APPLIED FOODSERVICE SANITATION

A Certification Coursebook

SERVSAFE

FOURTH EDITION

APPLIED

FOODSERVICE SANITATION

A Certification Coursebook

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THE NATIONAL FOOD SAFETY CERTIFICATION PROGRAM

A Certification Coursebook

The Educational Foundation of the National Restaurant Association

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10

Foreword

The Educational Foundation of the National Restaurant Association is continuing to provide leadership in foodservice sanitation and foodborne disease prevention through the updating of this text. This leadership was highlighted by the development of SERVSAFE®, a training and certification program for foodservice personnel, and the production of the coursebook *Applied Foodservice Sanitation.*

The text covers the principles of food microbiology, important foodborne diseases, standards that are enforced by regulatory agencies, and applied measures for the prevention of foodborne diseases and other microbiological problems. Additionally, this fourth edition describes the Hazard Analysis Critical Control Point (HACCP) system. The HACCP system is the most effective approach to food safety yet known, which when properly devised and implemented, provides high assurance that foodborne disease outbreaks and food spoilage will not occur. This concept is weaved into chapters that deal with successive operations from receipt of foods until service to customers. Hazards, standards, and corrective actions are presented for important operations (e.g., cooking, cooling, hot holding, and reheating) that are critical control points for food safety. This is a major advancement.

Foodservice industry professionals, regulatory agencies, and instructors in academic institutions who either apply or teach others to apply the principles and practices presented in *Applied Foodservice Sanitation, Fourth Edition,* will contribute to the reduction of foodborne diseases and to the improvement of food quality. This text, therefore, continues to serve as a comprehensive force to help these groups work together for these two important common goals.

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for Applied Foodservice
Research)

A Message from The Educational Foundation

The Educational Foundation of the National Restaurant Association is proud to present *Applied Foodservice Sanitation, Fourth Edition,* a book for foodservice managers, supervisors, and employees aspiring to management jobs in the foodservice industry. Earlier editions have firmly established it as the nation's leading text for foodservice manager training programs by emphasizing key principles and practices of food safety. The fourth edition incorporates new information, concepts, and procedures vital to food safety.

Today's consumers demand more and more from the restaurants they patronize. They want top-rate, efficient service; varied, well-prepared menu offerings; and an attractive, clean, and comfortable dining atmosphere. An effective food safety program will complement and reinforce operators' efforts to provide all of these benefits to their guests. *Applied Foodservice Sanitation* provides information and methods to help the foodservice manager apply sanitation procedures to foodhandling functions from food purchasing and storage, to preparation and service to patrons. Only by implementing a complete food safety program can the operator be assured that food is safe right up to the time it is served.

Applied Foodservice Sanitation, Fourth Edition, introduces new material on implementing a foodservice sanitation management system in your operation. For the first time in any foodservice text, this system, known as Hazard Analysis Critical Control Point (HACCP), is detailed in a simple, straightforward manner so that managers may easily incorporate it into their operating procedures. The book itself has been organized according to the HACCP principle of following the flow of food through the operation. Students first learn to identify the foods at risk within an operation, then learn about the types of hazards to safe food, and finally learn how to protect food from those hazards during receiving, storing, preparing, holding, and serving.

This edition also incorporates changes in FDA standards, new information on emerging pathogens, updated information on equipment and cleaning and sanitizing operations, and a new chapter on crisis management. Like the third edition, the fourth edition focuses on *working through people* to maintain a sanitary operation, emphasizing such factors as training, influencing employee attitudes, working with vendors, and dealing with local health officers.

In some states and several county and municipal jurisdictions, training and certification for managers in foodservice sanitation is required by law. Nationally, however, the restaurant industry is exercising leadership in ensuring that food is handled safely. Recently, the National Restaurant Association strongly urged all of its members to voluntarily undertake training and testing for all management personnel to document that necessary food protection knowledge has been secured.

