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## INFECTION PREVENTION THROUGH SUPERIOR CLEANING

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### Abstract

Maintaining a safe and clean environment is an essential component in the care of the hospitalized patient today. The continued evolution of the patient safety movement has brought into focus the concern of healthcare-acquired infections. The development of microfiber products has changed the way environmental services and infection preventionists evaluate effective cleaning methodology.

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### Introduction

Each year, 1.2 million patients are affected by healthcare-acquired infections (HAIs) resulting in 99,000 deaths.<sup>1</sup> According to the Centers for Disease Control (CDC), HAIs are one of the top 10 causes of death in the US. The average HAI costs the hospital an estimated \$10,000 per patient<sup>2</sup>, and nationwide the estimated annual cost is \$35.7 to \$45 billion.<sup>3</sup>

Joint Commission Resources, the consulting arm of The Joint Commission, considers environmental hygiene (cleaning) an essential part of any standard infection prevention program. Other key elements are a hand hygiene initiative and solutions directly supported by executive leadership aimed at reducing the cross contamination and transmission of pathogens.<sup>4</sup>

The potential to transfer pathogens through contact increases significantly from the floor level to shoulder height surfaces. "The Guidelines for Environmental Infection Control in Health-Care Facilities (2003) from the CDC emphasize that environmental infection-control strategies can effectively prevent healthcare-acquired infections (HAIs), and these strategies include appropriate use of hospital-grade, EPA-registered cleaners and disinfectants in accordance with the manufacturers' instructions; keeping surfaces such as floors, walls, tabletops visibly clean on a regular basis; and cleaning and disinfecting high-touch surfaces such as doorknobs, bed rails, light switches and surfaces in and around toilets in patients' rooms, on a more frequent schedule than minimal-touch surfaces."<sup>5</sup>

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### Recognizing The Risk

Direct contact with patients is generally considered the major source for acquisition of pathogens on healthcare workers'

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### Recognizing The Risk (continued)

hands with potential transmission to other patients. Recent studies suggest that contaminated environmental surfaces play an important role in pathogen transmission. Pathogens exist on 25%-33% of all surfaces in a patient's room. Many are on the floor, but many more are on human contact points between the knees and the shoulders. Doctors, nurses, family members and visitors contaminate these surfaces from hand contact. Even with proper hand-washing technique, the presence and resilience of these pathogens means that hands will quickly become contaminated if the environment is not clean.

Conventional methods of cleaning involve the use of cotton string mops and cotton-cleaning cloths along with a bucket of water and EPA registered disinfectants. Moving cotton across the floor and high touch surfaces moves dirt particles around but is not capable of reaching pathogens in small crevices. Cleaning solution is typically changed after cleaning three patient rooms, and the risk of transferring pathogens from contaminated solution is highly probable. There are two ways to reduce pathogens in the healthcare environment: kill them or remove them. Disinfectants are the EPA required method for killing pathogens, but they rarely achieve the saturation or dwell time needed to disinfect. In high concentrations, they present health risks to employees and patients.

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### Industry Initiatives

In November 2002 the EPA published Environmental Best Practices for Health Care Facilities, which highlighted the use of microfiber technology in hospitals. Microfiber is a man-made synthetic fiber constructed of a star shaped polyamide (the generic term for Nylon) center surrounded by eight pie shaped polyester wedges. During manufacturing, these wedges separate or split from the center to form individual "blades" that measure 4-6 microns wide and 6-11 microns long. The average fiber is 100 times smaller than a human hair. The tiny fibers penetrate microscopic surface pores and possess a positive electrostatic charge, which attracts dirt, dust, bacteria, pollen, and other organic particles that have a negative charge. Microfiber's density allows it to hold six times its weight in water, making it more absorbent than a conventional cotton loop mop. In addition to the superior ability to attract, collect and hold pathogens, microfiber mops

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## Industry Initiatives (continued)

changed after each room is cleaned, thus eliminating cross contamination. Since the cleaning solution contains only clean microfiber mops, there is no longer a need to change solution between rooms. The article also noted that microfiber mops weigh significantly less than conventional mops, making them easier to use.<sup>6</sup>

The key to performance is the size, shape and concentration of split microfiber in the product. It is virtually impossible for the human eye to see the differences between microfiber products, but under magnification the differences become distinct. The quantity of microfiber varies greatly from one product to another. High performance cleaning textiles have over 300,000 fiber "blades" per square inch that reach into microscopic crevices to remove pathogens from environmental surfaces. Fibers with blades smaller than .1 micron are needed to pick up many pathogens, such as H1N1. A product with a high concentration of these precision fibers means greater surface contact for better performance. A product with larger blades, a low percent of microfiber, and/or a small quantity of split fiber will fail to remove most pathogens, let alone costly multi-drug resistance organisms, such as MRSA, VRE or C difficile.

