The ongoing battle with food poisoning: A pressing public health concern

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Globally, unsafe food leads to 600 million cases of foodborne illnesses each year, resulting in 420,000 deaths, with 40% of these deaths occurring among children under 5 years of age. Especially for immunocompromised elderly and children, the pathogens can be dangerous.

In 2019, 27 European Union (EU) member states reported a total of 5,175 foodborne outbreaks, leading to 49,463 cases of illness, 3,859 hospitalizations, and 60 deaths. This year, e.g., salmonella-contaminated arugula from Italy caused 98 cases in Germany, 16 in Austria, and 23 in Denmark (Whitworth, 2024).

In the United States, the E. coli outbreak recently reported by 13 states and linked to McDonald's is just one of the foodborne disease incidents this year. Several salmonella infections have also spread nationwide, with pathogens detected in various foods, including eggs, cucumbers, fresh basil, and charcuterie meats (CDC, 2024 LINK).

Symptoms of foodborne diseases may vary

The most common symptoms of food poisoning include stomach pain or cramps together with diarrhea and vomiting, nausea, and probably fever. In severe cases, diarrhea can get bloody and/or last more than 3 days. Fever (temperature over 38°C within the body) can occur, and vomiting can get so severe that the sick person cannot keep liquids inside and suffers from dehydration.

E. coli contamination, particularly from pathogenic strains like E. coli O157:H7, can pose serious health risks to consumers. It has been associated with symptoms ranging from mild gastrointestinal distress to severe conditions like hemolytic uremic syndrome (HUS), which can lead to kidney failure.

Possible sources of contamination

Usually, food is not sterile. It contains beneficial microorganisms such as lactic acid bacteria or cultured molds, but also unwanted ones such as E. coli or salmonella. The crucial point is the proliferation of the harmful ones. Food poisoning is often the result of poor hygiene or wrong processing. Here are some possible causes of getting a foodborne disease.

1. **Undercooked meat products or eggs:** Undercooked meat and eggs are primary sources of, e.g., E. coli or salmonella. If these foodstuffs are not cooked to a high enough internal temperature (meat: 70 – 80°C for at least 10 min.), the bacteria can survive and pose risks to consumers. High-speed cooking processes, standard in fast-food restaurants, can lead to unevenly cooked food, increasing the risk of contamination. However, the more probable origins of food poisoning are
2. **Raw vegetables and fresh produce:** Leafy greens and other raw vegetables are increasingly associated with E. coli outbreaks. Contamination often occurs during harvesting, processing, or transportation. When vegetables are served raw, such as in salads, the pathogens present might not be eliminated, which can lead to consumer exposure.
3. **Cross-contamination in preparation areas:** E. coli can spread easily in food preparation areas if strict separation between raw and cooked foods is not maintained. For example, if raw beef juices come into contact with salad ingredients or utensils, the risk of cross-contamination increases significantly.
4. **Cross-contamination in the slaughterhouse:** If infected animals are slaughtered together with healthy animals, the meat of the healthy ones can be contaminated with the juices of the ill ones.
5. **Inadequate supplier protocols and traceability:** The complex supply chains used by fast-food companies often involve multiple suppliers across various locations. A lack of strict hygiene and safety practices among suppliers can introduce contaminated food into the restaurant chain’s supply, leading to potential outbreaks.

Countermeasures to protect consumers

To prevent future E. coli outbreaks, implementing a range of countermeasures in food-providing businesses such as restaurants, fast-food chains, and suppliers, focusing on safe food handling, better biosecurity, and improved oversight throughout the supply chain, is vital. Food safety is broader than that, however. It has a critical role in ensuring that food stays safe at every stage of the food chain – from production to harvest, processing, storage, distribution, all the way to preparation and consumption.

1. **Enhanced Cooking Standards and Temperature Monitoring:** Ensuring meat is cooked to a safe internal temperature is crucial.
2. **Routine Microbial Testing of High-Risk Foods:** Routine microbial testing, particularly of high-risk items like ground beef and fresh produce, can detect E. coli contamination before the food reaches consumers. Testing can be carried out at the supplier level and within restaurants. In cases where contamination is detected, affected products can be removed from circulation

promptly, minimizing the risk to customers.

3. **Separation of Raw and Cooked Food Handling Areas:** Cross-contamination can be reduced by establishing dedicated areas and utensils for handling raw and cooked foods. For instance, separate workspaces for salad preparation and burger assembly can prevent contact between potentially contaminated raw ingredients and ready-to-eat items. Staff training on the importance of these practices is essential to their successful implementation.
4. **Supplier Standards and Transparent Audits:** Supplier chains must ensure that suppliers adhere to strict food safety protocols, including regular sanitation and testing practices. Supplier audits conducted by independent third parties can help verify compliance and identify any gaps in food safety practices. Transparency in these audits can also build consumer trust, as customers are more likely to feel reassured when they know safety checks are in place.
5. **Implementation of High-Pressure Processing (HPP):** High-pressure processing (HPP) effectively reduces bacterial contamination in foods without using heat, which can be particularly beneficial for items like fresh produce that are often served raw. HPP uses high levels of pressure to kill pathogens, including E. coli. However, as HPP provokes changes in the structure of vegetable cell walls, it is unsuitable for salads and other leafy greens.
6. **Enhanced Employee Training on Hygiene Practices:** Proper hygiene practices are fundamental in preventing contamination. Employees must wash their hands frequently, especially after handling raw foods. Fast-food chains should provide thorough training on proper food safety protocols, including how to handle food items safely and maintain a clean working environment.
7. **Crisis Response Protocols and Traceability Systems:** In the event of an outbreak, rapid response is critical. Fast-food companies should have crisis protocols in place that include steps for immediate product recalls, customer notifications, and investigation procedures. Improved traceability systems can also allow companies to track the source of contamination quickly, limiting the spread and reducing the impact on consumers.
8. **Preventing infections with harmful enteropathogens already in the animal:** To get “clean” animals arriving at the slaughterhouse, already the farmer must aspire to prevent/treat infections of the animals with pathogens possibly provoking foodborne diseases. For this purpose, the farmer can resort to vaccines and feed supplements supporting gut health, both for prevention and on medicine such as antibiotics when treatment is needed.

A path forward: Strengthening food safety standards

This new E. coli outbreak in the fast-food industry highlights the ongoing challenges of maintaining food safety standards at all food preparation and distribution stages. By implementing stricter cooking standards, enhancing biosecurity measures, enforcing supplier compliance, and improving traceability, fast-food chains like McDonald’s can significantly reduce the risk of E. coli contamination. Ultimately, consumer protection depends on a multifaceted approach that integrates strong hygiene practices, supplier oversight, and advanced technology in food safety. Through these measures, companies can work to restore consumer confidence, minimize health risks, and set a standard for food safety across the industry.