

Health Care System Guidance

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I. Introduction

An influenza pandemic will create significant challenges for the health care system. The number of children and adults seeking care for febrile and respiratory illnesses will increase substantially; some disease will be severe requiring inpatient care; and many of those infected will have underlying risk factors for adverse outcome including death. Influenza also will occur among health care workers and their family members resulting in shortages of trained staff to care for others. Physical resources, such as hospital beds and respiratory therapy equipment may not be sufficient to meet demand. Shortages of antiviral medications and vaccine will limit the ability to implement these preventive interventions. And large numbers of influenza-infected patients and staff shortages will stress the ability to implement good infection control in hospitals and other institutional settings, leading to nosocomial disease, further exacerbating the problem.

Although these stresses on the health care system are inevitable in an influenza pandemic, coordination, planning and exercising preparedness plans can improve the effectiveness of a pandemic response and limit mortality and morbidity. Particularly during the period before vaccine becomes available, quality health care will be the primary intervention to limit adverse health outcomes. Moreover, even when vaccine is available, supplies will be limited, two doses may be required for protection, and effectiveness may be limited in some population groups such as the very elderly or those who have underlying medical conditions. Thus, maintaining quality health care will remain an essential component of a pandemic response.

Health care organizations have been approached by the public health sector several times in recent years regarding emergency preparedness planning – for bioterrorist threats generally, for smallpox, and for SARS. In addition, health care organizations may be developing preparedness plans for non-disease threats to quality patient care, such as power outages or hurricanes. One approach to cope with the burden of planning for multiple threats would be to identify common elements of emergency response and include these in an “all hazards” plan. This may include, for example, the coordination and decision-making structure and some components of communication. It also is important to recognize what aspects of preparedness and response are different between hazards and require specific and unique response plans. Even two respiratory infections – influenza and SARS – would require some differences in planning infection control and other response components (*see Annex 12: Synergies and differences in preparedness and response for influenza and other infectious disease threats*). Working with state and local health departments, and referring to national guidance documents and recommendations of expert committees can help facilitate the planning process and improve consistency and coordination between organizations and communities.

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Health Care System Guide Objectives

- To promote and facilitate the development of written pandemic influenza preparedness and response plans by health care organizations, integrated with other emergency planning efforts
- To promote and facilitate coordination and collaboration between state and local health departments and private sector health care organizations
- To identify key health care preparedness issues and provide guidance on approaches to optimally address them in written preparedness and response plans

The Health Care System Guide is intended to assist pandemic influenza planning efforts for medical provider organizations, health care systems, hospitals, long-term care facilities, community (home) health care agencies, and other groups that will provide health care services as part of an influenza pandemic response. As is recommended for state health departments that are developing preparedness and response plans, private sector organizations should establish planning teams that include decision-makers, key stakeholder groups, and those with specific technical expertise. Organizations should consider identifying a coordinator who would serve as the point-of-contact for pandemic influenza planning. Participation on a planning team may include administration, legal, medical staff, nursing, infection control, emergency department, respiratory therapy, laboratory, occupational health, education and training, public relations, human resources, pharmacy, engineering, and environmental services personnel. In settings where many health care workers are members of unions, formal union representation may be useful.

Including representatives from state or local health departments and coordinating with other hospitals and health care organizations in communities and regions are important to strengthen preparedness planning leading to a more effective response. Support for planning and coordination of health care resources currently is being provided to states under the National Bioterrorism Hospital Preparedness Program (<http://www.hrsa.gov/bioterrorism/>). Under these agreements, funding is provided to health departments by the Health Resources and Services Administration (HRSA) to upgrade the preparedness of the nation's health care system to respond to bioterrorist and naturally occurring outbreaks of infectious disease, and to other public health threats and emergencies. Priority areas include:

- regional surge capacity in providing care for children and adults including facilities and personnel, both in the hospital and in the community;
- emergency medical services (EMS) coverage and flexibility;
- linkages between the health care system and public health departments including surveillance and laboratory diagnosis; and
- education and training including preparedness exercises

In order to most effectively plan and respond to an influenza pandemic, cities or regions should establish health care task forces as a focus for planning, preparedness, and coordinated response. The Task Force should include representatives from hospitals, physician and nursing organizations, home health care, long term care facilities, pharmacists, EMS, and local public health officials. Organization level planning teams and community-wide or regional task forces should be familiar with national and state level pandemic influenza preparedness and response

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plans to assure that critical elements of the plans are consistent (*see the National Pandemic Influenza Preparedness and Response Plan and Annex 1: State and Local Health Departments Guidance*).

During a pandemic, the community and regional task forces would be responsible for coordinating health care activities within the community. These groups would work with local health departments to issue public health advisories and improve communication with medical care providers and health care organizations. Community-wide resource management can be facilitated by having a real-time tracking system to monitor the impact of the pandemic on hospitals in the community. During a pandemic the tracking system, which would be developed during the interpandemic period, routinely would collect and communicate information on:

- number of available Intensive Care Unit beds (adult and pediatric)
- number of available medical beds (adult and pediatric)
- number of available emergency department (ED) beds (monitored and non-monitored)
- number of patients and/or waiting time in the ED
- number of patients waiting for inpatient beds (in ED, clinics, etc)
- number of hospitals on ED diversion
- morgue capacity
- shortages of medical supplies or equipment

II. Pandemic Influenza Health Care Burden

Influenza epidemics occur annually and usually peak between December and March in temperate regions of the Northern Hemisphere. In the United States, annual influenza epidemics are associated with an average of 36,000 excess deaths and more than 110,000 excess hospitalizations. Health care demands are likely to increase substantially during a pandemic.

Based on previous pandemics, attack rates for influenza infection in a community during a pandemic are likely to be as high as 35% (i.e. one-third of the population is likely to become infected). Although influenza cases and deaths are likely to occur over a several month period throughout the U.S., within any community most of the impact is likely to occur within 4 to 8 weeks. Community-level estimates suggest that demand for inpatient and intensive care unit beds and for assisted ventilation may increase by more than 25% during a pandemic. This excess demand, in the context of a U.S. health care system where trends have been toward a decreased number of admissions and hospital beds, will likely lead to critical shortages.

In addition to the increased overall need for health care services, morbidity and mortality patterns during a pandemic may differ substantially from those seen during non-pandemic years when older adults and persons with compromised immune systems primarily are at risk for serious disease and death. During the three pandemics of the 20th century, a substantial portion of the total mortality occurred among persons younger than 65 years old who would not be considered at high risk during non-pandemic years. During the 1918 pandemic in particular, the risk of death by age displayed a “W” pattern with similarly high rates among infants, young adults, and the elderly. In such a setting, health care workers (HCWs) may be particularly

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vulnerable given their frequent occupational exposure. High rates of work absenteeism are likely to occur as HCWs become ill or need to care for ill family members. Thus staffed hospital beds may be a more limiting factor than bed availability alone.

