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TECHNICAL REPORT

Public Health Preparedness in California: Lessons Learned from Seven Health Jurisdictions

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Preface:

Our nation's public health infrastructure is in critical condition. In part, it has been the victim of its own success. Ironically, the complete or near eradication of polio, measles, and other infectious disease made public health departments targets for federal, state, and local budgetary axes.

The tragic events of 9/11, coupled with the advent of a new series of infectious diseases – including SARS, West Nile Virus, and Monkey pox – have brought new attention to the role of public health and with it new funding to combat threats of a bioterrorist attack or a devastating infectious disease outbreak. Policy makers at all levels of government are now in the process of taking stock of the public health system's capabilities and shortcomings. Are we adequately prepared to respond to a wide range of public health threats? How can we ensure that the public health infrastructure provides individuals living in different communities the proper level of protection from infectious diseases, the assistance they need in combating chronic diseases, and with access to health promotion and disease prevention services? Are there ways in which we can improve the effectiveness and efficiency of the public health system?

The research presented in this report contributes to answering these and other relevant questions. The audience for this report includes federal, state, and local public health policy makers. However, it also includes health care providers, community-based organization, businesses, and schools because a robust public health system must rely on these institutions and organizations as well as public health departments and other government agencies.

The research was sponsored by the California Endowment and Kaiser Permanente. The report is based on research conducted under the auspices of RAND Health, a unit of the RAND Corporation.

Executive Summary

The deterioration of the nation's public health infrastructure has been widely recognized. However, not until the terrorist attacks on the World Trade Center in New York and on the Pentagon on September 11, 2001, and the subsequent anthrax attacks were any large-scale investments made in the public health infrastructure. Such investments present an unprecedented opportunity to strengthen the public health infrastructure to respond to a variety of threats, ranging from bioterrorism, to the threats posed by a growing chronic disease epidemic, or by environmental contamination. The Little Hoover Commission, an advisory body to the California state legislature, asked the RAND Corporation to assess gaps in California's public health infrastructure, beginning with an assessment of preparedness for a public health emergency manifested as a contagious infectious disease. Note that there are currently neither established standards for preparedness nor agreed-upon methods and measures for assessing it.

California is, in many respects--including its size, geography, and ethnic diversity--unique. Yet, as in some other states, California vests considerable discretion and authority with local public health jurisdictions. For this and other reasons described in the report, we have focused our analysis at the local level. We conducted seven site visits and tabletop exercises focused on public health preparedness for a contagious infectious disease (smallpox). In two additional jurisdictions, we conducted site visits and piloted a tabletop exercise focused on preparedness to address the diabetes epidemic. Despite the differences between California and other states, we believe that our findings may be of interest to public health officials and other stakeholders beyond California's borders.

RAND used multiple methods in conducting this assessment. We reviewed the CDC [Centers for Disease Control and Prevention] Local Preparedness Capacity Inventories that were completed in late 2002, and we conducted a series of site visits and tabletop

exercises from March 2003 through November 2003^a. California received its first allocation of preparedness funding from the CDC in early 2002, and the remaining funding in 2003. Most jurisdictions were receiving their initial funding allocations during the time this study was being conducted.

It is important to keep in mind that this study was conducted at a time of massive budget deficits in California, and public health agencies were being asked to commit significant resources to preparedness activities, including the development of smallpox preparedness plans.

Key Findings and Conclusions

1. Despite a slow start for receipt of CDC-related funding at local levels, each of the jurisdictions we studied has undertaken significant preparedness activities.

Some of these activities have been related to national--CDC and the Department of Health Services--efforts; others have been in conjunction with the California Governor's Office of Emergency Services. They have included general preparedness planning, development of smallpox plans, and identification of an individual to serve as the bioterrorism coordinator. All of the jurisdictions we studied report the ability to receive emergency messages from California's Health Alert Network (CAHAN).

2. There is widespread variation in the ability of local health jurisdictions to respond to infectious disease outbreaks and other public health threats. Public health jurisdictions vary significantly in their organizational arrangements, size, scope, understanding of their responsibilities, leadership quality, and available resources. As a result, California residents do not enjoy an equal level of protection against a wide array of public health threats, even after real or perceived differences in health risks faced by residents of different locales are accounted for. Although our analysis focused on public

^a We conducted seven site visits and tabletop exercises focused on public health preparedness for a contagious infectious disease. In two additional jurisdictions, we conducted sited visits and piloted a tabletop exercise focused on preparedness to address the diabetes epidemic.

health preparedness, we also found similar variation in activities aimed at addressing chronic disease. Some jurisdictions report that they do “nothing,” whereas others have quite robust programs. In our judgment, not all jurisdictions possess the minimum capabilities to respond to and protect the public during a contagious disease epidemic such as the one presented in the tabletop exercise.

3. Considerable ambiguity surrounds the appropriate role(s) for a local health jurisdiction vis-à-vis other local agencies with a stake in emergency preparedness and the State Department of Health Services. We found that, for some key activities, there is currently little agreement about *what* local health jurisdictions should do when faced with a public health emergency—as well as *how* they should do it. The perceived overlap in some functions between the Department of Health Services, the Governor’s Office of Emergency Services, and the Emergency Medical Services Authority adds to this ambiguity.

4. Despite differences in the size and organization of the public health jurisdictions studied, many of the perceived gaps identified in relation to preparedness were similar. Such perceived gaps include training of existing public health staff to assume “backup” roles in the event of an outbreak; strategic planning; community health assessment; workforce needs, particularly in the areas of epidemiologic and laboratory capacity; and access to legal consultation on public health law. In addition, all jurisdictions identified the need for a robust information system that would automate regular disease reporting from labs and hospitals; receive and map new cases in the event of an outbreak; and serve as a tool to manage outbreak investigation, contact tracing, and vaccination or prophylaxis if necessary. Finally, the reality of large numbers of uninsured Californian’s creates additional challenges in planning for and managing the public’s health issues during an outbreak.

5. Despite a year of intensive planning for a smallpox epidemic, we found substantial variation in the approaches taken to a hypothetical smallpox outbreak in the jurisdictions we studied. Some of the variation we observed reflected legitimate differences in interpreting public health evidence or different approaches to handling the

scenario presented (e.g., when to communicate with the public), while other differences reflected a surprising lack of knowledge (e.g., about the disease itself, laboratory testing, and/or the smallpox vaccine) or incomplete post-event planning (e.g., who to vaccinate, when vaccination should begin, or uncertainty about designated vaccination sites).

6. In most jurisdictions we studied, involvement of those community groups that particularly serve underrepresented minority groups in public health preparedness efforts is significantly lacking. Some public health jurisdictions we visited had incomplete knowledge of exactly where minority population groups were or how to reach and communicate with them, despite the fact that, historically, poor and minority populations are some of the most vulnerable in an infectious disease epidemic. While these groups may be involved in other public health activities, they were not involved in preparedness planning in the jurisdictions we visited. Unless such groups are regularly incorporated into the planning process, it is likely that preexisting issues such as poor communication and distrust of government will be exacerbated during a public health emergency. This exacerbation could, in turn, make disease containment more difficult to achieve.

7. Strong, central leadership and coordination of public health appear to be lacking. We did not find substantial evidence to suggest that health departments we visited thought they could rely on the California Department of Health Services to address needs common to many jurisdictions, or that there was strong central leadership to facilitate coordination or sharing of resources. At least with regard to preparedness, such lacks result in a fragmented system in which each jurisdiction must fend for itself. Few jurisdictions believe that they can count on the Department of Health Services in an emergency. The state public health laboratory may be an exception.

8. The current organization of public health preparedness activities in California leads to redundancies and inefficiencies. Because each public health jurisdiction is required to complete a set of core preparedness activities, many

jurisdictions are engaged in parallel activities. However, they do not routinely have the benefit of learning from one another or sharing resources. Both efficiencies of scale and a greater degree of standardization could be obtained if jurisdictions were to share resources to a greater extent or if some functions were, in some sense, regionalized. More engaged and concerted leadership from the State Department of Health Services will be important in improving efficiency. Absent additional involvement from the Department of Health Services in the areas of technical assistance and coordination, smaller health jurisdictions are handicapped because they do not have the staff breadth and expertise to comply with many of the requirements efficiently and effectively.

9. Border and jurisdictional issues need attention. Epidemics know no borders. It is unlikely that a highly contagious infectious disease, especially one that is introduced deliberately, will be confined to one public health jurisdiction. Although some attempts are under way to promote collaboration across neighboring jurisdictions--including the establishment of a system of six Regional Disaster/Medical Health Coordinators and Specialists--formal public health mutual aid agreements are virtually nonexistent, and there is often poor communication between jurisdictions. This is particularly the case for some rural jurisdictions (to which at-risk populations might flee) and their proximate urban jurisdictions, and jurisdictions at or near state or other national borders.

10. Public health preparedness may have a hidden cost. There was substantial evidence that reassignments of staff to accomplish preparedness functions, as well as cuts to public health budgets at a county level that have resulted from the current fiscal pressures, are compromising other public health functions. Multiple examples of retrenchments in essential programs (such as sexually transmitted disease and tuberculosis contact tracing, or teen pregnancy prevention programs) were provided during key informant interviews.

11. Estimated additional annual costs statewide of filling the “preparedness gap” range from \$72 to \$96 million. These estimates relate exclusively to the preparedness function. They do not account for other pressing public needs in many local public health

agencies, nor do they consider economies of scale that could be achieved through reorganization. Recent federal government investments in public health have begun to address long-neglected local public health infrastructure needs. Additional investments will be required in the future to shore up and modernize local public health systems.

12. Investments in the public health infrastructure addressing preparedness concerns create an important base on which to build a stronger public health system at the local and state levels. Improvements in the public health infrastructure resulting from the recent investments in preparedness create an unprecedented opportunity to strengthen public health. However, countervailing pressures, which stem largely from California's fiscal crisis, place the likelihood of capitalizing on this opportunity at risk.

Recommendations

1. Create a high-level commission or work group to examine alternative ways of reorganizing public health in California and to develop a shared understanding of what public health is and does. Such a commission or work group should be composed of state and local public health officials, representatives from community-based groups (especially those serving minority populations), health care providers, and academic experts, as well as state and local political leaders. Not only preparedness for an infectious disease outbreak but also preparedness for the growing epidemic of chronic disease require collaborative approaches among public health agencies, public and private organizations, and specific at-risk communities. Until recently, such collaboration has generally been lacking in California's public health planning. The role of strong, central leadership focused on public health at the state level and the nature of state-local relationships, should be key components of such a reexamination. At least in the short run, centralization and regionalization of some functions, and sharing of resources among others, will likely lead to greater effectiveness and efficiency. However, any process that involves rearranging responsibilities is likely to be contentious and will need to account for the political realities of state and local jurisdictional control and funding. Hence, the process for conducting such an examination must be fair, evidence-based, and neutral, and have as its overriding goal a system that most safely and

efficiently protects and improves the health of the public across the entire state^b. For public health to be truly prepared to address the full range of health threats and factors that influence community health it must reach outside its current organizational boundaries and the limited public health improvement strategies associated with bioterrorism preparedness. Programs in place in other states may be useful in this reexamination^c.

2. A set of objective performance measures for preparedness should be developed, implemented, and refined as needed. Preparedness in jurisdictions should be regularly exercised based on these measures. Such a system would clarify expectations and responsibilities for local public health agencies and ensure accountability. Any effort to develop performance standards and to hold public health accountable should factor in the broader vision of public health that encompasses not only official public health agencies but also the community partnerships that make up the public health system. Ultimately, such a measurement system might extend beyond preparedness to other aspects of public health.

3. Improve the statewide epidemiologic information system. A robust information system is the backbone upon which coordinated public health activities should be built. During a disease outbreak, such a system would be used to receive automated reports from hospital and commercial laboratories; manage a public health emergency, including mapping, managing and monitoring the status of contact tracing and other investigative activities; and administer and monitor vaccination or prophylaxis activities. The system should be interoperable at least throughout the state, if not the nation.

4. Generate increased community involvement in preparedness activities. Community organizations of all types, including minority-serving community organizations, schools, and large employers, need to be a part of the preparedness

^b One measure of the historical lack of political support for many working in public health is that bioterrorism funding is the single most significant investment in basic public health infrastructure that they have seen in their professional careers.

^c For example, Washington and Illinois, unlike California, have public health improvement plans. Michigan has begun a process of accrediting local health agencies as a first step to improving public health.

process, as they are in some jurisdictions for other areas of public health. This is the case both for planning efforts and, in the event of a public health emergency (whether natural or man-made), implementation activities. Furthermore, community organizations play important roles in advocating for public health activities. At this point, such organizations have been largely overlooked. Specific performance measures should address their involvement. The need for community involvement in public health activities is obviously not confined to preparedness; indeed, community collaborations are critical to the success of most public health activities. More work is necessary to understand what the critical capacities of community organizations are and how they can be achieved.

5. Maintain a highly skilled public health workforce in California. Investment in training is needed for existing public health staff at all levels, from leadership development and Incident Command Structure training, to cross-training public health professionals to fulfill critical functions during a public health emergency. Such training could occur in an efficient and effective way through coordinated planning and sharing of resources. Salary structures and archaic hiring practices in most communities will need to be revised if local health jurisdictions are to be successful in recruiting and retaining highly qualified staff.

6. Workforce planning must occur at both a local and statewide level. In virtually all jurisdictions, key members of the workforce are aging into retirement and there is little evidence of succession planning. In addition, reassignment of key staff to preparedness functions has created workforce shortages in other areas, and many local hiring practices prevent hiring individuals in time to have them work side by side with the individual whose position they will assume. Because of overall workforce shortages, local jurisdictions are competing with one another for scarce human resources, with little regard for how human resources might be used most efficiently. As part of the planning process, county governments in which public health agencies reside should be held accountable for addressing hiring impediments.

7. Public health departments must become better linked with the health care delivery system. Public and private health care providers and the institutions in which they deliver care have critical public health responsibilities. Before an outbreak is known and after it is suspected, they must participate in surveillance activities to detect and define the outbreak's scope. They also must be incorporated into strategies for community wide preparedness planning and training.

8. An evaluation of public health preparedness and gaps at the state level will be essential to understanding more fully the preparedness issues identified in this study. Such an analysis could be considered as part of the background work required to contemplate a reorganization of public health in California.

9. Additional studies are needed to more broadly fill the knowledge gaps regarding the public health infrastructure. Such studies would not confine themselves to preparedness but would include in-depth observations of public health responsibilities, identifying gaps and what is required to fill them, and developing reliable and valid measures of performance of public health systems at state and local levels.

10. Additional resources will be necessary to improve public health preparedness and to improve local public health systems. Our current estimates examine only the additional resources needed to improve the preparedness functions that local public health agencies are expected to engage in to protect against infectious disease outbreaks. But in the jurisdictions we studied, we also found evidence that additional resources are needed to assure that essential public health services are available in all locales in the state to cover the wide range of new and old health threats the people of California face on a daily basis.

Limitations

This study has several important limitations. First, because there are no agreed-upon standards for public health preparedness, we had to rely on participants' perceptions for both the adequacy of the status quo and the size and nature of the gaps that needed to be filled. Although our exercise methodology provides a high degree of realism, we cannot guarantee that self-reported assessments of gaps in services and capabilities are valid.

Second, we did not account for potential economies of scale that could be realized through increased efforts on the part of local health jurisdictions, as well as the State Department of Health Services, to share resources. In our view, substantial increases in overall efficiency can be gained through reorganization and sharing of activities and resources.

Third, we made no assumptions regarding the possible impact of new technologies on preparedness costs. Such technologies could tend to either increase or decrease costs, so we remain neutral on this issue.

Fourth, we did not measure any possible resource gaps at the state level. At this point, we can only speculate about how changes in state-level public health infrastructure investments would affect local infrastructure costs.

Finally, our analysis focused on seven of the state's 61 health jurisdictions. It did not include a detailed look at activities that may be sponsored by other state-level agencies, such as the Emergency Medical Services Authority or Environmental Protection, or at Department of Health Services-sponsored initiatives, except as they are perceived locally. However, the study jurisdictions, which account for 39 percent of California's population, were selected to be broadly representative of all state health jurisdictions in terms of size (area and population), geographic distribution, minority populations, and per-capita public health expenditures obtained from census data, as well as budget information obtained from the jurisdictions' websites. We also note that Los Angeles,

which accounts for a large share of the state's population, receives public health funds directly through the CDC, not through the California Department of Health. As a result, it has considerably more autonomy and flexibility than do other jurisdictions. Although we believe that many of our findings apply to health jurisdictions above and beyond those included in the study, the true level of generalizability is not known.

Background:

America's public health infrastructure is in disarray. Its weaknesses have been widely recognized since the 1988 Institute of Medicine Report on the Future of Public Health (IOM, 1988). The impressive achievements of public health over the past century, and their accompanying improvements in longevity among all sectors of the American public, have created a sense of complacency about the underlying public health infrastructure, which has deteriorated markedly over the past 25 years. Although some progress was made in the 1990s, the Centers for Disease Control and Prevention (CDC) declared in a 2001 report that the U.S. public health infrastructure remains "structurally weak in nearly every area" (CDC, 2001).¹ Not until the terrorist attacks on the World Trade Center in New York and on the Pentagon on September 11, 2001, and the subsequent anthrax attacks were any large-scale investments made in the public health infrastructure.

Since then, Congress has allocated approximately \$3 billion over a three-year period to rebuild the infrastructure, largely through CDC-administered programs focused on public health agencies.² A companion program, administered by the Health Resources and Services Administration (HRSA), addresses hospital preparedness concerns.³ Although the CDC's primary goal is to enhance the nation's ability to detect and respond to a bioterrorist attack, an additional goal is to improve the ability of public health systems to address other health threats, particularly those related to infectious diseases--a goal sometimes termed "dual use." As stated by the CDC's Bioterrorism Supplemental Funding Cooperative agreement, "Our nation must ensure that all state and local public health organizations have a strong infrastructure and are prepared to respond to bioterrorism, outbreaks of infectious diseases, and other public health threats and emergencies through comprehensive planning, training, and evaluation" (CDC, 2003).⁴

In the first two years of this investment, state and local public health agencies have responded to a set of mandates from the CDC that are intended to strengthen public health preparedness, and they have prepared specific plans to detect and respond to a

smallpox attack. A new report from the General Accounting Office indicates that states have only partially satisfied these mandates (GAO, 2004)⁵.

Although the focus of the investment has been on preparedness, it is important to recognize that public health preparedness is linked to the broader mission of public health. Ultimately, the ability to sustain preparedness will depend on assuring that other aspects of the infrastructure, such as an appropriately trained workforce with adequate resources at their disposal to conduct their work and partnerships with community-based organizations, are strong.

In late 2002, the Little Hoover Commission (an advisory body to the California state legislature) approached RAND Corporation and asked it to undertake a project aimed at identifying gaps in California's public health infrastructure. Because of the magnitude of the task and the urgency of first addressing preparedness for a natural or deliberate infectious disease epidemic, RAND undertook a phased approach. The first phase is an assessment of public health preparedness. As time and funding permit, subsequent phases will examine other dimensions of the public health mission to protect and improve the health of communities. The California Endowment has generously supported the first phase of this work. The following are the overall goals of the first phase:

- 1) To review existing standards for preparedness and to assess how well California meets those standards.
- 2) To estimate the gaps in the infrastructure with regard to preparedness.
- 3) To estimate the costs of filling the gaps.

In undertaking this work, both RAND and the California Endowment agreed that preparedness is only one of a myriad of issues addressed by public health agencies in California and nationwide. It is not immediately obvious that a jurisdiction that is prepared to deal well with one type of problem (e.g., infectious disease outbreaks) is prepared to deal with others (e.g., chronic disease epidemics, increasing community immunization levels, or environmental contamination). Hence, within the constraints of available resources, RAND agreed to undertake pilot work in at least one other domain

addressed by the public health infrastructure. In consultation with the California Endowment and staff of the Little Hoover Commission, we identified chronic disease as the additional domain.

Chronic disease is particularly salient because the epidemic of chronic disease has already begun, and its predicted impacts on the health of individuals, communities, and the health care system are enormous. Because the California Department of Health Services was completing a diabetes control and prevention plan as we began our work, we used diabetes as an exemplar for addressing a chronic disease threat. An additional area of interest and concern, based on prior work of RAND, the California Endowment, and others, is the importance of involving and addressing needs of underrepresented minority communities in public health activities. Because this issue is of particular salience in California, we explicitly examined how the infrastructure performed in outreach to and inclusion of minority-serving community-based organizations, using the window of preparedness to get a more complete picture of outreach and inclusion in other public health areas.

Early in the process, the RAND investigators met with members of the Health Officers Association of California (HOAC), California Conference of Local Health Officers (CCLHO), and County Health Executives Association of California (CHEAC) and put in place a process for keeping them informed of our progress. We also established an Advisory Committee consisting of HOAC/CCLHO members, with whom we discussed challenging issues.

Insurmountable difficulties in obtaining source materials made it readily apparent at the start of the project that it would not be possible to conduct a comprehensive assessment of the public health infrastructure, even for preparedness, at the state level^d. However, it was also apparent that, in the end, public health emergencies occur and are responded to on a local level. We therefore focused this study on the local public health infrastructure. The California Endowment concurred with this approach.

Methods

Overview

In California and many other states, public health functions are fulfilled by local jurisdictions, reflecting the preeminence of county governments. In most cases, County Supervisors serve as the local boards of health. In Los Angeles County, there are two city health jurisdictions (Long Beach and Pasadena), in addition to the county. Berkeley is also a separate public health jurisdiction within Alameda County. In addition to its statewide functions, the California Department of Health Services provides basic public health services for counties too small to organize a local health agency.^e

Our initial review of preparedness measures revealed that there are no national standards for what the public health infrastructure should look like, and no established methods for assessing such an infrastructure. Nor are there national standards for the overall public health infrastructure or for the domain of public health preparedness. Therefore, we

^d First, this was not a study initiated by the California Department of Health Services, and for the most part, key individuals were unwilling to be a part of or facilitate this assessment. Furthermore, in investigating the availability of source materials, it became clear that there is no single place where information about county health departments resides. Contracts dealing with different functions of local health departments are kept in separate places (even in different cities), and it was not even feasible to enumerate which source material existed, let alone get access to it. There is no clearly understood consolidated public health budget for California counties, and it is not possible to obtain comprehensive information from a single or even a few places. There does not seem to be a single individual, or a single office, with responsibility for coordinating the activities of local public health agencies. With regard to preparedness, we did, review the DHS Interim Progress Reports to CDC, which document activities accomplished with the CDC preparedness grants, but we were unable to interview key individuals to learn more about their perspectives of what was in the report.

^e In most counties public health agencies develop a set of partnerships with community agencies and other governmental agencies to accomplish public health activities (e.g., sanitation, air and water quality). These activities, aimed at preventing disease, prolonging life, and promoting health constitutes what most consider to be ‘public health.’

developed and applied a combination of methods to examine public health preparedness in California, including (1) a review of existing preparedness measures and an evaluation of the evidence supporting them, (2) use of an expert panel to develop a set of performance measures for use during the project, (3) a review of the *CDC Local Capacity Inventories* completed by California counties, (4) in-depth site visits and key informant interviews, (5) the development and use of a tabletop exercise, and (6) reviews of local public health agency budgets. Each is discussed below.

We used the framework of the Ten Essential Public Health Services for our work. This framework had been developed by the public health community and endorsed in the recent Institute of Medicine report on *The Future of the Public's Health in the 21st Century* (Table 1).

Table 1: Essential Public Health Services

1	Monitor health status to identify community health problems.
2	Diagnose and investigate health problems and health hazards in the community.
3	Inform, educate, and empower people about health issues.
4	Mobilize community partnerships to identify and solve health problems.
5	Develop policies and plans that support individual and community health efforts.
6	Enforce laws and regulations that protect health and ensure safety.
7	Link people to needed personal health services and assure the provision of health care when otherwise unavailable.
8	Assure a competent public health and personal health care workforce.
9	Evaluate effectiveness, accessibility, and quality of personal and population-based health services.
10	Research for new insights and innovative solutions to health problems.

(1) Review and evaluation of preparedness measures: First, we reviewed existing measures of public health preparedness. Our review documented the lack of consensus regarding how to measure public health preparedness as well as the lack of evidence to support most existing preparedness measures. Table 2 summarizes these measures, and

the components of preparedness they address, arranged under the public health service in Table 1 to which they most readily relate. A copy of the full analysis is available from the authors upon request.

TABLE 2	Study*																									
Essential Public Health Service	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
#1: Monitor health problems to identify and solve community health problems																										
Disease reporting: complete																										
Timely																										
Compliance																										
Syndromic surveillance																										
Capacity to receive/analyze data																										
Facility hazard assessment																										
#2: Diagnose and investigate health problems and health hazards in the community																										
Information system capacity:																										
Health alert network																										
24 hour/ 7 day capacity																										
Active surveillance																										
Epidemiologic capacity																										
Laboratory capacity																										
#3: Inform, educate, and empower people about health issues																										
Reports on community health																										
Information officer																										
Contact list																										
Preprinted materials																										
Website																										
Risk communication protocol																										
#4: Mobilize community partnerships and action to identify and solve health problems																										
Partnerships:																										
With healthcare providers																										
With public safety/ EMS																										
With community organizations																										
With media																										
#5: Develop policies and plans that support individual and community health efforts																										
Emergency response plan:																										
Testing of plan																										
Plan integrated regionally/state																										

	<i>Study*</i>																									
Essential Public Health Service	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
#6: Enforce laws and regulations that protect health and ensure safety																										
Clear and relevant laws exist																										
Process to review/ update laws																										
Law enforcement capability																										
Legal counsel available																										
#7: Link people to needed personal health services and assure the provision of health care when otherwise unavailable																										
Resource assessment																										
Resource management																										
Plan for hospital surge capacity																										
Plan for medication, supplies And personnel from region/state																										
Treatment facilities designated																										
Vulnerable group treatment plan																										
Mental health support plan																										
Mass immunization/ prophylaxis plan																										
#8: Assure a competent public and personal health care workforce																										
Workforce written tests																										
Workforce drills																										
Workforce training																										
Workforce credentialing																										
#9: Evaluate effectiveness, accessibility, and quality of personal and population-based health services																										
Evaluate emergency plan																										
Evaluate partnership activities																										
Evaluate staff knowledge																										
Evaluate drills																										
Quality improvement process																										
#10: Research for new insights and innovative solutions to health problems																										
Identify and apply research findings																										

* Each column represents one of the 25 studies, or instruments, that was selected for review.

