SAMPLE

Chartered Institute of Environmental Health

Food Safety Management Principles

Based on the 2009 FDA Food Code

Management Principles

We all need to eat and drink to stay alive, so it is important that our food does not harm us in any way. *Everyone* who works with food has a responsibility to safeguard the health of consumers. As a manager or supervisor, you have *special* responsibilities for consumer health, so you must make certain the food sold at your workplace does not cause illness, injury or any other problem.

You might not be the person with direct responsibility for every aspect of the production, sale or service of food at your workplace. But you still need to be aware of all the topics discussed on the following pages – because they could help you avoid compromising the safety of food.

Food Safety – Management Principles concentrates on the basic principles of good practice. These are the principles you must establish and maintain if you are to sell food that is safe to eat. The principles are the same for every food business, but exactly how you apply them depends on your particular establishment and your own professional judgment.

The Importance of Food Safety

key words

Case – the occurrence of illness affecting one person.

Food – anything that people normally eat or drink, including water and ice.

Foodborne illness/disease – any illness caused by eating or drinking contaminated food.

Food safety – the safeguarding, or protection, of food from anything that could harm consumers' health. This includes all the practical measures involved in keeping food safe and wholesome through all the stages of production to point of sale or consumption.

Hazard – anything that could cause harm to consumers.

Foodborne disease outbreak – the occurrence of two or more cases of a similar illness that result from eating a common food.

Reasonable care – the management responsibility to take all reasonable precautions and care to avoid committing a violation.

Food safety involves safeguarding food from anything that could harm the health of consumers. High standards enable everyone to enjoy their food without illness, injury or other problems, but poor standards can lead to all kinds of harm – and even death. As food safety is so important to everyone, the people who work with food have legal, ethical and economic responsibilities for keeping food safe to eat. This chapter outlines the impact of foodborne disease and introduces some of the responsibilities of food service professionals.

Consumer awareness

The safety of food is high on the list of consumer expectations, but outbreaks of foodborne illness and scares about health hazards from food have often been in the headlines in recent years. Despite increased public awareness of food safety issues, there are still millions of cases of foodborne illness every year and thousands of deaths. Many of these cases are linked to retail eating establishments.

No single reason has been identified for these high figures, but factors may include:

- changes in menu trends – such as eating out more often, eating more reheated food, eating raw food (such as sushi) or eating lightly cooked food (such as meat that is still pink in the center)
- changes in domestic shopping habits – including more bulk-buying so that food is stored at home for longer periods before it is eaten
- changes in farming practices, with food produced in massive quantities rather than at a small farm or by local industry
- more interstate shipping, so that food spends more time in transit, which may increase the possibility of temperature abuse
- more importation of food and ingredients
- a reduction in the use of preservatives
- seasonal variations in menu demands – so, for example, in summer there may be insufficient refrigeration space or there could be temperature abuse associated with cook-outs
- the identification of new foodborne diseases
- an increase in the number of cases of foodborne illness that are reported as a result of better public awareness – but the figures are still unlikely to show the true extent of the problem because many people with a foodborne illness do not consult a physician, so they are not included in the official statistics.

New International Food Safety Icons

The 11 international food safety icons below were published in 2005 by the International Association for Food Protection (IAFP). The purpose of the icons is to provide an easily recognizable symbol that conveys a specific food safety message to food handlers of all nationalities.

The IAFP icons are consistent with the standards presented in the FDA *Food Code*.

1. Thoroughly cook foods to appropriate temperatures.
2. Do not cross-contaminate between raw and ready-to-eat or cooked foods.
3. Wash hands with soap and warm running water.
4. Do not touch ready-to-eat foods with bare hands.
5. Food contact surfaces and utensils must be properly washed, rinsed, and sanitized.
6. Do not work with food or beverage if you are ill or experiencing gastrointestinal symptoms.
7. A food that requires time and temperature control for safety.
8. Cold foods must be held at 5°C (41°F) or below.
9. Hot foods must be held at 57°C (135°F) or above.
10. Do not allow foods to stay in the temperature danger zone.
11. Hot foods must be cooled from 57°C to 21°C (135°F to 70°F) within two hours and from 57°C to 5°C (135°F to 41°F) within the next 4 hours for a total cooling time of six hours.

