



## RAPID RISK ASSESSMENT

# Severe respiratory disease associated with Middle East respiratory syndrome coronavirus (MERS-CoV)

21st update, 21 October 2015

## Main conclusions and options for response

The majority of the MERS cases continue to be reported from the Middle East.

Given the continuous occurrence of MERS cases in the Middle East and the substantial number of people travelling between the region and EU countries, sporadic importation of MERS cases to EU/EEA Member States can be expected. The last reported MERS case in Europe was in Germany in March 2015.

The most recent outbreak in Jordan is not unexpected although is of concern. The majority of the reported cases have an exposure history involving a hospital with an admitted confirmed MERS case. The role of hospitals as amplifiers of MERS-CoV infection is now well known.

The outbreak in Jordan is centred on hospitals in Amman. The importation of cases to EU/EEA Member States from Jordan is considered low.

WHO does not recommend travel restrictions in relation to MERS-CoV, but rather recommends raising awareness among travellers to and from affected countries.

EU residents travelling to Middle Eastern countries need to be made aware that MERS-CoV is currently circulating in the region, and that transmission in hospital settings is still one of the main sources of infection. EU travellers should also be reminded that the risk of infection can be reduced by taking simple infection prevention measures.

Should someone infected with MERS-CoV enter Europe, they are likely to present themselves to a healthcare facility. The risk of nosocomial spread highlights the need for awareness among healthcare workers, stringent infection control precautions, early detection through functioning testing algorithms and preparedness planning.

The risk of widespread transmission of MERS-CoV in the community after sporadic importation into the EU/EEA remains low.

Previously issued advice for travellers, including pilgrims, and healthcare workers remains valid.

## Source and date of request

ECDC internal decision, 8 October 2015.

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Erratum 22 October 2015: Page 1 and 9: 'citizens' was replaced with 'residents'. Page 9: In the section Options for response 'Traveller and Umrah pilgrims' was changed to 'Travellers and pilgrims'.

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## Public health issue

This update of ECDC's risk assessment on MERS-CoV has been triggered by an increase in MERS cases acquired through nosocomial transmission in Amman, Jordan. In this update, we assess whether this event changes the risk of international spread or increases the risk to EU residents staying in or travelling to Jordan.

## Consulted experts

Internal experts: Eeva Broberg, Niklas Danielsson, Romit Jain, Kaja Kaasik-Aaslav, Silviu Lucian Ionescu, Hanna Merk, Pasi Penttilä.

External consulted experts: Mohammad Mousa Al-Abdallat, Sultan Alqasrawi - Communicable Diseases Directorate, Jordan Ministry of Health, Amman; the World Health Organization (WHO) was consulted however the views expressed in this document do not necessarily represent the views of WHO.

## Disease background information

Since the disease was first identified in Saudi Arabia in September 2012, more than 1 600 MERS cases have been detected in over 20 countries. In Europe, eight countries have reported confirmed cases, all with direct or indirect connection with the Middle East.

The clinical presentation of MERS ranges from asymptomatic to very severe pneumonia with acute respiratory distress syndrome, septic shock and multi-organ failure resulting in death. The clinical course is more severe in immunocompromised patients and persons with underlying chronic comorbidities. There is growing evidence that the dromedary camel is a host species for the virus and that camels play an important role as a source of human infection [1].

Although it is likely that zoonotic transmission is the starting point of most clusters, human-to-human transmission is the most common mode of transmission for MERS-CoV. Human-to-human transmission occurs mostly in healthcare settings and, to a much more limited extent, within communities, mainly within households. So far, the majority of cases have been reported from hospital outbreaks in Saudi Arabia, the United Arab Emirates and South Korea. Some of these outbreaks included more than 100 cases [2-4]. Further studies are still required to better understand the risk factors for animal-to-human and human-to-human transmission.

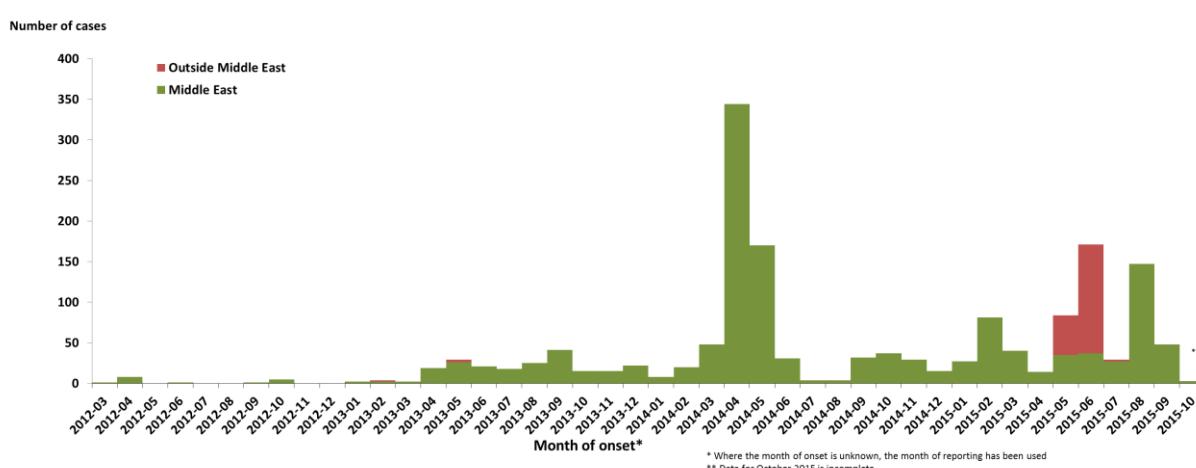
It has not yet been established to what extent unrecognised mild and asymptomatic cases contribute to the sporadic cases reported in the community where exposure to camels, hospital outbreaks or other confirmed cases in the community could not be confirmed [5].

## Event background information

### Worldwide situation

Since April 2012 and as of 13 October 2015, 1 616 cases of MERS, including 624 deaths, have been reported by health authorities worldwide (Figure 1 and 2, and Table 1).

