

► GUEST COMMENTARY

Bacteria Matters: Upgrading Food Service Hygiene Beyond Norovirus

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Abstract Norovirus might be the most common foodborne germ in the U.S. Bacteria transmitted through food or contaminated food contact surfaces, however, can cause more severe illnesses and higher mortality rates. Further, bacteria have been linked to more persistent and widespread environmental contamination in food service establishments than has norovirus.

Keywords: norovirus, bacteria, foodborne outbreak, *Salmonella*, *Listeria*, *E. coli*, sanitizer, disinfectant, food service

Anyone who has experienced the stomach flu, which is characterized by severe vomiting and diarrhea, is unlikely to forget the ordeal. If you have had this experience, there is a good chance you were infected with norovirus. According to the Centers for Disease Control and Prevention (CDC, n.d.), norovirus is the primary germ linked to this illness and is responsible for more than one half of foodborne infections in food establishments across the U.S. Its high virulence—meaning that even a small amount of viral particles can lead to infection—and its ability to survive in various environments contribute significantly to this public health issue.

Given the virulence of norovirus, addressing cross-contamination is undoubtedly a critical risk to manage. To help accomplish this task, the Food and Drug Administration (FDA) recommends in §2-501.11 of the 2022 *Food Code* that retail food service establishments should have written procedures for employees at food service establishments to follow when cleaning up after incidents of vomiting and diarrhea. This section of the *Food Code* emphasizes that the procedures must specify the actions employees should take to minimize the spread of contamination and the exposure of employees, consumers, food, and surfaces to vomitus

or fecal matter (Food and Drug Administration [FDA], 2023).

Although the recommendations are somewhat general, the Public Health Reasons section of the 2022 *Food Code* (also known as the Annex) underscores, among other points, the necessity of having and effectively using U.S. Environmental Protection Agency (U.S. EPA)-registered disinfectants that can combat norovirus (FDA, 2024). Until recently, these recommendations fostered a de facto understanding that solely disinfecting against norovirus was an acceptable industry best practice for controlling the spread of illness when employees or consumers were implicated in bodily fluid spills.

Why Controlling Bacteria Matters, Too

While norovirus is the most prevalent germ responsible for foodborne infections in the U.S., other germs—particularly bacteria—cause greater illness severity and higher mortality rates. A 2025 study revealed that infections from *Salmonella*, Shiga toxin-producing *E. coli* (STEC), and *Campylobacter* result in more than 2 times as many hospitalizations as does norovirus (Scallan Walter et al., 2025). Furthermore, the study found that

Listeria infections are associated with a hospitalization rate 200 times higher than that of norovirus. In terms of case fatality rate—the proportion of individuals who die from an illness among those infected—*Salmonella*, STEC, and *Campylobacter* have rates 4–6 times higher than does norovirus. *Listeria* infections, on the other hand, show a staggering likelihood of resulting in death that is more than 4,000 times greater than that of norovirus. (Table 1).

Furthermore, environmental contamination caused by bacterial colonization wreaks havoc on food service establishment operations. A famous recent case is that of a restaurant in Kalamazoo, Michigan, that faced persistent and widespread *Salmonella* outbreaks over 10 years, with bacteria found on various surfaces, including kitchen and restroom areas (Nettleton et al., 2021). To combat this contamination, the restaurant was mandated to clean all surfaces to norovirus standards and underwent follow-up testing for *Salmonella*. Despite extensive renovations and cleaning efforts, including a complete norovirus standard clean before reopening, *Salmonella* continued to be detected. Ultimately, the restaurant had to close permanently in late 2018 and dispose of contaminated food and furnishings (Nettleton et al., 2021). This case underscores the challenges of managing bacterial contamination in food environments, especially when the focus is on norovirus control procedures.

Lastly, norovirus is not always the only germ responsible for the symptoms, as previously discussed. In fact, bacteria such as *Shigella*, *Salmonella*, and STEC can also cause vomiting and diarrhea in infected individuals (Johns Hopkins Medicine, 2026). Bloody diarrhea is a common symptom associated with these bacterial infections, which raises the important question of if the appropriateness of dis-

TABLE 1

Estimated Foodborne Infections, Hospitalization Rates, and Mortality Rates for Five Foodborne Illness Pathogens

Pathogen	Infections (#)	Hospitalizations	Deaths	Hospitalization Rate (Per 100,000 Infected Individuals)	Mortality Rate (Per 100,000 Infected Individuals)
<i>Listeria</i>	1,250	1,070	172	85,600	13,760
<i>Salmonella</i>	1,280,000	12,500	238	977	19
STEC	357,000	3,150	66	882	18
<i>Campylobacter</i>	1,870,000	13,000	197	695	11
Norovirus	5,540,000	22,400	174	404	3

Note. Table was generated using surveillance data as of 2019 and adjusted for underreporting and underdiagnosis (Centers for Disease Control and Prevention, 2025; Scallan Walter et al., 2025). STEC = Shiga toxin-producing *E. coli*.

infectants for food establishments should also include compliance with the Occupational Safety and Health Administration (n.d.) standards for bloodborne pathogens, such as efficacy against HIV and hepatitis B, in addition to bacterial disinfection, and certainly beyond norovirus disinfection alone.

