PANDEMIC INFLUENZA PLANNING GUIDANCE FOR HEALTHCARE INSTITUTIONS

VERSION SEPTEMBER 2007

PHILADELPHIA METROPOLITAN AREA MEDICAL ADVISORY COMMITTEE

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Glossary of Acronyms and Terms

ACRONYM	DEFINITION
ACIP	Advisory Committee on Immunization Practices
AHRQ	Agency for Healthcare Research and Quality
ARDS	Acute Respiratory Distress Syndrome
BSL	Biosafety Level
CDC	Centers for Disease Control and Prevention
CLIA	Clinical Laboratory Improvement Amendment
CMS	Centers for Medicare and Medicaid Services
DAAC	Division of Acute and Ambulatory Care
DFA	Direct Fluorescent Antibody
DHHS	Department of Health and Human Services
DVHC	Delaware Valley Healthcare Council
EAP	Employee Assistance Program
ED	Emergency Department
EKG	Electrocardiography
EMS	Emergency Medical Services
EOC	Emergency Operations Center
ESF	Emergency Support Function
FEMA	Federal Emergency Management Agency
FRED	Facilities Resource Emergency Database
FTE	Full Time Equivalent
HAP	Hospital and Healthsystem Association of Pennsylvania
HEICS	Hospital Emergency Incident Command System
HEPA	High-Efficiency Particulate Air
H&P	History and Physical
HQ	Home Quarantine
IFA	Immunofluorescent Antibody
ILI	Influenza-like-illness
IRT	Influenza Response Team
JIC	Joint Information Center
JOC	Joint Operations Center
MOU	Memorandum of Understanding
MRE	Meals Ready to Eat
NIAC	National Infrastructure Advisory Council
OEM	Office of Emergency Management
OR	Operating Room
OSHA	Occupational Safety and Health Administration
PA DOH	Pennsylvania Department of Health
PAPR	Powered Air Purifying Respirator
PA-PSRS	Pennsylvania Patient Safety Reporting System
PDPH	Philadelphia Department of Public Health
PEMA	Pennsylvania Emergency Management Agency
POC	Point of Care
PPE	Personal Protective Equipment
RT-PCR	Reverse Transcriptase-Polymerase Chain Reaction
SARS	Severe Acute Respiratory Syndrome
SNS	Strategic National Stockpile
SOFA	Sequential Organ Failure Assessment
WHO	World Health Organization
WQ	Work Quarantine

TERM	DEFINITION
E-TEAM	A regional web-based software program utilized as a form of communication between New Jersey, Pennsylvania, and Delaware Emergency Operations Centers, hospitals, public health, and other government agencies that provides real-time situation updates and reports.
FLU AID	A computer program that provides estimates of the impact of an influenza pandemic to a specific community developed by the Centers for Disease Control and Prevention.
FLU SURGE	A spreadsheet–based model created by the Centers for Disease Control and Prevention that provides estimates of the surge in demand for hospital-based services during an influenza pandemic.
INFLUENZA ZONE	Designated high-risk zones in the hospital setting where suspect and confirmed cases of pandemic influenza present and receive care.
INFLUENZA RESPONSE TEAM	A group of healthcare workers educated and trained by hospitals to perform daily screening, assessment, and management of confirmed and suspected patients with pandemic influenza.
MEDICAL RESERVE CORP	A robust cadre of volunteers, including medical and public health professionals who respond to emergencies and natural disasters. It is a partner program with Citizen Corps, a national network of volunteers dedicated to ensuring hometown security.
N-95 PARTICULATE RESPIRATOR	A tight-fitting facepiece with an air-purifying cartridge that eliminates specific air contaminants by filtering ambient air through an air-purifying element. Specifically, an N95 mask filters out 95% of particulate aerosols free of oil that flow through the mask. This respirator protects against particles, not gases or vapors, and it is not resistant to oil. Time use restrictions may apply to usage of this respirator.
N-100 PARTICULATE RESPIRATOR	Analogous to the N95 Particulate Respirator in form and function. Distinctively, an N100 mask filters out 100% (~99.97% filter efficiency level) of the particles free of oil that flow through the mask.
POWERED AIR PURIFYING RESPIRATOR	A device equipped with a blower that filters ambient air to deliver purified air to the user providing a greater level of protection from airborne particles than particulate respirators.
SIGNIFICANT EXPOSURE TO PANDEMIC INFLUENZA	Close contact (within 3 feet) of a probable or confirmed case of pandemic influenza who is actively coughing or sneezing or who has undergone an aerosol generating procedure *and* there was a breach in infection control protocols or a lack of PPE.

OVERVIEW

In May 2006, the Philadelphia Department of Public Health (PDPH) convened a group of hospital-based professionals in Philadelphia to participate in planning for an influenza pandemic that would potentially overwhelm resources and pose a risk to worker safety. The major outcome of this meeting was a request on the part of hospitals for specific guidance that provided clear recommendations in areas such as addressing supply needs and staffing shortages, identification and control of illness among staff and patients, the use of antiviral medications and other pharmaceuticals, as well as planning for altered standards of care.

To develop this guidance, the Philadelphia Department of Public Health (PDPH) convened a series of meetings over a period of one year with experts working in healthcare facilities and academic medical centers in the Philadelphia metropolitan area. Participants included hospital epidemiologists, infection control practitioners, Emergency Department physicians and nurses, ethicists, human resource professionals, hospital safety officers and disaster preparedness planners. Additional participants included representatives from private and public medical insurers (Independence Blue Cross and The Centers for Medicare and Medicaid Services), the Occupational Safety and Health Administration, the American Red Cross Southeastern Pennsylvania Chapter, and the Delaware Valley Healthcare Council. PDPH staffed a series of structured meetings focused on identifying consensus-based guidelines for healthcare facilities that provide acute care services.

These regional experts were asked to participate in working groups that focused on staffing issues, facility issues, and altered standards of care respectively. The ultimate goal of the process was to produce a document based on the healthcare planning guidance proposed by the Department of Health and Human Services for pandemic preparedness in November 2005. The working groups met regularly to review existing data and policy statements, share the plans and thinking of their own institutions, and propose specific solutions to assist healthcare facilities with planning for a major pandemic. The recommendations put forth in this document represent suggestive approaches that hospitals and healthcare facilities may use on a voluntary basis to supplement internal emergency response plans for infectious disease emergencies, particularly those that result in mass casualties. A primary purpose of this collaboration was to present the common thinking likely to be implemented among hospitals in the Philadelphia metropolitan area, to share best practices and ideas, and to support a coordinated approach to pandemic management on a regional level. The conceptual framework, key planning assumptions, and broad strategies to which work group participants agreed are outlined below:

- The recommendations outlined in this document are voluntary. In many cases, when working group members could not arrive at a single, consensus-based recommendation, several recommendations were proposed. The document identifies those areas in which consensus was not reached by the working group members, and in some cases identifies which recommendations were advocated by the majority of members, or fewer members.

- In areas where federal or state recommendations existed for specific healthcare practices, the committees generally agreed to accept these as a minimum standard that healthcare facilities should attempt to achieve. The document includes additional recommendations beyond federal guidelines in areas in which work group participants believed that more rigorous recommendations were required (e.g., level of personal protective equipment suggested for certain healthcare procedures).

- The working group participants generally agreed that hospitals should attempt to designate “influenza zones” that would be staffed by pre-identified, dedicated and trained staff. Non-airtight physical barriers to minimize contact with non-acute staff and visitors should physically separate these zones from other hospital units and public spaces. Areas of public access should also be identified and considered to be moderate transmission risk zones once

pandemic influenza is widespread. The designation of these zones drove many planning considerations, particularly regarding protective equipment and an antiviral medication plan for staff. However, most participants believed that these zones would be most useful during early pandemic phases, and would be difficult to maintain once the region was involved in widespread transmission of a pandemic virus, likely overwhelming hospital resources.

- Workgroup members agreed upon several strategies for antiviral medication usage, including the provision of pre-exposure prophylaxis for the highest risk staff (e.g., "influenza zone" staff), post-exposure prophylaxis for certain high risk situations, and treatment courses for patients who present early in the course of their illness. Supply needs for antiviral medications were estimated for hospitals based on this usage pattern and the size of staff and patient populations. Supply needs for personal protective equipment were estimated using similar approaches, and were developed in accordance with guidance issued by the Occupational Safety and Health Administration.

- Workgroup participants planned with the assumption that there would be little or no vaccine during the pandemic first wave and then limited supply to be prioritized after that. Recommendations were made to promote annual seasonal influenza vaccine for all staff and to increase rates of pneumococcal vaccine for appropriate populations.

- The workgroups did not arrive at a uniform consensus regarding the determination of definitive altered standards of care. There was strong agreement that planning for this issue should be coordinated at the state and federal level, though some felt it was important to document some framework for clinical practice in particular for allocation of critical resources during limited supply while federal and state protocols remain lacking. Ethical considerations focused on rationing existing available resources, and did not address removal of resources from those with chronic conditions. The need for ongoing, frequent communication between hospitals as resources become scarce was felt to be critical, particularly to ensure consistency between institutions. Communication between area hospitals, public health authorities, and the public was also felt to be extremely important, to manage expectations and ensure the optimal utilization of resources, as staff and supplies become short.

- The workgroup participants agreed that hospitals should expect to be self-sustaining during the first 7 weeks (50 days) after the declared start of regional pandemic influenza transmission, particularly with respect to supplies of both antiviral medications and protective equipment. Local and state public health agencies will work to deploy supplies from the strategic national stockpile (SNS) and staff from local volunteer-based organizations. Healthcare facilities were encouraged to expand internal bed capacity into non-traditional patient care spaces (a table with possible solutions to this issue is provided in the document) to take advantage of hospital staff, supply and communications resources, if possible, before a community invests in setting up free-standing improvised healthcare facilities. Most participants did not favor the creation of alternate care facilities outside of hospital campuses. If considered, they are to provide observational and minimal healthcare to overflow patients and to those without home care resources.

I. INTRODUCTION TO THE PLANNING PROCESS

Global experts in infectious diseases and public health agree that a future influenza pandemic with the potential to cause illness and death among thousands to millions of people within a limited period of time is probable. This necessitates extensive planning for the healthcare sector at the local level to manage the extraordinary demands likely to occur during a major pandemic. Over the past two years, recommendations and checklists have been issued from national and state authorities to assist with the creation of a comprehensive medical plan, but these have often lacked definitive guidelines, detailed protocols, and specific timelines for implementation. Most of the recommendations proposed in this document are designed for implementation under moderate to severe pandemic conditions, but they may be applied judiciously if the severity of a future pandemic is mild.

The guidelines put forth in this document are intended to assist hospitals and healthcare facilities and are not mandates. Hospitals must judge these guidelines on an individual basis and employ the recommendations best suited for their needs. For ease, recommendations are listed throughout the document in bold italics at the end of the paragraph that describes their intent and rationale. Recommendations are also presented in a summary table by pandemic phase for implementation in Appendix 1 (page 82). One of the primary goals of this document is to share the local expert opinions and recommendations so that individual healthcare institutions will be aware of the actions likely to be implemented regionally, thereby promoting a unified approach to the delivery of healthcare services during a prolonged national medical emergency.

1. PANDEMIC PLANNING WORK GROUPS

The Philadelphia Department of Public Health (PDPH) launched this planning process following a meeting of area hospital and medical professionals convened as the “Philadelphia Metropolitan Area Medical Advisory Committee.” The primary purpose of the group was to seek medical expertise and local guidance for pandemic influenza planning. As hospitals requested specific recommendations for the range of issues related to healthcare planning for a pandemic, PDPH convened 3 work groups (from committee representatives) to address and solve specific issues related to healthcare staff, medical logistics (facilities and supplies), and altered standards of care. Initial participants among these work groups consisted of hospital infectious disease specialists, infection control practitioners, emergency department directors, emergency preparedness coordinators, regional and local public health physicians and emergency planners, and local experts in biomedical ethics. As the work group process began, participation expanded to include healthcare human resource directors, senior members from health insurers, local Occupational Safety and Health Administration representation, emergency planners from the American Red Cross Southeastern Pennsylvania Chapter, and regional administrators from the Centers for Medicare and Medicaid Services.

The Philadelphia Department of Public Health would like to express gratitude to the local and regional healthcare community for volunteering their time and input into this collaborative initiative whose goal is to better serve the healthcare needs of the greater Philadelphia metropolitan community during an emergency.

2. HOSPITAL-BASED PLANNING GUIDELINES AND RECOMMENDATIONS

A. Process

This document summarizes the recommendations to date from the three work groups and gives specific guidelines to healthcare institutions to supplement internal emergency response plans as they pertain to infectious disease emergencies with particular emphasis on pandemic influenza. When available, work group participants accepted recommendations made by federal and state governments as minimum standard actions for healthcare facilities. At times, more stringent

recommendations were made when federal and state guidance was insufficient based on review of available evidence and expert opinion. Panel members proposed solutions to specific problems that were shared with the rest of the work group. Members served as section reviewers, providing feedback on the content and construction of the recommendations before further editing by PDPH staff. The final list of recommendations was distributed to all work group members where they were asked to agree or disagree with the recommendation and were given an opportunity to comment. Recommendations that received multiple comments or moderate disagreement were brought back to the work group for further discussion during a systematic 3-month review process.

The Pandemic Influenza Planning Guidance for Healthcare Institutions: Version September 2007 is a living document that will undergo continuous review and modifications as knowledge increases and as additional state and federal guidances regarding pandemic influenza are issued. Recommendations may be modified by the work groups or by a suitable sub-committee during an evolving pandemic if patterns of transmission or other important viral characteristics vary significantly from those anticipated. The release of the federal guidelines entitled "Interim Pre-pandemic Planning Guidance: Community Strategy for Pandemic Influenza Mitigation in the United States" by the Centers for Disease Control and Prevention, is one such example of the ongoing national-based community-level guidance for pandemic influenza planning.[1] This CDC guidance specific for early, targeted, layered use of non-pharmaceutical interventions proposes a pandemic severity index that will direct the level of response based on fatality rate. CDC also outlines a trigger-based method for the activation of non-pharmaceutical interventions based on recognition of a confirmed cluster of novel influenza within a state or region with evidence of community transmission. The severity index, triggers for activation, and other intricacies of the CDC plan will be incorporated into this Pandemic Influenza Planning Guidance for Healthcare Institutions as appropriate.

B. Approaches to Altered Standards of Care

Healthcare resources will likely be exhausted early during a moderate to severe influenza pandemic. If this were to occur, alterations in the delivery of patient care would need to be implemented to maximize the number of lives saved. Due to the lack of precedence and complexity of these issues, a separate work group dedicated to addressing these problems was created. Early discussion by the altered standards of care work group outlined the following non-exclusive objectives to the management of mass casualties: 1) to maximize efficacy, 2) to prioritize by urgency, 3) to provide equal opportunity for care, and 4) not to abandon any patient. The work group agreed that the best approach during a pandemic emergency would be to prioritize maximizing efficacy above the other three approaches if resources were grossly inadequate to allow application of all four.

The altered standards of care work group focused on specific staffing and supply issues and other factors that would be critical during a severe pandemic. Consensus was not reached on many topics; solutions were deferred to other panels and groups convened to address exclusive issues (e.g. ventilator allocation). As a reference, this document does outline federal approaches and published strategies for limited resource allocation including recommendations from an out-of-state ventilator allocation work group process. Local public health authorities and senior staff from the Delaware Valley Healthcare Council (DVHC) maintain an awareness of state and federal initiatives that will continue to advise and develop this guidance.

At the beginning of the meeting process, federal guidance was reviewed to help direct this initiative and has provided some framework of the altered standards proposed to be implemented regionally during a pandemic. In August of 2004, the Agency for Healthcare Research and Quality (AHRQ) convened meetings of experts in medicine, law, bioethics, emergency management, and public health to draft a summary of the issues and guiding principles related to altered standards of care during mass casualty events. Below is a summary of the main points contained in the final document published and distributed in April 2005.[2]

- The goal of an organized and coordinated response to a mass casualty event should be to maximize the number of lives saved.
- Changes in the usual standards of health and medical care in the affected locality or region will be required to achieve the goal of saving the most lives in a mass casualty event.
- Many health system preparedness efforts do not provide sufficient planning and guidance concerning the altered standards of care that would be required to respond to a mass casualty event.
- The basis for allocating health and medical resources in a mass casualty event should be fair and clinically sound. The process for making these decisions should be transparent and judged by the public to be fair.
- Protocols for triage need to be flexible enough to change as the size of a mass casualty event grows and will depend on both the nature of the event and the speed with which it occurs.
- An effective plan for delivering health and medical care in a mass casualty event should take into account factors common to all hazards, as well as factors that are hazard-specific.
- Plans should ensure an adequate supply of qualified providers who are trained specifically for a mass casualty event.
- A number of important non-medical issues that affect the delivery of health and medical care need to be addressed to ensure an effective response to a mass casualty event. They include:
    - The authority to activate or sanction the use of altered standards of care under certain conditions;
    - Legal issues related to liability, licensing, and intergovernmental or regional mutual aid agreements;
    - Financial issues related to reimbursement and other ways of covering medical care costs;
    - Issues related to effective communication with the public;
    - Issues related to populations with special needs; and,
    - Issues related to transportation of patients.
- Guidelines and companion tools related to the development of altered standards of care in a mass casualty event are needed by, and would be extremely useful to, preparedness planners at the Federal, State, regional, community, and health systems levels.

C. Legal Issues

In January of 2007, the Infectious Diseases Society of America called for legislative action for liability protection for clinicians during an influenza pandemic.[3] This call followed the medical aftermath of Hurricane Katrina when hospitals and medical professionals suffered legal action after practicing under extreme conditions. Since the approaches to medical care during an emergency situation developed by this process are nontraditional, they may be subject to legal scrutiny. The work group also believed that pre-pandemic public education describing the content and rationale for pandemic mitigation strategies would benefit compliance and understanding that may reduce litigation.

Legal questions arising from this process were drafted throughout all work group meetings. These questions have been submitted to appropriate legal counsel for review. Answers to these issues were not available at the time of the completion of this version. They will be incorporated into subsequent versions as they become available.

3. PANDEMIC PHASES, THRESHOLDS, AND SCHEMES

This work groups identified three measures of pandemic influenza activity as triggers for specific mitigation strategies. They are the pandemic phase scheme, influenza illness surveillance, and overall hospital stress. In addition, level of pandemic severity derived from the CDC Pandemic Severity Index, will likely contribute to community threat assessment and enhance decision making. The CDC has also proposed triggers for the activation of non-pharmaceutical interventions (e.g. dismissal of students from school) based on the recognition of a laboratory confirmed cluster of pandemic illness in the region or state and with evidence of community transmission. The World Health Organization's (WHO) pandemic phase scheme is well known and is based upon level of human-to-human transmission (see Table 1). Healthcare responses will incorporate these national and global models for activation; however, as stressed by our panel, responses will be activated by assessment of pandemic influenza transmission relative to the Philadelphia metropolitan area. Moreover, recommendations for severe and restrictive actions will require a comprehensive situational assessment within each healthcare institution that quantifies disease burden and care delivery capabilities.

A. The Phase Scheme

To guide the creation of triggers for local action, PDPH adjusted the WHO pandemic period and phase scheme to reflect the activity and relative geography of pandemic influenza (see below). Notification of disease surveillance and transmission characteristics will be disseminated via health alerts and posted on the City of Philadelphia's emergency preparedness website located at: http://www.phila.gov/ready/.

Table 1. Pandemic Phases Outlined by WHO and Modified by PDPH

Period	Phase	Transmission
Inter-pandemic	1	Influenza virus subtype in animals only (risk to humans low)
	2	Influenza virus subtype in animals only (risk to humans substantial)
Pandemic Alert	3	Human infection (transmission in close contacts only)
	4 4A* 4B* 4C*	Limited human to human spread; small clusters <25 cases lasting <2 weeks Limited human to human spread in North America Limited human to human spread in Northeast United States (300 mile radius around Philadelphia) Limited human to human spread in the Philadelphia metropolitan area
	5 5A* 5B*	Localized human to human spread; larger clusters 25-50 cases over 2-4 weeks Infected individual or close contact is identified within institution/facility Unrelated, non-epidemiological linked clusters occurring in Philadelphia metropolitan area
Pandemic	6	Widespread in the general population
	7*	Recovery phase and preparation for next wave; return to limited human to human spread; small clusters in the community

*Phase proposed by PDPH

Healthcare planning elements presented in this document reference these pandemic phases when appropriate. It is important to note that the amount of time for each phase interval outlined in Table 1 above is unpredictable and therefore it is possible that particular phases (or sub-phases) may be bypassed as a pandemic situation unfolds. For instance, if an emerging pandemic influenza strain capable of limited human-to-human spread is first detected in New York City, then the Philadelphia metropolitan area progresses from phase 3 to phase 4B. If this were to occur, recommendations

made in 4A would be implemented immediately (as appropriate) and concomitantly with recommendations for phase 4B. Such situations may require the immediate reconvening of committee members to maintain community-wide agreement and consensus recommendations. If an emerging pandemic influenza strain follows the typical seasonal influenza pattern and spreads from west to east across North America, then we would expect a 2 to 6 week time period (average of 4 weeks) for the virus to travel from the West Coast to Philadelphia. This estimate would be reduced if the strain emerged in the southern states or the Midwest.

Recommendation: Healthcare institutions should maintain awareness of the current pandemic phase and initiate appropriate recommended control strategies.

B. Measures of Disease Burden and Hospital Stress

In addition to case counts, PDPH will monitor other data to estimate the local impact of pandemic influenza. PDPH will track data daily to define the magnitude and extent of transmission and illness in the city and will provide frequent situational awareness summaries to the healthcare community. Data sources analyzed include local hospital emergency department (ED) triage logs, pediatric ambulatory clinic data, influenza laboratory positive tests (and other respiratory pathogens), medical calls to the cities' 911 call center, local retail pharmaceutical sales trends, syndromic surveillance output from the New York City Department of Health and Mental Hygiene, and surveillance summaries from the Pennsylvania Department of Health (PA DOH) and CDC. These surveillance systems will be used in conjunction with internal healthcare facility assessments of patient burden and available resources to guide appropriate infection control and pandemic mitigation strategies.

Severely restrictive and unprecedented healthcare practices must have sufficient cause to recommend implementation. Assessment of the situation must come from an internal evaluation of available healthcare resources and the demand for acute medical care. This measure should include the number of patients presenting with febrile respiratory illness above a threshold, anticipated daily ED volume and admissions, the daily in-patient census with breakdown estimates of acuity of care, available critical supplies, and most importantly the number of clinical staff who arrive for work at the onset of each shift. Communication of daily stress assessment should occur to appropriate internal decision makers. When hospital stress is determined to be too great for the institution to function (provide minimal standard patient care), administrators are advised to communicate this information to PDPH and other appropriate healthcare emergency response authorities (Philadelphia Office of Emergency Management, Delaware Valley Healthcare Council, and PA DOH) for immediate guidance.

Recommendation: Beginning in pandemic phase 4B, healthcare institutions are advised to conduct a daily internal assessment of hospital stress that evaluates the institution's capabilities to provide minimum standard healthcare to all patients.

Recommendation: When hospital stress exceeds the ability of the institution to provide minimum standard healthcare during a pandemic, communication to PDPH is recommended to receive guidance (215-685-6741, after hours 215-685-1776).

4. THE PHILADELPHIA HEALTH RESPONSE DURING A PANDEMIC

A. Command and Control

Organizational Structure

City Emergency Response Center

The City of Philadelphia will activate its Emergency Operations Center (EOC) to coordinate aspects of emergency response involving public safety agencies, continuity of critical functions, public information, and other critical aspects of pandemic response. This EOC will include a position (or positions) to coordinate all aspects of Emergency Support Functions (ESF) #8 - health/medical, including the support and coordination of hospital activities and other healthcare facilities. Specifically, the City's Office of Emergency Management (OEM) will coordinate daily or more frequent communications with hospitals to ascertain bed status, supply and manpower needs, use of non-traditional or alternate care facilities for providing patient care, as well as medical evaluation or triage functions. The City EOC will also facilitate the inter-agency support and coordination required for Department of Public Health disease control measures, as necessary, including quarantine and isolation orders, and vaccine or antiviral distribution.

The City's Emergency Response Plan and Emergency Operations Center organizational structure follows the Incident Command System. Depending on the pandemic phase and specific issues requiring emergency response, a unified command structure will be in place, with official(s) from the appropriate City agency serving as Incident Commander. For example, early in the pandemic (e.g., phase 4C, or early in phase 5), the primary response objective will be disease containment and implementation of public health control measures: an official from PDPH will serve as Incident Commander. Later in the pandemic, when issues of workforce depletion and continuity of essential services are paramount, officials from the Managing Director's office will serve as Incident Commanders within a unified command structure, with representatives from Health, Fire, Police and other critical response agencies.

Public Health Emergency Command Center

As soon as first cases of sustained human-to-human transmission are detected anywhere in the world, the Philadelphia Department of Public Health will activate an Emergency Command Center. This Command Center will coordinate the health-related aspects of the emergency response to an influenza pandemic, particularly those aspects that pertain to disease surveillance, case and contact identification, data collection from healthcare facilities, and school closure. The PDPH Emergency Response Plan provides detailed information about the location, the organizational structure, and specific activities of the PDPH Command Center.

The PDPH Emergency Command Center will have frequent communications with the City EOC to provide updates on the citywide and regional status of the pandemic in addition to any implemented disease control measures that require a multi-agency response involving many layers of government and private sector agencies. As the pandemic escalates and the emergency management issues become more focused on sustaining critical infrastructure and social order, the role of the health Command Center will focus primarily on specific public health functions (e.g., disease surveillance and monitoring), and the City EOC will become the primary coordinator of the emergency response.

Regional Coordination

The City EOC will be responsible for communications with county EOCs in neighboring jurisdictions, as well as the Pennsylvania Emergency Management Agency (PEMA) and the Federal Emergency Management Agency (FEMA), if necessary. Request and coordination of distribution of federal Strategic National Stockpile (SNS) assets will take place through the City EOC. It is expected that, staff permitting, the city's EOC will quickly become a Joint Operations Center (JOC), with participation from regional, state and federal agencies, as necessary.

Emergency Management Agencies at all levels of government will activate their EOCs during a pandemic to support local pandemic response efforts and facilitate regional coordination. The City EOC will communicate with EOCs in the 4 southeastern Pennsylvania suburban counties as well as southern New Jersey and Delaware through a variety of communications platforms, including the web-based E team software, which will be used to provide ongoing situation updates and reports from throughout the region. Hospitals will communicate with the region's EOCs using this same system, as well as through conference calls, and the Pennsylvania Department of Health "FRED" system, or Facilities Resource Emergency Database. These systems will be used to push information or alerts to hospitals, and to collect information from hospitals with respect to supply or employee needs, bed availability, and possible altered standards of care that might necessarily result from region-wide resource depletion. Early in the pandemic, when case counts are low, public health agencies may assume primary responsibility for hospital communication and coordination, although this will likely become a city or county EOC function as the pandemic progresses. This regional communications platform will also provide support to a Joint Information Center (JIC), to ensure a common regional message, particularly with respect to closure of critical facilities or services, as well as healthcare and public health messages.

II. PLANNING ELEMENTS FOR HEALTHCARE INSTITUTIONS

1. HOSPITAL SURVEILLANCE

A. Patient Surveillance

All patients, especially those whose primary presentation is not for influenza-like-illness (ILI), should be monitored closely for development of clinical signs of influenza during their hospital admission to detect illness and mitigate transmission of influenza throughout the hospital. Healthcare personnel who record patient vital signs should incorporate screening for the current case definition of influenza (fever greater than 100.4˚ F, plus one of the following: cough, sore throat, or respiratory distress). Patients meeting these criteria should be reported to the unit supervisor or charge nurse immediately. These patients should receive phase-specific pandemic influenza evaluation and implementation of appropriate infection control strategies as outlined in this document. If suspicion is high for influenza, antiviral treatment should be initiated within 48 hours of illness onset.

> ***Recommendation:*** ***Beginning in phase 4C and ongoing, healthcare employees who record vital signs should also screen for clinical signs that fit the case definition for influenza and report suspect cases immediately to their unit supervisor.***

B. Staff Surveillance

1. Passive screening (Case definitions)

All healthcare employees should be able to recognize the signs, symptoms, and risk factors of pandemic influenza and understand protocols for self exclusion and reporting their illness to the appropriate supervisor at the time of onset. Case definitions have been developed for the most likely strain of pandemic influenza but as a real pandemic develops, these definitions and screening questions may need to be modified to more closely reflect the symptomatology and epidemiology of the disease.

Education of healthcare employees on the methods of passive surveillance should occur in phase 3 and be ongoing. Staff must also receive information on the policies regarding self reporting of illness and what measures they can expect regarding furlough, mandatory sick leave, compensation, etc. (see section II.7.A.3 Human Resource policies, page 50). *The minimal clinical case definition to use is the presence of fever (>100.4°F) and at least one respiratory complaint including cough, sore throat, or shortness of breath.*

> ***Recommendation: Begin employee education campaigns for the recognition of symptoms of influenza during pandemic phase 3 and provide education on hand washing, covering coughs, and seasonal vaccination.***

Employee education regarding passive screening should be implemented at the beginning of pandemic phase 4A and continue through all subsequent phases. The proposed suspect case definition to use for employee screening during phase 4A should H5N1 avian influenza obtain limited human to human transmission, is derived from the WHO case definitions and includes: fever present (>100.4°F, 38°C), *and* one respiratory complaint present including cough, difficulty breathing, shortness of breath, *and* one of the following risk factors in the 7 days prior to illness onset: travel to Asia, Africa, or Europe or other locale where high pathogenic H5N1 influenza exists, *or* close contact with birds or carcasses of birds or feces of birds, consumption of undercooked poultry products where high pathogenic H5N1 avian influenza exists, *or* working in a laboratory that conducts testing on viruses in particular animal viruses, *or* caring for someone with confirmed pandemic influenza or similar unexplained illness description and a positive risk factor.[4] The actual case definition used during a pandemic will likely be determined by WHO and the CDC at that time, however these

working groups or a suitable subcommittee may review the proposed case definitions and make modifications if warranted.

Recommendation: Begin aggressive employee education for the recognition of symptoms and risk factors for pandemic influenza during phase 4A and encourage reporting of illness to supervisor. Also educate on policies regarding furlough, mandatory sick leave, infection control, and employee compensation.

As a pandemic worsens, policies regarding exclusion of exposed and sick employees may be modified to best accommodate the supply and demands of the healthcare community (see section II.7.B, Policies for Exposed Asymptomatic Staff, page 52). Other measures of disease burden and hospital stress will be considered to make decisions regarding exclusion, isolation, and infection control. Passive surveillance of employees should continue through later pandemic phases (4B through 6) where containment strategies might still have an impact. It is recommended to maintain passive surveillance during pandemic phase 7, so that identification of subsequent waves can be detected and the virologic profile and epidemiology determined.

Recommendation: Maintain aggressive education and passive surveillance of employees through pandemic phase 7. Review and modify exclusion policies as needed.

2. Active screening

Utility of active screening of employees as they arrive to work or during their shifts to identify new cases and decrease transmission is debatable because of the increased administrative and logistical demands in a background of staff shortages and the low probability of detecting true cases. During the severe acute respiratory syndrome (SARS) outbreak in the spring of 2003, three hospitals in Kingston Ontario (175 miles east of Toronto) conducted an extensive screening process for their employees as they arrived to work to identify illness and exposure. The process detected 5 people who had exposures to SARS cases and were thus home quarantined for 10 days.[5] These measures did not identify a single case of SARS but there were no recorded cases of SARS in Kingston during the Canadian outbreak in 2003.[6] Hospitals in Singapore implemented a 3-times per day temperature screening program during the SARS outbreak in 2003. All employees with access to clinical areas either had their temperature taken and recorded by a designated nurse, or were able to self report their temperatures. This measure identified 9 probable cases of SARS in 2 hospitals and led to rapid isolation and implementation of infection control measures. Health officials from the affected hospitals, the Singapore Ministry of Health, and the CDC conclude that this measure of screening was a useful component in their overall efforts to contain the epidemic of SARS in Singapore.[7] These examples suggest that active screening of employees during an influenza pandemic could be useful as a component strategy to control infection but is also labor intensive, of minimal yield, and may not be a judicious use of staff during later phases of a pandemic.

After facility restriction has occurred (phase 4B), healthcare institutions may implement a shift-based verbal assessment of illness and exposure for all employees upon entry. Temperature checks should be added to the verbal assessment for employees who are members of the Influenza Response Team (IRT) as they begin and finish each shift (see section II.4.A.1 Influenza Response Teams, page 27). This screening program should be implemented once pandemic influenza has been identified in Northeastern United States (300 mile radius around Philadelphia) and maintained through the interwave/recovery period (phases 4B –7). Temperature checks of non-Influenza Response Team staff who have access to clinical areas may be added to an interview screening process if there are available resources and staff, however; this has not been shown to increase case finding, and therefore is not recommended.

Recommendation: Implement a shift-based verbal assessment of illness and exposure for all employees who have access to clinical areas as they begin and finish each shift,

during phase 4B through phase 7. For Influenza Response Team members include temperature testing in the pre and post-shift evaluation.

