

Southeastern Center for Emerging Biologic Threats  
Conference on  
From Planning to Action—Critical Issues in Responding to Pandemic Influenza  
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Summary of Workgroup Findings

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Report for the Southeastern Center for Emerging Biologic Threats



## Conference Summary

### From Planning to Action—Critical Issues in Responding to Pandemic Influenza

Pandemic influenza represents the type of health threat that could rapidly overwhelm healthcare and public health systems in the United States. In the event of a pandemic, the U.S. Department of Health and Human Services (DHHS) predicts that approximately 90 million people, 30% of the U.S. population, could become ill, of whom half would likely require outpatient care. Depending on whether the next pandemic resembles those that occurred in 1957 or 1968 or the 1918 pandemic, DHHS anticipates roughly 900,000 to 10 million hospitalizations and 200,000 to 2 million deaths. Given the scope of this challenge, substantial investments are being made at all levels of government in the United States to plan for pandemic influenza.

Plans developed by DHHS and state health departments represent lengthy inventories of problems to be anticipated, tasks to be undertaken, and decisions to be made at different stages of an influenza pandemic.<sup>1,2</sup> These documents are works-in-progress and will evolve as the threat of pandemic influenza and response options come into greater focus. Despite their complexity, which understandably reflects the potential enormity of pandemic influenza, there is a more limited set of underlying, core challenges.

On November 11, 2005, members of the Southeastern Center for Emerging Biologic Threats (SECEBT), a consortium of public health officials and academicians from 8 states (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee)<sup>3</sup> met to identify key challenges and response strategies that will be essential in responding to pandemic influenza at the state and local levels.<sup>4</sup> The meeting occurred shortly after DHHS issued updated pandemic influenza planning guidance, providing an opportunity to reflect on state planning efforts to date and anticipate future planning steps. A review of plans developed by the 8 states prior to the release of the DHHS guidance provided a backdrop to workgroup discussions,<sup>5</sup> which focused on four planning domains: 1) surveillance and containment, 2) vaccination, 3) healthcare and antiviral drug use, and 4) the interface between animal and human health.

A common theme in the deliberations of each workgroup was the challenge faced by state and local health departments and by healthcare institutions in translating federal guidance into specific actions, programs, and policies. Anyone who has worked in government in support of programs administered or implemented by others is familiar with the conundrum facing central authorities in providing guidance to jurisdictions and constituents. If guidance is too specific, its framers are apt to be criticized for being overly proscriptive and for failing to allow for sufficient flexibility in response to local circumstances. If it is too vague, its framers may be criticized for failing to assume their leadership role and for leaving constituents the task of independently solving shared problems. Thus, a second recurring theme in the deliberations was the recognition that successfully balancing and integrating multiple perspectives requires ongoing dialogue and collaboration across different levels of government and among a broad mix of constituents.

While it is important to consider the detailed operational tasks that will comprise a pandemic response, it is equally important to anticipate the core challenges that will arise in a pandemic and attendant key questions and controversies. The purpose of this report is to describe these essential challenges, questions, and controversies and, to the extent possible, potential solutions that were identified by the conference participants. The perspectives represented at this conference included those of federal, state, and local government officials responsible for developing and implementing pandemic influenza plans, researchers responsible for developing the evidence base necessary for critical decisions, and healthcare leaders responsible for providing healthcare services. Participants included experts in epidemiology, public health law and administration, infectious diseases and other medical specialties, and veterinary medicine. Although broad-based, this group does not represent the full spectrum of perspectives required for effective pandemic influenza planning. Thus, issues addressed in this report are undoubtedly incomplete but are described in the spirit of supporting and advancing pandemic influenza planning in all states. The report is organized under headings representing the four conference workgroups.

### Surveillance and Containment: The Role of “Social Distancing” and Protective Strategies

The Surveillance and Containment Workgroup started with two assumptions: first, an influenza pandemic will most likely originate outside the United States and arrive

in this country via international travelers and second, once a pandemic establishes a foothold in the United States, it would be virtually impossible to prevent it from eventually sweeping through the country. Thus, the group focused much of its attention on strategies to delay introduction of influenza into a state and to slow transmission once cases begin to appear. Regarding the initial detection of pandemic influenza in a state or locality, surveillance will largely depend on the vigilance of physicians and other healthcare providers in the frontlines to querying persons with influenza-like illness about recent travel, either internationally or to regions of the United States that are already affected, much like it was done during the recent SARS outbreak.<sup>6</sup> To stimulate physicians to consider shifted strains of influenza in the differential diagnosis of influenza-like illness, health departments are working to keep healthcare providers informed about the threat of pandemic influenza and to strengthen relationships to assure that clinicians understand the importance of notifying public health officials when suspicion arises regarding possible cases of avian influenza. Given the presumption that the pandemic will arise elsewhere, it will likely be an event that public health officials and the public alike will be forewarned about through global surveillance and media attention, and public health departments will be responsible for keeping healthcare providers and the public informed about its status.

