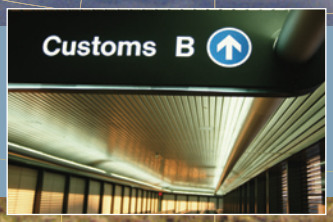
NGA Center for BEST PRACTICES

PREPARING FOR A PANDEMIC INFLUENZA

A Primer for Governors and Senior State Officials



THE NATIONAL GOVERNORS ASSOCIATION (NGA), founded in 1908, is the instrument through which the nation's governors collectively influence the development and implementation of national policy and apply creative leadership to state issues. Its members are the governors of the 50 states, three territories and two commonwealths.

The NGA Center for Best Practices is the nation's only dedicated consulting firm for governors and their key policy staff. The Center's mission is to develop and implement innovative solutions to public policy challenges. Through the staff of the Center, governors and their policy advisors can:

- **quickly learn about what works**, what doesn't, and what lessons can be learned from other governors grappling with the same problems;
- **obtain assistance** in designing and implementing new programs or in making current programs more effective;
- **receive up-to-date, comprehensive information** about what is happening in other state capitals and in Washington, D.C., so governors are aware of cutting edge policies; and
- **learn about emerging national trends** and their implications for states, so governors can prepare to meet future demands.

For more information about NGA and the Center for Best Practices, please visit www.nga.org.

ISBN: 1-55877-402-5

PREPARING FOR A PANDEMIC INFLUENZA

A PRIMER FOR GOVERNORS AND SENIOR STATE OFFICIALS

Foreword

History's greatest killer always has been disease. Smallpox alone has killed hundreds of millions of people, more than that Black Death of the Middle Ages and all the wars of the 20th Century combined.[1] Even as some of history's most infamous scourges—smallpox, polio, tuberculosis—are brought under control through vaccines and antibiotics, others—AIDS, SARS, Ebola, Marburg, Monkeypox, West Nile Virus, Hantavirus—emerge.

Against this backdrop, the world watches the spread of an influenza virus among the global bird population. At time of publication, the H5N1 virus had been found in 47 countries. Millions of birds had been culled in an effort to keep the virus out of commercial poultry flocks. A confirmed 224 people in 10 countries had been infected with the virus, mostly through close contact with infected chickens or, in rare cases, sustained, close contact with infected individuals such as family members. Of those 224 known human cases, 125 proved fatal.

The H5N1 influenza virus may not provide the spark for another human pandemic. Nonetheless, history has shown that such pandemics do occur periodically. Prudence therefore dictates states achieve a level of preparedness that ensures, at a minimum, the maintenance of essential services during times in which widespread disease affects the health care system, the broader economy, and society as whole. Steps taken now to prepare for what could be a severe pandemic will have benefits throughout the health care system and will prepare states for a range of health- and disaster-related challenges.

Pandemic preparedness involves more than stockpiling pharmaceuticals and planning for surges of patients at hospitals. A severe pandemic will affect all sectors of society: high rates of worker absenteeism could affect the operations of water treatment facilities and power plants; efforts to slow or stop the spread of the disease could limit the availability of food, cause schools to be closed for significant periods of time, and create economic hardships for state and local governments, business owners, and individuals; and government efforts to manage the public's response could be complicated by the myriad sources of information—including the Internet—on which people rely for guidance.

Preparing for a Pandemic Influenza: A Primer for Governors and Senior State Officials offers an overview of these and other issues governors and state officials must consider as they develop plans to respond to pandemic influenza or other disease outbreaks. This document focuses on state policies and responsibilities, and is intended to complement the federal guidance issued by the White House Homeland Security Council, the Department of Health and Human Services, and the Department of Homeland Security.

The report was authored by Dr. Stephen Prior, who is the founding Research Director of the National Center for Critical Incident Analysis, a Distinguished Research Professor at the National Defense University in Washington, DC, and president of Quantum Leap Health Sciences, Inc. in Arlington, Virginia. Trained as a life scientist with qualifications in microbiology and biochemistry, he has more than 20 years of research experience in a wide range of multinational and biotechnological environments.

Dr. Prior is an acknowledged leader in the field of medical defense against the threat posed by biological weapons and bioterrorism and has advised and worked closely with government and commercial defense staffs worldwide to develop medical countermeasures. A native of the United Kingdom, his career has included appointments to the UK Ministry of Defense, North Atlantic Treaty Organization (NATO), and the U.S. Department of Defense. He recently has applied his skills to helping governments understand the implications of and prepare for a possible pandemic influenza. As Dr. Prior has noted, "Mother nature has no peer as an inventor of biological threats."

June, 2006

Acknowledgements

The author would like to acknowledge the following individuals for their valuable contributions to this document: Emily Falone, Chief of Public Health Preparedness in the state of Delaware; Dianne Mandernach, Commissioner of Health for the state of Minnesota; and Chris Logan, Senior Policy Analyst for Homeland Security in the NGA Center for Best Practices.

Summary

A comment made at a recent briefing for congressional staff on a pandemic influenza outbreak succinctly captures the potential magnitude of this uncertain but urgent threat: "Once a pandemic happens, we will divide forever the progress of our nation as pre-pandemic and post-pandemic." When a pandemic occurs, the impact of the disease will join the lexicon of nation-changing incidents on the scale of 9-11 and the 2005 Hurricane Season. In every state, governors and senior officials will be at the forefront of protecting public health, maintaining critical services and infrastructure, and leading the public from crisis to recovery.

An episode of pandemic influenza is the viral equivalent of a perfect storm. Three essential conditions must be met for an outbreak to begin:

- A new flu virus must emerge from the animal reservoirs that have produced and harbored such viruses—one that has never infected human beings and therefore one for which no person has developed antibodies.
- The virus has to make humans sick (most do not).
- It must be able to spread efficiently, through coughing, sneezing, or a handshake.

The avian flu virus H5N1 already has met the first two conditions: transfer to humans has been documented and the effects are deadly, with 30 percent to 70 percent lethality, but the transmission rates to humans and between humans are still relatively low. Recent reports suggest the virus is mutating and could change in ways that allow it to fulfill the third criterion. When the human-to-human transfer begins, unless it is controlled rapidly in the locality of the outbreak, current levels of international travel could help foster a pandemic in a matter of weeks.

This document examines the key issues governors and their top officials may face should a pandemic occur. It is not intended to serve as a guidance document for preparing a response plan; the federal government—primarily the Department of Health and Human Services—has provided excellent guidance for such planning. Instead, this document introduces senior state officials to many of the considerations they will face in developing such plans.

A pandemic virus may cause a large number of disease incidents and deaths; it will cause anxiety and possibly panic among our citizens; and it will cost the nation significant resources and effort to effectively respond. To prepare for a pandemic, governors and state officials must consider not only how to manage the outbreak itself, but also how to maintain critical operations during the outbreak. Four key facts will inform these efforts and help shape response actions:

- **The effects of a pandemic flu will be broad, deep, and simultaneous, and states must focus resources to ensure continuation of essential services.** Populations worldwide will be affected at the same time and the ability to function and deliver services throughout the public and private sector will be compromised. Delivery of products throughout the world and within the United States may be interrupted and essential services may be strained. Excess medical or other personnel will not be available to fill gaps. Consequently, states must be prepared to set priorities on service delivery and facilitate self-reliance.
- **Medical response capability in a pandemic will be limited, strained, and potentially depleted during a pandemic, and other measures will be needed to control the spread of the disease.** Anti-viral drugs may or may not prove effective and certainly will not be available for the entire general population. Vaccines likely will be developed but not in sufficient quantities or time to inoculate the population before a pandemic starts. Medical treatment also will be limited by lack of equipment—such as ventilators—and more importantly by lack of trained personnel to operate the equipment. Consequently, in addition to coordinating care, states will need to focus on curbing the spread of the disease through actions like restricting public gatherings, limiting travel, closing schools, and stressing personal hygiene (more draconian measures, such as isolation and quarantine, may be effective only in the earliest stages).
- **Government must work closely with the private sector to ensure critical operations and services are maintained.** Many individuals may be sick and incapacitated, affecting a wide range of key services—such as food, energy, and health care—that are delivered by the private sector. Economic activity will be disrupted severely, but basic services must still be maintained. States will need to create ad-

visory councils with industry to sustain such functions as food delivery and energy supply. States also will need to define and communicate the leadership roles, responsibilities, and lines of authority needed to maintain government operations. Development of continuity of operations plans (COOP) will be critical for both government and business.

- **A pandemic will force many key decisions to be made in a dynamic environment of shifting events, and partnerships must be built now and tested to ensure appropriate and rapid action.** The impact of the disease, areas affected, capabilities available, and stages of recovery must be considered constantly when determining response. For this reason, states, the federal government, and the private sector will need to test and evaluate pandemic flu plans through periodic exercises that expose gaps and build relationships among and across all levels of government and institutions. The ability to make good decisions "on the fly" will be as important as good planning made in advance of a pandemic.