According to Darrel Hicks, BA, REH, CHESP, Director of ES at St. Lukes Hospital in St. Louis, "utilizing the right type of microfiber will provide you with numerous benefits. The guiding principle is always to remove germs if possible rather than kill them, and then when necessary, use the least amount of the mildest chemical that will do the job because stronger often means more toxic to people. Therefore, the best way to remove pathogens in spore or vegetative form is with the use of a high quality split microfiber cloth..."<sup>7</sup>

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## Superior Cleaning

In a survey conducted by the Association for Professionals in Infection Control and Epidemiology (APIC) and the American Society for Healthcare Environmental Services (ASHES), "more than four out of five hospitals are either already using or plan to use advanced cleaning technology such as microfiber mops".<sup>8</sup> Numerous microfiber products are currently available. Umf Corporation, manufacturer of PerfectCLEAN, is an innovator in the research and development of high performance textiles with built-in anti-microbial protection. PerfectCLEAN mops and wipers are constructed from "micro denier" fibers that are actually much smaller than a "microfiber" by definition.

ATS, an independent laboratory in Minnetonka, Minnesota tested PerfectCLEAN's efficacy and found it was capable of removing 99.99% to 99.9999% of bacteria and spores from hard surfaces.<sup>9</sup> Further, all textile components used in PerfectCLEAN products were developed to meet the Centers for Disease Control (CDC) recommendations for Blood Borne

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## Superior Cleaning (continued)

Pathogens.<sup>10</sup> The products are chlorine compatible and can withstand standard commercial laundry processing over 100 washings.

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## Conclusion

While environmental surfaces throughout a healthcare facility offer only one possible source of transmission for potential HAIs, experts consistently recommend better surface sanitation and hand washing as the two most significant environmental controls to reduce HAIs."<sup>11</sup> Using microfiber products that are proven to trap and remove microbes greatly reduces the potential for cross contamination. When selecting microfiber products, it is important to have independent testing of microbiological data to prove the product effectiveness. Microfiber manufactures should have a complete system that will clean everything in the facility, and provide the necessary training to use the products correctly. Recognizing the important role Environmental Services plays in the effort to control infection supports the use of the most effective technology.

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<sup>1</sup> *Estimating Health Care-Associated Infections and Deaths in U.S. Hospitals, 2002, Center for Disease Control*

<sup>2</sup> *Grinstead, Dale, PhD, "A Disinfection Connection: reviewing protocol for surface-level disinfection and tips for aligning goals with environmental services to reduce HAIs", Infection Control Today, July, 2009, p42-44*

<sup>3</sup> *Scott, R. Douglas, "The Direct Medical Cost of Healthcare-Associated Infections in U.S. Hospitals and the Benefits of Prevention", Economist, March, 2009*

<sup>4</sup> *The Cost of Antibiotic Resistance, Chapter 4: "Transmission Control to Prevent the Spread of MDROs in Healthcare Facilities", Joint Commission Resources, 2009*

<sup>5</sup> *Pyrek, Kelly M., "Environmental Cleaning is Imperative to Infection Prevention", Infection Control Today, 8/25/09*

<sup>6</sup> *"Using Microfiber Mops in Hospitals, Environmental Best Practices for Health Care Facilities" United States Environmental Protection Agency, November, 2002*

<sup>7</sup> *Environmental Cleaning Issues: Advice from the Experts, Environmental Surface Disinfection in the Healthcare Environment", J. Hudson Garrett Jr. PhD, MSN, MPH, APRN, CIC, Infection Control Today, July, 2009 p 45-48*

<sup>8</sup> *Rollins Gina, "How clean is clean? New technologies, monitoring practices gain traction", Materials Management in Health Care, May 2009*

<sup>9</sup> *Surface Organism Removal Validation, ATS Laboratories, March, 2006*

<sup>10</sup> *"Guidelines for Laundry in Health Care Facilities", Office of Health and Safety, Centers for Disease Control and Prevention, 02/02/02*

<sup>11</sup> *Grinstead, Dale, PhD, "A Disinfection Connection: reviewing protocol for surface-level disinfection and tips for aligning goals with environmental services to reduce HAIs", Infection Control Today, July, 2009, p42-44*

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