Measures such as individual case investigations, contact tracing, and mandatory isolation or quarantine are likely to be feasible and effective only at the earliest stages, when there are very few cases and when such measures are likely to have a substantial impact on slowing transmission. As part of these efforts, states are enhancing the capacity of their public health laboratories to diagnose different influenza strains, which will be a critical part of early efforts to detect and characterize the arrival of pandemic influenza. Determining when case-specific investigation and response measures are no longer useful and when attention should shift to population-level interventions may be a difficult decision and one that should be coordinated among states. The latter will include “social distancing” interventions such as closing schools, canceling public events, or imposing “snow day” slow-downs in public transportation and other services. Taken together, both early individual-level interventions and larger-scale social distancing interventions will be aimed at “buying time” to allow for increased vaccine and antiviral production and availability.

Questions surrounding school closures were emblematic of the challenges confronting public health officials in considering the imposition of social distancing

strategies to slow or limit the spread of influenza. These questions include: 1) what is the optimal time in the course of a pandemic to recommend school closures and when should such recommendations be lifted, 2) what is the effectiveness of this approach, 3) what are the consequences for families, as closing schools would force many parents to stay home from work, 4) are there alternatives or variations in this approach that may be useful (e.g., voluntary versus optional school attendance, requiring documentation of pandemic-strain vaccination, screening students on arrival at school, use of web-based or other approaches to supporting home-based schooling), 5) what are the unintended consequences of school closures (e.g., would adolescents respond by congregating elsewhere), and 6) should school closures be imposed coincident with other social distancing interventions?

Complicating the ability to answer these questions is the paucity of systematically collected evidence regarding the effectiveness and consequences of these measures, particularly with respect to influenza.<sup>7</sup> Lessons learned in other countries about the value of social distancing during the SARS epidemic, or in the United States from other diseases (e.g., the effect of holiday breaks on school-based measles outbreaks), may not be applicable to influenza, given differences in transmissibility such as the period of infectiousness relative to symptoms, or cultural differences between other countries and the United States.

Similar questions surround the value of recommending or requiring the use of masks in public. Answers depend on scientific or technical questions (e.g., what is the relative importance of droplet versus aerosol transmission, what are the properties of different types of masks?) as well as behavioral questions (e.g., will people use masks properly, would mask use lead some to venture into public settings despite symptoms, would mask use lead to an inappropriate sense of protection?).

Recommendations concerning the role of social distancing and of the value of public mask use may rest on common sense, biologic plausibility, and judgment; however, it is notable that the Surveillance and Containment Workgroup members were unable to reach consensus on these issues. To the extent that the federal government can make more specific recommendations regarding the utility of such interventions, it may be worth taking a cue from other clinical and public health guidelines that document the strength of the evidence base for recommendations (e.g., data from controlled trials or observational studies, expert opinion). If evidence is less certain, there may be greater rationale for officials in different jurisdictions to justify decisions based on specific

local circumstances. Alternatively, it may be easier for governments to make individual-level recommendations, advising people to avoid congregating to lessen their personal risk of exposure to influenza. As increasing numbers of people heed this advice, spurred by growing fear as morbidity and mortality increase, those responsible for managing schools or businesses may simply elect to shut down their facilities in the face of an absent workforce, student body, or clientele. Likewise, churches may cancel services and other community organizations may cancel programs, regardless of advice from the government.

In contrast to the discussion regarding social distancing strategies, there was considerably less controversy regarding strategies for influenza surveillance. While challenges remain to assure that surveillance systems successfully meet information needs as they evolve over the course of a pandemic, this is much more familiar ground, particularly for public health epidemiologists to whom a large share of planning responsibility has fallen within states. Key elements of surveillance planning include augmenting existing strategies for monitoring influenza morbidity and mortality,<sup>8</sup> including strengthening networks of sentinel providers to monitor trends in cases of "influenza-like" illness" and collect specimens, characterizing strains and antiviral susceptibility, monitoring vaccine and drug effectiveness and adverse effects, implementing newer forms of automated syndromic surveillance<sup>9</sup> for various markers of influenza-related use of healthcare services, tracking use and availability of outpatient and inpatient healthcare services, and strengthening personal links between clinicians and health departments.

