Middle East Respiratory Syndrome (MERS) is a severe respiratory illness caused by a novel coronavirus (MERS-CoV) associated with travel to or residence in the Arabian Peninsula. Three cases have been reported in the United States as of 5/19/14.

KEY POINTS: Is your clinic or department prepared?

a. Triage patients for symptoms as quickly as possible.

b. Waiting rooms should have masks (adult and child sizes), hand sanitizer and tissues available for patients and families at all times. Signage explaining usage is also helpful.

c. Ask all patients with respiratory symptoms about their travel history and evaluate patients for MERS-CoV infection who have:
   - Fever, cough, shortness of breath (many have had pneumonia). Some patients have also had GI symptoms, including diarrhea, and kidney failure.
   - History of travel from countries in or near the Arabian Peninsula within 14 days before symptom onset, or
   - Have had close contact with a symptomatic traveler who developed fever and acute respiratory illness within 14 days after traveling from countries in or near the Arabian Peninsula.

d. Prevent transmission to yourself and others:
   For any patient suspected of having MERS:
   - Put a regular mask on them (and anyone with them)
   - Place immediately into a negative pressure isolation room. If not available, place them in a private room with the door closed until a negative pressure isolation room can be arranged.
   - Contact and Airborne Isolation Precautions (called “Special Airborne Precautions at CHCO) are to be used in addition to Standard Precautions.
   - Health Care Workers (HCW) are to wear the following:
     - Eye protection, gown, gloves, and N95 mask (or equivalent)
     - Avoid touching your face
     - Care should be taken when removing the PPE to prevent self-contamination (a lesson learned from SARS)
   - Patient care equipment, such as stethoscopes and BP cuffs, should be dedicated to the isolation room and not moved from room to room.
   - Clean the room and equipment with an EPA-registered disinfectant and apply per instructions. Pay special attention to frequently touched surfaces, common equipment, and toilets.

e. Immediately contact your local health department when proceeding with evaluation of a patient for MERS-CoV infection.

1. What is MERS?
Middle East Respiratory Syndrome (MERS) is an acute respiratory viral illness. It is caused by a coronavirus, MERS-CoV, that produces infection of the upper and lower respiratory tract. MERS-CoV was first discovered in April 2012 in Saudi Arabia and is thought to be a novel, recently emerged virus. The origin of MERS-CoV is still unknown, but recent studies suggest that it most likely is a zoonotic virus that jumped into the human population either from camels or bats. Currently MERS infection is NOT endemic or epidemic in the United States. The CDC (Centers for Disease Control) reported the first domestic cases of MERS on May 2 and May 11 in Indiana and Florida, respectively, which were imported from recent travelers to Saudi Arabia. On May 16, a third case was
identified in an Illinois resident who had contact with the Indiana case. This patient did not require medical attention and was identified as having been infected with MERS-CoV through serological testing. Countries where human infection with MERS has been reported include: Bahrain, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, the United Arab Emirates (UAE), and Yemen. Other Middle Eastern countries considered at-high-risk include: Iraq, Iran, Israel, Palestinian territories, and Syria. To date, all cases of MERS-CoV have occurred in the Middle East or in individuals who have traveled to the Middle East.

2. What are the symptoms of infection with MERS?
Most people who have been confirmed to have MERS-CoV infection developed severe acute respiratory illness. They had fever, cough, and shortness of breath. A subset of patients also developed acute renal failure and some also had GI symptoms, including diarrhea. More than 30% have died. Some infected people have had mild upper respiratory tract symptoms and asymptomatic infections have been reported. MERS-CoV is in the same virus family as the SARS-CoV. Currently, MERS-CoV appears to be a more virulent virus than SARS-CoV but less easily transmissible.

3. How many cases of MERS has there been worldwide?
The median age of people who have contracted MERS is 49 years old with a range of 9 months – 94 years old. As of May 14, 2014, there were 571 laboratory confirmed cases of MERS worldwide with 171 deaths (30% case fatality rate). The majority of people who have died have been elderly and have had an underlying medical condition. In April 2014, there was a dramatic increase in the reported number of cases of MERS (Figure). This increase in cases led to an Emergency Committee meeting of the WHO which declared on May 14 that the spread of the MERS-CoV had become more serious and urgent, but that it did not yet constitute a global health emergency.

Epidemic curve of 536 laboratory-confirmed cases MERS-CoV cases by outcome (as of 8 May 2014 [source: WHO at: http://www.who.int/csr/disease/coronavirus_infections/MERS_CoV_Update_09_May_2014.pdf?ua=1]
4. Who is at risk for MERS-CoV infection?

MERS is a communicable disease and human-to-human transmission is possible. The greatest risk of acquiring MERS infection is among close contacts.

