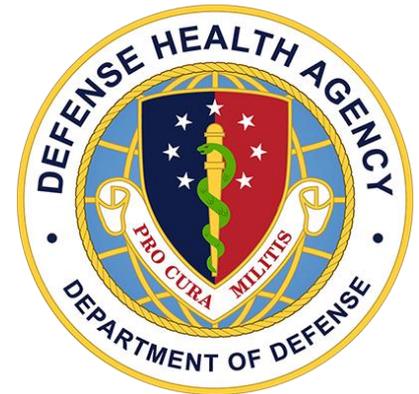


Department of Defense
Armed Forces Health Surveillance Branch
Global MERS-CoV Surveillance Summary
(24 FEB 2016)



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DEPARTMENT OF DEFENSE (AFHSB)

Global MERS-CoV Surveillance Summary #77

24 FEB 2016 (next Summary 9 MAR)



CASE REPORT: As of 24 FEB 2016, 1,728 (+10) cases of Middle East respiratory syndrome coronavirus (MERS-CoV) have been reported, including 643 deaths, in the Kingdom of Saudi Arabia (KSA) (+9), Jordan, Qatar (+1), 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, and the U.S. Of the most recently reported cases, one was identified by the Qatar Ministry of Public Health (QMOPH) in Doha, in a male with recent travel to KSA. The other nine new cases were reported in KSA, one of which occurred in a Sudanese national – it is unusual for the KSA MOH to release this level of detail. On 24 FEB, the Hong Kong Center for Health Protection (HK CHP) reported a suspect case of MERS-CoV; however this case's preliminary test results were negative and it is therefore not included in our above case count.

DIAGNOSTICS: Clinical diagnostic testing is available at BAACH, NAMRU-3, LPMC, MAMC, NHRC, USAFSAM, SAMMC, TAMC, WBAMC, WRNMMC, and NIDDL (NMRC). Tripler AMC (TAMC) completed validation of clinical diagnostic testing capability on 24 NOV 2015. 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 DOHMH were offered clinical testing kits. On 23 FEB 2016, AFHSB updated [MERS-CoV testing guidelines for DoD](#), which include lab contact information, and are aimed at capturing mild cases that may present in healthier populations such as DoD personnel. On 8 DEC 2015, CDC updated its [Interim Patient Under Investigation \(PUI\) Guidance and Case Definitions](#) for MERS-CoV. On 13 NOV 2015, GeneOne Life Science, Inovio Pharmaceuticals, and Walter Reed Army Institute of Research (WRAIR) [announced](#) a partnership to create a MERS-CoV vaccine. On 16 FEB 2016, [WRAIR began a phase 1 clinical trial](#) for the vaccine candidate (GLS-5300) developed by Inovio Pharmaceuticals and GeneOne Life Science. On 17 FEB, SAB Biotherapeutics announced a new human antibody therapeutic for MERS-CoV, which showed promising results in a [study](#) by NMRC and the University of Maryland School of Medicine.

INTERAGENCY/GLOBAL ACTIONS: On 11-14 JAN 2016, WHO led a third joint mission to KSA to review the MERS-CoV situation in the country. The [WHO recommendations](#) from this visit include: progressing from a passive to an active sentinel surveillance system, moving from planning stages to implementing stages for camel surveillance, not just collaborating between health and agriculture industries but conducting case investigations jointly, and more broadly sharing lessons learned from nosocomial outbreaks outside of insular hospital systems. 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) have not yet been met. However, the Committee also emphasized that they have a heightened sense of concern as transmission from camels to humans continues in some countries and instances of human-to-human transmission continue to occur in health care settings. The Committee further noted that its advice has not been completely followed as asymptomatic cases that have tested positive for the virus are not always being reported as required. CDC maintains their [Travel Alert Level 2](#) for MERS-CoV in the Arabian Peninsula. On 18 FEB, the Samsung Foundation announced it will donate \$33 million to fund MERS-CoV research.

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 36 (+1) spatial clusters predominately involving close contacts. Limited camel-to-human transmission of MERS-CoV has been proven to occur. A recent [study in Nature](#) showed that MERS-CoV is able to replicate efficiently in a bat host, and that bats became infected with virus in the absence of clinical signs. This evidence highlights the host-range plasticity of the virus and supports the hypothesis that bats are the likely ancestral reservoir for MERS-CoV. The most recent known date of symptom onset is 13 FEB 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 495 (+1) cases in females to date. CDC reports 289 (+1) of the total cases have been identified as healthcare workers (HCWs). Of these, 180 were from KSA, 31 from UAE, 7 from Jordan, 2 from Iran, 1 from Tunisia, and 29 from ROK. On 19 FEB, CDC published an analysis of the nosocomial outbreak that occurred at King Abdulaziz Medical City in Riyadh, KSA from JUN to SEP 2015. CDC concluded the outbreak was a result of “emergency department overcrowding, uncontrolled patient movement, and high visitor traffic” and that multiple measures were required to interrupt transmission including an almost complete shutdown of the hospital.

