

Norovirus in the United States

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Although now recognized as the leading cause of foodborne disease outbreaks, norovirus has historically been poorly characterized with respect to its endemic disease burden. Such data are needed to support continued development and targeting of appropriate interventions for norovirus disease, including vaccines. In response, CDC has led a series of studies that provide population-based incidence rates of norovirus disease and associated health outcomes in the United States. Additionally, CDC launched two novel outbreak surveillance systems in 2009, the National Outbreak Reporting System (NORS) and CaliciNet, which provide more comprehensive data on the attribution of norovirus disease.

Comparing the various methodologic approaches and triangulating the results from seven studies, we generated summary estimates of the overall US norovirus burden, including specific estimates by age groups and disease outcomes, as well as temporal trends. On average, norovirus causes an estimated 570–800 deaths, 56,000–71,000 hospitalizations, 400,000 ED visits, 1.7–1.9 million outpatient visits, and 19–21 million total illnesses annually in the United States. Persons aged ≥ 65 years are at greatest risk of norovirus-associated death, while children aged < 5 years have the highest rates of norovirus-associated medical care visits. Endemic norovirus disease occurs year-round but exhibits a pronounced winter peak and surges by up to 50% during years in which pandemic strains emerge.

Surveillance data demonstrate that norovirus is not only the leading cause of acute gastroenteritis (AGE) outbreaks in the United States, but also the leading cause of AGE outbreak-associated hospitalizations and deaths. Reported norovirus outbreaks most often result from person-to-person transmission and occur most frequently in healthcare facilities, where there are vulnerable populations more prone to severe outcomes. Emergent variants of the norovirus genotype GII.4 are responsible for the majority of norovirus outbreaks and demonstrate distinct epidemiologic characteristics. Amongst reported foodborne norovirus outbreaks, the most common scenario involves contamination of ready-to-eat foods during preparation in commercial settings by infected food handlers. However, norovirus contamination during production and processing has also been reported, such as with mollusks and produce, and is likely under-recognized.

This collection of studies and surveillance data highlights the substantial progress made over the last five years in characterizing the burden and attribution of norovirus disease in the United States. These findings can help guide targets for interventions and justify continued efforts towards development of norovirus vaccines.