Employees with symptoms consistent with influenza should report to Occupational Health, be excluded from work until symptoms resolve, and be evaluated to receive a treatment course of antiviral medication. Employees with a significant exposure should also report to Occupational Health for assessment and given the pandemic phase, they should be furloughed or placed in work quarantine, and receive post-exposure antiviral prophylaxis (see section II.7 Occupational Health Issues, page 49). Hospital administrators should maintain a database of employees who are identified as ill and exposed from these screening programs to track staff and to direct antiviral treatment and prophylaxis.

3. Staff absenteeism

Monitoring of healthcare employees who call out sick is a surveillance system that reflects staffing shortages and may provide additional markers for hospital stress. Literature to support the utility of using employee absenteeism as a surveillance measure of infectious diseases is limited. Feedback from work group participants indicated that these data are decentralized and currently difficult to collect and aggregate at each institution. A retrospective analysis of one local hospital's nursing staff absenteeism during a recent winter season did correlate with emergency department visits for febrile illness, but these data were collected in two week intervals, aggregated weeks later, and contributed indirectly to the measure of hospital stress. Work group participants felt that identifying the number of employees who report to work and their skill sets will provide a better real-time assessment of hospital workforce capabilities and overall hospital stress each day during a pandemic.

Recommendation: Monitoring employee absenteeism should not be a primary method of surveillance but may be used to supplement assessment of hospital stress if collected daily and internal system already exists.

C. Surveillance Systems to Monitor Healthcare Utilization

1. Emergency department monitoring

PDPH follows daily ED census from each hospital, and categorizes each patient encounter into a specific disease syndrome based on the patient's chief complaint. Two syndromes are monitored daily that reflect ILI: fever-flu and respiratory. Complaints that mention fever, flu, chills, or aches all over, are coded into the fever-flu syndrome, and percentages are compared each day for statistical increases. PDPH has run this syndromic surveillance program since the 2002-2003 winter season and has strong evidence that this chief complaint criterion captures most influenza activity as compared with positive influenza laboratory tests in the city. PDPH will issue surveillance summary bulletins of citywide aggregated output on a regular basis during a pandemic to estimate healthcare utilization demands on hospitals.

Recommendation: Emergency department syndromic surveillance will be conducted by PDPH with frequent distribution of summary bulletins to the healthcare community during a pandemic. The fever-flu syndrome can be used as a component to assess influenza like illness burden on healthcare institutions.

Of note, hospital EDs will be expected to receive a surge in patients during pandemic phases 4A, 4B, and 4C that will most likely be composed of patients without pandemic influenza (e.g., if winter season patients with respiratory infections, patients seeking prophylactic medication and vaccine, other worried, excess pediatric patients). In addition, emergency departments will still receive baseline numbers of patients with chronic medical condition exacerbations, obstetric deliveries, overdoses, trauma, etc., throughout all phases of the pandemic. These emergency department dynamics must be kept in mind when analyzing these healthcare utilization data sources.

2. Admission data
Monitoring the number of patient admissions can add to the overall daily assessment of disease burden and hospital stress. In addition to the total number of admissions, hospitals are encouraged to track admissions due to ILI, and other levels of severity of disease (ICU admissions).

3. Death data
Monitoring the number of patients who die of pandemic influenza will be a useful measure of disease severity and impact. Early estimates of case fatality will be important for the CDC to assess and use to predict a pandemic's severity. Hospitals are advised to maintain counts of deceased on a daily basis and to report these data to PDPH. These data will also be used to coordinate excess body collection by the Medical Examiner's Office.

4. Laboratory test data
PDPH receives weekly aggregated counts of positive respiratory virus tests including influenza A and B from clinical laboratories in Philadelphia. These data will be used to estimate influenza transmission in the region and will be summarized regularly as a regional surveillance system and disseminated to the healthcare community as available. Hospitals may also conduct laboratory test surveillance to assess internal influenza disease transmission.

5. In-patient census data
Daily monitoring of in-patient census is recommended for healthcare institutions. In-patient surveillance may be the best single measure to estimate resource demand on a hospital each day. In addition, tracking the acuity or level of care of these patients will help to better estimate the anticipated staffing and resource needs required for total patient management.

> ***Recommendation:** Monitor daily in-patient census and level of care as a component to assess hospital stress beginning in phase 4B.*

D. Laboratory Diagnosis

Historically, the utility of laboratory testing for influenza has been questionable because of the lack of reliable low cost test methods. With recent technological advances, laboratory diagnosis has become instrumental to the detection and treatment of influenza worldwide, to the minimization of related healthcare costs, to the mitigation of the indiscriminant use of antibacterial medications, and to the containment of nosocomial influenza outbreaks.[8]

Laboratory testing for influenza during a pandemic will be important and practical at the onset of community infection to confirm and subtype the circulating virus at a time when the number of clinical presentations is low. Strain identifying testing should occur among those patients who meet the phase-specific clinical case definition and who have risk factors. Healthcare institutions are advised to conduct strain typing laboratory diagnostic testing on all high suspicion patients during the pandemic alert phase (phases 4A-5A). The type of laboratory test used will depend upon the institution's available resources and capacity. PDPH will assist with specimen transport to the state reference laboratory (Bureau of Laboratories) in Lionville, Pennsylvania if necessary.

> ***Recommendation:** Strain specific laboratory testing (H-subtyping) is advised for patients with very high suspicion of infection with pandemic influenza during phase 4A until the beginning of phase 5A.*

Once pandemic influenza has begun unrecognized local transmission, the demand for diagnostic testing will be excessive and impractical to maintain. Therefore during widespread transmission, patients presenting with signs and symptoms consistent with pandemic influenza should be treated as influenza cases and managed as appropriate. Strain specific testing should resume for suspect

patients during the initial recovery period (phase 7) to monitor for the emergence of a subsequent wave of infection.

***Recommendation:* Strain specific laboratory testing (H-subtyping) is not recommended once pandemic influenza is widespread (phases 5B, 6) but should resume during pandemic phase 7 for patients with high suspicion for influenza.**

Healthcare employees who have recovered from pandemic influenza should be identified so that they can be utilized to work in high-risk areas. Therefore, H-subtyping diagnostic testing should occur for all employees with suspect pandemic influenza so that immunity to the circulating strain can be confirmed. Recovered staff should still be provided with appropriate personal protective equipment (PPE) and antiviral prophylaxis if working with pandemic patients (Influenza Response Teams, see page 27). These policies may be relaxed if re-infection is understood not to occur and preventive supplies are limited.

***Recommendation:* Healthcare employees with suspect pandemic influenza should receive strain specific laboratory testing (H-subtyping).**

The interpretability of rapid antigen tests should be analyzed in the background of prevalence of influenza in the population being tested, the quantity of viral particles in the specimen, the type of specimen tested (nasopharyngeal swab, nasopharyngeal wash, throat swab, nasal swab, or nasal wash), and the sensitivity and specificity of the test for that specimen type. Many of these tests have lower than preferred sensitivity regardless of specimen type, making the positive predictive value (PPV) low during early transmission in the community. Therefore the use of POC tests should be discouraged when infection rates are low. If they are used in a patient with a high suspicion of influenza due to clinical presentation and risk factors (exposure to a confirmed or probable case), and the test result is negative, it is recommended to conduct further definitive testing. Positive test results should be interpreted with caution and may only be reliable during increased transmission or an outbreak setting. POC tests do not identify the H-subtype of influenza virus.

The following are recommendations made by WHO in July 2005 for the use of rapid antigen tests for the diagnosis of influenza [9]:

- Other influenza surveillance measures should be consulted for when to use POC tests.
- During periods of high influenza activity, it is impractical to test all patients meeting the case definition.
- Rapid tests should only be used when they can affect management.
- When influenza activity is low, no POC test is needed. Instead, use immunofluorescent antibody (IFA) staining, viral culture or reverse transcriptase-polymerase chain reaction (RT-PCR).
- When influenza transmission is beginning or during an outbreak setting, use a POC test. Accept positive results and definitive test negative results.
- When influenza transmission is widespread, no POC test.
- Rapid POC tests are not recommended for avian influenza strains.

A summary of all licensed and commercially available tests for influenza and rapid antigen tests is provided in Appendix 3.

***Recommendation:* Point of care (POC) testing for pandemic influenza should not be routinely used for diagnosis.**

2. HOSPITAL COMMUNICATIONS

A. External Communications

1. Public information plan

Each hospital should have a well-developed crisis communication plan. An organization's crisis communication plan should be fully integrated into the overall emergency response plan. Each hospital should also be prepared to work with public health and other government officials, neighboring healthcare facilities, and the public and the press to ensure that rapid and ongoing information sharing will occur during an influenza pandemic.

> ***Recommendation:*** ***Hospitals are advised to develop a comprehensive crisis communications plan with elements prepared specifically for an influenza pandemic. PDPH has provided sample guidelines for creating a hospital crisis communication plan in Appendix 5.***

Media protocols

Hospitals and health systems should focus communications efforts during an influenza pandemic on supporting the government agencies that are designated as the central point of information dissemination. Hospital and health system public relations officials should defer to appropriate government public relations officials to provide regular updates and action recommendations. This assures continuity and consistency of messages, portrays a unified emergency response, and will provide important fact-based information to foster public confidence. The Delaware Valley Health Care Disaster Preparedness Task Force has written Media Protocols During a Declared Emergency. This document establishes an agreed upon framework that will guide how hospitals should manage media inquiries during an emergency. Local hospital personnel can access this document online at: http://www.dvhc.org/.

> ***Recommendation:*** ***Hospitals are advised to reference "Delaware Valley Health Care Disaster Task Force Media Protocols During a Declared Emergency." These policies and procedures should be implemented among hospitals and healthcare institutions in the Delaware Valley in the event the Federal, State, or local government declares an emergency, such as an influenza pandemic. (See Appendix 5)***

Altered standards of care

Ongoing public communications will be essential prior to the onset of and during a pandemic to explain the rationale for altered standards of care to all healthcare workers, patients, and visitors. It is suggested that communication messages describing altered standards be crafted for each phase/threshold and that they be actively delivered to the public and healthcare staff during the preceding pandemic phase. In the pre-pandemic and early pandemic alert periods, staff should receive education and conduct exercises in healthcare settings that demonstrate agreed upon altered standards of care (see Appendix 2, page 92).

> ***Recommendation:*** ***Altered standards of care should be communicated to healthcare staff and to the public at a minimum of one phase prior to their implementation and messages should be coordinated with local government.***

Hotline and website communications

In addition to using many other communication channels, PDPH delivers emergency information to the public via the City's emergency preparedness website, www.readyphiladelphia.org, and the health department emergency call center (215-686-1776). During an influenza pandemic, these channels will be used to deliver messages and field inquiries from the public. Hospitals will likely also receive a surge of inquiries from the public during an influenza pandemic and should prepare to ramp up the ability to handle phone calls and post information on agency and partner websites.

***Recommendation:* Hospitals should consult with PDPH or the health department in their jurisdiction on how to manage message content and public inquiries via telephone hotlines and websites including:**

- ***How to handle public inquiries and what types of calls to refer to the health department.***
- ***Coordinate information that will be provided by hospitals and the types of inquiries that will be referred to the local health department or PA DOH.***

2. Public health/government agency

Communication between public health and local stakeholders

The Philadelphia Department of Public Health will collaborate with state and federal partners to share regular information updates with hospitals. PDPH will distribute information such as travelers' advisories, infection control recommendations, potential priority distribution of antiviral medications, and availability of first-generation vaccines to hospitals through a variety of channels including health alerts, E Team, the Philadelphia Health Information Portal, broadcast fax, and conference calls. Also, DVHC has established a standing bridge conference call line to facilitate regional inter-hospital and inter-agency coordination during regional exercises. This line may be used during real emergencies to facilitate communications. DVHC or PDPH will announce scheduled meeting times when hospitals should connect to this line to conference. Healthcare disaster personnel can direct inquiries regarding access to this conference call line to DVHC.

***Recommendation:* Effective two-way communication between hospitals and PDPH should be maintained. PDPH, DVHC or other lead agency will initiate regularly scheduled conference calls with all area hospitals. As information becomes available, PDPH will provide updates and guidance related to disease susceptibility, diagnosis, management and other topics. Hospitals should also report on initial cases, then levels of disease burden and hospital stress, current and anticipated supply and personnel shortages, and other relevant issues.**

Response protocol

The Managing Director of the City of Philadelphia, in consultation with the Mayor and the Health Commissioner, will open the City's Emergency Operations Center (EOC), launching the City's response to a pandemic under the guidelines set forth by the City's Emergency Operations Plan (EOP). The Mayor's Director of Communication will establish a Joint Information Center (JIC) at the EOC or an alternate site. The JIC will serve as a centralized communication hub, it will hold timely briefings to report information, and ensure that consistent messages represent all involved agencies.

3. Inter-hospital communication

Disaster personnel from hospitals in the Delaware Valley have regular communications between institutions through ongoing emergency healthcare support zone activities. In addition to telephone trees and 800 megaHertz radios, timely and accurate information may be shared during an influenza pandemic between hospitals by using E Team. E Team is a web-based real-time system that allows agencies to distribute and receive information related to an emergency. DVHC has led the region by managing the logistical and operational responsibilities of this system and conducts regular trainings and exercises.

***Recommendation:* During pandemic phases 4A through 7, hospitals should post information on E Team about their operational status, including number of patients being treated, current bed capacity, personnel capacity, blood bank inventory, and other relevant factors.**

B. Internal Communications

Hospitals and healthcare facilities will be responsible for all internal communications to employees, patients and visitors. Guidance on messages and materials will be provided from external sources (PDPH, PA DOH, CDC). Since it is important to disseminate messages that are consistent across agencies, PDPH has pre-developed some sample educational materials (see Appendix 6) and will continue to issue updated materials when a pandemic occurs.

Hospital Emergency Incident Command System

The Hospital Emergency Incident Command System (HEICS) provides a command structure that is flexible and expandable, allowing for ease of communication during event management. HEICS employs a logical management structure, defined responsibilities, clear reporting channels and a common nomenclature to help unify hospitals with other emergency responders. HEICS is quickly becoming the standard for healthcare disaster response.

> ***Recommendation:*** ***Hospitals should ensure that an incident command structure is in place during an influenza pandemic. Communication protocols should be defined by the incident command structure and provide for regular information updates to management and key personnel during an influenza pandemic.***

1. Staff notification

Hospitals should maintain contact lists for all facility personnel. Contact lists should be updated regularly, or at least annually, and include phone numbers, e-mail and home street address. Staff phone call-down trees and e-mail group lists are useful ways to notify employees during an emergency.

> ***Recommendation:*** ***Hospitals should develop and maintain mechanisms to reach all employees with urgent communications related to hospital status and working conditions. Mechanisms should be exercised yearly. Informational flyers may be added to paycheck envelopes as an additional way to communicate with employees.***

2. Patient and family communication strategies

Messages that are empathetic (take the emotional perspective of the audience) appear honest and open, and come from a trusted source are most effective in a crisis. To prepare for and during a pandemic, PDPH will provide hospitals with patient education materials (see Appendix 6) and updated information on the City's emergency preparedness website (www.philadelphia.org and www.phila.gov/ready). Hospitals should also prepare to ramp up the ability to handle phone calls and post information on agency and partner websites. Finally, the face-to-face communication that patients and families will have with hospital staff is an important way that they will receive information about a pandemic. Hospital employees should be prepared to answer questions or refer patients and families to another appropriate source for information.

3. EDUCATION AND TRAINING

Influenza related education activities within healthcare institutions will be essential and should begin early in the pandemic alert period so that employees have a clear understanding of how healthcare facility operating procedures will change during a pandemic. Training and education should continue aggressively into the pandemic period for staff, visitors, patients, and for new and reassigned employees. Education programs should focus on pertinent symptomatology, modes of viral transmission, infection control, and strategies that will likely be implemented to manage the pandemic. Specifics on the education materials and the timelines for implementation are outlined below.

When appropriate, PDPH will formulate staff and public risk communication education materials for distribution to healthcare facilities in the Philadelphia metropolitan region. Universal education materials across the region will help to insure the communication of similar messages and to minimize public confusion. Examples of education materials to be provided by PDPH include: updates of pandemic epidemiology; infection control guidelines, PPE usage for healthcare employees (in addition to materials provided by OSHA), and rules for work quarantine and home quarantine for healthcare employees (see Appendix 6).

Education and training activities related to seasonal influenza should occur throughout the fall and winter months during pandemic phase 3, and be ongoing with more relevant content pertaining to pandemic influenza at the onset of phase 4A regardless of month. Policies pertaining to altered standards of care or other sensitive issues should be described at a minimum of one phase prior to their scheduled implementation so there is adequate time to educate staff and describe the rationale.

> ***Recommendation: Staff, patient, and visitor education on transmission, vaccination, and infection control measures regarding seasonal influenza should occur through the fall and winter months, during pandemic phase 3.***
>
> ***Recommendation: Staff, patient, and visitor education activities for pandemic influenza should begin early in phase 4A and be ongoing to promote maximum preparedness of employees and maximum compliance from visitors and patients. Phase-specific education protocols should be delivered during the preceding phase.***

A. Education About Pandemic Influenza

Healthcare employees, visitors, and patients should be informed about the signs and symptoms of seasonal influenza and pandemic influenza, risk factors for acquiring both, and policies for self-reporting influenza-like symptoms to appropriate personnel. The CDC will provide PDPH with updates on the clinical presentation of pandemic influenza as they develop. Updates will then be disseminated by PDPH to hospitals and other healthcare facilities in the Philadelphia metropolitan area. Healthcare employees should review guidelines for standard precautions, droplet precautions, and other infection control methods on a regular basis. Once a pandemic obtains limited human-to-human spread (onset of phase 4), education of staff about the healthcare institution's specific pandemic influenza plan should begin. Employees should receive education on policies that will affect their work, with extensive explanation of their purpose.

> ***Recommendation: Pandemic influenza education on clinical signs and symptoms and appropriate infectious disease precautions should begin during pandemic phase 4A and be ongoing as updates become available.***
>
> ***Recommendation: At phase 4A, all employees should be informed of the healthcare facility's relevant pandemic influenza plan so that they understand procedures before they are implemented.***

B. Infection Control

The education and practice of basic infection control policies regarding respiratory hygiene/cough etiquette and hand hygiene will be essential to the mitigation of pandemic influenza in all healthcare institutions. Information on the importance and proper methods should be disseminated to employees, patients, and visitors during the winter in phase 3, when seasonal influenza is circulating and throughout all subsequent pandemic phases. Campaigns should include posted signage in common areas (elevators, waiting areas, cafeterias, lavatories, break rooms, etc.) in appropriate languages and literacy levels. Specific instructions should include covering the nose/mouth with a tissue or mask when coughing or sneezing to contain respiratory secretions, disposing of tissues in the nearest waste receptacle after use, and performing hand hygiene after contact with respiratory secretions.

> ***Recommendation: Respiratory hygiene, cough etiquette, and hand hygiene education activities including use of language and reading-level appropriate signage clearly posted in common areas should begin in pandemic phase 3 during fall and winter months and be ongoing from the onset of phase 4A.***

C. Antiviral Medication Distribution and Use Plan

One of the most important education activities will be the transparent and early education of healthcare employees, patients, visitors, and the public about the procedures for use and administration of antiviral medications for prophylaxis and treatment of individuals during the pandemic. Rationale for the targeted use of these medications should emphasize their limited supply and be accompanied by risk assessment and infection control guidelines. Education for staff on the antiviral medication distribution plan should begin in phase 4A and be ongoing. The distribution plan calls for the provision of daily prophylaxis to voluntary IRT (Influenza Response Team) members after their deployment in phase 4B, post-exposure prophylaxis of employees and others following a significant exposure, and strict treatment guidelines for patients (see section II.8.C, Antiviral Drugs, page 63).

> ***Recommendation: Staff education about the antiviral medication distribution plan should begin in phase 4A and be ongoing to maximize understanding and compliance of employees and the public.***

D. Pandemic Influenza Visitation Restriction Policies

Visitation restriction policies will be implemented during the pandemic alert period (phase 4B). Policies will be relaxed during phases 5B and 6 when disease burden overwhelms the healthcare system but visitors will be expected to assist with certain patient care activities. Because of the variability of the visitation plan over subsequent pandemic phases, education about the visitation policy should begin in phase 4A for both the public and healthcare employees. Phase-specific policies should be described and understood during the preceding phase of implementation (see section II.5.C Visitation Limitation, page 38).

> ***Recommendation: Employee and public education about hospital visitation restriction policies for pandemic influenza should begin in phase 4A to promote maximum compliance.***

E. PPE – Protocols and Procedures

Healthcare employees, visitors, and patients should learn and understand the importance of proper donning and doffing techniques of PPE through posted signage in common areas, fit testing activities, hands-on activities in small groups, and reading-level and language appropriate flyers. Employees

should be repeatedly informed of the PPE protocols when on the influenza wards, during certain patient-care aerosolizing procedures, and when in non-influenza designated areas. Staff should also be informed of the protocols for visitor and patient PPE requirements in both the influenza and non-influenza designated areas of the hospital. Suspect influenza patients and their visitors will also require education explaining use of PPE for themselves and the rationale for the designation of higher level PPE for healthcare workers providing care for them. Pre-made flyers describing the basics of disease transmission with the explanation for varying PPE among employees, patients, and visitors should be posted in patient treatment areas.

Employees designated to work in areas where pandemic influenza patients are receiving care (Influenza Response Team members) should wear, at a minimum, an N-95 particulate respirator. Fit testing for N-95 and N-100 particulate respirators needs to occur prior to the onset of local transmission. Training programs to fit test and demonstrate proper use of these respirators should occur during pandemic phase 3 and be ongoing.

> ***Recommendation: Begin education activities during pandemic phase 4A for employees about the importance and methods of wearing pandemic PPE properly. Provide materials to describe PPE guidelines for patients and visitors receiving care during phase 4B.***

> ***Recommendation: Conduct ongoing fit testing of N-95 respirators for all employees regardless of position beginning in pandemic phase 3.***

F. Training of Influenza Response Teams

In the event of a pandemic, hospitals are recommended to select and train Influenza Response Teams (IRT), a cadre of healthcare professionals who will care for influenza patients in designated sections of hospitals during a pandemic. Training in advance for IRT members, especially for critical care triage officers is imperative. Operation of a screening station in emergency departments and outpatient waiting rooms will be a strategy to identify those who are infectious before exposing others to influenza. Triage officers and pre-ED screening employees will require additional levels of training to perform their unique functions. Recommended training topics for all Influenza Response Team members are:

- Proper usage of PPE, provision of education regarding pandemic protocols to patients and visitors;
- Usage of the buddy system for psychological support; and,
- Methods of internal communications to essential staff and security.

There will be differences in the daily duties of staff within the IRT. In-patient ward and clinical ED IRT members should receive education on methods to multi-task patient care duties to decrease the number of patient encounters per shift and other exposure reducing measures (see section II.4.B Staffing Plan, Influenza Response Teams, page 27).

> ***Recommendation: At phase 4A, identify employees to become Influenza Response Team members and educate them on roles, guidelines, PPE, prophylaxis, treatment zones, exposure reduction tactics, and functions of these positions.***

G. New Staff, Re-assigned Staff, Non-facility Clinical Staff

During the pandemic period, hospitals will likely re-assign certain high-risk staff to non-influenza areas of the hospital (pregnant women, immunocompromised) and certain low-risk staff (those employees who have recovered from the current circulating strain of pandemic influenza) to influenza designated areas including the influenza zones where patients will present and receive care. It will be necessary to train re-assigned staff and new employees, including volunteers (retired healthcare professionals, medical reserve corps members) and orient them to the facility and pandemic procedures. Plan to

train/orient non-facility clinical support staff about infection control guidelines, PPE requirements for all persons in both influenza designated and non-influenza designated areas, respiratory hygiene, hand hygiene, cough etiquette, and to the floor plan of the hospital facility and the facility's pandemic influenza plan.

Recommendation: Prepare to educate and train new and re-assigned employees regarding facility orientation, pandemic influenza principles, and pertinent control strategies.

H. Tracking Training Programs

It is imperative for healthcare facilities to meticulously document all staff training programs to insure they provide proper education and training for all employees. Special attention should be paid to education and training of employees who are reassigned on short notice or are on temporary assignment during hospital surge.

Recommendation: Healthcare institutions should maintain strict documentation of all trainings and educational activities pertaining to pandemic influenza.

4. TRAIGE, CLINICAL EVALUATION, ADMISSIONS, AND INPATIENT CARE

A. Staffing Plan

1. Influenza Response Teams (IRT)

Work group members decided that a possible approach to protecting key clinical staff would be to identify and train a cadre of healthcare workers dedicated to the daily screening, assessment, and management of suspected and confirmed patients with pandemic influenza. Ideally, members of the Influenza Response Teams (IRT) should be recruited on a volunteer basis and should be comprised of ED and outpatient clinic screening and triage staff, security personnel, nurses, physicians, anesthesiologists, respiratory therapists, occupational health evaluation staff, radiology technicians and others with direct close-contact patient care responsibilities. IRT members will work primarily in influenza treatment areas or response zones that should be designated in select areas of the hospital where pandemic influenza patients will present and receive treatment (see section below on Influenza Zones, page 28). Hospitals should also identify shift supervisors for each influenza zone (ED, ICU, ward, etc.) to perform verbal assessments of symptoms and temperature testing of IRT staff at the start and end of each shift in addition to other management responsibilities. Hospitals should develop and begin education and training for IRTs during pandemic phase 4A. Education and training should include; pandemic protocols, infection control, PPE, the buddy system, influenza zone protocols, patient care multi-tasking, additional clinical duties (phlebotomy, electrocardiography (EKG) as appropriate), and clinical definitions for screening and admissions. IRTs should be deployed during phase 4B.

> ***Recommendation: Hospitals are advised to develop a group of healthcare workers dedicated to the daily treatment of pandemic influenza patients in phase 4A, and activate them in phase 4B.***

Along with extensive training and higher-level PPE, this group should receive prophylactic oseltamivir (or other suitable antiviral medication) every day for the duration of the pandemic (see section II.8.C Antiviral Drugs, page 63). PPE recommendations are derived from guidance provided by OSHA[10], Department of Health and Human Services (DHHS), and WHO and reflect employee activities and proximity to pandemic patients (see section II.6.A.1 PPE For Staff, page 44).

> ***Recommendation: IRT members should receive daily prophylaxis with a neuraminidase inhibitor beginning in phase 4B.***

IRT members will likely be expected to perform additional duties to decrease the number of staff who will need to be in close contact with pandemic patients. In addition to standard clinical care duties, IRT ward and ED staff should perform phlebotomy, lead placement and EKG tracing, deliver meal trays to patients, and bag and remove trash from influenza patient treatment areas. All members of the IRT will be expected to group clinical activities to reduce the number of patient encounters while in the influenza zone in order to limit high-risk exposures and to reduce daily PPE usage.

> ***Recommendation: Influenza Response Team members should perform additional patient care duties that decrease the number of staff needed to enter the influenza treatment area and combine patient care visits to decrease usage of PPE.***

IRT supervisors should assign IRT staff into pairs and trios of buddies who will support each other during their shifts. IRT members should report with their buddy to their Influenza Response Team zone supervisor. The supervisor should verbally assess the psychological and physical condition of IRT members, take temperatures, and distribute the prophylactic dose of antiviral medication. Any IRT members found to have symptoms that qualify for influenza like illness should be sent to occupational health for full evaluation (see section II.7.A Occupational Health Issues, page 49). Prior to clinical activities, each IRT buddy should assess the proper application of PPE. At the end of each

shift, buddy pairs (or trios) will report to the zone supervisor for temperature checks and verbal assessment of mental and physical condition, and assist each other with proper PPE removal (doffing) practices.

Recommendation: IRT members should utilize the buddy system, be assessed by supervisors at the start and finish of each shift, and assist each other with PPE application and removal.

IRT staff model summary:

- Recruited on a volunteer basis
- Staff to work directly with suspect and confirmed pandemic influenza patients
- Staff to work in high-risk influenza zones in the healthcare facility
- Will perform additional clinical duties as able (phlebotomy, EKG tracing) and non-clinical duties (trash removal, food tray assistance) to reduce staff exposure
- Higher level PPE
- Multi-task patient care activities to decrease exposure and PPE usage
- Daily dose of antiviral prophylaxis for duration of the pandemic
- Verbal assessment at beginning and end of shift with temperature checks by supervisor
- Buddy system, checking of proper PPE usage, psychological support mechanism

2. Support staff

There will be many additional staff assignments to support hospital functions that will not involve influenza patient care responsibilities. Most of these positions will restrict staff to non-influenza treatment areas and therefore exposure risk will be considered medium once pandemic influenza is widespread due to contact with the general population and coworkers. Protection for these workers will vary based on their activities and proximity to patients but should include at a minimum:

- maintaining 6 feet of separation when able
- use of physical barriers
- surgical masks to provide droplet protection

Certain assignments will bring employees into the influenza treatment zones including influenza ward hallways and patient rooms (housekeeping, pharmacy, consultants). Recommendations for appropriate PPE will depend upon entrance and egress of non-IRT staff into designated influenza zones (see section II.6.A.1, PPE for Staff, page 44). Certain support staff with repeated access to influenza patient rooms and evaluation stations may be considered part of the IRT (housekeeping, security) and therefore may receive daily antiviral prophylaxis in addition to appropriate PPE.

B. Influenza Zones

The work groups felt that pandemic patients should be separated from the general patient population in the hospital to best protect other patients and non-IRT staff. Influenza zones should be determined in all areas of the hospital where pandemic influenza patients will present, be evaluated, and receive care (ED, ICU, inpatient ward, radiology suite). Guidelines for infection control in these zones for direct patient care activities should utilize airborne precautions up to 20 feet from the patient when possible. Healthcare personnel who are working in the influenza zones (IRT) should not work in the non-influenza areas of the hospital. Treatment zones should be partitioned from non-influenza designated areas of the hospital. Partitions can be clear plastic, canvas, or other types of temporary barriers that do not require an airtight seal. Tape may be used on the floor to demarcate the zone and signal the need for enhanced PPE. Clear and abundant signage should be posted with clear messages (in appropriate languages) describing the infectious risk and required PPE for entry.

Recommendation: Healthcare institutions should create influenza zones in the ED and other entrances where patients present with pandemic influenza beginning in phase 4B.

Recommendation: Healthcare institutions should create influenza zones in all areas of the hospital where pandemic patients will be evaluated, undergo procedures, and receive care.

1. Emergency Department (ED)

A screening station at the entrance to the ED should be designated to screen patients for infection with influenza. IRT staff and security at this entrance should wear higher-level PPE. Provide a surgical mask to patients with symptoms consistent with influenza (and their visitor as well) and direct patient to an influenza zone within the ED. Pandemic patients should be separated in the influenza zone by distance and physical barriers to protect patients presenting with non-influenza respiratory illnesses. Ample signage should be posted that provides patient instructions and infection control protocols. Make trash receptacles, sanitizing gel, and tissues accessible to all persons in the ED.

2. Intensive Care Unit (ICU) and Inpatient Ward

Sections of the ICU and wards should be designated as inpatient influenza zones. As with the ED, determination of the boundaries should be based on number of patient care areas anticipated and the existing architecture of the unit. Physical barriers should be used with clear demarcation of zone boundaries and appropriate signage. Patient rooms should remain separated and closed from common areas such as hallways, though hallways may likely be within the influenza zone. Recommendations for PPE will be stricter for employees who enter patient rooms. Donning and doffing stations for additional higher-level PPE and for hand hygiene practices should be positioned immediately outside of patient rooms.

3. Other Considerations

Radiology suite and other patient traffic areas

Radiology suites and other departments within hospitals that will receive influenza patients for diagnostic and treatment procedures should designate specific areas for influenza patients and implement appropriate infection control protocols (surgical mask worn by patient). If possible, select elevators and hallways should be designated for influenza patient transport.

Ward/ICU Reception desk

If the reception desk or other section of a ward is inside the influenza zone, employees without direct patient care but who will work within the zone (clerks, housekeeping) should wear gloves and an N-95 respirator at all times.

Delivery and removal of food trays, waste, supplies

Ward deliveries including food trays and supplies should be placed outside of the influenza zone partition. Items should be brought into the zone by protected staff and distributed to patients as appropriate. Level of PPE should be determined by the location that the staff member accesses for item delivery and removal as outlined in this section.

C. Protocols for Screening and Evaluation

This section provides guidance for screening and evaluating patients with respiratory illness. Likelihood of a diagnosis of pandemic influenza will depend upon the level of transmission in the local community and exposure history.

Phase 3, or when pandemic influenza is occurring outside of North America

Level of suspicion should focus on clinical symptoms and history regarding risk factors:

- Fever >100.4, and cough or respiratory distress
- Direct contact with birds (particularly water fowl and poultry)
- Work in a microbiological laboratory or other specimen handling occupation
- Exposure to others with known pandemic or avian influenza (within 2 weeks prior to illness onset) or other severe respiratory illness

- Travel to areas where pandemic or avian influenza is endemic

Once novel strain influenza is suspected, clinical specimens for H-subtype diagnostic testing should be collected and sent to the appropriate clinical laboratory. Infection control guidelines consisting of standard and droplet precautions should be implemented with prompt reporting of suspect cases to the local public health authority.