**Figure 1. Distribution of confirmed MERS cases by month\* and probable place of infection, March 2012–13 October 2015 (n=1 616)**



## Current epidemiological situation

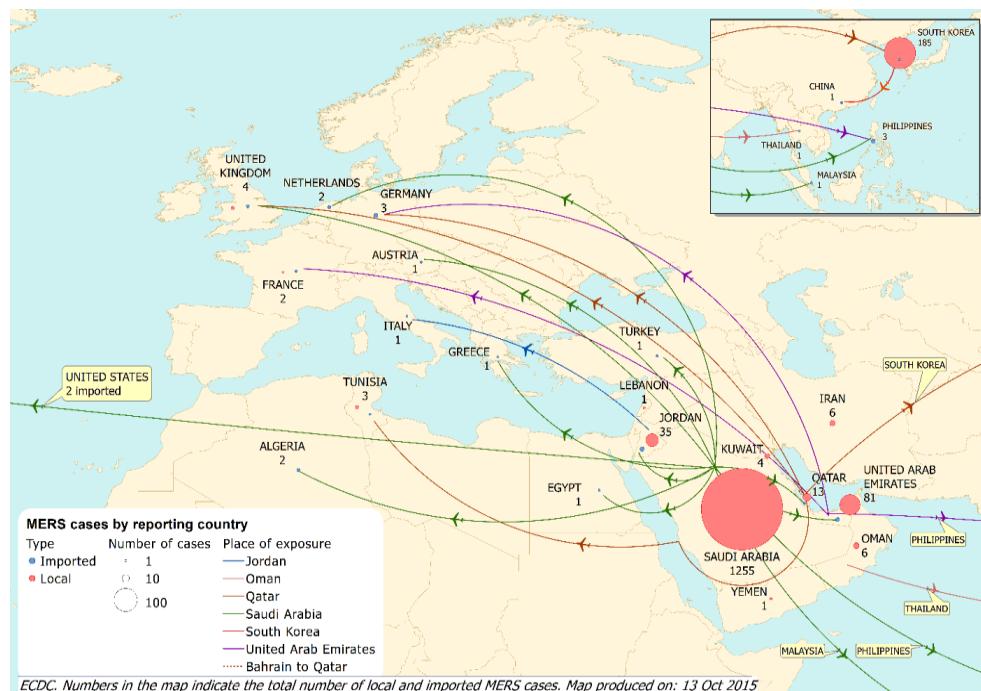
Since the previous update of the ECDC Rapid Risk Assessment on MERS-CoV of 27 August 2015 [6], and as of 13 October, Saudi Arabia has reported 90 new cases and 41 deaths, Jordan has reported 14 new cases and seven deaths and Kuwait has reported one fatal case (Table 1).

**Table 1. Confirmed MERS cases and deaths, by country of reporting, March 2012–13 October 2015**

Region	Country	Number of cases	Number of deaths
Middle East	Saudi Arabia	1 255	539
	United Arab Emirates	81	11
	Jordan	35*	14
	Qatar	13	5
	Oman	6	3
	Iran	6	2
	Kuwait	4	2
	Egypt	1	0
	Lebanon	1	0
	Yemen	1	1
Europe	United Kingdom	4	3
	Germany	3	2
	France	2	1
	Netherlands	2	0
	Austria	1	0
	Greece	1	1
	Italy	1	0
	Turkey	1	1
Africa	Tunisia	3	1
	Algeria	2	1
Asia	South Korea	185	36
	Philippines	3	0
	China	1	0
	Malaysia	1	1
	Thailand	1	0
Americas	United States of America	2	0
	<b>Global</b>	<b>1 616</b>	<b>624</b>

\* 7 cases serologically confirmed [7]

**Figure 2. Distribution of confirmed MERS cases by place of probable infection, as of 13 October 2015 (n=1 616)**



7 of the cases reported with Jordan as place of probable infection were serologically confirmed [7]

## Outbreak in Amman, Jordan

Between 26 August and 13 October, Jordan reported 16 MERS cases including seven deaths. The probable place of infection for all the cases is Amman. However, the first case reported on 26 August 2015 had recently travelled from Saudi Arabia and infection in Saudi Arabia cannot be excluded.

Nine of the 16 cases were reported in men with a median age 56 years, ranging from 29 to 78 years. Seven of the 16 cases occurred in women with a median age 47 years, ranging from under 1 year to 73 years. Known exposures of the 16 cases include:

- two healthcare workers who provided care to a MERS patient, one male and one female.
- two having history of visiting a family member at a hospital where a MERS case was hospitalised.
- one with a history of visiting a MERS patient in hospital.
- six with a history of being admitted to or visiting a hospital where a MERS patient was hospitalised.
- three cases who are contacts of hospitalised MERS patients.

Investigations are ongoing for the history of exposure to known risk factors in the 14 days prior to the onset of symptoms for two cases.

Three of the 16 cases were asymptomatic at the time of diagnosis.

The world's first documented outbreak of MERS was in a hospital in Zarqa in Jordan in April 2012. The outbreak occurred before the MERS-CoV had been isolated but the nine epidemiologically linked cases were retrospectively attributed to a MERS outbreak after samples tested positive for the infection (two cases by PCR and seven by serological tests) [7]. Two of the cases (confirmed by PCR) were fatal and none of the cases with early onset of symptoms had contact with camels. Other hospital outbreaks have been described in several countries, including Saudi Arabia and South Korea [2-4, 8].

The Ministry of Health of Jordan reported ten cases in 2014. Seven of the cases in 2014 were reported between March and May 2014 and at least three were healthcare workers who had been in contact with known cases. Five cases that occurred in 2014 were a cluster in a private hospital in Zarqa. One of the ten cases was an asymptomatic contact to a known case who was diagnosed through contact tracing.