III. Preparedness and Response Activities for Health Care Facilities

Health care facility pandemic preparedness and response plans should include the same components as public sector plans. These include decision-making and coordination, surveillance, vaccine and antiviral use, and communications. In addition, factors affecting the ability to provide quality care – staffing, equipment and supplies – and strategies to prevent transmission of infection to patients and staff through infection control and other interventions, are important.

A. Decision-making and Coordination

Planning and preparedness during the interpandemic period will decrease the need to make immediate decisions and improve those that are made at the time of a pandemic. While planning teams should be broad-based and include representatives from most departments in the hospital, a smaller group should be responsible for coordination and decision-making at the time of a pandemic. Key categories to include on a response coordination team include senior management, administration, hospital epidemiology, infection control, human resources, and the hospital counsel.

B. Surveillance and Triage

Hospitals will play an important role in surveillance for influenza before and during a pandemic. When a novel influenza virus has been identified in people (*Phase 0, levels 1 to 3 – see National Pandemic Influenza Preparedness and Response Core Plan for definition of pandemic phases*) but before disease has been recognized in the U.S. or in a setting of limited person-to-person transmission, surveillance activities should focus on identifying infection caused by the novel virus, leading to actions to stop further spread. For example, in 2004, with human cases of avian H5N1 influenza identified in Vietnam and Thailand and outbreaks in poultry documented in a number of Asian countries, CDC provided guidance to healthcare facilities for isolation and diagnostic testing of persons presenting with respiratory illness within 7 days after leaving an H5N1 poultry-infected country.

If the novel strain is spread efficiently between people, and a pandemic occurs (*Phase 1 and 2*), surveillance data will be important to identify when infections caused by the pandemic strain first occur in a community. Diagnostic testing for influenza among persons presenting with pneumonia or other severe respiratory illness, as well as those with influenza-like illness (ILI), may include the use of rapid diagnostic tests as well as more sensitive techniques including polymerase chain reaction (PCR) and viral isolation. Subtyping initial influenza A isolates would be important to confirm that the influenza disease is caused by the pandemic strain. Documenting pandemic disease in a community would trigger implementation of specific response activities such as antiviral chemoprophylaxis and community control measures. In

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addition, it would be a trigger for health care organizations to implement other pandemic response activities, as defined in their pandemic plan. These may include:

- Canceling elective admissions and surgeries
- Evaluating bed availability and expanding capacity, as possible
- Implementing plans for earlier discharge of patients who do not require ongoing inpatient care
- Reviewing staffing plans to accommodate the increased burden of disease that will occur
- Establishing specific triage and waiting areas for persons with respiratory illness
- Implementing plans to enhance hospital infection control

Once pandemic disease in the community has been documented, ongoing monitoring of hospitalizations and deaths will provide important information to decision-makers on impacts and the effectiveness of control measures (*see Annex 4: Surveillance*). State and local health departments will provide guidance on surveillance methods and reporting. Monitoring the occurrence of nosocomial influenza infection also is important to assess the effectiveness of infection control strategies and identify if procedures or implementation needs to be improved to protect patients. Nosocomial infection can be defined by the onset of disease that is clinically consistent with influenza or identified by rapid diagnostic test or another method, in someone who has been hospitalized for 48 hours or more.

C. Triage and Clinical Evaluation of Patients

Objectives of triage include identifying persons who may have pandemic disease and separating them from others to reduce the risk of transmitting infection, and identifying the type of care they require. If feasible, a separate triage area should be established for persons presenting with febrile or respiratory disease. An option may be to convert urgent care or fast track areas in or adjacent to the Emergency Department (ED) to patient treatment areas; temporary triage facilities in trailers or other areas also could be considered. Because not every patient with these presenting symptoms will have influenza, infection control within the triage area should include provision of masks to persons who are coughing, availability of tissues and posters or other displays emphasizing cough etiquette and hand washing facilities. If separate areas for patients who may have influenza and all others cannot be established, at a minimum, an alternate site should be set up for those at highest risk of complications from influenza infection, for example, outpatients presenting for dialysis or follow-up for hematopoietic stem cell transplant or cancer chemotherapy (in addition, these persons are at high priority for receipt of influenza vaccination, when it is available).

A triage officer also can manage patient flow, including referral to local physicians' offices or other non-hospital care settings when ED or inpatient care is not required. Liaison with and referral to home health agencies for follow-up may be an additional option to limit the number of admissions and reserve inpatient beds for those most in need. Given the likely overwhelming volume of persons seeking care during the peak of a pandemic, assuring appropriate staffing and sufficient personnel for triage will be critical. Health care organizations might promote the use of telephone triage for health plan members or designate outpatient clinics or practices as sites for evaluation of persons who may have influenza to reduce ED burden. Patient volume is likely

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to increase in the emergency department and clinics during a pandemic. Key issues include managing that increased volume, assuring that influenza does not spread in these settings, and appropriately managing admissions or follow-up for those not admitted.

Summary of planning needs

- Plan for use of alternative space for emergency care.
- Separate waiting areas for persons with febrile and respiratory disease from other patients.
- Expand use of a triage officer to manage patient flow, including patient referral to other clinics within the facility or to local physicians' offices or non-traditional care settings when ED care is not required.
- Review policies to assure adequate staffing of the emergency department and other outpatient areas.
- Assure that high-risk outpatients presenting for procedures such as dialysis or chemotherapy are separate from those who may have influenza; these patients and their care providers should receive influenza vaccine when it is available.

Clinical evaluation of persons with potential influenza disease is likely to be similar for pandemics and annual influenza outbreaks. Recent human cases of influenza caused by highly pathogenic avian influenza viruses (e.g., H5N1) have been associated with high case fatality rates and frequent occurrence of lower respiratory illness. It is possible that influenza caused by a pandemic strain will be more severe and that severe illness will occur more often in persons who would be at low risk for such disease during annual influenza outbreaks. Some persons with influenza, particularly children, will present with high fever and no respiratory symptoms.

When pandemic disease in a community is widespread, etiological diagnosis of influenza generally is not needed in persons with compatible clinical disease. Supplies of rapid diagnostic tests are limited and tests are likely not to be available. Use of diagnostic laboratory testing should be guided by surveillance needs outlined in state pandemic plans. Infection control measures such as isolation and cohorting should be guided by clinical diagnosis.

D. Human and Physical Resources for Inpatient Care

Health care utilization in the United States has changed markedly in recent years. Improved ability to provide outpatient care has led to fewer inpatient admissions and decreased hospital stays. The expansion of managed care also has contributed to this trend. The consequence is fewer hospital beds and hospitalized patients who tend to be sicker. Financial management strategies such as just-in-time inventory limit the materials available on-hand and increase dependence on functional supply systems, which may be disrupted during a pandemic. Health care organization plans must consider availability of hospital and ICU beds, equipment such as ventilators, supplies including masks, pharmaceuticals such as appropriate antibiotics to treat secondary bacterial infections, and staffing to manage the excess demand.