***Recommendation:* During phase 3, patients presenting with suspect novel influenza should receive H-subtype diagnostic testing and standard and droplet infection control protocols. Cases should be promptly reported to the local public health authority.**

Later phases (4-7), viral transmission occurring in North America

As pandemic influenza spreads easier among human populations and is identified in North America, (optimally phase 4B, transmission in the northeast United States), healthcare institutions should implement a patient reception and triage strategy in the emergency department and outpatient clinics as outlined above. Clinical suspicion of pandemic influenza during later phases should increase as transmission spreads into the local community and more specific symptomatology is understood about the pandemic strain. Submission of laboratory specimens for diagnosis should continue through phase 4, then decrease during widespread transmission (phases 5, 6).

***Recommendation:* During later pandemic phases (5, 6), clinical triage should rely more on symptoms and exposure history and less on diagnostic testing.**

D. Admission Policies

During severe pandemic conditions, medical management of pandemic influenza patients will depend on several factors:

- Available hospital resources (employees, space, and supplies)
- Home care when medically stable, given appropriate support
- Admission reserved for critically ill
- Admission for homeless or those who live alone (might be transferred to an alternate care facility to support these populations if activated (see section II.9.B.2 Identification of Expanded Bed Space, page 73)
- Admission and ventilator access dependent upon implementation of a critical care triage protocol (see below)

1. Critical Care Pandemic Triage

Because critical care resources are likely to be in short supply in a pandemic and demand will not be met, it may be necessary to prioritize patients for ICU care and mechanical ventilation based on survivability.[11] The goal of such a priority scheme or "triage protocol" would be to maximize benefits for the largest number of patients and save as many lives as possible as described in the federal guidance on altered standards of care in a mass casualty event from AHRQ. Hospital stress must be sufficient to warrant application of a pandemic critical care triage protocol. Coordination across the region will be of paramount importance. The process for the determination of critical resource allocation strategies will involve state and federal emergency management planners and be supported by governmental leaders.

Members of the planning groups felt that it was not the role of local healthcare planners to develop specific protocols for the allocation of critical services and resources during a national emergency. Rather, state and federal officials should address the role of developing altered standards of clinical care. At present, guidance for these issues is lacking due to the complexity and ethical sensitivities. Some panel members felt strongly that there is sufficient literature to conceive an approach to pandemic critical care allocation, and that having some framework would be beneficial. Public health

planners in New York State have developed a pandemic allocation strategy that may have utility during a pandemic in Philadelphia.[12] We outline the main points of this approach below.

There are very few examples of protocols to guide decision-making in this context. In October 2006, CMAJ published a protocol that can be considered by hospitals in the Philadelphia region. This triage protocol proposed by Christian and colleagues is outlined below and applies to all patients both with and without influenza, since all share a limited pool of resources. The triage protocol has four main components: inclusion criteria, exclusion criteria, minimum qualifications for survival and a prioritization tool that uses the Sequential Organ Failure Assessment (SOFA) score to prioritize patients based on 6 clinical parameters. The text below first outlines the components of the protocol and then describes how to apply it in the patient care context.[13]

1) Inclusion Criteria

The inclusion criteria identifies patients who may benefit from admission to critical care and focuses on respiratory failure, since the provision of ventilatory support is what distinguishes the ICU from other acute care areas.

To meet inclusion criteria a patient must have one of the following:

A. Requirement for invasive ventilatory support
   - Refractory hypoxemia (SpO_2 < 90% on non-rebreather mask or FIO_2 > 0.85)
   - Respiratory acidosis (pH < 7.2)
   - Clinical evidence of impending respiratory failure
   - Inability to protect or maintain airway

B. Hypotension (systolic blood pressure < 90 mm Hg or relative hypotension) with clinical evidence of shock (altered level of consciousness, decreased urine output or other evidence of end-organ failure) refractory to volume resuscitation requiring vasopressor or inotrope support that cannot be managed in ward setting

2) Exclusion Criteria

The exclusion criteria can be broken down into 3 categories:

- patients who have a poor prognosis despite care in an ICU
- patients who require resources that simply cannot be provided during a pandemic
- patients with advanced medical illnesses whose underlying illness has a poor prognosis with a high likelihood of death (baseline death rate higher than 50% within 1-2 years)

The patient is excluded from admission or transfer to critical care if any of the following is present:

A. Severe trauma
B. Severe burns of patient with any 2 of the following:
   - Age > 60 yr
   - > 40% of total body surface area affected
   - Inhalation Injury
C. Cardiac arrest
   - Unwitnessed cardiac arrest
   - Witnessed cardiac arrest, not responsive to electrical therapy (defibrillation or pacing)
   - Recurrent cardiac arrest
D. Severe baseline cognitive impairment
E. Advanced untreatable neuromuscular disease
F. Metastatic malignant disease
G. Advanced and irreversible immunocompromise
H. Severe and irreversible neurologic event or condition
I. End-stage organ failure meeting the following criteria:

Heart
   - NYHA class III or IV heart failure

Lungs
   - COPD with FEV_1 < 25% predicted, baseline PaO_2 < 55 mm Hg, or secondary pulmonary hypertension
   - Cystic fibrosis with post bronchodilator FEV_1 < 30% or baseline PaO_2 < 55 mm Hg
   - Pulmonary fibrosis with VC or TLC < 60% predicted, baseline PaO_2 < 55 mm Hg, or secondary pulmonary hypertension

- Primary pulmonary hypertension with NYHA class III or IV heart failure, right arterial pressure >10 mm Hg, or mean pulmonary arterial pressure >50 mm Hg

Liver

- Child-Pugh score greater than or equal to 7

J. Age > 85 yr
K. Elective palliative surgery

3) Minimum qualifications for survival

Minimum qualifications for survival set a ceiling on the amount of resources that can be expended on any one patient. This requires an initial assessment and follow-up assessments at 48 and 120 hours, as well as an ongoing cut-off ceiling if a patient has a SOFA score of 11 or higher or any other exclusion criteria. The point of subsequent assessments is to identify patients who are not improving thus allowing discontinuation of resources that can be re-allocated to others.

SOFA Score Criteria

	Score				
Variable	0	1	2	3	4
PaO_2/FIO_2, mm Hg	> 400	≤ 400	≤ 300	≤ 200	≤ 100
Platelet count, $\times 10^6$/L	> 150	≤ 150	≤ 100	≤ 50	≤ 20
Bilirubin level, mg/dL (μmol/L)	< 1.2 (< 20)	1.2–1.9 (20–32)	2.0–5.9 (33–100)	6.0–11.9 (101–203)	> 12 (> 203)
Hypotension†	None	MABP < 70	Dop ≤ 5	Dop > 5 Epi ≤ 0.1 Norepi ≤ 0.1	Dop > 15 Epi > 0.1 Norepi > 0.1
Glasgow Coma score	15	13–14	10–12	6–9	< 6
Creatinine level, mg/dL (μmol/L)	< 1.2 (< 106)	1.2–1.9 (106–168)	2.0–3.4 (169–300)	3.5–4.9 (301–433)	> 5 (> 434)

Note: PaO_2 = partial pressure of arterial oxygen; FIO_2 = fraction of inspired oxygen; MABP = mean arterial blood pressure, in mm Hg;
*Adapted, with permission, from Ferreira FL, Bota DP, Bross A, et al. Serial evaluation of the SOFA score to predict outcome in critically ill patients. *JAMA* 2001;286: 1754-8.
†Dop (dopamine), epi (epinephrine) and norepi (norepinephrine) doses in μg/kg per min.

Table reproduced from Christian, Michael et al. Development of a triage protocol for critical care during an influenza pandemic, CMAJ November 21, 2006, 175(11).

4) SOFA Score and Prioritization Tool

The final component of the triage protocol is a color-based tool for the prioritization of patients for admission to the ICU and access to ventilatory support.

Initial assessment

Triage code	Criteria	Action or priority
Blue	Exclusion criteria met or SOFA score > 11*	• Manage medically • Provide palliative care as needed • Discharge from critical care
Red	SOFA score ≤7 or single-organ failure	Highest priority
Yellow	SOFA score 8–11	Intermediate priority
Green	No significant organ failure	• Defer or discharge • Reassess as needed

48-hour assessment

Triage code	Criteria	Action or priority
Blue	Exclusion criteria met or SOFA score > 11 or SOFA score stable at 8-11 with no change	• Provide palliative care • Discharge from critical care
Red	SOFA score < 11 and decreasing	Highest priority
Yellow	SOFA score stable at < 8 with no change	Intermediate priority
Green	No longer dependant on ventilator	• Discharge from critical care

120-hour assessment

Triage code	Criteria	Action or priority
Blue	Exclusion criteria met or SOFA score > 11 or SOFA score < 8 with no change†	• Provide palliative care • Discharge from critical care
Red	SOFA < 11 and decreasing progressively	Highest priority
Yellow	SOFA < 8 with minimal decrease (< 3-point decrease in past 72 h)	Intermediate priority
Green	No longer dependant on ventilator	• Discharge from critical care

Note: SOFA = Sequential Organ-Failure Assessment (see Appendix 1, available at www.cmaj.ca/cgi/content/full/175/11/1377/DC1).
*If an exclusion criterion is met or the SOFA score is > 11 anytime from the initial assessment to 48 hours afterward, change the triage code to Blue and proceed as indicated.
†If an exclusion criterion is met or the SOFA score is > 11 anytime from 48 to 120 hours afterward, change the triage code to Blue and proceed as indicated.

Table reproduced from Christian, Michael et al. Development of a triage protocol for critical care during an influenza pandemic, CMAJ November 21, 2006, 175(11).

Applying the Protocol *Note- Triage protocol applies to all patients (not only those with ILI)*
In order to apply the protocol, follow the steps below:

1) Asses whether the patient meets inclusion criteria
    a. If yes, proceed to step 2
    b. If no, reassess patient later to determine whether clinical status has deteriorated
2) Assess whether the patient meets the exclusion criteria

a. If no, proceed to step 3
b. If yes, assign a blue triage code; do not transfer the patient to critical care; continue current level of care or provide palliative care as needed

3) Proceed to prioritization tool, initial assessment. (Continue to evaluate at 48 and 120 hours)

In addition to the outlined protocol by Christian and colleagues, the New York State Workgroup on Ventilator Allocation adopted many of these protocols and made some modifications worthy of consideration. These include:

1. Removal of age and specific disease entities from the list of exclusion criteria;
2. Supervising physicians have sole authority to finalize allocation decisions for each patient, not primary care providers;
3. Chronically ventilated patients would be protected from this allocation strategy unless they were presenting with acute illness; and,
4. Inclusion of a rapid appeals process for clinicians and patients who disagree with the allocation determination.

2. Focused history and physical form

Patient admission procedures for physicians are often comprehensive and labor intensive. In a pandemic influenza surge setting, filling out all of the information on the traditional history and physical form (H&P) would take excess time and might not be necessary to manage each patient. Pandemic influenza has traditionally been an illness manifested and complicated primarily by respiratory signs and symptoms. Use of a focused H&P form for influenza patients that focused on the respiratory system and related pertinent information could reduce physician work allowing them to see more patients in less time. A one-page double-sided focused H&P form is attached in Appendix 4. The front side of the sample H&P is for recording the pertinent history and physical exam findings plus a table to compute the SOFA score. The backside is a reproduction of the critical care triage criteria from the article by Christian and colleagues for easy reference. The form includes a line for documentation of the decision to admit or decline admission to critical care and to provide the rationale to support the decision. *Minimum requirements on an H&P form for reimbursement are pending Centers for Medicare and Medicaid Services (CMS) authorization.*

Once approved, healthcare facilities should begin the use of a pandemic focused H&P form for influenza patients just before the disease burden becomes overwhelming so that staff become accustomed to its use and alterations can be made prior to widespread transmission. Institutions should begin use of this form in phase 5A.

Tentative Recommendation: Pending CMS authorization for reimbursement, begin use of a focused history and physical form for highly suspect influenza patients at phase 5A.

E. Inpatient Care Guidelines

The work groups felt that in the event of a pandemic, it may be necessary to modify patient care standards in order to effectively provide care for the increased numbers of influenza patients. Suggestions listed in this section are under development, and recommendations are labeled as tentative where appropriate. *Reimbursement requirements and other mandatory patient care protocols are pending further consideration with appropriate agencies for final clarification and recommendation development.* However, the following lists some of the suggested approaches discussed by panelists for management of patients who present for healthcare services.

1. Documentation

Documentation of medical care

Inpatient documentation is recorded for a number of reasons including patient care assessment and plans, continuity of care, federal, regional, local legislative and third party payer requirements. In

normal settings, progress notes are written daily by primary caregivers and "as needed" by others (consultants, pharmacy, physical therapy, case managers, etc.). Decreasing the frequency of note writing during an influenza pandemic would allow more time for clinicians to deliver care to patients. The frequency would be established by need but could be reduced to once every other day. It is acknowledged that such a reduction would have legal and billing implications that would have to be addressed. Progress notes written as needed should continue to focus on the most relevant clinical information (patient stability, vital signs, respiratory status, mental status, updated lab data, overall assessment and plan).

Some work group members expressed concern about the separation of patient care from documentation if documentation was reduced to every other day while medical assessment remained a daily activity. Members suggested that in situations of altered standards, doctors should continue writing medical assessment notes daily, but notation could be significantly decreased by length and content.

> ***Tentative Recommendation: Decrease daily progress note writing to once every other day for inpatients who are stable and whose medical plan of care is relatively unchanged. Begin this measure during pandemic phase 5A. Alternatively reduce content of daily progress notes.***
> *Recommendations are pending definitions of minimal medical assessment documentation, and pandemic reimbursement requirements from CMS.*

Early Discharge of Inpatients

Surge capacity can be increased if consideration is given to early discharge of stable inpatients. Early discharge should be considered after all staffed and un-staffed licensed beds have been utilized and when patient safety can be adequately assured. Patients requiring minimal observation may be discharged from the hospital to an alternate site of care if that specific surge facility has been set up and appropriate staff and resources exist to assure patient safety (see section II.9.B, Bed Capacity page 73).

Documentation of nursing care

All normal nursing care policies remain in effect for all patients during pandemic phases 3 through 5B as able by patient burden and staff availability. Nursing documentation can be greatly reduced when standards are altered for widespread influenza. Admission paperwork can be limited to include the most important information for the management of pandemic influenza patients. Progress notes can be reduced or even eliminated, unless there is important information that directly affects the acute care of the patient.

> ***Tentative Recommendation: At phase 6, all hospitals should reduce nursing admission paperwork and nursing progress notes for pandemic influenza patients to contain only information critical to the acute care of each influenza patient.***
> *Recommendation is pending definitions of minimal nursing documentation, and pandemic reimbursement requirements from CMS.*

Nurses may omit documentation of administration of patient medications if a system of document by exception is implemented. A medication exception log can be used where nurses will document which patients did not receive their prescribed medications. It can then be assumed that all other patients received their appropriate medications if there was no entry into the medication exception log. Staff training and supervision is essential to assure the accuracy of this system.

> ***Tentative Recommendation: At phase 6, hospitals could reduce nursing documentation of patient medications by implementing a medication exception log policy.***

2. Nursing Care Guidelines

Alterations to the standard nurse to patient ratios, reduction in routine patient hygiene activities, and reduction of required documentation are examples of alterations to nursing care that can be made during a pandemic, though these measures should not compromise patient safety. Visitation protocols outlined in this document encourage assistance with routine nursing care from visitors allowed into the hospital after pandemic influenza begins local circulation. During the later phases of a pandemic, staff nurses should dedicate more of their duties to invasive, advanced clinical nursing care, vital sign monitoring, and rely on visitors and other volunteers to assist with feeding, bathing, oral medication administration and other basic nursing care duties.

Nurse to Patient Ratio

As a pandemic progresses, standard nurse to patient ratios may be suspended and redefined to accommodate staffing shortages. New ratios should be determined to scale the resources to meet the demands of the pandemic. As a supplement to nursing staff this guidance suggests that visitors should be encouraged to provide routine nursing care to patients whom they are visiting. A proposed nurse to patient ratio during a severe pandemic is outlined in section II.9.A.3, page 71). This section increases the nursing ratio by a factor of 2 which is arbitrary and untested, but may be achievable and sets an upper limit for the expected patient care duties of nurses that continue to report for work.

Frequency of nursing activities

The frequency of select nursing activities for patients may be reduced. Routine patient bathing and gown changing may be suspended or decreased unless patients are grossly dirty or contaminated with infectious material. Visitors may assist with these duties but must be provided with appropriate PPE and directions for disposal of soiled items. Vital sign monitoring and documentation should not be compromised under any circumstances.

Recommendation: At phase 6, reduce frequency of patient bathing and other select routine nursing activities, maintain monitoring and documentation of vital signs of all patients, and request visitor assistance with routine care.

3. Patient Meals

Preparation and frequency of patient meals may need to be modified to accommodate decreases in kitchen, nursing aide, and environmental staff as well as depletion of the supply of food. Suggestions include:

- Serving patients two full meals per day with access to between meal cold snacks (fruit bowl, high calorie shakes, etc.)
- Converting menu items from warm foods to cold foods to decrease preparation time
- Using disposable dining ware (plates, cups, forks, spoons, etc.)

Recommendation: As appropriate during pandemic phase 5B, decrease patient meals to 2 meals per day with an optional snack. Serve cold prepared meals, and utilize disposable dining ware, waste storage space and supplies permitting.

4. Routine Medications, Medical Supplies

To conserve hospital pharmacy supplies, persons who present to the hospital for care during an influenza pandemic should bring with them to the hospital any routinely used medications and necessary medical supplies (e.g. wheel chairs, oxygen tanks etc.). This practice will be especially important during phases 5B and 6 when hospital supplies are scarce. Because this is an altered standard of care, public information messaging will be necessary to describe the protocol and rationale.

Recommendation: Patients who present to the hospital for care during phases 5B and 6 should bring with them any routine medications and medical supplies (e.g., oxygen tank, wheelchair).

5. FACILITY ACCESS PLANNING

A. Access Restriction

Entrance and egress from the healthcare institution should be limited once pandemic influenza is in the region. One visitor/employee designated entrance should be created during pandemic phase 4B. This entrance should be a main entrance, near parking lots and garages, and have enough space to facilitate a brief verbal screening process and allow for a security presence. The emergency department will need to be maintained as an entrance for employees, patients, and visitors and should also allow for a screening/triage process in addition to stationing of security personnel. All other entrances should be locked and their usage discouraged. Access for delivery services should still be maintained at the appropriate entrances with restrictions for entrance of non-delivery service personnel. These access points may require additional security to maintain order. Facility access restrictions may be relaxed during pandemic phase 7.

> ***Recommendation:** At phase 4B, healthcare institutions should limit facility access for employee and visitors to one main entrance and assign security to maintain order.*

B. Service Reduction

1. Elective surgery

When disease burden and hospital stress is extreme, elective surgeries may be rescheduled to make available additional operating rooms (OR) and personnel and to conserve essential resources to support trauma and other surgical emergencies.

Examples of elective surgical cases for suspension include but are not limited to:

1. Hernioraphy
2. Cholecystectomy
3. Cosmetic surgery
4. Bariatric surgery
5. Selected reconstructive procedures

> ***Recommendation**: Suspend elective surgeries at phase 5A and utilize OR space, employees, and resources for pandemic influenza support as appropriate.*

2. Out-patient procedures/visits

If disease transmission due to influenza approaches or exceeds 30% of the population, primary care personnel and other outpatient resources will be needed to evaluate and manage suspect influenza patients, and routine outpatient follow-up care activities will have to be greatly reduced or even suspended. Outpatient care activities that may be postponed or conducted by telephone include:

- Refilling of prescriptions
- Post-surgery follow up
- Medication adjustment
- Visits for chronic diseases such as hypertension or diabetes
- Well child visits
- Low-risk prenatal care

Decisions regarding the need and timing for an outpatient visit should be made on a case-by-case basis. To alleviate some of the burden on primary care settings, a mechanism could be established whereby, office personnel rather than the clinician, call prescriptions into the patient's pharmacies. Additionally, a "stand-by" schedule could allow for a patient to be called into the office if the medical

personnel find themselves with time to perform more routine duties. These strategies require additional consideration as a pandemic evolves.

Recommendation: Outpatient appointments for routine physicals and chronic disease management may be suspended during pandemic phase 4C through phase 7. Clinics should prepare to receive pandemic influenza patients for evaluation.

C. Visitor Limitation

The work groups acknowledged that visitors of patients within healthcare facilities present unique infection control and pandemic mitigation challenges. Their presence in the hospital likely increases their individual risk of contracting influenza as well as the possibility that they may expose others to influenza from the community if they are incubating the virus. However, attentive family members (spouses, adult children, parents) are often sources of critical medical information, and willingly provide assistance with many patient activities of daily living and routine nursing care (bathing, feeding, dressing, toileting). Therefore, the best plan for patient visitation during an influenza pandemic should emphasize infection control measures to minimize transmission but also to utilize this potential workforce during extreme situations when healthcare staffing is severely reduced. Because restriction of visitation is often unpopular to the public and considered unacceptable to most parents, limitations should be well thought out, reasonable, and explained to the public in advance of their implementation. The proposed recommendations for visitation are made under the assumption that the impact of the pandemic will be moderate to severe.

Recommendation: Restrictions and rules for patient visitation must be communicated to the public in advance of implementation to promote maximum compliance.

Rules regarding patient visitation will differ depending upon the pandemic phase, whether the patient to be visited is suspected to have pandemic influenza, and whether the patient is in the emergency department or admitted to a ward. Key components of the pandemic visitation protocol include:

- Staff education on visitation restriction policies
- Limiting facility access
- Verbal screening for symptoms
- Education on infection control methods and use of PPE
- Maintaining a visitor log
- Encouraging assistance with basic nursing care
- Limiting to one visitor per patient

Staff and public education for modified visitation protocols to the hospital should commence once a strain acquires limited human-to-human spread (phase 4A). Specific limitations on visitation will be recommended to occur in the late pandemic alert period (phases 4B-5A) and then will be relaxed and modified in later phases when exposure is widespread and resources are depleted (phases 5B-6). Restrictions will likely be re-implemented once the pandemic wave subsides and hospitals are recovering and preparing for a potential next wave of illness (phase 7). Recommendations proposed are based on visitation protocols employed by hospitals during the SARS outbreaks in Ontario and Singapore where authors concluded that visitation restriction was a successful component in their overall efforts to contain infection.[14]

Pandemic Phase 3
Normal hospital visitation policies remain in effect for all patients.

Pandemic Phase 4A
Normal visitation policies should still be maintained, however all visitors and patients should receive information regarding the specific visitor restriction strategies that will be implemented once the

pandemic evolves into phase 4B and beyond (e.g., limiting one visitor per patient, screening, infection control education, facility access, etc.). Visitors should also receive instruction on hand washing and respiratory hygiene.

Recommendation: Visitor and patient education on hospital pandemic visitation restriction policies should begin in phase 4A, though there are no recommended limitations during this phase.

Pandemic Phase 4B

During phase 4B when there is limited human-to-human spread in the Northeast United States:

- Begin screening all visitors for signs and symptoms consistent with the emerging pandemic.
- Direct all visitors to enter the healthcare facility from a single entrance (or limited number of entrances as permitted) where an IRT staff person can conduct a brief interview and security can maintain a presence (i.e., main entrance, near parking garage). Prior to implementation, PDPH and CDC will advise screening tool content.
- At this designated entrance, visitors should be asked:
    - Key questions about symptoms and recent travel history (within past 10 days) to locations within the United States and abroad that are currently experiencing localized human to human spread.
    - If they have had exposure to anyone with influenza like symptoms in the past 10 days.
- Visitors should be admitted after they complete the visitor screening process and are determined not to be ill or exposed.
- Screening staff should provide information fact sheets that describe further instructions that visitors will receive on the ward regarding PPE and infection control.
- A log of visitors permitted to enter the facility that documents their name, patient whom they are visiting, ward visited, and the date and time that they entered and left the facility, should be kept at the designated visitor entrance. This log should be available to internal infection control staff and the local public health authority if required for contact tracing.
- If visitors have illness or an exposure suggestive of influenza (and do not require acute care), they should be given a surgical mask and denied access until they are well, or greater than 10 days have elapsed since their potential exposure and they have not developed symptoms consistent with pandemic influenza.

Visitors who meet the definitions for exclusion laid out in this document may be unwilling to leave the premises and some may have special concerns that have not been addressed. For the screening process to work efficiently, there should be on-going communications with screening staff, security, ward staff, and a supervisor who can make judgments about when to relax visitation protocols and recommend appropriate infection control (see below section on special circumstances).

Recommendation: Restrict visitor access to one entrance and conduct a brief interview for illness and exposure to influenza during pandemic phase 4B. Exclude those who are symptomatic and those with an exposure. Keep a visitor log to help with contact tracing.

Emergency Department

Limiting the number of visitors in the emergency department (ED) during phase 4B will help keep an orderly environment during a time when ED volume will likely increase due to public concern about an evolving pandemic. Therefore, ED patients should be permitted to have one visitor with them while they remain in the ED. Both patient and visitor will be required to undergo screening (symptoms, travel history, contacts, relation to patient, etc.) and education on respiratory hygiene and hand hygiene. If the patient (or visitor) is suspected to have pandemic influenza, both will be expected to wear a surgical mask to decrease potential spread to others. They may also be moved to an area of the emergency department (or location nearby) reserved for the initial evaluation of influenza patients.

Recommendations for restrictions on visitation in the ED should always allow for a minimum of one visitor per patient throughout the entire pandemic. Up to two visitors per patient at a time may be permitted for patients who are critical or have expired, or are expected to expire provided that all visitors undergo the screening questions and comply with infection control guidelines. A security presence is strongly recommended to maintain order.

Recommendation: Emergency department patients should be limited to one visitor per patient during pandemic phase 4B and both should be interviewed for pandemic influenza illness and exposure.

Pandemic Phase 4C

During phase 4C, when the novel strain of pandemic influenza has been identified in the metropolitan Philadelphia area, ED volume will likely be high though many presentations would not be due to pandemic influenza (some will present with other respiratory pathogens, asthma, anxiety, requests for vaccine and antiviral medications). Restrictions for visitation in the ED as outlined for phase 4B should be maintained. Visitors of patients admitted to an inpatient ward will be limited to one per patient and required to undergo pandemic influenza screening as implemented in phase 4B, with an additional question to determine if the patient to be visited has confirmed or suspect pandemic influenza. If visitors pass the screening, they should receive education and training on the techniques of hand hygiene, respiratory etiquette, and the proper methods for donning and doffing appropriate personal protective equipment (PPE) when they arrive on the ward. Ward staff should maintain an awareness of visitation and enforce the one visitor rule. Additional precautions for visitors will be recommended if they are visiting a pandemic influenza patient (see below). In addition, visitors will be asked to assist staff with basic patient care as appropriate (hygiene, feeding, administration of oral and topical medications). Visitors of non-influenza patients do not require PPE related to influenza.

Recommendation: Limit one visitor per hospitalized patient during phase 4C, maintain a visitor log, and encourage visitor assistance with routine nursing care.

Visitors of influenza patients

If the screening process identifies an asymptomatic, unexposed visitor of an influenza patient, he/she may be allowed entry but must adhere to strict infection control policies outlined for employees with direct patient care responsibilities. Upon arrival to the ward, the visitor should receive extensive education on the risks of transmission, policies for hand hygiene and respiratory etiquette, and be given appropriate PPE (e.g., gown, gloves, an N95 respirator) with education for proper donning and doffing. Masks should be fit-tested using OSHA recommended standard procedures for employees as able.[15] If staff is unavailable to provide fit-testing, N95 masks should be approximated to best fit visitor's facial contour. Visitors with beards should be advised to shave and then return for visitation. Children should not visit hospitals as there are no N-95 respirators that fit them appropriately. Mobility should be limited to the ward where the patient is residing; they should be encouraged to bring in food to eliminate trips to the cafeteria. Finally, because PPE will be in limited supply, visitors should be educated to care for their PPE and to plan on using the items for the duration of the visit.

Recommendation: Visitors of influenza patients should be given PPE including a gown, gloves, and an N95 respirator approximated for best fit, and education on PPE application and maintenance, hand hygiene and respiratory etiquette.

Pandemic Phase 5A

Once a pandemic strain has developed localized human-to-human spread and is in the healthcare facility, restrictions on visitation should be at a maximum to limit transmission. Therefore it is recommended that visitation should be prohibited for all patients 16 years of age and older who are not critically ill. Though harsh, this measure will likely be a valuable strategy to decrease transmission and to begin to conserve quantities of PPE for essential hospital employees. The work groups felt that pediatric patients (less than 16 years of age) should always be permitted one visitor who must be

a parent or legal guardian. Other patients with chronic mentally debilitating conditions up to age 21 years should also be permitted one parental visitor. Patients requiring critical care or who are expected to expire may have visitation restrictions relaxed. This should be addressed on a case-by-case basis (see special circumstances below). Obstetric patients should also be permitted one visitor.

Recommendation: Prohibit visitation for patients 16 years of age and older who are not critically ill during phase 5A. Limit all other patients to one visitor unless critically ill. Adhere to strict infection control practices, maintain a visitor log, and encourage assistance with routine nursing care.

Pandemic Phase 5B

It is during phases 5B and 6 that overall admissions due to influenza will increase dramatically and the strain on the healthcare workforce may become critical. A greater percentage of people will come to the hospital to visit pandemic influenza patients, increasing the demand for PPE. In order to offset this increased need, visitors will be *expected* to assist with routine nursing care duties. Education they receive as they arrive on the ward will continue to focus on infection control and PPE, but should also contain a list of duties pertaining to the care of the patient being visited so that they are better prepared to assist with care.

Recommendation: Maintain limited visitation during pandemic phase 5B as outlined in phase 5A. Expect visitors to assist with routine nursing care and provide instructions on duties.

Pandemic Phase 6

As a pandemic becomes widespread in the community and healthcare facilities are experiencing the full burden of patients, reduced staff, and depletion of PPE, administrators should assess situational capabilities and review efficacy of visitation protocols implemented thus far. If staffing is manageable, and supplies of PPE are sustained, then policies regarding visitation outlined in pandemic phase 5B should be continued. However, if staffing has become critical, recommendations on visitation for phase 6 may be relaxed to allow one visitor for all patients so that more visitors will be available to support nursing care duties. The visitor log will lose utility for contact tracing during pandemic phase 6, as illness will be widespread in the community. Institutions will still be advised to continue with a visitor screening process, but keeping a log may be omitted.

Recommendation: If the institutional situation is critical, visitation can be relaxed to allow one visitor for all patients during pandemic phase 6. Visitors will be expected to assist with routine nursing care. Institutions may stop recording a visitor log.

It is likely that the visitor screening process at the entrance will identify more people with an exposure to influenza prohibiting their entry. Therefore, if staffing shortages are critical, it may be acceptable to allow asymptomatic visitors with an influenza exposure into the facility. If they are visiting a non-influenza patient, they will be expected to wear a surgical mask at all times and to assist with routine nursing care duties. If they are visiting an influenza patient, they should wear PPE (gown, gloves, N95 respirator) as outlined above to protect themselves from further exposure.

Recommendation: Asymptomatic exposed visitors may be permitted to enter the facility if staffing shortages are critical during pandemic phase 6. They will be expected to assist with routine nursing care and adhere to strict infection control guidelines.

Recommendation: Symptomatic visitors should be excluded from the facility unless they require medical care.

Recovered Visitors

It may be that during phase 6, visitors who claim to have recovered from pandemic influenza will arrive at the hospital. If true, and the same strain is circulating, these people could visit and support nursing care of influenza patients without the need for extensive PPE. This approach could be very useful for the healthcare sector to maintain standards of patient care and levels of critical PPE during the most stressed time. Recovered visitors should produce a medical record or physician's note documenting the diagnosis (laboratory confirmation should be the standard). Attention to the circulating pandemic strain will be important to assure that people who have recovered remain at no risk for re-infection if hospitals choose to relax PPE recommendations. These visitors will be expected to assist with routine nursing care of the patient that they are visiting.

Persons who claim to have recovered from pandemic influenza but fail to provide documentation may be granted access for visitation if restrictions have been relaxed and the situation is critical. They should undergo an interview process that explains the risks associated with infection if they are in error (due to other similar respiratory illnesses and no laboratory confirmatory test result). Recommendations for access and PPE should depend upon the interview assessment, the person's understanding, and the available resources.

Pandemic Phase 7

During the initial recovery period where the potential for a subsequent pandemic wave is unknown, policies should return to visitation protocols outlined in phase 4B. The front door screening process should continue and keeping a log of all visitors should be re-established.

