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Preface

The Agency for Healthcare Research and Quality (AHRQ), through its Evidence-Based Practice Centers (EPCs), sponsors the development of evidence reports and technology assessments to assist public- and private-sector organizations in their efforts to improve the quality of health care in the United States. This report on Regionalization of Bioterrorism Prepaaredness and Response was requested and funded by AHRQ's Center for Primary Care, Prevention, and Clinical Partnerships. The reports and assessments provide organizations with comprehensive, science-based information on common, costly medical conditions and new health care technologies. The EPCs systematically review the relevant scientific literature on topics assigned to them by AHRQ and conduct additional analyses when appropriate prior to developing their reports and assessments.

To bring the broadest range of experts into the development of evidence reports and health technology assessments, AHRQ encourages the EPCs to form partnerships and enter into collaborations with other medical and research organizations. The EPCs work with these partner organizations to ensure that the evidence reports and technology assessments they produce will become building blocks for health care quality improvement projects throughout the Nation. The reports undergo peer review prior to their release.

AHRQ expects that the EPC evidence reports and technology assessments will inform individual health plans, providers, and purchasers as well as the health care system as a whole by providing important information to help improve health care quality.

We welcome written comments on this evidence report. They may be sent to: Director, Center for Outcomes and Evidence, Agency for Healthcare Research and Quality, 540 Gaither Road, Rockville, MD 20850.

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The authors of this report are responsible for its content. Statements in the report should not be construed as endorsement by the Agency for Healthcare Research and Quality or the U.S. Department of Health and Human Services of a particular drug, device, test, treatment, or other clinical service.

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Structured Abstract

Context: No single community can prepare fully, nor respond completely, to a large-scale bioterrorism event. Regionalization of some aspects of preparedness planning for bioterrorism may facilitate a timely and effective response.

Objectives: The purpose of this project was to first identify the key tasks of responders during a bioterrorism response and the resources required to perform them, and then to evaluate the evidence about the potential effectiveness of existing regional systems for the delivery of these resources and services for bioterrorism preparedness and response.

Data Sources: We searched the medical, emergency management, and supply chain management literatures and government documents. For each literature, we searched databases (e.g., MEDLINE®), Web sites, prominent journals, and bibliographies of retrieved articles.

Study Selection: We sought articles describing the key tasks during responses to bioterrorism or bioterrorism-related events, the resources required for these responses, and existing regional systems for delivery of these resources. We included articles describing regionalized responses to the 2001 anthrax attack, naturally occurring outbreaks, and disasters; we also included articles describing regionalized systems for trauma care, bioterrorism surveillance, and the bioterrorism response supply chain.

Data Extraction: From articles meeting the inclusion criteria, we extracted information about the type of regionalized response system described in the article, whether it had been evaluated, and any evaluative results reported.

Data Synthesis: We reviewed 9542 publications and more than 500 Web sites. Of these, 396 articles, 61 government reports, and 75 Web sites met our inclusion criteria. We found numerous existing regionalized systems for the delivery of goods and services relevant to bioterrorism preparedness and response; however, these systems are not well coordinated and few have been evaluated for their ability to facilitate a response to bioterrorism or a bioterrorism-relevant event. For example, we found that the regionally organized Laboratory Response Network provided laboratory surge capacity during the 2001 anthrax attack and that an international research network rapidly identified the pathogen during the SARS outbreak. In several instances, mutual aid agreements successfully facilitated the regional provision of emergency goods and services; and regionalization of trauma care has reduced costs and improved patient outcomes. How well these regional systems would perform during a large-scale bioterrorism event remains untested.

Simulations: Because we found no evidence describing regionalization of bioterrorism surveillance, we developed a simulation model to evaluate the tradeoffs in sensitivity and specificity when analyzing surveillance data locally as opposed to regionally. We found that warning thresholds may need to be modified to prevent increases in false positives when pooling data. Because we found no evaluations of regionalized inventory management for resources for bioterrorism responses, we developed a simulation model to address the costs and benefits of differing strategies for pre-attack stockpiling and post-attack distribution of antibiotics. Preliminary results indicate that the number of deaths resulting from an anthrax-like attack is

sensitive to the number of people seeking prophylactic antibiotics and to the time required for dispensing. Maintaining local inventories is only effective when the probability of bioterrorism is relatively high.

Conclusions: Numerous regional systems exist for responding to bioterrorism; however, few have been evaluated. Efforts to coordinate them are ongoing and would likely benefit from evaluations of regionalized information management systems; of strategies to rapidly distribute and dispense pharmaceuticals and other response resources; and of plans to specify response roles, remuneration, and chain of command.

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http://www.ahrq.gov/clinic/epcindex.htm