

## **Infection prevention and control during health care for confirmed, probable, or suspected cases of pandemic (H1N1) 2009 virus infection and influenza-like illnesses**

**Updated guidance**

**16 December 2009**

### **I. Background**

Since the first recorded cases in April 2009, the pandemic influenza A (H1N1) 2009 virus has spread rapidly across the globe resulting in sustained community transmission worldwide. Health-care facilities continue to face the challenge of providing care for patients infected with the pandemic virus. In order to minimize transmission during health care, it is crucial that health-care workers (HCWs), other care-givers, including attendants, patients, and visitors, follow appropriate infection prevention and control (IPC) precautions. Although some of these precautions are generic and should be followed by everyone, the nature of work performed by HCWs may require additional or more intensive precautions beyond those that patients or visitors need to follow.

IPC measures and strategies for pandemic (H1N1) 2009 should be consistent with those used to prevent transmission of other infectious agents in all health care settings. Furthermore, since the spread of pandemic (H1N1) 2009 is worldwide and is circulating concurrently with seasonal influenza viruses, the same IPC measures should be used for all patients with human influenza. However, it is particularly important to be vigilant for other respiratory diseases that may require different or additional IPC measures (e.g. pulmonary tuberculosis) and which may be overlooked due to large numbers of patients with respiratory symptoms seeking care.

Human-to-human transmission of the pandemic (H1N1) 2009 virus appears to be similar to transmission of other human influenza viruses, i.e. occurring primarily either directly or indirectly through close, unprotected contact with large respiratory droplets. The contribution to influenza transmission of smaller droplet nuclei at close-range exposure is unknown, but may be more important under special conditions; e.g. aerosol-generating procedures associated with increased risk of infection transmission (see Section III, 1.2). Therefore, IPC precautions for patients with suspected, probable, or confirmed pandemic (H1N1) 2009 virus infection, as well as those with other respiratory pathogens that cause influenza-like symptoms, should focus on controlling the spread of respiratory droplets.

WHO developed this guidance to meet the urgent need for up-to-date information and evidence-based recommendations for care of patients with confirmed, probable, or suspected H1N1 (2009) virus infection and influenza-like illnesses (ILI). This guidance summarizes and highlights the principal elements in the document “Infection prevention and control of epidemic- and pandemic-prone acute respiratory diseases in health care - WHO Interim Guidelines”<sup>1</sup> that are applicable for the current influenza pandemic and that highlight specific issues under current circumstances with pandemic (H1N1) 2009 virus circulation.

This updated guidance revises and clarifies priorities for the use and implementation of IPC measures in several areas, including:

- administrative measures, which have been more broadly defined and emphasized;
- a revision of the duration of precautions for certain patient populations;
- a new section addressing the risks and implications of antiviral drug resistance;
- reorganization of the section on Key Elements for Infection Prevention. This reorganization emphasizes the critical importance of early detection and infection control intervention to mitigate the introduction and spread of influenza and other respiratory infections in health-care settings; and,
- WHO’s recommendation for prioritizing and immunizing health-care workers with pandemic (H1N1) 2009 vaccines.<sup>2</sup>

This guidance document recognizes several knowledge gaps; e.g. data are limited regarding the risk of transmission associated with procedures that involve manipulation of the respiratory tract. However, new information on the efficacy of hand hygiene and medical masks in mitigating transmission of influenza lends support to emphasizing these measures for routine patient care.

Emphasis is also placed on measures that are cost-effective and local adaptations of this guidance may be needed. Health-care facilities should consider the long-term implications of sustaining care for patients during a pandemic and the overall impact on health-care delivery when making decisions about resource allocations to permit the safest possible health care for all patients

This guidance replaces guidance documents issued on 29 April and 25 June 2009 and remains valid until 30 June 2010, at which time a full evidence review will be undertaken. Always check the WHO web site for the most recently published guidance.<sup>3</sup>

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1. Infection prevention and control of epidemic- and pandemic-prone acute respiratory diseases in health care - WHO Interim Guidelines. World Health Organization, June 2007. Available at [http://www.who.int/csr/resources/publications/WHO\\_CD\\_EPR\\_2007\\_6/en/index.html](http://www.who.int/csr/resources/publications/WHO_CD_EPR_2007_6/en/index.html). Accessed on December 4, 2009.

