

MIDDLE EASTERN RESPIRATORY SYNDROME CORONAVIRUS (MERS-CoV)  
SPECIMEN COLLECTION AND SUBMISSION INSTRUCTIONS

**NOTE:** Before collecting and handling specimens for Middle East Respiratory Syndrome Coronavirus (MERS-CoV) testing, it must be determined whether the person meets the current definition for a “patient under investigation” (PUI) for MERS-CoV infection prepared by the Centers for Disease Control and Prevention (CDC). All suspect MERS cases must be evaluated and approved for testing by the Division of Infectious Disease Epidemiology (DIDE) prior to submission. Please call 304-558-5358 or 304-549-9795 (after hours) for consultation.

## SPECIMEN COLLECTION

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.

Lower respiratory specimens such as sputum are preferred, but collecting nasopharyngeal (NP) and oropharyngeal (OP) swab specimens are strongly recommended, especially if additional respiratory disease testing is to be done. Respiratory specimens should be collected as soon as possible after symptom onset, ideally within 7 days and before any antiviral medications are administered. All specimens must be received at OLS within **72 hours of collection**.

### RESPIRATORY SPECIMENS

#### A. LOWER RESPIRATORY TRACT

##### a. Bronchoalveolar lavage, tracheal aspirate, pleural fluid, etc.

- Label a 50mL conical tube or other sterile, leak-proof, screw-cap collection cup with the patient’s name or other unique identifier.
- Collect 2-3mL of specimen into the container.
- Screw lid on tightly and refrigerate at 2-8°C for up to 72 hours and ship on cold packs. If exceeding 72 hours, freeze at -70°C and ship on dry ice.

##### b. Sputum

- Label a 50mL conical tube or other sterile, leak-proof, screw-cap collection cup with the patient’s name or other unique identifier.
- Instruct the patient to rinse the mouth with water. Do not swallow.
- Take several deep breaths.
- Cough hard from deep inside chest, 3 times. This allows the sputum to move up from the lungs.
- Spit the sputum into the sterile collection tube, avoiding touching the sides of the container.

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- Repeat this process until you obtain 1-2 mL of sputum.
- Screw lid on tightly and refrigerate at 2-8°C for up to 72 hours and ship on cold packs. If exceeding 72 hours, freeze at -70°C and ship on dry ice.

### B. UPPER RESPIRATORY TRACT

#### a. Nasopharyngeal (NP)

- Label a viral transport media tube with the patient's name or other unique identifier.
- Immobilize the patient's head and insert the swab into the nasopharynx and leave in place for 10 seconds to absorb secretions. ***NOTE:** 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 swab immediately into viral transport media tube, break swab at breakpoint, and close lid tightly.  
***NOTE:** NP/OP specimens can be combined, placing both swabs in the same vial.*
- Refrigerate at 2-8°C for up to 72 hours and ship on cold packs. If exceeding 72 hours, freeze at -70°C and ship on dry ice.

#### b. Oropharyngeal (OP)

- Label a viral transport media tube with the patient's name or other unique identifier.
- Swab the posterior pharynx, avoiding the tongue.
- Place swab immediately into viral transport media tube.  
***NOTE:** NP/OP specimens can be combined, placing both swabs in the same vial.*
- Refrigerate at 2-8°C for up to 72 hours and ship on cold packs. If exceeding 72 hours, freeze at -70°C and ship on dry ice.

#### c. Nasopharyngeal wash or nasal aspirates

- Label a sterile, leak-proof, screw-cap collection cup with the patient's name or other unique identifier.
- Collect 2-3mL of specimen.
- Screw lid on tightly.
- Refrigerate at 2-8°C for up to 72 hours and ship on cold packs. If exceeding 72 hours, freeze at -70°C and ship on dry ice.

**BLOOD SPECIMENS**

A. Serum (for serologic testing)

For 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,  $\geq 3$  weeks after the acute sample was collected. However, since we do not want to delay detection at this time, a single serum sample collected 14 or more days after symptom onset may be beneficial.

