

Perspective

# Establishing Medical Coverage and Epidemiological Surveillance during the Grand Magal of Touba in Senegal: A Public Health Need

Cheikh Sokhna<sup>1,2,\*</sup>, Balla Mbacké Mboup<sup>3</sup>, Ndiaw Goumbala<sup>2</sup>, Mamadou Dieng<sup>3</sup>, Ahmadou Bamba Sylla<sup>3</sup>, Didier Raoult<sup>4</sup>, Philippe Parola<sup>1</sup>, Philippe Gautret<sup>1</sup>

<sup>1</sup>Aix Marseille University, IRD, AP-HM, SSA, VITROME, IHU-Méditerranée Infection, Marseille, France

<sup>2</sup>VITROME, Campus International IRD-UCAD de l'IRD, Dakar, Senegal

<sup>3</sup>Région Médicale de Diourbel, Diourbel, Senegal

<sup>4</sup>Aix Marseille University, IRD, AP-HM, MEPHI, IHU-Méditerranée Infection, Marseille, France

## ARTICLE INFO

### Article History

Received 24 January 2020

Accepted 18 May 2020

### Keywords

Mass gathering  
 Covid-19  
 surveillance system  
 Grand Magal of Touba  
 Senegal

## ABSTRACT

The Grand Magal is a religious pilgrimage that takes place in Senegal. An estimated 4–5 million individuals yearly gather in the holy city of Touba. Pilgrims come from the whole Senegal and surrounding countries and from countries outside of Africa where Mouride Senegalese emigrated. It is the largest Mass Gathering (MG) event of the Mouride community and the largest Muslim religious MG in West Africa. The context of the Grand Magal MG is unique given its location in a tropical developing country and its international component which may favour the globalization of local endemic diseases and warrants investment in modern methods for public health surveillance and planning of the event.

© 2020 The Authors. Published by Atlantis Press International B.V.

This is an open access article distributed under the CC BY-NC 4.0 license (<http://creativecommons.org/licenses/by-nc/4.0/>).

In December 2019, an outbreak of a new disease named COVID-19, caused by a novel coronavirus known as SARS-Cov2, appeared in Wuhan, China [1]. COVID-19 has spread rapidly around the world. About 213 countries are currently affected and 2,549,632 cases and 175,825 deaths have been confirmed worldwide [2]. On 2 March 2020, Senegal registered its first confirmed case of SARS-Cov2 that had been imported from France. On 2 May 2020, the number of confirmed cases went up to 1115, including 161 in the holy city of Touba, in the region of Diourbel, where the Grand Magal of Touba (GMT) is celebrated [3].

The GMT is the largest Muslim Mass Gathering (MG) in Africa between 4 and 5 million pilgrims each year estimated to celebrate the departure into exile of the Cheikh of the Mouride community, who was deported to Gabon by the French authorities in 1895 [4]. The context of the GMT is unique in Africa (Figure 1). Over the course of 1 week, it brings together several million people, in a limited geographical area (the holy city of Touba and its outskirts). On the occasion, pilgrims from all Senegal and even from abroad, flock to this city using all available means of transport, with all the attendant risks of road accidents. These people are of all ages: children under five, teenagers, young and old men and women, elderly people, in varying states of physical health and from all social and economic strata. During the GMT, the total population of pilgrims is six times

the usual population of Touba according to data collected during the 2005 cholera outbreak, based on mobile phones belonging to people travelling to Touba from all over the country [5]. A pilot study conducted in 2017 among GMT pilgrims from the villages of Dielmo and Ndiop showed that 41.8% of participants reported respiratory symptoms, and an acquisition of rhinovirus (13.0%), coronavirus (16.0%) and adenovirus (4.6%) [6]. Finally, a prevalence of influenza infections (42.3%) higher than in any other studies conducted in Senegal was reported in GMT patients [Unpublished data]. It is likely that the crowded conditions of the GMT encourage the transmission of influenza, as observed in other MG settings [7].

Mass gathering participants are often exposed to high risks of the increased transmission of infectious diseases, especially respiratory diseases [8]. The current COVID-19 pandemic poses serious public health challenges across the globe and experts have recommended cancellation of the Hajj pilgrimage to Mecca, which is planned in July early August 2020, and of the Tokyo Olympic Games, planned from 24 July to 9 August 2020 [9]. Human coronavirus circulation (notably 229E) has already been demonstrated at the Hajj and at the Olympic games [10,11].

