a bed of greens, on sandwich bread or a croissant, with crackers or toasts, or stuffed inside of a tomato or bell pepper.

Baked Potato Salad

(Bonus recipe not included in textbook)

You will need

- **Time:** 2 days, 20-minute cook, 30-minute prep
- **Skills:** Identifying TCS foods, proper cooling, and storage of TCS foods

Check each item off as you collect it.

Equipment

- ☐ Scale
- ☐ Measuring spoons
- ☐ Dry measuring cups
- ☐ Vegetable peeler
- ☐ Rubber spatula
- ☐ Box grater
- ☐ Cutting board
- ☐ Chef's knife
- ☐ Large pot with cover
- ☐ Colander
- ☐ Sheet pan or shallow hotel pan
- ☐ 12-14-inch skillet
- ☐ Paper-towel-lined plate
- ☐ Tongs
- ☐ Large bowl

Ingredients

Yield: 4-6 servings

- ☐ 4 lbs. Yukon gold potatoes, peeled
- ☐ 15 slices Bacon
- ☐ 16 oz. container Sour cream
- ☐ 2 Tbsp. Mayonnaise
- ☐ 2 cups Cheddar cheese, shredded
- ☐ 2 Tbsp. Fresh chives, thinly sliced
- ☐ 1 tsp. Salt (plus extra for cooking water)
- ☐ 1 tsp. Black pepper

Mise en Place

- Peel potatoes.
- Shred cheddar cheese.
- Slice chives.

Steps

1. Place the potatoes into a large pot and cover with lightly salted water. Bring to a boil over high heat, then reduce heat to medium-low; cover and simmer until just tender, about 15 minutes.
2. Drain the potatoes; cool on a sheet pan or shallow hotel pan in a refrigerator for 8-24 hours. Dice once cooled.
3. Place the bacon in a large, deep skillet, and cook over medium-high heat, turning occasionally, until evenly browned, about 10 minutes. Drain the bacon slices on a paper-towel-lined plate. Allow it to cool and crumble the bacon into a large bowl.
4. Place the cooled potatoes into the bowl with the bacon; mix in the sour cream, mayonnaise, cheddar cheese, chives, salt, and pepper. Refrigerate overnight before serving

Baked Potato Salad Questions

Tasting notes

Answers will vary.

Did anything surprise you while preparing this item?

Answers will vary.

What would you change if you prepared this item again?

Answers will vary.

Which foods in this recipe are considered TCS foods?

Boiled potatoes, bacon, sour cream, mayonnaise, cheddar cheese