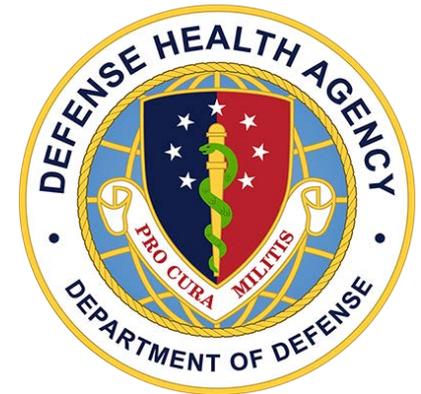


Department of Defense
Armed Forces Health Surveillance Branch
Global MERS-CoV Surveillance Summary
(27 JUL 2016)



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DEPARTMENT OF DEFENSE (AFHSB)

Global MERS-CoV Surveillance Summary #88

27 JUL 2016 (next Summary 10 AUG)



CASE REPORT: As of 27 JUL 2016, 1,866 (+3) cases of Middle East respiratory syndrome coronavirus (MERS-CoV) have been reported, including at least 578 (+2) deaths (CDC reports at least 663 deaths as of 22 JUL) in the Kingdom of Saudi Arabia (KSA) (+3), 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. 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 human-to-human transmission has been identified in at least 51 spatial clusters predominately involving close contacts. Limited camel-to-human transmission of MERS-CoV has been proven to occur. The most recent known date of symptom onset is 8 JUL 2016. A recent article in *Infectious Disease News* described the ongoing difficulty in explaining primary cases in which the patient has no known exposure to a camel, healthcare setting, or other MERS-CoV infected individual; this issue is particularly relevant as at least 13 primary cases have been reported in KSA since the nosocomial cluster in Riyadh ended in late JUN. Of the 558 cases reported between 1 JAN 2015 and 5 JUN 2016, the authors noted only 11.5 percent were reported as having exposure to a camel. 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 587 cases in females to date. CDC reports 304 of the total cases have been identified as healthcare workers (HCWs). A joint study by the Health Authority of Abu Dhabi, UAE, and the U.S. CDC retrospectively analyzed medical data on MERS-CoV patients in UAE from JAN 2013 to MAY 2014, and found that mild and asymptomatic MERS-CoV cases made up the majority (35% and 35% respectively) of UAE's cases in this time period (65 cases), and that many of these mild/asymptomatic individuals were shown to shed the virus for longer than two weeks. A study published by CDC found that antibodies to MERS-CoV can persist for up to 34 months after infection; furthermore, observed differences in immunologic responses to MERS-CoV exposure and infection suggest a potential role for genetic factors in the immune response. The latest KSA MOH Weekly Monitor publication described the recent nosocomial cluster in Riyadh and suggested that this was a “super-spreader” event, triggered by “misdiagnosis or late diagnosis due to co-infection with another pathogen or immunosuppression.”

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. On 22 JUN, FAO reported that, to date, field surveys have identified MERS-CoV seropositive livestock in the following countries: Spain (the Canary Islands), Nigeria, Tunisia, Ethiopia, Somalia, Kenya, Sudan, Egypt, Jordan, KSA, Oman, and UAE. A recent study in *Tropical Animal Health and Production* found that dromedary camels from KSA show significantly higher MERS-CoV carrier rates than dromedaries imported from Africa. Additionally, the two MERS-CoV lineages identified in Nigerian camels were found to be genetically distinct from those strains currently circulating in the Arabian Peninsula. These findings support the theory that camel imports from Africa are not contributing significantly to the circulation of MERS-CoV in camels in the Arabian Peninsula. A recent study in *PNAS* described a statistical framework for analysis of MERS-CoV transmission patterns; its application to cases occurring between JAN 2013 and JUL 2014 in KSA revealed a strong capacity to accurately reproduce MERS-CoV epidemic dynamics, with the model successfully predicting the distribution of cases and the number and size of clusters.

DIAGNOSTICS/MEDICAL COUNTERMEASURES: Clinical diagnostic testing is available at BAACH, NAMRU-3, LRMC, MAMC, NHRC, USAFSAM, SAMMC, TAMC, WBAMC, WRNMMC, and NIDDL (NMRC). Surveillance testing capability is available at NHRC, AFRIMS, NAMRU-2, NAMRU-3, NAMRU-6, USAMRU-K, and Camp Arifjan. All 50 state health laboratories and the NYC Department of Health and Mental Hygiene (DOHMH) were offered clinical testing kits. On 23 FEB 2016, AFHSB updated MERS-CoV testing guidelines for DoD which are aimed at capturing mild cases that may present in healthier populations such as DoD personnel. A recent study by the CDC exploring the feasibility of using convalescent plasma immunotherapy to treat MERS-CoV found that a small number of potential plasma donors (12 of 443) had sufficient antibody titers. The authors noted the low prevalence of seroreactivity could reflect a short-term antibody response to MERS-CoV and raised concerns about whether naturally-occurring infections and potential vaccines would offer long-lasting immunity.