Applied Foodservice Sanitation is a critical component of SERVSAFE®, The Educational Foundation of the National Restaurant Association's comprehensive crisis management program that concentrates on three key areas of potential risk—food safety, responsible alcohol service, and employee and customer safety. SERVSAFE courses focus on the manager's role in assessing risks, establishing policies, and training employees. To help managers convey proper procedures to their employees, SERVSAFE programs include a host of employee training materials for each subject, such as employee study guides, videos, and a manager's kit that includes a leader's guide and other teaching aids.

As the manager training component in the SERVSAFE Food Safety program, *Applied Foodservice Sanitation* may be adapted for administration in a variety of ways. Foodservice employees who purchase the Certification Coursebook and register with The Foundation may take the course in seminar format, traditional classroom situations, or a combination of home study and group learning, which minimizes the time that managers have to spend in a classroom. Courses may be administered for in-house group training programs sponsored by foodservice companies, trade associations, and other industry organizations. The text and related course materials are available to college and community college students of hotel, restaurant, and institutional management as part of the regular academic curriculum.

All who complete the course will be eligible for an Educational Foundation SERVSAFE certificate upon satisfactory completion of a certification examination administered under the auspices of The Foundation.

The development of this book was greatly aided by members of the industry, educators, and regulatory representatives who served on the *Applied Foodservice Sanitation* Advisory Committee. They include Dr. Frank L. Bryan, M.P.H., Director, Food Safety Consultation and Training (formerly Scientist Director, Centers for Disease Control, U.S. Health Service); Gary P. DuBois, National Manager, Field and Regulatory Quality Assurance, Taco Bell Corporation; Larry M. Eils, R.S., Director of Public Health and Safety, National Automatic Merchandisers Association; Dr. Robert L. Flentge, D.V.M., M.S., Chief, Division of Food, Drugs, and Dairies, Illinois Department of Public Health; Glen A. Graf, Training/Human Resources, Bakers Square Restaurants; Robert E. Harrington, Assistant Director, Technical Services, Public Health and Safety, National Restaurant Association; Edward LaClair, Quality Assurance Manager, Taco Bell Corporation; Dr. David McSwane, H.S.D., Assistant Professor of

Public and Environmental Affairs, Indiana University; Dr. Peter B. Manning, Associate Department Head and Professor, Department of Hotel, Restaurant, and Travel, University of Massachusetts at Amherst; Marsha Robbins, R.S., Food Safety Consultant; Joel Simpson, Director of Quality Assurance, Dobbs International Services, Inc.; and Edward Sherwin, Chairman, Hotel/Motel & Restaurant-Club Management Department, Essex Community College. Special recognition is due The Foundation's "sanitation team," Paul F. Martin, Director of Educational Programs; Marianne Gajewski, Manager, Educational Projects; and particularly to Susan Marts Myers, Project Editor; and Elizabeth Teeter, Assistant Editor, whose expertise resulted in the smooth integration of new material and reviewer comments in this edition.

We also appreciate the technical review and information received from our SERVSAFE sponsor companies: American Egg Board; Beef Industry Council of the National Live Stock & Meat Board; Heinz U.S.A.; National Fisheries Institute; PRISM (A subsidiary of Johnson Wax); Procter and Gamble Company; Sparta Brush Company, Inc.; and World Dryer Corporation (A Division of Specialty Equipment Companies, Inc.).

The Educational Foundation of the National Restaurant Association is dedicated to the advancement of professionalism in the foodservice industry through education and training. Our objective is to provide the resources managers need to reach the highest possible level of achievement in a very competitive environment.

Education contributes to both the growth of the industry and to the professional and personal growth of the individual who enjoys the rewards. *Applied Foodservice Sanitation, Fourth Edition,* is one way we can contribute to your professional growth.

DANIEL A. GESCHEIDLE

President
The Educational Foundation
of the National Restaurant
Association

Contents

PART I

The Sanitation Challenge

1

Providing Safe Food

Eating out is fun. People love to get together over food. Friends meet for lunch, for cocktails after work, or go to dinner after an evening at the theater. Meeting over food is often conducive to negotiating and planning. Conferences are often arranged around a schedule that includes at least one, and often several, meals.