Special Circumstances

It is recognized by this expert committee that infection containment strategies such as limiting public access to hospitals do not need to be absolute in order to be effective in mitigating disease transmission, and that policies deemed unacceptable by the public may create additional problems that can undermine the healthcare response. For these reasons, at least one parent or legal guardian of a child less than 16 years of age admitted to the hospital should be allowed visitation during all pandemic phases. Parents or caretakers that report an exposure to influenza, may be permitted access for visitation, but they should be required to wear a surgical mask at all times while in the hospital, or PPE described for visitors if their child has been admitted for pandemic influenza. Symptomatic parents who are not ill enough to require admission may still be permitted visitation if determined to directly affect the care and well being of the patient. These people should be assessed on a case-by-case basis and must adhere to strict PPE and infection control if granted visitation. Obstetric patients should also be allowed one visitor during all pandemic phases. Some patients may have unusual circumstances that would warrant alterations from these broad recommendations. Restrictions on visitation may be relaxed for patients who are critically ill and facing end of life. This should also be reviewed on a case-by-case basis, but allowance of up to two visitors at a time may be acceptable if infection control guidelines are strictly followed.

D. Security

Security will be necessary for the protection of healthcare facility employees and patients. Hospitals should plan to increase security forces in order to secure PPE, pharmaceuticals, and other supplies, to protect healthcare employees, to control unruly crowds, and to secure the facility from entry by unauthorized persons. Security personnel positioned in front of the pre-ED triage area should be part of the Influenza Response Teams and should therefore don higher level PPE and be provided with daily prophylactic antiviral medication. Education and training of security personnel will be essential to enforce the recommendations proposed in this document.

E. Transfers and Divergence

As a pandemic escalates, communications with OEM, emergency medical services (EMS), DVHC, and local public health will occur to assess hospital capacity and to redirect patients accordingly. This response will likely occur regionally through existing Emergency Healthcare Support Zone cooperative agreements. Transfers may be effective during early stages of local pandemic transmission if there is an uneven patient distribution or a prolonged pre-widespread period of disease in Philadelphia. During later pandemic phases it will become increasingly difficult to manage transfers and divergence and this will likely not be a working option without additional staffing and facility support from external sources.

6. INFECTION CONTROL GUIDELINES

Transmission Assumption

The pandemic infection control guidelines described in this section are based on a comprehensive strategy that utilizes numerous simultaneous control measures. Many recommendations are presented as a minimum standard that healthcare institutions should implement when able. Additional or higher level infection control protocols may be appropriate during the earlier phases of a pandemic when factors of transmission and virulence are not fully described. For the purposes of this document, the modes of transmission of a potential strain of pandemic influenza will be primarily derived from known transmission methods for seasonal influenza viruses as described in the U.S. DHHS interim guidance for the use of masks and respirators during an influenza pandemic. These modes include close contact with large respiratory droplets, direct transfer of virus from contaminated sources to mucous membranes, and immediate vicinity contact with small particle infectious aerosols.[16] Recommendations will also incorporate recent guidance from OSHA regarding level of risk of exposure and PPE.[10]

A. PPE Recommendations

1. PPE for Staff

Agreement was reached that recommendations for measures to protect staff should emphasize prevention, and that strategies that are known to work should be promoted over less certain interventions (PPE versus antiviral prophylaxis). Guidance from OSHA, DHHS, and WHO regarding PPE for staff against influenza has been incorporated into this process (see Table 2, page 45). Personal protective equipment recommendations have been developed based on level of risk (i.e. location of staff assignment respective to influenza patient care areas and specific duties). Recommendations are presented as minimum standard which healthcare institutions should attempt to achieve. Given the lack of data and complete understanding of methods of transmission of pandemic influenza viruses, discussion among work group participants occurred pertaining to more stringent respiratory protection for employees. These recommendations represent additional activities that hospitals may want to incorporate into their hospital-specific plans based upon population served, institutional financial resources, etc.

OSHA recommends the use of powered air purifying respirators (PAPR) for aerosol generating procedures. Most agency recommendations add a caveat that higher-level protection may be used over an N-95 respirator for other direct patient care activities. Given this, hospitals may choose alternative purchasing strategies that invest in reusable equipment such as N-100 particulate respirators and PAPRs for direct patient care that does not involve respiratory aerosolizing procedures. The increased cost of the N-100 could potentially be offset by its increased durability compared to the N-95, allowing for a longer period of reuse. The PAPR has the advantage of a detachable hood and positive pressure in the hood preventing any leakage or breach, as can occur with N-95 or N-100 particulate respirators. The detachable hood can be disinfected and reused. There are versions designed that leave clinician's ears outside of the hood to facilitate patient auscultation. Healthcare planners should make pre-pandemic purchasing decisions that best balance protection, functionality, and cost. Another consideration is that PPE has an advantage over specific influenza control measures (antiviral prophylaxis) in that it can be used for a variety of biohazardous situations beyond influenza, and therefore may be more cost effective.

OSHA defines four levels of risk based on job duty and proximity to pandemic patients. PPE recommendations for very high and high exposure risk should be followed once IRT activation has occurred (phase 4B) and influenza zones have been established. PPE recommendations for employees with medium and lower exposure risk (contact with the general population) will be activated once pandemic influenza is suspected to be circulating within the local community (phase 4C). Table 2 summarizes PPE recommendations for employees made by OSHA, DHHS, and WHO as well as consensus recommendations developed by the working groups.

Table 2. PPE recommendations for staff based on level of risk of exposure and staff assignment.

Level of Risk*	Staff Assignment Area	PPE Recommendations			
		OSHA Feb 2007	DHHS Oct 2006**	WHO April 2006***	*Consensus Recommendations*
Very High Risk *Influenza Response Team*	Influenza zone/ward inside patient room within three feet of patient's head (aerosol generating procedures, routine clinical assessment, vital signs, phlebotomy, bathing, feeding, etc.) Laboratory processing influenza specimens	N95 particulate respirator or higher for most situations PAPR**** for aerosol generating procedures face shield, eye protection, gowns, gloves,	N-95 particulate respirator or higher (N-100), consider use of PAPR	minimum N-95 particulate respirator, eye protection, gloves, gown	Minimum: PAPR for aerosolizing procedures for all other activities: N-95 particulate respirator and face shield, gowns, gloves More Stringent: HEPA PAPR (with or without detachable hood) for all activities within three feet of patient's head
High Risk	Influenza zone/ward inside patient room greater than three feet from patient's head (meal tray delivery and removal, trash removal, housekeeping, verbal consults)	N95 particulate respirator or higher for most situations face shield, eye protection, gowns, gloves,	N-95 particulate respirator for direct patient contact if not available use surgical masks	preferable particulate respirator eye protection, gloves, gown	Minimum: N-95 particulate respirator gown, gloves, face shield More Stringent: N-100 particulate respirator
	Influenza zone/ward outside of patient room (hallways, bathrooms, break room, supply room, etc.)	No specific guidance	No specific guidance	No specific guidance	Minimum: N-95 particulate respirator gloves More Stringent: No additional recommendations
Medium Risk	High frequency contact with general population (non-pandemic influenza area: outside influenza treatment areas, cafeteria, lobby, pharmacy, medical records, etc.)	Barrier protection, surgical mask, reusable face shield may be acceptable respirator may be considered if close contact with symptomatic persons expected	Transparent barriers preferable to use of respirators	No specific guidance	Minimum: Barrier protection, surgical mask, reusable face shield may be acceptable More Stringent: Respirator may be considered if close contact with symptomatic persons expected
Lower Risk	Work setting without public contact (administrative and department offices)	No PPE guidance, Avoid close contact, hand hygiene, respiratory etiquette	No applicable guidance	No applicable guidance	Minimum: Surgical mask optional if supplies permit More Stringent: No additional recommendations

*Level of risk scheme derived from OSHA Guidance on Preparing Workplaces for an Influenza Pandemic
**Recommendation for surgical masks and respirators only.
***Recommendations specifically for Influenza A H5N1 in humans.
**** PAPR - Powered air purifying respirator

Recommendation: PPE recommendations for very high and high exposure risk should be followed once IRT activation has occurred (phase 4B) and influenza zones have been established.

Recommendation: PPE recommendations for employees with medium and lower exposure risk should be activated once pandemic influenza is suspected to be circulating within the local community (phase 4C).

2. PPE for Patients and Visitors

At the start of pandemic phase 4, it is recommended that all patients presenting for acute care with symptoms suggestive of a febrile respiratory infection (cough, shortness of breath, chills) wear a surgical mask as tolerated to decrease potential transmission prior to being evaluated. A supply of surgical masks designated for this purpose must be accessible in the emergency department, hospital entrance screening station, and ambulatory clinics. Personnel should be assigned to monitor the waiting/triage area to identify such patients, to distribute masks, and to provide instruction on proper use.

Recommendation: Patients presenting with a febrile respiratory illness should be identified and provided a surgical mask with instructions for use beginning in pandemic phase 4A.

Patients admitted with suspect pandemic influenza or other acute infectious respiratory illness are expected to wear a surgical type mask when in the presence of others as a measure to decrease transmission such as when an employee is present in the patient's room. These patients are also expected to wear a surgical mask when being transported outside of their room, when in waiting areas, and when undergoing procedures in other areas of the healthcare institution (radiology, bronchoscopy suite, operating room, etc). Masks should be re-used by individual patients for as long as possible unless the mask becomes wet, soiled, or damaged.

Recommendation: Patients with confirmed or suspect pandemic influenza should wear a surgical mask when others are present in their room, and while being transported through the healthcare facility.

Fit-testing of Respirators for Visitors

Type of PPE for visitors will correspond to the recommendations for PPE for staff outlined above and will be determined by area of the hospital visited and type of patient contact as supplies permit. Much of the visitation restriction plan outlined in this document encourages that visitors provide assistance with patient care (feeding, bathing) and therefore most visitors will be at very high risk exposure. Even though respirators work best when the wearer has been properly fit tested, standard fit testing of particulate respirators for all visitors performing high-risk and very high-risk activities in the hospital setting will be difficult during phase 6. OSHA outlines specific guidelines for performing fit testing for employees including provision of a medical questionnaire designed to identify those with cardio-pulmonary illnesses and other chronic conditions and exposures that may complicate proper use of particulate respirators.[17] Visitors who wish to be in the hospital and who will be in close proximity to pandemic patients, should be respirator fit-tested as outlined for employees by OSHA. However, if the situation is dire and fit-testing procedures are not feasible, hospitals may ask visitors to sign a waiver where visitors acknowledge lack of proper fit-testing, risk of exposure and illness, and agree to enter the healthcare facility. Visitors who refuse to sign such a waiver should be excluded. At a minimum, proper donning and doffing education should be performed prior to admittance into Influenza Zones. Children should not visit hospitals as there are no N-95 respirators that fit them appropriately.

Recommendation: Visitors will be encouraged to assist with routine nursing care and should be offered PPE based on level of risk outlined for staff.

3. PPE Reuse Policies

Most personal protective equipment is designed for one time use. Staff should be encouraged and trained to perform multiple functions when entering an influenza patient room to decrease PPE need. OSHA advocates the reuse of particulate respirators during dire situations if supplies are insufficient and the item continues to function properly (not obviously soiled or damaged). When a reuse strategy is implemented, care must be used when applying and removing PPE and during storage to preserve maximum function and reduce contamination. Once respirators are in limited supply, employees may consider applying a surgical mask to the outside to prevent external contamination thereby extending respirator use.

Recommendation: Particulate respirators may be reused during pandemic phase 6 or sooner if supplies are limited provided that they remain functional and undamaged.

Recommendation: Surgical masks may be placed over particulate respirators to decrease contamination and preserve respirator utility.

B. Cohorting

Cohorting patients in the same room is recommended when patients have active infection with the same organism and no other transmissible infection. Influenza patients should be admitted to the same ward of the hospital, and designated staff with strong infection control skills should be assigned to work exclusively in these wards.

Recommendation: Cohort confirmed and highly suspect pandemic influenza patients in the same room and ward of the healthcare institution.

C. Isolation and Quarantine

Patients with suspected or confirmed infection with influenza should be isolated in a private room if possible, within a designated influenza zone. For patients who are expected to undergo multiple procedures likely to aerosolize respiratory secretions (e.g. intubation, frequent suctioning, tracheostomy, nebulization) during their admission, it is recommended that they be placed in a negative pressure environment as available. Patients who have sustained a significant exposure should be evaluated for post-exposure prophylaxis, asked to wear a surgical mask when in the presence of others and be confined to their rooms for a minimum of one pandemic influenza incubation period (5-7 days).

D. Other Infection Control Measures

Proper hand washing will be an essential component to an infection control strategy and should be described and practiced extensively throughout all pandemic periods. Provision of tissues, soap and towels, hand sanitizer, and waste receptacles will be necessary to support this effort and paramount to decrease infectious particles in the healthcare facility. Hand washing with soap and water for greater than 20 seconds is recommended if hands are visibly soiled with potentially infectious material.

Recommendation: Extensive and repeated hand washing is essential for control of influenza in the healthcare setting.

Medical Equipment

Equipment should be designated for strict use on influenza wards and for confirmed and suspect influenza patients. Pulse oximeters, blood pressure cuffs and machines, portable X-ray machines, Electrocardiogram (EKG) machines, defibrillators and other devices that have direct patient contact

should be regularly and thoroughly cleaned with appropriate viral disinfectant. Equipment should not be transported between influenza and non-influenza zones.

> ***Recommendation:*** ***At the onset of pandemic phase 5A, designate medical equipment for strict use for pandemic patients, avoid removal from influenza wards, and perform regular and aggressive antiviral cleaning of these items.***

Gastrointestinal Transmission

If an emerging influenza pandemic strain demonstrates transmission capabilities through gastrointestinal means, then it is recommended to implement standard and droplet precautions when caring for patients. Standard precautions include the use of gloves, gowns, masks, and eye protection. Disposable gloves and gowns should be worn for each patient encounter, removed and followed by immediate and thorough hand washing. Alcohol based sanitizers are acceptable; however, if hands are visibly soiled with potentially infectious materials, thorough hand washing with soap and water is preferred. During limited supply, gloves and gowns may not need to be removed when a staff person is caring for more than one patient infected with pandemic influenza in the same room or on the same ward if the gloves or gown are not visibly soiled or damaged. It is also advised that employees perform multiple patient care activities during each entry into a patient's room as a way to conserve gowns and gloves and other protective equipment.

E. Environmental Maintenance

Hand washing supplies, tissues, trash receptacles, and environmental cleaning products must be ample and available. Environmental cleaning of the common areas and patient treatment areas of the hospital should be regularly cleaned with a disinfectant solution. Emphasis should focus on frequently touched surfaces in high-traffic areas including elevator buttons, handrails, doorknobs, computer stations, and telephones.

Laundry Services

Laundry services may be interrupted. Patient bed linen changes should be done on an as needed basis or when the linens are visibly soiled or damaged. Patient towels should be reused as often as possible unless they are soiled with infectious material.

> ***Recommendation****: Patient bed linen changes and towel changes should be done on an as needed basis or when linens and towels are damaged, wet, or soiled with infectious material.*

7. OCCUPATIONAL HEALTH ISSUES

A. Policies for Ill Staff

1. Excluding ill staff

Work group members and public health authorities agreed that excluding ill employees from the work environment should be emphasized throughout all pandemic phases. Policies should differ for staff who become ill at work and for staff who become ill while off duty. At the onset of pandemic phase 4A, occupational health and human resource departments should begin employee education campaigns regarding symptomatology and protocols for reporting illness including:

- Notify healthcare workers that they should not come to work if they suspect ILI defined as a temperature greater than 100.4°F *and* cough *or* sore throat
- Establish and advertise a telephone line (staffed by an infection control or occupational health practitioner) for healthcare workers to call and report illness
- Educate on pandemic sick leave policies (see section II.7.A.3 Human Resource Policies, page 50)

If healthcare workers develop ILI while at home they should be instructed to:

- Stay at home or if necessary seek medical care. If medical care is sought, rapid diagnostic testing for influenza and H-subtype testing should be encouraged
- Call their supervisor and the dedicated infection control report line
- Remain in isolation until they meet the criteria to return to work
- Report to Occupational Health for evaluation after recovery

If healthcare workers develop ILI while at work they should be instructed to:

- Immediately inform their supervisor
- Apply a surgical mask to protect others
- Report to occupational health services for evaluation, including rapid diagnostic testing for influenza and influenza H-subtype testing
- Receive instructions on avoiding public transportation, wearing a surgical mask, and returning to work after resolution of symptoms. If public transportation is unavoidable, healthcare workers should perform hand hygiene before boarding, keep a surgical mask on and cough or sneeze into a tissue while in transit
- Following their departure, their workstation (and any computer terminals, phones, other surfaces likely to have been recently touched) should be cleaned and disinfected
- Report to Occupational Health for evaluation after recovery

Recommendation: Exclude ill employees from the work environment. Set up occupational health stations for evaluation and education on infection control and exclusion policies beginning in phase 4B. Perform rapid diagnostic testing for influenza and H-subtype diagnostic testing for staff with suspect influenza.

2. Returning to work

Healthcare workers who have recovered from pandemic influenza are at lowest risk for developing re-infection with the same influenza subtype. As such, it is especially important that hospitals provide or facilitate H-subtype diagnostic testing, monitor the progress of ill employees, and support their return to work. Maintaining lists of recovered healthcare workers can facilitate staffing decisions. Hospitals should follow best practice guidelines for return to work that are based upon seasonal influenza recommendations. Current recommendations suggest that a staff member who becomes ill (i.e. either meets the case definition for the circulating influenza strain or has a laboratory-confirmed case) should avoid the work environment until all of the following criteria are met:

- At least 5 days have passed since the symptoms of illness began; and
- Fever has resolved and has not been present for at least 24 hours; and
- Cough is improving (decreasing in frequency and amount of secretions with no associated chest discomfort or shortness of breath); and

- The worker has been medically evaluated and cleared to return to work by an occupational health practitioner or other appropriate person.

Upon returning to the work environment, recovered healthcare workers should continue to follow infection control protocols to decrease transmission to patients.

Recommendation: Staff returning to work should be evaluated by occupational health for recovery status and work assignment.

3. Human Resource policies

Human resource senior management panelists worked extensively to develop a comprehensive approach for hospitals to consider when developing pandemic mitigation strategies for employees. Issues addressed include: coordination of main entrance screening stations, clinical evaluation and H-subtyping diagnostic testing for staff with suspect influenza, use of sick time, role of medical documentation, policies for unscheduled absences, return to work policies, compensation, vaccination administration planning, child, elder, pet care, and psychological support.

Phase 1 Human Resource Actions

- Conduct research for creation/addition of pandemic planning to crisis management plan
- Create Pandemic Committee; consider succession planning for committee members in the event of illness during pandemic
- Consult with appropriate experts
  - Infection control experts
  - Other medical professionals
  - Crisis management consultants
  - Employee assistance professionals
  - Technology consultants
  - Public health authorities
  - Legal counsel
- Create system to monitor/track absenteeism and establish baselines.
- Consider process for monitoring symptoms. System may include:
  - Managers asking symptoms when employee calls out
  - Setting up central phone number or "hotline" for employees to call and leave message
- Develop system for rapidly delivering vaccine or antiviral medications to appropriately identified healthcare personnel
  - Determine if system will be centralized or decentralized
  - Decentralized system to include:
    - Determining team to distribute vaccine to individual healthcare departments
    - Establish point person(s) within individual departments to administer vaccine
    - Establish process to collect information and deliver second dose if recommended
  - Antiviral prophylaxis – determine distribution protocol
  - Involve Protective Services/ Security in distribution process
  - Create consent form for those that accept vaccine and declination forms for those that decline vaccine

Phase 2 Human Resource Actions

- Develop system detecting symptomatic personnel before they report to duty (See below Phases 3, 4, 5 and 6)
- Gather and create list of alternative sources of labor (See Augmentation of Staff, page 70)
- Employee Support – gather list and secure support resources
  - Employee housing
    - Secure employee housing on-site or near site for those that are required to stay or wish to stay on-site because they are fearful of exposing family members upon return home
    - Employee housing may be limited; identify employees eligible for on-site housing
  - Child and elder care
    - Encourage employee child and eldercare personal planning strategy
    - Research locations and personnel resources for on-site care
  - Employee transportation to and from work
  - Develop psychological support strategies
    - Employee Assistance Programs (EAP)
    - Internal resources (Chaplaincy, Behavioral Health)
    - Contact volunteers from community to provide employee support

- Test all processes during non pandemic influenza season – conduct drill
- Union concerns with schedule changes and position realignment– talk with union and discuss partnership
- Third party vendors (such as EAP, temporary agencies) – talk with vendors regarding resources; will they have the resources to support you as a customer?
- Conversation with psychological support vendors (EAP, community resources) to ensure they can accommodate needs in event of pandemic

Phase 3 Human Resource Actions

- Communicate regularly with employees regarding seasonal and pandemic influenza. Evaluate employee concerns to guide frequency and topics of communications.
  Topics should include:
  - Vaccination
  - Phases of pandemic
  - Modes of transmission
  - Warning signs and symptoms
  - Infection control
  - General staff concerns
  - Broad institutional approaches to pandemic mitigation
- Heightened alert and monitoring of absenteeism
- Utilize Passive surveillance – employees report symptoms
  - When monitoring for influenza like illness (ILI) consider temperature greater than 100.4 F and cough or sore throat
  - Monitor additional symptoms for call out surveillance
- Unscheduled absences still handled under normal attendance policies

Phase 4 Human Resource Actions

- At any point during Phase 4 and beyond, consider social distancing and other methods to limit exposure:
  - Encourage self reporting of symptomatic staff
  - No shaking hands
  - Standing three (3) feet apart
  - No more than three (3) people at a table
  - Cancel non-essential events (holiday parties, social events)
  - Cancel essential events; alternatives conference calls, web conferences
  - Provide alternative break areas for employees providing direct care to suspect and confirmed influenza patients
  - Stagger break times
- Institute use of personal protective equipment
- Communication messaging should address the policies and rationale for:
  - Work Quarantine (WQ)
  - Influenza Response Team (IRT)
  - Antiviral prophylaxis plan
  - Influenza treatment and intermediate risk zones
  - Policies on sick leave and compensation
  - Options for on-site housing
- Coordinate verbal screening assessment with employee main entrance stations (commence during phase 4B)
- Clinically evaluate symptomatic staff and inform on pertinent policies
- Perform or coordinate H-subtyping laboratory testing on symptomatic and high suspect influenza staff
- Encourage sick staff members to stay home
  - Allow employees to use sick time with appropriate medical documentation as per existing hospital policies regarding number of days absent to require doctor's note
  - Allow vacation/personal time or unpaid sick time for all unscheduled absences without medical documentation
- Reassignment of high-risk personnel (immunocompromised, pregnant employees, etc.)
  - Encourage self disclosure of high risk to managers
  - Explain risks but make reassignment voluntary
  - For those that decline reassignment, create declination form that explains risk and ask for employee's signature

Phase 5 Human Resource Actions

- Set up occupational health verbal and clinical evaluation stations for symptomatic staff
  - Coordinate with main entrance stations
  - Perform or coordinate H-subtyping laboratory testing on symptomatic and high suspect influenza staff
- Based on staff shortages, initiate Work Quarantine (WQ)- (See Work Quarantine guidelines for more detail on specifics and monitoring)
- Brief worker on rules of Work Quarantine, answer questions, provide behavioral health counseling and educational materials for household
- Develop methods for daily monitoring of employee while in Work Quarantine
- Establish tracking mechanism for monitoring 7 day Work Quarantine
- Even if no WQ, consider restricting employees from working at other facilities to prevent spread
- Operational staffing adjustments
  - Implement alternative sources of labor (See Augmentation of Staff, page 70)
  - Consider telecommuting – (* ADA Warning -when considering positions that are available for telecommuting, detail that telecommuting for a particular position is in the event of an emergency situation and will only be considered in a short, temporary capacity)
  - Redistribution of current workers and schedule changes
  - Third party vendors – what support can they provide
  - Do not allow staff who care for influenza patients to work in other areas of the hospital
- Return to work - Personnel returning to work after having pandemic influenza
  - Personnel must be fever free for 24 hours and must have appropriate medical clearance
  - Employees will be required to provide clearance note from healthcare provider or depending on phase and impact, set up clearance "stations" in occupational health to assess personnel and determine reassignment locations
  - Assessment, such as H-subtyping or serologic testing should be conducted to ensure employee had suffered from pandemic influenza before reassigning
- Allow employees to use sick time without appropriate medical documentation – consider limits such as 3 - 7 day maximums
- Continue to excuse all unscheduled absences from normal attendance policies
- Pandemic associated absences should not be used as an episode to terminate
- Coordinate and implement psychological support services for staff
  - Strongly encourage use of buddy system

Phase 6 Human Resource Actions

- Employee support
  - Implement employee housing as available
    - Housing on-site or near site for those that are required to stay or wish to stay on-site because they are fearful of exposing family members upon return home
  - Support child, elder, pet care strategies
  - Employee transportation support
  - Psychological support
    - Employee Assistance Program (EAP)
    - Internal resources (Chaplaincy, Behavioral Health)
    - Volunteers from community to provide employee support

Phase 7 Human Resource Actions

- Payment/Employee Relations issues
  - Consider non-exempt/exempt payment issues
  - Consider hazard or bonus pay
  - Consider implication for FMLA and how to secure appropriate paperwork.

B. Policies for Exposed, Asymptomatic Staff

Exposure to pandemic influenza should vary by staff assignment and duties, breach in infection control practices, and prevalence of virus in the community and healthcare institution. OSHA released guidance on preparing workplaces for an influenza pandemic that included a detailed exposure risk stratification scheme.[10] Recommendations in this section emphasize OSHA standards where applicable.

1. Significant Exposures

Work groups agreed on a working definition for a significant exposure to pandemic influenza as close contact (within 3 feet) of a confirmed or probable case of pandemic influenza who is actively coughing or sneezing or who has undergone an aerosol generating procedure (intubation, nebulization, suctioning, chest physiotherapy, etc.) *and* there was a breach in infection control protocols (e.g., employee was not wearing appropriate PPE - N95 respirator or higher level of respiratory protection, and eye protection). Exposure may be considered insufficient to warrant intervention if other infection control measures were in place (e.g., patient wearing a surgical mask, use of a negative pressure environment, brevity of the duration of exposure, etc.). Confirmation of sustained significant exposure must meet elements in the above definition including a breach in infection control protocols (e.g., lack of PPE, closer proximity to patient, excessive aerosolization procedures, etc.). Based on this assessment, response to a significant exposure should depend upon the level of transmission in the community and healthcare setting and available resources. When transmission levels are low, employees that sustain a significant exposure should be provided with one course of antiviral prophylaxis, and be furloughed for 5-7 days or asked to follow the rules for work quarantine for the same time period. Once influenza transmission is widespread in the healthcare facility, staff may be continuously exposed and therefore might warrant continued antiviral prophylaxis if supplies permit. See Table 3 for a summary of proposed responses to significantly exposed staff by level of influenza transmission.

Table 3: Proposed tiered scheme for responses to significantly exposed healthcare staff

Tier	Level of Transmission	Proposed Responses
1	Isolated cases, early stages, (phases 3-4B, 7)	1) Furlough 5-7 days 2) One 10-day course antiviral post-exposure prophylaxis
2	Increased rates of exposure, increased demand for healthcare staff (phases 4C-5A)	1) Work Quarantine 2) One 10-day course antiviral post-exposure prophylaxis
3	Widespread in population, assume all HCWs exposed if ~35% attack rate (phases 5B-6)	1) Work quarantine 2) One 10-day course antiviral post-exposure prophylaxis for significant exposures and continuous prophylaxis if supplies allow

Recommendation: Employees with a documented significant exposure should receive a minimum of one course of antiviral prophylaxis and be furloughed or asked to follow work quarantine protocols as dictated by level of pandemic influenza transmission, medication supplies, and staffing shortages.

High-risk exposures (OSHA Very High and High Exposure Risk)[10]

High-risk exposures pertain to healthcare employees that have repeated direct influenza patient encounters including those who perform aerosol generating procedures. Provision of a daily dose of antiviral medications for staff with continued high-risk exposures (e.g. IRT members) is recommended for the pandemic duration. PPE is discussed in section II.6.B Infection Control Guidelines, page 44. Clinical staff not assigned to care for pandemic patients (non-IRT staff) who inadvertently are exposed to pandemic influenza (e.g., obstetrician delivering a baby of a pre-symptomatic pandemic case) should be considered for significant exposure and managed accordingly.

Moderate-risk exposures (OSHA Medium Exposure Risk)[10]

Moderate-risk exposures for healthcare employees include those with direct contact to the public in densely populated environments. This includes clerical staff, security, cafeteria workers, pharmacists, and other support staff not assigned within the influenza response zone. Protection for this group should emphasize barriers including increased distancing (> 6 feet), temporary physical barriers, and droplet precautions including the use of a surgical mask.

C. Work Quarantine and Home Quarantine

Work quarantine

Work quarantine (WQ) allows healthcare workers who have had a moderate to high-risk exposure to continue working as long as they remain asymptomatic. While off duty, they are required to observe the rules and activity restrictions of home quarantine (HQ). Although WQ is less protective than full home quarantine, it is necessary to ensure adequate staffing levels in healthcare facilities and the ongoing provision of care during an emergency. Lessons from the SARS outbreak in Canada suggest that WQ can help to meet the dual goals of limiting transmission within the community and continuing to provide essential healthcare.

WQ will be considered for implementation for employees who have had a significant exposure to a confirmed or highly probable case of pandemic influenza. Exposure assessment and decision to implement WQ should be determined on a case-by-case basis. Exposure may be considered insufficient to warrant WQ if other infection control measures were in place (patient wearing a surgical mask, use of a negative pressure environment, brevity of the duration of exposure, etc.). Exposures that occur outside of the healthcare facility (in the home) should be assessed by infection control personnel and may be sufficient to warrant WQ. Staff with a significant exposure will also be considered for antiviral post-exposure prophylaxis as described in section II.8.C, page 63. Guidance for healthcare institutions on when to implement WQ will be determined by the pandemic phase scheme, the availability and efficacy of post-exposure antiviral prophylaxis, the current understanding of the transmissibility of the virus, and the status of hospital operations as they pertain to staffing shortages.

> ***Recommendation: Work quarantine is recommended for implementation of high-risk exposed employees and significantly exposed staff once pandemic influenza severely stresses the resources of the healthcare community.***

For all employees who are subject to the rules of WQ and HQ, extensive education of the rationale and procedures must occur and be understandable by all staff. Employees should be provided with literacy appropriate materials to bring home for education of household members. Hospitals should develop their own protocols for conducting screening, tracking, and managing individuals in WQ including a twice a day screening for illness while in the hospital setting. It is recommended to monitor for influenza like illness at the beginning and end of the shift. ILI is defined as temperature greater than 100.4°F *or* cough *or* sore throat. Also, individuals in WQ without direct patient care responsibilities (clerks, security, etc.) must wear a surgical mask at all times while on-duty. Healthcare workers with direct patient care responsibilities (e.g., nurses, physicians, respiratory therapists) may need to wear a higher level of respiratory protection when exposed to potential pandemic patients as outlined in section II.6: Infection control, page 44.

> ***Recommendation: Staff in WQ and their household members should receive appropriate education on the procedures and rationale for WQ and HQ.***

The amount of time necessary for an employee to spend in WQ will be the upper estimate of the incubation period of the circulating strain of pandemic influenza. Seasonal influenza has a typical incubation period of 1-3 days; high pathogenic H5N1 avian influenza infection in humans has a longer incubation period (up to 10 days or more). Final decisions on the recommended period for WQ will be determined after the pandemic strain has emerged and the incubation period has been estimated. For planning purposes it is reasonable to expect that significantly exposed employees will be expected to complete a period of WQ for 5-7 days.

WQ should be terminated in the following situations:

- Clinical confirmation of influenza or ILI in the healthcare worker (transfer to patient status or full HQ)

- 5-7 symptom-free days following unprotected exposure (all quarantine restrictions lifted)
    - Employee should maintain a high level of awareness for development of symptoms
- The index case is determined not to have pandemic influenza during the WQ period

At the end of the designated WQ period, the healthcare worker should receive physical and psychological health assessments.

Recommendation: Exposed employees should be assessed on an individual basis whether to begin WQ for approximately 5-7 days, and should be closely monitored for development of symptoms.

Hospitals may want to consider dedicating certain resources for off-duty healthcare workers under WQ (e.g., group residences, meals, behavioral support counseling). Hospitals may want to consider setting up a hotline to serve workers' mental health needs and receive any reports of ILI while at home.

Rules for Work Quarantine

- When healthcare workers in WQ are not at work, they are to follow the rules of HQ (see below).
- The health care worker must wear at a minimum a surgical mask at all times while at work and wash their hands before and after every patient encounter. Higher levels of PPE should be worn when performing direct patient care or other higher risk activities as defined by recommendations for infection control.
- Additional hand washing is recommended after touching one's face and using the restroom.
- Eat in a separate room when possible.
- Healthcare workers in WQ should commute to work alone in a private vehicle, if possible. If they must be in a private vehicle with others or use public transportation, the work quarantined individual should wear a surgical mask.
- Health care workers under WQ or HQ should not enter additional hospital sites except as authorized or necessary to perform duties. Re-assignment may be considered to limit employee movement during WQ.
- Work Quarantined health care workers with offices in the community should be allowed to see patients in their offices. Non-essential visits should be deferred. The healthcare worker under WQ should wear PPE at all times.
- Health care workers under WQ must monitor their temperature twice a day, at the beginning and end of each shift. They must immediately stop work and notify their supervisor or appropriate hospital infection control staff if they develop ILI.

