

Certified Professional of Food Safety
Credential Examination Review Guide
Second Edition

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About the Author

Martha Smith Patnoad, MS, CP-FS has been affiliated with the University of Rhode Island Cooperative Extension for over thirty years. She holds a Bachelor of Science and a Masters degree from the University of Rhode Island and a Six Year Professional Certificate in Adult and Vocational Education from the University of Connecticut. For the past 16 years, she has been a Cooperative Extension Professor and Food Safety Education Specialist in the Department of Food Sciences and Nutrition. In that capacity, she has developed and implemented food safety education programs for school- age children and their caregivers, educators, volunteer foodservice workers, producers of fruits and vegetables and home gardeners through funded grant projects. Her responsibilities also include coordination of Food Safety Manager Certification and Recertification courses offered through the University.

She is a member of the National Environmental Health Association and holds a Certified Professional of Food Safety credential. She is a past academic advisor to the Conference for Food Protection, Council II and past president of the Rhode Island Association of Family and Consumer Sciences. Martha was NEHA's England Sabbatical Exchange Award Winner in 2000. Her sabbatical experience focused on food safety education programs in England. In 2003, she was the recipient the University's Outstanding Outreach Award. Ms. Patnoad resides in Richmond, Rhode Island with her husband Edward. Her daughter Aimee is employed as an environmental scientist.

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Introduction

This study guide is designed to assist you in preparing to take the National Environmental Health Association's (NEHA's) Certified Professional of Food Safety (CP-FS) Exam.

To be eligible to sit for the CP-FS exam, candidates must meet the criteria for either A or B, as follows:

A. Degree Track:

1. Bachelor's degree in food science or environmental health from an accredited degree program in environmental health; or
2. Bachelor's degree with at least two (2) years of experience in food protection; or
3. Bachelor's degree and possession of the NEHA REHS/RS credential or equivalent credential.

B. Experience Track:

1. High school diploma or GED and
 - a) five (5) years of progressive experience in food-related work and
 - b) successful passage of the Certified Professional Food Manager (CPFM) exam, the Food Safety Managers Certification Examination (FSMCE), or the ServSafe exam; or membership in a food-related professional organization and accumulation of 24 hours of continuing-education experience (presenting a paper or having a paper published can be substituted for four [4] hours of continuing-education experience, up to maximum of two papers); or
2. Associate's degree and
 - a) four (4) years of progressive experience in food-related work and
 - b) successful passage of the Certified Professional Food Manager (CPFM), the Food Safety Managers Certification Examination (FSMCE), or the ServSafe exam; or membership in a food-related professional organization and accumulation of 16 hours of continuing-education experience (presenting a paper or having a paper published can be substituted for four (4) hours of continuing-education experience, up to a maximum of two papers).

How to Use this Study Guide

The study guide reviews the content areas included in the CP-FS examination. Candidates also are expected to utilize knowledge of the field acquired through education and experience to prepare for and pass the CP-FS examination.

This study guide covers the following topics:

- Study Skills and Test-Taking Strategies,
- Microbiology of Foodborne Illness,
- Cause and Prevention of Foodborne Illness,
- Hazard Analysis Critical Control Point (HACCP) Principles,
- Investigating a Foodborne-Illness Incident/Outbreak,
- Public Health Law as the Basis for Inspections, and
- Food Establishment Inspection Process.

Each chapter includes:

- ✓ a brief introduction to the subject,
- ✓ key concepts,
- ✓ key words and definitions,
- ✓ review of the subject matter,
- ✓ applicable sections of the U. S. FDA's 2005 *Food Code*,
- ✓ sources of additional information on the subject matter,
- ✓ five CP-FS exam practice questions from the topic area, and
- ✓ study questions.

Before you begin your studies for the CP-FS examination, please review Chapter I of the study guide, "Study Skills and Test-Taking Strategies." The information presented in this chapter will guide your examination review.

Please review the CP-FS Exam Content Outline on pages iii - v. The test is designed to assess the competency of practitioners in the field. The exam content outline highlights the knowledge areas that the test encompasses.

The appendix includes answers to the study questions from each chapter, a glossary, and a listing of study references, including texts and Web sites, which you may find useful in your preparation for the CP-FS examination and in your work as a food safety professional.

Study Guide

This study guide was designed with the purpose of aiding candidates in preparing for the Certified Professional of Food Safety (CP-FS) credentialing examination. However, the guide is not designed to provide answers to all of the questions that appear on the examination. Rather, it is designed to help the candidates to better understand their individual strengths and weaknesses. The study guide allows for this self-assessment and identifies the additional resources for review. The study guide provides an overview of the examination and enables the candidate to determine the areas where more preparation is needed.

