

Commentary

Improving Rural Community Preparedness for the Chronic Health Consequences of Bioterrorism and Other Public Health Emergencies

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The terrorist attack on the World Trade Center in New York City on September 11, 2001, and the anthrax attacks in mid-September 2001 led to numerous efforts to improve public health emergency preparedness.^{1,2} However, most of this work has focused on meeting acute healthcare needs immediately following mass trauma events.³ Less attention has been focused on the impact of public health emergencies on nonacute healthcare needs, particularly those of underserved, vulnerable populations. Because of their limited access to healthcare services compared to most urban areas, rural communities may be especially burdened by the longer-term impact of public health emergencies. Effective bioterrorism preparedness in rural communities is a significant issue for the nation since 65 million Americans live in these communities.⁴ Because of their remote locations and limited resources, rural communities' healthcare and social services needs differ from urban communities when it comes to recovery from mass casualty events.^{5,6}

In the immediate aftermath of a public health emergency, first responders are called to the scene. For large events, healthcare providers from neighboring or even distant communities may provide assistance. However, after first responders and nonresident healthcare providers leave the rural community, local public health agencies (LPHAs) and primary care providers (PCPs) would be left to manage the community's substantial postacute and chronic health needs.

On the basis of the experience of previous human-caused events as well as natural disasters, anticipated postacute and chronic health needs following terrorism and bioterrorism are likely to be extensive and will require both immediate and long-term attention

from healthcare providers. The mental health impact of terrorism may extend over prolonged periods^{7,8} and impact a greater percentage of the population than would physical trauma.⁹⁻¹¹ Many rural communities lack adequate access to specialist mental healthcare professionals,¹² and therefore local PCPs (many of whom work within LPHAs) would be called upon to provide most ongoing mental health treatment in the months and years following an event. Existing studies have addressed acute medical needs such as injury or physical trauma¹³⁻¹⁶ and some work has been done on psychological trauma, particularly posttraumatic stress disorder,¹⁷⁻¹⁹ but little is known about how rural healthcare providers will respond to the intermediate and longer-term health needs of rural communities following public health emergencies.²⁰

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To prepare for these events, it is necessary to first adequately assess the current state of the public health system in the rural community. There have been some prior efforts to assess the public health system's capabilities including, for example, the Public Health Assessment for Emergency Preparedness developed by the Centers for Disease Control and Prevention and the Department of Justice. This instrument is built upon the 10 "Essential Public Health Services,"²¹ but does not directly address the long-term implications of a mass trauma event. By targeting existing unmet needs that overlap with the healthcare needs that may result from public health emergencies, it would be possible to develop models and tools that decrease existing unmet needs while also promoting improved emergency preparedness. Accordingly, this article addresses important considerations when assessing unmet health needs in light of recognized deficits in local rural public health systems. We focus here on intermediate and long-term health needs related to chronic physical ailments and psychological disorders that may follow from a range of natural and human-caused events. Because of the lack of available data, we suggest that a mix of qualitative (eg, key informant interviews, focus groups with stakeholders) and quantitative (eg, surveys that examine knowledge-based testing of healthcare providers) methodologies is required to assess existing resources and response mechanisms in rural and neighboring urban communities so as to meet anticipated postevent health needs.

● Rural Areas as Vulnerable Targets for Terrorism

Rural areas are tempting targets for terrorism and bioterrorism.^{5,22,23} National energy sites, nuclear sites, and hazardous materials' manufacturers are often located in or near rural areas. Rural areas comprise the source of most food distribution, and thus localized agricultural bioterrorism could threaten significant portions of the country. Furthermore, although rural areas may not contain many high-profile targets, they are often less well-defended. Many cities get their water from remote rural reservoirs/watersheds that have limited supervision. Contaminants could be spread to cities by crop duster aircraft originating from rural airports.⁵ Trains carry people and cargo through many rural communities. Rural communities may also face "spillover" effects from bioterrorist events targeting neighboring urban centers. Finally, a terrorist event in an urban area may result in a mass exodus to a rural area, overwhelming rural providers with sick and even contaminated individuals.²⁴ Some of these individuals may choose to remain in the rural community indefinitely.

