



CORONA
VIRUS



Middle East Respiratory Syndrome- Coronavirus
(MERS-CoV)



TENNESSEE
DEPARTMENT OF
HEALTH

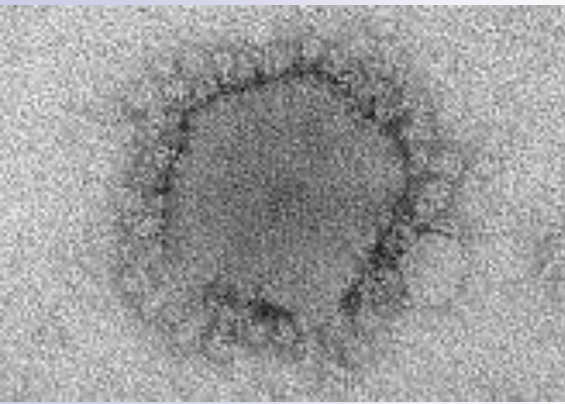
Update on Middle East Respiratory Syndrome Coronavirus (MERS-CoV)

Marion Kainer MD, MPH, FRACP, FSHEA
Director, Healthcare Associated Infections
and Antimicrobial Resistance Program

Tennessee Department of Health

hai.health@tn.gov

May 23, 2014





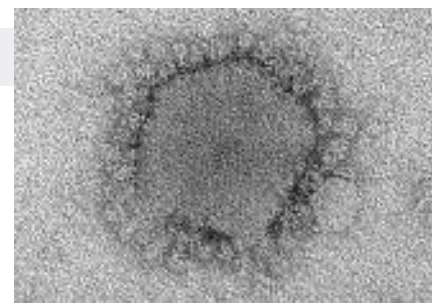
DISCLAIMER:

This is a rapidly evolving situation

Information presented here is as accurate as possible, but specific numbers and assumptions may change rapidly as we gain new insights

There still are many unknowns

What is MERS-CoV?



- Viral respiratory illness caused by Middle East Respiratory Syndrome Coronavirus (MERS-CoV)
- First reported in Kingdom of Saudi Arabia (KSA) in Sept 2012
- What is the origin? Unclear



Symptoms/ Signs

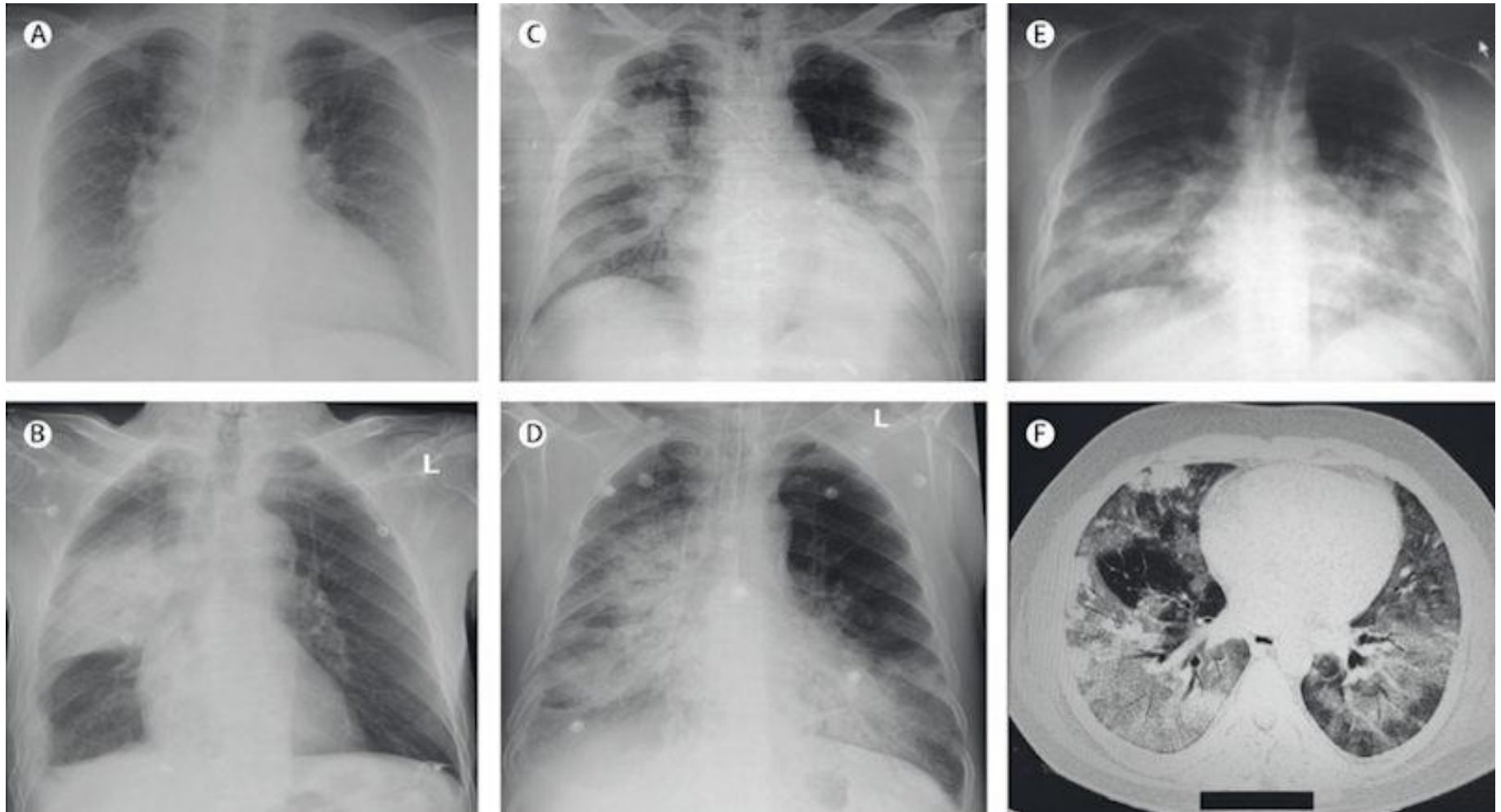
- **Fever, cough, shortness of breath**
- **Severe acute respiratory illness, including pneumonia**
- **Gastrointestinal symptoms, including diarrhea**
- **Kidney failure**
- **Spectrum of illness is incompletely defined**



Incubation Period for Secondary Cases (human-human)

- **Median: 5 days (range: 2-13 days)**

MERS-CoV: CXR & CT scans





Beware!!

