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

Before collecting and shipping specimens for Middle East Respiratory Syndrome Coronavirus (MERS-CoV) testing, please **call DHSS at 800/392-0272 (24/7)**. **Note that before any specimen is sent for testing, DHSS staff must first be consulted.** After consultation and determination that the patient meets the criteria for testing, contact the Missouri State Public Health Laboratory (MSPHL) at 573/751-3334 or 800/392-0272 if you have questions regarding collection and shipping prior to collecting the specimens. This will help ensure that proper specimens are obtained in the right quantity, and that they are packed and transported properly.

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, CDC recommends collecting multiple specimens from different sites at different times after symptom onset, if possible.

Points to consider when determining which specimen types to collect from a patient under investigation for MERS include:

- The number of days between specimen collection and symptom onset
- Symptoms at the time of specimen collection

Additional points to consider:

- Maintain proper infection control when collecting specimens
- Use approved collection methods and equipment when collecting specimens
- Handle, store, and ship specimens following appropriate protocols

Collection of all three specimen types (not just one or two of the three), lower respiratory, upper respiratory and serum specimens for testing using the CDC MERS rRT-PCR assay is recommended. Lower respiratory specimens are preferred, but collecting nasopharyngeal and oropharyngeal (NP/OP) specimens, and serum, are strongly recommended depending upon the length of time between symptom onset and specimen collection. Respiratory specimens should be collected as soon as possible after symptoms begin – ideally within 7 days. However, if more than a week has passed since symptom onset and the patient is still symptomatic, respiratory samples should still be collected, especially lower respiratory specimens since respiratory viruses can still be detected by rRT-PCR. For example,

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- if symptom onset for a PUI with respiratory symptoms was less than 14 days ago, a single serum specimen (see Section II. Serum), an NP/OP specimen and lower respiratory specimen (see Section I. Respiratory Specimens) should be collected for CDC MERS rRT-PCR testing.
- if symptom onset for a PUI with an ongoing respiratory tract infection, especially lower, was 14 or more days ago, a single serum specimen for serologic testing (see Section II. Serum) in addition to a lower respiratory specimen and an NP/OP specimen (see Section I. Respiratory Specimens) are recommended.

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 or name, 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 swab AND oropharyngeal swab (NP/OP swab)

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. NP/OP specimens can be combined, placing both swabs in the same vial. Refrigerate specimen at 2-8°C up to 72 hours; if exceeding 72 hours, freeze at -70°C and ship on dry ice.

- Nasopharyngeal swab - Insert a swab into the nostril parallel to the palate. Leave the swab in place for a few seconds to absorb secretions. Swab both nasopharyngeal areas.
- Oropharyngeal swab (e.g., throat swab) - Swab the posterior pharynx, avoiding the tongue.

Nasopharyngeal wash/aspirate or nasal aspirate

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 hours; if exceeding 72 hours, freeze at -70°C and ship on dry ice.

II. Blood Components

Serum (for rRT-PCR testing)

For rRT-PCR testing (i.e., detection of the virus and not antibodies): A single serum specimen collected optimally during the first 10-12 days after symptom onset is recommended. Note: The kinetics of MERS-CoV are not well understood. Once additional data become available, these recommendations will be updated as needed.

Minimum serum volume needed: The minimum amount of serum required for MERS-CoV testing (either serologic or rRT-PCR) is 200 µL. If both MERS-CoV serology and rRT-PCR tests are planned, the minimum amount of serum required is 400 µL (200 µL for each test). Serum separator tubes should be stored upright for at least 30 minutes, and then centrifuged at 1000–1300 relative centrifugal force (RCF) for 10 minutes before removing the serum and placing it in a separate sterile tube for shipping (such as a cryovial). Refrigerate the serum specimen at 2-8°C and ship on ice-pack; freezing and shipment of serum on dry ice is permissible.

Children and adults: Collect 1 tube (5-10 mL) of whole blood in a serum separator tube.

Infant: A minimum of 1 mL of whole blood is needed for testing pediatric patients. If possible, collect 1 mL in a serum separator tube.

EDTA blood (plasma)

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

IV. Shipping

Specimens should be stored and shipped at the temperatures indicated above. If samples other than blood tubes are unable to be shipped within 72 hours of collection, they should be stored at -70°C and shipped on dry ice.

All specimens must be prepacked to prevent breakage and spillage. Specimen containers should be sealed with Parafilm® and placed in ziplock bags. 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.

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 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 to the inadequate seal of these bags.

Specimens should either be sent on the MSPHL Courier or shipped for overnight delivery.