

**Real-Time Surveillance of Infectious Diseases and Other Health Conditions during Iraq's
Arbaeenia Mass Gathering: A Teaching Case-Study**

Student's Guide

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Abstract

Mass gatherings (MGs) are public events attended by many people and held for many reasons. Mass gatherings can exert a strain on local resources like food, drinks, and accommodations, and can add burden to host countries and to travelers' countries of origin. The most common religious mass gatherings in the Middle East are the Hajj at Mecca in Saudi Arabia and the Arbaeenia in Karbala in Iraq. The growing number of individuals who attend the annual Arbaeenia mass gathering can lead to increased risk of transmission and importing of infectious diseases, therefore there is a need to develop a simple surveillance system to detect several health conditions.

The goal of this case study is to build the capacity of trainees to implement real-time surveillance during mass gatherings. This case study stimulates the students to define mass gatherings, implement a surveillance system during mass gatherings, analyse surveillance data, and establish a plan to decrease the burden on the health system. The case study is designed for novice field epidemiology trainees. The case study can be completed in 3-4 hours. Used as adjunct training material, the case study provides the trainees with competencies to determine the appropriate type of surveillance system to be used during mass gatherings.

Keywords: Mass gathering; real-time surveillance; health system

How to Use the Case Study

General instructions: This case study should be used as adjunct training material for novice epidemiology trainees to reinforce the concepts taught in prior lectures. The case study is ideally taught by a facilitator in groups of about 20 participants. Participants are to take turns reading the case study, usually a paragraph per student. The facilitator guides the discussion on possible responses to questions. The facilitator may make use of flip charts to illustrate certain points. Additional instructor's notes for facilitation are coupled with each question in the instructor's guide to aid facilitation.

Audience: This case study was developed for novice field epidemiology students. These participants are commonly health care workers working in the county departments of health whose professional background may be medical doctors, nurses, environmental health officers or laboratory scientists who work in public health-related fields. Most have a health science or biology background.

Prerequisites: Before using this case study, participants should have received lectures on surveillance during Mass gathering.

Materials needed: Flash drive, flip charts, markers, computers with MS Excel

Level of training and associated public health activity: Novice – Surveillance of mass gathering.

Time required: 2-3 hours

Language: English

Goal of Case Study

The goal of this case study is to build the capacity of trainees to implement real-time surveillance during mass gatherings.

Learning Objectives

By the end of the teaching session, participants will be able to:

1. Define mass gatherings and identify the types of mass gatherings.
2. Determine the reasons why mass gatherings place burdens on health systems including surveillance systems.
3. Define public health surveillance and its types.
4. Determine the appropriate type of surveillance system to be used during mass gatherings and the justification to use this type.
5. Develop a data collection tool and the variables it contains.
6. Conduct descriptive analysis of the provided data and illustrate the data using graphs.
7. Prepare a plan to decrease the burden on the healthcare system

Introduction:

Mass gatherings (MGs) are public events attended by a large number of people and held for many reasons. MGs can exert a strain on local resources like food, drinks, and accommodation, and can pose a health risk to the population [1] and add burden to the host countries and to travelers' countries of origin. The most common religious mass gatherings in the Middle East are the Hajj at Mecca in Saudi Arabia, which occurs annually, and the Arbaeenia in Karbala in Iraq [1].

Part 1: Story

Arbaeenia is the largest religious mass gathering in Iraq and it convenes in Karbala. During Arbaeenia, Shi'a Muslims commemorate the 40 days following the day of the martyrdom of Hussein bin Ali. During this event, more than 10 million visitors from within and outside of Iraq come to visit Imam Hussein's shrine in Karbala. Most of those visitors walk hundreds of kilometers for many days to reach Karbala [2,3].

The growing number of individuals who attend this event annually can lead to increased risk of transmission and importing of infectious diseases, therefore we need to develop a simple surveillance system to detect several health conditions during mass gathering. The Eastern Mediterranean Public Health Network (EMPHNET) collaborated with the Iraq Field Epidemiology Training Program (FETP) and the Iraq Ministry of Health to apply real-time surveillance to several common health conditions during the Arbaeenia mass gathering in Iraq between November 12th, 2016 and November 22nd, 2016.

Part 1 questions:

Question 1. Define mass gatherings and include the types of MGs? Give an example of each one.

Question 2. Determine the reasons why MGs place burdens on health system including their surveillance systems?

Question 3. Given that national and local authorities have preparedness plans in place and the resources to effectively manage the gathering [2], describe the themes for preparedness of mass gathering?

Question 4. Define public health surveillance and list the types of surveillance systems?

