

The Association of State and Territorial Health Officials (ASTHO) is the national non-profit organization representing the state and territorial public health agencies of the United States, the U.S. Territories, and the District of Columbia. ASTHO's members, the chief health officials of these jurisdictions, are dedicated to formulating and influencing sound public health policy, and to assuring excellence in state-based public health practice.

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CONTENTS

EXECUTIVE SUMMARY	4
STATE HEALTH OFFICIAL CHECKLIST	6
INTRODUCTION AND BACKGROUND	12
The influenza virus, 13	
Pandemic influenza history, 14	
Annual flu season, 15	
Pandemic influenza planning efforts to date, 16	
WHO HAS THE AUTHORITY?	17
Local, state and federal roles, 17	
Declaring a pandemic and activating plans, 19	
POLICIES AND PROTOCOLS	22
Mass influenza vaccination, 22	
Pandemic vaccine procurement and distribution, 23	
Antiviral prophylaxis, 24	
Pandemic quarantine and containment, 26	
Pandemic laboratory protocols, 27	
SURGE CAPACITY	30
Provider and workforce shortages, 30	
Volunteers, 32	
Pandemic facility and equipment needs, 33	
Economic loss, 34	
RISK COMMUNICATIONS	36
CONCLUSIONS	39

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NATURE S TERRORIST ATTACK: PANDEMIC INFLUENZA

EXECUTIVE SUMMARY

“ The (1918 Spanish Influenza) epidemic killed, at a very, very conservative estimate, 550,000 Americans in ten months; that s more Americans than died in combat in all the wars of this century, and the epidemic killed at least 30 million in the world and infected the majority of the human species. As soon as the dying stopped, the forgetting began. ”

Alfred W. Crosby
Influenza 1918, The American Experience

Almost a century after the Spanish flu, the United States remains unprepared for pandemic influenza, an event which could affect an extraordinary number of people and last more than a year. It remains a challenge to convey the potential severity of a pandemic to key law and policymakers, as well as individuals in the medical and public health communities. Lessons learned from the annual influenza season, pandemic history, and the 2001 anthrax attacks underscore four key reasons for state health officials to gain advance understanding of their role during an influenza pandemic and address preparedness at this time:

- While an early warning for a terrorist attack is unlikely, the warning already exists for an influenza pandemic. Most public health experts expect that it will happen again.
- The morbidity and mortality resulting from an influenza pandemic may far outweigh that caused by a bioterrorist attack, with an estimated 89,000-207,000 deaths, 314,000-734,000 hospitalizations, 18-42 million doctor visits, and 20-47 million additional cases who do not seek formal medical care.
- The state health official will be looked to as the controlling health authority by the public, governor, and legislature, and will need to assert significant leadership to mobilize and sustain private and public healthcare resources during an influenza pandemic.

- The substantial overlap between the public health infrastructure needed to address bioterrorism-related events and that which is needed to address naturally occurring outbreaks suggests now is an exceptional time to develop or evaluate state preparedness plans for an influenza pandemic.

At least thirty-five states are in the process of developing state-specific pandemic plans, and twelve have completed draft plans (D. Joseph, CDC Influenza Pandemic Coordinator, personal communication, October 2, 2002). Some public health experts note that the plans adequately identify major issues surrounding an influenza crisis, but believe that each state's pandemic plan should explicitly outline a detailed course of action.

States have significant resources available to assist them in writing or formalizing plans, including: CDC's *Pandemic Influenza Planning Guide for State and Local Officials* - a document which provides step-by-step guidance for pandemic planning, FluAid - a CDC tool which uses state-specific statistics to approximate the impact of a pandemic on an area, draft plans from other states, and the experience gained and assessments developed through bioterrorism preparedness planning.

The following checklist provides state health officials with a preliminary means of assessing their jurisdictions' readiness to respond to a pandemic. The checklist is not exhaustive, but identifies major issues that each state will need to address during a pandemic. The list also differentiates between issues that are specific to pandemic influenza and those that have broader utility for public health emergency preparedness. The overlap demonstrates why state health officials have an unprecedented opportunity, using their bioterrorism assessments and plans as scaffolding, to help create strategies that will improve their states' response to future pandemics. The full report offers a more comprehensive description of the challenges involved in pandemic planning and response.

STATE HEALTH OFFICIAL CHECKLIST:

Are you and your state ready for pandemic influenza?

Italicized items are specific to pandemic influenza preparedness; all others have broader utility for bioterrorism events, infectious disease outbreak, and other public health threats and emergencies. A tabletop exercise or team discussion may help you and your agency work through these issues.

LEGAL AND POLICY ISSUES

1. My state has one of the following: a formally adopted pandemic influenza plan; a draft pandemic plan; a pandemic annex to our all-hazards, chemical, or bioterrorism plan.

2. I have secured formal or informal agreements with my state's healthcare insurers, Medicaid, and healthcare product/service providers for cooperation with public health recommendations during a pandemic or other sustained public health emergency.

3. I am familiar with my state's quarantine laws and how they apply to an infectious disease emergency.

4. I know whether my state statutes provide for mandatory vaccination during an infectious disease emergency.

5. I am familiar with my state's laws and procedures for closing businesses or schools and suspending public meetings during a declared state of emergency.

6. I am familiar with my state's medical volunteer licensure, liability, and compensation laws for in-state, out-of-state, returning retired, and non-medical volunteers.

7. I know whether my state allows hospitals and other licensed healthcare institutions to use temporary facilities for provision of medical care in the event of a public health emergency.

8. I am familiar with the required protocol for securing needed healthcare services and supplies both through and independently of the federal government during a public health emergency.

AUTHORITY

9. *My state has an executive pandemic planning committee that oversees the planning process.*

10. *My state has identified key jurisdictional stakeholders responsible for development and implementation of specific components of the pandemic plan.*

11. *My state has identified the authority responsible for officially activating our plan during an influenza pandemic.*

12. My state's governor, legislature, local officials, and other state agency heads have discussed their respective responsibilities in the event of a sustained public health emergency.

13. My state has a command system in place (e.g., the Incident Command System) to help determine roles and responsibilities during a multi-agency, multi-jurisdictional event.

14. I am familiar with the controlling authority over intrastate and interstate modes of transportation, should these need to be curtailed during the early weeks of a pandemic or other public health emergency (e.g., airplanes, trains, highways).

