ServSafe
National Restaurant Association

NATIONAL FOOD SAFETY MONTH

THE SCIENCE OF FOODBORNE ILLNESSES AND OUTBREAKS

THE MOST COMMON FOODBORNE ILLNESSES

In the foodservice industry, the threat of spreading potentially harmful foodborne illnesses is always present.

48 MILLION

Nearly 48 million people in the U.S. are afflicted with foodborne diseases annually.

1 IN 6 PEOPLE

Around 1 in 6 people will get sick from a foodborne illness each year.[1]

Although foodborne illnesses stemming from restaurants continue to pose a threat to public health, most cases are highly preventable.

[1] FDA. (2022, February 17). What You Need to Know about Foodborne Illnesses

IN THIS GUIDE

We'll explore the most common pathogens that cause foodborne illness and how they make people sick. Managers and employees alike can use these key details to avoid contaminating food and prevent foodborne illness outbreaks.

THE 5 MOST **COMMON CAUSES** OF FOODBORNE ILLNESS

A foodborne illness occurs when a person ingests a pathogen from a food or beverage, causing them to become sick. In this case, a "pathogen" can mean a bacterium, virus, or parasite. Each type of microorganism can hitch a ride into our meals via surfaces, hands, and contaminated food items.

In the never-ending fight against foodborne illnesses, it makes sense to focus on those organisms that are most likely to make their way into your kitchen.

Based on data from the Food and Drug Administration (FDA), we know that there are five pathogens that cause the majority of foodborne illnesses in the United States:

1. **Noroviruses**
2. **Salmonella**
3. **E. coli**
4. **Hepatitis A/E**
5. **Shigella**

Each of these contaminants can spread through food and drink, which means avoiding them should be a priority for food service workers. Let's explore each pathogen in more detail.

1 NOROVIRUSES

Noroviruses, of which there are several strains, are considered to be the leading cause of illness from contaminated food or water. This type of virus can be spread when an infected person handles or prepares foods like:

- → **Fruits**
- → **Vegetables**
- → **Meats**
- → **Salads**
- → **Oysters grown in contaminated water**

While most people who get sick from noroviruses experience non-life threatening symptoms, some people need to be treated by a doctor or hospitalized. **Since this type of pathogen is a virus, not a bacteria, antibiotics won't work against fighting noroviruses.** And its rapid spread means that norovirus can rip through a community before officials have enough time to identify it.

Noroviruses also spread easily from person to person, which means they spread even faster in groups or crowded living situations (like nursing homes, dorms, daycare centers, or correctional facilities).

SYMPTOMS

- → Projectile or explosive vomiting
- → Watery diarrhea (that isn't bloody)
- → Cramps
- → Headache
- → Mild fever
- → Muscle aches

QUICK STATS

11% OF DEATHS

MORTALITY:
Accounts for 11% of deaths associated with food consumption

12 HOURS

SYMPTOM ONSET:
1-2 days after ingesting the virus, though symptoms may start as soon as 12 hours after

1-2 DAYS

DURATION:
1-2 days, sometimes longer

HOW TO AVOID SPREADING NOROVIRUS

Handwashing is essential in keeping norovirus from spreading to surfaces we touch. All it takes is a small amount of norovirus in your system to get sick. Anyone involved in handling food or drink should always abide by proper handwashing protocols and basic food safety, like staying home from work when sick. Properly sanitizing surfaces and wearing gloves while handling ready-to-eat foods will also help stop the spread.

Cross-contamination occurs when Salmonella is spread from a contaminated source – an infected food handler or animal – to other food or objects. For instance, a food handler who doesn't adequately wash their hands or sanitize utensils after coming into contact with a contaminated product may spread the pathogens to new places.

2 SALMONELLA

The genus **Salmonella** is responsible for some of the most infamous foodborne illness outbreaks in history. People can get sick from several types of Salmonella, and the bacterium can spread through food and drink as well as contaminated water or hands.

This pathogen often affects animal products, but it can also be found in produce and other foods, including:

- → **Meats and poultry**
- → **Eggs**
- → **Milk and dairy products**
- → **Fish, shrimp**
- → **Fruits and veggies**
- → **Freshly prepared salad dressings made with unpasteurized eggs**
- → **Dry foods (spices, yeast, coconut raw tree nuts, cake mix, peanut butter)**
- → **Sauces**

One type of Salmonella, known as ***S. Typhi***, is most commonly associated with unclean drinking water. It causes a disease known as typhoidal illness, or typhoid fever.

