Weighing the Pros and Cons of Patient Safety Technology

Although some emerging technology promises a patient safety cure-all, hospitals need to evaluate clinician workflow before implementing new gadgets.
In the 21st century, technology offers a solution to just about any everyday problem. Don’t know that actor that just came onto your screen? Log onto the IMDB app. Need directions? Just type the address into your phone.

Healthcare is no different. Emerging technologies promise to solve the industry’s biggest patient safety concerns, and sometimes they actually do, but not always. In some cases, healthcare technology can simplify complicated processes and improve care. In other situations, it can have negative consequences, particularly if hospitals fail to consider the technology’s impact on workflow.

Just like the technology we encounter in everyday life, healthcare technology can be beneficial, but only when it is appropriately integrated into the system in which it is used. Unfortunately, in their rush to purchase cutting-edge gadgets, hospitals often neglect this step.

“Workflow needs to be assessed and made more efficient, and if possible, standardized so that when you introduce the new technology, you’re not introducing something new into a bad process,” says Mary Logan, president and CEO of the Association for the Advancement of Medical Instrumentation (AAMI) in Arlington, Virginia. “You’re really looking at your process and making sure technology fits in with that, so it’s an opportunity to improve. Hospitals historically haven’t done that, but they need to.”

We have reviewed some of the new technology that’s making an impact in the patient safety world, as well as any evidence to support its impact. Perhaps more importantly, experts have outlined ways in which hospitals can evaluate important workflow considerations before purchasing or implementing any new technology that impacts patient care.

**Evaluating workflow**

It’s hard to not to get swept up in the wave of excitement that accompanies any new gadget, just walk by an Apple store during the release of a new iPhone® and you’ll see that enthusiasm firsthand.

Ultimately, however, there is no silver bullet. Any type of technology, whether it’s a new EHR software update or a surgical robot, is only as effective as the hospital’s process allows it to be.

“One of the critical challenges we see when new technology emerges is there is a lot of hoopla about it and people getting pretty excited and seeing this as a solution,” says Chris Lavanchy, engineering director of the health devices group at the ECRI Institute in Plymouth Meeting, Pennsylvania. “And it can be. But the challenge, I think, is that people don’t realize on the outset what needs to be done on their part to make it work.”

Instead of looking at technology as the entire solution, hospitals should view it as one potential enhancement integrated into a larger process. Failing to do the legwork to ensure effective integration can lead to wasted expenditures on ineffective gadgets, or, worse, a disorganized process that leads clinicians to find potentially dangerous workarounds.

Hospitals should focus on six important factors before purchasing and implementing any new technology that impacts patient care:

- **Impact on humans:** Any new technology needs to integrate seamlessly with the clinicians who are going to use it. For example, patient monitoring technology can be a useful way to alert clinicians if a patient on a PCA pump is suffering from respiratory depression, Lavanchy says. However, when this technology is implemented in a lower-acuity setting where clinicians are not used to monitoring patients or responding to alarms, it leads to negative consequences associated with alarm fatigue.

- **Impact on the system:** Every facility’s workflow varies, presenting different obstacles for implementing technology. Prior to adopting any new technology, hospitals should review their workflow and applicable policies, and then determine how the technology would disrupt or enhance that process. Input from clinicians is critical, since they understand the nuances of patient care interventions.

- **Clinician training:** New devices or gadgets are limited by their operator’s knowledge and training, which means preparing clinicians for new patient safety technology is critical to ensure it is utilized effectively. Many hospital leaders consider this kind of training “unproductive time” since it takes clinicians away from patients, says Marilyn Neder Flack, senior vice president of patient safety initiatives at AAMI and executive director of the AAMI Foundation. “What we hear is nurses get 20 minutes to learn a new piece of complex technology, and that’s not fair to the nurse and it’s not fair to the patient,” she says. In the same vein, new technology may require new physician privileging requirements. Robotic surgery equipment, for example, requires specific, in-depth training before surgeons are qualified to perform surgeries autonomously. And ongoing training is equally important.

