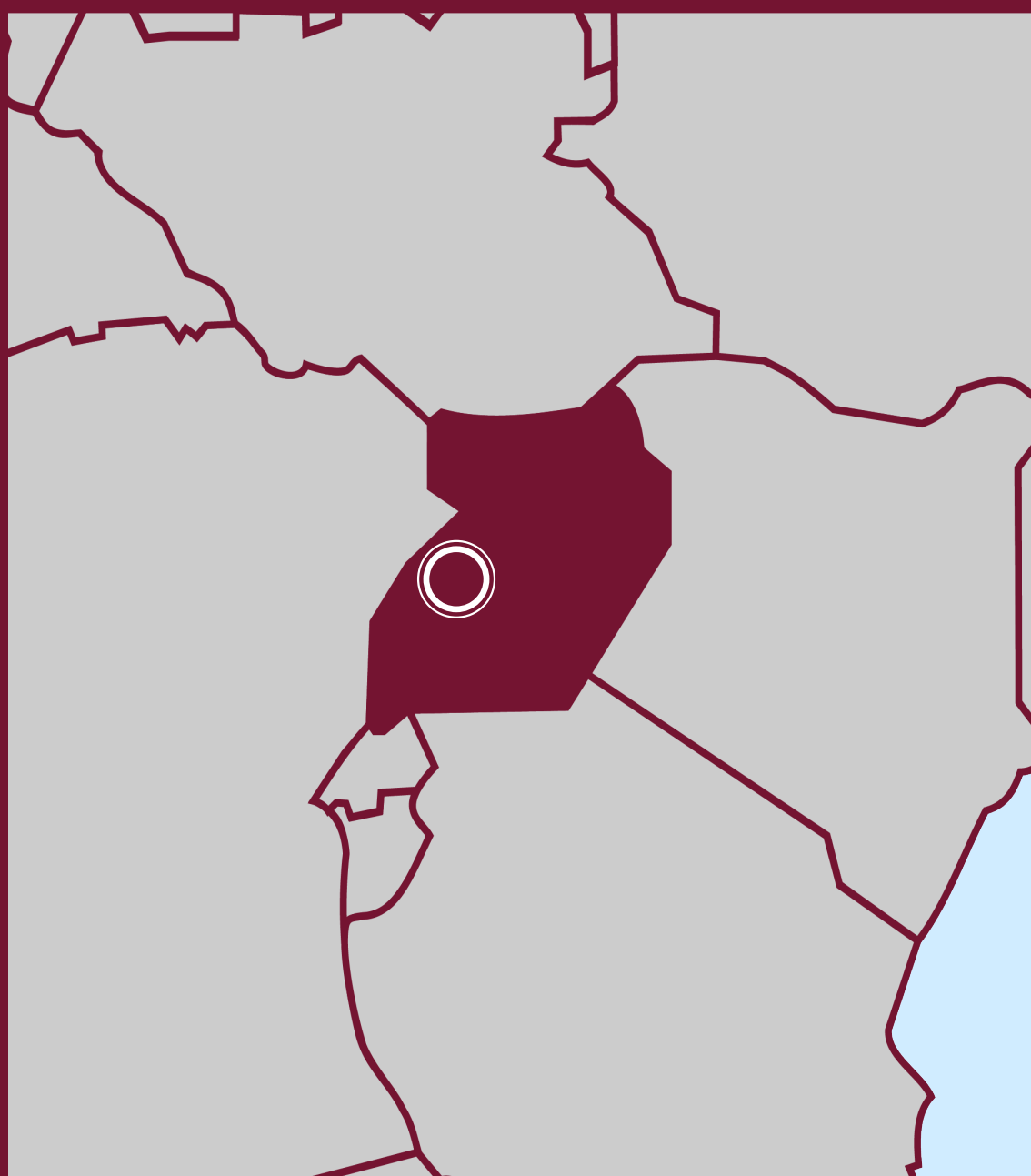


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Participant Guide

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Investigating a Cholera Outbreak in Kaiso Fishing Village, Hoima District, Uganda, October 2015

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Abstract

Globally, even though improvements have been made to effective surveillance and response, communicable diseases such as cholera remain high priorities for national health programs, especially in Africa. High-quality surveillance information coupled with adequate laboratory facilities are effective in curbing outbreaks from such diseases, ultimately reducing morbidity and mortality. One way of building this capacity is through simulation of response to such health events. This case study based on a cholera outbreak investigated by FETP trainees in October 2015 in Uganda can be used to reinforce skills of frontline FETP trainees and other novice public health practitioners through a practical simulation approach. This activity should be completed in 2.5 hours.