Nevertheless, it is too early to consider cancelling the GMT, which is scheduled to take place from 5 or 6 October 2020, according to the Muslim calendar. It will be necessary to monitor the progress of the COVID-19 pandemic within Senegal and around the world [12]. If the GMT is maintained, it will be necessary to take very

\*Corresponding author. Email: [cheikh.sokhna@ird.fr](mailto:cheikh.sokhna@ird.fr)



**Figure 1** | Grand Magal de Touba in 2019, the largest mass gathering in Senegal.

strict sanitary measures to limit the propagation of infectious disease, especially COVID-19. There is, therefore, an absolute need to set up effective surveillance, in particular epidemiological surveillance, to prevent all these risks, and more generally to ensure that the resident populations and pilgrims benefit from the monitoring needed to prevent the emergence of new diseases or the decompensation of pre-existing diseases. A good health surveillance system is evidently conditions upon on an adequate information system, with tools for collecting information. A good sanitary system must cover all these aspects. Senegal is a member of the WHO and has adopted the IHR (International Health Regulations) that governs the surveillance of large gatherings, which stipulates that infectious diseases must be reported in real time. The GMT is a source of health risks that must be detected and managed quickly and the emergence or the spread of communicable infectious diseases is the main risk. Due to the international dimension of the GMT, these diseases may even spread beyond borders.

## CONFLICTS OF INTEREST

The authors declare they have no conflicts of interest.

## AUTHORS' CONTRIBUTION

CS, NG wrote the first draft of the paper. MMM, MD, ABS, DR, PP and PG reviewed the paper. All authors have approved the final version of the paper.

## REFERENCES

- [1] Lai CC, Shih TP, Ko WC, Tang HJ, Hsueh PR. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease-2019 (COVID-19): the epidemic and the challenges. *Int J Antimicrob Agents* 2020;55:105924.
- [2] World Health Organization. Coronavirus disease (COVID-19) outbreak situation; 2020. Available from: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019> (accessed April 23, 2020).
- [3] Le Ministère de la Santé et de l'Action sociale. Sitrep 14: Coronavirus: Riposte à l'épidémie du nouveau Coronavirus COVID-19, Sénégal. Rapport de Situation N° 14 du 23 avril 2020. Available from: <http://www.sante.gouv.sn/activites/sitrep-14-coronavirus-riposte-%C3%A0-l%C3%A9pid%C3%A9mie-du-nouveau-coronavirus-covid-19-s%C3%A9n%C3%A9gal-rapport> (accessed April 24, 2020).

- [4] Sokhna C, Mboup BM, Sow PG, Camara G, Dieng M, Sylla M, et al. Communicable and non-communicable disease risks at the *Grand Magal* of Touba: the largest mass gathering in Senegal. *Travel Med Infect Dis* 2017;19:56–60.
- [5] Finger F, Genolet T, Mari L, de Magny GC, Manga NM, Rinaldo A, et al. Mobile phone data highlights the role of mass gatherings in the spreading of cholera outbreaks. *Proc Natl Acad Sci U S A* 2016;113:6421–6.
- [6] Hoang VT, Goumballa N, Dao TL, Ly TDA, Ninove L, Ranque S, et al. Respiratory and gastrointestinal infections at the 2017 Grand Magal de Touba, Senegal: a prospective cohort survey. *Travel Med Infect Dis* 2019;32:101410.
- [7] Memish ZA, Steffen R, White P, Dar O, Azhar EI, Sharma A, et al. Mass gatherings medicine: public health issues arising from mass gathering religious and sporting events. *Lancet* 2019;393:2073–84.
- [8] Abubakar I, Gautret P, Brunette GW, Blumberg L, Johnson D, Pomeroy G, et al. Global perspectives for prevention of infectious diseases associated with mass gatherings. *Lancet Infect Dis* 2012;12:66–74.
- [9] Ahmed QA, Memish ZA. The cancellation of mass gatherings (MGs)? Decision making in the time of COVID-19. *Travel Med Infect Dis* 2020;34:101631.
- [10] Hoang VT, Sow D, Dogue F, Edouard S, Drali T, Yezli S, et al. Acquisition of respiratory viruses and presence of respiratory symptoms in French pilgrims during the 2016 Hajj: a prospective cohort study. *Travel Med Infect Dis* 2019;30:32–8.
- [11] Valtonen M, Waris M, Vuorinen T, Eerola E, Hakanen AJ, Mjosund K, et al. Common cold in Team Finland during 2018 Winter Olympic Games (PyeongChang): epidemiology, diagnosis including molecular point-of-care testing (POCT) and treatment. *Br J Sports Med* 2019;53:1093–8.
- [12] Sokhna C. Senegal faces the coronavirus disease –19 challenge. *Travel Med Infect Dis* 2020;101687.