Study Manual Review Questions

Chapter 2:

1. According to the Food Code, a potentially hazardous food is defined as:
2. Describe the conditions necessary for bacterial growth.
3. List the pathogens most often transmitted through contaminated food and the symptoms they cause.
4. What are viruses, and how do they differ from bacteria?
5. List the classifications of foodborne illness, define each type, and give examples.

Chapter 3:

1. List the causative factors in foodborne illness as established by data collected by the CDC from 1993 to 1997 and the percentages of illnesses for which they are responsible.
2. According to the Food Code, what is the suggested cooling time for PHF?
3. List six suggested cooling methods for PHF.
4. What final cooking temperatures are recommended in Chapter 3 of the FDA Food Code for the following foods?
   - Fish
   - Ground beef
   - Pork
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8. List examples of verification procedures.

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2. What is a pandemic?
3. What is the purpose of a foodborne-illness investigation?
4. What techniques are used to investigate a suspected foodborne-illness incident? Explain each technique in detail.
5. Explain the difference between a foodborne-illness outbreak and an incident.

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3. Define the term “critical violation” in relation to inspections as defined in the Food Code. Give examples of what might be considered to be critical items on an inspection report.
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5. What should be the focus of the consultation with the permit holder at the conclusion of the inspection and why?
Answers to Study Questions

Chapter 2

1. According to the *Food Code*, a potentially hazardous food is defined as:
   In general, foods that are good sources of nourishment for bacteria are warm, moist (water activity of 0.85 or higher), of low acidity (4.9 or higher), and high in protein. Bacteria need protein for growth. The foods that meet the criteria are referred to as potentially hazardous foods (PHFs). The *Food Code* defines a potentially hazardous food as follows:

   A. FOOD that is natural or synthetic and that requires temperature control because it is in a form capable of supporting:
      i. The rapid and progressive growth of infectious or toxigenic microorganisms;
      ii. The growth and toxin production of *Clostridium botulinum*; or
      iii. In raw shell EGGS, the growth of *Salmonella* enteritidis.

   B. “Potentially hazardous food” includes an animal FOOD (a FOOD of animal origin) that is raw or heat-treated; a FOOD of plant origin that is heat-treated or consists of raw seed sprouts; cut melons; and garlic-in-oil mixtures that are not modified in a way that results in mixtures that do not support growth as specified under Subparagraph (A) of this definition.

   C. “Potentially hazardous food” does not include:
      i. An air-cooled hard-boiled EGG with shell intact, or a shell EGG that is not hard-boiled, but has been treated to destroy all viable Salmonellae;
      ii. A FOOD with an a<sub>w</sub> value of 0.85 or less;
      iii. A FOOD with a pH level of 4.6 or below when measured at 75°F (24°C);
      iv. A FOOD, in an unopened HERMETICALLY SEALED CONTAINER, that is commercially processed to achieve and maintain commercial sterility under conditions of nonrefrigerated storage and distribution;
      v. A FOOD for which laboratory evidence demonstrates that the rapid and progressive growth of infectious or toxigenic microorganisms or the growth of S. Enteritidis in EGGS or C. botulinum can not occur, such as a FOOD that has an a<sub>w</sub> and a pH that are above the levels specified under Subparagraphs (c)(ii) and (iii) of this definition and that may contain a preservative, other barrier to the growth of microorganisms, or a combination of barriers that inhibit the growth of microorganisms; or
      vi. A FOOD that does not support the growth of microorganisms as specified under Subparagraph (a) of this definition even though the FOOD may contain an infectious or toxigenic microorganism or chemical or physical contaminant at a level sufficient to cause illness (*Food Code*, Section 1-201-10)

2. Describe the conditions necessary for bacterial growth.

   **Food Source**
   In general, foods that are good sources of nourishment for bacteria are warm, moist (water activity of 0.85 or higher), of low acidity (4.9 or higher), and high in protein. Bacteria need protein for growth. Foods that meet these criteria are referred to as potentially hazardous foods (PHFs).