#### Vaccines: Scarcity, Priorities, and Logistics

A starting assumption for DHHS and state plans is that the supply of vaccine against the pandemic strain will be insufficient to meet demand, at least during the initial phases of a pandemic, with the obvious and attendant need to prioritize vaccine use. Setting priorities for influenza vaccination is familiar to public health officials, healthcare providers, and the public, reflecting long-standing and widely publicized identification of priority groups for seasonal influenza vaccination and, in the past 2 years, responses to shortages of seasonal vaccine in the United States. In the event of an influenza pandemic, especially a pandemic that is more similar to the 1918 pandemic than those

that occurred in the latter half of the 20<sup>th</sup> century, controversies surrounding prioritization will likely reach unprecedented levels of intensity.

Participants in the Vaccines Workgroup recognized that translating this guidance into widely accepted and feasible operational practice will be a humbling challenge—invoking questions of values, fairness, and logistics. DHHS guidance divides the U.S. population into 21 groups from higher to lower priority for vaccination. The consensus of the workgroup was that states should follow these federal guidelines with the possible exception of moving essential infrastructure workers to a higher priority group—a consideration prompted by the recent memory of failures of critical public safety services in New Orleans following Hurricane Katrina. They also felt that state and local health departments should be given some flexibility to sub-prioritize potential vaccine recipients, which will be necessary in the early stages of vaccine production if supply is inadequate to cover the highest priority groups.

The group identified multiple logistic challenges. It was agreed that states should control access and distribution of the vaccine at least initially if vaccine is in short supply. This would include state control of vaccination sites during the vaccine shortage and movement to private sector or mass vaccination clinics when vaccine supplies are adequate. The latter strategies would build on existing systems for administration of seasonal influenza vaccine, which is largely managed by the private sector, and the experience of health departments and others in managing mass vaccination sites. When vaccine is in short supply, validating high priority status of those who seek vaccination will be necessary, and policies should be developed in advance to avoid confusion and tension at vaccination sites. It may be necessary to require evidence of age, chronic health condition (e.g., medication bottle or insurance statement) or employment in a high-priority position.

There will also be a need to track vaccine use, adverse effects, and efficacy. Requiring non-government providers to report uses of the vaccine was recognized as a potentially burdensome but necessary imposition. The group recommended that to the extent possible, systems for reporting vaccine use and adverse effects should be developed in advance of a pandemic and take advantage of existing systems, such as the CDC-developed Countermeasure and Response Administration system,<sup>10</sup> state immunization registries, and the Vaccine Adverse Event Reporting System (VAERS).<sup>11</sup>

A number of issues remain unresolved in interpreting the recent DHHS guidance and in anticipating questions that the guidance does not fully address. For example,

when should a state decide to administer vaccine to members of successively lower priority groups? Assuming that a 2-dose regimen will be required to achieve maximal protection, should the first dose for those in a lower-priority group be withheld until the second dose can be assured for those in a higher priority group? Should families of emergency response volunteers and health care workers be vaccinated to assure the responders that their families are protected, increasing the likelihood that critical workers will be available for duty and not distracted by the need to attend to the health of family members? Lastly, the group observed that the current prioritization strategy is based on reducing total mortality. Depending on age-specific attack or case-fatality rates, the epidemiology of a pandemic may force a reconsideration of this approach. For example, if the pandemic were associated with a "W-shaped" age-specific death rates, as in the case of the 1918 pandemic, it may be necessary to re-visit the current guidance and consider an approach based on age-specific morbidity or mortality rates or years of "potential" or "productive" life lost,

#### Healthcare and Antiviral Drugs: Surge Capacity and Adapting to Alternative Standards of Care

If the next pandemic is caused by a 1918-like virus in terms of its relative novelty and virulence, our healthcare institutions will not be able to provide a level of care commensurate with current public expectations. Despite efforts to plan for healthcare "surge capacity" needs, participants in the Healthcare and Antiviral Workgroup uniformly agreed that our current healthcare system lacks sufficient surge capacity and that inability to meet healthcare needs is our greatest vulnerability. Providers noted that urban hospitals are routinely working at capacity, particularly emergency departments and intensive care units, and that relatively small increases in demands for healthcare during recent influenza seasons stressed hospitals' capacity to care for those with severe respiratory disease even further. Hospital representatives noted with some anxiety the tendency of federal emergency plans to defer certain critical decisions to states, for state plans in turn to defer decisions to local governments, and for local agencies to defer to hospitals, leaving hospitals responsible for determining who will and will not receive limited services.

