

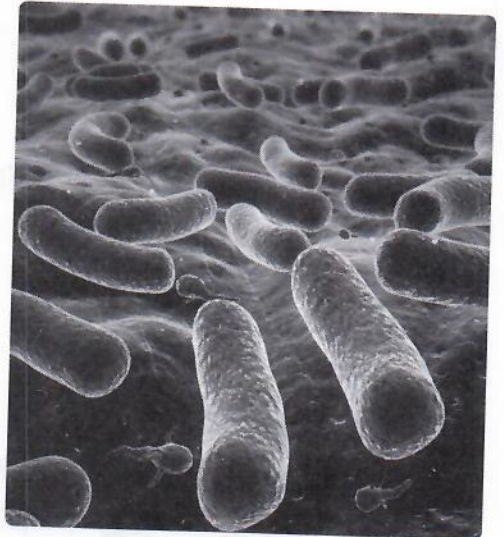
CHAPTER 2

FOODBORNE ILLNESS

Chapter 1, "Food Contamination", provided some basics on how food becomes contaminated. This is extremely important to understand and prevent, because food contamination can lead to foodborne illness.

A foodborne illness is a disease transmitted to people by contaminated food. A foodborne illness outbreak is when two or more people contract the same illness from the same food source, as confirmed through laboratory tests.

Every person is at risk for foodborne illness, and this risk can be easily reduced by properly training food service employees to carefully prepare and serve food.



TYPES OF MICROORGANISMS

As noted earlier, biological contamination is the presence of microorganisms or their toxins. Biological contamination is caused by four types of microorganisms:

- Viruses
- Bacteria
- Parasites
- Fungi

These microorganisms fall into two groups: pathogenic microorganisms and spoilage microorganisms.

Pathogenic microorganisms are invisible to the eye, cannot be smelled nor tasted, and are the primary cause of foodborne illness. **Spoilage microorganisms** can be seen and smelled, and usually do not cause a foodborne illness, but result in spoiled food.

HOW BACTERIA GROW

Conditions that provide a favorable environment for bacteria to grow are easily remembered using the acronym "FAT TOM," which stands for:

F	Food	Potentially Hazardous / TCS foods allow growth
A	Acidity	Foods with slightly acidic or neutral pH allow growth
T	Temperature	Temperatures between 41°F to 135°F allow growth
T	Time	Foods stored or held in the Temperature Danger Zone for 4 hours or longer allow growth to unsafe levels
O	Oxygen	Most microorganisms require oxygen to grow
M	Moisture	Moisture in food allows microorganisms to grow

TIME / TEMPERATURE CONTROL FOR SAFETY (TCS) FOOD

TCS food is any food that is capable of supporting the rapid growth of harmful microorganisms. Any food can become contaminated and cause foodborne illness, but these common foods have been frequently linked to cases of foodborne illness:

- Milk and milk products
- Fish, shellfish & crustacea
- Shell eggs
- Sprouts and raw seeds
- Meat - beef, pork & lamb
- Soy-protein foods
- Poultry
- Other raw products
- Cooked rice or beans
- Cut tomatoes
- Garlic in oil
- Sliced melons
- Cut leafy greens
- Baked potatoes wrapped in foil

FOODBORNE ILLNESSES

When a foodborne illness occurs, sick customers may experience common symptoms like nausea, vomiting, diarrhea, headache, fever and other flu-like symptoms.

Illness Caused by Viruses

Foodborne illnesses caused by viruses are the most common. A virus is a very small, infectious microorganism that can only grow inside the living cells of other organisms - humans, animals, and plants. Most are not effectively treated with antibiotics. Viruses are commonly transmitted by infected food workers, and cause sicknesses such as the common cold, flu, measles, chicken pox, and yellow fever. Good personal hygiene, including not working while ill, is the best preventative measure to avoid spreading viruses in a food service establishment. The following are the most common foodborne illnesses caused by a virus:

