

# Public health risks related to communicable diseases during the hajj 2019, Saudi Arabia, 9–14 August 2019

2 July 2019

## Main conclusions and options for response

In 2019, the hajj will take place between 9 and 14 August.

The risk for EU/EEA citizens to become infected with communicable diseases during the 2019 hajj is considered low, thanks to the vaccination requirements for travelling to Makkah (Mecca) and the Saudi Arabian preparedness plans that address the management of health hazards during and after hajj.

As with other mass gathering events, the risk of communicable disease outbreaks is greatest for food- and waterborne diseases and respiratory diseases.

Outbreaks of MERS-CoV continue to be reported from the Arabian Peninsula, specifically from Saudi Arabia, which implies that there is a risk of importation of cases to Europe after the hajj.

The risk of vaccine-preventable and vector-borne diseases is considered low if preventive measures are applied.

## Advice for those making the hajj

### Prior to travelling

It is important that travellers seek advice from healthcare providers on the health requirements and recommendations for Saudi Arabia. Travellers should be advised to follow recommendations issued by the Saudi Arabian Ministry of Health and WHO. Advice issued by ECDC should also be taken into account.

According to the Saudi authorities, pilgrims are required to provide proof of vaccination with the conjugated meningococcal ACW135Y vaccine administered no less than ten days prior to arrival in Saudi Arabia in order to obtain an entry visa. Travellers making the hajj should be up to date with immunisations routinely administered in their EU country of residence, including vaccinations for measles, mumps and rubella (MMR) and diphtheria-tetanus-polio (see [ECDC vaccine schedule site](#)). Additional vaccinations such as hepatitis A, hepatitis B, influenza, and rabies may be indicated.

## During the hajj

Travellers making the hajj should take the following into account:

- Pay attention to personal hygiene and adhere to food and water hygiene regulations in order to decrease the risk of gastrointestinal illnesses.
- Practise respiratory hygiene and cough etiquette to reduce the risk of respiratory infections.
- Practise insect and tick bite avoidance measures day and night.
- Visit only licensed barbers for shaving.
- Due to the expected high temperatures, avoid direct sun exposure and drink sufficient amounts of liquid.

## After the hajj

Travellers returning from the hajj should seek medical attention immediately if they experience symptoms suggestive of any type of infection, e.g. gastrointestinal or respiratory. They should also mention their travel history to their healthcare provider.

Due to continuing reports of MERS-CoV disease in Saudi Arabia, people returning from the hajj should be made aware of the need to seek immediate medical advice if they have a fever (38 °C and over), cough or difficulties breathing within 14 days of their return.

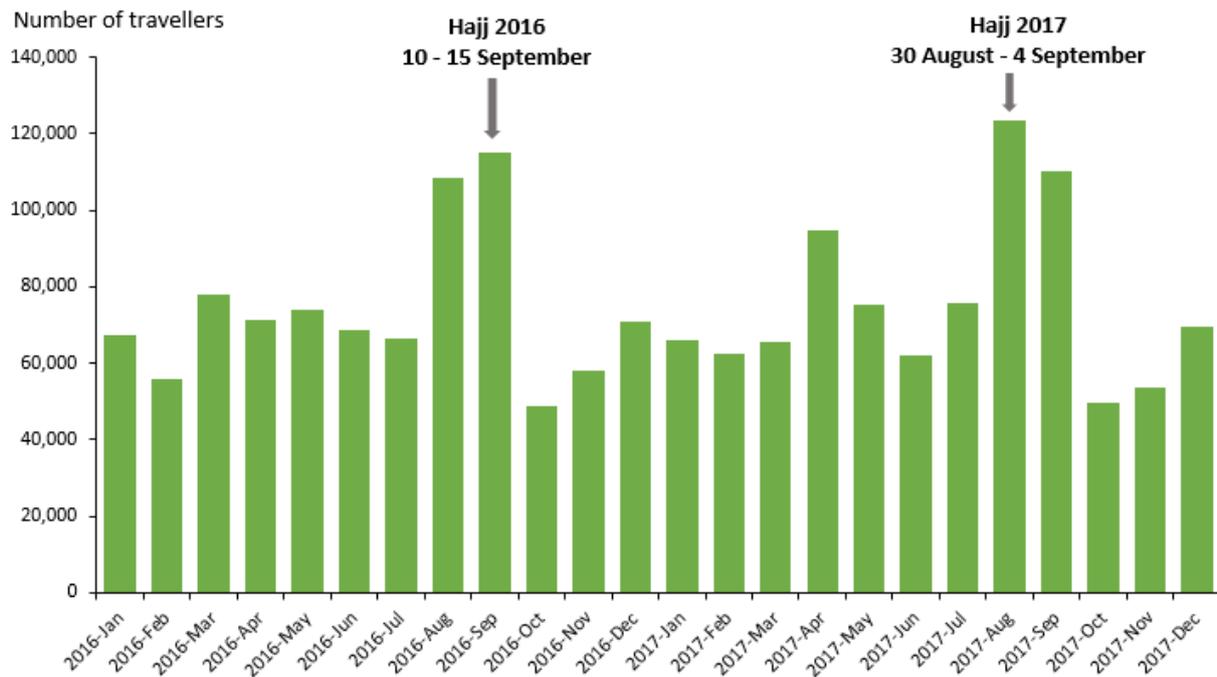
Travel history and previous hospitalisation should be reported to the healthcare provider if a person returning from the hajj requires hospitalisation within one year after returning from the hajj. This is to ensure that the possible acquisition of antimicrobial-resistant (AMR) bacteria will be considered and that appropriate measures can be implemented in accordance with national guidelines for the prevention of AMR.

## Event background and general precautions

Every year, more than one million pilgrims make the hajj to Saudi Arabia. In August 2018, 1 758 722 foreign and 612 953 domestic pilgrims took part in the hajj. In 2018, most of the foreign pilgrims arrived by air (94%), while only five percent crossed land borders; one per cent came by sea [1].

In 2017, the hajj took place between 30 August and 4 September, resulting in an increase in travel from the EU during the month preceding the hajj. A similar increase was observed in 2016 when the hajj took place between 10 and 15 September (Figure 1). According to IATA data for 2016 and 2017, almost 900 000 travellers from EU countries travelled to Saudi Arabia throughout the year. The majority of the travellers originated from the United Kingdom (41%), Germany (14%) and France (13%).

International mass gatherings can pose a risk for communicable disease outbreaks and global spread of infectious diseases. The aim of this document is to present the health requirements and recommendations from the Ministry of Health in Saudi Arabia for hajj and umrah pilgrims and assess the potential health risks related to communicable diseases and other health threats for EU citizens in the course of the hajj pilgrimage between 9 and 14 August 2019 in Saudi Arabia.

