

## Management of the Nursing Bag With Embedded Antimicrobials

MARY MCGOLDRICK, MS, RN, CRNI

Nursing bags brought into the home may serve as reservoirs for multidrug-resistant organisms and other pathogenic organisms. The presence of pathogens on the outside surfaces of nursing bags suggests the potential risk for indirect transmission of infection from one patient to another via a contaminated nursing bag. Bakunas-Kenneley and Madigan (2009) cultured nursing bags from four different home care agencies and found 84% of the outside of the bags cultured positive for human pathogens (15.9% multidrug-resistant organisms). It is also well documented in acute care settings that pathogens may survive on dry surfaces for extended periods placing patients at risk. For example, organisms' survival times may include:

- *Clostridium difficile* (spores) >5 months
- *Acinetobacter* spp 3 days to 11 months
- *Enterococcus* spp including vancomycin-resistant enterococcus 5 days to >46 months
- *Pseudomonas aeruginosa* 6 hours to 16 months
- *Klebsiella* spp 2 hours to >30 months
- *Staphylococcus aureus*, including multidrug-resistant *Staphylococcus aureus* (MRSA), 7 days to >12 months
- Norovirus 8 hours to >2 weeks (Otter et al., 2013).

To address this potential risk for pathogenic organism transmission, manufacturers have produced nursing bags made with antimicrobial embedded textiles. See Figure 1. Antimicrobial products kill or slow the spread of microorganisms, such as bacteria, viruses, protozoans, and fungi (Environmental Protection Agency [EPA], 2010). The EPA regulates the making and marketing of antimicrobial products when embedded into textile-based materials, such as the exterior surface of a nursing bag. The federal statute that specifically governs this area is the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). FIFRA does not allow companies to make public health pesticidal claims (e.g., Microban® will kill 99.9% of MRSA on the surface of the nursing bag) for any product distributed or sold unless the product has been approved and registered by the EPA or is covered by an exemption from registration. In the United States under a "Treated Articles Exemption" of FIFRA, companies can avoid a

lengthy pesticide registration process if they refrain from making explicit or implicit health benefit claims about the antimicrobial product and make clear to its customers that the antimicrobial product, if it is mentioned at all, is solely for protection of the treated article (EPA, 2000). As a result, a product containing an antimicrobial agent that is exempted under this provision does not need to be evaluated by the EPA for human health or environmental impacts, nor does it need to be evaluated for efficacy in reducing surface microbial load and the potential for the article to serve as a source or reservoir for human pathogens.

One type of antimicrobial treatment that can be performed to produce antimicrobial textiles is adding Microban® to the manufacturing process of textiles used in nursing bags. Microban® protection provides continuous defense against the growth of microbes and inhibits their growth. When microbes come in contact with the bag's exterior surface, Microban® disrupts the



Figure 1. Nursing bag with embedded antimicrobials. Used with permission from Hopkins Medical Products.

cell function, making the microorganism unable to grow and reproduce. Microban<sup>®</sup> protection begins to work as soon as the microorganism comes into contact with the product's surface (Microban International A, 2018). "A recent study was conducted on two samples: one was treated with Microban<sup>®</sup> antimicrobial fabric treatments and one was left unprotected. Both samples were inoculated with bacteria. The growth of bacteria was tracked over an incubation

**Nursing bags made with embedded antimicrobial textiles, such as Microban<sup>®</sup>, still need to be cleaned and sanitized at the same frequency as a nursing bag made from textiles that do not contain an antimicrobial agent.**

period of six hours. The sample with Microban's<sup>®</sup> antimicrobial fabric treatment showed 250x less bacteria after the six-hour period than the sample left unprotected" (Microban International B, 2018).

Some companies have conducted independent lab tests on the antimicrobial embedded textiles to validate the reduction of organisms on the surfaces of the fabric; however, cannot use this data without EPA registration to make health claims about the reduction of organisms and the products' ability to control the microbial burden on the surface of the nursing bag. Without EPA registration, the FIFRA only allows for claims to be made that antimicrobials within a product will help preserve the product, control odors, and manage stains caused by bacteria and mold.

Despite these marketing limitations, home care and hospice clinicians may make erroneous

assumptions that nursing bags made with an antimicrobial agent embedded in the fabric are:

- Without any microorganisms on the surface of the nursing bag; or
- Self-sanitizing; or
- Recommended to be cleaned less frequently.

Nursing bags made with embedded antimicrobial textiles, such as Microban<sup>®</sup>, still need to be cleaned and sanitized at the

same frequency as a nursing bag made from textiles that do not contain an antimicrobial agent. Each agency needs to define in policy the frequency with which nursing bags are to be cleaned. Without data to support a cleaning frequency, it is suggested that the exterior of the bag be cleaned and sanitized:

- anytime when visibly soiled; and
- *minimally* on a monthly basis when a surface barrier is routinely used under the bag; or
- *minimally* on a weekly basis for the exterior surfaces, when a surface barrier is *not* routinely placed under the bag (McGoldrick, 2018).

The antimicrobial protection in the fabric is built-in during the manufacturing process and will not wash off during cleaning or wear away during use. Refer to McGoldrick (2017) for information on protecting the external surfaces of the nursing

bag through the use of surface barriers.

Embedded antimicrobials in textiles used in nursing bags is one component of a multi-pronged approach to consider to prevent the transmission of pathogenic organisms and prevent infections in home care and hospice patients. ■

**Mary McGoldrick, MS, RN, CRNI**, is a Home Care and Hospice Consultant, Home Health Systems, Inc., Naples, Florida.

The author declares no conflicts of interest.

Address for correspondence: Mary McGoldrick, MS, RN, CRNI, P.O. Box 211, Naples, FL 34106 (mary@homecareandhospice.com).

Copyright © 2019 Wolters Kluwer Health, Inc. All rights reserved.

DOI:10.1097/NHH.0000000000000774

**REFERENCES**

Bakunas-Kenneley, I., & Madigan, E. A. (2009). Infection prevention and control in home health care: The nurse's bag. *American Journal of Infection Control, 37*(8), 687-688.

Environmental Protection Agency. (2000, March 6). *Pesticide Registration (PR) Notice 2000 - 1\*. Notice to Manufacturers, Formulators, Producers and Registrants of Pesticide Products*. Retrieved from <https://www.epa.gov/sites/production/files/2014-04/documents/pr2000-1.pdf>

Environmental Protection Agency. (2010). *What are Antimicrobial Pesticides?* Washington, DC: U.S. Environmental Protection Agency, Office of Prevention, Pesticides, and Toxic Substances, Office of Pesticide Programs, U.S. Government Printing Office.

McGoldrick, M. (2017). Best practices for home care "Bag Technique" and the use of surface barriers. *Home Healthcare Now, 35*(9), 478-484.

McGoldrick, M. (2018). Cleaning and disinfection. In *Home Care Infection Prevention and Control Program*. Saint Simons Island, GA: Home Health Systems.

Microban International A. (2018). *Frequently asked questions about antimicrobials, definitions & more*. Retrieved from <https://www.microban.com/faq> <https://www.microban.com/faq>

Microban International B. (2018). *Antimicrobial additives: Fabric treatment*. Retrieved from <https://www.microban.com/blog/advanced-antimicrobial-fabric-treatment>

Otter, J. A., Yezli, S., Salkeld, J. A., & French, G. L. (2013). Evidence that contaminated surfaces contribute to the transmission of hospital pathogens and an overview of strategies to address contaminated surfaces in hospital settings. *American Journal of Infection Control, 41*(5 Suppl.), S6-S11.