Better hospital purchasing decisions

Reducing hidden costs and health risks by investing in stronger devices

When a patient enters a hospital, there are many paths he or she can take. From admission to discharge, there are typically several stops on an individual's journey of care. That's why it's highly important that everything runs smoothly along the way. Medical devices required for testing and administering medications must work properly so that care providers can move patients through the treatment process in a timely manner. If they don't, a delay in care could be very costly to a hospital and put patients' lives at risk.

Unfortunately, in today's healthcare environment, it is becoming more common to see devices that don't perform as they should. This trend of more frequent device failures is making purchasing choices an even greater challenge for healthcare executives. While there are many factors to consider—ranging from pricing to patient experience—quality has become paramount. Are these medical devices made of material that will withstand chemical contact and high impact? Will they be cost-effective? How long will they last? Will they keep patients safe?

In this paper, we will discuss the reasons devices fail, the hidden and avoidable costs that result from device failure and disruptions in care, and how healthcare management can play a critical role in creating change in the system.

A challenging environment

Patient safety is a top concern in today's healthcare environment, which means healthcare professionals are more motivated than ever to prevent healthcare-associated infections (HAIs). HAIs are infections that are not present or incubating at the time of admission, often appearing after discharge from a hospital. The most serious HAIs involve "superbugs," such as methicillin-resistant Staphylococcus aureus (MRSA), vancomycin-resistant enterococci (VRE), and Clostridium difficile (C. diff).

HAIs not only threaten patient health but also result in increased, avoidable costs for hospitals through higher rates of premature death, longer hospital stays, and reduced reimbursements for excess readmissions. These risks mean healthcare professionals are more motivated than ever to use the most effective disinfectants on medical devices.

"When a patient has an HAI, all the costs associated with treating that condition are additional and are not reimbursed by Medicare, so there is a big financial burden picked up by the hospital," said Tim Attebery, president and CEO of Ballad Health's Holston Valley Medical Center.

Ballad Health is an integrated healthcare system serving northeast Tennessee, southwest Virginia, northwest North Carolina, and southeast Kentucky. Attebery knows well the financial challenges of running a facility in a major regional market.

"The reputation of the hospital is also directly affected to the extent the patient acquires an infection that they didn't have when they came in. You do not want a perception in the community that your hospital is not a clean, safe environment of care," said Attebery.

Increasingly, consumers are aware of HAIs and may question infection or redo rates for a surgeon or hospital. That data may influence a patient's decisions, such as the facility they choose. This is changing how healthcare brands and clinicians are approaching disinfection protocols.

Hospitals must comply with increased disinfection regulations by using diligent environmental cleaning and sterilization protocols to prevent HAIs and avoid fines. Often, providers rely on frequent use of isopropyl alcohol (IPA), IPA + chlorhexidine, bleach, and other aggressive chemical disinfectants. Many applications require sterilization with ethylene oxide (EtO) or gamma irradiation, especially to control pathogens that are resistant to traditional disinfectants.

Healthcare rules and regulations change at a rapid pace, and devices must keep pace with new developments in disinfection practices. The Joint Commission is now auditing to ensure that disinfectants being used on specific devices are prescribed in Instructions for Use (IFU).

"Every hospital in the U.S. is evaluated based on how well they follow the standards that are promulgated by the Joint Commission, which reflect evidence that has been accumulated over years and years," said Attebery. "That environment of care needs to adhere to the highest standards for patient safety. We're constantly evaluating. Are we having infections at a rate higher than what we would expect? Are those infections associated with a certain room, a certain condition, or a certain type of patient? If the Joint Commission identifies that we are not adhering to the standards with regard to patient safety and infection prevention, that could jeopardize our Medicare certification."

Materials matter

The good news is that these HAI control efforts are achieving positive results. Thanks to improved hygiene and aggressive disinfection and sterilization protocols, the Centers for Disease Control and Prevention (CDC) HAI Progress Report describes significant reductions for nearly all infections. The bad news is that some of these aggressive disinfectants, disinfectant wipes, and sterilizations are taking a high toll on devices molded with commonly used polymers.