Today, policy makers—and the general public—are becoming well informed about the issues and concerns surrounding a pandemic. But that does not mean we are fully prepared to respond. Aggressive planning at the state level must move forward. Proper planning and training for a pandemic flu will produce benefits even if a pandemic proves very mild or does not occur because the preparation involved is transferable to virtually any type of public health emergency. Done well, pandemic flu planning will help the nation become better prepared for all types of hazards.

Introduction[i]

When the next pandemic occurs, the impact of the disease and our response to it will join the lexicon of nation-changing incidents like Hurricane Katrina and the 9-11 attacks. The magnitude of this episode will divide forever the progress of our nation between its pre-pandemic and post-pandemic history. It is very difficult with all of the pressures on budgets, time, and resources to respond to a threat that has not yet manifested on our shores, but some threats are just too great to ignore. Given the potential impact of a pandemic on our nation, we must begin our preparation efforts now, when we have the luxury of time.

A pandemic and the required responses will be like nothing we have witnessed previously. The virus may cause a large number of disease incidents and deaths; it will cause anxiety and possibly panic among our citizens; and it will cost the nation significant resources and effort to effectively respond. According to the National Strategy for Pandemic Influenza[2]:

> Influenza viruses do not respect the distinctions of race, sex, age, profession or nationality, and are not constrained by geographic boundaries. The next pandemic is likely to come in waves, each lasting months, and pass through communities of all sizes across the nation and world. While a pandemic will not damage power lines, banks or computer networks, it will ultimately threaten all critical infrastructure by removing essential personnel from the workplace for weeks or months. This makes a pandemic a unique circumstance necessitating a strategy that extends well beyond health and medical boundaries, to include the sustainment of critical infrastructure, private-sector activities, the movement of goods and services across the nation and the globe, and economic and security considerations. The uncertainties associated with influenza viruses require that our Strategy be versatile, to ensure that we are prepared for any virus with pandemic potential, as well as the annual burden of influenza that we know we will face.

The strategy accurately states that the pandemic threat requires "the leveraging of all instruments of national power, and coordinated action by all segments of government and society." Governors and lead state officials should prepare for the emerging threat of avian influenza and the possibility of a subsequent pandemic influenza episode.

Distinguishing Among Risks: When is "Flu" Not "the Flu"?

To develop effective solutions for managing in a pandemic, it is important to understand the distinction between *seasonal influenza*, which causes yearly epidemics of usually mild respiratory disease; *avian flu (or bird flu)*, which is a severe disease almost exclusively affecting poultry; and *pandemic influenza*, which will affect humans but have an undetermined impact because of uncertainties about when it will occur, the extent of the disease, and the likely number of deaths.

Seasonal Influenza

In the United States, influenza is a largely misunderstood, underestimated, and often overlooked disease. Influenza in its routine, seasonal appearance causes 30,000 to 40,000 deaths each year in the United States and 250,000 to 500,000 deaths worldwide. It ranks (with related pneumonias) in the nation's top 10 causes of death. Seasonal flu is managed by the same basic approach each year, i.e., a medical component (principally a flu vaccine) that seeks to prevent and treat the disease, and an augmenting nonmedical component that seeks to minimize the societal impact.

Seasonal influenza causes 30 to 40 thousand deaths each year in the United States, ranking it among the nation's top 10 causes of death.

Seasonal influenza is as different from pandemic flu as a tidal surge is from a tsunami. Both diseases cause illness and deaths, but they are very different in terms of magnitude and impact. The annual response to seasonal flu is well characterized and well understood, involving annual flu shots for persons most at risk from the disease and staff absenteeism due to illness lasting three to four days. It is also worth noting that despite the numbers of U.S. deaths each year, the seasonal flu does not invoke significant psychological or psychosocial reactions from the general public. However, exceptions from this norm can occur; in 2004, with vaccines in short supply and reports of a possible increase in childhood

[i] This paper presents an overview of the most critical issues governors and senior state officials must consider in preparing for a pandemic influenza. It is not intended to serve as a guidance document from which to construct a detailed state plan. The federal government—particularly the White House Homeland Security Council, Department of Health and Human Services, and Department of Homeland Security—is providing such guidance. Instead the purpose of this document is to help state planners understand the issues involved in response and to motivate state planning efforts.

deaths, there was greater concern and some degree of panic in a public conditioned to a normal flu season and a normal medical response.

Avian Influenza

The H5N1 virus—the cause of the current major concern about an avian or bird flu in large parts of the world—was first identified in Hong Kong in 1996. Further outbreaks occurred in subsequent years, and in 2001 the virus began a much wider spread, causing the largest documented outbreak of avian flu in the last 50 years. The spread of a single avian flu virus (H5N1), demonstrating an as yet unstoppable movement across large parts of Asia, Eurasia, Africa, and most recently Europe, appears to signal the presence of the virus in migratory bird populations. This means that we now must consider the global spread of this virus to be an immediate possibility.

The current H5N1 avian flu is chiefly an animal disease, having nearly 100 percent lethality in certain bird species. It does not infect humans readily; most cases of H5N1 influenza infection in humans have resulted from contact with infected poultry (e.g., domesticated chicken, ducks, and turkeys) or surfaces contaminated with secretion/excretions from infected birds. So far, the spread of H5N1 virus from person to person has been limited and has not continued beyond one person. However, it has demonstrated high rates of lethality in infected humans.

The current avian flu virus is generating concern about the threat to domestic poultry and allied industries in the affected countries, creating a drain on internal resources and representing a considerable problem in their relations with neighboring countries and trading partners. However, merely spreading the avian virus does not represent a challenge that will be equal in all countries.

Countries with highly regulated, industrial-scale housing of domesticated poultry are less susceptible and better able to respond to an imminent threat than those countries with backyard flocks and domestic birds, which represent an uncontrolled environment for the spread of the virus and a logistical nightmare for testing and control. In Asia and Africa, there is uncontrolled spread of avian flu in countries with poultry farms and, importantly, backyard flocks. The spread in Europe appears to be much more limited and may indicate what would happen if the virus reaches the United States.

Concern about the threat of H5N1 to the domestic poultry and allied industries has led to the creation of response plans and processes. At present, the threat to the U.S. agriculture industry is considered low and the virus is not present in the country. Moreover, past experiences with monitoring U.S. flocks for the development of diseases, including avian flu caused by viruses other than H5N1, have shown that early detection and prompt action can limit the infection to the immediate locality of the first reported case—the last few outbreaks have not progressed beyond the immediate confines of the poultry shed where they were detected.

This experience gives a reasonable degree of confidence that the nation is watchful, aware, and ready to rapidly respond to avian flu with plans, policies, and procedures that have proven effective against diseases similar to an H5N1-initiated avian flu. However, if the H5N1 virus does become established in a domestic poultry flock, it could be the forerunner of a pandemic and undoubtedly will begin to influence public perception and behaviors.

Because of its potential for infecting humans, an avian flu outbreak of H5N1 will have immediate behavioral and economic effects in an affected country or state. France, which saw its first reported cases of H5N1 avian infections in February 2006, is reporting an economic impact of over $48 million per month because of depressed demand for chicken. Italy, also recently infected by H5N1, reports a 70 percent drop in demand for poultry and poultry products. The public is responding to the fear of a pandemic by changing behaviors, and similar behavior should be anticipated in the United States.

Pandemic Influenza

An episode of pandemic influenza is the viral equivalent of a perfect storm. Three essential conditions must be met for an outbreak of pandemic influenza to begin. Fortunately they rarely converge; unfortunately they are impossible to predict.

1. A new flu virus must emerge from the animal reservoirs that have produced and harbored such

viruses—one that has never infected human beings and therefore one for which no person has developed antibodies.

2. The virus has to make humans sick (most do not).
3. It must be able to spread efficiently, through coughing, sneezing, or a handshake, or through contaminated media such as doorknobs.

The avian flu virus H5N1 already has met the first two conditions: transfer to humans has been documented and the effects are deadly, with 30 percent to 70 percent lethality. However, the transmission rates to humans and between humans are still relatively low.[3] Recent reports[4] suggest the virus is mutating and adapting in ways that may increase its probable fulfillment of the third criteria. Once adapted, the avian flu will have the potential to become a pandemic and time will be short. When the human-to-human transfer begins, unless it is rapidly controlled in the locality of the outbreak, it is estimated that with current levels of international travel it will become a pandemic in a matter of weeks.[5]

HHS estimates that in a moderate influenza pandemic, the United States might experience 209,000 deaths, with 128,750 patients requiring ICUs and 64,875 patients needing mechanical ventilators.

In a severe pandemic (similar to 1918), the numbers could rise to 1.9 million deaths, with 1.5 million needing ICUs and 742,000 needing ventilators. Under both scenarios, 30 percent of the population (90 million) would contract the illness and 45 million would need outpatient care.

Three pandemics occurred in the last century—in 1918, 1957, and 1968. Each caused significant human morbidity (illness) and mortality (deaths). Some experts have estimated that the worst of these, the 1918 pandemic, may have caused over 50 million deaths worldwide in less than 12 months. In the opinion of many experts and organizations such as the World Health Organization (WHO) and the U.S. Department of Health and Human Services (HHS), a new pandemic based on effective transmission of the H5N1 flu virus will have a significant—but as yet unquantifiable—impact.