In addition, rural areas face obstacles to responding effectively to crises involving these industries due to limited resources. The number of healthcare professionals in many rural communities is very limited in comparison with urban areas,²⁵ and the possibility of their exposure to a biological agent prior to its identification is proportionately high. This exposure could debilitate them, leaving rural communities without adequate access to healthcare treatment and urban communities without backup support.²⁶

Furthermore, most rural communities do not immediately feel threatened by a bioterrorist attack, resulting in less preparation in comparison with their urban counterparts.²² For example, Wetter and colleagues²⁷ found that while 20 percent of all hospitals had a response plan for incidents involving biological or chemical weapons, rural hospitals were only one-third as likely as urban sites to have such capacity.

● Needs Assessment, Surge Capacity, and Existing Public Health Emergency Preparedness

The rural public health infrastructure, already strained through years of underfunding and increasing demands,²⁸ requires enduring and dedicated funding to address public health emergencies.²⁹ As healthcare expenditures continue to increase at rates exceeding general inflation, there is a significant concern that rural communities will continue to be overshadowed by urban communities. Accordingly, it is important to assess which models of rural preparedness lead to the most effective use of these limited resources.

The first step in this process is the completion of a needs assessment, a systematic evaluation of the type, depth, and scope of a problem to identify gaps between what services are available and what services need to be made available.^{30,31} A needs assessment includes the following elements: collection and analysis of existing data; obtaining survey information from the local community and/or focus or discussion groups; conducting a public policy review that examines existing legal and regulatory concerns as well as policies and practices of relevant organizations; and a review of current programs, activities, and resources.^{30,31}

Ideally, rural communities will already have completed a community healthcare needs assessment, and can build upon that general needs assessment in order to complete a more focused assessment that examines healthcare needs that could arise from the aforementioned threats. These efforts could also build on the Public Health Assessment for Emergency Preparedness if the local health department participated in the study.

The needs assessment should describe the existing network of care in rural communities for intermediate and long-term chronic and postacute conditions, that is, nontrauma care, and the extent to which the system may already be under strain in meeting existing demand for healthcare and social services. Attention should focus on conditions that may be caused or exacerbated by terrorism and bioterrorism, including anxiety disorders and infectious diseases. This network should be conceptualized as broadly as possible and should include not only health services organizations but also organizations that provide social services that may be vital in the rural community's long-term recovery. Adequate social services are likely to be particularly important in helping a community recover from the stress and anxiety created by an event.

In addition, the needs assessment should include an analysis of the surge capacity of facilities available within the rural community and surrounding areas. Given the particularly limited resources available in rural communities, it is vital to examine how neighboring urban providers can serve a long-term, supportive role for rural communities following these events by, for example, providing trainees in medicine, psychology, and other allied healthcare professions to assist in the event of a public health emergency. Therefore, this assessment would ideally include a variety of organizations, including public health agencies, community health centers and other primary care clinics, hospitals (including neighboring academic medical centers, children's hospitals, Veterans Health Administration hospitals, and military hospitals), individual providers (including specialists), schools, faith-based organizations, and local community centers from rural communities and neighboring urban areas.

The examination should cover both formal and informal linkages between agencies and providers to understand the flow of patients, information, and resources within and to the rural community, perhaps using social network analysis.³²⁻³⁴ Given the range of possible events, fostering improved communication and awareness of other local healthcare organizations and providers before an event occurs will allow providers to focus on the needs that they are best able to meet should an event occur. These efforts may take some time to develop, as local providers may initially view this process with some trepidation arising out of the belief that these efforts are unnecessary in rural communities, or from a sense that providers are in competition for patients.

Ideally, these assessments would highlight special concerns of vulnerable subpopulations including women, children, and families,³⁵ the homeless, the uninsured, those with poor English skills, and persons with physical and mental disability including frail el-

ders, as each of these groups may experience different needs for healthcare and social services. For example, the incidence of domestic and elder abuse may increase in the aftermath of a mass casualty event,³⁶ as might the abuse of prescription and illicit substances.^{37,38}

In addition, the needs assessment should evaluate knowledge of existing preparedness efforts and the postacute and chronic health-related consequences of human-caused threats among local healthcare providers. This will allow LPHAs to determine which existing tools would be most beneficial in improving provider awareness of what to look for and who to ask for assistance following a public health emergency. Merely making these resources available within a community does not ensure that information and knowledge are being adequately disseminated. Individuals need also to be made aware that these resources are available and when they may be necessary.

