Standardized Emergency Management System and Response to a Smallpox Emergency

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Abbreviations:
CDC = US Centers for Disease Control and Prevention
DHS = Department of Health Services
HSO = Hospital Surveillance Officer
ICS = incident command system
LAC = Los Angeles County
LAC-DHS = Los Angeles County Department of Health Services
MFF = Mobile Field Force
SEMS = Standardized Emergency Management System
SNS = Strategic National Stockpile
VAE = vaccine adverse event

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Abstract

The smallpox virus is a high-priority, Category-A agent that poses a global, terrorism security risk because it: (1) easily can be disseminated and transmitted from person to person; (2) results in high mortality rates and has the potential for a major public health impact; (3) might cause public panic and social disruption; and (4) requires special action for public health preparedness. In recognition of this risk, the Los Angeles County Department of Health Services (LAC-DHS) developed the Smallpox Preparedness, Response, and Recovery Plan for LAC to prepare for the possibility of an outbreak of smallpox.

A unique feature of the LAC-DHS plan is its explicit use of the Standardized Emergency Management System (SEMS) framework for detailing the functions needed to respond to a smallpox emergency. The SEMS includes the Incident Command System (ICS) structure (management, operations, planning/intelligence, logistics, and finance/administration), the mutual-aid system, and the multi/interagency coordination required during a smallpox emergency. Management for incident command includes setting objectives and priorities, information (risk communications), safety, and liaison. Operations includes control and containment of a smallpox outbreak including ring vaccination, mass vaccination, adverse events monitoring and assessment, management of confirmed and suspected smallpox cases, contact tracing, active surveillance teams and enhanced hospital-based surveillance, and decontamination. Planning/intelligence functions include developing the incident action plan, epidemiological investigation and analysis of smallpox cases, and epidemiological assessment of the vaccination coverage status of populations at risk. Logistics functions include receiving, handling, inventorying, and distributing smallpox vaccine and vaccination clinic supplies; personnel; transportation; communications; and health care of personnel. Finally, finance/administration functions include monitoring costs related to the smallpox emergency, procurement, and administrative aspects that are not handled by other functional divisions of incident command systems.

The plan was developed and is under frequent review by the LAC-DHS Smallpox Planning Working Group, and is reviewed periodically by the LAC Bioterrorism Advisory Committee, and draws upon the Smallpox Response Plan and Guidelines of the Centers for Disease Control and Prevention (CDC) and recommendations of the Advisory Committee on Immunization Practices (ACIP). The Smallpox Preparedness, Response, and Recovery Plan, with its SEMS framework and ICS structure, now is serving as a model for the development of LAC-DHS plans for responses to other terrorist or natural-outbreak responses.

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Introduction

The smallpox virus is a high priority, Category-A agent[1] that poses a global terrorism, security risk because it: (1) easily can be disseminated and transmitted from person to person; (2) results in high mortality rates and has the potential for major public health impact; (3) might cause public panic and social disruption; and (4) requires special action for public health preparedness. If an outbreak of smallpox were to occur, multiple factors could contribute to a more rapid spread of smallpox than occurred before 1977 when this disease was eradicated. These factors include: (1) virtually non-existent immunity to smallpox in the absence of the naturally occurring disease and the discontinuation of routine vaccination in the United States in the early 1970s; (2) potentially delayed recognition of smallpox by healthcare personnel who are unfamiliar with the disease; (3) increased mobility and crowding of the population; and (4) potential use of more virulent, weaponized viruses with decreased incubation periods. Because of these factors, a single case of smallpox requires an immediate and coordinated public health and medical response to contain the outbreak.

The Los Angeles County Department of Health Services (LAC-DHS) developed the Smallpox Preparedness, Response, and Recovery Plan to prepare the county for the possibility of an outbreak of smallpox.[2] It was developed within the overall framework of the LAC Bioterrorism Preparedness Program to strengthen the emergency preparedness and response capabilities related to terrorism, outbreaks of other infectious diseases, and other public-health threats and emergencies. Key elements of the planning process were discussions with the local Emergency Medical Services (EMS) Agency, law enforcement, and fire department personnel.

