

Public Health Preparedness: Evolution Or Revolution?

Although emergency preparedness has not been easily incorporated into public health, it is stimulating changes in public health practice.

by **Nicole Lurie, Jeffrey Wasserman, and Christopher D. Nelson**

ABSTRACT: The recent emphasis on preparedness has created heightened expectations and has raised questions about the extent to which U.S. public health systems have evolved in recent years. This paper describes how public health preparedness is transforming public health agencies. Key signs of change include new partnerships, changes in the workforce, new technologies, and evolving organizational structures. Each of these elements has had some positive impact on public health; however, integration of preparedness with other public health functions remains challenging. The preparedness mission has also raised challenges in the areas of leadership, governance, quality, and accountability. [*Health Affairs* 25, no. 4 (2006): 935–945; 10.1377/hlthaff.25.4.935]

E V E N T S AT THE DAWN OF THE TWENTY-FIRST CENTURY pushed public health emergency preparedness to the top of the U.S. national agenda. Concern intensified with the response to the 2005 Gulf Coast hurricanes and amid the growing possibility of an H5N1 influenza virus pandemic (bird flu). The federal government has responded with an investment of some \$5 billion since 2001 to upgrade the public health system's ability to prevent and respond to large-scale public health emergencies, whether caused by terrorism or by natural agents.

However, the government's call to arms falls upon a system still in the process of recovering from years of being underresourced and often ignored by federal policymakers. The Institute of Medicine (IOM) termed the system "still in disarray" in 2003, despite the fact that the IOM had first articulated its concerns in 1988.¹ Moreover, the public typically has had a poor understanding of what public health systems are and of what governmental public health agencies do.

■ **Heightened expectations.** The new emphasis on and funding for public health preparedness has heightened expectations about how the system should perform and has raised questions about the extent to which U.S. public health systems have evolved and improved in recent years. Congress and the taxpayers it represents

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want to know how the funds have been spent and whether the system is better prepared than before to protect the public in a public health emergency. Although the preparedness mission represents only a small part of what public health does, the changes that have occurred in public health during the past few years provide a vantage point from which to examine the status of the system as a whole and to identify ways of encouraging the evolution of—and even hastening a revolution in—public health.

■ **Signs of change.** During the past three years, RAND researchers have had the opportunity to examine the public health infrastructure through a series of inter-related projects: an assessment of California's public health preparedness; tests of a measure of health department performance; the development and conduct of “table-top exercises” in thirty-two communities in twelve states; an examination of the public health–hospital interface; a study of the impact of variation in state and local relationships on preparedness; and a review of quality improvement efforts in public health.² All told, the RAND team visited forty-four communities in seventeen states.³ Taken together, these assessments suggest that public health is in the midst of a major transition, spurred in part by the addition of public health preparedness to the responsibilities of state and local public health agencies. Key signs of change include new partnerships, changes in the workforce, new technologies, and evolving organizational structures. Although each of these elements has had some positive impact on public health, none has been implemented without problems, and integration of preparedness with other public health functions remains a major challenge for many public health agencies. Furthermore, the preparedness mission has raised special challenges for public health in the areas of leadership, governance, quality, and accountability.

In a 2002 commentary, one of us (Lurie) pointed out that much of our public health infrastructure has changed little over the past century and asked, “Do we want to rebuild a nineteenth-century system, even with twenty-first-century technology?”⁴ Although building a brand-new public health system from scratch is both impractical and politically untenable, we believe that public health preparedness can have a profound impact on how the U.S. public health system evolves. In this paper we discuss key ways in which public health preparedness is affecting public health agencies and suggest that despite the challenges inherent in embracing this new responsibility, public health will become a stronger and more visible governmental partner as a result, better able to protect and improve population health.

Recent Changes In Public Health

■ **New partners.** Partnerships between community entities, such as private health care facilities or schools and local government officials, are not at all new to public health. However, the process of preparing a community to meet the challenges of a potential public health emergency has required public health depart-

ments to build relationships with new kinds of partners, including emergency management agencies, law enforcement, and other first responders.⁵ The development of emergency response plans or participation in drills, for example, has required public health agencies to work closely with first responders and has stimulated agencies to develop stronger relationships with the hospital and health care community. Throughout our site visits and exercises, we observed repeatedly that preparedness planning has been instrumental in forging these new relationships and that communication and working relationships between many of these entities is better than it was in the pre-9/11 era.

