**Chapter 2 Notes**

Contamination: presence of harmful substances in food

* These can be biological, chemical, or physical
* Contaminates cause foodborne illness or physical injury
* Food can be contaminated on purpose, but usually it is an accident (typically by way of the way people handle food)

Biological contamination

* Occurs from pathogens (harmful microorganisms)
* 4 types of pathogens that cause foodborne illness
	+ Bacteria
	+ Viruses
	+ Parasites
	+ Fungi (includes mold and yeas)
* The Big 6 (highly contagious and cause severe illness- dubbed by the FDA)
	+ Shigella spp. (bacteria)
	+ Salmonella Typhi (bacteria)
	+ Nontyphoidal Salmonella (NTS) (bacteria)
	+ Shiga toxin producing Escherichia Coli (STEC) (bacteria)
	+ Hepatitis A (virus)
	+ Norovirus (virus)

Symptoms of FBI

* Diarrhea
* Vomiting
* Fever
* Nausea
* Abdominal cramps
* Jaundice

Onset time: How quickly FBI symptoms appear in a person

* Can range from 30 minutes to 6 weeks

Bacteria

* Can be found almost anywhere
* Cannot be seen, smelled, or tasted
* Need 6 conditions for growth: Food, acidity, temperature, time, oxygen, moisture (FAT TOM)
	+ Food: TCS foods support the growth
	+ Acidity: grow best in little to no acid (PH 7)
	+ Temperature: 41-135 F or the temperature danger zone
	+ Time: The longer it spends in the temperature danger zone the more it grows
	+ Oxygen: Some need oxygen, some do not
	+ Moisture: Grow well in food with high levels of moisture/or high-water activity
* Control FAT TOM conditions to control bacteria. In your operation you will most likely only be able to control time and temperature
* Salmonella Typhi
	+ Lives only in humans
	+ Carried in people’s bloodstream and intestinal tract
	+ Food linked includes ready to eat food and beverages
	+ To prevent wash hands and cook food to minimum internal temps. Do not allow any employee to work who has been diagnosed
* Nontyphoidal Salmonella
	+ Farm animals carry it naturally
	+ Food linked includes poultry and eggs, meat, milk and dairy products, produce
	+ To prevent cook poultry and eggs to minimum internal temps, prevent cross contamination between poultry and ready to eat foods, and do not allow any employee to work who has been diagnosed
* Shigella spp.
	+ Typically found in someone’s feces who has ate or drank contaminated water or food
	+ Flies can also transfer from feces to food
	+ Food linked includes food easily contaminated by hands (i.e. salads with tcs foods) and food that has made contact with contaminated water (i.e. produce)
	+ To prevent wash hands, control flies, and do not allow any employee to work who has been diagnosed
* Shiga toxin producing Escherichia Coli (STEC)
	+ Found in the intestines of cattle. Bacteria can contaminate meat during slaughtering. It is also found in infected people
	+ Food linked includes ground beef (raw and undercooked) and contaminated produce
	+ To prevent do not allow any employee to work who has been diagnosed, cook food to minimum internal temps, purchase produce from approved and reputable suppliers, prevent cross contamination between raw meat and ready to eat foods

Viruses

* Carried by humans and animals. They require a living host to grow. They do not grow in food but can be transferred through food.
* People get viruses from food, water, or any contaminated surface. Typically occur through fecal oral routes.
* Norovirus is leading cause of foodborne illness. It is often transmitted through airborne vomit particles.
* Not destroyed through normal cooking temperatures.
* Hepatitis A **and** Norovirus
	+ Mainly found in feces of those infected with it. It can contaminate water and many types of foods. Commonly linked with ready to eat foods.
	+ Typically transferred to food when people touch food with hands that have infected feces on them.
	+ Infected person might not show symptoms for weeks.
	+ Cooking does not destroy it.
	+ Food linked includes ready to eat foods and shellfish from contaminated water.
	+ To prevent exclude employees who have been diagnosed, exclude employees who have jaundice for 7 days or less (hepatitis A only), wash hands, avoid bare hand contact with ready to eat foods, and purchase shellfish from approved, reputable suppliers

Parasites

* Require a host to live and reproduce
* Commonly associated with seafood, wild game, and food processed with contaminated water
* To prevent purchase food from approved and reputable suppliers and cook food to required minimum temps. Undercooked or raw fish must be properly frozen by manufacturer.

Fungi

* Includes yeasts, molds, and mushrooms
* Some molds and mushrooms produce toxins…throw out all moldy food unless it is naturally a part of the food
* Harmful mushrooms are difficult to recognize. Purchase all mushrooms from approved and reputable suppliers.

Biological toxins

* Most caused by pathogens, but you should also be aware of toxins
* Some are naturally occurring, some are made by pathogens when item is time temperature abused, some contaminated by an animal or plant they ate
* In general, people will experience illness within minutes of eating a toxin
* Symptoms can include diarrhea, vomiting, neurological symptoms, difficulty breathing, burning in the mouth, hives, heart palpitations
* Cannot be destroyed by cooking or freezing
* To prevent purchase plants, mushrooms, and seafood from a reputable and approved supplier and ensure control of time and temp when handling raw fish

Chemical Contaminants

* Can contaminate food is used or stored incorrectly
* Most symptoms occur within minutes. Vomiting and diarrhea are typical.
* Chemicals should be approved for food service use
* Store chemicals away from food and contact surfaces
* Make sure all manufacturers’ labels are readable

Physical Contaminants

* Can include naturally occurring or manmade items
* Symptoms could include cuts, dental damage, chocking, and bleeding

Deliberate contamination of food

* Might include terrorists or activists, disgruntled current or former staff, vendors, competitors
* FDA Food Defense Program based on ALERT
	+ Assure
	+ Look
	+ Employees
	+ Reports
	+ Threat

Responding to a FBI outbreak

* Gathering information
* Notifying authorities
* Segregating product
* Documenting information
* Identifying staff
* Cooperating with authorities
* Reviewing procedures

Food Allergens: a protein in a food or ingredient that some people are sensitive to

* When enough of an allergen is eaten, an allergic reaction can occur. An allergic reaction is when the immune system mistakenly considers the allergen to be harmful and attacks the food protein
* Symptoms might include
	+ Nausea
	+ Wheezing or shortness of breath
	+ Hives or itchy rashes
	+ Swelling of various body parts
	+ Vomiting and/or diarrhea
	+ Abdominal pain
	+ Itchy throat
* The big 8 allergens account for 90% if allergens
	+ Milk
	+ Eggs
	+ Fish
	+ Peanuts
	+ Soy
	+ Wheat
	+ Crustacean shellfish
	+ Tree nuts
* Food labels are an important tool used to identify allergens. The big 8 allergens must be identified on labels
* Service staff should be able to tell the customer the following:
	+ How the dish is prepared
	+ Identify the ingredients
	+ Suggest items
	+ Identify the allergen special order
	+ Deliver food appropriately
* Ensure there is no cross contact when preparing allergen foods

Chapter review:

* The most common symptoms of FBI are diarrhea, vomiting, fever, nausea, abdominal cramps, and jaundice
* Most contamination occurs through people who cause it
* Time and temp are most important way to prevent FBI from bacteria
* Good personal hygiene is the most important way to prevent FBI from viruses
* Parasites are most linked to seafood
* If someone has a reversal of hot and cold symptoms it is most likely biological toxins
* To prevent deliberate contamination the manager should know who is in the facility, monitor thew security of products, keep information related to food security on file, and know where to find the safety data sheets