- **CXR may be normal**

Treatment & Mortality

- Supportive treatment only
- No vaccine
- No specific antivirals

- Case fatality among confirmed cases 28-30%

Major Increase in MERS-CoV

May 22, 2014 (WHO):

Confirmed cases: **632** (total)

Deaths: **193**

□ Kingdom of Saudi Arabia (KSA)

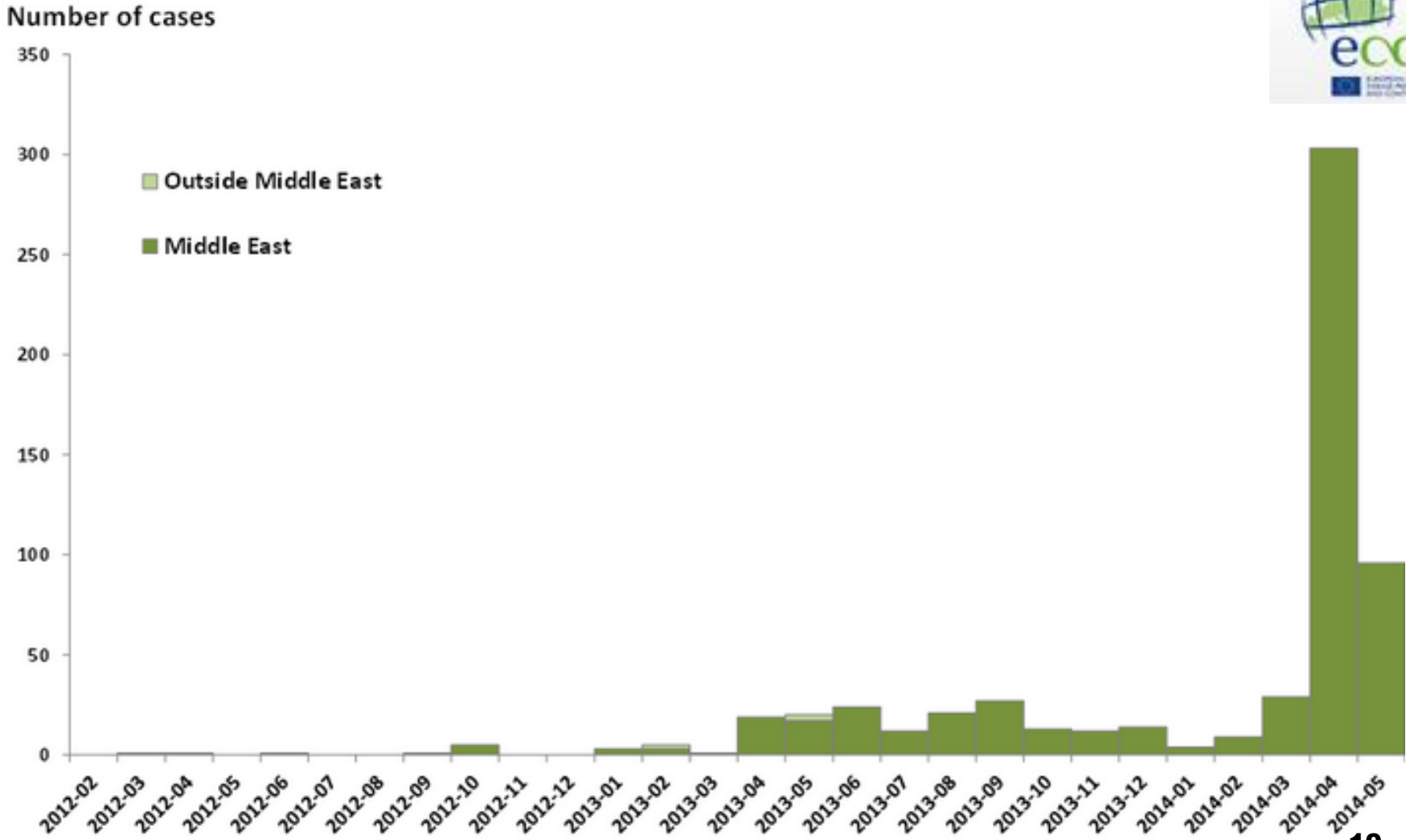
■ 551 cases, 177 deaths

□ United Arab Emirates (UAE)