15. My staff has relationships with health authorities of adjoining states to ensure effective communication during public health emergency.

16. I know the key individuals from local public health agencies, the medical community, and the political community with whom I will need to communicate during a pandemic or other public health emergency.

17. My state has identified an overall authority in charge of coordinating different medical personnel groups during a public health emergency.

18. My state has identified a responsible party to make decisions about culling infected animal populations during a pandemic or other infectious disease emergency that affects animal populations.

19. I am familiar with the state and local authorities who will assist in maintaining public order, if needed, during a pandemic or other public health emergency.

20. I am familiar with the procedure for enlisting the National Guard's assistance during a public health emergency.

VACCINATION/ANTIVIRALS

21. My state's annual influenza vaccine program adequately assures vaccination of at-risk/hard to reach populations, and has the infrastructure in place to vaccinate these populations during a pandemic.

22. My state's pandemic plan outlines a process for identifying essential workers (those people in my state whose jobs/skills are critical for maintenance of public safety and an efficient pandemic response) and "highest risk" groups who will need to receive priority influenza vaccination and/or antiviral prophylaxis.

23. My state has identified the method(s) of pandemic vaccine and antiviral delivery (i.e., public sector, private sector, or a combination of these two) that will be most efficient for the jurisdiction and for different priority groups.

24. My state has developed a documentation process for administered pandemic vaccine doses, which recall capacity if more than one dose is required to induce immunity.

25. My state has determined how adverse vaccine side effects will be documented during a mass vaccination campaign.

26. My state has compiled a list of healthcare workers and institutions that will assist in mass vaccination during a pandemic or other public health emergency.

27. My state has identified ways to secure and protect a limited vaccine supply and other essential medicines and supplies.

28. My state has developed and tested, through a simulated exercise, a plan for mass immunization including: accepting delivery of large quantities of vaccine; storing and handling vaccine; setting up and staffing clinics; administering vaccine; and educating the public, media, and medical providers.

SURGE CAPACITY

29. I know the estimated impact of an influenza pandemic on my jurisdiction. (FluAid, developed by CDC and available on the CDC website, produces state-specific estimates of the impact a pandemic could have on your jurisdiction).

30. My state's emergency response planning has involved healthcare product/service providers to determine how to best prevent and control disease spread and manage the healthcare of the population during a pandemic or other sustained health emergency.

31. My state has identified ways to augment medical, nursing, and other healthcare staffing for provision of care during a pandemic or other public health emergency.

32. My state has outlined a process to recruit and train medical volunteers for provision of care and vaccine administration during a public health emergency.

33. My state has identified alternate facilities where overflow cases will be treated once hospitals have reached capacity, and has developed processes with Emergency Medical Services to assess, communicate, and direct patients to available beds.

34. My state has a plan for dealing with mass mortality, including transportation and burial bodies.

COMMUNICATIONS AND EDUCATION

35. *I have conveyed the importance of pandemic preparedness, and its overlap with bioterrorism preparedness, to my governor and to other state law and policy makers.*

36. *My state has begun educating the public on pandemic influenza to instill acceptance of the pandemic response and to optimize public and healthcare provider assistance during a pandemic.*

37. *If I am selected as the primary public spokesperson during a pandemic, I am ready to clearly and consistently answer the following types of questions; or, the person who is identified as the primary spokesperson in my state is prepared to answer the following types of questions:*

How is the influenza virus transmitted?

How is a pandemic different from the annual flu season?

Why is vaccination so important during a pandemic?

Are there vaccine side effects/dangers?

Why is a vaccine shortage likely at the beginning of an influenza pandemic?

In the event of a vaccine shortage during the early pandemic months, what specific priority groups will be vaccinated first?

Where can I get the vaccine?

How can the public best protect itself during the early months of a pandemic before adequate vaccine is available?

Does the public still need to be vaccinated after the first wave of pandemic cases seems to be over?

38. My state has identified the most effective media to get messages out to the public during a pandemic or other public health emergency (e.g., TV, radio, hotlines).

39. My state has planned how to coordinate state, local, and federal public messages and ensure they are consistent and timely.

LABORATORY/SURVEILLANCE

40. *My state public health laboratory can isolate and subtype influenza virus year round.*
41. *My state has identified those labs that will test for a virulent influenza strain.*
42. *My state public health laboratory has linked to clinical laboratories and provided training on the use of rapid flu tests.*
43. My state has identified ways to augment laboratory staffing in the event lab workers are affected by a pandemic or other public health emergency.
44. My state public health lab has computerized record keeping to help with data transmission, tracking, and analysis during a pandemic or other public health emergency.
45. My department of health has determined how to assess and document the progress of both immunization and the spread of disease throughout the population during an infectious disease emergency.

Preparedness Planning for State Health Officials

Nature s Terrorist Attack; Pandemic Influenza

INTRODUCTION

In 2000, Monica Schoch-Spana, Senior Fellow at the Johns Hopkins Center for Civilian Biodefense Studies, published the article "Implications of Pandemic Influenza for Bioterrorism Response." The report recalled the catastrophic events of the 1918-1919 influenza pandemic, with the goal of advancing bioterrorism preparedness discussions among health officials [1]. The reverse discussion can now be encouraged, using examples from the October 2001 anthrax attack to underscore the importance of pandemic influenza planning.

Many scientific, medical, and public health experts agree that another influenza pandemic is imminent and question why the United States has not pushed harder to prepare. Their concern is rooted in history; the 1918 Spanish flu caused at least 30 million and perhaps as many as 50 million fatalities worldwide [2].

To date, limited funds have been made available for pandemic planning, and states are in various stages of readiness for a public health crisis that could potentially last more than a year. But the efforts that are now being put towards preparing for a bioterrorist attack, and the significant overlap between pandemic and bioterrorism preparedness, suggest this is an unprecedented opportunity for health agencies to initiate or continue development of an explicit pandemic response plan.

The differences between the two public health emergencies, one naturally occurring and the other a result of terrorism, warrant either an annex to a state's all-hazards/bioterrorism plan or a free-standing pandemic influenza plan. However, states can leverage the assessments and experience gained through bioterrorism preparedness activities to improve their pandemic readiness.

State health officials will be looked as controlling health authorities by governors, legislatures, and the public, and will need to assert significant leadership to

mobilize and sustain private and public healthcare resources during a pandemic.

