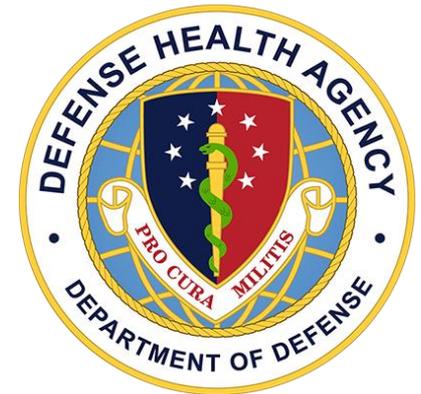


Department of Defense
Armed Forces Health Surveillance Branch
Global MERS-CoV Surveillance Summary
(28 DEC 2016)



APPROVED FOR PUBLIC RELEASE

For questions or comments, please contact:

dha.ncr.health-surv.list.afhs-ib-alert-response@mail.mil



DEPARTMENT OF DEFENSE (AFHSB)

Global MERS-CoV Surveillance Summary #99

28 DEC 2016 (next Summary 11 JAN 2017)



CASE REPORT: As of 28 DEC 2016, 1,949 (+11) cases of Middle East respiratory syndrome coronavirus (MERS-CoV) have been reported, including at least 603 (+6) deaths (CDC reports at least 690 (+6) deaths as of 27 DEC) in the Kingdom of Saudi Arabia (KSA) (+11), Jordan, Qatar, United Arab Emirates (UAE), United Kingdom (UK), France, Germany, Tunisia, Italy, Oman, Kuwait, Yemen, Malaysia, Greece, Philippines, Egypt, Lebanon, Netherlands, Iran, Algeria, Austria, Turkey, Republic of Korea (ROK), China, Thailand, Bahrain, and the U.S. The KSA Ministry of Health (MOH) has classified 10 of the 11 new cases as primary and one case in Mecca as a secondary, asymptomatic household contact. The new cases were reported from six different cities in KSA: Khamis Mushait (1), Mahd adh-Dhahab (1), Mecca (2), Najran (2), Riyadh (4), and Taif (1). AFHSB's death count (Case Fatality Proportion (CFP) - 31%) includes only those deaths which have been publicly reported and verified. While CDC's death count (CFP - 37%) may present a more complete picture, it's unclear when and where those additional deaths occurred during the outbreak.

On 28 DEC, local media quoted Egypt's Minister of Agriculture as stating that 19 camels within a shipment coming from Sudan had tested positive for MERS-CoV. The shipment consisted of 600 camels in total; the cases were identified through testing conducted prior to being slaughtered for consumption. The affected camels have been isolated and the rest of the shipment has been released after being confirmed to be "safe."

BACKGROUND: In SEP 2012, [WHO reported two cases of 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 identified (including SARS). Limited camel-to-human transmission of MERS-CoV has been proven to occur. The most recent known date of symptom onset is 9 DEC 2016. The KSA MOH has previously admitted to inconsistent reporting of asymptomatic cases. Due to these inconsistencies, it is also difficult to determine a cumulative breakdown by gender; however, AFHSB is aware of at least 601 (+3) cases in females to date. CDC reports 307 (16%) of the total cases have been identified as healthcare workers (HCWs); in its most recent MERS-CoV risk assessment on 5 DEC, WHO reported 20% of total MERS-CoV cases have been HCWs. Limited human-to-human transmission has been identified in at least 54 (+1) spatial clusters as of 28 DEC, predominately involving close contacts. The newest confirmed cluster is household-based; the index case was reported by the KSA MOH on 17 NOV in a 29-year-old female living in Hafar Al-Batin; the mother of the index case was subsequently confirmed as a secondary household contact on 28 NOV. There has also been one suspected household cluster which is not included in the spatial cluster count above: a 47-year-old male from Mecca was reported as a primary case by the KSA MOH on 20 DEC; on 21 DEC a 24-year-old male from Mecca was reported as a secondary, asymptomatic household contact. These are the only two cases that the KSA MOH has reported in Mecca since MAY 2015; AFHSB is currently classifying these two cases as a suspected household cluster, and it has not been included in the above cluster count.