- In community settings, human-to-human transmission has been reported in individuals living with an infected person. However, there is currently no evidence of sustained human-to-human spread of MERS-CoV in community settings.
- In healthcare settings, transmission and outbreaks have been reported among healthcare workers caring for patients with MERS-CoV. Of note, approximately half of the laboratory confirmed secondary cases of MERS-CoV have occurred in healthcare workers.
- Some transmission to other patients has also occurred. In addition, patients that are at the extremes of age and with comorbid conditions appear to be at greater risk of developing more severe disease.
- The exact incubation period of the MERS coronavirus is not known, but is thought to be within 14 days.

**Exposure to Bats and Camels:** There is good evidence to suggest that the primary host species of MERS-CoV is a fruit bat, the Egyptian tomb bat (Taphozous perforates). This is similar to SARS-CoV, whose zoonotic reservoir is also a fruit bat, the Chinese horseshoe bat (Rhinolophus spp). The MERS-CoV has also been found in camels. MERS-CoV, however, does not appear to cause disease in bats or camels. A few human MERS cases have been epidemiologically linked to camels. One patient who died of MERS visited a camel farm and drank camel milk before becoming ill. An animal trader came down with MERS after visiting a camel farm and a Saudi man, who contracted MERS, was infected with a strain that matched a virus found in one of his personal camels. MERS-CoV has also been found in samples of camels’ milk. Only a minority of MERS patients, however, have had contact with camels or have consumed camel’s milk. It is still unknown how the vast majority of primary MERS cases have been acquired.

5. Who should be suspected of and be evaluated for MERS?

Currently, the CDC has issued the following guidelines regarding possible MERS cases: “Healthcare professionals should evaluate for MERS-CoV infection, patients in the U.S. who meet the following criteria:

A. Fever and pneumonia or acute respiratory distress syndrome (based on clinical or radiologic evidence) AND EITHER
   - history of travel from countries in or near the Arabian Peninsula within 14 days before symptom onset OR
   - close contact with a symptomatic traveler who developed fever and acute respiratory illness (not necessarily pneumonia) within 14 days after traveling from countries in or near the Arabian Peninsula) OR
   - is a member of a cluster of patients with severe acute respiratory illness (e.g., fever and pneumonia requiring hospitalization) of unknown etiology in which MERS-CoV is being evaluated in consultation with state or local health department (more details below).
   OR
B. Close contact of a confirmed or probable case of MERS.”

6. If I suspect a patient has MERS, what should I do?

**Isolation:** The exact mode of transmission of MERS-CoV currently remains unknown. However, since MERS-CoV causes a respiratory illness similar to SARS-CoV, it is thought to be transmitted via the airborne and/or contact route. Therefore, all patients suspected of having a MERS-CoV infection should be immediately placed in a negative pressure room and contact and airborne precautions are to be used by those entering the room. At CHCO, this is called “Special Airborne Precautions”. All healthcare personnel should use personal protective equipment, including gowns, gloves, eye protection, and a N95 mask (or equivalent).

**Notification:** After precautions, immediately notify your Infection Control and/or Epidemiology department (if you have one). Otherwise, contact your local health department.

**Lab Testing:** Samples should be obtained and sent for testing to the Colorado Department of Health and Environment (CDPHE). Acceptable specimens include nasopharyngeal washes, nasopharyngeal swabs, or oropharyngeal swabs. For patients with more severe disease, lower respiratory tract specimens (ie tracheal aspirates, induced sputums, BALs) appear to have a higher sensitivity than upper respiratory tract specimens and should be obtained whenever possible. Samples from blood and stool can also be tested.
Patients with lower respiratory illness should also be evaluated for common causes of community-acquired pneumonia, guided by clinical presentation and epidemiologic information. For these patients, testing for MERS-CoV and other respiratory pathogens can be done simultaneously. Positive results for another respiratory pathogen (e.g. influenza) should not necessarily preclude testing for MERS-CoV because co-infection can occur.

7. What is the recommended treatment for MERS infection?
Current treatment for MERS is primarily symptomatic supportive care. There are no vaccines or virus-specific therapies proven or available as of yet. For critically ill patients, advanced respiratory and cardiovascular support may be necessary.

For more information on MERS and the latest up to date data please see the following websites:
http://www.cdc.gov/CORONAVIRUS/MERS/INDEX.HTM

We are modifying our distribution process for Contagious Comments. If you wish to receive this publication please provide us with your E-mail address below.

Name: ____________________________________________

E-mail Address: __________________________________

Both the Contagious Comments and BugWatch publications are always posted on Children’s Hospital Colorado website at:

Please return your E-mail address to: Carolyn Brock, Children’s Hospital Colorado, Epidemiology – Box B276, 13123 E. 16th Avenue, Aurora, CO 80045 or E-mail address: carolyn.brock@childrenscolorado.org.

Thank you for your interest in our publication.