Home Quarantine (HQ)

Many of the guidelines outlined for HQ will be coordinated by PDPH with healthcare facility involvement when applicable. Arrangements should be made for monitoring patients, reporting symptoms, transporting patients for medical evaluation if necessary, and providing essential supplies and services. HQ is most suitable for contacts with a home environment that can meet their basic needs and in which unexposed household members can be protected from exposure. Other considerations include:

- Persons in HQ must be able to monitor their own symptoms (or have them monitored by a caregiver).
- The person's home should be evaluated for suitability before being used for quarantine. Questioning should address specifics related to private bedroom and bathroom use, activities around meal times, other individuals in the household, presence of high-risk issues, access to food and medications, etc.
- Persons under HQ should minimize interactions with other household members to prevent exposure during the interval between the development and recognition of symptoms. Precautions may include: 1) sleeping and eating in a separate room; 2) using a separate bathroom; and, 3) appropriate use of personal protective equipment.

- Infection control and environmental cleaning in the home should occur often each day. Persons who share bedrooms, and other common living areas are advised to create temporary barriers from other household members. Screens or sheets may be used to create temporary walls between people in HQ.
- Household members may go to school, work, etc., without restrictions unless the quarantined person develops symptoms. If the quarantined person develops symptoms, household members should remain at home in a room separate from the symptomatic person and await additional instructions from health authorities.
- Household members can provide valuable support to quarantined persons by helping them feel less isolated and ensuring that essential needs are met.
- Psychological support services should be provided to minimize psychological distress.
- Quarantined persons should be able to maintain regular communication with their loved ones and healthcare providers.

D. Workforce Support Issues

In the event of a pandemic, healthcare workers are likely to require various types of instrumental and psychosocial support in order to perform effectively; they may face stigma, long work hours under stressful conditions, dual obligations of caring for patients and family, and illness/ death of colleagues, among other challenges. The following are examples of reactions healthcare workers had to the SARS outbreak in Singapore that can be applied to concerns healthcare workers may experience during an influenza pandemic:[18]

- Healthcare workers perceived they were at great risk of exposure to the disease, and would become infected with the disease while treating infected patients.
- Healthcare workers experienced concern for inadvertently spreading disease to family members and friends.
- Healthcare workers experienced social stigmatism and ostracism from public and even family because they were facing a deadly infectious disease for which there was no known effective treatment.
- They would have felt more comfortable reporting to work if the preventive measures had been implemented more quickly and with clearer policies.
- Healthcare workers felt more confident when they received quality training for proper PPE use and actually believed in the effectiveness of PPE.

Experience from SARS suggests that transportation and childcare are the leading issues influencing ability to report to work. Furthermore, fear and concern about exposing family members is the leading issue influencing willingness to report to work. For this reason, hospitals may want to consider offering residential support for healthcare workers that care for pandemic influenza patients and their families. On-site housing may eliminate the need for travel and the risk of household exposures. Furthermore, off-site pet, elder, and childcare will help to alleviate family obligations, thereby helping healthcare workers to function in their professional roles (see below).

> ***Recommendation**: Healthcare workers will likely have concerns associated with working during a pandemic that may be alleviated by timely institutional preventive measures, training, and education.*

1. Family emergency plan for staff

All healthcare employees should be aware that basic services such as electricity, gas, water, sewage treatment, and telephones might be restricted or unavailable for days or weeks during a pandemic. During a severe pandemic, childcare programs and schools will likely close for prolonged periods of time (possibly up to 12 weeks) and alternative childcare arrangements will have to be devised. Personal family plans should also incorporate continuity of essential services to family members with special needs, such as home health care supervision or outpatient services such as dialysis, or

maintenance of in-home life support machinery requiring electricity. Successful family emergency planning should consider the needs of all household members and anticipate supplies and communications strategies to assure best outcomes.

Storage of adequate supplies of food, water, and materials for all family members is especially important for healthcare employees so that essential healthcare personnel are able to report for duty. Human resources should encourage all healthcare personnel to develop a disaster kit that contains a collection of basic items (food, clothes, flashlight) and essential items (prescription medications) that household members will need in the event of a disaster. A typical all-hazards disaster kit should contain three days supply of water (1 gallon of water per person per day) and food per person and per pet in the family in addition to various tools, materials, and medicines. During a pandemic however, it will be important to have extra supplies on hand because of the possible prolonged interruption of essential services. For pandemic preparedness, households are advised to store a 2 week supply of water and food per person and per pet in the household[19]. Table 4 provides examples of supplies for a first aid, medical, and emergency supply kit, with examples of non-perishable food items. [20]

Human resources should also emphasize the importance of family, child, elder, and pet care planning and contingency plans for school and childcare center closures for children, power outages for family members who use power operated life support machinery, and interruption of in-home care services for elders and disabled family members. In congruence with the Community Strategy for Pandemic Influenza Mitigation by CDC[1], healthcare employees should plan for all ill family members to stay home. Family members should not be brought to the workplace unless the institution has developed a safe child or family member care program. Staff are encouraged to develop family support strategies for child, elder, special needs, and pet care utilizing in-laws, grandparents, neighbors and other responsible parties who will be available during an influenza pandemic. Refer to the www.ready.gov and www.redcross.org websites for family disaster plan guidance.

***Recommendation:* Healthcare employees are advised to develop a family support disaster plan.**

Table 4: Family Emergency Plan Recommended Materials and Supplies for Disaster Preparedness with additional emphasis on Pandemic Preparedness (2 week supply)[21], [22], [23]

First Aid Kit	Medical, Health, and Emergency Supplies Kit	Food and Water Supply
-Sterile adhesive bandages in assorted sizes -2-inch sterile gauze pads (4-6) -4-inch sterile gauze pads (4-6) -Hypoallergenic adhesive tape -Triangular bandages (3) -2-inch sterile roller bandages (3 rolls) -3-inch sterile roller bandages (3 rolls) -Scissors -Tweezers -Needle -Moistened towelettes -Antiseptic -Thermometer -Tongue blades (2) -Tube of petroleum jelly or other lubricant -Assorted sizes of safety pins -Cleansing agent/soap -Latex gloves (2 pair) -Sunscreen -Non-prescription drugs: -Aspirin or non-aspirin pain reliever -Anti-diarrhea medication -Antacid (for stomach upset) -Syrup of Ipecac (use to induce vomiting if advised by the Poison Control Center) -Laxative -Activated charcoal (use if advised by the Poison Control Center)	-Soap and water, or alcohol-based (60-90%) hand wash -Medicines for fever, such as acetaminophen or ibuprofen -Prescription medications for family and for pets, -Contact lens solution, hearing aid batteries, eye glasses -Thermometer -Anti-diarrhea medication, cough and cold remedies, stomach remedies, -Vitamins -Fluids with electrolytes -Portable radio, battery powered or crank, or television and extra batteries -Flashlight and extra batteries -Manual can opener -Garbage bags -Tissues, toilet paper, paper towels, disposable diapers -Bleach, unscented, household -Surgical masks -Box of disposable gloves -Matches -Candles -Cash and coins -Shut off wrench (to shut off main household valves for gas and water) -Additional blankets or sleeping bags -Warm clothing	-Foods should be non-perishable, ready-to-eat, and require little or no additional water or preparation. -Ready-to-eat canned foods with high liquid content, and canned meats, fish, fruits, vegetables, beans, and soups. -Protein or fruit bars -Dry whole grain cereal or granola -Peanut butter or nuts -Dried fruit -Crackers, salt free -Canned juices -Bottled water (at least 1 gallon per person per day) -Fluids with electrolytes (Or make your own electrolyte drink for someone over age of 12: 1 quart water, 1/2 tsp. baking soda, 1/2 tsp. table salt, 3 to 4 tbsp. sugar, 1/4 tsp. salt substitute. Mix well with lemon juice or sugar free Kool-Aid) -Canned or jarred baby food and formula -Pet food -Other nonperishable foods.

2. On-site housing

Medical centers that are part of a college or university campus may have access to temporary living accommodations for employees. Dormitories and hotels may be vacated during a pandemic and could be used to house staff who wish to continue working but are unable to leave the medical center, or choose not to impose the rules of home quarantine on their household or potentially expose them to influenza. In addition, call rooms may be supplemented with additional beds and refrigerators to support staff that wish to remain in the hospital.

Recommendation: Healthcare institutions should expand local temporary residential accommodations for employees as available, including call rooms, dormitories, and hotels.

3. Childcare, eldercare, pet support strategies

If healthcare workers do not return to their homes between shifts, or do not report to work because they have to take care of elders, children, pets, or are worried about infecting family members,

hospitals may need to make accommodations to support management of staff household members as able. Human Resources can facilitate this process by encouraging healthcare workers to develop a family response plan, and by coordinating support services with trusted neighbors, relatives, and community-based organizations. Family members with special needs including use of supplemental oxygen, outpatient dialysis, or assistance with activities of daily living may require additional support from home-care or other medical support services. These populations will be addressed in continued planning forums with specific guidance added to this document when available.

4. Psychosocial services

Although the provision of clear, comprehensive, and timely information can mitigate adverse psychological consequences, healthcare workers will need support in confronting the exhaustion, stress, isolation, and uncertainty they may face responding to a pandemic.

In phase 4, hospitals may choose to:

- Identify (and create alliances with) local community-based and nongovernmental organizations with expertise in psychological support services and training.
- Develop processes for providing follow-up support for persons who have accessed mental health services.
- Arrange training for in-house behavioral services staff (and other designated staff) regarding disaster mental health and debriefing techniques.
- Prepare educational and training materials on mental health issues for distribution to healthcare workforce.
- Prepare educational materials on mental health issues for distribution to family members of healthcare workers.

In phases 5-6 hospitals may choose to:

- Distribute educational materials to all hospital employees to inform them of the emotional responses they may experience or observe in their colleagues, and families, and themselves and to provide strategies for coping with these emotions. (Educational materials should also describe various options for seeking out behavioral health services and assistance from governmental, nongovernmental, and employee assistance programs [EAP])
- Set-up and advertise a confidential telephone support line staffed by behavioral health professionals, crisis intervention/supportive counseling programs, and peer support groups.
- Designate rest/recuperation sites for employees and mandate routine breaks. Rest sites can be stocked with food, relaxation materials (e.g., movies and relaxation tapes), and educational pamphlets describing psychosocial services.
- Appoint “stress control teams” to monitor employees for stress, exhaustion, and need for rest and recuperation. Develop policies to report and follow-up on individual cases of psychological or functional impairment.
- Assign “buddies” to maintain frequent contact among staff members, to provide mutual help in coping with daily stressors, and to provide supervision for proper placement and removal of PPE. See below “Buddy System” for further information.
- Develop protocols to screen staff members for mental disorders and substance abuse and to refer them for appropriate treatment.

<u>The Buddy System</u>

Assigning healthcare employees to partner up as buddies will likely help to cope with pandemic stress and also promote adherence to pandemic mitigation strategies. Although there is no empirical data indicating the benefit of this type of system in healthcare, the procedure is theologically sound and has the capacity to reduce the chance for breach in PPE of healthcare employees and to provide psychological support. Buddies should be assigned and tracked by the influenza zone supervisors and other shift supervisors and may consist of pairs or triples working the same shifts.

Buddies should:

- Exchange contact information.
- Call before work to make sure each other are awake, coming to work, has transportation, etc.
- At start and end of shift, buddies should report together to zone supervisor in a changing room/ locker room for temperature testing, verbal assessment of physical and psychological condition, and receipt of antiviral prophylactic dose (if on an IRT).
- Monitor each other's placement and removal of PPE throughout shift.
- Symptomatic healthcare workers should be excluded from duty and sent to occupational health for evaluation. Pair up healthy healthcare worker with other available healthcare worker without a buddy or pair with a buddy team to make teams of three.
- Buddies should be encouraged to talk during breaks about family situation, fears and concerns, symptoms, etc.

Recommendation: A buddy system should be implemented for all healthcare employees as appropriate for psychological support and adherence to pandemic mitigation strategies. Education should begin in phase 4A, and the system implemented during phase 4B.

8. USE AND ADMINISTRATION OF VACCINES AND ANTIVIRAL DRUGS

A. Pandemic influenza vaccine

Pandemic influenza vaccine is expected to be unavailable during the initial weeks to months of a pandemic, and in limited supply once production is at full capacity and distribution begins.

H5N1 Vaccine
The FDA announced the licensure of the first vaccine in the United States for humans against high pathogenic H5N1 avian influenza in April 2007. The inactivated influenza virus vaccine is derived from the A.Vietnam/1203/2004 influenza virus and is indicated for persons 18 through 64 years of age who are at increased risk of exposure to the H5N1 virus subtype. The vaccine has been purchased by the federal government for inclusion in the Strategic National Stockpile.[24]

1. Prioritization

The supply of an efficacious pandemic influenza vaccine will likely be limited and must therefore be appropriately rationed. The PDPH Pandemic Influenza Coordinating Committee described in the Philadelphia Department of Public Health's Pandemic Influenza Preparedness Plan is a committee composed of local senior health and emergency management officials who will review the proposed prioritization recommendations from DHHS, plus the current epidemiological situation and vaccine supply.[25] The group will then revise the prioritization scheme as appropriate, and begin implementation of vaccination of the target groups. See DHHS proposed prioritization table (see Table 5, page 62).

The current vaccination prioritization scheme proposed by DHHS has received considerable debate regarding prioritizing populations most likely to suffer illness and death over public safety and critical infrastructure staff (e.g., utility, sewage, water systems staff). The inter-agency Pandemic Vaccine Prioritization Working Group of the federal government is working to determine and finalize a prioritization scheme during a pandemic situation that is acceptable to both stakeholders and the public.[24] The working group conducted a survey of the public of Las Cruces, New Mexico; Nassau County, New York; and of stakeholders in Washington, D.C. These groups prioritized the people working to fight the pandemic and to provide care as the highest target population to receive vaccine. The release of a vaccine prioritization scheme that reflects this public opinion to prioritize health care workers and others who will support essential community functions in a pandemic is expected later in 2007.

Table 5. Proposed Vaccine Priority Group Recommendations, Department of Health and Human Services (DHHS), November 2005[26]

Tier	Subtier	Population	Rationale
1	A	Medical workers with direct patient contact, support for direct patient contact and vaccinators	Health care workers must provide care for the ill and serve as Vaccinators
	B	Persons ≥ 65 years of age with 1 or more influenza high-risk conditions, not including essential HTN	These groups are at high risk of hospitalization and death. Excludes elderly in nursing homes and those who are immunocompromised and would not likely be protected by the vaccine
		Persons 6 months to 64 years, with 2 or more influenza high-risk conditions, not including essential HTN	
		Persons 6 months or older with history of hospitalization for pneumonia or influenza or other influenza high-risk condition in the past year	
	C	Pregnant women	In past epidemics, pregnant women have been at risk. Vaccine also protects infant who cannot receive vaccine.
		Household contacts of severely immunocompromised persons who would not be vaccinated due to likely poor response to vaccine	Vaccinating household contacts of immunocompromised and young infants will decrease risk of exposure/infection of those who cannot be protected by vaccine.
		Household contacts of children <6 months old	
	D	Public health emergency response workers critical to pandemic response	Critical to plan, monitor, and implement response, including vaccine administration.
		Key government leaders	Preserve decision making capacity to plan and implement a response
2	A	Healthy 65 years and +	Groups at increased risk, but not as high risk as population in Tier 1B
		6 months to 64 years, with 1 high-risk condition	
		6-23 months old and healthy	
	B	Other public health emergency responders	Includes critical infrastructure groups that have impact on maintaining health (e.g. public safety or transportation of medical supplies and food); implementing a pandemic response, and on maintaining societal functions
		Public safety workers, including police, fire, 911 dispatchers, and correctional facility staff	
		Utility workers essential for maintenance of power, water, and sewage system	
		Transportation workers transporting fuel, water, food, and medical supplies and public ground transportation	
		Telecommunications / IT for essential operations and maintenance	
3	A	Other key government decision makers	Important societal groups for a pandemic response
		Funeral directors / embalmers	
4		Healthy people 20-64 years of age, not included in above categories	All persons not included in other groups

2. Administration planning

Philadelphia Department of Public Health planning

PDPH will formulate a database to track the distribution of vaccine to healthcare institutions. Each healthcare institution should create an emergency position using the hospital's Incident Command Structure to coordinate vaccine distribution and report this information to PDPH once notified that vaccine has become available.

Vaccine Registry
Occupational Health or other appropriate department of healthcare institutions should develop a vaccination registry to track all vaccinations given. The registry should be able to track the names, contact information, and adverse events of persons receiving a first dose. A vaccine against pandemic influenza will likely require two doses, administered at least one month apart to provide adequate immunity. Administration of a second dose during limited supply with existing lower prioritized unvaccinated populations is pending DHHS guidance.

B. Other Vaccines

1. Seasonal Influenza vaccine
Recommendations are for all healthcare employees with direct patient contact to receive annual seasonal influenza vaccine.

2. Pneumococcal vaccine
Pandemic Influenza
DHHS recommends that during the interpandemic period, state and local health departments work with healthcare partners to enhance levels of pneumococcal polysaccharide vaccination among those for whom it is recommended. Increased use of the pneumococcal polysaccharide vaccine may decrease rates of secondary bacterial infections during a pandemic as there is data from the 1968 influenza pandemic showing increased rates of concomitant bacterial pneumonia due to *S. pneumoniae.* [27] Large-scale pneumococcal vaccination might not be feasible once a pandemic occurs, therefore inter-pandemic and pandemic alert periods are ideal times to deliver this preventive measure.[28]

Seasonal Influenza
To prevent potentially serious complications of seasonal influenza (pneumonia, bacteremia, meningitis), CDC recommends the pneumococcal polysaccharide vaccine for the following populations:[29]

- Adults 65 years of age or older
- Anyone over 2 years of age whose body has a lower resistance to infection because of a long term health problem, a disease or condition, or a drug treatment
- Alaskan Natives and certain Native American populations

For specific guidelines on the prevention of pneumococcal disease, please see the Recommendations of the Advisory Committee on Immunization Practices (ACIP) (http://www.cdc.gov/mmwr/pdf/rr/rr4608.pdf)

The pneumococcal conjugate vaccine licensed in 2000 is recommended for routine use for all children less than 2 years of age administered in a 4-dose series beginning at age 2 months. This vaccine is also recommended for children between the ages of 2 to 5 years who have a condition that places them at high-risk for invasive pneumococcal disease. These conditions include: Sickle cell disease, congenital or acquired asplenia (or splenic dysfunction), HIV infection, cochlear implants, and other chronic cardiac, pulmonary, renal, and immune deficiency processes.[30]

C. Antiviral Drugs

It is uncertain if any of the antiviral medications that are currently FDA approved for the treatment and prophylaxis of influenza will be effective against the next human pandemic strain. Recent circulating seasonal influenza viruses have demonstrated high resistance rates globally to the adamantanes (amantidine and rimantidine), and therefore are not recommended for use during a pandemic. Resistance to the neuraminidase inhibitors has occurred among seasonal influenza isolates in Japan, but this was rare despite considerable selective pressure. Only 0.3% of 1,180 isolates tested from the 2003–2004 season were resistant to oseltamivir, despite the use of approximately 6 million treatment

courses.[31] However, resistance to the neuraminidase inhibitors (oseltamivir and zanamivir) may increase before the next pandemic strain reaches North America if use of these medications is poorly regulated and widespread. This however, may not be significant as there is evidence to suggest that neuraminidase inhibitor resistant strains of human seasonal influenza are less fit to cause illness and therefore may not be capable of pandemic disease burden and spread.[31] Both neuraminidase inhibitors are useful against seasonal influenza for treatment and prophylaxis when used appropriately. Oseltamivir has demonstrated efficacy against the majority of H5N1 strains *in vitro*, and therefore has the potential to be an effective intervention to minimize disease and death from pandemic influenza caused by H5N1. One important point to maintain is that if the next strain of pandemic influenza demonstrates sensitivity to the adamantanes, their consideration for use will be reconsidered.

DHHS is actively procuring a large stockpile of neuraminidase inhibitors with a goal of obtaining 81 million treatment courses by December 2008.[32] These medications will likely be distributed from the Strategic National Stockpile in limited supply as a pandemic evolves. Given the uncertainty of effectiveness, expense, finite shelf life, storage logistics, and the plans of the federal government to procure a national stockpile, work group members believed that hospitals should not be in the position to stockpile large quantities of antiviral medications, nor to implement a global pandemic prophylaxis strategy for all employees and their family members. Rather, healthcare institutions are advised to acquire and maintain a minimal supply of antiviral medications for targeted prophylactic use and selective treatment for patients who will most likely benefit from their administration. These recommendations prioritize prevention over treatment, though both elements have a role in the response to pandemic influenza. Specific guidelines on the use of antiviral medications during an influenza pandemic are outlined below.

Recommendation: Healthcare institutions are advised to acquire and maintain a minimal supply of antiviral medications for targeted prophylactic use and selective treatment for patients who will most likely benefit from their administration.

1. Prophylaxis

Protecting people from pandemic influenza should use a combination strategy of cohorting influenza patients and staff who care for them, strict adherence to infection control guidelines, PPE, vaccination if available, and use of antiviral prophylaxis in select circumstances.

Influenza Response Teams (IRT)

As part of the protective strategy for healthcare employees at greatest risk of acquiring influenza, IRT members should be provided with daily antiviral prophylaxis once the Influenza Response Team plan is activated (see section II.4.A.1 Influenza Response Teams, page 27). The dose should be given at the beginning of each shift. Hospitals would be expected to provide daily prophylaxis for this high-risk group for a minimum duration of 50 days (5 ten-day courses). After this time, continued prophylaxis should be available from the federal reserves in the Strategic National Stockpile whose distribution will be coordinated by the Philadelphia Department of Public Health and the Pennsylvania Department of Health (see section II.9.C.3 Strategic National Stockpile, page 79).

Recommendation: Hospitals should provide Influenza Response Team members a prophylactic daily dose of antiviral medication for 50 days.

Healthcare workers with episodic exposure

During a pandemic, some hospital employees will likely be inadvertently exposed to a case of influenza. These incidences need to be recognized and for staff involved to be knowledgeable to self report the exposure to the appropriate supervisor or infection control administrator. Exposure assessment and decision to provide antiviral prophylaxis should be determined on a case-by-case basis. Definitions for significant exposure will depend upon pandemic phase, suspicion of infection among the case, lack of or breach in the use of PPE, and proximity and duration of exposure. A

significant exposure is considered to be close contact (within 3 feet) of a confirmed or probable case of pandemic influenza who is actively coughing or sneezing or who has undergone an aerosol generating procedure (intubation, nebulization, suctioning, chest physiotherapy, etc.) *and* the employee was not wearing appropriate PPE (i.e., N-95 respirator or higher level of respiratory protection, and eye protection). Exposure may be considered insufficient to warrant antiviral prophylaxis if other infection control measures were in place (i.e., patient wearing a surgical mask, use of a negative pressure environment, brevity of the duration of exposure, etc.). Exposures that occur outside of the healthcare facility (in the home or community) should be assessed by infection control personnel and may be sufficient to warrant antiviral prophylaxis.

Recommendation: Healthcare workers who have sustained a significant pandemic influenza exposure within the hospital setting should receive counseling and a 10-day course of antiviral prophylaxis.

Patients and visitors with an episodic exposure

Guidelines for the prophylactic use of antiviral medications among non-influenza patients and visitors with an episodic exposure in the healthcare facility will be the same as those outlined for healthcare workers above. However, if supply of antiviral medication is limited, healthcare workers should be stratified to receive prophylaxis ahead of patients and visitors due to their essential role in the management of an influenza pandemic (see Table 6, page 66).

Recommendation: Patients and visitors who have sustained a significant pandemic influenza exposure within the hospital setting should receive a 10-day course of antiviral prophylaxis.

2. Treatment

Work group members believed that treatment of pandemic influenza should be prioritized on efficacy of the intervention to improve the clinical outcome of the patient and not by level of severity of disease or presence of comorbid conditions, an approach that is supported by scientific literature.[33] Decision to treat patients will depend upon the likelihood that the patient has infection with the circulating pandemic strain and that illness onset was less than 48 hours. During earlier pandemic phases when transmission is low or difficult to detect (phases 3-4B), strain specific laboratory diagnostic testing is recommended so that initial cases can be confirmed. Cases that are positive (confirmed) and who present within 48 hours of their symptom onset should receive treatment with a neuraminidase inhibitor (Oseltamivir 75mg BID x 5 days or Zanamivir 10mg inhaled BID x 5 days, medication and dose adjusted for pediatric patients and renal impairment).

Recommendation: Confirmed influenza patients should be provided antiviral treatment if presenting within 48 hours of onset of symptoms during pandemic phases 3 through 4B, and phase 7.

During pandemic phases 4C through 6 when influenza is rapidly spreading, laboratory testing capacity will be insufficient to H-subtype test all suspect patients, at which time diagnosis will rely more on clinical case definition and epidemiologic associations. Treatment will be recommended for these suspect patients who meet the clinical case definition and have an exposure or other epidemiologic risk factor and who present within 48 hours of their symptom onset. Once the pandemic wave subsides (phase 7), laboratory testing capabilities should resume and decisions to treat influenza patients should again rely on confirmatory testing.

Recommendation: Suspect and confirmed influenza patients should be provided antiviral treatment if presenting within 48 hours of onset of symptoms during pandemic phases 4C to 6.

3. Prioritization for use

Work group participants agreed that allocation of antiviral medications for select populations should emphasize prevention strategies before treatment. The tiered prioritization scheme outlined in Table 6, is to assist hospitals and healthcare institutions for allocation of antiviral medications if they are in limited supply. Hospitals who elect to follow these guidelines should have a supply of antiviral medications on hand that can meet the demands of the proposed population tiered scheme for the initial 7 weeks of pandemic transmission in Philadelphia. Additional medications are expected to be provided by the Strategic National Stockpile once it has been deployed.

Table 6. Antiviral Medication Prophylaxis Stratification Scheme and Usage Guidelines

Tier	Population	Neuraminidase Inhibitor Use
1	Influenza Response Teams	Daily prophylaxis for duration of initial wave Once daily for 50 days
2A	Healthcare worker with significant exposure	Post-exposure prophylaxis Once daily for 10 days
2B	Patient or visitor with an in-house significant exposure	Post-exposure prophylaxis Once daily for 10 days
3	Continuous healthcare worker prophylaxis during widespread transmission and sufficient supply	Once daily as supplies permit

4. Estimation of pre-pandemic amounts of antiviral medications

In an effort to assist hospitals and healthcare facilities to plan for the expected need for antiviral medications based on the model outlined above, calculations were made to produce estimates of pre-pandemic amounts. Assumptions for these estimates included severe pandemic conditions (1918-like, 35% attack rate, 12 week initial wave duration) and a 7-week (50 day) period for hospitals to sustain themselves before external supplies would be received. Estimation of percentages of populations that would receive exposures, number of staff per hospital bed, and staff assignment were derived from panel discussion. Calculations were performed for a 500-bed facility and for a 200-bed facility (see Table 7, page 67).

For planning purposes, 500-bed healthcare facilities are estimated to need approximately 2,100 courses (21,000 pills) of antiviral medications to sustain the first 7 weeks of a severe pandemic wave (~830 medication courses for 200-bed facilities). The ratio derived from these calculations for the number of hospital beds to pre-pandemic antiviral courses needed is approximately 1:4. This ratio may be applied to healthcare institutions of various sizes to obtain ballpark pre-pandemic planning estimates. It is recognized that there were many assumptions made to derive the final estimates of medications, but these final values appear logistically reasonable given a severe pandemic scenario.

Table 7. Proposed estimation matrix for stockpiling antiviral medications for the initial 7 weeks (50 days) of a severe influenza pandemic. Assume severe conditions: 35% attack rate and 1918-like virus.

	Population to receive antiviral drugs	Estimation of population for first wave of pandemic*	Number of pills and courses	Calculation for a 500 bed facility (approximately 3,000 clinical staff)**	Calculation for 200 bed facility (approximately 1,200 clinical staff)
PROPHYLAXIS	Influenza Response Team (IRT) -see section II.4.A.1, page 27	5-10% of institution staff (use 5% for calculation)	5 ten pill courses prophylaxis (1pill/day for 50 days) (50 pills /person)	3,000 staff (0.05) = 150 IRT (50pills) **= 7,500pills, (750 courses)**	1,200 staff (0.05) =60 IRT (50pills) **= 3000 pills, (300 courses)**
	Clinical, non IRT healthcare workers following an in-hospital significant exposure***	3-5% of institution staff (use 3% for calculation)	1 ten pill course prophylaxis (1pill/day for 10 days/ person)	3,000 staff (0.03) = 90exposed(10pills) **= 900 pills (90 courses)**	1200(0.03) =36exposed(10pills) **= 360 pills (36 courses)**
	Non pandemic influenza patients following an in-hospital significant exposure	1% of all patients	1 ten pill course prophylaxis (1pill/day for 10 days/person)	100,000(7wks/52wks) =15,000 patients (.01) =150 exposed (10pills) **=1,500 pills (150 courses)**	40,000(7 wks/52wks) = 5,500 patients (.01) = 55exposed (10pills) **= 550 pills (55 courses)**
	Visitors following an in-hospital significant exposure	40-100 range of visitors depending on size of facility	1 ten pill course (1pill/day for 10days/person)	100 exposed visitors (10 pills) **=1,000 pills (100 courses)**	40 exposed visitors (10 pills) **=400 pills (40 courses)**
	Prophylaxis Total			**10,900 pills (1,090 courses)**	**4,310 pills (431 courses)**
TREATMENT	Influenza patients presenting within 48 hours of onset	40-60% of all influenza patients (use 50% for calculation)	1 ten pill course treatment (2pills/day for 5 days)	2,000 influenza patients (0.5)**** =1,000 patients (10 pills) **=10,000 pills (1,000 courses)**	800 influenza patients (0.5) =400 patients (10 pills) **= 4,000 pills (400 courses)**
	Total number of pills (prophylaxis and treatment)			**20,900 pills (2,090 courses)**	**8,310 pills (831 courses)**

*Population estimates were derived from work group panel opinion
**Staff to patient bed ratio is estimated at 6:1 by work group members from hospitals of various sizes.
***Significant exposure considered to be close contact (within 3 feet) of a confirmed or probable case of pandemic influenza who is actively coughing or sneezing or who has undergone an aerosol generating procedure *and* the employee was not wearing appropriate PPE
****Using FluSurge 2.0 (Centers for Disease Control and Prevention, July 2005) and FluAid 2.0 (Centers for Disease Control and Prevention, July 2004) assume 35% attack rate and 12 week wave duration (severe assumptions).
~32,500 citywide influenza admissions during first 7 weeks divided by 25 hospitals equals 1300 patients per hospital. 500 bed hospitals estimated to receive 2,000 admissions, 200 bed hospitals estimated to receive 800 admissions.

D. Other Medications to Consider

Panelists argued that stockpiling for potential future medical emergencies was impractical and should not be a primary responsibility of hospitals because the list of medications and supplies for all hazards (biological, chemical, radiological, trauma) is extensive. Rather, it should be the responsibility of government to procure and maintain population-based emergency supplies for distribution to healthcare institutions as needed (e.g., Strategic National Stockpile). Consensus agreement was reached for pre-purchase and maintenance of a small cache of select antiviral medications expected to be useful during an influenza pandemic as outlined above. Other classes of medications presumed to be used extensively during a pandemic received some discussion. Recommendations for their use are described below.

Antibacterial Drugs

Bacterial pneumonia is a frequent complication of severe influenza infection. As such, hospitals are advised to anticipate increases in the use of intravenous antibiotics for pandemic influenza patients. Sources of pneumonia will likely be from the community in addition to nosocomial transmission. Concomitant bacterial pneumonia from the 1968-9 Hong Kong influenza pandemic had higher rates of infections due to *Staphylococcus aureus* and *Streptococcus pneumonia*e. Therefore, a small surplus (2 week excess supply) of a variety of antibacterial medications that include coverage for *S. aureus* and *S. pneumoniae* is recommended and could include: quinolones, extended spectrum beta-lactams, macrolides, and 3rd or 4th generation cephalosporins. Antibiotics should be reserved for patients who present with severe pneumonia; suspect cases with mild influenza should not receive empiric antibiotic treatment.[27]

> ***Recommendation:* Hospitals should obtain and manage a small surplus of antibiotic medications to treat pandemic influenza patients with bacterial pneumonia.**

Immunosuppressive agents

The H1N1 pandemic of 1918 caused many deaths among young adults. It is believed that the rapid deterioration of these cases involved an inflammatory cascade (cytokine storm) in the lung parenchyma that progressed these patients into acute respiratory distress syndrome (ARDS) requiring mechanical ventilation. If the next human pandemic influenza strain causes similar pathology, it may be useful for healthcare institutions to consider the use of immune suppression medications as adjuvant medical treatment to antiviral drugs. There is evidence that immunosuppression (genetic or by use of glucocorticoids) does not protect mice from death when infected with high pathogenic H5N1.[34] More research is required to determine the utility of this strategy.