Text updated from the previous report will be printed in red; items in (+xx) represent the change in number from the previous Summary (13 JUL 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

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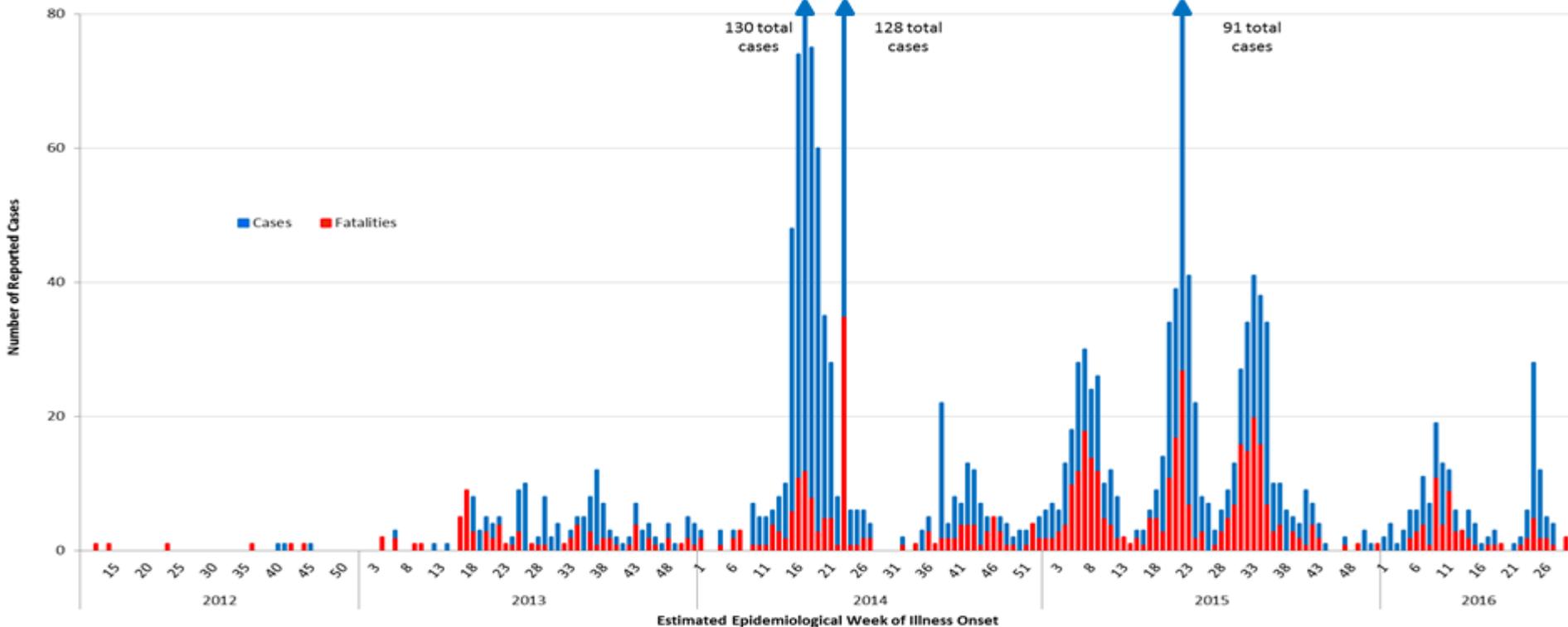
27 JUL 2016



INTERAGENCY/GLOBAL ACTIONS: 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. However, the Committee also emphasized that they still have concerns as transmission from camels to humans continues in some countries, instances of human-to-human transmission continue to occur in health care settings, and asymptomatic cases are not always being reported as required. On 13 JUL, CDC released updated [guidance](#) for the monitoring and movement of potential MERS-CoV cases, including a table with specific guidance for public health actions based on exposure category and clinical criteria.

According to FAO's latest [MERS-CoV situation update](#), surveillance in quarantined animals and in live animal markets in Aswan, Egypt will take place from 22 to 27 JUL. The last round of sampling for longitudinal surveillance in the cities of Luxor and Matrouh ended on 26 JUN; the fifth round of cross-sectional surveillance in three slaughterhouses started the week of 11 JUL and will be completed by the end of JUL. Successive sampling will continue in Matrouh, Egypt until SEP 2016.

