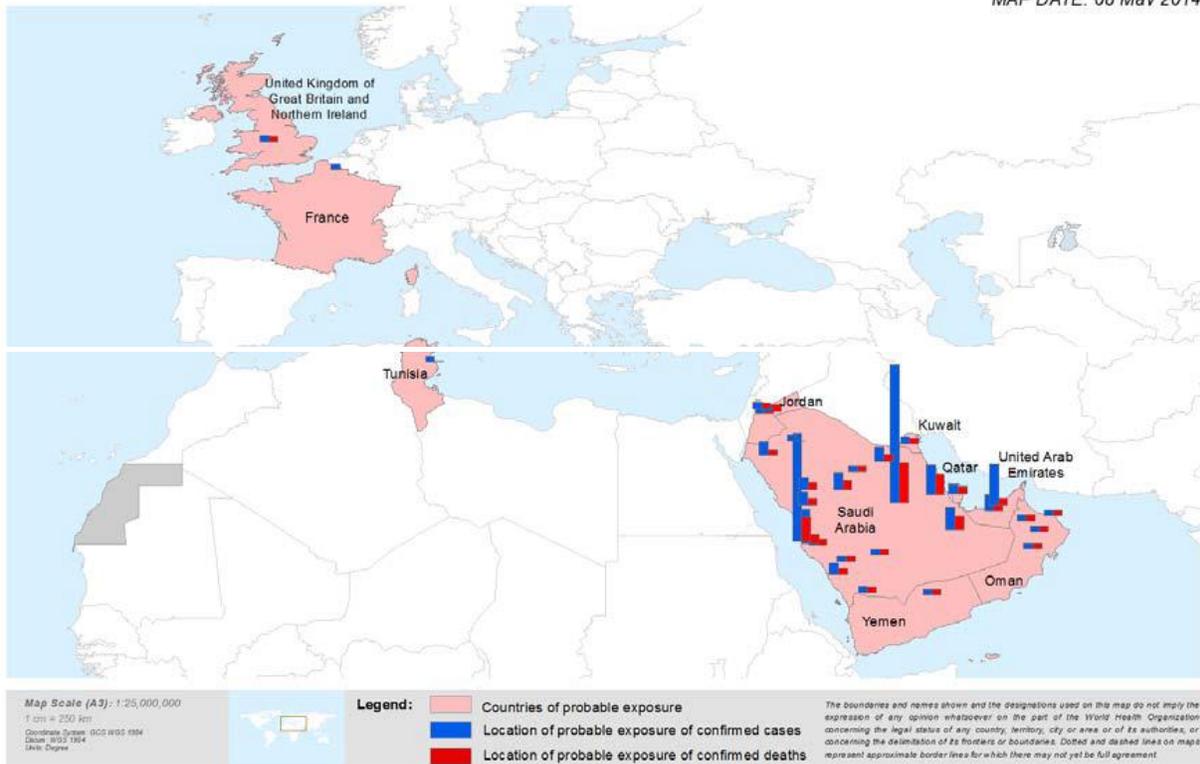


## Guidelines on Middle East Respiratory Syndrome Coronavirus (MERS-CoV)

Since April 2012, 536 laboratory-confirmed cases of human infection with Middle East respiratory syndrome coronavirus (MERS-CoV) have been reported to WHO, including 145 deaths (Figure 1). To date, the affected countries in the Middle East include Jordan, Kuwait, Oman, Qatar, Saudi Arabia (KSA), United Arab Emirates (UAE) and Yemen; in Africa: Egypt and Tunisia; in Europe: France, Germany, Greece, Italy and the United Kingdom; in Asia: Malaysia and Philippines; and in North America: the United States of America (USA). All of the cases recently reported outside the Middle East (Egypt, Greece, Malaysia, the Philippines and the USA) recently traveled from countries inside of the Middle East (KSA or UAE). Overall, 65.6% of cases are male and the median age is 49 years old (range 9 months-94 years old).