IAFP encourages the use of the icons in training and educational materials, stickers, signs, posters or similar products. A license from IAFP to use the icons for commercial uses is required, but the icons may be reproduced free of charge (with proper copyright acknowledgement) in certain types of educational materials. The icons can be downloaded in digital format from http://www.foodprotection.org/

Spoilage bacteria

These are the types of bacteria that make food spoil (sometimes called 'rotting', 'decaying', 'deteriorating' or 'going bad'). Food that is putrid or decomposed is considered unfit for human consumption and must not be sold.

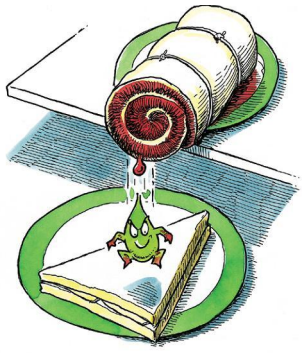
How bacterial contamination occurs

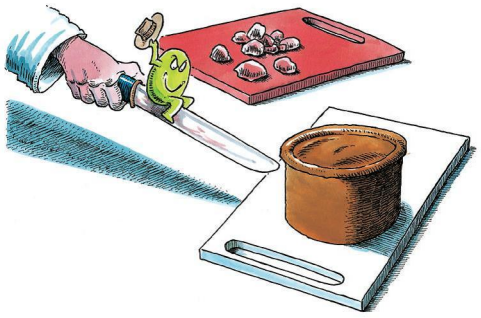
As bacteria exist in the environment – in water, the soil and the air – and on and inside animals, many raw foods are contaminated before they reach your establishment.

Careless or inappropriate handling may ***add*** bacteria to food – for example, through poor personal hygiene and habits. It can also ***spread*** bacteria from one food to another – such as from a raw potentially hazardous food (time/temperature control for safety food) to a ready-to-eat food. This is called cross-contamination, and it can happen when foods touch or drip, but it also often occurs via 'vehicles of contamination', such as cutting boards and knives. Although bacteria can move, they cannot travel far on their own, but they are often 'transported' from one place to another on people, animals, equipment, utensils and wiping cloths, in particular by:

- hands
- hand-contact surfaces, such as preparation tables, cutting boards, door handles and faucets
- food-contact surfaces, such as cutting boards, containers and utensils that have not been cleaned and sanitized properly between uses.

Examples of cross-contamination





management principles

- Encourage high standards of personal hygiene and habits.
- Insist that food is kept covered until use.
- Provide suitable utensils for moving or 'handling' food and encourage employees to use them.
- Keep food areas clean. Make certain that employees clean and sanitize all equipment, utensils and other food-contact surfaces after every task involving food.
- Remove garbage and trash from food areas and dispose of it safely and hygienically.
- Train employees to keep raw and cooked food apart and to use separate utensils for raw food and cooked food.
- Train employees to keep allergen-free food separate from food that contains food allergens.