● Thematic Areas to Examine in Assessing Public Health Emergency Preparedness

It is important to examine the structures of the healthcare and social service organizations and the processes that they use to deliver care within the rural community, as structural and organizational features are often more amenable to change through policy than individual behaviors. In addition, understanding the underlying structure of the network of care may help target resources more efficiently and effectively in the event of a public health emergency. As a complete instrument is beyond the scope of this article, we summarize the following key thematic elements for examination in a preparedness-needs assessment (based on the 10 Essential Public Health Services model):

1. Monitor community health status to identify current and potential postevent deficiencies.
2. Diagnose and investigate potential hazards and targets (building on existing health problems).
3. Inform and educate the community about hazards (including evaluating information and telecommunications systems).
4. Comprehensive inclusion of public health stakeholders to identify deficiencies and support community preparedness.
5. Development of public health response plans specific to long-term health effects.
6. Improve enforcement of relevant laws and regulations particularly areas that are likely to be deficient (eg, behavioral health, infectious diseases).
7. Inform the community about availability of personal healthcare services before and after an event and build on community partnerships to ensure

mechanisms for providing services for people after an event.

8. Evaluate programs to educate and inform local providers about preparedness and its relevancy to existing healthcare needs.
9. Evaluate effectiveness, accessibility, and quality of relevant personal and population-based healthcare services on the basis of identified deficiencies.
10. This process should provide new insights to existing health problems and those that may occur after an event.

● Perspective and Recommendations

Although bioterrorism shares many characteristics with natural disasters, it is unique in that many biological and chemical weapons are unfamiliar, as well as the potential health impacts may be uncertain and ambiguous. Bioterrorist agents may be contagious and can cause an array of symptoms. Thus, bioterrorism requires a broader view of public health emergencies than traditional disaster planning, necessitating that local communities engage in the needs assessment proposed here. As this article suggests, the need for public health agencies to pay increased attention to public health emergencies can have synergistic as well as antagonistic effects. For example, the aforementioned process could potentially lead to greater collaboration and less duplication of resources across organizations. Improvements in surveillance, greater access and utilization of information systems, and improvements in communications all may be driven by greater concern for preparedness. These improvements can benefit the delivery of public health services even in the absence of an attack.

For example, formal educational programs for mental health issues and other longer-term health concerns related to bioterrorism and terrorism are in development.³⁹ By taking these programs and, if necessary, adapting them to meet local needs (eg, high prevalence of methamphetamine use), providers are able to ensure that local community needs are addressed. By providing continuing education in behavioral health through LPHAs, rural PCPs would be not only better trained to address psychological needs after an emergency but also better able to meet existing mental health needs.

Rural public health agencies are often called upon to coordinate and plan for public health emergencies, either as a result of legislative mandates or due to disinterest on the part of other providers. Thus, public health practitioners will likely take the lead role in this needs assessment. The limited availability of specialty care in rural communities points to a need to improve public

health emergency preparedness among primary care clinics, many of which are run by state health departments that also provide core public health functions. In rural communities, local public health practitioners and PCPs will become the frontline providers of most healthcare services following a public health emergency. For example, a recent report noted that some rural public health units were overwhelmed with individuals concerned about anthrax following the 2001 anthrax attacks.²² Accordingly, it is vital that as many local PCPs be included in preparedness plans as is feasible. Conducting a focused, community needs assessment as described herein helps accomplish these goals.

Nevertheless, the proposed approach is a lengthy and potentially expensive one, and is likely to require a period of 6 months or longer. As such, it will require public health agencies to work with other healthcare professionals to guide the assessment, referral, and treatment of postevent chronic conditions, psychological disorders, and somatic complaints.

Thus, conducting such an assessment and implementing its recommendations will help ensure the availability, quality, and continuity of healthcare services for rural residents following bioterrorism and other public health emergencies. Furthermore, it provides an opportunity to take a revised look at the problem of providing postacute and chronic care and to determine whether existing programs meet existing needs or should be restructured or eliminated in favor of new programs, potentially improving existing quality of care.

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