**Figure 1. Number of travellers from EU countries to Saudi Arabia, by month, 2016–2017**

Source: IATA

Every hajj season, the Ministry of Health in Saudi Arabia publishes a list of health requirements and recommendations for the hajj. This includes general health guidance, vaccination requirements and general recommendations [2]. Before the event, pilgrims should make sure that they meet the visa requirements, receive the required and recommended vaccines, and get all routine immunisations, including booster doses recommended in their home country. The national health authorities in the countries of origin of hajj pilgrims should have appropriate strategies for the prevention and control of communicable diseases before, during, and after the completion of the hajj. The current international collaboration efforts (planning vaccination campaigns, developing visa quotas, arranging rapid repatriation, and managing health hazards at the hajj) are crucial steps in this process.

Returning pilgrims are advised to be vigilant for symptoms of acute respiratory illness with fever and cough during the first two weeks after their return. Returning pilgrims experiencing such symptoms should seek immediate medical attention and inform health attendants of their recent travel to Saudi Arabia in order to detect and manage all diseases associated with those symptoms (e.g. MERS-CoV, influenza). Influenza infection is a relatively common disease, and early detection of influenza is important to enable the appropriate management of the disease. This includes antiviral treatment, minimised contact with others, strict cough etiquette, and respiratory hygiene [2]. Health facilities should ensure that appropriate arrangements are in place for testing returning pilgrims who present with symptoms suggestive of MERS-CoV.

## Recommendations of the Saudi Arabian Ministry of Health

### General public health recommendations

**Standard hygiene recommendations.** The Ministry of Health in Saudi Arabia advises all pilgrims to comply with local public health recommendations [2], including the following:

- Washing hands with soap and water or a disinfectant, especially after coughing and sneezing, after using toilets, before handling and consuming food, and after touching animals.
- Practising respiratory hygiene and cough etiquette to reduce the risk of respiratory infections, e.g. using disposable tissues when coughing or sneezing and disposing them in a garbage bin.
- Wearing face masks when in crowded places.
- Trying as much as possible to not touch one's eyes, nose and mouth.
- Avoiding contact with those who appear ill and avoid sharing their personal belongings.
- Avoiding contact with camels in farms, markets, or barns.

- Avoiding consumption of unpasteurised milk or raw meat, or certain animal products, including camel products that have not been thoroughly cooked.

**Food- and waterborne diseases.** Authorities in Saudi Arabia do not permit the importation of food in conjunction with hajj and umrah arrivals except for very small quantities for personal consumption and in properly canned or sealed containers [2].

The Ministry of Health in Saudi Arabia recommends that all pilgrims should observe the following:

- Washing hands before and after eating and after going to the toilet.
- Thoroughly cleaning and washing fresh vegetables and fruit.
- Food should be cooked thoroughly.
- Food should be kept at safe temperatures.
- Raw and cooked food should be kept separated.

**Insect-borne diseases.** The Ministry of Health in Saudi Arabia recommends that pilgrims should take measures to avoid mosquito bites during the day and evening, e.g. by wearing protective clothing, using physical barriers such as window screens and closed doors, and applying insect repellent to skin or clothing. Repellents should contain DEET, IR3535 or Icaridin, and be applied as indicated in the product's instructions.

**Health education.** Health authorities in the countries of origin are requested to provide basic health education to pilgrims prior to travel. This may include food safety, heat exhaustion, and means of preventing infectious diseases [2].

## Recommendations for specific diseases

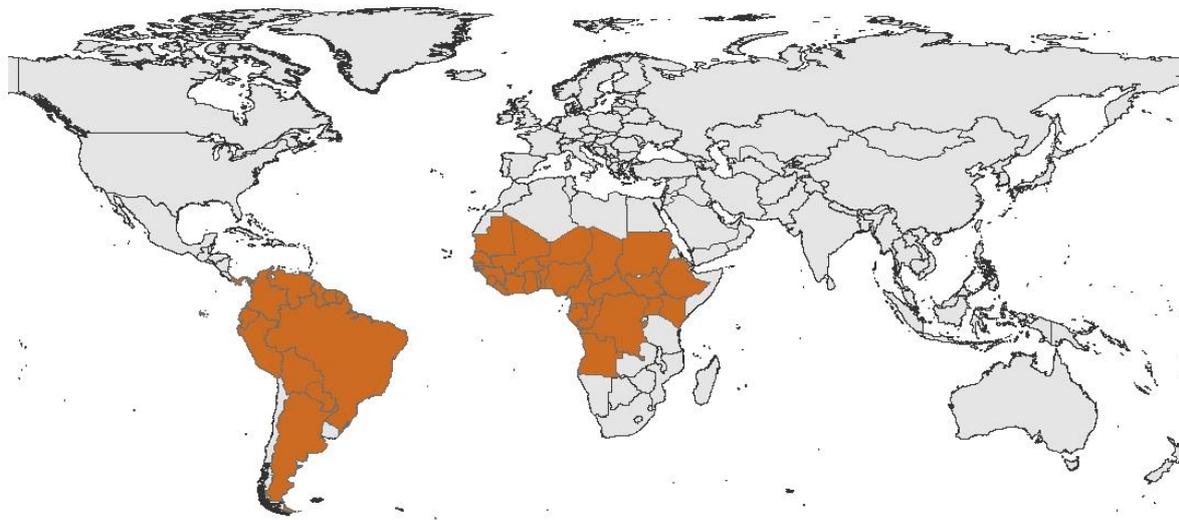
**Yellow fever.** The Ministry of Health in Saudi Arabia requires that all travellers arriving from countries or regions at risk of yellow fever transmission must present a valid *International Certificate of Vaccination or Prophylaxis* documenting YF vaccination. The Certificate is valid for life, starting 10 days after vaccination [2].

Countries/areas at risk of yellow fever transmission, as per the WHO International Travel and Health Annex 1 [3] are:

- African states: Angola, Benin, Burkina Faso, Burundi, Cameroon, the Central African Republic, Chad, Congo, Côte d'Ivoire, the Democratic Republic of the Congo, Equatorial Guinea, Ethiopia, Gabon, The Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Sudan, South Sudan, Togo, and Uganda.
- South and Central American States: Argentina, Venezuela, Brazil, Colombia, Ecuador, French Guiana, Guyana, Panama, Paraguay, Peru, Bolivia, Surinam, and Trinidad and Tobago.

Aircraft, ships and other means of transportation arriving from countries affected by yellow fever are requested to submit a valid certificate indicating that disinsection was applied in accordance with methods recommended by WHO. They may be subject to inspection as a condition of granting free pratique (including permission to enter a port, to embark or disembark, and to discharge or load cargo or stores) [2].