Examples of foodborne illness

Pathogen	Foods commonly involved	Typical symptoms	Average onset time
BACTERIAL INFECTION			
Campylobacter	Raw poultry, raw meat, untreated milk	Diarrhea (often bloody), abdominal pain, nausea, fever	48-60 hours
Listeria	Untreated milk, dairy products such as soft cheeses, and ready-to-eat products including raw salads and vegetables	Symptoms like 'flu' can cause severe complications for pregnant women	1-70 days
Salmonella	Raw poultry, eggs, raw meat, untreated milk and dairy products	Abdominal pain, diarrhea, vomiting, fever	12-36 hours
Shigella (bacillary dysentery)	Untreated water, milk and dairy products, raw vegetables and salads, shellfish, turkey, apple cider	Diarrhea (sometimes bloody), fever, abdominal pain, dehydration	1-7 days
Vibrio	Raw and lightly cooked fish and shellfish	Vomiting, diarrhea, abdominal pain, fever, headache, dehydration	2-48 hours
BACTERIAL INTOXICATION			
Bacillus cereus	Cereals (especially rice), soil and dust	Abdominal pain, some diarrhea, vomiting	1-6 hours or 8-16 hours depending on the form of the illness
Clostridium botulinum (botulism)	Incorrectly processed canned food, vacuum-packed foods, continuous stockpots, temperature-abused potatoes, honey (causing infant botulism)	Double vision, difficulties in breathing and swallowing, paralysis	12-36 hours
Staphylococcus aureus	Products of animal origin touched by hand, such as ham, poultry, milk and cheese	Vomiting, abdominal pain, nausea, possible low temperature	1-6 hours
BACTERIAL TOXIN-MEDIATED INFECTION			
Clostridium perfringens	Animal and human excreta, soil, dust, insects and raw meat	Abdominal pain, diarrhea	12-18 hours
Escherichia coli (*E. coli* O157)	Human and animal gut, sewage, water , raw vegetables, salads and raw meat	Abdominal pain, fever, diarrhea (may be bloody), vomiting, kidney damage or failure	12-24 hours or longer
VIRUSES			
Hepatitis A	Water, raw shellfish, raw vegetables, food prepared by bare hands (the fecal-oral route is typical), prepared salads and other ready-to-eat foods	Fever, nausea, vomiting, jaundice, liver disease, fatigue	15-50 days
Norovirus	Water, raw shellfish, raw vegetables, salads and fruits	Nausea, projectile vomiting, diarrhea. Fever and headache possible	24-48 hours
Rotavirus	Water, raw seafood, raw vegetables and salads	Vomiting, diarrhea, some fever possible, dehydration	24-36 hours
PARASITES			
Anisakis	Raw or lightly cooked seafood	Nausea, vomiting, coughing, possible fever and bloody stools	4-6 hours usually, but up to 7 days possible
Cryptosporidium parvum	Water, raw fruits and vegetables	Diarrhea	up to 7 days
Giardia lamblia	Water, raw fruits and vegetables	Watery diarrhea, abdominal pain, nausea	up to 1 week or longer
Trichina spiralis	Pork and wild game meat	Nausea, abdominal pain, vomiting, diarrhea, muscle pain, fever, difficulty with breathing	2-28 days
TOXINS			
Ciguatoxin	Warm-water fish	Dizziness, reverse sensation of hot and cold, diarrhea, vomiting	30 min-36 hours
DSP, PSP, NSP and ASP	Shellfish	Numbness, uncoordination , diarrhea, vomiting, reverse sensation of hot and cold	10-60 min
Mycotoxins	Cereals, grains, nuts, dried fruits	*Acute:* cramp, loss of body-weight, severe bleeding, internal swelling *Chronic:* gangrene, kidney damage, hepatitis, cancer	Wide variation

Student sheet Quiz 2

Objective

Consolidate aspects of food hazards and foodborne illness.

15 minutes

1. Which of the following is not an example of a biological foodborne disease?
   a. Fungi, such as mold or yeasts
   b. Pesticides
   c. Viruses
   d. Naturally occurring poisons such as those found in some plants, fish and mushrooms

2. T__ F__ A 'food-contact surface' is any surface that is touched by food.

3. T__ F__ All types of bacteria are harmful.

4. Pathogenic bacteria come from:
   a. Raw food
   b. Water
   c. People
   d. All of the above

5. T__ F__ Viruses depend upon particular types of food for their survival.

6. T__ F__ The mycotoxins are not destroyed by cooking.

7. The time it takes for the symptoms of a foodborne illness to start after contaminated food has been eaten is known as:
   a. The dormant period
   b. Binary fission time
   c. Onset (or incubation period)
   d. The danger zone

8. Which of the following is not a highly susceptible population:
   a. Elderly people
   b. Professional athletes
   c. Pregnant women and unborn babies
   d. Breast-fed babies and the very young

9. T__ F__ A toxin mediated infection is an illness caused by eating food contaminated by certain live pathogenic bacteria that make toxins as they live in the stomach or intestine.

