Interim Guidance for Infection Control Within Healthcare Settings When Caring for Patients with Confirmed, Probable, or Cases Under Investigation of Avian Influenza A(H7N9) Virus Infection

This interim guidance provides recommendations for initial infection control in healthcare settings for confirmed, probable, or cases under investigation of avian influenza A(H7N9) virus infection (update on the latest information on H7N9 (/flu/avianflu/h7n9-virus.htm) is available).

These recommendations will be updated as additional information on H7N9, its transmissibility, epidemiology, available treatment, or vaccine options become available. These interim recommendations are based upon current available information and the following considerations:

- Lack of a safe and effective vaccine
- A suspected high rate of morbidity and mortality among infected patients
- Unknown potential for human to human transmission
- Absence of confirmed or probable H7N9 cases in the United States

This interim guidance recommends a higher level of infection control measures than for seasonal influenza, as outlined in the Prevention Strategies for Seasonal Influenza in Healthcare Settings (/flu/professionals/infectioncontrol/healthcaresettings.htm). Among important differences from this seasonal influenza guidance are recommendations for contact and airborne precautions for patients with confirmed, probable, or a cases under investigation of H7N9 virus infection, which includes a higher level of personal protective equipment for healthcare personnel, including eye protection (i.e., required) and the expanded use of respirators (i.e., for all patient-care activities). For seasonal influenza, eye protection is not required in all instances and respirator use is recommended only during aerosol-generating procedures conducted on influenza patients.

Note that this interim guidance adds to existing infection control precautions (i.e., Standard Precautions) used every day in healthcare settings during the care of any patient. Standard Precautions are the foundation for preventing transmission of infectious agents in all healthcare settings and assume that every person is potentially infected or colonized with a pathogen that could be transmitted in the healthcare setting. Elements of standard precautions that apply to patients with respiratory infections, including those caused by the influenza virus, are summarized below (e.g., hand hygiene, gloves, gowns, respiratory hygiene and cough etiquette). All aspects of standard precautions (e.g., injection safety) are not emphasized in this document but can be found in the guideline titled Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings (http://www.cdc.gov/hicpac/2007IP/2007IsolationPrecautions.html) and are summarized for non-hospital settings in the Guide to Infection Prevention for Outpatient Settings: Minimum Expectations for Safe Care. (http://www.cdc.gov/HAI/settings/outpatient/outpatient-care-gl-fundamental-elements.html)
This interim guidance was developed by Centers for Disease Control and Prevention (CDC) subject matter experts, based on existing infection control guidelines, scientific evidence and expert opinion. After internal review at CDC, the document was reviewed by other relevant federal agencies.

**Interim Definition of Patient** ([/flu/avianflu/h7n9-case-definitions.htm](http://www.cdc.gov/flu/avianflu/h7n9-case-definitions.htm) with confirmed, probable, or cases under investigation of H7N9 virus infection.

**Definition of Healthcare Settings** -- Settings include but are not limited to acute-care hospitals; long-term care facilities, such as nursing homes and skilled nursing facilities; physicians’ offices; urgent-care centers; outpatient clinics; home healthcare (i.e., care provided at home by professional healthcare providers), and emergency medical services. Settings include specific sites within non-healthcare settings where healthcare is routinely delivered (e.g., a medical clinic embedded within a workplace or school).

**Definition of Healthcare Personnel (HCP)** – HCP refers to all persons, paid and unpaid, working in healthcare settings whose activities place them at risk for transmission of respiratory infections from patients. Examples of such activities include those that require direct contact with patients and/or exposure to the patient care environment, including being in the patient room or in a triage or examination room or other potentially contaminated areas, and handling blood, body fluids, secretions, or excretions (except sweat) or soiled medical supplies, equipment or environmental surfaces.

**Information and Definitions of Facemask and Respirator** – Please see Appendix

**Fundamental Elements to Prevent Transmission**

1. **Minimize Potential Exposures**
   - Implement policies and practices to minimize exposures to persons with confirmed, probable, or cases under investigation of H7N9 virus infection before arrival, upon arrival, and throughout the duration of the affected patient’s presence in the healthcare setting. Measures include prompt screening and triage of symptomatic patients, implementation of respiratory hygiene and cough etiquette, placement of a facemask (See definition of facemask in Appendix) on symptomatic patients upon entry to the facility, and rapid implementation of airborne isolation precautions, in addition to standard and contact precautions. For more information on ways to minimize potential exposures, please see Prevention Strategies for Seasonal Influenza in Healthcare Settings ([/flu/professionals/infectioncontrol/healthcaresettings.htm](http://www.cdc.gov/flu/professionals/infectioncontrol/healthcaresettings.htm)).