CP-FS EXAM CONTENT OUTLINE

- I. Causes and Prevention of Foodborne Illness** **28% of exam**
1. Differentiate between foodborne illness and foodborne outbreak
 2. Differentiate between the cause of foodborne infection and foodborne intoxication
 3. Recognize the major types of microorganisms/toxins that cause biological contamination
 4. Identify the common types of bacteria and virus and associated illnesses and symptoms
 5. Identify the common types of parasites and fungi and associated illnesses and symptoms
 6. Define foods that are potentially hazardous
 7. Identify biological, physical and chemical contamination
 8. Demonstrate knowledge of the hazards associated with cross contamination
 9. Demonstrate knowledge of the personal hygiene and employee health to food safety
 10. Demonstrate knowledge of the relationship between hand contact and foodborne illness (hand washing)
 11. Demonstrate knowledge of the relationship between poor personal habits and foodborne illness
 12. Demonstrate knowledge of the relationship between employee illness and foodborne illness
 13. Demonstrate knowledge of the hazards of contamination and pests as they relate to foodborne illness
 14. Assess the potential for foodborne illness in a food establishment
 15. Evaluate standards, policies and procedures for preventing foodborne illness
 16. Describe the HACCP Program
 17. Prevent hazards prior to and during receipt of food
 18. Prevent hazards during food storage
 19. Prevent hazards during food preparation
 20. Prevent hazards during food service and display
 21. Prevent hazards during re-service of packaged foods and service of stored, previously prepared foods
 22. Prevent hazards during transportation of food
 23. Improve practices and procedures, e.g. self inspection procedures
 24. Practice and promote personal hygiene
 25. Prevent people with food transmitted diseases from working in the food service establishment
 26. Demonstrate knowledge of cleaning and sanitizing utensils and equipment, correct use of chemicals for cleaning and sanitizing, and practices for manual and mechanical warewashing
 27. Demonstrate knowledge of allergens and their symptoms, and labeling of food products for allergens
- II. Knowledge of Food Safety Inspections** **21% of exam**
1. Knowledge of how to observe the facility and personnel practices carefully
 2. Knowledge of inspector's proper attire
 3. Demonstrate knowledge of collecting data in a scientific manner
 4. Analyze inspection findings
 5. Determine corrective action required
 6. Document inspection
 7. Demonstrate knowledge of equipment operation principles
 8. Calibrate test equipment
 9. Perform accurate measurements and calculations
 10. Demonstrate an understanding of how to interpret test results
 11. Identify unique variables of institutional high risk populations
 12. Examine receipt and storage of food and supplies
 13. Assess food preparation facilities and procedures
 14. Assess water supply, vector control, and waste management methods
 15. Perform appropriate field tests

16. Inspect equipment
17. Assess potential for cross-contamination
18. Assess potential for temperature abuse
19. Assess food storage procedures
20. Identify food source
21. Verify product identification and Evaluate labeling and product representation
22. Identify proper display and service techniques
23. Use, test, and calibrate thermometers used in food preparation, service and storage.
24. Identify proper temperatures for heating, reheating, holding, cooling, and display of food
25. Identify proper story and placement of food items in refrigerators
26. Demonstrate knowledge of proper loading, maintenance, and use of mechanical warewashers and cleaning and sanitizing procedures

III. Facility and Plan Review

13 % of exam

1. Demonstrate and understanding of the concepts associated with proper hand washing facilities
2. Demonstrate and understanding of the issues associated with facilities for storing hazardous materials
3. Demonstrate and understanding of the issues associated with facilities for dressing, restrooms, and laundry
4. Demonstrate knowledge of suitable facility construction and design for food establishments
5. Demonstrate knowledge of appropriate materials and design for floors, walls, and ceilings for food establishments
6. Demonstrate knowledge of proper lighting and ventilation
7. Demonstrate knowledge of proper plumbing installation and water supply
8. Demonstrate knowledge of proper procedures for disposal of solid waste and wastewater
9. Identify rules and regulations related to facilities and pest control
10. Evaluate the adequacy of equipment for refrigeration, cooking, hot holding, cooling and display
11. Identify proper design and location of equipment
12. Evaluate equipment and utensils to verify they are designed and constructed to be durable and to retain their characteristic qualities under normal use and conditions
13. Demonstrate knowledge of problems associated with the use and maintenance of equipment and utensils
14. Identify proper floor or counter clearance for equipment
15. Identify appropriate use and location for different types of refrigerators and freezers
16. Identify proper use and location of equipment used to heat food

