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# Cholera Mortality during Urban Epidemic, Dar es Salaam, Tanzania, August 16, 2015–January 16, 2016<sup>1</sup>

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In 2015, a cholera epidemic occurred in Tanzania; most cases and deaths occurred in Dar es Salaam early in the outbreak. We evaluated cholera mortality through passive surveillance, burial permits, and interviews conducted with decedents' caretakers. Active case finding identified 101 suspected cholera deaths. Routine surveillance had captured only 48 (48%) of all cholera deaths, and burial permit assessments captured the remainder. We interviewed caregivers of 56 decedents to assess cholera management behaviors. Of 51 decedents receiving home care, 5 (10%) used oral rehydration solution after becoming ill. Caregivers reported that 51 (93%) of 55 decedents with known time of death sought care before death; 16 (29%) of 55 delayed seeking care for >6 h. Of the 33 (59%) community decedents, 20 (61%) were said to have been discharged from a health facility before death. Appropriate and early management of cholera cases can reduce the number of cholera deaths.

Cholera is an acute diarrheal illness caused by infection with the bacterium *Vibrio cholerae* (1). Severe cholera can be rapidly fatal; patients who do not receive appropriate treatment could die within hours (1). Prompt replacement of fluids and electrolytes through the use of oral rehydration solution (ORS) and intravenous fluids can prevent cholera death (2). With appropriate care, case-fatality rates for cholera should be <1% (1).

Tanzania reported an outbreak of cholera on August 15, 2015 (3,4). At that time, 6 of 8 countries bordering

Tanzania were experiencing cholera outbreaks (5). Cholera outbreaks can spread rapidly, crossing national borders, and are a major global health security problem.

Early in the Tanzania outbreak, most cases and deaths were reported in Dar es Salaam, where 3,371 cases and 36 deaths (case-fatality rate 1.1%) had been recorded by October 31, 2015. Deaths were exclusively reported from cholera treatment centers (CTCs), but additional deaths in the community were rumored. When cholera deaths in the community were suspected, an environmental health officer was required to visit the decedent's house, prepare a burial permit, obtain a rectal swab for culture, and assist with the disposal of the body. The burial permit included the decedent's name, suspected cause of death, and date of death. We conducted a cholera mortality evaluation to identify unreported deaths, investigate household cholera management practices, and describe healthcare-seeking behaviors.

## The Study

We obtained a list of persons who were suspected to have died of cholera (decedents) from the CTCs and obtained the burial permits from the CTCs, referral hospitals, and municipal offices (for complete description of methods, see online Technical Appendix 1, <https://wwwnc.cdc.gov/EID/article/23/13/17-0529-Techapp1.pdf>). The case definition for suspected cholera death was death of a person  $\geq 2$  years of age with acute watery diarrhea with or without vomiting with illness onset after August 15, 2015, in Dar es Salaam. A confirmed cholera death was defined as death of a person  $\geq 2$  years of age whose stool was positive for *Vibrio cholerae* O1 (6). All suspected and confirmed cholera deaths identified from CTC reports and burial permits were included in the evaluation.

We developed survey instruments with the Open Data Kit software (<https://opendatakit.org/>). Written informed

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<sup>2</sup>These first authors contributed equally to this article.

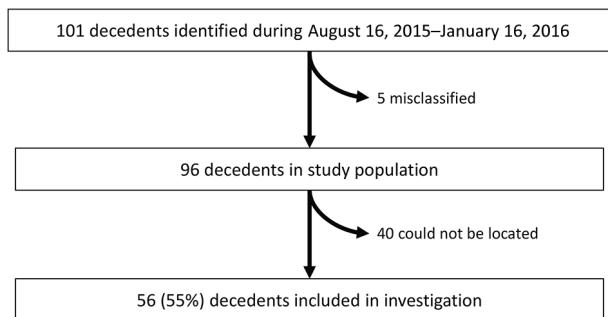
consent to take surveys was obtained, and then trained enumerators completed surveys with caregivers or relatives of the deceased (online Technical Appendix 2, <https://wwwnc.cdc.gov/EID/article/23/13/17-0529-Techapp2.pdf>). During January 19–23, 2016, these data were collected electronically on Galaxy Tablets (Samsung, Seoul, South Korea).

