Iron lungs out. Surgical robots in. The heart-wrenching sight of rows of children trapped in iron lungs has given way to the ability to transplant lungs.

As stewards of the strategic direction of their organizations, trustees must understand how new technology can shape and advance strategy. In fact, in our judgment, a strategic plan should include a strategic clinical technology plan to ensure that it involves an understanding of technology’s risks, requirements and dependencies.

To understand where health technology might head in the future, the technology experts at ECRI Institute caucus each year to review emerging technology we believe health care providers should keep on their radar in the coming year.

We publish our annual “Top 10 Hospital C-suite Watch List” to help trustees and senior management of health care providers take stock of technological change. The list reviews 10 important technology innovations or breakthroughs we believe are worth monitoring for any health care strategic planning process.

Importantly, changes in health care technology continue to follow several key trends that our top 10 list shows again this year: Make it safer. Make it smaller. Make it smarter. Here are three innovations from our list that showcase these trends.

Make it safer

Wearable sensor technology has already affected many of us by assiduously counting our every step and reminding us politely how close we are to our fitness goals for the day. In health care, new, smarter wearable sensor technology has the potential to transform the monitoring of many patient conditions on an ongoing basis, improving patient safety along the way.

For example, if we can count your steps at home, we can use sensors to track what is happening to you while you are recovering from surgery. In fact, new possibilities for wearable sensors seem to pop up each day. Wearable sensors could untether patients in the hospital from wired physiologic monitors, possibly enabling patients to safely leave the hospital sooner than they otherwise would or reducing readmissions by having better post-procedure monitoring at home.

One interesting application of sensors to directly improve patient safety may lie in preventing pressure ulcers. According to the Agency for Healthcare Research and Quality: “Each year, more than 2.5 million people in the United States develop pressure ulcers. These skin lesions bring pain, associated risk for serious infection, and increased health care utilization.” Results from one medical center conducting a clinical trial using special sensor technology show increased compliance with the hospital’s patient-turning protocol from a baseline of 68 percent to 98 percent.

In another example, Stanford University Medical Center showed that a smartwatch device detected seven of eight seizures in patients with epilepsy and transmitted that information to caregivers. While the device cannot prevent an episode, early detection and notification can allow caregivers to deliver treatment sooner. Many more examples exist of wearable sensors improving patient safety and care by detecting falls, measuring gait irregularities and monitoring vital signs remotely, to name a few.

Make it smaller

Sometimes innovation comes not from inventing a completely new technology (think about the camera in your phone) but by taking an existing technology and making it smaller and less invasive. Miniature leadless pacemakers fit into this category.
In a recent review article, pacemaker implantations increased by 56 percent from 1993 to 2009, with a total of 3 million patients having the procedure. In these patients, about 4 percent have some type of device complication — such as lead failure or infection in the surgical pocket site where the pacemaker sits.

Given the spate of pacemaker wire recalls and serious safety issues, leadless pacemakers could provide an advantage in safety, not just convenience. While still in the relatively early stages of development and not necessarily appropriate for all possible recipients, these tiny devices are about 10 percent the size of a normal pacemaker and do not require conventional surgical implantation. The devices are deployed through a transcatheter system directly into the right ventricle of the heart.

Make it smarter

Organ transplantation saves lives. Unfortunately, not everyone who needs a new lung or heart gets one in time. Currently, about two-thirds of the lungs and hearts removed for possible transplantation never are used because the process of transporting and storing the organs on ice frequently creates damage and the organ does not survive long enough to be implanted safely.

Several organizations have developed smart transport and storage systems that can keep removed lungs and hearts viable for longer by using a warm perfusion system that attempts to keep them in a more natural “physiologic” state. The technology has the potential to double the number of heart and lung transplants. If the number of lungs available were to double, it could possibly provide a donor lung for everyone in the U.S. on the waiting list.

The trustee’s role

As new technology inevitably transforms health care, trustees should keep in mind two important points.

First, settling on a strategic direction for a health care organization requires an understanding of the clinical and information technology required to make the strategy work. (You also need to understand your existing base of technology, something many hospitals simply fail at.) Every strategic planning process should include a clinical technology planning process that maps onto the strategic directions your organization has chosen.

Second, while technology does not create strategy, it does enable strategy. So, ensure your organization has a good process for both technology-horizon scanning [i.e., monitoring emerging clinical technology trends] and technology decision-making in real time. In other words, capital budgeting and the setting of priorities in real time should follow a systemized process that matches the priorities of the organization.

For example, trustees might ask whether the capital budget includes clear and consistent written criteria for evaluating both replacement and new clinical technology. And those criteria should include a careful review of both the strategic priority and the current clinical evidence supporting the use or value of any new technology.

While this approach may sound simple, it is not easy to do. The push and pull of individual departments and individual clinicians always presents challenging trade-offs and, if not managed, will potentially distort capital allocation.

Trustees can play a valuable role in this process by ensuring that clinical and information technology decisions map onto the organization’s priorities. Trustees should ask how clinical technology requests are assessed (for example, what information is gathered to support a requested clinical technology acquisition?) and how priorities are set. Trustees should also ask how budgeted acquisition capital is split between new, innovative clinical technology and the replacement of existing clinical technology.

A bright future

The trend toward creating smaller, safer, smarter technology gives us some truly remarkable opportunities to make today’s advanced surgical robots look like the iron lungs of years past. Today, we still go the hospital to get the benefits of the vast majority of technological innovations. But tomorrow, the trend toward smaller, safer and smarter will bring a future where technology comes to you.

Boards need to be prepared for changes in patient care. Will your watch someday display your blood pressure continuously from an implanted sensor? Will Costco take your MRI exam? Will your asthma attack be treated by an internal pump that injects you with exactly the right dose of medicine? Compared with the iron lung technology of the last century, wouldn’t that be an incredible breath of fresh air for this one?

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To read ECRI Institute’s “2016 Top 10 Hospital C-suite Watch List,” visit www.ecri.org/2016watchlist.