The plan is an operational, working document that is implemented if and when a smallpox emergency occurs; it is refined and updated regularly. The plan operates under the Standardized Emergency Management System (SEMS) model. It designated the use of the Incident Command System (ICS) structure (including management, operations, planning and intelligence, logistics, and finance/administration); the mutual-aid system; and multi/interagency coordination in a smallpox emergency.[3]

The plan was developed and is reviewed frequently by the Smallpox Planning Working Group (see Acknowledgements); it is reviewed periodically by the LAC Bioterrorism Advisory Committee, and it draws upon the Smallpox Response Plan and Guidelines from the Centers for Disease Control and Prevention and the recommendations of the Advisory Committee on Immunization Practices.[4,5] The plan is subject to revision as additional guidance is received from the state and federal governments, and local experience is gained in testing and conducting simulation exercises.

Use of SEMS and ICS in Response to a Smallpox Emergency

The plan covers three phases of a smallpox emergency including preparedness (actions taken before a smallpox emergency occurs), response (actions taken during a declared smallpox emergency event), and recovery (actions taken after the smallpox emergency is declared as over). The response plan is activated under the same criteria used by the Centers for Disease Control and Prevention director when authorizing the release of smallpox vaccine to public health authorities, following Strategic National Stockpile (SNS) protocols.[4]

When any one or more of the criteria for activating the response plan is met, the LAC-DHS Public Health Emergency Control Center immediately is activated under the SEMS framework. Simultaneously, or subsequently according to the criteria outlined in the following sections, Operations Center of the LAC-DHS Department and the LAC Emergency Operations Center also are activated partially or fully as appropriate. The Regional Emergency Operations Center in Los Alamitos, California and state and federal emergency operations centers also are partially or fully activated, as appropriate.

SEMS

In the event of a smallpox incident, the response plan is to be implemented fully according to the SEMS to ensure compatibility and coordination of operations among all levels of the LAC-DHS including the LAC-DHS Public Health Emergency Control Center and the Operations Center of the LAC-DHS Department. External to the LAC-DHS, the use of the SEMS protocols ensure the coordination of the LAC Emergency Operations Center and regional, state, and federal emergency management systems and coordination of the multiple agencies (including law-enforcement and fire) that are involved in a smallpox emergency. The SEMS provides for the rapid expansion and contraction of the numbers of personnel, and allows for shifts in the level of the smallpox emergency incident command from the LAC-DHS Public Health Emergency Control Center to the LAC-DHS Department Operations Center, and the LAC Emergency Operations Center levels within the county as a situation might warrant. In the SEMS model, each person has a supervisor, and ideally every supervisor is responsible for three to five, but no more than seven, persons. The elements and activities within the SEMS-ICS of management, operations, planning/intelligence, logistics, and finance/administration sections in the context of a smallpox emergency response are detailed in the following sections. A diagram of the ICS for LAC-DHS is in Figure 1.