One strategy that has been proposed to respond to additional needs for in-patient beds is to provide care in non-traditional settings or *ad hoc* field-hospitals that could be established in

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public settings such as schools or armories, or in private facilities such as hotels. However, significant challenges are likely to occur in establishing such facilities including difficulty finding equipment, assuring adequate infection control and disposal of medical waste, and the need to adhere to the range of legal and environmental requirements for inpatient facilities. Staffing may provide the greatest challenge as personnel will be required to staff existing beds. Rather than establishing care at non-traditional sites, health care organizations may evaluate the potential to increase the number of beds in current facilities. Health department and regional planners also should consider Veterans Administration and Department of Defense hospitals as other options for surge capacity.

Staffing

One objective of planning is to maximize staffed beds during an influenza pandemic. Many hospitals already have high census protocols and emergency preparedness plans that may be applicable. Specific preventive interventions may reduce staff absenteeism during a pandemic. Health care personnel are among priority groups for antiviral chemoprophylaxis and vaccination. However, available supply of antivirals likely will be far less than the need and the efficacy of chemoprophylaxis may be compromised by antiviral resistance, particularly if adamantanes (amantadine and rimantadine) are used both for treatment and chemoprophylaxis. If available, vaccine is also likely to be in short supply early in a pandemic. Assuming insufficient vaccine initially to protect all hospital staff, health departments and health care organizations should work together to define front-line health care workers who would have priority for vaccination or chemoprophylaxis. In establishing priorities, hospitals should consider specific staffing needs for persons with febrile and respiratory illnesses, including for those who may require intensive care. Communications strategies should be developed to inform workers who should be vaccinated and to provide vaccination at the work-site. Later, when vaccine supplies are sufficient, institutions may develop programs to extend vaccination to all staff and potentially to vaccinate family members of employees to decrease their need to care for ill persons at home.

Despite the possibility that some staff will be protected by vaccination or chemoprophylaxis, many likely will not receive these interventions. Absenteeism may result from illness, the need to care for ill family members, and possibly from fear of exposure and infection – particularly if disease is severe and case-fatality rates are high among working-aged adults as in the 1918 pandemic. As part of preparedness planning, health care organizations should develop strategies to cope with staffing shortages.

Generally, health care workers who have respiratory illness should be excluded from work to avoid infection of patients, many of whom are at high risk for severe or complicated disease. In a pandemic, HCWs who have mild respiratory illness could provide care for cohorted influenza patients. In addition to chemoprophylaxis begun before exposure and vaccination, other strategies to decrease the risk that an HCW will be infected include good infection control and post-exposure chemoprophylaxis. Antiviral treatment using a neuraminidase inhibitor shortly after onset of symptoms can markedly decrease the duration of illness and time missed from work as well as reducing the amount of viral shedding and risk to other staff and patients. Early therapy also is the most efficient approach to antiviral use when supplies are limited.

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As facilities develop preparedness and response plans for an influenza pandemic, they also should review their policies for influenza vaccination of staff and patients before the annual influenza epidemics. Annual vaccination of HCWs against influenza can have several beneficial effects. These include direct protection of the vaccinated person, indirect protection of their patients and other contacts, and encouragement to other staff and patients to be vaccinated. Increasing vaccination during the interpandemic period also may help increase vaccine acceptance at the time of a pandemic, and increased demand may lead manufacturers increase supply and production capacity, enhancing preparedness.

Summary of potential staffing interventions

- Ensure that the facility's time-off policies and procedures adequately consider staffing needs in periods of clinical crisis.
- Consider or expand hospital-sponsored sick care services for the children of hospital staff to reduce staff absenteeism. Childcare staff should be immunized when vaccine is available.
- Consider approaches to increase clinical care staff from among current employees. Within reasonable limits of clinical competency, consider use of registered nurses and other health care providers currently serving in administrative positions to provide patient care.
- Consider appropriate clinical care roles for trainees (such as medical or nursing students).
- Consider use of retired health care providers as volunteers for some patient care roles.
- Consider increased use of community volunteers for functions such as patient or specimen transport and for maintaining good patient flow in crowded emergency department settings.

Bed Availability

Additional beds can be made available for those who require admission for influenza or its complications by decreasing other admissions, implementing more stringent triage, and decreasing the length-of-stay. Hospitals also may be able to add acute care beds in a public health emergency, although staffing those beds may be a limitation. State health departments should work with licensing agencies to review regulations on the number of beds in a facility and, if needed, modified them to allow expansion at times of crisis.

Strategies to increase the availability of hospital beds

- Review policies for scheduling elective procedures and develop guidelines and contingency plans to limit elective admissions and surgery. Decreasing elective utilization of health care facilities during a pandemic will increase bed availability, allow redistribution of staff and equipment, and may decrease the elective patient's exposure to influenza infected persons. Consideration should be given to performing any necessary surgeries in a surgical ambulatory care center to reduce the likelihood of exposure to influenza infected patients in hospital.
- Expand focus on managing patient flow. Utilization review activities have increased importance during a pandemic, when bed availability is limited and normal continuity of care may be disrupted because of staffing shortages.
- Review and revise criteria for admission. Consider directing patients referred for

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admission by their physician to the emergency department where the need for admission can be directly evaluated in the context of bed and staff shortages.

- Coordinate with home health care agencies to provide follow-up for persons who are not admitted to the hospital or are discharged earlier than usual.
- Ensure that the facility has guidelines for expediting patient discharge during periods of anticipated high demand. These may involve designating physicians and nurses from each service to review patient status and consider discharge options such as sending patients home with follow-up by a home health care agency, having them stay with relatives who can provide some care, or discharging them to a skilled nursing facility.
- Review guidelines and policies allowing expeditious transfer of patients between units, especially from critical care units, when indicated.
- Develop plans and policies to transport discharged patients home or to other facilities expeditiously. Consider creating a patient discharge holding area or discharge lounge to free up bed space.

Equipment and supplies

Critical equipment shortages are most likely for respiratory care, particularly mechanical ventilation. Hospitals that routinely supplement the number of ventilators they own by renting additional units when needed may find that these resources are not available in a pandemic. Although several thousand ventilators are included in the Strategic National Stockpile (SNS), this quantity is small relative to what the national need may be. Because a pandemic will not affect all areas simultaneously, it may be possible to shift some resources between areas; this may be most feasible if a pandemic wave already has passed through a community and ventilators become available rather than an area that has not yet experienced disease sending its equipment elsewhere.

Consumable resource needs are those specific to an outbreak of infectious respiratory disease, including hand hygiene supplies, gowns, gloves, and surgical masks, as well as other supplies associated with routine patient care. Since infection control supplies have no expiration, it would be possible to establish stockpiles. However, hospitals may be reluctant to make expenditures now to prepare for future events. Health departments may want to explore establishment of regional stockpiles of these materials.

Shortages may occur of antibiotics appropriate for therapy of secondary bacterial complications that follow influenza infection. Staphylococcal and pneumococcal infections, and other bacteria have been documented to complicate influenza. Given the risk of methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin supply shortages could occur. Because of the large number of antibiotics that are effective against pneumococcal disease, the ability to treat this complication should not be limited.

