Lesson 7:
Chapter 3 Module 1
Time/Temperature Control for Safety Foods (TCS)

Chapter 3: Knowing the Menu

Chapter 3 – Module 1: Time/Temperature Control for Safety Foods

TIME/TEMPERATURE CONTROL FOR SAFETY FOODS

Key Words:

- Time/Temperature for Safety Foods (Potentially Hazardous or High Risk Foods)
- The Big Eight
- Cross-Contamination
- Cross-Contact
- Temperature Danger Zone (TDZ)

Main Ideas:

- Potentially Hazardous Foods that support the growth of organisms increase the risk of foodborne illness
- The Big Eight contribute to most (nearly 90%) of all allergic reactions to foods
- There are over 200 foods that have been identified as food allergens

Time/Temperature Control for Safety Foods

Any food can become contaminated and unsafe. However, some foods are more likely to be sources of bacteria and viruses that can spread foodborne illness than others. Many of the foods that are susceptible to bacterial growth are low-acid foods that contain high amounts of moisture. The FDA Food Code specifically identifies **Time/Temperature Control for Safety** foods. Module 3.1 of the 2009 FDA Food Code has more specific details.

POTENTIALLY HAZARDOUS FOODS

FDA Food Code

The FDA Food Code specifically identifies **Time/Temperature Controlled for Safety (TCS)** foods that are more likely to support growth of organisms that cause foodborne illness. These foods are meat, poultry, fish, eggs, dairy products and cooked plant foods such as rice and baked potatoes. The Food Code also lists raw seed sprouts, cut melons, cut leafy greens, cut tomatoes, and garlic-in-oil mixtures.

The Big Eight

Some people have allergic reactions to certain foods. The CDC lists **The Big Eight** which contribute to most allergic reactions to food: milk, eggs, soy, wheat, fish, crustacean shellfish, peanuts, and tree nuts.

Ready-to-Eat (RTE) Foods

At high risk for contamination by viruses are **Ready-to-Eat** foods that do not receive further cooking before being served to customers. These include salads, vegetables, and fruits that are served raw. Sandwiches, deli meats, and cheeses, are also Ready-to-Eat food items. Any cooked food that will not receive further cooking or reheating before being served to a customer falls into the Ready-to-Eat category.

Table 3: Potentially Hazardous Foods

It is estimated that viruses cause over one-half of all foodborne illnesses every year in the U.S. Viruses do not grow in foods, but they can be spread to foods by employees who are ill and do not wash hands properly. Foods that are at high risk for contamination by viruses are Ready-to-Eat (RTE) foods that do not receive further cooking before being served to customers.

Other sources of bacteria and viruses that cause foodborne illness include beverages such as unclean water, raw milk, and raw fruit juices. When unclean water is used to wash raw fruits and vegetables, bacteria and viruses can be spread to these foods (an example of **Cross-Contamination**).

Bacteria and viruses can also be spread through ice. Therefore, it is important that a restaurant have a supply of both clean water and clean ice.

One virus (Norovirus) and 10 bacteria listed in Table 4 below cause over 95% of foodborne illnesses in the United States. Parasites are another cause foodborne illness sometimes found in raw fish, fresh produce, and unclean water. The table below lists organisms by scientific name along with their common food or beverage sources. Many of the foods listed are also identified as Time/Temperature Control for Safety foods in the FDA Food Code.

Bacteria or Virus	Food and Beverage Sources
Norovirus	• Salads • Fruits • Oysters • Ready-to-Eat foods
Salmonella spp	• Fresh produce • Meat and poultry • Eggs • Milk and dairy products
Clostridium perfringens	• Meats • Gravies and stews containing meat • Mexican foods • Vegetables
Campylobacter spp	• Undercooked poultry • Raw milk • Unpasteurized cheeses • Unclean water
Staphylococcus aureus	• Meat and meat products, poultry and egg products • Salads (egg, tuna, chicken, potato, pasta) • Cream-filled bakery products • Sandwich fillings • Milk and dairy products
Enterohemorrhagic and Shiga-producing *E.coli* (O157:H7 and other strains)	• Raw or undercooked ground beef • Fresh produce • Raw milk • Unpasteurized fruit juice • Unclean water
Shigella	• Raw produce and Salads • Milk and dairy products • Poultry
Yersinia enterocolitica	• Meats • Oysters, fish, and crabs • Raw milk
Bacillus cereus	• Meats • Milk • Vegetables • Fish
Vibrio parahaemolyticus	• Raw or improperly cooked oysters
Listeria monocytogenes	• Raw milk and unpasteurized cheeses • Ice cream • Raw vegetables • Raw poultry and meats • Hot dogs and Deli meats

Table 4: Bacteria and viruses and their common food and beverage sources

Norovirus

What is Norovirus?

Norovirus is a virus that is the most common cause of foodborne illness in the U.S. today. It causes about 21 million illnesses a year, and about 5 million of these illnesses are spread through food. It can be spread from one person to another, on contact surfaces such as door handles, through the air, or through food. Norovirus can stay on restaurant furniture and kitchen counters for many days.

