ECRI UPDATE

An Undercover Hazard: "Clean" Mattresses Can Ooze Body Fluids onto Patients

patient is lying on an apparently clean bed or stretcher when blood from a previous patient oozes out of the surface. Clearly, you don't want to put your patients through that experience. But is your facility doing enough to prevent it?

For the second consecutive year, ECRI Institute addresses the topic of mattress and mattress cover contamination on its annual Top 10 list of health technology hazards. Obstacles to addressing the issue persist, prompting ECRI to not only retain the topic, but to rank it as the Number 2 hazard on its list for 2019. The nonprofit research organization produces its annual list to raise awareness about critical hazards associated with medical devices and systems and to promote solutions that can help prevent patient harm.

DANGER BENEATH THE SURFACE

A hospital bed or stretcher consists of a frame, a foam or air mattress, and a mattress cover. The mattress cover is designed to prevent body fluids and other contaminants from entering the mattress. During room cleaning, the mattress cover is cleaned and disinfected to prepare the bed or stretcher for the next patient.

Because it is protected by the cover, the mattress itself is not cleaned between patients. If, however, the integrity of a mattress cover is compromised, contaminants can contact or seep into the mattress during patient care. These contaminants can remain on, or in, the mattress after cleaning, putting subsequent patients, as well as staff, at risk of exposure.

Examples exist of a patient lying on an apparently clean mattress when blood from a previous patient oozed out of the surface onto the patient. During a search of FDA's Manufacturer and User Facility Device Experience (MAUDE) database covering the period from 2008 to June 2018, ECRI Institute identified five reports of patient bloodborne pathogen (BBP) exposure from contaminated mattresses. That's in addition to the more than 700 reports that FDA has received of mattress covers failing to prevent blood and other body fluids from leaking into mattresses. (Reports span the six-year period from 2011 to 2016, as detailed in FDA's Covers for Hospital Bed Mattresses: Learn How to Keep Them Safe.)

Additionally, the mattress cover itself could remain contaminated if the cleaning products or procedures used are not appropriate for the circumstances of use.

The actions required to protect patients and staff are straightforward: Mattress covers should be cleaned and disinfected between uses; they should be inspected for signs of damage between patients; and they should be discarded when they have exceeded their useful life. However, healthcare facilities can face some unexpected obstacles when trying to put these recommendations into practice.

OBSTACLES TO MATTRESS COVER CLEANING AND DISINFECTION

Adequate cleaning and disinfection requires the use of appropriate cleaning products and procedures for the types of contaminants present. Failure to do so can result in contaminants remaining on, or within, the mattress or cover. For example, using a tuberculocidal product would not be an effective disinfectant for covers contaminated with bacterial spores.

In addition, the use of products or procedures that are incompatible with the mattress cover material could cause immediate damage to, or degradation of, the mattress cover. Such damage could allow the mattress underneath to become contaminated during subsequent use.

There's always the risk that staff will either knowingly disregard the cleaning instructions or mistakenly use inappropriate cleaning and disinfection methods. Providing comprehensive training and supplying appropriate cleaning and disinfection products are key steps to reducing that risk. Also important, however, is raising awareness about the hazard. Staff need to be educated about the consequences of improper cleaning: patients and staff can be exposed to infectious materials.

Another potential challenge, however, is that not all mattress cover suppliers recommend products and procedures that will successfully remove the likely surface contaminants without compromising the cover's integrity—that is, creating weak spots that could allow leaks. In this situation, healthcare facilities can't be sure which products and

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procedures are appropriate.

If your mattress cover manufacturer or rental company does not recommend an antimicrobial product for all expected contaminants, demand that they provide this information. "Facilities need to know how to properly reprocess mattress covers after exposure to blood, body fluids, or bacterial spores," notes Amanda Sivek, senior project engineer in ECRI Institute's Health Devices Group. "If this information isn't readily apparent in the IFU, ask—and be insistent."

Instructions should specify that a cover can be disinfected using (1) at least one product from the U.S. Environmental Protection Agency's (EPA) List E, which covers registered antimicrobial products that are effective against Mycobacterium tuberculosis, human HIV-1, and hepatitis B virus, and (2) at least one product from EPA's List K, which covers products that are effective against Clostridium difficile spores. (For reference, ECRI Institute has published lists of disinfectant concentrations for all products in List E and all products in List K.)

OTHER CHALLENGES

Identifying potential mattress or mattress cover contamination-or identifying products that are susceptible to future contamination-requires routine and appropriate inspections of each mattress and cover. Some vendors, however, do not provide a comprehensive inspection and preventive maintenance (IPM) procedure for their products, or they do not recommend an appropriate inspection frequency for them. Consequently, environmental services or housekeeping staff may not know how to identify signs of damage when cleaning and disinfecting covers, or clinical/biomedical engineering or facilities departments may not include mattresses and covers on their IPM schedule.

Additionally, not all mattresses and mattress covers are marked with individual serial numbers or similar unique identifiers. The lack of a unique identifier complicates the process of tracking mattresses and covers for IPM purposes, as well as for identifying when a mattress or cover has exceeded its expected life.

KEY RECOMMENDATIONS

"The first thing we recommend is that you conduct a housewide inspection of all your mattresses and covers to identify whether any show signs of fluid ingress," advises Sivek. "When one small facility we spoke with went looking for this problem, they found that approximately half of their mattresses showed signs of fluid ingress."

Further, ECRI Institute recommends that healthcare facilities:

- 1. Require that mattress cover suppliers specify compatible antimicrobial products.
- 2. Use additional surfaces (pads/ chucks, mattress covers) that are compatible with your mattresses.
- 3. Train staff to recognize mattress cover problems (e.g., tears, cracks).
- Verify that relevant cleaning checklists include recommended procedures and materials for cleaning mattress covers and steps for inspecting mattresses and covers.
- 5. Add mattresses and covers to your IPM schedule, if they are not already included.

Finally, when selecting mattresses and mattress covers for future procurement, the organization recommends that you favor products that facilitate cleaning, inspection, and tracking. **‡**

Stay tuned for the next issue of *TechNation*,

where more hazards from the list are uncovered.

This article supplements ECRI Institute's 2019 Top 10 Health Technology Hazards report. An Executive Brief of the report can be downloaded from ECRI Institute as a free public service. The full 2019 Top 10 Health Technology Hazards Solutions Kit, which includes detailed problem descriptions and recommendations for addressing the hazards, requires membership in ECRI Institute programs.

For more information, visit www.ecri.

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