The workgroup identified multiple dimensions of the surge capacity dilemma and observed that to date the greatest attention has been focused on beds, mechanical



ventilators, and staff. Health departments and hospitals are considering a mix of strategies to increase bed capacity: activating currently available but non-staffed beds, increasing the number of beds in service in existing in-patient settings (e.g., converting single-bed rooms to multiple-bed rooms), using beds currently allocated to other care functions (e.g., recovery, procedure, short-stay), adapting non-care sites in hospitals to bed space (e.g., auditoriums, offices), erecting tents or other temporary structures, or adapting non-traditional sites for lower-level inpatient care (e.g., hotels, schools, dormitories). States and the federal government have either purchased or ordered mechanical ventilators that will be maintained as part of the emergency stockpile. Their use will necessitate that hospitals upgrade rooms to be able to use these ventilators outside the intensive care unit.

This approach to meeting surges in demands for care will require systems of triage and ongoing assessment to assure that those initially assigned to lower levels of care can be transferred to higher-level care sites when indicated and *vice versa*. An extension of this strategy is the promotion and support of home care. Taken together, these strategies are geared to lessen the chance that emergency departments and hospitals will be inundated with patients who could be successfully managed in non-hospital settings or lower-level care settings, reserving hospital care for those most in need. Triage systems should also anticipate the needs of the “worried well” and of patients who are concerned about influenza but have relatively minor respiratory symptoms due to other infections or conditions. Because these patients cannot be assumed to be healthy or unaffected by influenza, they will require assessment and thus add to demands for healthcare until their status is confirmed. Given their potential impact, it will be essential to establish procedures to triage and care for these patients in ways that limit their demands on space, staffing, equipment, consumables and transportation services.

Meeting the staffing needs for this array of services will be an equally complex challenge, ranging from maintaining the current workforce in the face of personal or family illness and “burnout” to enlisting, training (or re-training), and credentialing volunteers, including lay volunteers and those with varying levels of healthcare training or experience (e.g., students in medicine, nursing and other healthcare disciplines and retirees). A spirit of professional duty or civic responsibility may motivate many to come to work during a crisis, despite the potential threat to their personal and family’s health, and this spirit will likely motivate both healthcare professionals and those who support

care and infrastructure services. The history of the 1918 pandemic is replete with stories of extraordinary self-sacrifice and dedication, but the limits of such dedication during a modern pandemic are unknown and untested. During the SARS outbreak in 2003 in Toronto—an event of vastly smaller magnitude than pandemic influenza, personnel shortages were reportedly the largest challenge faced by affected hospitals,<sup>12</sup> despite various pay rewards and incentives and the dedication of many.<sup>13</sup> Integral to the question of maintaining staff is the capacity of institutions to protect the health of their employees or volunteers, through use of antiviral prophylaxis, vaccine, or personal protective equipment (PPE), or to provide care in the event they become ill. This may raise complex questions involving trade-offs inherent in defining priority groups among healthcare workers for receipt of vaccine and antiviral drugs, in deciding between use of antivirals for treatment versus prophylactic use for employees, and in weighing the interests or demands of employees and the organizations that represent them.

Regarding anti-viral drug use, many of the concerns that arose in the Vaccines Workgroup also arose in the Healthcare and Antiviral Workgroup, particularly with respect to translating federal guidance into on-the-ground decisions regarding who should and should not receive scarce medications. In general, the workgroup concurred with federal recommendations to prioritize treatment over prophylactic use and, among healthcare providers, to reserve prophylactic use for those directly involved in caring for patients with respiratory illness. The group's consensus on this point was noted with the caveat that current guidelines do not sufficiently prioritize those healthcare workforce who will be needed to attend to the urgent care needs of patients with severe non-influenza-related diseases or injuries—problems that are not going to disappear in the event of an influenza pandemic.

