

## Hajj 2009: a mass gathering in the context of pandemic A(H1N1)2009 influenza

### 1. Overview of the Hajj pilgrimage

The Hajj pilgrimage to Mecca, Saudi Arabia (cf figure 1.), is among the largest annual pilgrimages in the world. It is a religious obligation that must be carried out, by every physically-able Muslim who can afford to do so. The pilgrimage takes place from the 8th to the 12th day of the last month of the Islamic calendar. Since the Islamic lunar calendar year is 11 to 12 days shorter than the solar year, the pilgrimage month changes throughout the seasons. In 2009, Hajj is scheduled from **24 to 29 November**.

Around 3 million Muslim pilgrims from over 160 countries head to Mecca each year. The great majority (97%) arrive by air (mainly Jeddah), 1% by land, and 2% by sea. Note that many of those travelling by air pass through major international hubs on their way to Saudi Arabia.

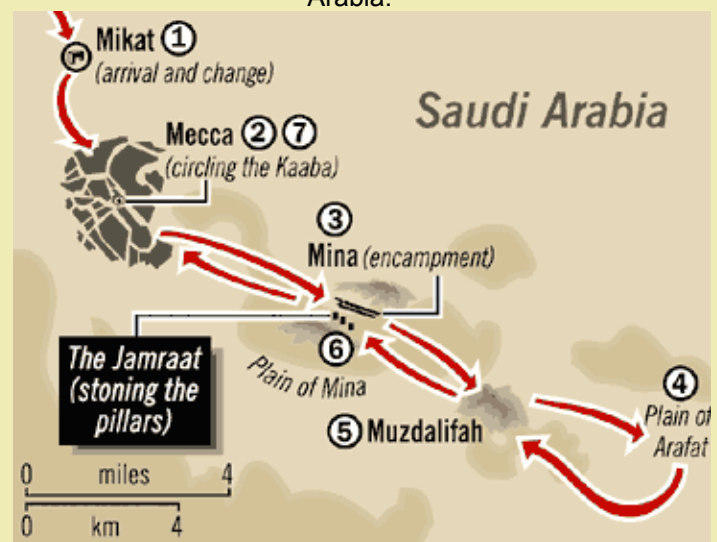
Pilgrims can also go to Mecca to perform the rituals at other times of the year. This is sometimes called the "lesser pilgrimage", or Umra. It is most frequently performed during the month of Ramadan that took place from 22 August to 19 September this year.

**Figure 1:** Mecca, Saudi Arabia



Pilgrims are requested to perform a series of rituals at specific holy sites and on specific days (and times) during Hajj. Figure 1. illustrates the obligatory steps of the process. The itinerary includes four different locations and is mostly done by foot, several barefoot. It also includes spending one night outdoors as well as the ritual of animal sacrifice on the 10<sup>th</sup> day of the month i.e. on 26/27 November in 2009. Although not part of the itinerary strictly speaking, many pilgrims travel to the city of Medina north of Mecca, where the Prophet Mohammed is buried.

**Figure 2.** Pilgrims itinerary: Mecca and holy sites, Saudi Arabia.



Mass gatherings of the magnitude of Hajj often present challenges for public health authorities and strain health infrastructure. Moreover, the specific characteristics of Hajj (summarised in box 1.) including concentration of millions of people including many from developing countries and elderly, for a relatively long period (up to a month) and with an itinerary favouring crowd movement, are likely to favour infectious disease spread and increase the risk of non-communicable conditions such as injuries. Thus, preparedness and response plans are elaborated and revised every year by Saudi health authorities in order to ensure a "healthy" Hajj.

## 2. Main health risks associated with Hajj

The main Hajj-related health events recorded are attributable to non-communicable diseases: heat stroke, injuries, stampedes (human crush), causing in some instances hundreds of deaths. In 2006, 51% of deaths occurring at Hajj were due to injuries.

More occasionally, infectious disease outbreaks have been described: large outbreaks of meningococcal infections (in 1987, 2000, 2001), dengue (exported to pilgrims' countries of residence), respiratory infections (influenza, TB) and gastrointestinal illness.

Based on repeated Hajj experiences, Saudi health authorities regularly update health requirements. Up till May 2009, pilgrims had to fulfil the following for obtaining visas to Saudi Arabia (cf [Saudi Arabian health requirements for visas](#)):

- Provide proof of vaccination against:
  - yellow fever vaccine for pilgrims coming from endemic countries.
  - meningococcal meningitis (ACYW135).
  - polio for those coming from still prevalent/polio virus transmitting countries.
- Seasonal influenza vaccination was recommended especially for high risk groups (elderly, pilgrims with chronic diseases, etc.).
- Respect prohibition of food items upon entry to Saudi Arabia.