How to Use the Case Study

General instructions: This exercise is led by 1-2 facilitators with a class size of 8-15 students. It is participatory and the facilitator should encourage all students to take part through reading out aloud, attempting the questions, sharing answers aloud, giving opinions and critiquing each other. In some cases, role plays may be performed.

Audience: District Surveillance officers, Field Epidemiology Training Program (FETP) trainees

Prerequisites: Before using this case study, case study participants should have received lectures in outbreak investigation and basic biostatistics. They should also be proficient in English and conversant with Microsoft Excel.

Materials needed: Laptop with Microsoft Excel, flipchart/white board, markers

Level of training and associated public health activity: Novice – outbreak investigation

Time required: 2.5 hours

Language: English

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Goal of Case Study: Simulate a cholera outbreak investigation

Learning Objectives - After completion of this case study, the participants should be able to:

1. List the steps in outbreak investigation and response
2. Assess the occurrence of an outbreak
3. Establish a working case definition
4. Develop a line listing of cases and state its relevance
5. Draw and interpret an epidemic curve
6. Develop list of possible preventative and control measures
7. Explain the need to monitor the preventive and control measures instituted
8. Identify the stakeholders to whom you would disseminate your findings

Introduction

Kaiso village, located on the Eastern shores of Lake Albert in Hoima district in Western Uganda, is approximately 258 km from Kampala, Uganda's capital city. The village consists of three zones, Fichama, Songa-Bakobya and Songa-Lendu. It is surrounded by Kabwoya Wild Life Reserve and has an estimated population of 9,000 people. Songa-Lendu has a population of 6,500, Songa-Bakobya 2,100 and Fichama 500. [1] The village settlement has a sloping landscape extending from the escarpment of the western rift valley to the shoreline of Lake Albert. The major economic activity is fishing with a large proportion of the community being migrants who trade in fish. During months when fish catches are good, the village population exceeds 10,000 people. There are two main rainy seasons: March to May and October to November. Latrine coverage in the village is 10%. [2]

Figure 1. Location of Kaiso fishing village, Hoima District, Uganda. Accessed on 2nd Sept 2015



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In September 2015, a cholera outbreak occurred in Nkondo, a village neighbouring Kaiso fishing village in Western Uganda. This outbreak was confirmed at the Central Public Health Laboratory (CPHL). The necessary case management and preventive measures were instituted and the outbreak was controlled. On 12th October 2015, the District Health Officer (DHO) of Hoima reported an outbreak of suspected cholera in Kaiso fishing village found on the shoreline of Lake Albert, 10 km from Nkondo. He reported deaths of two adults from profuse diarrhea and vomiting on 2nd and 10th October and several other suspected cases. [2]

Question 1. What is the threshold required for reporting cholera?

Question 2: Would you consider this an outbreak? Explain your answer.

Part 1

On 13th October 2015, the district and the Ministry of Health (MoH) responded by setting up a Cholera Treatment Centre (CTC) in Kaiso village and sensitizing the community. They also distributed “Waterguard” for chlorination of drinking water. However, the initial response did not curb the outbreak and therefore on 20th October, the MoH made a decision to investigate further. Preparations were made for field work and on 1st November 2015, MoH together with Field Epidemiology Training Program (FETP) trainees and the district surveillance officer started epidemiological investigations in Kaiso village.

Question 3. Why do you think the initial response in Kaiso village failed?

Question 4. What are the steps in an outbreak investigation?

Question 5. How would you prepare for an investigation of an outbreak?

Question 6. Who would you include on your investigation and response team and why?

Part 2

The team visited the Hoima District Health Office and Cholera Treatment Centre to obtain a situation report and the initial line list. The District Health Officer said he suspected that the index case may have come from Nkondo village. The team created a working case definition for cholera. The next day, the team engaged community health workers in active case finding of people with profuse diarrhoea and vomiting.

Question 7. What is the possible working case definition for suspected cholera in this setting?

Question 8: What is the difference between active and passive case finding?

Question 9: How would you enhance active case finding in this investigation?

Question 10: What type of variables would you include in the line list template for cholera?

The team took stool samples from the suspects to the lab to confirm cholera. On 7th November, results from CPHL confirmed cholera. During this time, 122 cases had been line listed.

