POINT TAKEN

Dr. James Buehler On the Promise of Syndromic Surveillance

What is the biggest challenge facing public safety in America today?

From the perspective of public health, I think one of the biggest challenges is making sure that we have systems in place that will allow us to detect biological attacks as quickly as possible. The emerging field of syndromic surveillance encompasses a growing variety of data sources and methods that are being used to provide an early warning of an outbreak or seasonal disease, such as influenza. Although a fair amount of experience has been gained over the past several years, there's still some unanswered questions: we still don't know what the best methods, the best data sources and the best statistical methods are for using this tool. Also, we really don't know if it will work any quicker than traditional ways of detecting outbreaks.

How effective are syndromic surveillance systems that are currently in place?

If you think about their utility for detecting expected events like the annual flu season, or expected annual increases in seasonal viral gastroenteritis, these systems score pretty well. When you look at other types of naturally-occurring community outbreaks, there are reports that syndromic surveillance systems have picked them up before they would have been recognized through more traditional methods, or when they wouldn't have been recognized at all through other methods. However, they would score a big question mark for picking up things like a biological attack, partly—and fortunately—because we haven't had that much experience with biological attacks.

In addition, experience is showing that syndromic surveillance systems can be used for other purposes. For example, 911 call data may show an increase in heat-related illness during heat waves and inform public health efforts to prevent or respond to heat-related disease. In New York City, the health department has used its pharmacy sales data to track the purchase of nicotine patches in relation to smoking cessation programs.

What sources of data are used in syndromic surveillance for monitoring the next outbreak, and how are they used?

911 call data are one of the more commonly used data sources for syndromic surveillance. People who are becoming ill may call 911 for assistance. As a result, an increase in health-related calls to 911 may provide a sign that an epidemic is emerging. Other types of data that are being used include school or work absentee records, pharmacy sales, calls to nurse hotlines, doctor visits, emergency department visits and EMS trip logs. Each of these may provide a warning of the emergence of an increase in disease and prompt public health officials to conduct an investigation.

One thing that is clearly emerging is that the most effective strategy is to not depend on one source of information, but to rely on multiple sources of data. If multiple systems yield alarms, then there is a greater likelihood that a problem is occurring, rather than a false alarm. For example, many health departments that are doing syndromic surveillance use emergency room data and they may be backing that up with data from 911 calls, or data from pharmacy sales, or data from over-the-counter drug sales, or data from absenteeism. So experience suggests that there is probably no one source that is ideal by itself, but that a mix of sources seems to be the most useful.

I think the other thing that people are doing is looking not only at unusual trends over time but also by time and place, in that they're looking for clusters within certain locations. There are different choices of statistical methods depending on how much historical data you have. Basically, all of [the methods] are trying to answer the question: Based on what's happened in the past, is what we're seeing today unexpected or out of the ordinary?

Where is syndromic surveillance most progressive?

One of the places that has done an excellent job of integrating syndromic surveillance into helping its health practice has been New York City. After the events of September 11, the New York City Department of Health and Mental Hygiene really had to step in. Now, the community is alerted of certain trends such as the flu season and sources of infection. I think it helps not only public health, but it helps doctors have a better sense of how the patients that they're seeing in their offices may be part of a broader, community trend.

James Buehler, M.D., is a research professor of epidemiology and a member of the Center for Public Health Preparedness and Research at the Rollins School of Public Health at Emory University. He also serves as a consultant epidemiologist at the Georgia Division of Public Health. During a 21-year career at the Centers for Disease Control and Prevention (CDC), he worked in a range of public health areas, including general field epidemiology, maternal and child health and HIV/AIDS. His work in public health surveillance has spanned analysis, methods development, systems management, and application of surveillance data to program and policy improvement. In the fall of 2001, Dr. Buehler served as the leader of the CDC anthrax investigation team in Trenton, N.J., where anthrax-laden letters entered the postal system and infected postal workers.

How accurate are most syndromic surveillance systems for detecting specific syndromes?

Well, that's the big question: Are these things sensitive? In other words, are they going to pick up the outbreaks? But the flipside of the *(continued on page 41)*

(continued from page 42) same coin is, are they specific? In other words, when an alarm occurs, is it a real alarm or is it a false alarm? It's a trade off. The more you try to make sure you don't miss anything, then the more likely you'll have false alarms. Getting that right balance between detecting things as soon as possible and avoiding too many false alarms is the real balancing act that I think people are still trying to work out.