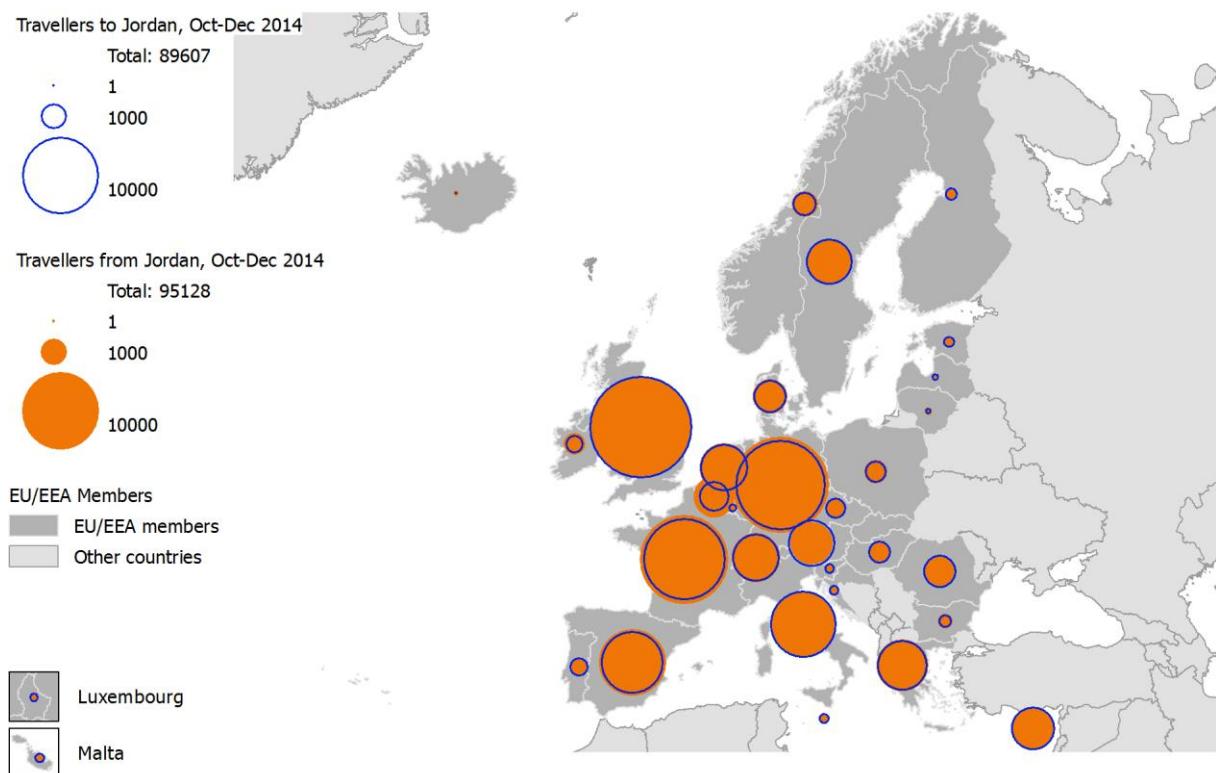
## Travel patterns in and out of the Middle East, with focus on Jordan

The volume of travel in and out of the Middle East is high throughout the year. An analysis of global travel figures showed that 6.9 million commercial air travellers departed from Saudi Arabia, Jordan, Qatar and the United Arab Emirates between June and November 2012 [9].

### *Tourism, including medical tourism*

The Ministry of Tourism acknowledges 251 280 entries to Jordan by air and land in the first six months of 2015 by people carrying European passports, and 255 271 exits [10]. From October to December 2014, 95 128 travellers on commercial air carriers arrived from Jordan to their final destination in an EU/EEA country (Figure 3). The number of border-crossings into the country by people carrying passports from Arab countries was close to 1 400 000 in the same period, and approximately 1 250 000 entries by people carrying Jordanian passports.

**Figure 3. Number of travellers on commercial air carriers (excluding unscheduled charters), by EU/EEA country, to and from Jordan, October–December 2014.**



Sources: Bluedot.global (formerly BioDiaspora), IATA 2014

Medical tourism is a frequent activity in Jordan, receiving visitors from different areas in the region. Nevertheless, data on medical tourism is difficult to find. According to the local media, the Private Hospital Association has estimated that approximately 250 000 patients from overseas sought care in Jordan in 2014 [11]. In 2009 it was assessed that most patients going to Jordan to receive healthcare were from Bahrain, Libya, Palestine\*, Saudi Arabia, Sudan, Syria and Yemen [12].

### Refugees and migration

According to the Office of the United Nations High Commissioner for Refugees (UNHCR), there were 672 930 refugees and asylum-seekers in Jordan in December 2014, and UNHCR estimates that by December 2015 the number will be 1 000 630 [13]. The majority are from Syria. However, approximately 80% of the Syrian refugees and asylum-seekers reside in non-camp settings in Jordan [13]. The refugee situation may pose specific challenges for the national disease surveillance systems.

### Respiratory infection surveillance in Jordan

Jordan has contributed to the global influenza surveillance and response system (GISRS) over the last five influenza seasons. According to GISRS data, the influenza epidemics in Jordan have exhibited an overall pattern similar to the countries in the northern hemisphere. The season has started no earlier than in week 43 and peaked between week 49 and week 15 [14].

Jordan operates a severe acute respiratory infections (SARI) surveillance system [15] covering four sentinel hospitals in the public sector. Furthermore, a national surveillance program was implemented in April 2015 to strengthen the national surveillance [16]. However, between April to September 2015, cases of pneumonia and colds were not reported to the latter system.

\* This designation shall not be construed as recognition of a State of Palestine and is without prejudice to the individual positions of the Member States on this issue.

