

Comparison of 3 Infrared Thermal Detection Systems and Self Report for Mass Fever Screening

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[Karen Hunter] Hello, I'm Karen Hunter. With me today is Nicole Cohen, associate chief for science with the Quarantine and Border Health Services Branch at CDC. Dr. Cohen is a co-author of an article appearing in the November 2010 issue of CDC's journal, *Emerging Infectious Diseases*. The article describes a study of infrared thermal detection systems for possible use in screening large groups of people for fever. Welcome, Dr. Cohen.

[Nicole Cohen] Thanks, Karen. It's great to be here.

[Karen Hunter] Dr. Cohen, what are infrared thermal detection systems?

[Nicole Cohen] Infrared thermal detection systems, which are commonly referred to as thermal scanners, are devices that register infrared energy, or heat. They've been used in a variety of settings for many years. For example, if a person wanted to know how energy efficient their house is, a technician could use a thermal scanner to find the areas that were leaking heat and needed better insulation.

[Karen Hunter] I'm curious. How do these devices work? Are they similar to the walk-through scanners at airports?

[Nicole Cohen] The devices pick up infrared radiation, essentially heat, coming off objects that are warmer than the surrounding environment. The most common application for this technology that people are familiar with is night-vision goggles that allow you to see warm objects, such as people, in the dark. Thermal scanners work similarly, except they additionally measure the amount of heat and display it in the form of a temperature.

[Karen Hunter] I see. How are infrared thermal scanner systems used in public health?

[Nicole Cohen] Well, the 2003 SARS outbreak and the 2009 H1N1 pandemic both raised concerns about how to screen large numbers of people, primarily travelers, for possible infectious diseases. Infections often cause fevers. Fever raises body temperature, so an infrared thermal detection system could tell if a person's temperature is above the normal range. Some countries have used thermal scanners in locations such as hospital entrances, and many countries used them at airports to screen international travelers as part of their response to the influenza pandemic.

[Karen Hunter] Why did CDC decide to study thermal scanners?

[Nicole Cohen] The Quarantine and Border Health Services Branch was asked to do this study as part of national preparedness planning for possible use at airports and border crossings. Not

many studies have been done of these scanners for use in mass screening for fever, and the evidence of their effectiveness was fairly thin. We found that they do work, but there are distinct limits on their usefulness.

[Karen Hunter] The difference between a healthy temperature and a fever isn't very many degrees. Are the devices actually sensitive enough to detect fever in humans?

[Nicole Cohen] Yes, but as we found in our study, there are still questions about both reliability and accuracy.

[Karen Hunter] Don't people who have a fever usually know it?

[Nicole Cohen] Not always. We found people are not very good at knowing whether or not they have a fever. Because we did our study in hospital emergency departments, we knew that there would be people with fevers. Before we measured their temperatures, we asked people whether they thought they had a fever. The self-reports and the thermal scanner readings were both compared with temperatures taken using an oral thermometer, which is considered the best method. We used the comparison with oral temperatures to determine whether self-reports or thermal scanners were better at detecting fevers. We found that some people who had a fever didn't realize it and some who thought that they were feverish actually were not. Overall, thermal scanners were better than self-reports at detecting fevers.

[Karen Hunter] If the devices work better than self-reporting, why wouldn't we want to use them?

[Nicole Cohen] Like with every technology, there are costs involved. Not surprisingly, the systems that worked best tended to be the more expensive ones. In addition to the actual cost of the devices, there's also the personnel cost; you need people to operate them. There are over 300 ports of entry into the United States, so you can see that the costs could add up quickly. You also need to have other methods in place for screening people because the systems on their own are still not sufficiently sensitive or reliable. Even if they do tell you a person has a fever, they can't tell you why. And you need to consider the social costs of inconveniencing travelers. Without careful planning, using these systems could create stressful delays at airports. Before we decide whether thermal scanners should be used in a pandemic-type situation, we need to consider both the costs and the benefits to determine whether the resources that thermal scanners would require might be better used for other public health activities.

[Karen Hunter] Thank you, Dr. Cohen. I've been talking with CDC's Dr. Nicole Cohen about a paper that appears in the November 2010 issue of CDC's journal, *Emerging Infectious Diseases*. You can see the entire article online at www.cdc.gov/eid. If you'd like to comment on this podcast, send an email to eideditor@cdc.gov. That's eideditor – one word - at cdc.gov. I'm Karen Hunter, for *Emerging Infectious Diseases*.

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