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Sensing Danger in the Air: Diagnosing Bioterror Quickly

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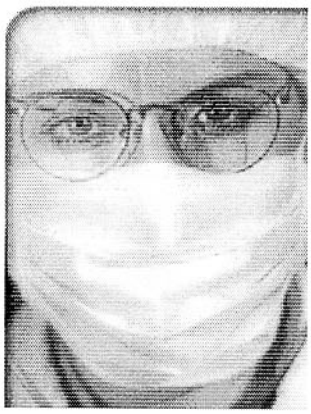

Oct. 18 (CBS HealthWatch) The nightmare of bioterrorism has been visited upon the United States--with a surprising twist. Terrorists haven't targeted masses of people, as the staggering scale of the September 11 attacks had led us to expect. Bioterror has come instead by mail, exposing dozens, not thousands, to deadly germs.

The threat of a massive biological attack is still real, however. Even though law enforcement is paying close attention to delivery methods like crop dusters, there are other ways to release a cloud of germs among a large group of people.

In a worst-case scenario, anthrax powder conceivably could be dumped into a subway tunnel or disease-laden aerosol could be pumped into the ventilation system of an office tower.

If an airborne agent like anthrax or smallpox were released into a large population today, no one would know until hundreds or thousands of victims started filling up hospitals, many of them--like American Media employee Robert Stevens in Florida--too far gone to save.

Since the first bioterrorism simulations were run in the 1970s, that's how public health officials have envisioned an attack unfolding. But in the near future, we may live with devices that can sense germs in the air and sound an alarm long before anyone gets sick.

One such device is the Bioguardian air sampler, made by InnovaTek, Inc., which is coupled with a sensor made at Eastern Washington University. The device, says InnovaTek President Patricia Irving, can detect germs like anthrax, smallpox, and other potential bioweapons "in a matter of minutes" after they're dispersed in the air.

The device collects bacteria and viruses from the air and concentrates them in water. A laser sensor scans microorganisms in the water. Every microorganism produces a unique signature when scanned by the laser. So if anthrax bacteria, for instance, are present in the water, the pattern of light waves bounced off the bacteria will match the anthrax pattern in the unit's computer database.

Unlike the truck-sized "labs on wheels" that the US military used in the Gulf War to monitor the battlefield for signs of a biological attack, the Bioguardian is small enough to fit in a suitcase. That means it could be installed indoors in sports arenas, office buildings, or convention halls as part of an environmental control system.

Irving says the US Department of Defense has ordered so many of the Bioguardian units that her company is struggling to meet the demand. What's more, InnovaTek has heard from many private companies interested in the technology. The interest extends "well beyond our own borders," she says. "These are worldwide inquiries."

Other companies have been developing sensors that can detect biowarfare agents in the air by identifying fragments of genetic material unique to a particular virus or bacterium. For example, when DNA from an anthrax spore comes in contact with a chemical in the sensor, it triggers a reaction warning that anthrax is present in the environment.

Designer Genes, Inc., in Phoenix, Arizona, has developed a detector of this kind that they hope to make available by late 2002. Michelle Hanna, president of the company, says their sensor technology is fully developed, but they have to collaborate with partners to come up with a working device. "We're planning to design something like a smoke detector that will hang off the ceiling," she says.

Calvin Chue, a microbiologist at the Johns Hopkins Center for Bioterrorism Studies, isn't too excited about the new detection systems, however. "I don't think the technology is at a point that they're going to be that useful right away," he says.

The biggest problem is that these devices can be too sensitive, causing false alarms when they mistake ordinary particles for biological agents. "They go off all the time," Chue says.

What's more, they're very expensive. "I don't think the price of the technology has come down enough yet that you can deploy it at the local level," says Jonathan Ban, a research associate at the Chemical and Biological Arms Control Institute, a think tank in Washington, DC. "There are ways you can spend that money that are far more effective."

Ban says it's more useful to monitor data that could provide a picture of an emerging epidemic following a biological attack--symptoms reported to 911 operators, absenteeism in the workplace, and sales of certain drugs, for instance. What's more, money spent on systems to collect data can help officials keep track of all kinds of public health problems, not just bioterrorism.

Chue estimates that better detectors might be ready for homeland defense in 3-5 years, or 2-3 years if researchers at various companies and institutions coordinate their efforts, with government supervision and funding. But since the events of September 11, there is "blood in the water," he says.

Small research companies are grabbing for funds to rush the development of their detector technology, and Chue says he fears "some things will duplicate development that is already ongoing."

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