RELEVANT STUDIES: On 4 MAR, CDC published a [study](#) that tested archived serum (from 2013-2014) from livestock handlers in Kenya for MERS-CoV antibodies to search for autochthonous MERS-CoV infections in humans outside of the Arabian Peninsula. The study found two (out of 1,122 samples) tested positive, providing evidence of previously unrecorded human MERS-CoV infections in Kenya.

(+xx) represents the change in number from the previous AFHSB Summary of 14 DEC 2016.

All information has been verified unless noted otherwise.

For questions or comments, please contact: dha.ncr.health-surv.list.afhs-ib-alert-response@mail.mil

APPROVED FOR PUBLIC RELEASE



DEPARTMENT OF DEFENSE (AFHSB)

Global MERS-CoV Surveillance Summary #99

28 DEC 2016



INTERAGENCY/GLOBAL ACTIONS: FAO reported in its latest MERS-CoV situation update that between 5 and 9 DEC, as a component of ongoing surveillance of camels in Kenya, it had implemented profiling of livestock markets as well as mapping of trade and migration routes in Isiolo County (central Kenya) and Marsabit Counties (northern Kenya) in order to identify potential hotspots for MERS-CoV along camel value chains.

WHO released its latest [summary and global risk assessment](#) of MERS-CoV on 5 DEC. The report acknowledged improvements in multi-sectoral investigations of community-acquired cases, including the testing of dromedary camels/herds in the vicinity and follow-up of human contacts of laboratory confirmed cases. The assessment was critical, however, of the continued occurrence of nosocomial outbreaks in the Arabian Peninsula, calling the situation “deeply concerning” and attributing these outbreaks to “low awareness and [a lack of] early suspicion of MERS-CoV infections in many countries,” which can delay the triage or isolation of suspected cases, and to poor compliance with basic infection, prevention, and control (IPC) measures in healthcare settings. As of 5 DEC, investigations into transmission within healthcare facilities are ongoing in KSA, Jordan, and ROK; secondary cases linked to these outbreaks have reported exposures ranging from “direct contact” to “no clear contact” with confirmed MERS-CoV patients. While the epidemiologic patterns of MERS-CoV have remained the same since WHO’s last assessment, WHO observed that “hospital outbreaks in the Middle East are occurring more frequently, and, often, though not always, are small in size and can affect several hospitals.” Future research priorities laid out by WHO included enhanced understanding of the type of exposures that result in human-to-human transmission within healthcare settings, with specific mention of “the potential role of asymptomatic PCR-positive health care workers, and the possible role of environmental contamination” in human-to-human transmission.

WHO convened the Tenth International Health Regulations (IHR) Emergency Committee on 2 SEP 2015 and concluded the conditions for a Public Health Emergency of International Concern (PHEIC) had not yet been met.

DIAGNOSTICS/MEDICAL COUNTERMEASURES: On 6 DEC, Inovio Pharmaceuticals (U.S.) and GeneOne Life Science (ROK) announced additional funding had been awarded by the International Vaccine Institute (IVI) (ROK) to accelerate the progress of a DNA-based vaccine for MERS-CoV (GLS-5300), currently in Phase I clinical trials at the Walter Reed Army Institute of Research (WRAIR) in the U.S. The funding was provided as part of a \$34 million pledge made by IVI last year to support the development of an emergency use MERS-CoV vaccine for international use; IVI and GeneOne plan to jointly conduct a clinical trial of GLS-5300 in ROK.

A research group from the Jenner Institute at the University of Oxford (UK) recently announced it had been awarded a grant from the UK Medical Research Council (MRC) to conduct a Phase I clinical trial of a newly developed MERS-CoV vaccine candidate in the UK, followed by a further trial in KSA. The vaccine is intended for dual use in humans and livestock. The Jenner Institute is currently working with collaborators in Morocco and KSA to undertake vaccine studies in camels.