## Situation in Saudi Arabia

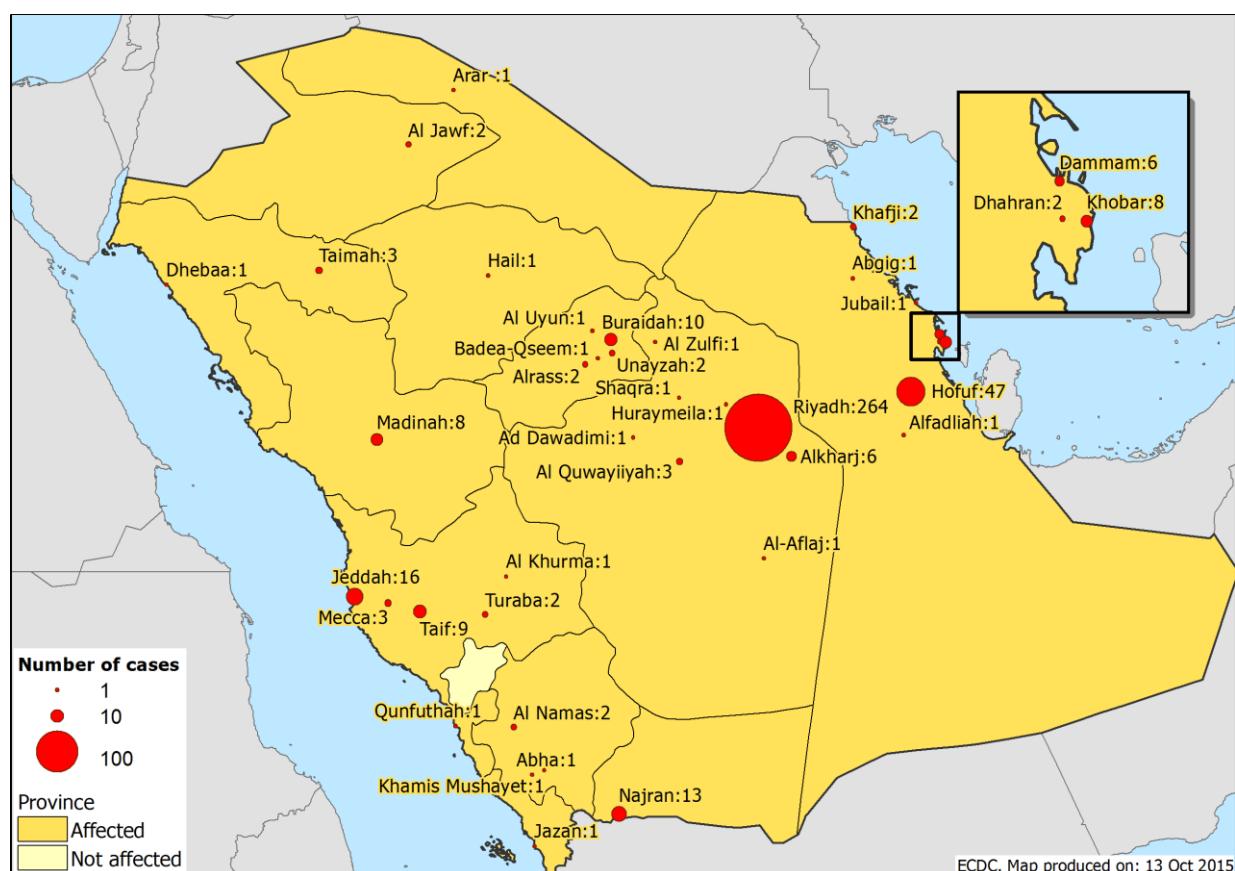
Since the beginning of 2015, Saudi Arabia has reported 428 cases (Figures 4 and 5) and 264 (62%) of these cases have been reported from Riyadh.

Since the risk assessment of 27 August 2015, Saudi Arabia reported 90 additional cases from Riyadh (67), Madinah (7), Najran (4), Alkharj (3), Jeddah (3), Namas (2), Qweiyah (2), Aloyoon (1) and Dawadmy (1).

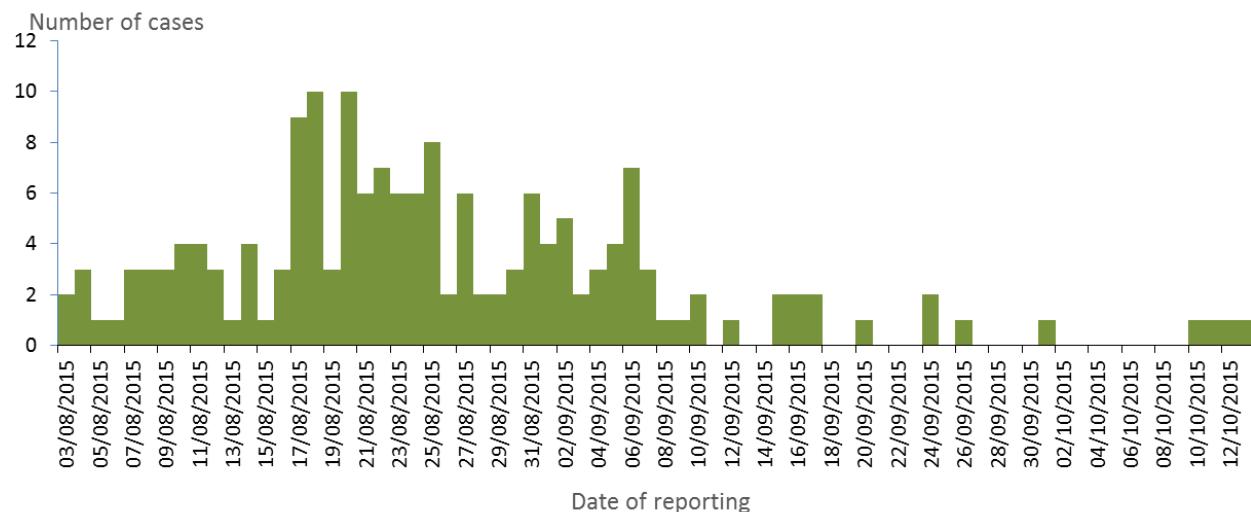
Twenty-four (27%) of the 90 new cases were healthcare workers from Riyadh (19), Jeddah (1) and Madinah (4). There were equal number of healthcare workers in both gender groups. The median age for the healthcare workers was 31 years ranging from 24 to 77 years.