Two instruments deserve particular mention. One is a measure that has been developed and pilot-tested by the Health Officers Association of California and is similar to the draft National Public Health Performance Standards. The goal of that instrument is to examine the public health infrastructure more broadly; it does not focus specifically on preparedness. The other is the CDC *2002 Local Preparedness Capacity Inventory* (discussed more fully in (3) below). This inventory was completed by each of California's local public health agencies late in 2002, and the results were sent to the California Department of Health Services. Because these instruments were used to collect data on each local health jurisdiction in California, we focused particular attention on them.

We identified the measures common to more than one instrument listed in Table 2 and added to them the Critical Benchmarks for preparedness developed by the CDC and HRSA for their cooperative agreement programs. We organized these measures according to the Essential Public Health Service to which they were most closely related.

(2) Expert panel: We formed an expert panel to guide our work in this project. The panel was composed of a broad array of public health experts, individuals known and respected by their peers and the broader community for their expertise in areas of public health organization and measurement, use of media, linkages between public health and the health care system, and linkages between public health and communities. Two-thirds of the panel members were from California. Representatives from the CDC and the Health Resources and Services Administration (HRSA), as well as the California Endowment, joined the panel as observers. A listing of panelists appears in Appendix A.

The role of the panel was to provide advice about the measurement aspects of the study: the development and use of performance measures and the economic analyses, among others. With regard to the performance measures, we asked the panelists to review our synthesis of the existing performance measures, and to assess their importance and feasibility. However, unlike the typical RAND expert consensus panels,⁶ we did not ask panelists to review the evidence base supporting each measure, because no substantial

evidence base exists. Panelists rated both the importance and feasibility of measurement on a scale of 1 to 10, with 10 having the most importance or highest feasibility. We retained only those measures scoring 8 or higher on importance and 5 or higher on feasibility. We used these as an “interim” set of measures. (These measures will be refined on the basis of evidence gathered for this study.) These measures helped guide the site visits and exercises described below.

(3) Review of local capacity inventories: As mentioned above, one of the measures identified in our review was the CDC’s *2002 Local Preparedness Capacity Inventory*. In 2002, each county was asked to complete this document and send it to the California Department of Health Services. Because the County of Los Angeles receives funding directly from the CDC, it is not required to complete this version of the inventory. We also reviewed the state’s capacity inventory that it completed. The Department of Health Services promised counties confidentiality in return for completing the inventory; hence, we were required to contact each county directly to obtain permission to review the inventories. We received copies of completed inventories from 41 of the 60 potentially responding health jurisdictions. All but two of the non-responding jurisdictions were small and rural. The primary reasons given by respondents from counties that did not provide their inventories were concerns that the county’s security might be jeopardized or that sharing these inventories would result in adverse media criticism; or that they did not know whose permission should be obtained to release them to us; or that the inventories could not be located. We cannot ascertain whether the nonresponding counties actually completed their inventories for the state. It is important to note that these inventories were completed in fall 2002, which is prior to the time that the CDC public health preparedness funding had reached the local level. Therefore, they provide some documentation of the status of preparedness activities at the county level before funding was received and before concerted preparedness efforts were begun.

(4) Site visits: Our first step was to choose the locations for site visits and exercises. Public health policy is typically implemented on a local level, so we focused our assessments on the local level. California has 61 local public health jurisdictions. To

accurately represent the range of variations, we chose eight jurisdictions to cover a spectrum along several dimensions: geography (urban, rural and border status), population size (large, medium, and small), demographics (especially ethnicity and socioeconomic status), and organizational status (independent versus contracts public health functions back to state). Seven jurisdictions agreed to participate.^f Together, these seven public health jurisdictions comprised 39 percent of the statewide population. In addition, we selected two jurisdictions as pilot sites for the diabetes component of our work (see Appendix B for further discussion of diabetes). Each of the jurisdictions is identified in Figure 1.

^f One site declined to participate in the site visits and exercises, citing a prior adverse experience with media participation in an exercise as the reason.

Figure 1.



We conducted two-day site visits in each jurisdiction. On the first day, we interviewed key informants, including, but not limited to, the public health director, the health officer, the bioterrorism coordinator (where one existed), the director of public health nursing, the director of communicable disease control, a senior epidemiologist, a fiscal manager, a local political official, representatives of the clinical (doctor or hospital) community, as well as senior officials from police, fire, and emergency medical services departments. We also asked to speak with representatives of community-based organizations participating in preparedness planning and response efforts. Specific interviewees varied by site. These interviews provided information about how the public health system was organized and financed, preparedness plans and progress to date, and the challenges faced in developing a public health preparedness plan in the face of other health department responsibilities. Interviews were semi-structured, using a standardized protocol, and interviewees were assured confidential handling of their responses. Each interview lasted approximately one hour. A copy of the interview protocol is shown in Appendix C. During the site visits, we also collected relevant documentary material and provided each health jurisdiction's fiscal manager with a budget template that he or she was asked to complete and return to us for analysis. The template included line items for all typical public health expenditures.

(5) Development and use of tabletop exercises: Since direct observation of the level of preparedness is impossible unless there is an actual public health emergency, we must rely on indirect methods. We therefore developed a tabletop exercise^g designed specifically to assess how jurisdictions were able to fulfill the Essential Public Health Services, focusing on the measures endorsed by our expert panel. We conducted the exercise on the second day of the site visit. We selected a tabletop exercise over a functional test because it is less resource-intensive and disruptive; because it can be conducted privately, without media attention; and because there is no evidence to suggest

^g A tabletop exercise is an exercise of a few emergency management functions, held within classroom or meeting place setting and focused on training rather than testing; types of tabletop exercises are: *basic tabletop*: problems solved by group process; *advanced tabletop*: play revolves around delivery of pre-scripted messages. A functional exercise is an exercise designed to evaluate the capabilities of the emergency response system and conducted at the site where the activity would normally take place. ⁶ (Gebbie, 2004)

that the additional benefits associated with conducting a functional test are worth the costs. The exercise, based on a hypothetical smallpox outbreak, uses RAND's "Day After" methodology, in which participants react to a scenario set in the future, and at the end return to the present to do analysis and strategic thinking. The exercise was pre-tested in two East Coast sites prior to this study.

In each jurisdiction, two facilitators followed a written discussion guide, tailoring the discussion to the group's response in each step of the exercise; a third individual took detailed notes on all aspects of the discussion.

The public health director and health officer in each jurisdiction were asked to participate in the exercise, and to invite other participants, based on the nature of their communities. They received guidelines regarding the types of individuals to be invited (bioterrorism coordinator, public health nurse, lab director, local hospitals and doctors, local disaster relief agencies, minority-serving community organizations, elected local officials, schools, and representatives from fire, police, emergency medical services), but individual invitations were left to their discretion. We aimed for, and generally obtained, a group size of 15 to 18 participants. Participants were assured that neither their nor their jurisdiction's responses would be individually identified without express written permission.

The exercise, which is provided in Appendix D, consisted of three steps. In the first step, participants are confronted by three separate case reports that might be consistent with smallpox, in the context of a heightened national terrorism alert. They are asked how they would respond to the case reports, begin an investigation, collect and transport biologic samples from patients to the appropriate laboratories, involve other partners as they deem necessary, activate an emergency operations center, and communicate with the public and other political authorities, if they think these actions are appropriate. In the second step, participants are confronted with confirmed cases, increasing numbers of sick people, up to 2,000 exposed individuals, and a panicked population. They are asked about isolation and quarantine and its enforcement, legal authorities to act, plans for

vaccination and delivering care to those in need, crowd control, and ongoing public communication. In each of the first two steps, after participants responded to the specific problems posed by the scenario, they were asked to discuss how the problems presented in the scenario related to their infrastructure more broadly, including existing public health assessments of their community and its residents, programs and policies for infectious disease surveillance and reporting, communication with the clinical community and the media, and relationships with first responders and other community partners.

In Step 3, participants were asked to self-assess (on a scale of 1 to 10) the group's response to the exercise events and the state of their current public health infrastructure, with specific reference to the Essential Public Health Services. They were then asked to rate (a) "where they are," based on what was learned in the exercise, and (b) "where they wanted to be" for each dimension. The difference (or gap) between the exercise results and desired performance was used as a springboard for discussion about what would be required to fill the gap (e.g., human resources, policies and procedures, information technology, communications equipment, supplies, and other resources) and the obstacles to filling it.

Following the exercise, the director of the health department and/or the health officer received a written after-action report that documented the group's responses during the exercise and included an assessment of strengths and areas for improvement. Participating health officials were given the opportunity to review the after-action report, to add content, and to correct anything they believed was misinterpreted or inaccurate.

At the completion of all of the exercises, three members of the study team reviewed each of the after-action reports and rated each jurisdiction's level of preparedness on a scale of 1 (worst) to 10 (best) for each essential public health service, using the interim set of performance indicators as a guide. Raters agreed with one another within one point for each Essential Public Health Service. Most of the disagreements stemmed from incomplete or unclear information in the after-action reports, which were subsequently corrected. Raters then identified which of the interim performance measures seemed

most relevant to assessing performance, and a “short set” of indicators was developed. Two additional raters then reviewed all of the after-action reports and scored them using the short set of indicators. They again agreed within one point on all but one Essential Public Health Service; the disagreement related to an element that inadvertently supported the use of syndromic surveillance.^h Since the evidence that syndromic surveillance systems meaningfully enhance preparedness is inconclusive, that element was subsequently deleted. Representative performance indicators are shown in the left-hand column of Table 3.ⁱ

Although the exercise was based on RAND’s long-standing experience in developing war gaming and conflict resolution techniques, to our knowledge this exercise (along with the pretests in the two East Coast sites) is the first application of the methodology to identify gaps in the public health preparedness infrastructure. As such, it is a previously untested method in public health and may provide an additional approach to enhancing public health preparedness.

Economic analyses: We used data generated during Step 3 of the tabletop exercises to estimate the *incremental costs* associated with improving the public’s protection against infectious disease outbreaks. In Step 3, the difference (or gap) between participants’ perceptions of actual performance on the exercise and desired performance served as a catalyst for a group discussion on the various resources that would be required to fill the gaps, along with the obstacles they would expect to encounter. We specifically considered four categories of gaps: human resources, policies and procedures, technology, and supplies.

Throughout the discussion, the exercise facilitators urged participants to (a) be candid in their assessments of the status quo, in terms of the public health department’s ability to fulfill each of the Essential Public Health Services with regard to preparedness, and (b)

^h Syndromic surveillance systems generally involve the collection and analysis of data on symptoms, as opposed to medical diagnoses, from emergency rooms and other settings where individuals seek health care.

ⁱ The complete set of performance indicators used in the analysis is available from the authors upon request.

be realistic in their assessments of the level of resources that could and should be made available to fill the gaps. For instance, once a resource need was identified, the facilitators asked participants to provide information on how the resource would be used to improve the public health infrastructure, whether there were less-costly alternatives, what they would do without the resource, and whether they could reassign existing staff without compromising other functions. We tried to distinguish between resources needed to enhance preparedness and those needed or desired to strengthen other aspects of the infrastructure that did not bear directly on preparedness. We made every effort to avoid creating a “wish list” mentality among the participants.

Upon completion of the exercises in seven jurisdictions, we developed a spreadsheet showing the types and quantities of resources identified. We then priced each requested resource. In many instances, this task was straightforward. When participants agreed, for example, that an additional epidemiologist was required to support disease investigations, we obtained an appropriate salary estimate for this position and applied a factor of 1.42 to account for the expected costs of fringe benefits. We relied on salary data from two data sources: www.spb.ca.gov and salary.com. The factor used to account for fringe benefits came from salary.com.

The participants often indicated that they required only a portion of an individual’s time to conduct a training program, to complete a plan, or to execute a particular function. In these instances, we relied on our extensive experience in developing cost proposals for a wide range of health services–related projects to arrive at an appropriate cost. For example, in response to a request to “train staff, on an annual basis, to assume as-needed emergency functions,” we assumed that training would require two months of a training coordinator’s time, which translates into an annual cost of \$14,627. This value was derived by taking two-twelfths of a mid-level training coordinator’s annual salary of \$61,806 and multiplying it by the 1.42 benefits markup factor.

In pricing the resource requests, we distinguished between recurring and nonrecurring costs, and amortized the latter over a three-year period. Recurring costs include, for

example, salaries and benefits for full-time employees, and ongoing information system operation and maintenance costs. Nonrecurring costs include computer hardware, salary and other staff costs required to develop various plans, and communications equipment. Thus, we assumed that, after three years, nonrecurring cost items needed to be either substantially updated (e.g., a smallpox plan) or replaced (e.g., an information technology [IT] system server).

Given the inherent uncertainty associated with estimating the costs of “gaps,” we believe that it is appropriate to provide a range of estimates rather than a point estimate. Toward that end, we developed two sets of estimates for the study jurisdictions.

Estimate 1 was developed by pricing all of the additional resources that exercise participants identified as essential to shoring up their public health infrastructures.

Estimate 2 includes costs that are likely to be incurred but that may have escaped notice during the exercise. For example, during our in-person interviews with stakeholders in each of the study health jurisdictions, we repeatedly heard that many health department senior staff devoted significant portions of their time to preparedness activities. Many of these individuals reported that, as a result, they had either dropped other public health functions and services and/or had increased the numbers of hours worked (and often the level of stress experienced in their work life). We accounted for these “opportunity costs” in Estimate 2 by assuming that both the local health officer and a senior epidemiologist would each devote 20 percent of their time to preparedness-related activities and that this additional time would not be covered by any bioterrorism grant.^j In constructing Estimate 2, we also doubled the amount of staff time that we assumed would be required to develop plans and training programs, and we increased the salaries that would be required to fill key health department positions by using the highest estimates contained in our two salary data sources for each of the labor categories.

^j The 20 percent figure was derived from interviews with health department directors and other key health department officials. It represents our best estimate of the proportion of time that the health department director and senior epidemiologist will devote to preparedness-related activities for the foreseeable future. We realize that this figure is likely to be somewhat, if not substantially, higher in the near term and diminish as time goes on.

After developing these two estimates, we compared the costs associated with filling the gaps to (a) budgeted fiscal 2003 bioterrorism expenditures and (b) budgeted overall public health expenditures for each of the seven jurisdictions. To honor the confidentiality assurances we gave participants, we do not provide any information in this report that would identify individual study communities.

In summary, our study relied on multiple data sources and analytic methods. For the most part, our findings and conclusions are based on data generated through the stakeholder interviews and the tabletop exercises. As indicated previously, we used a set of interim performance indicators, which were developed after an extensive literature review and in conjunction with our expert panel, to assist us in rating each health jurisdiction's performance on the tabletop exercises.

Results:

Preparedness Capacity Inventories

Data quality issues precluded a full assessment of the CDC's 2002 *Local Preparedness Capacity Inventories*. Upon review of these data, it became clear that a variety of different officials had completed the inventories and that there were significant omissions. In many cases, respondents skipped entire sections. Other questions asked the respondent to "check all that apply." If no answer applied, the question would necessarily be left blank. When there were substantial omissions throughout the inventory, we could not with certainty determine whether the blanks were deliberate (nothing applied) or the question was simply skipped. We decided to include the response in the denominator if a blank response was immediately preceded and followed by a completed question and to exclude responses in which an entire section was left blank (even if most questions used a "check all that apply" format). In light of these problems, we limited our use of these data to compare responses from jurisdictions participating in our site visits and exercises with those that did not participate in order to gauge the representativeness of the jurisdictions we selected. We could not detect any differences in the pattern of response. We also viewed the responses as providing a

coarse baseline against which local jurisdictions would make progress over the subsequent years of effort aimed at enhancing preparedness.

The following broad themes emerged from the review. At the time the inventories were completed in fall 2002, the level of preparedness planning was low; fewer than 40 percent of jurisdictions for which we had data had included all of the CDC-recommended planning components in their planning processes. Most had not yet assessed their public health or epidemiology workforce, and there was wide variation in respondents' interpretations of the public health authorities covered by state statute, such as the role of the public health department in enforcing quarantines. Of note, most jurisdictions reported having participated in some type of preparedness exercise, most often a tabletop exercise, and nearly all indicated that they had responded to a "public health emergency," although that term was not defined in the inventory. Very few public health directors or bioterrorism coordinators (when there was one) had participated in general leadership or media training; there were similarly low rates of training for preparedness-related functions, such as incident command training.

Site Visits and Exercises

The key informant interviews and exercises provided complementary information. The site visits illuminated areas that needed further exploration during the exercises, and the exercises yielded information that was not apparent during the interviews, particularly with regard to how the system and its key participants would respond to a specific threat. The interviews and exercises took place roughly a year after the counties filed the inventories discussed above. In most cases, local jurisdictions were just receiving their initial allocations from the state.

We found that each jurisdiction has done considerable planning since the state's receipt of the CDC and HRSA grants; interviewees and exercise participants were able to point to progress made in enhancing preparedness and/or in strengthening particular aspects of their infrastructure. For example, all of the jurisdictions we visited report being able to receive messages from the California Health Alert Network (CAHAN), and that it is now

possible for all of them to be on a conference call with state-level staff. Despite this commonality, the exercises revealed wide variations in the level of preparedness.

Overall, raters considered two of the seven counties to be relatively well prepared to respond to a scenario of the magnitude described in the exercise (scores of 9–10 on most services), and one to be particularly poorly prepared (scores of 6 or less on most services). The remainder fell in an intermediate range but exhibited different strengths and weaknesses.

A few factors distinguished those counties that were better prepared from those that were less prepared. Better-prepared jurisdictions tended to be larger, but smaller jurisdictions were not necessarily the least well prepared. Better-prepared jurisdictions seemed to make more flexible use of their staff.

Counties that were better prepared had done more planning, although they did not necessarily have written plans, and had exercised with others, such as police and other first responders. They were clearer about their legal authorities and had strong relationships with the law enforcement community. They had a more complete understanding of who made up their populations and had made efforts to communicate in languages relevant to their communities.

One factor that was clearly important, but extremely difficult to measure, was the leadership qualities of the health officer. Some health officers commanded extraordinary respect from their staff, who trusted them to make appropriate decisions. They sought input from their staff during the exercise, and staff felt comfortable voicing their opinions during the decision making process. At the same time, these individuals were comfortable making decisions, taking actions, and delegating responsibilities to their staff. They had also worked deliberately to develop the leadership capabilities of their staff and had made independent efforts to reach out to other jurisdictions to exchange ideas and materials relevant to preparedness.

Table 3 provides examples of performance indicators and responses to exercise components for each Essential Public Health Service. Because we promised confidentiality to each jurisdiction, we have not identified the jurisdictions. Below is a brief description of our findings in relation to each Essential Public Health Service.

Table 3.

Key Essential Public Health Services Performance Indicators
and Examples of Differences and Similarities Across Jurisdictions

Key EPHS Performance Indicators	Differences Across Jurisdictions	Similarities Across Jurisdictions
EPHS 1: Monitor health status to identify community health problems		
<ul style="list-style-type: none"> • Number of hours/week that a public health professional is available to receive emergency calls. • Ability to receive reports of reportable diseases electronically. • Availability of baseline data to compare new diseases to baseline rates. • Conduct regular community health assessments. • Existence of syndromic surveillance system in the community. 	<ul style="list-style-type: none"> • One jurisdiction would take several days for cases to be noticed and come to attention of health department. • One jurisdiction is so small that it seems unlikely that any case would escape knowledge of the health department for very long. • Only two jurisdictions have done recent community health assessments and have good knowledge of where their vulnerable populations are. • Two jurisdictions have set up syndromic surveillance capacities. 	<ul style="list-style-type: none"> • All jurisdictions report ability to receive case reports 24/7; no system has been tested. • In all jurisdictions, outreach to physicians and hospitals to increase surveillance is underway.
EPHS 2: Diagnose and investigate health problems and health hazards in the community		
<ul style="list-style-type: none"> • Capacity to contact community hospitals and physicians to initiate active surveillance. • Adequate numbers of trained staff to investigate a serious infectious disease outbreak. • Capacity to begin investigating a report of a possible infectious disease outbreak within 12 hours. • Receive notices through CDC's HAN. • Health department have (or have access to) necessary laboratory capacity. 	<ul style="list-style-type: none"> • One jurisdiction can reach over 90 percent of community physicians via email to begin active surveillance. • Three jurisdictions can use blast fax to contact local hospitals and emergency departments but have limited capacity to reach practicing physicians. • One county seemed to lack basic knowledge of how to begin an investigation. 	<ul style="list-style-type: none"> • All could begin an investigation within 12 hours and were confident in their ability to investigate a small number of cases. All but one were limited in their ability to handle larger numbers. Most would rely on "just in time" training of other staff for investigation. • All but one reported significant lab equipment and personnel shortages.

EPHS 3: Inform, educate, and empower people about health issues		
<ul style="list-style-type: none"> • Availability of designated local public information officer. • Presence of preexisting contacts with the local media. • Presence of robust channels of communication to minority groups in the community that can be used in a public health emergency. • Plans in place for dissemination of information to the public. 	<ul style="list-style-type: none"> • Four jurisdictions would notify the public as soon as a suspicious case was taken seriously. Three would only notify the public after a diagnosis was confirmed. • Two jurisdictions had strong preexisting relationships with media, and two had weak relationships. • Only one jurisdiction had strong, preexisting relations with a large number of minority- serving community organizations. • One jurisdiction provides public messages and information in nine languages; one provides information in only one language. 	<ul style="list-style-type: none"> • All jurisdictions had access to a Public Information Officer, but most PIOs were not in the health department. • Five jurisdictions were limited in their capacity to reach minority groups, especially non-English speaking populations.
EPHS 4: Mobilize community partnerships to identify and solve health problems		
<ul style="list-style-type: none"> • Presence of an effective system for getting information <i>to and from</i> health care providers and law enforcement officials. • Evidence of involvement of community-based organization in preparedness planning. 	<ul style="list-style-type: none"> • Two jurisdictions do substantial outreach to physicians and infection control practitioners. • In one jurisdiction, disaster agencies were uncertain about their role; in a second, disaster agencies were prepared to provide clergy and mental health support. Disaster agencies were not expressly involved in other jurisdictions. 	<ul style="list-style-type: none"> • In no jurisdiction had minority-serving community organizations been involved in preparedness planning. With one exception, other community partners, including schools, businesses, and the Red Cross had been minimally, if at all, involved. • Most jurisdictions had a good command of roles played by institutions and individuals in a health emergency. • There were strong ties with EMS/fire/police. All but one jurisdiction had a high level of comfort with simultaneous criminal and epidemiologic investigations.

EPHS 5: Develop policies and plans that support individual and community health efforts		
<ul style="list-style-type: none"> Local health department formally incorporated in the community's emergency response incident command structure. Existing emergency response plan that establishes roles of individuals and community organizations. Plans explicitly cover quarantine and isolation, and mass vaccination. Plans address vaccination of public health and emergency first responders on an as-necessary basis against smallpox. 	<ul style="list-style-type: none"> Two jurisdictions have written plans in place regarding vaccination and transportation of specimens. One jurisdiction, which was among the most prepared, has no written plan or protocol in place. 	<ul style="list-style-type: none"> There are no public health mutual aid agreements with neighboring county health departments. Formal mutual aid agreements for fire and first responders are in place in most jurisdictions.
EPHS 6: Enforce laws and regulations that protect health and ensure safety		
<ul style="list-style-type: none"> Relevant public health laws are widely understood and accepted by law enforcement/first responders and local governance leadership. Legal counsel is knowledgeable about public health law and available to local authorities 24 hours a day/7 days a week. There is a plan for enforcing a quarantine that involves both public health and law enforcement, in which roles and responsibilities are clear. Jurisdictional issues related to PH emergencies have been identified and resolved. 	<ul style="list-style-type: none"> Two jurisdictions assert that the health officer has authority to mandate whatever is necessary to resolve an outbreak. In one jurisdiction, police question this authority. One jurisdiction has legal counsel available on a 24/7 basis; in three jurisdictions, legal counsel is unfamiliar with public health law. In three jurisdictions, protocols are in place for law enforcement to support a quarantine, although guidelines regarding use of force have not been finalized. In two jurisdictions, law enforcement personnel question whether they have the authority to enforce a quarantine. 	<ul style="list-style-type: none"> Most jurisdictions have a very limited supply of security personnel; many security personnel work for the police department and moonlight as hospital security guards. These same individuals are often in the National Guard.

<p>EPHS 7: Link people to needed personal health services and assure the provision of health care when otherwise unavailable</p>		
<ul style="list-style-type: none"> • Identification of surge capacity during a public health emergency in hospital beds, ICUs, isolation, patient transport, and key personnel. • Contingency plans to ensure the provision of vaccine, isolation, quarantine, and treatment to members of vulnerable populations in the case of an infectious disease outbreak. • Explicit plan for mass immunization. 	<ul style="list-style-type: none"> • Two jurisdictions had clear protocols for mass vaccination and quarantine. • One jurisdiction had comprehensively assessed surge capacity. • One jurisdiction had well-developed plans to handle the worried-well. 	<ul style="list-style-type: none"> • Nursing shortage is a serious impediment to adequate surge capacity. • No jurisdiction had clear plans for how to vaccinate or care for disenfranchised populations. • Quarantine and vaccination sites have been tentatively designated in each jurisdiction.
<p>EPHS 8: Assure a competent public health and personal health care workforce</p>		
<ul style="list-style-type: none"> • Ability of public health workforce to operate in a command and control environment. • Backup capacity/ redundancy for key public health staff (e.g., the Health Officer). • Mechanisms to ensure that public health staff can be quickly retrained and reassigned in the event of a public health emergency. • Plans are in place to ensure that nurses and other health professionals who may have multiple employment arrangements are assigned to where they are needed most in a public health emergency. 	<ul style="list-style-type: none"> • One jurisdiction has invested heavily in leadership training for senior management. • One jurisdiction is training non-epidemiologists for investigation and contact tracing; three jurisdictions are developing their own plans for such training. • One jurisdiction has childcare provisions in place to support personnel to come to work during an emergency. 	<ul style="list-style-type: none"> • All jurisdictions have significant training needs with regard to vaccination, contact investigation, relevant laws, use of force, and lab procedures. • All jurisdictions need processes for credentialing volunteers and for licensing out-of-state workers. • Key functions in each jurisdiction hinge on a single individual who is often near retirement. • No jurisdiction has addressed staffing for professionals with multiple employment arrangements.

EPHS 9 & 10: Conduct evaluations of services and research on solutions to PH problems.		
		<ul style="list-style-type: none"> • Funds to conduct evaluations were not included in the CDC grants for preparedness planning. • Most local public health jurisdictions devote few resources to evaluation. • Very few jurisdictions conducted frequent and/or extensive community health assessments. • Preparedness evaluations are even more rare.