The problem is that many materials commonly used in medical devices today have a low level of compatibility with new disinfectants and stringent cleaning protocols. Constant exposure to aggressive chemicals can damage a device's structure, causing cracks, crazing, discoloration, and stickiness.

Medical devices also endure a lot of impact. Every day, device housings and hardware are handled by multiple people, move across many environments, and can be dropped or bumped on hard surfaces. Combined with low chemical resistance, this high-stress environment often leads to device failure.

Material choice plays a big role in whether a device is successful or fails. The material's properties, how it is processed, and the environment in which it is used all factor into device performance. Making the wrong material selection, poor chemical resistance, high-stress design, or inconsistencies in manufacturing can result in a faulty device.

High risks, high costs

There are many kinds of hidden costs that could arise if a device doesn't perform like it should. Damaged or broken devices can't be used, leading to a delay in care. Whether it's a surgeon having to wait an hour or more for an operating room due to equipment failure or a patient having to wait for a test because of broken diagnostic equipment, delays can cost an enormous amount of resources in terms of labor and time.

If the housing breaks and the internals of the device are exposed to chemicals, the device may stop performing critical functions. The cost to improve housings, the least expensive parts of electronic devices, is nothing compared to the cost of device failures—both to the manufacturer and the hospital.

"We have to work very hard on throughput. That means when a physician needs to order a test, we have to make sure the equipment is available and that the staff is available to try to provide that service as quickly as possible," said Alan Levine, executive chairman, president, and CEO of Ballad Health. "Our goal is to get you in the hospital and get you diagnosed, treated, and home as quickly as possible so that we can contribute as much as we can to your healing."

However, delays in care are more than just a financial issue. They also have a dangerous effect on patient safety. The longer a patient stays in the hospital, the more potential there is for exposure to risk, including HAIs.

"The hidden cost of that is when the equipment goes down, it's not available to the patient and it costs an enormous amount of money to replace or repair," said Levine. "A lot of times, the results of that are intangible. You don't realize it until you stop thinking, and it's an 'aha!' moment."

A proposed solution

The current rates of medical device failures are unacceptable and unsustainable for a hospital's bottom line. Device failures can cause delays in care which keep patients in the hospital longer, putting them at greater risk for HAIs. Hospitals must be able to invest in well-made devices that can adapt to the increased use of aggressive disinfectants and meet today's regulatory and safety demands.

To preserve efficient patient flow and keep costs low, management must request that device manufacturers use materials that have higher levels of chemical compatibility. Healthcare decision makers can begin changing the conversation around device viability in the Request for Proposal (RFP). Executives could request that more types of disinfectants be approved by the hospital and that device housings and hardware:

- Be made of materials compatible with bleach, alcohol, quaternary ammonium, and hydrogen peroxide when cleaned a certain number of times a day.
- Shall maintain integrity when bumped into a wall or dropped during normal use throughout the device's expected service life.
- Shall not become sticky to the touch after cleaning with the preceding listed types of disinfectants up to a certain number of times per day throughout the device's expected service life.

Testing devices for durability after disinfection is another important step to creating change. The device manufacturer can start by testing the chemical resistance of materials when exposed to disinfectants then use a mechanical property retention test to measure how a well-designed device will respond to impact after disinfection.

"As we learn about ways to maintain a clean, safe environment for our patients, we're discovering that the agents we use to sterilize are actually causing an adverse effect on the housing of the equipment," said Attebery. "As we look at equipment in the future, it's going to be important for us to ask our manufacturers and suppliers whether they're using materials that are easily cleaned without affecting the functioning of the equipment."

Now more than ever, healthcare professionals have the opportunity to play an active role in protecting patient safety and keeping operating costs down. Demanding better-performing materials for medical devices and indicating what disinfectants are included in IFUs across all the devices in a healthcare system could have a highly positive impact on patients and hospitals. By taking action, hospitals may improve their chances of having more successful Joint Commission audits and increase access to cleaner, safer, longer-lasting medical devices. Ultimately, stronger devices ensure that a patient's path through the hospital is smooth and that hospitals can continue providing safe, high quality care without delay.

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