Chapter 8

Safety, Sanitation, & Maintenance
Functional Subsystem: Safety, Sanitation, & Maintenance

- Functional subsystem in the foodservice systems model.
- Permeates all other subsystems.
- Safety often is related to cleaning & maintenance practices.
Safety

- Includes not only the safety of the food served, but also the safety of employees & guests.

- Safety considerations include:
  - Food safety
  - Sanitation
  - Facility Design
  - Maintenance
  - Risk Management
Food Safety

- Food safety training & management are the most critical function that occur in the food production facility.

**Food Code**
- Joint publication by FDA, FSIS, & CDC.
- Reference document for food safety practices in foodservice operations.
- Revised every two years.
Food Spoilage

- Unfitness for human consumption due to chemical or biological causes.

- Criteria for assuring foods are fit to eat:
  - Desired stage of development or maturity
  - Freedom from pollution
  - Freedom from objectionable chemical & physical changes
  - Freedom from microorganisms & parasites
Foodborne Illness Facts

- 76 million cases each year.
- 5000 deaths each year.
- Medical care, productivity losses, & premature death caused $6.9 billion in estimated economic losses.
- Most common biological pathogens:
  - *Campylobacter*
  - *Salmonella*
  - *E. coli*
  - *Listeria monocytogenes*
Improving Food Safety

- CDC suggestions:
  - More training for food handlers
  - Better protocols for investigation
  - Hazard analyses in food operations
  - Improved data on:
    - How pathogenic origins are carried & spread
    - How food preparation contributes to proliferation
    - How food handling contributes to an outbreak
Microbiological

- Common forms:
  - Bacteria
  - Molds
  - Yeast

- Found everywhere temperature, moisture, & substrate favor life & growth.

- **Microbiological spoilage** – food spoilage caused by microorganisms.
Bacteria

- Microscopic, unicellular organisms of varying size & shape.

- Requirements for bacterial growth:
  - Time & temperature
  - Food & moisture
  - Acidity (pH)
  - Oxygen

- **Thermal death time** – time required at a specific temperature to kill a specified number of vegetative cells or spores.
Molds & Yeasts

- Grow in a wide range of substrates & temperatures.
- Most common type of spoilage that can be identified by the naked eye.
- Yeasts are not known to cause foodborne illnesses, but they may cause spoilage or induce undesirable reactions.
Viruses

- Small pathogens that multiply in the living cells of the host but not in cooked food.
- Can be carried by food & water, but only multiply in the living cell.
- **Norwalk virus** – accounts for 65% of all serious, nonbacterial foodborne illness.
Other Microorganisms

- **Rickettsiae** – includes typhus fever, Q fever, & Rocky Mountain spotted fever.

- **Protozoa** – unicellular, animal-like forms distributed widely in nature that are carried in food & cause illness when digested.

- **Parasites** - includes trichinae, tapeworms, & roundworms.
Biochemical spoilage – caused by natural food enzymes.

Uncontrolled reactions cause off-flavors, odors, or colors.

Enzyme formation is controlled & inactivated by heat, cold, drying, addition of inhibiting chemicals, & irradiation.
Physical

- Physical spoilage causes:
  - Temperature changes
  - Moisture
  - Dryness

- **Physical hazard** – danger of particles that are not supposed to be in a food product.
Spoilage may result from interaction of certain ingredients in a food or beverage with oxygen or light.

Kinds of chemical hazards:
- Pesticides
- Contamination with foodservice chemicals
- Excessive quantities of additive, preservatives, & spices
- Acidic action of foods with metal-lines containers
- Contamination of food with toxic metals
An infecting agent that causes disease.

Acute gastroenteritis (food poisoning) is caused by:

- **Foodborne intoxication** – caused by toxins formed in food prior to consumption.

- **Foodborne infection** – caused by activity of large numbers of bacterial cells carried by the food into the gastrointestinal tract.
Foodborne Intoxications

- **Salmonella**
- **Shigella**
- **Listeria monocytogenes**
- **Staphylococcus aureus**
- **Clostridium perfringens**
- **Bacillus cereus**
- **Clostridium botulinum**
Emerging Foodborne Pathogens

- **Campylobacter jejuni** – found in the flesh of cattle, sheep, pigs, & poultry.
- **Escherichia coli** – transmitted by eating raw or undercooked ground beef.
- **Norwalk Virus** – caused by poor personal hygiene among infected food-handlers.
- **Parasites** – includes cyclospora, cryptosporidium, vibrio cholerae, & hepatitis.
Combating Foodborne Pathogens

- Wash hands thoroughly & vigorously with soap & hot water after using the bathroom & before handling food.
- Wash all produce thoroughly with string running water, using fingers or a brush to rub surface clean.
- Pay special attention to stem areas & other crevices.
- Keep produce refrigerated as close to service as possible.
Prions