RELEVANT STUDIES: On 4 MAR, CDC published a [study](#) that tested archived serum (from 2013-2014) from livestock handlers in Kenya for MERS-CoV antibodies to search for autochthonous MERS-CoV infections in humans outside of the Arabian Peninsula. The study found two (out of 1,122 samples) tested positive, providing evidence of previously unrecorded human MERS-CoV infections in Kenya.

(+xx) represents the change in number from the previous AFHSB Summary of 14 DEC 2016.

All information has been verified unless noted otherwise.

For questions or comments, please contact: dha.ncr.health-surv.list.afhs-ib-alert-response@mail.mil

APPROVED FOR PUBLIC RELEASE



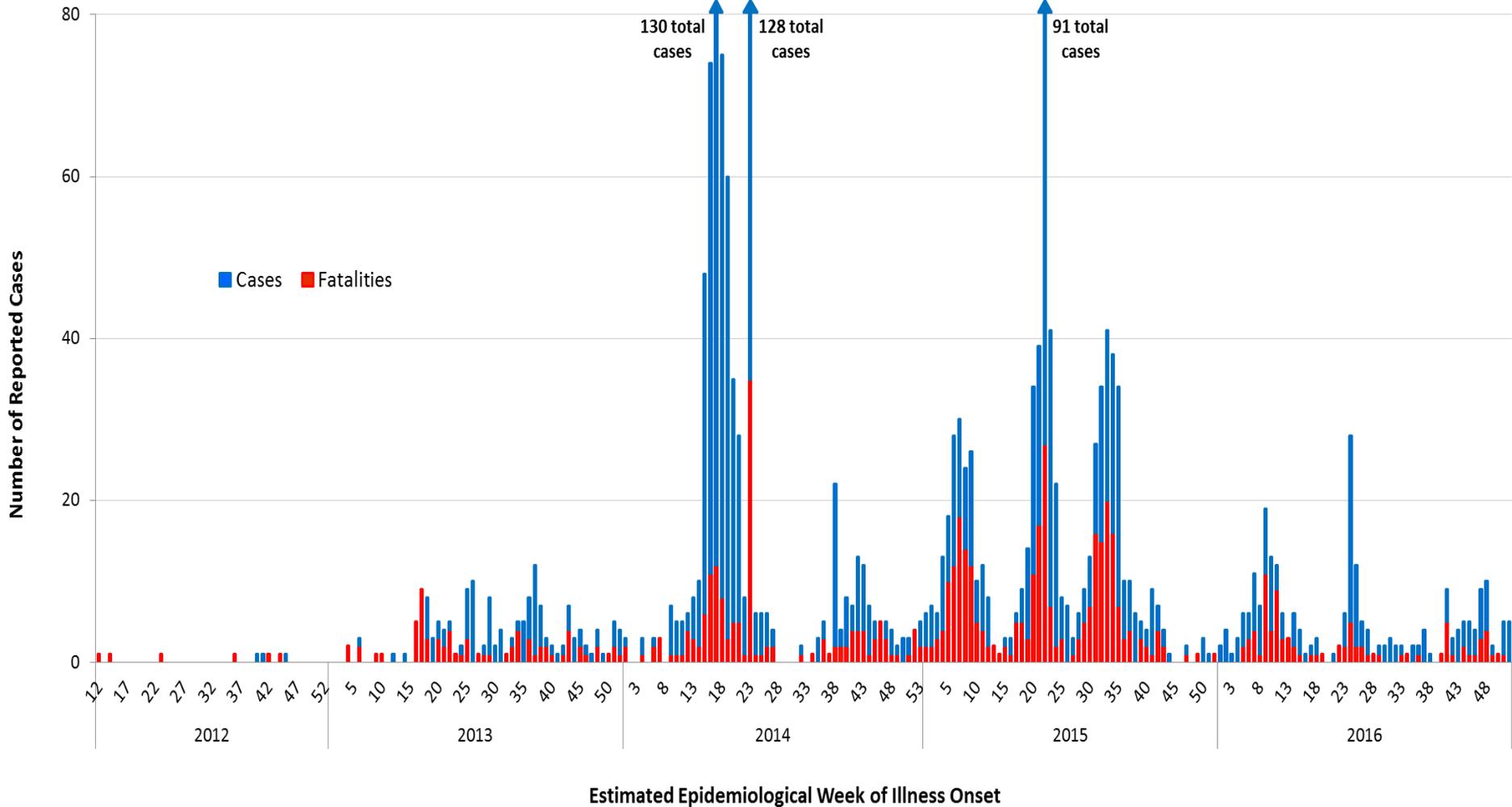
DEPARTMENT OF DEFENSE (AFHSB)