**Figure 2. Countries and regions (in orange) for which proof of yellow fever vaccination is required from all travellers arriving to Saudi Arabia**



**Meningococcal disease.** Adults and accompanying children older than two years of age arriving for the hajj, umrah, or seasonal work in hajj zones are required to submit a valid vaccination certificate with a quadrivalent (ACYW) meningococcal vaccine administered not less than 10 days prior to the planned arrival in Saudi Arabia [2].

Vaccination with one of the following vaccines is acceptable:

- Quadrivalent (ACYW) polysaccharide vaccine within the last three years.
- Quadrivalent (ACYW) conjugate vaccine within the last five years.

Current scientific evidence suggests that conjugate vaccines are safe and effective for those above 55 years of age.

It is important to document the type of vaccine (e.g. conjugate vaccine) on the vaccination record. Failure to document the type of vaccine reduces the validity of the certificate to three years.

Vaccination with quadrivalent (ACYW) conjugate vaccine is also required for:

- domestic pilgrims;
- residents of the two holy cities (Makkah and Medina), and
- any person who might be in contact with pilgrims, including personnel in healthcare settings and other authorities.

The Ministry of Health in Saudi Arabia may opt to administer prophylactic antibiotics to some travellers to Saudi Arabia at the points of entry if deemed necessary.

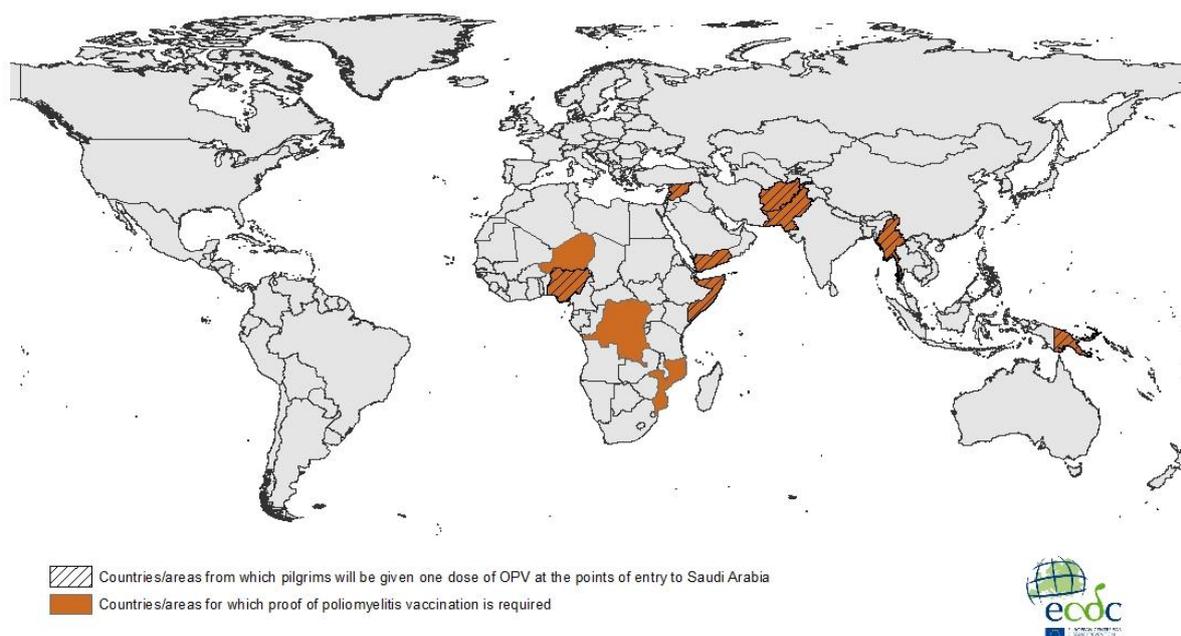
**Poliomyelitis:** Travellers from areas with active poliovirus transmission (i.e. those with active transmission of a wild or vaccine-derived poliovirus) and from countries at risk of polio reintroduction are required to submit a valid polio vaccination certificate (Figure 3) [2].

Travellers arriving from Afghanistan, the Democratic Republic of the Congo, Mozambique, Niger, Nigeria, Pakistan, Papua New Guinea, Syria, Myanmar, Yemen and Somalia should present proof of vaccination with at least one of the following vaccines:

- At least one dose of bivalent oral polio vaccine (bOPV) within the previous 12 months and administered at least four weeks prior to arrival or
- At least one dose of inactivated polio vaccine (IPV) within the previous 12 months and administered at least four weeks prior to arrival.

Travellers arriving from Afghanistan, Nigeria, Pakistan, Papua New Guinea, Syria, Myanmar, Yemen and Somalia will also receive one dose of OPV at the border points of entry in Saudi Arabia regardless of age and vaccination status.

**Figure 3. Vaccination requirements for Saudi Arabia: countries and areas for which proof of poliomyelitis vaccination is required; countries of origin for which one dose of OPV for travellers is mandatory, regardless of vaccination status**



**Seasonal influenza.** The Ministry of Health in Saudi Arabia recommends that all visitors arriving for umrah, hajj or seasonal work in hajj zones get vaccinated against seasonal influenza at least 10 days prior to their arrival [2].

Influenza vaccination is particularly important for pregnant women, children under five years of age, the elderly, individuals with chronic medical conditions (e.g. chronic cardiac, pulmonary, renal, metabolic, neurodevelopmental, liver or hematologic diseases), individuals with immunosuppressive conditions (e.g. HIV/AIDS), people with malignancies, and people undergoing chemotherapy or receiving steroids.

Countries are encouraged to secure adequate quantities of the most recent influenza vaccine recommended for use in their country to be administered to those intending to make the hajj. For this year's hajj, the southern hemisphere vaccine is expected to be available before the hajj, and the Ministry of Health in Saudi Arabia recommends that all pilgrims from the southern hemisphere or from countries which use the southern hemisphere vaccine should get vaccinated at least 10 days before embarking on the hajj.

The Ministry of Health in Saudi Arabia requires all domestic pilgrims and health workers in the hajj and umrah areas to receive the most recently seasonal influenza vaccine 10 days prior to their arrival to hajj and umrah areas.

ECDC comment: In the northern hemisphere, influenza vaccine is usually available as early as late August or early September. Pilgrims vaccinated during the previous flu season may still have some protection. Pilgrims planning to make the hajj next year should ensure they get vaccinated for the upcoming flu season as this may still confer some protection for their planned hajj next year. WHO has already released the recommended composition of influenza virus vaccines for use in the 2019 southern hemisphere influenza season [4].

**MERS-CoV.** Efforts to prevent MERS-CoV infections during mass gatherings have been successful. However, other viral respiratory tract infections are common [2].