2. Strategic Advisory Group of Experts on Immunization – Report of the extraordinary meeting on the influenza A (H1N1) 2009 pandemic, 7 July 2009. *Weekly Epidemiological Record*, 24 July 2009, 8430:301-304. Available at <http://www.who.int/wer/2009/wer8430.pdf>. Accessed on December 4, 2009.

3. Infection prevention and control in health care for confirmed or suspected cases of pandemic (H1N1) 2009 and influenza-like illnesses. World Health Organization, June 2009. Available at [http://www.who.int/csr/resources/publications/SwineInfluenza\\_infectioncontrol.pdf](http://www.who.int/csr/resources/publications/SwineInfluenza_infectioncontrol.pdf). Accessed on December 4, 2009.

## II. Fundamentals of infection prevention strategies

Categories of controls for preventing infection transmission in health-care settings have been organized hierarchically in accordance with their effectiveness. The categories are: administrative controls, environmental/engineering controls, and personal protective equipment (PPE).

**Administrative controls.** These are the first priority of IPC strategies. They provide the infrastructure of policies and procedures to prevent, detect, and control infections during health care. To be effective, IPC measures must be implemented at the first point of patient encounter and should be continued until patient discharge from the facility. Below are important administrative controls and policies that specifically apply to respiratory infections, including pandemic (H1N1) 2009, and which health-care facilities should have in place (see also Section V):

- measures to limit the introduction of infection in health-care settings. Strategies may include: diverting patients who are ill to a dedicated influenza evaluation and treatment area and limiting entry by persons who are ill, but are not seeking health-care services;
- measures to control persons who are ill and seeking and receiving health care, e.g., patient triage for early detection, preventing overcrowding in waiting areas, providing dedicated waiting areas for the ill, and placement of hospitalized patients;
- implementation and facilitation of source control measures; i.e., respiratory hygiene and cough etiquette to help contain respiratory secretions in persons with respiratory symptoms;
- implementation and facilitation of IPC precautions by health-care workers and others involved in patient care, including policies on the use of available supplies and PPE;
- policies and procedures for all facets of occupational health; and
- strategies for the organization of health-care services, especially when there is a surge in demand (e.g., postponing elective visits and procedures based on clinical judgment).

**Environmental/engineering controls.** These include basic health-care facility infrastructures<sup>4</sup> and are the next priority. These controls address ensuring adequate environmental ventilation in all areas within a health-care facility, as well as adequate environmental cleaning. Both controls can help reduce the spread of some pathogens during health care.

**Personal Protective Equipment.** Rational and consistent use of available PPE and appropriate hand hygiene also help reduce the spread of infection.<sup>5</sup> Although use of PPE is the most visible

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4. Essential environmental health standards in health care. World Health Organization, 2008. Available at [http://www.who.int/water\\_sanitation\\_health/hygiene/settings/ehs\\_hc/en/index.html](http://www.who.int/water_sanitation_health/hygiene/settings/ehs_hc/en/index.html). Accessed on December 4, 2009.

5. WHO Guidelines on Hand Hygiene in Health Care. World Health Organization, 2009. Available at [http://whqlibdoc.who.int/publications/2009/9789241597906\\_eng.pdf](http://whqlibdoc.who.int/publications/2009/9789241597906_eng.pdf). Accessed on December 4, 2009.

control used to prevent the spread of infection, it is the last and weakest of the hierarchy of IPC measures and should not be relied on as a primary prevention strategy. In the absence of effective administrative and engineering controls, PPE has limited benefit.

### III. Summary of infection control precautions in specific situations

#### 1. Caring for patients with suspected, probable, or confirmed infection with pandemic (H1N1) 2009 virus infection and influenza-like illnesses

The following precautions should be taken when providing care to patients with suspected, probable, or confirmed pandemic (H1N1) 2009 virus infection and for patients with ILI.

- 1.1. When working in direct contact with patients, Standard<sup>6</sup> and Droplet Precautions<sup>7</sup> should always be applied.

##### As per Standard Precautions:

Hand hygiene is a major component of Standard Precautions and one of the most effective methods to prevent transmission of pathogens known to cause health care-associated infections. Hand hygiene must be performed before and after any contact with patients and after contact with contaminated items or surfaces.

- Hand hygiene includes either washing hands with soap and water or the use of an alcohol-based hand rub.
- Wash hands with soap and water when they are visibly soiled.
- Use of PPE does not eliminate the need for hand hygiene.

