

Norovirus Beyond Borders: A Global Public Health Threat Requiring Coordinated Action

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Abstract

Norovirus is a leading cause of acute gastroenteritis globally, contributing to significant morbidity, mortality, and economic losses in both high- and low-income countries. Although historically associated with travelers' diarrhea, norovirus is now being recognized as a broader global health threat, with outbreaks occurring in a wide range of settings, including hospitals, cruise ships, schools, refugee camps, and communities. Its high infectivity, low infectious dose, and environmental persistence allow for rapid transmission across geographic and socioeconomic boundaries. While migrant and marginalized populations often bear a disproportionate burden due to barriers such as limited access to culturally competent care, fear of stigmatization, and exclusion from surveillance systems. Outbreaks are frequently accompanied by xenophobic narratives, which hinder effective response by fostering mistrust and delaying case reporting. This commentary underscores the need for multilingual public health messaging, migrant-inclusive surveillance, equitable infrastructure investment, and strengthened international cooperation. Reframing norovirus as a global, borderless health concern is essential for building resilient, inclusive systems capable of mitigating future outbreaks.

Keywords: Norovirus, Travelers' diarrhea, Global surveillance, Public Health, Migration

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Introduction

Norovirus (NoV) is a leading cause of acute gastroenteritis globally and an increasingly recognized contributor to travelers' diarrhea (TD).^{1,2} While TD has traditionally been linked to bacterial pathogens such as *Escherichia coli*, *Shigella* sp., and *Campylobacter* sp., recent studies have highlighted the growing burden of viral agents, particularly norovirus, which affects travelers and non-travelers alike across both high- and low-income countries.²⁻⁵

First identified during a gastroenteritis outbreak in Norwalk, Ohio, norovirus is now responsible for over 50% of all non-bacterial gastroenteritis outbreaks worldwide, with widespread transmission in hospitals, cruise ships, military camps, and schools.^{3,4} Its success as a pathogen stems from its high infectivity, low infectious dose, and remarkable environmental persistence, contributing to approximately 685 million cases and

200,000 deaths annually, primarily among young children in low-resource settings.⁵

Despite its significant global burden, norovirus is often narrowly framed as a disease associated with migration or travel. This perspective obscures its broader public health implications and risks reinforcing xenophobic responses during outbreaks. This communication emphasizes the role of norovirus as a leading cause of community-acquired gastroenteritis and its contribution to cases of travelers' diarrhea, underscoring the need for enhanced global surveillance systems, the incorporation of norovirus-specific prevention strategies into public health and travel counseling, and the promotion of evidence-based, non-stigmatizing communication. Recognizing the true global burden of norovirus is essential for strengthening resilient, inclusive, and effective public health systems in an increasingly interconnected world.

Norovirus Outbreaks: Context and Concerns

Norovirus outbreaks are consistently reported across a wide range of global settings, highlighting the virus's ability to spread in both high- and low-resource environments. In North America, recurrent outbreaks aboard cruise ships and in colleges illustrate its persistence despite access to advanced healthcare systems.⁶ School-based outbreaks often result in academic disruptions, temporary closures, and strain on public health resources, particularly in under-resourced and ethnically diverse communities.^{4,6}

In Europe, a 2015 outbreak in a German refugee camp, where 3.7% of residents were affected, underscored the vulnerability of displaced populations during humanitarian crises.⁷ Educational settings remain frequent hotspots; Catalonia, Spain, recorded 38 school and summer camp outbreaks between 2017 and 2019, affecting over 1,200 individuals.⁸ Similarly, 22% of norovirus outbreaks in England between 2015 and 2020 were linked to schools.⁹

In Africa, the GII.4 2008 variant is responsible for a significant outbreak among hospitalized children, and has been associated with an estimated 212,000 child deaths annually in low-resource regions,^{10,11} with prevalence rates ranging from 12.6% to 17% in children with gastroenteritis.^{12,13}

