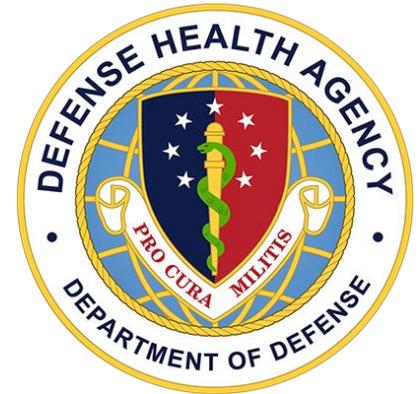


Department of Defense
Armed Forces Health Surveillance Branch
Global MERS-CoV Surveillance Summary
(30 NOV 2016)



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DEPARTMENT OF DEFENSE (AFHSB)

Global MERS-CoV Surveillance Summary #97

30 NOV 2016 (next Summary 14 DEC)



CASE REPORT: As of 30 NOV 2016, 1,921 (+10) cases of Middle East respiratory syndrome coronavirus (MERS-CoV) have been reported, including at least 590 (+1) deaths (CDC reports at least 675 (+3) deaths as of 30 NOV) in the Kingdom of Saudi Arabia (KSA) (+12), Jordan, Qatar, United Arab Emirates (UAE), United Kingdom (UK), France, Germany, Tunisia, Italy, Oman (+1), Kuwait (-3), Yemen, Malaysia, Greece, Philippines, Egypt, Lebanon, Netherlands, Iran, Algeria, Austria, Turkey, Republic of Korea (ROK), China, Thailand, Bahrain, and the U.S. All but one of 12 cases reported out of KSA over the past two weeks have been classified as primary and reported from ten different cities in KSA: Hafar Al-Batin (2), Aflaj (1), Alzulfi (1), Arar (1), Abqaiq (1), Najran (1), Riyadh (2), Taif (1), Rijal Alma (1), and Yanbu (1). On 29 NOV, Omani media reported the confirmation by a Ministry of Health (MOH) official of a new case of MERS-CoV in Muscat in a 67-year-old Omani citizen in stable condition. Three suspect cases of MERS-CoV that were reported by local media on 30 SEP in a Kuwaiti family traveling in Thailand have been removed from AFHSB's case count, as neither officials from Kuwait nor Thailand MOHs have since issued confirmation. 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.

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 1 NOV 2016. The KSA Ministry of Health (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 595 (+3) cases in females to date. CDC reports 307 of the total cases have been identified as healthcare workers (HCWs).

Limited human-to-human transmission has been identified in at least 54 spatial clusters as of 30 NOV, predominately involving close contacts. The most recent possible cluster (not included in the above count) involves two people from Riyadh, KSA living in the same household. AFHSB believes the index case of this cluster is a primary case who was first reported by the KSA MOH on 29 NOV (exposure currently under investigation), in critical condition. The second case was reported on 28 NOV as a secondary household contact of a confirmed case by the KSA MOH.

INTERAGENCY/GLOBAL ACTIONS: On 16 NOV, Hong Kong's Centre for Health Protection announced the completion of a disease simulation exercise, which tested the government's preparedness for a possible MERS-CoV detection. The simulation involved a table-top and "ground-movement" exercise for a scenario with a MERS-CoV case traveling from the Mainland to Hong Kong via train.

In its 30 NOV [situation update](#) on MERS-CoV, FAO reported it is continuing to conduct cross-sectional surveillance of dromedary camels and other livestock species in Kenya, Ethiopia, and Egypt.

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.

(+xx) represents the change in number from the previous AFHSB Summary of 16 NOV 2016.

All information has been verified unless noted otherwise.