In addition to their human toll, pandemics can have enormous social and economic consequences. For example, in 2003 the more localized epidemic of severe acute respiratory syndrome (SARS) caused economic losses and social disruption far beyond the affected countries and far out of proportion to the number of cases and deaths. Most experts agree the greatest impacts of the SARS outbreak were on the economies of the countries with confirmed cases of the disease, and some sectors such as the travel and hotel industries were affected more than others.

SARS caused more than 8,000 cases and nearly 800 deaths worldwide. Estimates of the economic impact indicate the greatest decline in GDP in Hong Kong at 2.6 percent, followed by China (1.1 percent) and Taiwan and Singapore (0.5 percent). Individual economic sectors show more marked affects—for example, a decline in retail trade in Hong Kong of 15 percent. A study by the Bank of Canada estimated that the SARS crisis cut Canada's GDP in the in the second quarter of 2003 by 0.6 percent.

SARS was a relatively short-lived outbreak that lacks some of the more worrisome characteristics of a pandemic influenza. It can be anticipated that a pandemic would have an even more disruptive effect on societies and economies. With unlimited geographic spread, a pandemic could rapidly affect populations, social infrastructures, and economies in all countries, painting a grim picture for the whole world. Given the greater level of disease and death that a pandemic would cause, the effects could be magnified several-fold.

In a recent report, the U.S. Congressional Budget Office estimated the impact of a severe outbreak of pandemic influenza would cause a decline in U.S. GDP of five percent in the year it occurred, equivalent to $500 billion in 2004 dollars. A moderate outbreak would have less impact but still cause a 1.5 percent decline, equivalent to $160 billion in 2004 dollars and comparable to the impact of SARS on affected countries in 2003.

Epidemics could last six to eight weeks in affected areas. Multiple waves of illnesses are likely, with each wave lasting two to three months. During each wave, absenteeism rates could reach 40 percent in a severe pandemic from illness, caring for sick family members, and fear of social contact.

Avian flu presents an uncertain but potentially significant threat of a new human pandemic. As of

March 1, 2006, WHO reported 174 confirmed cases of H5N1 infection in humans and 94 deaths, demonstrating a mortality rate of around 50 percent of infected people. At this level, the H5N1 virus is one of the most deadly human diseases ever reported, on par with the Ebola and Marburg viruses in terms of lethality.

The SARS outbreak—though disruptive—lacks some of the more worrisome characteristics of a pandemic influenza. For example, SARS carriers typically exhibited symptoms (e.g., fever) while contagious and required close contact to spread the infection. A pandemic flu carrier might not show any symptoms for up to two days while still shedding the virus, thus making it harder to isolate.

Moreover, viruses that are closely related to H5N1 (so-called Type A Influenza viruses) have shown an ability to evolve to become effectively passed (transmitted) from human to human. If this form of H5N1 is established and effective human-to-human transmission occurs, it will be very easy for the highly infectious virus to spread rapidly in human populations and across the globe. In our interconnected and interdependent world, with rapid and extensive international and intercontinental travel, it is not hard to imagine (or model) the worldwide spread of the virus and the disease in what is called a pandemic.

The avian flu or a human pandemic can manifest in the United States through viral spread or in U.S. citizens returning from travel to areas where the virus is active. If H5N1 enters the United States, it will impact every facet of our daily lives and potentially cause untold damage to our economy and threaten the social fabric of our communities. These threats will engage every level of government and potentially impact every citizen.

The Role of the Governor and Lead State Officials in Managing a Pandemic

To prepare for a pandemic, governors and state officials must consider not only how to manage the outbreak, but also how to maintain continuity of operations during the outbreak. Fundamentally, the magnitude of the issues inherent in pandemic preparedness can be expressed in the question, "Are we, our personnel, and our state prepared to prevent or minimize the human morbidity and mortality, the social disruption, and the economic consequences caused by an influenza pandemic?" It is the entire question that needs to be answered, not merely the issue of a medical response to the death and disease caused by this uncertain threat.

Management of an outbreak, including a considerable medical and public health component, has been the primary focus of the pandemic planning at the national and state levels. However, maintaining operations during an outbreak is rapidly becoming an equal concern because of the impact that the disease will have on economic, social, and political aspects of our nation's day-to-day routine.

State and local officials must address not just the immediate outbreak of influenza, but also the interpandemic phase and the possibility that the worst effects may occur in a second or third wave. Based on a historic review of pandemic episodes, it is likely that the initial pandemic episode (or wave) will last 8-12 weeks. It will be followed by a second and possibly even a third wave of disease that will occur 8-12 weeks after the initial wave of the disease has passed. The entire pandemic period may take over a year to complete the three phases. During each interpandemic phase, there will be an opportunity to recover and prepare for a future outbreak, but this will represent a time of considerable stress for the public and an exhausted responder community.

After a pandemic wave is over, it can be expected that many people will have lost friends or relatives, suffer from fatigue, or have financial losses as a result of the interruption of business. State governments or other state or local authorities will need to address these concerns while also preparing to respond to the next phase or wave of disease.

A key priority will be ensuring that government operations continue. Each agency must develop a list of service priorities and then develop plans for meeting those priorities. Continuity of operations (COOP) and continuity of government (COG) documents should incorporate such plans.

State and local officials must address not just the immediate outbreak but also plan for the interpandemic phase and the possibility that the worst effects may occur in a second or third wave.

Developing an Effective Pandemic Plan

It is important for state-level planning to address both managing the spread of the pandemic—focusing on medical interventions and enacting other measures to prevent disease spread—and managing **in** the pandemic—focusing on maintaining continuity of operations and continuity of government. Managing in a pandemic—with considerable loss of staff, depleted resources, a struggling economy, and a nervous public—will be a considerable challenge to local and state leadership.

In addition, the evolving nature of the threat means the planning process needs to be iterative and updated as new information becomes available. So many of the pandemic characteristics are uncertain, and will remain uncertain until the outbreak occurs, that a fixed plan is unlikely to be a successful plan.

Key Steps in Planning for a Pandemic

Effective plans must answer the following basic questions:

- Is there recognition of the potential human, social, and economic impact of a pandemic within the state and region?
- Are there public and private sector commitments to prepare for such an event?
- Is there a strategy on how to involve the community in the planning process?
- Have ethical aspects of policy decisions been considered? Is there a leading ethical framework that can be used during the response to an outbreak to balance individual and population rights?
- Is a legal framework in place for the state pandemic plan? Does this framework include contingencies for health-care delivery and the maintenance of essential services, and for the implementation of public health measures?
- Has the state prioritized countermeasure allocation before an outbreak? Can the state update this prioritization immediately after the outbreak begins based on the at-risk populations, available supplies, and characteristics of the virus?
- Does the state have an effective communications plan and strategy? Are all the key state personnel aware of their roles and responsibilities in the communication plan? Does the state have back-up plans in the event that one or more functions fail due to infrastructure or manpower losses during the epidemic?

The efforts involved in developing an effective pandemic plan also will improve the state's capacity for addressing many other public health emergencies.

Accordingly, plans must stress communication, intergovernmental coordination, public education, health resources, curbing economic impacts, maintaining essential services, using appropriate legal authority to stop disease spread, and training.

Clearly define and communicate leadership roles, responsibilities, and lines of authority for the response at all levels. Defining roles and responsibilities across the government and private sectors, and designating personnel (and trained back-ups) to fulfill essential activities will be needed prior to the incident. Prior to a catastrophic event, these roles must be communicated effectively to facilitate rapid and effective decision-making. This framework can then inform and create the local and community level plans that are the key to success against a major threat like the pandemic virus.

Encompass both the horizontal and vertical domains. The plan must include all state (horizontal) assets, including government and private-sector capabilities, while vertically linking national efforts with local requirements. The National Strategy for Pandemic Influenza states a pandemic will require "the leveraging of all instruments of national power, and coordinated action by all segments of government and society." As the chief executive of the state, the governor is uniquely positioned to provide the nexus for this horizontal and vertical integration.

In the horizontal domain, it will be essential that state officials are able to coordinate the state-based powers vested in the office of the governor and use them effectively to manage in a pandemic. For example:

- Identifying the sectors that are most vulnerable during a pandemic will help to determine the potential impact and how the effects might be mitigated. For example, states with significant service-based economies and tourism may be hard hit by restrictions on travel and public gatherings.

- Testing and assessing plans that allow staff to provide critical capability while reducing pandemic spread, including working from home or telecommuting. Many states or state agencies may find, for example, that they do not have sufficient bandwidth or server capacity to allow large-scale telecommuting of its workforce.
- Addressing the problems of conducting state business and developing new requirements for conducting state business (including emergency measures) when travel, meeting, and social contact are limited to prevent the spread of disease.
- Assessing how governors can use, explain, and enforce emergency powers against a background of public unease and possibly panic.

