

# Infrared System Detects Fever Instantly Without Touch

## VITALS

**Major Finding:** Compared with the use of oral or rectal thermometers to detect patients with fever, an infrared thermal detection system had a sensitivity of 70%, a specificity of 92%, a positive predictive value of 42%, and a negative predictive value of 97%.

**Data Source:** Emergency department study of 566 patients screened for fever by ITDS and usual methods.

**Disclosures:** The device manufacturer OptoTherm lent the machine, but didn't fund the study. Dr. Hewlett had no other disclosures.

BY MIRIAM E. TUCKER

ATLANTA — An infrared thermal detection system noninvasively screened for fever in a study of 566 patients presenting to an emergency department.

Infrared thermal detection systems (ITDS) have been used in several countries to screen travelers for fever, particularly in airports. At the Decennial International Conference on Healthcare-Associated Infections, Dr. Angela Hewlett presented findings from her study of the use of an ITDS as part of an infection control strategy during the recent 2009 influenza A(H1N1) pandemic.

"Fever is a primary symptom of seasonal influenza, H1N1, avian influenza, SARS [severe acute respiratory syndrome], and a lot of other contagious infectious diseases. Much interest has been generated on how best to screen patients, visitors, and other people entering a health care facility for illness in order to protect hospitalized patients from the spread of disease," said Dr. Hewlett, an infectious disease specialist at the University of Nebraska, Omaha.

In an interview, Dr. Hewlett noted that the study was done in an ED because that is the best place to find patients with fever. The ITDS approach "is not meant to replace routine triage temperature measurements in the ED or other settings, but rather to be used for screen-

ing as an infection control modality during extreme circumstances where screening becomes necessary, like in a pandemic."

Screening can be labor intensive in such situations, especially during pandemics when health care worker absenteeism may be high. ED backups can occur while questions are being asked and temperatures are being measured.

The study was conducted from Nov. 18, 2009, through Jan. 9, 2010—the height of the H1N1 pandemic—in the emergency department at the University of Nebraska's medical center. The device used in this study, OptoTherm's ThermoScreen Infrared Fever Screening System, uses a thermal imaging camera to measure skin temperature by quantifying infrared energy emitted from the face. "It can actually measure temperature in a split second and does not require any contact with the patient," Dr. Hewlett said.

The ITDS was placed in the triage area and was used to screen every patient who came in. Triage nurses also took patients' temperatures using routine oral or rectal thermometers. In all, 566 patients, ranging in age from 15 days to 89 years (mean 32 years), were screened using the ITDS. Of those, the ITDS identified 71 (12.5%) as having a temperature of at least 100° F, compared with 43 (7.6%) who were identified with routine methods.

Using the triage temperature as the standard for the detection of fever, the ITDS had a sensitivity of 70%, a specificity of 92%, a positive predictive value (PPV) of 42%, and a negative predictive value (NPV) of 97%. Among the 454 adult patients aged

18 and older, sensitivity was 65%, specificity was 93%, PPV was 34%, and NPV was 98%. In the 112 children aged 17 years and younger, those values were sensitivity 75%, specificity 87%, PPV 56%, and NPV 94%, and in the 41 children aged 2 years and under, the values were 71%, 85%, 71%, and 85%, respectively.

Although the false-positive rate was high, the device readily excluded non-febrile individuals, with a 97% chance that a patient did not have a fever if the ITDS measurement was negative, Dr. Hewlett noted.

"The ITDS proved to be a very effective screening tool to identify patients with fever across all ages and genders," she said. Quick identification of patients and visitors who may be ill reduces the danger that influenza and other diseases will spread within a health care facility.

The device could be useful in a variety of settings, Dr. Hewlett said in the interview. "The ITDS has potential infection-control applications in many other settings, including screening patients, employees, and visitors at the entrance to a hospital or other health care facility. It also could be used as a quick triage method in the ambulatory setting, where patients can be screened for fever and those with a potentially contagious disease could be placed in a separate room, provided masks, etc., so that they do not transmit illness to other patients."