   **Temperature**
   Most bacteria are mesophilic and grow best in the temperature range of 60 to 110°F. This range includes the temperature of the human body (98.6°F). Potentially hazardous foods held in the temperature danger zone (41–140°F) for more than four hours present a risk of rapid bacterial growth.
All bacteria, however, do not have the same temperature requirements for growth. Psychrophilic bacteria grow best at cool temperatures (32–60°F [0–21°C]), while thermophilic bacteria grow well in hot temperatures (above 110°F [43°C]).

Time

In general, bacteria multiply rapidly given warmth, moisture, and time. Under ideal conditions, a single cell can produce over one million cells in five hours. Food should not be kept in the temperature danger zone (41–135°F) for more than four hours. The four-hour time frame is cumulative and includes all the steps of processing, preparing, and serving of potentially hazardous foods.

Air/Oxygen

Not all bacteria need the presence of oxygen to reproduce. Aerobic bacteria require oxygen, while anaerobic bacteria require no oxygen. Facultative bacteria can survive with or without oxygen. Most bacteria that are responsible for foodborne illnesses are facultative.

Acidity (pH)

The pH of a substance indicates its level of acidity or alkalinity. It is measured on a scale ranging from 0 to 14; numbers lower than 7 are acidic, 7 is neutral, and numbers higher than 7 are alkaline.

Foods with a pH of about 7 are ideal for bacterial growth. Most animal food products, including meat, fish, poultry, eggs, and milk, have a pH around 7. Vegetables and pasta products that have a high pH in their raw state become ideal for bacterial growth when heated.

Moisture

All bacteria need moisture in a usable form to grow and reproduce. Water activity values indicate the amount of water that is free, or not part of the food. The water activity of pure water is 1.0, while that of potentially hazardous food ranges from 0.97–0.99. Freezing, drying, salting, or adding sugar to food reduces the amount of water available and slows or prevents bacterial growth.

3. List the pathogens most often transmitted through contaminated food and the symptoms they cause.

- *Campylobacter jejuni*—diarrhea, fever, vomiting
- Hepatitis A virus—diarrhea, fever, jaundice
- *Salmonella*—diarrhea, fever
- *Shigella*—diarrhea, fever
- Norwalk and Norwalk-like virus—diarrhea, fever, vomiting
- *Staphylococcus aureus*—diarrhea, vomiting

4. What are viruses and how do they differ from bacteria?

Viruses are the smallest known living organisms. They are one-tenth to one-hundredth the size of bacteria and do not have a cell wall, cell membrane, or nucleus. They require living cells to reproduce. After either humans or animals consume them in food or water, they multiply in the cell tissue of the host cell while the host cell continues to live. Since the cells in food products are dead, viruses do not grow or multiply in food. Food products are only viral carriers. Water, air, soil, people, and surfaces may also act as carriers for viruses.

Bacteria are the largest and most complex group of living organisms on earth. These single-celled organisms may be bacilli, which have the form of short rods (e.g., the *Salmonella* species); they may be cocci, which are round—(e.g., *Staphylococcus aureus*); they may be spirachaetes, which are spiral shaped (e.g., *Campylobacter jejuni*); or they may be vibrios, which are comma shaped (i.e. *Vibrio cholerae*).

In the right environmental conditions, bacteria reproduce by binary fission, producing two identical cells for each one cell. In the laboratory, certain bacteria have been known to divide four times in one hour and to continue to divide at that rate under suitable environmental...
conditions. Ideal conditions for binary fission include moderate temperature (around 90°F), moisture (water activity, or \( a_w \)), availability of a food source, and an appropriate pH (around 7, or neutral). Aerobic bacteria require oxygen, while anaerobic bacteria require no oxygen for binary fission. Many pathogenic bacteria are facultative—that is, they can grow in either aerobic or anaerobic conditions.

5. List the classifications of foodborne illness, define each type, and give examples.

Foodborne infection is an illness that results from consumption of food containing harmful living microorganisms: *Campylobacter jejuni, Listeria monocytogenes*.