Thirty of the 66 non healthcare worker cases reported contact to a previously confirmed case either in the hospital or in the community, while for other 36 cases, the route of transmission is either not known or under review. Seven cases had a history of frequent contact with camels and consumption of their raw milk. This current distribution of cases by source of infection reflects the situation reported by the health authorities in Saudi Arabia where the majority of the cases were identified as primary cases followed by healthcare-acquired infection and infections in healthcare workers. (Figure 6)

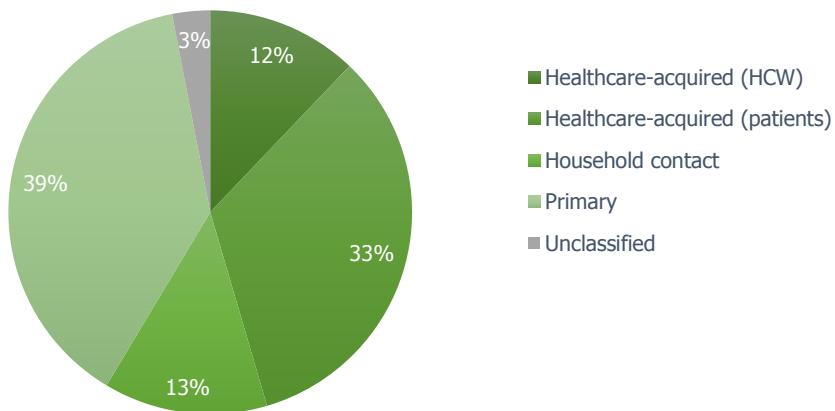
**Figure 4. Distribution of MERS cases by reporting city, Saudi Arabia, 1 January – 13 October 2015**



**Figure 5. Number of cases (n=170) reported by Saudi Arabia in Riyadh, 3 August -13 October 2015, by date of reporting**



**Figure 6. Distribution of percentage of confirmed MERS cases by source of infection in Saudi Arabia, as of 13 October 2015**



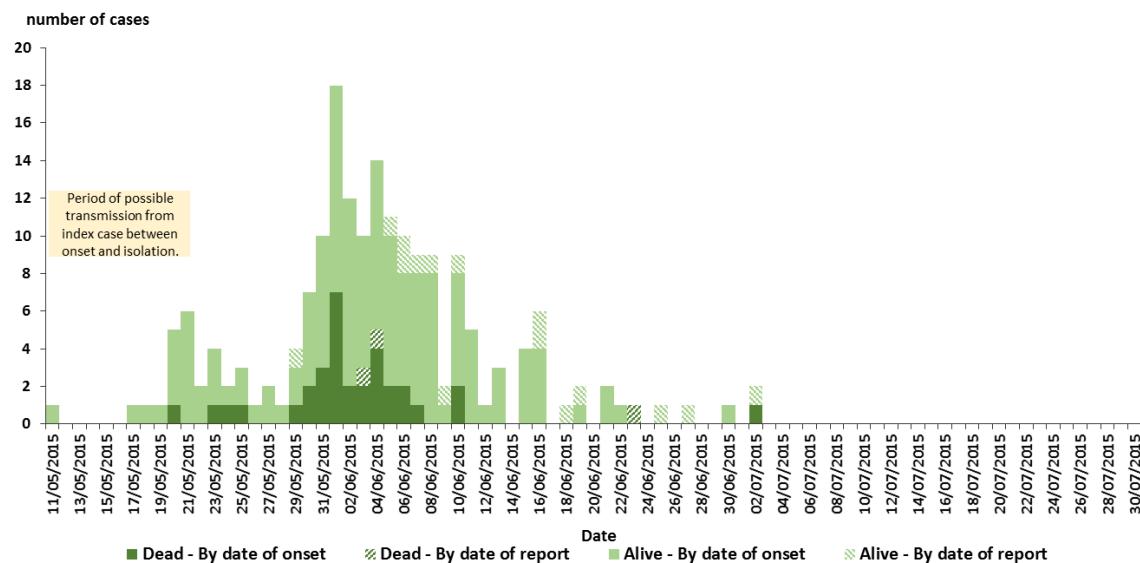
Source: Ministry of Health, Saudi Arabia. <http://www.moh.gov.sa/en/CCC/PressReleases/Pages/Statistics-2015-10-13-001.aspx>

## Situation in South Korea

According to media reports quoting the Ministry of Health, the last confirmed case in the Korean outbreak was readmitted to hospital on 12 October 2015 due to fever and tested positive for MERS-CoV [17]. The patient, who is immunocompromised [17], had been discharged earlier this month after tests were negative for MERS-CoV. One-hundred-and-twenty-nine individuals who were in contact with the patient, including medical workers, are in isolation [17].

Between May and July 2015, 186 cases including 36 deaths due to MERS-CoV were reported following the nosocomial outbreak in South Korea. This outbreak involved 15 healthcare facilities.

**Figure 7. Distribution of confirmed cases of MERS by date of onset or reporting, South Korea and China\*, 11 May–30 July 2015 (n=186)**



\* One case from South Korea travelled to China and was notified by China.

## Situation in Kuwait

There has been one new fatal case of MERS in Kuwait in a 78-year-old male from Kuwait city. He developed symptoms on 8 September and was admitted to hospital on 13 September, where he tested positive for MERS-CoV the following day. According to WHO, the patient owned dromedary camels and had a history of frequent contact with them. He had no history of exposure to other known risk factors in the 14 days prior to the onset of symptoms. The patient passed away on 19 September.

This is the fourth case reported from Kuwait and the first since March 2014.

