

Biomed, Manufacturers Play Pivotal Roles in Infection Prevention

Robert King

Hospital acquired infections (HAI) are a growing problem that not only threatens patients but also healthcare facilities' finances. Biomedics can play an important role in preventing HAIs, and manufacturers also can help drive down HAI rates through effective medical device design.

A World Health Organization (WHO) report estimates that at any time, more than 1.4 million people worldwide suffer from HAIs. "With a concerted effort we can drive the occurrence of new infections toward zero," says Stephen Streed, system director of epidemiology for Lee Memorial Health System in Cape Coral, FL. Streed also is a member of the board of directors for the Association for Professionals in Infection Control and Epidemiology.

Patients can acquire infections through different means, including medical instruments and devices. "Any device that is being used for treatment of the patient certainly enables organisms to enter the body and develop into an infection," Streed says. Another way is through contact with caregivers, particularly caregivers' hands.

The most frequent infections occur from surgical wounds, urinary tract infections, and lower respiratory infections, the WHO report says, with the highest prevalence of HAIs in intensive care units and acute surgical wards.

Doing Their Part

Biomedical equipment technicians (BMETs) and clinical engineers can help prevent HAIs by wearing proper personal protective equipment (PPE), Streed says. "The first thing for the biomed to understand is that equipment that comes to them may not be thoroughly cleaned. Hopefully it has been, but they should be using the proper PPE themselves just in case."

It also can be challenging to tell whether equipment has been cleaned. "When you culture the touch pads of monitors you frequently find organisms that are residual from the patient," Streed says.

Healthcare personnel may be unsure about whose responsibility it is to clean equipment, says Matthew J. Arduino, MS, PhD, the acting chief of the clinical and en-

Checkpoints

A World Health Organization (WHO) report estimates that at any time, more than 1.4 million people worldwide suffer from a hospital acquired infection (HAI).

- ✓ Patients can acquire HAIs from medical equipment and devices.
- ✓ Biomedical technicians (BMETs) and clinical engineers should not assume that equipment is clean and should use the proper personal protective equipment when handling equipment.
- ✓ BMETs should practice proper hand hygiene at all times.
- ✓ Device manufacturers should consider infection control in their design process.

vironmental microbiology branch for the U.S. Centers for Disease Control's (CDC) Division of Healthcare Quality Promotion. Arduino also sits on the AAMI Renal Disease and Detoxification Committee. "If a patient leaves the room and there is shared equipment, housekeeping doesn't touch it and neither does the nursing staff, thinking it is somebody else's responsibility to disinfect it," Arduino says.

Although devices may look clean, Streed says, "I would clean those items myself if not designated cleaned by someone else. Most hospitals have ready-to-use disinfectant cloths that you can use to wipe down the equipment and, depending on the equipment, will not damage it."

BMETs also should understand the basics of infection control. "Understanding the concepts of transmission of infection and how to break that chain is helpful," Arduino says. Proper hand hygiene is key. Hand hygiene should be practiced before and after a technician leaves a patient's room, even if he or she didn't touch the patient, a CDC guideline says. An alcohol-based foam or gel is generally more effective in killing bacteria than soap and



Stephen Streed

Chain of Infection

Understanding how the chain of infection works is an important first step to preventing or breaking the infection. Below is an example of a chain of infection provided by Matthew Arduino of the U.S. Centers for Disease Control. Remove any of these links and the transmission ceases.

1. Presence of an organism of sufficient virulence
2. A reservoir (This could be other patients either colonized or infected, or other contaminated surfaces.)
3. Mode of transmission (How it gets from the reservoir to the susceptible patient. Some ways include direct or indirect contact, droplet, or airborne.)
4. Portal of entry
5. A susceptible host

water, according to the guideline. For information about proper hand hygiene, visit www.cdc.gov/handhygiene.

Many healthcare institutions have an infection control specialist on staff who can be a valuable resource to the biomed department. “It is a good idea to involve that person during product selection, and involve them during questions involving cleaning,” Streed says.

“Does the manufacturer give you guidelines on how to clean that device, what chemicals are appropriate to use, does the device tolerate those chemicals well, and what are the physical properties of the devices themselves?” Streed asks.

BMETs also should understand how devices and instrumentation are being used on the floor. When they obtain a device and are unsure whether it has been cleaned or how it is being used, “then biomedics can take appropriate precautions, which might include the use of a lab coat and gloves,” Arduino says.

Device Design Considerations

Preventing HAIs extends beyond the healthcare facility to device manufacturers, who should consider infection control in the design process, Arduino says. Devices can be designed to be cleaned quickly without having to be dismantled, he says.

Manufacturers also should consult infection control personnel during the device design process to better understand the issues they face, Arduino says. It’s also critical that manufacturers provide clear instructions for cleaning devices and instrumentation, and provide



information on the appropriate detergent disinfectants to use on the product. For example, “with the advent of touch screens, are there disinfectant products that will not damage the screens?” Arduino asks.

Controlling Costs

Reducing HAIs can result in significant savings. A 2007 CDC report estimates the overall annual direct medical costs of HAIs to hospitals in the United States ranges from \$28.4 billion to \$33.8 billion. Published studies have found that infections can cost \$30,000 to \$50,000 or more per infection depending on the site and severity of infection, Streed says.

Numerous factors contribute to these increased costs, including more funding for treatment and extended hospital stays. “You go in the hospital for one thing and you end up with something else. Your costs go up,” Arduino says.

The federal government is providing some funding to help combat HAIs. The U.S. Department of Health and Human Services (HHS) plans to award \$50 million in grants to states as part of the American Recovery and Reinvestment Act. HHS has earmarked \$40 million for surveillance and prevention efforts, and another \$10 million to improve the process and increase the frequency of inspections for ambulatory surgical centers.

Streed says surveillance is an important element of the plan. “Awareness leads to change in this business,” he says. “I think the funding is going to end up in state health departments that are going to develop some surveillance and reporting processes that can help the general public understand there is a continuing problem with HAIs.” ■

Robert King is editor of *AAMI News*.