Foodborne intoxication results from the consumption of food containing toxins produced by harmful bacteria. These toxins can cause illness even after the bacteria are dead. They may occur naturally in foods such as mushrooms or certain plants and animals (e.g., puffer fish): *Staphylococcus aureus, Vibrio spp.*

Foodborne toxin-mediated infection is an illness that results from consumption of food containing harmful living microorganisms. Once in the human intestine, the organisms produce harmful toxins: *Clostridium perfringens, Bacillus cereus*.

Chapter 3

1. List the causative factors in foodborne illness as established by data collected by the CDC from 1993 to 1997 and the percentages of illnesses for which they are responsible.
   - Improper holding temperatures—37%
   - Contaminated equipment—16%
   - Poor personal hygiene—19%
   - Inadequate cooking—11%
   - Food from unsafe source—9%
   - Other—11%

2. According to the Food Code, what is the suggested cooling time for PHF?
   Hot PHF not used for immediate service or hot display must be cooled from 135°F (37°C) to 70°F (71°C) in two hours, and from 135°F (60°C) to 41°F (5°C) or less in within six hours.

3. List six suggested cooling methods for PHF.
   - Divide food into smaller or thinner portions to reduce the food mass.
   - Use rapid cooling equipment, such as a blast chiller.
   - Place the food in its container into an ice bath and stir often.
   - Use containers that transfer the heat easily through the container wall.
   - Add ice as an ingredient.
   - Place food in shallow pans.

4. What are the final cooking temperatures recommended in Chapter 3 of the *Food Code* for the following foods?
   - Fish—145°F (63°C) for 15 seconds.
   - Ground beef—155°F (68°C) for 15 seconds.
   - Pork—145°F (63°C) for 15 seconds.
   - Poultry—165°F (63°C) for 15 seconds.
   - Stuffed meats—165°F (63°C) for 15 seconds.
5. **How and when should hands be washed?**

- All employees should use the following procedure to wash their hands, using soap and warm water of at least 110°F (40°C):
  - Rub vigorously on the surfaces of the lathered fingers, fingertips, areas between the fingers, and hands for at least 20 seconds.
  - Rinse thoroughly under clean, running, warm water.
  - Pay particular attention to the areas underneath the fingernails during the cleaning procedure.
  - Immediately follow the cleaning procedure with thorough drying of clean hands and arms using a single-service paper towel or electric hand dryer.

- Hands must be washed
  - before starting any food preparation activity.
  - after using the restroom.
  - after coughing, sneezing, or using a handkerchief or tissue.
  - after touching or working with potentially hazardous raw food(s) (meat, fish, poultry).
  - after eating, drinking, or using tobacco.
  - after handling a pet.
  - after taking out the garbage/trash.
  - after clearing tables and handling dirty dishes, pots, pans, or cooking utensils.
  - after using any type of cleaner or sanitizer and during food preparation as needed.

6. **Under what conditions should food employees be excluded from work in a health care facility food service operation?**

- Any employee should be excluded who
  - has been diagnosed with illness due to *Salmonella Typhi*, *Shigella* spp., Shiga toxin–producing *Escherichia coli*, or hepatitis A virus;
  - is experiencing symptoms associated with an acute gastrointestinal illness, which may include diarrhea, fever, vomiting, jaundice, and sore throat with fever;
  - has a boil or infected wound;
  - has a lesion containing pus such as a boil or infected wound that is open or draining;
  - is asymptomatic but has stools positive for *S. typhi*, *Shigella* spp., or Shiga toxin–producing *Escherichia coli*;
  - has had an illness from *Salmonella typhi* within the last 3 months;
  - has had an illness from *Shigella* spp. or Shiga toxin–producing *Escherichia coli* within the last month;
  - has had onset of jaundice within the last 7 days;
  - is suspected of causing, or being exposed to, a confirmed disease outbreak caused by *S. typhi*, *Shigella* spp., Shiga toxin–producing *Escherichia coli*, or hepatitis A virus, including an outbreak at an event such as a family meal, church supper, or festival, because the employee consumed food implicated in the outbreak, or consumed food at the event prepared by a person who is infected or ill with the infectious agent that caused the outbreak or who is suspected of being a shedder of the infectious agent or who lives with an ill person;
  - lives in the same household and/or has knowledge about, a person who has been diagnosed with a disease caused by *S. typhi*, *Shigella* spp., Shiga toxin–producing *Escherichia coli*, or hepatitis A virus; or a person who regularly attends an educational insitution or works in a
setting where there is a confirmed disease outbreak caused by *S. typhi*, *Shigella* spp., Shiga toxin–producing *Escherichia coli*, or hepatitis A virus.