EPHS 1: Monitor health status to identify community health problems. Most counties had not performed recent community health assessments, and information about the distribution and demographics of potentially vulnerable populations was incomplete. Only two county public health departments had a firm grasp on where their vulnerable populations were, and only one had mapped them. In some jurisdictions, representatives from police and fire departments appeared to have better knowledge of vulnerable populations than did the health department; in some cases, these entities also had stronger relationships with minority community leaders.

Various efforts were under way to improve disease surveillance in most jurisdictions, but such efforts focused mainly on outreach to the physician community. No jurisdiction had implemented a surveillance system that linked electronically to hospitals, laboratories, and doctors' offices and could be used to manage an epidemic in real time. Jurisdictions varied in their estimates of how long it would take for the three suspicious cases presented in the exercise scenario to come to the attention of public health officers, and for their health department to realize that all three were related. One group of participants asserted that, because their county is small and the medical community is tightly knit, it is unlikely that a suspicious case would escape the health department's attention for very long. Although all counties report that they have the ability to receive case reports on a 24/7 basis, none have tested this capability.

EPHS 2: Diagnose and investigate health problems and health hazards in the community. With regard to initiating an investigation and taking steps to stem the spread of disease, health departments varied dramatically in their ability to rapidly alert the physician and hospital community to a potential outbreak. Methods for reaching local hospitals quickly ranged from using blast fax and email to relying on informal relationships between the public health medical director and hospital medical staff. Only one jurisdiction could quickly reach the majority of its doctors electronically. One jurisdiction seemed fundamentally uncertain about the basics of beginning an investigation. Two jurisdictions pointed out that investigation is, technically, a state responsibility but that the point at which a handoff to the state would occur was unclear. Although all jurisdictions recognized the importance of timely and careful specimen collection and testing, they varied substantially in how they would go about collecting samples, and where they would send samples for analysis. The availability of trained personnel to collect specimens and conduct epidemiological investigations is limited in all counties. Most jurisdictions would rely on public health nurses, who would require training because their regular duties lie elsewhere.

EPHS 3: Inform, educate, and empower people about health issues. All counties had a Public Information Officer, but only a few such officers were attached to the health department. Jurisdictions were split about when they would first communicate with the public about a potential outbreak. Some jurisdictions would notify the public as soon as they began to investigate a suspicious case; others would wait until a diagnosis was confirmed. The ability to reach racial/ethnic population groups, especially non-English speaking populations, varied considerably. Only one county we studied had strong, preexisting relationships with minority-serving organizations. One health department was able to communicate health information in nine languages; another could communicate only in English. There was wide variation in participants' understanding of public health legal authority—both within and across jurisdictions--especially with regard to quarantine and its enforcement.

EPHS 4: Mobilize community partnerships to identify and solve health problems. Most counties have strengthened relationships with police, fire, and emergency medical services over the past two years. Two jurisdictions also have relationships with the FBI. The police in two counties volunteered to share their contact lists of minority community leaders or on-call translators. However, no county we studied had involved minority-serving community organizations directly in preparedness planning. Schools, businesses, and the Red Cross had been involved only minimally. Lack of community involvement was highlighted as an issue by the fact that each jurisdiction was asked to involve minority-serving community organizations in the exercise; none did so.^k

EPHS 5: Develop policies and plans that support individual and community health efforts. Most counties had neither developed nor recently updated a strategic plan. Plans were sometimes more than a decade old. One jurisdiction that seemed more prepared than most of the others had developed and tested preparedness plans, but admitted to having no written protocols in place because time and staff to write them are lacking. Formal mutual aid agreements, which are commonplace in emergency response, were not evident in any of the jurisdictions we visited. Also, the jurisdictions varied widely in the degree of planning for mass vaccination and home quarantine, and most first responders who would carry out mass vaccination have not been pre-vaccinated. Furthermore, while several counties advise their populations to be prepared for 72 hours of home isolation, the extent to which these recommendations are followed is unclear. Policies and procedures for surge capacity for transporting both patients and corpses have not been fully addressed. Policies and procedures that are relevant to counties with bi-national or state-border population issues had not been addressed explicitly. There appeared to be little if any coordination with Mexican health authorities, although regular communications were common.

^k When asked about reasons for non-participation of minority-serving community organizations, responses included not knowing who they were, that problems with choosing one to participate over another would cause political problems, that the organizations were most likely not interested in preparedness, that the organizations had not been previously involved in preparedness planning, and that existing health department staff could represent the concerns of racial/ethnic populations in the community.

EPHS 6: Enforce laws and regulations that protect health and ensure safety. Most counties had identified a source for legal counsel, although that individual was often not familiar with public health law. There was wide variation in the jurisdictions' knowledge of the health officer's legal authority and in the knowledge of public health law overall. One county asserted that they understood the health officer to have the authority to issue a quarantine; however, the police present at the exercise did not believe this to be true. Multiple counties had a very limited supply of security personnel, making surge capacity in the event of an emergency an issue. Finally, policies regarding the timing of events such as isolation and vaccination of first responders were generally underdeveloped.

EPHS 7: Link people to needed personal health services and assure the provision of health care when otherwise unavailable. Shortages of nursing staff and hospital beds represented a common challenge for participating jurisdictions--one not unique to an infectious disease emergency. Vaccination is one of the needed health services during the type of crisis presented, although antibiotic prophylaxis could be a necessity in other circumstances. As previously noted, although all jurisdictions had identified vaccination as a need, and several had even identified sites at which it would occur, there was general uncertainty regarding vaccination: who should be vaccinated, under what circumstances, and the basics of vaccine timing and efficacy. Some of the variation we observed reflected legitimate differences in interpreting public health evidence or different approaches to handling the scenario presented; other differences reflected a surprising lack of knowledge or incomplete post-event planning. An additional challenge is that uninsured and otherwise disenfranchised populations may not immediately present for care, either when they first become ill (potentially exposing more individuals) or if they were to need vaccination, prophylaxis, or other personal health care services. The recognition of this problem and plans to deal with it were largely nonexistent or underdeveloped.

EPHS 8: Assure a competent public health and personal health care workforce. This is a critical issue for all jurisdictions. All jurisdictions identified financial and bureaucratic obstacles to hiring, in addition to a shortage of qualified applicants. Time and financial

constraints limit the availability of training for existing personnel. Specific training gaps are most pronounced with regard to vaccination, contact investigation, relevant laws, use of force, lab procedures, and leadership development. In most counties, requirements for credentialing volunteers, protocols for licensing out-of-state workers, and plans to minimize work absenteeism need to be developed. With the exception of one jurisdiction, there has been no systematic assessment of workforce competencies. One jurisdiction has made significant investments in leadership training for its staff. Another is a pilot site for “Public Health Ready,” an emerging national program to develop and assess the capabilities of the public health workforce.

EPHS 9 and 10: Conduct evaluations of services and research on solutions to public health problems. We did not explicitly discuss these two services. CDC has not specifically directed jurisdictions to evaluate their preparedness. Moreover, given current resources, it is unlikely that such evaluations will be conducted in the near future.

In addition to the issues noted above, there were other similarities across the jurisdictions we studied. Personnel shortages are a serious challenge. Participants noted that many public health nurses also work at one or more local hospitals or nursing homes and could only be in one place (if they came to work at all) in the event of an emergency. In many cases, there is no shared understanding about where the priority assignments will be: both the health department and local hospitals counted these individuals as among ‘their assets’. In other words, current estimates of personnel availability during a crisis are likely to be overestimates. Similarly, many hospital security guards are off-duty police officers and are part of National Guard units. Jurisdictions would likely have a serious shortage of law enforcement personnel during an emergency (EPHS 6, 7, and 8). In addition, in all but one health department, at least one key function was dependent on a single individual who was close to retirement. Hiring freezes imposed by state and local budget crises and hiring processes compound staff shortages at every site. The shrinking applicant pool for many types of public health professionals means that, even if funding were adequate, not enough qualified people are available. In addition, most counties

noted the challenges of early disease detection when a large part of the population was uninsured, as they would be more likely to delay seeking care.

In addition to the wide variation in infrastructure, there was also considerable variation in the fundamental approach to containing a smallpox epidemic. Jurisdictions varied on when and how they would begin an epidemiological investigation; when and who to vaccinate; knowledge of vaccine efficacy; uncertainty about whether epidemiologists or vaccinators had to wait until their vaccination “took” before they could contact potential cases; and whether healthy individuals should stay home or go about normal activities once there was one or more confirmed smallpox cases in the community. There was wide variation in the level of knowledge about which laboratories can perform tests to rule in or rule out smallpox (currently, smallpox can be confirmed only at the CDC, but can be ruled out at some state labs); where to locate information or pre-prepared material that could be used to communicate smallpox information to the public and the medical practice community; and when, either legally or practically, a jurisdiction would hand over responsibility for managing the public health crisis to the state health department or the CDC.

Despite the substantial variability in preparedness and the approach to managing a hypothetical epidemic, most of the jurisdictions had similar needs. Many were allocating scarce resources, often working on their own, to fill these needs. Examples include developing programs to train nurses assigned to other functions to help with an epidemiologic investigation; rewriting laboratory procedures for processing samples or conducting diagnostic tests; and developing emergency response plans, policies, and procedures. Many expressed an overarching need for a statewide information system that could be used to receive automated reports from hospital and commercial laboratories; manage a public health emergency, including mapping, managing, and monitoring the status of contact tracing and other investigative activities; and help administer and monitor vaccination or prophylaxis activities. Threats such as a potential terrorist attacks require implementing broad strategies requiring collaborative approaches among public health agencies, public and private organizations, and specific communities at-risk--a

characteristic generally lacking in California's public health planning until recently. Therefore, public health investments must also extend to the capacity building of communities to engage in effective community health improvement efforts.

While there was clear evidence of progress toward improving public health preparedness, these efforts appear to be associated with substantial unintended costs. In nearly all jurisdictions, despite the receipt of funding specifically allocated to bioterrorism preparedness, public health directors noted that they had reassigned staff with responsibilities for other key functions (e.g., teen pregnancy prevention or sexually transmitted disease contact tracing) to preparedness activities, primarily to preparing a plan for smallpox. In several jurisdictions, health directors reported that they plan to curtail or suspend key public health activities - including tuberculosis control, sexually transmitted disease treatment and contact tracing, childhood immunization, mammography, and pregnancy prevention activities – or have already done so. Directors reported that preparedness mandates contributed to these curtailments, though it is difficult to disentangle those curtailment effects from the simultaneous effects of state and local budget cuts. In any case, it is not clear when the downstream consequences of these programmatic changes will become manifested as population health problems.

Our investigation focused on local capabilities. The accountability and capabilities of local health systems vary, naturally, by the size of the communities they serve, which range from a few thousand to 10 million people. The distinction between state and local public health responsibilities must also be factored into discussions of public health preparedness. It is not reasonable, for instance, for a small rural county to have its own public health laboratory capable of testing for all biological agents. Instead, such a county needs to be able to package and transport samples properly and quickly to the state lab, and it needs to be assured that it will receive an appropriate share of state resources during an outbreak. A large urban county, on the other hand, can be expected to shoulder more responsibility for dealing with some issues in their entirety. It should also be noted that most counties will not be the first area affected by a disease outbreak, but will need to know about outbreaks elsewhere as soon as possible to initiate prevention

and control activities. Thus, expanding the capabilities of the local public health authority depends on much greater support from the State health department and statewide public health organizations. This may require changes in governance, administrative policies and priorities, and improved state and local planning processes.

Economic Analysis

Analyses using Estimate 1 for each jurisdiction indicated that the additional funds required to fill the “preparedness gap” ranged from a low of \$754,000 per year in one jurisdiction to a high of \$2.2 million per year in another. Across the seven jurisdictions, between 9 and 94 percent of preparedness needs are currently being met through the CDC’s cooperative agreements program. The median is 28 percent.

Across the seven health jurisdictions, additional staff was the largest unmet need, accounting for 62 percent of additional costs that would be required to fill the preparedness gap. The most acute labor shortages appeared to be for epidemiologists, public health nurses, training coordinators, and public health microbiologists. The costs associated with acquiring and implementing more-sophisticated information technology systems accounted for 21 percent of the costs, followed by the costs of developing new policies and procedures (9 percent), equipment other than information technology (4 percent), training (2 percent), and other, including better outreach to community groups (2 percent).

As one would expect, on a jurisdiction-by-jurisdiction basis, the size of the gaps widens when Estimate 2 is used. Specifically, we estimated that the preparedness gaps per jurisdiction under Estimate 2 range from \$894,000 per year to \$2.9 million per year. The median jurisdiction is only 25 percent of where it should be to respond effectively to a host of infectious disease threats. The corresponding range for the seven jurisdictions is between 7 and 93 percent.

In general, the smaller the jurisdiction, the greater is its need for additional resources, although it should not be assumed that the smallest or largest jurisdictions represented

those with the largest or smallest gap. Regardless of its size, each jurisdiction must incur a set of fixed costs, and those costs represent a relatively large fraction of the jurisdiction's total public health preparedness budget. This phenomenon is a function of how the CDC's cooperative agreements program is being implemented in California, in which allocations are based on a base rate plus a per capita increment. Nonetheless, each jurisdiction is required to submit the same types of plans and to conduct the same types of training programs and other activities. It is much easier for a large jurisdiction than for a small one to absorb these additional requirements into their existing infrastructures. As noted earlier, there have been few opportunities to share resources across health jurisdictions. In fact, during our site visits, public health officials often spoke of how they were left to their own devices to comply with state or CDC requirements.

If we extrapolate our findings from the seven health jurisdictions we studied to the state's 61 health jurisdictions, we find that an additional \$72 million in annual expenditures would be required to fill the preparedness gap statewide under Estimate 1 and an annual \$96 million would be required under Estimate 2.¹

We also calculated the size of the gaps relative to overall public health expenditures for the seven study jurisdictions. Under Estimate 1, the gaps range from a low of less than 1 percent of total public health expenditures to a high of 21 percent. The figures increase slightly using Estimate 2, where they range from a low of less than 1 percent to a high of 26 percent.

¹ To calculate total incremental expenditures for the state's 61 health jurisdictions, we used our estimated expenditures for the seven study jurisdictions and for the remaining 54 jurisdictions we used the median value from the seven jurisdictions. Moreover, because of the current arrangements for allocating the grants across health jurisdictions, and the relatively large fixed costs incurred by each jurisdiction, we used the median cost for the study jurisdictions for our state-level extrapolations, rather than taking a population-based approach.

Key Findings and Conclusions

1. Despite a slow start for receipt of CDC-related funding at local levels, each of the jurisdictions we studied has undertaken significant preparedness activities.

Some of these preparedness activities have been related to CDC's and the Department of Health Services' efforts; others have been in conjunction with the Governor's Office of Emergency Services. These activities have included general preparedness planning, development of smallpox plans, and identification of an individual to serve as the bioterrorism coordinator. All of the jurisdictions we studied report the ability to receive emergency messages from California's Health Alert Network (CAHAN).

2. There is widespread variation among local health jurisdictions with respect to their ability to respond to infectious disease outbreaks and other public health threats.

Public health jurisdictions vary significantly in organizational arrangements, size, scope, understanding of their responsibilities, quality of their leadership, and available resources. As a result, California residents do not enjoy an equal level of protection against a wide array of public health threats, even after real or perceived differences in health risks faced by residents of different locales are accounted for. Although our analysis focused on public health preparedness, we also found similar variation in activities aimed at addressing chronic disease. Some jurisdictions report that they do 'nothing', while others have quite robust programs. In our judgment, not all jurisdictions possess the minimum capabilities to respond to and protect the public during a contagious disease epidemic such as the one presented in the tabletop exercise.

3. Considerable ambiguity surrounds the appropriate role(s) for a local health jurisdiction vis-à-vis other local agencies with a stake in emergency preparedness and the State Department of Health Services.

We found that, for some key activities, there is currently little agreement about *what* local health jurisdictions should do when faced with a public health emergency—as well as *how* they should do it. The perceived

overlap in some functions between the Department of Health Services, the Governor's Office of Emergency Services, and the Emergency Medical Services Authority adds to this ambiguity. Moreover, the lack of agreed-upon standards either nationally or for California makes it difficult to objectively measure performance and, consequently, to promote accountability. Our exercises brought into sharp relief the high level of ambiguity that exists within some, if not most, of the jurisdictions studied regarding the health department's role during a public health emergency and how they will be held accountable for their actions.

4. Despite differences in the size and organization of the public health jurisdictions studied, many of the perceived gaps identified in relation to preparedness were similar. Such perceived gaps include: training of existing public health staff to assume "backup" roles in the event of an outbreak; strategic planning; community health assessment; workforce needs, particularly in the areas of epidemiologic and laboratory capacity; and access to legal consultation on public health law. In addition, all jurisdictions identified the need for a robust information system that would automate regular disease reporting from labs and hospitals; receive and map new cases in the event of an outbreak; and serve as a tool to manage outbreak investigation, contact tracing, and vaccination or prophylaxis if necessary. Finally, the reality of large numbers of uninsured Californian's creates additional challenges in planning for and managing the public's health issues during an outbreak.

5. Despite a year of intensive planning for a smallpox epidemic, the approaches to a hypothetical smallpox outbreak in the jurisdictions we studied varied substantially. Some of the variation we observed reflected legitimate differences in interpreting public health evidence or different approaches to handling the scenario presented (e.g., when to communicate with the public), while other differences reflected a surprising lack of knowledge (e.g., about the disease itself, laboratory testing, and/or the smallpox vaccine) or incomplete post-event planning (e.g., who to vaccinate, when vaccination should begin, or uncertainty about designated vaccination sites). There was also substantial variation in determining whether and when health officers would

quarantine a hospital or other site, and uncertainties about the legal authority to enforce a quarantine.

6. In most of the jurisdictions we studied, involvement of community groups in public health preparedness efforts, particularly those that serve underrepresented minority groups, is significantly lacking. Some public health jurisdictions we visited had incomplete knowledge of exactly where minority population groups lived or how to reach and communicate with them, despite the fact that, historically, poor and minority populations are some of the most vulnerable in an infectious disease epidemic. While the community groups may be involved in other public health activities, they were not involved in preparedness planning in the jurisdictions we visited. Unless such groups are regularly incorporated into the planning process, it is likely that preexisting issues, such as poor communication and distrust of government, will be exacerbated during a public health emergency. This exacerbation, in turn, could make disease containment more difficult to achieve.

7. Strong, central leadership and coordination of public health appears to be lacking. We did not find substantial evidence to suggest that the health departments we visited thought they could rely on the California Department of Health Services to address needs common to many jurisdictions or that there was strong central leadership to facilitate coordination or sharing of resources. At least with regard to preparedness, this results in a fragmented system in which each jurisdiction must fend for itself. Few jurisdictions believe they can count on the Department of Health Services in an emergency. The state public health laboratory may be an exception.

8. The current organization of public health preparedness activities in California leads to redundancies and inefficiencies. Because each public health jurisdiction is required to complete a set of core preparedness activities, many jurisdictions are engaged in parallel activities. They do not, however, routinely have the benefit of learning from one another or of sharing resources. Both efficiencies of scale and a greater degree of standardization could be obtained if jurisdictions were to share

resources to a greater extent or if some functions were, in some sense, regionalized. For example, resources for development of training programs for staff, rewriting laboratory manuals, conducting strategic planning, and, to some degree, to conduct community health assessments could be provided on a more centralized or regionalized basis, in which a core team of staff could serve multiple jurisdictions. Similarly, among smaller counties, key staff such as epidemiologists or bioterrorism coordinators could be shared.

More-engaged and more-concerted leadership from the State Department of Health Services will be important in improving efficiency. The current system of allocating state funds for public health preparedness, which is determined by a base amount and a resident population–based increment, leaves smaller jurisdictions with relatively high fixed costs associated with conducting many of the tasks required by the state. Absent additional involvement from the Department of Health Services in the areas of technical assistance and coordination, smaller health jurisdictions are handicapped because they do not have the staff breadth and expertise to comply with many of the requirements efficiently and effectively.

9. Border and jurisdictional issues need attention. Epidemics know no borders. It is unlikely that a highly contagious infectious disease, especially one that is deliberately introduced, will be confined to one public health jurisdiction. Although some attempts are under way to promote collaboration across neighboring jurisdictions—including the establishment of a system of six Regional Disaster/Medical Health Coordinators and Specialists--formal public health mutual aid agreements are virtually nonexistent, and there is often poor communication between jurisdictions--particularly between some rural jurisdictions (to which at-risk populations might flee) and their proximate urban jurisdictions, and jurisdictions at or near state or other, national borders. There is some evidence that progress is being made regarding state-border issues and between urban and rural jurisdictions regarding planning for surge capacity in the context of anticipated population exodus from major cities. In the case of the Mexican border, proximate jurisdictions have large migrant populations who work and live in both countries. In the event of an emergency, such populations may flee to Mexico, making

epidemic control extremely difficult because robust communication channels between local jurisdictions and the Mexican health authorities have not been established. Conversely, many expect a mass exodus from Mexican communities to U.S. border communities for vaccination, prophylaxis, and care. It should be noted that the current budget allocations do not account for daily or seasonal transient population flows such as those found in border counties and in smaller rural communities that attract large tourist populations.

10. Public health preparedness may have a hidden cost. There was substantial evidence that reassignments of staff to accomplish preparedness functions, as well as cuts to public health budgets at a county-level that have resulted from the current fiscal pressures, are compromising other public health functions. Multiple examples of retrenchments in essential programs (such as sexually transmitted disease and tuberculosis contact tracing, or teen pregnancy prevention programs) were provided during key informant interviews.

11. Estimated additional annual costs statewide of filling the “preparedness gap” range from \$72 million to \$96 million. These estimates relate exclusively to the preparedness function and do not account for other pressing public needs in many local public health agencies. They also do not take into account economies of scale that could be achieved through reorganization. Recent investments by the federal government in public health have begun to address long-neglected needs of the local public health infrastructure. Additional investments will be required in the future to shore up and modernize local public health systems.

12. Investments in the public health infrastructure addressing preparedness concerns create an important base on which to build a stronger public health system at the local and state levels. Improvements in the public health infrastructure resulting from the recent investments in preparedness create an unprecedented opportunity to strengthen public health. However, countervailing pressures, which stem largely from California’s fiscal crisis, place the likelihood of capitalizing on this opportunity at risk.

Recommendations

1. Create a high-level commission or work group to examine alternative ways of reorganizing public health in California and to develop a shared understanding of what public health is and does. Such a commission or work group should be composed of state and local public health officials, representatives from community-based groups (especially those serving minority populations), health care providers, academic experts, and state and local political leaders. Preparedness not only for an infectious disease outbreak but also for the growing epidemic of chronic disease requires collaborative approaches among public health agencies, public and private organizations, and specific communities at-risk. Until recently, such collaboration has generally been lacking in California's public health planning. The role of strong, central leadership focused on public health at the state level and the nature of state-local relationships, should be key components of such a reexamination.

At least in the short-run, centralization and regionalization of some functions, and sharing of resources among other functions, will likely lead to greater effectiveness and efficiency. However, any process that involves rearranging responsibilities is likely to be contentious and will need to account for the political realities of state and local jurisdictional control and funding. Hence, the process for conducting such an examination must be fair, evidence-based, and neutral, and have as its overriding goal a system that most safely and efficiently protects and improves the health of the public across the entire state.^m For public health to be truly prepared to address the full range of health threats and factors that influence community health, it must reach outside its current organizational boundaries and the limited public health improvement strategies associated with bio-terrorism preparedness. Programs in place in other states may be useful in this reexamination.ⁿ

2. A set of objective performance measures for preparedness should be developed, implemented, and refined as needed. Preparedness in jurisdictions should be regularly exercised on the basis of these measures. Such a system would

^m One measure of the historical lack of political support for many working in public health is that bioterrorism funding is the single most significant investment in basic public health infrastructure that they have seen in their professional careers.

ⁿ For example, Washington and Illinois, unlike California, have public health improvement plans. Michigan has begun a process of accrediting local health agencies as a first step to improving public health.

clarify expectations and responsibilities for local public health agencies and ensure accountability. Any effort to develop performance standards and to hold public health accountable should factor in the broader vision of public health that includes official public health agencies but also the community partnerships that make up the public health system. Multiple potential measures were reviewed for this project, and some may serve as a reasonable starting point. The need for such measures is not unique to California, but California's size and complexity highlight the need for a system of performance assessment that is appropriate at national, state, and local levels. Ultimately, such a measurement system might extend beyond preparedness to other aspects of public health.

3. Improve the statewide epidemiologic information system. A robust information system is the foundation upon which coordinated public health activities should be built. During a disease outbreak, such a system would be used to receive automated reports from hospital and commercial laboratories; manage a public health emergency, including mapping, managing, and monitoring the status of contact tracing and other investigative activities; and administer and monitor vaccination or prophylaxis activities. The system should be interoperable at least throughout the state, if not the nation. However, redundancy and backup systems are the hallmark of preparedness efforts. A backup system that is not entirely dependent on electronic technology, as well as basic equipment, such as generators to assure continuity of operations, will be essential.

4. Generate increased community involvement in preparedness activities. Community organizations of all types, including minority-serving community organizations, schools and large employers, need to be a part of the preparedness process, as they are in some jurisdictions for other areas of public health. This is the case both for planning efforts, and in the event of a public health emergency (whether natural or man-made), implementation activities. Furthermore, community organizations play important roles in advocating for public health activities. At this point, such organizations have been largely overlooked. Specific performance measures should address their

involvement. The need for community involvement in public health activities is obviously not confined to preparedness; indeed, community collaborations are critical to the success of most public health activities. More work is necessary to understand what the critical capacities of community organizations are and how they can be achieved.

5. Maintain a highly skilled public health workforce in California. Investment in training is needed for existing public health staff at all levels, from leadership development and Incident Command Structure training, to cross-training public health professionals to fulfill critical functions during a public health emergency. Such training could occur in an efficient and effective way through coordinated planning and sharing of resources. At the same time, efforts to develop a new generation of public health professionals who are prepared for public health practice are essential. While this is not a California-specific issue, California has pressing needs for such professionals. California has the advantage of a variety of educational institutions, including schools of public health, academic medical centers, and other health professional training programs that can be enlisted in this effort. Salary structures and archaic hiring practices in most communities will need to be revised if local health jurisdictions are to be successful in recruiting and retaining highly qualified staff.

