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TECHNICAL REPORT

Quality Improvement

Implications for Public Health Preparedness

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Prepared for the U.S. Department of Health and Human Services



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EXECUTIVE SUMMARY

Recent events, such as the terrorist attacks of September 11, 2001, the anthrax attacks, the flu vaccine shortage of 2004–2005, and the response to Hurricane Katrina, have all rekindled interest in strengthening the nation's public health infrastructure and, in particular, have shown the importance of public health emergency preparedness (PHEP). To enhance the public health system and address gaps in preparedness, the U.S. government has spent billions of dollars since September 2001 to introduce surveillance systems, purchase equipment, and develop plans and measures. Despite these efforts, concerns remain about the ability of the public health system to respond to emergencies.

Federal and state budget deficits strain the current system, while changes in the health care delivery system and ambivalence about the role of government have resulted in relatively low expectations for public health and what it can achieve. Standards for defining and measuring preparedness are lacking, and there are few measures with which to assess the performance—and progress—of health departments in emergency preparedness or to implement systematic change. Adding to these challenges is the complexity of the public health system itself, which includes thousands of county and city health departments; local boards of health; state and territorial health departments; tribal health departments; public and private laboratories; parts of multiple federal departments and agencies; hospitals and other health care providers; volunteer organizations, such as the Red Cross (Lister, 2005); and private vaccine and drug manufacturers and distributors. Moreover, the broad mission of public health, which extends from the promotion of physical and mental health to disease prevention, means that emergency preparedness must compete with many other programs and activities.

The goal of this study is to help address gaps in public health by showing how quality improvement (QI) methods can be used to improve the emergency preparedness of the system.

What Is Quality Improvement?

The term *quality improvement* has been used broadly by practitioners in various fields to refer to a range of strategies and techniques designed to improve performance and quality. Originally developed in manufacturing, QI methods have been applied to health care, engineering, service industries, and emergency response organizations, although not widely within public health.

Our review of the literature suggests that, although different fields use QI in many different ways, all QI programs designed for complex organizations reflect a set of core concepts (Langley, Nolan, et al., 1996; Cretin, Shortell, et al., 2004; Lighter and Fair, 2004; Daita 2005):

- **Emphasis on systems.** QI considers quality to be the result of complex, interdependent systems, with individuals working within these systems. Quality problems are solved by focusing on the system, not by exhorting poor-performing individuals to “try harder.”
- **Product or outcome focus.** QI efforts are oriented toward a specific product or outcome, and planning is focused on the needs of those served by the organization.
- **Use of quantifiable measures.** Potential changes and procedures are evaluated according to their effect on quantifiable measures.
- **Reduction in variability.** The focus of QI efforts is on the design of processes to reduce *unwarranted* variability in the product or services provided (outcomes of the process).
- **Continuous improvement.** QI efforts need to be ongoing, rather than one-time initiatives, since organizational processes and systems will usually change with time.

In sum, this report defines QI as a multidisciplinary, systems-focused, data-driven method of understanding and improving the efficiency, effectiveness, and reliability of public health processes and practices related to preparedness. The ongoing process of QI requires all four of the following elements: performance goals, performance measures, QI practices, and feedback and reporting (Langley, Nolan, et al., 1996; Lighter and Fair, 2004).

Approach

In the study, we examined the QI practices used in a small group of public health departments (HDs). We conducted site visits with seven HDs and telephone interviews with two others. During these interviews, we looked for examples of four components of QI:

- **Performance goals**, i.e., agreed-upon targets for improvement efforts of the organization or work unit
- **Performance measures** that focus on structures, processes, or outcomes of an organization's work
- **QI practices**, i.e., systematic techniques and approaches used to understand processes, identify needed changes, and implement improvements
- **Feedback and reporting mechanisms** to document and track performance.

During our site visits, we also noted instances of several organizational and contextual factors that can affect the success of QI initiatives, including organizational culture, leadership, information systems, technical skills, and incentives.

Key Findings

Although no sites had comprehensive, fully functioning QI processes for PHEP, many sites had one or more components of QI. We highlight some key findings below.

All sites reported having performance goals for PHEP. CDC cooperative-agreement guidance was the main source of performance goals, while other public HDs cited the National Public Health Performance Standards Program (NPHPSP) or, in some cases, developed their own performance goals. One local health department (LHD) used a special process to develop *SMART* performance goals—i.e., goals that are specific, measurable, achievable, realistic, and time-weighted. These characteristics facilitate the development of performance goals by precisely defining the target, stating the measure used to evaluate whether the target has been reached, naming the accountable parties, and ensuring that goals are neither too easy nor too difficult and that deadlines for achieving goals are clear.