- **Contact with other hospitals:** Although each hospital’s processes are different, there may be some commonality in the barriers they encounter. Talking to other facilities that have implemented the same technology can establish an understanding of potential problems that might arise.

- **Dialog with the vendor:** Vendors will do their best to sell their product, but they can also answer important questions about how to effectively implement their technology and what
kind of preliminary training is required for clinicians. Hospitals that have already reviewed workflow concerns can ask specific questions about the implementation process.

- **Input from all departments:** Typically, new technology has a ripple effect that impacts several different units or departments. Although the IT department may take the lead on certain products, like EHR software, it’s imperative to gather input from clinicians, patient safety experts, risk managers, quality care coordinators, and C-suite leaders.

**Emerging technology that’s making a mark on patient safety**

According to Neder Flack, any technology that is used on or will interact with a patient should be considered a form of patient safety technology. This terminology is far-reaching: Even technology that doesn’t directly interact with the patient can, and often does, have patient safety implications. EHRs, for example, are used by nurses and physicians, but in recent years, researchers have uncovered a number of potential patient safety concerns born out of EHR software, ranging from incorrect drug dosages to missed diagnostic tests.

Listed below are some of the important and potentially impactful patient safety technologies on the market.

**Keeping tabs on patients**

Data analytics and real-time vital signs are providing clinicians with more valuable information to make care decisions.

For example, EarlySense, based in Waltham, Massachusetts, has been around since 2004, offering patient monitoring for hospitals and health systems. A sensor placed under a mattress detects critical vital signs, alerting nurses to patient deterioration via a central display station or individual handheld device. The motion-detecting sensor is also designed to prevent falls and pressure ulcers. In 2014, the *American Journal of Medicine* found that continuous monitoring using the EarlySense System led to a decreased length of stay and fewer code blue events. Another patient monitoring software known as The Rothman Index captures data from a patient’s EHR to create an individual score that can be used to alert clinicians if a patient is experiencing subtle declines.

**I see you’ve been washing your hands …**

As hospitals look for new ways to improve hand hygiene compliance, technology is filling the void with automated surveillance solutions, replacing the antiquated and often unreliable "secret shopper" method.

Last year, eight hand hygiene compliance companies formed an alliance called the Electronic Hand-Hygiene Compliance Organization (EHCO). In a press release announcing the new coalition, proponents of automated surveillance pointed out that direct observation only accounts for a small percentage of hand hygiene events, and that in many cases clinicians know they are being observed. Automated surveillance, conversely, tracks 100% of hand hygiene occurrences and has been shown to improve hand hygiene rates in some hospitals.

In November, DebMed, one of the eight organizations that make up EHCO, announced that the University of Vermont Health Network and Champlain Valley Physicians Hospital in Plattsburgh, New York, increased hand hygiene compliance by 40% in four months by using the DebMed Group Monitoring System. Using wireless sensors, the system records every hand hygiene event and stores it on a server, allowing staff to easily view trends and statistics and identify areas for improvement.

Other systems, like SwipeSense, rely on badges and wall-mounted hubs to track compliance. Several other companies use radio frequency identification and real-time location systems to collect hand hygiene compliance data.

**Robots that come in all shapes and sizes**

The robot revolution is here, and it’s happening in various parts of the hospital.

Increasingly, robots are being used to disinfect patient rooms. Using high-intensity UV light, these robots are able to disinfect an entire hospital room, sometimes in just 15–20 minutes.

Xenex, perhaps the most popular brand of UV disinfecting robots, has been shown to reduce surgical site infections by as much as 100%. In other studies, Xenex has reduced *C. difficile* rates by as much as 70% and cut MRSA rates by as much as 57%.

The Mayo Clinic in Rochester, Minnesota, recently tested the Xenex robots for a six-month period. Although the robots added about 25 minutes to the room turnaround process, *C. diff* infections declined 30%.