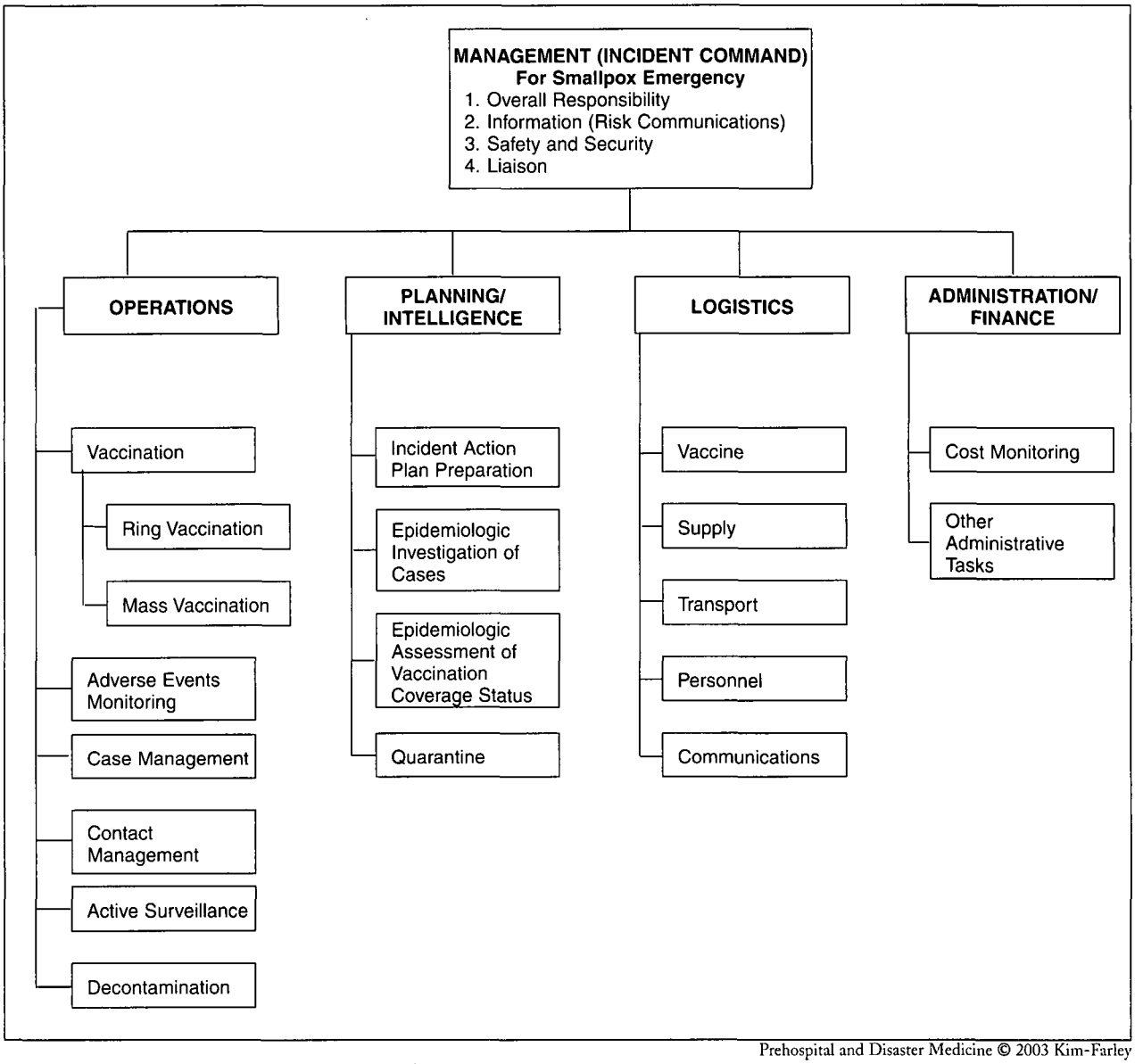
Management (Incident Command)

Overall Responsibility

The chief (or designee) of Acute Communicable Disease Control, representing the LAC Director of Public Health and Health Officer, is the initial SEMS incident commander for a smallpox emergency. The incident commander is the manager of the public health Emergency Control Center and has the overall responsibility for the smallpox emergency, sets objectives and priorities, and coordinates all aspects of a smallpox emergency with other local, state, and federal authorities, as appropriate.

The initial incident commander designates section chiefs for the operations, planning/intelligence, logistics,

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Figure 1—Diagram of Incident Command System

and financial/administrative sections according to the SEMS framework, each with a designated back-up. The incident commander and section chiefs direct other centrally-based and field team members. The incident commander and section chiefs designate representatives to liaise with their respective SEMS staff at other levels when they are activated. Additional functions within the incident command system are implemented by an information officer, safety officer, and liaison officer, who are designated by the incident commander, as needed, are discussed in the following sections.

Information (Risk Communications)

The Information Officer is the point-of-contact for the media and other organizations seeking information directly regarding a smallpox emergency. The Information Officer proactively issues risk communications with the public and the media. Prototype communication messages developed as part of the preparedness phase of the LAC-DHS plan are modified according to the specific circumstances surrounding the smallpox emergency.