What is your idea of an ideal syndromic surveillance system?

It needs to have good people relationships. Let's say you are doing it with a set of emergency rooms, you need to have a good relationship with the people in those emergency rooms so you have a shared understanding of what it is you're trying to accomplish. Another attribute of a good system is that it is automated so that it's not intrusive at all, because people are busy providing healthcare. Another important thing is that it does need to be respectful of concerns about privacy and confidentiality. One of the key ways to assure that is to only collect a very limited amount of information—you just get what you need and nothing more. Then you've got to have good systems in place for putting it together and analyzing it in a timely manner. If you do see something unusual, then you need to have the capacity to follow back and to ask, "Is this something that merits more attention or not?" Think of it as a cycle from collection to feedback where you've got to have all of the pieces in place.

What are the current downsides of syndromic surveillance?

We really haven't seen clear guidance yet as to who should be doing this, or exactly how it should be done. If a state health department, or a big city health department is trying to decide whether or not to do this, there's just a lot of questions that have been unanswered. So I think for those areas that are doing syndromic surveillance, it needs to be evaluated so that over time we can put together and describe the experience.

To me, the biggest downside is we really are not in the position to provide clear guidance to people that are trying to decide whether or not to practice syndromic surveillance. I think the other potential downside is we don't want to lose track of the importance of making sure that we strengthen our traditional approaches. Syndromic surveillance shouldn't detract from making sure that our existing reporting systems are working well, and that health departments have very good relationships with healthcare providers in their community.

We don't really know whether the next outbreak will be detected by syndromic surveillance or by a doctor, a nurse or an EMT who sees something out of place and gives the health department a call. So we need both; we need to judiciously develop syndromic surveillance and evaluate it carefully and, at the same time, continue to cultivate the more traditional public health types of disease reporting.

What is the difference between passive and active forms of surveillance, and where does s yndromic surveillance fit in?

The words passive and active are applied to surveillance systems in general, not necessarily to syndromic surveillance. In the traditional model of disease surveillance, the state health department gives a list of notifiable diseases, and if a doctor diagnoses any one of those, he is obligated to report it to the health department. In a passive system, the health department is waiting for people to give them a call. If they take a more active approach, that may mean the health department is calling laboratories or calling doctors, and making visits to track down cases of illnesses. So it's a dichotomy.

Syndromic surveillance falls outside that dichotomy. However, you can say it is an active approach because the process of data transmission is typically automated or in settings where it's done for a very limited period of time around a specific event, like a sporting event or a political convention. Syndromic surveillance is in many ways an active relationship where it takes in account the people involved. The people from public health are working with a local hospital, local school systems, or local healthcare providers to get this information. And not only get it, but to process it, and make the information available to the community.

What does the future hold for surveillance?

At first the question was what's going to pick an epidemic up first: syndromic surveillance, the astute clinician or our traditional surveillance systems? The question ought to be not one versus the other, but how do we weave these things together so that they're supportive of one another and how can we make sure that syndromic surveillance helps to make the doctors and nurses more astute. We have to take advantage of the new resources that have been put into public health, including surveillance, to strengthen relationships.

Think about preparedness for bioterrorism as the tip of the pyramid, and in order to respond effectively to a bioterrorism attack, you've got to have the capabilities to deal specifically with that. Think also that the tip of the pyramid sits on a base of overall public health infrastructure. We need to continue to focus on the specific things that need to be done to respond to a bioterrorist attack, but at the same time continue to develop our public health capacity in general, whether that's for infectious diseases or any other type of emergency. If we do that, then that tip of the pyramid for responding to bioterrorism will have a good foundation.

If a bioterror event happened today, would the public health community be prepared?

We shouldn't think of that as a yes or no answer, but certainly we are much more prepared. Clearly, I think there were lessons learned from the anthrax attacks in 2001. One of the big lessons from anthrax was the importance of having good communication in place. And when you look at the criticism that public health received, I think much of that was centered around how effectively public health agencies were able to deal with a very rapidly evolving situation and to make sure that people had the information they needed. In many respects, every naturally-occurring outbreak, whether it's small or large, is in some way preparation, and I would say we're doing better. We're probably not where we would want to be, but we will get there.***—Natasha Chin*** HFR

TELL US ABOUT IT

If you'd like to discuss a topic or share an innovation that has improved first response in your community, please email us at *HFR.editor@elsevier.com*