■ 67 cases, 9 deaths

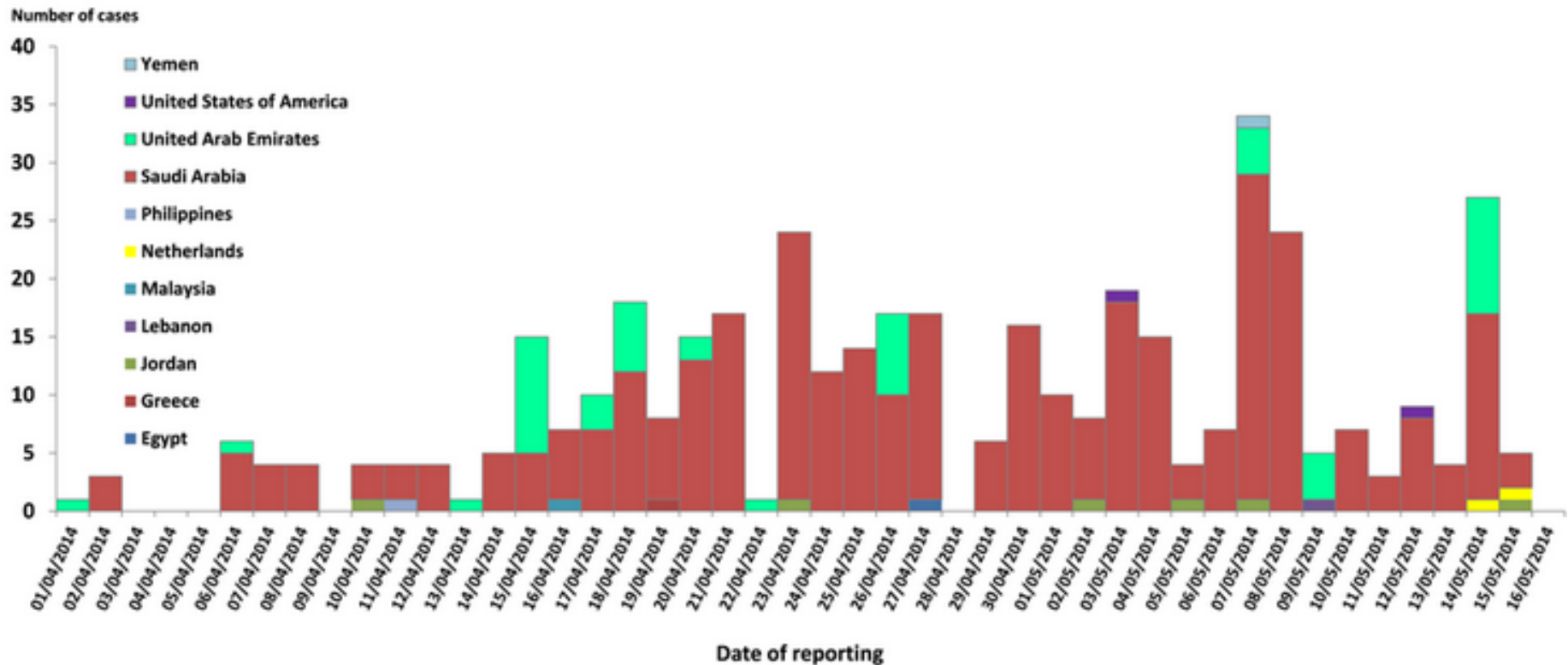
Confirmed Cases of MERS-CoV

3/2012- 5/16/2014, N=621

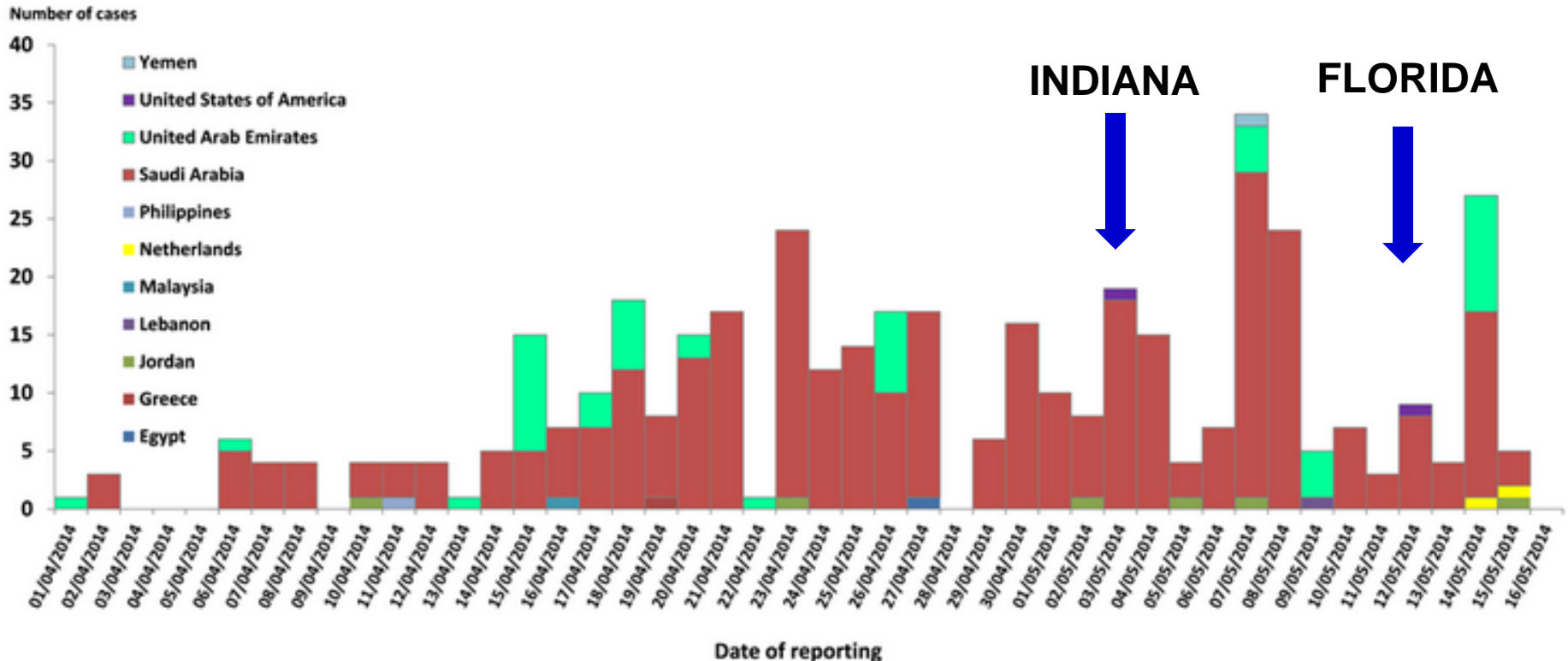


* Where the month of onset is unknown, the month of reporting has been used
 ** The data for May 2014 is incomplete

Confirmed Cases of MERS-CoV by Reporting Country and Date April 1, 2014- May 15, 2014



Confirmed Cases of MERS-CoV by Reporting Country and Date April 1, 2014- May 15, 2014



Reason for Increase Unclear



Seasonality

Coronaviruses; young camels



Nosocomial transmission

Hospitals: major amplification



Better case detection

More testing in KSA



Changes in virus?

No evidence so far based on genetic sequencing data

Transmission Occurs When There is a **Failure** to:

- **Recognize** cases of MERS-CoV
- Implement appropriate **infection control** measures to prevent spread
 - Need to know what to do (Guidelines, Policy)
 - Need to do it (Adherence/Compliance)

Useful Resources (Internet Search Terms)



“CDC MERS”

[http://www.cdc.gov/CORONAVIRUS/MERS/
INDEX.HTML](http://www.cdc.gov/CORONAVIRUS/MERS/INDEX.HTML)

“TNHAN” (Tennessee Health Alert Network)

<https://tnhan.tn.gov>

This is a rapidly evolving situation. ALWAYS check these websites for most up-to-date information

Useful Resources (Internet Search Terms)



“CDC MERS”

[http://www.cdc.gov/CORONAVIRUS/MERS/
INDEX.HTML](http://www.cdc.gov/CORONAVIRUS/MERS/INDEX.HTML)

This is a rapidly evolving situation. ALWAYS check this website for most up-to-date information

Information for Specific Groups



People Who May Be at Increased Risk for MERS

Information for people who have recently traveled from the Arabian Peninsula, had contact with a recent traveler from this area, or had contact with a confirmed or probable case of MERS...