ECDC comment: WHO does not advise special screening at points of entry with regard to the hajj nor does it currently recommend the application of any travel or trade restrictions [5,6].

**Zika virus disease and dengue.** A disinsection certificate, fulfilling the WHO method recommendations, is required by the Ministry of Health in Saudi Arabia for aircraft, ships, and other means of transportation coming from countries affected with the Zika virus and/or dengue fever [2].

Pilgrims are advised to take necessary measures to avoid mosquito bites during the day and evening, which includes wearing protective clothing (preferably light-coloured) that covers as much of the body as possible, using physical barriers such as window screens and closed doors, and applying insect repellent that contains DEET, IR3535 or Icaridin to skin or clothing as indicated in the product's instructions.

ECDC comment: ECDC published a risk assessment on Zika virus transmission for EU/EEA travellers in April 2019 [7]; also relevant in this context is a WHO document [8]. A list of dengue-affected countries can be found in ECDC's Communicable Disease Threats Reports and on the WHO website [8].

## Recommendation for routine immunisations

The Ministry of Health in Saudi Arabia recommends that all pilgrims should be up to date with their routine immunisation schedule, including vaccinations against diphtheria, tetanus, pertussis, polio, measles, varicella and mumps [2].

## Other conditions

**Heat-related conditions:** The Ministry of Health in Saudi Arabia recommends that all pilgrims, especially older people, should avoid direct sun exposure and drink sufficient amounts of liquids. Countries are urged to provide advice on health-related illness to their pilgrims prior to travel. Medications that can exacerbate dehydration (e.g. diuretics) or interfere with heat exchange may need adjustment by treating physicians [2].

**Responding to International Health Events:** In a Public Health Emergency of International Concern (as defined by WHO) or in an event subject to notification under the International Health Regulations (2005), the health authorities in Saudi Arabia – in consultation with WHO – will take all necessary measures [2].

**Physical ability and health education:** Before embarking on the hajj or umrah, people who would like to make the pilgrimage are encouraged to assess their physical fitness and health – or should have it assessed by a medical professional before applying for a visa. Those with severe medical conditions such as terminal cancers, advanced cardiac disease, respiratory diseases, liver or kidney disease, and senility are exempt from religious duties such as pilgrimages [2].

Health authorities in the countries of origin are requested to provide basic health education to pilgrims prior to travel. This may include information on food safety, heat exhaustion, and means of preventing infectious diseases [2].

# Risk of transmission of infectious diseases related to the hajj

Note: The Annex to this risk assessment lists additional infectious diseases not mentioned in this section that could potentially be imported into Saudi Arabia during the hajj.

## Meningococcal diseases

The transmission of meningococcal meningitis is facilitated by crowded environments [9], as occasionally experienced during the hajj. The risk of importation of meningococcal meningitis is increased during the seasonal peaks in the countries of the African meningitis belt, several of which are home to large Muslim populations.

An outbreak of serogroup W-135 meningococcal disease occurred during the 2000 hajj [10]. Cases were reported worldwide in hajj pilgrims and their close contacts, with most cases in Saudi Arabia. Of the 253 cases identified in Saudi Arabia, serogroup identification was available for 161 cases (64%). Serogroup W-135 caused 93 cases (37%), while serogroup A caused 60 (24%) cases. The same outbreak resulted in 90 cases of meningococcal infection in nine European countries, mostly affecting the UK and France [10].

## Food- and waterborne diseases

Gastrointestinal illnesses during mass gathering events, including the hajj, are a possible health threat. This is due to possible breaches of food hygiene standards, shortage of clean water, the presence of mildly ill and asymptomatic carriers of pathogenic bacteria and viruses, and the preparation of large numbers of meals that may be inappropriately stored by pilgrims. There are several studies describing the incidence and aetiology of traveller's diarrhoea during the hajj [11,12].

Hajj and umrah pilgrims are not allowed to bring fresh food into Saudi Arabia. Only properly canned or sealed food or food stored in containers with easy access for inspection is allowed in small quantities, sufficient for one person for the duration of the trip [2].

The most important measures to prevent gastrointestinal illnesses are to drink safe water (chlorinate or boil water before consumption), use appropriate food hygiene, wash hands regularly with water and soap or disinfectant, eat thoroughly cooked food, carefully wash fruits and vegetables with bottled or chlorinated water before peeling and before consumption. Other measures to reduce the risks of gastrointestinal disease include avoiding consumption of raw seafood products and keeping raw and cooked food separately. More recommendations on food handling and other good practices during the hajj are available from the guidelines of the Saudi Ministry of Health [13].

## Malaria

Malaria is a widespread parasitic disease in tropical areas, and it is likely that a significant number pilgrims host the parasite [14,15]. Outbreaks of malaria have occurred during the hajj in the past. However, Saudi Arabia is currently at the pre-elimination phase of malaria, and local transmission of malaria has only been reported in villages along the border with Yemen [16]. Therefore, the risk of transmission in relation to the hajj is very low.

The Ministry of Health in Saudi Arabia and WHO do not recommend malaria prevention measures, including chemoprophylaxis, in the cities of Makkah and Medina [2,3,8]. But pilgrims should still follow bite prevention measures.

## Measles

Outbreaks of measles have been reported after mass gatherings and continue to occur globally [17-19]. There is a particularly high burden of measles among infants and adults, the groups at the highest risk of complications [18]. People of all ages should check their vaccination status before travelling. Particular care is recommended if travelling with infants under one year of age. This is also essential for travellers for whom vaccination is contraindicated and who will be at an increased risk of infection and possible complications [18]. It is advised that non-immune pilgrims attending the hajj and umrah are vaccinated in accordance with the national schedule prior to their travel, e.g. two doses of measles-containing vaccine [20].

## Arboviruses

The *Aedes aegypti* mosquito is known to exist in the western and south-western regions of Saudi Arabia where the hajj is taking place [21]. According to a literature review, dengue outbreaks have occurred in these regions since the 1990s, with the western region being declared endemic for the disease in 2004 and remaining so [22,23]. Therefore, there is a possibility of an outbreak of dengue during the hajj.

Studies in western Saudi Arabia reporting DENV-2 and DENV-3 isolates with strains from Africa, India, and Singapore highlight the role that the hajj pilgrimage might play in the importation and subsequent exportation of the dengue virus [24,25]. In addition, in 2018, two travel-related cases of dengue (DENV-3) were reported by France through the EU Early Warning and Response System (EWRS). The cases were siblings who developed dengue-like syndrome on return from a pilgrimage to Makkah and Medina.