7. **According to the Food Code, when must equipment, food contact surfaces, and utensils be cleaned?**

   Equipment, food contact surfaces, and utensils should be cleaned
   - before each use with a different type of raw animal food such as beef, fish, lamb, pork, or poultry.
   - each time there is a change from working with raw foods to working with ready-to-eat foods.
   - between use with raw fruits and vegetables and with PHF.
   - before a food temperature–measuring device is used or stored.
   - any time during the operation when contamination may have occurred.

8. **How should food items not requiring refrigeration be stored in a food establishment?**

   - Away from cleaning supplies.
   - Label containers of household cleaners or detergents so they are not mistaken for food items. Cornstarch and some laundry detergents, for example, are similar in texture and appearance.
   - Protect dry foods (rice, flour, pasta, and cereals) from insects and rodents that often carry harmful bacteria. Store dry food in airtight containers in a cool dry place. Shelving should be 6 inches off the floor and 6 inches away from the wall to allow for cleaning.
   - Food may not be stored in the following locations: in locker rooms; in toilet rooms; in garbage rooms; in mechanical rooms; under sewer lines that are not shielded to intercept potential drips; under leaking water lines, including leaking automatic fire sprinkler heads and lines on which water has condensed under open stairwells; or under other sources of contamination.

9. **According to the Food Code, how must wastewater be managed in a food service establishment?**

   - Sewage must be disposed of through an approved facility that is either a public sewage treatment plant or an individual sewage disposal system sized, constructed, maintained, and operated according to law.
   - A food establishment may not create a cross-connection by connecting a pipe or conduit between a potable-water system and a nonpotable-water system or a water system of unknown quality.
   - The piping of a potable-water system must be clearly identified so that it is readily distinguishable from piping that carries nonpotable water.
   - Air gaps between the water supply inlet and the flood level rim of the plumbing fixture, equipment, or nonfood equipment must be at least twice the diameter of the water supply inlet and may not be less than 25 mm (1 inch).
   - A backflow or back-siphonage prevention device installed on a water supply system shall meet American Society of Sanitary Engineering (ASSE) standards for construction, installation, maintenance, inspection, and testing for that specific application and type of device.
10. What are the minimum wash and rinse water temperatures for dishwashing machines?

Table 5. Mechanical Warewashing Equipment with Wash Solution Temperatures

<table>
<thead>
<tr>
<th>Machine Type</th>
<th>Wash Temperature</th>
<th>Rinse Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Tank</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Stationary rack-single temperature</td>
<td>165°F (74°C)</td>
<td>165°F (74°C)</td>
</tr>
<tr>
<td>- Conveyor, dual temperature</td>
<td>160°F (71°C)</td>
<td>180°F (82°C)</td>
</tr>
<tr>
<td>- Stationary rack, dual temperature</td>
<td>150°F (66°C)</td>
<td>180°F (82°C)</td>
</tr>
<tr>
<td>Multi Tank</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Conveyor, multi-temperature</td>
<td>150°F (66°C)</td>
<td>160°F (71°C)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-180°F (82°C)</td>
</tr>
<tr>
<td>Chemical sanitizing</td>
<td>120°F (49°C)</td>
<td>120°F (49°C)</td>
</tr>
</tbody>
</table>

11. According to the Food Code, what is the concentration of a chlorine sanitizing solution?

Table 6. Minimum Temperature of Chlorine Sanitizing Solution Based on the Concentration and pH of the Solution