- **PROtein INfectious agents** – small glycosylated protein molecules found in brain cell membranes.
- **Spongiform encephalopathies** – infectious prion diseases of the brain.
- **Termed:**
  - Bovine Spongiforme Encephalopathy (mad cow disease) in cattle
  - Scrapie in sheep
  - Chronic wasting disease in deer & elk
  - Creutzfeld Jakob Disease or Gerstmann Sträussler Syndrome in humans
Controlling Microbiological Quality of Food

Must focus on:
- The food itself
- The people involved in handling the food
- The facilities & equipment

Good sanitation will:
- Prevent foodborne illness breakouts
- Maintain customer goodwill
- Keep the bottom line from bottoming out
Foodborne Illness Transmission

Flowchart:

- Disease Agents
  - Contaminated Equipment and Utensils
  - Infected Pests (rats, flies, roaches)
  - Infected Animals (cattle, swine, poultry)
  - Untreated Sewage
  - Unsafe Water
  - Soil

- Food Purchased
  - Food Stored
  - Food Prepared
  - Food Served
  - Food Eaten
  - Illness Occurs

Further Opportunities for Contamination
Foodborne Illness Transmission

- Food handlers/Customers Carrying Disease Organisms
  - From Respiratory Tract Through Coughing/Sneezing
  - From Open Sores, Cuts, and Boils
  - From Intestinal Tract Through Hands Soiled With Feces

  - Food Prepared
  - Food Eaten
  - Illness Occurs
Reducing the effect of contamination is largely a matter of temperature control in the storage, production, & service of foods.

Temperature Danger Zone

- $41^\circ F - 140^\circ F$
Employee Sanitation

- Employee personal hygiene & good food handling practices are basics of a sanitation program.
- Employees with poor hygiene at home & work are the third most frequently cited cause of outbreaks of foodborne illness.
- Most critical aspect of personal cleanliness is frequent & thorough hand washing.
Food Safety Programs

- Monitors all food production activities for errors in handling & eliminates those errors.
- ServSafe® - emphasizes the foodservice manager’s role in measuring risks, setting policies, & training & supervising employees.
- Health inspection rating systems – provide detailed inspection cards & grades to foodservice facilities.
Hazard Analysis Critical Control Point Model (HACCP)

- Initially developed for quality control in the food processing industry.
- **Critical Control Points** – steps in production processing in which loss of control would result in an unacceptable safety risk.
- **Hazard** – an unacceptable contamination of food.
Principles of a HACCP Plan

- Principle 1: Conduct a hazard analysis.
- Principle 2: Determine the critical control points (CCPs).
- 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 & documentation procedures.
Procedures for Complaints

- Obtain all the pertinent information.
- Remain concerned & polite, but do not admit liability or offer to pay medical bills.
- Never suggest symptoms.
- Record the time that the symptoms started.
- Try to get a food history of all the meals & snacks eaten before & after the person ate the suspected meal.
- Never offer medical advice.
Role of Federal Agencies

- The U.S. Public Health Service (PHS):
  - Within the U.S. Department of Health & Human Services
  - Identifies & controls health hazards
  - Provides health services
  - Conducts & supports research
  - Develops training related to health

- Agencies within the PHS:
  - CDC – investigates & records reports of foodborne illness & is charged with protecting public health
  - FDA – protects the nation’s health against unsafe & impure foods, unsafe drugs & cosmetics, & other potential hazards.
Role of Federal Agencies

- **The Food Safety & Inspection Service (FSIS)**
  - Agency of the U.S. Department of Agriculture (USDA).
  - Protects the nation’s health against unsafe & impure meats.

- **The Environmental Protection Agency (EPA)**
  - Controls pollution systematically by research, monitoring, standard setting, & enforcement activities.
  - Specific foodservice industry programs include water standards, air quality, pesticides, noise abatement, & solid waste management.
Role of State & Local Health Agencies

Ensure food establishments:

- Are equipped, maintained, & operated to offer minimal opportunities for food hazards to develop
- Use food products that are wholesome & safe
- Are operated under the supervision of a person knowledgeable in sanitary food-handling practices.
Foodservice Operation Inspections

- Changing focus toward more emphasis on food-handling practices.
- Look at those areas where hazards exist & decide if those hazards will cause foodborne illness.
- Self-inspection program (internal audit)
  - Should be a continual check on the adequacy of the sanitation program.
  - Should not be developed primarily for preparing for regulatory agency inspections (external audits).
Employee Safety

- **Accident** – an unexpected event resulting in injury, loss, or damage.

- **Construction & maintenance considerations:**
  - Adequate lighting
  - Clearly marked exits
  - Safety devices on equipment
  - Fire extinguishers of appropriate type.