Global MERS-CoV Surveillance Summary #99

28 DEC 2016



Global MERS-CoV Epidemiological Curve by Illness Onset



(+xx) represents the change in number from the previous AFHSB Summary of 14 DEC 2016.

All information has been verified unless noted otherwise.

For questions or comments, please contact: dha.ncr.health-surv.list.afhs-ib-alert-response@mail.mil

APPROVED FOR PUBLIC RELEASE



DEPARTMENT OF DEFENSE (AFHSB)

Global MERS-CoV Surveillance Summary #99

28 DEC 2016



MERS-CoV Diagnostics and Medical Countermeasures at DoD Laboratories



RETURN TO TOP

For questions or comments, please contact: dha.ncr.health-surv.list.afhs-ib-alert-response@mail.mil

APPROVED FOR PUBLIC RELEASE



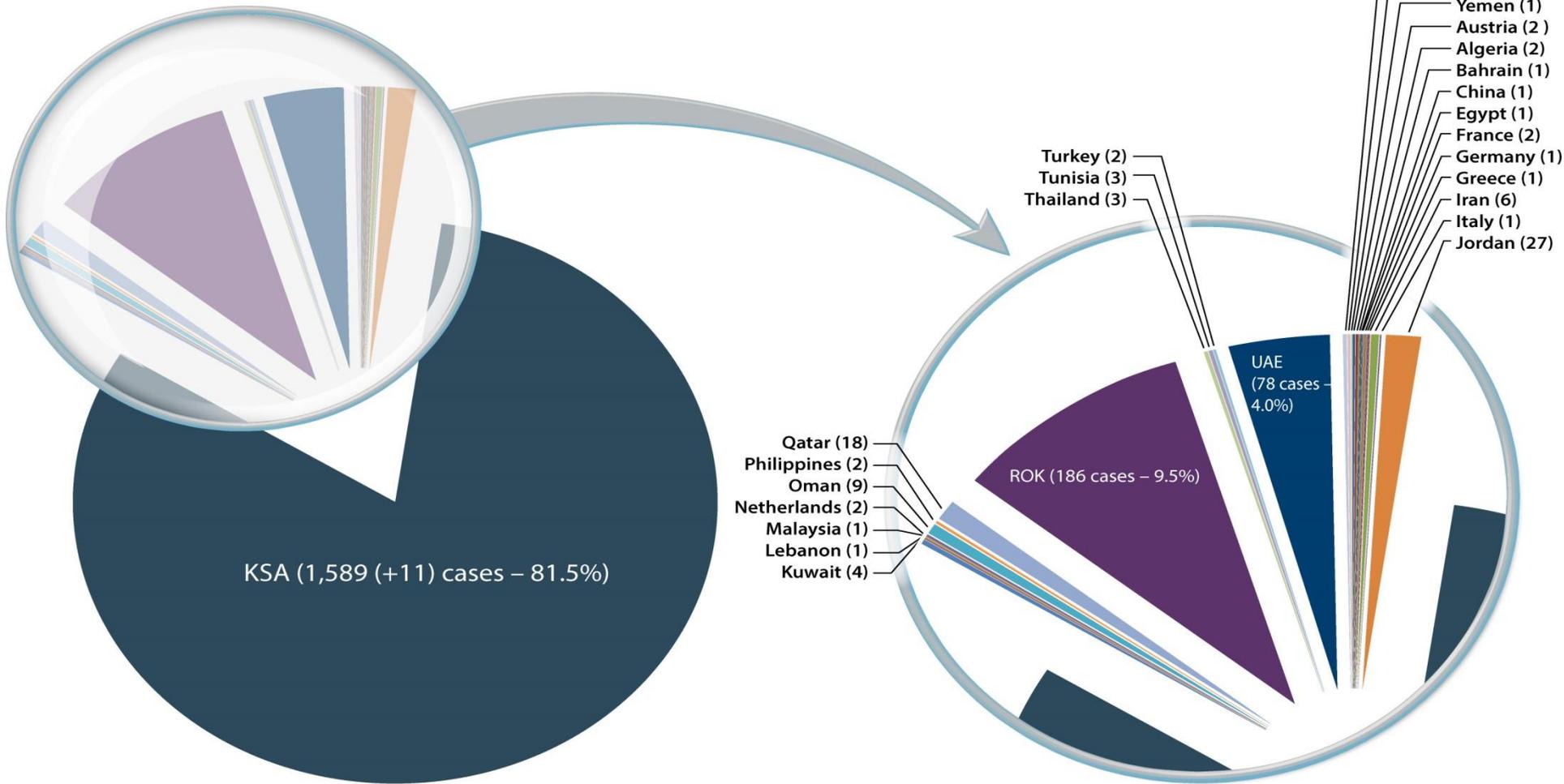
DEPARTMENT OF DEFENSE (AFHSB)