It is also true that many of us simply eat away from home at one time or another for convenience or by necessity. Two-income families and singles often opt to eat out after a long day at work. Passengers on transportation systems, guests in hotels, patients in hospitals, residents of nursing homes or other institutions, students in schools and universities, and the men and women serving in the military all need to have food provided for them.

WHAT PEOPLE EXPECT

Diners walking into a commercial facility for the first time bring with them a number of expectations. They expect good, safe food, clean surroundings, and pleasant service. Together these elements make up a pleasant dining experience.

It is a challenge to managers of commercial and noncommercial establishments to direct a number of activities at once, including employee training and

management; and the purchasing, preparation, and service of food. Foodservice managers generally expect to meet the diners' expectations. Managers *assume* that they are going to provide good, safe food in clean surroundings with friendly service. This assumption, especially regarding safe food and clean surroundings, should be based not only on a foundation of goodwill and good intentions, but on a sound understanding of sanitary policies and procedures.

THE CHALLENGE TO FOOD SAFETY

Food safety has always been a concern of foodservice operators. By and large the industry has done an excellent job of providing safe food to the American public; however, the number of foodborne illnesses attributed to the foodservice industry is still significant. The foodservice industry is serving a public that is increasingly intolerant of any food safety risk.

A shortage of foodservice employees trained and motivated to follow safe food practices makes the job of food safety management even more difficult. Foodservice operators cannot assume workers learned proper personal and food hygiene practices in their homes or that government health inspections will ensure safe operations.

A food safety management program is an organized system developed for all levels of the foodservice operation. The system controls factors that can compromise food safety and contribute to incidents of foodborne illness. A key component of this system is to provide adequate training for all foodservice personnel in safe foodhandling practices.

The National Restaurant Association has reaffirmed its position that the responsibility for providing safe and wholesome foods rests with the foodservice industry. It has called for the establishment of and adherence to effective standards of safe foodhandling practices. The Association strongly urges its membership to train and test its managers to a standard of food safety knowledge and commits itself to offering comprehensive training and testing to the industry.

In this chapter we will:

- Learn the reasons for managing a sanitary foodservice operation.
- Define the terms *foodborne illness* and *outbreak.*
- Define *sanitation.*
- Introduce the Hazard Analysis Critical Control Point/Sanitary Assessment of Food Environment (HACCP/S.A.F.E.) system of ensuring food safety.
- Discuss how to market sanitation to your employees and guests.

FOODBORNE ILLNESS

A *foodborne illness* is a disease that is carried or transmitted to human beings by food. Most victims of foodborne illnesses do not readily identify the source of their symptoms, but the public is becoming more aware that certain types of illnesses may be food-related.

All foodservice operations have the potential to cause foodborne illness through errors in purchasing, receiving, storing, preparing, and serving food. None of the many types of operations

Exhibit 1.1 Classification of foodservice operations

Group I Commercial Foodservice

Eating Places

Restaurants, lunchrooms
Limited-menu restaurants
Commercial cafeterias
Social caterers
Ice cream, frozen custard and yogurt stands
Bars and taverns

Food Contractors

Manufacturing and industrial plants
Commercial and office buildings
Hospitals and nursing homes
Colleges and universities
Primary and secondary schools
In-transit feeding (airlines, trains, cruise ships)
Recreation and sports centers

Lodging Places

Hotel restaurants
Motor-hotel restaurants
Motel restaurants

Other Commercial

Retail host restaurants
Recreation and sports
—Includes drive-in movies, bowling lanes, recreation and sports centers
Mobile caterers
Vending and non-store retailers
—Includes sales of hot foods, sandwiches, pastries, coffee, and other hot beverages

Group II Institutional Foodservice

Business, Educational, Governmental, or Institutional Organizations That Operate Their Own Foodservices

