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The Importance of Floor Disinfection

By Robert Kravitz

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We may not know it or ever give it much thought, but we have as many as 50 direct and indirect contacts with floors every day. And if those floors are contaminated—as they often are—the potential for cross contamination is possible. This surprise finding comes from Mark Warner, who has worked with a variety of organizations, including the U.S. Department of Homeland Security, helping them find ways to stop the spread of disease.

Warner—who is now product manager for disinfectants and sanitizers with Enviro-Solutions (a manufacturer of green cleaning chemicals and supplies)—says the number of ways we touch floors "may even be more than 50 depending on the type of work we do, whether we have young children, even our gender."

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Some of the less-noticed indirect ways we touch floors include:

- Tying a shoelace;
- Picking up or wrapping power cords lying on a floor;
- Moving a mat;
- Picking up a tool, pen, pencil, paper or similar item that has fallen to the floor; and
- Setting down and then picking up a purse or briefcase from the floor.

History of DEFCON

The DEFCON ranking system was developed by the U.S. Joint Chiefs of Staff in 1959 so that a uniform readiness posture could be employed to meet different circumstances and threats.

As to military applications, the lower the DEFCON ranking, the greater the risk and need for amplified military preparedness and procedures to meet a potential threat.

The highest alert conditions, calling for the lowest DEFCON rankings, have occurred three times—during the 1962 Cuban missile crisis, during the Yom Kipper War (in Israel) of 1973, and after Sept. 11.

The ways are endless. Once we touch an item that has been on a contaminated floor and then touch something else, another person or our eyes, nose or mouth, the chain of contamination has been established. And for women, the possibilities of cross contamination are even greater than for men. Why? Women use purses. An Atlanta, Georgia television station found this to be true in an informal study conducted in June 2006. The station asked a health team to swab the bottoms of women's purses and then take the samples to a local laboratory for analysis.

The laboratory reported that one in four of the purses contained varying amounts of E. coli and/or hepatitis C, as well as differing degrees of other extremely serious bacteria. The study also found that all 50 purses had been placed on restroom floors next to toilets in the shopping center's public restrooms. The study concluded that this practice most likely contributed to the amount of contamination on the purses—also explaining why the potential for cross contamination can be greater for women than for men.

The shoe connection

Although there are scores of indirect ways people touch floors, the most common way of all is via our shoes—taking them on and off and tying shoelaces. And shoes—specifically shoe bottoms—can become highly contaminated, as was discovered in a two-week study

The floor infection quiz

The following quiz is designed not only to test your knowledge but to increase your understanding of the items discussed. Please

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conducted by Dr. Charles Gerba, a microbiologist with the University of Arizona.*

Gerba's study was rather simple. He asked 10 participants to wear a brand-new pair of shoes for two weeks. They were to go about their normal daily activities—everything from going to work or school to shopping at the grocery store. At the end of two weeks, the shoes were taken to a laboratory for analysis. Gerba reported an average of 421,000 units of bacteria on the outside of the shoes and 2,887 on the inside.

- E. coli (known to cause intestinal and urinary tract infections, meningitis and diarrheal disease) found its way onto 27 percent of the shoes tested.
- Coliform was detected on 96 percent of the shoes.

"The common occurrence of coliform and E. coli bacteria on the outside of the shoes indicates [people have] frequent contact with fecal material, which most likely originates from floors in public restrooms or contact with animal fecal material outdoors," explains Gerba. "Our study also found that bacteria can be tracked by shoes over a long distance into homes, offices and other spaces after the shoes are contaminated."

Implications for facility managers

Clearly this is an ongoing problem—especially since contaminants build up on floors almost as soon as foot traffic begins. For instance, the public restroom floors in the Atlanta study were actually cleaned and mopped throughout the day, and yet contamination was found on the bottoms of women's purses, most likely from the floors.

"The most effective way to keep floors healthy and stop the spread of pathogens and disease [from floors to people and other surfaces] is through more effective cleaning," says Mike Schaffer, president of Tornado® Industries, manufacturers of a variety of floor care cleaning and polishing tools and equipment. "And especially now, with continuing concerns about H1N1, effective cleaning from the floors up is all the more important."

When it comes to effective floor care, Schaffer suggests the following steps:

- Adjust priorities so that the main concern in floor care is health over appearance;
- Discuss with custodial workers how contaminated floors can spread disease;
- Employ properly diluted cleaners and disinfectants, and change solutions frequently. Always check the cleaning ability/detergency of the cleaners as well as its microbial efficacy; and
- Clean and disinfect mop heads, frames, buckets and carts—including the wheels.

"Along with this, floors must be deep cleaned with an auto scrubber or a similar floor machine on a regular basis," adds Schaffer. "Auto scrubbers are better able to cope with extremely difficult-to-remove contaminants such as residue in grout areas, epoxy grout residue, oil and grease (both organic and inorganic), and embedded contaminants brought in by foot traffic."