The use of PPE should be guided by a risk assessment concerning anticipated contact with blood and body fluids for routine patient care. When procedures include a risk of splash to the face and/or body, PPE should include the use of:

- facial protection by means of either a medical mask<sup>8</sup> and eye-visor or goggles, or a face shield; and
- a gown and clean gloves. The use of gloves does not eliminate the need for hand hygiene.

##### As per Droplet Precautions:

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6. Standard Precautions are basic precautions designed to minimize direct, unprotected exposure to potentially infected blood, body fluids or secretions applicable to all patients. See also Standard precautions in health care. World Health Organization, 2007. Available at [http://www.who.int/csr/resources/publications/EPR\\_AM2\\_E7.pdf](http://www.who.int/csr/resources/publications/EPR_AM2_E7.pdf). Accessed on December 4, 2009.

7. Droplet Precautions include the recommended use of PPE. HCWs should wear a medical mask, if they are working within approximately 1 metre of a patient who is ill or infected.

8. In this document, the term "medical mask" refers to disposable surgical or procedure masks.

- Wear a medical mask if working within approximately 1 metre of the patient or upon entering the room/cubicle of a patient on Droplet Precautions.
- Perform hand hygiene before and after patient contact and immediately after removal of a medical mask.

1.2. When performing aerosol-generating procedures associated with an increased risk of infection transmission (e.g. aspiration or open suctioning of the respiratory tract, including for the collection of lower respiratory tract specimens, intubation, resuscitation, bronchoscopy, autopsy, etc.), IPC precautions should include the following:

- Wear a particulate respirator (e.g. FFP2; see<sup>9</sup> for listing), eye protection (i.e., goggles or a face shield); a clean, non-sterile, long-sleeved gown; and gloves (some of these procedures require sterile gloves).
- Perform procedures in an adequately ventilated room; e.g. minimum of 6 to 12 air changes per hour in facilities with a mechanically ventilated room and at least 60 liters/second/patient in facilities with natural ventilation).<sup>10</sup>
- Limit individuals in the room only to those required for the patient's care and support.
- Perform hand hygiene before and after patient contact and after PPE removal.

1.3. Special considerations for patients who are mechanically ventilated or undergoing respiratory therapy treatments.<sup>11</sup>

Patients who are mechanically ventilated or receiving respiratory therapy treatment can be managed using Standard and Droplet Precautions. If an aerosol-generating procedure associated with increased risk for infection transmission in an open system is also performed, guidance described in III.1.2 should be used. The following is procedure-specific IPC precaution guidance:

- Non-invasive ventilation (NIV) (i.e., BiPAP, CPAP):<sup>12</sup> Standard and Droplet Precautions unless indicated otherwise by new evidence of increased transmission risk.<sup>13</sup>
- Invasive ventilation:

9. Examples of acceptable, disposable particulate respirators in use in various parts of the world include: Australia/New Zealand: P2 (94%), P3 (99.95%); China: II (95%), I (99%); European Union: CE-certified filtering face-piece class 2 (FFP2) (95%), class 3 (FFP3) (99.7%); Japan: 2nd class (95%), 3rd class (99.9%); Republic of Korea: 1st class (94%), special (99.95%); United States: NIOSH-certified N95 (95%), N99 (99%), N100 (99.7%).

10. WHO Guidelines on Natural Ventilation for Infection Control in Health-Care Settings. World Health Organization, 2009. Available at [http://www.who.int/water\\_sanitation\\_health/publications/natural\\_ventilation/en/index.html](http://www.who.int/water_sanitation_health/publications/natural_ventilation/en/index.html). Accessed on December 4, 2009.

11. Research is needed to further evaluate the association of different types of procedures for respiratory support and respiratory therapy with increased risk of disease transmission.

12. Limited clinical experience with pandemic (H1N1) 2009 suggests that NIV (i.e. bi-level positive airway pressure, or BiPAP) or continuous positive airway pressure, or CPAP, is not recommended for patients requiring ventilatory support, except for those in whom another indication for NIV exists or if mechanical ventilation is not available and other measures of oxygenation/ventilatory support have been inadequate.

13. The studies evaluating the risk of infection transmission associated with non-invasive ventilation provide conflicting results and further assessments are warranted to better inform guidance development and policy decisions.

