Infection prevention and control precautions when caring for patients with suspected, probable or confirmed Middle East Respiratory Syndrome CoronaVirus (MERS-CoV) infection

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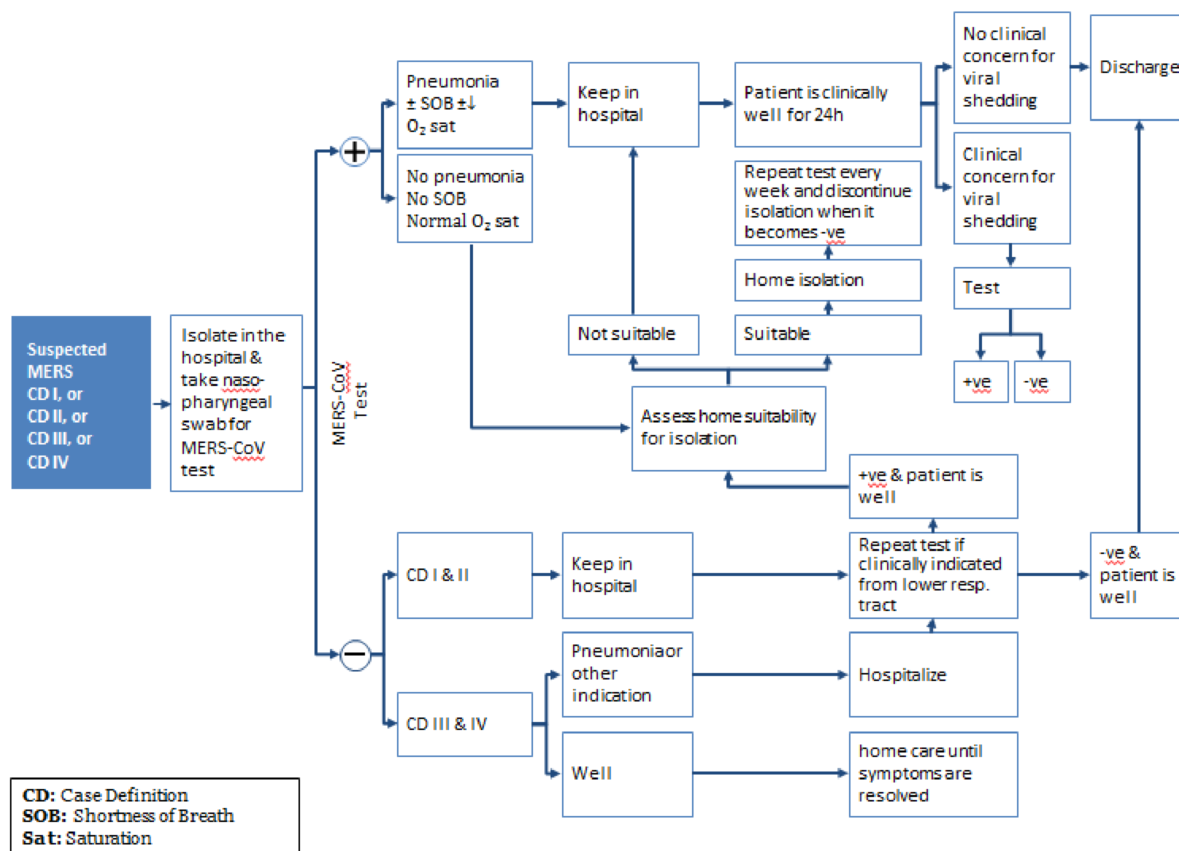
This document is an updated version of the previous Ministry of Health guidelines released on May, 2013[1] and February 2014[2]. It is based on the World health organization infection control guidelines on MERS-CoV infections[3] and intended to guide healthcare providers, administrators in health care facilities within the Kingdom of Saudi Arabia on the infection prevention and control when caring for patients with suspected, probable or confirmed Middle East Respiratory Syndrome CoronaVirus (MERS-CoV) infection.

I. Algorithm for managing patients with suspected and confirmed MERS-CoV[4]



II. Infection Prevention and Control (IP&C) principles:

Effective IP&C relies on the application of the following principles “controls” (in order of importance):

A. Administrative principles:

These constitute a core of actions to prevent, detect and control infections. They include:

- Establish a sustainable IP&C infrastructure and activities including education of all healthcare providers, surveillance, monitoring of compliance, provision of supplies and supporting improvement as needed.
- Adopt and implement unified IP&C policies and procedures
- Organization of health services in order to apply source control by identifying patients with acute respiratory infections (ARI) (including suspected MERS-CoV infections), and allowing appropriate placement and prompt application of required precautions. Recognition of ARI relies on evaluation of epidemiological, clinical and laboratory aspects of cases.
- Apply measure to prevent overcrowding in healthcare especially in waiting areas and emergency rooms.
- Family members and visitors in contact with ARI patients should be limited to those essential for support and who can be trained and able to comply with infection control precautions.

