

## Interim Infection Prevention and Control Recommendations for Hospitalized Patients with Middle East Respiratory Syndrome Coronavirus (MERS-CoV)

Standard, contact, and airborne precautions are recommended for management of hospitalized patients with known or suspected MERS-CoV infection, based on CDC's case definition for a patient under investigation: [www.cdc.gov/coronavirus/mers/case-def.html#pui](http://www.cdc.gov/coronavirus/mers/case-def.html#pui). Note that additional infection prevention precautions or considerations may be needed if a MERS-CoV patient has other conditions or illnesses that warrant specific measures (e.g., tuberculosis, *Clostridium difficile*, multi-drug resistant organisms).

Though these recommendations focus on the hospital setting, the recommendations for personal protective equipment (PPE), source control (i.e., placing a facemask on potentially infected patients when outside of an airborne infection isolation room), and environmental infection control measures are applicable to any healthcare setting.

In this guidance healthcare personnel (HCP) refers all persons, paid and unpaid, working in healthcare settings who have the potential for exposure to patients and/or to infectious materials, including body substances, contaminated medical supplies and equipment, contaminated environmental surfaces, or contaminated air. HCP include, but are not limited to, physicians, nurses, nursing assistants, therapists, technicians, emergency medical service personnel, dental personnel, pharmacists, laboratory personnel, autopsy personnel, students and trainees, contractual personnel, home healthcare personnel, and persons not directly involved in patient care (e.g., clerical, dietary, house-keeping, laundry, security, maintenance, billing, chaplains, and volunteers) but potentially exposed to infectious agents that can be transmitted to and from HCP and patients. **This guidance is not intended to apply to persons outside of healthcare settings.**

As information becomes available, these recommendations will be re-evaluated and updated as needed. These recommendations are based upon available information (as of May 14, 2014) and the following considerations:

- Suspected high rate of morbidity and mortality among infected patients
- Evidence of limited human-to-human transmission
- Poorly characterized clinical signs and symptoms
- Unknown modes of transmission of MERS-CoV
- Lack of a vaccine and chemoprophylaxis

### Key Components of Standard, Contact, and Airborne Precautions Recommended for Prevention of MERS-CoV Transmission in U.S. Hospitals

For full details of these precautions, see 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Setting: [www.cdc.gov/hicpac/2007IP/2007isolationPrecautions.html](http://www.cdc.gov/hicpac/2007IP/2007isolationPrecautions.html).

Component	Recommendation(s)	Comments
Patient placement	<ul style="list-style-type: none"> <li>• Airborne Infection Isolation Room (AIIR)</li> </ul>	<ul style="list-style-type: none"> <li>• 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 a single-patient room with the door closed. The patient should not be placed in any room</li> </ul>

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		<p>where room exhaust is recirculated without high-efficiency particulate air (HEPA) filtration.</p> <ul style="list-style-type: none"> <li>• Once in an AIIR, the patient’s facemask may be removed.</li> <li>• When outside of the AIIR, patients should wear a facemask to contain secretions.</li> <li>• Limit transport and movement of the patient outside of the AIIR to medically-essential purposes.</li> <li>• Implement staffing policies to minimize the number of personnel that must enter the patient’s room.</li> <li>• After a potentially infectious patient leaves a room, unprotected individuals, including HCP, should not be allowed in the 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 <a href="http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5417a1.htm?s_cid=rr5417a1_e#tab1">www.cdc.gov/mmwr/preview/mmwrhtml/rr5417a1.htm?s_cid=rr5417a1_e#tab1</a>.</li> </ul>
<p><b>Aerosol Generating Procedure</b></p>	<ul style="list-style-type: none"> <li>• Use a combination of measures to reduce exposures from aerosol-generating procedures when performed on MERS-CoV patients.</li> <li>• Limiting the number of HCP present during the procedure to only those essential for patient care and support.</li> <li>• Conduct the procedures in a private room and ideally in an AIIR when feasible. 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.</li> <li>• 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 that is at least as protective as a fit-tested N95 filtering facepiece respirator [e.g., powered air purifying or elastomeric respirator during aerosol-generating procedures]).</li> <li>• Conduct environmental surface cleaning</li> </ul>	<ul style="list-style-type: none"> <li>• Although there are limited data available to definitively define a list of aerosol generating procedures, procedures that are usually included are those planned ahead of time, such as bronchoscopy, sputum induction, elective intubation and extubation; and some procedures that often occur in unplanned, emergent settings and can be life-saving, such as cardiopulmonary resuscitation, emergent intubation, and open suctioning of airways.</li> <li>• Once the patient vacates a room where aerosol generating procedures were conducted, unprotected individuals, including HCP, should not be allowed in that room until sufficient time has elapsed for enough air changes to remove potentially infectious</li> </ul>