He also recommends that managers consider a new generation of smaller, battery-powered floor machines specifically designed to provide greater flexibility and versatility in smaller settings where occupant safety is of greater concern. The key advances in these new floor scrubbers—which typically have 14- and 24-inch cleaning paths—are that they are quiet and compact, use eco-friendly batteries that require no maintenance. This allows the machine to operate without a cord, clean about 11,000 square feet per hour and have significantly extended charge time before the battery must be recharged.

Rating the risk

"Managers should also know that there are times when a routine floor care program is sufficient at preventing the spread of disease and other times when a more intense program is called for," says Warner. "The

choose the most correct answer.

1. What is the main difference between DEFCON 2 and DEFCON 3?

- A. More powerful cleaning chemicals are used in DEFCON 3.
- B. DEFCON 2 means a virus or threat of infection is present in a community but not a specific facility.
- C. Dealing with a DEFCON 3 threat requires calling professionals trained to handle specific public health threats.

D. All of these are true.

2. It is estimated that we touch a floor directly or indirectly how many times per day?

- A. 50
- B. 40
- C. 10
- D. About 5

3. What is the most effective way to stop the spread of pathogens and disease from floors to people?

- A. Through hand washing
- B. Through the use of more powerful disinfectants
- C. Through proper and thorough cleaning
- D. All of the above

4. Why are women more likely than men to spread cross contamination?

- A. They more frequently work with children in schools and day care centers.
- B. Men tend to wash their hands more frequently than do women.
- C. Their purses are often placed on floors, including restroom floors.
- D. They more frequently work in health care settings.

5. Why are auto scrubbers preferable to mop and bucket floor cleaning?

- A. They deep clean grout and floor areas more effectively.
- B. They clean faster, addressing floor contamination issues in a more timely manner.
- C. They need to be used only when the threat of disease is at a higher level.
- D. They help improve the appearance of floors.

6. When it comes to cleaning and protecting human health, what does a higher DEFCON ranking mean?

- A. A lower threat of disease
- B. A higher threat of disease
- C. Use of disinfectants rather than all-purpose chemicals
- D. None of these

Answers: 1)B; 2)A; 3)C; 4)C; 5)A; 6)B

distinctions are referred to as risk levels [for the spread of contamination and disease] and are based on the DEFCON ranking system." (See sidebar, History of DEFCON on page 63.)

As it applies to the professional cleaning industry, there are four rankings, with each level requiring facility managers and cleaning professionals to adjust their cleaning procedures and frequencies and to select different cleaning chemicals and tools to address the infection or disease threat at hand. The four DEFCON levels are:

- DEFCON 1: No dangerous infection or pathogen risk exists. Proper routine cleaning procedures and the use of neutral or all-purpose cleaners is sufficient. However, sanitizers and disinfectants should be used to clean restrooms, food service areas and floors.
- DEFCON 2: This level indicates that a contagious disease, infection or virus is present in a community but not in a specific facility. Neutral, all-purpose cleaners are to be replaced with products that have greater cleaning efficacy. Disinfectants should have stated kill claims for the pathogen(s) of concern and there should be a greater emphasis on cleaning and disinfecting floors along with other horizontal surfaces. Key contact points should be cleaned and disinfected twice per day.
- DEFCON 3: At this level, the health threat is present in a facility. Much more thorough, specific and frequent cleaning is required. Floors should be cleaned and disinfected first—preferably with an auto scrubber. Next, walls, counters, desks and all restroom fixtures, followed by high-touch areas (doorknobs, light switches, etc.) should be addressed. Floors are then cleaned and disinfected once again. This second floor cleaning helps ensure that floors have not become recontaminated during the cleaning of other areas or surfaces.
- DEFCON 4: This is the most serious risk level calling for experts that can handle the removal of dangerous biohazard agents.



Today's facility managers are addressing challenges that they may never have assumed possible a decade or more ago. Building owners and occupants want their facilities to be more sustainable than ever and, with the difficult economy, are taking more steps to keep and attract tenants.



Although the health of their facilities has always been a concern, this concern is now a top priority. Fortunately, the professional cleaning industry has made significant advances in the past decade, introducing new technologies, cleaning systems and procedures along with more effective and healthier cleaning tools and equipment. In addition, cleaning professionals have become just that: professionals—all of which is helping to keep floors, facilities and people healthy

and productive.

* Germ Tracker: Study Reveals High Bacteria Levels on Footwear; April 22, 2008; commissioned by the Rockport Company, LLC, a leading shoe manufacturer. Charles Gerba is a professor in the Departments of Soil, Water, and Environmental Science (College of Agriculture) and Epidemiology and Biostatistics (College of Public Health) at the University of Arizona.

About the author



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