Table 1: Frequency of cholera cases identified at specific time points between October and November 2015 in Kaiso fishing village (summary of the line list)

Months	October 2015																				November 2015
Date of onset	2	10	12	13	14	15	17	18	19	20	21	23	24	25	26	27	28	29	30	31	2
Number of cases	1	1	11	46	8	6	3	2	3	3	5	5	3	2	1	7	6	3	3	1	2

To further explain plausible propagating factors in this outbreak, we obtained rainfall data from Kabwoya wildlife reserve weather station located 2 km from Kaiso village.

Table 2: Amount of rainfall in Kaiso fishing village in October 2015

Months	October 2015									
Date	1	7	9	11	12	19	21	24	29	30
Amount of rainfall (mm)	10	6	10	8	4	3.6	10	1.8	8	2.5

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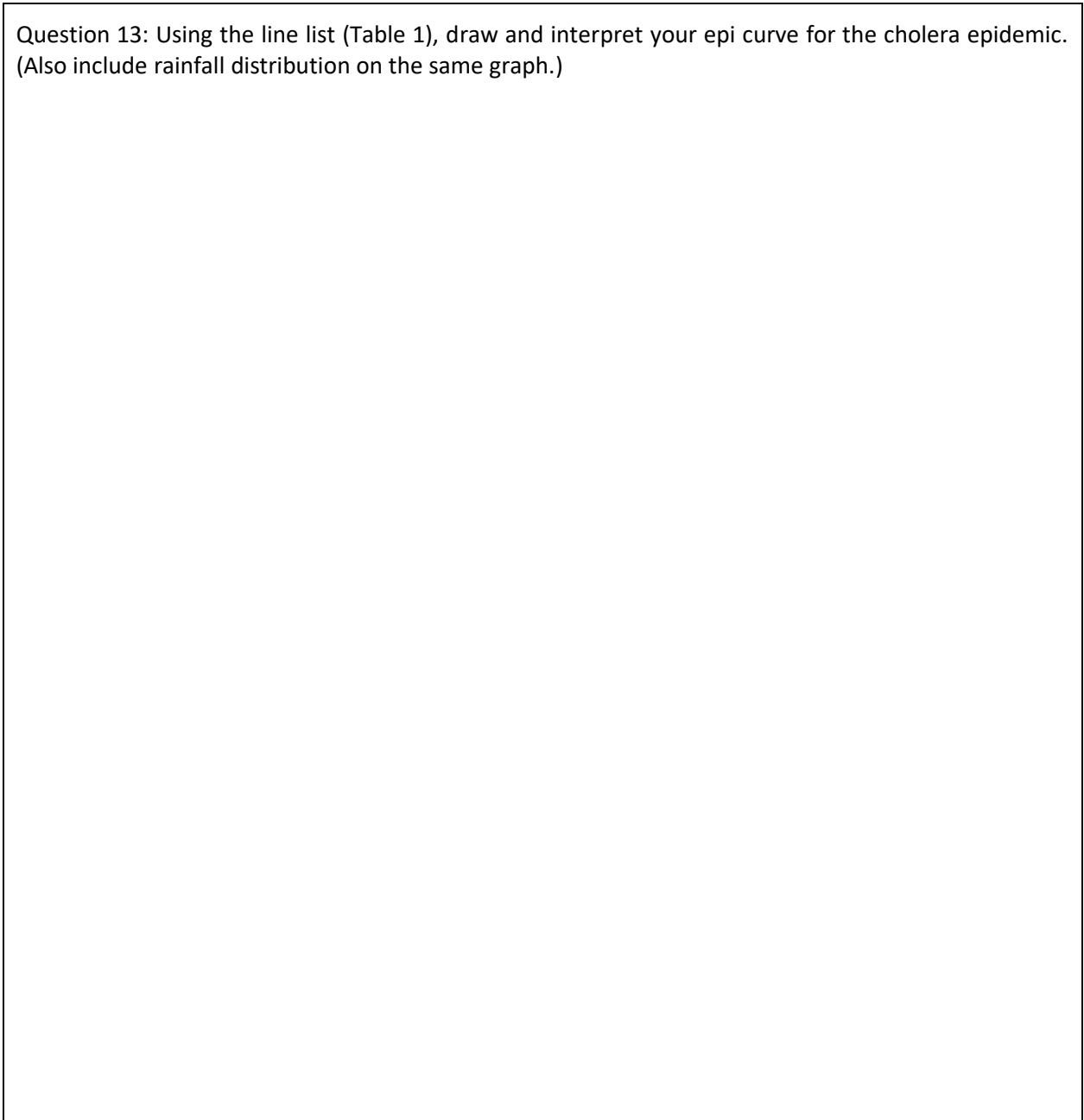
On the same day, a preliminary descriptive analysis of the results was conducted and an epidemic curve (epi curve) was constructed. We generated a hypothesis that drinking contaminated lake water was the source of the outbreak. The team then decided to conduct analytical studies to confirm the hypothesis. On 8th November, MoH and the FETP trainees conducted an environmental assessment to identify any risk factors. They took water samples from the village water sources for analysis at CPHL. In the meantime, from 9th–11th November, data for the analytical study was collected by trained CHWS and the FETP trainees.

