



DEPARTMENT OF DEFENSE  
Armed Forces Health Surveillance Branch  
Integrated Biosurveillance Section  
**Global MERS-CoV Surveillance Summary #114**  
**17 JAN 2020**



**BLUF:**

- As of 17 JAN 2020, 2,585 human cases of infection with Middle East respiratory syndrome coronavirus (MERS-CoV) have been reported globally since 2012, with 85% of cases reported in the Kingdom of Saudi Arabia (KSA).
- At least 156 (42%) of all cases reported from 2018-2019 were linked to clusters of human-to-human transmission in specific close contacts of cases in households or health facilities. To date, no sustained human-to-human transmission of MERS-CoV (i.e., to the community at-large) has been reported. However, limited non-sustained human-to-human transmission in healthcare facilities continues to be a prominent feature of MERS-CoV.
- MERS is the sixth human CoV ever identified; in JAN 2020, a seventh CoV (nCoV-2019) was identified in a cluster of patients in Wuhan, China. MERS-CoV and Severe Acute Respiratory Syndrome (SARS-CoV) are both included in WHO's priority list of pathogens due to epidemic potential and insufficient countermeasures.

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# DEPARTMENT OF DEFENSE (AFHSB/IB)

## Global MERS-CoV Surveillance Summary #114

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**CASE REPORT:** As of 17 JAN 2020, 2,585 (+398 since AFHSB's last report on 15 NOV 2017) cases of infection with Middle East respiratory syndrome coronavirus (MERS-CoV) have been reported worldwide, including at least 792 (+117) deaths (CDC reports 858 (+89) deaths as of 9 JAN). AFHSB's death count (case fatality proportion (CFP) 31%) includes only those deaths which have been publicly reported and verified. While CDC's CFP (34%) may present a more complete picture, it is unclear when and where those additional deaths occurred during the outbreak. Since human cases of MERS were first identified in 2012, cases have been reported in the Kingdom of Saudi Arabia (KSA), Republic of Korea (ROK), United Arab Emirates (UAE), Jordan, Oman, Qatar, Iran, Kuwait, United Kingdom (UK), Thailand, Tunisia, Austria, Algeria, France, Lebanon, Malaysia, Netherlands, Philippines, Turkey, U.S., Bahrain, China, Egypt, Germany, Greece, Italy, and Yemen (see [Global Distribution of MERS](#)). The majority of MERS cases continue to occur in the Arabian Peninsula (90%) and specifically in the KSA (85%).

From JAN 2018 to DEC 2019, 368 MERS cases were reported in the KSA (346), Oman (14), Qatar (3), UAE (3), Republic of Korea (1), and the United Kingdom (1). About half (49%) of the 346 cases in the KSA were reported from the central region of Riyadh (see [Geographic Distribution of 2018-2019 MERS-CoV Cases](#)). At least 156 (42%) of all cases reported from 2018-2019 were linked to clusters of human-to-human transmission, in keeping with the overall percentage of cluster-associated cases (43%). Nineteen percent of these cases were in healthcare workers (HCWs). Twenty of the 22 clusters of human-to-human transmission reported in the KSA during 2019 occurred during the first five months of the year (JAN-MAY). Since JUN 2019, the number of reported cases has been relatively low, predominantly consisting of geographically disparate, primary cases. The most recent known date of symptom onset is 8 DEC 2019.

**BACKGROUND:** In SEP 2012, WHO [reported](#) two cases of infection with a novel coronavirus (now known as MERS-CoV) from separate individuals – one with travel history to the KSA and Qatar and one in a KSA citizen. This was the sixth strain of human coronavirus ever identified (including severe acute respiratory syndrome coronavirus (SARS-CoV)). Limited camel-to-human transmission of MERS-CoV has been proven to occur. The KSA Ministry of Health (MOH) has previously admitted to inconsistent reporting of asymptomatic cases. Due to this, it is difficult to determine a cumulative breakdown by gender; however, AFHSB is aware of at least 703 (+34) cases in females to date. In its MERS-CoV risk assessment in JUL 2019, WHO reported that 18% of all MERS cases have been in HCWs. To date, no sustained human-to-human transmission has been reported, either in the Arabian Peninsula or globally. However, limited non-sustained human-to-human transmission in health care facilities continues to be a prominent feature of MERS-CoV. Limited human-to-human transmission has been identified in at least 120 (+48) spatial clusters as of 17 JAN, predominantly involving close contacts. In 2017, AFHSB produced a dynamic online product, [The MERS-CoV Epidemic](#), which features a retrospective cluster analysis of all MERS cases reported from MAR 2012 to JUN 2016. AFHSB/IB published a paper describing this analysis in the journal [Epidemiology & Infection](#) in NOV 2017. Since the virus was discovered, significant progress has been made in terms of understanding the epidemiology, transmission, and pathogenesis of MERS-CoV; however, it is still unclear how exactly MERS-CoV is transmitted from bats, the presumed reservoir, to camels.