Pneumococcal polysaccharide vaccine can prevent pneumococcal disease and is recommended for all persons 65 years old or older and persons 2 years old or older who have underlying medical conditions that increase their risk of severe disease. A single manufacturer produces licensed pneumococcal polysaccharide vaccine for the U.S. market and increased demand in an influenza pandemic could lead to supply shortages. The optimal approach to decrease the risk of

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shortages in a pandemic is to increase vaccination during the interpandemic period. Because the duration of protection is 5 or more years, there is no rationale to wait until a pandemic occurs to be vaccinated. Pneumococcal vaccine and administration costs are reimbursed by Medicare for those who are eligible under this program. A pneumococcal conjugate vaccine was licensed in 2000 for use in infants and children aged 9 years and less, and is recommended for universal use among children less than 2 years old. Vaccination has markedly decreased rate of pneumococcal infection in the immunized population as well as providing indirect or herd immunity that has decreased the rate of disease in adults and the elderly. During a pandemic, expanded use of this vaccine among children may prevent some pneumococcal complications of influenza. However, supply shortages may limit the ability to vaccinate more broadly. Polysaccharide vaccine provides an option for children greater than 2 years of age.

E. Education, Training, and Communications

HCWs should be educated about influenza disease, diagnosis, and management during the interpandemic period. Education also should highlight the value of annual vaccination for both HCWs and patients and the role of antiviral drugs in preventing disease and reducing the rates of severe influenza and its complications. Optimal infection control practices should be taught periodically and implementation monitored to promote and reinforce good behaviors.

To the extent that health care organization pandemic preparedness and response plans propose shifting HCW responsibilities in a pandemic, using normally non-clinical staff in clinical roles, or expanding activities of students, retired HCWs and volunteers, training programs should be developed to prepare persons for those roles. These programs could be implemented when a pandemic appears imminent, such as during the pandemic alert phase (*Phase 0, level 3*), when a novel influenza strain has caused outbreaks in one or more countries and appears to be efficiently transmitted between people. Materials that can be used for education and training on infection control are available from CDC and other organizations. A key component of training is conducting tabletop or field exercises that allow people to practice their proposed role in a pandemic response.

Although national, state, and local public health officials will have major communication responsibilities, local health care providers also will play a role. Local physicians may be more trusted sources of information in a community where they are known. Health departments and health care organizations should work together to identify credible spokespeople. Health care organizations should communicate directly with their members regarding approaches to prevent becoming infected during a pandemic, options for self-care among those who are mildly ill, symptoms that should prompt care-seeking, and appropriate sites for outpatient care and triage.

IV. Health Care Systems, Antiviral Drugs, and Influenza Vaccine

Vaccination is the primary intervention to decrease morbidity and mortality from influenza during a pandemic. Antiviral chemoprophylaxis also may have an important role in preventing infection and therapy may reduce complications and improve outcome. (*See Annexes 4 and 5 for guidance on priorities for vaccines and antiviral use.*) Two issues are important to consider in

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planning at the community and health care system levels: (1) coordinating distribution of vaccine and antiviral medication; and (2) educating health care providers regarding appropriate use of these interventions.

Initially during a pandemic, vaccine is likely to be in short supply and will be targeted to defined priority groups. Health care workers are likely to be one such priority group because of the importance of maintaining quality medical care for persons who become ill. Because vaccine supplies early in a pandemic may be insufficient for all persons in priority groups, health departments and health care organizations should work together to define specific job categories or individuals within the broader priority group for earliest vaccination (e.g., front-line health care workers). Influenza vaccine could be administered to HCWs at their workplaces by public sector or hospital personnel, or vaccination could occur at a public health clinic. It is unclear at this time whether initial vaccine supplies during an influenza pandemic will be purchased and distributed solely by the public sector or by both the public and private sectors. If some vaccine is distributed by the private sector, it will be important to educate those who have vaccine regarding priority groups and to implement strategies to assure that vaccine is used based on established plans rather than among those who have more access to medical care or can pay more for vaccination.

Later, as vaccine supply increases, vaccination will be expanded to the entire U.S. population or large segments of the population based on susceptibility to the pandemic strain. It is likely that there will be multiple channels for vaccine distribution and administration. Health care organizations can provide vaccine to employees and health plan members in clinics or at routine medical care visits. Private organizations, including groups that provide influenza vaccine annually, can work under contract with state and local health departments, supplying needed manpower and experience with influenza vaccine that will make mass vaccination campaigns more efficient and rapid. Existing relationships between vaccinators and private sector organizations such as grocery chains, pharmacies, and large employers also may be useful in identifying sites in the community where vaccinations can be provided.

Monitoring who is vaccinated during a pandemic will be a substantial challenge – particularly if vaccine is administered by a range of public and private sector organizations. State health departments should work with health care organizations to identify and implement a monitoring system. Expanding current state-based vaccination registries to include influenza would be one option for monitoring. Another possibility is development of a stand-alone system as was used to track smallpox vaccinations administered as part of the national preparedness program. Health care organizations also can use existing systems to keep track of employees and health plan members who receive vaccine and to generate reminders if two doses are needed for protection.

As with vaccine, the supply of influenza antiviral drugs is likely to be much less than the need. Oseltamivir, a neuraminidase inhibitor recently has been included in the Strategic National Stockpile. Discussions are ongoing about possibly increasing the amount stockpiled or including other drugs as well.

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HCWs are a priority group for chemoprophylaxis – particularly if vaccine is not available – in order to maintain quality health care. Antiviral drugs could be supplied by states to occupational health clinics at health care organizations for distribution to end-users. Because antiviral drug supplies are likely to be very limited, health departments may recommend implementing early treatment of HCWs after onset of influenza symptoms rather than chemoprophylaxis, as a more efficient strategy to use the limited drug supply. Occupational health clinics would be reasonable sites for distribution of therapeutic antiviral drugs.

Another group to consider for therapy with a neuraminidase inhibitor is persons who are being admitted to hospital for severe influenza infection and are within 48 hours of symptom onset. Treatment of persons at high risk for severe influenza who do not require admission at the time they present for care also is a priority, if sufficient antiviral drug supply is available. To most efficiently implement therapy for these groups, antiviral drugs must be available at hospitals and their emergency departments. Health departments may choose to ration available antiviral drugs to sites of care based on their patient load (or high-risk patient load, if such information is available). If such data currently are not available, they could be collected the annual influenza outbreak, facilitating planning for when a pandemic occurs. Educational materials, including clinical algorithms, should be provided to hospitals along with the antiviral medications to assure appropriate patient selection and use.