- Closed suctioning system. Standard and Droplet Precautions.
- Open suctioning system. Follow recommendations described in III.1.2.
- Chest physiotherapy: If the patient can tolerate it, a medical mask should be worn by the patient and Standard and Droplet Precautions should be used by the HCW.
- Nebulization: Standard and Droplet Precautions. Nebulizer treatment should be performed in an area that is physically separated from other patients (e.g. treatment room, screened enclosure).<sup>14</sup>

IPC precautions may need to be elevated during acute or unstable situations in emergency rooms and intensive care units, when aerosol-generating procedures associated with an increased risk of infection transmission are anticipated to be performed.

## 2. Duration of isolation precautions

Viral shedding generally diminishes rapidly with the resolution of symptoms, particularly fever. In uncomplicated illness in otherwise healthy adults, the duration of acute symptoms is usually one week. Viral shedding, or detection of viable virus, is an indicator of potential infectiousness. Studies assessing the association of laboratory test results with effective spread of the disease (e.g. household or institutional outbreaks) are warranted to help understand the period of communicability.<sup>15</sup> It is generally accepted that once the acute symptoms of influenza have resolved, the risk of transmission is sufficiently low such that Droplet Precautions are no longer required; Standard Precautions remain in effect for all patient care. However, there are several factors, such as age, certain medications, and immune status, that may contribute to a prolonged duration of virus shedding relative to symptom resolution, particularly in some patient groups:

- In infants and children, virus shedding may be more prolonged.
- In elderly patients, and those on certain medicines, such as antipyretics and oral corticosteroids, fever may be suppressed or absent.
- In severely immunosuppressed or immunocompromised patients, virus replication is known to persist for extended periods despite antiviral treatment.

In health-care settings, therefore, it is recommended that, in addition to the routine Standard Precautions, additional infection control precautions should be in place as follows:

- All patients should remain on Droplet Precautions for a minimum of seven days following symptom onset.

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14. The studies evaluating the risk of infection transmission associated with nebulization provide controversial results and further assessments are warranted to better inform guidance development and policy decisions.

15. Laboratory tests, namely rRT-PCR, is a highly-sensitive, diagnostic measure and may detect traces of virus RNAs. Therefore, a positive result does not necessarily indicate ongoing virus replication, but rather suggests recent virus infection. These tests should not be used on a routine basis for the determination of duration of IPC precautions. Professional judgment and clinical parameters (i.e., resolution of symptoms) and patient information (e.g. age, immune status, medication) should be used in situations where there is ongoing concern that a patient may be infectious for a prolonged period.

- In addition, for all patients, Droplet Precautions should be maintained until 24 hours following resolution of acute influenza symptoms, particularly fever.
  - Resolution of fever should be assessed with regard to use of antipyretics or corticosteroids. (The additional 24 hours allows for fluctuations in fever with the circadian cycle.)
  - Some symptoms, such as cough or other airway distress, may persist beyond the period of infectivity.
- Special attention is needed when caring for immunosuppressed patients who may shed more virus for a longer time period and are also at increased risk for development of antiviral-resistant virus.<sup>16</sup> For such patients, Droplet Precautions should be maintained for the duration of ILI.

### 3. Risk of drug-resistant virus

Sporadic cases of oseltamivir-resistant pandemic (H1N1) 2009 virus have been reported and there appears to be a higher risk of such viruses emerging in certain settings.<sup>17</sup> These higher-risk circumstances appear to include patients who are severely immunocompromised and who have been receiving antiviral therapy, as well as those patients in whom chemoprophylaxis has failed. However, 25% of the reported cases have been associated with treatment of uncomplicated influenza. As a result, infection control measures should be maintained and enforced in any situation where drug-resistant virus is suspected, including any patient whose respiratory symptoms persist beyond a 5-day antiviral treatment course.

### 4. Collection of laboratory specimens

For collection of respiratory tract specimens for diagnosis or surveillance purposes from patients with acute febrile respiratory infection, appropriate IPC precautions should be applied.

Upper respiratory tract specimens for diagnosis include nasal swab/wash (taken from deep throat), nasopharyngeal swab (taken from nasopharynx), nasopharyngeal aspirate and throat swab. Lower respiratory tract specimens include tracheal and bronchial aspirates. During routine upper respiratory specimen collection, recommendations for Standard and Droplet Precautions (III.1.1) should be followed.<sup>17</sup> For the collection of lower respiratory aspirates, recommendations for aerosol-generating procedures associated with a possible increased risk of infection transmission should be followed (III.1.2).