Healthcare Providers

Interim guidance, case definitions, infection prevention and control recommendations, home care guidance, preparedness checklists, clinical features of MERS...



Health Departments

Interim guidance, case definitions, tools to collect data on patients under investigation, and home care guidance...



Laboratories

Guidelines for collecting, handling and testing clinical specimens, and lab biosafety guidelines...



Travelers & Airline Crew

Guidelines for travelers and guidance for airline crew on flights arriving to the U.S...

Information for Healthcare Providers

Interim Guidance For Health Professionals

CDC interim guidance for evaluating patients, close contacts and clusters, reporting patients under investigation (PUIs), testing specimens, and infection control.

Clinical Features

CDC interim information for clinicians on human infections with MERS-CoV.

Case Definitions

CDC case definitions for patient under investigation (PUI), confirmed case, and probable case.

Infection Prevention and Control

Interim recommendations for managing hospitalized patients with known or suspected MERS-CoV infection.

Preparedness

Checklists and resources to help healthcare providers and facilities enhance preparedness for MERS-CoV infection control.

Interim Home Care and Isolation Guidance

CDC interim guidance to prevent MERS-CoV from spreading in homes and communities in the U.S.

<http://www.cdc.gov/coronavirus/mers/hcp.html>

Useful Resources (Internet Search Terms)



“TNHAN” (Tennessee Health Alert Network)

<https://tnhan.tn.gov>

This is a rapidly evolving situation. ALWAYS check this website for most up-to-date information



HOME

TNHAN Sign In:

[Forgot Password?](#)

Quick Links

- ▣ [CDC](#)
- ▣ [\(TEMARR\) Tennessee Emergency Medical Awareness, Response and Resources](#)
- ▣ [How To Confirm TNHAN Alerts](#)
- ▣ [CEDEP Emergency Preparedness Webpage](#)
- ▣ [TN Health Alert Network Instructional Video For New System Users](#)
- ▣ [Add new link](#)

Response Manager Landing Site Admin Links

MANAGE LANDING SITE CONTENT

- [Manage Home Page Content](#)
- [Manage Images](#)
- [Manage Quick Links](#)
- [Manage Documents](#)

Welcome to the Tennessee Health Alert Network (TNHAN)

Registered users of TNHAN who have forgotten their password can use the "Forgot Password?" link on the left to reset their password.

Password Requirements: Password must be a minimum of 8 characters in total length, and contain 1 character from at least 3 of the 4 following options:

1. 1- uppercase character (A through Z)
2. 1- lowercase character (a through z)
3. 1 -Numerals (0 through 9)
4. 1 -Non-alphabetic characters (~ ! @ # \$ % ^ * & _ - + = ` | \ () { } [] : ; ' ' < > , . ? /)

More than 10 unsuccessful login attempts within 30 minutes will lock your account. Wait 30 minutes and you account will automatically unlock

Documents

Type	Name	Modified By
	MERS CO V SubmissionForm	TN\dc49b10
	TDH MERS CoV screen	TN\dc49b10
	TNHAN New User Instructions 4-9-13	TN\dc49215





<https://tnhan.tn.gov>

MERS-CoV Screening Form

MERS-CoV Specimen Submission

BOTH NEWLY UPDATED 5/16/2014

Documents

Type	Name
	TNHAN ALERT Measles MERS-CoV 5.19.14
	MERS CO V SubmissionForm
	TDH MERS CoV screen
	TNHAN New User Instructions 4-9-13

<https://tnhan.tn.gov>

Please Help Us to Detect and Protect Against MERS-CoV



**Partnership
Clinicians & Public Health**

Detect

- 1) Recognize potential cases by implementing screening questions
- 2) Notify Public Health
- 3) Laboratory testing

Protect

- 1) Implement infection control measures
- 2) Manage persons exposed before implementation of infection control
- 3) Contact tracing and monitoring

Detect

- 1) **Recognize potential cases by implementing screening questions**
- 2) **Notify Public Health**
- 3) **Laboratory testing**

Protect

- 1) **Implement infection control measures**
- 2) **Manage persons exposed before implementation of infection control**
- 3) **Contact tracing and monitoring**

Travel Question #1

During the 2 weeks before you got sick, did you visit any countries outside of the US?

Yes → *Which countries did you visit?*

- Arabian peninsula or neighboring countries → MERS-CoV screening form
- China → H7N9 screening form

Countries in the Arabian Peninsula and neighboring countries



- Bahrain,
- Iran,
- Iraq,
- Israel,
- Jordan,
- Kuwait,
- Lebanon,
- Palestinian territories,
- Oman,
- Qatar,
- Saudi Arabia (KSA),
- Syria,
- United Arab Emirates (UAE)
- Yemen

Travel Question #2

During the 2 weeks before you got sick, did you have any close contact with anyone who was sick and who travelled overseas?

Yes → *Which countries did they visit?*





- **Arabian peninsula or neighboring countries** → **MERS-CoV screening form**
- **China** → **H7N9 screening form**

If Positive on Screening Questions in Triage

- **Place facemask on patient (if tolerated)**
- **Patient placement (negative pressure airborne infection isolation room if possible, otherwise closed room with door)**
- **Review MERS-CoV Screening Form in detail**
- **Contact Infection prevention and public health**

MERS-CoV Screening Form

Documents

Type	Name
	TNHAN ALERT Measles MERS-CoV 5.19.14
	MERS CO V SubmissionForm
	TDH MERS CoV screen
	TNHAN New User Instructions 4-9-13



<https://tnhan.tn.gov>

TN Department of Health Middle East Respiratory Syndrome Coronavirus (MERS-CoV) Screening Form