Global MERS-CoV Epidemiological Curve by Illness Onset



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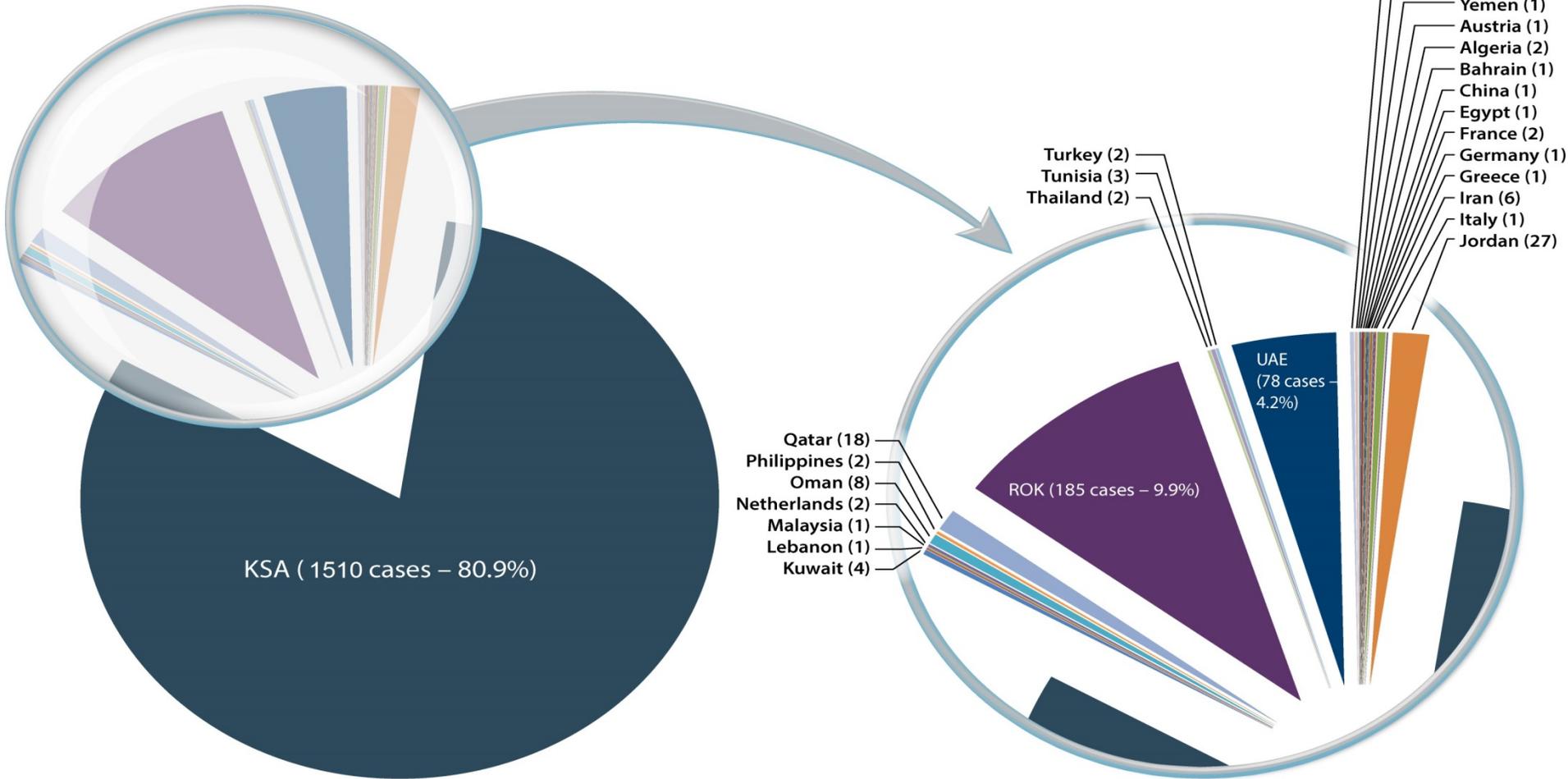
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Global MERS-CoV Surveillance Summary #88