IV. Special Categories

13% of exam

1. Develop plans for special needs (e.g. food banks, soup kitchens, athletic events)
2. Use knowledge of risk assessment
3. Use knowledge of Modified Atmosphere Packaging (MAP)
4. Use knowledge of barriers – multiple hurdle technology
5. Understand parameters of food relative to foodborne illness
6. Use knowledge of emerging pathogens
7. Access relevant documents on Internet
8. Use knowledge of food irradiation and its hazards
9. Use knowledge of irradiated food labeling requirements
10. Assist with planning for emergencies
11. Understand techniques used in emergencies (e.g. flooding, power failures, fires)
12. Demonstrate knowledge of shipping manifest documents
13. Inspect transportation vehicles and related equipment
14. Evaluate critical controls during transport/delivery of food (time/temperature records)

15. Demonstrate knowledge of Food and Bio Security associated with the food service industry
16. Demonstrate knowledge of special requirements of high risk populations and establishments

V. Legal Aspects of Food Safety

10% of exam

1. Knowledge of definition of adulteration
2. Knowledge of definition of contamination
3. Knowledge of embargo, search, seizure, condemnation, recall, and nuisance abatement
4. Knowledge of current food safety laws and regulations (e.g. adulteration, misbranding of food)
5. Knowledge of state food safety laws and regulations
6. Knowledge of local food safety laws and regulations
7. Follow procedures for access to establishment
8. Follow procedures when denied access
9. Follow procedures for ceasing operations
10. Follow procedures for resuming operations
11. Knowledge of privacy protection for permit holders
12. Knowledge of privacy protection for employees
13. Knowledge of summary abatement

VI. Food Safety Education & Consumer Protection & Awareness

7% of exam

1. Provide on-site training for groups (e.g. food workers, church supper, events)
2. Apply basic principles of education and training
3. Educate food managers when inspecting
4. Demonstrate knowledge of time, temperature, and hygiene factors
5. Demonstrate knowledge of hand washing procedures
6. Demonstrate knowledge of HACCP
7. Train employees and others to follow proper practices of food production and service

VII. Knowledge of Sample Collection and Interpretation of Results

4% of exam

1. Use knowledge of sampling techniques
2. Conduct scientific sampling
3. Collect specimens in a legally defensible manner
4. Preserve and protect samples and specimens
5. Document critical information about samples and sites
6. Interpret test results accurately
7. Apply correct food sampling procedures

VIII. Identify and Understand Pest Control

4% of exam

1. Identify vectors and pests
2. Knowledge of the life cycle and conditions favorable to growth of vectors, pests
3. Understand multi-method control (education, biological, physical, legal)
4. Understand chemical controls (use, storage, health risks, environmental hazards)
5. Provide public instruction about vectors and pests

Study Guide Chapters

Chapter 1

Study Skills and Test-Taking Strategies

- Introduction
- Study Skills
- Effective Methods for Retaining Material
- Test-Taking Strategies

Chapter 2

Microbiology of Foodborne Illness

- Introduction
- Key Concepts
- Key Words
- Mic. Causes of Foodborne Illness
- Env. Factors Affecting Bacterial Growth
- Transmission of Foodborne Illness
- Classification of Foodborne Illness
- Read More About the Topic
- Works Cited
- Study Questions

Chapter 3

Causes and Prevention of Foodborne Illness

- Introduction
- Key Concepts
- Key Words
- Causative Factors in Foodborne Illness
- Foodborne Illness Intervention
- Read More About the Topic
- Works Cited
- Study Questions

Chapter 4

HACCP Principles

- Introduction
- Key Concepts
- Key Words
- HACCP Background
- HACCP Plan Development
- Seven Principles
- Suggested Formats for HACCP
- HACCP for Retail Food Establishments
- Read More About the Topic
- Works Cited
- Study Questions

Chapter 5

Investigating a Foodborne Illness Outbreak

- Introduction
- Key Concepts
- Key Words
- Investigating a Suspected Outbreak
- Read More About the Topic
- Works Cited
- Study Questions

Chapter 6

Public Health Law: The Legal Foundation for Inspections

- Introduction
- Key Concepts
- Key Words
- The Inspection
- The Bill of Rights
- The Permitting Process
- Read More About the Topic
- Works Cited
- Study Questions

Chapter 7

The Food Establishment Inspection Process

- Introduction
- Key Concepts
- Key Words
- Risk Categorization
- Inspection Steps
- Read More About the Topic
- Works Cited
- Study Questions

Appendix A.

Recommended Reading

Primary Sources

Each chapter includes a listing of both print and Web sites pertinent to the topic of the chapter. The two references listed below are the best sources for information to consult in preparation for the CP-FS Certification Examination.