B. Environmental and engineering controls:

- Insure adequate environmental ventilation in all areas within healthcare facilities
- Insure adequate environmental cleaning
- Maintain spatial separation of at least 1m between ARI patients and others

C. Personal Protective Equipment (PPE):

- Apply rational and consistent use of available PPE with appropriate hand hygiene

III. Infection prevention and control when caring for patients with ARI:

The early identification, isolation and reporting of ARIs of potential concern are central to effective containment and treatment. Current evidence indicates that the primary mode of transmission of most acute respiratory diseases is through droplets, but transmission through contact (including hand contamination followed by self-inoculation) or infectious respiratory aerosols at short range can also happen for some pathogens in particular circumstances [4]. In general, the principles of infection prevention and control when caring for patients with ARI are:

A. Standard precautions should always be applied when caring for any patient. These include hand hygiene; use of PPE when contact with patients' blood, body fluids, secretions (including respiratory secretions) and non-intact skin is anticipated. Standard precautions also include prevention of needle stick or sharp injuries; safe waste management; and cleaning and disinfection and when applicable sterilization of patient care equipment and linen, and cleaning and disinfection of the environment. The use of respiratory hygiene is encouraged in anyone with respiratory symptoms.

B. Additional IP&C precautions when caring for ARI:

All individual including visitors and healthcare workers in contact with patients with ARI should:

- Wear a medical mask when in close contact (within 1m) or upon entering the room or cubicle of the patient. If traditional veils are used, wear the mask behind the veil.
- Perform hand hygiene before and after contact with a patient and his/her surroundings and immediately after removal of medical mask.

C. Infection prevention and control precautions for aerosol-generating procedures (AGP):

Additional precautions should be observed when performing aerosol-generating procedures, which may be associated with an increased risk of infection transmission, in particular, tracheal intubation, tracheotomy, non-invasive ventilation and manual ventilation before intubation. These include:

- Wearing a disposable particulate respirator, i.e. N 95 or higher respirator (always check the seal when putting on a particulate respirator).
- Wearing eye protection (i.e. goggles or a face shield);
- Wear a clean, non-sterile, long-sleeved gown and gloves (some of these procedures require sterile gloves);
- Wearing an impermeable apron for some procedures with expected splashes of high fluid volumes that might penetrate the gown;
- Performing procedures in an adequately ventilated area; i.e. minimum of 6 to 12 air changes/hour in facilities with a mechanically ventilated room and at least 60 liters/second/patient in facilities with natural ventilation.
- Limiting the number of persons present in the room to the absolute minimum required for the patient's care and support;
- Performing hand hygiene before and after contact with the patient and his or her surroundings and after PPE removal.

IV. Infection prevention and control precautions when caring for patients with suspected, probable or confirmed MERS-CoV infections:

In addition to the ARI precautions above:

- Limit the number of visitor and family members to those essential for patient support.
- To the extent possible, assign only skilled healthcare care providers to take care for suspected, probable or confirmed MERS-CoV patients
- **Patient placement:**
  - Place patients with suspected, probable or confirmed MERS-CoV infection in adequately ventilated single rooms or Airborne Precaution rooms if available.
  - The rooms used for isolation (i.e. single rooms) should be situated in an area that is clearly segregated from other patient-care areas.
  - When single rooms are not available, put patients with the same lab confirmed diagnosis together.
  - If this is not possible, place patient beds at least 1 m apart.
- **When in close contact** (within 1 m) or upon entering the room of patients with probable or confirmed MERS-CoV infection, all individuals including visitors and healthcare providers should always:
  - Wear a medical mask.
  - Wear eye protection (i.e. goggles or a face shield).
  - Wear a clean, non-sterile, long-sleeved gown; and gloves (some procedures may require sterile gloves).
  - Perform hand hygiene before and after contact with the patient and his or her surroundings and immediately after removal of PPE.
  - Healthcare providers should refrain from touching their eyes, nose or mouth with potentially contaminated gloved or ungloved hands.
- **Patient movement and transport:**
  - Avoid the movement and transport of patients out of the isolation room or area unless medically necessary. The use of portable X-ray equipment and other important diagnostic devices may make this easier. If transport is required, use routes of transport that minimize exposures of staff, other patients and visitors.
  - Notify the receiving area of the patient's diagnosis and necessary precautions as soon as possible before the patient's arrival.
  - Clean and disinfect patient-contact surfaces (e.g. bed) using hospital approved disinfectant after use.
  - Ensure that HCWs who are transporting patients wear appropriate PPE and perform hand hygiene afterwards.
- **Duration of isolation precautions for MERS-CoV infection:**
  The duration of infectivity for MERS-CoV infection is unknown. Little information is currently available on viral shedding and the potential for transmission of MERS-CoV.
  - While Standard Precautions should continue to be applied always, additional isolation precautions should be used during the duration of symptomatic illness and continued for 24 hours after the resolution of symptoms.
  - Patient information (e.g. age, immune status and medication, presence of parenchymal lung disease [6]) should also be considered in situations where there is concern that a patient may be shedding the virus for a prolonged period. In these situations, discontinuation of isolation precautions may be

guided by laboratory testing. Isolation precautions can be discontinued if at least one respiratory sample is negative for MERS-CoV RNA.
- Discontinuation of isolation precautions should be made in conjunction with the IP&C professional or delegate.

