How great is the risk of Middle East respiratory syndrome coronavirus to the global population?


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“...The potential for respiratory tract infections during mass gatherings is related to the presence of a large number of people from different parts of the world in congested and crowded areas...”

Since the initial discovery of the Middle East respiratory syndrome coronavirus (MERS-CoV), there has been global concern about its threat to global health security and its pandemic potential. The virus was initially recovered from a patient from the Kingdom of Saudi Arabia (KSA) in September 2012 [1,2]. The virus was originally designated human coronavirus-Erasmus Medical Center [2] and was later called MERS-CoV [3]. As of 30 August 2013, there were a total of 104 cases with 49 (47%) death [101]. The majority of these cases occurred in KSA, where 82 cases with 41 (50%) deaths [101]. In Saudi Arabia, there were two periods of disease activity [4]. The initial period was from June 2012 to 1 April 2013, and during that period, nine cases were reported mainly in the central and western part of the country. These cases occurred sporadically and included two family clusters. This reporting period was also significant for the lack of any transmission in health care setting. The second reporting period in Saudi Arabia was from 1 April 2013 to 14 July 2013 [4]. This period showed a cluster of 23 cases and these cases were linked to an outbreak in a health care facility in the eastern part of the country (Al-Hasa) [5]. In addition to Saudi Arabia [2–7], additional cases were reported from other countries such as Qatar [1], Jordan [8,102], the UK [9,10], Germany [11], France [12], Tunisia [103], UAE [13] and Italy [104]. MERS-CoV infection so far has three pattern of transmission. The first pattern is the occurrence of sporadic cases in different Middle East countries. The second pattern is nosocomial transmission within health care facilities to health care workers and other patients [4] and the third pattern is the occurrence of transmission as a family cluster [5,6,8,10,14,15].

The severity of reported cases of MERS-CoV ranges from mild disease to fulminant respiratory infection [4,5]. Less severe disease was described within family contacts and hospital clusters [5,6,15]. The clinical spectrum of MERS-CoV infections also includes asymptomatic and subclinical cases [16]. Asymptomatic and/or subclinical MERS-CoV cases are important since these cases may contribute to the transmission of MERS-CoV to close contacts within the community or the hospital setting cases [16]. In addition, the presence of these mild cases would inversely affect the reported high case fatality rates.

The potential for respiratory tract infections during mass gatherings is related to the presence of a large number of people from different parts of the world in congested and crowded areas especially during the annual Muslim pilgrimage (the Hajj) [17,18]. Thus, the occurrence of the first cases, MERS-CoV, a few months before the 2012 Hajj season was a concern for international communities [19]. At that time, there was no human-to-human transmission, and there
were no travel restrictions to areas where cases were reported [19]. The KSA has a unique policy to manage health risks associated with the annual pilgrimage through the preparation and annual revision of the recommendations and health requirements for the annual Umrah and Hajj.

As MERS-CoV emerged in 2012 prior to Hajj, an update to the Hajj requirements was published in Eurosurveillance [20]. The recommendations included explicit measures to reduce the risk of transmission of viral respiratory infections including MERS-CoV infection. These recommendations include the practice of proper hand hygiene, protective behaviors and cough etiquette [20]. The 2012 Hajj season which took place from 10 to 31 October 2012, was uneventful without any MERS-CoV cases being reported. During that season, four million pilgrims from 187 countries performed the annual Hajj. None should 300 pilgrims with respiratory symptoms was tested positive for MERS-CoV infections [21]. In addition, the testing of 154 French pilgrims returning from the 2012 annual Hajj showed that 83.4% had respiratory symptoms [22]. None of the pilgrims were positive for MERS-CoV by real-time PCR [22]. This year, 2013, the annual Hajj is taking place in October 1–20, and thus with the increased number of cases of MERS-CoV, there was a concern of the potential risk of the transmission of MERS-CoV. The KSA released the 2013 Hajj requirement [105]. The Saudi Ministry of Health recommends that people aged over 65 years and those with chronic diseases (e.g., heart disease, kidney disease, respiratory disease and diabetes) and pilgrims with immune deficiency (congenital and acquired), malignant and terminal illnesses, pregnant women and children aged under 12 years planning to come for Hajj and Umrah this year, to postpone the performance of the Hajj and Umrah [106]. The Saudi Ministry of Health also recommends that all pilgrims should comply with common public health recommendations to prevent the spread of respiratory infectious disease, such as hand hygiene, use of disposable tissues when coughing or sneezing, avoid direct contact with the persons who is coughing, sneezing or vomiting [105].

The second meeting of the WHO Emergency Committee convened by the Director-General under the International Health Regulations (2005) [106] was held on Wednesday, 17 July 2013. The unanimous decision of the Committee was that, with the information now available, and using a risk-assessment approach, the conditions for a Public Health Emergency of International Concern have not at presently been met [107]. Two mass gatherings events attracting over 15 million pilgrims have occurred in Saudi Arabia over the past 12 months, the annual Hajj in October 2012 [19] and the recently completed July 2013 Ramadan Umrah season. No MERS-CoV cases have been reported from these events.

These observations support the findings in a recent modeling paper published in Lancet that examined the risk of MERS-CoV on mass gathering [23,24]. Breban and colleagues estimated MERS-CoV R0 to be 0.69 compared to the R0 for pre-pandemic severe acute respiratory syndrome-coronavirus of 0.80 [23] concluding that MERS-CoV in its current status quo is unlikely to cause a pandemic [23]. Watchful surveillance and vigilance will continue despite the minimal risk of global spread.

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