MERS-CoV can be spread to humans by direct or indirect contact with dromedary camels and from person to person by direct contact, by fomites, and by respiratory droplets. Cases in individuals with direct or indirect exposure to dromedary camels and no known exposure to confirmed MERS case(s) are referred to as "primary" cases. "Secondary" cases refer to individuals who are infected through direct or indirect exposure to confirmed MERS case(s). A [CDC Emerging Infectious Diseases](#) Early Release article for FEB 2020 noted that the source of infection for 60% of primary cases with environmental exposure is still unknown. Most MERS patients develop severe respiratory illness with symptoms of fever, cough and shortness of breath. Like SARS-CoV, MERS-CoV is a potential pandemic agent.

**MEDICAL COUNTERMEASURES & RESEARCH:** In a study published in [The Lancet Infectious Diseases](#) in JUL 2019, the MERS-CoV vaccine candidate GLS-5300 was shown to be safe, well-tolerated, and induced a robust immune response in a Phase I first-in-human clinical trial conducted at the Walter Reed Army Institute of Research (WRAIR) Clinical Trials Center. The plasmid DNA vaccine was co-developed by GeneOne Life Science Inc. and Inovio Pharmaceuticals, Inc. While other vaccine candidates have been tested for use in dromedary camels, this is the first vaccine tested in humans.

(+xx) represent the change in number from 15 NOV 2019.

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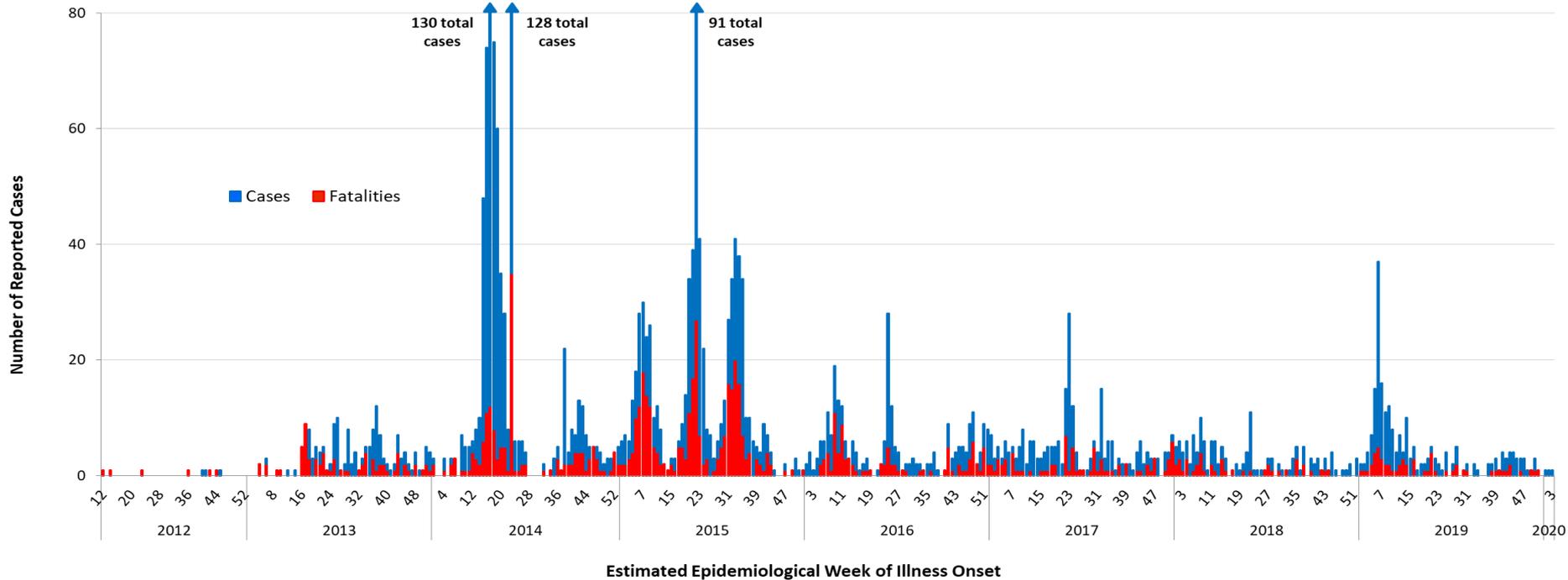
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**INTERAGENCY/GLOBAL ACTIONS:** In JUL 2019, WHO stated in its updated [global MERS-CoV risk assessment](#) that its assessment “remains unchanged” since its AUG 2018 report. WHO noted that while there have been significant improvements in surveillance for MERS, particularly in the Middle East, and in reacting to suspected disease clusters, early identification of cases in the community and in health care systems, compliance with infection prevention and control (IPC) measures, and contact follow-up remain major challenges. In particular, WHO attributes the continued occurrence of health care-associated outbreaks to low awareness among HCWs and lack of early suspicion of MERS-CoV infections. Because MERS symptoms are non-specific, initial symptoms are often missed, providing a window for exposure to other patients in healthcare settings. Non-compliance or irregular adherence to standard IPC precautions in healthcare facilities can exacerbate human-to-human transmission in these settings. Approximately 24% of MERS cases reported to WHO since its last update in 2018 were associated with transmission in a healthcare facility. WHO last convened the [International Health Regulations \(IHR\) Emergency Committee](#) regarding MERS on 2 SEP 2015, at which time the committee concluded that the conditions for a Public Health Emergency of International Concern (PHEIC) had still not been met.

