

# Chlorine disinfectant is no more effective than water at killing off hospital superbug, new study shows

November 21 2023

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One of the primary chlorine disinfectants currently being used to clean hospital scrubs and surfaces does not kill off the most common cause of

antibiotic-associated sickness in health care settings globally, according to a new study.

Research by the University of Plymouth has shown that [spores](#) of *Clostridioides difficile*, commonly known as C. diff, are completely unaffected despite being treated with high concentrations of bleach used in many hospitals.

In fact, the chlorine chemicals are no more effective at damaging the spores when used as a surface disinfectant—than using water with no additives.

Writing in the journal *Microbiology*, the study's authors say susceptible people working and being treated in [clinical settings](#) might be unknowingly placed at risk of contracting the superbug.

As a result, and with incidence of biocide overuse only serving to fuel rises in [antimicrobial resistance](#) (AMR) worldwide, they have called for urgent research to find alternative strategies to disinfect C. diff spores in order to break the chain of transmission in clinical environments.

Dr. Tina Joshi, Associate Professor in Molecular Microbiology at the University of Plymouth, carried out the study with Humaira Ahmed, a fourth-year Medicine student from the University's Peninsula Medical School.

Dr. Joshi, said, "With incidence of anti-microbial resistance on the rise, the threat posed by superbugs to [human health](#) is increasing. But far from demonstrating that our clinical environments are clean and safe for staff and patients, this study highlights the ability of C. diff spores to tolerate disinfection at in-use and recommended active chlorine concentrations."

"It shows we need disinfectants, and guidelines, that are fit for purpose and work in line with bacterial evolution, and the research should have significant impact on current disinfection protocols in the medical field globally."

C. diff is a microbe that causes diarrhea, colitis and other bowel complications and is known to infect millions of people all over the world each year.

It causes around 29,000 deaths per year in the U.S., and almost 8,500 in Europe, with the most recent data showing that incidence of C. diff infection was increasing prior to the start of the COVID-19 pandemic in the UK.

Previously, Dr. Joshi and colleagues had demonstrated the ability of C. diff spores to survive exposure to recommended concentrations of sodium dichloroisocyanurate in [liquid form](#) and within personal protective fabrics such as surgical gowns.

The new study examined spore response of three different strains of C. diff to three clinical in-use concentrations of sodium hypochlorite. The spores were then spiked onto surgical scrubs and patient gowns, examined using scanning [electron microscopes](#) to establish if there were any morphological changes to the outer spore coat.

Dr. Joshi, who is on the Microbiology Society Council and Co-Chairs their Impact & Influence Committee, added, "Understanding how these spores and disinfectants interact is integral to practical management of C. diff infection and reducing the burden of infection in health care settings."

"However, there are still unanswered questions regarding the extent of biocide tolerance within C. diff and whether it is affected by antibiotic

co-tolerance. With AMR increasing globally, the need to find those answers—both for *C. diff* and other superbugs—has never been more pressing."

**More information:** Clostridioides difficile spores tolerate disinfection with Sodium hypochlorite disinfectant and remain viable within surgical scrubs and gown fabrics, *Microbiology* (2023). [DOI: 10.1099/mic.0.001418](https://doi.org/10.1099/mic.0.001418)

Provided by University of Plymouth

Citation: Chlorine disinfectant is no more effective than water at killing off hospital superbug, new study shows (2023, November 21) retrieved 2 May 2024 from <https://phys.org/news/2023-11-chlorine-disinfectant-effective-hospital-superbug.html>

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