

Interim Guidelines for Collection, Processing and Transport of Clinical Specimens from Patients Under Investigation for Middle East Respiratory Syndrome (MERS)

Before collecting and shipping specimens for Middle East Respiratory Syndrome Coronavirus (MERS-CoV) testing, determine whether the patient meets the current definition for MERS “Patient Under Investigation” prepared by the Centers for Disease Control and Prevention (CDC). See [Interim Guidance for State and Local Health Departments](#).

Specimen Type and Priority To date, little is known about pathogenic potential and transmission dynamics of MERS-CoV. To increase the likelihood of detecting infection, it is recommended to collect specimens from different sites – for example a nasopharyngeal swab and a lower respiratory tract specimen such as sputum, bronchoalveolar lavage, bronchial wash, or tracheal aspirate. Specimens should be collected at different times after symptom onset, if possible. Consider lower respiratory tract, serum, and stool specimens a priority for collection and PCR testing.

General Guidelines For short periods (≤ 72 hours), most specimens should be held at 2-8°C rather than frozen; for delays exceeding 72 hrs, freeze specimens at -70°C as soon as possible after collection (with exceptions noted below). Label each specimen container with the patient’s ID number, specimen type and the date the sample was collected.

I. Collecting Respiratory Specimens

A. Lower respiratory tract

Bronchoalveolar lavage, tracheal aspirate, pleural fluid

Collect 2-3 mL into a sterile, leak-proof, screw-cap sputum collection cup or sterile dry container. Refrigerate specimen at 2-8°C up to 72 hrs; if exceeding 72 hrs, freeze at -70°C and ship on dry ice.

Sputum

Have the patient rinse the mouth with water and then expectorate deep cough sputum directly into a sterile, leak-proof, screw-cap sputum collection cup or sterile dry container. Refrigerate specimen at 2-8°C up to 72 hrs; if exceeding 72 hrs, freeze at -70°C and ship on dry ice.

B. Upper respiratory tract

Nasopharyngeal and oropharyngeal swabs

Use only synthetic fiber swabs with plastic shafts. Do not use calcium alginate swabs or swabs with wooden shafts, as they may contain substances that inactivate some viruses and inhibit PCR testing. Place swabs immediately into sterile tubes containing 2-3 ml of viral transport media. Refrigerate specimen at 2-8°C up to 72 hrs; if exceeding 72 hrs, freeze at -70°C and ship on dry ice.

Nasopharyngeal swabs -- Insert a swab into the nostril parallel to the palate. Leave the swab in place for a few seconds to absorb secretions. Swab both nostrils.

Oropharyngeal swabs -- Swab the posterior pharynx, avoiding the tonsils and tongue.

Nasal Aspirates

Collect 2-3 mL into a sterile, leak-proof, screw-cap sputum collection cup or sterile dry container. Refrigerate specimen at 2-8°C up to 72 hrs; if exceeding 72 hrs, freeze at -70°C and ship on dry ice.

II. Blood Components

Serum

For eventual serum antibody testing: Serum specimens should be collected during the acute stage of the disease, preferably during the first week after onset of illness, and again during convalescence, ≥ 3 weeks later.

Children and adults Collect 1 tube (5-10 mL) of whole blood in a serum separator tube. Allow the blood to clot, centrifuge briefly, and separate sera into sterile tube container. The minimum amount of serum required for testing is 200 μ L. Refrigerate specimen at 2-8°C and ship on ice-pack; freezing and shipment on dry ice is permissible.

Infants A minimum of 1 cc of whole blood is needed for testing of pediatric patients. If possible, collect 1 cc in an EDTA tube and in a serum separator tube. If only 1cc can be obtained, use a serum separator tube.

EDTA blood (plasma)

Collect 1 tube (10 mL) of heparinized (green-top) or EDTA (purple-top) blood. Refrigerate specimen at 2-8°C and ship on ice-pack; do not freeze.

III. Stool

Collect 2-5 grams of stool specimen (formed or liquid) in sterile, leak-proof, screw-cap sputum collection cup or sterile dry container. Refrigerate specimen at 2-8°C up to 72 hrs; if exceeding 72 hrs, freeze at -70°C and ship on dry ice.

IV. Shipping

Specimens from suspected MERS cases must be packaged, shipped, and transported according to the current edition of the International Air Transport Association (IATA) Dangerous Goods Regulations at http://www.iata.org/whatwedo/cargo/dangerous_goods/Pages/index.aspx. Shipments from outside of the United States may require an importation permit that can be obtained from the CDC.