Ways to Prevent Norovirus from Spreading:

- Restaurant employees should wash hands often with soap and water. Alcohol-based sanitizers can be used in addition, but should not substitute for handwashing.
- Fruits and vegetables should be washed before preparing them. Cook oysters and other shellfish thoroughly before serving them. Norovirus can survive temperatures as high as 140°F.
- Clean and disinfect surfaces such as kitchen work counters and dining room tables. If Norovirus might be present, a highly concentrated sanitizer should be used. Quaternary ammonium compounds are not effective against Norovirus.
- Restaurant employees should not work handling food when they are ill.
- Wash dirty laundry promptly in hot water and machine dry. This may include employee aprons along with kitchen towels, dining room tablecloths, and napkins.

High Risk Foods for Food Allergens

People who have food allergies may become very ill from eating a food to which they are allergic. There are eight common food allergens that cause the most food allergy reactions (**The Big Eight**). Table 5 lists these allergens along with common food sources and ingredients that might contain these allergens. This is only a partial list. Over 200 foods have been identified as causing allergic reactions to foods. Restaurant managers should read food labels carefully and consult their food suppliers or food manufacturers to gain more knowledge about food ingredients. It is important to give customers with food allergies accurate information.

Food Allergen	Common Food Sources	How It Might Be Listed on the Label
Milk	Milk, cheese, yogurt, ice cream, pudding, custard, cream, butter, pudding, milk chocolate candy	Casein, curds, ghee, lactalbumin, lactoferrin, lactose, whey, milk solids
Eggs	Eggs, mayonnaise, meringue, macaroni, pasta, baked goods	Egg powder, dried eggs, egg solids, albumin, globulin, lecithin, lysozyme, ovalbumin
Soy	Edamame, miso, natto, tamari, tempeh, tofu, soy sauce, baked goods, soups, cereals, deli meats	Vegetable broth, gum, oil, or starch, hydrolyzed vegetable protein (HVP), textured vegetable protein (TVP), monosodium glutamate (MSG)
Wheat	Baked goods, pasta, couscous, cereals, breaded and battered foods, soups, ale and beer	Bran, durum, germ, gluten, malt, starch, bulgur, cracker meal, flour, semolina, spelt, triticale, starch
Fish	Fish, anchovies, surimi (imitation seafood), caviar, Caesar salad dressing, sushi, sashimi, tempura	Fish oil, steak sauce, Worcestershire sauce, fish sauce, fish flavoring
Crustacean Shellfish	Abalone, clams, crab, crawfish, lobster, oysters, scallops, shrimp, cockle, mussels	Agar, alginic acid, alginate, fish or shellfish flavoring
Peanuts	Peanuts, baked goods, candy, cereal, granola, whole grain breads, sauces, salad dressings	Peanut butter, peanut flour, peanut oil, hydrolyzed plant or vegetable protein
Tree Nuts	Almonds, Brazil nuts, cashews, chestnuts, filberts, hazelnuts, hickory nuts, macadamia nuts, pecans, pine nuts, pistachios, walnuts	Nut butters, nut pastes, nut oils, hydrolyzed plant or vegetable protein

Table 5: **The Big Eight** Food Allergens and common foods and ingredients.
Adapted from the Food Allergy Research and Education “How to Read a Label” information sheet.

International Association for Food Protection Food Allergen Icons

STANDARD OPERATING PROCEDURES: TIME/TEMPERATURE CONTROL FOR SAFETY FOODS

When food is stored, cooked, and held at appropriate temperatures, restaurant employees can prevent the growth of most harmful bacteria.

- Keep cold food cold (≤41°F)
- Keep hot foods hot (≥135°F)
- Do not allow Time/Temperature Control for Safety Foods to remain in the Temperature Danger Zone (between 41°F and 135°F) for longer than 4 hours
- Cool hot leftover foods to ≤41°F as quickly as possible before storing in a refrigerator; the cooling process should not take over 4 hours
- Label cooked leftovers or Ready-to-Eat foods with the expiration date
- Check refrigerators often to make sure they keep foods at 41°F or colder. Temperatures above 41°F require corrective action. Check the temperature setting and notify the manager. Repairs may be necessary.
- Avoid Cross-Contamination of foods during preparation and service; clean and sanitize equipment, cutting boards, and utensils between food items
- Avoid Cross-Contact between foods that contain common food allergens and other foods
  - Carefully clean the counter and equipment after each use
  - Set aside a separate kitchen counter and equipment to prepare foods that will be free of food allergens

There is no video for Chapter 3 Module 1.

Quiz…Next Page

Time/Temperature Control for Safety Foods

Module Quiz: Please make sure you have read Chapter 3 – Module 1 before you take the quiz. If you have any questions about the information found in Module 1, please ask your manager before you begin.

1. Which of the following are high risk foods that may spread bacteria and viruses causing foodborne illness?
   a. Raw leafy greens
   b. Cut tomatoes and melons
   c. Baked potatoes
   d. Raw alfalfa sprouts
   e. All of the above

2. Which of the following are among **The Big Eight** high risk foods for food allergens?
   a. Milk
   b. Eggs
   c. Peanuts
   d. Soy
   e. All of the above

3. Bacteria and viruses can be spread through ice?
   a. True
   b. False

4. Viruses can spread easily when Ready-to-Eat foods come in contact with a sick employee. Which of the following is NOT an example of a Ready-to-Eat food?
   a. Salad
   b. Raw eggs
   c. Sandwiches
   d. Cheeses

5. Unclean water, raw milk, and raw fruit juice can contain bacteria or viruses that cause foodborne illness.
   a. True
   b. False