## ECDC threat assessment for the EU

The majority of MERS cases continue to be reported from the Middle East, and more specifically from Saudi Arabia. Although the last reported MERS case in Europe was in Germany in March 2015, sporadic imported cases can be expected in EU/EEA Member States due to the substantial number of people travelling between the Middle East and EU countries, and the continuous occurrence of cases in the Middle East communities causing nosocomial and household clusters.

The number of cases related to the recent outbreak in Riyadh are declining although cases continue to be reported from Saudi Arabia, including Riyadh. In South Korea, one MERS case remains hospitalised with an ongoing contact investigation.

The recent hospital outbreak in Amman is the third reported in Jordan since the beginning of the epidemic. The outbreak in Amman is not unexpected although is of concern. The majority of the reported cases have an exposure history involving hospitals with an admitted confirmed MERS case. The extent to which different healthcare facilities in Amman are affected and are linked to the outbreak, is currently unclear. An official report from a WHO mission to Jordan assessing the situation is pending. Previous WHO missions have concluded that sub-optimal implementation of infection prevention and control measures have contributed to outbreaks in the Middle East and South Korea. In addition, MERS-CoV infections occur in the dromedary camels in Jordan [18], and Jordan has a dromedary camel density similar to Saudi Arabia [19]. Furthermore, medical tourism to Jordan from the region is substantial and may increase the risk of transmission to and from Jordan.

Affected groups include patients hospitalised for other medical reasons, healthcare workers, visitors to an outbreak-affected hospital and household contacts. The role of hospitals as amplifiers of MERS-CoV infection is now well known. Most nosocomial transmissions occur when infection prevention and control precautions are sub-optimally applied and before a specific case is suspected or confirmed. The successful prevention of amplification of MERS-CoV infections associated with healthcare facilities depends on the effective implementation of infection prevention and control programmes.

Three asymptomatic MERS cases tested positive during contact follow-up in Amman [20-22]. This number is in line with observations during the large 2014 nosocomial outbreak in Jeddah, when up to 25% of the detected cases were asymptomatic prior to testing positive, although it is unclear how many developed symptoms later [3].

The pattern of the outbreak in Jordan is also similar to other hospital outbreaks related to MERS-CoV in the past in terms of affected age, gender group and fatalities. Probable factors contributing to the extent of the outbreak might be low awareness, late case identification and poor compliance with infection prevention and control precautions. The recent nosocomial outbreak of MERS-CoV in South Korea has illustrated the potential for large nosocomial outbreaks in other parts of the world, following a single imported case.

The outbreak in Jordan is centred on several hospitals in Amman. Jordan has influenza and SARI surveillance in place and should detect large-scale epidemics of respiratory infection in the community, especially those with more severe outcomes. Rapid identification of potential cases is an important part of limiting the spread of MERS-CoV. The risk of importation of MERS cases from Jordan to EU/EEA Member States is considered low.

Epidemiological studies assessing the detailed risk factors for primary cases are urgently needed. In addition, as is emphasised by the recurring MERS-CoV outbreaks in hospitals, continuous surveillance of respiratory infections, in particular SARI, and rapid documentation of the nosocomial clusters in a publicly available format is needed to guide global public health preparedness and response. Furthermore, the possible role of asymptomatic MERS cases in transmitting the virus needs to be carefully assessed.

Sporadic imported cases that can be expected in EU/EEA Member States pose a risk of nosocomial spread. This highlights the need for awareness among healthcare workers, stringent routine application of infection prevention and control measures (including standard and transmission-based precautions), early detection through functioning testing algorithms and preparedness planning.

The risk of widespread transmission of MERS-CoV in the community after sporadic importation into the EU/EEA remains low.

## Options for response

### Travellers and pilgrims

The EU Health Security Committee issued a statement with traveller advice regarding MERS-CoV (Annex 1) [23].

EU residents travelling to Middle Eastern countries need to be made aware that MERS-CoV is currently circulating in these areas, and that transmission in hospital settings is one of the main sources of infection. This applies in particular, but not exclusively, to Saudi Arabia and the United Arab Emirates, but also to Jordan. EU travellers should be reminded of the importance of good hand and respiratory hygiene and adherence to good food-safety practices, and advised to avoid contact with sick people. This is particularly important for travellers with pre-existing medical conditions (e.g. diabetes, chronic lung disease, chronic renal disease, immunodeficiency etc.).. Travellers to the Middle East should avoid close contact with camels, visiting camel farms and consuming unpasteurised camel milk products or raw/under-cooked meat.

Pilgrims with pre-existing medical conditions, who are planning travel to Middle Eastern countries should be advised to consult a healthcare provider to review the risk before deciding to make the pilgrimage. The Ministry of Health of Saudi Arabia has advised the elderly, pregnant women and children and patients with chronic immunodeficiency or metabolic diseases to postpone their pilgrimage for their own safety. The Ministry also offers advice on how to prevent infection [24].

Travellers with pre-existing medical conditions should be advised to identify a trusted healthcare facility prior to travel in case of a health emergency during their stay. Travellers who require medical care should minimise contact with other sick people in the facility [25].

WHO does not recommend travel restrictions in relation to MERS-CoV, but rather recommends raising awareness among travellers to and from affected countries [26]. The US Centers for Disease Control and Prevention (CDC) and the National Travel Health Network have also issued health and travel advice for travellers to the Middle East and pilgrims participating in the Hajj and Umrah [27,28].

## Returning travellers and advice for healthcare workers

The Health Security Committee issued a statement with advice for returning travellers and healthcare workers regarding MERS-CoV (Annex 2) [29].

Countries should advise travellers returning from all areas affected by MERS-CoV to seek medical attention if they develop a respiratory illness with fever and cough or diarrhoea during the two week period after their return, and to disclose their recent travel history to their healthcare provider.

Early detection of MERS-CoV infection among travellers from the Middle East, especially from countries with high incidence of MERS cases, remains essential. The recent outbreaks in South Korea, Saudi Arabia and Jordan are highlighting the continued risk of healthcare-associated transmission and the need for timely diagnosis and implementation of infection prevention and control measures.