Pre-event familiarity with pandemic response policies and protocols; federal, state, and local roles during a pandemic; issues of surge capacity; and pandemic risk communications will better prepare both state health officials and their jurisdictions to respond to an influenza pandemic.

BACKGROUND

The influenza virus

Influenza symptoms are familiar to most persons in the United States and include fever, headache, sore throat, cough, muscle aches, and fatigue. The disease usually resolves in two to seven days and may be indistinguishable from other respiratory diseases in the absence of a laboratory test [3]. During a normal influenza season, 10 to 15 percent of the U.S. population becomes ill, and mortality associated with influenza is highest in those 65 years of age and older, often resulting from viral or bacterial pneumonia complications.

Three virus types, influenza A B and C, can cause this respiratory illness and are easily transmitted in crowded and enclosed spaces. Regional and widespread epidemics are most often attributed to influenza A and B viruses, while type C is associated with mild illness, sporadic cases, or minor outbreaks [4]. Difficulty in controlling illness from one flu season to the next is due to changes in virus types A and B. Both undergo constant, but relatively subtle mutations (antigenic drift), accounting for the different influenza epidemiology, strains, and vaccines seen from year to year.

Pandemics occur when an entirely new subtype of influenza A virus emerges (antigenic shift) through recombination of human and animal antigens (swine or avian). Not all antigenic shifts cause a pandemic, but if a novel subtype is virulent and easily transmitted, a pandemic is probable.

There is no way to predict when the next pandemic will occur, but most experts agree that it will happen. Sentinel site surveillance around the world serves as an early warning system. The World Health Organization (WHO) has conducted influenza surveillance since 1947 to detect prevalent and emerging strains. Information from

the surveillance is used to formulate the annually produced influenza vaccine [5].

Both the Centers for Disease Control and Prevention (CDC) and the U.S. Department of Defense (DoD) are also actively involved in surveillance efforts, and 48 states have cooperative agreements with the poultry industry and the U.S. Department of Agriculture's Animal and Plant Health Inspection Service to monitor and identify avian influenza virus in commercial poultry flocks [6,7]. Early identification of infected animal populations is considered important because swine and poultry are often implicated in the emergence of new human influenza A strains, and interspecies transmission of the virus has previously been reported. CDC conducts additional surveillance in the U.S. for influenza-related morbidity and mortality.

Pandemic influenza history

The devastation that could accompany an influenza pandemic is not reflected by the public's perception of the annual flu season, despite the fact that influenza causes significant morbidity and mortality each year. The flu is too often associated with a serious winter cold, a vaccination shot, or an illness that is life-threatening only to young children and the elderly. A review of pandemic history forces reconciliation of this perception with the potential severity of a future pandemic, and the lessons learned can be applied to current preparedness efforts.

In 1918, the public shared today's casual view of the virus. Influenza "was a homey, familiar kind of illness: two or three days in bed feeling downright miserable, a week or so feeling shaky, and then back to normal. Call it a bad cold or call it flu, it was an annual occurrence in most families and not a thing of terror....." [8]. Thus, the rapid and gruesome deaths that occurred during the 1918 pandemic were shocking to both physicians and the public.

The pandemic also shattered the perception that risk of dying from influenza is significant only for very young or old individuals. While it is true that during a regular flu season 80 to 90 percent of all deaths occur in those 65 years of age and older, during the 1918 pandemic the highest mortality rates were found among young adults [3].

The 1957 Asian flu and the 1968 Hong Kong flu caused far fewer deaths in the United States (104,000 collectively). This has been attributed to less virulent viruses,

antibiotic treatment of secondary infections, and improved supportive care [9]. However, there was still a great deal of societal disruption due to fear of contracting the disease and to high rates of absenteeism as workers stayed home to care for sick relatives.

Significant societal changes have occurred since the last substantial pandemic in 1968, making it difficult to predict the level of illness and disruption that a pandemic could cause today. National and international travels have increased tremendously, which could potentially speed the spread of influenza virus from one country to another.

In addition, the first case of HIV/AIDS had not been identified at the time of the last pandemic. The 2001 United Nations AIDS epidemic update estimates that there are now 40 million people in the world living with HIV/AIDS [50]. Research suggests that the influenza-related mortality in persons with AIDS is similar to that in the general U.S. population over 65 years of age, a group already identified as high-risk [11]. These factors, along with increased urbanization and crowding, may change the face of the next influenza pandemic.

Annual flu season

While this report focuses on issues that involve state health official leadership during a pandemic, it is important to note that bolstering efforts to control annual influenza will not only decrease the significant influenza morbidity and mortality that occur each year,¹ but will better prepare states for the next pandemic.

For example, a vaccination program that is put into practice each year before the influenza season, and which aims to increase coverage for at-risk and hard to reach populations, will improve access to these populations during a pandemic. Additionally, encouraging influenza vaccination among the general public in years when sufficient vaccine is available may build both support for influenza vaccine production and public trust of the vaccine.

¹The CDC estimates that influenza results in more than 114,000 hospitalizations and 20,000 fatalities annually [12].

A CDC document that provides step by step guidance for pandemic planning-Pandemic Influenza: Planning Guide for State and Local Officials - details vaccination, Surveillance, and other activities that can be advanced during the pre-pandemic period [13].

Pandemic influenza planning efforts to date

Recognizing the need to further address pandemic planning, a U.S. Working Group on Influenza Pandemic Preparedness and Emergency Response (GRIPPE), including CDC the Council of State and Territorial Epidemiologists (CSTE) and influenza experts from the public and private sectors, was formed in 1993 to discuss a national plan.

The most recent version of the National Pandemic Influenza Plan was authored by agencies within the United States Department of Health and Human Services (HHS) including CDC the Food and Drug Administration, and the National Institutes of Health. The national plan is currently under review by these agencies. At least thirty-five states are in the process of developing state-specific plans, and twelve have completed draft plans (D. Joseph, CDC Pandemic Influenza Coordinator, personal communication, October 2, 2002).

Some public health experts note that the plans adequately identify major issues surrounding an influenza crisis, but believe that each state's pandemic plan should explicitly outline a detailed course of action to follow in the event of a pandemic. It remains a challenge to convey the potential severity of a pandemic to key law and policymakers, as well as individuals in the medical and public health communities.