Question 11: How would you confirm a suspected cholera case?

Question 12: What is an epidemic (epi) curve? What information can be obtained from an epi curve?



Question 13: Using the line list (Table 1), draw and interpret your epi curve for the cholera epidemic. (Also include rainfall distribution on the same graph.)



Question 14: What is the case fatality rate for Cholera in this particular outbreak?

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In Fichama village, there were 2 cholera cases reported, while Songa-Lendu and Songa-Bakobya reported 83 and 35 cases, respectively.

Question 15: Calculate the attack rate for the 3 different village zones. Interpret your answer.

Part 3

This data was analysed on 12th November and summary of findings completed on 13th November. On 12th November, water results from CPHL indicated contamination with vibrio cholerae. From 14th- 22nd November, the district health team together with Ministry of Health and the FETP trainees further reinforced preventive and control measures and encouraged vigilance for new cases. Water collection sites were associated with the outbreak as shown in Table 3. People who collected water from Songa-Lendu were almost seven times more likely to get cholera compared to those who collected water from Fichama.

Table 3: Association between water collection sites and cholera

Exposure	% cases exposed (n=61)	% controls exposed (n=126)	OR _{M-H} (95% CI)
Songa-Lendu	69	33	6.7 (2.5-17)
Songa-Bakobya	21	37	1.8 (0.64-5.3)
Lake-Rescue/Fichama	10	30	Ref

Figure 2. sketch map showing Kaiso fishing village zones (Songa-Lendu, Bakobya, and Fichama), water collection sites (A, B, C) on the shoreline and the sewage channel



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Another associated risk factor found was drinking unboiled water. Communities were encouraged to report any suspected cases to the community health workers. Also during this time, a comprehensive outbreak report was written by the FETP trainees. The report included recommended prevention and control measures as well as a plan for monitoring these measures. Findings were disseminated on 16th December 2015 to stakeholders. [5]

Question 16. What preventive and control measures would you institute in this village?

Question 17. What is the benefit of monitoring your preventive and control measures?

Question 18: To whom would you disseminate your findings?

Question 19. Assuming that you get a chance to brief the Minister of Health about the outbreak; conduct an elevator pitch of not more than 5 minutes of what you will say. An elevator pitch is a precise summary of an issue/event, covering all the critical aspects and delivered within a few seconds (the approximate duration of an elevator ride).

Conclusion

In October 2015, a cholera outbreak involving 122 cases and 2 deaths occurred in a lakeshore fishing village in Hoima district, Uganda. Analytical studies established an association between the cases and consumption of lakeshore water contaminated by sewage washed down a gully channel. Preventive and control measures were immediately instituted. [2, 3]

According to the World Health Organisation, cholera, an infectious and yet preventable disease, requires immediate notification and action. [4] The alert threshold for cholera is a single suspected case while the action threshold is a single confirmed case. [4] Therefore a strong surveillance system is critical for early detection and response so as to avert outbreaks. For efficient outbreak investigation and response, it is important to follow the systematic steps as outlined by the US Centres for Disease Control and Prevention. [5]

Background Reading

CDC. Cholera-Vibrio Cholerae infection: Prevention and Control Atlanta, GA: CDC; 2014 [cited 2016 23rd August]. Available from: <http://www.cdc.gov/cholera/prevention.html>

CDC. Principles of Epidemiology in Public Health. Section 2: Steps of an outbreak investigation Atlanta, GA2012 [cited 2016 23rd August]. Third Edition: Available from: <http://www.cdc.gov/ophss/csels/dsepd/ss1978/lesson6/section2.html>

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Uganda MoH. Technical Guidelines for Integrated Disease Surveillance and Response. Kampala, Uganda 2012, Pages 251-254.

Competing Interests

The authors declare no competing interest.

Author's Contributions

This case study was designed by Monica Okuga. David Oguttu , Allen Okullo, Bao-Ping Zhu, and Alex Riolexus Ario participated in the outbreak Investigation and response. Charles Perry Ko, Meeyoung Mattie Park and Joseph Asamoah Frimpong reviewed and supervised the development of the case study.

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Appendices

Appendix 1: Hierarchy of health system in Uganda

