

## “Stomach Flu” Season: How the Virus Spreads Trojan Horse-Style

*By Ralph Morris, M.D., M.P.H.  
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As students return to the classroom and we approach yet another “stomach flu” season, [new research](#) provides a fascinating glimpse into the transmission of stomach viruses, including the dreaded norovirus. According to the researchers, large numbers of norovirus particles can invade human cells “Trojan horse-style,” encased within a protective membrane known as a *vesicle*. Just as the fabled giant model horse of antiquity provided a concealed army of warriors access to the city of Troy, “vesicle-cloaked” viruses are stealthily delivered to human cells, undetected by the human immune system. How ingenious!



*A computer-generated image of the legendary Trojan horse*

### *Stand-alone vs. Clustered Viruses*

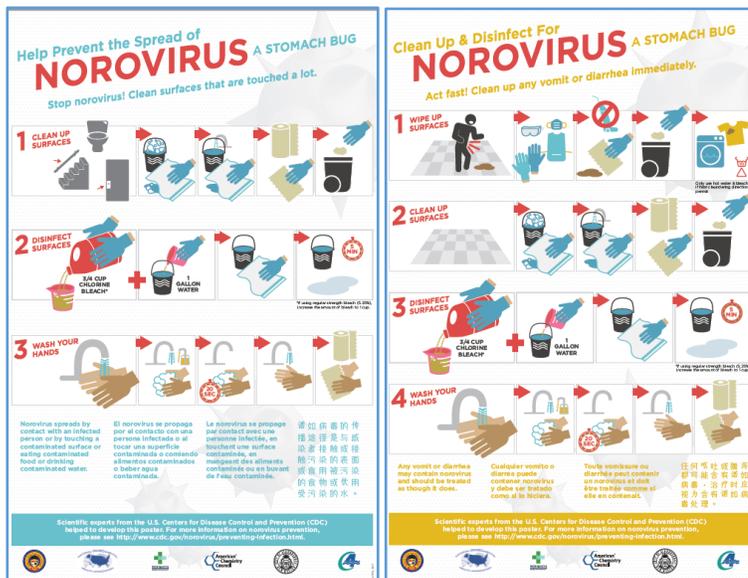
Scientists used to think viruses were most effective at spreading illness by attacking human cells as individual virus particles. They reasoned that when multiple tiny viruses invade multiple human cells, there is a high probability of infection. The new research demonstrates something quite different: viral particles concealed in a membrane can mount a much more potent attack on individual human cells. Experiments using mice and piglets show the severity of illness is much greater when the animals are exposed to vesicle-enclosed virus clusters. Viruses so encased “cooperate and compensate for each other’s insufficiencies,” according to an [NPR interview](#) with one of the investigators.

### *We’re onto You, Stomach Bugs*

Norovirus and rotavirus, another “enteric” virus, or “stomach bug,” are transmitted from person to person through the fecal-oral route, during which vesicles remain intact, transporting their infectious cargo from one host to the next. Norovirus alone is responsible for some 20 million cases of illness each year, and about 3,000 deaths in the US. It spreads rapidly through schools, nursing homes and daycare centers, and has ruined many perfectly good vacation cruises. Greater attention to hand-washing and disinfecting frequently touched surfaces can help intercept the transmission of both viruses and their vesicles.

The authors of the new study have provided intriguing insight into how stomach bugs infect human hosts. We agree with them that targeting the vesicle, the “Trojan Horse” of infection, could be the best path to success in developing new antivirals for stomach bugs. We’re onto you, stomach bugs!

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*Norovirus is no match for chlorine bleach*

*A collaboration of public health and consumer advocate experts recently updated a set of free, [downloadable posters](#) that provide easy-to-understand pictogram-style directions for cleaning and then using chlorine bleach solutions to disinfect norovirus-contaminated surfaces.*

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