- **Safe practices of employees are critical.**

- **Ergonomics**
Employee Safety

- **Occupational Safety & Health Act (OSHA)**
  - Assures safe & healthful working conditions
  - Allows a compliance officer to enter a facility to determine adherence to standards.
OSHA Compliance Conditions

- Accessibility of fire extinguishers & their readiness for use
- Guards on floor openings, balcony storage areas, & receiving docks
- Adequate handrails & stairs
- Properly maintained ladders
- Proper guards & electrical grounding for foodservice equipment
OSHA Compliance Conditions

- Lighted passageways, clear of obstructions
- Readily available first-aid supplies & instructions
- Proper use of extension cords
- Compliance with OSHA posting & record-keeping requirements
Customer Safety

- Responsibility of the foodservice manager & employees.
- Emergency action procedures should be included in the employee manual & during training sessions.
- Should have an employee trained & certified in first aid at all times.
  - Heimlich maneuver
  - Cardiopulmonary resuscitation (CPR)
Sanitation

- **Clean** – free of physical soil & with an outwardly pleasing appearance.

- **Sanitary** – free of disease causing organisms & other contaminants.
Sanitization

- Critical for any surface that comes in contact with food.
- Common chemicals for sanitation:
  - Chlorine
  - Iodine
  - Quaternary ammonia
Audits of Sanitation Standards

- Audit – means of evaluating the maintenance of foodservice sanitation standards.
- **External Audit** – performed by federal, state, & local governmental agencies.
- **Internal Audit** – program of self-inspection as a means of maintaining standards of sanitation.
Employee Training in Food Sanitation

- Training aides include:
  - Training manuals
  - Mini posters

- Materials available from:
  - Integrated Food Safety Information Delivery System ([www.profoodsafety.org](http://www.profoodsafety.org))
  - Iowa State Extension’s food safety website ([www.extension.iastate.edu/foodsafety](http://www.extension.iastate.edu/foodsafety))
  - U.S. government food safety website ([www.foodsafety.gov](http://www.foodsafety.gov))
  - The online food safety answers line ([www.foodsafetyanswers.org](http://www.foodsafetyanswers.org))
Ware Washing

- Manual or mechanical process of washing & sanitizing dishes, glassware, flatware, & pots & pans.

- Common equipment:
  - Sinks
  - Dishmachines
  - Pot & pan washing machines
Dishmachines

- Most reliable way to clean & sanitize dishes & utensils.
- **Scraping** – disposing of fragments of discarded or leftover food in the dishwashing process.
- Types of dishmachines:
  - Single tank
  - Rack conveyor
  - Flight-type continuous conveyor
Pot & Pan Washers

- Capable of cleaning cooked-on foods off pots & pans.
- Pressurized hot water is sprayed directly on the soiled surface.
Kitchen & Dining Areas

- Floors, walls, & ceilings must be constructed for easy maintenance.
- Arrangement & design of the equipment & fixtures should facilitate cleaning.
Floor Maintenance

- Spills should be wiped up promptly to avoid tracking & to eliminate a safety hazard.
- Regular schedules for cleaning floors should be established.
- Floor care equipment should be cleaned regularly.
Dish Storage

- All dishes & utensils must be stored in dry, clean, and dust-free areas above the floor.
- Use of mobile equipment is ideal.
Procedures for Handling Garbage & Trash Disposal

- Garbage & trash containers must be leakproof, easily cleanable, pestproof, & durable with tight-fitting lids.
- Garbage & trash should not be allowed to accumulate anywhere but in containers.
- Garbage & trash should be removed from production areas on a frequent basis.
Procedures for Handling Garbage & Trash Disposal

- Garbage storage areas should be easily cleanable & pestproof.
- A garbage can washing area with hot water & a floor drain should be located away from food production & storage areas.
Solid Waste

- **Social responsiveness** – ethics involving the responsibility of a company to society.
- 60%-70% of solid waste discarded is service related (food, napkins, straws, etc.)
- **Waste management practices include:**
  - Recycling
  - Source reduction
  - Incineration
  - Composting
  - Biological solutions
Solid Waste Terms

- **Recycling** – act of removing materials from solid waste stream for reprocessing into new materials and products.

- **Source Reduction** – reducing the amount of solid waste at the foodservice site.

- **Incineration** (combustion) – burning waste materials and recovering energy.
Solid Waste Terms

- **Composting** – controlled application of the natural process of degradation.

- **Biological solutions** – use of bacteria to break down animal fats and food products that clog drains.
Solid Waste

- An integrated solid-waste management program includes:
  - Menu design & planning
  - Purchase specifications
  - Food production practices
  - Service methods
  - Portion control
  - Waste-product disposal methods
  - Consumer education
  - Employee training
**Maintenance**

- **Preventive maintenance** – process of keeping equipment & facilities in a good state of repair.

- Cleaning tasks should be combined in a master schedule that includes:
  - What is to be cleaned
  - When each task should be done
  - How the task should be performed
  - Who has the assigned responsibility
Pest Control

- Rodents & insects can be sources of contamination of food, equipment, & utensils.
- Pest control rules:
  - Deny pests food, water, & a hiding or nesting place.
  - Deny pests access to the facility.
  - Work with a licensed pest control operator (PCO) to eliminate pests that do enter.
Risk Management

- A discipline for dealing with the possibility that some future event will cause harm to an organization.

Risk Management Questions:
- What can go wrong?
- What will we do?
- If something happens, how will we pay for it?