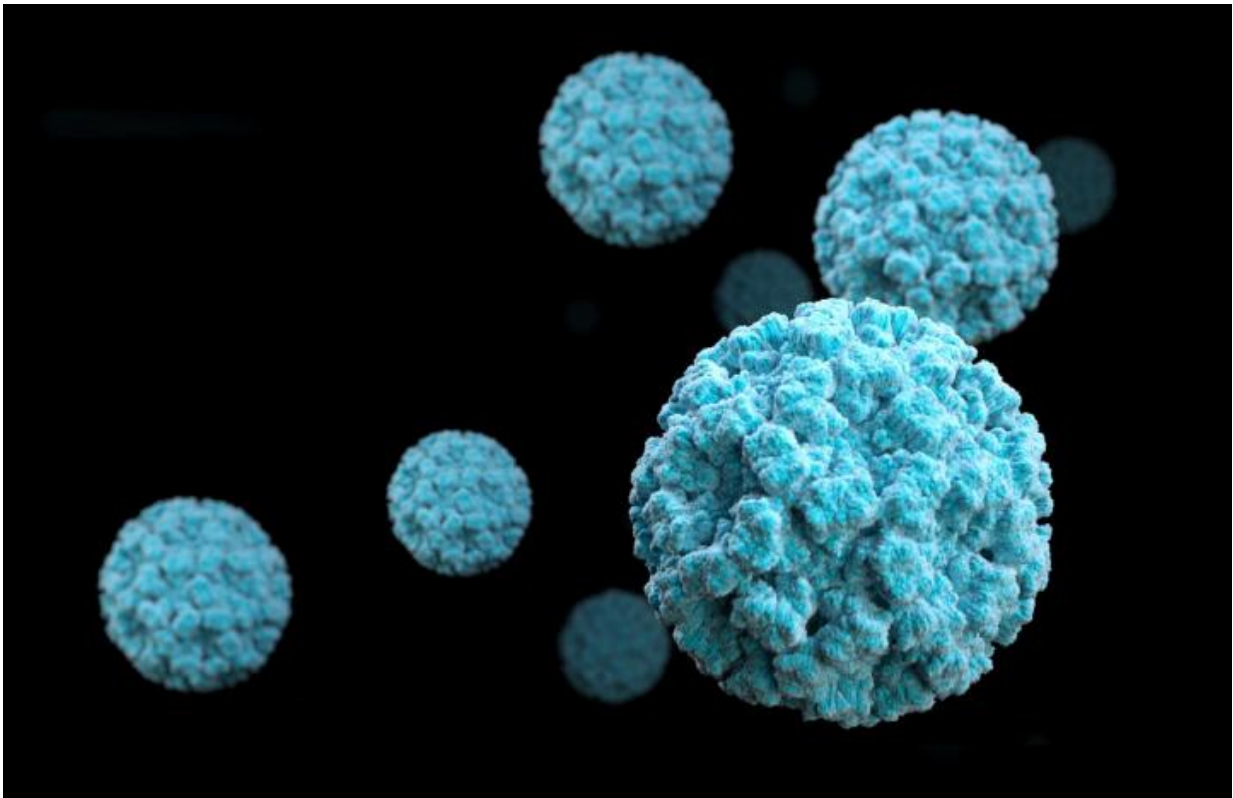


Applied math reveals the key to stopping norovirus lies—literally—in our own hands

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Norovirus. Credit: CDC

From stately cruise ships to Olympic host cities, recent headline-grabbing outbreaks prove that norovirus—an incapacitating stomach bug which causes vomiting and diarrhea and has no vaccine—can strike anywhere, anytime.

Yet it often does its nastiest work on the road, in public avenues where travel and close quarters mix with limited awareness and ability to control the spread. So how can you avoid letting [norovirus](#) turn your next dream trip into a nightmare?

According to an upcoming study in *Royal Society Open Science*, the most effective method is also the simplest: washing your hands.

Modelling virus spread

Arizona State University applied mathematicians used data from a major norovirus outbreak on a cruise ship to create a new math model of how norovirus spreads.

"Our model indicates that person-to-person contact is the primary mode of transmission," says Sherry Towers, the study's lead author and professor at the Simon A. Levin Mathematical, Computational and Modeling Sciences Center, an affiliated research center of the School for Human Evolution and Social Change.

This explains why densely populated environments with large common areas like cruise ships, resorts and Olympic villages are the perfect settings for wide-scale outbreaks. But knowing that personal contact is the main way the disease spreads also provides a solution.

How to keep yourself safe

Because aggressive steps like self-quarantine and avoiding the sick often happen too late—or not at all—in these environments, the team's next step was to compare the effectiveness of different preventative measures, such as hand washing and surface cleaning, in halting the spread.

"It only takes a few virus particles to make you sick, so no matter how stringent the cleaning, it is next to impossible to remove all the virus from contaminated surfaces," Towers says. "However, since the primary route for infection is hand-to-mouth contact, you can't be infected if you wash your hands thoroughly before eating or touching your face."

To keep yourself safe from—and prevent—norovirus outbreaks, Towers recommends you scrub up for at least 20 seconds with soap and warm water before eating food, as well as after using the restroom or touching a potentially contaminated surface.

"When your mother told you to always wash your hands before coming to the dinner table," says Towers, "she was right."

This research builds on other studies from the center and school that explore the causes of, and potential policy solutions for, viral disease exposure in mass transportation. Similar innovative math models are also being successfully developed and applied to study "transmittable" social behaviors and trends.

More information: Quantifying the relative effects of environmental and direct transmission of norovirus, *Royal Society Open Science*, [rsos.royalsocietypublishing.org ... /10.1098/rsos.170602](https://royalsocietypublishing.org/doi/10.1098/rsos.170602)

Provided by Arizona State University

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