### CONFIRMED CASES OF MIDDLE EAST RESPIRATORY SYNDROME - CORONAVIRUS 2012 - 2014

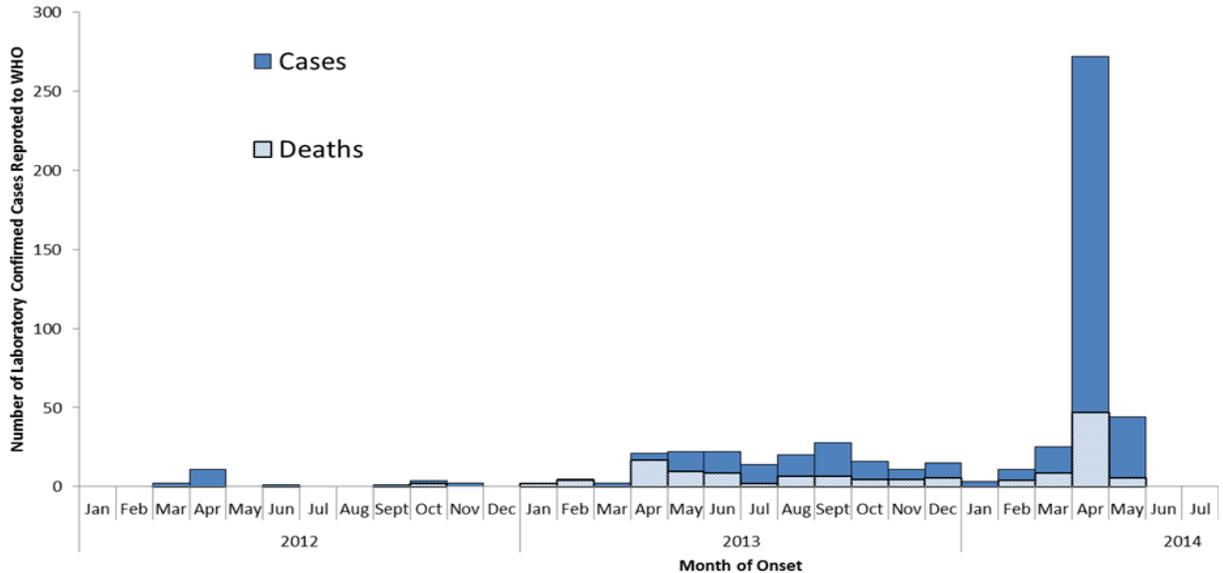
MAP DATE: 08 May 2014



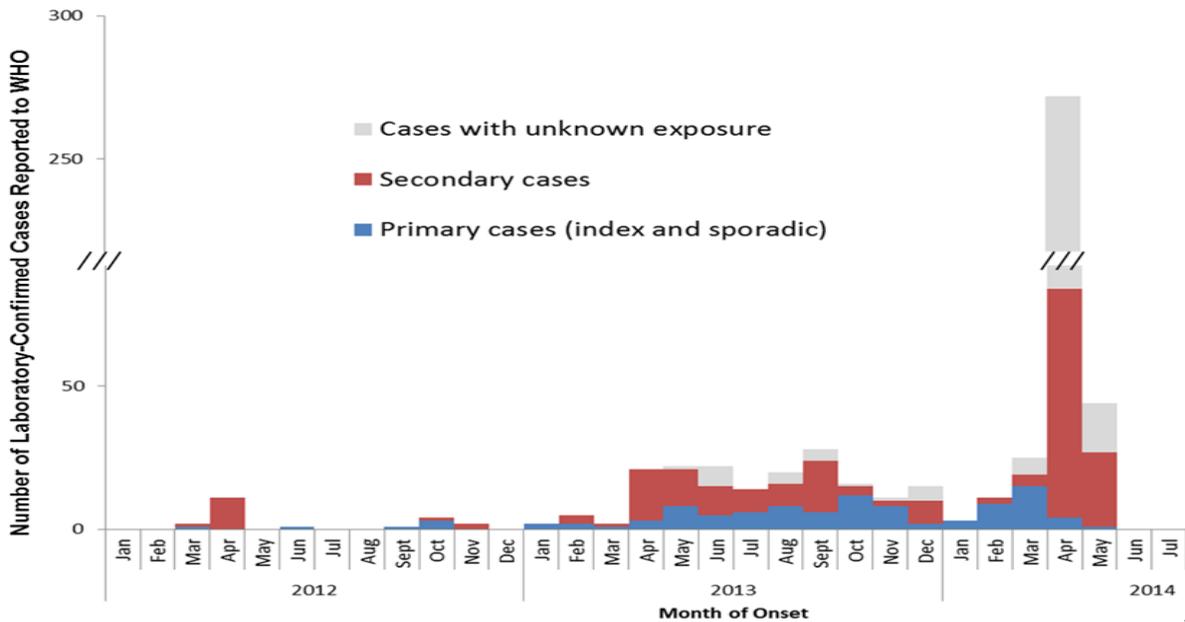
**Figure 1.** Location of the laboratory-confirmed cases of MERS-CoV infection by country of presumed exposure, March 2012-8 May 2014

Since the last update of 27 March 2014, 330 laboratory-confirmed cases, including 59 deaths, were reported to WHO. These include 290 cases infected in KSA, 37 cases from UAE, 1 case from Yemen and 2 cases from Jordan. These include one case each from Egypt, Greece, Jordan, Malaysia, USA and the Philippines who were infected in the Middle East. No further transmission has been documented so far from the recent exported cases.

