

Healthcare Associated Infections and Flooring in Healthcare Settings

Nosocomial or healthcare associated infections (HAIs) have become an unfortunate, yet prevalent, side effect of hospital stays in America in recent years. These are infections that patients acquire while in a healthcare setting receiving treatments for other conditions. Some estimates place one of every 20 hospitalized patients contracting an HAI¹, with another study showing an estimated 1.7 million HAI events and 99,000 associated deaths occurred in American hospitals in 2002 alone.²

While many factors contribute to HAIs, much discussion surrounding their prevention focuses on the physical environment. Although floor coverings serve as one of the most abundant finishes present in every area of a hospital, there is no clinical evidence indicating that flooring of any type is a source of infection in healthcare settings.⁴

Specifiers must define a facility’s functional areas based on aesthetic and performance needs while understanding how flooring relates to the prevention of illness and injury among caregivers and patients. There has been much debate regarding the best type of flooring for healthcare settings - hard surfaces, resilient, broadloom carpet or modular carpet. A fourth option has also recently been introduced - an advanced textile composite flooring that combines key attributes of soft surface floor covering with the long-wearing performance characteristics of hard-surface flooring.

Infection Control

The Centers for Disease Control & Prevention (CDC) uses a classification system to evaluate the disinfection and sanitation of items used in a healthcare environment. This classification is organized into critical, semicritical and noncritical based on the degree of risk for infection involved in the use of the items. Because flooring only comes in contact with intact skin, it is considered a noncritical surface, which carries little risk of causing an infection among patients or staff.⁵

The CDC divides noncritical environmental surfaces into two categories - housekeeping surfaces and medical equipment surfaces - with different levels of surface disinfection required for each. Within housekeeping surfaces, there is further categorization regarding the frequency of hand contact. Floor coverings and ceilings are considered “low-touch surfaces” while doorknobs, bedrails and light switches are considered “high-touch surfaces.”⁶

In keeping with CDC Guidelines regarding low-touch surfaces, “Extra sanitizing, cleaning and decontamination of floors in healthcare settings is unwarranted. Studies have demonstrated that disinfection of floors offers no advantage over regular detergent/water cleaning and has minimal or no impact on the occurrence of healthcare acquired infections.”⁶

Studies have also shown that soft surfaces such as carpet and textile composite flooring are less likely to transmit infection than either vinyl flooring or other hard surfaces, and ultimately concluded that smooth surfaces were the most difficult to sanitize.^{7,10}

The CDC categorizes the following as noncritical surfaces with concern to infection risk.

PATIENT CARE ITEMS	ENVIRONMENTAL SURFACES
bedpans	bed rails
blood pressure cuffs	some food utensils
crutches	bedside tables
computers	patient furniture

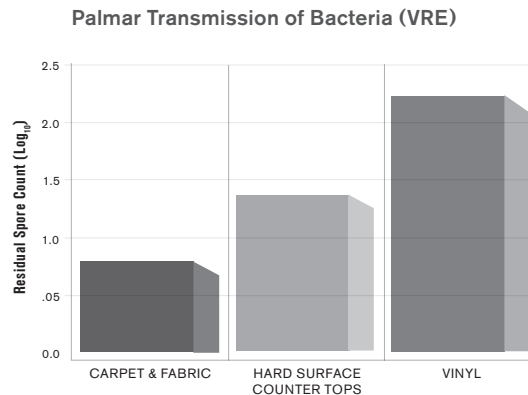
CDC Housekeeping Surfaces - High Touch vs. Low Touch

HIGH TOUCH	LOW TOUCH
doorknobs	window sills
bed rails	flooring
light switches	ceilings
wall areas around toilets	
edges of privacy	

The design of the physical environment, of which flooring is one of the single largest specifications, impacts resident and staff outcomes in healthcare settings and contributes to a better quality of life for those who stay, work and visit in these facilities.

When carpet is clean and dry, living organisms, such as bacteria and mold, are unable to find the nutrients necessary to multiply. According to a study conducted by Roger Liebe and Jane Rhode, “One interesting and highly counterintuitive variable related to the texture of surfaces is that while smooth surfaces would seem to be easier to sanitize, smoother surfaces were on the whole (with the notable exception of vinyl upholstery) less effectively cleaned and/or more likely to transmit infection to hands.”

Study results from simulated transmission of VRE measured in log recovery of VRE from inoculated test surfaces.^{7,10}



According to the CDC, “Large surfaces such as floors and walls have not been directly associated in the spread of staph and MRSA.” Should blood or bodily fluid spill on carpet or textile composite flooring, the Occupational Safety & Health Administration (OSHA) requires “an appropriate disinfectant” be used to decontaminate the affected surface.⁸ Many flooring manufacturers utilize solution dyed or “dye-fast” fibers in their carpets, enabling them to be cleaned with bleach-based products. Two commonly used disinfectants include sodium hypochlorite and quaternary ammonium salts. Both can be effective at containing types of MRSA, C. diff and VRE when flooring is exposed to these infections. Most “dye-fast” carpet fabrics can withstand exposure up to a 1:10 dilution of sodium hypochlorite (household bleach) or quaternary ammonium salts.⁹ It is recommended that the flooring manufacturer’s maintenance instructions be referred to for bleach dilution information.

Conclusion

Those specifying floor coverings for healthcare environments must consider whether those surfaces can be cleaned and maintained to prevent HAIs in patients and caregivers. There is no clinical evidence that flooring of any type is a source of infection in healthcare settings. As with any interior finish, specifiers should educate themselves and their clients about all aspects of a product before selecting it for a project. The design of the physical environment, of which flooring is one of the most abundant finishes, impacts resident and staff outcomes in healthcare settings and contributes to a better quality of life for those who stay, work and visit in these facilities.

Notes

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