

Tracking Infections

Automated data surveillance helps hospitals get the upper hand

By Dave Carpenter

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Hospitals are taking up new technological weapons in the fight against the silent killer that can emerge in any ward.

Despite extensive efforts to prevent them, about one hospital patient in 20 still gets an infection during his or her stay. While the overwhelming majority are not fatal, hospital-acquired infections do kill an estimated 88,000 patients a year, according to the Centers for Disease Control and Prevention, making them the fourth leading cause of death in the United States. They also add \$5 billion in excess costs, a crushing financial burden for hospitals already just eking by on slim operating margins.

With better technology now available, an increasing number of hospitals are trying computerized techniques that hold the promise of dramatic improvement over the time-consuming manual practices currently used by infection control practitioners. Most of the infection-tracking initiatives are relatively new, so specific results are somewhat limited and hard to quantify. But health care professionals involved say they are impressed by the payoff.

One of the earliest adopters of this technology was the University of Maryland Medical Center, which switched to computer-automated surveillance in 2001 to replace the daily flood of paper that resulted from a one-page report being sent from the lab to the infection control department every time a patient's culture tested positive. It now uses a Web-based system called Setnet, which sends e-mail messages to the appropriate users whenever a potential infection outbreak is detected.

Joan Hebden, R.N., the Baltimore medical center's director of infection control and hospital epidemiology, says the technology saves one full workday a week just by avoiding the need for a staffer to pore over the data. It also improved the efficiency and accuracy of efforts to detect infections.

"It's a huge time-saver," she says. "And the error elimination of a system like this—there's no dollar figure that can be put on that, because practitioners cannot be expected when they're sifting through 50 pieces of paper to detect everything."

Because it costs tens of thousands of dollars annually, "it's not something that [all] administrators are just going to jump right on and say, 'Here's the money you need for this,'" Hebden says. But, she notes, "I've been in infection control for a long time and I really don't see any downside at all"—although she'd ideally like the information in real time as opposed to daily e-mails.

Experts say effective infection control technology is badly needed and long overdue. Even amid an industrywide push to improve patient safety, a recent study by Health Grades, Golden, Colo., showed that

nosocomial infections worsened by 20 percent between 2000 and 2003. The proliferation is partly attributable to the fact that the infections include antibiotic-resistant bacteria that are increasingly difficult to treat, such as staphylococcus and streptococcus. Financially, patients with nosocomial infections require an extra 8.7 days of hospital treatment on average, at a cost of about \$14,000. Much of that cost is not reimbursed, particularly among Medicare and Medicaid patients and the uninsured.

So the chance to improve efficiency is attractive for both medical and bottom-line reasons. “I think the vast majority of hospitals over 200 beds are going to have this [type of] technology in five years,” says Dan Peterson, M.D., CEO of Cereplex Inc., one of several vendors competing in the field. The Germantown, Md.-based firm produces Setnet, which he says is now in use at 18 hospitals, including the University of Wisconsin Hospitals and Clinics, the Cincinnati Children’s Hospital and Medical Center and the Dallas VA Hospital.

Pilot study shows results

Another automated surveillance technology used in a pilot study in Alabama reduced both infection rates and related hospital operating costs. Encouraged by its success, 40 hospitals are participating in the Alabama Hospital Quality Initiative, and similar efforts are taking shape in California, New Jersey, New York, Texas and elsewhere.

Susan Taylor, the infection control coordinator at Providence Hospital in Mobile, Ala., was won over the first time she saw a detailed report produced by the new electronic service that identified hospitalwide infection trends and possible preventive and corrective measures.

It represented a big leap forward from the frustrating system of tardy, incomplete paper reports that has historically typified hospitals’ infection control efforts.

“When they showed me that report, I said, ‘Where were you for the last two years of my life?’ ” says Taylor, who recently joined Providence after two years in a similar job elsewhere. “I felt like I was not missing things like when I was doing the traditional paper trail.”

The system uses number-analysis—or data-mining—technology developed by MedMined, a medical information technology company based in Birmingham, Ala. In June, MedMined announced that a review of clinical data from the six initial medical centers that participated in the pilot from 2002 to 2004 showed that they lessened their infection rates by 19 percent, thereby reducing the average length of stay and avoiding unnecessary readmissions.