Effective communication activities include consistent communications with the CDC's command post and joint information centers. The CDC is expected to identify two of their communications experts to be sent to any community that has a confirmed case of smallpox. One of these persons would have responsibility for coordinating all communications and media-relations activities at the field site and the other coordinates communications with public and private-sector healthcare providers and agencies. The CDC also has information hotlines that are activated for risk communication.

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Safety and Security

The Safety Officer develops measures for ensuring the safety of all assigned personnel and monitors safety conditions. Given that a smallpox outbreak would produce fear and widespread demands for action, a security and law-enforcement response will be required to manage civil disorder, provide secure locations for vaccine distribution, and protect the supplies sent from the Strategic National Stockpile (SNS).

Security of public safety personnel and resources commonly is referred to as force protection. In Los Angeles, when law-enforcement resources respond to large-scale incidents, they usually are configured into mobile field forces (MFFs). A MFF is comprised of 56 to 60 officers, including internal command staff, who respond and are given a specific mission to complete. Both the Los Angeles Police Department and the Los Angeles County Sheriff's Department can mobilize the MFFs or smaller components from within their own departments, whereas other agencies might need to rely on a mutual-aid system in which they supply MMF from their mutual-aid area. When needed, the California National Guard can mobilize to provide additional security.

In Los Angeles, multiple security forces can be provided within approximately two hours notice. For a sustained operation, additional MFFs can be mobilized. Requests for MFFs from public health are coordinated through the Terrorism Early Warning (TEW) group. The Terrorism Early Warning group, by including staff from federal and local law-enforcement agencies and experts in the areas of public health, fire, and emergency management, addresses the intelligence needs for combating terrorism and protecting critical infrastructure. Additionally, security is provided, as necessary, for receipt and distribution of the SNS smallpox vaccine to the field and other points of distribution, for vaccination sites, for public health field workers, and for enforcement measures for patients and populations who might need isolation or quarantine.

Liaison

The liaison officer, designated by the incident commander, is the primary contact for representatives from other local, state, and federal agencies assigned to the smallpox emergency to coordinate their agency's involvement.

Operations Section

The Operations Section during a smallpox emergency is organized according to the SEMS framework, and may expand and contract according to need. As necessary, divisions are established to divide the smallpox emergency into geographic areas. Groups are established for functional areas of operation (e.g., vaccination or surveillance). Branches are established to create another level of organization within the Operations Section (e.g., when the number of divisions and groups exceeds the recommended span of control and where multiple disciplines are involved). Each operations area has a person responsible (e.g., division supervisor, group supervisor, or branch director) who reports to the SEMS incident commander.

Vaccination

During a smallpox emergency, vaccination of the population at risk is a critical containment strategy. Ring vaccination, the targeted vaccination of specified persons, always is used; but mass vaccination might be required.

Ring Vaccination

Ring vaccination is a principal containment strategy to protect those at greatest risk for contracting smallpox, and forms a buffer of immune persons to prevent spread of the disease. It is implemented by tracing, vaccination, and close surveillance of contacts of confirmed and suspected smallpox cases, as well as vaccination of the close contacts of those primary contacts.[4]

Based on the size of the outbreak, the LAC-DHS incident commander decides, in consultation with federal, state, and other local officials, on the number of persons that comprise the size of the vaccinated ring surrounding a case or contact. Personnel resources, effectiveness of supplemental outbreak control measures, and vaccine availability also determine the "depth" of the vaccination ring. Contacts of smallpox cases and household members of contacts of smallpox cases are identified through contact management operations.

Details regarding conduct of the LAC-DHS ring vaccination program include: (1) sites designated for ring vaccination; (2) criteria and procedures for activating vaccination sites; (3) staffing pattern for mass-vaccination clinics; (4) procedures for the handling and storing of smallpox vaccine; (5) procedures for screening vaccinees and obtaining informed consent; (6) procedures for vaccination—reconstitution, administration, infection control, and other precautionary actions; (7) post-vaccination clinic activities; (8) commonly expected vaccine reactions and recognition of vaccine take; and (9) recognizing, monitoring, reporting, and treating severe adverse events.

