

Understanding and protecting against foodborne illness

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Each year, 1 in 6 Americans gets sick from eating contaminated food. In total, researchers have identified more than 250 foodborne diseases, which have been traced to all kinds of foods, according to Tufts experts.

While symptoms nearly always resolve on their own, foodborne illnesses can sometimes be life-threatening. For example, "with E. coli, some infections are very mild," says John Leong, chair of Molecular Biology and Microbiology at Tufts University School of Medicine, "but a small percentage progress to very serious systemic illness such as kidney or neurological damage."

It's easy to start looking askance at everything we eat—but it's important to put our risk in perspective, says Alice Lichtenstein, a professor at the Friedman School and executive editor of Tufts Health & Nutrition Letter. "As with many things in life, we must think in terms of risk/benefit," says Lichtenstein. "Within the context of our current food supply, the benefits of eating lots of produce and other healthy foods such as nut butters far outweigh the risk of exposure to foodborne illness."

There are many things we can do to stay safe from the majority of foodborne illnesses, Lichtenstein and other Tufts experts say, such as following simple food handling tips and paying attention to warnings and recalls. "Once we get food home, the responsibility for [food safety](#) is in our hands," says Jeanne Goldberg, professor emerita at the Friedman School. "Just a few measures on your part can go a long way."

Foodborne illness basics

Most [foodborne illnesses](#) are caused by a variety of bacteria, viruses, and parasites, including listeria, salmonella, campylobacter, and escherichia coli (E. coli) bacteria.

"Some illnesses, like botulism, are caused by toxins secreted by bacteria that have grown in the food," says Leong. "But most often, foodborne illness is caused by ingesting microbes that then grow in the intestine and cause disease."

Any type of food can harbor pathogens. Most common are undercooked eggs, poultry, and meats, raw milk, and even raw fruits and vegetables.

It is common to blame symptoms on the last thing eaten, but symptoms can begin anywhere from one hour to several weeks after ingestion, depending on the germ or toxin causing the problem.

Groups at particular risk for infection and complications include older adults, pregnant women, young children, and people with weakened immune systems (such as people with diabetes, liver disease, kidney disease, organ transplants, HIV/AIDS, or those receiving chemotherapy or radiation treatment). Leong points out that stomach acid kills many pathogens, so people who have decreased stomach acidity (for instance [older adults](#), those on acid-blocking medications, or post-gastric bypass patients) are at increased risk for foodborne illness.

Infections from foodborne bacteria typically cause nausea, vomiting, diarrhea, abdominal cramps, and fever. In healthy individuals, symptoms generally last from two to seven days and resolve on their own, but they can occasionally lead to more serious illness.

Anyone with severe symptoms should seek medical attention. These include diarrhea that lasts more than three days, high fever, blood in stools, or frequent vomiting that makes it impossible to keep liquids

down.

Safe internal temperatures

To decrease risk for food poisoning, be sure to cook all animal proteins to the appropriate internal temperature. An accurate meat thermometer is an important tool in any kitchen.

- Beef: 145°F
- Poultry: 165°F
- Pork: 145°F
- Ground Meats: 160°F
- Fish & Shellfish: 145°F
- Fully Cooked Ham: 165°F
- Leftovers: 165°F
- Casseroles: 165°F

Following basic food safety rules can help prevent foodborne illness when cooking at home, picking up takeout, or eating at restaurants or other people's homes, according to Tufts experts.

Many people have survived eating pizza from the box that sat out all night, but the fact is, allowing food to remain at room temperature (or anywhere in the "danger zone" between 40°F and 140°F) gives germs a chance to grow. It is important to note that, if the bacteria release a toxin, reheating the food won't get rid of the problem. The CDC therefore recommends getting leftovers into the fridge within two hours or less.

Produce is responsible for nearly half of foodborne illness in the U.S.—pathogens can take up residence on the surface of fruits and vegetables in the field, after harvesting, in storage, or in preparation.

But the benefits from a diet rich in plant foods definitely outweigh the risks, and there's a simple way to get rid of unwanted guests on produce: plain water.