- **Home care for patients with MERS-CoV infection:**
  Symptomatic cases of suspected, probable or confirmed cases are better managed in a healthcare setting. If this is not possible for any reason, alternative settings for healthcare provision may need to be considered. The same principle of care in the home environment applies to symptomatic patients not requiring or no longer requiring hospitalization.
  The patients and the household members should be educated on personal hygiene and basic infection prevention and control measures.
  - Limit contact with the ill person as much as possible
  - Ensure that anyone who is at increased risk of severe disease does not care for the ill person or come into close contact with the ill person.
  - Perform hand hygiene following all contact with the ill person or his/her immediate environment
  - Respiratory hygiene should be practiced by all, especially the ill person.
  - Discard materials used to cover the mouth or nose after use
  - The caregiver should wear a medical mask fitted tightly to the face when in the same room with the ill person
  - Clean frequently touched surfaces such as bedside tables, bed frame, and other bedroom furniture daily with regular household cleaners or a diluted bleach solution (1 part bleach to 99 parts water). Clean bathroom and toilet surfaces daily with regular household cleaners or a diluted bleach solution (1 part bleach to 9 parts water).
  - The symptomatic person should remain at home until satisfactory resolution of the symptoms. The decision to remove the ill person from home observation should be made based on either clinical or laboratory findings or both.
  - All household members should be considered contacts and their health should be monitored as described below

  For details, consult the WHO Rapid advice note on home care for patients with Middle East respiratory syndrome coronavirus (MERS-CoV) infection presenting with mild symptoms and management of contacts [7].
- **Medical waste management:**
  No special precautions are recommended; routine practices are sufficient.
- **Cleaning, Disinfection, and/or Sterilization of patient-care equipment & linen:**
  - If possible, use either disposable equipment or dedicated equipment (e.g. stethoscopes, blood pressure cuffs and thermometers). If equipment needs to be shared among patients, clean and disinfect it between each patient use.
  - Reusable non-critical equipment (e.g., blood pressure cuffs, stethoscopes, pulse oximeters, commodes, bedpans, walkers, etc.) should be dedicated to the use of the patient, and should be cleaned and disinfected before reuse with another patient. Single-use devices should be discarded in a hands-free waste receptacle after use.
  - Ensure that cleaning, disinfection and/or sterilization procedures are followed consistently and correctly.
  - Manage laundry, food service utensils in accordance with routine procedures.
- **Cleaning and disinfection of the environment:**

- Hospital-grade cleaning and disinfecting agents are sufficient for environmental cleaning for the MERS-CoV virus. All horizontal and frequently touched surfaces should be cleaned at least twice daily and when soiled.
- The healthcare organization's terminal cleaning protocol for cleaning of the patient's room following discharge, transfer, or discontinuation of contact and droplet precautions should be followed.
- Housekeeping staff to wear protective equipment as indicated above and must be trained and made aware on the need of additional precautions
- Isolation areas should be cleaned after the rest of the ward areas and cleaning equipment should be disinfected after use.

- **Collection and handling of laboratory specimens:**
  - All specimens should be regarded as potentially infectious, and HCWs who collect or transport clinical specimens should adhere strictly to Standard Precautions to minimize the possibility of exposure to pathogens.
  - Ensure that HCWs who collect specimens wear appropriate PPE (gloves, gowns, particulate respirator, and eye protection). The specimen collection should be done in a well-ventilated single room.
  - Ensure that personnel who transport specimens are trained in safe handling practices and spill decontamination procedures.
  - Place specimens for transport in leak-proof specimen bags (secondary container) that have a separate sealable pocket for the specimen (i.e. a plastic biohazard specimen bag), with the patient's label on the specimen container (primary container), and a clearly written request form
  - Ensure that health-care facility laboratories adhere to appropriate biosafety practices and transport requirements according to the type of organism being handled.
  - Notify the laboratory as soon as possible that the specimen is being transported.
- **Managing bodies in Mortuary:**
  Deceased bodies may pose a potential infectious to those who handle them, either family members or body washers. Apply the following precautions [8]:
  - Place the body in appropriately sized body bag
  - Body washing should be performed at the hospital morgue
  - Morgue staff should apply Hand hygiene, gloves, particulate respirator (e.g.N95), water resistant gown, boots/shoe cover[8] (GCC-ICM-08-10)
  - If family members wish to perform the body washing, they must adhere to the same precautions above
  - Ensure that the body bags (which are plastic) are appropriately disposed of when the body is removed.

V. Admission criteria

- Not all suspected MERS-CoV patients should be admitted to healthcare facilities.
- Patients suspected to have MERS-CoV infection who have shortness of breath, hypoxemia, and/or clinical or radiological evidence of pneumonia should be hospitalized.
- Patients with suspected MERS-CoV who have no shortness of breath, hypoxemia, or evidence of pneumonia may be cared for and isolated in their home.

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