Alkhumra haemorrhagic fever (AHF) is a tick-borne disease found in Saudi Arabia and in Egypt [26]. In Saudi Arabia, outbreaks occurred in Jeddah and Makkah in 1995, 1999 and 2001 [13,26,27]. The virus is transmitted by ticks, following contact with livestock, e.g. sheep. The risk of AHF is probably low, but it should be considered as a differential diagnosis for viral haemorrhagic fevers.

## Tuberculosis

It is difficult to assess the transmission of tuberculosis during the hajj due to the long incubation period. However, based on the origin of the pilgrims, many of whom come from areas where tuberculosis is endemic, a risk for the spread of tuberculosis exists. Contributing factors are overcrowding and co-morbidities that make pilgrims susceptible to infection or reactivation of latent tuberculosis. The Saudi Ministry of Health notes that these factors increase the risk for tuberculosis transmission during the hajj. This is exacerbated by the fact that some pilgrims come from places where the disease is endemic [13].

The Saudi Ministry of Health advises patients with tuberculosis to postpone their hajj, with the exception of specific cases described on the Ministry of Health website [13]. People suffering from continuing cough for more than two weeks have to undergo the necessary tests before making the hajj in order to rule out tuberculosis.

## Other blood-borne and sexually transmitted diseases

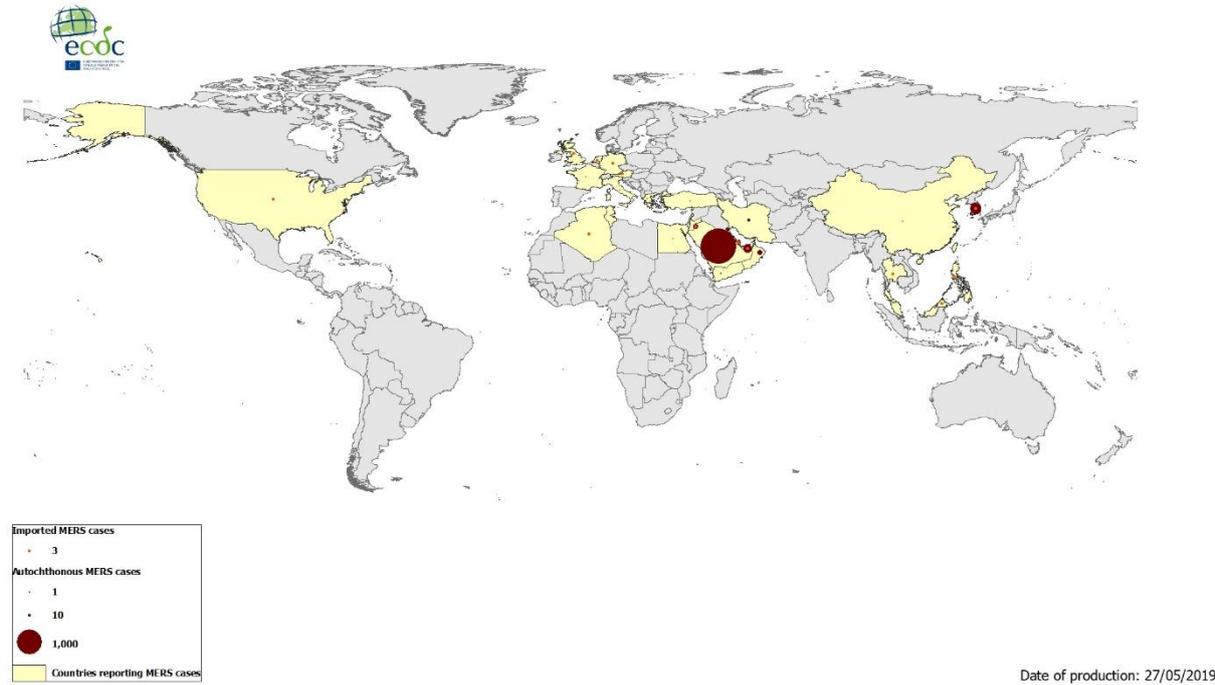
To avoid infection with hepatitis B, hepatitis C and HIV, pilgrims are advised to choose a suitable barber (not a street barber) and use disposable razors [13]. Pilgrims are also advised to practice safe sex to avoid any sexually transmitted diseases.

## Middle East respiratory syndrome

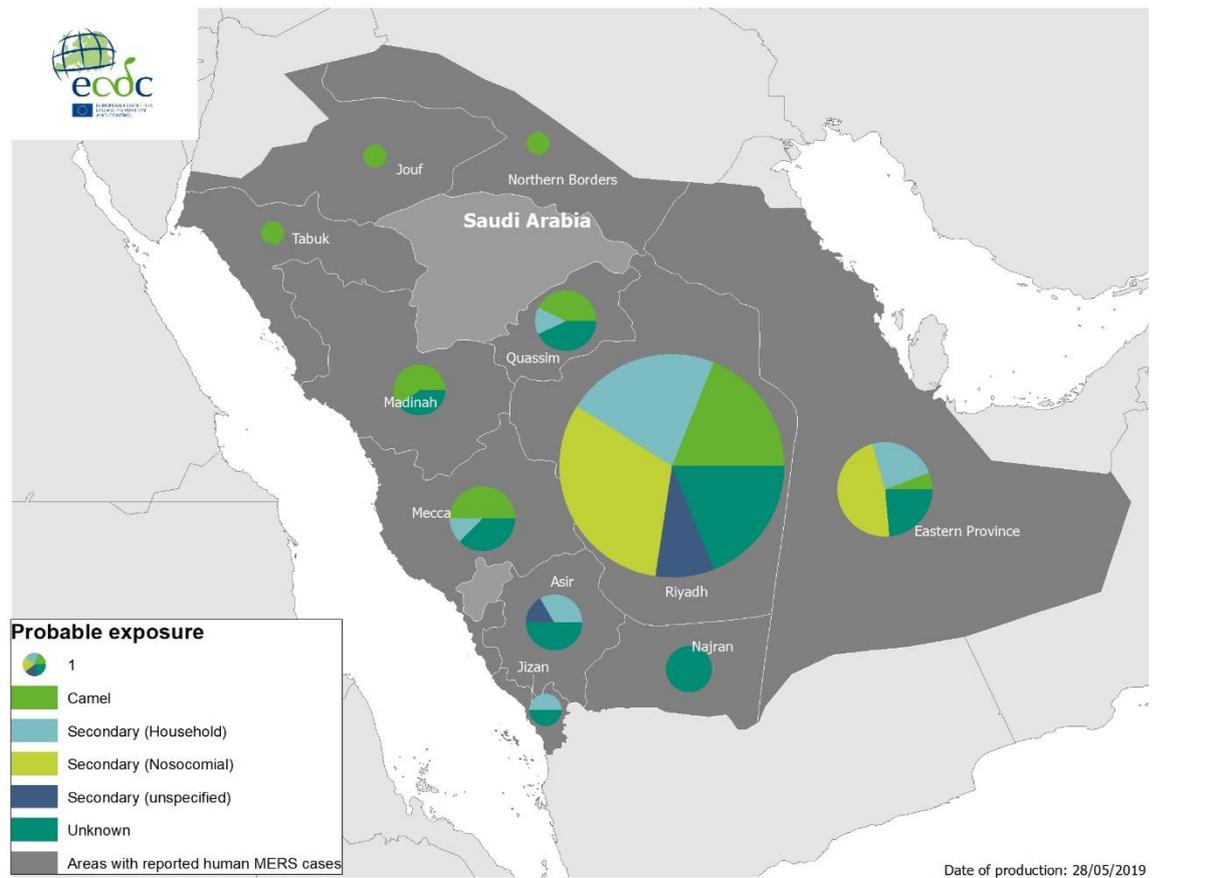
Although no cases of MERS-CoV infection have been associated with the hajj events since the discovery of the virus, the disease still raises a concern as outbreaks linked to camel contact and transmission in healthcare settings continue to be reported in Saudi Arabia [28,29]. As of 27 May 2019, 2 455 laboratory-confirmed cases of MERS-CoV, including 889 associated deaths (case-fatality rate: 36.2%) were reported globally (Figure 4); the majority of these cases were reported from Saudi Arabia, with 2 051 cases, including 793 related deaths with a case-fatality rate of 38.7% (Figure 5) [30]. Many of the primary cases reported direct camel contact or consumption of raw camel milk, while the secondary cases mostly occurred in healthcare settings. In 2019, two hospital outbreaks were detected in Wadi Aldwasir and Al-Kharj, Saudi Arabia, in January and April, respectively [30].