Employee foodservice
—Includes industrial and commercial organizations, seagoing ships, and inland-waterway vessels
Public and parochial elementary and secondary schools
Colleges and universities
Transportation
Hospitals
—Includes sanatoriums, voluntary and proprietary hospitals, long-term general and mental hospitals, and sales, or commercial equivalent, to employees in state and local short-term hospitals and federal hospitals
Nursing homes, homes for aged, blind, orphans, mentally and physically disabled
—Includes sales (commercial equivalent) calculated for nursing homes and homes for aged only. All others in this category make no charge for food served either in cash or in kind
Clubs, sporting and recreational camps
Community centers

Group III Military Foodservice

In Continental U.S. Only

Defense personnel
Officers' and NCO clubs ("Open Mess")
Foodservice—military exchange

Source: Adapted from "The Foodservice Industry—Food and Drink Purchases Projected to 1991." NRA Forecast 1991. *Restaurants USA*, December 1990. Reprinted by permission.

(see Exhibit 1.1) is exempt from causing foodborne illness in the absence of adequate precautions.

Consider the following:

- A once popular restaurant in the Midwest is forced into bankruptcy after a botulism outbreak caused by contaminated onions kills a 73-year-old woman. Lawsuits filed against the restaurant reach well into millions of dollars.
- A major food chain in the Southwest is sued by parents of children who were served food that was prepared too far in advance, not adequately reheated, and contaminated with toxin from *Bacillus cereus.*
- At a hospital in the East, 34 patients, including two in traction with their jaws wired shut, are stricken with the foodborne illness salmonellosis. The cause is traced to eggnog prepared in the hospital kitchen.
- At a school in the East, more than 400 children suddenly become ill from staphylococcal foodborne illness. The bacteria are traced to egg salad sandwiches.

Television and newspapers report outbreaks connected to institutions and other public gatherings. Mostly, though, it is up to the various governmental agencies and the state and local equivalents of the U.S. Public Health Service to obtain and release to the public information on foodborne illnesses.

Since 1938, the U.S. Public Health Service Centers for Disease Control (CDC) have published annual summaries on outbreaks of foodborne illness. An *outbreak* is defined as an incidence of foodborne illness that involves two or more people who eat a common food, which is confirmed through laboratory analysis as the source of the illness. There are two exceptions: (1) a single incidence of botulism; or (2) a chemical-caused illness. Each one of these qualifies as an outbreak. CDC reports are based on summaries of foodborne illnesses reported by individual states.

The U.S. Public Health Service has three objectives in gathering information on foodborne illnesses: (1) disease prevention and control, including correction of faulty food preparation practices in foodservice establishments; (2) knowledge of the disease and the causing element; and (3) administrative guides.

CAUSES OF FOODBORNE ILLNESS

Any kind of food can be the vehicle for foodborne illness. Some of the foods implicated in foodborne illnesses are poisonous by nature, for example, certain types of mushrooms. However, it is generally high-protein foods that we eat regularly that are responsible for most foodborne illnesses. These high-protein foods are classified as *potentially hazardous* by the U.S. Public Health Service and include *any food that consists in whole or in part of milk or milk products, shell eggs, meats, poultry, fish, shellfish, edible crustacea (shrimp, lobster, crab, etc.), baked or boiled potatoes, tofu and other soy-protein foods, plant foods that have been heat-treated, raw seed sprouts, or synthetic ingredients.* Potentially hazardous foods are capable of supporting rapid and progressive growth of infectious or disease-causing micro-organisms. The term does

not include foods that have a pH (acidity) of 4.6 or below, or an A_w (water activity) level of 0.85 or less, under standard conditions. (*Water activity* is the amount of moisture available for bacterial growth and will be explained in more detail in Chapter 2.)