Global MERS-CoV Epidemiological Curve as of 17 JAN 2020



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# MERS-CoV Diagnostics and Medical Countermeasures at DoD Laboratories



- AFRIMS**  
Armed Forces Research Institute of Medical Sciences
- BAACH**  
Brian Allgood Army Community Hospital
- BAMC**  
Brooke Army Medical Center
- Camp Arifjan**  
Camp Arifjan
- LRMC**  
Landstuhl Regional Medical Center
- MAMC**  
Madigan Army Medical Center
- NAMRU-2**  
U.S. Naval Medical Research Unit No. 2
- NAMRU-6**  
U.S. Naval Medical Research Unit No. 6
- NHRC**  
Naval Health Research Center
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Naval Infectious Diseases Diagnostic Laboratory
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Tripler Army Medical Center
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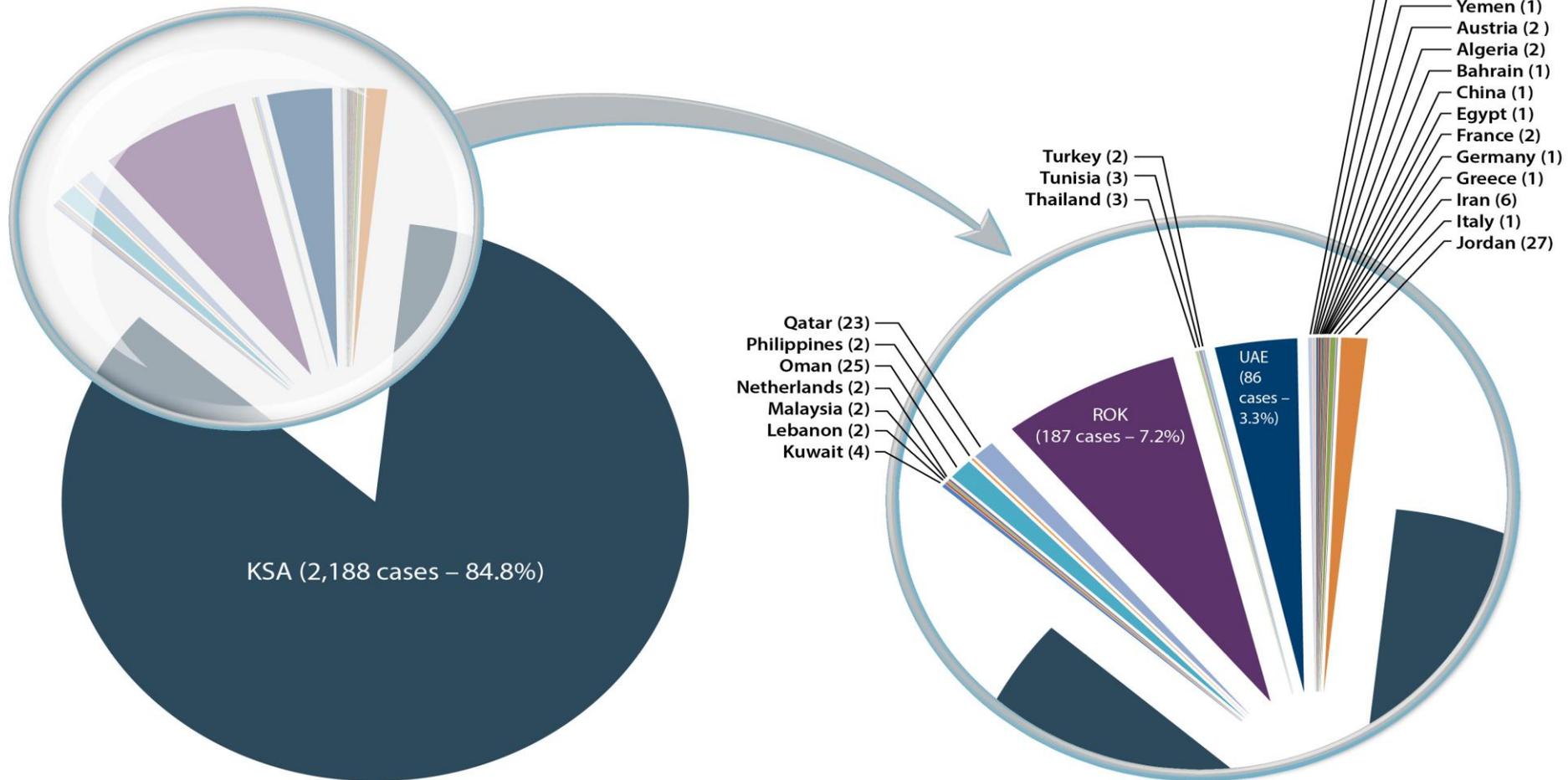
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## Global Distribution of Reported MERS-CoV Cases\* (SEP 2012–JAN 2020)



\*Data includes confirmed, suspect and probable cases reported by WHO, CDC, and various country MOHs