<table>
<thead>
<tr>
<th>Minimum Concentration</th>
<th>Minimum Temperature</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>mg/L</td>
<td>pH 10 or less °C (°F)</td>
<td>pH 8 or less °C (°F)</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>49 (120)</td>
<td>49 (120)</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>38 (100)</td>
<td>24 (75)</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>13 (55)</td>
<td>13 (55)</td>
<td></td>
</tr>
</tbody>
</table>


12. According to the Food Code, what are the characteristics and concentration of an iodine sanitizing solution?

- Minimum temperature of 75°F (24°C).
- pH of 5.0 or less or a pH no higher than the level for which the manufacturer specifies the solution is effective.
- Concentration between 12.5 mg/L and 25 mg/L.

13. According to the Food Code, what are the characteristics and concentration of a quaternary ammonium sanitizing solution?

- Minimum temperature of 75 degrees (24°C)
- Concentration as specified under 7-204.11 of the Food Code and as indicated by the manufacturer's use directions included in the labeling.
- To be used only in water with 500 mg/L hardness or less, or in water having a hardness no greater than that specified by the manufacturer's label.
Chapter 4

1. **List the seven HACCP principles**
   - Principle 1—Hazard analysis
   - Principle 2—Identify critical control points (CCP)
   - Principle 3—Establish critical limits
   - Principle 4—Establish monitoring procedures
   - Principle 5—Establish corrective actions
   - Principle 6—Establish verification procedures
   - Principle 7—Establish record-keeping and documentation procedures

2. **Explain the difference between a control point and a critical control point (CCP).**
   A CCP is a step in the production process at which a control can be applied that is essential to prevent or eliminate a food safety hazard or reduce it to an acceptable level. When CCPs are determined, potential hazards likely to cause foodborne illness or injury, if not controlled by some means, must be given consideration. The information developed in the hazard analysis step will aid in the determination of the CCPs.
   Control points are steps during production at which loss of control does not lead to a health risk. There are many control points in the food production process; however, very few are CCPs.

3. **List at least 12 prerequisite HACCP programs.**
   Prerequisite HACCP programs may include, but are not limited to, facility design; supplier control; ingredient specifications; equipment design; cleaning and sanitation; personal hygiene; employee training; pest control; receiving, storing, and shipping procedures; traceability; and recall.

4. **List and explain the stages included in a hazard analysis.**
   This step includes three stages: 1) identifying the type of hazard—physical, chemical, or microbiological; 2) evaluating the hazard to determine if it should be included in the plan; and 3) developing preventive measures.
   - **Stage 1—Identify the hazard and its level of risk.** This stage reviews the ingredients used in the product; the production process; the equipment used in all stages of production, storage and distribution of the final product; the population that consumes the product; and the facility itself. Using this information, the team develops a list of potential chemical, physical, and biological hazards that may be introduced, increased, or controlled during each step of food production.
     - Biological hazards are responsible for most foodborne-illness outbreaks. These hazards include bacteria, viruses, and parasites. Many occur naturally in air, food, water, soil, animals, and the human body.
     - Food additives include those used at allowable limits under GMPs—preservatives (nitrite and sulfiting agents), flavor enhancers (monosodium glutamate), nutritional additives (niacin), and color additives. Chemicals include those used in food establishments (e.g., lubricants, cleaners, sanitizers, cleaning compounds, coatings, and paints).
     - Food allergens: FDA believes there is scientific consensus that the following foods can cause serious allergic reactions in some individuals and account for more than 90% of all food allergies: peanuts, soybeans, milk, eggs, fish, crustacea, tree nuts, and wheat.
     - Physical hazards usually result from accidental contamination, poor food-handling practices during production, or both. Examples include slivers of glass,
human hair, nails, false nails, nail polish, pieces of jewelry, metal fragments from worn or chipped utensils and containers, dirt, stones, and frilled toothpicks.