Critical Offenses

In addition to paying special attention to potentially hazardous foods, the foodservice manager should focus on errors in foodhandling that are most often implicated in a foodborne illness outbreak. The following is a list of the *most frequently cited factors.*

1. Failure to properly cool food.
2. Failure to thoroughly heat or cook food.
3. Infected employees who practice poor personal hygiene at home and at the workplace.
4. Foods prepared a day or more before they are served.
5. Raw, contaminated ingredients incorporated into foods that receive no further cooking.
6. Foods allowed to remain at bacteria-incubation temperatures.
7. Failure to reheat cooked foods to temperatures that kill bacteria.
8. Cross-contamination of cooked foods with raw foods, or by employees who mishandle foods, or through improperly cleaned equipment.

WHAT IS SANITATION?

Sanitation is the creation and maintenance of healthful, or hygienic, conditions. Sanitation comes from the Latin word *sanitas* meaning health. In a foodservice situation, the word *sanitation* means wholesome food, handled and prepared in a way that the food is not contaminated with disease-causing agents. In other words, sanitation is what helps food stay safe.

But does sanitary simply mean clean? Not necessarily. That which appears to be clean may not always be sanitary.

Clean means free of visible soil. *Sanitary* means free of harmful levels of disease-causing micro-organisms and other harmful contaminants. Clean refers to aesthetics and concerns outward appearance—a face without a smudge, a glass that sparkles, a shelf wiped clear of dust. However, although clean on the surface, objects can harbor invisible disease-causing agents or harmful chemicals. Baby bottles boiled in water for ten minutes may be splotched and water-marked. They may not look clean on the surface, but they are free of disease-causing agents and can accurately be referred to as sanitary.

Let's look at the factors involved in food safety, as well as the inherent risks. They generally fall into three categories:

- Food—its safe condition initially, and its protection in preparation and service
- People—those involved in handling food both as employees and as customers
- Facilities—the sanitary condition of the physical plant, and the equipment used in a foodservice operation.

Food

Not all food is safe when it arrives in the operation. Any animal products, such as fresh poultry, may already be contaminated by the time the items are received. The foodservice manager must work with reputable suppliers and implement tight receiving procedures to help ensure safe food. Once the food arrives, it must be stored, prepared, and served using methods that maintain its safety.

Chapters 2 and 3 will cover what can cause *contamination*—the unintended presence of harmful substances or micro-organisms in food—the effects of contaminated food, and cross-contamination.

People

People pose the major risk to safe food (see Exhibit 1.2). The success of a foodservice manager in dealing with the foodborne-illness problem depends on how the human factor is handled. A manager must carefully train, monitor, and reinforce by example the principles presented during training.

Not only does a manager have to be concerned about the employees, a manager also has to overcome the problems of the unsanitary customer. Well-trained employees and well-designed facility are positive preventive measures against the customer who returns to the salad bar and wants to use the same plate and the customer who has an uncontrolled and unshielded cough.

Well-trained employees are essential when a crisis, accident, injury, or an illness happens in the establishment. For example, employees need to be informed and know what is expected of them in a crisis situation, such as a foodborne illness outbreak.

To help control this human factor in contamination and the challenge to safety, Chapters 4 and 16 cover in detail the elements of personal hygiene, and employee training and motivation respectively. Chapter 13 details accident prevention and emergency action, and Chapter 14 discusses crisis management.

Facilities and Equipment

Eliminating hard-to-clean work areas, faulty or overloaded refrigerators or other equipment, dirty surroundings, poor housekeeping, and conditions attractive to pest infestation make up the third focus of our analysis—the facilities and equipment.

Chapter 9 treats the subject of built-in sanitation in terms of materials, design, construction, and installation and layout of equipment. Adequacy of utilities and services, as well as other environmental factors in safeguarding people and food products, are also covered.

Chapters 10 and 11 present principles and procedures for the cleaning and sanitizing of equipment, utensils, and food preparation areas, and the development of a master cleaning schedule. Chapter 12 gives some practical information on pest control.

HAZARD CONTROL FOOD SAFETY PROGRAMS

Food safety programs need to incorporate a new system based on the actual

Exhibit 1.2 Transmission of a foodborne illness from infected human beings to food and back to other human beings