During August 16, 2015–January 16, 2016, the cholera surveillance system in Dar es Salaam identified 48 cholera deaths, all reported by CTCs. These deaths included persons who died at CTCs and persons who were dead on arrival. The burial permit assessment identified an additional 53 cholera deaths for a total of 101 total deaths (Figure 1); therefore, 52% of the total deaths were not captured by the existing surveillance system.

Cholera cases and deaths peaked in late September, with fewer deaths reported from November through January (Figure 2, panels A, B). The decrease in deaths coincided with a decrease in reported cholera cases. Of 101 decedents, 45 (45%) were not included in the study: for 35 (87.5%), caretakers could not be located; for 3 (7.5%), the caretakers had moved; 2 (5%) were an entire family unit with no respondent to give a survey; and 5 were misclassified (2 were <2 years of age and 3 had negative cultures with clinical signs inconsistent with cholera). Anecdotal reports suggested that many of the decedents for whom family members and caretakers could not be found were migrant workers who lived alone in single rented rooms, and the homes of others were not disclosed because of the stigma associated with cholera and local political pressure not to report.

Caretakers interviewed for this evaluation were family members (73%), landlords and neighbors (21%), employees (4%), and friends (2%) of the 56 decedents. The median age of decedents was 23 (range 2–80) years, and 32 (57%) were men or boys (Table).

Fecal samples from 39 (70%) decedents yielded *V. cholerae*. Laboratory results from 16 (29%) decedents were not available. The location of death was the community or en route to a health facility for 33 (59%) decedents, a health facility for 22 (39%), and an unknown location



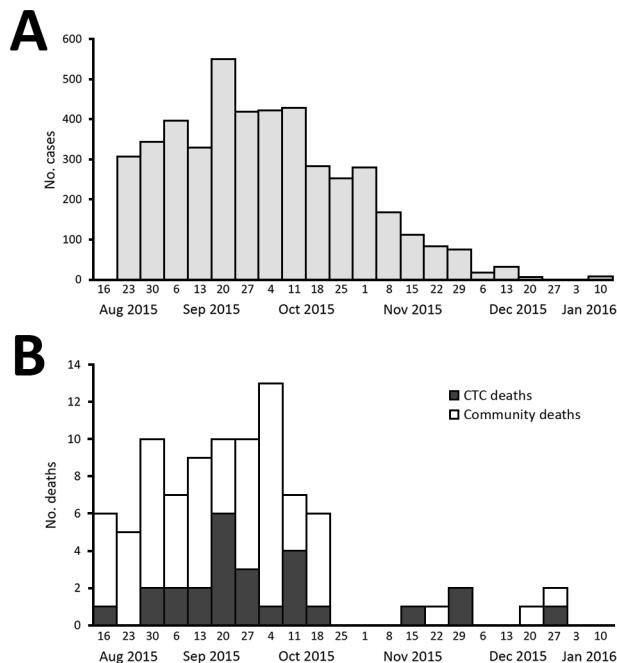
**Figure 1.** Study population for cholera mortality evaluation, Dar es Salaam, Tanzania, August 16, 2015–January 16, 2016.

for 1 (2%) (Table). Of the 51 respondents who reported that decedents received home treatment, 5 (10%) said ORS was consumed. Reasons the decedents did not take ORS at home included not knowing what ORS was (38%) and not thinking that ORS would help (33%). Of 56 decedents, 26 (46%) consumed fluids other than ORS, including water (30%), soft drinks (13%), and porridge (5%), at home before their deaths.

Of 55 decedents with a reported time of death, 44 (80%) died within 24 hours of symptom onset, and of the 51 (93%) decedents who sought care before death, 16 (31%) waited >6 h from symptom onset to seek care. All decedents were able to reach a health facility from their home within 1 hour. Of 33 decedents who died in the community or en route to a health facility, 20 (61%) had previously been discharged alive from a health facility.