All of the above should be reviewed and tested through exercises with neighboring states to harmonize response actions and continuity planning. Equally, in the vertical domain, lead state officials will be the point of entry for any federal engagement. States will need to work closely with their federal partners and establish relationships with key personnel to ensure the speed and quality of decision-making during a pandemic. Unlike most other crises, a pandemic creates significant limitations in what the federal agencies can and will provide during the incident. Gaining insight into these limitations, leveraging the individual strengths in each state that can be used, and acknowledging the possible loss of state assets—such as the National Guard forces—to federal requirements, will all be important roles for state planning and responses to the threat.

HHS has developed avian and pandemic influenza communication tools that draw on best practices in communication science.

These tools, or "message maps", distill information into easily understood messages written at a 6th grade reading level. Messages are presented in three short sentences that convey three key messages in 27 words. The approach is based on surveys showing that lead or front-page media and broadcast stories usually convey only three key messages usually in less than nine seconds for broadcast media or 27 words for print. Each primary message has three supporting messages that can be used when and where appropriate to provide context for the issue being mapped. See www.hhs.gov for more information.

Develop strategies to engage and educate the public. Public education campaigns should be developed now to begin to enhance the public's understanding of pandemic flu and build a trusted relationship with the response community. The planned response to pandemic influenza must develop a capacity to provide effective communication to the public to minimize negative behaviors, accentuate positive actions, and—based on the Canadian SARS experience—limit the psychosocial and psychological impact of imposing public health measures that include movement restrictions.

Developing appropriate messages and selecting trained (and trusted) messengers who can communicate with the public should be done now. The federal government, through the Department of Health and Human Services, offers a wealth of information on developing a communication strategy on its Web site.

Establish a pandemic preparedness coordinating committee that represents all relevant stakeholders in the region. Such a committee should include government representatives from all applicable disciplines (such as public safety, public health, homeland security, agriculture, emergency management, and education), private sector representatives from all critical service industries (including, of course, health care), and relevant volunteer organizations. The purposes of such a committee are to review and coordinate procedures for delivering health resources, backfilling personnel and equipment, and continuing operations of critical services.

In particular, coordination of health care assets will be crucial since they exist in the pubic, private, volunteer, and faith-based domains. Assessing what is available and taking care not to double-count assets will be very important. For example, it may be tempting to add together public, private, and National Guard EMS personnel, when in fact the same individual may be represented in all three categories. Moreover, the availability of such personnel will be affected by potential federal call-up of National Guard reserves.

Assess likely economic impacts. In a pandemic situation, the most immediate economic impact might arise not from the number of cases and deaths, but from uncoordinated efforts of the general public to avoid becoming infected. The

likely result would be both a "demand shock" for service sectors, such as tourism and mass travel, and a "supply shock" due to workplace absenteeism, disruption of production processes, and shifts to more costly procedures. In addition, emergency measures, such as quarantines and restrictions on travel and trade, could add to the economic disruption and increase its costs.

The combined effect of a reduction in state income and increases in spending will impact state budgets significantly. An assessment of the economic impact of a pandemic and the options to address a budget shortfall should be done in advance of the pandemic outbreak.

A significant loss of state output could arise from a reduction in the size and productivity of the state labor force due to illness and death. Further losses would come from the costs of hospitalization and medical treatment. The combined effect of a reduction in state income and increases in spending will impact state budgets significantly. An assessment of the economic impact of a pandemic and a corresponding examination of the options to address the budget shortfall are prudent actions that should be taken well in advance of the pandemic outbreak.

Determine how to provide goods and services. During a pandemic, changes in daily routines and negative behaviors (such as hoarding) will deplete normal stockpiles of materiel and resources. Maintaining normal daily routine activities will be a key element in managing in a pandemic. Many critical resources required to manage in a pandemic are in the private sector. The integration of those capabilities into the state response will be essential and can be achieved most effectively through the office of the governor. The National Strategy for Pandemic Influenza identified some of the key challenges:

> Movement of essential personnel, goods and services, and maintenance of critical infrastructure are necessary during an event that spans months in any given community. In order to minimize public concerns during the pandemic the private sector and critical infrastructure entities must respond in a manner that allows them to maintain the essential elements of their operations for a prolonged period of time, in order to prevent severe disruption of life in our communities. The private sector represents an essential pillar of our society because of the essential goods and services that it provides. Moreover, it touches the majority of our population on a daily basis, through an employer-employee or vendor-customer relationship. For these reasons, it is essential that the U.S. private sector is engaged in all preparedness and response activities for a pandemic. Critical infrastructure entities also must be engaged in planning for a pandemic because of our society's dependence upon their services.

Review state legal instruments. Implementing some or all of the measures in a pandemic plan will require not only resources allocation but possibly also the use of specific policies or legal instruments. For example, state laws pertaining to movement, activity restrictions, or quarantine may need to be used to reduce the spread of the disease. However, the differences between state laws may make regional action a more difficult proposition.

In the case of the risks from a possible pandemic influenza, concerns about differences between state laws led to federal action that can be used to augment state law and help ensure coordination between states and across regions. On April 1, 2005, the President signed Executive Order 13295[6] that extends the federal quarantine regulations (and several other components of the Public Health Service Act) to cover avian flu or pandemic influenza. This action provides substantial help to officials tasked with managing a pandemic influenza episode.

Governors should consider creating a state legal team to review current laws and regulations and assess how they would be applied during a pandemic. Developing expertise in this area now will aid the rapidity and appropriateness of decisions made during a pandemic. Moreover, as part of preparation, a range of potential actions should be reviewed with community leaders.

Other policies and law are not likely to be supplemented by federal legal code and will require specific state and local actions. For example, decisions on closure of schools, limits on use or practices on mass transit or public transport systems, restrictions on public gatherings, etc., must be determined by state and local officials and supported by local or state policies and law.

Imposing public health and other restrictive measures may require the use of specific (new) laws and policies to address pandemic-imposed problems. A comprehensive review of current laws and regulations, and an assessment of how they would be applied during a pandemic, should be undertaken now. Moreover, if such actions are to be seen as being fair and equitable, they will need to be discussed with community leaders. Beginning the process of consultation in communities well in advance of the emergence of the pandemic disease outbreak will have clear advantage over implementation without consultation during the disease episode.

Health care and public health interventions also may require state and local policies and legislation. A pandemic outbreak will impact the availability of personnel for essential (and nonessential) functions provided by state and local agencies and the private sector. Although a pandemic likely will overwhelm the number of public and private health care providers available, states still should review their procedures on credentialing or licensing health care personnel from other states. If personnel can be transferred from other regions, states will want to ensure there are no barriers.

There will be issues with providing qualified health care and medical capability for both emergent pandemic influenza victims (of which there may be thousands in each community) and for providing routine day-to-day health and medical delivery services. It is important to note that health emergencies and routine care will not diminish during the time of the outbreak. Some routine procedures can be delayed, but policies for providing them need to be addressed well in advance and should include communication with the public that will be impacted by the decisions.

Tabletop exercises can be valuable in helping decision-makers test response actions. For a pandemic flu exercise, states should assemble teams that include key government (state and local), private sector (essential industries), and public (media, volunteer, and faith-based) stakeholders. Representatives from a variety of government functions should be included, such as public health, police, emergency response, education, and the office of the Attorney General. Scenarios examined might include one in which a pandemic virus has emerged but has not yet reached the United States, a severe pandemic scenario, and a mild pandemic scenario. Situations tested might include continuity of operations under various absenteeism assumptions, health care surge capacity, circumstances and criteria for closing schools, restrictions on public gatherings, and vaccine and/or antiviral distribution. Ideally, some exercises should be conducted with neighboring states to test resource sharing and coordinating actions, such as school closings or travel restrictions.

Establish ways to exchange information with other states. By its very nature, a pandemic will impact not just one state but all states. Governors can lead the way in ensuring neighboring states work together to coordinate plans, policies, and procedures that will be used to respond during a pandemic.

As previously mentioned, governors should consider creating regional coordinating counsels and having their state participate in regional exercises. The creation of clearinghouses to share information also should be considered. Effective communication and sharing of plans and concerns with fellow state officials will develop a sound national strategy, leverage the capacity for mutual aid, and reduce redundant work that wastes scarce human resources and precious time as the threat advances.

Perform training exercises. Exercises should be planned and performed to assess current capabilities and explore effective options for incident response. Initiating even the most basic exercises now will save lives during a future incident. At a minimum, each state should have answers to all of the questions noted on page 6 and have tested these answers in a simulation or exercise that engages the appropriate personnel.

Federal partners should be included in most if not all of the state exercises. Involving the public and the media in these exercises also will be of value and will help to inform the communication and behavioral component of a response. Finally, some regional drills with neighboring states also are recommended.

A key aspect of any exercise at the state level should be to assess how the state can continue to provide essential services in the absence of significant support from the federal agencies. The state must test its ability to function without reliance on federal or regional assets and resources to reflect the likely conditions that will prevail during a pandemic.

Meeting essential needs during a crisis will pose technical and logistical challenges to state and local officials. Essential needs include goods (e.g., food, water, and medical supplies), services (e.g., sanitation, energy, and communication), public safety and security (police, fire, and rescue), financial services, mental health care, and many other activities. Assessing these requirements and identifying solutions that combine actions by the public and private sectors can be achieved most effectively through exercises undertaken well in advance of any outbreak.

