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Title: Mitigating the Risks of Global Spread of Lassa fever at the 2018 Hajj pilgrimage

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Okokhere and colleagues' (*Lancet Infect Dis. 2018 Mar*) analyses of 284 hospitalized Nigerian Lassa fever cases showing a 24% mortality rate is a timely reminder of the persistent threat to global health security of lethal viral hemorrhagic fevers. Nigeria is currently experiencing a Lassa Fever outbreak, with at least one case across 20 states, 81% of cases being predominantly from 3 states (Edo, Ondo, Ebonyi). Mortality was 24.8% in 408 positive cases (1781 suspected) between January 1st and 8th of April 2018.¹ Twenty-seven health care workers have been infected. Lassa fever features prominently in the 2018 WHO Blueprint of priority list of global infectious diseases threats² due to its epidemic potential and high mortality rate. Imported primary and secondary cases of Lassa fever have been described in industrialized countries.³

Every year over 10 million pilgrims from 184 countries gather in Saudi Arabia for the Hajj or the Umrah.⁴ A substantial number of pilgrims are elderly with comorbid diseases.⁴ Nearly 100,000 pilgrims from the four countries in West Africa where Lassa fever is endemic, and from areas with recent outbreaks participated at the 2017 Hajj (**Table 1**). In 2018, pilgrims are expected in May and August for the Ramadan and the Hajj. Mitigating risks of global spread of Lassa fever is important since the virus is spread via contact with body fluids. Furthermore, the diagnosis can be easily missed with an incubation period up to 21 days, and only 20% of patients developing symptoms, usually nonspecific, eg fever, cough, sore throat and diarrhea. These are very common in all pilgrims. Hemorrhage, respiratory distress, repeated vomiting, facial swelling, shock occur in 20% of symptomatic cases. Mainstay of management is early diagnosis, isolation, early initiation of ribavirin and supportive care.

There are no effective Lassa fever vaccines despite its first discovery in 1969. Restriction of visas to pilgrims from affected countries is unrealistic. A high level of vigilance for surveillance, early diagnosis, easy access to rapid diagnostic tests and use of appropriate personal protection equipment and instituting infection control measures are needed in febrile Muslim pilgrims from West Africa. Regarding the current outbreak in Nigeria, it is pertinent that most confirmed cases have been from states with predominantly non-Muslim populations. However, the Saudi authorities, the West African Health Organisation (WAHO), WHO-EMRO and the newly formed

Africa Centres for Disease Control and Prevention⁵ should increase co-operation and collaboration towards strengthening surveillance and implementing established preventive strategies- pre-travel, during pilgrimage and upon return. These include long term plans for joint surveillance, laboratory networks, effective public health workforce, promotion of continuous quality evidence base, and strengthening national and international responses for protecting global health security.

Author declarations:

Authors declare no conflicts of interest. All authors are associated with the Global Centre for Mass Gatherings Medicine. All authors contributed equally to this article.

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Table 1.

Numbers of Hajj pilgrims originating from Lassa fever endemic West African countries

Countries where the majority of Lassa fever cases are reported	Numbers of pilgrims at the 2017 Hajj*
Benin (outbreak in 2016)	1104
Burkina Faso (outbreak in 2018)	7101
Guinea (endemic)	6175
Liberia (endemic)	147
Nigeria (endemic)	82108
Sierra Leone (endemic)	254