6. Workforce planning must occur at both a local level and a statewide level. In virtually all jurisdictions, key members of the workforce are aging into retirement and there is little evidence of succession planning. In addition, reassignment of key staff to preparedness functions has created workforce shortages in other areas, and many local hiring practices prevent hiring individuals in time to have them work side by side with the individual whose position they will assume. Because of overall workforce shortages, local jurisdictions are competing with one another for scarce human resources, with little regard for how human resources might be used most efficiently. As part of the planning process, county governments in which public health agencies reside should be held accountable for addressing hiring impediments.

7. Public health departments must become better linked with the health care delivery system. Public and private health care providers and the institutions in which they deliver care have critical public health responsibilities. Before an outbreak is known and after it is suspected, they must participate in surveillance activities to detect and define the outbreak's scope. They also must be incorporated into strategies for community-wide preparedness planning and training. Providers may be needed to participate in mass immunization or prophylaxis programs, or simply to treat their own patients in concert with a public health strategy. Providers can also play a critical role in communicating with the public about risks, control strategies, and other matters. Better linkages between providers and public health agencies are needed to coordinate all of these activities and, thus, to ensure an appropriate community response to an emergency. Although few public health functions have been formally regionalized in California, there are good examples of regional collaborations that appear promising.^o

8. An evaluation of public health preparedness and gaps at the state level will be essential to more fully understanding the preparedness issues identified in this study. Such an analysis could be considered as part of the background work required to contemplate a reorganization of public health in California.

9. Additional studies are needed to fill the knowledge gaps regarding the public health infrastructure more broadly. This recommendation would include in-depth studies of public health responsibilities more broadly (not confined to preparedness), identification of gaps and what is required to fill them, and the development of reliable and valid measures of performance of public health systems at state and local levels.

10. Additional resources will be necessary to improve public health preparedness and to improve local public health systems. Our current estimates examine only the additional resources needed to improve the preparedness functions that local public

^o For example, the regional initiative to reduce health inequities in the San Francisco Bay Area and the statewide asthma initiative merit consideration for how public health in California might benefit from regional approaches and better links with the health care delivery system.

health agencies are expected to engage in to protect against infectious disease outbreaks. But in the jurisdictions we studied, we also found evidence that additional resources are needed to assure that essential public health services are available in all locales in the state to cover the wide range of new and old health threats the people of California face on a daily basis. It should be noted that our estimates of the incremental funding required to fill the identified preparedness gaps implicitly assume that the status quo—in terms of organization and funding—will continue intact, including the CDC bioterrorism preparedness grants.

Limitations

This study has several important limitations. First, because there are no agreed-upon standards for public health preparedness, we had to rely on participants' perceptions for both the adequacy of the status quo and the size and nature of the gaps that needed to be filled. Although our exercise methodology provides a high degree of realism, we cannot guarantee that self-reported assessments of gaps in services and capabilities are valid. Furthermore, respondents had little time to craft their responses, and most had not completed a recent strategic plan. Hence, they focused on more-immediate needs and concerns rather than on more strategic, and arguably more costly, ones.

Second, we did not account for potential economies of scale that could be realized through increased efforts on the part of local health jurisdictions, as well as the State Department of Health Services, to share resources. In our view, substantial increases in overall efficiency can be gained through reorganization and sharing of activities and resources.

Third, we made no assumptions regarding the possible impact of new technologies on preparedness costs. Such technologies could tend to either increase or decrease costs, so we remain neutral on this issue.

Fourth, we did not measure any possible resource gaps at the state level. At this point, we can only speculate about how changes in state-level investments in the public health infrastructure would affect local infrastructure costs.

Finally, our analysis focused on seven of the state's 61 health jurisdictions, and it did not include a detailed look at activities that may be sponsored by other state-level agencies, such as the Emergency Medical Services Authority or Environmental Protection, or at Department of Health Services-sponsored initiatives, except as they are perceived locally. However, the study jurisdictions, which account for 39 percent of California's population, were selected to be broadly representative of all state health jurisdictions, in terms of size (area and population), geographic distribution, minority populations, and per capita public health expenditures obtained from census data, as well as budget information obtained from the jurisdictions' websites. We also note, that Los Angeles, which accounts for a large share of the state's population, receives public health funds directly through the CDC, and not through the State Department of Health Services. As such, it has considerably more autonomy and flexibility than do other jurisdictions. Additionally, and as mentioned previously, our inability to examine the state's role in the area of public health preparedness in the course of our analysis is somewhat mitigated by the fact that California's public health infrastructure relies on local public health departments to provide most services to California residents. Although we believe that many of our findings apply to health jurisdictions above and beyond those included in the study, the true level of generalizability is not known.

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Appendix A

Expert Panel and Observers

Expert Panel:

Raymond J. Baxter, PhD
Senior Vice President, Community Benefit
Kaiser Permanente
Expertise: public health systems, measurement and evaluation

Maria Campbell Casey
Executive Director
Partnership for the Public's Health
Expertise: community partnerships and involvement

Jonathan Fielding, MD
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Appendix B

Diabetes Summary and Tabletop

Pilot Study of Chronic Disease Prevention and Control: Diabetes

Background

At the request of the Little Hoover Commission (an advisory body to the California state legislature), RAND has undertaken a project aimed at identifying gaps in California's public health infrastructure. The objective of the project was to identify gaps in the public health infrastructure that restrict efforts to prevent disease and promote health. The project was designed to examine the extent that public health investments serve a "dual-use" purpose (e.g., serve day-to-day functions as well as play a key role in times of public health emergencies). The project also tried to develop methods that could be used to examine a range of public health threats (including infectious disease, chronic, and environmental threats).

Our initial efforts focused on infrastructure needs for handling an infectious disease threat; specifically, a bioterrorist attack involving smallpox. To expand our work beyond preparedness for such an emergency, we turned our attention to a second major type of health threat: the prevention and control of chronic disease.

Since diabetes is a major public health concern, we used diabetes as an exemplar of chronic disease. Our project sponsors, the California Endowment and the State Diabetes Prevention and Control program, began in late 2003 to assess diabetes assets in the state. This project's focus on local communities provided an opportunity to complement those efforts and to identify local public health infrastructure gaps in addressing a chronic disease. While we focused efforts our pilot efforts on diabetes, we also were interested in examining related risk factors, including obesity, diet, and exercise.

The pilot efforts were designed to achieve the following goals:

- Develop methods to examine local public health capabilities in chronic disease prevention and control based on existing recommendations
- Develop methods to estimate the magnitude of the gap between current and desirable capabilities

This appendix describes the methods we have developed to examine infrastructure needs to prevent and control chronic disease. We also offer general observations from our two pilot tests of these methods.

Methods

To help us understand infrastructure gaps in chronic disease prevention and control, our approach included site visits and structured workshops.

The public health system that addresses chronic disease issues in a local community is often a patchwork of resources and activities undertaken by the local public health agency and a wide range of community partner organizations. Diabetes control and prevention requires responding to a range of complex and interacting factors that contribute to the development of diabetes in our communities. As a result, assessing the diabetes public health infrastructure presents two key challenges. First, the appropriate roles of the local public health agency and its community partners are defined differently from community to community. Second, there are significant variations in the expectations of local public health agencies with regard to chronic disease control and prevention. Our site visits and pilot exercises were intended to test the use of a specific approach to determine whether a sense of urgency could be created that would make a table-top exercise viable and would encourage identification of gaps in the public health infrastructure.

Site visits

We chose two large counties to pilot-test our site visit protocols and exercises: one in Northern California and one in Southern California. The counties differed in both the extent of previous diabetes control and prevention activity and whether the county took direct responsibility for providing indigent medical care services. We conducted two-day site visits in each jurisdiction. On the first day, we interviewed key informants, including, but not limited to, the public health director, the public health administrator, the chronic disease program director (where one existed), the director of public health nursing, a senior epidemiologist, a local school official, representatives of the clinical (doctor or hospital) community, as well as senior officials from

community-based organizations, including Community Health Centers and the American Diabetes Association Specific interviewees varied by site. These interviews provided information about how the public health system was organized and financed, chronic disease prevention and control plans and progress to date, and the challenges of developing and operating a chronic disease program in the face of other health department responsibilities and county budget crises. Interviews were semi-structured using a standardized protocol, and interviewees were assured of confidentiality.

Development and use of table-top exercises

We adapted the methodology we had developed for evaluating preparedness for an infectious disease emergency to evaluating preparedness for a chronic disease emergency. We began by identifying key chronic disease prevention and control activities consistent with the Essential Public Health Services framework (Table 1). The modified Essential Public Health Services framework served as a structured context within which to develop an exercise to assess core chronic disease activities. The exercise, conducted on the second day of the site visit, took the form of a workshop intended to assist jurisdictions in planning for a scenario that predicts a diabetes epidemic in their community over the next ten years if prevention measures are not initiated today.

The workshop was divided into three steps. In Step 1, participants were introduced to the discussion through a site-specific briefing on diabetes and a scenario predicting an epidemic by 2020. The scenario was developed using county health reports available in documents or on the county's website. Participants were asked to work through a set of questions about the community's current resources and activities that could be adapted to diabetes control and prevention. In this step, we gathered information about ongoing public health system activities and programs that may prove useful for diabetes control and prevention.

In Step 2, participants were asked to develop a strategy for reducing the development of diabetes and its complications within 10 years. The strategy was designed around discussions of the Essential Public Health Services as adapted for diabetes control and prevention. Use of the Essential Public Health Services as a framework for strategic planning assured that the group

discussion covered the full range of public health activities needed locally, whether conducted by the local public health agency or other public, private, or voluntary organizations. Participants were asked to specify programs and activities that their community could employ over the next decade in their strategy to prevent and control diabetes.

Step 3 examines the resources necessary to implement the 10-year strategy designed in Step 2. Furthermore, it identifies the gap between current resources and the resources necessary to control the epidemic. Participants were asked to self-assess (on a scale of 1-10) the group's response to the epidemic scenario and the state of their current public health infrastructure, with specific reference to the essential public health services. They were then asked to rate (a) "where they are," based on what was learned in the exercise, and (b) "where they wanted to be" for each dimension. The difference (or gap) between the exercise results and desired performance was used as a springboard for discussion about what would be required to fill the gap (e.g., human resources, policies and procedures, information technology, communications equipment, supplies, and other resources) and the obstacles to filling it. (Copies of the exercise materials appear at the end of this Appendix B)

Table 1. Essential Public Health Services, Modified for Diabetes Control and Prevention

<i>Essential Public Health Service</i>	
1	Monitor health status to identify individuals and populations at risk of diabetes; identify at-risk populations and monitor population nutritional intake and physical activity (and solve community problems).
2	Diagnose and investigate at-risk populations, screen for diabetes and identify opportunities for improving nutrition and increasing daily physical activity.
3	Inform, educate and empower people about the burden of diabetes, obesity/overweight, and the benefits of good nutrition, physical activity, and, for those with diabetes, regular self-monitoring.
4	Mobilize partnerships to identify and solve diabetes and diabetes-related health problems.
5	Develop policies and plans that support individual and community-wide efforts to slow the rate of diabetes.
6	Enforce laws and regulations that protect and enable the provision of diabetes-related care and develop communities that promote healthy lifestyle behaviors and essential safety.
7	Link people to needed diabetes screening and related follow-up, including regular foot care, vision care, and nutrition counseling, and assure the provision of health care when otherwise unavailable.
8	Assure a competent public and personal health care workforce that understands the link between healthy lifestyles and chronic diseases and can provide leadership and support for community interventions and state-of-the-art recommendations for the care of diabetic patients.
9	Evaluate effectiveness, accessibility, and quality of personal and population-based diabetes and chronic disease.
10	Research new insights and innovative solutions to managing chronic disease, decreasing risk factors in communities and among individuals, and increasing support for and adoption of healthy lifestyles.

In each jurisdiction, two facilitators followed a written discussion guide, tailoring the discussion to the group's response in each step of the exercise; a third individual took detailed notes on all aspects of the discussion.

Public health directors in each jurisdiction were asked to participate in the exercise, and to invite other participants, based on the nature of their communities. They received guidelines regarding the types of individuals to be invited (chronic disease program director/ coordinator, public health nurse, epidemiologist, local hospitals and doctors, local voluntary agencies addressing

diabetes or risk factors associated with diabetes, minority-serving community organizations, elected local officials, schools, and representatives from parks and recreation and city planning), but individual invitations were left to their discretion. We aimed for a group size of 15-18 participants. Participants were assured that neither they nor their jurisdictions would be individually identified without express written permission.

Pilot Study Observations

Based on the two case studies, we offer the following observations.

First, a structured exercise or workshop has promise as a method for assessing the potential for a local public health agency to pursue its chronic disease mission. However, the exercise will require modification to heighten the sense of urgency, and retesting before it is suitable for widespread use. The exercise provided participants with the opportunity to examine and discuss how best to organize a chronic disease initiative in the face of uncertain funding streams. At least in the two communities we visited, current funding for chronic disease initiatives appears to be time-limited and often focuses on a particular disease or condition for only a year or two before being re-directed to new initiatives. The groups gained insights about organizing for a chronic disease mission focused around risk factors that contribute to numerous chronic conditions. Perhaps more importantly, the exercise framework encouraged participants to think beyond current budgetary and organizational crises at the outset.

The pilot studies highlighted a number of public health infrastructure concerns. However, because of the limited nature of this work, it is premature to draw conclusions based on it. Below, for further discussion, are preliminary issues identified in this study, which are similar to those identified in the infectious disease (smallpox) exercises described in the body of this report.

- Public health authorities are hampered by bureaucratic impediments in hiring and retaining personnel appropriately trained to address chronic disease issues. These

impediments are related partly to changing budgetary priorities but also to civil service requirements that, for example, prevent hiring a replacement for a soon-to-be-retired employee until the employee actually retires.

- Leadership development and succession planning appear to be key infrastructure needs.
- The relationship between local public health agencies and their community partners needs further development. Local agencies appear unable to take full advantage of available community resources. In part, this reflects how the agency and its leadership define the agency's responsibility.
- Maintaining steady funding for ongoing chronic disease initiatives is a significant challenge. Chronic disease initiatives compete for limited public health resources with other local health and health care needs. Many of the current local projects are funded by temporary state or foundation grants, with no guarantee of continued funding beyond the initial grant period. State funds that have previously been used to address chronic disease concerns have been re-directed to other pressing public health concerns.

Local public health agencies have a unique role in collecting and disseminating disease and health risk factor information. However, this role may not be adequately fulfilled, in part because local agencies have not yet engaged in strategic planning or work with other community partners

- Some local public health agencies are reluctant to engage in primary prevention activities, such as screening, if follow-up resources are not assured. Even in those cases where clinical follow-up resources appear available, systems are not in place to assure a seamless flow of at-risk individuals into treatment.

Again, we stress the preliminary nature of this work, but note that, in accordance with Essential Public Health Services performance indicators 9 and 10, and consistent with our recommendation about further research, this and similar projects are essential to developing a fuller understanding of the public health infrastructure's needs and gaps.



Diabetes Prevention and Control Workshop: California

Methodology

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CALIFORNIA PUBLIC HEALTH INVESTMENT PROJECT DIABETES WORKSHOP METHODOLOGY

WORKSHOP OBJECTIVES

This workshop is part of a broader research effort entitled the California Public Health Investment project. This project analyzes the resources and capabilities of the California public health system, with the objective of identifying gaps in the public health infrastructure that restrict the effectiveness of efforts to prevent disease and promote health.

The diabetes workshop focuses on identifying infrastructure gaps – processes, personnel, equipment- that should be filled to more effectively control and prevent the onset of diabetes and related health problems. To this end, the workshop is designed to assist participants to:

- Identify gaps in the public health infrastructure’s capability to address chronic disease, using diabetes prevention and control as an example
- Identify current resources and activities that may be useful in preventing and controlling diabetes and related health issues
- Develop an integrated strategy that links current and future prevention and control resources in a community to achieving population health goals regarding diabetes prevention and control

Drawing on the existing literature and the advice of an expert panel, we have adapted a framework for assessing components of the public health infrastructure related to diabetes and chronic disease. The results of the workshop will inform a broader process of gauging the gaps that exist in the public health system infrastructure in addressing a broad range of public health threats.

The workshop is divided into three steps, which are illustrated in Figure 1. During Step 1, you will be asked to work through a set of questions that concern the current resources and activities available in your community that have relevance for diabetes control and prevention. The Step 1 Discussion Guide contains the questions that will structure this inquiry. The questions are organized under the 10 Essential Public Health Services (EPHS) framework. As adapted for this project, CDC’s EPHS framework provides a structured context for responding to diabetes. The elements of this framework are listed below.

1. Monitor health status to identify community health problems.
2. Diagnose and investigate health problems and health hazards in the community.
3. Inform, educate, and empower people about health issues.
4. Mobilize community partnerships to identify and solve health problems.
5. Develop policies and plans that support individual and community health efforts.
6. Enforce laws and regulations that protect health and ensure safety.
7. Link people to needed personal health services and assure the provision of health care when otherwise unavailable.
8. Assure a competent public health and personal health care workforce.
9. Evaluate effectiveness, accessibility, and quality of personal and population-based health services.
10. Research for new insights and innovative solutions to health problems.

This step is designed to gather information about ongoing public health system activities and programs that may prove useful for diabetes control and prevention.

In Step 2, participants will be asked to design a strategy for reducing the development of diabetes and its complications within 10 years. Several concepts may help frame the strategy in a format that allows for an assessment of gaps. First, the strategy should be designed around the EPHS as adapted for diabetes control and prevention. Using the EPHS framework assures that the group discussion covers the range of public health activities needed at the community level. Second, discussion should focus on the overall public health system rather than a single organization. The public health system includes all public, private, and voluntary entities that contribute to the public health activities within a community. Using the EPHS framework, participants will identify specific programs and activities that the community could employ in their strategy to control and prevent diabetes over the next decade. Examples of programs and activities that might be included in the chosen strategy are shown in Table 1.

Step 3 of the workshop examines the resources necessary to implement the strategy designed in Step 2 and identifies the gap between what is necessary to control the epidemic and current resources. Gaps may reflect that neither the local public health agency nor community partners have adequate or appropriate resources for implementing the diabetes control and prevention strategy.

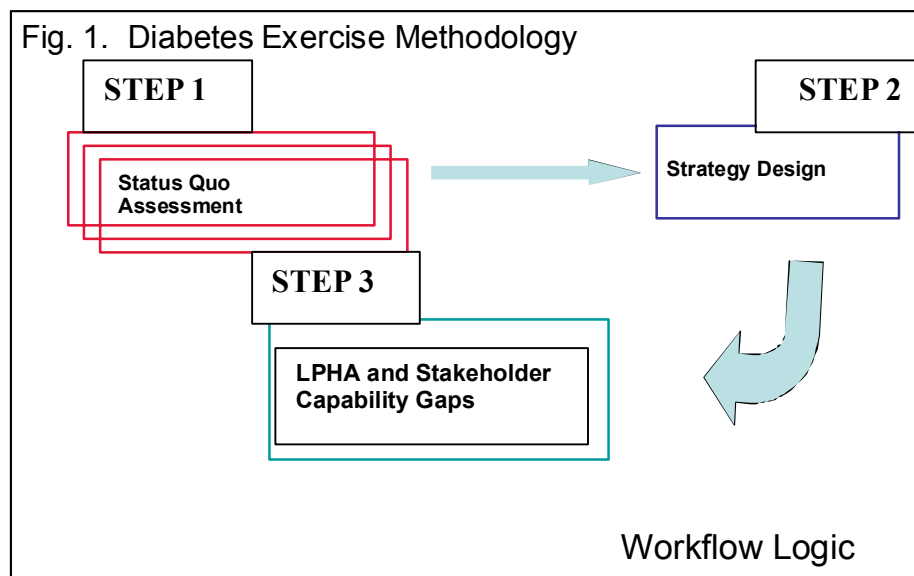


Figure 1. Diabetes Workshop Methodology

This figure outlines the logical flow of the workshop. First is the identification of existing programs and activities relevant to diabetes control and prevention. This survey is followed by the design of a strategy to achieve diabetes prevention and risk reduction goals. Lastly, local public health agencies and community partners are asked to identify gaps in their *existing* resources that would prevent them from implementing their selected strategy.

TABLE 1. EXAMPLES OF DIABETES CONTROL AND PREVENTION ACTIVITIES

	LPHA Activities	Other Stakeholder Activities
Essential Public Health Services		
Monitor and Investigate	Collect community level data Establish community level disease registries/at-risk populations Analyze data for performance	(Example) Participate in Surveys of Diabetes incidence and that of related health problems
Educate	Issue regular community health assessments Provide technical assistance Use new media approaches to inform/educate	Engage media in design of healthy lifestyle messages Develop supportive environments for individual change efforts Provide social support and reinforcement to make healthy choices
Mobilize Partnerships and Develop Policies	Convene community coalitions/partnerships Briefing and engaging policy leaders Convene other public and private parties	Engage community members in establishing program goals, specifying interventions, and delivery of programs Create programs to increase physical activity; improve nutrition
Enforce Laws	Engage housing and community planning authorities to change environment Increase supply of funds and key resources	Increase health food choices in grocery stores, schools, senior centers Increase safe locations for physical activity
Link to Services	Screen population for Diabetes Deliver health services for underserved ID barriers to care for Diabetes-related	Increase of evidence-based preventive care practices Increase access and utilization of high quality healthcare Increase self-management skills
Trained Workforce	Train public health officials in chronic disease Raise private provider understanding of Diabetes threat	Adequate provider education through national guideline implementation Improve provider communication and counseling skills Improve health literacy so patients can make brave informed decisions
Evaluate Programs	Evaluate local public health Diabetes intervention Quality improvement program to improve personnel and population-based services	Participate in community evaluation of interventions through design & implementation Implement staff wellness programs that include health assessment, health promotion, and health management components
Research	Participate in research efforts or demonstration projects	Engage members of intended audience in design and delivery of projects



Diabetes Prevention and Control Workshop: California

Background

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A Call to Action: Public Health Fears Devastating Diabetes Epidemic

In 2002, over 200,000 Americans died with diabetes as the primary or contributing cause, making diabetes the fifth leading cause of death in the US.

Many state and local public health departments are struggling to address ongoing—and growing—health threats like diabetes and other chronic illness. Immediate action is needed to prevent and address the growing burden of diabetes-related conditions and its risk factors.

A Growing Epidemic

- About 18.2 million Americans are estimated to have diabetes in 2003ⁱ; **5.2 million of these diabetes victims are unaware** that they have the disease.
- The number of people who will suffer from diabetes is projected to **double or triple by 2050**.
- Diabetes is affecting people at younger ages. Diagnosed diabetes increased by 33% in the 1990s, with a **70% increase in the 30-39 age group alone**ⁱⁱ.
- Diabetes-related deaths resulted in over **one million years of potential life** lost in 2002.

Risk Factors Ballooning out of Control

Risk factors that contribute to the development and progression of diabetes are also on the rise in our nation. Poor nutrition and lack of regular physical activity leading to obesity or overweight increase the risk of diabetes.

- Obesity is reaching epidemic proportions. According to the Centers for Disease Control and Prevention (CDC), “More than **60% of adults are overweight or obese**, and the percentage of young people who are overweight has more than doubled in the last 30 years. Between 10% and 15% of Americans aged 6–17 years are overweight.”ⁱⁱⁱ Over 9 million children are overweight, many of them may require renal dialysis by the time they are in their 20s and 30s.
- More than 60% of American adults do not meet CDC’s physical requirements and more than **25% are not active at all** in their leisure time.”^{iv}
- The **proportion of overweight children rose from 4 percent in 1960 to 15 percent today**. These youngsters are at great risk for developing diabetes early in their lives.

Overwhelming Economic and Productivity Burden

Diabetes has a substantial impact on the economy, healthcare costs and utilization, quality of life, and worker productivity.

- In 2002, total expenditures attributed to diabetes and its complications were estimated at **over \$132 billion**, with \$92 billion attributable to direct medical expenditures for the disease.^v This represents a staggering 35 percent increase in the last five years.

- In 2002, about **15% of national healthcare expenditures** were associated with diabetes treatment.^{vi}
- On average, individuals with diabetes incurred over **\$13,000 in direct medical expenditures** in 2002, whereas the general population, when adjusted to reflect the demographics of those with diabetes, incurred \$5,642.
- Missed work days associated with diabetes totaled nearly 88 million in 2002. Men with diabetes had **3.1 more lost workdays and 7.9 more days in bed** than men who did not have diabetes.^{vii}
- In 1994, more than **half of all persons with diabetes reported that they were limited in activity** and more than 60% attributed their limitations to diabetes.^{viii}
- Diabetes-related hospitalizations accounted for **13.9 million hospital days** in 1997.

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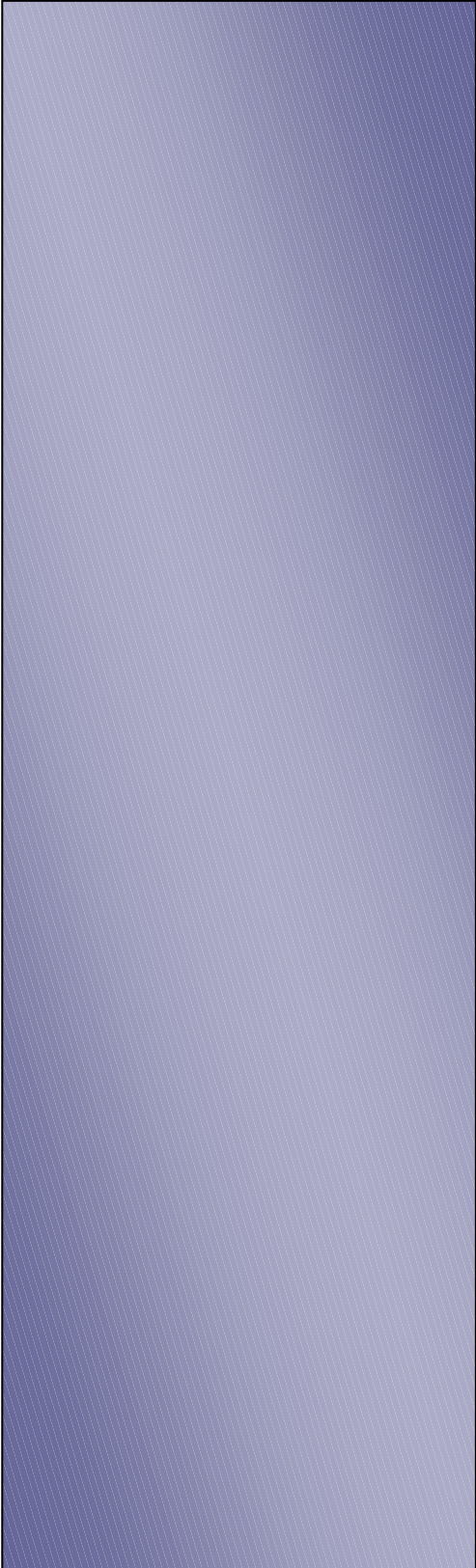
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^v <http://care.diabetesjournals.org/cgi/reprint/26/3/917.pdf>

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Diabetes Prevention and Control Workshop: California

Facilitator's Guide

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CALIFORNIA PUBLIC HEALTH INVESTMENT PROJECT

DIABETES WORKSHOP – FACILITATOR GUIDE

Overview

The diabetes workshop focuses on identifying infrastructure gaps—processes, personnel, and equipment—that have the potential to restrict public health efforts to control and prevent the onset of diabetes and related health problems. To this end, the workshop is designed to assist participants to:

- Identify gaps in the public health infrastructure’s capability to address chronic disease, using diabetes prevention and control as an example
- Identify current resource and activities that may be useful in preventing and controlling diabetes and related health issues
- Develop an integrated strategy that links current and future prevention and control resources in a community to achieve population health goals regarding diabetes prevention and control

Drawing on the existing literature and the advice of an expert panel, we have adapted a framework for assessing components of the public health infrastructure related to diabetes and chronic disease. The results of the workshop will form a part of a broader process of gauging the gaps that exist in the public health system infrastructure in addressing a broad range of public health threats. At the conclusion of the workshop a summary of the exercise results will be provided to participants.