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	<p>following procedures (see section below on environmental infection control).</p>	<p>particles. More information on clearance rates under differing ventilation conditions is available <a href="http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5417a1.htm?s_cid=rr5417a1e#tab1">www.cdc.gov/mmwr/preview/mmwrhtml/rr5417a1.htm?s_cid=rr5417a1e#tab1</a>.</p>
<b>Personal Protective Equipment (PPE) for Healthcare personnel (HCP)</b>	<ul style="list-style-type: none"> <li>• Gloves</li> <li>• Gowns</li> <li>• Eye protection (goggles or face shield)</li> <li>• Respiratory protection that is at least as protective as a fit-tested NIOSH-certified disposable N95 filtering facepiece respirator or greater. <ul style="list-style-type: none"> <li>○ If a respirator is unavailable, a facemask should be worn. In this situation respirators should be made available as quickly as possible.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Recommended PPE should be worn by HCP upon entry into patient rooms or care areas for any reason (e.g., clinical care, specimen collection, environmental cleaning, etc.).</li> <li>• Upon exit from the patient room or care area, PPE should be removed and either <ul style="list-style-type: none"> <li>○ Discarded, or</li> <li>○ For re-useable PPE, cleaned and disinfected according to the manufacturer's reprocessing instructions</li> <li>○ Hand hygiene should be performed after removal of PPE.</li> </ul> </li> </ul>
<b>Hand Hygiene</b>	<ul style="list-style-type: none"> <li>• HCP should perform hand hygiene frequently, including before and after all patient contact, contact with potentially infectious material, and before putting on and upon removal of PPE, including gloves.</li> <li>• Healthcare facilities should ensure that supplies for performing hand hygiene are available.</li> </ul>	<ul style="list-style-type: none"> <li>• 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.</li> </ul>
<b>Environmental Infection Control</b>	<ul style="list-style-type: none"> <li>• Follow standard procedures, per hospital policy and manufacturers' instructions, for cleaning and/or disinfection of: <ul style="list-style-type: none"> <li>○ Environmental surfaces and equipment</li> <li>○ Textiles and laundry</li> <li>○ Food utensils and dishware</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Use EPA-registered hospital disinfectants to disinfect hard non-porous surfaces. <ul style="list-style-type: none"> <li>○ Follow label instructions for use.</li> </ul> </li> <li>• Searchable EPA website of registered products: <a href="http://iaspub.epa.gov/apex/pesticides/f?p=PPLS:1">http://iaspub.epa.gov/apex/pesticides/f?p=PPLS:1</a>.</li> </ul>
<b>Duration of Infection Control Precautions</b>	<ul style="list-style-type: none"> <li>• At this time, information is lacking to definitively determine a recommended duration for keeping patients in isolation precautions.</li> <li>• Duration of precautions should be determined on a case-by-case basis, in conjunction with local, state, and federal health authorities.</li> </ul>	<ul style="list-style-type: none"> <li>• Factors that should be considered include: presence of symptoms related to MERS-CoV, date symptoms resolved, other conditions that would require specific precautions (e.g., tuberculosis, <i>Clostridium difficile</i>) and available laboratory information.</li> </ul>