In addition, personnel losses through sickness, caring for sick family members, and forced absenteeism (e.g. taking care of children at home when schools are closed) will be substantial. They will be compounded by absenteeism by persons too scared to leave home and work. Undertaking exercises and using models (such as the Centers for Disease Control and Prevention (CDC) FluAid and FluSurge models) to assess the impact on state populations will help to develop effective responses at the state and local levels.

The use of exercises will help to define national and state-specific requirements. Sharing of data from these exercises will help prepare regions and the nation to face any pandemic incident and can inform other incidents involving naturally occurring diseases or bioterrorism threats.

Governors' Considerations During the Preparedness Phase

Promote Self-Reliance

- Encourage and invest in *increased food storage* in pantries in government facilities such as schools, prisons, cafeterias, group homes, and state institutions. Encourage businesses, [the] faith-based community, and individuals to do the same.
- *Stockpile equipment and supplies* which may be in short supply such as masks, ventilators, hand sanitizers, medications such as antivirals, and some antibiotics for pneumonia.
- Identify ways for state government to *continue to provide essential services* during a pandemic influenza such as employees telecommuting from home. Ask businesses and local governments to do the same and set up a coordinating council that includes membership of key government agencies, essential private sector industries, and the volunteer and faith-based community to help plan for continuity of essential operations.
- Review and address actions and impediments for implementing *quarantine or social distancing*.

Knowledge

- Ensure you and your key staff have a good *understanding of federal role, strategies, and agreements* including:
  - Incident Command System for federal government;
  - How the federal government plans to communicate with governors' federal strategies to contain and mitigate situations;
  - Federal agreements with private companies regarding interstate commerce; waiver of primary home/business foreclosures; waiver of health insurance limitations on amount of medications an individual can stockpile through private insurance; etc.
- Conduct a *legal review* and discussion regarding what circumstances would call for a State of Emergency or Public Health Emergency and what state laws may need to be waived.

Communications

- *Keep communities informed* of the seriousness of pandemic influenza and what they should do to prepare. Inform public of state strategies and response limitations such as effectiveness of quarantine and isolation (effective chiefly in early stages), and priority distribution of limited medications such as antivirals to health workers and others first responders before the general population.
- Institute programs which *promote good hygiene* practices in schools, workplaces and other public places.
- *Prepare emergency messages* such as public service announcements, to reach all communities including non-English speaking and persons with special needs.

Continuity of Operations and Government Plans

A pandemic has unique characteristics when compared with a more "typical" disaster, and some of these characteristics will impact how government (and businesses) can operate. It will be important to consider how existing Continuity of Operations Plans (COOP) and Continuity of Government (COG) plans can be modified to account for a pandemic episode.

COOP and COG plans will need to be reviewed to ensure they can withstand significant staff absences and other pandemic-related risks. The impact of a pandemic on staffing levels is not confined merely to those who are sick or deceased. Staff absences can be expected for many reasons:

- suspected illness or recovery from actual illness;
- caring for the ill;
- looking after school-aged children (as schools are likely to be closed);
- feeling safer at home (e.g., to keep out of crowded places such as public transport); and
- fulfilling other voluntary roles in the community.

With the exception of incapacitated staff, most of the absentee workforce can provide some useful functions for a government or business operation. However, this requires planning and possibly investment in technology to permit completing office work in the home or elsewhere.

In the event of a pandemic, it is important that core people and core skills are available to keep essential parts of a government agency or office operating. To permit the effective implementation of COOP and COG, lead state officials should consider:

- What are the essential parts of state government and state business? Who are the core individuals required to keep the essential parts of the state running?
- What are the core skills required to keep state government running, including specific licensure and certification needs for key positions? Are there sufficient backups for people and skills if there is a high level of absence?
- Are there other resources (e.g. volunteers, retirees) that could be drawn on if necessary?
- Is it possible to coordinate or operate through a "virtual" governor's office, remotely, using telephone and email?
- Who are the core people required to manage the pandemic contingency plan?
- Does the state have any systems that rely on periodic physical intervention by key individuals to keep them going? How long would the system last without attention?

Once the core people and skills are identified, the state must ensure key personnel are aware of their position and how they will be managed in the event of a pandemic. Plans should consider strategies for minimizing the possibility that these people will become ill with influenza, e.g., allowing them to work from home even in the very early stages of a pandemic, or use other social distancing measures. If working from home is not a well-established practice in the office, agencies and businesses may wish to conduct some large-scale tests with employees to iron out any procedural or technological issues, such as bandwidth, access, server capacity, and security.

Finally, when considering the impact on the state, it will be essential to maximize performance and resilience among state and local leaders and personnel providing critical infrastructure capacity. This task will be particularly challenging in light of the grief, exhaustion, anger, fear, family and self-care issues, and ethical dilemmas likely facing this critical group. Leaders and personnel also may be subject to social and economic factors that may affect their ability to perform crucial tasks and functions adversely—an important consideration that highlights the need to create leadership reserves and "just in time" training packages.

Using models (such as the CDC FluAid and FluSurge models) to estimate the numbers of people in a state affected by a pandemic under various scenarios can help identify needs and effective responses at the state and local levels.

Public Communication Strategies

Both before and during a pandemic, state and local officials should assume responsibility for extensive interaction with the public. Many of the mechanisms that are effective for communication and public education on citizens' role in disease control and on potentially controversial subjects such as quarantine and isolation, the management of scarce resources, and the capacity limits of the health care system can be developed in advance of any pandemic influenza crisis. These systems, when properly implemented, will not vary much for different infectious diseases and can be adjusted to adapt to the unique characteristics of specific diseases, as the situation warrants.

It is worth noting that excellent reviews of risk communication issues are being published in the peer-reviewed scientific literature. Some of the key findings in that research that impact the development of guidelines and best practices for a pandemic influenza communications plan include the following:

- Trust is particularly important when there is inadequate time or information to assess which actions should be taken, or when the perceived threat of an immediate hazard complicates decision-making for the individual.
- Communicating risk entails confronting important uncertainties, some of which are irreducible.
- Assessment of risks is determined not by facts but by emotions.
- Risk is a combination of a probability of something happening, a feeling of the dreadfulness of the event, and a context for the event.
- There is little evidence that knowledge of risk as embodied in professional assessments influences the ways in which the general public perceives and responds to risks and dangers.
- Fear disturbs the balance between rational and irrational behavior.
- Mass communication is mediated or filtered in different ways, through the diverse groups that comprise society.
- The public extracts the gist of any information—not the detail—to make decisions.

The primary goal for public officials, especially at the state and local level, will be communicating with the public in a crisis in a way that helps to build, maintain, or restore public trust. This can be accomplished if officials:

- involve the public in planning efforts early and often;
- offer guidance and statements that are easily understood;
- supply factually correct and comprehensive information;
- provide briefings about government actions with complete candor and transparency; and
- tailor messages to accommodate public beliefs, opinions, and cultural sensitivities.

Communicating Before a Pandemic

Public education campaigns should be developed now to enhance the public's understanding of pandemic flu and build a trusted relationship with the response community. Residents may be more assured if it is obvious that states with international points of entry or crowds associated with tourist attractions anticipated their vulnerabilities and informed the public about how they may act when the pandemic is spreading.

Faced with the continuing spread of the H5N1 virus as an endemic disease in wild birds and the possible spread of the disease by migratory birds to countries, it will be important for state officials to remain vigilant and knowledgeable about the current status of these outbreaks. In states with significant poultry (or poultry-related) industries, the state agriculture, commerce, and public health staff likely are well prepared. It will be important for most other states to maintain a good situational awareness about the disease and to ensure they have plans for effective responses that can be implemented at short notice.

State and local officials should assume responsibility for extensive communication with the public. To help ensure the accurate delivery of information, state officials should brief and inform key local media representatives on the states' communication plans and spokespeople. Good media relationships built on trust will help ensure the rapid flow of good information.

It also will be important for all states to consider what will

be communicated with the public and who will convey the message(s). Avian flu is a threat to a significant component of our national economy and will be perceived as a major factor in increasing the threat from a pandemic. Communicating the right messages in a time of uncertainty will be of great value and is a function that state officials are well-placed to perform.

outcome. A pandemic episode will make a lot of people sick and will lead to deaths in numbers that may far outweigh our experience with seasonal influenza. Though most planners assume 30 percent of the population will become ill, we only can speculate that somewhere between 0.2 and 2 percent of those with the disease may die.

Communicating to the Public on Pandemic Influenza

There are some essential and simple messages a governor can communicate. These include:

The Basics

- A pandemic influenza could be a devastating event.
- Precautions can be taken to lessen the effects of the pandemic influenza such as social distancing, good hygiene, use of anti-viral drugs (if available), and use of vaccines (if available).
- Anti-viral medication will be in short supply and dedicated to essential workers.
- Vaccines may not be available until many months after the pandemic begins.
- Individuals may be asked to stay home for extended periods of time.
- Places where the public gathers, such as schools and child care centers, may be closed due to staffing shortages and as a method to lessen the spread of disease.