The second part of Stage 1 reviews the likelihood of the risk and the level of severity of each identified hazard. An estimate is usually based on several factors: experience, epidemiological data, and technical and research literature. Issues of quality must be separated from those of safety during this step.

The HACCP flow chart developed during the HAACP planning activities is amended to include the information collected during this stage and becomes the basis for the HACCP plan.

- **Stage 2—Determine the hazards to be addressed in the HACCP plan.** During this stage, the list of potential hazards developed during Stage 1 is reviewed, and the hazards that are to be included in the plan are selected. The decision to include a potential hazard in the plan is based on its severity and the likelihood of occurrence. The likelihood of a hazard is evaluated on the basis of past experience, epidemiological data, and a review of the scientific and technical literature. Factors beyond the immediate control of the food establishment, such as how consumers will hold and prepare the food at home, also must be taken into consideration; these factors could influence how food should be handled during production.

This stage often involves developing the answers to a series of questions about ingredients; intrinsic factors of the food; procedures used for preparation/processing; microbial content of the food; facility and equipment design; packaging; sanitation; employee health, hygiene, and education; conditions of storage between packaging and the consumer; intended use by the consumer; and the intended consumer.

- **Stage 3—Develop preventive measures.** This stage identifies where in the production process the identified hazards may be controlled and what preventive measures can be applied. Examples of preventive measures could include temperature control, eliminating the potential for cross-contamination, limiting the time a food is in the TDZ, and/or ensuring good personal-hygiene practices.

The result of the hazard analysis is a comprehensive listing of all the hazards associated with each step of the food production process and the method/measure to be used to control the hazard(s). The term "control measure" is used because it is next to impossible to prevent all hazards, but they can be controlled. A hazard may require more than one control measure, and one specific control measure may be used to control only one specific hazard.

**5. Define the term critical limits and give examples.**

A critical limit is a maximum or a minimum value to which physical, biological, or chemical hazards must be controlled at a CCP to minimize the risk that a food safety hazard will occur. This step focuses on establishing a criterion that must be met for preventive measure associated with each CCP in the plan. Critical limits are usually based on research data (scientific facts), regulations, and/or industry and company standards. Examples include time, temperature, humidity, water activity, pH, and salt concentration.

**6. What is monitoring? Give examples.**

Monitoring consists of planned observations or measurements used to 1) assess whether a CCP is under control and 2) produce an accurate record for future use in verification. These procedures track food safety management practices throughout the production process. The monitoring system can indicate what actions should be taken to get a system back on track if there has been a loss of control, in particular at each CCP; it also provides written documentation for use in verification.

The HACCP plan should include instructions and documentation for either continuous or scheduled monitoring. The schedule should be based on technical literature, regulatory guidelines, and/or company guidelines.
Examples of monitoring activities include visual observations, measurement of temperature, time, pH, and water activity.

7. **In a HACCP plan, what is the function of a corrective action?**
   The corrective action must demonstrate that the CCP has been brought under control. Even in the most well-designed and well-implemented HACCP systems, a loss of control can occur. The situation should be corrected immediately according to predetermined procedures in the plan. The nature of the corrective action will depend on the severity of the loss of control.

8. **List examples of verification procedures.**
   - Establishment of appropriate verification inspection schedules.
   - Review of the HACCP plan.
   - Review of CCP records.
   - Review of deviations and their resolution, including the disposition of food.
   - Random sample collection and analysis.
   - Review of critical limits to verify that they are adequate to control hazards.
   - Review of written record of verification inspections that certify compliance with the HACCP plan or deviations from the plan and corrective actions taken.
   - Validation of the HACCP plan, including on-site review and verification of flow diagrams and CCPs.
   - Review of modifications to the HACCP plan.
   - Review of training activities.
   - Internal verification inspections should be conducted as follows:
     - Routinely or on an unannounced basis, to ensure that selected CCPs are under control.
     - When it is determined that intensive coverage of a specific food is needed because of new information concerning food safety.
     - When foods prepared at the establishment have been implicated as a vehicle of foodborne disease.
     - When requested on a consultative basis and resources allow accommodation of the request.
     - When established criteria have not been met.
     - To verify that changes have been implemented correctly after a HACCP plan has been modified.
     - To direct monitoring of CCP data during operation.
     - To certify that monitoring equipment is properly calibrated and in working order.
     - To identify deviations and corrective actions.
Chapter 5

1. **What is epidemiology?**
   
   Epidemiology is the study of the methods and forces that play a part in the spread of disease among humans.