2. **Implement Engineering Controls**
   - Consider designing and installing engineering controls to reduce or eliminate exposures by shielding HCP and other patients from infected individuals. Examples of engineering controls include installing physical barriers such as partitions in triage areas or curtains that are drawn between patients in shared areas. Engineering controls may also be important to reduce exposures related to specific procedures such as using closed suctioning systems for airways suction in intubated patients. Another important engineering control is ensuring that appropriate air-handling systems (with appropriate directionality, filtration, exchange rate, etc.) are installed and maintained in healthcare facilities.

3. **Monitor and Manage Ill and Exposed Healthcare Personnel**
   - HCP who care for patients with suspected or known H7N9 should be advised to report any signs or symptoms of acute illness to their supervisor for a period of 10 days after the last known contact with the H7N9 sick patient.
     - Facilities should consider dedicating HCP caring for H7N9 cases to minimize risk of transmission and exposure to other patients and other HCP.

http://www.cdc.gov/flu/avianflu/h7n9-infection-control.htm

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Facilities should keep track of all HCP (e.g., clinicians, environmental services workers, food service) who care for or enter the rooms of confirmed, probable, or a cases under investigation of H7N9 virus infection.

- HCP who develop any respiratory symptoms after an unprotected exposure to a patient with confirmed, probable, or cases under investigation of H7N9 virus infection should not report for work. These HCP should notify their supervisor, implement respiratory hygiene and cough etiquette, seek prompt medical evaluation, and comply with work exclusion until they are no longer deemed infectious to others. If specific treatment (e.g., antiviral medication) is available, such treatment should be started as soon as possible, especially for HCP with underlying medical conditions that may put them at increased risk for complications.

- For asymptomatic HCP who have had an unprotected exposure (i.e., not wearing respiratory protection at the time of contact) to a patient or other persons with confirmed, probable, or a cases under investigation of H7N9 virus infection, exclusion from work for 10 days to monitor for signs and symptoms of H7N9 illness should be considered.

  - If necessary to ensure adequate staffing of the facility, the asymptomatic provider could be considered for continuing work if they are placed on prophylactic influenza anti-viral medications and can wear a facemask for source control. The facemask should be worn at all times while in the healthcare facility during a probable incubation period, e.g., 10 days after the exposure. The antivirals should be administered for this same duration.

  - Refer to the CDC web site for the most current recommendations on the use of antiviral agents for treatment and chemoprophylaxis. Both HCP and patients should be reminded that persons treated with influenza antiviral medications continue to shed influenza virus while on treatment. Thus, hand hygiene, respiratory hygiene and cough etiquette practices should continue while on treatment.

- Asymptomatic HCP who continue to work and are wearing a facemask for the purpose of source control (i.e., limiting transmission from exposed HCP to other HCP or patients), should be reminded that if they care for patients under airborne precautions (e.g., an H7N9 suspected or confirmed patient), the HCP would need to change to a fit–tested National Institute for Occupational Safety and Health (NIOSH) certified disposable N95 filtering facepiece respirator (without an exhalation valve) or other respirator providing equivalent or higher aerosol protection (i.e., the HCP should not wear both a facemask and respirator at the same time). When respirator use is no longer needed, the HCP should put a facemask back on as needed for source control.

- Facilities and organizations providing healthcare should:
  - Implement sick leave policies for HCP that are non-punitive, flexible and consistent with public health guidance (e.g., policies should allow and encourage HCP with confirmed, probable, or a cases under investigation of H7N9 virus infection illness to stay home, unless hospital admission for isolation and treatment is recommended).
  - Ensure that all HCP encompassed by these policies are aware of the sick leave policies.
  - Provide employee health services that:
    - Establish procedures for tracking absences and promptly identify HCP with confirmed, probable, or cases under investigation of H7N9 virus infection.
    - Ensure that HCP have ready access, including via telephone, to medical consultation and, if needed, prompt treatment.