The workshop is divided into three steps. Step 1 engages participants in discussing the diabetes epidemic and identifying the resources available in their community that are relevant to diabetes control and prevention.

In Step 2, participants will be asked to design a strategy for reducing the development of diabetes and its complications within 10 years. Several concepts may help frame the strategy in a format that allows for an assessment of gaps. First, the strategy should be designed around the ten essential public health services (EPHS) as adapted for diabetes control and prevention. Using the EPHS framework assures that the group discussion covers the range of public health activities needed at the community level. Second, the focus should be upon the overall public health system rather than a single organization. The public health system includes all public, private, and voluntary entities that contribute to the public health activities within a community.

Step 3 of the workshop examines the resources necessary to implement the strategy designed in Step 2 and identifies the gap between what is necessary to control the epidemic and current resources.

At the outset of the meeting it is advisable for the facilitator to carefully walk-through the different components of the workshop. Responding to participant questions regarding their roles will help to smooth deliberations later on. Participants are asked to play their normal organizational roles within the public health system.

Step 1: Assessing the Status Quo

This step of the workshop involves identifying resources available for diabetes control and prevention. Capabilities in local communities may be held either by the local public

health agency or by community-based organizations or other government agencies (i.e., the School Board). These capabilities may be organized to meet public health system objectives parallel to chronic disease prevention – for example, reductions in obesity or high blood pressure. Identifying programs and activities in these areas allows for an exhaustive presentation of the status quo in interventions and model approaches.

Local Public Health Agency (LPHA) capabilities for chronic disease prevention and control are often used to facilitate trust and collaboration between different stakeholders and institutions. A number of factors need to be taken into account when facilitating this process:

- Get participants to discuss their reactions to the briefing that layout the possible consequences of *not* responding in a coordinated fashion to the increasing trend of diabetes and associated health problems.
- Establish at the outset what groups or activities link LPHAs with community-based groups. Existing coalitions or programs with a history of collaboration between the LPHA and community-based organizations could serve as a vehicle for a diabetes control and prevention effort in a community.
- Make sure that community-based groups and other non-LPHA stakeholders identify themselves first. This gives them the opportunity to raise **first** the activities or programs that they already have that may or may not use or rely LPHA expertise.
- Try to foster a discussion of roles that acknowledges LPHA expertise, but also recognizes the resource and trust characteristics of community-based organizations. This might be accomplished through a discussion of different approaches that have been used to achieve similar public health objectives in the past.

Step 2: Designing a Strategy

This part of the workshop focuses on designing a strategy. Participants are asked to put together a set of integrated initiatives that form an overarching strategy for diabetes control and prevention. The proposed strategy draws together activities from a number of different programs, plans, initiatives and ideas. The sample list of potential activities (Table 1 from the methodology section) provides ideas which participants can use to generate plans or programs that fit their particular communities.

Strategy design is undertaken using the EPHS framework. EPHS headings serve as categories for recommended actions designed to achieve progress in chronic disease control. The matrix lists examples of activities and programs relevant to diabetes and serves as a prompt to participants as they assemble activities into an integrated strategy. Step 1's inventory of existing community-specific programs also focuses discussion on extant models and approaches relevant to diabetes control and prevention. Participants work through the discussion guide, filling in recommended programs and initiatives under each heading. Where necessary, the facilitator should refer to approaches identified during Step 1. In addition, preferred or optimal programs (those with the strongest evidentiary support from a public health perspective) should be highlighted as first prompts, where LPHA convening capabilities may be initiated to foster community action.

A number of additional points must be made to facilitate design activities:

- Strategy design raises a fundamental issue – the appropriate division of labor between community based groups and LPHAs in chronic disease control and prevention. It might be advisable to take up this issue at the beginning, using the responses to

channel the discussion of particular essential public health functions and related program choices. The template of the 10 essential public health services should be used as a guide to reinforce consensus views on who or which organizations normally take the lead in community-based interventions.

- Some participants will need to be reintroduced to the 10 essential public health services. The framework may need to be briefly described as the “structure” into which community activities can be inserted in pursuit of an overarching strategy.
- It may be advisable to again ask representatives of community-based organizations to lead off the discussion of initiatives in particular areas. This will give them the opportunity to place “on the table” their own experience (and preferred models) for interventions in support of the plan objectives
- LPHA personnel should be encouraged to contribute specialized expertise in areas where the LPHA has parallel or ancillary programs already in existence (for example, programs to encourage exercise, prevention of obesity, monitoring of high blood pressure). These contributions will help participants to make trade-offs between entirely new programs and the intelligent “re-labeling” of existing programs to achieve diabetes prevention objectives. This will also help to avoid “double counting” of resource requirements during the gap analysis

Step 3: Gap Assessment

Step 3 is the gap analysis. Because the strategy comprises a structured list of activities organized using the EPHS framework, gaps can be articulated by broadly comparing the integrated strategy with the resources and activities identified during the Step 1.

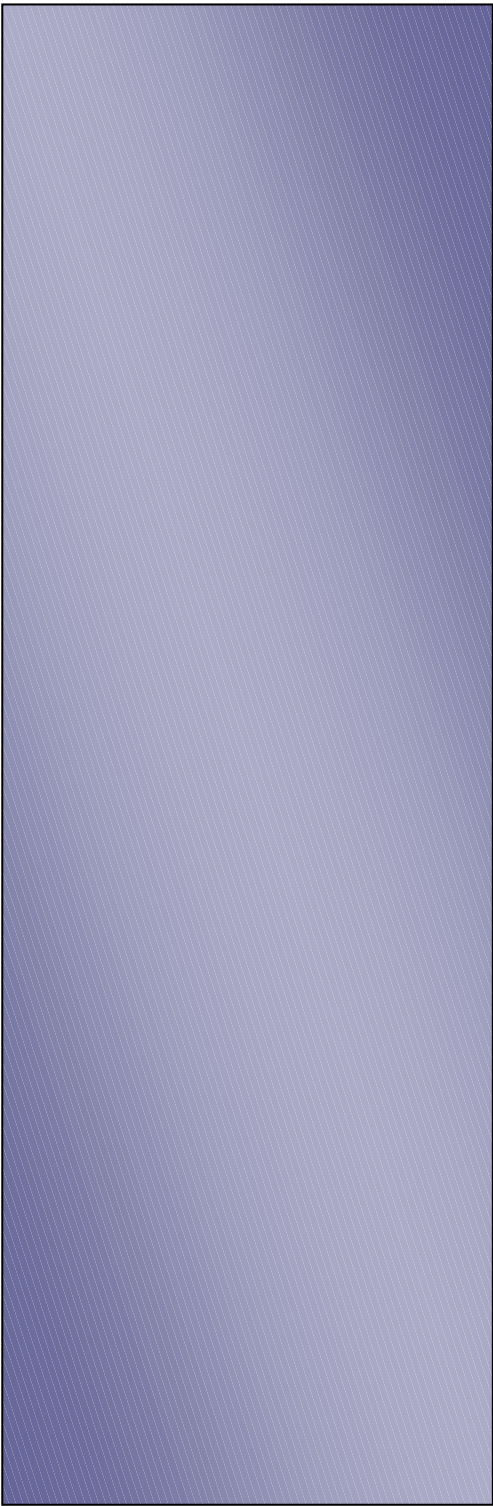
Participants are asked for two sets of rankings. Using a ten-point scale – and a blue pen -- group members first assess where they think their community stands in terms of having comprehensive and mutually reinforcing programs to prevent and control diabetes. This judgment is a compound consideration based on predicted increases in the incidence of disease (if current trends continue) and the assessment of parallel relevant public health system programs designed to minimize the severity of health conditions associated with diabetes undertaken in Step 1.

Next, using a red pen, participants are asked to evaluate the level/ranking necessary to achieve the levels of capability associated with the strategy designed during Step 2. For each of the questions, 10 represents the best achievable if resources were available to attain it, and 1 indicates that the function is less applicable to the community under examination.

The ranking process may require that details of the strategy be revisited. If this proves necessary, the points listed below offer suggestions for achieving timely consideration of different alternative rankings.

- The following list of questions should be used during the discussions on gaps
 1. Are there overlapping activities among the health system partners in this area?
 2. Is there an increasing or decreasing demand for ongoing activities?
 3. Is better coordination among system partners required?
- A summary of the agreed strategy should be posted in the room where you are meeting (or a separate copy provided for each participant)—on a white board, or on a flip chart. Sequentially working through the 10 essential public health functions will ensure the completeness of the gap presentation.

- If particular EPHS are felt to be of lesser importance, skip over them in your deliberations, but make note of the rationale for doing so. Moving beyond a particular EPHS category may signify: (a) satisfaction with ongoing efforts to meet a requirement; (b) insufficient information or knowledge to articulate a meaningful gap in resource terms; (c) inapplicability of the particular public health function due to its provision by an agency not represented; or (d) other factors. Coding the particular rationale for skipping an EPHS category will assist the expert panel in comparing different community strategy-related gaps at a later date.
- Focus on getting participants to articulate resource shortfalls in terms of people, proportions (percentages) of personnel-time, known program costs in ancillary or parallel areas (i.e., the cost of a public health expert with the task of advising the school board on dietary concerns relating to school lunch programs).
- Try to achieve as much consensus as practicable on the overall resource weightings (gaps) of the different segments of the strategy. Take careful note on areas of disagreement (with particular emphasis on differences of view dividing the LPHA from community-based groups and/or other stakeholders).



Diabetes Prevention and Control Workshop: California

Step One

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Background

The public health system involved in addressing chronic disease issues in a community is often a patchwork of resources and activities undertaken by the local public health agency (LPHA) and a wide range of community partner organizations and institutions. Diabetes control and prevention requires a broad view of the complex and interacting factors that contribute to the growth of the diabetes epidemic in our communities. The LPHA and its partners comprise the local public health *system*.

This project uses a framework called the Essential Public Health Services, first described in a statement called Public Health in America in 1994. This statement outlines those actions that must be undertaken to fulfill the vision, mission, and purpose of public health in a community. The Essential Services are:

1. Monitor health status to identify community health problems.
2. Diagnose and investigate health problems and health hazards in the community.
3. Inform, educate, and empower people about health issues.
4. Mobilize community partnerships to identify and solve health problems.
5. Develop policies and plans that support individual and community health efforts.
6. Enforce laws and regulations that protect health and ensure safety.
7. Link people to needed personal health services and assure the provision of health care when otherwise unavailable.
8. Assure a competent public health and personal health care workforce.
9. Evaluate effectiveness, accessibility, and quality of personal and population-based health services.
10. Research for new insights and innovative solutions to health problems.

The framework is used in this workshop to identify the services that are needed to prevent and control diabetes and the barriers associated with these efforts. Diabetes prevention and control efforts include those activities and resources of public, private and voluntary organizations related to the risks of diabetes, including efforts to address obesity, improve nutrition, and increase physical activity as well as specific diabetes related efforts.

This workshop is intended to assist participants to assess the local public health system's current capacity to prevent and control diabetes and to identify "gaps" in the system. Your responses will provide us with an understanding of how local diabetes control and prevention activities and structures are performing and help us identify additional needed resources.

In answering the following questions please focus on the entirety of the local public health system rather than a single organization. The contributions of all entities should be recognized in assessing the provision of the Essential Public Health Services in a community.

The following questions are based on the ten Essential Public Health Services as applied to diabetes prevention and control.

1. Monitor health status to identify individuals and populations at-risk of diabetes; identify at-risk populations and monitor population nutritional intake and physical activity (and solve community problems). (This includes accurate diagnosis of the community's health status; identification of threats and assessment of health service needs; timely collection, analysis, and publication of information on access, utilization, costs, and identification of populations that are at higher risk than the total population; and collaboration to manage integrated information systems with private providers and health plans.)

Has your community adopted goals or objectives for diabetes prevention and control?

1) Yes

2) No

If so, what are they?

What resources, activities or programs are currently available for diabetes prevention and control?

2. Diagnose and investigate at-risk populations, screen for diabetes and identify opportunities for improving nutrition and increasing daily physical activity. (This includes epidemiological identification of emerging health threats; public health laboratory capability using technology to conduct rapid screening and high-volume testing; and technical capacity for epidemiologic investigation of patterns of diabetes.)

What resources, activities or programs are currently available for diabetes control and prevention?

3. Inform, educate and empower people about the burden of diabetes, obesity/overweight and the benefits of good nutrition and physical activity and regular self-monitoring for those with diabetes. (This may include social marketing and targeted media public communication; providing accessible health information resources at community levels; active collaboration with personal health care providers to reinforce health promotion messages and programs; and joint health education programs with schools, churches, and worksites.)

What resources, activities or programs are currently available for diabetes prevention and control?

4. Mobilize partnerships to identify and solve diabetes and diabetes-related health problems. (This includes convening and facilitating community groups and associations, including those not typically considered to be health-related, in undertaking defined preventive, screening, and support programs; and skilled coalition-building ability to draw upon the full range of resources for improving community health.)

What resources, activities or programs are currently available for diabetes control and prevention?

5. Develop policies and plans that support individual and community-wide efforts to slow the rate of diabetes. (This includes worksite, school, and community development policies that support adoption of healthy lifestyles and involves leadership development; systematic community-level planning for diabetes improvement in all jurisdictions; development and tracking of measurable diabetes objectives as a part of continuous quality improvement strategies; joint evaluation with the medical care system to define consistent policy regarding prevention and treatment services; and development of codes and regulations to guide the practice of public health.)

What resources, activities or programs are currently available for diabetes control and prevention?

6. Enforce laws and regulations that protect and enable the provision of diabetes-related care and develop communities that promote healthy lifestyle behaviors and essential safety. (This may include development and use of diabetes registries, developing and enforcing land use policies, full enforcement of insurance codes; monitoring of medical services; and preventing discrimination due to diabetes.)

What resources, activities or programs are currently available for diabetes control and prevention?

7. Link people to needed diabetes screening and related follow-up, including regular foot care, vision care, nutrition counseling and assure the provision of health care when otherwise unavailable. (This may include ensuring effective entry for socially disadvantaged people into a coordinated system of clinical care; culturally and linguistically appropriate materials and staff to ensure linkage to services; ongoing “care management”; transportation services; targeted health information to at-risk population

groups; and technical assistance for effective worksite health promotion and diabetes prevention programs.)

What resources, activities or programs are currently available for diabetes control and prevention?

8. Assure competent public and personal health care workforce that understands the link between healthy lifestyles and chronic diseases and can provide leadership and support for community interventions and state of the art recommendations for the care of diabetic patients. (This may include education and training for personnel to meet the needs for public and personal health services; adoption of chronic disease prevention and care focus within all licensure and certification programs; active partnerships with professional training programs; and continuing education in management and leadership development programs for those charged with administrative/executive roles.)

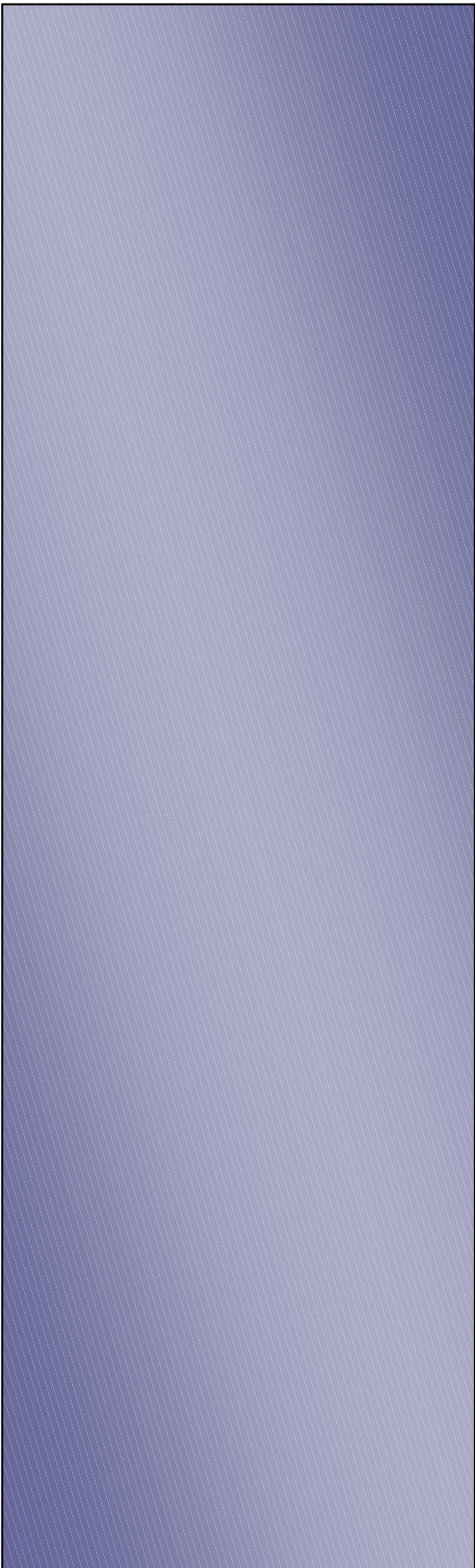
What resources, activities or programs are currently available for diabetes control and prevention?

9. Evaluate effectiveness, accessibility, and quality of personal and population-based diabetes and chronic disease. (This may include ongoing evaluation of diabetes and chronic disease programs, based on analysis of health status and service utilization data, to assess program effectiveness and to provide information necessary for allocating resources and reshaping programs.)

What resources, activities or programs are currently available for diabetes control and prevention?

10. Research for new insights and innovative solutions to chronic disease management, decreasing risk factors in communities and among individuals and increasing support and adoption of healthy lifestyle (This includes linkage to appropriate institutions of higher learning and research and an internal capacity to mount timely epidemiologic and economic analyses and conduct diabetes and chronic disease related control and prevention research.)

What resources, activities or programs are currently available for diabetes control and prevention?



Diabetes Prevention and Control Workshop: California

Step Two

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Background

Each of the organizations, programs, and capabilities comprising the local public health system makes a unique contribution to achieving the community's public health goals, including reducing the burden of chronic illness. Diabetes control and prevention efforts require the close integration of each of these contributions into a comprehensive strategy. As was described in the Step 1 discussion guide, the EPHS framework provides a way to organize programs and initiatives into mutually reinforcing elements of a cohesive program of action.

The Essential Services are:

11. Monitor health status to identify community health problems.
12. Diagnose and investigate health problems and health hazards in the community.
13. Inform, educate, and empower people about health issues.
14. Mobilize community partnerships to identify and solve health problems.
15. Develop policies and plans that support individual and community health efforts.
16. Enforce laws and regulations that protect health and ensure safety.
17. Link people to needed personal health services and assure the provision of health care when otherwise unavailable.
18. Assure a competent public health and personal health care workforce.
19. Evaluate effectiveness, accessibility, and quality of personal and population-based health services.
20. Research for new insights and innovative solutions to health problems.

This framework was used during Step 1 to develop and categorize an inventory of local public health system capabilities (activities and programs) relevant to the control and prevention of diabetes and its risk factors. For Step 2, participants will identify a set of activities and programs that together form a community-based strategy to reduce the incidence and severity of diabetes and its risk factors over a ten-year timeframe. Participants should select among the existing programs and activities identified in Step 1, and also propose new models or approaches that may contribute positively to diabetes prevention and control.

The questions below use the EPHS framework to walk participants through the development of their community's strategy:

Monitor health status to identify individuals and populations at-risk of diabetes; identify at risk populations and monitor population nutritional intake and physical activity and solve community problems.

Which of the existing activities or programs that you listed in Step 1 can be adapted to enhance the ability of the LPHS to identify those at risk for diabetes and its risk factors?

What new activities or programs can contribute to the achievement of this goal?

Investigate the presence of at-risk populations; screen for diabetes and identify opportunities for improving nutrition and physical activity levels.

Which of the resources, activities or programs that you listed in Step 1 would you like to use to enhance your ability to investigate the presence of at-risk populations, screen for diabetes, and identify opportunities for addressing risk factors?

What new activities or programs can contribute to enhanced investigation, screening, and identification of opportunities for addressing risk factors?

Inform, educate and empower people about the burden of diabetes, diabetes risk factors (e.g., obesity/overweight) and the benefits of good nutrition and physical activity and regular self-monitoring for those with diabetes.

Which of the existing activities or programs that you listed in Step 1 can enhance education and information dissemination on the benefits of physical activity, good nutrition, and maintaining an appropriate weight?

What new activities or programs can contribute to these efforts?

Mobilize partnerships to identify and solve diabetes-related health problems.

What existing partnerships and outreach efforts can enhance the LPHS' ability to identify and solve diabetes-related health problems?

What new partnerships and outreach efforts can contribute to enhancing these capabilities?

Develop policies that support individual and community-wide efforts to slow the rate of diabetes.

Which of the existing policy development efforts and community outreach initiatives that you listed in Step 1 can contribute to a reduction in the rate of diabetes onset in your community?

What new policy development efforts can enhance individual and community-wide efforts to reduce diabetes onset?

Enforce laws and regulations that protect and enable the provision of diabetes-related care and develop communities that promote healthy lifestyles and essential safety.

Which of the existing rules and regulations that you listed in Step 1 can enhance diabetes-related care and promote healthy lifestyles?

What new laws and regulations would enhance diabetes-related care and promote healthy lifestyles?

Link people to needed diabetes care and related follow-up including regular foot care, vision care, nutrition counseling as well as screening and assure the provision of health care when otherwise unavailable.

Which of the programs for improving clinical care for those with and at risk of diabetes that you listed in Step 1 can enhance access to diabetes care and health maintenance?

What new programs are necessary to improve performance in this area?

Assure competent public and personal health care workforce that understands the link between healthy lifestyles and chronic diseases and can provide leadership and support for community interventions and state of the art recommendations for the care of diabetic patients.

What existing programs and plans can enhance knowledge and capacity in the public and personal health care workforce – with special emphasis on chronic diseases in general and diabetes in particular?

What new programs can help to improve knowledge and capacity among personal and public health care workers in the areas of diabetes and related health conditions?

Evaluate effectiveness, accessibility, and quality of personal and population-based diabetes and chronic disease prevention and control efforts.

Which of the existing evaluation programs aimed at enhancing the effectiveness, accessibility and quality of diabetes control and prevention that you listed in Step 1 should be adapted to better meet diabetes objectives?

What new evaluation methods can be adapted to enhance the effectiveness, accessibility and quality of diabetes prevention and control efforts?

Research for new insights and innovative solutions to diabetes management, decreasing risk factors in communities and among individuals, and increasing support and adoption of healthy lifestyles.

Which of the existing programs, partnerships or outreach programs that you listed in Step 1 can enhance research for new insights and innovative solutions related to diabetes?

What new initiatives are required to better integrate research-based insights on diabetes into community-based programs for diabetes prevention and control?



Diabetes Prevention and Control Workshop: California

Step Three

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Step 3: Gap Assessment

You have completed Step One – Resource Assessment and Step 2 – Strategy Design. Your current task is to think about your group discussions in Step 1 and Step 2, and consider what this exercise has taught you about the strengths and shortfalls of your community’s public health capabilities.

We would like you to do two sets of rankings. First, using a ten-point scale and BLUE pen, please address the following questions about the current infrastructure in your community, in the context of what you learned during Steps 1 and 2. Then, using a RED pen and the same scale, please indicate the level you think your community needs to attain to address the chronic disease crisis posed by diabetes. For each of these questions, 10 represents the best achievable if resources were available to attain it, and 1 indicates that the function is not at all fulfilled in your community.

1. How would you rate your current community health assessments?

1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you think you are now and where you think you should be? What do you need to fill that gap?

- a) *Policies and procedures* If so, what kind?

- b) *Human resources (people)* If so, what kind and how many?

- c) *Information technology* If so, to add to or amplify an existing system or something else?

- d) *Equipment and supplies*

- e) *Other*

2. How would you rate the adequacy of your current plans for dealing with a serious chronic disease epidemic such as diabetes?

1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you think you are now and where you think you should be? What do you need to fill that gap?

- a) *Policies and procedures* If so, what kind?

- b) *Human resources (people)* If so, what kind and how many?

c) *Information technology* If so, to add to or amplify an existing system or something else?

d) *Equipment and supplies*

e) *Other*

3. How would you rate the surveillance and disease reporting systems currently in place?

1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you think you are now and where you think you should be? What do you need to fill that gap?

a) *Policies and procedures* If so, what kind?

b) *Human resources (people)* If so, what kind and how many?

c) *Information technology* If so, to add to or amplify an existing system or something else?

d) *Equipment and supplies*

e) *Other*

4. How would you rate the collaboration to manage integrated information systems with private providers and health benefit plans?

1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you think you are now and where you think you should be? What do you need to fill that gap?

a) *Policies and procedures* If so, what kind?

b) *Human resources (people)* If so, what kind and how many?

c) *Information technology* If so, to add to or amplify an existing system or something else?

d) *Equipment and supplies*

e) *Other*

5. How would you rate public health laboratory capability using technology to conduct rapid screening and high-volume testing?

1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you think you are now and where you think you should be? What do you need to fill that gap?

a) *Policies and procedures* If so, what kind?

b) *Human resources (people)* If so, what kind and how many?

c) *Information technology* If so, to add to or amplify an existing system or something else?

d) *Equipment and supplies*

e) *Other*

6. How would you rate the technical capacity for epidemiologic investigation of patterns of chronic disease such as diabetes?