The following sections discuss areas that need to be addressed in preparation for, and during, a pandemic. Because some of the issues have been encountered by states during their bioterrorism preparedness planning, efforts have been made to highlight areas where states have existing resources and experience, and to emphasize unique pandemic issues that will require planning beyond current bioterrorism preparedness activities.

PANDEMIC INFLUENZA PREPAREDNESS- WHO HAS THE AUTHORITY?

Local, state and federal roles

In February 2002, the United States Department of Health and Human Services announced the availability of funds for states to improve preparedness for and response to bioterrorism, other outbreaks of infectious disease, and other public health threats and emergencies. The cooperative agreement guidance, Public Health Preparedness and Response for Bioterrorism, outlines how the funds may be used to strengthen states' readiness and response to public health emergencies.

The first directive of the guidance asks states to "establish a process for strategic leadership, direction, coordination, and assessment of activities to ensure state and local readiness, interagency collaboration, and preparedness for bioterrorism, other outbreaks of infectious disease, and other public health threats and emergencies" [14]. Pre-event leadership and coordination among the federal, state, and local levels is critical for both bioterrorism and pandemic planning, and the degree to which they are established may determine the success of all other preparedness activities.

"Dark Winter," a senior-level exercise held in June 2001, simulated a smallpox outbreak in the United States in an effort to reveal major challenges officials would face in the event of a bioterrorism attack. An analysis of the exercise demonstrated that conflict between state and federal authorities quickly arose during decision-making discussions.

Throughout the simulation, state leaders wanted to maintain their autonomy and tight to make decisions about vaccination strategies and other pressing issues, while federal officials remarked that the state by state approach could lead to inconsistencies and disorganization across the nation [15]. Unless pre-event discussions define Local, state, and federal responsibilities, tensions are sure to develop during an influenza pandemic, particularly around issues of vaccination and disease containment.

The Incident Command System (ICS) is a field-tested, emergency management system that has proven successful in overcoming such conflicts of authority and in organizing responses across multiple agencies during a crisis. ICS developed in the early 1970s out of a growing need to coordinate the response to wildland fires, and has since been adopted by many federal agencies, including the Federal Emergency Management Agency (EEMA). The system addresses problems associated with inter-agency terminology, communications and organizational differences, and diffuse authority lines.

New York adopted ICS in 1996, and organized responses to both the World Trade Center and anthrax attacks through this system. Public health professionals responding to the 2001 anthrax attacks in other states have also expressed strong interest and support for the implementation of the Incident Command System [16]. ICS may be particularly suitable to a pandemic situation; it has the flexibility to expand as the pandemic grows to a multiple agency, multiple jurisdiction crisis.

Regardless of the command structure, Dr. D. A. Henderson, founding director of the Johns Hopkins Center for Civilian Biodefense Strategies and special biodefense advisor to HHS Secretary Tommy G. Thompson, cautioned that in an event of this magnitude (pandemic influenza), it is possible for political decisions to be made without advice from the medical and public health communities. "Public health needs to have someone in the decision making process at all times," he stated (D. A. Henderson, personal communication, June 6, 2001).

At the state level, the power to make decisions about key issues surrounding pandemic influenza will probably rest with the governor. As director of the public health agency response, a state health official has an integral role in establishing open dialogue among the public health community, the medical community, the governor, and other political officials. In light of these issues, state health officials will likely be called on to help address the following questions.

-
- What are the roles of state government versus federal government in a pandemic situation?
 - How will the state coordinate with federal pandemic planning and programs to ensure efficient delivery of vaccine, antivirals, and supplies?

- Who are the key individuals from local public health agencies, the medical community, and the political community with whom you will need to communicate?
 - Who is the overall authority in charge of coordinating different medical personnel groups in your jurisdiction?
 - Would the incident Command System help dissolve tensions and issues of autonomy in your state during a multi-agency, multi-jurisdictional event?
 - What is the required protocol for securing needed healthcare services and supplies from the federal government during a public health emergency? For securing healthcare services and supplies independent of the federal government?
 - If assistance in maintaining public order is needed, who are the appropriate state and local contacts, and is there a coordinated plan in place
 - What is the procedure for enlisting the National Guard's assistance?
-

Declaring a pandemic and activating plans

In contrast to a bioterrorism event, health officials may have advance warning of an influenza pandemic before it affects their jurisdiction. If initial cases appear in another country, states may be afforded months to prepare. WHO has developed an outline of pandemic "phases" to help delineate the events that occur before a pandemic is declared [17].

When ongoing surveillance identifies a novel virus, the following must be confirmed prior to declaring a pandemic: the virus infects humans, demonstrates efficient person to person transmission and the ability to cause serious disease, and has spread to other continents. The CDC will confirm the progression from one phase to the next so that states can better coordinate their responses [18].

In January 1976, events occurred that led the public health community to believe there was a significant possibility of a pandemic. Several soldiers at Ft. Dix, New Jersey, fell ill and one died from a respiratory virus. Lab analysis confirmed that

the isolates were swine influenza and similar to the virus that caused the horrific 1918 Spanish Influenza. The public health and political responses that followed illustrate the challenges involved in determining the stage and scale at which pandemic plans should be activated.

Because demonstrable transmission between relatively few individuals had occurred, federal health agencies were unsure whether the Ft. Dix cluster represented the beginning of a pandemic or a unique and disparate event. Unwilling to take chances, the CDC advised mass immunization of the U.S. population, and President Ford requested \$134 million from Congress to implement this recommendation [19].

But manufacturers were reluctant to commit to this degree of vaccine production, particularly after several insurance companies announced they would not cover the vaccine. When five months passed and no additional cases of influenza were reported, interest in the program as initially proposed began to fade.

An outbreak of a fatal respiratory illness, occurring in August of 1976, rekindled both fear of a pandemic and interest in a mass immunization program, even after the illness was determined to be Legionnaires disease. Although many decisions and conflicts transpired between start and finish, the story concludes with the production of 150 million doses of influenza vaccine, 45 million vaccinated people, suspension of the immunization campaign after a reported increase in Guillain-Barre syndrome, and heavy criticism for the federal decision making process and organization of the response [19]. It is worth noting that vaccination acceptance and coverage varied greatly from state to state, and was associated with the level of support the campaign received from state and local public health agencies.

The 1976 experience with swine flu serves as a reminder that awareness and pre-planning can assist federal and state health officials in determining when pandemic influenza plans should move from paper to action. Assembling a pandemic influenza working group after a novel virus alert may help state government and health officials to determine the appropriate timing of their responses.