27 JUL 2016



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

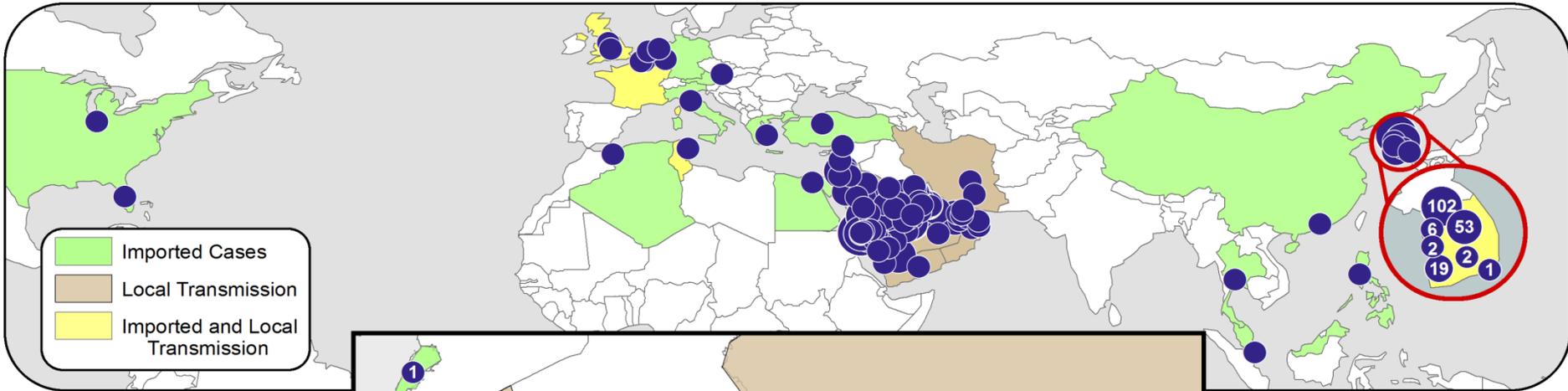


*Data includes confirmed, suspect and probable cases reported by WHO, CDC, and various country MOHs

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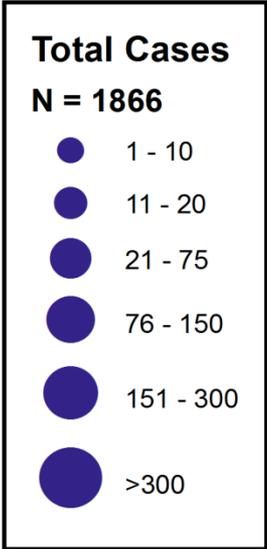
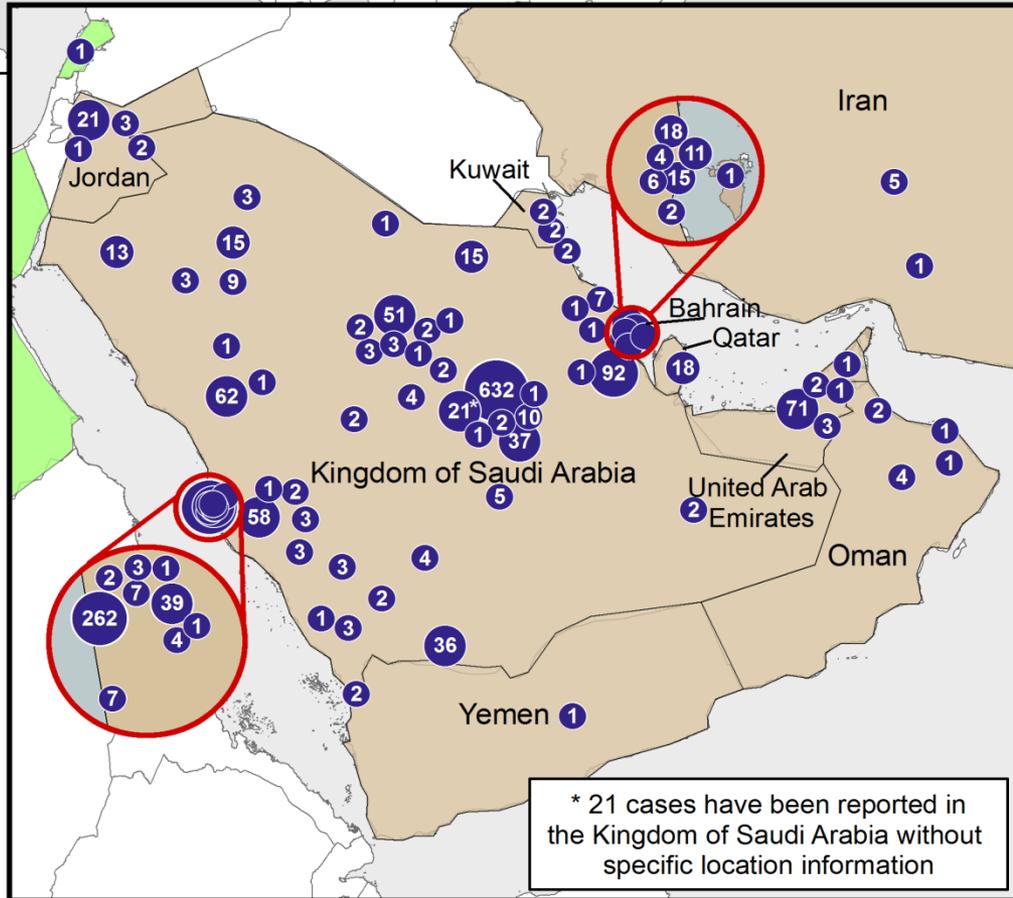
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Geographic Distribution of MERS-CoV Cases
01 APR 2012 - 27 JUL 2016



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

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