1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you think you are now and where you think you should be? What do you need to fill that gap?

a) *Policies and procedures* If so, what kind?

b) *Human resources (people)* If so, what kind and how many?

c) *Information technology* If so, to add to or amplify an existing system or something else?

d) *Equipment and supplies*

e) *Other*

7. How would you rate the capacity to provide accessible health information at the community level?

1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you think you are now and where you think you should be? What do you need to fill that gap?

a) *Policies and procedures* If so, what kind?

b) *Human resources (people)* If so, what kind and how many?

c) *Information technology* If so, to add to or amplify an existing system or something else?

d) *Equipment and supplies*

e) *Other*

8. How would you rate the capacity for social marketing and targeted public communication?

1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you think you are now and where you think you should be? What do you need to fill that gap?

- a) *Policies and procedures* If so, what kind?
- b) *Human resources (people)* If so, what kind and how many?
- c) *Information technology* If so, to add to or amplify an existing system or something else?
- d) *Equipment and supplies*
- e) *Other*

9. How would you rate the capacity for joint health education programs with schools, churches, worksites, etc.?

1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you think you are now and where you think you should be? What do you need to fill that gap?

- a) *Policies and procedures* If so, what kind?
- b) *Human resources (people)* If so, what kind and how many?
- c) *Information technology* If so, to add to or amplify an existing system or something else?
- d) *Equipment and supplies*
- e) *Other*

10. How would you rate the ability to build coalitions and partnerships to identify and solve chronic disease problems?

1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you think you are now and where you think you should be? What do you need to fill that gap?

- a) *Policies and procedures* If so, what kind?
- b) *Human resources (people)* If so, what kind and how many?

c) *Information technology* If so, to add to or amplify an existing system or something else?

d) *Equipment and supplies*

e) *Other*

11. How would you rate leadership development in addressing chronic disease problems in your community?

1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you think you are now and where you think you should be? What do you need to fill that gap?

a) *Policies and procedures* If so, what kind?

b) *Human resources (people)* If so, what kind and how many?

c) *Information technology* If so, to add to or amplify an existing system or something else?

d) *Equipment and supplies*

e) *Other*

12. How would you rate systematic community-level planning for chronic disease control and prevention?

1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you think you are now and where you think you should be? What do you need to fill that gap?

a) *Policies and procedures* If so, what kind?

b) *Human resources (people)* If so, what kind and how many?

c) *Information technology* If so, to add to or amplify an existing system or something else?

d) *Equipment and supplies*

e) *Other*

13. How would you rate the monitoring of medical services for improved diabetes control?

1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you think you are now and where you think you should be? What do you need to fill that gap?

a) *Policies and procedures* If so, what kind?

b) *Human resources (people)* If so, what kind and how many?

c) *Information technology* If so, to add to or amplify an existing system or something else?

d) *Equipment and supplies*

e) *Other*

14. How would you rate the capacity to ensure effective entry for socially disadvantaged people into a coordinated system of clinical care?

1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you think you are now and where you think you should be? What do you need to fill that gap?

a) *Policies and procedures* If so, what kind?

b) *Human resources (people)* If so, what kind and how many?

c) *Information technology* If so, to add to or amplify an existing system or something else?

d) *Equipment and supplies*

e) *Other*

15. How would you rate the education and training for personnel to meet the needs for public health services?

1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you think you are now and where you think you should be? What do you need to fill that gap?

a) *Policies and procedures* If so, what kind?

b) *Human resources (people)* If so, what kind and how many?

c) *Information technology* If so, to add to or amplify an existing system or something else?

d) *Equipment and supplies*

e) *Other*

16. How would you rate the education and training for personnel to meet the needs for personal health care services?

1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you think you are now and where you think you should be? What do you need to fill that gap?

a) *Policies and procedures* If so, what kind?

b) *Human resources (people)* If so, what kind and how many?

c) *Information technology* If so, to add to or amplify an existing system or something else?

d) *Equipment and supplies*

e) *Other*

17. How would you rate the ability to evaluate diabetes and chronic disease related programs and services?

1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you think you are now and where you think you should be? What do you need to fill that gap?

a) *Policies and procedures* If so, what kind?

b) *Human resources (people)* If so, what kind and how many?

c) *Information technology* If so, to add to or amplify an existing system or something else?

d) *Equipment and supplies*

e) *Other*

18. How would you rate the ability to mount timely epidemiologic and economic analysis of diabetes and chronic diseases?

1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you think you are now and where you think you should be? What do you need to fill that gap?

a) *Policies and procedures* If so, what kind?

b) *Human resources (people)* If so, what kind and how many?

c) *Information technology* If so, to add to or amplify an existing system or something else?

d) *Equipment and supplies*

e) *Other*

19. You have told us you think you need additional resources to address diabetes and chronic disease related issues. Please rank your top three priorities:

1.

2.

3.

Appendix C

Interview Protocol

**ASSESSING CALIFORNIA’S PUBLIC HEALTH INFRASTRUCTURE
INTERVIEW GUIDE**

Introduction: Describe purpose of the project and sponsor. Provide confidentiality assurance. State that focus of project is on ten essential public health functions:

- 1. Monitor health to identify community health problems**
- 2. Diagnose and investigate public hazards in the community**
- 3. Inform, educate and empower people about health issues**
- 4. Mobilize community partnerships to identify and solve health problems**
- 5. Develop policies and plans that support individual community health efforts**
- 6. Enforce laws and regulations that protect health and ensure safety**
- 7. Link people to needed personal and health services and assure the provision of health care when otherwise unavailable**
- 8. Assure competent public health and personal health care workforce**
- 9. Evaluate effectiveness, accessibility, and quality of personal and population-based health services**
- 10. Research for new insights and innovative solutions to public health problems**

I. BACKGROUND

A. History of the respondent’s public health work

1. Roles and responsibilities
2. Changes in roles over time

B. The general policy environment

1. How would you characterize the general policy environment, that is, the way in which improving the State’s public health infrastructure is discussed and debated?
2. Have there been changes in the policy environment during the last year?

II. CURRENT AND MOST RECENT INITIATIVES

A. Description of the status quo – strengths and weaknesses (i.e., “gaps”) in ability to meet the 10 essential functions

1. Monitor and identify community health problems
2. Diagnose and investigate public health hazards
3. Inform, educate, empower people
4. Mobilize partnerships
5. Develop policies and plans
6. Link people to health services
7. Enforce laws and regulations
8. Assure competent workforce
9. Evaluate population-based health services
10. Research on insights and solutions

B. Describe your current initiatives aimed at strengthening your county’s ability to prepare for, and respond to, a major public health threat:

1. Factors that motivated the initiatives
2. Alternatives considered (probe why not pursued)
3. Goals of the initiatives
4. Anticipated outcomes of the initiatives
5. Measures of success
6. Strategies for evaluating or monitoring the initiatives
7. Resources allocated (staff, equipment, other)
8. How is function organized within county?
9. Barriers faced during development of the initiative

C. Sources of information motivating the initiative

1. Mechanisms used to understand the county's needs (e.g., formal needs assessments) and sources of information relied on in deciding which initiatives to pursue

- a. Names of groups or individuals consulted
- b. General strategies recommended by these groups

D. Strategies for implementing the initiatives

1. Surveys of public attitudes

2. Studies showing costs and benefits of selected and alternative strategies

3. Changes in strategy or planned changes since inception

4. Barriers to effective implementation

- a. Vocal opposition from stakeholders
- b. Other political barriers, including relationships with federal and state officials
- c. Legal challenges to the initiative
- d. Economic barriers
- e. Social/cultural barriers

5. Evaluation strategies

- a. Evaluation requirements and approach--outcome measures
- b. Identification of long-term and interim goals
- c. Specified process for implementation
- d. Analysis of strategies

E. Stakeholder roles

1. Role respondent played in developing and implementing the initiative

2. Anticipated future role for respondent

3. Previous respondent involvement

4. Perception of roles played by other key participants in the development and implementation process

F. Knowledge about other agencies' public health-oriented activities

1. Alternative strategies being pursued by other agencies
2. Intergovernmental cooperation at the federal, state, local or regional level

III. MEASURING THE LOCAL PUBLIC HEALTH SYSTEM INFRASTRUCTURE

Insert set of questions derived from indicators present to the expert panel.

IV. RELATIONSHIP BETWEEN STATEWIDE AND LOCAL INITIATIVES

- A. Historical relationship
- B. Predicted response from the state to current initiatives
- C. Evidence on the relative effectiveness of state vs. local strategies
- D. Adequacy of resources provided by state to meet county's needs

V. ECONOMIC AND FINANCIAL ANALYSIS (FOR FINANCE OFFICERS ONLY)

- A. FY03 expenditures on 10 essential functions
 1. Fill out attached matrix on current expenditures
- B. Estimates of resources required to fill gaps identified in II
 1. Fill out matrix on expenditures required to fill gap

VI. ADDITIONAL AREAS OF INTEREST

- A. Extent to which "dual use" nature of alternative investments is considered
- B. What, if anything, did you have to give up to address possibility of a smallpox outbreak?
- C. What, if anything, did you do in response to SARS?
- D. Communications issues among federal, state, and local agencies
- E. Roles for, and relationships with, private-sector stakeholders

- F. What types of things can you do now, in terms of public health functions and services that you weren't able to do prior to the CDC and HRSA cooperative agreements and other initiatives undertaken in the wake of 9/11?
- G. Remaining "gaps" in public health services
- H. Resources required to meet needs

VII. MISCELLANEOUS

- A. Available documentary material
 - B. Other potential respondents to interview

APPENDIX D
Smallpox Tabletop



“The Day After... in Los Angeles County, California”

Methodology

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CALIFORNIA PUBLIC HEALTH PROJECT SCENARIO METHODOLOGY

EXERCISE OBJECTIVES

The overall goal of this project is to assess the unmet needs of the California Public Health System as it seeks to address the ongoing and emerging challenges to the public's health and welfare.

In support of this project, the goals of this exercise are:

- To assist with strategic planning for a public health emergency
- To assess the degree of preparedness for a public health emergency
- To identify potential shortfalls in the ability to respond to a public health emergency (in this case, bioterrorism) in terms of a) human resources b) policies and procedures c) technical resources

Drawing on the existing literature and the advice of an expert panel we have prepared a framework for assessing components of the public health infrastructure and a set of performance indicators. Although we will use this exercise to measure performance according to those indicators, at this time there is no 'gold standard' for such performance. At the conclusion of the study, you will receive information that compares your community's readiness with the readiness reports from the other communities that participated in the exercises, along with an assessment from the expert panel regarding what constitutes an adequate response. However, please note that the identity of the other communities will not be revealed without the express consent of local health directors in those communities.

The exercise is structured in three parts. At the end of part 1, you will be asked to answer some question about the existing public health infrastructure in your community. This information will be combined with data gathered in one-on-one interviews and through the local health department preparedness inventory you completed in the fall of 2002. In part 2, you will be asked to consider – and deliberate upon -- a brief scenario describing a bioterrorism incident impacting the Los Angeles area. In part 3, you will be asked to reflect on the adequacy of those resources, and to identify any shortfalls in resources that became evident during the exercise.

BACKGROUND

Recent assessments of terrorist threats to the United States have focused on national capabilities for response under the control of the Federal Government. The establishment of the federal Department of Homeland Security exemplifies this substantive focus. The events of September 11 2001 made it clear that the capabilities of first-responders – principally at the state, county, and local level – are critical to ensuring early action to minimize casualties and restore vital services.

Any large-scale terrorist attack using chemical or biological agents would undoubtedly involve both Federal civilian and military response capabilities. It is also the case, however, that the *in place* public health infrastructure is the first line of defense in the detection, surveillance and response phases of consequence management and recovery.

The adequacy of organizational, resource, and interagency structures at the state and local level is thus of primary importance.

The public health system must meet bioterrorism challenges at the same time it fulfills its other responsibilities. Many claim it is not equipped to do this. After all, if the current public health infrastructure is under fiscal stress, how will it find resources to fulfill its responsibilities? What changes in the “basics” of public health system function will help to enhance both day-to-day and emergency response capabilities? What relationships between public health authorities and law enforcement agencies and others will need to be re-ordered to meet a potential bioterrorism challenge? What enhancements to the public health infrastructure are necessary? And what quantitative measures of capability shortfalls are useful in planning to close critical gaps? These questions, among others, are addressed in this project.

The public health system is organized to meet the needs of communities with a broad range of demographic, ethnic, and economic characteristics. The resource base of public health institutions is currently under some stress, as government funding seeks to meet the challenge of rising health care costs, meeting the needs of the uninsured, and addressing new requirements. Bioterrorism preparedness fit well into the “new requirements” category.

DEFINING TERRORISM and BIOTERRORISM

Over the years many different definitions of a terrorist, a terrorist act, and terrorism have been set forth (tailored to specific situations, studies, or political agendas). An effort has been made in recent years to develop a generally accepted working definition of the term, focusing on the act of terrorism without reference to the perpetrator. The *National Strategy for Homeland Security* characterizes terrorism as:

(A)ny premeditated, unlawful act dangerous to human life or public welfare that is intended to intimidate or coerce civilian populations or governments.

With this basic definition, international terrorism is an act perpetrated across borders or on a foreigner within the perpetrator’s country. Domestic terrorism is perpetrated in the attacker’s country of origin against a domestic target. *BIOTERRORISM* refers to the use of biological organisms as the weapon of choice by terrorists.

THE ESSENTIAL FUNCTIONS OF THE PUBLIC HEALTH SYSTEM

The literature on public health outlines ten essential functions central to the prevention, detection, analysis, and mitigation of key threats to the public’s health.

- a. Monitor health status to identify community health problems
- b. Diagnose and investigate public health hazards in the community
- c. Inform, educate and empower people about health issues
- d. Mobilize community partnerships to identify and solve health problems
- e. Develop policies and plans that support individual and community health efforts
- f. Enforce laws and regulations that protect health and ensure safety
- g. Link people to needed personal health services and assure the provision of health care when otherwise unavailable
- h. Assure competent public health and personal health care workforce

- i. Evaluate effectiveness, accessibility, and quality of personal and population-based health services
- j. Research for new insights and innovative solutions to public health problems.

These functions are carried out on a day-to-day basis, and are dependent on resource allocation decisions made by public and private agencies, and by state, local, and federal governments and by the nature of communities and the structures (assets) in them. The public health system is thus a complex amalgam of micro and macro-level decisions, which serve as the basis for “emergency” public health measures taken in anticipation of threats such as those posed by bioterrorism, as well as to support all other public health needs.

Bioterrorism necessitates a response by the public health system that has significant implications for resource allocation. A homeland security-centric discussion of public health system functions necessarily emphasizes a different balance of activities – focusing on critical factors in the mitigation of impacts caused by a deliberate attack using biological agents. As an incremental set of responsibilities, these new priorities will necessarily build on existing capabilities.

Improvements in public health system capabilities for handling bioterrorism also could contribute to the effectiveness of health, safety, and training efforts important to the maintenance of overall societal health and welfare. The dual-use quality of these investments thus presents us with an opportunity to improve both emergency response capabilities and day-to-day delivery of health care services to disadvantaged populations.

SCENARIO FRAME OF REFERENCE

The scenario used in the exercise focuses on particular aspects of the public health infrastructure, as it exists in local communities. Communities are being selected to cover urban, rural, and intermediate rural/urban combinations.

Communities have been selected to accurately mirror the diverse character of the state of California. Stakeholders identified in the exercise reflect groups active in the delivery of public health services.

This scenario is designed present public health authorities with only generalized warnings. This means that participants are to assume that terrorist attacks *have* occurred in the United States, post September 11 2001. The Anthrax attacks in Florida and the Washington D.C. area are also a part of the backdrop for these events, but no additional instances of biological weapons use have occurred.

Very little tactical warning of the attacks is provided. This is means that the communities involved have only a short period of time to react – making their responses critically dependent on the human and material resources at their immediate disposal. Finally, communities under attack vary according to their levels of preparedness and in the approaches they have adopted to protecting public health. Crisis responses reflect the widely divergent programmatic, demographic, and economic characteristics prevalent in the state. The timeline presented below illustrates the overall intensity levels presented in the scenarios, as well as the attackers potential impact and disruptive effect.

Smallpox Incident Timeline

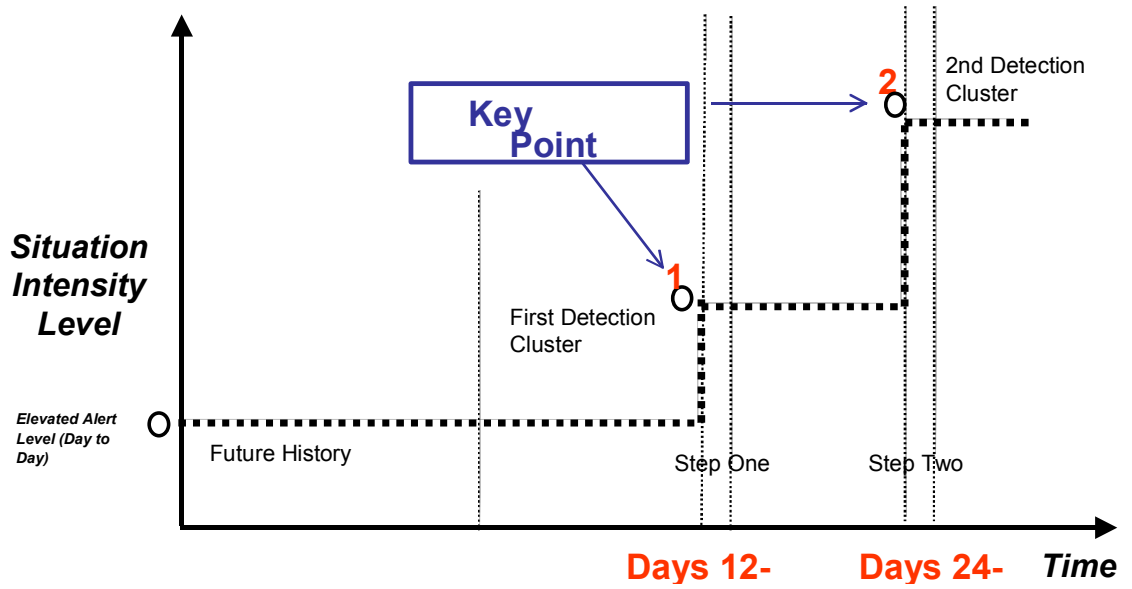


Figure 2. Smallpox Incident Timeline

BASIC STEPS IN THE EXERCISE

There are three steps in the exercise (see Figure 3). For each step two groups of participants are asked to perform the same tasks. The basic steps are as follows.

Step One – Groups are constituted as ad hoc community task forces on emergency medical services, and confront a bioterrorism crisis. These task forces are, of course, centered around existing consequence management plans and programs organized by the responsible public health officers. The assumption is that important local and state officials will augment such groups with parallel responsibilities for public safety and security during any significant bioterrorism incident.

Participants are asked to outline the decisions and responses they would make in order to implement existing contingency plans for dealing with a potential biological weapons incident. Groups are then asked to evaluate the adequacy of existing contingency plans – and in-place capabilities -- for dealing with the scenario as presented. Lastly, groups are asked to enumerate any and all capability shortfalls present.

Step Two – At the end of this step groups confront a *confirmed* smallpox outbreak. Considerable ambiguity is still present, however, on the exact scope and intensity of epidemic. Deliberations occur in the context of constraints on resources and knowledge concerning future cases. Participants are asked to respond to the situation in light of new developments, using the assets and resources available to their communities. As the outbreak worsens perceptibly, added emphasis is placed on the identification of critical gaps in capabilities that importance for mitigating the harshest public health outcomes.

Step Three – The Lessons Learned/Rank Ordering Step. During this step participants consider their experiences and are reorganized into new groups, with the task of identifying needed improvements and resources required.

The Day After Exercise Methodology

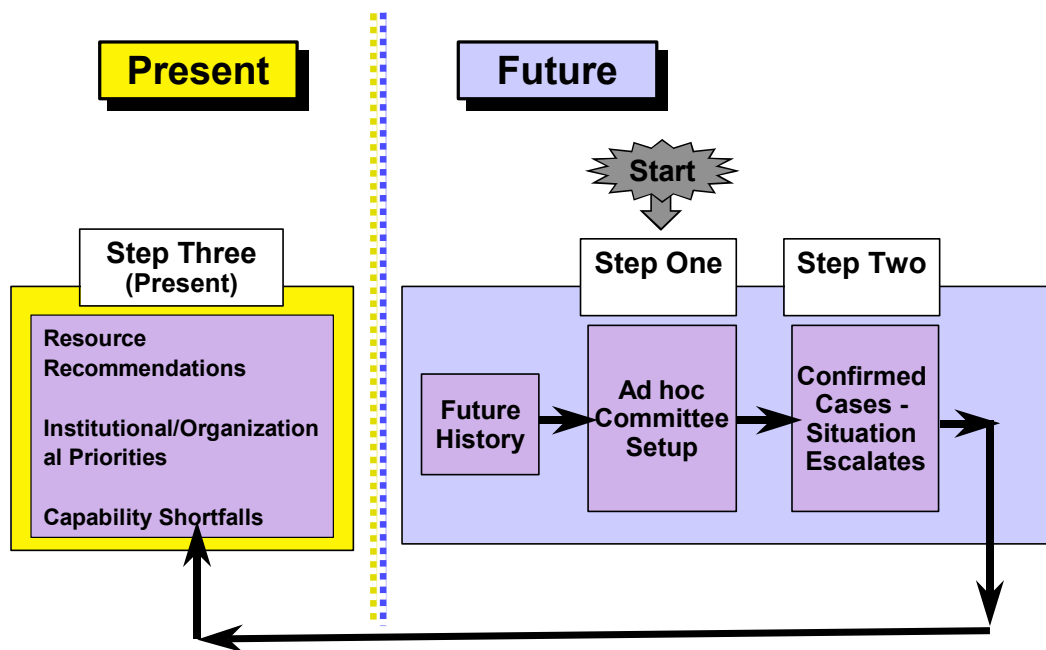


Figure 3. The Day After... Exercise Methodology

The project design team analyses the results gained from group deliberations. The Expert Panel charged with preparing a systematic gap analysis of needed public health system capabilities then considers these conclusions.



**“The Day After...
in Los Angeles
County, California”**

***Exercise
Homework***

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Exercise Homework: Self assessment of community public health infrastructure

During a three-day period in July, 20 individuals present to a local hospital's emergency room complaining of fever, night sweats, headaches, coughing, and joint pains. Initially, an untimely flu epidemic is suspected. However, after the third day, concern grows more acute: Additional patients are admitted with more severe symptoms, and laboratory personnel who analyzed patient blood samples begin reporting similar symptoms.

Several days later, ERs and physicians have seen enough cases to alert local and state public health authorities, who immediately undertake large-scale surveillance and dispatch an investigation team. The state health department also notifies the CDC [Centers for Disease Control and Prevention], at which point other federal agencies are alerted. It is quickly determined that all patients had visited a regional airport in the last 10 days. The governor orders the airport closed and quarantined. Fire and HAZMAT [hazardous materials] teams report to the scene to investigate and determine if there is a continuing threat. The National Guard is called to assist police with airport closure and crowd control.

Days later, seven of those affected die. All victims' blood specimens test positive for brucellosis.[a](#)

A statewide and international alert is activated urging anyone who passed through the airport to contact their local health department. News agencies report that brucellosis can be fatal, creating panic. Local ERs are crowded with patients complaining of flu-like symptoms.

Using the above scenario as a frame of reference, please rate the following *as they currently exist in your community*.

A rating of 1 means that this function is not at all fulfilled in your community. A rating of 10 represents the best achievable performance if resources were available to attain it.

Please rate:

1. Your current community health assessments?

(doesn't exist) 1 2 3 4 5 6 7 8 9 10 (best achievable) unable to rate

2. The adequacy of your current contingency plans for dealing with a serious infectious disease outbreak -- or a bioterrorism attack?

(doesn't exist) 1 2 3 4 5 6 7 8 9 10 (best achievable) unable to rate

3. The surveillance and disease reporting systems currently in place

(doesn't exist) 1 2 3 4 5 6 7 8 9 10 (best achievable) unable to rate

4. Completeness and timeliness of notifiable disease reporting by health care providers (doctors, hospitals, neighborhood clinics, commercial laboratories)

Doctors

(doesn't exist) 1 2 3 4 5 6 7 8 9 10 (best achievable) unable to rate

Hospitals

(doesn't exist) 1 2 3 4 5 6 7 8 9 10 (best achievable) unable to rate

Clinics

(doesn't exist) 1 2 3 4 5 6 7 8 9 10 (best achievable) unable to rate

Commercial Laboratories

(doesn't exist) 1 2 3 4 5 6 7 8 9 10 (best achievable) unable to rate

5. The current laboratory capacity to deal with a large infectious disease outbreak

(doesn't exist) 1 2 3 4 5 6 7 8 9 10 (best achievable) unable to rate

6. Existing communication protocols with EMS, fire and law enforcement regarding response to a public health emergency

(doesn't exist) 1 2 3 4 5 6 7 8 9 10 (best achievable) unable to rate

7. Existing communications channels for two-way exchange of information between the health department and providers during an outbreak (neighborhood clinics, local physicians, hospitals, neighboring health departments, and commercial laboratories)?

Neighborhood clinics

(doesn't exist) 1 2 3 4 5 6 7 8 9 10 (best achievable) unable to rate

Local Physicians

(doesn't exist) 1 2 3 4 5 6 7 8 9 10 (best achievable) unable to rate

Hospitals

(doesn't exist) 1 2 3 4 5 6 7 8 9 10 (best achievable) unable to rate

Neighboring Health departments

(doesn't exist) 1 2 3 4 5 6 7 8 9 10 (best achievable) unable to rate

Commercial laboratories

(doesn't exist) 1 2 3 4 5 6 7 8 9 10 (best achievable) unable to rate

8. The ability to enforce in-home isolation of large numbers of people, in order to contain an infectious disease outbreak

(doesn't exist) 1 2 3 4 5 6 7 8 9 10 (best achievable) unable to rate

9. The capacity of hospitals and other health care facilities to treat large numbers of individuals who become ill during an outbreak?

(doesn't exist) 1 2 3 4 5 6 7 8 9 10 (best achievable) unable to rate

10. The resources (i.e., staff, vaccine, facilities, training, funding) for implementing a rapid vaccination or chemoprophylaxis program?