4. **Train and Educate Healthcare Personnel**

http://www.cdc.gov/flu/avianflu/h7n9-infection-control.htm 4/12/2013
Provide all HCP with job- or task-specific education and training on preventing transmission of infectious agents, including refresher training when an outbreak of confirmed, probable, or cases under investigation of H7N9 virus infection is detected.

5. **Ensure Adherence to Infection Control Practices (i.e., Standard Precautions, plus Contact and Airborne Precautions)** All HCP (see section 7 for measures for non-HCP visitors) who enter the room of a patient with confirmed, probable, or a cases under investigation of H7N9 virus infection should adhere to all of the following:

- **Hand Hygiene**
  - HCP should perform hand hygiene before and after all patient contact, contact with potentially infectious material, and before putting on and upon removal of personal protective equipment, including gloves. Hand hygiene in healthcare settings can be performed by washing with soap and water or using alcohol-based hand rubs. If hands are visibly soiled, use soap and water, not alcohol-based hand rubs.
  - Healthcare facilities should ensure that facilities and supplies for performing hand hygiene are readily available to all personnel.

- **Gloves**
  - Put on clean, non-sterile gloves upon entry into the patient room or care area. Change the gloves if they become torn or heavily contaminated.
  - Wear gloves whenever touching the patient's intact skin or surfaces and articles in close proximity to the patient (e.g., medical equipment, bed rails, linens).
  - Remove and discard gloves immediately upon leaving the patient room or care area. Please see section below on “Using More than one Kind of Personal Protective Equipment (PPE)” for recommended sequence of PPE removal.

- **Gowns**
  - Put on a clean gown upon entry into the patient room or area. Change the gown if it becomes soiled. Remove and discard the gown immediately upon leaving the patient room or care area.

- **Respiratory Protection**
  - Use respiratory protection (i.e., a respirator) that is at least as protective as a fit-tested NIOSH-certified disposable N95 filtering facepiece respirator upon entry to the patient room or care area. See appendix for respirator definition.
  - The respirator should be the last part of the personal protective equipment (PPE) ensemble to be removed. If reusable respirators are used, they must be cleaned and disinfected according to manufacturer's reprocessing instructions prior to reuse. If disposable respirators are used, they should be removed and discarded after leaving the patient room or care area and closing the door.
  - Respirator use should be in the context of a complete respiratory protection program in accordance with Occupational Safety and Health Administration (OSHA) regulation. ([29 CFR 1910.134](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=12716)). Staff should be medically cleared, fit-tested if using respirators with tight-fitting facepieces (e.g., a NIOSH-certified disposable N95) and trained in the proper use of respirators, safe removal and disposal, and medical contraindications to respirator use.

- **Eye Protection**
  - Put on eye protection (i.e., goggles or face shield) upon entry to the patient room or care area. Remove and discard eye protection immediately upon leaving the patient room or care area. If reusable eye protection is used, it must be cleaned and disinfected according to manufacturer’s reprocessing instructions prior to reuse.

- **Using More than one Kind of Personal Protective Equipment (PPE)**
Different types of PPE are used together to prevent multiple routes of transmission.

The following sequence is a general approach to putting on PPE: first gown; then mask or respirator; then goggles or face shield; then gloves.

The following sequence is a general approach to removing PPE: first gloves; then goggles or face shield; then gown; then mask or respirator.

Except for respirator, remove PPE at doorway or in anteroom. Remove respirator after leaving patient room and closing door.

Perform hand hygiene as described above immediately before putting on and after removing all PPE.

Patient Placement

- Place a patient with confirmed, probable, or cases under investigation of H7N9 virus infection in an Airborne Infection Isolation Room (AIIR) that has been constructed in accordance with current guidelines.
- If an AIIR is not available, the patient should be transferred as soon as is feasible to a facility where an AIIR is available. Pending transfer, place a facemask on the patient and isolate him/her in an examination room with the door closed. The patient should not be placed in any room where room exhaust is recirculated without high-efficiency particulate air (HEPA) filtration.
- Once in an AIIR, the patient’s facemask may be removed; the facemask should remain on if the patient is not in an AIIR. Limit transport and movement of the patient outside of the AIIR to medically-essential purposes. When outside of the AIIR, patients should wear a facemask to contain secretions.
- Only essential personnel should enter the AIIR. Implement staffing policies to minimize the number of essential personnel who must enter the room.
- In the event in which large numbers of patients require AIIR, consideration can be made to placing patients who are presumed to have the same infection together (cohorting).
- Once the patient vacates a room, unprotected individuals, including HCP, should not be allowed in that room until sufficient time has elapsed for enough air changes to remove potentially infectious particles. More information on clearance rates under differing ventilation conditions is available. In addition, the room should undergo appropriate cleaning and surface disinfection before unprotected individuals are allowed to reenter it.