Popularity surrounding Xenex and several other UV robots spiked recently amid concerns of a potential Ebola epidemic. Although the robots cost as much as $100,000 apiece, some infection prevention experts have argued the initial cost far outweighs the added costs associated with an HAI.

Beyond disinfecting rooms, surgical robots have become much more ubiquitous in healthcare facilities as a less invasive alternative to traditional surgical procedures.

The da Vinci Surgical System was granted FDA approval in 2000, and many hospitals jumped on board. Recently, however, some have raised concerns about physician training and robot malfunctions that have led to patient injuries.
Doctors and hospital leadership recognize elevated patient safety and physician satisfaction with PerfectServe®

When the executive team of Spectrum Health System made the decision to implement PerfectServe’s secure care team communication platform, Dr. Matthew Denenberg, vice president of medical affairs (VPMA) of the system’s Helen DeVos Children’s hospital, says it was for all the right reasons.

It wasn’t about being “cutting edge” or increasing the hospitals’ competitive share of the marketplace. The decision came from a shared understanding that it was time to move toward a direct and digital method of communication for the hospital network’s physicians because the old way simply wasn’t working anymore.

“It was unsafe,” Dr. Denenberg says. “And it wasn’t cost effective.”

Dealing with archaic communication processes
In addition to his role as VPMA, Dr. Denenberg also serves as an ER physician, putting him in the unique position of understanding first-hand the angst of hospital staff when facing archaic processes in times of real emergency.

“We started seeing a rise in the number of event reports of delayed communications with physicians during time of patient need,” says Denenberg.

It became apparent that the network’s paper-based system was no longer appropriate in today’s era of direct and digital communications.

Implementation and adoption of a secure care team collaboration solution
The initial implementation of PerfectServe Synchrony™ took three months and by that time 50% of Spectrum’s 3,000 physicians were using it regularly.

Dr. Denenberg was charged with helping hospital leadership ensure physician adoption and became the project champion. He was able to walk away from the implementation and adoption stages with some powerful insights.

For instance, to encourage early adoption by a larger number of physicians, Denenberg says hospitals should put serious thought and consideration into educating their staff on both PerfectServe’s browser-based and mobile app interfaces.

Denenberg also says hospitals should take measures to ensure that their communications workflow governance—as well as their technology infrastructure—is sound. While governance promotes the foundation to develop standard workflows, making sure the Wi-Fi signals in isolated places—like the radiology suite and on rural campuses—can support the technology will prevent gaps in communication workflows and encourage adoption.

Lastly, Denenberg suggests that hospital leaders spend quality time understanding different physician groups’ unique workflows. For example, while PerfectServe’s HIPAA-compliant security measures prevent anyone other than the physician from accessing his or her messages on the app, one cardiologist had a standard practice of having his nurse read his messages aloud to him in the operating room while his hands were otherwise preoccupied—usually inside a patient’s chest.

“We obviously did not consider that particular situation up front,” Denenberg says. “But what I particularly like about PerfectServe is that the service team is very attentive. They helped us find a workaround for this and for all of the minor hiccups we ran into. And now the biggest complaint we hear is that all of the system’s staff isn’t using the service yet.”

Instant communications and improved patient outcomes
Now that Spectrum Health physicians are initiating up to 60,000 interactions a month through PerfectServe Synchrony, the benefits have become evident.

“It’s instantaneous contact with providers. We have eliminated the middleman,” Denenberg says. “Our physicians who are using this on an everyday basis absolutely love the ease of back and forth communication with their colleagues.”

A final word of advice from the doctor
For Spectrum, PerfectServe has decreased response times on average from 12 minutes to four, eliminated confusion and inconsistency with maintaining call schedules, improved physician satisfaction and increased levels of patient care and safety.

“The one thing I would say to the leadership of a hospital that’s not using PerfectServe, or similar clinical communication system,” Denenberg says, “is ‘Why aren’t you?’ It provides standard workflows across a hospital system for instant communication that significantly increases patient safety by decreasing long delays in communicating with physicians.”

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