(doesn't exist) 1 2 3 4 5 6 7 8 9 10 (best achievable) unable to rate

11. The adequacy of mutual aid agreements with other local public health agencies for assistance in times of emergency

(doesn't exist) 1 2 3 4 5 6 7 8 9 10 (best achievable) unable to rate

12. The relationships with local news media outlets that could disseminate accurate information during a public health emergency

(doesn't exist) 1 2 3 4 5 6 7 8 9 10 (best achievable) unable to rate

13. The relationships with community-based groups that can communicate with hard-to-reach groups during a public health

(doesn't exist) 1 2 3 4 5 6 7 8 9 10 (best achievable) unable to rate

14. The relationships with the Red Cross or local VOAD (Voluntary Organizations Aiding in Disasters)

(doesn't exist) 1 2 3 4 5 6 7 8 9 10 (best achievable) unable to rate

15. Overall capacity of your overall public health workforce

(doesn't exist) 1 2 3 4 5 6 7 8 9 10 (best achievable) unable to rate

16. Ability to maintain continuity of important public health functions during a public health emergency

(doesn't exist) 1 2 3 4 5 6 7 8 9 10 (best achievable) unable to rate



**“The Day After...
in Los Angeles
County, California”**

***Future
History***

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California Public Health System Project

Future History – Winter 2004

THE WAR ON TERRORISM – 2002-2003

The post 9/11 U.S. effort to mobilize the international community in a global effort to combat the growing threat of terrorism has focused on thwarting the efforts and diminishing the capabilities of global terrorist organizations and in particular Al Qaeda. As a result of these efforts, a broad and globally coordinated counter terrorism campaign has been launched, achieving varying levels of success.

The Still Significant Al Qaeda Threat

- Al Qaeda has managed to reconstitute some of its capabilities following its loss of sanctuary in Afghanistan. Links between the terrorist group and transnational criminal and terrorist organizations seem to have enabled a much more robust rebuilding of its capacities. Anticipating this phenomenon, law enforcement and national security authorities in Europe, Asia, and the United States have sought to coordinate intelligence and law enforcement investigative data in order to discover and penetrate isolated terrorist cells. Estimates on the extent of links between Al Qaeda and other fundamentalist Muslim groups are contentious, as is the exact number and location of remaining Al Qaeda fighters.

Potential Sources of Terrorism Risk for the United States and its Allies

- There is a concern that Al Qaeda may have shared its expertise with domestic terrorist groups, and remaining international terrorist cells. There is also a worry that unrelated groups might seek to take advantage of the terrorist-focus to perpetrate “copy cat” attacks. The exact scope and nature of this threat is contentious among analysts.

TERRORISM AROUND THE WORLD

Terrorist incidents around the world have helped to keep threat perceptions vivid in the eyes of the general public. It is nonetheless the case that most incidents seem tied to exploiting the weaknesses of some of the U.S.’s weaker partners in the war on terror. Incidents listed below fall into this category.

- Afghanistan – The Karzai government continues to suffer from guerilla attacks from small groups of fighters loyal to the former-Taliban regime. The national unity government still suffers from factional fighting – leading some observers to doubt its long-term survival prospects.
- Philippines – The Abu Sayyaf Group (ASG) continues to survive in spite of repeated exploratory attacks by Philippine armed forces units aided by Australian and U.S. advisers. Kidnapping of westerners continues to plague thinly inhabited islands in the Philippine archipelago.

- Israel and Palestine – In spite of international hopes, no new ceasefire has been achieved between Palestinian fighters and the Israeli government. The re-election of the Likud government led by Ariel Sharon caused some to despair of any real progress in the Palestinian-Israeli conflict. The apparent collapse of the “Roadmap” and new suicide bombings have heightened tensions and calls for international intervention.

STRATEGIC DEVELOPMENTS

Major events in the world can have causal importance in the onset, frequency, and geographic distribution of terrorist violence. Note here is taken of strategic developments which alter the context of the terrorist threat to the United States and its closest allies.

Iraq – The successful campaign against Saddam Hussein gave way to an acrimonious debate within the UN over the post war administration of Iraq. UN inspections restarted under a new UN Security Council resolution, and have confirmed the presence of chemical weapons at various locations north of Baghdad. In spite of prior expectations, the U.S. and Britain have initiated discussions on a framework arrangement for peace between Israel and the Palestinians. Russian scientists rumored to be in contact with the former Hussein regime still eluded capture – and the disposition of smallpox believed to be in their possession is not known.

- Saudi Arabia – Al Qaeda financial backers in the Kingdom have been identified by U.S. intelligence officials. Despite this fact the Saudi Government refused to prosecute key involved persons. U.S. – Saudi relations have suffered as a result. Popular Saudi support for the Palestinian Intifada – and for Islamic fundamentalist movements elsewhere in the world – continue to concern U.S. and British government officials.
- Iran – Iran’s inclusion in the “Axis of Evil” has intensified a previously simmering antagonism with the United States. Iranian reformers have been prevented from revising policies of support for Hezbollah and Hamas. Iranian Revolutionary Guard links with terrorist cells on the West Bank and Gaza parts of Palestine may be escalating.
- Northeast Asia - The concern about future developments in North Korea produced by Pyongyang's October 2002 admission that it was building a uranium isotope enrichment facility has not subsided. While the rhetoric between North Korea and the United States toned down markedly when Pyongyang announced in June (2003) that it would "temporarily" halt its spent fuel reprocessing efforts, tensions in the region remain high. South Korea, Japan, and China have all sought to persuade North Korean leaders to agree to a permanent resolution of the nuclear issue. No real progress has been achieved, however. As a consequence there are indications that the United States is considering using military force to effect curtailment of the North Korean program, in spite of the obvious danger that such actions could pose to South Korea’s civilian population.

TERRORISM IN THE UNITED STATES

US and State Government Preparations

The Department of Homeland Security (DHS) was formally established in March 2003. Major governmental agencies integrated into the new DHS structure

include: The Federal Emergency Management Agency (FEMA), the Coast Guard, the Customs Service, the Immigration and Naturalization Service, the Transportation Security Agency, the Animal and Plant Health Inspection Service, and the National Infrastructure Protection Center (NIPC) among others.

The Office of Homeland Security has been retained in a direct advisory capacity for the president on national strategies for homeland defense. DHS has assumed the responsibility for drafting a national plan for bioterrorism defense – highlighting potential attacks using highly communicable diseases. In this capacity, DHS is involved in extensive liaison with the states as a part of an initiative to augment local public health capabilities. The Smallpox vaccination program designed to immunize public health personnel and first responders against the disease has continued. Controversies over the vaccine's risks continue to slow the rate of vaccination, however.

Terrorist Incidents

- (November 12, 2003) A bomb exploded in New York City at La Guardia Airport. Two people were killed and a further 15 were wounded. The explosive device scattered shrapnel over a wide area, causing significant damage to loading facilities and to 2 aircraft at departure gates. The incident triggered the shutdown of the entire airport and the evacuation of passengers and support personnel from the facility. Investigation by federal authorities later tied the incident to a suspected terrorist cell based in New Jersey that was suspected of ties with Al Qaeda operatives in the Middle East.
- (December 12, 2003) A pipe bomb exploded in the mailroom at the Los Angeles Times headquarters. A note left at the scene identified the perpetrators as followers of an obscure Muslim cleric loyal to Osama bin Laden. Following the explosion a warning was phoned in to an L.A. Times office stating that this was the first a series of attacks designed to “show Americans what it is like to feel true fear.” Subsequent investigation failed to identify a perpetrator for the attack. The bomb's design was similar to others widely available on the World Wide Web.
- (January 15, 2004) A suicide bomber detonated a device while standing outside of city hall in Santa Monica, California. The bomb did extensive damage to the building and to surrounding facilities. Three persons were killed and a further 10 seriously injured. A coded message was left with the local ABC television affiliate stating that this was “another attack against complacent Americans” to show them the realities of war.”
- (February 15, 2004) Raids by federal and New York City law enforcement agencies were conducted against 4 targets in Queens, Manhattan, Brooklyn, and the Bronx. Among those arrested were 3 persons on the FBI's most wanted list. These individuals were known to have associations with Al Qaeda-related fund raising front organizations. In one of the raided apartments was discovered a “planning document” for a future attack on targets located in central and Southern California. Information from a computer seized at a second site corroborated this planning and mentioned

a “home run” attack that would shake the US Government “to its foundations.”

Rumors and “Copy-Cat” Attacks

While concerns on the potential for biological weapon attacks on the United States has grown, no cases beyond the 2002 Anthrax attacks in Florida and in the Washington DC area, have been detected. Smallpox vaccinations of medical personnel and first responders (firefighters, EMTs, etc.) have begun, though negative health reactions among some early participants slowed implementation of the initial program.

Rumors of biological weapon discoveries, and “nuisance” attack using otherwise innocuous white powders and noxious liquids have occurred, but in each case have proven to be harmless. Nonetheless, conventional terrorism has emerged as a significant domestic problem. Some events that exemplify this new trend include:

- (November 21, 2003) 12 members of a white supremacist militia group were arrested outside of Golden Gate Park in San Francisco. The group was found to be in possession of automatic weapons and plastic explosives – and to have a map showing the locations of tourist rest areas and local landmarks.
- (December 17, 2003) 5 members of a Virginia militia group were arrested after they were discovered preparing home-made mortars for shells that, based on sketches and purchase orders, appeared designed to hold cyanide pellets and a chemical reagent.
- (January 25, 2004) A misdiagnosis of chickenpox as smallpox at a Los Angeles area hospital led to a twenty-four hour quarantine and the parallel closure of a neighboring health center due to the isolation of potentially exposed persons. Subsequent analysis using data from “still-experimental” syndromic surveillance systems failed to reveal the appearance of broader evidence of a smallpox outbreak. Legal action launched by persons detained in the hospital against their will, and by medical staff concerned at their own liability for decisions made during the quarantine, led to an investigation by public health officials into the adequacy of their existing contingency planning for bioterrorism threats.
- Leaks of information from the Department of Homeland Security and the California Governor’s office seemed to indicate that both levels of government had information about a potential biological weapons attack on important landmarks in the State. Official denials of this story did little to diminish media interest in the case. Unauthorized “off the record” reports by government officials at all levels pointed to “unspecified evidence” that a group had been planning to use a biological weapon at some point in the recent past.

Problems in Alert and Warning

Obtaining unambiguous alerts of terrorist, or bio-terrorist attack is extremely difficult. The covert nature of terrorist planning is exacerbated by the disturbing lack of useful systems for tracking the activities of potential attackers. Information exchange programs involving federal, state, and local governments continue to grow – as does the realization that agencies do not yet have a high enough level of trust to achieve near-term breakthroughs in communication. The relative rigidity of the National Homeland Security Alert framework – alongside a lack of resources at the local level – continues to impede progress.

THE PUBLIC HEALTH CONTEXT IN CALIFORNIA

As with other state health departments, the California Department of Health Services has spent the last year working to help the public health community build its terrorism preparedness and response efforts. During Summer 2003, substantial resources were devoted to reporting on the use of the over \$70 million in public health and hospital preparedness funds received from the U.S. Department of Health and Human Services (HHS) over a year ago.¹ The Department of Health Services also exercised a smallpox response plan, which was first submitted to the Centers for Disease Control and Prevention in December 2002². Assessments of overall preparedness to date have revealed a number of findings related to current preparedness:

Most of the local health departments (58 county and 3 city jurisdictions) have forged new ties with other first responder entities in their communities, but exercises have demonstrated substantial remaining barriers to optimal cooperation and communication between these groups despite the existence of the Standardized Emergency Management System. State and local health departments are continuing to work under less than optimal staffing levels, as they have still not found qualified individuals to fill many of the new positions created using the HHS funds. Vacancies are particularly common for epidemiologist and public health nurse positions.

Much attention has been devoted to building disease reporting and surveillance capacity in order to help ensure more rapid identification of natural and manmade disease outbreaks. While a few communities have successfully developed sophisticated electronic data transfer systems that link community healthcare providers and laboratories to the health departments in real-time, others continue to receive disease reports by mail or phone, and only intermittently.

State and local health departments' efforts to enhance hospital preparedness around the state have been hindered by the relatively small amount of preparedness funding received by most hospitals. Getting hospitals to engage in preparedness exercises has been particularly challenging in the rural areas of the state. Many hospitals have not yet developed the decontamination and isolation facilities mandated through the state's terrorism response plan. Moreover, exercises conducted in various locations throughout the State indicated a disturbing shortage of surge capacity in many areas, which would be required to care for patients in the event of a large-scale disease outbreak or terrorist attack.

¹ During the same time period, a separate public health and hospital preparedness grants totaling over \$28 million were made to the Los Angeles County Department of Health.

² California Department of Health Services. 2003. Smallpox: California's public health activities. Available online: <http://www.dhs.ca.gov/ps/ddwem/environmental/epo/PDF/Smallpox%20Activities.pdf>. Accessed February 10, 2003.

While the state health department has developed a plan for public risk communication in the event of a terrorist attack, this plan has yet to be tested on a large scale. Small-scale exercises revealed that the public still has some mistrust of risk-related messages from state officials.

The state's vaccination of first responders for smallpox continues, with approximately 60% of the initial target group vaccinated as of August 1. As in other states, although the number of adverse reactions that have occurred is no higher than expected, several state healthcare professional and consumer organizations have publicly voiced concerns over potential expansion of the vaccination effort.

Testing of the state's ability to distribute the National Pharmaceutical Stockpile (NPS) revealed some ambiguity in agreements with neighboring states pertaining to use of the NPS in the case of a multi-state emergency. While California's emergency-related public health laws are generally more sophisticated than those of other states due to a past need to address natural disasters, there is still some lack of clarity related to state versus local roles and responsibilities in a crisis.

In addition to their terrorism preparedness work, the state and local health departments have just ended a summer during which they were under elevated alert status for West Nile Virus in nearly 20 counties, although the number of human cases identified remained low [there were 0 cases in CA before 2003]. Additionally, salmonella outbreaks have occurred in 10 California communities during the past several months, necessitating small-scale—yet resource intensive—epidemiologic investigations that crossed county lines. Now, many health departments are focusing on SARS, the latest emerging infectious disease to cause a worldwide epidemic.

While their work has been punctuated by the need to prepare for possible terrorist attacks and emerging infectious diseases like West Nile Virus, the local health departments continue to struggle in addressing the day-to-day needs of the communities they serve with limited resources. Nearly 20% of Californians are uninsured and are largely dependent on the local public health safety net for their healthcare,³ although anticipated health services budget cuts for FY 2004 have necessitated a rearrangement of many communities' public health clinic systems as well as the need to negotiate additional contracts with private providers to expand the capacity to provide basic services. HIV/AIDS rates continue to rise in several urban and border areas, necessitating resource-intensive health education and testing campaigns. The health departments are also gearing up to monitor another influenza season, which is expected to be more severe than that experienced in winter 2002-2003. The threat of SARS further complicates the upcoming flu season.

The Department of Defense has also sought to reorganize its capabilities to assist the federal government in the case of domestic bioterrorism emergencies. It is commonly acknowledged, however, that state and local public health capabilities constitute the bulk of resources available to detect, contain, and recover from disease outbreaks caused by deliberate attacks using biological agents.

³ Mills R. 2002. Current population reports: health insurance coverage 2001. Available online: <http://www.census.gov/prod/2002pubs/p60-220.pdf>. Accessed February 7, 2003.



“The Day After... in Los Angeles County, California”

Step One

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February 2004

Washington and Ottawa (February 6) – U.S. and Canadian intelligence intercepts reveal the possible existence of a Canadian-based Al Qaeda planning cell focused on developing the capability to “strike behind the lines” in the United States with biological and chemical agents. The available evidence points to the likely existence of active Al Qaeda cells in Montreal, Vancouver, and possibly also Toronto.

Indonesia (February 8) – The U.S. Ambassador reported information indicating that Islamic extremists in Indonesia, aided by funds and other support from Al Qaeda, will soon increase the magnitude and character of their anti-government activities in Indonesia and assistance to global Al Qaeda activities. One of the police raids that produced this evidence also turned up several forged U.S. and Canadian passports.

Washington (February 10) – Assessment of evidence uncovered in Iraq suggests that two former Russian bioweapons scientists had been aiding the Iraqi biological weapon program substantially and that Iraq may have obtained a sample of smallpox through these scientists. The location of the Russian scientists and the smallpox samples cannot be determined.

Manchester, UK (February 13) – Police raid the offices of a radical Islamic study group whose files list an unusually large number of doctors and other individuals with positions or access to medical and medical research facilities. The raid provides information indicating that the organization had received funds from suspicious sources in France and Al Qaeda front organizations in Saudi Arabia and Egypt.

Montreal (February 16) – A Royal Canadian Mounted Police (RCMP) raid on a mosque in Montreal turns up several locked trunks containing three chem-bio protection suits, laboratory equipment suitable for growing biological agents, and manuals for producing Ricin and other chemical warfare agents. Chemical and biological analysis of the suits, two of which have been damaged and repaired, reveal traces of anthrax and Ricin. The two individuals who stored the trunks at the mosque have been identified and it is established that they entered the country illegally using forged passports. Their current whereabouts are unknown.

Washington (February 24) – A newly analyzed series of National Security Agency (NSA) intercepts reveals that planning has been underway for some time – under the direction of an Al Qaeda cell based in France with substantial contacts in England and Canada – to develop and deploy the capability to launch biological and chemical terrorism attacks against “the U.S. military and its great cities” in part to demonstrate that U.S. overseas deployments could be strategically disrupted by such attacks.

The intercepts also indicate that:

- Sometime in the last few months, individuals and equipment related to these capabilities have entered Canada through both East and West Coast cities.
- Six major U.S. port cities – Newport News, Galveston/Houston, Seattle, San Francisco/Oakland, Los Angeles/Long Beach, and San Diego – and nearby military bases are believed to be the prime targets for possible attack.

On the recommendation of the Secretary of the U.S. Department of Homeland Security, videoconferences are scheduled with local and state officials and relevant law enforcement and emergency response personnel in all of the cities and their respective states.

Private messages from the DHS Secretary to the Governors of California and Washington indicate that the intelligence includes “some information” that increases the likelihood that West Coast cities are “a preferred target” because of the increasing tensions in Northeast Asia.

Washington and Sacramento (February 25) – A videoconference of high-level federal, state, and local officials assess the recently acquired intelligence information on a possible terrorist chem/bio threat against California port cities and other strategic areas and agreed that coordinated decision-making was urgently needed at the federal, state, and local levels. The group articulated a particular need to address chemical or biological agent detection capabilities in California and the medical services dimension of the local and regional response to the prospect of an attack. They also articulated the need not to overreact, as they had previously received harsh criticism for responding to a cluster of pulmonary illnesses as if it had been inhalation anthrax.

The group decided that expanded chemical and biological agent detection efforts would be initiated in the Long Beach and East Bay port areas. In addition, it was decided that the California Department of Health Services should publish an advisory to both emergency rooms and primary care physicians (in parallel through HMOs) throughout the state emphasizing the importance of reporting any Smallpox-like illnesses to the local health department.

The Los Angeles County Department of Health Services was tasked to provide technical assistance to rural communities throughout the area that lacked fully automated syndromic surveillance assets. It was anticipated that a pilot program of web-based data collection could be deployed on an emergency basis at selected area hospitals. The health services department was also asked to prepare a plan for deploying epidemiology personnel to hospitals with potentially suspicious clusters of disease symptoms.

Los Angeles (March 1) – On the afternoon of March 1 the following information came to the attention of health officials in Los Angeles County and the California Department of Health Services through a series of informal communications:

- Patient 1:
 - On February 27, a 21-year-old female student (Patient AB) at Cal State, Los Angeles presented to the Student Health Center with a fever, chills, and headache. She gives a history of a sister with the “flu”. A nasopharyngeal swab for influenza is performed. She is sent home with instructions to call for results, and with Tylenol with codeine for pain and fever.
 - On February 28 the student returns to the Student Health Center with continued fever, and a rash on her face and arms. She is sent to White Memorial Hospital and admitted for observation with diagnoses of possible chickenpox versus drug allergy (she had taken codeine). The influenza test from her previous visit was negative.
 - On March 1 an infectious disease consult is obtained on the student to verify a diagnosis of chicken pox, and to see if any isolation was warranted. The consultant notices that the timing and pattern of the rash meet the three major diagnostic criteria for smallpox, so he isolates the patient and contacts the Los Angeles County Department of Health Services that coordinates sample collection by a vaccinated laboratory worker.
- Patient 2:
 - On February 27, a 40-year-old maintenance man (Patient CD) at the Biltmore Hotel presented to the Northeast Community Clinic with fever 102 and vomiting. He speaks limited English and there is no interpreter available. He improves with antiemetics and is sent home with a diagnosis of viral syndrome.
 - On February 28, he is brought into Olive View Medical Center by ambulance, now with fever, severe headache and rash, and is admitted with a presumptive diagnosis of meningitis.
 - On March 1 he dies, with cultures/diagnostic tests negative for *N. meningitis*, along with other bacterial pathogens. An autopsy is scheduled for March 2.
- Patient 3:
 - On February 28, a 42-year-old businessman (Patient EF) is seen at Kaiser Permanente, West LA with a fever, headache and backache and vomiting. He had been on a recent business trip to Asia, and is admitted with a presumptive diagnosis of malaria.
 - On March 1 he has a negative test for malaria, no response to empirical therapy, and is beginning to develop a papular rash on his face, arms, and legs. Two other patients have appeared at the Kaiser Permanente Medical Offices with fevers and rashes on their extremities, and the practice’s system picks these three cases up, and the Los Angeles County Department of Health Services is notified.

Los Angeles Co. officials wonder if similar cases are presenting elsewhere.

A hastily arranged videoconference involving Los Angeles Co. and state health officials assesses the possibility that they are seeing early evidence of a bioterrorism attack. They also address whether they could be seeing the early manifestation of a broader biological weapons attack on the greater Southern California area, given the proximity of Long Beach harbor.

After considerable discussion the group agreed that coordinated decision-making was urgently needed to address the medical services dimension of the situation while laboratory confirmation of suspected smallpox in Patient AB proceeds. The CDC is notified of the situation and asked for assistance in order to fully characterize the disease outbreak.

The group decides that representatives of Los Angeles County and CA-DHS [and appropriate local representatives of federal government agencies] – for now to be given the deliberately innocuous title of the *ad hoc Los Angeles County Task Force on Public Health Emergency Services* – should convene that evening in Bakersfield to:

- Begin looking for additional patients with rash illnesses or unexplained fever in other County area hospitals;
- Develop a recommended list of other local medical services actions that need to be initiated at this time;
- Develop a contingency media strategy in the event there is a need to respond to media inquiries on the situation; and
- Provide recommendations on other issues that need to be sent forward for decision in state and federal venues.

After further discussion it is agreed that the ad hoc Task Force would meet at 9:00 pm that evening at the Department of Health Services in order to draft an interim response plan of action to deal with the possible Smallpox outbreak.

Sacramento (March 2) – The State of California Joint Information Center (JIC) and the Standardized Emergency Management System (SEMS) are activated.

Step One Instructions: How to Proceed

1. You will have sixty minutes to complete your deliberations on Step One.
2. You are members of the *ad hoc Los Angeles County Task Force on Public Health Services* made up of representatives from LA County and CA-DHS.
3. The group leader will begin by canvassing participants on the initial steps that they would take to deal with a public health problem similar to that presented.
4. A facilitated discussion will then take place, during which the group leader will lead a conversation assessing the capabilities of the public health system for dealing with an outbreak of infectious disease. This discussion is structured by questions designed to examine the local public health infrastructure's capacity for implementing responses in categories made up of the 10 Essential Public Health Functions.
5. The group leader will summarize participant deliberations for presentation at the plenary session following.

2 March 2004

MEMORANDUM FOR: County Board of Supervisors, Los Angeles County
Secretary, California Office of Homeland Security
Director, California Department of Health Services

FROM: Director, Ad Hoc Los Angeles Co. Task Force on Public Health Services

SUBJECT: Health and Medical Services Issues Related to Emerging Smallpox Concerns

OVERVIEW

This memorandum outlines a response framework for management of the suspected Smallpox outbreak in Los Angeles County.

The focus is on assessment and implementation of contingency plans for public health responses to the emergency. Two categories of issues are presented – concerns regarding the existence of contingency plans, and resources – focusing on implementing plans and programs and detailed issues relating to the adequacy of the plan and resources in the current situation. Identification of “work-arounds” for short-term problems is also important.

Monitor health status to identify community health problems

1. Have you previously identified which populations are especially vulnerable to infectious disease outbreaks?

2. Is there a surveillance system and/or other systems specifically capable of timely reporting of a bioterrorism attack or infectious disease outbreaks?

____ A. Yes. (How well does it work? Has it been tested? What is known about its timeliness and completeness?)

_____ B. No. Explain.

3. Does the public health department receive notices from the CDC and the state health department through the Health Alert Network?

_____ A. Yes. How are these messages received and acted upon?

_____ B. No. Please Explain.

Diagnose and investigate public health hazards in the community

1. Are there enough trained staff to investigate public health hazards and health problems in the context of a serious infectious disease outbreak?

_____ A. Yes. (What kinds of people are they, and are they familiar with the symptoms and infection characteristics of smallpox?)

_____ B. No. Explain. Can you get access to additional personnel if needed?

2. Does the health department have the necessary laboratory capacity to perform the testing and analyses necessary for the investigation of an infectious disease outbreak?

_____ A. Yes. Do the labs have surge capacity to handle a large number of requests for analyses?

____ B. No. Do they have access to external laboratory capabilities in a neighboring jurisdiction or at the state level (perhaps arranged through a memorandum of agreement)?

3. Are other entities (e.g., hospitals, doctors, community clinics) actively involved in the diagnosis and investigation of public health problems in the community?

____ A. Yes. Specifically, which other groups are involved? How?

____ B. No. Explain.

4. In the context of active disease surveillance, what communications channels exist to facilitate the flow of information to and from the public health department and healthcare providers for active surveillance?

Inform, educate and empower people about health issues

1. What special relationships, if any, have been developed with broadcast and print media outlets to facilitate the release of public service announcements during emergencies?

2. Have public service announcements been prepared to communicate appropriate risk behaviors and contingency plans in the event of a bioterrorism attack?

_____ A. Yes. What types of messages have been prepared? Are the announcements available in languages other than English? Which ones?

_____ B. No. Explain.

3. What, if any, formalized arrangements exist for integrating community-based organizations in risk communications?

Develop policies and plans that support individual and community health efforts

1. What sort of prior agreements govern the roles of community-based organizations in the event of a bioterrorism attack, or an infectious disease outbreak (e.g., quarantine or isolation programs, provision of mass vaccination)?