Text updated from the previous report will be printed in red; items in (+xx) represent the change in number from the previous Summary (11 FEB 2016).

All information has been verified unless noted otherwise. Sources include CDC, WHO, Nature, HK CHP, QMOPH, Science Translational Medicine, Business Wire, EurekAlert, and the KSA MOH.

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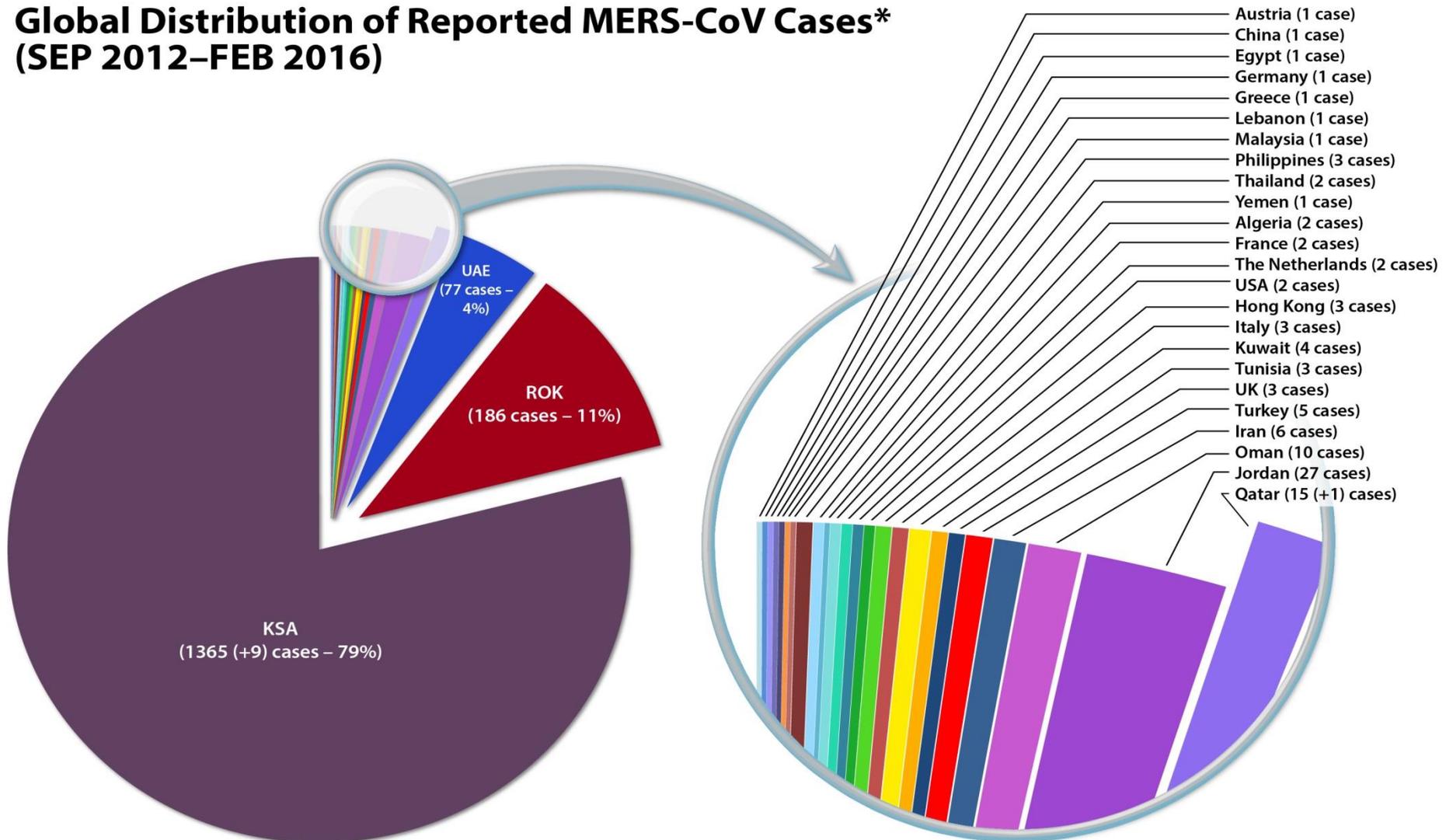
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Global MERS-CoV Surveillance Summary #77