2. **What is a pandemic?**

   An epidemic that spreads throughout many countries and continents and affects large numbers of people.

3. **What is the purpose of a foodborne-illness investigation?**

   The purpose of a foodborne-illness investigation is to prevent additional cases, recurrence of the illness, or both. The investigation should include the following: identification of the affected individuals; determination of the implicated foods; development of information about the causative agents; and determination of the factors that contributed to the contamination, growth, and survival of the etiologic agents.

4. **What techniques are used to investigate a suspected foodborne-illness incident? Explain each technique in detail.**

   - **Surveillance** - Includes a review of the establishment(s) involved, their operation(s), and where the suspected food was grown, harvested, packaged, processed, prepared, stored, and/or served. Information should be collected on and observations made of the sources of ingredients, employees who might have handled the food, personal-hygiene practices, and methods of preparation. The review may utilize hazard analysis critical control point (HACCP) principles. The HACCP system assists in the determination of what points in the flow of food are essential to the control of foodborne hazards. The use of HACCP principles provides for a systematic approach that includes charting of all the production steps for the implicated food(s), a hazard analysis, and list of control measures that may or may not be in place.

   - **Records** - Involves collecting information from each ill person, including the following: age, gender, when and where victims think they ate the suspected food, who else consumed the same food or drink, what foods were eaten in the 72 hours prior to consumption of the suspected food, state of health of the infected person prior to becoming ill, clinical symptoms, treatment, and results of treatment.

   - **Sample Collection** - Samples of the implicated food should be collected immediately after the incident has been reported to the regulatory authority. The most highly suspected foods should be collected and examined first. Use sterile equipment (e.g., knife, spoon, tongs) to collect the sample and put it in a sterile jar or plastic bag, and seal and label. The sample should be refrigerated until it is tested. If you are testing foods for organophosphate pesticides or heavy metals, do not use plastic bags or containers, as the chemicals from the plastic may leach into the food and interfere with the analysis. If possible, also collect any packaging or containers used to hold, prepare, and serve the suspected food, as they will aid in the investigation. Rinsings from containers and packaging can also be used to detect pathogens.

   - **Analysis** - The analysis should include a complete review of current information about the nature of the disease-causing organism, the infected population, and the laboratory results for the suspected food. If no sample of the suspected food is available, the public health authority must rely on other data collected during its investigation to determine the cause of the foodborne-illness incident.
5. **Explain the difference between a foodborne-illness outbreak and an incident.**

The *Food Code* defines an outbreak as the occurrence of two or more cases of a similar illness resulting from the ingestion of a common food. Designation of a foodborne-illness incident as an outbreak may result from findings of a laboratory analysis of the suspected food. Or it may result from a careful review of the data collected from interviews with ill individuals focusing on possible consumption of a common food, consumption at a common location, or both.

**Chapter 6**

1. **What is the difference between an inspection and a search?**

The purpose of a search is to seek out conditions that violate the law, items used to commit a crime, or items gained during the commission of a crime. For example, a police officer who undertakes a search must have documented reasons to believe that the search will produce evidence confirming that a crime has been committed.

An inspection is a visitation or survey used to determine whether conditions detrimental to health exist. The goal of an inspection is to determine the level of compliance with public health law. The public health official conducting the inspection must always be cognizant of the constitutional rights of the individual, the establishment, and the owner/operator. It is not the objective of an inspection to find evidence that may be used in criminal prosecution. However, an outcome of the inspection could be criminal prosecution if evidence of a crime or violations of public health laws are found.