According to the *Model Emergency Response Communications Planning for Infectious Disease Outbreaks and Bioterrorist Events*, core working group members should include; a state lab representative, an epidemiology representative, health communications staff (public affairs officer, health educator, and/or information technology expert),

and an administrative coordinator [20]. Additional working group members may include local public health officials and vary on a state by state basis, depending on the agencies involved in emergency response for that jurisdiction.

State health officials can assess whether their designated bioterrorism advisory committee includes persons who would be involved in a pandemic response, and if it is appropriate to coordinate both pandemic and bioterrorism planning through this committee.

-
- At what stage will you convene a pandemic influenza working group? Who will serve on this committee?

 - Is it possible to involve your state's bioterrorism advisory committee in the pandemic planning process?

 - At what stage will the state's pandemic plans be activated? Who has this authority?

 - When will a state public health emergency be declared?
-

PANDEMIC INFLUENZA PREPAREDNESS- POLICIES AND PROTOCOLS

Mass influenza vaccination

One of the most critical issues in pandemic planning is the establishment of a mass vaccination strategy, or the fast and efficient delivery of vaccine to great numbers of people. Ongoing bioterrorism planning for mass delivery of emergency materials and vaccines provides a strong foundation on which to base a pandemic vaccine delivery plan.

The *Public Health Preparedness and Response for Bioterrorism* cooperative agreement guidance requires states to plan for management of the National Pharmaceutical Stockpile's (NPS) 12-hour "Push Packs" [14]. Push Packs contain pharmaceuticals and other emergency items, and are designed to arrive in 12 hours or less, following a state's request. Once delivered, it is the state's responsibility to distribute the materials to the appropriate populations, depending on the emergency. Planners are currently investigating how to ensure the efficient delivery of materials throughout their state.

Additionally, the CDC Smallpox Vaccination Clinic Guide was made available to states in September 2002 [21]. This guide outlines the Logistics for emergency mass smallpox vaccination. As planners consider how to adapt the guidance to their state's system and environment, state health officials may want to link pandemic influenza planning with these efforts and encourage collaboration among influenza, smallpox, and NPS coordinators.

The need for a free standing pandemic influenza plan or annex to the state's current mass vaccination plan stems from the unique characteristics and production of influenza vaccine. In contrast to an anthrax or smallpox event, where vaccine or antibiotics may be available in limited quantities, it is likely that there will be severe shortages or even *no* effective vaccine in the beginning stages of a pandemic.

Influenza vaccine production is a complex process involving the growth of virus in millions of fertilized chicken eggs. Ongoing surveillance is used to identify circulating strains, and the antigens from these strains are incorporated into the

annual vaccine with the hope they will provide protection against the actual strains circulating that season.

However, influenza pandemics result from the evolution and spread of a new viral strain, and vaccines composed of currently circulating strains are unlikely to have a preventive effect. An estimated six to eight months will be required to produce a vaccine that affords protection against the pandemic strain, and individuals may require two doses of the new vaccine, given 30 days apart, to induce immunity [13]. Expedited vaccine manufacturing has been explored as a technique to reduce vaccine production time, but the procedure has not been approved by the Food and Drug Administration (K. Fukuda, R. Strikers, S. Crawford, personal communications, June 7, 2001).

Because a shortage of influenza vaccine is expected during the beginning months of a pandemic, there is a need to identify priority groups (i.e. high risk individuals, health care workers, law enforcement) that should first receive the influenza vaccine. Although this has been discussed at the national level, there is no definitive guidance that identifies the priority groups. The *CDC Pandemic Influenza Planning Guide for State and Local Officials* offers a default list for use in planning activities until decisions are finalized [13].

Pandemic vaccine procurement and distribution

The U.S. Department of Health and Human Services tasked CDC with recommending an option for pandemic vaccine procurement and distribution. CDC convened meetings, including state, local, public and private stakeholders, with the goal of identifying the best way to procure and distribute vaccine during a pandemic.

Each state currently approaches annual influenza vaccine procurement and distribution in the way that is most efficient for their jurisdiction. During the annual flu season, approximately half of states handle procurement and distribution of the influenza vaccine through the state health agency. The rest either operate through a third party contractor for distribution to providers, in accordance with the state's direction, or use a combination of these two approaches [22].

In a pandemic situation, these systems will require significant adjustment to ensure that vaccine reaches priority groups. This may entail federal purchase of the vaccine, particularly during the early months of a pandemic when vaccine is likely to be limited in supply.

Once a recommendation on this issue has been made, state health officials and their staff can examine how the delivery system operating in their state on an annual basis will change in a pandemic situation.

Antiviral prophylaxis

In the absence of available vaccine, amantadine, rimantadine, oseltamivir and zanamivir may be useful in preventing disease or treating severe clinical cases of influenza. Unfortunately, sufficient quantities of these antivirals are not currently available, side effects of amantadine and rimantadine may be severe, the potential for antiviral resistance is a great concern, and national recommendations for use of antivirals in a pandemic situation have not been approved. Because of this, health officials have been uncertain whether to include antiviral strategies in their preparedness plans [9].

Changing information about efficacy, safety, and resistance emergence requires a flexible and evolving approach to the use of these antiviral agents in a pandemic setting; such an approach will be particularly important when vaccine is either unavailable or in short supply. Options that should be discussed include use of these drugs for treatment alone, chemoprophylaxis alone, or combinations of treatment and chemoprophylaxis.

-
- If influenza vaccine and antivirals are in limited supply during the early months of a pandemic, which priority groups will receive them?
 - Are state-specific adjustments to CDC's recommended vaccine priority list needed? (i.e., are there certain workers in your state whose absence due to illness would pose a major problem?)
 - What is the process for adjusting the priority list as the pandemic evolves and vaccine becomes available?

- Will state, federal, or private agencies be responsible for the procurement and distribution of vaccine?
 - What method of influenza vaccine delivery will be most efficient for your jurisdiction and for the different priority groups? Will the public or private sector be responsible for vaccination?
 - Can your state coordinate pandemic influenza vaccination planning with planning for mass smallpox vaccination or National Pharmaceutical Stockpile planning?
 - How will your state protect and secure the limited vaccine supply?
 - Does state law allow for mandatory vaccination? Vaccination by non-licensed volunteers?
 - How will adverse vaccine side effects be documented and addressed?
 - Are providers and volunteer providers liable for emergency care, vaccines or antivirals administered during a pandemic?
-

Pandemic quarantine and containment

The anthrax attacks in October 2001, although occurring stateside, had global repercussions. Anthrax scares and hoaxes affected countries from Iceland to Taiwan, causing them to institute precautions for the receipt and handling of international mail. In an influenza pandemic, public fear will be bolstered by the very real and global spread of influenza.