Understanding Sanitizers and Disinfectants in Effective Bacterial Control

Did you know that a sanitizer is not intended to disinfect, and it does not provide the same level of bacterial control as a disinfectant? Sanitizers, whether designed for food contact surfaces or not, do not eliminate all bacteria; rather, they reduce bacterial levels to thresholds deemed acceptable by health authorities. For example, a sanitizer is required to reduce the level of bacteria on a contaminated surface by thousands to hundreds of thousand times its original level, depending on whether it is intended for use on nonfood contact or food contact surfaces, respectively. In contrast, a disinfectant reduces the level of bacteria on a contaminated surface by millions of times or more. In short, a disinfectant effectively destroys bacteria on surfaces, whereas a sanitizer lowers the bacterial count on surfaces without completely eliminating them (Data Requirements for Pesticides, 2026).

The use of disinfectants to eliminate bacteria rather than simply control norovirus is not widely acknowledged or understood among food service establishment employees. This lack of awareness stems from a his-

torical emphasis on sanitizing (but not disinfecting) food contact surfaces and the recent introduction of requirements in §4-1002.11 of the *Supplement to the 2022 Food Code* (FDA, 2024). Additionally, many states in the U.S. continue to follow earlier versions of the *Food Code* that do not provide recommendations for disinfection beyond what is outlined in the Annex (FDA, 2023).

In response to these challenges, the Conference for Food Protection Disinfection Committee, serving in the 2025–2027 biennial period, is revising its *Guidance for the Safe and Proper Use of Sanitizers and Disinfectants in Food Establishments*, which was adopted in 2023 (Conference for Food Protection, 2023). The updated guidance will aim to ensure consistency with the *Supplement to the 2022 Food Code* and to address the practical and training needs of food service professionals regarding the proper use of sanitizers and disinfectants.

Can Disinfectants Registered for Norovirus Also Eliminate Bacteria?

This crucial topic often causes confusion among employees of food service establishments and also for many health inspectors. Not all U.S. EPA-registered products are universally effective against norovirus and bacteria when used in the exact same way. For example, many disinfectants, particularly dilutable concentrates, may be designed to eliminate norovirus much faster than bacteria. As a result, if a food service establishment employee follows

the directions for use to disinfect norovirus, bacteria might not be properly addressed (due to required contact time of disinfectant on the surface), depending on the chosen product. Additionally, the dilution strength needed for effective disinfection of norovirus and bacteria for many of these dilutable concentrates can differ, thus requiring two separate preparation methods and contact times. Ultimately, it is essential to thoroughly read, understand, and follow the directions for use on the registered label of the disinfectant.

The Bottom Line

Maintaining food safety and preventing the spread of germs is essential in any food service establishment. A fail-safe process that covers all flanks is difficult to describe in a few paragraphs, but the following points can be considered key to follow in your food service operation:

- 1. Follow procedures:** Carefully clean up vomit and diarrhea spills by adhering to established procedures. Always wear personal protective equipment (PPE) and treat any waste—including contaminated food, equipment, and used PPE—as biohazard material. Dispose of these contaminated items according to local regulations.
- 2. Use effective disinfectants:** Choose broad-spectrum disinfectants that are effective against bacteria such as *Salmonella*, STEC, *Shigella*, *Campylobacter*, and *Listeria* and viruses such as norovirus and hepatitis A, B, and C.

3. **Read and understand the registered label on the disinfectant:** Beware that contact time (for ready-to-use and dilutable concentrates) and mixing instructions (for dilutable concentrates) can be different for norovirus versus bacteria disinfection.
4. **Clean and disinfect surfaces:** After a bodily fluid spill or when directed by local health authorities, clean and disinfect surfaces. Pay special attention to high-touch areas and restrooms. Follow the directions on the registered label for use of the disinfectant.
5. **Preclean surfaces:** Before using sanitizers or disinfectants, preclean soiled surfaces with appropriate detergents. Remember, food contact sanitizers are not designed to effectively clean food residues from kitchen equipment and utensils.
6. **Ensure hygiene:** Maintain proper employee hand and personal hygiene. Exclude food workers as recommended by FDA's *Employee Health Policy Tool* recommendations (FDA, 2025).
7. **Incorporate into your HACCP plan:** Include these cleaning and sanitation steps in your hazard analysis critical control point (HACCP) plan. 🌿

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