Some hospitals have begun stockpiling oseltamivir in anticipation of a pandemic. This raises questions about whether and how oseltamivir should be used during non-pandemic influenza seasons in order to protect stockpiles for pandemic use—a question subsequently changed by observed widespread resistance of seasonal influenza to the adamantane class of antiviral drugs and CDC's recommendations to use neuraminidase inhibitors during the remainder of the 2005-2006 influenza season.<sup>14</sup> Questions about surge capacity also involve other medications, diagnostics, and supplies of PPE and other materials. If some hospitals amass stockpiles while others continue a "just-in-time" approach to inventory management, substantial disparities in the availability of drugs or supplies among institutions may arise during a crisis, requiring advance planning for

sharing resources. A hopeful example of the potential for such sharing was provided by two neighboring hospitals in the region during the 2004-2005 influenza season. One had ordered seasonal vaccine from a producer that was forced to suspend production and delivery, and the two hospitals—one public and one private—arranged a vaccine sharing agreement.

This array of strategies will require that standards of care change as resources and personnel are stretched in ways unprecedented in the United States. For example, nurse-to-patient ratios will need to be lowered, and the group pointed to emergency standard-of-care guidelines developed by the Agency for Healthcare Research and Quality as a model for adapting to extraordinary circumstances.<sup>15</sup> Contemplating the need to adopt alternative standards of care will require additional planning to ascertain who is responsible for invoking and lifting such alternatives and whether and how such alternate standards should be invoked simultaneously by multiple facilities in a state or region. Safeguards will need to be in place to protect healthcare providers and hospitals from lawsuits when patients are denied what may be considered in other circumstances “standard of care”.

Lastly, the participants emphasized the importance of communication, not only “vertically” between government agencies and healthcare institutions but also “horizontally” within institutions. Workshop participants had had varying degrees of experience in public health-healthcare collaborations involving high-profile infectious disease emergencies, including participation in the response to actual situations (e.g., a case of SARS in one state), in tabletop exercises, or in SARS or pandemic influenza planning. While acknowledging the need for detailed emergency response plans, the group emphasized the importance of exercises to foster relationships and model key decisions that may need to be made in the future.

### Animal-Human Interface

To a large extent, much of the pandemic influenza planning that has taken place to date in the United States is based on the assumption that a pandemic strain capable of rapid human-to-human transmission will arise elsewhere in the world and arrive in this country as the result of human travel. This assumption is supported by the ongoing global spread of H5N1 avian influenza, accompanying human cases of H5N1 infection and disease, and the potential for an H5N1 virus to acquire greater human-to-human

transmissibility through mutation or recombination with a human strain in this environment. However, the possibility remains that a zoonotic influenza strain with pandemic potential may arise in the United States, as evident from the threat that surfaced but never materialized with "swine flu" in New Jersey in 1976,<sup>16</sup> or that an avian influenza strain with the potential for seeding a pandemic may be introduced into North America through migratory birds, illegal importation of birds or bird products, deliberate introduction, or laboratory accident.

Discussion in the Animal-Human Interface Workgroup focused on detecting and responding to an outbreak of either low or highly pathogenic avian influenza among commercial or backyard poultry. Recent advances in security and surveillance have significantly reduced the potential for widespread distribution of a highly pathogenic avian influenza strain within the commercial poultry industry in the United States. Nonetheless, an outbreak involving only a few farms could have a dramatic impact, reflecting the need to cull or quarantine birds in the affected region, to assess and minimize health risks to industry workers and their families, to protect those involved in depopulation and disposal of affected flocks, and to mitigate damaging economic and social consequences.

An effective response to this scenario will require strong collaboration among animal and human health officials and industry. While substantial progress has been made to build these relationships, participants in this group noted that there is a need to further strengthen these links and overcome historical barriers to collaboration. These barriers have arisen in part because of differences in missions and limited collaborative experience. For example, public health departments have the role of monitoring, protecting, and promoting human health. The Federal and state departments of agriculture are responsible for administering regulatory programs aimed to protect both animal health and the viability of food production industries, including surveillance and eradication of diseases such as avian influenza. The food industry seeks to deliver a quality product and make a profit in rapidly fluctuating markets. While these objectives intersect in the arena of food safety, there are few instances where there has been a need for all these entities to work simultaneously on a single issue. Exceptions have included prior interactions at the federal level in deliberations regarding the benefits and risks of antibiotic use in animal production and collaborations at the state or local levels in responding to disease clusters, such as tuberculosis cases, among poultry industry workers. Prior collaborations have not required the intensity of sustained interaction that

would be essential in responding to a poultry outbreak due to highly pathogenic avian influenza. Nonetheless, the group cited promising instances of recent successful collaborations in planning for avian influenza, including joint participation of public health and agricultural officials in tabletop exercises—a trend that merits further development.