Blood samples, acute and/or convalescent, may be collected for serologic purposes. Use of IPC precautions should be in accordance with the patient's stage of illness. Standard and Droplet Precautions (i.e., clean gloves and a medical mask) should be applied for samples collected during the acute phase and Standard Precautions (i.e., clean gloves) for the convalescent phase.

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16. Oseltamivir-resistant pandemic (H1N1) 2009 influenza virus. World Health Organization, *Weekly Epidemiological Report*, 30 October 2009, 8444:453–468. Available at <http://www.who.int/wer/2009/wer8444/en/index.html>. Accessed on December 4, 2009.

17. Research is needed to evaluate the association of different types of procedures for collection of specimens from upper respiratory tract with an increased risk of disease transmission.

## **5. Infection control precautions for patient care in regions where avian influenza A (H5N1) and pandemic influenza A (H1N1) 2009 have been reported to be co-circulating**

Patients presenting with an ILI might be infected with one of several influenza viruses (e.g. avian influenza A (H5N1), pandemic (H1N1) 2009, seasonal, and/or other influenza viruses), as well as other respiratory pathogens. Epidemiological and clinical<sup>18</sup> clues should be used in triage areas to identify and apply the appropriate IPC measures in accordance with the most likely diagnosis. Laboratory diagnosis should be pursued for etiological clarification whenever avian influenza A (H5N1)<sup>19</sup> is suspected. But a laboratory-confirmed diagnosis is not always available or might be delayed, and clinical clues and epidemiological link(s) (e.g. close and prolonged contact with patients infected with influenza A (H5N1) or animal exposures) can aid in the presumptive diagnosis of avian influenza A (H5N1). For laboratory-confirmed or suspected cases of avian influenza A (H5N1) infection, Standard plus Droplet plus Contact<sup>20</sup> Precautions and eye protection should be applied when providing routine care.<sup>21</sup>

## **V. Key elements for infection prevention in health-care settings**

### **1. Health-care facility managerial activities**

Procedures should be developed to ensure proper implementation of administrative controls, environmental controls, and use of PPE. Policies that address adequate staffing and supplies, training of staff, education of patients and visitors, and a strategy for risk communication are particularly needed.

### **2. Basic infection control recommendations for all health-care facilities**

Standard and Droplet Precautions should be used when caring for a patient with an acute, febrile, respiratory illness.

### **3. Respiratory hygiene/cough etiquette**

All persons (HCWs, patients and family members, visitors) should cover their mouth and nose with a disposable tissue when coughing or sneezing, then discard the tissue in a receptacle and perform hand hygiene. Additionally, whenever available, patients who are showing signs of an ILI should wear a medical mask in waiting areas and when they are being transported within the facility.

### **4. Triage early recognition and reporting of pandemic (H1N1) infection**

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18. Clinical management of human infection with avian influenza A (H5N1) virus. World Health Organization, August 2007. Available at [http://www.who.int/csr/disease/avian\\_influenza/guidelines/clinicalmanage07/en/index.html](http://www.who.int/csr/disease/avian_influenza/guidelines/clinicalmanage07/en/index.html). Accessed on November 18, 2009.

19. International Health Regulations (2005). World Health Organization, 2008. Available at <http://www.who.int/ihr/9789241596664/en/index.html>. Accessed on November 18, 2009.

20. Contact Precautions include the recommended use of PPE. HCWs should wear gowns and clean gloves when providing direct care.

21. Infection control recommendations for avian influenza in health-care facilities. World Health Organization, April 2008. Available at [http://www.who.int/csr/disease/avian\\_influenza/guidelines/aidememoireinfcont/en/index.html](http://www.who.int/csr/disease/avian_influenza/guidelines/aidememoireinfcont/en/index.html). Accessed on November 18, 2009.

Consider pandemic (H1N1) 2009 virus infection in patients with acute, febrile, respiratory illness in places where community-level spread is occurring.<sup>22</sup> Patients may present with other respiratory infections that are co-circulating in the community (e.g. respiratory syncytial virus, parainfluenza virus, non-H1N1 2009 influenza viruses, etc.). Implement IPC, including application of a medical mask and hand hygiene, for any person presenting with a respiratory illness.