Some sites expressed concern about using CDC guidance in setting their goals. Some noted that the CDC guidance came out too late to be useful for planning. Another concern was that the guidance places too much emphasis on structure (for example, having one epidemiologist for every 500,000 people) and ease of measurement, as opposed to goals for improvement.

Several LHDs also noted difficulties in prioritizing performance goals. LHDs reported that performance goals were often developed on an ad hoc basis, in response to immediate needs and requirements. At several sites, the lack of a widely accepted, quantifiable definition of *preparedness* was also a stumbling block to engaging in QI in PHEP.

The use of some form of performance measurement existed for both routine and rare processes. Several HDs had implemented measures for routine, ongoing processes, many in the area of infectious disease. Examples include a measure of the timeliness of disease-reporting across the state and a measure of LHD progress toward statewide performance goals for PHEP. HDs measured rare preparedness processes both in response to naturally occurring events and as a part of drills or exercises. HDs cited West Nile virus, anthrax, and flu season, among others, as opportunities to measure preparedness--e.g., in number of people vaccinated during a flu clinic, the extent to which the HD was able to shape communication to the public with regard to West Nile virus, and in the HD's success in contacting individuals with special health care needs in the event of a natural disaster. Drills and exercises were used to capture easily quantifiable metrics, such as the percentage of people reached in an alert. However, more-comprehensive and more-complex exercises represented a difficult measurement enterprise.

Many of the measures were imprecise, lacked clear objectives, or were not relevant. Specific exercise objectives and metrics for complex exercises were often not identified in advance. Many of the sites routinely drafted after action reports (AARs) following exercises and considered them to be valuable ways to measure rare or response processes. However, we found that AARs often measured "success" implicitly, without reference to a priori goals and measures. Even if there were a priori goals, measures were often imprecise. Moreover, some of the measures were only indirectly related to actual preparedness--e.g., measures to assess whether a plan was written, whether a training was held, or whether certain equipment was purchased.

On the whole, measurement and documentation of PHEP processes were not pervasive. Each of the nine sites had at least one example of a measure for PHEP; however, few sites could describe more than a handful. In addition, several sites lacked documentation for the measures they had developed.

Many sites had examples of QI goals and measurements; fewer had implemented many QI practices. Few sites had command of more than one QI practice, and practices were often employed without conscious understanding that the specific instance was an example of a broader class of QI. Examples of QI practices included cyclical QI practices based on iterative cycles of setting improvement aims, testing a change, evaluating the effects of the change, and providing feedback to inform the next cycle. Another QI practice was the use of a *collaborative*, which refers to a structure in

which various agencies or health departments can share experiences, learn from one another, and find ways to cooperate and pool resources, training, and knowledge.

As to using QI practices for rare events, several of the HDs considered the skilled use of Incident Command Structure (ICS) to be a way to improve PHEP for response situations. ICS refers to the combination of facilities, equipment, personnel, procedures, and communications used during emergency response. When applied correctly, ICS lays out a systematic way to respond to emergencies that specifies clear roles and responsibilities and that has built-in processes to facilitate a cyclical planning and response process. The HDs that found ICS most useful were those that incorporated ICS into routine practice or that had other opportunities to practice it.

State and local HDs typically implemented different types of QI practices appropriate to their respective roles. LHDs would typically be first responders in the event of a public health incident; state HDs were more likely to help coordinate or facilitate the local and regional response. As a result, LHDs tended to focus internally on QI, whereas state HDs saw their QI role more in terms of providing resources and training, and facilitating structures within which LHDs could improve.

QI practices were more likely to be implemented if they were integrated into daily work and made work easier or more efficient. For example, one LHD made changes to its infectious-disease-reporting process to reduce reporting time, which streamlined the data-entry process, thus making the work process easier as well as faster. Sites noted that implementation of QI practices was more successful when there was an explicit effort to do so.

HDs typically did not have systematic feedback mechanisms for QI. Many of the HDs we visited told us that they often made changes to the way they worked and created plans for preparedness based on lessons learned from actual events and exercises. However, we found few examples of HDs that used an explicit process to routinely incorporate back into practice those changes suggested by their improvement efforts. Moreover, the findings of AARs were often not acted upon following a drill. Nor did sites routinely retest after changes have been made to determine the success of the changes.