What the Public Can Do Now

- Get a flu shot. Though the seasonal flu vaccine will *not* protect you from pandemic influenza, it will keep you from getting "normal" flu and thus lessen the burden on the health care system.
- Begin stockpiling some food and supplies to the extent practical (up to a week's worth of food and staples is advised).

What the Public Can Do During a Pandemic

- Listen to the media for government advisories and frequently visit the state Web site for updates.
- Stay home when sick.
- Practice good hygiene such as frequent hand washing, social distancing (e.g., avoid public gatherings), and not coughing or sneezing near others.

In considering the threat from a pandemic outbreak that could result from the current widespread incidents of avian flu around the world, the public also is challenged by a confusing series of announcements that make H5N1 variously sound as if it represents the end of the world or will be countered readily by a new vaccine. In truth, we cannot predict the

In previous infectious disease outbreaks, it was found that the community generally wants information from people they recognize as authoritative until their family is more highly threatened. Then they may be more likely to turn to leadership they are familiar with (such as clergy, union leaders,

and the mayor). State and local advisory councils should be formed and empowered by state authorities to work in communities before and during any outbreak. These can be established now and integrated into exercises and planning to ensure they are an effective component of the state and local responses.

In addition, when citizens are heavily involved in making decisions and setting policies through collaborative processes, those decisions and policies generally enjoy broader support than those developed solely inside government. In public health settings, that level of public engagement is likely to result in higher levels of compliance with official recommendations and orders.

Numerous examples of strong public engagement processes are available from a range of social policy areas:

- In Plaquemines Parish, Louisiana, the small Native American and Cajun community of Grand Bayou has organized itself to engage local and state governments, universities and faith-based groups and drive the development of policies and strategies that will ensure the community's survival in the face of repeated natural disasters, coastal erosion, and economic losses.[9]
- The Public Health Agency of Canada has used public engagement strategies on a range of social and economic issues, including strengthening health care, addressing aboriginal diabetes, and remediating environmental contamination, and has published a *Toolkit for Public Involvement in Decision Making*.[10]
- The federal government successfully used a public engagement project to help determine priorities for allocating scarce influenza vaccines during a pandemic. The Public Engagement Pilot Project on Pandemic Influenza[11] involved groups of citizens selected from communities in Georgia, Massachusetts, Nebraska, and Oregon and a group of representatives of organizations with a role in vaccine production and distribution. The groups' recommendations about the priorities the government should use in rationing scarce vaccines are reflected in the National Pandemic Influenza Strategy released by the White House in November 2005.

Communication During a Pandemic

Public education and communication strategies are vital to mounting an effective pandemic response. The role private citizens play in supporting crisis response and recovery activities will be influenced largely by the information and messages they receive from their community leaders.

Disease outbreaks frequently are marked by uncertainty, confusion, and a sense of urgency. In the absence of clear, effective communication, government officials at every level can perpetuate fear unintentionally, undermine public trust, and inspire counterproductive actions. A fearful public will be wary of cooperation if information is frequently withheld, if messages are ambiguous, or if public statements contradict other public notices.

Given accurate, candid, timely, and trusted information—starting before a pandemic outbreak—citizens can appreciate better how their self-interest generally aligns with the public interest—protecting public health—and thus how their actions can help control the spread of disease. An engaged public with trust in its leadership will be more likely to support exposure control efforts and contribute to a more rapid resolution of a crisis.[13] To that end it is worth noting that the Institute of Medicine (IOM) advises:

> (t)he most effective way that public officials can avoid a damaging credibility problem in a pandemic is by sharing the dilemmas of pandemic control with the public in a productive and effective way, that is, by doing more than simply furnishing facts and figures. More research is needed to learn how to do this well; in the meantime, public health officials are advised to invest in targeted (as opposed to nuanced) and widely dispersed communications in order to sway as many undecided as possible to the cause of influenza prevention and control.

Developing this capacity and integrating it with messages from the governor's office will be critically important during a pandemic episode. In a situation where high risk and fear of infection are likely, effective public risk communication will enhance "people's willingness and ability to cope with risk, to bear anxiety, to follow instructions, to help their neighbors, and to recover when the crisis is over."[14] Risk and health communication experts' recommendations emphasize the need to align public perception with realistic assessments of threat

and risk-reducing and adaptive behavior.[15] Achieving alignment requires a concerted effort with federal officials, local officials, and neighboring states. In the past, a state taking the lead in risk communication has enhanced the trust between a nervous public and their elected leaders.

Public perceptions of how the incident is developing and the management of the crisis will condition the public response during the pandemic. It will be important to communicate both elements to the general population. Making it clear what the state is doing and what citizens can do to help can help allay public concerns by stressing action. The transition in the mind of the public from being "victims" to playing their part as "responders" will enhance the response greatly and help to regain a normal basis for operations in our communities.

There also will be significant expectations about the response by the federal, state, and local authorities. That expectation, however unwarranted, will be fueled by an aggressive media and a plethora of self-promoting "experts" who will remind everyone that this is something the authorities could have and should have avoided. It will be imperative to counter these claims and manage expectations in a public not used to hearing about self-reliance in the face of a health or medical crisis.

Medical Response: Supplying Vaccines & Antivirals

The medical component of the response offers great promise yet great uncertainty. Will a vaccine be available in sufficient capacity to limit the spread of the disease? Will antivirals be effective? Will in-patient care exceed all available resources? Many of these questions are as yet unanswered, but pre-pandemic planning must prepare for the uncertainties that exist. Although many states have developed comprehensive plans for the medical component of a response, all need to continually refine their plans to reflect changing information on the medical intervention aspects of the response, such as vaccine and antiviral availability and distribution, current and surge care capacity, availability of equipment such as ventilators, and information on the etiology and treatment of the disease should it occur.

The National Strategy For Pandemic Influenza and most state planning documents acknowledge the value of vaccines and antivirals (principally Tamiflu® and Relenza®), but these are not the only countermeasures and treatments that may play a role in a pandemic influenza episode. There is the possibility that as more information about the behavior of the H5N1 virus in humans becomes available, other medications will be identified as being of value. These products may become part of the HHS element of the National Strategy for Pandemic Influenza, but it is possible that the federal authorities will expect states to develop their own responses that will include the new countermeasures.

Vaccines

Some of the key observations about vaccines include:

- No vaccines are available yet for public use.
- Estimates for production indicate vaccines for the general population will not be available until 6-9 months **after** a pandemic begins.
- It is unclear when and how many vaccine doses will be made available to states for special populations and critical personnel.
- Vaccine use will require legal instruments to limit liability to producers, the federal government, vaccinating personnel, etc.
- The liability may include concerns about lack of efficacy as well as side effects or adverse events from vaccination.
- It is possible that multiple vaccines will be available with limited data on who should use which product.

The keys to the successful use of vaccines will be the development of flexible plans for use and defining priority groups who will be vaccinated. States should conduct assessments of their priorities, examine the options for using limited vaccine supplies, and publish lists of key personnel that will be the first recipients of any vaccine supplies. The plans must include effective, transparent communication about why these groups have been selected and given priority. For large sections of the public, there must be coherent explanations of why they are excluded (e.g., limited numbers of doses) and the additional precautions those who are excluded can take to increase their level of protection against the disease.

State officials should continue to advocate and enhance discussions of the value of the routine vaccination against this threat. The use of the seasonal flu vaccine will reduce illness and deaths from the virus and reinforce state-coordinated, local action as a key component of influenza responses. In the event of a pandemic episode, this familiarity with vaccination guidance—including the designation of high-risk groups—will provide a good starting point for the use of vaccines. In some venues, the discussion of seasonal influenza versus a pandemic episode will provide a useful test of possible public reaction. These discussions should include a knowledgeable medical expert to ensure a possibly nervous public fully understand the differences between these diseases and the required response.

Antivirals

The use of FDA-licensed antiviral medicines, with proven use over several years, will minimize many of the concerns raised by newly created vaccines. However, considerations for the use of antivirals include:

- Only limited supplies will be available for general use.
- Virus resistance may limit effectiveness of the products or require doses above normal levels.
- Special formulations (powdered drug) are required for children—these supplies also will be limited.

Again, explanations of who gets what and why will be crucial to an effective response. The question of why some people will not get the medicines will need to be answered in a transparent manner and is an area where work undertaken now to educate and inform the public may pay great dividends during a pandemic.

For vaccines and antivirals, the basic elements of the plan must include acquisition, stockpiling, distribution, and monitoring of use—including side effects and adverse events. Many of these tasks will be influenced by whether a pandemic actually occurs or is perceived to be imminent.

For example, the acquisition of antiviral products in the prepandemic phase will pose problems that differ from those associated with acquisition during the outbreak. The latter situation will impose very different logistical, economic, and security constraints from those of prepandemic acquisition. In an appropriate analogy, the two situations can be likened to prewar planning and wartime implementation. A flexible, adaptable, and rapidly updatable plan will be an essential part of the prepandemic preparedness efforts.

Currently, the most comprehensive analysis of requirements and prioritization of the antiviral and vaccine stockpiles has been undertaken by HHS. The initial assessments of required stockpiles for states and the priority personnel that should be considered as targets for these interventions have identified two major groups. Each of these groups will require markedly different responses from state officials.