Planning the response to disease in commercial poultry flocks is further challenged by scientific unknowns including 1) the risk to workers involved in depopulation and disposal of affected flocks, 2) the effectiveness of different forms of personal protective equipment for those involved in assessment and depopulation activities, and 3) the effectiveness and appropriate interpretation of environmental sampling methods aimed at detecting animal pathogens, either as part of exposure monitoring during depopulation activities or for early on-farm detection of potential outbreaks. Regarding the latter, many states restrict the use of commercially available diagnostic tests for detecting regulated animal diseases by non-veterinarians, based on concerns that the use of these test may prompt growers to cull affected animals without notifying agricultural authorities and thus undermine surveillance efforts. The group observed that these unknowns are partly the result of limitations in research funding for animal health relative to human health and the disparate missions of institutions conducting veterinary and human health research. As a consequence, there is a dearth of rapid diagnostic tests for animal pathogens, animal health research has not sufficiently addressed human health outcomes, and human health research has insufficiently assessed human exposures to animal pathogens.

Beyond the threat to industrial flocks, the group expressed a greater concern about the vulnerability of live bird markets and non-industrial or unregulated "backyard" flocks, including domestic chickens and quail, birds illegally imported as "hobby birds," and birds raised for fighting. The outbreak of exotic Newcastle disease that occurred in southern California in 2002<sup>17</sup> was a sobering reminder of the difficulty in detecting and controlling an outbreak among domestic birds in non-commercial settings or unregulated facilities. As that outbreak demonstrated, improving the capacity to detect outbreaks in "backyard" birds will require collaboration among a broader range of constituent groups, such as law enforcement, animal control, natural resource agencies, and agricultural extension service representatives. In an effort to address this need, some states have developed training programs in agro-terrorism, but partnerships between agriculture and public health on these initiatives still need to be strengthened.

Given this background, the group made recommendations in five general areas. First, while surveillance for avian diseases is being strengthened within the poultry industry, there is a need to strengthen surveillance for avian disease in non-industrial settings, including companion animals, zoos, wildlife, and so-called "gap locales" such as backyard flocks, "hobby bird" venues, and smuggled birds. This may require enlistment of community workers from multiple service agencies who may observe dead birds in public settings during the course of their work; however, expanding this approach to involve those who may observe dead birds in private settings would require careful attention to or consideration of privacy and confidentiality regulations. Second, greater attention should be given to protecting the health of poultry industry workers, beginning with programs to expand the use of annual vaccination with trivalent influenza vaccine in this population. This will require innovative strategies for financing such programs and for reaching a population that is relatively mobile. Further studies are needed to assess the risk of exposure to bird pathogens, including exposure to low-pathogenicity strains of influenza, among industry workers and to assess risk among those in different roles from growing to processing. This information is needed to inform recommendations for the use of protective equipment in the event of outbreaks of avian disease. Similarly, guidelines for use of antiviral drugs should give greater attention to the potential role of these medications among industry workers who may be exposed to avian influenza. Third, regarding the protection of those who will be called to support culling and disposal of infected birds or flocks, greater consideration should be given to pre-identifying personnel, providing training, and fit-testing protective equipment. Fourth, there is a need to develop rapid diagnostic tests that can be used in field settings to detect H5 or H7 strains in the event of suspect illness among birds. A major limitation of current diagnostic tests is that laboratory confirmation of avian pathogens may require up to a week or more, complicating decisions regarding quarantine of flocks and other interventions. Fifth, research on the interface between animal and human health should include expanded serologic studies of exposure to low-path avian influenza strains among workers in different poultry occupations in order to assess the likelihood of occupational transmission of influenza from birds to humans. Expanded studies of influenza virus transmission between other species, such as the recently documented canine-equine transmission,<sup>18</sup> are also needed as a model for understanding inter-species transmission of influenza.

## Discussion

Participants in this one-day conference represented a group with considerable expertise and experience in public health and healthcare, and their deliberations identified a number of core issues in anticipating the threat of pandemic influenza. These issues are summarized in the Table and center on the need to judiciously use vaccines, drugs, and other healthcare resources in the face of demands that will undoubtedly exceed supplies, at least during certain phases of a pandemic, and on the need to strengthen partnerships among government agencies, healthcare providers, and constituents.

The challenge of meeting healthcare needs seems the most daunting. Questions about the values that underlie priorities for allocating healthcare resources may spark widespread public dissent. For example, recommendations for vaccine and antiviral drug use that give priority to those in occupational groups essential for providing or maintaining critical services are likely to raise questions of fairness, regardless of the strength of the rationale for setting these priorities, and these controversies may be shaped by the context of social and economic disparities extant in our country, especially if those in higher priority groups are perceived as representing more advantaged groups.