Date of First Symptom Onset	MM	DD	YY	Medical Record # or Other Patient Identifier					
Date of Birth	MM	DD	YY	Patient Name					
1. EPIDEMIOLOGIC CRITERIA									
1a. Travel Exposures				Condition Met <input type="checkbox"/>					
<ul style="list-style-type: none"> <input type="checkbox"/> <i>In the 14 days prior to symptom onset, did patient live in or travel to the Arabian Peninsula or neighboring country? Countries in the Arabian Peninsula and neighboring countries: Bahrain, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Palestinian territories, Oman, Qatar, Saudi Arabia, Syria, the United Arab Emirates (UAE), and Yemen.</i> <input type="checkbox"/> <i>In the 14 days prior to symptom onset, did the patient have 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 (listed above)? "Close contact" is caring for or living with a person with a flu-like illness.</i> 									
Country/Area/City visited within 14 days of illness onset:		Start	MM	DD	YY	End	MM	DD	YY
Country/Area/City visited within 14 days of illness onset:		Start	MM	DD	YY	End	MM	DD	YY
1b. Close Contact with confirmed/probable MERS/Coronavirus Case				Condition Met <input type="checkbox"/>					
<ul style="list-style-type: none"> <input type="checkbox"/> <i>In the 14 days prior to symptom onset, did the patient have close contact with a confirmed or probable MERS/Coronavirus case while the affected person was ill? "Close contact" is caring for or living with a person with a flu-like illness</i> 									
2. CLINICAL CRITERIA									
2a. Fever				Condition Met <input type="checkbox"/>					
<p>During this illness, has patient had a temperature of >100°F?</p> <ul style="list-style-type: none"> <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown 									
2b. Respiratory Illness or Abnormal CXR or Chest CT or ARDS				Condition Met <input type="checkbox"/>					
<p><i>(Check all that apply)</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Symptoms of Respiratory Illness <input type="checkbox"/> Abnormal Chest Radiograph (CXR) or Chest CT scan or Pneumonia <input type="checkbox"/> ARDS (Acute Respiratory Distress Syndrome) or other severe respiratory illness 									
<p>If patient met one of the epidemiologic criteria (1a. Travel or 1b. Close Contact with MERS case) AND one of the clinical criteria (Fever (2a) or Respiratory Illness or Chest X-Ray/CT scan or ARDS (2b)), then IMMEDIATELY NOTIFY your infection control AND PUBLIC HEALTH, 24/7. The Tennessee Department of Health (TDH) central office phone number is (615)-741-7247</p>									
<p>To improve the ability of TDH to detect any unusual cause of severe acute respiratory infection (SARI, defined as fever and cough requiring hospitalization) in TN, please notify public health of:</p> <ol style="list-style-type: none"> 1. Clusters of SARI [fever and cough requiring hospitalization, cause unknown]. "Cluster" is defined as 2 or more patients with onset of disease within a 2-week period among people linked by a specific setting (e.g., hospital, workplace, household, classroom, extended family, camp, barrack, dormitory) 2. Healthcare workers who have cared for patients with SARI, particularly patients requiring ICU care. <p>TDH staff will assess and provide guidance on further evaluation, such as testing.</p>									

Date of First Symptom Onset	MM	DD	YY	Medical Record # or Other Patient Identifier	
Date of Birth	MM	DD	YY	Patient Name	

1. EPIDEMIOLOGIC CRITERIA

1a. Travel Exposures

Condition Met

- In the 14 days prior to symptom onset, did patient live in or travel to the Arabian Peninsula or neighboring country? Countries in the Arabian Peninsula and neighboring countries: Bahrain, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Palestinian territories, Oman, Qatar, Saudi Arabia, Syria, the United Arab Emirates (UAE), and Yemen.*
- In the 14 days prior to symptom onset, did the patient have 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 (listed above)? "Close contact" is caring for or living with a person with a flu-like illness.*

Country/Area/City visited within 14 days of illness onset:		Start	MM	DD	YY	End	MM	DD	YY
Country/Area/City visited within 14 days of illness onset:		Start	MM	DD	YY	End	MM	DD	YY

1b. Close Contact with confirmed/probable MERS/Coronavirus Case

Condition Met

- In the 14 days prior to symptom onset, did the patient have close contact with a confirmed or probable MERS/Coronavirus case while the affected person was ill? "Close contact" is caring for or living with a person with a flu-like illness*

Date of First Symptom Onset	MM	DD	YY	Medical Record # or Other Patient Identifier	
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1. EPIDEMIOLOGIC CRITERIA

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- In the 14 days prior to symptom onset, did patient live in or travel to the Arabian Peninsula or neighboring country? Countries in the Arabian Peninsula and neighboring countries: Bahrain, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Palestinian territories, Oman, Qatar, Saudi Arabia, Syria, the United Arab Emirates (UAE), and Yemen.*
- In the 14 days prior to symptom onset, did the patient have 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 (listed above)? "Close contact" is caring for or living with a person with a flu-like illness.*

Country/Area/City visited within 14 days of illness onset:		Start	MM	DD	YY	End	MM	DD	YY
Country/Area/City visited within 14 days of illness onset:		Start	MM	DD	YY	End	MM	DD	YY

1b. Close Contact with confirmed/probable MERS/Coronavirus Case

Condition Met

- In the 14 days prior to symptom onset, did the patient have close contact with a confirmed or probable MERS/Coronavirus case while the affected person was ill? "Close contact" is caring for or living with a person with a flu-like illness*

Note: increased from 10 days to 14 days

Date of First Symptom Onset	MM	DD	YY	Medical Record # or Other Patient Identifier	
Date of Birth	MM	DD	YY	Patient Name	

1. EPIDEMIOLOGIC CRITERIA

1a. Travel Exposures

Condition Met

- In the 14 days prior to symptom onset, did patient live in or travel to the Arabian Peninsula or neighboring country? Countries in the Arabian Peninsula and neighboring countries: Bahrain, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Palestinian territories, Oman, Qatar, Saudi Arabia, Syria, the United Arab Emirates (UAE), and Yemen.*
- In the 14 days prior to symptom onset, did the patient have 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 (listed above)? "Close contact" is caring for or living with a person with a flu-like illness.*

Country/Area/City visited within 14 days of illness onset:		Start	MM	DD	YY	End	MM	DD	YY
Country/Area/City visited within 14 days of illness onset:		Start	MM	DD	YY	End	MM	DD	YY

1b. Close Contact with confirmed/probable MERS/Coronavirus Case

Condition Met

- In the 14 days prior to symptom onset, did the patient have close contact with a confirmed or probable MERS/Coronavirus case while the affected person was ill? "Close contact" is caring for or living with a person with a flu-like illness*

NOTE: KSA refers to MERS-CoV as "CORONAVIRUS"

Number of Novel Coronavirus Cases



2. CLINICAL CRITERIA

2a. Fever

Condition Met

During this illness, has patient had a temperature of >100°F?