Global MERS-CoV Surveillance Summary #99

28 DEC 2016



Global Distribution of Reported MERS-CoV Cases* (SEP 2012-DEC 2016)

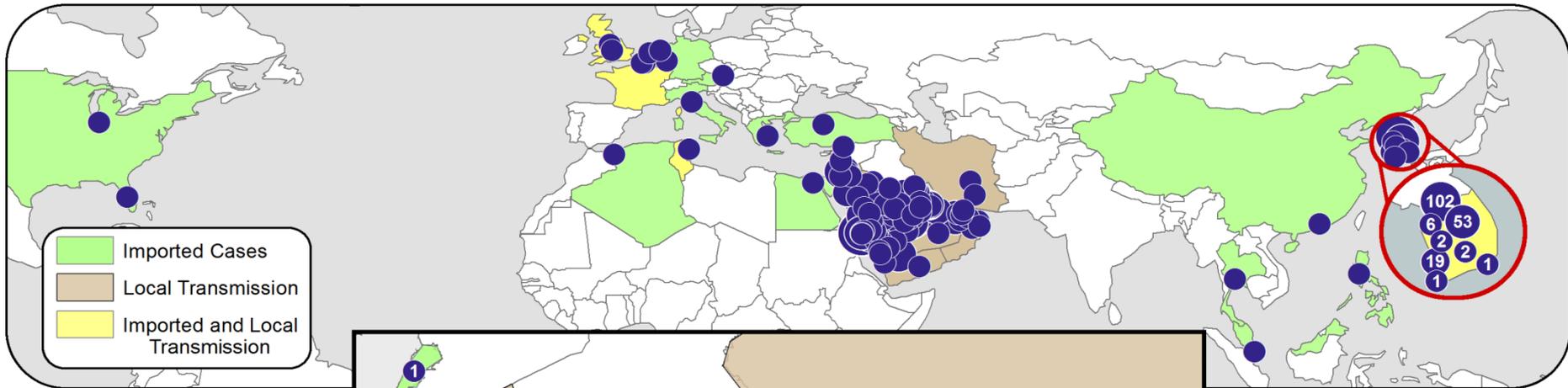


*Data includes confirmed, suspect and probable cases reported by WHO, CDC, and various country MOHs