Illness	Hepatitis A
Caused by	<i>Hepatovirus</i>
Food sources	Shellfish, contaminated water and ready-to-eat foods like raw produce and salads
Prevention	<ul style="list-style-type: none">▪ Use good personal hygiene practices, particularly proper handwashing▪ Obtain foods from an approved source

Illness	Norovirus
Caused by	<i>Norovirus</i>
Food sources	Unsafe water sources that contaminate raw shellfish, fruits and vegetables
Prevention	<ul style="list-style-type: none">▪ Use good personal hygiene practices, particularly proper handwashing▪ Avoid cross-contamination through proper cleaning and sanitizing▪ Properly wash and handle produce▪ Obtain shellfish from an approved source▪ Use water and ice from an approved source

Illness Caused by Bacteria

Foodborne bacterial illnesses are preventable, if measures are taken to protect food. Careful attention to time and temperature control, correct personal hygienic practices, cross-contamination prevention, and obtaining food supplies only from approved sources, will greatly reduce the risk of foodborne illness. The following are some common bacterial illnesses, foods they are associated with, and best preventive measures:



Best Preventative Measure - Prevent Cross-contamination

Illness	Nontyphoidal Salmonellosis (NTS)
Caused by	<i>Salmonella spp.</i>
Food sources	Poultry, raw eggs, produce (cantaloupes, tomatoes & peppers)
Prevention	<ul style="list-style-type: none">• Avoid cross-contamination with raw foods and ready-to-eat foods• Cook foods to their recommended internal temperature for a minimum of 15 seconds• Exclude foodhandlers who are sick from NTS• Use good personal hygiene practices, particularly proper handwashing

Best Preventative Measure - Time and Temperature Control

Illness	E. Coli
Caused by	<i>Shiga toxin-producing E. Coli (STEC)</i>
Food sources	Raw or undercooked ground beef, contaminated produce, unpasteurized dairy products
Prevention	<ul style="list-style-type: none">• Cook ground beef to an internal temperature of 155°F for a minimum of 15 seconds• Use good personal hygiene practices, particularly proper handwashing• Avoid cross-contamination• Use only pasteurized dairy and juice products• Exclude diagnosed foodhandlers

Illness	Botulism
Caused by	<i>Clostridium botulinum</i>
Food sources	Home-canned goods, food from damaged packaging, garlic and oil products, reduced-oxygen packaged food
Prevention	<ul style="list-style-type: none">• Practice proper time and temperature controls for storage• Do not use home canned items - use only food from approved vendors• Throw away any food from damaged packaging

Best Preventative Measure - Good Personal Hygiene Habits

Illness	Shigellosis
Caused by	<i>Shigella</i>
Food sources	Salads, raw vegetables, dairy products, other ready-to-eat foods, contaminated water
Prevention	<ul style="list-style-type: none">• Use good personal hygiene practices, particularly proper handwashing• Use sanitary and approved food and water sources• Control flying insects• Avoid cross-contamination

Illness	Salmonella Typhi (Typhoid Fever)
Caused by	<i>Salmonella spp.</i>
Food sources	Drinking water and ready-to-eat foods
Prevention	<ul style="list-style-type: none">• Exclude foodhandlers who have been diagnosed with Typhoid Fever• Cook foods to their recommended internal temperature for a minimum of 15 seconds• Use good personal hygiene practices, particularly proper handwashing

Other bacteria that can cause foodborne illnesses may include:

