

Foodborne Illness— Revisiting the Basics

FOOD PROTECTION CONNECTION

A look at the “Big 6” foodborne pathogens and food protection strategies

Worldwide foodborne illness sickens 600 million people and causes 420,000 deaths annually, and the World Health Organization (WHO) estimates that 33 million years of healthy lives are lost each year due to eating unsafe foods. While the food supply in the United States is one of the safest in the world, each year the U.S. contributes to those global statistics by adding nearly 48 million illnesses, 128,000 hospitalizations, and 3,000 deaths as a result of foodborne and waterborne illnesses, according to the Centers for Disease Control and Prevention (CDC).

More than 250 foodborne diseases have been identified, with 31 foodborne bacteria, viruses, parasites, and toxins identified by the CDC as “known pathogens” that are surveilled and tracked for public health. Of those 31 notable foodborne pathogens,

the “Big 6” have been singled out as those that are of particular concern and focus for prevention of foodborne illness in the U.S. because they are highly infectious and can cause severe disease in small quantities.

THE “BIG 6” FOODBORNE PATHOGENS

The “Big 6” pathogens are:

1. Norovirus
2. *Salmonella*
3. *Salmonella typhi*
4. *Escherichia coli*
5. *Shigella spp.*
6. Hepatitis A



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Foodborne pathogens do not work alone, and it's important to recognize that there are risk factors that work in tandem with contamination that increase risk and contribute to the responsibility of foodborne illness outbreaks.

TOP RISK FACTORS FOR OUTBREAKS

The top 5 risk factors for foodborne illness outbreaks are:

1. Improper hot and cold holding temperatures of potentially hazardous foods (this includes cooling and reheating of foods)
2. Improper cooking temperatures of food
3. Dirty and/or contaminated utensils and equipment
4. Poor employee health and hygiene
5. Food from unsafe sources

While the majority of people affected by a foodborne illness will experience mild symptoms and will not require medical treatment, high risk populations are at increased risk of developing severe health outcomes, like more acute symptoms, complications from disease, and even death. High risk populations are those people with compromised immune systems and pre-existing conditions, the elderly and very young, as well as pregnant women.

Most people assume that when they experience illness from food, it is caused by the last thing eaten, however foodborne illness symptom onset can range from a couple of hours to as long as six weeks, depending on the culprit pathogen. Hepatitis A can have an onset time as long as 50 days, while Norovirus has an onset time as short as 12-48 hours after consumption.

FOOD HANDLING THROUGHOUT THE SUPPLY CHAIN

Improved food safety and technology has played a significant role in helping to mitigate the impact of foodborne disease, however outbreaks do still exist. For

occurring at any step along the chain, including production, processing, distribution, or preparation.

Production refers to growing and harvesting produce or raising animals for food that will be consumed.

Processing means changing the original or natural form of the crop or animal into what we recognize and purchase as 'food.'

Distribution is the process of getting the food from the farm or processor to the consumer, which can be a grocery store, restaurant, hospital, school, etc. This step can be a singular move or may involve many stages of distribution, depending on the product's processing steps.



various reasons, pathogens find their way into the supply chain and cause illness. The supply chain is very complex and it takes many steps for foods to make their way from farm to table with the possibility of contamination

Preparation can occur in a home kitchen directly by the consumer or in a commercial kitchen serving a wider audience of consumers.

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It is critical to remember that none of these supply chain steps exist in a bubble. There is always risk for food to be mishandled at multiple points throughout the chain. It's important to know that once contamination occurs, it may not be obvious and further mishandling can compound the problem, such as leaving food at the wrong temperature, allowing pathogens to multiply quickly, or not cooking the food the required minimum internal temperature, resulting in a contaminated end product being consumed and causing illness.

PROTECTING CONSUMERS IS A TEAM EFFORT

Combating foodborne illness is a coordinated effort that relies on the United States Department of Agriculture (USDA) Food Safety and Inspection Service (FSIS), the Food and Drug Administration (FDA), and the CDC by ensuring food safety throughout the U.S. food supply. Each organization's responsibilities are as follows:

FSIS is responsible for the safety and wholesomeness of meat, poultry, and egg products, including proper packaging and labeling.

FDA holds that same responsibility for all foods outside the scope of FSIS.