Regardless of the amount of antiviral drug included in a national stockpile, some antiviral drugs will be available within the private sector. The ability to meet pandemic response goals will be enhanced if private drug supply also is used consistent with defined priorities. As with vaccination, providers should be educated and strategies implemented to improve compliance with defined priorities. Appropriate use of antiviral drugs also is important as misuse may lead to induction of antiviral resistance. This is particularly likely to occur if the adamantanes (amantadine and rimantadine) are used for therapy. Health care organizations and professional societies should develop strategies and programs to educate providers about the importance of reserving these agents for chemoprophylaxis. Professional societies should work with CDC and health departments to develop educational materials that can be disseminated before and during an influenza pandemic. Pharmacists should be included in this effort as they often are asked questions by patients and physicians, and can communicate with providers who use antiviral therapy inappropriately. During a pandemic, information on rates of antiviral drug resistance and any additional or new recommendations on antiviral drug use will be communicated through multiple channels including CDC, health departments, professional societies, and health care organizations. (*Specific recommendations on the use of antiviral agents are included in Annex 7.*)

V. Infection Control

Infection control recommendations apply to health care providers who work in a range of settings. The types of precautions recommended to prevent transmission of infection are relevant to hospitals, long term care facilities, and outpatient settings. Situations where specific precautions or alternate approaches are needed are highlighted. Additional information on infection control for influenza is available on the CDC website (<http://www.cdc.gov/flu/professionals/infectioncontrol/>).

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A. Background

Influenza is a respiratory infection that is spread from person-to-person primarily by inhalation or contact with respiratory droplets. These droplets, which may be produced by coughing or sneezing, only travel short distances and remain suspended in the air for only a short time. Other methods of disease transmission such as airborne spread by droplet nuclei (i.e., small droplets that remain suspended in the air and may travel longer distances, for example, through ventilation systems) or direct contact with articles recently contaminated by nasopharyngeal secretions are thought to play a more minor overall role in transmission compared with droplet transmission.

Influenza is highly contagious, especially among institutionalized populations. Patients are most infectious during the 24 hours before the onset of symptoms and during the most symptomatic period, which generally lasts 3 to 5 days after the onset of illness. Detectable viral shedding in the nasal secretions usually ceases within 7 days of the onset of illness but can be prolonged in young children and immunodeficient patients. It is possible that more prolonged shedding could occur with pandemic influenza since the immune system would not have prior experience with related strains.

Infection control practices both in the community and in health care settings will present special challenges in the event of a pandemic. The substantial burden of disease, illness and absenteeism among health care workers, and the potential use of less highly trained personnel to address health care needs all will stress the ability to apply optimal infection control. Planning will increase the likelihood that high quality infection control can be effectively applied during a pandemic despite these stresses. Key strategies include prompt recognition, detection, isolation and cohorting of confirmed and suspected cases, and implementation of droplet (respiratory) precautions. Because secondary bacterial infections are likely to contribute to influenza morbidity and mortality, infection control measures also need to focus on decreasing the spread and consequences of such infections.

B. General Principles of Routine Infection Control

The Society for Healthcare Epidemiology of America (SHEA) states three goals for infection control and prevention programs: (1) protect the patient; (2) protect the health care worker, visitors, and others in the health care environment; and (3) accomplish the previous two goals in a cost-effective manner, whenever possible. These goals are germane to any patient care setting including acute care hospitals, long term care facilities, nursing homes, ambulatory care centers, out-patient surgical facilities, rehabilitation centers, alternative care centers, and home-care programs. Each type of health care organization may employ a different means of achieving these goals based on their needs, circumstances, and federal, state, and local regulations.

The Centers for Disease Control and Prevention and the Healthcare Infection Control Practices Advisory Committee (HICPAC) have developed guidelines on prevention of nosocomial/health care associated infections that are based on the latest epidemiologic information on transmission

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of infection in hospitals. (*See the Internet Resources section for links to the recommendations for prevention of nosocomial pneumonia and for isolation precautions in hospitals.*)

These guidelines include standard precautions, which should be followed when caring for all patients, regardless of their diagnosis, and transmission based precautions, which should be used when a patient is known or suspected to be infected or colonized with an epidemiologically important pathogen.

While droplets are the primary mode of influenza transmission, influenza viruses also may survive for hours on environmental surfaces that have been contaminated with secretions and be transmitted following contact. Airborne transmission has been hypothesized to explain some outbreaks but has not been well documented. The efficacy of placing infected persons in room with negative pressure in relation to their immediate environment has not been assessed. In addition, this measure would likely be impractical during a pandemic where the number of patients with influenza would exceed the availability of negative pressure rooms.

C. Standard Precautions

Standard Precautions address the importance of hand hygiene before and after caring for a patient; use of gloves, masks, eye protection, face shields, and gowns when splashes or sprays of blood, body fluids, secretions, or excretions are possible; cleaning of patient-care equipment, the patients' physical environment, and soiled linen; precautions to reduce the possibility of health care worker exposure to blood borne pathogens; and patient placement.

During the care of a patient with suspected or confirmed influenza:

- Wear gloves if hand contact with respiratory secretions or potentially contaminated surfaces is expected.
- Wear a gown if soiling of clothes with patient's respiratory secretions is expected.
- Change gloves and gowns after each patient encounter and before touching any noncontaminated items or touching another patient, and perform hand hygiene.
- Decontaminate hands before and after touching the patient, after touching the patient's environment, or after touching the patient's respiratory secretions, whether or not gloves are worn.
- When hands are visibly soiled or contaminated with respiratory secretions, wash hands with either a non-antimicrobial or an antimicrobial soap and water. Hand hygiene with plain soap or detergent for at least 10 to 15 seconds under running water is an effective method of removing soil and transient microorganisms. If sinks for hand hygiene are not readily available, alcohol-based agents can be used.
- If hands are not visibly soiled and after glove removal, use an alcohol-based hand rub for routinely decontaminating hands in clinical situations. Alternatively, wash hands with an antimicrobial soap and water.

During a pandemic, it is possible that health care institutions may become overwhelmed and care delivered at alternative sites. These alternative sites may not have sinks as readily accessible as traditional health care settings. Therefore, consideration should be given to using detergent-

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containing towelettes to cleanse hands followed by alcohol-based hand rubs for antisepsis. The protocol (as indicated in standard precautions) for glove use should remain unchanged regardless of the setting in which medical care is provided.

D. Respiratory Hygiene/Cough Etiquette

For an organism that primarily is transmitted by respiratory secretions, efforts to decrease the spread of secretions and droplets may help limit transmission. A new program called Respiratory Hygiene/Cough Etiquette has been developed to do so. This program should be implemented at the first point of contact with a potentially infected person to prevent the transmission of all respiratory tract infections in healthcare settings, including influenza. A Respiratory Hygiene/Cough Etiquette program includes posting visual alerts instructing patients and persons who accompany them to inform healthcare personnel if they have symptoms of respiratory infection; providing tissues to patients and visitors to cover their mouth and nose when coughing and sneezing; providing dispensers of alcohol-based hand rubs; ensuring that supplies for hand hygiene are available where sinks are located; offering masks to persons who are coughing; encouraging coughing persons to sit at least 3 feet away from others; and having healthcare personnel observe droplet precautions in addition to standard precautions. Further information about this program as well as supporting materials are available from the CDC website (<http://www.cdc.gov/flu/professionals/infectioncontrol/resphygiene.htm>).