10. T__ F__ The most common symptoms of foodborne illness are abdominal pain, diarrhea, vomiting and muscle pain.

11. According to the FDA *Food Code*, the temperature 'danger zone' is:
    a. 45°F - 140°F
    b. 41°F - 135°F
    c. 45°F - 141°F
    d. None of the above

12. T__ F__ According to recent analysis Norovirus may cause most cases of known foodborne illnesses.

13. Potentially hazardous foods or time/temperature control for safety foods include:
    a. Milk and dairy products
    b. Cut melons
    c. Raw seed sprouts and soy products
    d. All of the above

14. T__ F__ Most pathogenic bacteria need A_w to be above 0.89 in order to multiply.

15. T__ F__ Physical and chemical hazards cause the greatest number of food safety problems.

Integrated Pest Management

key words

Infestation – the presence of pests.

Pest – an animal or insect that contaminates or damages food.

Integrated pest management – a comprehensive system of pest prevention and control.

Pests can be a serious economic and health problem. They can contaminate and destroy food stocks, damage premises and spread foodborne illnesses. This chapter discusses the principles of preventing infestation.

Pests

The main pests of concern in food establishments are:

- insects – such as flies, moths, ants, cockroaches and wasps
- stored product pests – such as beetles, mites and weevils
- rodents – rats and mice
- birds – mainly pigeons, sparrows, starlings and seagulls.

The problems they create include:

- loss of profit
- damage to the business' reputation
- food contamination and waste
- the spread of diseases
- damage to buildings, equipment and electrical cables, causing fire and other safety hazards.
- non-compliance with the law.

Damage to the business' reputation and profit

Food operations attract pests because they contain everything most pests need to survive:

- food – in storage, under preparation or as waste
- moisture – as condensation from cooking activities, from plumbing leaks or from stored liquids
- warmth – from heating systems or from handling and processing activities
- shelter – for sleeping or nesting in any undisturbed areas, such as under refrigeration equipment that has not been moved regularly for cleaning or the back of a store that has not been checked frequently.

Food contamination and waste

Pet animals can also contaminate food and must not be allowed in any food facility unless they are a 'service animal' on duty.

Unhealthy habits

Many pests inhabit unhealthy places where they pick up pathogenic bacteria on their bodies and legs – for example, rats live in sewers, while flies feed and breed in landfills, garbage containers and animal droppings. Some pests also have pathogenic bacteria living inside their bodies: these can be spread to food and water from their droppings and urine or through their saliva as they eat. Pests also cause physical contamination with their droppings, eggs, fur, nest material, mites, parasites and their own dead bodies.

The spread of diseases

Student sheet Activity 5

Objective

Memorize the required times and cooking temperatures for PHF/TCS foods.

10 minutes

Fill out the missing times and temperatures on the chart below.

Food Item	Minimum Internal Temperature	Minimum Holding Time at the Specified Temperature
Poultry Stuffed poultry, fish, meat or pasta Stuffing containing fish, meat or poultry Wild game animals	°C (°F)	
Roast (rare) beef	°C (°F)	
Ground beef and pork	°C (°F)	
Fish and meat not listed elsewhere on this chart Unpasteurized shell eggs prepared for immediate service	°C (°F)	
Unpasteurized shell eggs cooked for late service	°C (°F)	
Exotic species of game animal Comminuted fish and meat Injected meat	°C (°F)	
Food cooked in a microwave oven	°C (°F)	
	Minimum Surface Temperature	
Steaks	°C (°F)	

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