2. Do consortia of government agencies and community-based organizations exist for the fostering of trust relationships with communities with historically troubled contacts with the government?

_____ A. Yes. Explain.

_____ B. No.

Enforce laws and regulations that protect health and safety

1. Have you recently reviewed the laws and regulations that guide public health during an emergency?

_____ A. Yes. When?

_____ B. No. Explain.

2. How clear are you about the legal authorities that govern your actions during a public health emergency?

3. What plans exist for law enforcement's imposition of a quarantine? What is the role of law enforcement?

4. Is there a plan to vaccinate first responders on an as-necessary basis against smallpox?

_____ A. Yes.

_____ B. No. Explain.

Link people to needed personal health services and assure the provision of health care when otherwise unavailable

1. Which facilities or providers, if any, have the capacity and equipment for the isolation of individuals in the event that isolation and quarantine are necessary?

2. Is there a specific plan ensuring that the public receives vaccination and/or treatment during a public health emergency?

_____ A. Yes. Explain.

_____ B. No. Explain.

3. Have specific contingency plans been designed to ensure the provision of vaccine, isolation and quarantine, and treatment to members of vulnerable populations (e.g., those without insurance, or members of language or minority groups) in the case of an infectious disease outbreak?

_____ A. Yes. If yes, please explain.

_____ B. No. Explain.

Assure a competent public health and personal health care workforce

1. Have (a) the public health workforce, (b) health care providers (doctors and nurses), (c) and/or volunteer staff from community based organizations, received training on their specific roles during an infectious disease outbreak or a public health emergency?

_____ A. Yes. Explain.

_____ B. No. Explain.



“The Day After... in Los Angeles County, California”

Step Two

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March 2004

OVERALL CONTEXT

The public health situation has worsened – with the probable but not yet confirmed smallpox outbreak in Los Angeles County.

Federal and state public health authorities have deployed extensive human, diagnostic, and material resources to the Los Angeles County area. Discussion has begun of whether a state of emergency should be declared for the region, and whether the federal government should take over primary administration of the public health response.

State officials and local public health entities are implementing the emergency response plans, and are in receipt of significant vaccination supplies and disease monitoring resources.

SITUATIONAL DETAIL

A multi-agency public health response has begun. This response includes the following measures:

- Public health response teams are mobilized, and vaccinated if they have not been before;
- An epidemiological investigation has begun, including isolating and interviewing the suspected cases, identifying those who may have come into contact with infected persons;
- Active surveillance is initiated to bring other cases to light, and existing syndromic surveillance reports are scrutinized more closely;
- Vaccination clinics are set up so they can be opened if required;
- Public health officials continue to have difficulty obtaining a diagnosis of the agent causing mass illness;
- Information from surveillance systems continues to “trickle” in as the lack of standardized reporting formats impedes centralized data integration and detection of patterns in the disease outbreak;
- Epidemiologists assigned to work on the outbreak prove skilled and readily able to liaise with local officials. One problem that emerges is that some of the assigned staff had previously refused a smallpox vaccination or were ineligible. This decreases the number of trained staff wishing to work at hospitals and for field work among those suspected of exposure to the virus;
- Risk communication with the public is made more complicated by the multiplicity of messages articulated by public health officials, local community activists, and the mass media. Authoritative statements on how people could lower their risks were difficult to come by, and are invariably contradicted by contending views;
- Proposals for isolation or quarantine are the subject of contentious debate – much of it uninformed and highly emotional. Public health officials continued to implement plans consistent with their interpretation of events – leading to criticism and “second-guessing” of government actions by the media;
- Approximately 35% of the County’s nursing staff has called in sick, leaving all of the hospitals shorthanded.

March 2, 2004

Los Angeles (1300) – The lab and CDC are working on test results – awaiting confirmation of a preliminary smallpox diagnosis based on samples taken from all three patients. There have been some concerns that the way specimens were collected and stored may result in contamination of the preliminary PCR tests, and the CDC is carrying out more definitive tests.

Los Angeles (1500) – Two physicians who were recently vaccinated as part of smallpox response teams, one of whom had seen smallpox cases in India, attend the autopsy of Patient CD. In part because the patient was determined to have been HIV-infected, they are unable to conclude on the available evidence whether smallpox caused the fatality.

Los Angeles (1900) – Based on the available information – and the uncertainties about the magnitude of the potential smallpox problem in Los Angeles– the State Director of Health Services decides to delay issuing a public health advisory for the greater Southern California region. The Director still feels “burned” by accusations of overreaction to the last infectious disease outbreak, which alarmed a lot of people but turned out to be a minor problem. Consultations continued among state, local, and federal public health officials on expanding (and deepening) surveillance and investigation efforts throughout the region.

March 3

Los Angeles (1500) – The CDC reports that it has confirmed smallpox in cases CD and EF, but AB’s results are indeterminate due to possible contamination. The health department begins a narrowly focused ring vaccination strategy, immunizing individuals known or suspected to have been in contact with all three cases.

Initial interviews with AB and EF, their friends and family, and the friends and family of CD have so far found nothing in common in their day-to-day lives or recent histories. Initially, interviewers were unable to communicate with many of Patient CD’s friends and family because they spoke limited English. Health workers who could translate were soon dispatched to the location and completed the investigative interviews without incident.

Los Angeles (2200) – Local evening news programs carry reports that two or more smallpox cases have been discovered in Los Angeles. The Mayor of Los Angeles complains about the “irresponsible” reporting of the local broadcast media, denying any such disease confirmation has been received. Calls to the Los Angeles County Department of Health Services swamp the telephone lines with reports of “early symptoms” shortly after the evening news reports. Hospital emergency departments report a large increase in the number of people concerned that they may have been exposed (to smallpox).

March 4

Los Angeles– State, local, and federal epidemiologists continue their epidemiological investigation in the Los Angeles County area. Several dozen cases of rashes are identified and in several instances lead to temporary precautionary restrictions on access to and from

hospital wards and other precautions at a small number of clinics and hospitals. However, all of these cases are eventually diagnosed as other diseases ranging from severe cases of adult chicken pox to severe outbreaks of psoriasis.

Public Health workers investigating the reports have been working 12-hour shifts and fatigue is setting in as the public's fear grows with each news report. Unsubstantiated reports of smallpox cases continue in both English and foreign-language media.

Crowds have begun to gather outside Department of Health Services clinics throughout Los Angeles County demanding emergency vaccination and treatment to protect them from smallpox. Police and Sheriff deputies dispatched to the scenes have trouble managing the number of people present as demonstrators refuse to disperse when ordered to do so.

March 5

Los Angeles – The Los Angeles Medical Center clinics appear less well attended and patients are missing appointments in what appears to be avoidance of “suspected smallpox” healthcare facilities. Some local area clinics are closed because their staffs are concerned about becoming infected from patients.

March 6

Los Angeles – A 60-year-old Korean-American businessman (Patient GH) is seen at Cedar Sinai Medical Center with a fever, headache, backache, and vomiting. He had been on a recent business trip to Asia with his wife, and is admitted with dehydration and a presumptive case of malaria.

Los Angeles – A 32-year-old undocumented domestic worker (Patient JK) visits Clinica Msr. Oscar Romero with a rash on her arms and legs and complaining of a high fever. Despite efforts to enhance surveillance, she is diagnosed as having a likely case of adult chicken pox and is sent home with a free sample of a new pain medication.

Reports that people are leaving Los Angeles begin to surface. The Mayor of Los Angeles advises calm and says “public health authorities have the disease outbreak increasingly under control.”

March 7

Los Angeles – Patient GH has a negative test for malaria, no response to empirical therapy, and is beginning to develop a papular rash on his face, arms, and legs. When his wife (Patient GH1) also appears at Cedar Sinai Hospital and complains of a fever and exhibits a nascent rash on her arms she is also admitted for observation. Within an hour an emergency room doctor who for the past week has been carefully examining all incoming patients who exhibit rashes and fever has examined the couple and becomes concerned that they may have contracted smallpox. Samples are taken from both patients and forwarded to the CDC for analysis.

Los Angeles – Patient JK is brought back to Clinica Msr. Oscar Romero now exhibiting rashes that appear far worse than adult chicken pox. As a safety precaution he sends the patient to Los Angeles Medical Center with a hand-written note recommending that they be tested for smallpox. Prior to their arrival, the doctor also attempts to contact a duty nurse at the hospital via telephone - warning them of the patient he was sending. In the middle of phone call, however, the duty nurse was interrupted and the connection was lost.

People demanding treatment or vaccinations against smallpox increasingly overwhelm most area medical facilities. On arrival at the hospital, the patient is forced to wait – as she is behind at least 100 other people also demanding treatment.

Los Angeles County – In initial interviews on the morning of March 9, no common links are found among the large number of patients who had presented with a viral illness within the past two weeks. Approximately two dozen, however, have developed rashes in various stages of severity. This group were assigned case numbers and targeted for further investigation.

Los Angeles County Area (1500) – Epidemiologic investigations establish that all of the suspected smallpox identified thus far – including the couple – either worked at the Biltmore or had eaten food at the Hotel 12-14 days before their illness began. State health officials contact Biltmore Hotel officials to obtain names of people who work there, and to the degree possible, names of all individuals who have visited or eaten at their location in the preceding three-week period.

Biltmore releases the names of known guests who used credit cards, but refuses to provide information on workers. A spokesman for the Hotel said that Biltmore had to respect “worker privacy” – even during an apparent public health emergency. After a back and forth, Biltmore released records of names and addresses of its employees. It quickly became apparent, however, that much of the contact information was inaccurate – likely the result of undocumented workers giving false information to protect their anonymity.

March 8

Sacramento and Atlanta (1100) – CA health officials and the CDC are notified of 5 suspected smallpox cases in San Francisco, San Diego and San Bernadino. An additional 13 possible cases are identified in the Los Angeles County area. Health officials in a growing number of U.S. cities report suspected cases, in all cases involving individuals who attended a meeting in Los Angeles and visited or stayed at the Biltmore in late February.

Los Angeles (2200) – Local, state, and national media outlets begin airing stories announcing that an infectious outbreak of unknown size is under way, and centered in the City of Los Angeles.

Hundreds of people line up outside Los Angeles County area hospitals demanding to be “tested” and vaccinated. The Los Angeles County Department of Health Services maintains it’s narrowly focused immunization strategy, arguing that since the outbreak is small the risks of mass vaccination exceed the benefits.

Police and Sheriff Departments and emergency workers attempt to control the growing crowds with mixed success. A 72-year-old man with a history of a prior heart attack experiences severe chest pain and calls 911. But is unable to make to an emergency room in time because of the crowds.

March 9

(1200) – An additional 10 confirmed cases and 20 suspected cases are reported in Los Angeles, California, and nationally, all of who had been to the Biltmore during the critical period.

(1300) – There are also rumors that a number of potentially infected persons are fearful of stepping forward because they are undocumented, and fear they will be jailed or deported. One Spanish radio station advises that vaccination centers are a trap to catch undocumented workers. A preacher in a predominantly black church advises congregants that smallpox vaccine is experimental and that blacks are being used as guinea pigs to test it – “just like the Tuskegee experiment in the 1950s.”

Los Angeles (1500) – Attempts to locate and interview local and out of state exposed persons are accelerated by CA public health officials. Identification of Biltmore employees continues to be delayed, as information on undocumented workers proved inaccurate.

(1800) – Media outlets are carrying frequent updates on the number of suspected smallpox cases – 80 and 200 respectively – on evening news reports. By now, 12 other cases begin to emerge. All of the ICU beds in area hospitals are full with suspected smallpox cases and some patients requiring intensive care are boarding on general wards and emergency rooms.

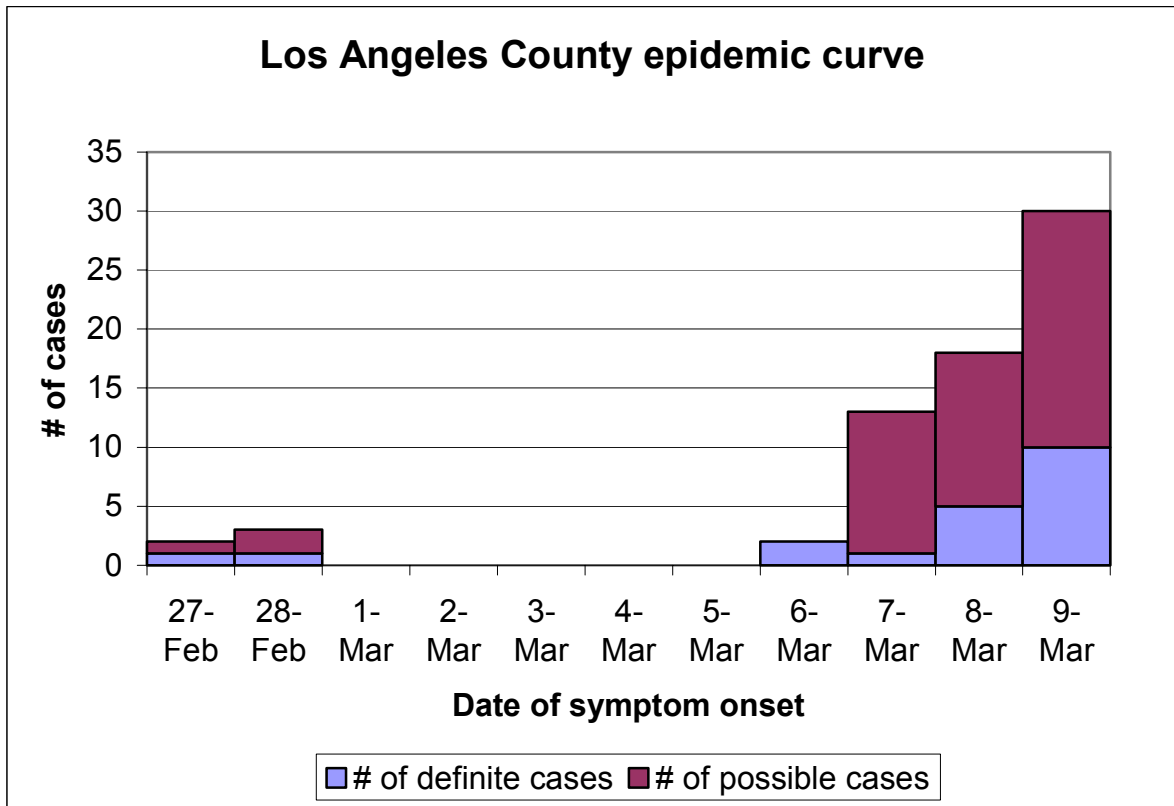


Figure 1. Epidemic Curve for Suspected Smallpox Outbreak

(1900) – A report delivered to the Governor and the Secretary of the U.S. Department of Homeland Security estimates that there could be as many as 2000 individuals exposed during the critical period February 24-26. This estimate is based on the number of people who worked at or attended events at the Biltmore during this period.

(2000) – On the recommendation of local and state officials, it is agreed that the ad hoc Los Angeles Co. Task Force on Public Health [and Medical] Emergency Services should be reconvened the next morning to:

- Develop a recommended list of local medical services actions that need to be initiated immediately;
- Reconsider the narrow vaccination, considering whether it should be broadened or the vaccine made available to the public;
- Develop a new media strategy for dealing with the worsening public health situation;

- Provide recommendations on other issues that need to be sent forward for decision in state and federal venues.

After further discussion it is agreed that the ad hoc Task Force would meet at 9:00 pm at the Department of Health Services to discuss these issues.

Step Two Instructions: How to Proceed

1. You will have approximately one hour to complete your deliberations on Step Two.
2. You are members of the ad hoc Los Angeles County Task Force on Public Health services made up of representatives from the County Public Health department and the CA-DHS.
3. Your principal task is to respond to the evolving bioterrorism crisis by coming to some conclusions regarding appropriate actions for dealing with contingencies only partially anticipated by pre-incident planning. To this end, your responses during this Step occur in the context of planned actions that have proven partially or wholly inadequate to the growing challenge.
4. The group leader will begin the deliberations by asking members to give their individual perspectives on the situation. After this, the facilitator is charged with leading a discussion that focuses on assessing the response capabilities of public health agencies and community-based groups involved in infectious disease surveillance and response.
5. The group leader will then summarize participant discussions from Step Two for presentation during the plenary session.

12 March 2004

MEMORANDUM FOR: Los Angeles County Board of Supervisors
Secretary, California Office of Homeland Security
Director, California Department of Health

FROM: Director, Ad Hoc Los Angeles County Task Force on Public Health Services

SUBJECT: Crisis Management in Health and Medical Services Related to the Infectious Disease Outbreak

OVERVIEW

This memorandum focuses on crisis management challenges confronting the public health and medical systems during the infectious disease outbreak.

Your task is to examine capability shortfalls in outbreak response, with a view to identifying near-term remedial measures that can increase the efficacy of public health responses and public understanding of the evolving situation.

Detection and Awareness

1. Detection and surveillance systems elsewhere in the Los Angeles County area have been alerted to watch for potential symptoms of smallpox infection. What new measures would you use to increase the effectiveness of disease surveillance and to guard against the increasing problem of misreporting?

Surveillance

1. What might you be able to do to identify possible other clusters of symptoms – and perhaps infection?

1. Who else might you be able to call on for help?

Public Mental Health

1. Now that smallpox has been confirmed in the Los Angeles County area, what new elements would you include in any additional risk communication messages?

2. How would you address the mental health needs of the population now that the occurrence of smallpox has been confirmed?

3. How would you seek to allay fears in “minority” communities (i.e., among Asian, African American, Hispanic residents) regarding the veracity of information regarding smallpox and smallpox vaccination? How should community-based organizations be integrated into these efforts?

Isolation/Quarantine

1. What, if any, special security procedures might be necessary to ensure the integrity of a quarantine implemented in Los Angeles County? (e.g., Does it make sense to activate National Guard and Reserve units to assist local law enforcement agencies?) How, if at all, should community-based organizations be informed of decisions regarding deployment of these personnel? Do plans currently exist?

Shelter

1. Should a request be made to state or federal authorities to provide additional security personnel?

_____ A. Yes.

_____ B. No. Explain.

2. What steps would you take to ensure the availability of emergency housing for persons not yet exposed to the smallpox virus – but resident in areas where instances of infection are suspected?

3. Should living space at established quarantine sites be augmented?

_____ A. Yes. How can this be achieved on emergency basis?

_____ B. No. Explain.

Environmental Protection

1. What special procedures would you implement to ensure against environmental contamination (i.e., from bodies of expired smallpox victims, inappropriately handled samples, etc).

Vaccination

1. How, if at all, might you need to augment your plans for vaccination? What would be your vaccination strategy? Who might help you implement it?

2. What system, if any, needs to be in place to monitor vaccine side effects?

Surge Capacity

1. How would hospitals and clinics handle the pressure of extra patients after they reached capacity? What sources exist for extra hospital beds and ventilators, and medical supplies?



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Step Three:

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Step 3 Gap Assessment

You have now completed Step One and Step Two. Your task at this point is to think about how your team responded, and to consider what the exercise experience has taught you about the strengths and shortfalls of your public health capabilities.

We would like you to do 2 sets of rankings. First, using a ten-point scale and a *blue* pen, please address the following questions *about the current infrastructure in your community*, in the context of what you learned during Steps 1 and 2 of the exercise. Then, using a *red* pen and the same scale, please indicate the *level you think your community needs to attain to be well prepared*. For each of these questions, 10 represents the best achievable if resources were available to attain it, and 1 indicates that the function is not at all fulfilled in your community.

1. How would you rate your current community health assessments?

(worst) 1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you are now and where you think you should be?
What do you need to fill that gap?

a) *Policies and procedures* If so, what kind?

b) _____
Human resources (people) If so, what kind and how many?

c) _____
Information technology If so, to add to or amplify an existing system, or something else? _____

d) *Equipment and supplies* _____

e) *Other* _____

2. How would you rate the adequacy of your current contingency plans for dealing with a serious infectious disease outbreak -- or a bioterrorism attack?

(worst) 1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you are now and where you think you should be?
What do you need to fill that gap?

a) *Policies and procedures* If so, what kind?

b) _____
Human resources (people) If so, what kind and how many?

c) _____
Information technology If so, to add to or amplify an existing system, or something else? _____

d) *Equipment and supplies*

e) *Other* _____

3. How would you rate the surveillance and disease reporting systems currently in place?

(worst) 1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you are now and where you think you should be?
What do you need to fill that gap?

a) *Policies and procedures* If so, what kind?

b) *Human resources (people)* If so, what kind and how many?

c) *Information technology* If so, to add to or amplify an existing system, or something else? _____

d) *Equipment and supplies*

e) *Other* _____

4. How would you rate the completeness and timeliness of notifiable disease reporting by health care providers (doctors, hospital, clinics, commercial laboratories)?

(worst) 1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you are now and where you think you should be?
What do you need to fill that gap?

a) *Policies and procedures* If so, what kind?

b) *Human resources (people)* If so, what kind and how many?

c) *Information technology* If so, to add to or amplify an existing system, or something else? _____

d) *Equipment and supplies*

e) *Other* _____

5. How would you rate the current laboratory capacity to deal with a large infectious disease outbreak?

(worst) 1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you are now and where you think you should be?
What do you need to fill that gap?

- a) *Policies and procedures* If so, what kind?

- b) *Human resources (people)* If so, what kind and how many?

- c) *Information technology* If so, to add to or amplify an existing system, or something else?

- d) *Equipment and supplies*

- e) *Other* _____

6. How would you rate the existing communication protocols with EMS, fire and law enforcement regarding response to a public health emergency?

(worst) 1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you are now and where you think you should be?
What do you need to fill that gap?

- a) *Policies and procedures* If so, what kind?

- b) *Human resources (people)* If so, what kind and how many?

- c) *Information technology* If so, to add to or amplify an existing system, or something else?

- d) *Equipment and supplies*

- e) *Other* _____

7. How would you rate the existing communications channels for two-way exchange of information between the health department and providers during an outbreak (neighborhood clinics, local physicians, hospital, neighboring health departments, and commercial laboratories)?

(worst) 1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you are now and where you think you should be?
What do you need to fill that gap?

a) *Policies and procedures* If so, what kind?

b) *Human resources (people)* If so, what kind and how many?

c) *Information technology* If so, to add to or amplify an existing system, or something else?

d) *Equipment and supplies*

e) *Other*

8. How would you rate the ability to enforce in-home isolation of large numbers of people, in order to contain an infectious disease outbreak?

(worst) 1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you are now and where you think you should be?
What do you need to fill that gap?

a) *Policies and procedures* If so, what kind?

b) *Human resources (people)* If so, what kind and how many?

c) *Information technology* If so, to add to or amplify an existing system, or something else?

d) *Equipment and supplies*

e) *Other*

9. How would you rate the capacity of hospitals and other health care facilities to treat large numbers of individuals who become ill during an outbreak?

(worst) 1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you are now and where you think you should be?

What do you need to fill that gap?

a) *Policies and procedures* If so, what kind?

b) *Human resources (people)* If so, what kind and how many?

c) *Information technology* If so, to add to or amplify an existing system, or something else?

d) *Equipment and supplies*

e) *Other*

10. How would you rate the resources (i.e., staff, vaccine, facilities, training, funding) for implementing a rapid vaccination or chemoprophylaxis program?

(worst) 1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you are now and where you think you should be?

What do you need to fill that gap?

a) *Policies and procedures* If so, what kind?

b) *Human resources (people)* If so, what kind and how many?

c) *Information technology* If so, to add to or amplify an existing system, or something else?

d) *Equipment and supplies*

e) *Other*

11. **How would you rate the adequacy of mutual aid agreements with other local public health agencies for assistance in times of emergency?**

(worst) 1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you are now and where you think you should be?

What do you need to fill that gap?

a) *Policies and procedures* If so, what kind?

b) *Human resources (people)* If so, what kind and how many?

c) *Information technology* If so, to add to or amplify an existing system, or something else?

d) *Equipment and supplies*

e) *Other*

12. **How would you rate the relationships with local news media outlets that could disseminate accurate information during a public health emergency?**

(worst) 1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you are now and where you think you should be?

What do you need to fill that gap?

a) *Policies and procedures* If so, what kind?

b) *Human resources (people)* If so, what kind and how many?

c) *Information technology* If so, to add to or amplify an existing system, or something else?

d) *Equipment and supplies*

e) *Other*

13. **How would you rate the relationships with community-based groups that can communicate with hard-to-reach groups during a public health emergency?**

(worst) 1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you are now and where you think you should be?

What do you need to fill that gap?

a) *Policies and procedures* If so, what kind?

b) *Human resources (people)* If so, what kind and how many?

c) *Information technology* If so, to add to or amplify an existing system, or something else?

d) *Equipment and supplies*

e) *Other*

14. **How would you rate the relationships with the Red Cross or local VOAD (Voluntary Organizations Aiding in Disasters)?**

(worst) 1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you are now and where you think you should be?

What do you need to fill that gap?

a) *Policies and procedures* If so, what kind?

b) *Human resources (people)* If so, what kind and how many?

c) *Information technology* If so, to add to or amplify an existing system, or something else?

d) *Equipment and supplies*

e) *Other*

15. How would you rate the overall capacity of your overall public health workforce?

(worst) 1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you are now and where you think you should be?
What do you need to fill that gap?

- a) *Policies and procedures* If so, what kind?

- b) *Human resources (people)* If so, what kind and how many?

- c) *Information technology* If so, to add to or amplify an existing system, or something else? _____
- d) *Equipment and supplies*

- e) *Other* _____

16. How would you rate the ability to maintain continuity of important public health functions during a public health emergency?

(worst) 1 2 3 4 5 6 7 8 9 10 (best achievable)

What is the shortfall, if any, between where you are now and where you think you should be?
What do you need to fill that gap?

- a) *Policies and procedures* If so, what kind?

- b) *Human resources (people)* If so, what kind and how many?

- c) *Information technology* If so, to add to or amplify an existing system, or something else? _____
- d) *Equipment and supplies*

- e) *Other* _____

17. Please describe whether (and which) resources would have to be diverted from other public health activities and programs in the event of a serious infectious disease (or bioterrorist) outbreak, such as the one described here?

What problems, if any, would this cause? Please be as specific as possible.

18. In the current, real life environment, are there activities that you have had to reduce or eliminate to meet the new demands of bioterrorism preparedness?

19. What have been the consequences of this?

20. What areas of research are high priorities for improving your public health responses to potential bioterrorism attacks or infectious disease outbreaks?

You've told us you need resources in the following areas: (staff to provide)

Please rank, in order, your top 3 needs.