Healthcare workers in the EU should be made aware of the risk related to travellers from affected areas, the presentation of the disease, and the need to promptly investigate travellers returning from affected areas presenting with severe respiratory illness.

The successful prevention of amplification of MERS-CoV infections associated with healthcare depends on the full implementation of Infection Prevention and Control programmes. Before a specific case is suspected or confirmed; the routine application of measures to prevent spread of acute respiratory infections (ARI) when caring for symptomatic patients is essential to reduce spread of any ARI in healthcare settings. Additional precautions when caring for patients with probable or confirmed infection with MERS-CoV should be applied to further reduce the risk of transmission [30].

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## Annex 1. MERS-CoV infection advice with regard to travelling [23]

### Statement of the Health Security Committee (HSC)\* based on scientific input by the European Centre for Disease Prevention and Control

4 August 2015

The Middle East respiratory syndrome (MERS) is an emerging infectious disease that was first reported in September 2012 in Saudi Arabia. The disease is caused by the MERS coronavirus (MERS-CoV) that primarily infects the respiratory system but can affect many organ systems in severe cases. Since 2012, more than 1 400 cases of MERS have been reported from 26 countries. The majority of cases have been reported from the Middle East region where Saudi Arabia alone has notified more than 1 000 cases. Seven European countries have reported confirmed cases, all with direct or indirect connection with the Middle East.

The largest outbreak outside of the Middle East has been in South Korea where a person who returned from travels in the Arabian Peninsula gave rise to several hospital-centred clusters with altogether close to 200 cases. The outbreak in South Korea has been propagated mainly through nosocomial transmission and transmission to family caregivers. The imported index case was diagnosed on 20 May 2015 and the epidemic curve peaked during the first week of June. No transmission has been reported in South Korea since 4 July.

There is growing evidence that the dromedary camel is a host species for MERS-CoV and that zoonotic introductions from camels play an important role for the epidemiology in the Middle East. However, zoonotic infections are likely to be rare events and almost all human cases, whether in the Middle East or elsewhere, are the result of transmission from an ill person to a close contact, most of which have occurred in healthcare settings. It is not yet fully understood how the virus spreads but contamination through respiratory droplets plays an important role as well as aerosol-generating medical procedures.

The following statement is a summary of the technical guidance for consideration by National Contact Points in Member States, and should be reviewed according to how the MERS epidemic evolves.

Based on currently available information, the risk for travellers to countries affected by MERS to acquire MERS-CoV infection is considered low.

#### South Korea

As no transmission has occurred in South Korea since 4 July, the risk to travellers or the risk of imported cases to the EU are considered as negligible.

#### Arabian Peninsula

The risk of transmission in Saudi Arabia is related to the high number of nosocomial clusters identified, the persistent transmission in healthcare settings for more than two years, the suspicion of infections occurring through unrecognised chains of transmissions in the community and the risk related to exposure to camels and camel products. In this context, the risk for travellers to the Arabian Peninsula and in particular to Saudi Arabia is considered low and related to contacts with healthcare facilities or to exposures to live camels and camel products.

In line with the most recent WHO advice countries should not impose travel or trade restrictions in relation to MERS-CoV. However, EU residents travelling to countries with ongoing MERS-CoV transmission should be made aware that MERS-CoV is circulating in these areas and should be reminded of the importance of good hand and food hygiene, and to avoid contact with sick people.

Travellers to the Arabian Peninsula should avoid close contact with camels, visiting farms and consuming unpasteurised camel milk, urine or improperly cooked meat.

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\* The statement is based on Article 11 'Coordination of response' of Decision 1082/2013/EU on serious cross border health threats and can be adapted to the needs and circumstances of Member States.

People with pre-existing medical conditions are more likely to develop severe disease if exposed to MERS-CoV. Those at higher risk of severe MERS-CoV infection, and therefore for whom awareness of the risks is particularly important, include:

- elderly people
- people with chronic diseases, including: heart diseases, kidney diseases, respiratory diseases, nervous system disorders and diabetes
- people with immunodeficiency conditions, congenital and acquired
- pregnant women.

Hajj and Umrah travellers with pre-existing medical conditions should be advised to consult a healthcare provider to review the risk before deciding to make the pilgrimage. The [Ministry of Health of Saudi Arabia](#) advises patients with chronic diseases and the elderly to postpone their pilgrimage

Travellers with pre-existing medical conditions should be advised to identify a trusted healthcare facility prior to travel in case of a health emergency during their stay. Travellers who require medical care should minimise contact with other sick people in the facility.

Countries should advise returning travellers from all countries affected by MERS to seek medical attention if they develop a respiratory illness with fever and cough during the two weeks after their return and to disclose their recent travel history to the healthcare provider.

The Health Security Committee will re-evaluate the evidence and situation on a regular basis and revise this statement accordingly.

## Annex 2. Advice to healthcare workers caring for patients with MERS-CoV infection [29]

### Statement of the Health Security Committee (HSC)\* based on scientific input by the European Centre for Disease Prevention and Control

4 August 2015

Since it was first identified in Saudi Arabia in September 2012, more than 1 000 cases of Middle East respiratory syndrome coronavirus (MERS-CoV) infection have been detected in over 20 countries. In Europe, seven countries have reported confirmed cases, all with direct or indirect connection with the Middle East. The clinical presentation of MERS coronavirus infection ranges from asymptomatic to very severe pneumonia with acute respiratory distress syndrome, septic shock and multi-organ failure resulting in death. The clinical course is more severe in immunocompromised patients. There is growing evidence that the dromedary camel is a host species for the virus and that camels play an important role as a source of human infection. Although it is likely that zoonotic transmission is the starting point of most clusters, human-to-human transmission is the dominant mode of transmission for MERS-CoV, and almost all new cases are generated in healthcare facilities or among family members. Nosocomial transmission has been a hallmark of MERS-CoV infection, and the majority of cases have been reported from hospital outbreaks in Saudi Arabia, the United Arab Emirates (UAE) and most recently in South Korea. It is expected that small numbers of cases will continue to present to healthcare services in the EU as a result of: (a) medical transfers of MERS-CoV infected patients into the EU for specialist care; (b) patients who acquired MERS-CoV while visiting the affected area and develop the infection in the EU; and (c) patients who are exposed to and infected with MERS-CoV through contacts with confirmed cases in the EU (secondary transmission in the EU).