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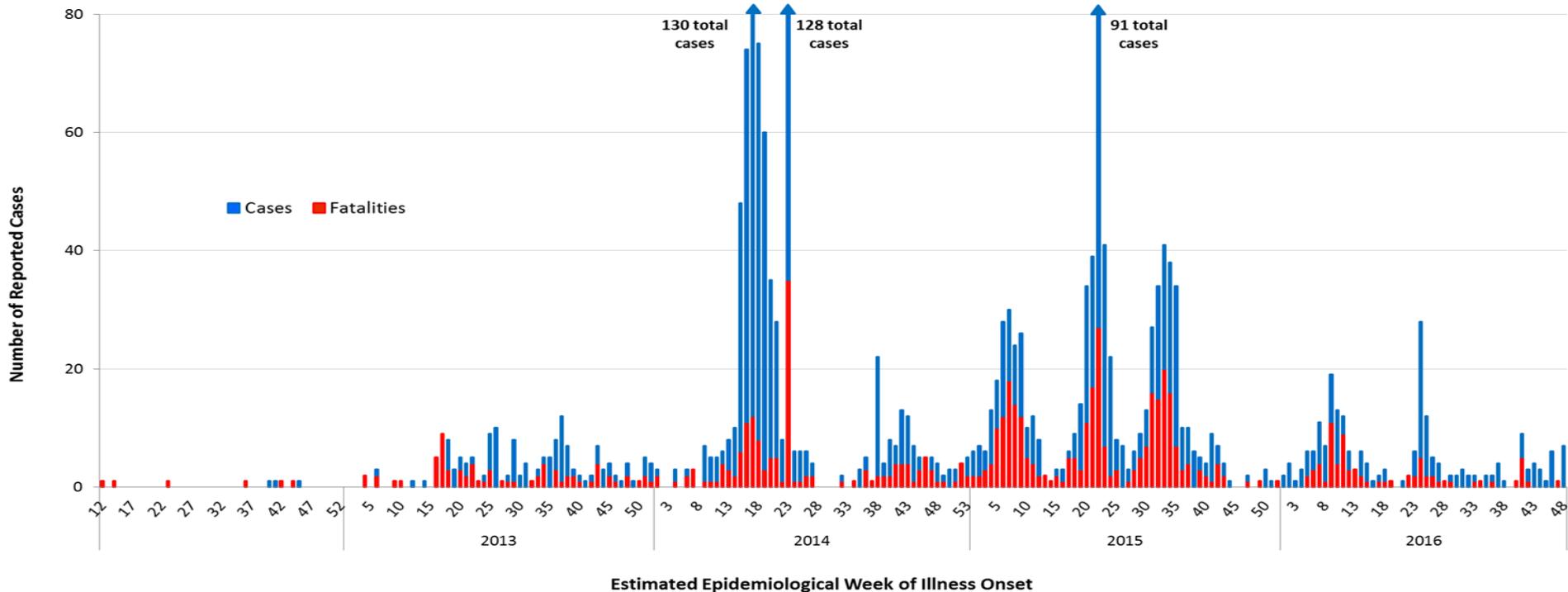
30 NOV 2016



RELEVANT STUDIES: A study recently published in the Journal of Virology describes a safe, efficient, dual-use vaccine for humans and animals against MERS-CoV and rabies virus. 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.

DIAGNOSTICS/MEDICAL COUNTERMEASURES: A recent study in Nature describes a way to improve the effectiveness of the current MERS-CoV vaccine by minimizing the generation of ineffective antibodies. A researcher at the University of Toronto demonstrated that it is possible to engineer synthetic ubiquitins capable of eradicating MERS-CoV and Crimean-Congo Hemorrhagic Fever (CCHF) in human cell cultures. A new start-up company, Ubiquitech, was recently launched to further this research to develop anti-viral agents for MERS-CoV and CCHF.

