

Wireless Badge Tracks Hand-Hygiene Practices

BY MIRIAM E. TUCKER

A novel and relatively inexpensive experimental wireless device worn by health care workers was highly accurate in automatically tracking hand-hygiene compliance in a hospital setting.

Despite evidence that hand hygiene is one of the most effective ways to prevent transmission of infection to patients, compliance among health care workers remains low.

Monitoring of hand hygiene compliance is a requirement for hospitals to be credentialed by the Joint Commission, Dr. Philip M. Polgreen said during a telephone press briefing held prior to his presentation of the findings at the annual meeting of the Society for Healthcare Epidemiology of America in San Diego.

Currently, the most commonly used methods for tracking hand hygiene include having a person visually observe health care workers.

Visual observation is labor intensive and is subject to inconsistency as well as to the "Hawthorne effect," in which

people behave differently when they know they're being watched. Another common approach is the use of a radiofrequency identification system, which requires the installation of infrastructure that can be prohibitively expensive, said Dr. Polgreen of the University of Iowa, Iowa City, who is director of the Infectious Disease Society of America's Emerging Infections Network.

The experimental system can be installed and removed easily, and is far less expensive than direct observation by staff or installation of a radiofrequency identification system.

The experimental device, which is worn as a pager-size badge, wirelessly detects the use of tagged hand-hygiene dispensers for alcohol-based sanitizer (or soap dispensers). The device automatically logs the date, time, and length of use, as well as the dispenser identification

number. The health care worker's location at the time before and after hand-hygiene events is determined by the placement of "beacon" radio probes inside patient rooms, hallways, and other strategic locations.

Data from the badges can be collected and analyzed without any manual data entry, and results can be fed back to users.

In a pilot study, research assistants

and health care workers entered and exited unoccupied rooms of different types and configurations hundreds of times while being observed by human observers to compare the subjects' actual location with the signals generated by the "active badges." When the subjects stayed in the room for 30 seconds, the system achieved a sensitivity of 91.1%, a specificity of 100%, a positive predictive value of 100%, and a negative predictive value of 95.7%. When time within rooms was increased to 60 seconds, sensitivity was 97.7%, specificity was 100%, positive predictive value was 100%, and negative predictive value 98.9%.

The system can be installed and removed easily, and is far less expensive than either direct observation by staff or installation of a radiofrequency identification system, Dr. Polgreen said.

Asked whether some health care workers might object to wearing these devices, Dr. Polgreen said that the system can be designed to consolidate data to yield unit-level compliance rates that don't identify particular offenders. SHEA vice president Dr. Neil Fishman noted that "ultimately, our goal is to provide the safest care environment for the pa-



The pager-size badges that are worn by health care workers wirelessly detect the use of tagged hand-hygiene dispensers for alcohol-based sanitizer or soap. The devices automatically log the date, time, and length of use.

tients we take care of. ... We just have to maintain that focus as opposed to the policing aspect of it."

As a next step, Dr. Polgreen and his associates are about to begin pilot-testing the system in active inpatient units with real patients. "Hopefully we'll have lots of data within the next few months," he said.

In an interview, Dr. Polgreen said that he, along with lead computer scientist Ted Herman, Ph.D., and other associates, assembled the devices themselves at University of Iowa and have not received any corporate or industry funding for the project. All funding came from the National Science Foundation, the National Institutes of Health, and a pilot grant from the University of Iowa's department of internal medicine. ■

Chlorhexidine Dressings Cut Catheter-Related Infections

BY MARY ANN MOON

The rate of major catheter-related infections among patients in the intensive care unit decreased by 60% when dressings impregnated with chlorhexidine gluconate were secured over insertion sites for arterial or central venous catheters, investigators reported.

That decrease was achieved among ICU patients participating in a multicenter study in France, even though the background rate of catheter-related infections already was extremely low, said Dr. Jean-Francois Timsit of University Joseph Fourier, Grenoble, France, and his associates.

They conducted a randomized, controlled trial to assess chlorhexidine-impregnated sponges because small, unpublished studies of the dressings had yielded promising results.

The trial involved 1,636 medical and surgical patients treated in seven ICUs at three university hospitals and two general hospitals. The patients were randomly assigned to receive either chlorhexidine dressings or standard dressings over catheter insertion sites.

Use of the chlorhexidine dressings cut the rate of major catheter-related infections from 1.4/1,000 catheter-days to 0.6/1,000 catheter-days.

That protective effect was consistent both for gram-negative and gram-positive organisms, as well as for arterial and central venous catheters, the investigators said (JAMA 2009;301:1231-41).

Skin and catheter cultures showed a significant decrease in bacterial colonization with the chlorhexidine dressings.

The researchers estimated that the number needed to treat to prevent one major infection was 117 catheters.

Eight patients who were treated with the chlorhexidine dressings developed contact dermatitis, which resolved when the dressings were removed. All of these eight patients had multiple organ failures, subcutaneous edema, and fragile skin.

Dr. Timsit and his colleagues also studied whether decreasing the number of dressing changes (following the first such change at 24 hours after catheter insertion) would affect infection outcomes.

The group of patients who were assigned to a delayed dressing change every 7 days showed a rate of catheter-related infection similar to the rate of the group assigned to the standard number of dressing changes (every 3 days).

That finding suggests that it is probably safe to delay dressing changes in order to minimize occasions for potential catheter contamination—"provided the dressings are closely monitored and changed immediately should separation or soiling be detected," the investigators added.

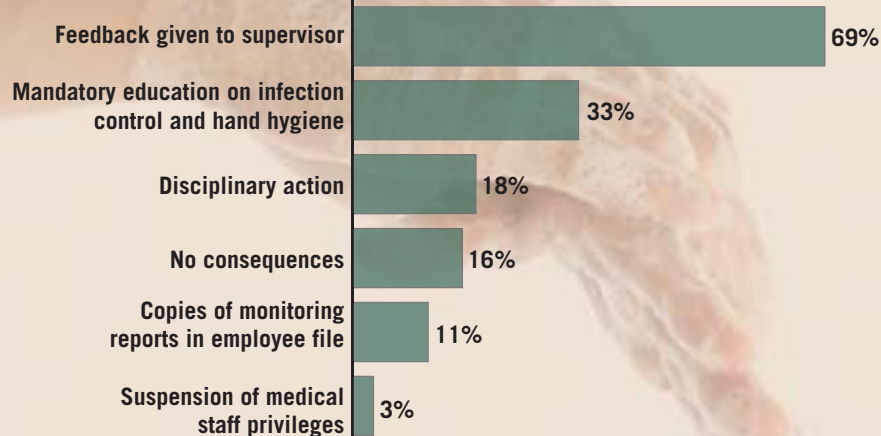
The study results "have the potential to change the standard of care for insertion and maintenance of in-

travascular catheters," noted Dr. Eli N. Perencevich of the University of Maryland, Baltimore, and Dr. Didier Pittet of the University of Geneva Hospitals and the World Health Organization Alliance for Patient Safety, in an editorial comment that accompanied the report.

The "relatively simple" use of a chlorhexidine-impregnated dressing may decrease further the already low rates of infection that are achieved through the use of optimal ICU practices, they said in their commentary (JAMA 2009;301:1285-7). ■

DATA WATCH

Consequences for Hospital Workers Who Fail to Comply With Hand Hygiene Protocols



Note: Based on a 2008 survey of 539 members of the Association for Healthcare Resource and Materials Management.
Source: Perception Solutions Inc.