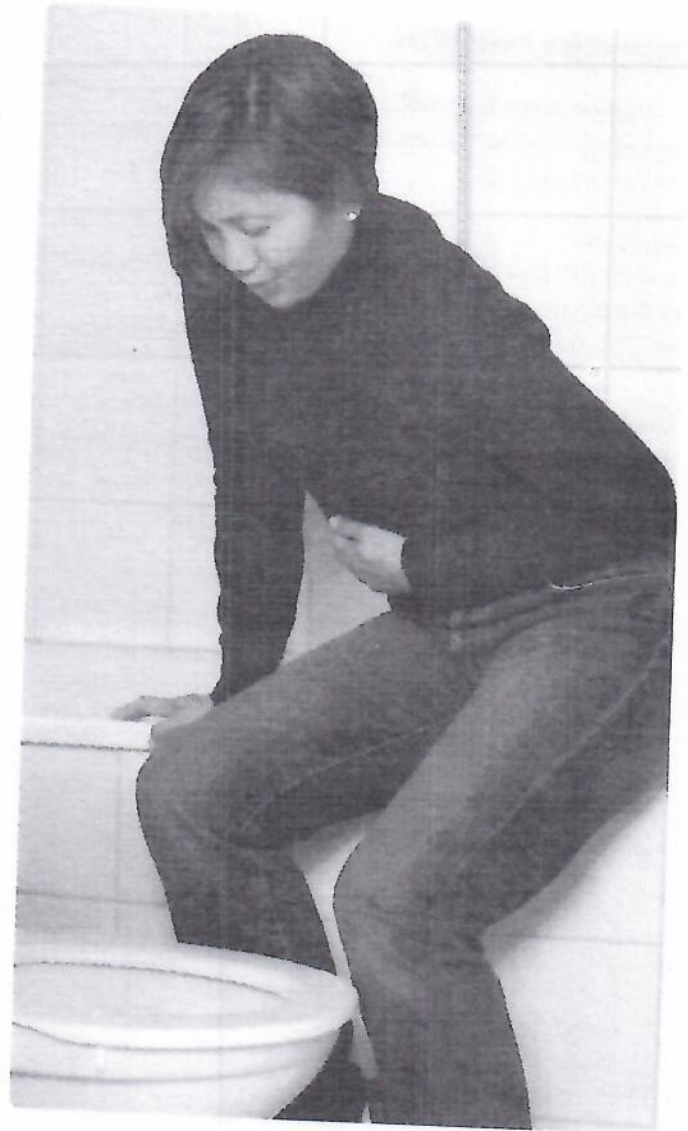
Listeria from unpasteurized milk products and deli meats, Vibrio from contaminated raw shellfish, and Staphylococcus from the hair, skin, nose and throat of the human body.

Illness Caused by Parasite

Parasites are organisms that grow, feed, and are sheltered on or in another organism — the “host” — while contributing nothing to the survival of the host. Parasites can survive on food. Parasitic worms and their larvae are commonly found in animal foods such as hogs and fish. Parasites can cause foodborne infections that may include symptoms such as nausea, diarrhea, abdominal pain, fever, fatigue, and cramping. To prevent foodborne illness associated with parasites it is most important to obtain food, especially seafood, from a reputable supplier. Cooking foods to their required internal temperature is also important. Be sure that fish that will be served raw has been properly frozen and is designated to be of sushi-grade quality.

Illness Caused by Fungi

Fungi occur naturally in air, soil, plants, animals, water and some foods. Common fungi includes molds, yeast, and mushrooms. Some fungi are harmful or even fatal when consumed by humans. Food with visible mold that is not an intended part of the product (such as the rind on certain cheeses) should be discarded. While fungus is typically considered a spoilage microorganism, some molds produce toxins that can cause illness. Aflatoxins produced by fungi, are found on nuts and oilseeds and can be toxic. Yeast, on the other hand, is a fungus that causes rapid fermentation (spoilage) of food and may produce an alcoholic smell or taste. Yeast, like mold, grows well in sweet, acidic foods with low water activity, such as jellies, jams, syrup, and fruit juice. Food that has been spoiled by yeast should be discarded.



HANDLING EMPLOYEE ILLNESS

Exclusion from Work

It is extremely important that all food service employees pay close attention to their health and report any illness or symptoms of illness to management. Employees that have been diagnosed with certain illnesses are prohibited by law from working in a food service establishment. This prohibition is called an “exclusion” from work. Carefully follow all rules and regulations for employee exclusion to prevent the spread of illness. Employees diagnosed with an illness from any of the following pathogens must be excluded from work in accordance with Florida law:

1. *Salmonella Typhi*
2. Nontyphoidal *Salmonella*
3. *Shigella*
4. *E. Coli*
5. Hepatitis A
6. Norovirus



Diagnosed employees may return to work only after having been cleared to do so in writing by a medical doctor.