E. Droplet Precautions

Droplet precautions should be a primary focus of planning as respiratory droplets represent the major route of influenza transmission. Droplets (particles >5 μ in diameter) are expelled from the respiratory tract primarily during coughing, sneezing, and talking, and during the performance of certain procedures such as suctioning and bronchoscopy. Particles do not remain suspended in the air and close contact (<3 feet) usually is required for transmission. Transmission occurs when droplets containing microorganisms generated from the infected person are deposited on the host's conjunctivae, nasal mucosa, or mouth or when there is direct contact of hands with respiratory droplets or secretions followed by touching the mouth, nose, or conjunctiva. Because droplets do not remain suspended in the air, special air handling and ventilation are not required to prevent droplet transmission; that is, droplet transmission *must not* be confused with airborne transmission.

Components of Droplet Precautions

- Place the patient in a private room. When a private room is not available, place the patient in a room with a patient or patients who have active infection with the same microorganism but no other infection (cohorting). In a pandemic it is likely that most patients with suspected influenza will not have a specific laboratory confirmed diagnosis; such patients should be cohorted with other patients who have or may have influenza. If for some reason cohorting is not achievable, at least 3 feet spatial separation should be maintained between the infected patient and other patients and visitors. Special air handling and ventilation are not necessary, and the door may remain open.

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- Wear a surgical mask upon entering the patient's room or when working within 3 feet of the patient. Remove the mask when leaving the patient's room and dispose of the mask in a waste container. N95 respirators, which would be recommended for infections with airborne spread such as tuberculosis, are not required for influenza. Logistically, some hospitals may want to implement policy for the wearing of a mask to enter the room.
- Limit the movement and transport of the patient from the room to essential purposes only. If transport or movement is necessary, minimize patient dispersal of droplets by having the patient wear a surgical mask.

Influenza precautions should be maintained for the duration of the respiratory illness. Further details regarding standard precautions and transmission based precautions can be found in the *Guideline for Isolation Precautions in Hospitals (see References)*. This document currently is being updated and a newer draft will be available on the Internet when available.

F. Other components of Infection Control for an Influenza Pandemic

State and/or local health departments should maintain communication with communities and health care institutions regarding pandemic influenza phase and whether infections with the pandemic strain have been identified in the state or surrounding areas. Infection control measures during a pandemic may differ from routine influenza infection control procedures because it can be assumed that risk of transmission is high, immunity within the population is low, an increased number of persons will be seeking medical care, and resources traditionally used for infection control may be in short supply. Each recommendation discussed below includes what should be done in an ideal situation (reflecting recommendations for routine influenza when medical supplies are adequate) as well as alternative measures to consider should the ideal not be possible. No distinction has been made based on the site at which care is given (such as hospitals, physicians' offices, or long term care facilities) with the presumption that health care professionals in each setting will adopt the highest level of infection control possible in their circumstances.

Staff Education

Staff should be educated about the epidemiology and prevention of influenza. It will be particularly important that staff understand the dynamics of influenza infection spread. Education should be a regularly scheduled event and should be repeated and geared toward a wider audience when a pandemic is expected. Additional methods of education including teleconferencing and mass mailing may be considered. Extra effort should be made to ensure that all staff participates in this program including nurses who work on a part-time basis, other staff who may not routinely care for patients but might be required to do so in the event of a pandemic, volunteers, and non-patient care staff (such as administrative, medical records, and food service personnel).

Bed Management

Isolation plans for use during a pandemic should be developed in advance. Under ideal circumstances, patients with suspected or diagnosed influenza should be in a private room.

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During a pandemic, private rooms and rooms with special ventilation will be limited, and containment of infection is likely to be difficult. Thus, patients with influenza like illness or confirmed influenza infection should be cohorted with others who have active confirmed or suspected influenza infection. Because of the possibility of prolonged shedding of influenza virus during a pandemic, all influenza specific bed management measures should be maintained for at least seven days after onset of illness or longer if symptoms persist. Uninfected patients who are at high-risk for influenza complications should be considered for private rooms. Isolation procedures for other pathogens, including use of a private room, should continue to be utilized.

Patient transport

Movement and transport of influenza infected patients should be limited as much as possible. If a patient must be transported, the patient should wear a surgical mask to decrease the risk of virus transmission to other patients and health care workers. In settings where patient transport is common, such as from the Emergency Department to radiology, planners should consider using alternate routes for persons with possible influenza infection and those who have no symptoms of influenza.

Cleaning, disinfection, and sterilization

The most important mode of transmission of influenza is via aerosolized or droplet transmission from the respiratory tract of infected persons. Transmission of droplets by direct contact is less important. Appropriate use of disinfectants should be followed. Recommended guidelines are available in the Healthcare Infection Control Practices Advisory Committee (HICPAC) Guideline for Environmental Infection Control in Healthcare Facilities, 2003 (<http://www.cdc.gov/ncidod/hip/enviro/guide.htm>), and from the Association for Professionals in Infection Control and Epidemiology (APIC). No additional recommendations specific to influenza are indicated.

Patient education

Patients should be educated about what they can do to decrease transmission of influenza to other patients, health care workers, and visitors. Information on Respiratory Hygiene/Cough Etiquette should be posted and be communicated individually to patients being hospitalized with respiratory disease. Congregation of patients should be minimized to prevent spreading of illness by non-symptomatic or undiagnosed persons.

Visitors

Visitors should be limited as much as possible to reduce the likelihood of transmission of influenza among visitors, patients, and health care workers. The use of family members and volunteers to assist in patient care during a pandemic may be considered with documented policies and education in place.

Health care workers with influenza-like illness

As part of the health care organization's responsibility to implement measures that reduce transmission of infection, it may be optimal to exclude personnel from patient contact if they have symptoms of febrile upper respiratory tract infection suggestive of influenza. This is

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especially critical if the health care worker cares for severely immunocompromised patients including neonates, young infants, and patients in the intensive care unit. To reduce the likelihood of excluding personnel from duty, all health care workers should be strongly encouraged to receive annual influenza vaccine and receive pandemic strain vaccine once it is available. Consideration may also be given to chemoprophylaxis with antiviral agents if vaccine is not available.

During a pandemic, when health care systems are likely to be overwhelmed, it may be necessary to amend personnel restriction policies. For example, health care workers with symptoms of influenza-like-illness, who feel well enough to be at work, might be allowed to care for patients with known influenza, thus freeing other personnel to care for non-influenza patients. Except in circumstances of limited staff, personnel with febrile influenza-like-illness should not care for patients at high risk of complications from influenza infection. Hospitals need a plan for staffing during the various periods of pandemic influenza that considers high census, high absenteeism, ill staff, use of diagnostic tests for staff assignments, and that weighs the benefits and risks for patients of high risk of influenza infection. Policies regarding staff refusal to care for influenza patients should also be addressed.