CDC serves as the lead agency investigating foodborne illness outbreaks while working closely with both the FDA and FSIS, as well as gathering data related to foodborne illnesses, surveillance of disease reporting and trends, monitoring the effectiveness of foodborne illness prevention and control efforts, and providing educational materials and resources to support food safety initiatives in an effort to prevent future outbreaks.

It's worth noting that during the COVID-19 pandemic the incidence of foodborne illness reporting as well as foodborne illness outbreaks and food recalls experienced a notable decline.

While there is not an absolute reason behind this, the consensus is that the pandemic caused a shift in the food safety system.

One reason suggested for the decline was the combination of societal disruptions with changed consumer behaviors, including lockdowns, reduced travel, closed eateries and food shortages, which reshaped the way people ate, forcing people to get more of their food at grocery stores and cook that food at home instead of consuming it elsewhere. This shifted food safety risk areas dramatically across this country and the world. The pandemic did not occur in a microcosm, so there were substantial changes to a large number of variables all at once, making it very difficult to pinpoint one specific causal relationship responsible for the reduction, but it is certainly worth further exploration to see if any conclusive cause and effect narratives exist that can be applied to food safety and foodborne illness prevention.

Challenges and threats to food safety continue to evolve constantly with the emergence of new organisms that cause disease as well as antibiotic resistance of existing pathogens; shifting consumers preferences and habits with demands for less processed foods; changes in our food production and supply, including more imported foods; changes in the environment leading to food contamination; changes in diagnostic tools available for foodborne illness; and better detection of multistate outbreaks. Each of these factors, alone and collectively, contributes to the challenge of protecting the supply chain from disease-causing pathogens and contaminants.

OUR INDIVIDUAL ROLE IN FOOD SAFETY

While the prevention and mitigation of foodborne illness often seems large scale and out of our control, it's imperative to remember that each of us plays an important role in food safety. Our actions directly impact the safety of the food we serve every day, and the measures we take to protect the food under our control can directly impact consumers' health and safety. ■

REFERENCES

1. www.cdc.gov
2. www.fda.gov
3. www.foodsafety.gov
4. www.foodsafetynews.com

SAN CE Questions | FOOD PROTECTION CONNECTION



This Level I article assumes that the reader has introductory knowledge of the topic. The desired outcome is to ensure a basic understanding and explanation of the concepts of the subject matter and recalling of related facts.

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Reading *Foodborne Illness—Revisiting the Basics* and successfully completing these questions online has been approved for 1 hour of Sanitation continuing education for CDM, CFPPs. CE credit is available ONLINE ONLY. To earn 1 SAN CE hour, access the online CE quiz in the ANFP Marketplace. Visit **www.ANFPonline.org/market** and select “**Edge CE Articles**” within the Publications Section. If you don’t see your article title on the first page, then search the title, “*Foodborne Illness—Revisiting the Basics*.” Once on the article title page, purchase the article and complete the CE quiz.

- Which of the following is *not* someone considered to be part of a high-risk population?
 - A woman in her first trimester of pregnancy
 - An HIV patient
 - Your 30 year-old foodservice employee with influenza
- Which of the following is *not* a role of the CDC?
 - Inspects slaughterhouses
 - Provides educational material on food safety
 - Investigates foodborne illness outbreaks
- The FDA is responsible for the inspection, safety, and wholesomeness of eggs.
 - True
 - False
- The range of onset time for a foodborne illness can be:
 - A few hours to 6 weeks
 - 12-48 hours
 - 5 minutes to 50 days
- There are _____ known foodborne pathogens identified by the CDC.
 - 6
 - 31
 - 250
- Which of these is *not* a challenge to the future of food safety?
 - Improper cooking temperatures
 - Imported foods
 - Antibiotic resistance
- Which of the following is *not* a “top 5” risk factor that works in tandem with contamination to increase risk of foodborne illness outbreaks?
 - Improper cooling of foods
 - Good employee health and hygiene
 - Food from unsafe sources

COVID-19 RESOURCES

Utilize these materials to keep you updated and prepared:

- **General COVID-19 Resources**
- **Nursing Home & Long-Term Care Facility Resources**
- **Sanitation & Safety Resources**
- **Crisis & Emergency Preparedness Tools**
- **Pandemic Micro Webinar Series**

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