

## **Aerosolized Hydrogen Peroxide Can Significantly Reduce *C. difficile* Infections**

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March 18, 2022

Aerosolized hydrogen peroxide (aHP) can significantly reduce *Clostridioides difficile* infection (CDI) and is an effective disinfection system, suggests a new study published in the *American Journal of Infection Control*.

*C. difficile* is the most common cause of healthcare-associated infection and increasingly occurs outside acute care hospitals. CDI symptoms can range from mild diarrhea to life-threatening colitis and sepsis, sometimes requiring urgent colon removal.

The CDC has reported that, in the United States, 223,900 people required hospitalization for CDI and at least 12,800 died in 2017. Because of its large toll, CDI is grouped with antimicrobial-resistant "threat" organisms that often accompany it. People older than age 65 are at particular risk for disease, and at least 20% of patients experience recurrence.

In healthcare facilities, *C. difficile* is transmitted by bacterial spores that readily contaminate surfaces in patients' rooms, from handrails to bedside tables to light switches and knobs. The spores are resistant to disinfectants, and rooms are often cleaned with bleach solutions. But those bleach fumes are irritating and may cause bronchospasm for patients with asthma or COPD, and so alternative cleaning agents are needed.

In a retrospective study of an acute-care facility in Philadelphia, researchers compared the incidence of healthcare-associated CDI (HA-CDI) at the facility before and after adding aHP to other infection control practices. The aHP process produces an aerosolized dry-mist fog that contains a specified percentage of hydrogen peroxide. The fog is used after the room has been physically cleaned, settling on exposed surfaces and killing any remaining *C. difficile* spores.



Dr Christopher L. Truitt

The aHP mixture also contains 0.01% ionic silver. The study lead was Christopher L. Truitt, PhD, Wayland Baptist University. Truitt told *Medscape Medical News* that hydrogen peroxide affects the endospore layer of the *C. difficile* organism and allows the "ionic silver to get into the cell and is shown to bind to enzymes and inactivate those inside the cell and actually improve the efficacy."

Asked whether it's the silver or the peroxide that disinfects, Truitt replied: "I can't answer that. We don't know if it's the silver or the hydrogen peroxide. The commercially available chemical that's used in that machine is a proprietary set-up...with EPA approval as a sporicidal."

In the baseline 27-month period, the hospital tallied 120 HA-CDI cases. After aHP was introduced, they counted just 72 cases over 33 months, a 41% decrease in the facility's HA-CDI rate, from 4.6 per 10,000 patient-days to 2.7 per 10,000 patient-days ( $P<.001$ ).

There was also a progressive decrease in hospital-onset CDI even after aHP was introduced, from 5.4 per 10,000 patient-days in 2015 to 1.4 per 10,000 patient-days in 2019.

Yoav Golan, MD, Tufts University School of Medicine, Boston, Massachusetts, told *Medscape Medical News* there were two major study limitations. "One is the fact that they did not control for other interventions that may have an effect on *C. difficile*: antibiotic stewardship and infection control," he explained. This limitation was noted by the study authors and may explain the continued decline in infections after the introduction of aHP. The other limitation was not using a crossover study design.

"I would argue that they should have provided a little more information about their own practices in their own hospital when it comes to intensification of infection control [and] when it comes to a stewardship and changes that they've made to antibiotic usage," Golan continued. "The description of changes over time and those practices would have allowed us to better understand the impact of the hydrogen peroxide intervention."

Despite his criticisms, Golan concluded: "I think that the study is important. I think their intervention is unique in a way that they've been using an aerosolizing system that's using a relatively high concentration of hydrogen peroxide. I think that there's enough in this paper to suggest that using such a system may have an impact on the environment, and through that, on dissemination."

Truitt added that a next step would be to compare aHP with ultraviolet light, which is commonly used to disinfect hospital rooms.

*Am J Infect Control*. Published online March 16, 2022. Abstract