Although the device isn't cheap, "it could be argued that if screening prevented even a single case of nosocomial influenza in a hospitalized patient—resulting in a longer length of hospital stay or transfer to the ICU—the device would probably pay for itself," she said.



OptoTherm's ThermoScreen Infrared Fever Screening System could be useful for screening in a pandemic.

COURTESY OPTOTHEM, INC.

## Conventional Infection-Control Measures Reduce MRSA

BY MIRIAM E. TUCKER

A hospital-based strategy using multiple infection-control interventions resulted in more than a 90% reduction in health care-associated infections due to methicillin-resistant *Staphylococcus aureus* without the need for active MRSA surveillance.

Findings from a 7-year observational study add support to the argument that the controversial practice of active surveillance is excessively resource-intensive and of limited value because it targets only MRSA and not other common nosocomial pathogens, Dr. Michael Edmond said in a telebriefing held in advance of the Decennial International Conference on Healthcare-Associated Infections.

Other disadvantages and unintended consequences of so-called "active detection and isolation" (ADI) include high cost, ethical issues, increases in noninfectious adverse events (such as falls and decubitus ulcers), patient dissatisfaction, and prolonged length of stay. "MRSA infections can be controlled without active surveillance. ... ADI should be viewed as an option of last resort to control multidrug-resistant organisms," said Dr. Edmond, chair of the division of infectious diseases at Virginia Commonwealth

University Medical Center, Richmond.

The study setting was an 820-bed urban academic medical center. The interventions were initiated over more than a decade, starting in 1998 with concurrent surveillance for health care-associated infections (HAIs) in ICUs. Antiseptic-coated central venous catheters (CVCs) were introduced in 2002. In

2004, an ICU hand hygiene campaign was introduced.

Active interventions began in 2006, mandatory house staff education on CVC insertion. Roving "hand hygiene observers" were instituted hospitalwide in 2007, chlorhexidine bathing of ICU patients in 2008, and a "bare below the elbows" recommendation in 2009, which

banned sleeves below the elbows, as well as ties or lab coats that serve to transmit germs.

Device-related infection rates per 1,000 ICU patient-days actually rose slightly from 1998 until 2003, from 16.8 to 21.4. But after that the rate dropped steadily, from 18.0 in 2004 to 9.4 in 2006, to 5.8 in 2008 and just 3.3 in 2009. Overall there was an 83% reduction from 2003 through 2009, Dr. Edmond and his colleagues found.

Other MRSA HAI rates also declined. Central line-associated bloodstream infections dropped by 85%, catheter-associated urinary tract infections by 60%, and ventilator-associated pneumonia by 86%.

The overall MRSA infection rate in all medical, surgical, and neuroscience ICUs dropped by 93% from 2003 to 2009, from 2.86 to 0.21/1,000 patient-days. The percentage of HAIs due to MRSA in those settings dropped from 11.7 in 2003 to 5.1 in 2009. And for the first time ever, in the latter half of 2009 there were no device-associated MRSA HAIs in any of the hospital's eight adult, pediatric, and neonatal ICUs, Dr. Edmond reported.

**Disclosures:** Dr. Edmond disclosed financial relationships with BioVigil and Cardinal Health.

## Low-Tech Interventions Can Help

### MY TAKE

This hospital achieved dramatic results in an observational study, although it's possible that the improvement could represent a low performance level prior to the interventions.

In general, hospitalists are not involved in using active detection and isolation strategies for MRSA. I think the take-home message for hospitalists is that there are low-tech interventions that they can implement to reduce health care-associated infections:

- ▶ Antiseptic-coated central venous catheters (CVCs).
- ▶ Hand hygiene with roving observers.

- ▶ Feedback on health care-associated infections and infection-control practices.

- ▶ Mandatory house staff education on CVC insertion, focusing on good sterile technique.

- ▶ Chlorhexidine bathing of ICU patients.

- ▶ "Bare below the elbows" rules, which ban sleeves below the elbows, as well as ties or lab coats that serve to transmit germs.

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