Use Caution When Performing Aerosol-Generating Procedures

- Some procedures performed on patients with suspected or confirmed influenza, including H7N9, infection may be more likely to generate higher concentrations of infectious respiratory aerosols than coughing, sneezing, talking, or breathing. These procedures potentially put HCP and others at an increased risk for influenza exposure. Although there are limited data available to define which procedures are related to influenza transmission, some authorities have included procedures that are usually planned ahead of time, such as bronchoscopy, sputum induction, elective intubation and extubation, and autopsies; and some procedures that often occur in unplanned, emergent settings and can be lifesaving, such as cardiopulmonary resuscitation, emergent intubation and open suctioning of airways.
- Ideally, a combination of measures should be used to reduce exposures from these aerosol-generating procedures when performed on patients with suspected or confirmed influenza. However, it is appropriate to take feasibility into account, especially in challenging emergent situations, where timeliness in performing a procedure can be critical to achieving a good patient outcome.
Precautions for aerosol-generating procedures are included in Prevention Strategies for Seasonal Influenza in Healthcare Settings (http://www.cdc.gov/flu/professionals/infectioncontrol/healthcaresettings.htm) and are reiterated below:

- Only performing these procedures on patients with suspected or confirmed H7N9 if they are medically necessary and cannot be postponed.
- Limiting the number of HCP present during the procedure to only those essential for patient care and support.
- Conducting the procedures in an AIIR when feasible. This will not be feasible for unplanned, emergent procedures, unless the patient is already in an AIIR. Such rooms are designed to reduce the concentration of infectious aerosols and prevent their escape into adjacent areas using controlled air exchanges and directional airflow. They are single patient rooms at negative pressure relative to the surrounding areas, and with a minimum of 6 air changes per hour (12 air changes per hour are recommended for new construction or renovation). Air from these rooms should be exhausted directly to the outside or be filtered through a high-efficiency particulate air (HEPA) filter before recirculation. Room doors should be kept closed except when entering or leaving the room, and entry and exit should be minimized during and shortly after the procedure. Facilities should monitor and document the proper negative-pressure function of these rooms.
- Considering use of portable HEPA filtration units to further reduce the concentration of contaminants in the air. Some of these units can connect to local exhaust ventilation systems (e.g., hoods, booths, tents) or have inlet designs that allow close placement to the patient to assist with source control; however, these units do not eliminate the need for respiratory protection for individuals entering the room because they may not entrain all of the room air. Information on air flow/air entrainment performance should be evaluated for such devices.
- HCP should adhere to PPE precautions in this interim guidance (i.e., gloves, a gown, and either a face shield that fully covers the front and sides of the face or goggles, and respiratory protection equivalent to a fitted N95 filtering facepiece respirator or equivalent N95 respirator [e.g., powered air purifying respirator, elastomeric] during aerosol-generating procedures)
- Unprotected HCP should not be allowed in a room where an aerosol-generating procedure has been conducted until sufficient time has elapsed to remove potentially infectious particles. More information on clearance rates under differing ventilation conditions is available.
- Conduct environmental surface cleaning following procedures (see section on environmental infection control).

6. Implement Environmental Infection Control

- Ensure that cleaning and disinfection procedures are followed consistently and correctly. Manage laundry, food service utensils, and medical waste in accordance with routine procedures.
- Standard cleaning and disinfection procedures (e.g., using cleaners and water to preclean surfaces prior to applying disinfectants to frequently touched surfaces or objects for indicated contact times) are adequate for influenza virus environmental control in all settings within the healthcare facility, including those patient-care areas in which aerosol-generating procedures are performed.
Management of laundry, food service utensils, and medical waste should also be performed in accordance with standard procedures. There are no data suggesting these items are associated with influenza virus transmission when these items are properly managed.

