

Study: Hospital Laundering Practices May Expose Patients To Infection-Causing Bacteria

Bacteria remain in towels used to clean hospital rooms even after laundering; findings suggest towels reduce effectiveness of hospital-grade disinfectant

ROSWELL, Ga., May 29, 2013 /PRNewswire/ -- New study results published online in the *American Journal of Infection Control* found that 93 percent of tested laundered towels used to clean hospital rooms contained bacteria that could result in healthcare-associated infections (HAIs).

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Most people don't expect to leave the hospital sicker than when they came in, but HAIs are a significant problem, with an estimated 1.7 million cases reported annually in the United States¹. While stringent disinfecting practices are in place to combat HAIs, study results show that traditional hospital laundering practices are not sufficient to remove all viable bacteria from the laundered towels. The study, "[Microbial contamination of hospital reusable cleaning towels](#)," conducted by Charles Gerba, Ph.D., Professor of Microbiology, University of Arizona, and colleagues from the University of Arizona, with support from Kimberly-Clark, found that:

- Laundering practices were insufficient for removing potentially harmful bacteria from reusable cloth and microfiber towels commonly used to clean hospital rooms.
- Of the total number of towels tested, 93 percent contained viable bacteria including *E.coli* (causes gastroenteritis), total coliforms (bacteria indicative of fecal matter) and *Klebsiella* (causes pneumonia, UTIs and other infections).
- Of the total number of soak buckets containing disinfectant, 67 percent contained viable bacteria, including spore-forming bacteria (causes botulism and tetanus) and coliform bacteria.

A second, separate companion study, "[Decreased activity of commercially available disinfectants containing quaternary ammonium compounds \(QACs\) when exposed to cotton towels](#)," also conducted by the team, found laundered cotton towels can reduce the strength of the hospital-grade disinfectants (QACs) by up to 85.3 percent.

"It is very concerning to think that the very process by which hospitals are trying to prevent the spread of bacteria, may actually be causing it," said Dr. Gerba. "Whether alone or in combination, the presence of bacteria on the towels and the inactivation of the cleaning agent may increase the risk for transmission of pathogens in hospitals. These observations indicate the need to critically reevaluate current hospital cleaning practices associated with reuse of cloth towels."

Rethinking Critical Processes

Proper cleaning practices in hospitals play a critical role in reducing the spread of bacteria that could cause HAIs and are especially important in the healthcare setting where patients with weakened immune systems may have a harder time fighting off germs.

Successful disinfection involves two major elements: germicide at the appropriate concentration and a delivery method that allows the germicide to reach the surface. In this study, housekeeping staff soaked cloth towels in the disinfectant (either QAC or bleach) until use, then wrung them out and used them to clean surfaces inside patient rooms. The towels were then either washed in-house or sent to a central laundering facility, and the laundered towels were then stored and reused in the same manner.

The initial study found that exposure of QAC disinfecting cleaners to laundered towels for as little as 30 seconds rendered the cleaning agent ineffective as defined by Environmental Protection Agency criteria. Microfiber towels were found to have especially high levels of bacteria due to their high absorbency. Previous studies of microbial survival in towels have indicated that the more absorbent a cloth towel, the longer the microorganisms can survive. Studies have also found that *Staphylococcus* can survive for 19-21 days in cotton cloths.ⁱⁱ

"A major cornerstone for the successful reduction of healthcare acquired infections is the cleaning and disinfecting of surfaces such as those found in patient rooms and various areas of the hospital," said David Koenig, Ph.D., Research Technical Leader in Corporate Research and Engineering, Kimberly-Clark Corporation. "As a best practice, it is recommended that hospitals either use a sterilization process to clean re-usable cloth and microfiber towels or switch to disposables, hence decreasing the probability of transferring bacteria to surfaces that patients and employees may come in contact with."

Testing Results & Methodology

Ten hospitals in Arizona were selected at random and three clean cloth or microfiber towels were obtained from each location. Samples were also collected from the inside surface of the bucket used to soak the towels in disinfectant at each hospital. Viable bacteria were detected on 93 percent of the towels tested and on 67 percent of the soak buckets swabbed. From the towels tested, spore-forming bacteria were isolated from 56 percent, coliform bacteria from 23 percent, *E. coli* from 3.3 percent, and mold from 13 percent. Spore-forming bacteria were isolated from 44 percent of the soak buckets swabbed and coliform bacteria from 12 percent of the soak buckets swabbed.

Survey Results & Methodology

A survey of cleaning practices was also conducted and included questions about the protocols used for cleaning rooms, towel use, and laundry procedures. Questions involved the disinfectant(s) used, whether the towels were soaked or sprayed in the disinfectant, exposure time, frequency of disinfectant changes, fabric content of the cleaning towels, towel washing and drying practices, and towel storage conditions. Eight of the 10 hospitals reported using cotton towels, and the other two reported using microfiber towels. Two hospitals sent their linens to be laundered in a central facility, and the others laundered their towels in-house. All but one of the hospitals reported a QAC as their disinfectant of choice; the lone exception was a rehabilitation hospital that reported using bleach for terminal cleaning under all circumstances. In addition, all but one of the hospitals reported soaking their cleaning towels in a bucket with disinfectant.

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Source: Kimberly-Clark Corp. [KMB-B]

ⁱ CDC: http://www.cdc.gov/HAI/pdfs/hai/infections_deaths.pdf

ⁱⁱ AJIC study: Neely AN, Maley MP. Survival of enterococci and staphylococci on hospital fabrics and plastic. J Clin Microbiol 2000;38:724-6

EDITOR CONTACT:

Laura Weitzenhoff/Rachel Gross, Schwartz MSL
781-684-0770, kcp@schwartzmsl.com
Deborah Butcher, Kimberly-Clark Professional*
678-352-6207, dbutcher@kcc.com

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