



Food safety program fact sheet:

How Food Borne Illness starts

During production, processing, packaging, transportation, preparation, storage, and food may be exposed to contamination with:

1. poisonous substances
2. infectious microorganisms, or
3. toxigenic microorganisms

Processing failure may lead to survival of such microorganisms or toxins and time-temperature abuse can allow proliferation of pathogenic bacterial and molds. If a contaminated product that has been eaten contains sufficient quantities of poisonous substances or pathogenic microorganisms, foodborne illness will result. In addition, some plants are intrinsically toxic; animals may acquire toxins from their food or metabolize them, or they become infected with parasites. A risk of foodborne illness result when such foods are eaten.

A food borne illness outbreak is defined by the FDA Food Code as any sickness involving 2 or more people eating the same food or food from a common source.

Potentially hazardous foods (PHFs) are foods that are capable of supporting the fast growth of disease-causing germs. PHFs include milk and milk products, shell eggs, meats and poultry, fish and shellfish, crustaceans, cooked potatoes, tofu and soy-protein products, cooked or partially cooked plant foods, sliced melons, and raw seed sprouts. Pasteurized products such as pasteurized eggs and milk are still treated as PHFs!

The #1 situation that causes Food borne illness (FBI) is improper cooling of hot food masses. Food should served immediately after cooking. Otherwise, the hot mass must either be cooled to $< \text{or} = 40^{\circ} \text{F}$ or kept hot $> \text{or} = 140^{\circ} \text{F}$ within 4 hours total time. $40\text{-}140^{\circ} \text{F}$ is known as the temperature danger zone (TDZ). Most pathogens grow best at about 100°F ; perfringens grows best at $110\text{-}120^{\circ} \text{F}$.

TYPES OF FOOD BORNE ILLNESS

A food borne infection is a disease that results from eating food containing living harmful microorganisms (germs). These kinds of germs colonize the intestinal lining and invade the body, causing food borne illness symptoms.

A food borne intoxication is a disease that results from eating food contaminated with poisons or toxins from bacteria, molds, or chemicals. These toxins are usually odorless, tasteless and colorless, and they can cause disease even after the disease germs in the food have been killed.

A toxin-mediated infection is a disease that results from eating food containing live germs. These kinds of germs would colonize the stomach or intestine, making toxin as they live and grow. The toxin produced inside the body causes the food borne illness symptoms.

Staphylococcal food intoxication - The ball-shaped bacterium is most commonly found in the nasal passages, on hands and skin, in cuts, burns, boils and pimples. Staph makes heat-stable toxin as it grows on food. Food poisoning results from eating contaminated cooked or processed foods that have not been cooled properly. "The 24-hour stomach flu."

Clostridium perfringens (toxin-mediated infection) - The spores, found in soil, dust and feces are carried on raw food products. They turn vegetative and grow after being a) heat-shocked b) put into a

situation without oxygen [anaerobic] c) given more than 4 hours time in the temperature-danger-zone. Mild to moderate gas cramps and diarrhea.

Botulism (an intoxication) - A disease caused by eating the pre-formed toxin of *Clostridium botulinum* in already cooked or processed foods with little or no acid and held in anaerobic conditions. The spores go through the same process as for *perfringens*. Central nervous system disorder, leading to paralysis and possible death from suffocation.

Bacillus cereus (intoxication) - These spore-formers are generally of 2 strains: the ones found in meat, poultry and vegetables cause diarrhea. Those in grain products such as rice, flour, corn, starches and dry-mix products produce vomiting. The spores go through the same process as for *perfringens*.

Salmonellosis (infection) - *Salmonella* bacteria are found in animals especially poultry and eggs, in pets such as turtles, and in humans. When preparing foods containing eggs that will not be thoroughly cooked, such as Caesar salad dressing, meringues, mousses and taramisu, use liquid pasteurized eggs or commercially prepared mixtures. Do not serve undercooked shell eggs. Moderate flu-like symptoms.

Shigellosis (infection) - The *Shigella* bacterium is found in human feces of carriers. When carriers do not wash their hands properly after using the toilet, they can introduce fecal smears from their fingertips into prepared foods. Severe flu-like symptoms with possible adult weight loss of 15-20 pounds.

Listeriosis (infection) - A disease caused by eating live *Listeria monocytogenes* germs in processed and refrigerated foods. The germ is found abundantly in nature. If the food processing plant fails to kill the *Listeria* bacteria during processing, the germs can grow in refrigerated temperatures; they are psychrophilic (lover of the cold). Ice cream, soft cheeses, lunch meats, sausages and any number of cooked/processed refrigerated foods have been implicated in outbreaks. Severe flu-like symptoms which can lead to death, especially of pregnant women and fetuses.

Escherichia coli O157:H7 (toxin-mediated infection) - This bacterium has been found in the feces of cattle, cows, deer, squirrels, seagulls and human carriers. Raw or undercooked ground beef and red meats are primary vehicles of transmission. Cooking ground beef to an internal temperature of $\geq 155^{\circ}$ F is necessary to kill this germ. Severe flu-like symptoms, sometimes resulting in very bloody diarrhea and kidney failure.

Campylobacteriosis (infection) - An illness caused by eating cross-contaminated foods or insufficiently cooked meat, poultry or unpasteurized dairy products. Flu-like symptoms.

Hepatitis A (infection) - A highly contagious viral infection which, while not usually fatal, can make someone extremely sick for weeks or months. Indicative symptoms are flu-like, with white feces, chocolate colored urine, and jaundice (a yellowing of skin and eyes). Adequate and proper hand washing is an excellent preventive measure; vaccination is the only reliable control measure.

Ciguatera - Ciguatera toxin - An intoxication caused by eating contaminated reef fish such as Jackfish, Amberjack, Grouper, Surgeon Fish, Red Snapper and Barracuda. These fish feed on smaller reef fish which feed on the tiny free-swimming algae-poisonous during certain times of the year. The toxin is not destroyed by cooking temperatures. Therefore, fish should only be obtained from reputable suppliers. Indicative symptoms are central nervous system disorder, with reversal of hot and cold sensations.