But developing these relationships has not been without its challenges, largely because of differences in culture, work style, and mission. Emergency responders and police have emergency responses as a primary mission. They are used to making rapid decisions, acting quickly, and working in a hierarchical command structure—a culture that has been derisively described by some in public health as “ready-fire-aim.” In contrast, public health departments are typically responsible for a range of activities, including many that involve slowly evolving and non-life-threatening problems; they have therefore been able to conduct much of their work in a more contemplative mode and at a relatively slower pace. In many public health agencies, a high priority is placed on reaching consensus before taking action. Agencies typically value collaboration skills, and many have reported discomfort when functioning in a hierarchical command structure. Indeed, some public health officials “self-selected” into collaborative organizations and philosophically object to what they see as the “militarization of public health” and the use of incident command structures.

The relationships between public health agencies and hospitals have also been affected by different missions and experiences. From the personal health care delivery system perspective, hospitals have long had requirements for disaster preparedness, and hospital staffs often function hierarchically, especially in emergencies. In fact, many in the hospital community view public health agencies as latecomers to emergency planning and preparedness and are uncertain about agencies’ role or what they offer.⁶ Nonetheless, taken together, collaboration with these partners is heightening the expectations for the role of public health in communities.

■ **Changes in the workforce.** *New staff.* Preparedness has resulted in several changes to the public health workforce, including new personnel and new responsibilities. First, all states and most metropolitan areas have hired bioterrorism or emergency preparedness coordinators. These staff often have backgrounds and experience in emergency response, law enforcement, or the military, and it has taken time for them to understand the culture of the public health enterprise and vice versa. At the same time, people in these roles are often responsible for bringing new ways of doing things to health departments, including exercises, drills, and after-action reviews. Many are comfortable in a command structure and willing to serve

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as incident commanders in an emergency. Although such traits can serve them well in their roles as preparedness coordinators, the background and perspective these personnel bring can sometimes create friction with public health leaders, who are often more reticent about stepping into these roles.

New roles and responsibilities. Non-preparedness staff in many public health departments have been asked to take on new roles and responsibilities in the event of a public health emergency, and many are being “cross-trained” to do so. For many public health agencies, this represents the first time that the entire staff has been trained to work toward a focused, common public health goal outside of their day-to-day roles. This training has provided public health personnel with an awareness of emergency preparedness that fully permeates health department workforces, more so than the awareness of traditional public health missions, such as immunization, control of sexually transmitted diseases (STDs), or chronic disease prevention. However, the development and implementation of such training programs is still redundant and nonstandardized, and it is often unclear how well staff could actually perform their new roles in a crisis.

Staff shortages. Most health departments we visited experienced challenges related to both staff availability and budget. Many states have hiring freezes in place. There is not a robust pipeline of trained personnel to work in public health agencies, and salaries for public health nurses, epidemiologists, laboratory professionals, and physicians are often not competitive with those of their private-sector counterparts. Several states we visited have dealt with these problems by contracting services out to nonprofit and private-sector entities. However, it is not clear that this strategy builds long-term internal capacity in health departments. In numerous instances, states and localities that have transferred staff in other non-preparedness-related positions (for example, immunization coordinator) to senior preparedness roles have found that there was not a workforce available to replace them. All of this has led to a prevailing perception that public health emergency preparedness and other public health functions have a “zero-sum” relationship, in which increasing investment in one sector entails reductions in investments in the other. In fact, our case studies and key-informant interviews revealed that senior state and local health department officials spend a substantial fraction of their time, often upward of 20 percent, on preparedness-related matters.⁷ Public health departments reported that cuts to local public health budgets have led to reduction in, and in some instances elimination of, important public health services and programs, including teen pregnancy prevention, tuberculosis (TB) screening, and STD contact tracing.

Aging workforce. An aging workforce has compounded workforce shortages in

public health. Moreover, because of overall shortages of qualified employees to fill key public health positions, health jurisdictions are competing with one another for scarce human resources. Often this focus on competition has kept departments from considering other alternatives for meeting workforce needs, such as using the available pool of employees more efficiently.