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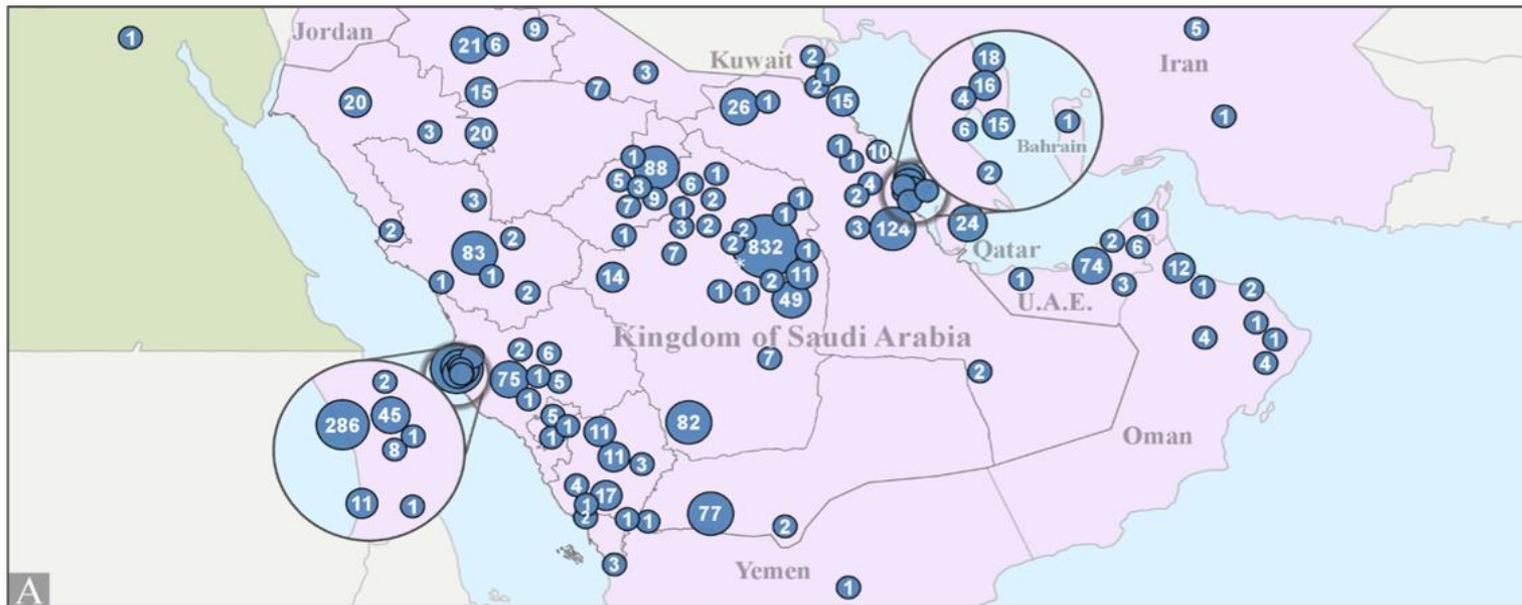
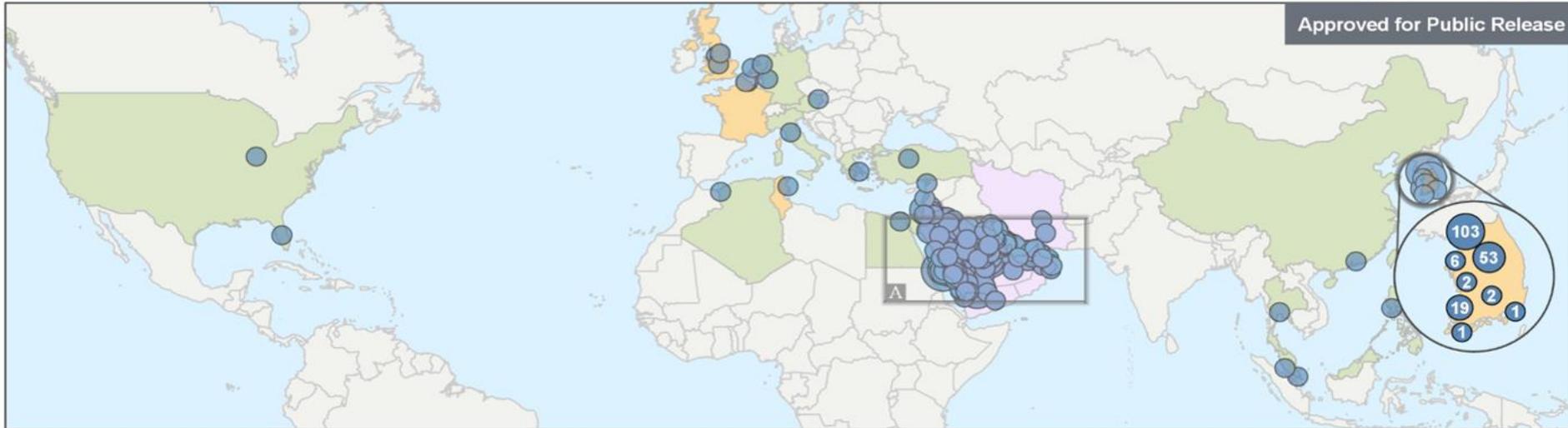
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# Geographic Distribution of MERS-CoV Cases

12 APR 2012 - 17 JAN 2020



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- Local Transmission
- Local Transmission and Imported Cases
- Imported Cases

Total Cases (N = 2585)

- 1-10
- 11-20
- 21-75
- 76-150
- 151-300
- >300

\* 21 cases have been reported in the Kingdom of Saudi Arabia without specific location information.

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