24 FEB 2016



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



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

[RETURN TO TOP](#)

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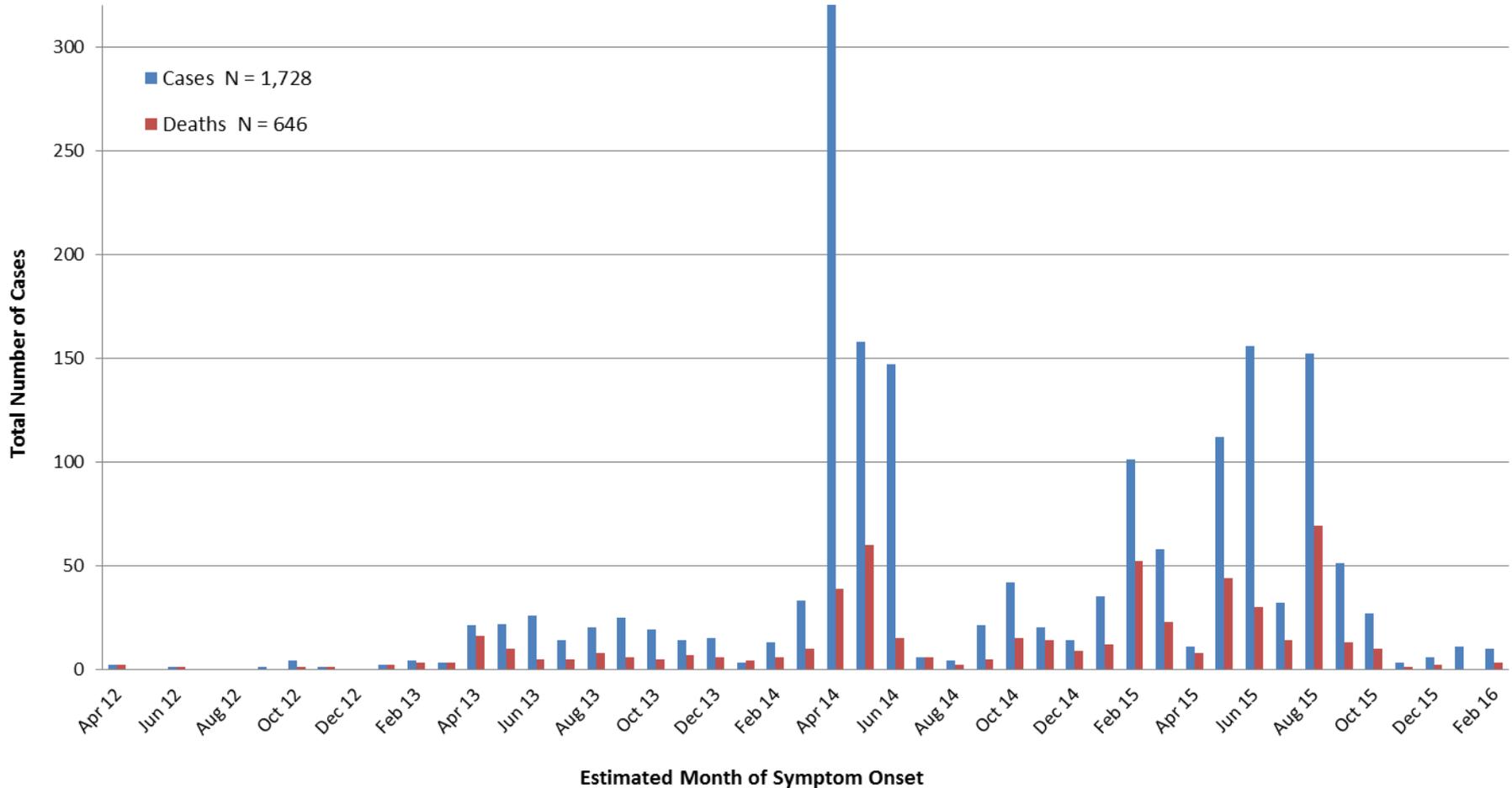
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Global MERS-CoV Surveillance Summary #77

24 FEB 2016



Global MERS-CoV Epidemiological Curve - 24 FEB 2016





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Global MERS-CoV Surveillance Summary #77