## 3. A special context for Hajj 2009: the A(H1N1)2009 influenza pandemic

### 3.1. A(H1N1)2009 epidemic in Saudi Arabia:

The first confirmed case of A(H1N1)2009 in Saudi Arabia was reported in June 2009. As of 19 November 2009, over 7000 cases have been confirmed and over 23 000 cases clinically diagnosed across the country. A(H1N1)2009 death toll reaches 81.

### 3.2. Little evidence of importation of A(H1N1)2009 cases from Saudi Arabia:

Since the beginning of the pandemic, attendance of Mecca (and Medina) pilgrimage among cases of A(H1N1)2009, has not been systematically described upon the return of pilgrims. Thus, the potential role played by pilgrimage to Saudi Arabia in the spread of the A(H1N1)2009 influenza virus to other countries cannot be documented. Cases among pilgrims returning from Umra have been reported in Algeria, Egypt (including the 1st A(H1N1)2009 related death), Iran, Lebanon, Palestine and Turkey.

## 3.3. Results from the Umra pilgrimage during Ramadan 2009:

According to Saudi health authorities, during the month of Ramadan (the preferred period for Umra):

- 218 confirmed cases of A(H1N1)2009 were reported in Mecca. 8 were Umra pilgrims.
- 132 confirmed cases were recorded in Medina including 17 among visitors to Prophet's Mosque.
- No deaths related to A(H1N1)2009 were reported.

## 4. Public health initiatives addressing concern over Hajj and A(H1N1)2009

Major concerns have risen over the impact that a large international gathering could have on the spread of A(H1N1)2009 worldwide. Thus, early in the course of the pandemic, an [“International consultative workshop on preventive measures against infectious disease for Hajj and Umra”](#), was held in Jeddah from 27 to 30 June 2009 followed by a [special session of the Regional Committee of the WHO Eastern Mediterranean Region on pandemic A/H1N1/2009](#) on 22 July 2009 in Cairo, Egypt to tackle the issue. (WHO further disseminated recommendations on 13 November 2009 in [conditions for travellers to Saudi Arabia](#)).

### 4.1. Health requirements for obtaining visas to Saudi Arabia (Hajj 2009):

Based on recommendations from the experts' consultations, Saudi health authorities adapted and updated previous health requirements for Hajj 2009 by adding the following:

- Vaccination against influenza A(H1N1)2009 (to be taken two weeks before applying for visa).
- Pilgrims aged under 12 and over 65 years and those suffering from chronic diseases such as heart, liver and kidney disease as well as complications of diabetes, obesity or any other diseases affecting the health and immunity, as well as pregnant women are encouraged to postpone Umra and Hajj this year. (cf [Saudi embassy health requirements November 20 2009](#)).

*For seasonal influenza and pandemic A(H1N1)2009 vaccines, Saudi Arabian embassies contacted health authorities in all countries to assess the availability of vaccine provision for Hajj 2009. For countries with available vaccines, proof of both vaccinations would be required by competent authorities before issuing visas. For countries where vaccines are not available, visas to pilgrims would be issued by responsible health authorities ([WHO EMRO, 15 November 2009](#)).*

## 4.2. Preparedness and response for the A(H1N1)2009 influenza pandemic at Hajj 2009:

Saudi Arabia health authorities consulted international experts in mass gatherings in their elaboration of a preparedness and response plan aiming to preserve the health of pilgrims and mitigate disease transmission on their return from Saudi Arabia (Memish *et al.* 2009).

Experts' recommendations were taken into account including:

- Adherence to good personal hygiene measures, including cough etiquette, use of antiseptic hand gels, and frequent hand washing with soap and water.
- Planning and provision of appropriate amounts of antiviral drugs for H1N1 treatment and prophylaxis for Hajj pilgrims.
- Planning adequate human and technical capacity for Saudi reference laboratories.
- Planning sufficient and adequate quarantine and isolation facilities.
- Strengthening surveillance and reporting systems in Saudi.