- **Personnel that will have medications supplied from the federal stockpile.** The federal authorities are currently establishing this stockpile (approximately 50 million doses) with the relevant suppliers of the products. Distribution to states will be through HHS-established procedures and designated centers. The cost of this material will be borne by the federal government.
- **Personnel that will be identified by the states.** The federal government also is coordinating contracts for up to an additional 25 million doses for state distribution. For this group, only partial reimbursement (25 percent) will be provided by the federal government; the remaining 75 percent will fall to states to fund. Depending on the number of personnel in this group, this may represent a considerable cost for pandemic planning. Establishing how many doses to purchase and how to stockpile, distribute, and monitor the doses should be an immediate concern for state officials.

Federal and state stockpiles of antiviral medications likely will not be widely available to the general public. Instead, they likely will be distributed to first responders, health care workers, and personnel critical to delivery of essential services. Only after considering these individuals can states consider providing doses to affected groups in the general population.

The plans will need to be updated constantly as the availability of materiel changes, the knowledge of what is required to respond gains clarity, and the understanding of the virus is unraveled by scientists and other researchers. Flexible, adaptable, dynamic planning will be essential for success.

Nonmedical Response: Preventing Transmission

Transmission of infection, such as pandemic influenza, requires three elements: a source of the infecting virus, a susceptible host (e.g., person), and a means of transmission for the virus to move to or be acquired by a susceptible host (e.g., a contagious individual coughing or sneezing near a susceptible host). Preventing transmission can be accomplished by protecting the susceptible host from coming in contact with the virus by eliminating the source of infection (infection control) or curtailing the means by which a disease moves from one host to another (limiting contacts).

There is a growing interest in implementing nonmedical interventions that would include basic personal hygienic practices, movement and activity restrictions, and social distancing. These measures have been well established as public health strategies and have a long history of successful use against a range of human diseases. They are also the mainstay of the public health measures used to control the recent outbreaks of SARS in many countries around the world. Considerable data exists on their use for infection control, and state health officials will be well versed in their implementation and the issues that may arise from their use in local communities. (A more detailed explanation of these measures was published recently by the Center for Strategic and International Studies, Washington, DC[16]).

Personal Hygiene

During a period of pandemic influenza, the public health community will stress the importance of universal hygiene and wellness behavior including hand washing, cough etiquette, receiving adequate sleep, exercising, and eating a balanced diet. Hand washing, in particular, is one of the most important things one can do to protect oneself from illness and prevent the spread of infection. Officials also will be concerned that those who present with influenza symptoms seek proper care at the appropriate time and those without symptoms, particularly those individuals comprising the critical workforce infrastructure (i.e., medical personnel, teachers, etc.), continue their daily routine as directed.

Measures such as hygiene practices and disinfection or sterilization often are described as basic common sense. Their inclusion in any planning for responses to a pandemic episode would appear to be axiomatic. However, only through explicit inclusion in public communication will these measures be adopted widely. The public will need to be reassured that, as basic as they appear, these measures represent concrete actions that can reduce transmission of the virus and, if used appropriately, will save lives. Simple, effective measures will be invaluable against the H5N1 virus.

Of central importance will be a communication program to stress hygiene and behaviors that curb the spread of germs. Communications may include public signage (e.g., on billboards; along major thoroughfares; in grocery stores, offices buildings, and restrooms; and throughout public transportation systems); written handouts or flyers distributed by postal mail or at public gatherings (such as transit stations); and public service announcements in print media as well as on radio, television, and the Internet.

Movement and Travel Restrictions

Travel restrictions have been shown to reduce geographic spread, as well as total and local incidence during a disease outbreak. Restrictions may be placed on some or all modes of transportation—air, rail, ferry, cruise ship, subway, and bus—and may include a range of increasingly stringent limitations, from issuing travel warnings to closing high-risk stops, limiting schedules, or canceling travel routes altogether.

In addition, residents may be more reassured if it is obvious that states with international points of entry or crowds associated with tourist attractions anticipate their vulnerabilities and inform the public about how they may act during periods when the pandemic is spreading.

Social Distancing

Public gatherings can provide a target-rich environment for transmission. Large gatherings (such as sporting events, parades, concerts, political rallies, holiday celebrations, and festivals), as well as smaller social activities (such as weddings, funerals, and religious services), may need to be curtailed, postponed, or cancelled altogether. By placing such limitations, officials can reduce social interactions and transmission of disease.

Closing public facilities or facilities where large groups congregate also can reduce opportunities for disease transmission through social interactions. Government officials have clear authority to close public (but not private) facilities. Consequently, public facilities—schools, government offices, transportation hubs, museums, libraries, and convention centers—would be the first considered for closing. Private

facilities—shopping malls, concert halls, skating rinks, gyms, restaurants, bars, theaters, and grocery stores—may be closed under general emergency powers or special powers granted during times of public health emergencies.

Consequences and Limitations of Restrictions

Although social distancing and quarantine are effective policies for preventing and controlling the initial spread of disease, there are psychological consequences to such measures as evidenced during the SARS outbreak. In a survey of 129 quarantined persons in Toronto, Canada, symptoms of post-traumatic stress disorder (PTSD) and depression were observed in 28.9 percent and 31.2 percent of respondents, respectively. The duration of quarantine was related significantly to increased PTSD symptoms[17], and in a qualitative study in Toronto, recent contacts requiring quarantine reported feelings of guilt, anger, and fear for the welfare of family and friends as well as loneliness, boredom, and sadness from missing their loved ones.[18]

In a survey of 129 people quarantined in Toronto, Canada, during the SARS outbreak, symptoms of post-traumatic stress disorder (PTSD) and depression were observed in 28.9 percent and 31.2 percent of respondents, respectively. The duration of quarantine was significantly related to increased PTSD symptom.

Moreover, in the United States, actions that impact civil liberties represent political, legal, and ethical lightning rods. Stringent quarantine measures may be difficult to enforce for any extended period of time.

In addition, the WHO reported that opportunities for averting a pandemic or appreciably slowing its spread through quarantine, isolation, and restricting travel would end once efficient and sustained human-to-human transmission was established. It is likely containment of the influenza virus and the disease at some point in its spread becomes virtually impossible. At that point, efforts to prevent international or even national spread through travel-related measures also would become ineffective.

As levels of morbidity and mortality mount during a pandemic, measures designed to isolate or restrict the movement of the sick would cease to be effective or feasible because of the spread of the disease to other areas and large number of cases. However, other strategies that employ social distancing, such as cancelling public gatherings and closing schools, still could prove effective. It will be important to define thresholds for when the more restrictive measures cease to be useful. This will need to be rapidly communicated to the public, accompanied by appropriate explanations, to ensure compliance and prevent additional confusion about what needs to be done and when in order to protect oneself and one's family.

Achieving Public Compliance

Past experiences from around the world, including the recent encounters with SARS, have shown public action in response to an outbreak can help mitigate casualties and speed recovery—or cause panic and hasten the spread of disease. Gaining and maintaining public support during an outbreak is therefore a critical element of disease control. As mentioned, one of the best ways to accomplish this is through policies that engage the public as a partner. Although this strategy is included in the National Strategy for Pandemic Influenza, the policy needs to be implemented at the local or state level. Accordingly, state agencies should take the lead in engaging the public in developing the response to a pandemic episode.

Ideally, public reaction to the disease would uniformly and voluntarily support disease control programs. Based on past experiences, with a disease as deadly and indiscriminate as pandemic flu, this is neither likely nor realistic. For various reasons, individuals may reject government efforts. For example, they may believe they personally are unaffected or unable to stay away from work or from family members or friends. They also may be too afraid to take actions that require them to be confined with potential carriers—especially with no way of determining who does and does not have the disease. Finally, in some cases, individuals also may fail to comply with recommended public actions because they are unaware of what they should do.

Disease control strategies must, to the extent possible, promote voluntary compliance through education, communication, and provision of the necessary support—such as incentives—to help stop the spread of disease. For example, states may need to work with their school districts to allow fulfillment of school work through online courses. They also

may need to institute policies that encourage telecommuting of employees who do not need to be physically present in the office. In the event compliance needs to be enforced, it is imperative the basis for enforced actions is explained and debated with the people likely to be most affected. The use of legal instruments should be the weapon of last resort. As has been observed on more than one occasion, the law is a poor enforcer of public behavior; in times of duress the use of the law can be a potent catalyst for a public backlash.

Compensating for Limited Outside Resources

Unlike a discrete geographical crisis, where aid can be provided from unaffected areas and where federal agencies often can provide additional capacity, no such geographic relief will be found in a pandemic. All states will be impacted, and mutual aid pacts may be ineffective in identifying excess resources. Federal agencies will be occupied fully by meeting primary mission requirements, leaving little or no excess capacity for state support.

While state and local government officials can provide leadership and resources, they cannot provide all of the services required to contain a pandemic outbreak. An effective and comprehensive response to a pandemic with limited medical intervention will require unprecedented coordination and collaboration between a wide range of government and nongovernmental actors.