1. *Food Code*. (2005). Washington, DC: Food and Drug Administration, U.S. Department of Health and Human Services.
2. McSwane, D., Rue, N., & Linton, R. (2005). *Essentials of Food Safety Sanitation* (4th ed.). Upper Saddle River, NJ: Prentice Hall.

Secondary Sources

The references listed below provide information and resources on specific topics if a quick review of a particular topic is needed to prepare for the CP-FS Certification Examination.

- a. Centers for Disease Control and Prevention (CDC) Outbreak and Response Surveillance Unit web site: www.cdc.gov/ncidod/dbmd/outbreak.
- b. *Control of Communicable Diseases Manual* (18th ed.) D. Heymann, MD, ed. (2004), Washington, DC: American Public Health Association.
- c. Grad, F.P. (1990). *The Public Health Law Manual* (2nd ed.,). Washington, DC: American Public Health Association. Chapters, 2, 3, 4, 7, and 8.
- d. Vela, G. Roland Vela, (1997). *Applied Food Microbiology*. Belmont, CA: Star Publishing Company. Pages 27-78.
- e. U.S. Food and Drug Administration Center for Food Safety and Applied Nutrition. FDA. (2006) Managing Food Safety: A Regulator's Manual for Applying HACCP Principles to Risk-Based Retail and Food Service Inspections and Evaluating Voluntary Food Safety Management Systems", <http://www.cfsan.fda.gov/~tcjm/hret3toc.html>
- f. U.S. Food and Drug Administration Center for Food Safety and Applied Nutrition. (2005) "Managing Food Safety: A Manual for the Voluntary Implementation of HACCP Principles for Operators of Food Service and Retail Establishment <http://www.cfsan.fda.gov/~tcjm/hret2toc.html>

Appendix B. Glossary

- ✓ **Anaerobe.** An organism, especially a bacterium, not requiring oxygen or free oxygen.
- ✓ **Aerobe.** An organism, especially a bacterium, requiring oxygen to live.
- ✓ **Binary fission.** The process by which bacteria reproduce (nonsexual reproduction), dividing in two under ideal conditions.
- ✓ **Backflow.** A flow of contaminated water entering the potable-water supply as a result of back-pressure.
- ✓ **Centers for Disease Control and Prevention (CDC).** A federal agency whose primary responsibility is the collection of data and information on human diseases in the United States.
- ✓ **Certified Pest Control Operator (CPCO).** An individual, usually certified by a state, who is knowledgeable about the use of pesticides and the life cycles and habitats of pests and vectors.
- ✓ **Clean.** Free of visible soil.
- ✓ **Colony.** A cluster of microorganisms that is growing within, or on the surface of, a nutrient medium and that contains millions of bacteria cells.
- ✓ **Communicable disease.** An illness that is easily transmitted from person to person.
- ✓ **Contaminated ingredients.** Ingredients contaminated by chemical, physical, or microbiological sources.
- ✓ **Cross-connection.** A physical link through which contaminants from drains, sewers, or waste pipes may enter the potable-water supply.
- ✓ **Cross-contamination.** The transfer of pathogenic microorganisms between food items.
- ✓ **Critical items.** 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*.
- ✓ **Critical limit.** The maximum or minimum value to which physical, biological, or chemical hazards must be controlled at a critical control point to minimize the risk that a food safety hazard may occur.
- ✓ **Critical control point (CCP).** The second step in a HACCP plan, 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.
- ✓ **Critical violations.** Violations that are likely to contribute to food contamination, illness, or environmental degradation and that pose a serious public health risk.
- ✓ **Endemic.** Present in the population (said of a disease).
- ✓ **Enforcement.** The implementation of standards adopted by the legislature or an administrative unit of government.