Global MERS-CoV Epidemiological Curve by Illness Onset



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MERS-CoV Diagnostics and Medical Countermeasures at DoD Laboratories





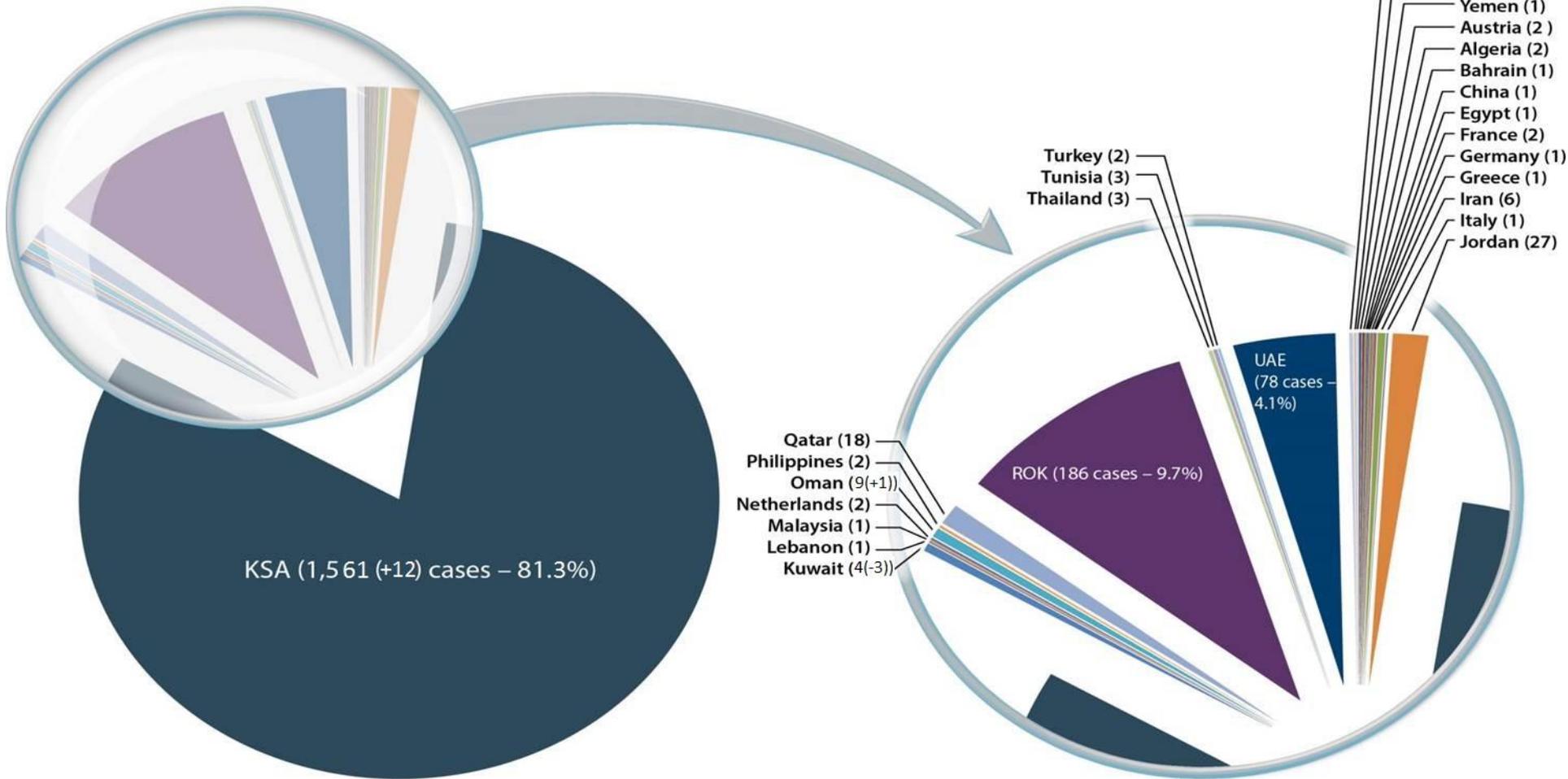
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Global Distribution of Reported MERS-CoV Cases* (SEP 2012–NOV 2016)



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

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