Specimens should be stored and shipped at the temperatures indicated above. If samples are unable to be shipped within 72 hours of collection, they should be stored at -70°C and shipped on dry ice. When shipping frozen specimen from long distances or from international locations, it is best to use a combination of dry ice and frozen gel ice-packs. The gel ice-packs will remain frozen for a day or two after the dry ice has dissipated.

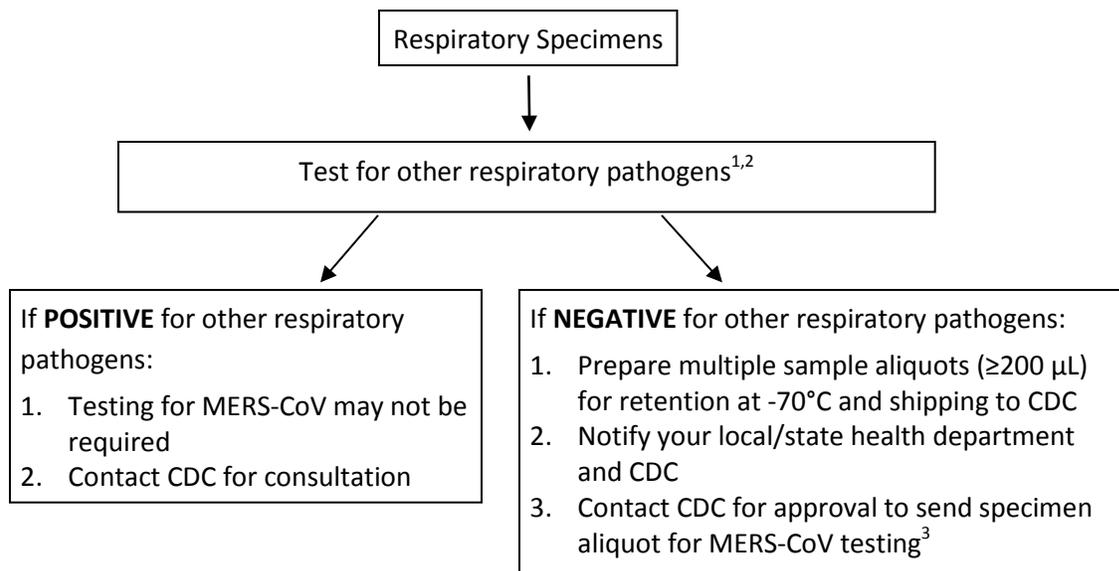
All specimens must be prepacked to prevent breakage and spillage. Specimen containers should be sealed with Parafilm® and placed in ziplock bags. Place enough absorbent material to absorb the entire contents of the Secondary Container (containing Primary Container) and separate the Primary Containers (containing specimen) to prevent breakage. Send specimens with cold packs or other refrigerant blocks that are self-contained, not actual wet ice. This prevents leaking and the appearance of a spill. When large numbers of specimens are being shipped, they should be organized in a sequential manner in boxes with separate compartments for each specimen.

Some things ***not to do***:

- Do not place any dry ice in the "Primary Container" or "Secondary Container," foam envelopes, ziplock bags, cryovial boxes, or hermetically sealed containers.
- Do not place Primary Containers sideways or upside down in ziplock bags.
- Do not use red top Secondary Containers for Category A Infectious Substances.
- Do not place any paperwork in the Secondary Containers or ziplock bags, so as not to damage the paperwork.
- Do not use biohazard/autoclave bags to prepack your materials due the inadequate seal of these bags.

For requests for shipping information or testing, contact the CDC Emergency Operations Center at 770-488-7100. Specimens should be shipped for overnight delivery.

MERS-CoV Specimen Processing Guidelines: RT-PCR Testing



¹ Respiratory pathogens to be considered for testing by molecular or antigen detection methods (**not by viral culture**) include, 1) influenza A, influenza B, respiratory syncytial virus, human metapneumovirus, human parainfluenza viruses, adenovirus, human rhinovirus and other respiratory viruses; 2) *Streptococcus pneumoniae*, *Legionella pneumophila*, and other pathogens that cause severe lower respiratory infections. Season, clinical presentation, and epidemiologic/surveillance information should be considered when selecting which pathogens to test for. If your laboratory does not have molecular or antigen testing capability, contact your local or state laboratory for assistance.

² **Virus isolation in cell culture and initial characterization of viral agents recovered in cultures of MERS-CoV specimens are NOT recommended at this time. However, if done, these activities must be performed in a BSL-3 facility using BSL-3 work practices.**

³ See "Interim Guidelines for Collection, Processing and Transport of Clinical Specimens from Patients Under Investigation for MERS" (Section IV) for shipping information.