RETURN TO TOP

For questions or comments, please contact: dha.ncr.health-surv.list.afhs-ib-alert-response@mail.mil

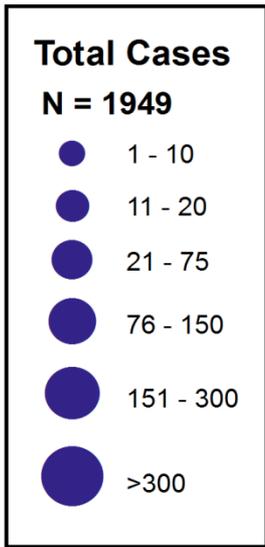
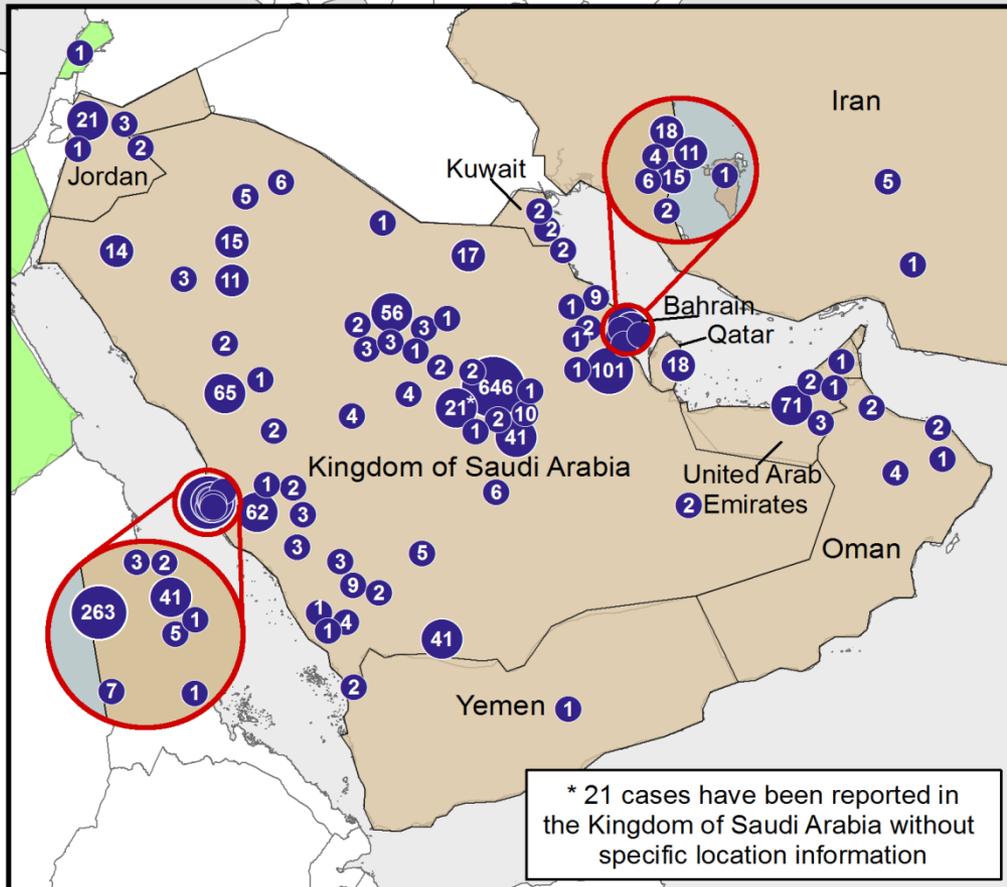
APPROVED FOR PUBLIC RELEASE



Geographic Distribution of MERS-CoV Cases
1 APR 2012 - 28 DEC 2016



APPROVED FOR PUBLIC RELEASE



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

RETURN TO TOP

For questions or comments, please contact: dha.ncr.health-surv.list.afhs-ib-alert-response@mail.mil

APPROVED FOR PUBLIC RELEASE