Serologic testing is currently available at CDC upon request and approval ONLY. Please be aware that the MERS-CoV serologic test is for research/surveillance purposes and not for diagnostic purposes - it is a tool developed in response to the MERS-CoV outbreak.

B. 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 week after symptom onset, preferably within 3-4 days, after symptom onset, may be also be beneficial.

*NOTE: These time frames are based on SARS-CoV studies. The kinetics of MERS-CoV are not well understood and may differ from SARS-CoV. Once additional data become available, these recommendations will be updated as needed.*

- a. 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 $\mu$ L.
- b. Infants --- A minimum of 1mL of whole blood is needed for testing of pediatric patients. If possible, collect 1mL in an EDTA tube and in a serum separator tube. If only 1mL can be obtained, use a serum separator tube.

Refrigerate the specimens at 2-8°C and ship on cold packs. Freezing and shipment on dry ice is permissible.

- c. 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 cold packs. Do not freeze.

## **STOOL SPECIMENS**

Collect 2-5 grams of stool (formed or liquid) in sterile, leak-proof, screw-cap collection cup without preservative or transport media as follows:

- Label a sterile screw-top collection cup with the patient's name or other unique identifier.
- Obtain clean newspaper, plastic wrap or wide-mouthed container.
- Lift the toilet seat. Cover the toilet bowl with a large sheet of newspaper or plastic wrap. Make a depression in the material with your hand to allow for collection. (If using wide-mouthed container, hold so that stool goes directly into container and does not come into contact with water or urine.)
- Lower the toilet seat and sit to pass specimen onto newspaper or plastic wrap.
- Place collected stool into a sterile collection cup.

Refrigerate specimen at 2-8°C up to 72 hours and ship on cold packs. If exceeding 72 hours, freeze at -70°C and ship on dry ice.

**DO NOT TAKE STOOL FROM TOILET BOWL. Stool specimens cannot be tested if mixed with water or urine.**

## **SPECIMEN TRANSPORT**

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Specimens from suspected MERS cases must be packaged, shipped, and transported as Category B Infectious Substances according to the current edition of the International Air Transport Association (IATA) Dangerous Goods Regulations 1.5 and 49CFR Section 172.0700 [U.S. Department of Transportation.

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, 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 packed to prevent breakage and spillage. Specimen containers should be sealed with Parafilm® and placed in plastic zippered 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

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shipped, they should be organized in a sequential manner in boxes with separate compartments for each specimen.

1. Ensure that specimen is properly labeled with the patient name and that the Microbiology Laboratory Specimen Submission Form is completed entirely. Write "suspect MERS" in the comments section. The patient identification on the form and collection container must be identical.
2. Place the samples into the zippered plastic bag with the absorbent.
3. Place the bag into the clear plastic tube and screw lid on tightly.
4. Place the tube into the shipper and surround with frozen cold packs. Additional cold packs and newspaper may be used, if available, to better control the temperature.
5. Close the styrofoam lid on top of the box to seal its contents.
6. Securely seal shipper and ship using courier of choice (or UPS if label is provided).

**Do not delay specimen shipment. Do not ship specimens on Friday or holidays. Specimens must be received at OLS within 72 hours of collection.**

CDC recommends against the following:

- Do not place any dry ice in the "Primary Container" or "Secondary Container", foam envelopes, plastic zippered bags, cryovial boxes, or hermetically sealed containers.
- Do not place Primary Containers sideways or upside down in the plastic zippered bags.
- Do not place any paperwork in the Secondary Containers or plastic zippered bags, so as not to damage the paperwork.
- Do not use autoclave bags to pack your materials due to the inadequate seal of these bags.

### CONTACT INFORMATION:

Office of Laboratory Services  
PH | 304-558-3530  
FX | 304-558-6210

Division of Infectious Disease Epidemiology  
PH | 304-558-5358  
FX | 304-558-8736

### REFERENCE:

CDC Website -- <http://www.cdc.gov/coronavirus/mers/guidelines-clinical-specimens.html>

OLS | 167 11<sup>th</sup> AVENUE | SOUTH CHARLESTON, WV 25303  
304-558-3530