Elective utilization of health care facilities

Elective utilization of health care facilities including acute care hospitals, ambulatory surgical centers, and dialysis centers should be limited as much as possible during a pandemic. Reducing the number of elective visits to health care facilities and elective procedures will reduce exposure to influenza-infected patients receiving care in the health care facility. Performing fewer elective procedures also will allow redistribution of supplies and personnel to care for those ill with influenza and its complications. Health care facilities should develop criteria and guidelines for appropriate patient utilization including the consideration of a phone triage system.

For acute care hospitals, CDC guidelines for Prevention of Nosocomial Pneumonia suggests that during severe outbreaks – such as an influenza pandemic – medical and surgical elective admissions be eliminated or curtailed, and cardiovascular and pulmonary surgery be restricted, as possible. Consideration should be given to closing ambulatory surgical centers. If these centers remain open, patients should be screened for influenza-like-illness before surgery to reduce the risk of the patient transmitting influenza to others and to reduce the risk of complications to the patient. Health care workers should be vaccinated in order to prevent influenza virus transmission to patients while in the center. Many persons are dependent on certain health care procedures or treatments, such as dialysis, which must continue during a pandemic. In these situations it is especially important that both the health care worker and the patient receive annual influenza vaccine and that pandemic strain vaccine be administered once it is available.

Home health care

The demand for home care may increase as more stringent criteria are applied for hospital admission, as persons may be discharged home earlier, and as visits to outpatient facilities are limited. Home health care personnel need to apply infection control as scrupulously as hospital personnel, given their potential to spread infection between households. Hand hygiene, masks, and gloves should be used as described above. Home health care workers and home health

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patients should receive influenza vaccine annually and the pandemic strain vaccine should be administered once it is available.

VI. Outbreak Control

Nosocomial influenza outbreaks are more likely to occur during a pandemic because of the large number of persons (patients, staff, and visitors) who will be infected; possible difficulties implementing optimal infection control practices due to increased patient loads, staff shortages, and use of non-routine or volunteer staff; and the limited supply of vaccine and antivirals that are likely to be available initially. Active surveillance programs for nosocomial influenza illness can lead to early detection of outbreaks and response. Recognition of nosocomial influenza infection needs to be followed by the initiation of enhanced infection control measures.

Influenza outbreak control plan for health care facilities

- Implementation of surveillance for nosocomial onset of acute febrile respiratory illness or pneumonia (onset ≥ 48 hours after admission). The former would include documenting new onset of fever $>100^{\circ}\text{F}$, with or without myalgia, malaise, or headache, and with one or more of sore throat, cough, rhinorrhea, or nasal congestion. Respiratory specimens should be sent to the laboratory to determine whether influenza is the etiology. Use of a rapid antigen detection test can accelerate diagnosis and may facilitate a more rapid response. Detection of one case should lead to enhanced surveillance to increase the likelihood that an outbreak would be identified.
- Investigation by control personnel to identify potential causes of the outbreak or factors that contribute to ongoing spread. These investigations may identify a specific area of the facility that is a focus; determine whether infected health care workers may be transmitting the organism; and assess how well infection control practices are being implemented.
- Implementation of control measures. These may include isolating or cohorting patients; educating staff; enhancing infection control; placing infected staff members on leave or changing their patient care responsibilities; and use of vaccine or antiviral prophylaxis, if available.
- Communicating with the state and/or local health department and the community pandemic influenza Task Force. Public health input may facilitate investigation and response. Task Force involvement may be useful if patients need to be diverted to other facilities to decrease their risk of infection.

Recommendations for Long-Term Care Facilities

Infection control during an influenza pandemic poses special challenges for long-term care facilities (LTCF). Most LTCF residents, because of their age and underlying medical conditions, are at high risk for complications of influenza infection and LTCF staff may have less training in infection control compared with staff at hospitals. Influenza outbreaks occur in LTCFs each year with attack rates that may exceed 50 percent among susceptible persons. During a pandemic, the

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risk is likely to be increased as a greater proportion of staff and visitors are likely to be infected and susceptibility of residents to the pandemic strain may be universal.

Pandemic influenza preparedness and response goals for LTCFs

- Decrease the risk of influenza and its complications among staff and residents
- Prevent influenza outbreaks or effectively manage them, should they occur
- Effectively manage influenza illness to decrease complications and the need to transfer residents to acute care facilities.

All LTCFs should have preparedness and response plans that include vaccination recommendations, surveillance, infection control, policies regarding visitors, use of antiviral prophylaxis and therapy, outbreak reporting and management, and clinical care guidelines

Decreasing the risk of influenza and its complications

Annual influenza vaccination of LTCF residents is important to decrease their risk of infection and prevent mortality. Several states require that influenza vaccine be offered to LTCF residents. The use of standing orders is an effective strategy to increase vaccination rates and is endorsed by the Center for Medicare and Medicaid Services. LTCF staff also are among the groups recommended for annual influenza vaccine. Although such vaccination is unlikely to affect immunity to a pandemic strain, emphasizing the importance of vaccination and implementing active programs to enhance coverage during the inter-pandemic period will facilitate delivery and acceptance of vaccine during a pandemic. Because pneumococcal infections are a leading cause of bacterial complications of influenza, the pneumococcal polysaccharide vaccine also should be administered to all LTCF residents.

Surveillance for influenza also is important during the annual influenza season and during a pandemic. Prompt identification of acute febrile respiratory infections and pneumonia cases will facilitate implementation of approaches to prevent spread. Surveillance should include clinical assessment of any resident who develops signs of illness. Signs that are compatible with influenza include fever, respiratory symptoms, anorexia, vomiting, and increased confusion or decreased mental status. Rapid diagnostic tests are useful to confirm influenza illness. Because test sensitivity is limited, culture or polymerase chain reaction (PCR) also should be obtained if suspicion is high, if other cases of influenza have been diagnosed in the facility, or if disease is widespread in the community. Following diagnosis, management may include antiviral therapy and supportive care. Isolation or cohorting should be used to reduce the risk of infection spreading within the facility.

Influenza among LTCF staff or visitors may result in the introduction of infection into the facility. During a pandemic, visitors should be screened and those who are ill excluded. Because transmission may occur during the prodrome before influenza is clinically evident, excluding children – who may be most likely to spread disease – and limiting all visitors during a pandemic may be warranted. Although similar concerns exist regarding spread of infection from staff, excluding ill staff may not be possible in order to maintain adequate care of residents. Strict adherence to good infection control by all staff should be emphasized. Ill staff members could be assigned to care for cohorted or isolated residents with influenza.

