AHRQ Update

AHRQ's Bioterrorism Research Portfolio: Real Linkages in Real Time

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Responding to a bioterrorist event calls for critical communication and linkages in real time; among systems of care, the public health infrastructure and individual clinicians, law enforcement agents and emergency responders. In particular, there are many unanswered questions about the health care system's capacity to rapidly respond. How can an overburdened health care system ramp up to handle mass casualties? How will triage decisions be made rapidly and accurately? How can regional resources be used to provide surge capacity in the event of a bioterrorist attack? What are the early warning signs of such an event? To enhance health care system preparedness for bioterrorism, we need health services researchers to rise to the challenge and begin to develop and analyze the best evidence-based models, tools, and knowledge to address these potentially devastating threats.

THE RESEARCH CHALLENGE

How can we prepare to make evidence-based decisions when the events upon which these decisions might be based are rare occurrences?

The relative rarity of a public health emergency—whether it's the anthrax attacks of October 2001 or the occurrence of a “new” disease such as SARS—poses particular challenges to building an evidence base for future decision making. The potential volatility of such an event was dramatically illustrated when an AHRQ-funded staffing model for mass prophylaxis scheduled for testing on September 12, 2001 in New York City became an unscheduled live drill three weeks later in response to the anthrax attacks. While the research team at Weill Medical College of Cornell University did not anticipate an actual live application of their model, they were immediately called upon to move from the theoretical to the applied. When it comes to emergency preparedness, we must conceptualize the approach to research in an entirely different manner.

AHRQ: FORGING LINKAGES

Today, the Agency is working together with the Office of Public Health Emergency Preparedness within the Department of Health and Human Services, as well as sister agencies—including the Centers for Disease Control and Prevention and the Health Resources and Services Administration—on a number of bioterrorism response and preparedness initiatives at the federal, state, and local levels. In keeping with its longstanding track record of forging partnerships, the Agency has a particular mandate: to enhance and reinforce linkages between the personal health care delivery system and the public health infrastructure. The ability of the health care system to “surge” to meet overwhelming need has been a unique focus of AHRQ’s research portfolio. Additionally, the Agency is assessing the training and information needs of community clinicians to diagnose and manage patients appropriately; assessing the preparedness of hospitals and health care systems; and analyzing the impact on cost, quality, and outcomes.

In forging these linkages, AHRQ is building research-based tools and models, emphasizing the utilization of information technology, and developing the research capacity needed to quickly and creatively test new approaches.

BUILDING THE EVIDENCE BASE

Even before the first anthrax attacks of 2001, the Agency was sponsoring research related to public health preparedness. In FY 2000, as part of the Department of Health and Human Services’ larger bioterrorism research initiative, the Agency received \$5 million for research aimed at improving the health care system’s ability to respond to a bioterrorist event. Today, AHRQ’s investment in bioterrorism-related research has nearly quadrupled to \$24 million, with projects spanning eight key areas: (1) models for effective and efficient medication and vaccine distribution, (2) understanding the role of state and regional models for preparedness, (3) defining, measuring, and demonstrating surge capacity within the health care system, (4) the unique

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issues related to pediatric care and bioterrorism, (5) the role of health information technology to in detecting, tracking, and providing real-time decision support to clinicians, (6) methods and best practices for clinician training, (7) further development of health care system/public health care system linkages, and (8) translating research into practice. Additionally, the Agency's work complements the Department's investments in states (through the Centers for Disease Control and Prevention), and in hospitals (through the Health Resources and Services Administration), thereby ensuring that opportunities are maximized for health care providers to be part of the solution. For a list of AHRQ-funded projects and institutions working in these areas, see the Agency web site at <http://www.ahrq.gov/research/bioterrorport.htm>.

New technologies help address many of the "real time" needs of a prospective bioterrorism event, from detecting patterns before they become health threats to alerting providers before patients show up in their emergency departments. AHRQ's early investment in bioterrorism preparedness research is already yielding an impressive mix of web-based tools, software, decision support such as inventories that help locate critical resources, simulation models to support planning, surveys and questionnaires for hospital readiness, databases designed to detect trends and flag possible alerts, emergency alerts to physicians, and data analysis systems such as syndromic surveillance systems that look for patterns that would indicate a public health event.