SYMPTOMS

- → Nausea
- → Vomiting
- → Diarrhea
- → Cramps
- → Fever

- → An immune response to Salmonella may cause a condition known as reactive arthritis in the 3 to 4 weeks after symptom onset

- → If bacteria escape the GI tract, blood poisoning or secondary infection of other organs may occur
- → Typhoid fever: diarrhea or constipation, aches, headache, lethargy, high fever, rash

QUICK STATS

<1% OF DEATHS

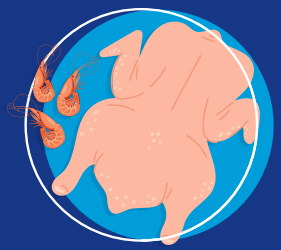
MORTALITY:
Less than 1%

6-72 HOURS

SYMPTOM ONSET:
6-72 hours after exposure

4-7 DAYS

DURATION:
Symptoms usually last 4-7 days, acute symptoms 1-2 days or longer



HOW TO AVOID SPREADING SALMONELLA

Unfortunately, Salmonella can be hard to wash off of food. That means that the most important measures employees can take to prevent illness include:

- **Thoroughly cooking** all food items, particularly perishables like meats
- **Hand washing** regularly and thoroughly
- Keeping raw foods like produce **separate from other items**
- Keeping food at a **safe temperature** when stored or displayed

3 E. COLI

While most **E. coli bacteria** strains are harmless, some produce a toxin – the Shiga toxin – that can cause serious health issues, including blood-clotting problems, kidney failure, and even death.

Not all the Shiga-producing E. coli can cause these problems, but one subset, known as enterohemorrhagic E. coli (EHEC), can.

EHEC outbreaks can trace back to many foods:

- **Ground meats**
- **Unpasteurized "raw" milk**
- **Unpasteurized fruit juice**
- **Lettuce, spinach, sprouts**
- **Commercially manufactured frozen cookie dough**

The infection sometimes progresses into the life-threatening form of the illness that causes kidney failure, with children and people with weak immune systems being at especially high risk.

Some people who get EHEC get the less serious form of the infection, which can range from no symptoms to diarrhea that starts out watery and then turns bloody.

SYMPTOMS

- Diarrhea that initially is watery but becomes bloody. In some cases, the diarrhea may appear to consist entirely of blood and occur as frequently as every 15-30 minutes
- Nausea
- Vomiting
- Severe abdominal cramps
- Symptoms may progress to hemolytic uremic syndrome (HUS), a life-threatening condition that causes decreased urine production, dark or tea-colored urine, and losing pink color in the cheeks and lower eyelids

QUICK STATS

3-5% PROGRESS TO HUS

MORTALITY:
For patients whose illness progresses to HUS, 3-5%

3-4 DAYS

SYMPTOM ONSET:
Usually 3-4 days post-exposure, but may range from 1-9 days

2-9 DAYS

DURATION:
2-9 days

HOW TO AVOID SPREADING E. COLI

Here are some things you can do to protect yourself and others from any type of E. coli:

- Cooking ground beef to a **safe minimum internal temperature** of 160 °F
- **Washing raw fruits and vegetables** under clean, running water
- **Not drinking unpasteurized ("raw") milk** or eating certain cheeses made from it

4 HEPATITIS A

Hepatitis is an illness that can be caused by several viruses within the same family. The pathogen that food industry leaders need to pay attention to is the hepatitis A virus (HAV).

Communities with poor sanitation are high-risk areas for HAV. However, the most common way the hepatitis A virus spreads is through the feces of infected people, which can then be passed on via surfaces. For instance, a daycare worker who cleans an infected child after they have a bowel movement may spread the virus if they don't wash their hands well before handling food.

When HAV ends up on the hands of people who prepare food, it can spread to the items they touch and anyone who eats the affected food.

