



Wristbands designed to prevent surgical errors

Published October 2005

Marking the surgical site is a requirement in the JCAHO's Universal Protocol on wrong-site/-patient surgeries, but compliance depends on several human factors. If surgical team members don't take a time out or forget to mark the site, it can lead to devastating results.

Now a new tactic has been developed to help jog memories and save patients from injury or death.

A physician in St. Louis has developed a simple alarm system to help surgeons follow the Universal Protocol on wrong-site/-patient surgeries. **Richard Chole, MD, PHD**, chair of the Department of Otolaryngology at the Washington University School of Medicine and chief of service at Barnes-Jewish Hospital, both in St. Louis, developed a wristband and marker system that forces physicians to mark a patient's surgery site to reduce medical errors.

The wristbands use technology similar to the security system found at a local department store, although the chip inside is more sophisticated to prevent any potential interference with OR equipment.

The chip will set off an alarm if it passes through a set of detectors. Each wristband is packaged with a marker that the physician should use to mark the operating site in accordance with the Universal Protocol.

After marking the site, the physician removes a sticker from the marker and places it on the wristband. That sticker deactivates the chip inside the wristband, allowing the patient to pass through the detectors without tripping the alarm.

If the physician forgets to put a sticker on the patient's wristband, an alarm will go off.

The alarm can take any form a hospital prefers, from an audible signal to a flashing light. Once the alarm goes off, the surgical team will know that it hasn't marked the surgery site.

The sticker is located on the marker as a reminder for the physician. With pen in hand, it's literally a matter of one second to peel off the sticker and put it on the wristband.

The goal is to create a simple reminder to help increase adherence to the Universal Protocol and reduce wrong-site surgeries, says Chole.

In 2004, Barnes-Jewish Hospital staff reviewed the numbers and believed they had an unacceptably high number of wrong-site surgeries, despite the fact that the hospital had been marking surgery sites for two years.

"We were running sentinel events, and there were five out of 50,000. I walked out of the room, and I was appalled, actually. None of the five had been marked. I just felt we were better than that and could do better," says Chole.

"I thought maybe we could find a high-tech solution," he adds.

The idea came to him a couple of days later, when Chole was in a place decidedly different from a hospital.

"A couple of days later, I was at a Home Depot. They deactivated the chip for the alarm, and I had an 'a-ha!' moment," says Chole. "From this, I thought we could find a simple solution."

Chole spoke with engineers at Washington University and explained his idea. Together, they worked up a prototype and patented the idea.

"The sensor had to be a little more robust than the ones at Home Depot. At Home Depot, there aren't a lot of radio frequencies. In a hospital, there are. It also couldn't interfere with our hospital equipment," says Chole.

The sticker is on a strip of paper attached to the marker's cap. Chole wanted the sticker to be placed on or near the cap to serve as an obvious reminder for the physician to deactivate the chip. "You already have the pen in your hand, [and] the cap and sticker are in your hand," he says.

The patent was submitted in August, and Chole says the university's lawyers couldn't find a similar product on the market. Chole's brother Stephen now runs CheckSite, the company the brothers developed to market the wristband system.

Chole says the goal was to make the wristbands as cost-effective as possible because they want the product to be used by hospitals for every surgical procedure.

The detectors, called sentries, carry a one-time cost of about \$6,000-\$7,000. The wristband-pen combination sells for only \$2.50. "Normally, a pen costs the hospital 90 cents to \$1," says Chole. "It will pay for itself in avoiding paid compensations."

The wristband will also give surgeons and medical staff peace of mind because surgical errors have a terrible effect on those involved in the mistake.

"I didn't realize how devastated the surgeon can be by making such a mistake," he adds.

"It's been accepted pretty well by surgeons. Nursing staff like it because it reduces the amount of times they have to hassle the surgeon, and they are very into patient safety," says Chole.

Chole says ideas such as his wristband build redundancies into a hospital's safety net. "The airline industry doesn't rely on human memory for safety issues," says Chole.