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<p><b>Monitoring and Management of Potentially Exposed Personnel</b></p>	<ul style="list-style-type: none"> <li>• HCP who care for patients with MERS-CoV should be advised to monitor and immediately report any signs or symptoms of acute illness to their supervisor or a facility designated person (e.g., occupational health services) for a period of 14 days after the last known contact with the sick patient.</li> <li>• HCP who develop respiratory symptoms or fever after an unprotected exposure (i.e. not wearing recommended PPE at the time of contact) to a patient with MERS-CoV should                         <ul style="list-style-type: none"> <li>○ not report to work or immediately stop working</li> <li>○ notify their supervisor</li> <li>○ implement respiratory hygiene and cough etiquette</li> <li>○ seek prompt medical evaluation</li> <li>○ comply with work exclusion until they are deemed no longer infectious to others.</li> </ul> </li> <li>• For asymptomatic HCP who had an unprotected exposure (i.e. not wearing recommended PPE at the time of contact) to a patient with MERS-CoV                         <ul style="list-style-type: none"> <li>○ Consider exclusion from work for 14 days to monitor for signs and symptoms of respiratory illness and fever</li> <li>○ If necessary to ensure adequate staffing of the facility the asymptomatic provider could be considered for continuing work if they wear a facemask for source control (i.e., limiting transmission from exposed HCP to other HCP or patients),                                 <ul style="list-style-type: none"> <li>▪ The facemask should be worn at all times while in the healthcare facility for 14 days from the last unprotected exposure</li> <li>▪ HCP continuing to work while wearing a facemask should be reminded that if caring for patients under airborne precautions, to change the facemask to respiratory protection that is at least as protective as a fit-tested NIOSH-certified disposable N95 filtering facepiece respirator (without an exhalation valve) (i.e., the HCP should not wear both a</li> </ul> </li> </ul> </li> </ul>	

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	<p>facemask and respirator at the same time.) When respirator use is no longer needed, the HCP should put a facemask back on for source control.</p>	
<p><b>Monitoring, Management, and Training of Visitors</b></p>	<ul style="list-style-type: none"> <li>• Establish procedures for monitoring managing and training visitors.</li> <li>• Limit visitors to those who are essential for the patient’s wellbeing and care.</li> <li>• Visits should be scheduled and controlled to allow for:                             <ul style="list-style-type: none"> <li>○ Screening of symptoms for acute respiratory illness before entering the hospital and upon arrival to hospital</li> <li>○ Facilities to evaluate risk to the health of the visitor (e.g., visitor might have underlying illness putting them at higher risk for MERS-CoV) and ability to comply with precautions</li> <li>○ Facilities to provide instruction, before entry into the patient care area on hand hygiene, limiting surfaces touched, and use of PPE according to the current facility policy while in the patients room</li> <li>○ Facilities should consider tracking (e.g., logbook) of all visitors who enter patient rooms</li> <li>○ Visitors should not be present during aerosol-generating procedures</li> <li>○ Visitors should be instructed to limit their movement within the facility.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Visitors who have been in contact with the MERS-CoV patient before and during hospitalization are a possible source of MERS-CoV for other patients, visitors, and staff.</li> </ul>

**Preparedness**

To aid providers and facilities, CDC has developed two checklists that identify key actions that can be taken now to enhance preparedness for MERS-CoV infection control.

- Healthcare Providers Preparedness Checklist:  
<http://www.cdc.gov/coronavirus/mers/preparedness/checklist-provider-preparedness.html>
- Healthcare Facility Preparedness Checklist:  
<http://www.cdc.gov/coronavirus/mers/preparedness/checklist-facility-preparedness.html>

## **Interim Home Care and Isolation Guidance**

CDC has developed interim guidance for local and state health departments, infection prevention and control professionals, healthcare providers, and healthcare workers who are coordinating the home care and isolation of ill people who are being evaluated for MERS-CoV infection.

- Interim Home Care and Isolation Guidance for MERS-CoV:  
<http://www.cdc.gov/coronavirus/mers/hcp/home-care.html>

## **Important Links**

- Respirator Trusted-Source Information:  
[http://www.cdc.gov/niosh/npptl/topics/respirators/disp\\_part/RespSource.html](http://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/RespSource.html)
- Respirator Fact Sheet:  
<http://www.cdc.gov/niosh/npptl/topics/respirators/factsheets/respsars.html>