■ **New technologies.** Technology has become increasingly important in the workplace, and preparedness efforts—as well as the infusion of federal funds—have allowed public health agencies to achieve technological gains in two important areas. First, many communities have made recent investments in technology that enable all parties, including public health, to communicate on the same radio frequencies even when power is not available. This technology allows public health officials to communicate with their counterparts in emergency medical services (EMS) and allows fire and police departments to communicate with one another. Second, funding has facilitated advances in the information technology (IT) infrastructure for public health. Improvements have ranged from the development of a national Health Alert Network and Laboratory Response Network, which strengthens electronic laboratory reporting of reportable diseases, to statewide systems to conduct surveillance and outbreak investigation, most of which feed into the Centers for Disease Control and Prevention (CDC). The latter type of system enabled Pennsylvania to respond effectively to a hepatitis A outbreak in 2003.⁸ In part, it is this infrastructure that has the potential to bring many of the revolutionary strategies to public health. For example, while not related directly to preparedness funding, New York City recently mandated reporting of hemoglobin A1C test results as part of its strategy to address the diabetes epidemic.⁹ Improved IT can help many jurisdictions with similar innovative approaches to controlling both acute and chronic diseases.

■ **Integration of preparedness with other public health functions.** New partnerships, changes in the workforce, and new technologies have all made positive contributions to public health; however, integration of preparedness with other public health functions has remained a challenge. Because preparedness has been a new function with its own budget, its functions have often been kept separate from other public health functions. For example, vaccines and other components in the Strategic National Stockpile are tracked and distributed separately from other vaccines and medications handled by public health departments. In the face of concerns about pandemic influenza, for which the country is now preparing, we observed that some public health departments consider planning for a flu pandemic to be an entirely separate activity from general public health emergency preparedness. Also, such planning has involved only those responsible for annual influenza activities, with the unfortunate result that staff involved in the former activity did not take advantage of several years of work done by preparedness staff. We observed many similar instances in which public health departments missed opportunities to exploit the interface between bioterrorism surveillance and activities in other areas, ranging from patient safety and hospital nosocomial infections to chronic disease surveil-

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lance. However, increasing integration of these types of activities may well be building toward a “tipping point” in how public health activities are performed and could be another part of the revolution in public health practice.

Impact on performance. In the course of our work, we found that when public health agencies had made strides to integrate preparedness with other public health functions, performance, at least judged by exercises, was improved. For example, one large health jurisdiction had only a skeletal preparedness staff and distributed the bulk of the preparedness resources it received through the CDC grants to existing units. Unit heads were told that preparedness objectives should shape everything they did and that, reciprocally, other functions should influence preparedness efforts. We found through both key-informant interviews and direct observation that these efforts to integrate preparedness with other functions were reflected in performance. In contrast, we found that less-well-integrated health departments tended to perform poorly on tabletop exercises or reported other challenges in responding to real events. For example, staff in one state reported major problems implementing a mass vaccination clinic during the 2004–05 flu vaccine shortage, only to discover after the fact that its preparedness staff had already worked through the logistics of such an effort.

Impact on epidemiology and communications. Our research also found that integration of preparedness and other efforts seemed to have a positive effect on epidemiology and communications. In epidemiology, investments in laboratory capacity and reporting, IT, and the hiring of many more epidemiologists appear to have increased the epidemiological and investigative capacity of many health departments. Since public health emergencies on the scale of a bioterrorist attack or pandemic flu are thankfully rare, these staffs are available to fulfill general epidemiology tasks while maintaining the skills and capacity for a large-scale response. We are optimistic that over time, this will be reflected in greater outbreak detection, better investigation, and more rapid control of an outbreak. A similar phenomenon appears to have occurred regarding the use of incident command structures. Although some health departments have been resistant to using such a structure, several have embraced the concept and applied its principles to a range of activities, including outbreak investigation and budget planning. Particularly in the area of outbreak investigation, public health staff report improvements in both timeliness and completeness of outbreak management.

Effect on risk communication. The need for effective risk communication as a component of preparedness and response also has led health departments to hire more public information officers. We saw several health departments in which such people used their communication skills not just to convey specific risk informa-

tion, but also to improve communication between the health department, other partners, and the public and to raise awareness of other public health issues.