While camel contact is unlikely during participation in the hajj, pilgrims admitted to a hospital may become exposed to MERS-CoV. Transmission in home countries after travelling to a MERS-CoV-affected country has been documented in several instances, e.g. in the UK, France, and South Korea, albeit not in the context of the hajj [31-33].

**Figure 4. Worldwide distribution of confirmed MERS-CoV cases, by reporting country, April 2012 to 27 May 2019**



**Figure 5. Geographical distribution of confirmed MERS-CoV cases by probable region of infection and probable source of exposure, 2019 (as of 29 April 2019)**



## Antimicrobial resistance and healthcare-associated infections

High rates of antimicrobial resistance (AMR) in gram-negative and gram-positive bacteria are reported from the eastern Mediterranean region [34]. Increasing resistance in gram-negative bacteria have been reported for Saudi Arabia; this includes increases of carbapenemase-producing Enterobacteriaceae and carbapenem-resistant *Acinetobacter baumannii*, as well as hospital outbreaks of multidrug-resistant (MDR-)bacteria [35-38]. Local risk factors contributing to the emergence of AMR include over-the-counter use of antibiotics without prescription, heavy international travel due to the pilgrimage, a large population of expatriates, and challenges with adherence to infection control measures such as hand hygiene in hospitals [39].

A recent systematic review showed a high prevalence and/or a high risk of acquisition of MDR bacteria in pilgrims during the hajj [40]. Factors promoting the acquisition of MDR bacteria during the hajj include crowding, lack of food hygiene, lack of personal hygiene, and the acquisition of respiratory and gastrointestinal infections with subsequent antimicrobial use and healthcare exposure [40]. Pilgrims who acquire MDR bacteria abroad and return to their home countries represent a potential reservoir for onward transmission of MDR bacteria to the community and in hospitals.

## ECDC advice and WHO recommendations

ECDC strongly advises that adults and children travelling to Saudi Arabia are vaccinated with two doses of measles-containing vaccine and have up-to-date vaccinations against other diseases, in accordance with the national recommendations in their home countries [18,41].

In order to prevent food- and waterborne diseases, standard recommendations on food safety should be followed. There are also vaccines available against hepatitis A and typhoid fever. In the EU/EEA, hepatitis A vaccines are available as stand-alone vaccinations or in combination with HBV antigen or typhoid antigen. Typhoid vaccine is also available as a stand-alone vaccine.

WHO recommendations are available for childhood and for life-long protection against diphtheria, tetanus, pertussis, polio, hepatitis B, *haemophilus influenzae* type b, pneumococcal and rotavirus (infants only) infections, measles, mumps, rubella, typhoid, yellow fever and rabies [8]. The WHO position papers also provide travel recommendations. It is strongly recommended that non-immune pilgrims initiate, and ideally complete, their immunisations prior to travelling. If a primary course was not completed or a booster is routinely recommended, the schedule should be completed upon return to the home country [2].

Pilgrims should only use antibiotics when prescribed by a certified health professional. They should be advised to always follow their health worker's advice when using antibiotics, and not share or use leftover antibiotics. If pilgrims require hospitalisation within one year after returning from the hajj, they should be aware of the need to report their travel history and previous hospitalisations to their healthcare provider in order to consider the possible acquisition of antimicrobial-resistant (AMR) bacteria or MERS-CoV; this makes it possible to implement appropriate control measures in accordance with national guidelines.

## ECDC risk assessment

The hajj is one of the world's largest annual mass gathering events and may result in the transmission and importation of infectious diseases related to the crowded conditions during the pilgrimage. This may contribute to the international spread of diseases and the amplification of infectious disease outbreaks.

Despite a few outbreaks that have previously affected the EU after the hajj, the hajj poses a low risk for the importation and spread of communicable diseases in the EU because of the strict precautionary measures taken by Saudi Arabia.

## ECDC risk monitoring

ECDC monitors current outbreaks worldwide and publishes the results in the weekly Communicable Diseases Threat Report [42]. In addition, ECDC publishes an epidemiological update on detected events that could pose a public health threat to the EU/EEA Member States before the hajj in August 2019.

Based on the general risks during mass gathering events, and in accordance with the internal procedures applied to those events, ECDC will conduct enhanced epidemic intelligence surveillance for communicable diseases between 2 and 21 August 2019.

In the event of a Public Health Emergency of International Health Concern (PHEIC), or in the case of any disease outbreak subject to notification under the International Health Regulations 2005, the health authorities in Saudi

Arabia – following consultation with WHO – will take additional preventive precautions to avoid the spread of infection during and after the pilgrimage (in the pilgrim's country of origin) [2].

## Source and date of request

ECDC internal decision, 24 June 2019.

## Consulted experts

ECDC experts (in alphabetic order): Jordi Borrell Pique, Sergio Brusin, Laura Espinosa, Alice Friaux, Grazina Mirinaviciute, Thomas Mollet, Ariana Wijermans.