#### Advice on infection control

This is a summary of the recommended technical measures for reducing the risk of transmission of MERS-CoV in healthcare settings and laboratories in the EU for consideration by national contact points. It draws on, and adapts to the EU situation, interim advice produced by WHO (Infection prevention and control during health care for probable or confirmed cases of Middle East respiratory syndrome coronavirus (MERS-CoV) infection. Interim guidance, 4 June 2015. Available from: [http://apps.who.int/iris/bitstream/10665/174652/1/WHO\\_MERS\\_IPC\\_15.1\\_eng.pdf?ua=1A](http://apps.who.int/iris/bitstream/10665/174652/1/WHO_MERS_IPC_15.1_eng.pdf?ua=1A)). The highest risk of healthcare-associated transmission is in the absence of standard precautions, when basic infection prevention and control measures for respiratory infections are not in place, and before MERS-CoV infection has been confirmed. The summary of the advice follows:

Standard precautions (hand hygiene and use of personal protective equipment (PPE) to avoid direct contact with patients' blood, non-intact skin, body fluids and secretions, including respiratory secretions) should be applied for all patients.

Early detection of MERS-CoV infection among travellers exposed to camels or healthcare facilities in the Middle East remains essential. The outbreak in South Korea highlighted the continued risk of healthcare-associated transmission and the need for timely diagnosis and implementation of prevention and control measures, although the public health measures taken have now been effective in interrupting the chains of transmission and controlling the outbreak in South Korea.

Travellers returning from the Middle East should be made aware that if they develop respiratory symptoms or diarrhoea, either during travel or up to 14 days after their return, they should seek medical attention and report their travel history.

A patient presenting with severe acute respiratory disease in the EU and having in the last 14 days been in contact with MERS patients, healthcare services or camels in the Middle East should be investigated for MERS-CoV infection. The patient should be separated from other patients in waiting areas and in-patient settings and wear a disposable surgical or medical procedure mask.

Cases of MERS-CoV infection requiring admission should be admitted directly to negative-pressure single rooms, if available. If this is not possible, then a single room with en-suite facilities should be used. Positive pressure rooms should not be used.

\* The statement is based on Article 11 'Coordination of response' from Decision 1082/2013/EU on serious cross border health threats and can be adapted to the needs and circumstances of Member States.

Healthcare personnel providing care for cases of MERS-CoV infection should:

- use personal protective equipment that is appropriate for the exposure risk defined by a pre-assessment of the workplace and the planned interventions: if airborne exposure cannot be ruled out PPE should include respiratory protection by use of filters with a specification of FFP2 or FFP3; if only droplet exposure is expected and respirators are not available a surgical or medical procedure mask with the additional classification IIR (splash resistance to blood and body fluids) can be considered
- use eye protection (i.e. goggles or face shield)
- use gown and gloves
- self-monitor for symptoms.

The WHO interim guidance on Infection prevention and control during healthcare for probable or confirmed cases of Middle East respiratory syndrome coronavirus (MERS-CoV) infection (4 June 2015) should be consulted for more detailed guidance on other aspects of infection control. Available from:

[http://apps.who.int/iris/bitstream/10665/174652/1/WHO\\_MERS\\_IPC\\_15.1\\_eng.pdf?ua=1A](http://apps.who.int/iris/bitstream/10665/174652/1/WHO_MERS_IPC_15.1_eng.pdf?ua=1A).

A record of all staff providing care for confirmed MERS-CoV cases must be maintained. Staff providing care to confirmed MERS-CoV cases and staff who have been exposed to cases before implementation of infection control measures, should be vigilant for any respiratory symptoms in the 14 days following the last exposure to a confirmed case, and should seek testing and thereafter self-isolate if they become unwell.

Aerosol-generating procedures including all airway management procedures, such as tracheal intubation, broncho-alveolar lavage, other diagnostic airway procedures and manual ventilation, require particular protection measures. The number of persons in the room should be limited to a minimum during such procedures and all persons present should wear:

- a well-fitted FFP3 respirator
- tight-fitting eye protection
- gloves
- long-sleeved impermeable protective gowns.

All specimens collected for laboratory investigation should be regarded as potentially infectious, and healthcare workers who collect or transport clinical specimens should adhere rigorously to Standard Precautions to minimise the possibility of exposure to pathogens. The WHO *Aide-memoire on Standard Precautions in Health Care* is available from: [http://www.who.int/csr/resources/publications/EPR\\_AM2\\_E7.pdf](http://www.who.int/csr/resources/publications/EPR_AM2_E7.pdf)

Laboratories should adhere to guidance in these two documents:

The European Committee for Standardisation: *CWA15793 Laboratory Biorisk Management, 2011*, available from: <http://www.cen.eu/CEN/sectors/technicalcommitteesworkshops/workshops/Pages/ws31.aspx>

The World Health Organization: *Laboratory testing for Middle East Respiratory Syndrome Coronavirus. Interim guidance* of June 2015, available from:

[http://www.who.int/iris/bitstream/10665/176982/1/WHO\\_MERS\\_LAB\\_15.1\\_eng.pdf?ua=1](http://www.who.int/iris/bitstream/10665/176982/1/WHO_MERS_LAB_15.1_eng.pdf?ua=1)

The duration of infectivity for MERS-CoV patients remain unknown. Critically ill patients can shed MERS-CoV for long periods and viral detection tests should assist in the decision on when to discontinue additional precautions for hospitalised patients.

The Health Security Committee will re-evaluate the evidence and situation on a regular basis and revise this statement accordingly.