Other Medications

Hospital planners may want to consider pre-purchasing and maintaining a small supply of additional common use medications for inpatients that are likely to be used with greater frequency during a pandemic. These include but are not limited to; non-steroidal anti-inflammatory medications and antipyretics, bronchodilators, vasopressors, proton pump inhibitors or other acid suppressive agents, and sedatives (benzodiazapines, narcotics).

9. SURGE CAPACITY

A. Staffing

Managing staffing demands during a severe pandemic will be a formidable task for healthcare institutions. It is likely that most of the nation will be affected by pandemic influenza during a similar time period and therefore a national staff re-enforcement strategy will not be feasible. The federal CDC Community Strategy for Pandemic Influenza Mitigation in the United States document recommends consideration of voluntary home quarantine for people with an ill household member during a moderate pandemic (severity level 2, 3) and recommends implementation of this strategy if the pandemic is severe (category 4, 5).[35] This control measure designed to limit community transmission of virus is likely to cause additional staffing shortages in all workforce sectors and therefore the effects should be well thought through before activation. Discussion has occurred locally to consider exempting certain professions from voluntary home quarantine provided that they support healthcare or other essential community functions and utilize additional transmission reduction measures. Aside from this issue, healthcare institutions can increase staff capacity and protect employees from pandemic influenza by implementing the following strategies:

- Identify and cross-train essential staff
- Re-assign high-risk and immune staff
- Modify staffing schedules and expand roles to meet need as appropriate
- Maintain environmental cleaning policies
- Supplement staff from external sources when able

Specific guidelines for these strategies are described below.

1. Identification and cross-training of essential staff

Healthcare facilities should identify employee positions that are necessary for the institution to function under emergency conditions (e.g., administrators, security, environmental staff, medical staff, etc.), and to identify individuals who can perform those essential duties. Additional staff should be identified who can be easily trained to fill gaps in staffing essential roles. Essential and additional employees should be cross-trained so that under conditions of severe staffing shortages, essential roles can still be maintained.

> ***Recommendation:*** ***Healthcare institutions should identify essential roles and employees who can fulfill those responsibilities.***

> ***Recommendation:*** ***Beginning in phase 4A, cross train essential employees of the facility so that they are capable of performing the tasks of multiple essential roles***.

2. Re-assignment of staff

Re-assignment of staff may be required to accommodate expected staff shortages, increases in patients, and provision of necessary services. Employees may be required to perform multiple tasks uncharacteristic of their traditional roles during a pandemic. Training and documentation for re-assignment will be necessary.

Pregnant and immunocompromised staff

Staff who are pregnant or immunocompromised are at increased risk for severe complications associated with influenza infection and should be encouraged to disclose their condition to their supervisor for re-assignment away from direct patient care responsibilities during pandemic phase 4B.

> ***Recommendation****: Employees who are pregnant or immunocompromised should be encouraged to disclose their condition to their supervisor for re-assignment away from direct patient care responsibilities during pandemic phase 4B.*

Housekeeping

Influenza patient rooms and other common patient care areas will require ongoing extensive environmental cleaning during a pandemic to minimize nosocomial transmission. It is expected that the number of custodial staff will be reduced due to illness, caring for others, and fear of contagion. The frequency and extent of environmental cleaning in non-patient care areas (offices, pharmacy, supply rooms, loading docks) can be reduced or even suspended so that employees and resources can be allocated to maintain infection control standards in high traffic, potentially infectious areas (patient rooms, bathrooms, ED, clinical laboratory, etc).

Recommendation: Housekeeping staff should be re-assigned to maintain aggressive environmental cleaning policies in patient treatment areas and high traffic common areas.

3. Augmentation of staff

Re-assignment of healthcare workers and volunteers to meet the expected increased healthcare staffing demand should be well thought out with steps to minimize complications and adverse outcomes. Examples to expand existing staff include:

- Increasing part-time staff to full-time status
- Cancellation of vacation requests
- Re-assignment of administrative employees to clinical duties

Under more severe pandemic conditions institutions may consider:

- Using senior and junior medical students and nurses to make clinical assessments and therapy recommendations with less supervision
- Sophomore and freshman medical students and student nurses working full time taking vital signs, phlebotomy, respiratory care, etc.

Other staff members may have redefined roles and responsibilities based on maturity, experience, and willingness to contribute. As described elsewhere in this guidance document, visitors who pass a screening protocol during later pandemic phases may be allowed into the hospital, provided appropriate PPE and encouraged to assist staff with routine nursing care duties. Table 8 presents a list of possible employee resources for healthcare institutions to draw from in developing staffing surge models.

Table 8. Proposed Strategies to Increase Healthcare Workforce

Increased Usage of Current Staff
• Discuss full-time commitments with per diem staff.   ○ Consider asking them to commit solely to single institution to prevent exposure from other healthcare facilities if going to be working with non-exposed populations. • Use clinical staff in administrative positions to provide patient care. • Volunteer or mandatory cancellation of vacations for caregivers. • Determine essential functions that can be performed through telecommuting, and ensure that applicable employees have appropriate equipment/access prior to pandemic situation. • Call in only personnel needed to address the situation to preserve staff reserves for the long term. Assess availability of clinical staff to work overtime and extra shifts, but ask that staff not “show up” to reduce exposure of staffing resources. • Eliminate or reassign the non-essential functions of clinical staff. • Establish emergency credentialing/employment procedures for clinical staff. Contact applicants in the pre-employment process for early start dates. • Establish minimum documentation required to establish licensure and eligibility for work/payroll. • Contact Department of Health to determine any pre-employment requirements that may be waived in emergency hiring. (i.e., 2 step PPD, out-of-state licenses)

Alternative Sources of Staff

- Contact recent retirees for return to work.
- Supplement staffing with students from all clinical programs.
    - Determine scope of practice for students prior to pandemic situation.
    - Investigate legal protections for use of unlicensed personnel to provide healthcare services
        - Consult with institutional law department
        - Consult PA DOH
- Establish contracts with additional staffing agencies for expanded pool of agency nurses.
- Utilize volunteers for clinical and non-clinical roles.
    - Partner with Philadelphia Chapter of the Red Cross for volunteers.
    - Partner with local and regional Medical Reserve Corps
    - Discuss ability to utilize volunteers and non-bargaining unit employees in bargaining unit positions in emergency situations
    - Encourage visitor assistance with routine nursing care duties

Protection from liability for healthcare facilities and for clinicians who perform duties outside of their qualifications or license have not been adequately addressed by state and federal governing agencies. In addition, clear policies are lacking when utilizing unskilled employees and volunteers to perform services related to patient care. Questions pertaining to liability protection have been presented to state and federal agencies and are pending resolution.

Estimating patient care staff (Influenza Response Teams)

Considerations for staffing during a severe pandemic were proposed so healthcare institutions could plan staffing needs. Pandemic patient to clinical staff ratios were derived from doubling of current patient to non-emergency staff ratios. Increasing the patient to nurse ratio by a factor of 2 is arbitrary and untested, but may be achievable and sets an upper limit for the expected patient care duties of nurses that continue to report for work. The proposed assumptions and estimates that follow (see Table 9) do not consider variability among pediatric staffing ratios.

Table 9. Proposed staff to patient ratios and staff position estimates for implementation of altered standards of care during a severe influenza pandemic*

Staff stratified by Unit (% of all units served)	**Normal circumstances approximate staff to patient ratio**	**Severe pandemic proposed staff to patient ratio**	**Staff per 100 patients given severe pandemic**	**Positions given unit percentage**
Intensive Care Unit Staff (10%)				
Nurses	1:2	1:4	25	2.5
Physicians	1:8	1:15	6.7	1.0
Intermediate Care Unit (10%)				
Nurses	1:4	1:8	12.5	1.5
Physicians	1:15	1:30	3.3	1.0
Medical/Surgical Units (80%)				
Nurses	1:10	1:20	5	4.0
Physicians	1:25	1:50	2	2.0
Other Clinical Services (100%)				
Infectious Disease Specialists	1:50	1:100	1	1.0
Infection Control Professionals	1:50	1:100	1	1.0
Respiratory Therapists	3:50	3:100	3	3.0
Radiology technicians	2:50	2:100	2	2.0
Housekeeping	2:50	2:100	2	2.0
Total				**21**

* Estimates based on staffing models for large university based institution

During altered standards of care, total non-emergency department positions for inpatient clinical care is estimated at 21 full time equivalents (FTE). Assuming that there would need to be an additional 20 emergency department clinical staff (crude assumption), this estimates 41 staff positions per 100 patients or roughly 2:5 clinical staff to patients during a severe pandemic. Healthcare institutions may consider this matrix when estimating staffing needs during a national healthcare crisis.

B. Bed Capacity

1. Identification of expanded bed space

During the winter of 2006, the Delaware Valley Healthcare Council with support from PDPH commissioned a study to assess expanding patient bed capacity within hospitals. Eleven hospitals in the five southeastern Pennsylvania counties participated in this survey that prioritized bed expansion by staffing and supply availability for a mass traumatic event, and a biologic event. From this survey, the work group panel proposed a hospital surge bed prioritization to reflect best approaches during widespread influenza transmission (see Table 10). Hospitals are advised to conduct internal assessments for identification of spaces that may serve to expand bed capacity and to include a prioritization strategy into their emergency response plan.

Table 10. Proposed Hospital Surge Bed Location Prioritization

Priority	Bed Location	Examples/Comments
1	Unoccupied, staffed beds	Wards, ED
2	Set-up, unstaffed beds	Closed wards
3	Early transfer and discharge of patients	Medical safety permitting, possible transfer to an alternate observation facility if opened
4	Conversion of private rooms to semi-private, use of alternate locations with access to oxygen and suction	Recovery room/PACU, cardiac catheterization lab, endoscopy suites, ultrasound rooms. Cohort infected patients
5	Other spaces without oxygen and suction	Rehabilitation gyms, cafeteria, physical therapy units, etc., as practical

Pennsylvania Code and guidelines for exceeding licensed bed capacity

The Pennsylvania Department of Health (PA DOH) has information for healthcare institutions in the Commonwealth to review when exceeding Medicare exempt and licensed bed capacity. This information is available at the PA DOH's Facility Message Board website, notice dated October 19, 2006: Notice to Assist Pennsylvania Hospitals to Accommodate Increased Inpatient Demands Related to Influenza 2006-2007.[36] The following summarizes the information presented in the notice.

- Pennsylvania Code §101.172. Patient Limits: The number of patients admitted to any area of the hospital shall not exceed the number for which the area is designed, equipped, and staffed except in cases of emergency, and then only in accordance with the emergency or disaster plan of the hospital.

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- Hospitals should review and revise emergency response plans to include the potential for exceeding licensed and certified inpatient capacity.
    - Plans should include actions to protect patient health, safety, and privacy.
- Hospitals are encouraged to review historical records to determine the peak hospital bed need during prior influenza seasons, and then plan to meet or exceed this peak.
- Hospitals should use licensed and certified beds before using unlicensed or exempt beds.
- The Division of Acute and Ambulatory Care (DAAC) will assess practicality of expanding bed capacity.

- Hospitals should, where practical, postpone inpatient and outpatient elective procedures (surgery). Certain procedures may not be postponed if cancellation will lead to an emergency department visit or admission.
- After above steps are met, hospitals may use exempt psychiatric or rehabilitation unit beds for medical surgical patients.
    - DAAC must be contacted for approval.
    - CMS has authority to approve this temporary use if the Secretary of Health or designee declares a health emergency and recommends such use to CMS.
- When the above steps are insufficient to meet demand:
    - Hospitals may add non-licensed beds to hallways, offices, and other non-patient care areas.
    - This must be reported to the PA DOH through PAPSRS within 24 hours under infrastructure failure.
    - DAAC will focus on two elements:
        - Were the non-licensed beds adequately staffed?
        - Did the hospital follow the steps in its emergency response plan?

***Recommendation:* Hospitals are advised to explore internal expansion of inpatient bed capacity, to include such guidelines in their emergency response plans, and to implement the expansion in accordance with policies set forth by the PA DOH.**

2. Integration of non-traditional acute care spaces

Home care strategies

To minimize the burden of care placed on hospitals, criteria for admission will need to be severe and reserved for life-threatening illness as the pandemic allows. After medical evaluation, management of non-critically ill patients will emphasize a homecare strategy relying on family members as primary care givers. Additional support for patients with special needs, who live alone, or who are homeless will require extensive planning and coordination with existing home-based healthcare service programs and other government and emergency response agencies. Planning for this support is ongoing and specific policies related to this healthcare planning initiative will be updated into this document as they become available.

Alternate care facilities

If the number of acutely ill patients exceeds hospital and home-based care capacity, it may be necessary to establish additional venues to manage certain populations of patients. These non-traditional or alternate care facilities require extensive planning with clear delineation of roles and the scope of services provided. A recent analysis of U.S. based plans for alternate care facilities during an influenza pandemic recommended the following guidance for operation:[37]

- Triage, medical assessment and minimal supportive care for suspect influenza patients located near an emergency department with strict adherence to rapid separation of infected patients.
    - Provision of supportive care to include: oral and IV hydration, antiviral and antibiotic treatment, bronchodilation, and pain management.
- Minimal medical support to patients considered for early discharge, and non-influenza patients requiring intermediate care.
- Convalescent care of recovering influenza patients who live alone and are unable to care for themselves or who are homeless.
- Provision of mechanical ventilation would be very difficult to establish and hazardous to operate in an alternate care facility.
- Hospitals should be considered as the focal point for critically ill patients.
- Pandemic planners must address anticipated shortages of trained medical personnel.
- Preparedness could be enhanced by integration of multiple purposes for alternate care facilities.

***Recommendation:** Alternate care facilities should focus on providing triage evaluation and minimal medical support services with strict adherence to influenza specific infection control strategies as appropriate.*

Some work group participants voiced their concern for the ability of a hospital to staff alternate sites of care in addition to staffing their hospitals during a pandemic. Sources for expanded medical personnel to staff an alternate site of care may come from the regional chapter of the Medical Reserve Corps and other emergency volunteer organizations, though it is expected that these sources may be limited.

The decision to open alternate care facilities should be made jointly by the healthcare sector and relevant government agencies after implementation of expanded inpatient bed capacity plans and when redistribution of patients is no longer manageable. Declaration of a health emergency by the Secretary of Health, Governor, or both will create the appropriate social background to proceed with opening an alternate site of care. Supplies and staff to operate an alternate care facility will likely be limited. The following lists some important elements for planning:

- Support from a parent institution (hospital, health care network) practice owners, PDPH, Philadelphia Fire Dept/EMS (support defined as logistic, financial, legal);
- Command for operations of the alternate care facility should be assigned to a director level medical professional affiliated with the supporting hospital or government agency;
- An established relationship with a hospital and a mechanism for transport and direct admission to that hospital, for those patients requiring hospital level care; and,
- A commitment to a pre-determined number of available days of operation (minimum 14 days).

C. Consumable and Durable Supplies

1. Essential supplies

Healthcare institutions should track in-hospital amounts of medical supplies during times of rapid consumption. The following are consumable and durable supplies that will be in demand during a pandemic as identified by DHHS:[38]

Consumable resources:

- Hand hygiene supplies (soap and water and alcohol-based gels)
- Disposable N95, surgical and procedure masks
- Face shields
- Gowns
- Gloves
- Facial tissues
- Central line kits
- Morgue packs

Durable resources:

- Ventilators
- PAPRs
- Respiratory care equipment
- Beds
- IV pumps

Hospitals should consider increasing amounts of on-hand antibiotics for bacterial complications of influenza, medications for palliative care, and any additional items not mentioned above that are deemed essential for continuity of operations during a severe influenza pandemic.

It is advised for hospitals to identify and assess their anticipated needs for consumable and durable supplies for a severe pandemic strain that is 1918-like (35% attack rate and first pandemic wave lasting 12 weeks) to self-sustain for the first seven weeks of a severe pandemic wave. This would

allow enough time for external assistance and deployment of materials in the Strategic National Stockpile (SNS) (see section II.9.C.3 Strategic National Stockpile Materials, page 79). Programs developed by the CDC can assist healthcare facilities in calculating estimates of patients to expect during a severe pandemic (FluAid and FluSurge).

It was the consensus of the working groups that even though Memorandums of Understanding (MOU's) have been organized for the sharing of equipment, staff, and supplies between hospitals in the Philadelphia metropolitan area, during the middle of a severe pandemic sharing supplies will be impractical. During a recent regional pandemic influenza exercise, it was demonstrated that local venders who provide ventilators and additional emergency supplies have contracts with multiple hospitals in the region, and therefore have inadequate supplies to support a pandemic. Planning initiatives are addressing this need to expand vender-based supply chains. In the meantime, hospitals are encouraged to establish contingency plans, in addition to the use of the SNS supplies, for situations in which primary sources of medical supplies become limited or depleted. Planning should account for interruptions in supply chain of essential resources as a pandemic becomes widespread. Anticipation for additional interruptions in the delivery of electricity, fuel, oxygen and other gases, chemicals for laboratory testing, cleaning supplies, and food and potable water for patients and employees is advised. Other supplies to consider include: generators, sufficient supplies of potable water, and non-perishable, ready to eat foods that do not require freezing or refrigeration, such as MRE's (Meals Ready to Eat). Hospitals should devise alternate methods for supply of electricity, essential gases, chemicals, fuels, and food and water supplies that are necessary for hospital operations and include these into internal plans.

2. Pre-pandemic stockpile recommendations

Personal protective equipment

Healthcare facilities may choose to acquire a cache of personal protective equipment in anticipation of a severe pandemic. The following tables (see Tables 11 and 12) contain estimations of PPE for clinical staff, patients, and visitors, for 500 and 200 bed facilities for stockpile in preparation for the first 7 weeks of a pandemic given the staffing model and infection control guidelines for PPE outlined in other sections of this document (see section II.4.A Staffing Plan page 27, and section II.6.A PPE Recommendations page 44). Assumptions for these calculations included severe pandemic conditions (1918-like, 35% attack rate, 12 week initial wave duration) and a 7-week (50 day) period for hospitals to self-sustain before external supplies would be received. Estimation of percentages of populations that would receive exposures, number of staff per hospital bed, staff assignment, and level of PPE to be worn were derived from panel discussion and recommendations for levels of risk and level of protection from CDC, OSHA, WHO, and DHHS. The following calculations were devised for employees, patients, and visitors, with staff PPE further divided by level of risk of assignment based on OSHA guidelines.

Assumptions for calculations for Tables 11 and 12:

- Based on a 6:1 staff to patient ratio we estimated a 500-bed facility to have about 3,000 staff, and a 200 bed facility to have about 1,200 staff.
- Staff:
    - The following breakdown of staff level of risk was determined by panel discussion
        - 5% of staff will have very high-risk exposure to persons with confirmed or suspect influenza including the Influenza Response Team.
        - 1% of staff will have high-risk exposure to persons with confirmed or suspect influenza.
        - 70% of staff will have medium-risk exposure to influenza.
        - 24% of staff will have a lower-risk exposure to influenza.
- Patients:
    - Using FluSurge and FluAid Software, developed by the CDC, the number of influenza patients admitted to hospital was determined by summing the first seven weeks of

influenza patients during a 1918-like, severe pandemic first wave lasting 12 weeks with a 35% attack rate.
    - Patient stay estimated by FluSurge of 5 days.
- Visitors:
    - Estimate one visitor per suspect or confirmed influenza case.
    - Assume 2/3 of all visitors of influenza patients to be exposed to influenza.

Table 11. Proposed estimation matrix for stockpiling PPE for a 200-bed healthcare institution (approximately 1,200 staff) for the initial 7 weeks of an influenza pandemic. Assume severe conditions: 35% attack rate and 1918 like virus.

	Population by Risk and Estimation (%) of institution staff	Respiratory Personal Protective Equipment				Other Personal Protective Equipment		
	Account for 2 shifts per day (2 FTE*)	Surgical	N-95**	PAPR*** Hood/ Hose	PAPR	Gloves	Face Shields	Gowns
STAFF	**Very High Risk**** (IRT*****) **5% of Staff** 1,200 (0.05) **= 60 FTE**	1 per day per FTE (60 FTE) (50 days) = **3,000**	1 per day per FTE (60 FTE) (50 days) = **3,000**	1 per FTE for pandemic duration (60 FTE) **= 60**	1 per 2 FTE for pandemic duration **= 30**	50 per day per FTE (60 FTE) (50 days) **= 150,000**	10 per day per FTE (60 FTE) (50 days) **= 30,000**	10 per day per FTE (60 FTE) (50 days) **= 30,000**
	High Risk 1% of Staff 1,200 (0.05) **= 12 FTE**	1 per day per FTE (12 FTE) (50 days) = **600**	1 per day per FTE (12 FTE) (50 days) = **600**			25 per day per FTE (12 FTE**)** (50 days) **= 15,000**	5 per day per FTE (12 FTE) (50 days) **= 3,000**	5 per day per FTE (12 FTE) (50 days) **= 3,000**
	Medium Risk 70% of Staff 1,200 (0.70) = **840 FTE**	10 per day per FTE (840 FTE) (50 days) **= 420,000**					1 per day per FTE (840 FTE) (50 days) **= 42,000**	
	Lower Risk 24% of Staff 1,200 (0.24) **= 288 FTE**	5 per day per FTE (288 FTE) (50 days) **= 72,000**						
	Staff Total	**495,600**	**3,600**	**60**	**30**	**165,000**	**75,000**	**33,000**
PATIENTS	I**nfluenza patients ~800** influenza patients first 7 weeks (~5 day hospital stay)	1 per day (5 days stay) (800 patients) **= 4,000**						
VISITORS******	**Influenza patient visitors ~800** influenza patient visitors first 7 weeks (assume 1 per influenza patient)	1 per influenza patient visitor at admission = **800**	1 per day per visitor (800 visitors) (4 days) **= 2,400**			5 per day per visitor (800 visitors) (4 days) **= 16,000**	1 per day per visitor (800 visitors) (4 days) **= 2,400**	1 per day per visitor (800 visitors) (4 days) **= 2,400**
	Symptomatic or exposed ~530	1 per day per visitor = **530**						
	Visitor Totals	**1,230**	**2,400**			**16,000**	**2,400**	**2,400**
TOTAL	**Total**	**500,930**	**6,000**	**60**	**30**	**181,000**	**77,400**	**35,400**

* FTE - Full Time Equivalent
**N-95 mask assumed to function for duration of 12-hour shift
*** PAPR - Powered air purifying respirator
**** Level of risk scheme derived from OSHA Guidance on Preparing Workplaces for an Influenza Pandemic.
***** IRT - Influenza Response Team
****** Non-influenza patient visitors ~2,625, hospital does not provide PPE for this group

Table 12. Proposed estimation matrix for stockpiling PPE for a 500-bed healthcare institution (approximately 3,000 staff) for the initial 7 weeks of an influenza pandemic. Assume severe conditions: 35% attack rate and 1918 like virus.

	Population by Risk and Estimation (%) of institution staff	Respiratory Personal Protective Equipment				Other Personal Protective Equipment		
	Account for 2 shifts per day (2 FTE*)	Surgical	N-95**	PAPR*** Hood/ Hose	PAPR	Gloves	Face Shields	Gowns
STAFF	**Very High Risk**** (IRT*****) **5% of Staff** 3,000 (0.05) **= 150 FTE**	1 per day per FTE (150 FTE) (50 days) = **7,500**	1 per day per FTE (150 FTE) (50 days) = **7,500**	1 per FTE for pandemic duration (150 FTE) **= 150**	1 per 2 FTE for pandemic duration **= 75**	50 per day per FTE (150 FTE) (50 days) **= 375,000**	10 per day per FTE (150 FTE) (50 days) **= 75,000**	10 per day per FTE (150 FTE) (50 days) **= 42,000**
	High Risk 1% of Staff 3,000 (0.05) **= 30 FTE**	1 per day per FTE (30 FTE) (50 days) = **1,500**	1 per day per FTE (30 FTE) (50 days) = **1,500**			25 per day per FTE (30 FTE) (50 days) **= 37,500**	5 per day per FTE (30 FTE) (50 days) **= 7,500**	5 per day per FTE (30 FTE) (50 days) **= 4,200**
	Medium Risk 70% of Staff 3,000 (0.70) = **2,100 FTE**	10 per day per FTE (2,100 FTE) (50 days) **= 1,050,000**					1 per day per FTE (2,100 FTE) (50 days) **= 105,000**	
	Lower Risk 24% of Staff 3,000 (0.24) **= 740 FTE**	5 per day per FTE (740 FTE) (50 days) **= 185,000**						
	Staff Total	**1,244,000**	**9,000**	**150**	**75**	**412,500**	**187,500**	**46,200**
PATIENTS	I**nfluenza patients ~2,000** influenza patients first 7 weeks (~5 day hospital stay)	1 per day (5 days stay) (2,000 patients) **= 10,000**						
VISITORS******	**Influenza patient visitors ~2,000** influenza patient visitors first 7 weeks (assume 1 per influenza patient)	1 per influenza patient visitor at admission = **2,000**	1 per day per visitor (2,000 visitors) (4 days) **= 8,000**			5 per day per visitor (2,000 visitors) (4 days) **= 40,000**	1 per day per visitor (2,000 visitors) (4 days) **= 8,000**	1 per day per visitor (2,000 visitors) (4 days) **= 8,000**
	Symptomatic or exposed ~1,300	1 per day per visitor = **1,300**						
	Visitor Totals	**3,300**	**8,000**			**40,000**	**8,000**	**8,000**
TOTAL	**Total**	**1,257,300**	**17,000**	**150**	**75**	**452,500**	**195,500**	**54,200**

* FTE - Full Time Equivalent
**N-95 mask assumed to function for duration of 12-hour shift
*** PAPR - Powered air purifying respirator
**** Level of risk scheme derived from OSHA Guidance on Preparing Workplaces for an Influenza Pandemic.
***** IRT - Influenza Response Team
****** Non-influenza patient visitors ~7,000, hospital does not provide PPE for this group

3. Strategic national stockpile materials

The Federal government maintains a national repository of life-saving pharmaceuticals and medical material referred to as the strategic national stockpile (SNS). The SNS is packaged in two ways: 1) the 12-hour push package contains pharmaceutical, antidotes and medical supplies designed to provide rapid delivery of a broad spectrum of assets for an ill defined threat within 12-hours of a request; 2) specific supplies can be packaged for distribution based on the nature of the medical emergency through the SNS managed inventory system. Materials from the SNS may be distributed to state health departments at the request of the Governor's office.

During an influenza pandemic, it would be expected that many jurisdictions would make requests for similar SNS materials at the same time and therefore supplies would be rationed by the CDC and the Pennsylvania Department of Health and may not meet the full demands of the Philadelphia metropolitan area. Hospitals are advised to maintain a supply of infection control supplies to sustain operations during a severe pandemic for a minimum of 7 weeks. Supplies specific for pandemic influenza contained in the SNS include: antiviral medications, antibacterial medications, masks and respirators, gowns, gloves, IV tubing and fluids. These items may be proactively distributed to state-run warehouses within one week after the decision is made to deploy the supplies. The Philadelphia Department of Public Health will work with the Pennsylvania Department of Health to deploy materials to the healthcare sector in Philadelphia.

D. Special Populations Planning

The primary purpose of this guidance document is to address acute healthcare issues related to pandemic influenza for hospitals, however hospitals in the Philadelphia metropolitan area vary greatly in size and services provided. This initiative has identified several special health related populations that will require additional extensive planning to complete a regional comprehensive pandemic healthcare mitigation plan. These populations include:

- Pediatrics
- Long term care residents
- Dialysis patients
- Psychiatric patients
- Outpatient clinics
- Home care services

Work groups will be convened to address specific issues related to pandemic influenza planning for the above populations. Recommendations from that process will be incorporated into this document as available.

10. MORTUARY ISSUES

A. Protocols

Standard procedures for dealing with the deceased will likely be modified, suspended, or expedited if the numbers of decedents becomes unmanageable. Healthcare facilities should maintain a comprehensive record keeping system of fatalities per day, with identification information and location of bodies (in-hospital, in transport, at morgue/funeral home). Identification and documentation of deceased patients via toe tagging, bagging of decedent, and issuance of a death certificate for every person that is pronounced dead on hospital facility premises must continue to occur. Respecting family wishes for the care of the deceased during a mass fatality event, such as an influenza pandemic, may have to be modified.

Droplet precaution infection control procedures should be utilized when handling decedents of pandemic influenza. If family members wish to view the body of the patient prior to removal from the patient room they may be allowed to do so using appropriate PPE (see WHO recommendations below). Bodies should be toe tagged and bagged prior to removal from patient room. Deceased should then be transported to the designated mortuary storage area (refrigerated room) until transport is arranged. Hospitals are expected to utilize existing morgue space to capacity. Bodies may be placed on the floor of the refrigerated room instead of on stretchers or gurneys and then stacked to maximize space. In the event that the pandemic is extremely severe, and there are more fatalities than can be handled, the Medical Examiner's Office of the County of Philadelphia will initiate a Mass Fatality Response Plan (degree of response dependent upon level of emergency). The current plan indicates that if funeral homes become overwhelmed by the volume of deceased, hospitals must be prepared to store and hold properly identified bodies until the required resources become available for the implementation of a strategy for mass removal and final disposition. Additional security forces may be necessary for the protection of bodies stored on hospital facility premises. In-house cremation may be a possibility for those larger institutions that have incinerators.

> ***Recommendation: Hospitals are advised to maintain a comprehensive log system for the identification and location of decedents.***
>
> ***Recommendation: During a severe pandemic, hospitals should prepare to hold and store decedents for extended periods of time.***

The following is a summary of the WHO recommended protective procedures for healthcare workers to follow when caring for the deceased with avian influenza A infection[39]. These safety precautions could be applied to deceased humans with novel or pandemic influenza strain infection.

Removal of the body from the isolation room/area

- Minimum recommended PPE that healthcare worker should wear for the removal of the body from the room should include particulate respirator; disposable long-sleeved cuffed gown (if not available then a waterproof apron can be used); non-sterile gloves; and if splashing of body fluids is anticipated a face shield or goggles.
- Surgical masks may be used if air has been exchanged in the decedent's room.
- Body should be fully sealed in an impermeable body bag prior to removal from the room.
- Clean the exterior of the body bag prior to removal of body from room if the exterior of the bag is soiled.
- Remove PPE, perform hand hygiene, replace PPE and transfer body to appropriate location through appropriate passageways (designated hallways/elevators if strategy applied).
- Transfer to pathology or mortuary should occur as soon as possible after death.
- If the family of the patient wishes to view the body after removal from the room, they may be allowed to do so. If the patient died in the infectious period, the family should wear gloves and gowns and perform hand hygiene. Kissing or touching the decedents body should be

discouraged, but if this occurs, disinfection is recommended using a common antiseptic (e.g. 70% alcohol). If the family wants only to view the body and the face of the deceased, but not touch it, there is no need to wear additional PPE other than recommended given location in the facility (influenza zone).

- Cultural sensitivity should be practiced when able.
- Perform thorough environmental cleaning of area after body removal.

Postmortem examination

If postmortem examination of a pandemic influenza patient is necessary, full barrier PPE protection must be worn by the autopsy team, avoid any aerosolizing procedures (sawing through respiratory cavity) by using alternative methods, and extensive environmental cleaning must follow the autopsy.

B. Supplies

Healthcare facilities should include the purchase of additional mortuary supplies (body bags, toe tags, death certificates, PPE for mortuary related usage, etc.,) in their stockpiling efforts in preparation for a mass casualty event such as a influenza pandemic. Additional body bags, identification toe tags, and masks and gloves will be essential for the safe handling and extended storage of pandemic influenza decedents.

Recommendation: Hospitals should plan for increased use of mortuary supplies (morgue packs, body bags, death certificates, identification toe tags, PPE specific for care of deceased, etc.) for pandemic planning.

III. APPENDICES

APPENDIX 1. RECOMMENDATIONS BY PHASE SCHEME

All recommendations should be continued from previous phase unless otherwise indicated.
Refer to the identified page number of guidance document for further explanation.