- Yes
- No
- Unknown

2b. Respiratory Illness or Abnormal CXR or Chest CT or ARDS

Condition Met

(Check all that apply)

- Symptoms of Respiratory Illness
- Abnormal Chest Radiograph (CXR)/ or Chest CT scan or Pneumonia
- ARDS (Acute Respiratory Distress Syndrome) or other severe respiratory illness

- Can have symptoms of respiratory illness without radiographic evidence**

2. CLINICAL CRITERIA

2a. Fever

Condition Met

During this illness, has patient had a temperature of >100°F?

- Yes
- No
- Unknown

2b. Respiratory Illness or Abnormal CXR or Chest CT or ARDS

Condition Met

(Check all that apply)

- Symptoms of Respiratory Illness
- Abnormal Chest Radiograph (CXR)/ or Chest CT scan or Pneumonia
- ARDS (Acute Respiratory Distress Syndrome) or other severe respiratory illness

If patient met one of the epidemiologic criteria (1a. Travel or 1b. Close Contact with MERS case) AND one of the clinical criteria (Fever (2a) or Respiratory Illness or Chest X-Ray/CT scan or ARDS (2b)), then IMMEDIATELY NOTIFY your infection control AND PUBLIC HEALTH, 24/7. The Tennessee Department of Health (TDH) central office phone number is (615)-741-7247.

ONE Epi Criteria PLUS ONE Clinical Criteria

(i.e., DON'T need both Fever and Resp Illness)

**→ Contact Infection Control & Public Health
(even if in doubt)**

To improve the ability of TDH to detect any unusual cause of severe acute respiratory infection (SARI, defined as fever and cough requiring hospitalization) in TN, please notify public health of:

1. **Clusters of SARI** [fever and cough requiring hospitalization, cause unknown]. "Cluster" is defined as 2 or more patients with onset of disease within a 2-week period among people linked by a specific setting (e.g., hospital, workplace, household, classroom, extended family, camp, barrack, dormitory)
2. **Healthcare workers** who have cared for patients with SARI, particularly patients requiring ICU care.

TDH staff will assess and provide guidance on further evaluation, such as testing.

Clusters of Severe Acute Respiratory Illness (SARI)

Healthcare workers who have cared for patients with SARI (especially patients requiring ICU care)

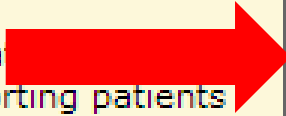
Implement Infection Prevention and Control (*airborne, contact, droplet*)

- **Source Control-** Facemask on suspect patient
- **Patient placement-** Negative pressure airborne infection isolation room
- **Personal protective equipment** for HCP (gowns, gloves, eye protection plus N95 respirator or above)
- **Hand Hygiene**
- **Aerosol Generating Procedures**

Information for Healthcare Providers

Interim Guidance For Health Professionals

CDC interim guidance for evaluating close contacts and clusters, reporting patients under investigation (PUIs), testing specimens, and infection control.



Infection Prevention and Control

Interim recommendations for managing hospitalized patients with known or suspected MERS-CoV infection.

Refer to CDC guidance for additional details

Resources to help healthcare facilities enhance preparedness and infection control.

Case Definitions

CDC case definitions for patient under investigation (PUI), confirmed case, and probable case.

Interim Home Care and Isolation Guidance

CDC interim guidance to prevent MERS-CoV from spreading in homes and communities in the U.S.

<http://www.cdc.gov/coronavirus/mers/hcp.html>

This is a rapidly evolving situation. Always check CDC website for most up-to-date IC information



Call Public Health

Category 1A

**IMMEDIATE TELEPHONIC
NOTIFICATION**

(24 hours a day, 7 days a week)

**Tennessee State Health Department
Number: (615) 741-7247**

**After hours, listen to the message &
call the number provided**

Tennessee Department of Health Reportable Diseases and Events

The diseases and events listed below are declared to be communicable and/or dangerous to the public and are to be reported to the local health department by all hospitals, physicians, laboratories, and other persons knowing of or suspecting a case in accordance with the provision of the statutes and regulations governing the control of communicable diseases in Tennessee (T.C.A. §68 Rule 1200-14-01-.02). See matrix for additional details.

Category 1A: Requires immediate telephonic notification (24 hours a day, 7 days a week), followed by a written report using the PH-1600 within 1 week.

- | | |
|---|---|
| [002] Anthrax (<i>Bacillus anthracis</i>) ^B | [516] Novel Influenza A |
| [005] Botulism-Foodborne (<i>Clostridium botulinum</i>) ^B | [032] Pertussis (Whooping Cough) |
| [004] Botulism-Wound (<i>Clostridium botulinum</i>) | [037] Rabies: Human |
| [505] Disease Outbreaks (e.g., foodborne, waterborne, healthcare, etc.) | [112] Ricin Poisoning ^B |
| [023] Hantavirus Disease | [132] Severe Acute Respiratory Syndrome (SARS) |
| [096] Measles-Imported | [107] Smallpox ^B |
| [026] Measles-Indigenous | [110] Staphylococcal Enterotoxin B (SEB) Pulmonary Poisoning ^B |
| [095] Meningococcal Disease (<i>Neisseria meningitidis</i>) | [111] Viral Hemorrhagic Fever ^B |
| [530] Middle East Respiratory Syndrome (MERS) | |







Category 1A
IMMEDIATE TELEPHONIC NOTIFICATION
(24 hours a day, 7 days a week)

<http://health.state.tn.us/ReportableDiseases/Common/ReportableDiseasesList.pdf>

Requests for Testing for MERS-CoV (Use Submission Form on TNHAN)

- TDH State Public Health Lab in Nashville, performs PCR test
 - Test is NOT commercially available
- Requires approval by TDH Central Office
 - Drs. Kainer, Jones, Dunn, Moore

Documents

Type	Name
	TNHAN ALERT Measles MERS-CoV 5.19.14
	MERS_CO_V SubmissionForm
	TDH MERS CoV screen
	TNHAN New User Instructions 4-9-13





Tennessee Department of Health
Division of Laboratory Services
MERS Coronavirus (MERS CO-V)
Submission Requisition

Place State Lab Accession
Label Here
(TDH use only)

Suspected MERS CoV: Call 615-741-7247 for medical consultation & testing approval

*Indicates Required Fields

SPECIMEN COLLECTION INFORMATION

*Last Name: _____ *First Name: _____ MI: _____
 *DOB: _____ *Gender: Male Female Ethnicity: Hispanic Non Hispanic
 Race: American Indian Asian Black Hawaiian/Pacific Islander White Other (_____) _____
 Address: _____
 City: _____ *County of Residence: _____ State: _____ Zip: _____ If Non-US resident: Country: _____