Depending upon the size and scope of the outbreak, multiple groups may be formed to carry out these activities.

Mass Vaccination

Voluntary, large-scale, mass vaccination of part or all of the population of LAC and possibly surrounding regions, might be helpful to supplement priority surveillance and containment and control strategies in areas with smallpox cases; to reduce the population at risk for additional intentional releases of smallpox virus, if the probability of such occurrences is considered substantial; or to address heightened public or political concerns regarding access to voluntary vaccination. Large-scale, voluntary, smallpox vaccination may be considered as a part of an overall national vaccination strategy, and would be initiated after the approval of the Secretary of the US Department of Health and Human Services.

Implementation of the voluntary, large-scale, mass-vaccination component of this smallpox response plan is the most challenging operation when no prior preparedness vaccination exists for the general population (vaccination of public health response and healthcare teams is ongoing) and if the entire LAC population is targeted for mass vaccination. In a large urban setting, the main challenge is the

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scale of the operation to immunize the population within a limited period.

One vaccination clinic with eight vaccination stations operating on two 8-hour shifts might require 234 staff (including 32 vaccinators) to vaccinate approximately 5,900 persons/day. Approximately 20 such vaccination clinics, with 4,680 staff (including 640 vaccinators) might be needed to vaccinate 1 million persons in 10 days. Therefore, vaccinating 10 million persons in LAC in 10 days might require 200 such vaccination clinics (or an increase in the hours of clinic operation each day or the number of vaccination stations in each clinic), with 46,800 staff (including 6,400 vaccinators). In an actual smallpox emergency in which substantial numbers of persons have been exposed or potentially exposed, the amount of time per patient can be reduced (less need for contraindications screening in an actual exposure), and therefore, greater numbers of persons can be vaccinated with smaller numbers of staff in a shorter time (ideally, within four days because smallpox vaccine provides limited protection, if administered within four days after exposure).

Such analysis demonstrates the importance of surveillance and containment through an aggressive, effective ring-vaccination program targeting persons at high risk for exposure, which buys time while conducting mass-vaccination as quickly as is possible. Given these personnel resource requirements, the following response plan should allow mass vaccination of the entire LAC population within a four-day period by activating mutual-aid agreements to draw resources from outside the county. If mutual-aid agreements are not possible (because of mass vaccination being simultaneously conducted in different areas of the state and nation), the health officer would invoke further emergency provisions (e.g., on-the-job training of volunteer workers to staff smallpox vaccination clinics or administer smallpox vaccine). Details regarding conduct of mass vaccination would be similar to those for ring vaccination, but on a larger scale.

Adverse Events Monitoring

Timely recognition of, and response to, vaccine adverse events (VAEs) are critical in protecting the public from unnecessary risk and maintaining confidence in the vaccination efforts. Persons who are most susceptible to adverse effects of smallpox vaccine include those with skin disorders (e.g., eczema or other forms of chronic skin disorders, burns, impetigo, or varicella zoster) and immunodeficiency states (human immunodeficiency virus [HIV], acquired immunodeficiency syndrome [AIDS], leukemia, lymphoma, generalized malignancy, agammaglobulinemia, or therapy with alkylating agents, antimetabolites, radiation, or substantial doses of corticosteroids). Certain complications can result in severe disability (e.g., blindness from autoinoculation of the eye), permanent neurological sequellae, or death.[4]

Healthcare workers should report VAEs among smallpox vaccine recipients as well as contacts of smallpox vaccine recipients (because the vaccine virus can be transmitted from an improperly covered and cared for vaccination site to contacts of vaccinated persons) to adverse-events monitoring personnel. Adverse events monitoring uses the CDC Vaccination Adverse Event Reporting System during a smallpox emergency.[4] Analysis of these data will help quantify the number of VAEs to smallpox vaccination in the present context of a substantially unvaccinated population that might be at greater risk because of higher numbers of persons with immunodeficiency states. Adverse-events monitoring staff will refer patients to a physician trained in treating VAEs. A list of physicians trained in treating VAEs is maintained by the Immunization Program Medical Director, and is used for patient referrals and clinician consultations.