- ✓ **Epidemic.** A state that exists when a disease spreads rapidly and large numbers of cases appear at the same time.
- ✓ **Etiologic agent.** The agent that causes an illness.
- ✓ **Epidemiology.** The study of the methods and forces that play a part in the spread of disease among humans.
- ✓ **Etiologic agent.** The agent that causes an illness.
- ✓ **Facultative.** Able to grow either with or without the presence of free oxygen.
- ✓ **Food establishment inspection report.** A document created by the public health regulatory authority that reports the data collected during the inspection in an effort to measure compliance with the authority's regulations.
- ✓ **Foodborne-illness outbreak.** The occurrence of two or more cases of a similar illness resulting from the ingestion of a common food, as defined in *Food Code*.
- ✓ **FIFO (First In, First Out).** Commonly used acronym for a method of stock rotation that uses old products first.
- ✓ **Good manufacturing practices (GMPs).** The condition and practices that must be followed to avoid producing an adulterated food product included in Part 110 of the CFR.
- ✓ **Hazard.** A biological, chemical, or physical agent that could cause a foodborne illness.
- ✓ **Hazard analysis.** The process of collecting and evaluating information on hazards associated with foods to determine which hazards should be addressed in a HACCP plan.
- ✓ **Host.** A human, animal, or plant in which another organism lives and nourishes itself.
- ✓ **Infective dose.** The number of microorganisms required to cause a foodborne illness in one person.
- ✓ **Imminent health hazard.** A regulatory violation that will cause food contamination, illness, or environmental degradation, and is a severe public health risk. For example, sewage back-up in a food preparation area. Imminent health hazards often require immediate closure of the food establishment and revoking the establishment's permit to operate. Examples include: floods, fires, interruption of electrical or water service, sewage back up, misuse of toxic materials, and gross unsanitary conditions.
- ✓ **Incidence.** The rate of occurrence of an illness.
- ✓ **Inspection.** A visitation or survey used to determine whether or not conditions detrimental to health exist.
- ✓ **Mesophile.** A microorganism that grows best at moderate temperatures, with optimum growth between 77° F and 113° F (25° C and 45° C).
- ✓ **Mode of transmission.** The method by which a pathogen is carried from the source to the food.
- ✓ **Monitor.** To conduct planned observations or measurements to assess whether a CCP is under control and also to produce an accurate record for future use in verification.

- ✓ **Onset Time.** The period of time that passes between ingestion of contaminated food and occurrence of foodborne-illness symptoms.
- ✓ **Organoleptic methods.** Methods of data collection that utilize human senses—taste, odor, or feel.
- ✓ **Pandemic.** An epidemic that spreads throughout many countries and continents and affects large numbers of people.
- ✓ **Pathogenic.** Capable of causing disease, harmful; used to describe any disease-causing agent.
- ✓ **Permit.** Written license issued by a public health regulatory authority authorizing an individual to operate a food establishment.
- ✓ **Permittee (permit holder).** An individual who is legally responsible for the operation of a food establishment, such as the owner, an owner's agent, or another person, and possesses a valid permit to operate a food establishment.
- ✓ **Person in charge.** The individual present at the food establishment who is responsible for its operation at the time of inspection.
- ✓ **Police power.** The power to provide for the health, safety, and welfare of people.
- ✓ **Population.** A group of individuals with a common characteristic.
- ✓ **Potable water.** Water that is safe to drink according to the U.S. Environmental Protection Agency, state health authority standards, or both.
- ✓ **Potentially hazardous food (PHF).** Natural and manmade foods in a form capable of supporting the rapid and progressive growth of infectious, toxin-producing microorganisms. These foods usually have high protein and moisture content and low acidity. (See page 11 for the complete FDA Food Code definition of PHF.)
- ✓ **Psychrophile.** A microorganism capable of growing at refrigerated or room temperature but grow best at cold temperatures, with optimum growth between 41°F and 68°F (5°C to 20°C).
- ✓ **Reservoir.** An alternate host or passive carrier of a pathogenic microorganism, such as soil, animals, or humans.
- ✓ **Ratite** is a flightless bird such as an emu, ostrich, or rhea.
- ✓ **Risk.** The probability that conditions will lead to a hazard.
- ✓ **Sanitary.** Pathogenic microorganisms and other contaminants have been reduced to safe levels.
- ✓ **Search.** The activity of looking for conditions that violate the law, items used to commit a crime, or items gained during the commission of the crime.
- ✓ **Severity.** The seriousness of a hazard.
- ✓ **Spoilage.** Significant food deterioration, usually caused by bacteria and enzymes that produce a noticeable change in the taste, odor, or appearance of the product.

- ✓ **Spore.** A stage at which some rod-shaped bacteria develop a thickened capsule that allows them to tolerate heat, extreme cold, high salt conditions, drying, and high acid conditions.
- ✓ **Thermophile.** A microorganism that grows best at temperatures above 110°F (43°C).
- ✓ **Temperature abuse.** Allowing a PHF to remain in the temperature danger zone for an unacceptable length of time.
- ✓ **Toxin.** A poison produced by a living microorganism.
- ✓ **U.S. Code of Federal Regulation (CFR).** A compendium of all federation regulations, organized by subject matter.
- ✓ **Validation.** Collecting scientific data and technical information to determine if a HACCP plan as implemented is effective in assuring consistent application of all indicated critical control points.
- ✓ **Vectors.** Insects or other arthropods that transmit infectious diseases to humans.
- ✓ **Verification.** The process of substantiating that all the components of a HACCP plan are effective and operating according to the plan.