Decisions regarding the allocation and restriction of healthcare services that are familiar in developing countries may have to be made in the United States. For example, healthcare resources currently dedicated to intensive hospital-based end-of-life care will, in all likelihood, be redirected to care for influenza patients with a greater likelihood of survival. Difficult decisions regarding allocation of scarce healthcare resources often prompt a recommendation to "call the ethicists," and this conference was no exception. Participants cautioned, however, that ethicists can provide valuable support in understanding questions and options but cannot "bail out" the decision makers. A related observation is that ethical questions often play out as political controversies, either within institutions or more broadly within communities.<sup>19</sup>

Conference participants reached consensus on some points within their topic-specific workgroups and left other questions unaddressed or unanswered. At the very least, the participants reported in their conference evaluations that the deliberations will aid their ongoing efforts to prepare for pandemic influenza and to anticipate the challenges they will face. By summarizing these deliberations, our goal is to assist

others engaged in pandemic influenza planning. It is important to acknowledge, however, that these deliberations were incomplete with regard to at least three critical areas:

- ☞ Risk communication. As was evident from both the initial criticism and later, albeit limited, praise regarding the federal government's efforts to communicate with the public about the anthrax attacks of 2001,<sup>20</sup> communication with the public is an essential dimension of any public health response to a large-scale emergency. While communications plans are a part of the pandemic influenza plans under development in each of the states, participants represented at this conference did not include those with primary expertise in health education and risk communication or primary responsibility for media relations, community outreach, or other communications activities.
- ☞ Government-business partnerships. Hurricane Katrina vividly illustrated the potential for governments to be overwhelmed in the face of a major disaster. Businesses have substantial resources for storing or transporting supplies, providing shelter, recruiting volunteers for community-wide response activities, and disseminating information. The potential contributions of businesses to an emergency response were illustrated by the actions of several large retailers and other companies in response to Hurricane Katrina.<sup>21,22</sup> Businesses can also play a key role in supporting the recovery of communities from an epidemic or disaster, as illustrated in 2003 by Toronto's recovery from the SARS epidemic.<sup>23</sup> Organizations such as the Business Executives for National Security are actively engaged in multiple regions of the country to support government efforts to prepare for public health emergencies, including terrorism and natural events like pandemic influenza.<sup>24</sup> While the interface between business and government was considered in the context of the interface between human and animal health and relationships with the poultry industry, the potential role of businesses in supporting mass vaccinations programs or home-based healthcare were not discussed in depth.
- ☞ Inter-agency and community engagement. DHHS guidance is explicit in calling for broad engagement of government agencies, elected officials, and community representatives in developing state plans, a step that conference participants from state health departments had taken and documented to varying degrees in developing their plans to date and a step that states will increasingly take with



the release of further DHHS guidance and the series of stakeholder meetings that the Secretary of DHHS is holding in each state. This was a conference of public health officials, researchers, and healthcare providers, and it was not designed to engage a broader array of perspectives.

Depending on whether the next influenza public health is more similar to the 1918 pandemic or to the pandemics that occurred in the latter half of the 20<sup>th</sup> century, pandemic influenza will challenge or threaten to overwhelm public health and healthcare systems in the United States. Deliberations such as these foster the exchange of ideas and the development of relationships that will be critical when the next pandemic arrives.

Table. Key challenges/issues and recommendations/points of consensus, summary of deliberations of four workgroups for pandemic influenza planning.

Challenge or Issue	Recommendations or Points of Consensus
<i>A. Surveillance and Containment Workgroup</i>	
Role of Individual case finding/reporting and isolation/quarantine	Most likely to be useful in response to initial case reports in an area. May be difficult to determine when such measures should be abandoned.
Role of social distancing measures, such as school closures and cancellation of public events	Participants anticipated that such measures would likely be invoked, but there was no consensus on optimal timing of such measures, reflecting paucity of relevant evidence regarding effectiveness.
Whether to recommend or mandate mask use in public settings	No consensus, reflecting uncertainties about effectiveness.
<i>B. Vaccination Workgroup</i>	
How to deliver vaccine and shift delivery methods during periods when vaccine is initially scarce but eventually more widely available	This will require an evolving logistics plan involving multiple partners at state and local levels, including healthcare providers, volunteer organizations, and businesses. Strategy will evolve from tight health department control of administration outlets (during period of scarcity) to involvement of multiple partners and vaccination sites, including mass vaccination facilities (during period of ready availability)
Translating federal guidelines for prioritization of vaccine use into actual practice	Participants concurred with priorities described in the DHHS plan, with a proviso that heightened priority should be given to law enforcement and security officials. Priorities may need revision depending on epidemiology of pandemic and vaccine availability. Sub-priorities may be necessary at early stage if vaccine supply is insufficient even for those in highest priority group(s).

