

Middle East Respiratory Syndrome Coronavirus

Disease Agent:

- MERS-CoV

Disease Agent Characteristics:

- Family: *Coronaviridae*; Subfamily: *Coronavirinae*; Genus: *Betacoronavirus*; Species: Not established
- Virion morphology and size: Enveloped, spherical particles, 118-136 nm in diameter, with spikes that project 16-21 nm from the virion envelope. A flexible helical nucleocapsid is present that forms coils that fold back on themselves.
- Nucleic acid: monopartite, positive-sense, single-stranded, polyadenylated and capped RNA, 26-32 kb in length, the largest of all RNA genomes
- Physicochemical properties: Sensitive to detergents and organic chemicals such as ether and chloroform. pH and temperature stabilities are variable among the coronaviruses but most are sensitive to heat, nonionic detergents, formaldehyde, oxidizing agents and UV irradiation.

Disease Name:

- Middle East respiratory syndrome coronavirus; previously known as novel coronavirus 2012 and HCoV-EMCpr

Priority Level:

- Scientific/Epidemiologic evidence regarding blood safety: Absent
- Public perception and/or regulatory concern regarding blood safety: Low but vigilant
- Public concern regarding disease agent: Low but vigilant

Background:

- Virus discovered in April 2012 in Jordan, but may have emerged a year earlier based on genetic sequences.
- Most cases or case clusters of severe acute respiratory infection have been identified in the Arabian Peninsula, but also detected in Jordan, Qatar, the United Arab Emirates, Tunisia, Morocco, France, Italy, Germany and the UK. Cases outside the Middle East appear to be geographically linked to the Middle East.
- Globally, as of August 13, 2013, 94 laboratory-confirmed cases of infection with MERS-CoV, including 47 deaths, have been reported to WHO (case-fatality rate: 50%).
- Median age is 50 years (range 2-94 years) with male-to-female ratio of 1.6 to 1.0 (all patients were 24 years of age or older except for two children).
- Virus may have crossed from insectivorous bat species to an intermediate animal host species and from there to humans, based on coronavirus sequence data from one South African bat.

Common Human Exposure Routes:

- Mode of transmission has not been determined, but may be zoonotic in nature with limited human-to-human transmission.

Likelihood of Secondary Transmission:

- No evidence for sustained community transmission. However, transmission has occurred in several clusters among household contacts and within healthcare facilities.

At-Risk Populations:

- Family members or other persons in close contact with a case
- Visiting or residing in the Middle East
- Nosocomial outbreaks with transmission to healthcare personnel highlight the importance of infection control procedures.
- Patients with chronic diseases (i.e., heart disease, kidney disease, respiratory disease, diabetes) and those with immune deficiency (congenital or acquired), malignancy and terminal illnesses, or pregnant women may be at increased risk for infection, severe disease, or both.

Vector and Reservoir Involved:

- None known

Blood Phase:

- Detection has been reported, but it is rare and at low concentration.

Survival/Persistence in Blood Products:

- Unknown

Transmission by Blood Transfusion:

- Not reported

Cases/Frequency in Population:

- See Mortality. At least 10 asymptomatic cases have been reported. There is no convincing evidence of the virus becoming more infectious over time.

Incubation Period:

- Generally less than one week, but may be as long as 14 days

Likelihood of Clinical Disease:

- Unknown since asymptomatic cases have not been characterized

Primary Disease Symptoms:

- All patients have acute respiratory symptoms, whereas several patients also may have accompanying gastrointestinal symptoms such as abdominal pain and diarrhea.

Severity of Clinical Disease:

- Severe

Mortality:

- Globally, as of August 13, 2013, 91 laboratory-confirmed cases of infection with MERS-CoV, including 47 deaths, have been reported to WHO (case-fatality rate: 50%).

Chronic Carriage:

- No evidence for chronicity.

Treatment Available/Efficacious:

- Supportive care with hospitalization in an intensive care unit. Healthcare workers caring for patients should exercise standard precautions including contact and airborne precautions.

Agent-Specific Screening Question(s):

- No specific question is in use.
- Not indicated because transfusion transmission has not been demonstrated
- Neither the CDC nor the FDA has recommended a question. If necessary the prospective donors could be asked if they have been in close contact with a symptomatic traveler who has developed fever and acute respiratory illness within 14 days of traveling from the Arabian Peninsula or neighboring countries.

Laboratory Test(s) Available:

- No FDA-licensed blood donor screening test exists.
- Nested PCR and real time PCR assays have been used.
- For detection, it is strongly recommended that lower respiratory specimens such as sputum, endotracheal aspirate, or bronchoalveolar lavage should be used when possible since viral loads are higher in the lower respiratory tract and low in nasopharyngeal samples.

Currently Recommended Donor Deferral Period:

- No FDA Guidance or AABB Standard exists
- The FDA recommended the following deferral criteria in conjunction with the SARS epidemic: 14 days from last exposure or 14 days after arrival in the US following travel/residence exposure, or 28 days after complete symptom resolution and the cessation of a treatment.

Impact on Blood Availability:

- Agent-specific screening question(s): Not applicable
- Laboratory test available: Not applicable

Impact on Blood Safety:

- Agent-specific screening question(s): Not applicable
- Laboratory test(s) available: Not applicable

Leukoreduction Efficacy:

- Unknown

Pathogen Reduction Efficacy for Plasma Derivatives:

- Multiple pathogen reduction steps used in the fractionation process have been shown to be robust in the removal of enveloped viruses.

Other Prevention Measures:

- Contact and airborne transmission precautions, in addition to standard precautions. Regard all specimens as potentially infectious.

Suggested Reading:

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