Phase	3
Transmission	**Human Infection (transmission in close contacts only)**
Introduction and Planning Process	Recommendation: Healthcare institutions should maintain awareness of the current pandemic phase and initiate appropriate recommended control strategies. (page 12) Recommendation: When hospital stress exceeds the ability of the institution to provide minimum standard healthcare during a pandemic, communication to PDPH is recommended to receive guidance (215-685 -6741, after hours 215-685-1776). (page 12)
Hospital Surveillance	Recommendation: Monitoring employee absenteeism should not be a primary method of surveillance but may be used to supplement assessment of hospital stress if collected daily and internal system already exists. (page 17)
Patient Surveillance	No recommendations
Laboratory Diagnosis	Recommendation: Healthcare staff with suspect pandemic influenza should receive strain specific laboratory testing (H-subtyping). (page 19) Recommendation: Point of care (POC) testing for pandemic influenza should not be routinely used for diagnosis. (page 19)
Staff Surveillance	Recommendation: Begin employee education campaigns for the recognition of symptoms of influenza during pandemic phase 3 and provide education on hand washing, covering coughs, and seasonal vaccination. (page 15)
Surveillance systems to monitor Healthcare Utilization	Recommendation: Emergency department syndromic surveillance will be conducted by PDPH with frequent distribution of summary bulletins to the healthcare community during a pandemic. The fever-flu syndrome can be used as a component to assess influenza like illness burden on healthcare institutions. (page 17)
Hospital Communications	Recommendation: Hospitals are advised to develop a comprehensive crisis communications plan with elements prepared specifically for an influenza pandemic. PDPH has provided sample guidelines for creating a hospital crisis communication plan in Appendix 5. (page 20) Recommendation: Hospitals are advised to reference “Delaware Valley Health Care Disaster Task Force Media Protocols During a Declared Emergency.” These policies and procedures should be implemented among hospitals and healthcare institutions in the Delaware Valley in the event the Federal, State, or local government declares an emergency, such as an influenza pandemic. (see Appendix 5) (page 20) Recommendation: Altered standards of care should be communicated to healthcare staff and to the public at a minimum of one phase prior to their implementation and messages should be coordinated with local government. (page 20) Recommendation: Hospitals should consult with PDPH or the health department in their jurisdiction on how to manage message content and public inquiries via telephone hotlines and websites including: • How to handle public inquiries and what types of calls to refer to the health department. • Coordinate information that will be provided by hospitals and the types of inquiries that will be referred to the local health department or PA DOH. (page 21) Recommendation: Effective two-way communication between hospitals and PDPH should be maintained. PDPH, DVHC or other lead agency will initiate regularly scheduled conference calls with all area hospitals. As information becomes available, PDPH will provide updates and guidance related to disease susceptibility, diagnosis, management and other topics. Hospitals should also report on initial cases, then levels of disease burden and hospital stress, current and anticipated supply and personnel shortages, and other relevant issues. (page 21) Recommendation: Hospitals should ensure that an incident command structure is in place during an influenza pandemic. Communication protocols should be defined by the incident command structure and provide for regular information updates to management and key personnel during an influenza pandemic. (page 22) Recommendation: Hospitals should develop and maintain mechanisms to reach all employees with urgent communications related to hospital status and working conditions. Mechanisms should be exercised yearly. Informational flyers may be added to paycheck envelopes as an additional way to communicate with employees. (page 22)
Education and Training	Recommendation: Employee, patient, and visitor education on transmission, vaccination, and infection control measures regarding seasonal influenza should occur through the fall and winter months, during pandemic phase 3. (page 23)

Phase	3
	Recommendation: Respiratory hygiene, cough etiquette, and hand hygiene education activities including use of language and reading-level appropriate signage clearly posted in common areas should begin in pandemic phase 3 during fall and winter months and be ongoing from the onset of phase 4A. (page 24) Recommendation: Conduct ongoing fit testing of N-95 respirators for all employees regardless of position beginning in pandemic phase 3. (page 25)
Triage, Clinical Evaluation, and Admissions	Recommendation: During phase 3, patients presenting with suspect novel influenza should receive H-subtype diagnostic testing and standard and droplet infection control protocols. Cases should be promptly reported to the local public health authority. (page 30)
Facility Access Planning	Recommendation: Restrictions and rules for patient visitation must be communicated to the public in advance of implementation to promote maximum compliance. (page 38) Normal hospital visitation policies will remain in effect for all patients during phase 3. (page 38)
Infection Control Guidelines	Recommendation: Extensive and repeated hand washing is essential for control of influenza in the healthcare setting. (page 47)
Occupational Health Issues	No recommendation
Use and Administration of Vaccines and Antiviral Drugs	Recommendation: Healthcare institutions are advised to acquire and maintain a minimal supply of antiviral medications for targeted prophylactic use and selective treatment for patients who will most likely benefit from their administration. (page 64) Recommendation: Hospitals should provide Influenza Response Team members a prophylactic daily dose of antiviral medication for 50 days. (page 64) Recommendation: Confirmed influenza patients should be provided antiviral treatment if presenting within 48 hours of onset of symptoms during pandemic phases 3 through 4B, and phase 7. (page 65) Recommendation: Hospitals should obtain and manage a small surplus of antibiotic medications to treat pandemic influenza patients with bacterial pneumonia. (page 68)
Surge Capacity	Recommendation: Healthcare institutions should identify essential roles and staff who can fulfill those responsibilities. (page 69) Recommendation: Hospitals are advised to explore internal expansion of inpatient bed capacity, to include such guidelines in their emergency response plans, and to implement the expansion in accordance with policies set forth by the PA DOH. (page 73) Recommendation: Alternate care facilities should focus on providing triage evaluation and minimal medical support services with strict adherence to influenza specific infection control strategies as appropriate. (page 74)
Mortuary Issues	Recommendation: Hospitals are advised to maintain a comprehensive log system for the identification and location of decedents. (page 80) Recommendation: Hospitals should plan for increased use of mortuary supplies (morgue packs, body bags, death certificates, identification toe tags, PPE specific for care of deceased, etc.) for pandemic planning. (page 81)

Phase	4A
Transmission	**Limited human-to-human spread; small clusters <25 cases lasting <2 weeks** **Limited human to human spread in North America**
Introduction and Planning Process	No additional recommendations
Hospital Surveillance	No additional recommendations
Patient Surveillance	No additional recommendations
Laboratory Diagnosis	Recommendation: Strain specific laboratory testing (H-subtyping) is advised for patients with very high suspicion of infection with pandemic influenza during phases 4A until the beginning of phase 5A. (page 18)
Staff Surveillance	Recommendation: PASSIVE SURVEILLANCE - Begin aggressive employee education for the recognition of symptoms and risk factors for pandemic influenza during pandemic phase 4A and encourage reporting of illness to supervisor. Also educate on policies regarding furlough, mandatory sick leave, infection control, and employee compensation. (page 16) Recommendation: Maintain aggressive education and passive surveillance of employees through pandemic phase 7. Review and modify exclusion policies as needed. (page 16)
Surveillance systems to monitor Healthcare Utilization	No additional recommendations
Hospital Communications	Recommendation: During pandemic phases 4A through 7, hospitals should post information on E Team about their operational status, including number of patients being treated, current bed capacity, personnel capacity, blood bank inventory, and other relevant factors. (page 21)
Education and Training	Recommendation:Staff, patient, and visitor education activities for pandemic influenza should begin early in phase 4A and be ongoing, to promote maximum preparedness of staff and maximum compliance from visitors and patients. Phase-specific education protocols should be delivered during the preceding phase. (page 23) Recommendation: Pandemic influenza education on clinical signs and symptoms and appropriate infectious disease precautions should begin during pandemic phase 4A and be ongoing as updates become available. (page 23) Recommendation: At phase 4A, all employees should be informed of the healthcare facility's relevant pandemic influenza plan so that they understand procedures before they are implemented. (page 23) Recommendation: Respiratory hygiene, cough etiquette, and hand hygiene education activities including use of language and reading-level appropriate signage clearly posted in common areas should begin in pandemic phase 3 during fall and winter months and be ongoing from the onset of phase 4A. (page 24) Recommendation: Staff education about the antiviral medication distribution plan should begin in phase 4A and be ongoing to maximize understanding and compliance of employees and the public. (page 24) Recommendation: Employees and public education about hospital visitation restriction policies for pandemic influenza should begin in phase 4A to promote maximum compliance. (page 24) Recommendation: Begin education activities during pandemic phase 4A for employees about the importance and methods of wearing pandemic PPE properly. Provide materials to describe PPE guidelines for patients and visitors receiving care during phase 4B. (page 25) Recommendation: At phase 4A, identify employees to become Influenza Response Team (IRT) members and educate them on roles, guidelines, PPE, prophylaxis, treatment zones, exposure reduction tactics, and functions of these positions. (page 25) Recommendation: Prepare to educate and train new and re-assigned employees regarding facility orientation, pandemic influenza principles, and pertinent control strategies. (page 26) Recommendation: Healthcare institutions should maintain strict documentation of all trainings and educational activities pertaining to pandemic influenza. (page 26)
Triage, Clinical Evaluation, and Admissions	Recommendation: Hospitals are advised to develop a group of healthcare workers dedicated to the daily treatment of pandemic influenza patients in phase 4A, and activate them in phase 4B. (page 27)
Facility Access Planning	Recommendation: Visitor and patient education on hospital pandemic visitation restriction policies should begin in phase 4A, though there are no recommended limitations during this phase. (page 39)
Infection Control Guidelines	Recommendation: Patients presenting with a febrile respiratory illness should be identified and provided a surgical mask with instructions for use beginning in pandemic phase 4A. (page 46)
Occupational Health Issues	Recommendation: Healthcare workers will likely have concerns associated with working during a pandemic that may be alleviated by timely institutional preventive measures, training, and education.

Phase	4A
	(page 56) Recommendation: Healthcare employees are advised to develop a family support disaster plan. (page 57) Recommendation: A buddy system should be implemented for all healthcare employees as appropriate for psychological support and adherence to pandemic mitigation strategies. Education should begin in phase 4A, and the system implemented during phase 4B. (page 60)
Use and Administration of Vaccines and Antiviral Drugs	No additional recommendations
Surge Capacity	Recommendation: Beginning in phase 4A, cross train essential employees of the facility so that they are capable of performing the tasks of multiple essential roles. (page 69)
Mortuary Issues	No additional recommendations

Phase	4B
Transmission	**Limited human-to-human spread in Northeast United States (300 mile radius around Philadelphia)**
Introduction and Planning Process	Recommendation: Beginning in pandemic phase 4B, healthcare institutions are advised to conduct a daily internal assessment of hospital stress that evaluates the institution's capabilities to provide minimum standard healthcare to all patients. (page 12)
Hospital Surveillance	No additional recommendations
Patient Surveillance	No additional recommendations
Laboratory Diagnosis	No additional recommendations
Staff Surveillance	Recommendation: BEGIN ACTIVE SURVEILLANCE Implement a shift-based verbal assessment of illness and exposure for all employees who have access to clinical areas as they begin and finish each shift, during phase 4B through phase 7. For Influenza Response Team members include temperature testing in the pre and post-shift evaluation. (page 16)
Surveillance systems to monitor Healthcare Utilization	Recommendation: Monitor daily in-patient census and level of care as a component to assess hospital stress beginning in phase 4B. (page 18)
Hospital Communications	No additional recommendation
Education and Training	Recommendation: Provide materials to describe PPE guidelines for patients and visitors receiving care during phase 4B. (page 25)
Triage, Clinical Evaluation, and Admissions	Recommendation: Hospitals are advised to develop a group of healthcare workers dedicated to the daily treatment of pandemic influenza patients in phase 4A, and activate them in phase 4B. (page 27) Recommendation: Influenza Response Team members should perform additional patient care duties that decrease the number of staff needed to enter the influenza treatment area and combine patient care visits to decrease usage of PPE. (page 27) Recommendation: Influenza Response Team (IRT) members should receive daily prophylaxis with a neuraminidase inhibitor beginning in phase 4B. (page 27) Recommendation: IRT members should utilize the buddy system, be assessed by supervisors at the start and finish of each shift, and assist each other with PPE application and removal. (page 28) Recommendation: Healthcare institutions should create influenza zones in the ED and other entrances where patients present with pandemic influenza beginning in phase 4B. (page 28) Recommendation: Healthcare institutions should create influenza zones in all areas of the hospital where pandemic patients will be evaluated, undergo procedures, and receive care. (page 29)
Facility Access Planning	Recommendation: At phase 4B, healthcare institutions should limit facility access for employees and visitors to one main entrance and assign security to maintain order. (page 37) Recommendations: Restrict visitor access to one entrance and conduct a brief interview for illness and exposure to influenza during pandemic phase 4B. Exclude those who are symptomatic and those with an exposure. Keep a visitor log to help with contact tracing. (page 39) Recommendation: Emergency department patients should be limited to one visitor per patient during pandemic phase 4B and both should be interviewed for pandemic influenza illness and exposure. (page 40)
Infection Control Guidelines	Recommendation: Personal Protective Equipment (PPE) recommendations for very high and high exposure risk should be followed once IRT activation has occurred (phase 4B) and influenza zones have been established. (page 46)
Occupational Health Issues	Recommendation: Exclude ill employees from the work environment. Set up occupational health stations for evaluation and education on infection control and exclusion policies beginning in phase 4B. Perform rapid diagnostic testing for influenza and H-subtype diagnostic testing for staff with suspect influenza. (page 49) Recommendation: A buddy system should be implemented for all healthcare employees as appropriate for psychological support and adherence to pandemic mitigation strategies. Education should begin in phase 4A, and the system implemented during phase 4B. (page 60)
Use and Administration of Vaccines and Antiviral Drugs	No additional recommendations.
Surge Capacity	Recommendation: Employees who are pregnant or immunocompromised should be encouraged to disclose their condition to their supervisor for re-assignment away from direct patient care responsibilities during pandemic phase 4B. (page 69) Recommendation: Housekeeping staff should be re-assigned to maintain aggressive environmental cleaning policies in patient treatment areas and high traffic common areas. (page 70)
Mortuary Issues	No additional recommendations

Phase	4C
Transmission	**Limited human to human spread in the Philadelphia metropolitan area.**
Introduction and Planning Process	No additional recommendation
Hospital Surveillance	No additional recommendations
Patient Surveillance	Recommendation: Beginning in phase 4C and ongoing, healthcare employees who record vital signs should also screen for clinical signs that fit the case definition for influenza and report suspect cases immediately to their unit supervisor. (page 15)
Laboratory Diagnosis	No additional recommendations
Staff Surveillance	Recommendation: MAINTAIN ACTIVE SURVEILLANCE Implement a shift-based verbal assessment of illness and exposure for all employees who have access to clinical areas as they begin and finish each shift, during phase 4B through phase 7. For Influenza Response Team members include temperature testing in the pre and post-shift evaluation. (page 16)
Surveillance systems to monitor Healthcare Utilization	No additional recommendations
Hospital Communications	No additional recommendations
Education and Training	No additional recommendations
Triage, Clinical Evaluation, and Admissions	No additional recommendations
Facility Access Planning	Recommendation: Outpatient appointments for routine physicals and chronic disease management may be suspended during pandemic phase 4C through phase 7. Clinics should prepare to receive pandemic influenza patients for evaluation. (page 38) Recommendations: Limit one visitor per hospitalized patient during pandemic phase 4C, maintain a visitors log, and encourage visitor assistance with routine nursing care. (page 40) Recommendation: Visitors of influenza patients should be given PPE including a gown, gloves, and an N95 respirator approximated for best fit, and education on PPE application and maintenance, hand hygiene and respiratory etiquette.(page 40)
Infection Control Guidelines	Recommendation: PPE recommendations for employees with medium and lower exposure risk should be activated once pandemic influenza is suspected to be circulating within the local community (phase 4C). (page 46) Recommendation: Patients with confirmed or suspect pandemic influenza should wear a surgical mask when others are present in their room, and while being transported through the healthcare facility. (page 46) Recommendation: Visitors will be encouraged to assist with routine nursing care and should be offered PPE based on level of risk outlined for staff. (page 46)
Occupational Health Issues	Recommendation: Staff returning to work should be evaluated by occupational health for recovery status and work assignment. (page 50) Recommendation: Employees with a documented significant exposure should receive a minimum of one course of antiviral prophylaxis and be furloughed or asked to follow work quarantine protocols as dictated by level of pandemic influenza transmission, medication supplies, and staffing shortages. (page 53) Recommendation: Work quarantine is recommended for implementation of high-risk exposed staff and significantly exposed employees once pandemic influenza severely stresses the resources of the healthcare community. (page 54) Recommendation: Staff in WQ and their household members should receive education on the procedures and rationale for WQ and HQ. (page 54) Recommendation: Exposed employees should be assessed on an individual basis whether to begin WQ for approximately 5-7 days, and should be closely monitored for development of symptoms. (page 55)
Use and Administration of Vaccines and Antiviral Drugs	Recommendation: Suspect and confirmed influenza patients should be provided antiviral treatment if presenting within 48 hours of onset of symptoms during pandemic phases 4C to 6. (page 65) Recommendation: Healthcare workers who have sustained a significant pandemic influenza exposure within the hospital setting should receive counseling and a 10-day course of antiviral prophylaxis. (page 65) Recommendation: Patients and visitors who have sustained a significant pandemic influenza exposure within the hospital setting should receive a 10-day course of antiviral prophylaxis. (page 65)
Surge Capacity	No additional recommendations
Mortuary Issues	No additional recommendations

Phase	5A
Transmission	**Localized human to human spread; larger clusters 25-50 cases over 2-4 weeks Infected individual or close contact is identified within institution/facility.**
Introduction and Planning Process	
Hospital Surveillance	No additional recommendation.
Patient Surveillance	No additional recommendation.
Laboratory Diagnosis	No additional recommendation.
Staff Surveillance	No additional recommendation.
Surveillance systems to monitor Healthcare Utilization	No additional recommendation.
Hospital Communications	No additional recommendation.
Education and Training	No additional recommendation.
Triage, Clinical Evaluation, and Admissions	Recommendation: During later pandemic phases (5 and 6), clinical triage should rely more on symptoms and exposure history and less on diagnostic testing. (page 30) Tentative Recommendation: Pending CMS authorization for reimbursement, begin use of a focused history and physical form for highly suspect influenza patients at phase 5A. (page 34) Tentative Recommendation: Decrease daily progress note writing to once every other day for inpatients who are stable and whose medical plan of care is relatively unchanged. Begin this measure during pandemic phase 5A. Alternatively reduce content of daily progress notes. (page 35)
Facility Access Planning	Recommendation: Suspend elective surgeries at phase 5A and utilize OR space, employees, and resources for pandemic influenza support as appropriate. (page 37) Recommendation: Prohibit visitation for patients 16 years of age and older who are not critically ill during phase 5A. Limit all other patients to one visitor unless critically ill. Adhere to strict infection control practices, maintain a visitor's log, and encourage assistance with routine nursing care. (page 41)
Infection Control Guidelines	Recommendation: Cohort confirmed and highly suspect pandemic influenza patients in the same room and ward of the healthcare institution. (page 47) Recommendation: Patient bed linen changes and towel changes should be done on an as needed basis or when linens and towels are damaged, wet, or soiled with infectious material. (page 48) Recommendation: At the onset of pandemic phase 5A, designate medical equipment for strict use for pandemic patients, avoid removal from influenza wards, and perform regular and aggressive antiviral cleaning of these items. (page 48)
Occupational Health Issues	Recommendation: Healthcare institutions should expand local temporary residential accommodations for employees as available, including call rooms, dormitories, and hotels. (page 58)
Use and Administration of Vaccines and Antiviral Drugs	No additional recommendation
Surge Capacity	No additional recommendation
Mortuary Issues	Recommendation: During a severe pandemic, hospitals should prepare to hold and store decedents for extended periods of time. (page 80)

Phase	5B
Transmission	**Unrelated, non-epidemiologically linked clusters occurring in Philadelphia metropolitan area**
Introduction and Planning Process	
Hospital Surveillance	
Patient Surveillance	No additional recommendation
Laboratory Diagnosis	Recommendation: Strain specific laboratory testing (H-subtyping) is not recommended once pandemic influenza is widespread (phases 5B, 6) but should resume during pandemic phase 7 for patients with high suspicion for influenza. (page 19)
Staff Surveillance	No additional recommendation
Surveillance systems to monitor Healthcare Utilization	No additional recommendation
Hospital Communications	No additional recommendation
Education and Training	No additional recommendation
Triage, Clinical Evaluation, and Admissions	Recommendation: As appropriate during pandemic phase 5B, decrease patient meals to 2 meals per day with an optional snack. Serve cold prepared meals, and utilize disposable dining ware, waste storage space and supplies permitting. (page 36) Recommendation: Patients who present to the hospital for care during phases 5B and 6 should bring with them any routine medications and medical supplies (e.g., oxygen tank, wheelchair). (page 36)
Facility Access Planning	Recommendations: Maintain limited visitation during pandemic phase 5B as outlined in phase 5A. Expect visitors to assist with routine nursing care and provide instructions on duties. (page 41)
Infection Control Guidelines	No additional recommendation
Occupational Health Issues	No additional recommendation
Use and Administration of Vaccines and Antiviral Drugs	No additional recommendation
Surge Capacity	No additional recommendation
Mortuary Issues	No additional recommendation

Phase	6
Transmission	**Widespread in the general population. Transmission continuous and widespread.**
Introduction and Planning Process	No additional recommendation
Hospital Surveillance	No additional recommendation
Patient Surveillance	No additional recommendation
Laboratory Diagnosis	No additional recommendation
Staff Surveillance	No additional recommendation
Surveillance systems to monitor Healthcare Utilization	No additional recommendation
Hospital Communications	No additional recommendation
Education and Training	No additional recommendation
Triage, Clinical Evaluation, and Admissions	Tentative Recommendation: At phase 6, all hospitals should reduce nursing admission paperwork and nursing progress notes for pandemic influenza patients to contain only information critical to the acute care of each influenza patient. (page 35) Tentative Recommendation: At phase 6, hospitals could reduce nursing documentation of patient medications by implementing a medication exception log policy. (page 35) Recommendation: At phase 6, reduce frequency of patient bathing and other select routine nursing activities, maintain monitoring and documentation of vital signs of all patients, and request visitor assistance with routine care. (page 36)
Facility Access Planning	Recommendation: If the institutional situation is critical, visitation can be relaxed to allow one visitor for all patients during pandemic phase 6. Visitors will be expected to assist with routine nursing care. Institutions may stop recording a visitor's log. (page 41) Recommendation: Asymptomatic exposed visitors may be permitted to enter the facility if staffing shortages are critical during pandemic phase 6. They will be expected to assist with routine nursing care and adhere to strict infection control guidelines. (page 41) Recommendation: Symptomatic visitors should be excluded from the facility unless they require medical care. (page 41)
Infection Control Guidelines	Recommendation: Particulate respirators may be reused during pandemic phase 6 or sooner if supplies are limited provided that they remain functional and undamaged. (page 47) Recommendation: Surgical masks may be placed over particulate respirators to decrease contamination and preserve respirator utility. (page 47)
Occupational Health Issues	No additional recommendation
Use and Administration of Vaccines and Antiviral Drugs	No additional recommendation
Surge Capacity	No additional recommendation
Mortuary Issues	No additional recommendation

Phase	7
Transmission	**Recovery phase and preparation for next wave; return to limited human to human spread; small clusters in the community.**
Introduction and Planning Process	No additional recommendation
Hospital Surveillance	No additional recommendation
Patient Surveillance	No additional recommendation
Laboratory Diagnosis	Recommendation: Strain specific laboratory testing (H-subtyping) is not recommended once pandemic influenza is widespread (phase 5B, 6) but should resume during pandemic phase 7 for patients with high suspicion for influenza. (page 19)
Staff Surveillance	No additional recommendation
Surveillance systems to monitor Healthcare Utilization	No additional recommendation
Hospital Communications	No additional recommendation
Education and Training	No additional recommendation
Triage, Clinical Evaluation, and Admissions	No additional recommendation
Facility Access Planning	No additional recommendation
Infection Control Guidelines	No additional recommendation
Occupational Health Issues	No additional recommendation
Use and Administration of Vaccines and Antiviral Drugs	Recommendation: Confirmed influenza patients should be provided antiviral treatment if presenting within 48 hours of onset of symptoms during pandemic phases 3 through 4B, and phase 7. (page 65)
Surge Capacity	No additional recommendation
Mortuary Issues	No additional recommendation

APPENDIX 2: ALTERED STANDARDS OF CARE SUMMARY

The following is a summary of recommendations developed by the work groups that pertain to altered standards of care. Altered standards should be communicated to healthcare employees and to the public at a minimum of one phase prior to their implementation and messages should be coordinated with local government. Legal support for these altered standards is lacking and protection for healthcare institutions and providers is pending new legislation.

Staffing Issues

Managing staffing demands during a severe pandemic will be a formidable task for healthcare institutions and a national staff re-distribution strategy will not likely be feasible. The following lists altered standards for augmentation of staff capacity:

- In pandemic planning phases, pre-identify Influenza Response Teams: healthcare personnel who will evaluate and manage pandemic influenza patients each day during a pandemic. See section II.4.A.1.
- Rescale the nurse to patient ratio to accommodate for staffing and resource shortages and increased numbers of pandemic patients. Refer to II.9.A.3 for a staffing plan. See section II.4.E.2.
- Staff with a documented significant exposure should receive a minimum of one course of antiviral prophylaxis and be furloughed or asked to follow work quarantine protocols as dictated by level of pandemic influenza transmission, medication supplies, and staffing shortages. See section II.7.B.1.
- Work quarantine (WQ) is recommended for implementation of high-risk exposed staff and significantly exposed staff once pandemic influenza severely stresses the resources of the healthcare community. See section II.7.C.
- Staff in WQ should observe home quarantine (HQ) procedures at home. Staff and household members should receive appropriate education. See section II.7.C.
- Staff returning to work should be evaluated by occupational health for recovery status and work assignment. See section II.7.A.2.
- To augment staff during severe pandemic conditions, institutions may consider using senior and junior medical students and nurses to deliver care that exceeds their credentialing. See section II.9.A.3.
- Encourage the assistance of patient visitors to perform routine nursing care duties; provide appropriate education of roles and infection control policies.

Supply Issues

Supplies such as personal protective equipment, medications, healthcare durable supplies and machinery, food and water will be in high demand nationwide. When supplies are low and there is no alternative, hospitals may have to ration and reuse certain supplies. Below are several supply extension recommendations proposed by the work groups.

- Patients who present to the hospital for care during phases 5B and 6 should bring with them any routine medications and medical supplies (e.g., oxygen tank, wheelchair). See section II.4.E.4
- Particulate respirators may be reused if the situation is dire, during pandemic phase 6 or sooner if supplies are limited provided that they remain functional and undamaged. See section II.6.A.3.
- Quick fit-testing by visual inspection for leaks of particulate respirators might have to be used if training staff and proper fit-testing capabilities are insufficient.
- Surgical masks may be placed over particulate respirators to decrease contamination and preserve respirator utility. See section II.6.A.3.
- Masks, gowns, and gloves may not need to be changed between patients with the same infectious disease provided that the items remain unsoiled and functioning.

Standards of Patient Care
In the event of a pandemic or other emergency, it may be necessary to modify patient care standards in order to provide life-saving care for the increased numbers of patients. The following are suggested recommendations to save as many lives as possible.

- During severe pandemic conditions, medical management of pandemic influenza patients and admission should depend on the following factors. See section II.4.D.
    - Available hospital resources (staff, space, and supplies)
    - Home care when medically stable, given appropriate support
    - Admission reserved for critically ill
    - Admission for homeless or those who live alone (might be transferred to an alternate care facility to support these populations if activated)
    - Admission and ventilator and other critical care resource access contingent upon a critical care triage protocol
- Utilize the proposed critical care triage program that contains strict inclusion and exclusion criteria to prioritize patients based on survivability. See section II.4.D.1.
    - Avoidance of removal of any patient from a ventilator or other critical care resource.
    - Emphasis on criteria for initially using critical care resources on patients.
- Tentative Recommendation*: Use of a focused history and physical form for highly suspect influenza patients at phase 5A. See section II.4.D.2.
- Tentative Recommendation*: Decrease daily progress note writing to once every other day for inpatients who are stable and whose medical plan of care is relatively unchanged. Begin this measure during pandemic phase 5A. Alternatively reduce content of daily progress notes. See section II.4.E.1.
- To increase surge capacity, consider early discharge of stable inpatients to alternate sights of care or to home with family care after all staffed and unstaffed licensed beds have been utilized. See section II.4.E.1.
- Tentative Recommendation*: At phase 6, all hospitals should reduce nursing admission paperwork and nursing progress notes for pandemic influenza patients to contain only information critical to the acute care of each influenza patient. See section II.4.E.1.
- Tentative Recommendation*: At phase 6, hospitals could reduce nursing documentation of patient medications by implementing a medication exception log policy. See section II.4.E.2.
- At phase 6, reduce frequency of patient bathing and other select routine nursing activities, maintain monitoring and documentation of vital signs of all patients, and request visitor assistance with routine care. See section II.4.E.2.
- As appropriate during pandemic phase 5B, decrease patient meals to 2 meals per day with an optional snack. Serve cold prepared meals, and utilize disposable dining ware, waste storage space and supplies permitting. See section II.4.E.3.
- Suspend elective surgeries at phase 5A and utilize operating room space and staff for pandemic influenza support as appropriate. See section II.5.B.1.
- Outpatient appointments for routine physicals and chronic disease management may be suspended during pandemic phase 4C through phase 7. Clinics should prepare to receive pandemic influenza patients for evaluation. See section II.5.B.2.
- Patient bed linen changes and towel changes should be done on an as needed basis or when linens and towels are damaged, wet, or soiled with infectious material. See section II.6.E.

***** *Reimbursement requirements and other mandatory patient care protocols need further consideration with appropriate agencies for final clarification and recommendation development.*

Alternate Care Facilities
Criteria for admission to hospitals will need to be severe and reserved for life-threatening illness as the pandemic allows. After medical evaluation, management of non-critically ill patients will

emphasize a homecare strategy relying on family members as primary care givers. If the number of acutely ill patients exceeds hospital and home-based care capacity, it may be necessary to establish additional venues to manage certain populations of patients. The following lists approaches for expanding bed capacity.

- Identify internal expanded bed space using the proposed hospital surge bed location prioritization scheme (see Table 10) summarized below. See section II.9.B.1.
    - Unoccupied, staffed beds
    - Set-up, unstaffed beds
    - Early transfer and discharge of patients
    - Conversion of private rooms to semiprivate, use of alternate locations with access to oxygen and suction
    - Other spaces without oxygen and suction
- Alternate care facilities should focus on providing triage evaluation and minimal medical support services with strict adherence to influenza specific infection control strategies as appropriate. See section II.9.B.2.

Facility Access

Entrance and egress from the healthcare institution should be limited once pandemic influenza is in the region. One designated employee and visitor entrance should be created and one entrance for the emergency room. All other entrances should be locked during phase 4B and strictly enforced.

Patient visitors will be limited early on in the pandemic and then restrictions will be relaxed when demand exceeds healthcare employee capabilities and visitors will be expected to provide routine nursing care to their patients.

- Restrict visitor access to one entrance and conduct a brief interview for illness and exposure to influenza during pandemic phase 4B. Exclude those who are symptomatic and those with an exposure. Keep a visitor log to help with contact tracing. See section II.5.C.
- Emergency department patients should be limited to one visitor per patient beginning in pandemic phase 4B and both should be interviewed for pandemic influenza illness and exposure. See section II.5.C.
- Limit one visitor per hospitalized patient during pandemic phase 4C, maintain a visitors log, and encourage visitor assistance with routine nursing care. See section II.5.C.
- Prohibit visitation for patients 16 years of age and older who are not critically ill during pandemic phase 5A and beyond. Limit all other patients to one visitor unless critically ill. Adhere to strict infection control practices, maintain a visitor's log, and encourage assistance with routine nursing care. See section II.5.C.
- Maintain limited visitation during pandemic phase 5B as outlined in phase 5A. Expect visitors to assist with routine nursing care and provide instructions on duties. See section II.5.C.
- If the institutional situation is critical, visitation can be relaxed to allow one visitor for all patients during pandemic phase 6. Visitors will be expected to assist with routine nursing care. Institutions may stop recording a visitor's log. See section II.5.C.
- Asymptomatic exposed visitors may be permitted to enter the facility if staffing shortages are critical during pandemic phase 6. They will be expected to assist with routine nursing care and adhere to strict infection control guidelines. See section II.5.C.
- Symptomatic visitors should be excluded from the facility unless they require medical care. See section II.5.C.
- During a severe pandemic, hospitals should prepare to hold and store decedents for extended periods of time. See section II.10.A.

APPENDIX 3. DIAGNOSTIC TESTS SUMMARY AND RAPID ANTIGEN TEST UTILITY TABLES

Several licensed and commercially available laboratory tests can be utilized for detecting and diagnosing influenza. These diagnostic tests vary in cost, resources required, technique, timeliness, and interpretation. The following is a list of diagnostic tests and their capabilities. Specific information on interpretability of four rapid antigen tests available for point of care detection of influenza strains A and B are also presented.

Viral Culture

The technique of viral culture has a high sensitivity for influenza virus detection but is used mainly in reference laboratories. There are currently two major types; conventional culture and shell vial culture. The three-day process for conventional culture begins with the inoculation of a patient specimen into cell culture. The culture is then monitored for the development of cytopathic effect, for manifestation of hemadsorption after addition of erythrocytes, or for the presence of influenza antigen via detection by antibody stain. Because numerous respiratory viruses produce a cytopathic effect, and not all cell lines develop a cytopathic effect characteristic of influenza, viral infection must be confirmed by immunofluorescence microscopy or by hemadsorption using guinea pig erythrocytes. Shell vial culture differs from conventional cell culture in that it uses single or mixed cell lines for viral isolation and centrifugation to enhance the sensitivity and shorten the time for detection from 3 days to about 24 hours.