SUBMITTER INFORMATION

*Submitter: _____ Medical Record Number: _____
 *Address: _____
 *City: _____ *State: _____ Zip Code: _____
 *Phone Number: _____ Fax Number: _____

SPECIMEN INFORMATION

*Date of Collection: ___/___/___ *Specimen Source: Sputum BAL Tracheal aspirate Pleural fluid NP OP NP/OP
 Blood/Serum Stool Other _____

MEDICAL HISTORY*

Date of Symptom Onset: ___/___/___ Have the patient's symptoms resolved? No Yes Unk.
 Signs and Symptoms: (check all that apply) Feverish Fever (>38°C, 100.4°F) Dry cough Productive cough Chills
 Sore throat Headache Muscle aches Shortness of breath Vomiting Abdominal pain Diarrhea
 Clinical signs of Pneumonia or ARDS Other _____
 CXR: Abnormal Chest X-Ray (CXR) consistent with (c/w) Pneumonia CXR c/w Acute Respiratory Distress Syndrome (ARDS)
 Concurrent risk factors: (check all that apply) Immunocompromised Pregnant Renal failure Other _____ Unk.
 Was the patient hospitalized for this illness? No Yes Unk.
 If yes, was the patient admitted to the intensive care unit? No Yes Unk.
 Did patient die from this illness? No Yes (Date: ___/___/___) Unk.

MERS CORONAVIRUS EPIDEMIOLOGY

MUST ANSWER "YES" TO AT LEAST ONE.

1. * Patient traveled within 14 days of onset to an area reporting human MERS Coronavirus: No Yes Unk.
 If Yes: Name of Countries visited in the Arabian Peninsula* _____
 Dates of travel to/from the Arabian Peninsula* or neighboring countries: To: ___/___/___ From: ___/___/___
 2. * In 14 days before symptom onset, patient was a close contact with an ill person with a history of recent travel to the Arabian Peninsula or neighboring countries: No Yes Unk.
 3. * Patient was a close contact to a known or suspected case of MERS Coronavirus: No Yes Unk.
 4. * Patient is a healthcare worker who has cared for patients with Severe Acute Respiratory Illness (SARI), particularly patients requiring ICU care No Yes Unk.
 5. * Patient is part of a cluster of SARI (fever and cough requiring hospitalization, cause unknown). "Cluster" is defined as 2 or more patients with onset of disease within a 2-week period among people linked by a specific setting (e.g., hospital, workplace, household, classroom, family group, camp, dormitory) No Yes Unk.
 * Is the patient (check all that apply): Health care worker US military Flight crew Other _____
 * During illness, was patient associated with any of the following (check all that apply)
 Flight Childcare/daycare facility Long-term Care Facility Correctional Facility Hospital
 School Please provide name(s): _____

ADDITIONAL INFORMATION:

Do not submit swab that has been used for rapid testing.
 Nashville Laboratory: P.O. Box 305130, Nashville, TN 37230 (USPS) OR 630 Hart Lane, Nashville, TN 37216 (FedEx, UPS, courier delivery)
 Arabian Peninsula and Neighboring Countries include: Bahrain, Iraq, Iran, Israel, Jordan, Kuwait, Lebanon, Oman, Palestinian territories, Qatar, Saudi Arabia, Syria, the United Arab Emirates (UAE), and Yemen.

SPECIMEN COMMENTS

- Lower respiratory specimens are preferred specimens and should be collected within 7 days after illness onset and before antiviral medications are administered. However, if more than a week has passed and the patient is still symptomatic, respiratory specimens should still be collected.
- Collecting nasopharyngeal and oropharyngeal (NP/OP), stool, and serum specimens are strongly recommended depending on the length of time between symptom onset and specimen collection. Serum specimens should be collected during the first week after symptom onset, preferably within 3-4 days.
- All specimens should be collected with appropriate infection control precautions (gowns, gloves, eye protection, N95 respirator or higher): <http://www.cdc.gov/coronavirus/mers/infection-prevention-control.html>

Lower Respiratory Tract: (preferred)

- Bronchoalveolar lavage, tracheal aspirate, pleural fluid
Collect 2-3 mL into a sterile, leak-proof, screw-cap sputum collection cup or sterile dry container.
- 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.

Upper Respiratory Tract:

- Nasopharyngeal AND oropharyngeal swabs (NP/OP swabs):
 - o 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.
 - Nasopharyngeal (NP) 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 nasopharyngeal areas.
 - Oropharyngeal (OP) swabs -- Swab the posterior pharynx, avoiding the tongue.
- Nasopharyngeal wash/aspirate or nasal aspirates
 - o Collect 2-3 ml into a sterile, leak-proof, screw-cap sputum collection cup or sterile dry container.

Blood Components

- Serum (for RRT-PCR Testing)
 - o 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 µL. Refrigerate the specimen at 2-8°C and ship on ice pack; freezing and shipment on dry ice is permissible.
 - o Infants: A minimum of 1mL of whole blood is need for testing for pediatric patients. If possible, collect 1 mL in an EDTA tube and in a serum separator tube. If only 1 mL can be obtained, use a serum separator tube.
- EDTA blood (plasma)
 - o 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.

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

Storage and Shipping Specifics

- All respiratory and stool specimens should be refrigerated at 2-8°C for up to 72 hours; if exceeding 72 hours, freeze at -70°C and ship on dry ice.
- For serum specimens, refrigerate the specimen at 2-8°C and ship on ice pack; although freezing at -70°C and shipping on dry ice is permissible. For EDTA blood specimens, refrigerate at 2-8°C and ship on ice-pack, and do not freeze.

CDC Recommends Against the Following:

- 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 to the inadequate seal of these bags.

Additional Information:

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

MERS-CoV Specimen Submission Form

Public health will ask these questions when you contact them– obtain this information and start filling out the form!