#### **5. Infection control considerations in outpatient settings.**

Apply strategies to limit unnecessary office visits by ill patients, such as diverting patients to designated pandemic influenza triage and evaluation sites, and using pre-health-care facility triage to determine patients who need on-site medical evaluation.

Implement signage at entry points advising persons who are ill to use respiratory hygiene/cough etiquette (see 3) and to inform reception personnel so that steps may be taken to protect other patients.

Health services targeting healthy populations, such as women who are pregnant, children attending immunization services or well-child visits, and patients with non-infectious disease health problems or injury should implement measures to separate persons with an ILI from patients who are healthy. Women who are pregnant have been identified as a group at particular risk for severe disease when infected by pandemic (H1N1) 2009 virus. Therefore, the protection of pregnant women from exposure to persons with an ILI is a priority that requires special attention.

Health services that care for patients at high risk for complications of influenza (e.g. oncology clinics, hemodialysis centers) and whose treatment cannot be reasonably delayed should implement strategies to avoid exposing vulnerable patients (e.g. have patients who are ill call before coming for an appointment, scheduling them at different times in the day, and ensuring immediate implementation of IPC measures upon entering the facility.)

#### **6. Placement of hospitalized patients with a presumptive diagnosis of pandemic (H1N1) 2009**

Place patients with the same presumptive diagnosis in wards, keeping at least 1 metre distance separation between beds. Implement rooming-in policies to keep mothers and babies together.<sup>23</sup> All persons entering the isolation area should adhere to Standard and Droplet Precautions. If it becomes necessary to place patients with presumptive or diagnosed influenza in the same room with asymptomatic patients, emphasis should be placed on maximizing their physical separation; i.e., at least 1 metre distance and greater, if possible.

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22. Human infection with pandemic (H1N1) 2009 virus: updated interim WHO guidance on global surveillance. World Health Organization, July 2009. Available at: [http://www.who.int/csr/disease/swineflu/WHO\\_case\\_definition\\_swine\\_flu\\_2009\\_04\\_29.pdf](http://www.who.int/csr/disease/swineflu/WHO_case_definition_swine_flu_2009_04_29.pdf). Accessed on November 18, 2009.

23. Mothers and newborn infants should be kept together unless separation is absolutely necessary. The benefits of not separating a mother and her newborn and of breastfeeding outweigh the potential risk.

**7. Additional measures for inpatient health-care services to reduce pandemic (H1N1) 2009 virus transmission associated with health care**

Limit the number of HCWs/family members/visitors in contact with a patient ill with the pandemic (H1N1) 2009 virus. To the extent possible, assign HCWs to the same group of patients both for continuity of care and to reduce opportunities for inadvertent infection control breaches that could result in unprotected exposure.

Family members/visitors should be limited to those essential for patient support and should use the same infection control precautions as HCWs who are providing routine care. (Family members/visitors should be restricted from an environment, when aerosol-generating procedures associated with an increase in the risk of infection transmission are being performed.)

**8. Specimen transport/handling within health-care facilities**

Follow applicable transport regulations and requirements and use Standard Precautions for specimen transport to the laboratory. Health-care facility laboratories should follow good biosafety practices.<sup>24</sup>

**9. Pre-hospital care (e.g. transportation to hospital)**

When transporting patients to hospital, infection control precautions are similar to those practiced during hospital care for all involved in the care of patients suspected of being infected with the pandemic (H1N1) 2009 virus.

**10. Occupational health**

Monitor HCWs in contact with patients who are ill with pandemic (H1N1) 2009 virus infection. HCWs with symptoms should stay at home. Workers at high risk for severe disease and complications of pandemic (H1N1) 2009 infection should follow recommended IPC measures carefully. Breaches in IPC measures may not always be prevented and alternatives, such as reassignment of workers at high risk for severe disease and complications of pandemic (H1N1) 2009 to other duties, should be considered.

Antiviral chemoprophylaxis for pandemic (H1N1) 2009 virus may give rise to antiviral resistance and is generally not recommended.<sup>25</sup> For people who have been exposed to an infected person and are at a higher risk of developing severe or complicated illness, an alternative option is to closely monitor them for symptoms and promptly administer antiviral treatment, if symptoms develop. If, to comply with local policies, antiviral

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24. Laboratory Biosafety Manual - Third Edition. World Health Organization, 2004. Available at: [http://www.who.int/csr/resources/publications/biosafety/WHO\\_CDS\\_CSR\\_LYO\\_2004\\_11/en/index.html](http://www.who.int/csr/resources/publications/biosafety/WHO_CDS_CSR_LYO_2004_11/en/index.html). Accessed November 18, 2009.