SYMPTOMS

- → Fever
- → Low appetite
- → Nausea or vomiting
- → Diarrhea
- → Muscle aches
- → Jaundice (yellowing in the whites of the eyes and the skin)
- → In severe cases, inflammation of the liver or liver damage may occur, sometimes resulting in death

QUICK STATS

2.4% DEATH RATE

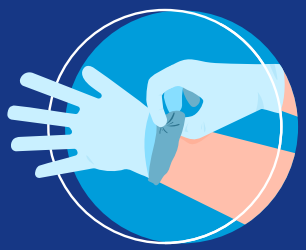
MORTALITY:
The overall death rate among people with hepatitis A (that is, liver involvement; the term "hepatitis A" is used to refer to the disease, not to the virus) is approximately 2.4%

2-4 WEEKS

SYMPTOM ONSET:
2-4 weeks after ingestion

1-2 WEEKS

DURATION:
1-2 weeks, but can last up to 6 months in some people



HOW TO AVOID SPREADING HEPATITIS

Since HAV is a virus, not a bacterium, the best way to prevent it is by:

- Ensuring all staff members **thoroughly wash their hands** before touching food
- **Wearing gloves and appropriate PPE** when preparing food
- **Cooking food until it's at a temperature of 190˚F** in the middle for at least 1½ minutes
- **Boiling food in water** for at least 3 minutes, which inactivates the virus

5 SHIGELLA

Shigella is a bacterium that spreads through humans via contaminated feces. All types of Shigella can cause an illness known as shigellosis, which is often mild and goes away on its own after about a week. However, some cases of shigellosis can become very severe, sometimes even leading to death.

Shigella most often spreads through unclean water, whether it's drinking water or swimming pool water that an infected person has been in. But food can also be contaminated if it's handled by an infected person who doesn't wash their hands well after having a bowel movement. It may likewise spread if contaminated water is used for growing crops or to rinse them afterward.

One specific type of the species, **S. dysenteriae type 1**, produces the Shiga toxin and is known to cause the most severe versions of the disease.

SYMPTOMS

- Diarrhea that may contain blood, pus, or mucus (dysentery)
  - May be severe enough to cause significant dehydration, sometimes leading to serious or fatal health consequences
- Abdominal cramps
- Vomiting
- Fever

QUICK STATS

11% OF DEATHS

MORTALITY:
While the disease is usually self-limiting in healthy people, some strains of the bacterium have fatality rates as high as 10-15%

12 HOURS

SYMPTOM ONSET:
Within 8 hours - 2 days after ingestion

1 WEEK

DURATION:
1 week or less

HOW TO AVOID SPREADING SHIGELLA

As is true for many other pathogens, it doesn't take much Shigella to cause illness; tiny bits of feces can pass from the unwashed hands of an infected person onto the hands and into the mouth of another, causing that person to be sick.

Since this pathogen spreads as a result of human contact with contaminated feces, **handwashing** is one of your best weapons against it.

High-Risk Foods: Top Carriers of Common Pathogens

While just about any food can carry some type of pathogen, there are some categories that tend to spread the top culprits more than others. Take extra care to properly store, display, cook, and serve these items.

FRESH PRODUCE

Fruits, vegetables, herbs, salads, etc.

MEATS

Ground meats, deli meats, etc.

ANIMAL PRODUCTS

Eggs, dairy items, milk

SEAFOOD

Oysters, shrimp, shellfish

UNPASTEURIZED PRODUCTS

Milk, cheese, fruit juices, etc.

DRY FOODS

Flour, nuts, spices

YOUR ROLE IN FIGHTING **FOODBORNE ILLNESSES**

As we've seen, most common foodborne illnesses are caused by just a few microorganisms. But if there's one thing to take away from current foodborne illnesses numbers, it's that these pathogens aren't going anywhere anytime soon. It's up to food service professionals to identify potential risks and address them before they make people sick.

Comprehensive food handler training is essential for educating restaurant staff on common foodborne pathogens, how food becomes contaminated, and their role in preventing foodborne illness outbreaks.

Check out our follow-up eBook: **"What Happens When Foodborne Illnesses Become Outbreaks: Behind the Scenes of Managing an Outbreak,"** where we explore the science behind foodborne illness outbreaks, including how illnesses are investigated and what restaurant owners or managers can do to respond to potential outbreaks.

Visit **foodsafetyfocus.com** for more information on protecting your community from foodborne pathogens.

FDA. (2012). Bad Bug Book, Foodborne Pathogenic Microorganisms and Natural Toxins. Second Edition.

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