The number of laboratory-confirmed MERS-CoV cases reported to WHO has sharply increased since mid-March 2014, essentially in KSA and UAE, where important healthcare-associated outbreaks are occurring (Figure 2). The number of cases who acquired the infection presumably from non-human sources has also increased since mid-March (shown as primary cases in Figure 3). These cases have not reported contacts with other laboratory-confirmed cases, and some have reported contacts with animals, including camels. Although camels are suspected to be the primary source of infection for humans, the routes of direct or indirect transmission remain unknown and investigations are ongoing.



**Figure 2.** Epidemic curve of 536 laboratory-confirmed cases MERS-CoV cases by outcome (as of 8 May 2014)



**Figure 3.** Epidemic Curve of 536 laboratory-confirmed MERS-CoV patients by case type (primary vs secondary; as of 8 May 2014)

## **Case Definition and Surveillance Guidance for MERS-CoV Testing Suspect Case (patients who should be tested for MERS-CoV) <sup>1</sup>**

### **Suspected Case**

I. A person with fever and community-acquired pneumonia or acute respiratory distress syndrome based on clinical or radiological evidence.<sup>2</sup>

OR

II. A hospitalized patient with healthcare associated pneumonia based on clinical and radiological evidence.<sup>2</sup>

OR

III. A person with 1) acute febrile ( $\geq 38^{\circ}\text{C}$ ) illness, AND 2) body aches, headache, diarrhea, or nausea/vomiting, with or without respiratory symptoms, AND 3) unexplained leucopenia ( $\text{WBC} < 3.5 \times 10^9/\text{L}$ ) and thrombocytopenia ( $\text{platelets} < 150 \times 10^9/\text{L}$ )<sup>3</sup>.

OR

IV. A person (including health care workers) who had protected or unprotected exposure<sup>4</sup> to a confirmed or probable case of MERS-CoV infection and who presents with upper<sup>5</sup> or lower<sup>6</sup> respiratory illness within 2 weeks after exposure<sup>7</sup>.

### **Probable Case**

A probable case is a patient in category I or II above with absent or inconclusive laboratory results for MERS-CoV and other possible pathogens who is a close contact<sup>8</sup> of a laboratory-confirmed MERS-CoV case or who works in a hospital where MERS-CoV cases are cared for.

### **Confirmed Case**

A confirmed case is a suspect case with laboratory confirmation<sup>9</sup> of MERS-CoV infection.

<sup>1</sup> All suspected cases should have nasopharyngeal swabs, and, when intubated, lower respiratory secretions samples collected for MERS-CoV testing.

<sup>2</sup> Patients who meet the criteria for category I or II above should also be evaluated for common causes of community-acquired pneumonia (such as influenza A and B, respiratory syncytial virus, *Streptococcus pneumoniae*, *Hemophilus influenzae*, *Staphylococcus aureus*, and *Legionella pneumophila*). This evaluation should be based on clinical presentation and epidemiologic and surveillance information. Testing for MERS-CoV and other respiratory pathogens can be done simultaneously. Positive results for another respiratory pathogen (e.g. H1N1 influenza) should not necessarily preclude testing for MERS-CoV because co-infection can occur.

<sup>3</sup> Laboratory tests to exclude other causes of this clinical presentation (e.g., dengue, Alkhurma hemorrhagic fever virus, CMV, EBV, typhoid fever, and malaria) should be simultaneously performed if clinically and epidemiologically indicated.

<sup>4</sup> Protected exposure is defined as contact within 1.5 meters with a patient with confirmed or probable MERS-CoV infection while wearing all personal protective equipment (surgical mask, gloves, and gowns, and, when indicated, goggles, or N95 mask). Unprotected exposure is defined as contact within 1.5 meters with a patient with confirmed or probable MERS-CoV infection without wearing all personal protective equipment (surgical mask, gloves, and gowns, and, when indicated, goggles, or N95 mask).

<sup>5</sup> Rhinorrhea, sore throat, and/or cough

<sup>6</sup> Shortness of breath, hypoxemia, or pneumonic infiltration evident on chest x-ray.

<sup>7</sup> Testing asymptomatic contacts are generally not recommended. Under certain circumstances, such testing may be considered in consultation with an Infectious Diseases/Infection Control consultant.

<sup>8</sup> Close contact is defined as a) any person who provided care for the patient, including a healthcare worker or family member, or had similarly close physical contact; or b) any person who stayed at the same place (e.g. lived with, visited) as the patient while the patient was ill.