Additional measures implemented by Saudi Ministry of health included:

- Screening (thermal cameras etc.) and temporary quarantines at points of entry,
- Vaccination of Mecca and Medina residents against A(H1N1)2009 as a priority target group, in addition to Saudi pilgrims and Hajj-related workers/personnel (vaccines available end of November 2009).
- Planning sufficient health capacity to attend pilgrims suffering influenza-like illness, including providing free influenza treatment to any pilgrim needing it while on Hajj.
- Implementation of enhanced surveillance for A(H1N1)2009 by health authorities, among other priority diseases (meningococcal meningitis, viral hemorrhagic fevers, foodborne diseases, acute diarrhea, plague and polio).

## 5. Measures taken by pilgrims' main countries of origin regarding A(H1N1)2009 influenza pandemic.

Countries most concerned by Hajj have endorsed recommendations from Saudi Arabia regarding postponing the pilgrimage till next year for high risk groups (*age <12yrs and >65yrs, pregnancy, underlying conditions*). Most countries had targeted future pilgrims with specific awareness campaigns in the past months. Out of 25 countries for which information was available<sup>1</sup> 3 countries had banned attending Umra this year.

However, only one currently bans attending Hajj. Some countries have reduced quota numbers for Hajj pilgrims in 2009.

Countries that usually provide on site medical services to their pilgrims every year in Saudi Arabia have reinforced the capacity of their mobile units. Some have set up specific programs for the follow-up of pilgrims upon their return from Hajj.

Requirements for allowing departure to Saudi Arabia vary among pilgrims' countries of origin. Most countries concentrating large Muslim populations have designated specific medical structures for examining future Hajj travellers and delivering mandatory certificates (the content of which depends on the country's regulations: "free of influenza symptoms, "with no chronic diseases", "vaccinated against A(H1N1)2009" etc.).

At least 7 countries expecting large numbers to attend Hajj 2009 defined pilgrims as a priority group for vaccination against A(H1N1)2009.

## 6. Conclusion

From 24 to 29 November 2009, Hajj will gather around 3 million pilgrims from nearly all over the world. This mass gathering will take place as A(H1N1)2009 influenza virus circulation is already intense in many countries. For those countries already quite affected by the pandemic, Hajj will probably have limited impact. On the other hand, in countries so far less affected, and with large numbers of residents attending Hajj this year, the impact could be more significant.

Results from surveillance of A(H1N1)2009 during Umra during the month of Ramadan 2009, showed little impact of the gathering on the evolution of the epidemic of A(H1N1)2009 in Mecca and Medina. However, these results cannot be extrapolated to Hajj as it concentrates much larger numbers of people than Umra. Moreover, Hajj will take place at a later stage in the course of the pandemic.

Although pilgrims are considered by many countries with large Muslim populations as priority target groups for immunisation against influenza virus A(H1N1)2009, many developing countries will probably have limited access to the vaccine and therefore will not be in a position to vaccinate all pilgrims.

<sup>1</sup> Algeria, Bahrain, Bangladesh, China, Egypt, France, India, Indonesia, Iran, Iraq, Lebanon, Libya, Malaysia, Morocco, Nigeria,

Oman, Pakistan, Qatar, Saudi, Senegal, Syria, Tunisia, Turkey, United Arab Emirates, Yemen.



## 7. References

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### Box 1. Characteristics of the Hajj pilgrimage.

#### **Population**

- Around 3 million people from over 160 countries
- Different epidemiological profiles, susceptibility
- High population density, reaching 7 persons /m<sup>2</sup>
- All age categories represented but many elderly (~25% aged ≥ 65 yrs old), many with underlying health problems
- Many underprivileged populations (low socio-economic status, difficult access to advanced health care).

#### **Duration**

- Long stays up to a month, often combined with visits to the Prophet's Mosque in Medina.

#### **Location**

- Various locations (figure 2)
- Open air, no shelters
- Massive crowd movement (running between 2 hills, circling the Kaaba building 7 times)

#### **Accommodation**

- Crowded temporary housing
- Camping
- Open air sleeping spaces

#### **Food and water supplies**

- Many street vendors (possibility of inadequate preparation and storage of food)
- Consumption of tap water despite free distribution of drinking water

#### **Environmental conditions**

- Extreme heat (male pilgrims not allowed to cover their head)
- Seasonal changes in Hajj
- Presence of vectors (dengue fever, rift valley fever described in Saudi Arabia),

#### **Others**

- Potentially risky practices (walking barefoot, shaving heads, “stoning of the devil” ritual (throwing stones), sheep sacrifice etc.).

#### **Main health events**

- Majority of non communicable diseases: injuries, heat-related illness
- Infectious diseases: meningococcal meningitis, respiratory infections, gastro-intestinal illness.