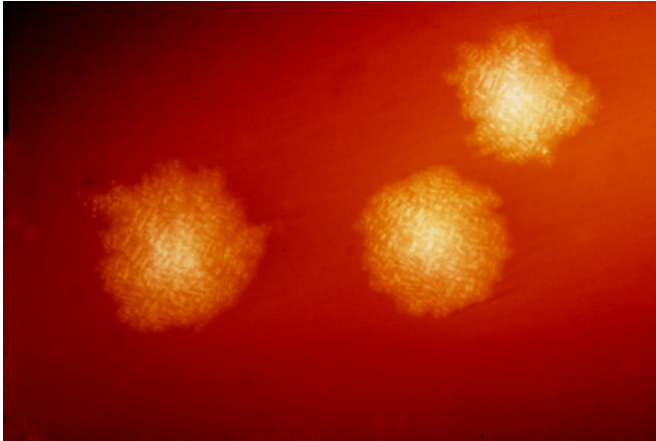


C. difficile resists hospital disinfectant, persists on hospital gowns, stainless steel

12 July 2019



This photograph depicts *Clostridium difficile* colonies after 48hrs growth on a blood agar plate; Magnified 4.8X. *C. difficile*, an anaerobic gram-positive rod, is the most frequently identified cause of antibiotic-associated diarrhea (AAD). It accounts for approximately 15-25% of all episodes of AAD. Credit: CDC

Surgical gowns and stainless steel remained contaminated with the pathogen *Clostridium difficile* even after being treated with the recommended disinfectant. The research is published July 12 in *Applied and Environmental Microbiology*, a journal of the American Society for Microbiology.

"The spores of the bacteria were able to grow after decontamination," said principal investigator Tina Joshi, BSci, Ph.D., Lecturer in Molecular Microbiology, University of Plymouth, UK. "This shows that spores are becoming resistant and we need to reconsider how we decontaminate and employ hygiene measures in hospitals."

C. difficile infects roughly half a million Americans annually, killing 29,000. New strains are responsible for hard-to-treat cases of severe illness. Symptoms can range from diarrhea to

fever, rapid heartbeat, inflammation of the intestines, and kidney failure. This pathogen commonly affects [older adults](#) in hospitals and in long-term care facilities.

The motivation for the research was a case in an American hospital in which gowns were suspected of contributing to transmission of *C. difficile*, said Dr. Joshi. The gowns were found to be contaminated with the deadly 027 strain of *C. difficile*.

The researchers examined the ability of *C. difficile* to adhere to, and subsequently transfer from hospital surgical gowns, by applying spores in sterilized water, at a concentration of 1 million per ml, directly to the surgical gowns in liquid for 10 seconds, 30 seconds, 1 minute, 5 minutes, and 10 minutes before being removed and discarded.. That methodology was designed to mimic transfer of infectious bodily fluids in the [clinical setting](#) in order to assess the potential for transmission to patients.

The numbers of spores recovered from gowns did not increase with contact time, suggesting that the spore transfer between surfaces occurred within the first 10 seconds of contact, said Dr. Joshi.

The single use gowns are... ineffective at trapping spores within their fibers and preventing the onward transmission of spores as demonstrated by spore recovery from the gowns, according to the investigators. This highlights the importance of ensuring that single-use surgical isolation gowns are used appropriately in [infection prevention](#) and control; i.e. [that personnel don the gowns upon entering and dispose of them when] exiting a single room to prevent spore transmission and incidence of [*C. difficile* infection].

The gowns were ultimately treated with disinfectant containing 1,000 ppm chlorine for 10 minutes. The disinfectant failed to clear the gowns of *C. difficile*. That "showed that the gowns can pick up and retain

the spores," said Dr. Joshi. The [spores](#) on [stainless steel](#) and vinyl flooring also remained viable after treatment with the disinfectant.

"Due to this resistance, it may be prudent to reconsider how much biocide we use currently, and to ensure infection control is standardized. This work can be applied to hospitals anywhere in the world, and should help inform future guidelines on infection control and biocides," said Dr. Joshi.

A review addressing the challenges of testing for *Clostridioides (Clostridium) difficile* infection (CDI) and recommendations for newer diagnostic tests was recently published in *Clinical Microbiology Reviews*, a journal of ASM.

Provided by American Society for Microbiology

APA citation: *C. difficile* resists hospital disinfectant, persists on hospital gowns, stainless steel (2019, July 12) retrieved 7 November 2022 from <https://medicalxpress.com/news/2019-07-difficile-resists-hospital-disinfectant-persists.html>

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