Restriction from Work

In addition to the legal obligation to exclude certain employees from work as described above, food service employees and managers must watch closely for the following symptoms, and restrict or exclude employees from work when exhibiting the following symptoms:

Restrict:

- Sore throat with fever, unless released in writing by a medical practitioner
- Running nose
- Lesions containing pus, such as boils or infected wounds that are open or draining

The restriction must keep symptomatic employees from working with exposed food, food contact surfaces, and food equipment. Individuals with a sore throat and fever should be excluded if they primarily serve a high-risk population.

Exclude:

- Diarrhea
- Vomiting
- Jaundice (yellowing of the eyes and skin), unless released in writing by a medical practitioner and approved by your inspector

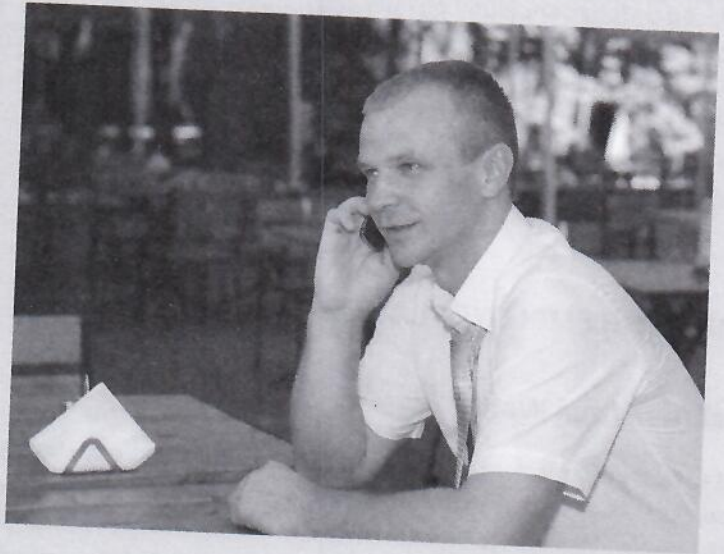
Exclude employees exhibiting any of the above symptoms when they are the result of a contagious or infectious condition.

BEST EMPLOYEE PRACTICE

Customer Complaints

It is extremely important to correctly and urgently handle any customer's claim that they became ill from eating at your food service establishment.

Whether at the time of service, or later by telephone or in person, all employees must know how to handle these claims according to company policy. Do not argue with the customer, but treat the situation as urgent and immediately notify your manager or supervisor.



CHAPTER TWO REVIEW QUIZ

True or False

1. T____ F____ A foodborne illness is a disease caused when people eat contaminated food.
2. T____ F____ Wheat is a common food allergen.
3. T____ F____ "Excluded" employees may return to work as soon as they feel better.
4. T____ F____ Employees have a legal responsibility to notify their supervisor when ill.

Complete Each Sentence

1. A potentially hazardous or _____ food is capable of supporting the rapid growth of harmful microorganisms.
2. _____ illnesses are commonly caused by poor personal hygiene behaviors.
3. Employees must report certain diagnosed illnesses and certain symptoms of illness to their _____.
4. Microorganisms capable of causing foodborne illness include: virus, fungi, parasites and _____.

Multiple Choice

1. Which of the following is not a type of microorganism?
 - a. Fungi
 - b. Bacteria
 - c. Virus
 - d. Acidity
2. Which of the following is the acronym used to remember the conditions in which microorganisms grow best?
 - a. TALL BILL
 - b. MAD MARY
 - c. FAST CAR
 - d. FAT TOM
3. Which of the following illnesses result in a food employee being "excluded" from work?
 - a. Salmonellosis
 - b. *E. coli*
 - c. Hepatitis A
 - d. All the above
4. Employees must report which of the following symptoms of illness to his or her manager:
 - a. Headache
 - b. Sore throat with fever
 - c. Aching teeth
 - d. Hair loss