<sup>9</sup> Confirmatory laboratory testing requires a positive PCR on at least two specific genomic targets (upE and ORF1a) OR a single positive target (upE) with sequencing of a second target (RdRpSeq or NSeq). It is strongly advised that lower respiratory specimens such as sputum, endotracheal aspirate, or bronchoalveolar lavage should be used when possible. If patients do not have signs or symptoms of lower respiratory tract infection or lower tract specimens are not possible or clinically indicated, both nasopharyngeal and oropharyngeal specimens should be collected and combined in a single collection container and tested together. If initial testing of a nasopharyngeal swab is negative in a patient who is strongly suspected to have MERS-CoV infection, patients should be retested using a lower respiratory specimen or, if not possible, a repeat nasopharyngeal and oropharyngeal specimen. For patients in whom adequate lower respiratory samples are not possible, investigators may also want to consider other types of auxiliary testing such as nasopharyngeal wash and paired acute and convalescent sera. Virus has also been demonstrated in other body fluids such as blood, urine, and stool but the usefulness of those body fluids in diagnosing MERS-CoV infection is uncertain.

## **Transmission**

Coronavirus is transmitted similarly to alternate strains which include:

- Direct transmission through droplets expelled during coughs and sneezes.
- Indirect transmission through touching surfaces and devices contaminated with the virus, and then touching the mouth, nose or eyes.
- Direct contact with patients or infected animals or animal products.

## **Symptoms**

The symptoms include acute and severe respiratory symptoms, accompanied by fever, cough and difficulty in respiration.

## **Treatment & Prevention**

Current medical advice states that patients should take supportive medication to deal with the complications and alleviate symptoms. There is no available vaccine or a qualitative medication available for this disease so far

### **Procedures to be taken on the emergence of suspected or confirmed cases at hospitals:**

All health workers have to take the droplet isolation precautions when dealing with patients (detaining the patient in a particular room, or with patient with akin symptoms, in addition to cleansing hands and putting on face-masks). That's to be added to using high-quality face-masks (N95), as well as eye protectors. When taking any measures that makes the health worker vulnerable to the infection transmission, such as the respiratory secretions or respiratory endoscopies, that should be conducted at a passive-pressure room.

- Informing the Infectious Diseases Department pertinent to the Public Health Agency.
- Taking nasal-annular samples and it is better to take samples from: sputum, liquid of the trachea, lotion of the bronchial and alveoli, and other secretions from the lower respiratory system, if possible, and sending all such samples to the referential laboratories in NCDC, Delhi and NIV, Pune.
- If the sample is found positive, health workers who have got in contact with the patient (nurse, physician, respiratory device technician, etc.) should be brought to take nasal-annular samples from them, as well as blood samples, and send them to the Public Health Agency.

### **Other preventive procedures:**

- Completing the enclosed epidemiological surveillance form, and sending it to the Infectious Diseases Department pertinent to the Public Health Agency.
- Identifying those in contact with the patient, and observing their health situation for two weeks.
- Taking nasal-annular samples, as well as (6 ml of blood in two tubes, 3 ml each) from all those in contact with the patient at home.
- Keeping all samples at the regular refrigerator temperature (2-8° C), making sure not to get frozen.
- Separating the blood samples by a centrifuge, and sending the “sera” in a suitable tube, to NCDC , Delhi or NIV ,Pune without using any anti-clotting drugs, with a temperature of (2-8° C), by putting ice cubes all around them, making sure not to get frozen.
- Sending a list of those from whom samples have been taken (those in contact with the patient) to the Infectious Diseases Department.
- Sending the Epidemiological Reporting and Surveillance to the Infectious Diseases Department pertinent to the Public Health



For further information

1. WHO Interim guidelines on Clinical management of severe acute respiratory infections when novel coronavirus is suspected  
[http://www.who.int/csr/disease/coronavirus\\_infections/InterimGuidance\\_ClinicalManagement\\_NovelCoronavirus\\_11Feb13u.pdf?ua=1](http://www.who.int/csr/disease/coronavirus_infections/InterimGuidance_ClinicalManagement_NovelCoronavirus_11Feb13u.pdf?ua=1)
2. WHO guidelines on infection prevention and control during health care for probable or confirmed cases of novel coronavirus (nCoV) infection  
[http://www.who.int/csr/disease/coronavirus\\_infections/IPCnCoVguidance\\_06May13.pdf?ua=1](http://www.who.int/csr/disease/coronavirus_infections/IPCnCoVguidance_06May13.pdf?ua=1)
3. WHO guidelines for Laboratory Testing for Middle East Respiratory Syndrome Coronavirus  
[http://www.who.int/csr/disease/coronavirus\\_infections/MERS\\_Lab\\_recos\\_16\\_Sept\\_2013.pdf?ua=1](http://www.who.int/csr/disease/coronavirus_infections/MERS_Lab_recos_16_Sept_2013.pdf?ua=1)