Asia has also seen frequent outbreaks in dormitories, daycare centers, and universities. In Japan and China, these have affected hundreds of students at a time,¹⁴ with a 2023 outbreak in a Chinese school dormitory underscoring the virus's rapid transmission in crowded environments.¹⁵ In South America, Brazil experiences seasonal surges associated with heavy rainfall and poor urban sanitation.¹⁶ Meanwhile, in Australia, outbreaks in aged care and Indigenous communities reflect vulnerabilities in even high-income nations.¹⁷

Compounding its epidemiological burden, norovirus exhibits exceptional genetic diversity, posing challenges for prevention and vaccine development. To date, over 10 genogroups and 48 genotypes have been identified, with genogroup II responsible for most human infections.¹⁸ Emerging strains, such as GII.17 and evolving GII.4 variants, frequently escape prior immunity, limiting vaccine effectiveness and complicating long-term control strategies.^{18,19}

Migration and Health Equity Dimensions

Migrant families worldwide, including those in high-income countries like the United States and Europe, face significant health inequities that impair their ability to respond effectively to outbreaks such as norovirus. Structural barriers, including limited access to culturally

and linguistically appropriate health messaging, delay symptom recognition, hinder healthcare engagement, and reduce adherence to public health measures.²⁰ These challenges are compounded by xenophobic narratives that often emerge during outbreaks. For instance, during the COVID-19 pandemic, Asian communities faced increased discrimination, which led to reduced testing and delayed treatment.²¹ Similar patterns were observed during the H1N1 and Ebola outbreaks, when stigma and marginalization further isolated immigrant populations from public health efforts.⁴

In the context of norovirus outbreaks, such stigma discourages migrant communities from engaging with public health authorities due to fears of deportation or legal consequences, especially under policies like the U.S. "public charge" rule.²² This limits outbreak reporting and weakens response efforts. The impact is especially pronounced in communal environments such as schools, shelters, and agricultural camps, where access to healthcare, childcare, and remote work options is often limited.²³ Fear of interacting with health personnel can also delay contact tracing, isolation, and sanitation interventions.

Beyond institutional settings, norovirus can spread rapidly in high-density immigrant communities where mistrust of public health systems persists. When communication strategies fail to account for language, literacy, or legal status, they further alienate these populations. Norovirus transmission, like many communicable diseases, cannot be separated from the socio-political realities of migration. Combating stigma, ensuring equitable access to care, and building trust are essential for effective outbreak control. Without inclusive public health frameworks, early warning signs may go unnoticed, exacerbating health disparities and prolonging preventable crises.

Conclusion and Recommendations

To effectively address the global threat of norovirus, governments, health systems, and international agencies must adopt coordinated, equity-driven strategies that account for both biological and social determinants of disease transmission. Central to this approach is the development of culturally responsive public health campaigns that go beyond translation and are shaped by community contexts. Surveillance systems must also evolve to include migration-sensitive variables such as language and legal status, while protecting personal data to build trust. Parallel investment in sanitation, hygiene, and outbreak infrastructure, particularly in high-risk environments like schools, refugee camps, and

overcrowded communities, is critical to mitigating transmission.

In addition, inclusive emergency preparedness plans must be developed with input from migrant and refugee communities, ensuring that culturally competent response efforts are implemented at every level. Public messaging should actively counter xenophobic narratives that blame immigrants for outbreaks, focusing instead on solidarity and evidence-based communication. Given norovirus's rapid evolution and high transmissibility, sustained global cooperation is needed in areas such as genomic surveillance, vaccine research, and international outbreak response. Ultimately, safeguarding the health of marginalized populations is not only an ethical imperative but also essential to global health security in an interconnected world.

Highlights

What Is Already Known?

Norovirus is a leading cause of acute gastroenteritis globally and is commonly associated with travelers' diarrhea. Outbreaks frequently occur in semi-closed environments such as cruise ships, schools, and refugee camps, affecting both high- and low-income populations.

What Does This Study Add?

This communication reframes norovirus as a global public health threat beyond its traditional association with travel or migration. It highlights the role of xenophobia in undermining outbreak responses, emphasizes the need for culturally inclusive health communication and surveillance, and calls for coordinated global action to ensure equitable prevention and control strategies across diverse settings.

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