Commercial airline travel was virtually unknown in 1918, with the Wright brothers first flight occurring only 15 years prior. Yet even with far less global contact than today, few countries escaped the pandemic. It is important for states, particularly those that serve as international ports of entry or that share a border with Canada or Mexico, to increase their familiarity with quarantine and other relevant public health laws on a global level.

Many states reviewed their emergency powers, pertaining to an infectious disease event, as they considered or enacted portions of the *Model State Emergency Health Powers Act*. The Act was drafted in response to the 2001 terrorist attacks, and "provides state officials with the ability to prevent, detect, manage, and contain emergency health threats without unduly interfering with civil rights and liberties" [23].

Having reviewed the pertinent laws and statutes, state health officials will be better able to make informed decisions regarding containment of disease in the event of an influenza pandemic.² It may be useful to review the plans of neighboring states and other countries, as well as the World Health Organization's global plan, to gain understanding of the worldwide response and the implications these plans will have for the United States. Links to country and state plans are listed in Appendix A.

-
- What are your state's quarantine laws and how are they implemented?
 - What are the laws of quarantine across state and country borders? Across state and tribal land borders?

- What restrictions on travel and trade can be invoked in the event of a pandemic?
 - What level of coordination with neighboring jurisdictions is required? Who are your contacts in those areas?
 - What are the laws and procedures for closing businesses and schools and suspending public meetings?
-

Pandemic laboratory protocols

The 2001 anthrax attacks also resulted in an overwhelming testing burden on state public health laboratories across the United States. Less than a year later, many labs were again operating at, or beyond, capacity in response to the West Nile virus epidemic. Pandemic influenza is expected to be equally taxing on laboratory resources and personnel. Clearly, state and local laboratory workers need to be involved in planning to further define their responsibilities during a pandemic.

The laboratory role is crucial for anticipating and containing a pandemic. When a pandemic strain of influenza is first suspected, laboratory analysis helps to determine the virulence and transmissibility of the virus. If the strain is deemed capable of causing a pandemic, isolation and further analysis of the virus are prerequisites for vaccine production. Laboratories will also play a role in confirming the arrival of a pandemic in a previously unaffected area and in monitoring the geographic distribution of the virus.

² While it is appropriate and necessary for states to review their quarantine laws and regulations, quarantine does not play a major role in controlling epidemic influenza, nor is it planned to play a major role in controlling pandemic influenza. Other control efforts, such as the closing of schools and businesses, can be discussed in the short term, but if a pandemic extends for several months they may prove impractical.

If an influenza pandemic progresses to the point where thousands of people are ill at the same time, most cases will be clinically diagnosed and treated empirically without laboratory confirmation. Even during a regular flu season, laboratory tests are usually reserved for complicated cases and for confirming the first clinical diagnoses of the season, but are not routine for everyone who exhibits influenza-like symptoms.

However, because many potential bioterrorist agents initially cause symptoms that resemble influenza, it has become increasingly important to ensure that rule-out testing capabilities exist. Improving the ability of laboratories to rapidly test for influenza aides both pandemic and bioterrorism planning. Additionally, ensuring state public health laboratories are adequately staffed, computerized for record keeping, able to test for influenza year round, and able to isolate and subtype virus will help with data transmission, tracking, and analysis during a pandemic.

At the state and local levels, laboratories will require pandemic influenza testing protocols, including information on specimen handling, shipping procedures, and appropriate assays for the pandemic viral strain. Current protocols for the regular flu season do not mandate biologic containment procedures for the handling of specimens, but testing a virulent pandemic strain would necessitate a higher biosafety level for laboratory worker protection [24].

Pre-event distribution of contingency plans for an increased level of biosafety handling, or identification of labs with existing, higher biosafety capabilities are possible ways to approach this problem. Contingency plans may also address issues of increasing laboratory staffing and capacity during a pandemic.

-
- What are clinician guidelines for cases that should be laboratory-confirmed during a pandemic? Who should be treated empirically?
 - Will specific, higher biosafety level labs be earmarked to test a virulent influenza virus, or will contingency plans to increase rigor in biosafety handling be issued to all labs?

- Where will you find additional laboratory staffing in the event lab workers are ill?
 - Are lab personnel on the priority list for receiving the influenza vaccine?
 - What influenza test kits are recommended and how will you ensure a sufficient supply?
 - Will private/commercial laboratories be involved in the pandemic response?
 - How will the spread of disease and the progress of immunization through the population be tracked?
 - Has appropriate training been provided to clinicians and clinical laboratorians on the use of rapid flu tests?
-

PANDEMIC INFLUENZA PREPAREDNESS- SURGE CAPACITY

Provider and workforce shortages

Study estimates indicate that the toll of a future influenza pandemic may range between 89,000-207,000 deaths, 314,000-734,000 hospitalizations, 18-42 million donor visits, and 20-47 million additional cases who do not seek formal medical care - all in the United States alone [18]. This overwhelming burden of illness and dispersion of cases over a large geographic area is a characteristic that distinguishes influenza from many potential bioterrorism agents.

The 2001 General Accounting Office (GAO) report, *Influenza pandemic plan needed for federal and state response*, notes that pandemic influenza will affect numerous locations simultaneously instead of the more focal epidemiology that would likely result from a bioterrorist attack [9]. Typically, unaffected areas contribute human and material resources during U.S. public health emergencies. This is difficult to duplicate in a pandemic situation because each jurisdiction will need all available resources and workforce.

The role of the primary care provider will be essential not only for provision of care during this widespread infectious disease emergency, but also for early identification of a virulent influenza strain and maintenance of accurate data on health indicators, morbidity, and mortality.

But, as Dr. L. J. Tan, Infectious Disease Specialist for American Medical Association, stresses, "In the event of a pandemic the last thing a physician is going to do is sit down and read a set of guidelines or recommendations . . . if they are included from the onset of the planning stages, physicians will be better informed and more likely to follow guidelines" (L. J. Tan, personal communication, June 22, 2001). The October 2001 bioterrorism attacks have reinforced the importance of pre-event communication and collaboration between state health agencies and the medical community.