Under any realistic scenario, the federal government will have limited resources to devote to a pandemic. The federal government does not stockpile doctors or nurses, and the National Guard and military services will be stretched to meet the needs of troops in the field, also affected by the pandemic. The federal government may be helpful in coordinating response, bringing supplies to affected regions, and providing up-to-date information.

The National Strategy for Pandemic Influenza identified a number of actions for states. Further guidance from HHS has expanded the specific roles and responsibilities for states and reinforced most of the burden for response will lie with the states.

Actions states will be expected to coordinate include:

- vaccine and anti-viral distribution, depending on supply;
- food supply and distribution to those incapacitated;
- shelter and care for those seeking treatment in excess of current hospital capacity;
- positioning and distribution of health care providers; and
- decisions on closings and other efforts to limit public gatherings.

Coping with Demands on the U.S. Military and Federal Agencies

Analysis of the impact of pandemic influenza on the military and other government agencies suggests the degradation of the capability in these agencies during a pandemic will leave them struggling to meet primary mission requirements. This degradation—due to personnel suffering and dying from disease and a broader absenteeism associated with other factors inherent in a pandemic—will mean most federal agencies may not be able to provide any support outside of their primary missions.

The National Strategy noted, "(We will) determine the spectrum of public health, medical and veterinary surge capacity activities that the U.S. military and other government entities may be able to support during a pandemic, contingent upon primary mission requirements, and develop mechanisms to activate them." It is important to note the caveat, "contingent upon primary mission requirements." It will be futile to assume support from the federal agencies during a pandemic if those agencies are too busy meeting their own (federal) mission requirements. It is better to plan for self-reliance and utilization of state-based assets for state and local responses.

Nowhere is sustaining primary mission requirements more critical than in the U.S. military, the agency of last resort (and greatest resource) in so many of our past responses to crises. In prosecuting its primary mission of securing the nation at home and abroad, which currently entails fighting two wars, the military likely will consume all available resources in maintaining their current posture and

An essential component for state responses will be the availability and integration of the National Guard. In the face of a military requirement to reinforce personnel affected by a pandemic outbreak, the possible federalization of Guard forces, an action that would deplete state resources, must be considered. An additional call-up of Guard forces from civilian ranks also may deplete the numbers of health care workers and other first responders that the state had considered available.

prosecuting the war on terrorism. The military challenge during a pandemic will be to do the things it is already tasked with, rather than providing support (designated as "military assistance to civil authorities") for beleaguered states.

The states may see significant losses from their National Guard forces, both due to the impact of the pandemic on personnel and because of federalization of the Guard to support the military in its primary missions at home and abroad. Discussions with National Guard representatives to assess possible reduction in state capabilities should be pursued actively and included in exercises to assess state responses.

Conclusion

We have witnessed nothing like the 1918 pandemic in our lifetime. It is hoped we will not have to face such a challenge anytime soon, but with H5N1 continuing to evolve and potentially becoming the next pandemic virus, there is no reason for delaying efforts to plan. Planning a pandemic response will improve system response to public health disasters of all sorts, thus justifying investments made even if a pandemic does not happen in this decade.

The National Strategy for Pandemic Influenza provides a framework that extends beyond health and medical interventions. The National Strategy shows the way to move from managing the medical aspects of a pandemic to planning for the management of essential services in a pandemic. This is a crucial distinction that underscores that many of the most difficult issues involve continuity of critical systems.

The impact of a pandemic episode will be felt most acutely at the community and local levels. Resources and support at these levels may exceed need and it is likely self-reliance will be the order of the day for extended periods when the pandemic is at its height. Effective state leadership before a pandemic occurs and during the pandemic episode (management in a pandemic) will be crucial.

Because a pandemic will not present a single event or catastrophe, but a series of events to address over time, the decision-making process must be agile and responsive. For this reason, states—together with localities, the private sector, and neighboring states—must spend considerable time in testing plans and simulating events. Only through such exercises will there be an opportunity to explore contingencies and build relationships among those tasked with responding.

Notes

[1] Tucker, Jonathan, "Scourge: The Once and Future Threat of Smallpox," Grove Press, 2001.

[2] The White House, Homeland Security Council, "National Strategy for Pandemic Influenza", November 2005. Available at: http://www.whitehouse.gov/homeland/nspi.pdf.

[3] World Health Organization, *Avian Influenza: Assessing the Pandemic Threat* (World Health Organization, 2005). Available at: http://www.who.int/csr/disease/influenza/H5N1-9reduit.pdf.

[4] World Health Organization, *WHO Inter-country Consultation: Influenza A/H5N1 in Humans in Asia* (World Health Organization, 2005). Available at: http://www.who.int/csr/disease/avian_influenza/H5N1IntercountryAssessment.pdf.

[5] WHO, *Avian Influenza*.

[6] Full text: By the authority vested in me as President by the Constitution and the laws of the United States of America, including section 361(b) of the Public Health Service Act (42 U.S.C. 264(b)), it is hereby ordered as follows:

Section 1. Based upon the recommendation of the Secretary of Health and Human Services, in consultation with the Surgeon General, and for the purpose set forth in section 1 of Executive Order 13295 of April 4, 2003, section 1 of such order is amended by adding at the end thereof the following new subsection:

"(c) Influenza caused by novel or reemergent influenza viruses that are causing, or have the potential to cause, a pandemic."

Sec. 2. This order is not intended to, and does not, create any right or benefit, substantive or procedural, enforceable at law or in equity by any party against the United States, its departments, agencies, entities, officers, employees or agents, or any other person.

[9] Grand Bayou Families United, *"Grand-Bayou-Building Sustainability"*, Department of Environmental Studies, Louisiana State University. Available at http://www.risk.lsu.edu/Grand%20Bayou.html.

[10] Public Health Agency of Canada, *The Health Canada Policy Toolkit for Public Involvement in Decision Making*, 2000. Available at http://www.hc-sc.gc.ca/ahc-asc/alt_formats/ccs-scm/pdf/2000decision_e.pdf.

[11] U.S. Department of Health and Human Services, Public Engagement Pilot Project on Pandemic Influenza Final Report, 2005. Available at: http://www.dhhs.gov/nvpo/PEPPPI/PEPPPICompleteFinalReport.pdf.

[12] Center for Strategic and International Studies, *Homeland Security Program, Model Operational Guidelines for Disease Exposure Control (Draft as of November 2, 2005)*. Available at: http://www.csis.org/media/csis/pubs/051102_dec_guidelines.pdf.

[13] Ibid.

[14] P.M. Sandman and J. Lanard, "Risk Communication Recommendations for Infectious Disease Outbreaks," Prepared for the World Health Organization SARS Scientific Research Advisory Committee, Geneva, Switzerland — October 20-21, 2003. Available at: http://www.psandman.com/articles/who-srac.htm.

[15] B. Reynolds, J. Galdo, and L. Sokler. *Crisis and emergency risk communication* (Atlanta, GA: Centers for Disease Control and Prevention, 2002).

[16] Center for Strategic and International Studies. "Model Operational Guidelines for Disease Exposure Control."

[17] L. Hawryluck, W.L. Gold, S. Robinson, S. Pogorski, S. Galea, and R. Styra, "SARS control and psychological effects of quarantine." *Emerg Infect Dis* [serial on the Internet] (July 2004). Available at: http://www.cdc.gov/ncidod/EID/vol10no7/03-0703.htm.

[18] R. Maunder, et al., "The immediate psychological and occupational impact of the 2003 SARS outbreak in a teaching hospital." *Canadian Medical Association Journal* 168(10): 1245-1251 (2003).

NGA CENTER DIVISIONS

The Center is organized into five divisions with some collaborative projects across all divisions.

- **Education** provides information on best practices in early childhood, elementary and secondary, and postsecondary education, including teacher quality, high school redesign, reading, access to and success in postsecondary education, extra learning opportunities, and school readiness.
- **Health** covers a broad range of health financing, service delivery and policy issues, including containing health-care costs, health insurance trends and innovations, state initiatives in public health, aging and long–term care, disease management and health care information technology, healthcare quality, mental health and substance abuse, and health workforce.
- **Homeland Security & Technology** informs states of best practices in homeland security policy and implementation including bioterrorism, critical infrastructure protection, energy assurance, information sharing, intelligence and emergency management, and government use of information technology.
- **Environment, Energy & Natural Resources** conducts analysis of state and federal policies affecting environmental protection, air quality and greenhouse gases, transportation and land use, housing and community design, energy infrastructure, energy efficiency and renewable energy, water and coastal resources, brownfields, military bases, cleanup and stewardship of nuclear weapons sites, and working lands conservation.
- **Social, Economic & Workforce Programs** focuses on best practices, policy options, and service delivery improvements across a range of current and emerging issues, including economic development, workforce development, employment services, criminal justice, prisoner reentry, and social services for children, youth, low-income families and people with disabilities.

National Governors Association

John Thomasian, Director
NGA Center for Best Practices
444 N. Capitol Street, Suite 267
Washington, D.C. 20001-1512
Telephone: 202.624.5300
www.nga.org/center

NGA Center for Best Practices