MEDICAL HISTORY*			
Date of Symptom Onset: __/__/__	Have the patient's symptoms resolved? <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> Unk.		
Signs and Symptoms: (check all that apply) <input type="checkbox"/> Feverish <input type="checkbox"/> Fever (>38°C, 100.4°F) <input type="checkbox"/> Dry cough <input type="checkbox"/> Productive cough <input type="checkbox"/> Chills <input type="checkbox"/> Sore throat <input type="checkbox"/> Headache <input type="checkbox"/> Muscle aches <input type="checkbox"/> Shortness of breath <input type="checkbox"/> Vomiting <input type="checkbox"/> Abdominal pain <input type="checkbox"/> Diarrhea <input type="checkbox"/> Clinical signs of Pneumonia or ARDS <input type="checkbox"/> Other _____			
CXR: <input type="checkbox"/> Abnormal Chest X-Ray (CXR) consistent with (c/w) Pneumonia <input type="checkbox"/> CXR c/w Acute Respiratory Distress Syndrome (ARDS)			
Concurrent risk factors: (check all that apply) <input type="checkbox"/> Immunocompromised <input type="checkbox"/> Pregnant <input type="checkbox"/> Renal failure <input type="checkbox"/> Other _____ <input type="checkbox"/> Unk.			
Was the patient hospitalized for this illness?		<input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> Unk.
If yes, was the patient admitted to the intensive care unit?		<input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> Unk.
Did patient die from this illness?		<input type="checkbox"/> No	<input type="checkbox"/> Yes (Date: __/__/__) <input type="checkbox"/> Unk.

Date of symptom onset very important...

MERS CORONAVIRUS EPIDEMIOLOGY

MUST ANSWER "YES" TO AT LEAST ONE.

1. * Patient traveled within 14 days of onset to an area reporting human MERS Coronavirus: No Yes Unk.
 If Yes: Name of Countries visited in the Arabian Peninsula* _____
 Dates of travel to/from the Arabian Peninsula* or neighboring countries: To: __/__/____ From: __/__/____
 2. * In 14 days before symptom onset, patient was a close contact with an ill person with a history of recent travel to the Arabian Peninsula or neighboring countries: No Yes Unk.
 3. * Patient was a close contact to a known or suspected case of MERS Coronavirus: No Yes Unk.
 4. * Patient is a healthcare worker who has cared for patients with Severe Acute Respiratory Illness [SARI], particularly patients requiring ICU care No Yes Unk.
 5. * Patient is part of a cluster of SARI [fever and cough requiring hospitalization, cause unknown]. "Cluster" is defined as 2 or more patients with onset of disease within a 2-week period among people linked by a specific setting (e.g., hospital, workplace, household, classroom, family group, camp, dormitory) No Yes Unk.
- * Is the patient (check all that apply): Health care worker US military Flight crew Other _____
 - * During illness, was patient associated with any of the following (check all that apply)
 Flight Childcare/daycare Facility Long-term Care Facility Correctional Facility Hospital
 School Please provide name(s): _____

Names of Countries and Locations within country very helpful

– e.g., Jeddah or Riyadh for KSA

Encounters with healthcare facilities

(Healthcare worker, inpatient or outpatient, visitor)

-- name of hospital (including city)

Known contact with "Coronavirus" or MERS

Travel dates very important to assess whether within IP 44

Laboratory Testing

Specimens:

- Lower respiratory tract specimens (e.g., sputum, BAL, ETA)
- NP/OP swab
- Stool
- Blood

See CDC guidance for collecting, handling and testing clinical specimens, including infection prevention

Information for Specific Groups



People Who May Be at Increased Risk for MERS

Information for people who have recently traveled from the Arabian Peninsula, had contact with a recent traveler from this area, or had contact with a confirmed or probable case of MERS...



Healthcare Providers

Interim guidance, case definitions, infection prevention and control recommendations, home care guidance, preparedness checklists, clinical features of MERS...



Health Departments

Interim guidance, case definitions, tools to collect data on patients under investigation, and home care guidance...



Laboratories

Guidelines for collecting, handling and testing clinical specimens, and lab biosafety guidelines...



Guidelines for travelers and guidance for airline crew on flights arriving to the U.S...



Refer to CDC guidance for additional details

Information for Healthcare Providers

Interim Guidance For Health Professionals

CDC interim guidance for evaluating patients, close contacts and clusters, reporting patients under investigation (PUIs), testing specimens, and infection control.

Clinical Features

CDC interim information for clinicians on human infections with MERS-CoV.

Case Definitions

CDC case definitions for patient investigation (PUI), confirmed case, and probable case.

Infection Prevention and Control

Interim recommendations for managing hospitalized patients with known or suspected MERS-CoV infection.

Preparedness

Checklists and resources to help healthcare providers and facilities enhance preparedness for MERS-CoV infection control.

Interim Home Care and Isolation Guidance

CDC interim guidance to prevent MERS-CoV from spreading in homes and communities in the U.S.

If patient does not require hospitalization– review guidance, assess if suitable for home care & provide instructions on prevention steps

Prevention Steps: Home Isolation

- **Stay home**
- **Separate yourself from other people in your home**
- **Call ahead before visiting your doctor**
- **Wear a facemask**
- **Cover your coughs and sneezes**
- **Wash your hands**
- **Avoid sharing household items**

<http://www.cdc.gov/coronavirus/MERS/hcp/home-care-patient.html>

Information for Healthcare Providers

Interim Guidance For Health Professionals

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Clinical Features

CDC interim information for clinicians on human infections with MERS-CoV.



Infection Prevention and Control

Interim recommendations for managing hospitalized patients with known or suspected MERS-CoV infection.

Preparedness

Checklists and resources to help healthcare providers and facilities enhance preparedness for MERS-CoV infection control.

Case Definitions

CDC case definitions for patient under investigation (PUI), confirmed case, and probable case.

Interim Home Care and Isolation Guidance

CDC interim guidance to prevent MERS-CoV from spreading in homes and communities in the U.S.

Review checklists for healthcare providers or healthcare facilities to make sure you are ready for any patients that may present with MERS-CoV

If Have a Positive MERS-CoV Case

- Public Health will work with you
- Be prepared for media attention
 - Contact TDH Director of Communications
 - Tel: (615) 741-3446
 - Woody.McMillin@tn.gov
- Contact investigations: flights, exposures of HCP and others
- TDH has tools to assist in monitoring of contacts including exposed HCP

Take Home Messages

- **Search terms: “CDC MERS” & “TNHAN”**
- **Key Elements for Control:**
 - **Detect and Protect**
 - **Screening questions: Travel, Contact-14 days**
 - **Infection Control**
- **Call Public Health 24/7 even if in doubt**
 - **(615) 741-7247 for central office TDH**
- **This is a rapidly evolving situation, there are still many unknowns**