External experts: Dipti Patel, Director, NaTHNaC, United Kingdom.

All experts have submitted declarations of interest; a review of these declarations did not reveal any conflict of interest.

Experts from WHO have reviewed the risk assessment, but the views expressed in this document do not necessarily represent the views of WHO.

## Disclaimer

ECDC issues this risk assessment document based on an internal decision and in accordance with Article 10 of Decision No 1082/13/EC and Article 7(1) of Regulation (EC) No 851/2004 establishing a European centre for disease prevention and control (ECDC). In the framework of ECDC's mandate, the specific purpose of an ECDC risk assessment is to present different options on a certain matter. The responsibility on the choice of which option to pursue and which actions to take, including the adoption of mandatory rules or guidelines, lies exclusively with the EU/EEA Member States. In its activities, ECDC strives to ensure its independence, high scientific quality, transparency and efficiency.

This report was written with the coordination and assistance of an Internal Response Team at the European Centre for Disease Prevention and Control. All data published in this risk assessment are correct to the best of our knowledge at the time of publication. Maps and figures published do not represent a statement on the part of ECDC or its partners on the legal or border status of the countries and territories shown.

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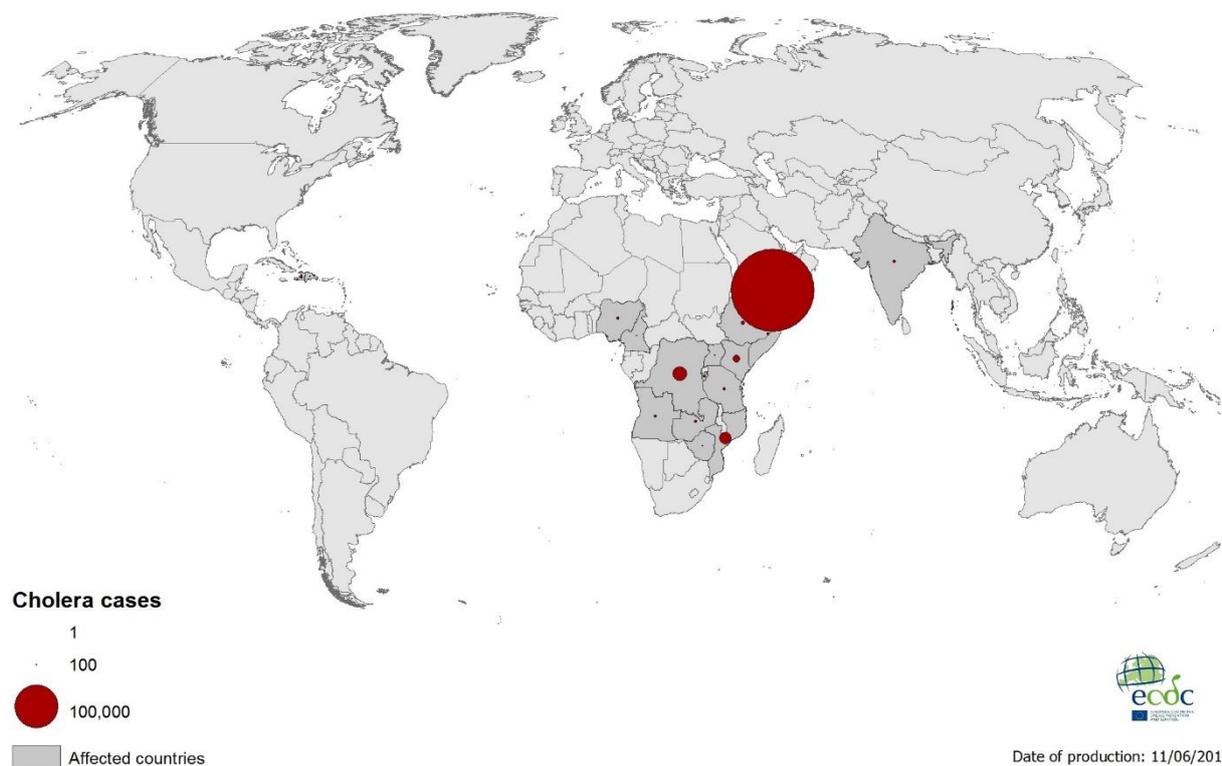
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## Annex 1. Risk for importation of communicable diseases into Saudi Arabia during the hajj

The risk of importation of communicable diseases into Saudi Arabia by hajj pilgrims is related to ongoing endemic infections and outbreaks in the pilgrims' home countries [43].

**Cholera:** In 2019, several cholera outbreaks have been reported in many countries, especially in the eastern African region and the Gulf of Aden. The largest outbreaks were reported in Yemen, the Democratic Republic of the Congo and Mozambique. This year (and as of 10 June), Yemen reported 386 715 cholera cases, including 656 deaths (CFR: 0.2%) [44]. Additionally, as of 12 May, the Democratic Republic of the Congo reported 10 469 suspected cholera cases, including 241 deaths (CFR: 2.3%) [45]. In Mozambique, in 2019 (and as of 22 April), OCHA reported 6 596 cholera cases, including eight deaths (CFR: 0.1%) [46].