Both types of viral culture are highly sensitive and detect both influenza A and B virus types as well as other respiratory viruses, but require technical expertise, a certified laboratory setting, and 24 hours to 3 days for results. Viral isolation by culture alone cannot provide H-subtype information.

Immunofluorescence Testing

Influenza A or B viruses can be detected using fluorescence microscopy by either direct fluorescent antibody (DFA) or immunofluorescent antibody (IFA). DFA methods are as follows: respiratory epithelial cells are deposited onto a welled slide, cells are stained with specific antibodies directly conjugated to the fluorescent dye, and the slide is dried and fixed. After a monoclonal antibody conjugate is applied to the slide well the slide is incubated and washed before fluorescence microscopy is used for detection. For immunofluorescent antibody (IFA) testing, monoclonal viral antibody is used to stain dried, fixed cells, followed by the application of an antibody conjugate to a mouse immunoglobulin. H-subtyping by immunofluoresence testing is not currently available.

Specificity and sensitivity depend on quantity of infected cells in the sample.
IFA has a higher sensitivity than DFA but DFA has higher sensitivity than POC rapid antigen tests. Even though IFA is more sensitive than DFA to influenza A and B, DFA is more frequently used by hospital, academic, reference, and public health laboratories because it provides results faster than IFA. BSL-2 laboratory facilities are required. Confirmation of a negative DFA by viral isolation is recommended.

Polymerase Chain Reaction

Reverse transcriptase polymerase chain reaction (RT-PCR) assay is considered to be one of the most sensitive and specific tests for diagnosis of influenza and is replacing viral isolation as the reference standard. The technique can detect all viral strains observed to date using RNA extracted from the patient specimen. RT-PCR can detect both influenza A and B and also determine the H-subtype as well as the strain in less time than viral isolation and is much more sensitive and specific than all available rapid antigen tests for influenza. This technique is especially important for the detection of respiratory virus in immunosuppresed transplant recipients and persons with chronic lung diseases. RT-PCR requires highly trained technologists, and a complex infrastructure, and has a relatively high cost per test. This is likely the best test method during a pandemic because it detects the specific H-subtype and can be scaled up to manage increased demand with minimal increases in staffing.

Serology

Serological tests are most often used for surveillance for novel subtypes and for retrospective diagnosis. In order for accurate diagnosis, a fourfold or greater rise in the influenza antibody from the acute phase (collected within the 1st week of illness) sample to the convalescent phase (collected 2-4 weeks after the acute sample) sample is indicative of recent infection. Test results for adults may be confounded by immune response to previous infections by other influenza strains in addition to immune response to the infecting virus strain. This type of test requires a BSL-2 or BSL-3 laboratory, trained technicians and two specimens taken from the patient during the acute and convalescent phases of influenza illness.

Rapid Antigen Tests

Rapid antigen tests are self-contained kits that require little technical training and utilize enzyme or optical immunoassay technology to detect influenza A and B viral antigens. Rapid antigen tests that are complexity waived by the Clinical Laboratory Improvement Amendment (CLIA) can be performed outside of a certified laboratory (in a physician's office, or at the patient bedside, also called point of care tests (POC). CLIA complexity moderate tests must be performed by trained laboratory technicians in a certified laboratory. Either complexity type provides test results in thirty minutes or less.

The following are recommendations made by WHO in July 2005 for the use of rapid antigen tests for the diagnosis of influenza [40]:

- Other influenza surveillance measures should be consulted for when to use POC tests.
- During periods of high influenza activity, it is impractical to test all patients meeting the case definition.
- Rapid tests should only be used when they can affect management.
- When influenza activity is low, no POC test is needed. Instead, use immunofluorescent antibody (IFA) staining, viral culture or reverse transcriptase-polymerase chain reaction (RT-PCR).
- When influenza transmission is beginning or during an outbreak setting, use a POC test. Accept positive results and definitive test negative results.
- When influenza transmission is widespread, no POC test.
- Rapid POC tests are not recommended for avian influenza strains.

Rapid Antigen Test Utility Tables

The following tables depict the positive predictive value (PPV) and negative predictive value (NPV) of four rapid antigen tests available for point of care detection of both influenza strains A and B. Sensitivity and specificity are based on appropriate specimen samples and PPV and NPV were calculated for 1%, 10%, and 50% disease prevalence of the population tested. Note, Xpect Flu A&B test has a 100% sensitivity and 100% specificity for multiple specimen types but the number of specimens evaluated in clinical trials for Xpect Flu A&B diagnostic test is substantially lower than numbers of specimens evaluated for other diagnostic tests (for influenza A, 10 throat swabs evaluated to calculate sensitivity, 20 throat swabs evaluated to calculate specificity). For more detail for Xpect Flu A&B see package insert at www.remel.com.

Influenza A

Test	Manufacturer	Manufacturer website	Specimen Type	Sensitivity (%)	Specificity (%)	1% Prevalence		10% Prevalence		50% Prevalence	
						PPV** (%)	NPV*** (%)	PPV (%)	NPV (%)	PPV (%)	NPV (%)
QuickVue Influenza A+B test	Quidel Corporation San Diego, CA (800) 874 1517	www.quidel.com	Nasal swab	94.0	90.0	**8.67**	**99.93**	**51.09**	**99.26**	**90.38**	**93.75**
			NP* swab	83.0	89.0	**7.08**	**99.81**	**45.60**	**97.92**	**88.30**	**83.96**
			nasal wash/aspirate	77.0	99.0	**43.75**	**99.77**	**89.53**	**97.48**	**98.72**	**81.15**
Binax NOW Influenza A&B	Binax Inc. Scarborough, ME (800) 257 9525	www.binax.now	NP swab	78.0	92.0	**8.97**	**99.76**	**52.00**	**97.41**	**90.70**	**80.70**
			nasal wash/aspirate	82.0	94.0	**12.13**	**99.81**	**60.29**	**97.92**	**93.18**	**83.93**
Xpect Flu A&B	Remel Inc. Lenexa, KS (800) 255 6730	www.remel.com	Nasal swab	88.9	100.0	**100.00**	**99.89**	**100.00**	**98.78**	**100.00**	**90.01**
			Throat swab	100.0	100.0	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
			nasal wash/aspirate	92.5	100.0	**100.00**	**99.92**	**100.00**	**99.17**	**100.00**	**93.02**
Directigen EZ Flu A+B	BD Diagnostic Systems Sparks, MD (800) 675 0908	www.bd.com/ds	NP wash/aspirate	86.0	99.0	**46.49**	**99.86**	**90.53**	**98.45**	**98.85**	**87.61**
			Throat Swabs	77.0	86.0	**5.26**	**99.73**	**37.93**	**97.11**	**84.62**	**78.90**

*** NP = Nasopharyngeal**

**** PPV = Positive Predictive Value**

***** NPV = Negative Predictive Value**

Influenza B

Test	Manufacturer	Manufacturer website	Type of Specimen	Sensitivity (%)	Specificity (%)	1% Prevalence		10% Prevalence		50% Prevalence	
						PPV** (%)	NPV*** (%)	PPV (%)	NPV (%)	PPV (%)	NPV (%)
QuickVue Influenza A+B test	Quidel Corporation San Diego, CA (800) 874 1517	www.quidel.com	Nasal swab	70	97	**19.07**	**99.69**	**72.16**	**96.68**	**95.89**	**76.38**
			NP swab	62	98	**23.85**	**99.61**	**77.50**	**95.87**	**96.88**	**72.06**
			nasal wash/aspirate	82	99	**45.30**	**99.82**	**90.11**	**98.02**	**98.80**	**84.62**
Binax NOW Influenza A&B	Binax Inc. Scarborough, ME (800) 257 9525	www.binax.com	NP swab	58	97	**16.34**	**99.56**	**68.24**	**95.41**	**95.08**	**69.78**
			nasal wash/aspirate	71	97	**19.29**	**99.70**	**72.45**	**96.78**	**95.95**	**76.98**
Xpect Flu A&B	Remel Inc. Lenexa, KS (800) 255 6730	www.remel.com	Nasal Swab	83.3	100	**100.00**	**99.83**	**100.00**	**98.18**	**100.00**	**85.69**
			Throat Swab	100	100	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
			nasal wash/aspirate	100	100	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
Directigen EZ Flu A+B	BD Diagnostic Systems Sparks, MD (800) 675 0908	www.bd.com/ds	NP wash Aspirate	80	100	**100.00**	**99.80**	**100.00**	**97.83**	**100.00**	**83.33**
			Throat Swab	69	99	**41.07**	**99.68**	**88.46**	**96.64**	**98.57**	**76.15**

Courtesy of the Philadelphia Department of Public Health, Division of Disease Control

December 2006

APPENDIX 4. INFLUENZA FOCUSED HISTORY AND PHYSICAL FORM

Focused History and Physical Form - Pandemic Influenza

Patient Identification Information:_____
_____ **Date:**___/___/___ **Time:**_____
_____
==========

Symptoms onset (date, time):_____
Symptoms (Check all that apply)
- ❑ Shortness of breath – at rest, exertional, positional
- ❑ Cough – character – productive, non-productive, bloody or blood-tinged
- ❑ Chest pain - character
- ❑ Fever
- ❑ Headache
- ❑ Muscle aches/body aches
- ❑ Nausea
- ❑ Vomiting
- ❑ Diarrhea

Additional Symptoms:_____ ___
_____
_____

Pertinent Family/Social History:
Are there family / household members with similar complaints?
_____
_____
Occupation:_____
Do you smoke?_____
Do you have any of the following?

Patient Medical History:
- ❑ Asthma
- ❑ COPD
- ❑ Diabetes
- ❑ Heart disease
- ❑ Hypertension
- ❑ Immune-compromise (HIV, cancer, steroid therapy)
- ❑ Other_____ ____

What prescription or over the counter medications do you take?_____
_____
_____
_____
_____
_____
_____

Influenza Vaccine History:_____
_____
_____
_____

==========

PHYSICAL:
Vital signs- temp_____; respiratory rate _____; heart rate _____; BP _____
Pulse oximetry - _____; Room Air _____; % FiO2_____
EENT_____
Heart – rhythm (regular / irregular etc)_____
Lungs _____
Abdomen_____
Neurologic - Alert (yes / no), meningismus (yes / no)_____
Other_____

LABORATORY DATA:
Basic Metabolic Panel:

Complete Blood Count:

Radiologic Data

SOFA (Sequential Organ Failure Assessment) Scoring Criteria [1] (See reverse for SOFA scoring details)

Variable	0	1	2	3	4	0hr		48hr		120hr	
						Actual Value	Sofa Score	Actual Value	Sofa Score	Actual Value	Sofa Score
PaO_2/FIO_2, mm Hg	>400	≤ 400	≤ 300	≤ 200	≤ 100						
Platelet count, x 10^6/L	>150	≤ 150	≤ 100	≤ 50	≤ 25						
Bilirubin level, mg/dl (µmol/L)	<1.2 (<20)	1.2-1.9 (20-32)	2.0-5.9 (33-100)	6.0- 11.9 (101-203)	> 12 (>203)						
Hypotension	none	MABP <70	Dop ≤ 5	Dop > 5] Epi ≤ 0.1 Norepi ≤0.1	Dop> 15 Epi> 0.1 Norepi>0.1						
Glasgow Coma score	15	13-14	10-12	6-9	<6						
Creatinine level, mg/dL (µmol/L)	<1.2 (<106)	1.2-1.9 (106-168)	2.0-3.4 (169-300)	3.5-4.9 (301-433)	>5 (>434)						
Total SOFA score											
Triage Code (blue, red, yellow, green)											

==========

ASSESSMENT:

==========

PLAN:

Rationale for Critical Care:

Focused History and Physical Form - Pandemic Influenza – Page 2

Triage Protocol For Critical Care

Box 1: Instructions for the application of the triage protocol to determine a patient's need for critical care during an influenza pandemic*

1. Assess whether the patient meets the inclusion criteria†
   - If yes, proceed to step 2
   - If no, reassess patient later to determine whether clinical status has deteriorated
2. Assess whether the patient meets the exclusion criteria†
   - If no, proceed to step 3
   - If yes, assign a "blue" triage code; do not transfer the patient to critical care; continue current level of care or provide palliative care as needed
3. Proceed to triage tool, initial assessment (see Fig. 1)

*The triage protocol applies to all patients undergoing assessment for possible critical care and not only those with influenza-like symptoms.
†See Box 2 for inclusion and exclusion criteria.

Box 2: Detailed inclusion and exclusion criteria used in the triage protocol for critical care during an influenza pandemic

Inclusion criteria

The patient must have 1 of the following:

A. Requirement for invasive ventilatory support
   - Refractory hypoxemia (SpO2 < 90% on non-rebreather mask or FIO2 > 0.85)
   - Respiratory acidosis (pH < 7.2)
   - Clinical evidence of impending respiratory failure
   - Inability to protect or maintain airway

B. Hypotension (systolic blood pressure < 90 mm Hg or relative hypotension) with clinical evidence of shock (altered level of consciousness, decreased urine output or other evidence of end-organ failure) refractory to volume resuscitation requiring vasopressor or inotrope support that cannot be managed in ward setting

Exclusion critiera

The patient is excluded from admission or transfer to critical care if any of the following is present:

A. Severe trauma

B. Severe burns of patient with any 2 of the following:
   - Age > 60 yr
   - > 40% of total body surface area affected
   - Inhalation injury

C. Cardiac arrest
   - Unwitnessed cardiac arrest
   - Witnessed cardiac arrest, not responsive to electrical therapy (defibrillation or pacing)
   - Recurrent cardiac arrest

D. Severe baseline cognitive impairment

E. Advanced untreatable neuromuscular disease

F. Metastatic malignant disease

G. Advanced and irreversible immunocompromise

H. Severe and irreversible neurologic event or condition

I. End-stage organ failure meeting the following criteria:

Heart
   - NYHA class III or IV heart failure

Lungs
   - COPD with FEV1 < 25% predicted, baseline PaO2 < 55 mm Hg, or secondary pulmonary hypertension
   - Cystic fibrosis with postbronchodilator FEV1 < 30% or baseline PaO2 < 55 mm Hg
   - Pulmonary fibrosis with VC or TLC < 60% predicted, baseline PaO2 < 55 mm Hg, or secondary pulmonary hypertension
   - Primary pulmonary hypertension with NYHA class III or IV heart failure, right atrial pressure > 10 mm Hg, or mean pulmonary arterial pressure > 50 mm Hg

Liver
   - Child–Pugh score ³ 7

J. Age > 85 yr

K. Elective palliative surgery

Note: SpO2 = oxygen saturation measured by pulse oximetry, FIO2 = fraction of inspired oxygen, NYHA = New York Heart Association, COPD = chronic obstructive pulmonary disease, FEV1 = forced expiratory volume in1 second, PaO2 = partial pressure of arterial oxygen, VC = vital capacity, TLC = total lung capacity.

Appendix 1: Scoring criteria for the Sequential Organ-Failure Assessment (SOFA) score*

Variable	Score 0	1	2	3	4
PaO_2/FIO_2, mm Hg	> 400	≤ 400	≤ 300	≤ 200	≤ 100
Platelet count, $\times 10^6$/L	> 150	≤ 150	≤ 100	≤ 50	≤ 20
Bilirubin level, mg/dL (μmol/L)	< 1.2 (< 20)	1.2–1.9 (20–32)	2.0–5.9 (33–100)	6.0–11.9 (101–203)	> 12 (> 203)
Hypotension†	None	MABP < 70	Dop ≤ 5	Dop > 5 Epi ≤ 0.1 Norepi ≤ 0.1	Dop > 15 Epi > 0.1 Norepi > 0.1
Glasgow Coma score	15	13–14	10–12	6–9	< 6
Creatinine level, mg/dL (μmol/L)	< 1.2 (< 106)	1.2–1.9 (106–168)	2.0–3.4 (169–300)	3.5–4.9 (301–433)	> 5 (> 434)

Note: Pao_2 = partial pressure of arterial oxygen; Fio_2 = fraction of inspired oxygen; MABP = mean arterial blood pressure, in mm Hg;
*Adapted, with permission, from Ferreira FL, Bota DP, Bross A, et al. Serial evaluation of the SOFA score to predict outcome in critically ill patients. JAMA 2001;286: 1754-8. Copyright © 2001, American Medical Association. All rights reserved.
†Dop (dopamine), epi (epinephrine) and norepi (norepinephrine) doses in μg/kg per min.

Initial assessment

Triage code	Criteria	Action or priority
Blue	Exclusion criteria met or SOFA score > 11*	• Manage medically • Provide palliative care as needed • Discharge from critical care
Red	SOFA score ≤7 or single-organ failure	Highest priority
Yellow	SOFA score 8–11	Intermediate priority
Green	No significant organ failure	• Defer or discharge • Reassess as needed

48-hour assessment

Triage code	Criteria	Action or priority
Blue	Exclusion criteria met or SOFA score > 11 or SOFA score stable at 8-11 with no change	• Provide palliative care • Discharge from critical care
Red	SOFA score < 11 and decreasing	Highest priority
Yellow	SOFA score stable at < 8 with no change	Intermediate priority
Green	No longer dependant on ventilator	• Discharge from critical care

120-hour assessment

Triage code	Criteria	Action or priority
Blue	Exclusion criteria met or SOFA score > 11 or SOFA score < 8 with no change†	• Provide palliative care • Discharge from critical care
Red	SOFA < 11 and decreasing progressively	Highest priority
Yellow	SOFA < 8 with minimal decrease (< 3-point decrease in past 72 h)	Intermediate priority
Green	No longer dependant on ventilator	• Discharge from critical care

Note: SOFA = Sequential Organ-Failure Assessment (see Appendix 1, available at www.cmaj.ca/cgi/content/full/175/11/1377/DC1).
*If an exclusion criterion is met or the SOFA score is > 11 anytime from the initial assessment to 48 hours afterward, change the triage code to Blue and proceed as indicated.
†If an exclusion criterion is met or the SOFA score is > 11 anytime from 48 to 120 hours afterward, change the triage code to Blue and proceed as indicated.

1. Christian MD, Hawryluck L, Wax RS, et. al. Development of a triage protocol for critical care during an influenza pandemic. *Canadian Medical Association Journal* 2006; 175 (11) 1377-81.

APPENDIX 5. HOSPITAL CRISIS COMMUNICATION PLAN

One of the most important ways hospitals can prepare for a crisis is by having a crisis plan. Crisis plans pre-determine as many decisions and activities as possible before an event so that hospitals can respond more quickly and effectively to an actual crisis. Crisis communication plans need not be very elaborate or detailed. An organization's crisis communication plan should be fully integrated into the overall emergency response plan.

Effective communication can guide the public, the news media, healthcare providers, and other groups in responding appropriately to outbreak situations and complying with health measures. During an influenza pandemic, strategic communication activities will be especially important to help mitigate the impact on the community.

Expect the public to immediately judge the content of official emergency messages in the following way: "Was it timely? Can I trust the source?" and "Are they being honest?" To avoid confusion early in a crisis, accurate, relevant, simple, fast and consistent messages are best.

This document is a brief overview of the elements hospitals should consider when developing a crisis communication plan. It focuses specifically on effective communication before and during an influenza pandemic.

A crisis communication plan should include the following elements:

- Signed endorsement from director
- Designated responsibilities and job action sheets for:
    - External communication about pandemic influenza
    - Internal communication with administrators, personnel, patients, and visitors
    - A person responsible for public health reporting (e.g., infection control)
    - A clinical spokesperson (e.g., a medical director)
    - A media spokesperson (e.g., a public information officer)
- Internal procedures for information verification, clearance, approval and release.
- Agreements/procedures to coordinate with PDPH or other appropriate government health authority, on the methods, frequency and scope of external communications during an influenza pandemic.
- Procedures and methods for how communications between local and regional healthcare facilities will be handled.
    - Plan to share information on E Team
    - Plan to participate in regularly scheduled conference call initiated by DVHC or PDPH for updates and status of influenza pandemic. Other topics may include:
        - Staffing levels, needs
        - Disease burden, hospital stress, bed capacity, patient census
        - Durable and consumable medical equipment, device needs
        - Supplies of influenza vaccine
        - Supplies of antiviral drugs
        - Altered standards of care
        - Security
        - Legal issues
- Agreements/procedures for information release authority.
- Contact list and procedures for coordinating with:
    - The Department of Public Health
    - Philadelphia Fire Department/Emergency Medical Services
    - Philadelphia Police Department
    - Philadelphia Office of Emergency Management
    - Delaware Valley Healthcare Council
    - Pennsylvania Department of Health

  - Other healthcare partners
- Agreements and procedures regarding Joint Information Centers.
- Procedures to secure needed resources (space, equipment, people) to maintain ongoing public information and media operations during a public health emergency.
- Copy of Delaware Valley Health Care Disaster Preparedness Task Force Media Protocols During a Declared Emergency (accessible at: http://www.dvhc.org/)
- Plan for using specified communication channels (e.g., telephone hotlines, blast fax, phone trees, website, e-mail notification, mass media)
- Regional and local media contact list (e.g., newspaper, radio, television, including after-hours news desks), and contact list for community leaders.
- Procedures and checklists for designated spokespersons.
- Draft hospital-specific communications that might be needed for expected or potential events
  - Types of communication templates to develop: press statements, talking points, fact sheets, health alert network messages, telephone hotline scripts
  - Types of events to prepare for:
    - Informing the public when hospital operations and routine procedures change and providing rationale.
    - Informing the public when implementing new security measures or changing points of entry at the hospital.
    - Informing the public when imposing visitation restrictions, requesting that visitors provide supportive functions for patients, or requiring PPE for visitors.
    - Informing the public that the hospital has implemented altered standards of care and providing rationale.
- Draft fact sheets, educational materials and risk communication
- Contact lists of facility personnel
- A plan for updating key facility personnel on a daily basis
  - A plan for updating clinical, ED and outpatient staff on the status of pandemic influenza, once detected
  - A plan for informing patients and visitors about the level of pandemic influenza activity, infection control, altered standards of care
- Plans for evaluating, testing and updating the crisis communication plan

Appendix 5 Reference List

1. Reynolds, B., Galdo,J., & Sokler, L. *Crisis and emergency risk communication.* Atlanta, GA: Centers for Disease Control and Prevention; 2002.
2. Seeger, M.W., Sellnow, T.L., & Ulmer, R.R. *Communication and organizational crisis*. Westport, CT: Praeger; 2003.
3. Department of Health and Human Services. *Pandemic Influenza Plan*. 2007.
4. Michigan Department of Community Health, Office of Public Health Preparedness. *Michigan Crisis and Emergency Risk Communication: A Guide for Developing Crisis Communication Plans*. 2003.
5. Centers for Disease Control and Prevention. *Crisis and Emergency Risk Communication.* 2002.

APPENDIX 6. EDUCATIONAL MATERIALS

The following is a list of infection control materials that can be used for educational purposes in various settings developed by the CDC and PDPH. Below is a brief description of each with a direct link for downloading purposes and additional resources. Additional resources will be added to this appendix for healthcare facilities as they are developed.

List of materials:

Clean Hands Save Lives Hand Hygiene Poster- CDC

Description: A CDC based poster promoting hand hygiene through hand washing or alcohol-based hand sanitizing gels. Includes a link to the CDC website for additional information and resources for hand hygiene. Spanish Version

Healthy Habits Help Keep Your Family Well Poster - CDC

Description: A CDC poster clarifying and highlighting the importance of exercising "healthy habits," to reduce transmission of infectious diseases including cough and sneeze etiquette and hand hygiene. Includes a link to the CDC website for additional information and resources for stopping "germs." Spanish Version

Personal Protective Equipment Donning and Doffing Poster- CDC

Description: A CDC designed poster that gives thorough and illustrated instructions (in both English and Spanish) for steps on how to correctly don and doff PPE in the healthcare setting.

Stopping the Spread of Germs INFLUENZA Flyer- PDPH (under development)

Description: A two-paged flyer developed by PDPH that concisely lists the common symptoms of influenza and reiterates the value of practicing correct "healthy habits" to prevent transmission.

Work Quarantine: Understanding its Purpose and Guidelines for Use Flyer- PDPH (under development)

Description: A two-paged flyer developed by PDPH for healthcare staff and family members that explains the purpose, protocols, infection control measures, and duration of the work quarantine. The flyer also briefly defines home quarantine.

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V. REFERENCES

[1] Centers for Disease Control and Prevention. Interim Pre-pandemic Planning Guidance: Community Strategy for Pandemic Influenza Mitigation in the United States. Febuary 2007. Available at: http://www.pandemicflu.gov/plan/community/commitigation.html. Accessed May 14, 2007.

[2] Altered Standards of Care in Mass Casualty Events, Bioterrorism and Other Public Health Emergencies. AHRQ Publication No. 05-0043. April 2005. Available at: http://www.ahrq.gov/research/altstand/. Accessed May 14, 2007.

[3] Infectious Diseases Society of America. Pandemic and Seasonal Influenza Principles for U. S. Action. January 2007. Available at: http://www.idsociety.org/Content/NavigationMenu/News_Room1/Pandemic_and_Seasonal_Influenza/IDSA_flufinalAPPROVED1.24.07.pdf. Accessed May 14, 2007.

[4] World Health Organziation. WHO case definitions for human infections with influenza A (H5N1) virus. August 29, 2006. Available at: http://www.who.int/csr/disease/avian_influenza/guidelines/case_definition2006_08_29/en/index.html. Accessed May 14, 2007.

[5] VanDenKerkhof E, Goldstein D, Rimmer M. Containing a New Infection with New Technology: A Web-based Response to SARS. *Canadian Medical Association Journal*, May 13, 2003;168(10):1259–1262.

[6]VanDenKerkhof E, Containing a New Infection with New Technology: A Web-based Response to SARS, author contact and inquiry made September 2006.

[7] Gopalakrishna G, Choo P, Leo YS, et al. SARS Transmission and Hospital Containment. *Emerg Infec Dis* [serial online] March 2004; 10(3):395-400. Available at: http://www.cdc.gov/ncidod/EID/vol10no3/03-0650.htm. Accessed May 14, 2007.

[8] Petric M, Comanor L, and Petti Cathy A. Role of the Laboratory in Diagnosis of Influenza during Seasonal Epidemics and Potential Pandemics. *Journal of Infectious Diseases* 2006;194(2):S98-110.

[9] World Health Organization. WHO recommendations on the use of rapid testing for influenza diagnosis. July 2005. Available at: http://www.who.int/csr/disease/avian_influenza/guidelines/rapid_testing/en/index.html. Accessed May 14, 2007.

[10] Occupational Safety and Health Administration. Guidance on Preparing Workplaces for an Influenza Pandemic. Available at: http://www.osha.gov/Publications/influenza_pandemic.html. Accessed May 14, 2007.

[11] Hick J, O'Laughlin D. Concept of Operations for Triage of Mechanical Ventilation in an Epidemic. Acad Emerg Med. 2006;13:223-229.

[12] NYS Workgroup on Ventilator Allocation in an Influenza Pandemic , NYS DOH /NYS Task Force on Life & Law. Allocation of Ventilators in an Influenza Pandemic. March 15, 2007. Available at: http://www.health.state.ny.us/diseases/communicable/influenza/pandemic/ventilators/docs/ventilator_guidance.pdf. Accessed May 17, 2007.

[13] Christian, Michael et al. Development of a triage protocol for critical care during an influenza pandemic, CMAJ November 21, 2006, 175(11) pp 1377-1381.

[14] Chan KP. Control of Severe Acute Respiratory Syndrome in Singapore. Environ Health Prev Med. 2005;10(5):255-259.

[15] Department of Labor, Occupational Safety and Health Administration Fit Testing Procedures Regulation Standard Number 1910.134, available on line at: http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9780

[16] Department of Health and Human Services. Interim Guidance on Planning for the Use of Surgical Masks and Respirators in Health Care Settings during an Influenza Pandemic. October 2006. Available at: http://www.pandemicflu.gov/plan/healthcare/maskguidancehc.html. Accessed May 14, 2007.

[17] Department of Labor, Occupational Safety and Health Administration OSHA Respirator Medical Evaluation Questionnaire, Regulation Standard Number 1910.134 Appendix C, available on line at: http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9783

[18] Koh D, Lim MK, Chia, SE, et al. Risk perception and impact of SARS on work and personal lives of healthcare workers in Singapore. *Med Care.* 2005;43:676-682.

[19] Department of Health and Human Services. Pandemic Flu Planning Checklist for Individuals and Families. December 2006. Available at: http://www.pandemicflu.gov/plan/pdf/individuals.pdf. Accessed May 14, 2007.

[20] US Department of Homeland Security. Preparing Makes Sense. Get Ready Now. December 19, 2006. Available at: http://www.ready.gov/america/_downloads/Ready_Brochure_Screen_EN_20040129.pdf Accessed May 14, 2007.

[21] US Department of Homeland Security. Unique Family Needs. May 8, 2007. Available online at: http://www.ready.gov/america/_downloads/checklist.pdf. Accessed May 14, 2007.

[22] US Department of Homeland Security. Preparing Your Pets for Emergencies Makes Sense. Get Ready Now. April 30, 2007. Available online at: http://www.ready.gov/america/_downloads/pets_tagged.pdf. Accessed May 14, 2007.

[23] American Red Cross. Preparedness: A Family Guide. February 3, 2007. http://www.redcross.org/static/file_cont6323_lang0_2512.pdf. Accessed May 14, 2007.

[24] United States Food and Drug Administration: Center for Biologics Evaluation and Research. H5N1 Influenza Virus Vaccine, Questions and Answers. April 17,2007. Available at: http://www.fda.gov/cber/products/h5n1san041707qa.htm. Accessed May 14, 2007.

[25] Philadelphia Department of Public health Pandemic Influenza Preparedness Plan, Revised December 2006. Available on line at: http://www.phila.gov/ready/pdfs/Pandemic%20Plan%20-Dec4-%202006.pdf

[26] United States Department of Health and Human Services. Public Health Guidance for State and Local Partners: Guidance Supplement 7 Antiviral Drug Distribution and Use. November 2005. Available at: http://www.hhs.gov/pandemicflu/plan/sup7.html Accessed May 16, 2007.

[27] Bonten MJ, Prins JM. Antibiotics in pandemic flu will be essential for treating, but not preventing, bacterial pneumonia. *BMJ*. 2006;332:248-9.

[28] United States Department of Health and Human Services. Pandemic Influenza Plan, Part 2: Public Health Guidance for State and Local Partners, Supplement 6: Vaccine Distribution and Use. Available at: http://www.hhs.gov/pandemicflu/plan/sup6.html. Accessed May 17, 2007.

[29] Centers for Disease Control and Prevention. Pneumococcal Vaccine What You Need To Know. August 29, 1997. Available at: http://www.cdc.gov/nip/publications/VIS/vis-ppv.pdf. Accessed on May 17, 2007.

[30] American Academy of Pediatrics, Red Book® 27th Edition 2006, Report of the Committee on Infectious Diseases, pages 527, 532.

[31] Hayden F, Pavia A. Antiviral Management of Seasonal and Pandemic Influenza, *J Infect Dis.* 2006;194(2):S119-126.

[32] Department of Health and Human Services. Pandemic Planning Update III, A Report from Secretary Michael O. Leavitt. November 13, 2006. Available on-line at: http://www.pandemicflu.gov/plan/pdf/panflureport3.pdf. Accessed May 14, 2007.

[33] Moscana, Anne, Neuraminidase Inhibitors for Influenza. The New England Journal of Medicine, 353;13, September 29, 2005 pp 1363-1373.

[34] Salomon Rachelle, Hoffman Erich, Webster Robert G., Inhibition of the cytokine response does not protect against lethal H5N1 influenza infection. PNAS July 24, 2007, vol. 104, no. 30, 12479-12481.

[35] Centers for Disease Control and Prevention. Interim Pre-pandemic Planning Guidance: Community Strategy for Pandemic Influenza Mitigation in the United States. February 2007 page 12. Available online at: http://www.pandemicflu.gov/plan/community/commitigation.html.

[36] Pennsylvania Department of Health. Facility Message Board, Notice to Assist Pennsylvania Hospitals to Accommodate Increased Inpatient Demands Related to Influenza 2006-2007. October 19, 2006. Available at: www.health.state.pa.us\facility. Accessed May 14, 2007.

[37] Lam C, Waldhorn R, Toner E, Ingelsby T, et al. The Prospect of Using Alternative Medical Care facilities in an Influenza Pandemic. Biosecur and Bioterror. 2006;4(4):384-390.

[38] United States Department of Health and Human Services. Public Health Guidance for State and Local Partners, Public Health Guidance Supplement 3: Healthcare planning. April 5, 2006. Available at: http://www.hhs.gov/pandemicflu/plan/sup3.html. Accessed on May 15, 2007.

[39] World Health Organization. Avian Influenza, Including Influenza A (H5N1), in Humans: WHO Interim Infection Control Guidelines for Health Care Facilities. April 24, 2006. Available at: http://www.who.int/csr/disease/avian_influenza/guidelines/infectioncontrol1/en/. Accessed on May 14, 2007.

[40] World Health Organization. WHO recommendations on the use of rapid testing for influenza diagnosis. July 2005. Available at: http://www.who.int/csr/disease/avian_influenza/guidelines/rapid_testing/en/index.html. Accessed May 14, 2007.