Table (continued). Key challenges/issues and recommendations/points of consensus, summary of deliberations of four workgroups for pandemic influenza planning.

Challenge or Issue	Recommendations or Points of Consensus
<i>C. Healthcare and Antiviral Drug Use Workgroup</i>	
<p>Meeting anticipated surges in demands for healthcare services may be our nation's greatest vulnerability in an influenza pandemic, including needs for facilities, medications, equipment, supplies, and staff.</p>	<p>Participants agreed on overall strategy but recognized need for substantial effort to develop following capabilities:</p> <ul style="list-style-type: none"> <li>▪ <u>Facilities</u>: A multi-tiered, multi-partner approach will be required to stretch existing hospital and clinic resources, identify alternative care sites for those who require an intermediate level of care, and encourage and support home healthcare.</li> <li>▪ <u>Staff</u>: Assuring sustainability of currently licensed healthcare workforce and support personnel will require attention to personal and family health concerns, redirection of staff resources to care of influenza patients, and appeals to professional values.</li> <li>▪ <u>Volunteers</u>: Developing, maintaining, and credentialing a ready volunteer workforce will require collaboration with volunteer and community-based organizations and businesses.</li> <li>▪ <u>Medications/supplies</u>: Variations among facilities in availability of stockpiled medications and supplies will raise complex ethical questions that were identified but not resolved.</li> </ul>
<p>Current standards of care will not be sustainable</p>	<p>Guidelines for relaxing standards of care, such as those developed by the Agency for Healthcare Quality and Research, will be necessary, including procedures for defining responsibility within a region for enacting altered care standards. These standards should be accompanied by triage policies to assure that patients are directed to appropriate levels of care based on need.</p>
<p>Communication between public health and healthcare providers will be critical.</p>	<p>Channels of communication and necessary relationships should be established in advance of crises. Panel recommended joint participation of public health officials and healthcare providers in tabletop exercises and drills, including exercising "incident command" procedures.</p>

Table (continued). Key challenges/issues and recommendations/points of consensus, summary of deliberations of four workgroups for pandemic influenza planning.

Challenge or Issue	Recommendations or Points of Consensus
<i>D. Animal Human Interface</i>	
Responding to outbreak of avian influenza in commercial poultry will require unprecedented collaboration between animal and human health officials	Relationships among animal health agencies, public health agencies, and industry must be strengthened, and models of successful collaboration in planning and conducting exercises must be expanded.
Birds outside the commercial poultry industry (e.g., "backyard" flocks, smuggled birds) may be at risk for exposure to avian influenza, but capacity is limited to detect outbreaks among birds in these less visible settings.	Provide training on recognition of avian disease as part of preparedness training provided to community service workers (e.g., police, fire, social services, agricultural extension services); include natural resource or wildlife agencies in public health and agricultural emergency planning.
Veterinary research and research into the animal-human interface of infectious disease is under-developed, leading to critical gaps in information relevant to prevention and control of zoonotic diseases.	<p>Avian influenza research should address:</p> <ul style="list-style-type: none"> <li>▪ Prevalence and risk of occupational exposure to "low-pathogenic" avian influenza strains among poultry workers</li> <li>▪ For those involved in depopulation and other outbreak response: <ul style="list-style-type: none"> <li>○ Risk of occupational exposure to avian pathogens</li> <li>○ Effectiveness of various forms of personal protective equipment</li> </ul> </li> <li>▪ Effectiveness and role of environmental sampling for animal pathogens for surveillance and outbreak management</li> <li>▪ Development of rapid tests for animal pathogens, including tests that can be employed in field settings</li> </ul>
Additional attention to the health of poultry industry workers and avian outbreak response workers is warranted.	<p>Improve interventions for poultry industry workers and outbreak response workers</p> <ul style="list-style-type: none"> <li>▪ Improve use of seasonal influenza vaccination among poultry industry workers</li> <li>▪ Improve training of outbreak response workers, including pre-event fit testing and training in use of personal protective equipment</li> <li>▪ Increase consideration of poultry industry workers in defining priority groups for pandemic strain vaccination and antiviral use</li> </ul>

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