Confirmed and Suspected Smallpox Case Management

The Smallpox Case and Suspect Case Management Unit works closely with the healthcare community during a smallpox emergency to provide information related to diagnosis, management, and referral of confirmed and suspected smallpox cases. Information regarding such instances would be provided directly by healthcare workers or by surveillance.

During a potential smallpox emergency, persons with febrile rash illnesses would be directed in press releases issued from the Risk Communications Section to seek evaluation and care at facilities (clinics, hospitals) where physicians and health professionals familiar with smallpox and similar rash illnesses would assess, diagnose, and triage patients. However, confirmed and suspected cases of smallpox might occur at any health facility, and therefore, preparing all facilities to manage such cases is necessary.

Smallpox patients and their contacts should be isolated (i.e., separated from other persons) to prevent the spread of smallpox. Although isolation of a limited number of smallpox cases initially might be accomplished in a hospital, using other facilities for larger community outbreaks of smallpox might be necessary. Until that time, if a suspected case of smallpox is identified in a hospital, strict standard, airborne, and isolation precautions should be followed.

Contact Management

Persons assigned to contact, tracing, and notification include public health investigators, disease intervention specialists, and other public health staff. If a major smallpox outbreak occurs, resources from outside the LAC-DHS likely would be needed, and would be obtained through contract and mutual-aid agreements. The Contact Management Operations Unit receives information regarding confirmed or suspected smallpox cases and takes action as described in the following sections.

Identifying Contacts

Contact identification personnel use contact identification procedures and forms to interview each suspected, probable, or confirmed case to obtain detailed names, travel history, and contact information for all persons with whom the patient had face-to-face contact (within six feet, two meters) from onset of fever until the time of the interview. After all contacts have been listed, they are allocated to priority categories for tracing and vaccination on the bases of

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duration and closeness of exposure. The prioritized contact information is given to the personnel responsible for tracing and interviewing contacts.

Tracing Contacts

Contact-tracing personnel receive names and any known address, telephone number(s), or other locating information for contacts from contact identification personnel. The CDC estimates that each case might require tracing and vaccination of >1,000 contacts.

Monitoring Contacts

Contacts are to remain under active surveillance for 18 days (one day after the longest incubation period for smallpox) after their last contact with the smallpox patient, or 14 days after successful vaccination. Contact-tracing personnel would establish methods for daily reporting by the contact, including methods for daily tracking if the contact does not have access to a home telephone.

Asymptomatic, vaccinated contacts can continue routine daily activities, but should remain within 20 miles of home, unless otherwise authorized in writing by the health officer or the health officer's representative, and should check their body temperatures twice daily. They should maintain daily telephone contact with designated health department personnel. If resources permit, closer monitoring (e.g., daily visits) by public health personnel is done.

Surveillance Operations Unit

In the event of a smallpox emergency, the Surveillance Operations Unit is established in the LAC-DHS Public Health Emergency Control Center. Active surveillance teams and enhanced hospital-based surveillance are the priority activities of surveillance operations. Surveillance operations immediately make all collected information concerning individual cases available to Contact Management Operations for identification, tracing, and monitoring; and to the Epidemiological Investigation and Analysis Unit of the Planning/Intelligence Section to distribute to personnel responsible for confirming cases and conducting the case interviews.

Active surveillance personnel initiate immediate active surveillance (i.e., surveillance conducted through visits and direct communications to ensure completeness of reporting and accuracy of the data) for additional suspected, probable, and confirmed cases. The scope of the outbreak determines the number of personnel required for active case detection. Active surveillance for additional smallpox cases is conducted in all LAC acute-care facilities. Each hospital is asked to identify one person to be a hospital surveillance officer (HSO) who is responsible for daily active surveillance at that institution (e.g. an infection-control practitioner). In the event that no suspected smallpox cases exist, a report still is required from the HSO to notify the health department that surveillance had been conducted and had not yielded suspected patients (zero reporting). Surveillance operations and the active surveillance teams ensure that all HSOs comply with reporting. Smallpox surveillance forms are completed on all suspected cases by the active surveillance teams. Line lists would be maintained and updated daily by the teams and would include both new patients and previously reported patients until smallpox is ruled out. Patients are classified as being at "high", "moderate", or "low" risk on the basis of the CDC criteria.[4]