Raw eggs and unpasteurized dairy are also prime breeding grounds for microbes, which thrive in moist, protein-rich environments, so raw It's recommended that eggs be cooked until the yolks are solid. Be aware that, while store-bought products in jars should be made with pasteurized eggs, raw or undercooked eggs can hide in fresh-made mayonnaise, Caesar dressing, custards, and some sauces.

The CDC strongly recommends against drinking unpasteurized "raw" milk and eating cheeses and other products made from it. The risk of contracting a foodborne illness from raw milk is at least 150 times higher than the risk from pasteurized milk.

Resources

Knowledge is power. To learn more about food safety issues, check these sites:

- Foodborne Illness: <https://www.cdc.gov/foodsafety/keep-food-safe.html>
- Mercury in Fish: <https://www.fda.gov/food/consumers/advice-about-eating-fish>
- Arsenic: <https://www.fda.gov/food/metals-and-your-food/what-you-can-do-limit-exposure-arsenic>
- Pesticides: <https://www.epa.gov/safepestcontrol/pesticides-and-food-healthy-sensible-food-practices>

Food safety practices

Based on the latest information, Tufts experts recommend the following:

- Germs like the moist interior of fruits and veggies, so choose undamaged produce, and cut away any damaged or bruised areas before using.
- Juices that may leak from packages can contaminate other food in the shopping cart, bag, cutting board, or refrigerator, so always keep raw meat, poultry, and seafood separate from produce and other foods. Although fresh produce accounts for a greater percentage of illness, raw foods from animals (meat, poultry, seafood, eggs, and milk) are actually the most likely to be contaminated.
- Wash your hands, utensils, and workspaces well with soap before and after handling food. If you want to clean potentially contaminated surfaces with bleach, use one teaspoon bleach to one quart water. More bleach is not better.
- Rinse raw fruits and vegetables under running water before peeling, cutting, or eating, to avoid transferring surface pathogens to the clean interior of fruits and vegetables. This also applies to organic produce, which are grown with fewer pesticides, but do not necessarily have fewer pathogens.
- Scrub sturdy produce, like melons or apples, with a clean brush. Don't use soap, which increases the risk of ingesting soap residue. The CDC also does not recommend special produce washes.
- Dry produce with a clean cloth or paper towel after washing.
- Don't re-wash pre-washed, bagged greens. The risk of transferring bacteria already lurking in the kitchen is greater than the risk that some contaminants may have made it through the commercial washing process.
- Avoid rinsing raw meat or poultry. Washing these foods has not been found to prevent illness, and it can spread bacteria to other foods, utensils, and surfaces, so the CDC strongly recommends

against this practice.

- Invest in two cutting boards, one for fruits and vegetables and the other for raw meat and seafood.
- Once cut, peeled, or cooked, get produce into a refrigerator within two hours, if you're not using it right away.
- Also keep foods that should be refrigerated, such as meat, seafood, and dairy, cold (either in the refrigerator or freezer) if you're not using them right away. The faster food gets cooled below 40 degrees Fahrenheit the better. Keep meats and seafood in the refrigerator when thawing and marinating.
- Don't consume undercooked eggs, [raw milk](#), or unpasteurized dairy products and juices. Leong cautions that choosing to eat raw or undercooked animal products (like steak tartare, rare burgers, and sushi) comes with an inherent risk of food poisoning.
- Cook all foods to the appropriate internal temperature (see "Safe Internal Temperatures" chart). "Thorough cooking is important because high temperature kills microbes," says Leong. One worthwhile investment is an instant read cooking thermometer or meat thermometer, the only way to be sure food has reached the internal temperature necessary to kill all pathogens. Don't go by sight.
- Refrigerate any leftovers as soon as possible, but at most within two hours of preparation. If it is not possible to get leftovers to a refrigerator within two hours of eating, leave them at the restaurant. Bacteria can begin to grow in any part of the meat that stays below 140 but above 40 degrees Fahrenheit, so cut up cooked turkeys and large roasts before refrigerating so they'll cool faster.
- Pay attention to news reports of specific products identified as causing outbreaks of foodborne illness, and discard any recalled items you have in your home.

Provided by Tufts University

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