

## **New Study Finds High-Touch Surfaces in Long-Term Care Facilities are Frequently Contaminated with Potentially Infectious Material**

*-- Results published in American Journal of Infection Control provide insights for enhancing infection prevention and control programs designed to prevent serious diarrheal illnesses among facility residents --*

**Arlington, Va., February 17, 2022** – Findings from a [study](#) published today in the *American Journal of Infection Control* (AJIC) provide new insights that could help long-term care (LTC) facilities assess the cleanliness of high-touch surfaces, and thereby enhance infection prevention and control measures designed to prevent serious diarrheal diseases and deaths among their residents. The study evaluated the utility of specific hygienic monitoring tools for assessing levels of microbial contamination on high-touch surfaces in 11 LTC facilities in South Carolina.

“Our study is among only four conducted to date evaluating environmental hygiene in LTC facilities,” said Jennifer Cannon, Ph.D., CDC Foundation field employee working with the Centers for Disease Control and Prevention (CDC), and the paper’s lead author. “Increasingly, hospitals are performing routine audits of high-touch surface cleanliness, helping to reduce morbidity and mortality among residents. Our results suggest similar auditing programs would benefit LTC facilities when included as part of their infection prevention programs.”

Diarrheal illnesses caused by norovirus and *C. difficile* infections (CDI) are among the most frequent healthcare-associated infections in LTC facilities; in the United States, approximately 60% of norovirus outbreaks and more than 50% of all healthcare-associated CDI occur in LTC facilities. Both pathogens can be transmitted by environmental surfaces contaminated with fecal matter. While environmental monitoring using surface hygiene indicators is a valuable tool to help prevent the spread of infection, there are no standard technologies or methodologies, and many monitoring tools are too expensive to be used routinely.

For their study, Dr. Cannon and her colleagues used three tools to evaluate the cleanliness of a minimum of 30 surfaces in each of 11 LTC facilities in South Carolina: adenosine triphosphate (ATP), a bioluminescent chemical reaction that indicates the presence of organic material; norovirus; and crAssphage, a recently discovered DNA bacteriophage that indicates past or present fecal

contamination. Their study was the first to utilize crAssphage as a fecal contamination indicator in the LTC setting.

Ninety percent of the high-touch surfaces the researchers tested (n=337) were positive for crAssphage or had organic material levels that resulted in failing ATP cleanliness scores.

- crAssphage was detected on 311 (92.3%) surfaces, often at high levels (median concentration 3.5 log genomic copies).
- Nearly all surfaces 324 (98%) had high levels of ATP, resulting in a “failing” score using threshold values suggested by the ATP kit manufacturer.
- All 337 surfaces tested negative for norovirus. The researchers suggest that this finding is consistent with previous studies suggesting noroviruses are rarely detected in the absence of a current or recent outbreak.

Aggregating data from all 11 facilities, Dr. Cannon and colleagues combined the ATP and crAssphage tools to identify the types of surfaces and locations most likely to be contaminated by organic or fecal material:

- Handrails and equipment controls were four times more likely to have high levels of crAssphage than other surfaces and locations (odds ratio [OR] 4.1, CI 2.0-8.5,  $p < 0.001$  for handrails; OR 3.6, CI 1.1-12.8,  $p < 0.05$  for equipment controls).
- Patient bed handrails as well as tables and chairs in patient lounges had high levels of both ATP and crAssphage.
- Locations in LTC facilities more likely to have high levels of crAssphage were patient beds (OR 3.9, CI 1.4-12.3,  $p < 0.05$ ) and hallways (OR 2.6, CI 1.3-5.0,  $p < 0.01$ ).
- Surfaces touched by patients and visitors were twice as likely to have high levels of ATP compared to those touched primarily by nursing and janitorial staff or by patients alone.

“This study provides valuable new information that could help LTC facilities monitor their cleaning practices and refine their infection-prevention plans to better protect patients from serious diarrheal illnesses,” said Linda Dickey, RN, MPH, CIC, FAPIC, and 2022 APIC president.

### **About APIC**

*Founded in 1972, the Association for Professionals in Infection Control and Epidemiology (APIC) is the leading association for infection preventionists and epidemiologists. With more than 15,000 members, APIC advances the science and practice of infection prevention and control. APIC carries out its mission through research, advocacy, and patient safety; education, credentialing, and certification; and fostering development of the infection prevention and control workforce of the future. Together with our members and partners, we are working toward a safer world through the prevention of infection. Join us and learn more at [apic.org](https://www.apic.org).*

### **About AJIC**

*As the official peer-reviewed journal of APIC, The American Journal of Infection Control ([AJIC](https://www.ajic.com)) is the foremost resource on infection control, epidemiology, infectious diseases, quality management,*

occupational health, and disease prevention. Published by [Elsevier](#), AJIC also publishes infection control guidelines from APIC and the CDC. AJIC is included in Index Medicus and CINAHL. Visit AJIC at [ajicjournal.org](http://ajicjournal.org).

## NOTES FOR EDITORS

“Hygienic monitoring in long-term care facilities using ATP, crAssphage, and human noroviruses to direct environmental surface cleaning,” by Jennifer L. Cannon, Ph.D., Geun Woo Park, Ph.D.; Benjamin Anderson, BS; Cortney Leone, MS; Morgan Chao, MS; Jan Vinjé, Ph.D.; and Angela M. Fraser, Ph.D., was published online in *AJIC* on February 17, 2022. The article may be found online at: <https://doi.org/10.1016/j.ajic.2021.11.014>

## AUTHORS

### **Jennifer L. Cannon, Ph.D. (corresponding author: [flb8@cdc.gov](mailto:flb8@cdc.gov))**

CDC Foundation field employee working with the Centers for Disease Control and Prevention  
Atlanta, GA, USA  
Center for Food Safety, University of Georgia  
Griffin, GA, USA

### **Geun Woo Park, Ph.D.**

Division of Viral Diseases, National Center for Immunization and Respiratory Diseases,  
Centers for Disease Control and Prevention  
Atlanta, GA, USA

### **Benjamin Anderson, BS**

Center for Food Safety, University of Georgia  
Griffin, GA, USA

### **Cortney Leone, MS**

Food, Nutrition, and Packaging Sciences Department, Clemson University  
Clemson, SC, USA

### **Morgan Chao, MS**

Food, Nutrition, and Packaging Sciences Department, Clemson University  
Clemson, SC, USA

### **Jan Vinjé, Ph.D.**

Division of Viral Diseases, National Center for Immunization and Respiratory Diseases  
Atlanta, GA, USA

### **Angela M. Fraser, Ph.D.**

Food, Nutrition, and Packaging Sciences Department, Clemson University  
Clemson, SC, USA

###