Decontamination

The Decontamination Group will provide information regarding the special precautions to be taken in homes, transport vehicles, and healthcare facilities to ensure that all bedding and clothing of smallpox cases have been sterilized, and that surfaces possibly contaminated with the virus are decontaminated. When needed, the Decontamination Group sends a person or team to assist in the decontamination process. The Decontamination Group also ensures that precautions and decontamination procedures are being followed.

Planning/Intelligence Section

The Planning/Intelligence Section in a smallpox emergency is organized into units according to the SEMS framework. The Section collects, evaluates, and displays information regarding the smallpox emergency (especially related to the progression of the outbreak and the vaccination status of the population at risk); develops the incident action plans for each operational period; and maintains smallpox emergency documentation.

Preparation of the Incident Action Plan

The Smallpox Emergency Incident Action Plan provides all smallpox emergency supervisory personnel with direction for future actions. The Incident Action Plan states the objectives to contain the smallpox outbreak; describes what parts of the ICS are to be in place for each operational period; prepares the strategy, tactics, and resources to be used by each Section to accomplish the objectives; and provides any other supporting materials.

Epidemiological Investigation of Cases

The Epidemiological Investigation Unit provides the information necessary to determine the progress of the smallpox outbreak and the effectiveness of the containment measures in controlling and ultimately stopping the outbreak.

This Unit oversees the epidemiological investigation and is responsible for collecting, managing, analyzing, and reporting data elicited from case interviews. Epidemiological investigation personnel are assigned to conduct case interviews and provide contact operations with all information related to potential smallpox contacts that were elicited during case interviews.

This Unit enters data into and manages and maintains a computerized system for data entry and analysis provided by federal authorities for collected case investigations and surveillance information for all confirmed, probable, and suspected cases. Where appropriate, geographic information systems are used for display and analysis of outbreak data. This Unit communicates analyzed surveillance data daily to reporting sources and other stakeholders.

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Epidemiological Assessment of Vaccination Coverage Status

The Epidemiological Assessment Unit provides the information necessary to determine if the ring-vaccination operation is effectively vaccinating around cases and contacts, one of the key strategies in containing a smallpox outbreak. The Unit also provides information concerning the progress and effectiveness of mass-vaccination operations with an emphasis on the vaccination status of the populations in geographic areas from which confirmed smallpox cases have been reported.

This Unit oversees the assessment of the vaccination status of the population at risk on the basis of data received from ring-vaccination and mass-vaccination operations, and provides input for the Incident Action Plan as to where more intensified vaccination actions are needed (e.g., holes in geographic coverage or breaks in ring vaccination). Where appropriate, geographic information systems are used for display and analysis of vaccination coverage data. The Unit communicates analyzed vaccination status data daily to reporting sources and other stakeholders.

Quarantine

The Quarantine Unit examines and makes recommendations regarding the feasibility and desirability of implementing smallpox quarantine, defined as the restriction of activities or limitation of freedom of movement of those presumed exposed to smallpox in such a manner as to prevent contact with those not exposed. Any decision regarding quarantine is made in full consultation with local, state, and federal authorities, including legal counsels and law-enforcement. If quarantine is feasible and desirable, the Quarantine Unit develops the Incident Action Plan for Quarantine in consultation with law enforcement. Federal assistance also might be required in enforcement of state quarantine.

Logistics Section

The Logistics Section in a smallpox emergency is organized into units according to the SEMS framework, including the Smallpox Vaccine Unit, Supply and Procurement Unit, Transportation Unit, Personnel Unit, and Communications Unit. The Logistics Section provides support to meet the smallpox emergency incident needs and provides resources and all other services needed to support the incident.