Major Challenges

■ **Leadership.** One clear and consistent finding that has emerged from our work concerns the role of strong leadership in public health preparedness. In our tabletop exercises, we repeatedly observed that strong leadership trumped all other factors in determining how jurisdictions fared when presented with a wide range of scenarios related to infectious disease outbreaks. The performance of health departments whose leaders were willing to take responsibility for, and make decisions in, a hypothetical situation was far better than those in which the leaders said they would be willing to be “co-in-charge” with others. Leaders were also important in facilitating organizational change, motivating staff, developing relationships with key community groups and other constituencies, training staff to assume various “backup” roles in the event of an outbreak, conducting strategic planning, and understanding when and where to hand off functions to officials from other agencies.

Although our work to date has not examined closely the best means of developing and promoting strong public health leadership, we noted that some successful health jurisdictions provided aggressive leadership training programs for employees. In one health department, for example, we were told about a program promoting public health leadership and cultural change, in which employees are taught how to assess performance and manage time, staff, and so on.

■ **Quality and accountability.** The investment in public health preparedness has led to calls for accountability at a number of levels. First, Congress wants an accounting of how the funds were spent, and the CDC is responsible for monitoring preparedness—at least at the state level. Some state legislatures are making similar demands regarding local preparedness, and in some areas, the public, aided by the media and the recognition of large regional variations in preparedness, is asking important questions, such as, “How prepared are we?” and “How do we know if we are prepared?” Unfortunately, those questions are difficult to answer, in large part because of a lack of measures to define and assess preparedness and a strong evidence base to support them.

Measuring performance. In many ways the current state of quality of U.S. public health systems is reminiscent of the state of quality in the personal health care delivery system a quarter-century ago. In fact, we have argued that there is a “quality chasm” in public health that is analogous to that in the personal delivery system.¹⁰ Evidence for this quality chasm includes the marked variability in mission, scope, and performance of public health agencies; the duplication of efforts seen in many areas of preparedness, such as training; and the uneven protection of the public in the event of a public health emergency. Although public health has made major strides in the area of performance measurement in general, it has lacked the kinds of risk-adjustment methods that have been developed to compare outcomes across

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systems. In the area of preparedness, the lack of well-accepted, standardized measures and metrics makes it difficult to satisfy the demands for accountability, or even to gauge the level of preparedness.

Although there is not agreement about these measurement issues on a national level, many state and local health departments we have encountered are making solid progress in measuring key attributes of public health emergency preparedness. But measuring preparedness creates new and difficult challenges for public health personnel because it involves measuring the capacity to deal with situations that happen only rarely, if at all.

Assessing structural elements of preparedness. Responses to this challenge generally involve one of two approaches. The first entails assessing the structural elements of preparedness, such as the presence and quality of plans or infrastructure. Preparedness plans, however, are often generated by a relatively small group of people within a jurisdiction, whereas actual responses are coproduced by larger groups—including the general public. Similarly, these assessments provide little opportunity to test jurisdictions’ ability to adapt plans and resources to unexpected and changing circumstances—a shortcoming illustrated vividly in the response to the recent Gulf Coast hurricanes. Finally, the self-report formats used by many assessments of plans and infrastructures are subject to biases in self-perceived skill and ability. One paradox is that jurisdictions with a well-developed understanding of preparedness are often more self-critical than others that are less prepared.

A second method involves exercises and drills of processes, or of surrogate outcomes based on realistic scenarios. These provide at least approximate measures of outcomes and, we believe, are a better way to assess preparedness (as well as to prepare). Their use has spread considerably in recent years. Nevertheless, we have a number of concerns about these assessments as currently used. Most jurisdictions routinely produce “after-action reports” on their exercises, but their evaluations of performance are often implicit, lacking reference to clear standards and transparent measures. This can impede attempts to establish shared terms of reference that can guide improvement efforts. Furthermore, these reports often sit on the shelf, and results are not widely communicated. Although we have heard about many exercises that reveal preparedness gaps that had already been revealed during previous exercises, we have found few jurisdictions that could cite specific instances in which such identification was followed by corrective actions. Even among jurisdictions widely regarded as exemplary, use of systematic quality improvement strategies in public health preparedness appears to be rare.