25. WHO Guidelines for Pharmacological Management of Pandemic (H1N1) 2009 Influenza and other Influenza Viruses. World Health Organization, August 2009. Available at [http://www.who.int/csr/resources/publications/swineflu/h1n1\\_use\\_antivirals\\_20090820/en/index.html](http://www.who.int/csr/resources/publications/swineflu/h1n1_use_antivirals_20090820/en/index.html). Accessed on December 4, 2009.

chemoprophylaxis is applied, users should be mindful that it is not a substitute for proper infection control.

#### **11. H1N1 vaccination**

WHO has advised that all countries should immunize their HCWs as a first priority to protect the essential health-care infrastructure.<sup>26</sup>

#### **12. Prioritization of PPE when supplies are limited**

PPE supplies (e.g., gloves, medical masks, respirators, gowns) may be limited as demand for resources increases during a pandemic. Administrative measures should be employed to set priorities for the use of limited resources, including controlling unnecessary use of PPE in low-risk circumstances. While PPE for the care of patients with pandemic (H1N1) 2009 should be pursued, risks for transmission of other pathogens (e.g., bloodborne pathogens, airborne pathogens) must also be considered.

#### **13. Waste disposal**

Standard Precautions should be used when handling and disposing of sharps and contaminated items.

#### **14. Dishes/eating utensils**

Wash dishes/eating utensils using routine procedures with water and detergent. Wear non-sterile disposable or utility gloves when handling soiled dishes and eating utensils.

#### **15. Linen and laundry**

Wash linen and laundry with routine procedures, water and usual detergent; avoid shaking linen/laundry during handling before washing. Wear non-sterile disposable or utility gloves when handling soiled linen and laundry.

#### **16. Environmental cleaning**

Ensure that appropriate and regular cleaning is performed with water and usual detergent on soiled and/or frequently touched surfaces (e.g. door handles).

#### **17. Patient care equipment**

Ensure cleaning and disinfection of reusable equipment between patients.

#### **18. Patient discharge**

If a patient with pandemic (H1N1) 2009 illness is still considered to be infectious upon hospital discharge (i.e. discharged within the period of infection control precautions [see IV.2]), instruct family members on appropriate infection control precautions in the home.<sup>27</sup>

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26. WHO recommendations on pandemic (H1N1) 2009 vaccines: Pandemic (H1N1) 2009 briefing note 2. World Health Organization, July 2009. Available at: [http://www.who.int/csr/disease/swineflu/notes/h1n1\\_vaccine\\_20090713/en/index.html](http://www.who.int/csr/disease/swineflu/notes/h1n1_vaccine_20090713/en/index.html). Accessed on December 4, 2009.

27. Infection-control measures for health care of patients with acute respiratory diseases in community settings. World Health Organization, 2009. Trainer's Guide available at <http://www.who.int/csr/resources/publications/ARDSTrainerweb.pdf> and Trainee's Guide available at <http://www.who.int/csr/resources/publications/ARDSTraineeweb.pdf>. Accessed on December 4, 2009.

### **19. Health-care facility engineering controls**

Health-care facility spaces should be well ventilated. Aerosol-generating procedures should be performed in environments that are adequately ventilated through mechanical or natural means.

### **20. Mortuary care**

Mortuary staff and the burial team should apply Standard Precautions, i.e. perform proper hand hygiene and use appropriate PPE according to the risk of exposure to body fluids (e.g. gown, gloves, and facial protection, if there is a risk of splashes from bodily fluids/secretions onto staff member's body and face).

### **21. Health care in the community<sup>21,28</sup>**

Limit contact with the person with influenza-like symptoms, as much as possible. If close contact is unavoidable, use the best available protection against respiratory droplets and perform hand hygiene.

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28. Advice on the use of masks in the community setting in Influenza A (H1N1) outbreaks. World Health Organization, May 2009. Available at <http://www.who.int/csr/resources/publications/Adviceusemaskcommunity.pdf>. Accessed on December 4, 2009.