According to MedMined, hospitals using the service achieved a measurable 300 percent financial return in the first year.

“There aren’t many opportunities in health care when something that is good for the patient is also good for the hospital and is a cost-saving measure for the payers of health care,” says G.T.

LaBorde, chief operating officer of MedMined. “When there’s something good, usually it costs more.”

The additional expenditures resulting from infections help push many hospitals into the red, LaBorde contends, with the 5 percent of patients with infections eroding about 63 percent of organizations’ inpatient operating profit.

The MedMined data-mining system was developed by Stephen Brossette, M.D., the company's founder and president. Relying on a combination of electronic patient monitoring and historical data, it finds sources of infections via a sophisticated system that can track, cross-reference and analyze signs of an infection. The service then alerts infection control staff to processes causing increased infection risk so that improvements can be made to prevent future infections.

Blue Cross and Blue Shield of Alabama provides the majority of the financial support, paying MedMined about \$3 million over three years to bring its services to the hospitals. The insurer already has saved more than \$3 million from the cost improvements made by the system, with other hospitals sure to add to that total.

Blue Cross spokesman Jim Brown, however, downplays the financial pluses and says it's the better health outcomes that really demonstrate the effectiveness of the Alabama Hospital Quality Initiative. Putting a premium on information-sharing, the initiative hosts quarterly meetings for staff at participating hospitals to discuss their infection control efforts.

"We know that shorter lengths of stay and reduced costs on the hospital side for admissions are going to reflect in some overall reduction in costs," Brown says. "But we don't want to get onto the treadmill that says we've got to make savings of X to determine that the program was worthwhile. We're looking at just the utilization aspect—that's the driver, not whether it's \$500,000 or \$11 million in savings. That takes care of itself over time."

Complex to develop

With the era of sweeping technological advances in health care long under way, why has it taken so long for hospital infection control to be revamped?

Experts say identifying patterns has been especially difficult because there are thousands of procedures taking place on a daily basis that affect infection risk—such as surgery, drawing blood and cleaning equipment—creating billions of data permutations.

Like other hospitals, Providence—a 349-bed Ascension Health System facility—has only one infection control professional. The kind of analysis being done by MedMined would have been impossible with such limited resources.

"The lab would give us paper reports on infections every day but ... we were limited in how quickly we could [quantify results] and take special precautions with a patient," says Ann Doss, R.N., the hospital's director of education, who was infection control coordinator until May 2005. "With MedMined, we can very quickly, every day, look at every patient and identify if a certain area or unit of the hospital is having more infections. We can trend the type of organism. It's important for us to pick up trends early in clusters of infections."

Under earlier systems, it took months to identify such trends. "To have these patterns every month and be able to tell what areas are affected right away has much more meaning to the staff than if three months down the road you tell them there was a problem," Taylor says. "It helps you address issues before they become a big problem."

Providence's hospitalwide infection rate has declined by more than 20 percent since 2003, putting it 30 percent below the national average. Its cumulative savings from reducing infections is \$846,000 in less than two years. The technology has provided another benefit, too, according to Doss. Medical staff are better able to get supplies ordered in advance because they can demonstrate cost effectiveness under the new system.

"It's not possible except using general CDC data from what they published many years ago to show how much an infection would cost," Doss says. "Your administrator and CFO may look at it as soft dollars, but the MedMined data shows bottom-line costs on what the hospital is losing due to infections. It makes it easier to get those products."

Chicago's Northwestern Memorial Hospital has contracted since 2003 to use surveillance software that was developed by another tech company, Salt Lake City, Utah-based TheraDoc Inc. Its infection tracking system monitors lab orders and results, patient demographics, vital signs and other data in real time, notifying the responsible clinician so appropriate interventions can be made.

Gary Noskin, M.D., medical director of health care epidemiology at Northwestern, says the system goes beyond data mining in providing real-time intelligence about antibiotic use. For example, if a patient with a positive blood culture has not been prescribed antibiotics, it detects that and immediately notifies the hospital pharmacists. While Northwestern hasn't systematically evaluated the results, Noskin says the comprehensive approach to patients with infections has been a success.

"One of the benefits is that it integrates the clinical, microbiological and pharmaceutical aspects of patient care," he says. "There are numerous examples where the system has allowed us to improve patient safety and clinical outcomes."

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