24 FEB 2016



GLOBAL MERS-CoV NUMBERS AT A GLANCE

	Total in 2012	Total in 2013	Total in 2014	Total in 2015	Total in 2016	Cumulative Total (2012-2016)
Cases	9	171	777	750 cases	21 (+10) cases	1,728 (+10) cases
Deaths*	6 deaths	72 deaths	277 deaths	288 deaths	3 (+3) deaths	at least 646 (+3) deaths
Case-Fatality Proportion	66%	42%	36%	39%	14%	37%
Mean Age	45 years	51 years	49 years	55 years	57 years	52 years
Gender Breakdown*	1 female	at least 58 females	at least 175 females	259 females	2 (+1) female	at least 495 (+1) females
# of Healthcare Workers (HCWs) reported*	at least 2 HCWs	at least 31 HCWs	at least 87 HCWs	109 HCWs	1 (+1) HCW	at least 289 (+1) HCWs

*Disclaimer: Data reported on MERS-CoV cases are limited and adapted from multiple sources including various Ministries of Health, CDC, and WHO. Consequently, yearly information may not equate to the cumulative totals provided by WHO and CDC.

Legend: Text updated from the previous report will be printed in red; items in (+xx) represent the change in number from the previous Summary (11 FEB 2016).

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Global MERS-CoV Surveillance Summary #77

24 FEB 2016



MERS-CoV Web Sites

- [WHO](#)
- [WHO Lab Testing Guidance](#)
- [WHO Travel Advice for Pilgrimages](#)
- [WHO 10th IHR Meeting Press Release](#)
- [CDC](#)
- [CDC Travel Advisory for the Arabian Peninsula](#)
- [CDC Travel Advisory for ROK](#)
- [CDC MMWR](#)
- [CDC Interim PUI Guidance](#)
- [ECDC](#)
- [AFHSB Detecting and Reporting Guidelines for MERS-CoV](#)
- [ROK MOHW](#)
- [U.S. Embassy in ROK, Update](#)

Information and News

- [Exportations of Symptomatic Cases of MERS-CoV Infection to Countries outside the Middle East](#) (CDC EID, APR 2016)
- [HK: Suspected MERS case reported \(Hong Kong CHP, 24 FEB\)](#)
- [Replication and shedding of MERS-CoV in Jamaican fruit bats \(*Artibeus jamaicensis*\)](#) (*Nature*, 22 FEB)
- [New MERS-CoV Case has been reported \(Qatar MOPH, 22 FEB\)](#)
- [Notes from the Field: Nosocomial Outbreak of Middle East Respiratory Syndrome in a Large Tertiary Care Hospital Riyadh, Saudi Arabia, 2015](#) (CDC MMWR, 19 FEB)
- [Samsung to donate \\$33m to MERS research](#) (ZDNet, 18 FEB)
- [Human polyclonal immunoglobulin G from transchromosomal bovines inhibits MERS-CoV in vivo](#) (*Science Translational Medicine*, 17 FEB)
- [SAB Biotherapeutics Produces New Human Antibody Treatment for MERS-CoV](#) (*Business Wire*, 17 FEB)
- [First-in-man trial of MERS vaccine begins at Walter Reed Army Institute of Research](#) (*EurekAlert*, 16 FEB)
- [The epidemiology of Middle East Respiratory Syndrome \(MERS\) coronavirus in the Kingdom of Saudi Arabia, 2012-2015](#) (*International Journal of Infectious Disease*, 10 FEB)
- [Latest WHO DON on MERS-CoV in the Arabian Peninsula](#) (WHO, 2 FEB)
- [Camel market closed to prevent possible coronavirus outbreak](#) (Saudi Gazette, 28 JAN)
- [OIE Notification of MERS-CoV in Camels in Jeddah](#) (OIE, 28 JAN)
- [WHO's high-level mission to Saudi Arabia on Middle East respiratory syndrome coronavirus \(MERS-CoV\) 11-14 January 2016](#) (WHO, JAN 2016)
- [Surveillance for Coronaviruses in Bats, Lebanon and Egypt, 2013-2015](#) (CDC EID, JAN 2016)
- [Multifacility Outbreak of Middle East Respiratory Syndrome in Taif, Saudi Arabia](#) (CDC EID, JAN 2016)
- [Middle East respiratory syndrome coronavirus \(MERS-CoV\) in dromedary camels in Nigeria, 2015](#) (*Eurosurveillance*, 10 DEC 2015)
- [Researchers Create a Mouse that Can Get MERS](#) (*MD Magazine*, 8 OCT 2015)
- [Presence of Middle East respiratory syndrome coronavirus antibodies in Saudi Arabia: a nationwide, cross-sectional, serological study](#) (*Lancet*, 5 MAY 2015)
- [WHO DON on first novel coronavirus infection](#) (WHO, 23 SEP 2012)

RETURN TO TOP

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