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Vaccination and antiviral prophylaxis are important strategies to limit the risk of influenza among LTCF residents and staff. (See Annexes 6 and 7) At the beginning of a pandemic, vaccine is likely to be unavailable. Antiviral drugs may be available from a public sector stockpile or could be purchased from the private sector market. Amantadine and rimantadine are recommended for prophylaxis against susceptible influenza strains. Amantadine is associated with an increased risk of neurological adverse events compared with rimantadine but is more widely available and cheaper. Both agents are equally effective. *Specific recommendations for prophylaxis of residents and staff are included in Annex 7.* Amantadine and rimantadine should not be used as therapy for influenza as they are likely to induce the development of resistant strains which would reduce the efficacy of prophylaxis. When vaccine becomes available, LTCF residents and staff are included as high priority groups for immunization. Public health law supports the ability to compel residents to accept vaccination or prophylaxis, if needed, to protect others in the facility.

Isolation or cohorting of patients with influenza or influenza-like-illness in the absence of diagnostic testing will help prevent transmission of infection. Cohorting staff who care for these residents also will decrease the risk of spread to uninfected residents. Isolation should be maintained for at least 7 days after the onset of symptoms or until illness is resolved, whichever is longer.

Outbreak detection and management

An influenza outbreak in an LTCF can be a catastrophe – especially in a pandemic where susceptibility may be universal and where vaccine and antiviral medications may be in short supply or unavailable. Policies that will limit the introduction of influenza into the facility and, if introduced, limit its spread are crucial. Surveillance should be implemented to detect compatible illness and confirm an influenza diagnosis. After influenza is identified within a facility, surveillance should become more active to detect additional cases and facilitate control measures. This may include routine periodic evaluation of all residents including more frequently measuring temperatures. Line-lists of cases should be maintained. Outbreaks, defined as three or more cases in a facility, should be reported to the local or state health department. Outbreak management includes decreasing the spread of infection by isolation, cohorting, and enhancing infection control; and managing illness by providing antiviral therapy, supportive care, and antibiotic treatment of bacterial complications. In outbreaks where illness is widespread, facilities should consider temporarily discharging residents to stay with well family members if adequate care can be provided in that setting.

VII. Medical Care at Non-Traditional Facilities

The large number of ill patients who will require inpatient medical services during a pandemic may overwhelm the capacity of existing health care facilities. Models, based on data from previous pandemics suggest that hospital bed demand in a community may increase by more than 25% during the peak of a pandemic. While it may be possible to absorb this demand at existing facilities – particularly if hospitals increase their number of beds, elective admissions decreased, and duration of hospitalization reduced – the additional burden may overwhelm

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capacity. In these settings, medical care may need to be provided in non-traditional settings. Given the large number of challenges involved in providing inpatient medical care at a non-traditional site, advance planning is critical to success. If establishing such sites is considered a viable option, state and local health departments should work with community task forces to incorporate non-traditional site planning in pandemic influenza preparedness and response plans.

State health departments, in their initial planning activities, should define the potential need and the capacity of the existing health care system to respond. In general, expanding capacity of existing facilities will be easier than establishing new sites for inpatient care. Potential barriers to increasing hospital bed capacity, including state or local regulations, should be identified and health department and hospital personnel work to overcome them. In some communities, Veterans Administration and military health care facilities can provide surge capacity for an influenza pandemic.

If estimated needs exceed capacity, even with potential expansions, providing care at non-traditional facilities may be needed. Specific plans for such facilities will need to be established during the interpandemic period in order for sites to be operational when disease peaks. Issues to be addressed are highlighted below.

- Conduct a community-wide space and site resource inventory. Determine the availability of armories, schools, gymnasiums, and other potential public sites for care. Private sector sites such as hotels or nursing homes may be ideal as non-traditional sites for inpatient care but would pose additional challenges in contracting. If a nursing home is considered as a potential site for influenza inpatient care, residents would need to be relocated before the transition or strict separation would be needed between residents and influenza patients, and between staffs caring for the two groups. Accessibility to public and private transportation is important for staff and visitors.
- For each site selected, define potential bed capacity, with bed placement at least 3 feet apart. In defining capacity, important factors to consider beyond number of beds, include the availability of sinks and bathrooms, and capacity for food preparation. Assuring unrestricted movement of patients and supplies, storage capacity for pharmacy and other supplies, and facilities for disposal/storage of medical waste also are important. Consultation with the appropriate authorities regarding fire safety, waste disposal, food handling, and other health and safety issues also are critical.
- Define a planning and management team that will have responsibility for establishing, stocking, staffing, and running a non-traditional care site. Given the myriad of regulations, requirements, and restrictions that exist, and the need to obtain sufficient funding, public health leadership likely will be needed. The team also should include persons with experience in hospital management, human resources, facilities management, infection control, and legal counsel.

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- Identify sources of equipment and supplies needed to provide medical care at non-traditional sites. Planners should carefully consider what equipment and supply shortages may exist when a pandemic is imminent, determine whether materials need to be stockpiled, and identify sources of funding to support stockpile purchases. Respiratory care needs, in particular should be considered; however, mechanical ventilation and intensive care should not be provided at non-traditional sites. Because sinks for handwashing are likely to be less available in non-traditional sites compared with existing hospitals, hand hygiene supplies should include detergent-containing towelettes and alcohol-based hand rubs. On-site needs for radiology and laboratory should be considered and needed supplies and equipment reserved or obtained. For those procedures that are not performed at the non-traditional site, reference facilities and transport of patients and/or specimens needs to be established.
- Identify sources of staffing for care at non-traditional sites. Local hospitals are unlikely to provide staff as their capacity will be stressed and absenteeism due to illness will create shortages. Health care personnel who routinely provide outpatient or home care, or retired providers may be potential sources of staffing. Some personnel may be able to take on responsibilities beyond what they usually provide with appropriate training. State laws should be reviewed for potential restrictions or regulations regarding types of care that can be performed by different categories of providers and licensing requirements. Volunteers may be able to provide non-patient care services such as patient transport, housekeeping, and meal service. Protecting the health and safety of staff is important and applicable OSHA rules should be identified and considered in planning.
- Determine the type of patient care that will be provided and the relationship between the non-traditional site and other health care facilities in the community. Given potential limitations in staffing, equipment, and supplies compared with existing hospitals, non-traditional facilities may provide care to those who are less severely ill. Preparedness plans should define the acuity of care that can be provided at non-traditional facilities and outline triage systems that will direct those who need higher levels of care to existing hospitals. Conversely, hospitals could triage less ill patients who require inpatient care to non-traditional facilities. Appropriate transport would need to be assured for such transfers as well as for emergency transport of those who become severely ill from the non-traditional facility to the hospital.
- Identify the trigger that will lead to activation of a non-traditional site plan. The key factor triggering implementation likely will be observations on the epidemiology and disease burden associated with the pandemic in other areas. Based on estimates of the time needed to set up a non-traditional site, assuming all plans were made in advance, the trigger could be identification of pandemic disease in the community, state, or region.

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- Establish a plan to monitor the type and quality of care provided in non-traditional settings. Monitoring should include the type and number of admissions, the level of care provided, the duration of stay, transfers to existing hospitals, and patient outcomes. Untoward events including medical errors, nosocomial infections, and unexpected deaths should be monitored and investigated as soon as they are identified.

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