

# Background: Norovirus

Norovirus is the [leading cause of](#) vomiting and diarrhea in the United States, with an estimated 19-21 million illnesses every year [according to the CDC](#). Norovirus impacts people in all age groups—it is the leading cause of foodborne illness in the U.S., and a frequent cause of outbreaks in schools, daycares, long-term care facilities, and cruise ships.

Norovirus was first identified in 1968, and is actually a collection of many viruses that are classified into ten genogroups. Of these genogroups, only four can infect humans (GI, GII, GIV, and GIX). While the GI and GII genotypes together cause the majority of outbreaks in humans, GII has caused between [65 - 80%](#) of the globally reported norovirus infections since 1995. Norovirus GII also has a higher mutation rate than GI.

## Norovirus Transmission and Viral Shedding

Norovirus infection occurs when individuals come into contact with the virus, which spreads through a fecal-oral transmission. This happens when infectious viral particles make it into someone's mouth; for example, by taking care of another person with a norovirus infection, touching a surface where there are viral particles (e.g., in a bathroom), or by consuming contaminated food or water.

Norovirus is extremely contagious and resilient—it resists common sterilization products and hand sanitizers. The virus spreads particularly efficiently in small and enclosed spaces, as symptoms frequently include vomiting, which allows for the wide spread of viral particles into one's surrounding environment. Importantly, during peak viral shedding, individuals can shed millions to billions of norovirus particles, whereas it takes less than 20 particles to make someone else sick.

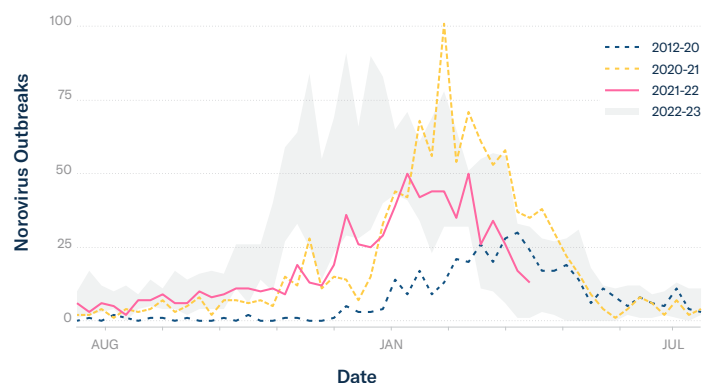
Peak norovirus shedding happens during the first days of infection, and declines throughout infection duration. However, it's possible to shed norovirus before symptoms develop ([incubation period is 12-48 hours](#)), and shedding can continue for weeks to months after infection. Norovirus is shed in feces and vomit, the two main symptoms of a norovirus infection. Norovirus can also lead to asymptomatic infection, with shedding occurring for similar lengths of time as symptomatic infections. In

some cases, this can [increase the potential and duration of an outbreak](#).

## Norovirus Outbreaks

Norovirus outbreaks typically have strong seasonal trends in the U.S., with high infection rates in the colder months (winter and early spring). The outbreak "season" tends to run from October through April.

**Number of Suspected or Confirmed Norovirus Outbreaks Reported by NoroSTAT-Participating States Per Week, 2012-2023**



\*reported by the state health departments in Alabama, Massachusetts, Michigan, Minnesota, Nebraska, New Mexico, North Carolina, Ohio, Oregon, South Carolina, Tennessee, Virginia, Wisconsin, and Wyoming to CDC through the National Outbreak Reporting System (NORS) by week of illness onset, 2012-2023.

Data Source: <https://www.cdc.gov/norovirus/reporting/norostat/data.html>

Outbreaks are more likely to spread quickly in small and enclosed settings such as schools and daycares, universities, long-term care facilities, correctional facilities, cruise ships, and workplaces. Immunity from norovirus infection wanes relatively quickly, so individuals can become infected and sick with norovirus multiple times per year. At this time, there are no FDA-approved vaccines to prevent norovirus infection.

### Role of Wastewater in Norovirus Monitoring

Currently, public health data systems measure the burden of norovirus by counting reported outbreaks and tracking test positivity from participating laboratories. State and local public health officials do not report individual [cases of norovirus to the CDC](#), so there is less complete disease information available for norovirus compared to other illnesses, such as COVID-19. Additionally, states and local municipalities vary in their norovirus reporting processes, such that the national monitoring systems do not reflect data from all states. Additionally, clinical data

do not estimate the amount and impact of asymptomatic infections, so current monitoring underestimates the true burden of disease.

Monitoring norovirus through wastewater can address these data gaps and provide important information about the levels and trends of norovirus in communities. In 2023, for example, national outbreak data peaked earlier than expected. Such seasonal shifts cannot be addressed in real time without continuous, year-round monitoring.

### Biobot and Norovirus

Biobot [launched norovirus wastewater analysis](#) in April 2023 to fill in these large gaps in data and provide important information about norovirus disease levels and trends. Biobot tests for norovirus in influent wastewater samples by using a qPCR assay to determine the presence of norovirus RNA. Biobot tests for both GI and GII genotypes.



### More Information

Find more information on [Biobot's norovirus wastewater analysis here](#).  
For further information on norovirus, and updates on norovirus outbreaks visit the [CDC's norovirus page](#).