**Figure 6. Worldwide distribution of cholera cases detected between January and June 2019**



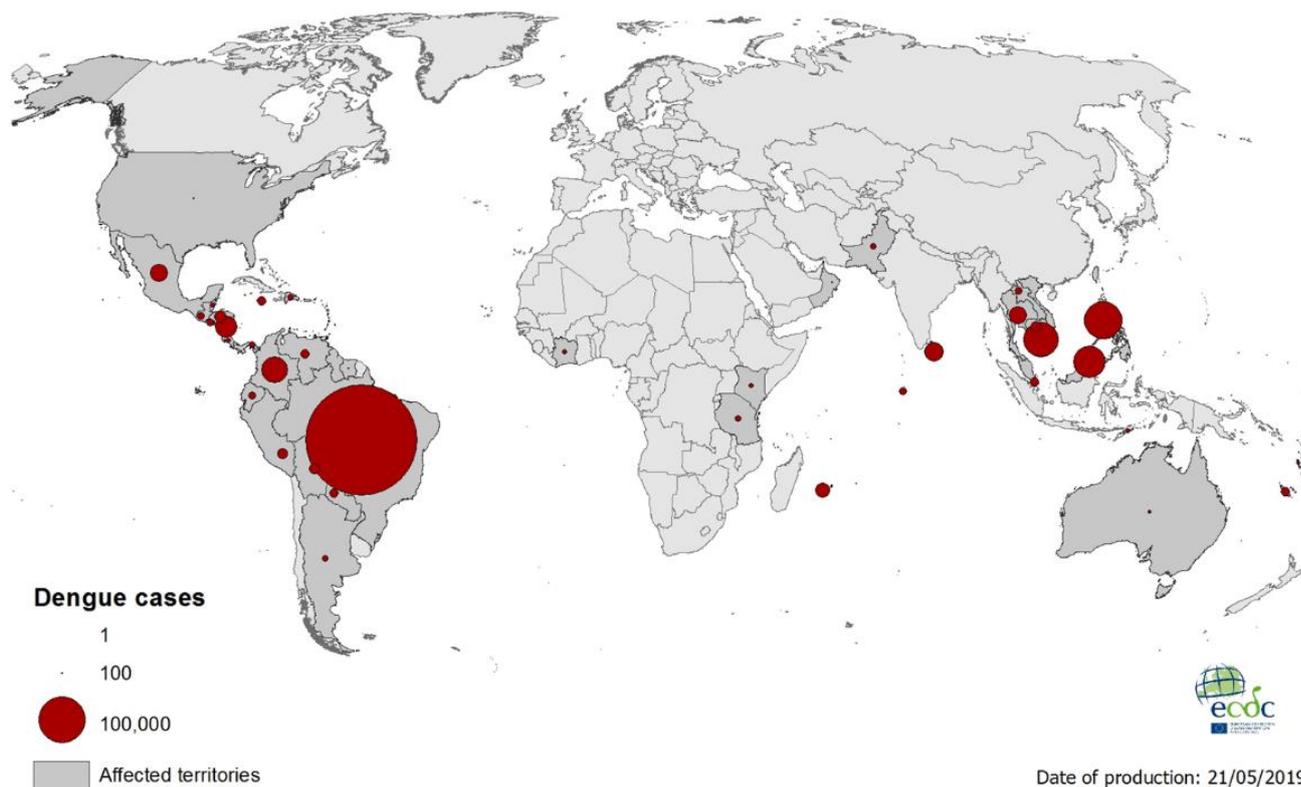
**Polio**: In 2019 (as of 5 June), a total of 29 wild poliovirus cases has been reported in Pakistan (21 cases) and Afghanistan (eight cases). Circulating vaccine-derived poliovirus type 2 was reported in Nigeria (eight cases), the Democratic Republic of Congo (one case), Somalia (two cases) and Niger (one case) [47].

**Diphtheria:** According to WHO, the diphtheria outbreak ongoing since 2018 in Yemen has reached 3 524 cases, including 203 deaths (as of 12 May 2019; CFR: 5.8%). An outbreak is also ongoing in Bangladesh, with 8 612 cases, including 45 deaths (CFR: 0.5%) between 2018 and 12 May 2019 [48]. In the Americas, Colombia, Haiti and Venezuela reported several confirmed diphtheria cases in 2018, while this year confirmed cases were reported in Haiti and Venezuela [49]. Additionally, in 2018, large diphtheria outbreaks were reported in India, Indonesia and the Philippines [50-52].

**Chikungunya and dengue** are associated with ongoing outbreaks in many countries. This increases the possibility of the introduction of these viruses through viraemic travellers.

**Dengue:** According to WHO, dengue is endemic in more than 100 countries, affecting mostly the Americas, south-east Asia and the western Pacific [53]. Recent outbreaks were detected in Tanzania, Kenya and Oman. It should be noted that underreporting of arboviruses is considered to occur in sub-Saharan Africa. ECDC monitors these global outbreaks through open source event-based surveillance; the maps below show the number of cases detected through event-based surveillance.

**Figure 7. Worldwide distribution of reported dengue cases from January to May 2019**



**Chikungunya** mostly occurs in Africa, Asia and the Indian subcontinent, in tropical and subtropical areas where *Aedes aegypti* and *Aedes albopictus* are found. Since 2013, autochthonous transmission has also occurred in the Americas region. Chikungunya virus has become a frequent cause of travel-associated febrile illness, and returning viraemic travellers can be the source of autochthonous transmission in areas suitable for arbovirus transmission [54]. In 2019, the largest outbreaks were reported in Brazil, the Republic of the Congo and Thailand. As of 23 March, Brazil reported 15 352 probable cases, including two confirmed deaths. Additionally, as of 14 April, there have been 6 149 suspected cases (with no deaths associated) reported in the Republic of the Congo. As of 13 May, Thailand reported 3 379 chikungunya cases (with no deaths associated) in 23 provinces across the country [55].

**Figure 8. Worldwide distribution of chikungunya cases detected between January and May 2019**



**Lassa fever** is known to be endemic in Benin, Ghana, Guinea, Liberia, Mali, Sierra Leone, and Nigeria. Sporadic cases can also be detected in other West African countries [56]. In 2019, as of 12 May, Nigeria has reported 2 426 suspected cases, 569 of which were confirmed [57]. The outbreak is widespread but with the highest concentration of cases in the south of the country relatively close to Lagos.

## Annex 2. Proposed informational text for hajj participants

### Advice for those making the hajj

#### Before leaving

Seek advice from healthcare providers on the health requirements and recommendations for Saudi Arabia. Follow recommendations issued by the Ministry of Health in Saudi Arabia and WHO; ECDC also produced health advice in this area.

You are required to provide proof of vaccination against meningococcal ACW135Y vaccine administered no less than ten days prior to arrival in Saudi Arabia in order to obtain an entry visa. Your immunisation schedule should be up to date with immunisations routinely administered in your EU country of residence, including vaccinations for measles, mumps and rubella (MMR) and diphtheria-tetanus-polio (see [ECDC vaccine schedule site.](#)) Additional vaccinations such as hepatitis A, hepatitis B, influenza, and rabies may be indicated.

#### During the hajj

- Pay attention to personal hygiene and food and water hygiene as this decreases the risk of gastrointestinal illnesses.
- Practise respiratory hygiene and cough etiquette to reduce the risk of respiratory infections.
- Practise insect and tick bite avoidance measures day and night.
- Visit only licensed barbers for shaving.
- Due to the expected high temperatures, all pilgrims should avoid direct exposure to the sun and drink sufficient amounts of fluids.

#### After the hajj

If you have symptoms suggestive of any type of infection, e.g. gastrointestinal or respiratory, seek medical attention immediately. Make sure you mention your travel history to your healthcare provider.

Due to the continuing reports of MERS-CoV disease in Saudi Arabia, seek immediate medical advice if you have a fever (38 °C and over), cough or difficulties breathing within 14 days of your return.

Report your travel history and previous hospitalisation to your healthcare provider if you require hospitalisation within one year after returning from the hajj. This is to ensure that the possible acquisition of antimicrobial-resistant (AMR) bacteria will be considered and that appropriate measures can be implemented in accordance with national guidelines for the prevention of AMR