2. **What is the intent of public health laws?**

The intent of federal, state, and local public health laws is to ensure environmental conditions that provide for good health, stop the spread of disease, and provide services and finances for programs that advance good health for all segments of the population.

3. **What is meant by the term “unreasonable searches”?**

The Fourth Amendment to the Constitution, and state and local regulations, provide protection against “unreasonable” searches. In the past 40 years, several court cases dealing with this issue have resulted in state and local governments enacting specific laws giving public health officials the authority to conduct inspections, based upon the need to protect the public’s health. The laws authorizing an inspection must be constitutional. The search or investigation (inspection) must further a public interest advanced by the law and is limited to the enforcement of the law (Grad, 1990, p. 132). The person who conducts the search or investigation must have been granted the authority to do so by a specific statute. The statute may also allow for unannounced inspections, in particular in emergency situations.

The regulations must clearly define the application process and the standards that must be met to obtain and maintain a permit. The same protections are given to the permit holder as to an individual under the U.S. Constitution.

4. **Describe the permitting process as outlined in the Food Code.**

   a. An applicant must submit an application at least 30 calendar days before the opening date of a food establishment.

   b. The application should include accurate information on:

      - type of operation.
      - intended menu.
      - food preparation methods.
      - anticipated volume of food to be prepared, sold, served, or stored.
      - proposed layout, mechanical schematics, construction materials, and finish schedules.
- proposed equipment types, manufacturers, model numbers, locations, dimensions, performance capabilities, and installation specifications.

- physical layout of the establishment (for required plan review), including type of equipment and its location in the establishment.

- evidence that standard operating procedures are being developed that ensure compliance with the Food Code.

- a HACCP plan, if required.

Chapter 7

1. **Define the term “imminent health hazard.”**
   An imminent health hazard is regulatory violation that will cause food contamination, illness, or environmental degradation and that poses a severe public health risk—for example, sewage backup in a food preparation area. Imminent health hazards often require immediate closure of the food establishment and suspension of the establishment’s permit to operate. Examples include floods, fires, interruption of electrical or water service, sewage backup, misuse of toxic materials, and gross unsanitary conditions.

2. **Define the term “critical item” in relation to inspections as defined in the Food Code. Give examples of what might be considered to be critical items on an inspection report.**
   Critical items are items that are spelled out in the Food Code as more likely to contribute to food contamination, illness, or environmental degradation and that pose a serious public health risk. They are delineated by an asterisk (*) in the Food Code.
   Examples: use of a food container to store toxic cleaning compounds; improper cooling of PHF; and lack of a separate handwashing sink. Check the Food Code, for other examples.

3. **Define the term “critical violation” in relation to inspections as defined in the FDA Food Code. Give examples of what might be considered to be a critical violation on an inspection report.**
   A critical violation is one that is likely to contribute to food contamination, illness, or environmental degradation and that poses a serious public health risk.
   Examples: Evidence of sewage backup in the food preparation area; overwhelming rodent infestation; and use of a non-potable water supply for drinking water.

4. **What measurements of conditions in the food establishment could be part of the inspection process? List examples.**
   Depending on the nature of the establishment and the food(s) being prepared/processed, conditions to be measured may include
   - Food product temperatures during/after
     - cooling.
     - hot-holding, cold-holding, or both.
     - cooking.
   - pH.
   - Water activity ($A_w$).
   - Warewashing process:
     - wash/rinse/heat sanitizer measurement.
   - sanitizer concentration.
   - pressure measurements.
   - time measurements.
• Light distribution—use a portable light meter.
• Insect and rodent infestation.
• Demonstration and application of food safety principles by the person in charge and by employees engaged in food preparation activities. Note: failure to do so should be considered a critical violation.

5. What should be the focus of the consultation with the permit holder at the conclusion of the inspection and why?

The food safety principles and public health rationale behind the identification of any violations, as well as preventive measures that could be undertaken by the establishment, should be discussed in detail. Acceptable solutions and time frames for their implementation should be part of the conversation. The results of the inspection and the establishment’s level of compliance with current regulations, including a review of the inspection report, also should be shared.