- Laundry and food service utensils should first be cleaned, then sanitized as appropriate.
- Some medical waste may be designated as regulated or biohazardous waste and require special handling and disposal methods approved by the State authorities.

7. **Manage Visitor Access and Movement Within the Facility**

- Establish procedures for monitoring, managing and training visitors of patients with confirmed, probable, or cases under investigation of H7N9 virus infection
  - Regardless of restriction policy, all visitors should follow respiratory hygiene and cough etiquette precautions listed in the Take Steps to Minimize Potential Exposures section of the Prevention Strategies for Seasonal Influenza in Healthcare Settings (/flu/professionals/infectioncontrol/healthcaresettings.htm)
- Limit visitors for patients in isolation for confirmed, probable, or cases under investigation of H7N9 virus infection to persons who are necessary for the patient’s emotional well-being and care.
  - Visitors who have been in contact with the patient before and during hospitalization are a possible source of influenza for other patients, visitors, and staff.
- For persons with acute respiratory symptoms, facilities should develop visitor restriction policies that consider location of patient being visited (e.g., oncology units) and circumstances, such as end-of-life situations, where exemptions to the restriction may be considered at the discretion of the facility.
- Visits to patients in isolation for H7N9 should be scheduled and controlled to allow for:
  - Screening visitors for symptoms of acute respiratory illness before entering the hospital.
  - Facilities should provide instruction, before visitors enter patients’ rooms, on hand hygiene, limiting surfaces touched, and use of personal protective equipment (PPE) according to current facility policy while in the patient’s room.
  - Facilities should consider tracking (e.g., log book) all visitors who enter the rooms of confirmed, probable, or cases under investigation of H7N9.
  - Visitors should not be present during aerosol-generating procedures.
  - Visitors should be instructed to limit their movement within the facility.
  - Exposed visitors should be advised to report any signs and symptoms of acute illness to their health care provider for a period of at least 10 days after the last known exposure to the sick patient.

8. **Monitor Activity of Severe Respiratory Infection in the Healthcare Setting**

- Implement mechanisms and policies that promptly alert HCP about increased respiratory illness activity or outbreak within the facility.
- Establish procedures to identify HCP at highest risk and actively follow them for acute respiratory illness, and to encourage all HCP to self-report acute respiratory illness.
- Communicate and collaborate with public health authorities.

**Appendix: Additional Information about Influenza**

**Information about Facemasks:**

- FDA - Masks and N95 Respirators, FDA (http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/GeneralHospitalDevicesandSu)</p>

http://www.cdc.gov/flu/avianflu/h7n9-infection-control.htm 4/12/2013
A facemask is a loose-fitting, disposable device that creates a physical barrier between the wearer and contaminants in the immediate environment. Facemasks may be labeled as surgical, laser, or procedural, and may come with or without a face shield. If worn properly, a facemask is meant to help block splatter that may contain germs (viruses and bacteria) from reaching your mouth and nose. While a facemask may be effective in blocking wearer's saliva and respiratory secretions to others, it does not filter or block very small particles in the air that may be transmitted by procedures.

Facemasks are cleared by the U.S. Food and Drug Administration (FDA) for use as medical devices, and should be thrown away in the trash.

Information about Respirators:

- **FDA - Masks and N95 Respirators, FDA** ([http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/GeneralHospitalDevicesandSupplies/MaskRespiratoryProtection/](http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/GeneralHospitalDevicesandSupplies/MaskRespiratoryProtection/))
- A respirator is a personal protective device that is worn on the face, covers at least the nose and mouth, and is designed to prevent inhaling hazardous airborne particles (including dust particles and infectious agents). Gas-tight and disposable respirators may also be cleared or approved by FDA as medical devices.
- **NIOSH information about respirators** ([http://www.cdc.gov/niosh/topics/respirators/](http://www.cdc.gov/niosh/topics/respirators/)).
- To work properly, respirators must be specially fitted for each person who wears one (this is especially true in workplaces where respirators are used).
- NIOSH information about respirators ([http://www.cdc.gov/niosh/topics/respirators/](http://www.cdc.gov/niosh/topics/respirators/)).