Effective quality improvement activities. We have, however, identified examples of

quality improvement activities in other areas of public health, although they mainly concern clinical services provided by health departments.¹¹ We have also identified several states that are taking actions to facilitate improved preparedness at the local level. For instance, some states have set standards that, among other things, seek to make the CDC guidance more accessible and relevant to local health departments in their states. Others are seeking to facilitate measurement of preparedness by creating common indicator systems and investing in online reporting systems; in at least one case, this system is built on the same platform as the state's Health Alert Network. Other states require regular preparedness exercises as a condition of releasing federal funds. At least one state encourages follow-through on corrective actions by tracking gaps identified in after-action reports and building requirements for corrective actions into each jurisdiction's contract with the state.

■ **Developing systems of accountability.** An important precondition for the development of an effective accountability system is greater agreement among stakeholders at the federal, state, and local levels regarding who should do what. Unfortunately, the initial funds from the CDC were distributed so rapidly that there was little time to determine which level of government should be responsible for what. In the ensuing three or so years, there has been little clarification about the allocation of responsibilities between federal, state, and local public health agencies. This confusion was a recurrent theme in our tabletop exercises; responsibilities and handoffs among local, state, and federal levels were nearly always unclear. Resolving this ambiguity is an important prerequisite for holding various governmental entities accountable for their performance and spending.

Developing a robust system of accountability is no simple feat. To be meaningful, public health emergency preparedness concepts and doctrine must be operationalized in clear and consistent measures that allow stakeholders to monitor progress and identify and address strengths and weaknesses. A key measurement dilemma in public health emergency preparedness is that exercises and drills are often the best way to measure the capacity to implement and adapt response plans, but they can also be quite expensive. We believe that it is possible to develop a set of relatively small-scale drills and exercises focused around the most important preparedness components and to build an accompanying small number of standardized metrics. At the same time, it should be possible to take advantage of more routine activities, such as those surrounding annual flu vaccination or back-to-school immunization campaigns, to test other aspects of preparedness. In a similar vein, systems that rely on emergency room or physician notification and reporting could be tested by monitoring and following up reports of children with uncontrolled asthma instead of confining reporting to notifiable infectious diseases. Creative development of such drills has the potential to strengthen other aspects of public health (such as tobacco control and HIV/AIDS) as well as to increase preparedness.

Measurement by itself, however, will not improve public health emergency preparedness; it must be supplemented by efforts that identify and interpret gaps, to develop and implement corrective actions. The imperative to improve preparedness, if tied to appropriate incentives, can help transfer quality improvement knowledge and skills to other domains of public health.

Evolution Or Revolution?

Although emergency preparedness has not been easily incorporated into public health, it is clearly stimulating the evolution of public health practice. Yet important barriers remain, including inadequate accountability systems, little consensus regarding who should be responsible for what, the lack of evidence-based performance measures, and the need to integrate public health preparedness with traditional public health activities and functions. We note, however, that the emphasis on preparedness, while helpful, will not solve all of the nation's public health problems.

Sustained funding for public health preparedness will be important. In addition to the fact that public health has been underfunded for a long time, as the workforce ages into retirement, it will be crucial to assure that an attractive career path exists for the "best and brightest" in public health.¹² This cannot be accomplished without assurance that funding for the public health infrastructure is a long-term investment and not a year-to-year decision for Congress to make.

Second, a uniform definition of public health and expectations for public health agencies are needed. As noted earlier, there exists today no clear national understanding of what public health is and does. Preparedness has helped create an understanding among Americans that all should be protected from the consequences of a public health emergency, whether due to bioterrorism or a new emerging infection such as pandemic influenza. The National Association of County and City Health Officials (NACCHO) has taken steps to develop an operational definition of a local public health agency. If widely adopted, this definition should help reduce uncertainty about what the public can expect from such an agency and should encourage the analogous clarification of expectations from state health departments.¹³ The CDC could also clarify the aspects of preparedness for which it is accountable and, as is the case for expectations for state health departments, develop a set of performance measures for itself. Taken together, actions at these three levels can go a long way toward creating a more uniform standard of health protection for the country.

BY IMPORTING NEW FRAMEWORKS, practices, partnerships, and concepts into public health, the emergency preparedness mission can help public health leaders transform the U.S. public health system so that it can respond effectively and economically to the broadening spectrum of challenges it faces. However, the pace of evolution, at least in nature, is slow. Revolutionary think-

ing—and action—is necessary to move to a public health system prepared to meet and respond to the challenges of our twenty-first-century world.

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NOTES

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