Very few physicians have experience in diagnosing or treating potential bioterrorism illnesses such as smallpox or anthrax, but it is the atypical U.S. physician that has never seen or treated a case of the flu. Influenza pandemic planning

is, therefore, not expected to call for extensive physician training on diagnosis and treatment.

However, the need for individuals providing basic, supportive care will increase as both health professionals and the public are affected by the pandemic. Millions of patients may require medical attention, but most will require only *minimal* medical attention. Within the parameters of existing state practice laws, volunteers may be extremely helpful in maintaining fluids through IVs and administering antivirals or vaccinations.

The CDC developed a tool for each state to estimate the potential effects of an influenza pandemic and to assist them in their preparedness planning. The assessment tool, FluAid, uses state-specific population, hospital, and workforce statistics to approximate the economic and societal impact of an influenza pandemic. FluAid is a free Internet tool available on the CDC website (Appendix A).

-
- What is the estimated impact of an influenza pandemic on your jurisdiction?

 - How will your state augment medical, nursing, and other healthcare staffing for provision of care during a pandemic?

 - Who will care for patients if the medical community experiences severe shortages during a pandemic?

 - How will the state collaborate and communicate with the private sector?

 - In the event that key health agency staff are unable to work, who will assume their duties and decision making responsibilities?

 - What personnel in your state are “essential workers?” (Those whose absence would affect public safety or disrupt the pandemic response).
-

Volunteers

Prior to 2002, it may have been difficult for states to give an overall estimate of their ability to increase staffing in response to a disaster. However, after preparing applications for the Health Resources Services and Administration (HRSA) Bioterrorism Hospital Preparedness Program, health agencies have a more comprehensive idea of their available volunteer resources [25].

Organizations such as the Red Cross, the Joint Commission on Accreditation of Health Care Organizations, and the American Hospital Association have encouraged capacity evaluations and listing of personnel who can provide medical care in the event of an emergency. Disaster Medical Assistance Teams, Metropolitan Medical Response Systems, and, once operational, the newly created Medical Reserve Corps may also assist in providing treatment during a pandemic.

Pandemic planning can build on these existing efforts and help to identify gaps in capacity that may hamper the efficient use of volunteers. The bigger challenge will be to ensure the number of identified medical personnel is not an overestimation and that various agency lists and efforts are not redundant.

Relatively simple medical care may help decrease the overall mortality during an influenza pandemic. This, together with the expectation that the number of people simultaneously requiring medical assistance will far surpass what is projected for a bioterrorist attack, may indicate a need for augmentation of current personnel lists to increase medical coverage during a pandemic.

For example, during the 1918 Spanish Flu, public health officials first enlisted the help of general practice physicians and nurses, then specialty physicians, then medical, dental, and nursing students, and finally entreated the entire untrained, general public [8]. Although there are better options and protocols in place today, the possibility of an unprecedented burden of illness still exists.

The U.S. anthrax experience illuminated several unresolved issues that affect volunteer services. The number of individuals volunteering to assist with the anthrax response was adequate, but their coordination proved more difficult. Knowing how to

reach, coordinate, and mobilize volunteers in advance will help prevent disjointed efforts. Clearly defining roles and chains of command pre-event is also a key component to the success of volunteer mobilization.

Finally, laws surrounding volunteer payment, licensure, and credentialing for persons working outside their normal jurisdiction need to be reviewed. Again, the HRSA Bioterrorism Hospital Preparedness Program activities should provide some answers to the questions raised during the October 2001 anthrax attacks, and to health officials can look to these as references pandemic planning.

-
- How will volunteer health workers be recruiting and trained quickly?
 - Can the state provide monetary compensation to volunteers?
 - What are the licensure requirements for out-of-state volunteers in cases of emergency? For retired health care workers that re-enter service to assist with the pandemic response?
-

Pandemic facility and equipment needs

In addition to staff surge capacity, there are also planning considerations for hospital and equipment surge capacity. During a regular flu season, more than 114,000 individuals are hospitalized due to flu-related complications [12]. Hospitals operate at maximum capacity, or are forced to divert patients to alternate facilities if they exceed maximum capacity. State bioterrorism planning will identify overflow locations such as schools and Veterans Affairs hospitals, but pandemic planners can further assess the building conversions needed to treat influenza cases (i.e. obtainment and operation of respirators).

Guidelines and case definitions for triaging patients will help physicians and volunteers better organize the available space and resources. In the event of a pandemic it has been suggested that severe illnesses be treated in hospitals, while milder illnesses are triaged to the converted buildings (L. J. Tan, personal communications, June 22, 2001). Pre-event coordination with Emergency Medical Services to establish triage logistics will streamline this process during a pandemic or other public health emergency.

A grim pandemic reality is that treatment inevitably fails in many cases, and morgue surge capacity, coroners, and trucks for transporting fatalities are needed. In Philadelphia during the Spanish flu, over 12,000 people died in the course of a single month. Burial issues were the main priority during the time, as the improper storage and burial of bodies added another layer of public health and infectious disease concerns to an already daunting situation [8].

-
- What are clinician guidelines for triaging influenza patients?
 - Where will overflow cases be treated once hospitals have reached capacity?
 - How will hospitals coordinate with Emergency Medical Services to assess patient status, communicate with, and direct patients to available beds?
 - How will the state address mass burial needs without an adequate workforce?
 - What are your state's contingency plans for increasing morgue capacity?
-

Economic loss

Economic repercussions unavoidably follow disruption of a state's workforce. The rapid removal of individuals from the workforce, along with public fear about contracting the disease and efforts to prevent the pandemic spread, have a significant effect on tourism, import, and export activities. Because of the panic a novel strain of influenza induces, pandemic "threats" can dramatically alter a country's or state's economic stability even before the virulence of the virus is confirmed.

In 1997, Hong Kong reported 18 cases of influenza and six fatalities caused by a novel virus strain [9]. Because this was the first apparent incident of a direct viral leap from avians to humans, it was feared worldwide that the new strain had pandemic capabilities. Travel, trade, and tourism slowed considerably.