Organizational culture and leadership were keys to QI efforts. Cultures that fostered cooperation, valued input from all staff, and empowered employees were important drivers in facilitating QI efforts. Leadership style was critical in developing a supportive organizational culture. Many different leadership styles and functions can support QI, including leaders who foster empowerment and accountability, those who use

their authority to drive and enforce QI efforts, and those who use a more charismatic style to champion change.

Barriers to QI included a lack of resources and incentives. A lack of time and, especially, an inadequate number of staff members were cited as key barriers to QI. Not having sufficient or well-trained staff often means that health departments are in a responsive mode rather than a strategic mode and are often incapable of building an infrastructure for QI. Other resources, such as data and informational systems, were also viewed as crucial to establishing an infrastructure to facilitate QI. Many sites emphasized training and skill development to achieve the skilled workforce needed to use available technologies effectively. Other barriers included a lack of federal funding and the notion that PHEP itself is as an add-on, rather than something integral to public health.

Overall, there were not strong incentives, either at the organizational or individual level, to engage in QI for PHEP. Better performance was not linked to funding. Moreover, there was a reluctance, given the perception that preparedness-related funding might be time-limited, to invest in long-term improvement efforts. Most HDs had not linked performance to staff salaries.

Recommendations

For QI to flourish and become standard practice, changes to the status quo are necessary. We make the following observations and recommendations.

Building QI capabilities and capacity is foundational. Implementing QI requires both theoretical knowledge and practical skills at all levels of the organization. Although much emphasis has been placed on the need to improve, less investment has been made in creating the organizational capacity to improve. The discipline of QI and the skills and techniques needed to pursue QI must be broadly disseminated throughout public health. Vehicles for increasing QI capacity could include development grants, education and training, technical assistance, tool (including information technology) development, leadership and management training, and grants that incentivize and reward QI practices and continuous improvement in performance.

Attention needs to be paid to organizational development and change. This study outlines many issues faced in PHEP, including the need to plan and develop a response capacity across well-established 'silos' and the need to transform the traditional workforce into an integrated ICS in the face of an emergency. These very difficult organizational challenges require sustained attention and resources to build the organizational and leadership capacity for public health (PH) to be prepared to protect the

public in a sustained emergency. As above, vehicles for increasing organizational-development capacity could include development grants, education and training, technical assistance, and leadership and management training.

PHEP and QI for PHEP will be most successful when integrated into routine PH practice and into daily work. The integration of QI into usual PH processes and into daily work provides an opportunity to practice QI skills and improve PHEP-relevant processes and capabilities while avoiding “preparedness burnout,” which could occur if staff is asked to add on additional work to address PHEP.

Performance goals and measures that are meant to facilitate improvement should be specific, measurable, relevant, and time-bound. Performance goals and measures must be relevant to PHEP and structured so that they track and assess improvement. A useful approach for stating performance goals is the SMART method, i.e., make sure that goals are specific, measurable, achievable, relevant, and time-bound. It is also important to match performance goals to the appropriate level (e.g., specific process, organization, state, or federal level).

Measuring and documenting key processes is essential to QI. Measurement of key processes should be widespread and documented. Measurement for routine processes, such as surveillance and disease-reporting, training, and lab functions, can be replicated and expanded to other routine processes. AARs for drills should be structured using a template, to facilitate the recording of consistent data.

Implementing QI practices systematically and rigorously is difficult, but essential. HD staff needs to become more systematic in their use of QI practices. It is helpful to use specific QI practices matched for the type of process to be improved. Routine processes are well suited to cyclical improvement practices. ICS training is being used to improve emergency response, although it should be considered the beginning, not the end, of QI practices.

Information from AARs will be more likely to be used to drive process change and set up the next measurement cycle if formalized procedures are implemented to do so. For each problem identified by the AAR, HD staff should identify the work process(es) or capability(ies) involved in the problem, create SMART goals to address the problem, and design focused drills or mini-exercises to test the changes implemented.

State efforts to facilitate QI for PHEP at the local level should be emphasized. State HDs were very valuable QI facilitators. States should foster collaborative structures among LHDs; assist LHDs with measurement; disseminate best practices; provide training; and coordinate resources.

Federal grants should incentivize QI at the state and local levels. Federal grant guidance should require state and local HDs to engage in QI and should be structured to create incentives for such engagement and to show improvement. Guidance could include specific language for developing goals and measures that facilitate improvement; supporting information-technology infrastructure to measure for improvement; training the public health workforce in QI strategies; and providing tools to incorporate lessons learned.