One example of investment in new technology is the support AHRQ provided along with other state and federal agencies in the development of the Realtime Outbreak and Disease Surveillance (RODS) system and software. Led by principal investigator Michael Wagner, M.D., Ph.D., at the University of Pittsburgh and funded even before the events of 9/11 and subsequent anthrax attacks, RODS analyzes real-time data from clinical as well other information systems to look for the earliest signs of outbreaks. Last year, RODS was used for prodromic surveillance at the 2002 Salt Lake City Winter Olympics. Currently, it is being used by the states of Pennsylvania and Utah in analyzing real-time data submitted from emergency departments.

Another illustration of technology's importance, also funded prior to 9/11, is a set of web-based training and continuing education modules. Hosted by the Center for Emergency Care and Disaster Preparedness at the University of Alabama at Birmingham (UAB), the web site provides information on rare infections and potential bioterrorist agents, and includes specific modules on dermatology, family practice, internal medicine, radiology, pathology, among others (see <http://www.bioterrorism-uab.ahrq.gov/>). During AHRQ's web-assisted audio conference, *Addressing the Smallpox*

Threat (held March 2003 and hosted by AHRQ's User Liaison Program), Thomas E. Terndrup, M.D., Professor and Chair at the Center, demonstrated the substantial increase in web site hits shortly after the November 2001 anthrax attacks. He also noted a national increase, peaking mid-January 2003, in the number of hits regarding smallpox (see www.ahrq.gov/news/ulp/smpoxtele/).

A great deal of attention has been paid to the potential for "dual use" technologies; i.e., systems of care, tools, or technologies, that, while, offering proven benefit in bioterrorism preparedness and other public health emergency preparedness, are also utilized in the daily delivery of care. The need for readiness in the time of a bioterrorist event is a powerful reason to diffuse health information technology into everyday clinical care. If it is used regularly, it is likely to be a more effective system for clinicians to use and adapt in the face of a catastrophic event.

Another issue presented by the prospect of a possible bioterrorism event is the necessity of putting research into practice at an accelerated rate. The ability to utilize research networks—particularly those where the health care delivery system and the public health infrastructure are already linked—is invaluable. Foreseeing the need for such capacity for research, the Agency fostered the development of Primary Care Practice-based Research Networks (PBRNs) and the Integrated Delivery System Research Network (IDSRN).

The PBRNs are "living laboratories" where community-based primary care clinicians work side by side with health services researchers on ideas stemming directly from daily clinical practice. Three of AHRQ's PBRNs (Cincinnati Children's Hospital Medical Center, the University of North Carolina, and the University of Wisconsin), are now focusing on the enhancement of a technology interface for bioterrorism surveillance, as well as interfaces between community-based primary care and public health departments.

The IDSRN, which was explicitly developed to fast track research, is another Agency venue for bioterrorism preparedness and response research, and several IDSRN partners have work underway or completed. For example, researchers at Weill Cornell (an IDSRN partner), to whom we referred earlier, have now put their simulation model into CD-ROM format with accompanying guidelines. Another partner, Abt Associates, is developing web-based software to inventory and locate resources in a bioterrorism event. Denver Health, also a partner, is developing a series of tools to profile bed supply and staffing resources and working on a system to help medical information centers triage incoming calls. Two other partners are assisting with state and regional models: the Emory University Center on Health Outcomes and

Quality is developing tools that aid state planning, and the Research Triangle Institute is producing a workbook for sharing regional preparedness tools.

Additionally, the Agency's Evidence-based Practice Centers (EPCs), have been answering the need to synthesize an expanding evidence base. The bioterrorism-related evidence reports often require examination of other models such as regional care models and their potential applicability to bioterrorism preparedness. Additional work has focused on clinical training for rare public health events, decision support systems, and the role of regional models. Within the AHRQ EPC Program, the Johns Hopkins University EPC has focused on training for bioterrorism and rare public health events, with a special emphasis on the assessment of preparedness drills. The Stanford/UCSF EPC recently finalized a report on regional models for bioterrorism preparedness.

RESPONDING TO THE CHALLENGE

Health care system preparedness for bioterrorism means something very different and very real than it did two years ago. Today, forging linkages between the health care delivery system and the public health infrastructure is more important than ever. Preparedness is dependent upon rapid-cycle research that can export tools, models, and evidence that can be rapidly applied and put into practice. We encourage you to learn about the numerous activities now underway at AHRQ in this critically important area and to share your ideas with us. We hope that you will partner with us on future initiatives to improve the quality of our health care system, and make it better prepared for public health threats. For more information on these and related activities, contact Sally Phillips at sphillip@ahrq.gov.