In an extremely politicized move, veterinary authorities slaughtered a total of 1.6 million chickens in wholesale facilities and Hong Kong vendors, and stopped

importation of chickens from neighboring areas. Although no additional cases of influenza were reported, Hong Kong's economy was greatly affected [24]. The CDC has estimated that U.S. economic losses associated with the next pandemic may range from \$71 billion to \$166 billion [13].

An economic crisis may also result from the extended duration of an influenza pandemic, which characteristically has at least two waves of cases. The second cycle occurs approximately three to nine months after the initial outbreak in a given area and may be even more severe than the first wave [17]. This differs from other communicable diseases that have the potential to be used as bioterrorist agents; most will have continuing spread, but once under control, will not resurge with any predictability [9]. The interval between influenza pandemic cycles may coincide with the availability of a pandemic vaccine, and offer the first opportunity to vaccinate the population.

Health officials can anticipate and be prepared for a second round of severe influenza cases and a pandemic period lasting more than a year [17]. Outlining a plan in advance will help hospitals, labs, and health agencies to restock and recuperate, preparing for another wave of illness.

-
- What measures will be taken to ensure the state obtains supplies for a second wave of influenza cases and an extended pandemic period lasting more than a year?
 - In a severe economic crisis, what health programs/services are priorities?
 - Who is responsible for making decisions about infected animal populations within your jurisdiction?
-

PANDEMIC INFLUENZA PREPAREDNESS- RISK COMMUNICATIONS

Lessons learned from the October 2001 anthrax events indicate that keeping the public informed throughout emergency situations is critical and helps reduce fear and disorder. This is particularly true for a highly contagious event like pandemic influenza.

In contrast to a bioterrorism incident, a pandemic does not arise from human malice, but through the natural evolution of the influenza virus. Homeland defense and tightening of airport security cannot avert a pandemic or necessarily prevent the virus from entering the United States. This, coupled with the fact that influenza can be transmitted merely by breathing in contaminated air, may result in extreme stigma and hostility.

“An epidemic erodes social cohesiveness because the source of your danger is your fellow human beings; the source of your danger is your wife, children, parents...” [8]. Pre-established relationships between health agencies and local law enforcement, and a plan for contacting the National Guard can help address public panic.

The 2001 anthrax attacks catalyzed the development of crisis communication tools. One of the resources, *Communications in Risk Situations: Responding to the Communications Challenges Posed by Bioterrorism and Emerging Infectious Diseases*, stresses the importance of maintaining trust and credibility with the public [26]. This entails identifying a highly credible spokesperson, such as a scientist or health professional, who has prepared for crisis communication with the public and media.

In the real or perceived absence of a credible spokesperson, people look to newscasts and reporters for information about emergency events.

The public health system was unprepared for crisis communications during the anthrax attacks. Communications were uncoordinated and, as a result, spokespersons were often inadequately prepared and appeared guarded and unreliable.

Inaccurate messages about anthrax were relayed through broadcasts and articles. Credibility was damaged, and the public became angry and mistrustful of government authorities. The experience demonstrates that a lack of effective communications among medical and public health communities, federal, state, and local governments, authorities and the media, and between *a//* entities and the public can jeopardize a coordinated response.

Developing a crisis communication strategy is, therefore, an integral part of influenza pandemic planning. A credible spokesperson and the support of a well-staffed and fully briefed communications team have the potential to dramatically improve the way messages are relayed to the public.

Advance education and communication with the public can also significantly reduce the level of public panic and disorder, bolster the percentage that get vaccinated, and decrease the number of "worried well" seeking medical assistance. Both public panic and large numbers of worried well can further tax the medical system and hinder pandemic response efforts.

State health officials or epidemiologists may be identified as the most appropriate spokespersons, or they may choose to appoint another respected authority and continue to review information intended for release, ensuring consistency and accuracy. In states with local or city public health agencies, it is critical that the state health official and local public health officials relay the same messages to the public.

Messages will potentially need to address symptoms and transmission of influenza, geographic spread of the pandemic, current case counts, designated treatment locations, vaccine and antiviral availability, reasons behind a vaccine prioritization strategy, how to provide supportive care for uncomplicated influenza cases, information about suspended public meetings and school closings, quarantines laws and enforcement, and volunteer need and coordination.

By increasing awareness about pandemic influenza and developing a specific plan to communicate with the public, state health officials can work together with an informed population, reducing disorder and improving the efficiency of their response to the pandemic.

-
- Who will be the identified spokesperson(s) to the media and public during a pandemic?
 - What pandemic influenza questions can be anticipated and what are the planned responses?
 - What are the three key messages you would like the public to hear and understand?
 - What will be done to ensure state and local public health officials relay the same messages to the public?
 - What communications medium will be the most effective in relaying information to the public (e.g., local television and radio stations; web site; 24-hour hotline; press release)?
 - If a novel influenza virus is identified, but not yet confirmed to be virulent, how will the public be informed without inciting undue panic?
 - How will vaccination of priority groups during the early months of a pandemic be explained to the general public?
 - How will you encourage a vaccination campaign in state and local areas if a pandemic has been declared?
 - During the interval between pandemic cycles, how will you raise public and health care worker enthusiasm for a vaccination campaign when it appears the pandemic is over?
-

CONCLUSIONS

In his book, *America's Forgotten Pandemic: Influenza 1918*, Alfred W. Crosby uses the phrase "forgotten pandemic" in part because the attention given to the event by public health officials, historians and the general public was, and still is, amazingly disproportionate to the pandemic's magnitude and destruction. As the United States moves further away from that devastating year, public health needs to ensure the lessons learned don't disappear completely.

The World Trade Center and anthrax attacks served as harsh reminders of the importance of disaster planning for both terrorist and naturally occurring emergencies. While advance warning for a terrorist attack is unlikely, the warning already exists for pandemic influenza. It will happen again, but it is not possible to pinpoint the date. Rather than waiting for more accurate pandemic *predictions*, the public health community can emphasize pandemic *anticipations* to spur preparedness activities. Pre-event consideration of agency roles, policy issues, workforce shortages, surge capacity, and risk communications will improve social cohesion and temper the impact of a pandemic.

By combining lessons learned from the 2001 terrorist incidents with those gleaned from pandemic history and the annual influenza season, the public health community can develop an effective response. State health officials have an unprecedented opportunity, using their states' bioterrorism preparedness assessments and plans as scaffolding, to help create strategies that address unique influenza preparedness issues and to improve the nation's response as a whole to future pandemics.