Smallpox Vaccine Unit

A major function of the Smallpox Vaccine Unit is to receive, handle, store, and distribute smallpox vaccine and bifurcated needles from the SNS. This Unit is responsible for receiving the vaccine and vaccination supplies for LAC, repackaging the supplies for local use, transporting the supplies to the distribution sites, and turning them over to the immunization program that then would ensure safe and secure storage and distribution at the mass-vaccination sites.

The LAC Immunization Program is responsible for receipt and secure storage of the smallpox vaccine and the bifurcated needles used to administer smallpox vaccine. The LAC Immunization Program would monitor closely the vaccine and bifurcated needle use, and make arrangements to obtain additional vaccine and bifurcated needles as needed.

Supply Unit

The Supply and Procurement Unit ensures that the other materiel requirements are procured and supplied to the Operations Section. A major supply and procurement need is for the other equipment and supplies required for the mass-vaccination clinics (e.g., tables, chairs, and forms). Vaccinia immune globulin for treatment of severe adverse reactions to smallpox vaccination also is procured, stored, and distributed as needed, to requesting hospitals and physicians.

Transport Unit

The Transport Unit provides ground transportation for conducting all operations including, if necessary, transportation of vaccination clinic personnel, surveillance personnel, laboratory specimens, and critical reports and documents. Transportation might be critical for movement of smallpox patients or suspected smallpox patients and their contacts for medical evaluation or for isolation in special facilities.

Personnel Unit

The Personnel Unit recruits and maintains records related to all personnel involved in the smallpox emergency. Newly recruited personnel make first contact with the Personnel Unit to receive their job responsibilities and the name of their supervisor. In the event of mass vaccination, the Personnel Unit recruits personnel from outside of the LAC-DHS and activates contract and mutual-aid agreements for those additional personnel.

Given the nature of a smallpox emergency, the Personnel Unit also ensures that all personnel involved in work that might bring them in contact with confirmed or suspected smallpox cases, or any thing or place that such cases might have contaminated, would have been vaccinated before, or immediately upon reporting to their work site (when feasible, preferably sufficiently in advance so as to have a documented take of the vaccination). The current ongoing efforts to vaccinate persons who would participate in the public health responses and hospital-care teams ensures a cadre of available, vaccinated personnel at the initial stages of a smallpox emergency.

Communications Unit

The Communications Unit ensures that internal communications systems within the incident command structure and external communications systems with local, state, and federal agencies involved in responding to the smallpox emergency, are functioning at all times including redundant and back-up systems.

Finance and Administration Section

The Finance and Administration Section in a smallpox emergency monitors costs related to the incident and provides accounting, procurement, time recording, and cost analyses. This monitoring of costs function is critical for

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later reimbursements to the county from state and federal (e.g., Federal Emergency Management Agency) resources for the expenses of responding to the smallpox emergency during a declared disaster. If necessary, the Section is organized according to the SEMS framework into units, including the time, procurement, compensation and/claims, and cost units. The Finance and Administration Section also might be asked to perform other administrative tasks in support of the smallpox emergency not covered by other sections.

Conclusion

The outline of the SEMS and ICS in the context of a smallpox emergency demonstrates the relevance of these emergency structures and operating procedures during such an event. The full plan includes: (1) the Preparedness Phase; (2) a more detailed Response Phase; (3) a Recovery Phase; (4) and the associated annexes and manuals. The Recovery Phase formally begins after the declaration of the end of the smallpox emergency, although certain elements of recovery may begin even during the event [see also Guidelines].

The decision to declare the end of the smallpox emergency is made by the Incident Commander in consultation with state and federal authorities. The smallpox emergency is expected to be declared over after two longest-range incubation periods (36 days) have passed without a single confirmed case of smallpox in the United States in the setting of intense, active surveillance activated during the Response Phase and after completion of decontamination of all areas potentially contaminated by smallpox cases.

The Smallpox Preparedness, Response and Recovery Plan, with its SEMS framework and ICS structure, is now a model for developing LAC-DHS plans for other terrorist or natural outbreak responses. Other cities, counties, and states that are developing or refining similar plans would be well-served to involve personnel who have expertise in emergency work and practical experience in using the SEMS model and the ICS structure.

Acknowledgements

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