

Dry-mist of hydrogen peroxide reduces environmental contamination by *Clostridium difficile* in hospital rooms used for elder care

Study project: Environmental samples were collected from 11 rooms (nine isolation rooms and two utility rooms) in three elder-care wards thought to be at high risk for environmental contamination with *C. difficile*. In the study*, conducted at Nottingham University Hospital, United Kingdom, about 20 samples were collected from each room. Sampling sites included places frequently touched (e.g., bedside tables, armchairs, nurse call buttons, faucet handles) and areas that might be overlooked during routine cleaning (e.g., curtains, lamps, curtain rails). At the time of sampling, the rooms had already been prepared for reoccupation: they had been manually cleaned with detergent and, if known to have been occupied by a patient with *C. difficile*, disinfected with 1% hypochlorite solution. Samples were cultured for *C. difficile*.

After the room was sampled for *C. difficile*, a single cycle (standard cycle) of dry-mist hydrogen peroxide decontamination (Gloster Sante Europe) was performed in 10 rooms. En-suite facilities were decontaminated by leaving the adjoining doors open. Windows and external doors remained closed for 2 hours from the start of the cycle. Environmental sampling was repeated after decontamination. It also was repeated 3–6 weeks later in four isolation rooms that had remained unoccupied (due to closure of the ward) after hydrogen peroxide decontamination.

Findings: Dry-mist of hydrogen peroxide reduced the number of rooms contaminated with *C. difficile*. Before decontamination, *C. difficile* was recovered from all 11 rooms. After decontamination of 10 rooms, *C. difficile* was recovered from five (P=0.033). (See Table)

Dry-mist of hydrogen peroxide reduced the number of samples from which *C. difficile* was recovered. Before decontamination, *C. difficile* was recovered from 48 (24%) of 203 samples. After decontamination *C. difficile* was recovered from seven (3%) of 203 samples (P<0.0001).

Of the seven samples containing *C. difficile* after decontamination, four were from visibly dirty or dusty sites and three were associated with fabric: a cotton curtain, a windowsill directly behind a curtain, and a notice board covered with felt. When four rooms were retested 3–6 weeks after decontamination, *C. difficile* was recovered from two of 80 samples (total, three colony-forming units).

Dry-mist of hydrogen peroxide reduced the number of colony-forming units of *C. difficile*. Before decontamination, a total of 138 CFU of *C. difficile* were recovered from the 10 rooms. After decontamination, eight colony-forming units were recovered—an approximately 10-fold reduction.

“This relatively quick and user-friendly technology [hydrogen peroxide dry-mist system] might be a more reliable method of terminally disinfecting isolation rooms, following detergent cleaning, compared to the manual application of other disinfectants.”

	% (no.) of rooms positive for <i>C. difficile</i>	% (no.) of samples positive for <i>C. difficile</i>	Mean <i>C. difficile</i> cfu per 10 samples
Before H ₂ O ₂ decontamination	100% (10/10)	24% (48/203)	68
After H ₂ O ₂ decontamination	50% (5/10)	3% (7/203)	0.4

Conclusion: The investigators reported that the number of positive *C. difficile* samples found in patient-ready isolation rooms before dry-mist decontamination was concerning—especially since four rooms were found to have two strains, indicating that the contamination may have been present for some time. They concluded that dry-mist hydrogen peroxide decontamination is effective at reducing the environmental burden of *C. difficile* in high-risk clinical areas, and the facility has adopted the technology as part of its routine *C. difficile* control measures.

Source*: Shapey S, Machin K, Levi K, Boswell TC. Activity of a dry mist hydrogen peroxide system against environmental *Clostridium difficile* contamination in elderly care wards. *J Hosp Infect* 2008;70(2):136-41.

FOR MORE INFORMATION

Contact for UK

ASP c/o J&J Medical Ltd.
Pinewood Campus, Nine Mile Ride
Wokingham
Berkshire RG40 3EW, England
T : +44 1 344 871 081
F : +44 1 344 871 171

Contact for Ireland

ASP c/o J&J Medical Ireland
Airton Rd, Tallaght
Dublin 24, Ireland
T : +353 1 466 5200
F : +353 1 466 5340

Contact for Egypt

Johnson & Johnson Medical Egypt
Florida Mall 5th Floor
1229 Square El Sheikh Ali Gad
El Hak St. Heliopolis
Cairo, Egypt
T : +202 2268 5026
F : +202 2268 4674

Contact for Middle East

ASP c/o J&J Medical Middle East
Dubai Healthcare City,
J&J building, 3rd floor
PO Box 505080, Dubai,
United Arab Emirates
T : +97 1 4 429 7235
F : +97 1 4 429 7250

Contact for South Africa

ASP c/o J&J Medical Pty Ltd SA
PO Box 273, Midrand
Halfway House 1685
Republic of South Africa
T : +271 1 265 1120
F : +27 11 265 1189

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