Question 5. What are the health events that could be detected by surveillance systems during MGs?

Part 2: Methods

A total of 60 data collectors took part in the field data collection over a period of 11 days (between November 12th, 2016 and November 22nd, 2016). Data was collected from 20 healthcare facilities along the major route from Najaf to Karbala (10 health care facilities in each governorate). All patients that visited the facilities over this period of 11 days were interviewed. *Figure 1* shows the map indicating the major routes for visitors travelling on foot during the annual MG [1].



Figure 1 Map indicating the major routes for visitors travelling on foot during the annual Arbaeenia religious mass gathering

Part 2 Questions

Question 6. What type of surveillance system would be most appropriate for use during the MG? Justify your answer.

Question 7. How should the data be collected and transmitted?

Question 8. What information should be collected?

A total of 20 tablets were provided to the field team (1 for each health care facility), and the Data4Action software platform was installed on the tablets to implement the survey tool [1].

Question 9. What are the acute infectious conditions that should be included in the survey tool?

Part 3: Results

A total of 41,689 patients visited the 20 healthcare facilities over a period of 11 days between November 12th, 2016 and November 22nd, 2016. The total number of patients, according to each facility, ranged from 383 to 4346 showing that some health facilities recorded considerably more cases than the others, possibly due to their locations [1].

Question 10. Of the total number of patients, about 33.3% were females and 66.7% were males, Draw a graph to present this data?

Question 11. More than three quarters of the patients that visited healthcare facilities were between 20-59 years of age and 66.7% of patients were males, how do you explain these statistics?

Question 12. About 23,554 patients were from Iraq, 16,217 were from Iran, 584 were from Bahrain, and 1334 were from other countries. Calculate the percentages of visitors from different countries. How would you present this data and what can you learn from these results?

Question 13. About 24,398 patients had acute or infectious conditions and symptoms, 13,799 had chronic conditions, 9,974 had traumas or injuries, 11,762 had joint pain, and 133 had chronic dermatologic conditions. Calculate the percentages for these conditions. How would you present this data and what can you learn from these results?

Question 14. Construct a representative graph of the results in *Table 1*. What insights can you gain from the graph?

Table 1. The distribution of acute or infectious conditions among patients who attended health care facilities during Iraq's Arbaeenia Mass Gathering, November 2016

Acute conditions or symptoms	Count, n (%)
Fever and cough or flu	16,711 (68.49)
Food poisoning	1526 (6.25)
Acute bloody diarrhea	1470 (6.03)
Acute dermatological conditions	1465 (6.01)
Acute watery diarrhea	1214 (4.98)
Fever and bleeding tendency	982 (4.03)
Fever and rash	624 (2.56)
Other acute illnesses	2610 (10.69)

Question 15. About 55.3% of chronic conditions were hypertension and 26.1% were Diabetes mellitus, 11.8% were asthma, 3.5% were ischemic heart pain and 2.3% were other chronic diseases, draw a graph of this data and describe what insight you have learned from the graph.

Question 16. About 68.5% of injuries were blisters, 26.2% were wounds, 4.3% were accidental injuries, and 1% were fractures, how would you present this data?

Part 4: Discussion

MGs create favorable conditions for infectious disease transmission. Statistics from our study showed that more than half (58.5%) of patients presented acute symptoms or infectious

conditions. Other studies have previously emphasized that there is an increased risk of infectious disease outbreaks during mass gatherings. Mass gatherings may also exacerbate non-communicable diseases (NCDs) and chronic conditions, which may lead to emergency and hospital admissions [1].

Question 17. How do you explain the high risks of infectious disease outbreaks during MGs?

Question 18. Our study showed that one third of people that visited health care facilities had NCD problems, explain why there is an increase of these cases during MGs?

Question 19. Our study showed that there is an increase in injuries during MGs; explain this finding and list your recommendations to solve this problem?

Question 20. During the Arbaeenia MG, one quarter of patients with injuries presented complained from joint pain; explain the possible reasons for this?

Part 5: Case study conclusion

In conclusion, the Arbaeenia mass gathering in 2016 exerted burden on the health care system of Iraq.

Question 21. If you were tasked with creating a plan to decrease the burden on the health care system, what are the most important points that you would include in this plan?

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References

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Resources and reading materials

Andrzej Zielioski, Barbara Pawlak. Toolbox for Implementation of Surveillance at Mass Gatherings.

https://www.rki.de/EN/Content/Institute/DepartmentsUnits/InfDiseaseEpidem/Div32/React/Work/wp4/WP_4_ToolBox.pdf?__blob=publicationFile. Accessed 20 June 2020.