**Conclusions**

More than half of the records of cholera deaths in Dar es Salaam were missing from the existing surveillance system, which only captured patients who arrived at CTCs. Deaths that occurred in other treatment locations



**Figure 2.** Suspected and confirmed cholera cases (A) and deaths (B) from cholera mortality evaluation and burial permit assessment, by week, Dar es Salaam, Tanzania, August 16, 2015–January 16, 2016. CTC deaths are deaths in patients ≥2 years of age with suspected or confirmed cholera who died following admission to a hospital or CTC. Community deaths were deaths in persons ≥2 years of age highly suspected of having cholera or having culture-confirmed cholera who died in the community or en route to a CTC. The date of death could not be determined for 6 decedents who were therefore excluded from the epidemic curves. CTC, cholera treatment center.

**Table.** Demographic characteristics of cholera decedents from cholera mortality evaluation, Dar es Salaam, Tanzania, August 16, 2015–January 16, 2016\*

Characteristic	Total, N = 56	Confirmed, n = 39	Suspected, n = 17
Median age, y (range)†	23 (2–80)	21 (2–80)	25.5 (3–73)
Sex			
M	32 (57)	24 (62)	8 (47)
F	24 (43)	15 (38)	9 (53)
Location of death			
Health facility	22 (39)	11 (28)	11 (65)
Community	33 (59)	28 (72)	5 (29)
Unknown	1 (2)	0 (0)	1 (6)
Clinical signs/symptoms			
Vomiting	42 (75)	28 (72)	14 (82)
Diarrhea‡	43 (77)	28 (72)	15 (88)
Headache	9 (16)	7 (18)	2 (12)

\*Values are no. (%) decedents except as indicated.

†Age was unknown for 7 persons.

‡One respondent did not know if the patient had diarrhea. Caretakers of 2 persons with suspected cases did not report diarrhea but met the burial permit assessment case definition.

or in the community were not reported. Underreporting of deaths during cholera epidemics, a phenomenon not unique to Tanzania (5,7,8), poses a threat to global health security.

We identified 3 anecdotal barriers to reporting cholera deaths. One barrier was political pressure; because of the electoral campaign ongoing during the epidemic, health-care workers might have been discouraged from reporting cholera cases (9,10). Similarly, in 2008, underreporting of cholera deaths was observed during an electoral campaign in Kenya (8). Another barrier was influence from local leaders; because of the stigma associated with cholera, these leaders might have wished to deny the presence of the disease in their communities and created an environment discouraging others from reporting (11,12). The third barrier was lack of communication with immigrants; some decedents reported to be migrant workers who lived alone did not have social contacts who could serve as caregivers or report the decedent's cause of death. Similar observations have been described in another cholera mortality investigation (13).

This evaluation suggested that most caregivers of decedents lacked knowledge of ORS. Other studies have observed that the use and knowledge of ORS (7,8,14) has plateaued or declined in countries of sub-Saharan Africa and Asia since the 1990s (15,16). This decline or plateau was associated with decreased funding for diarrhea control projects, declining commercialization of ORS, and inconsistent messaging regarding homemade ORS (16). In addition, >30% of cholera decedents delayed seeking care by >6 h. Although other cholera mortality studies have not directly addressed the effect of delays in seeking care, several studies have identified distance to health facilities or lack of transportation as barriers to timely care in rural populations (14,17,18). In this urban epidemic, all decedents were able

to reach a health facility within 1 hour. The failure to seek timely care was probably a matter of inadequate messaging to the public.

More than 60% of community decedents were reportedly discharged from a health facility before dying, suggesting inadequate management by health workers or premature discharge. The Tanzanian Ministry of Health initiated healthcare provider training in November 2015 to address cholera case management problems; starting around that time, cholera deaths became infrequent (Figure 2, panel B). The use of rectal swabs to confirm cholera in decedents might be a useful practice especially in the context of unexplained deaths during cholera outbreaks.

Enhanced surveillance, cholera case management training, and robust community education focused on destigmatizing the disease, as well as encouraging persons on the margins of society to seek medical attention for cholera-like symptoms, are needed to manage cholera epidemics. These practices can help expedite outbreak detection and response, facilitate the control of cholera at its source, and prevent deaths, enhancing global health security.

### Acknowledgments

We thank the district and regional health management teams in Ilala, Kinondoni, and Temeke Districts and the environmental health officers, without whom this study would not have been possible. We also thank the National Task Force of Tanzania for input and support throughout the evaluation. Staff of the Field Epidemiology and Laboratory Training Program deserves special appreciation for helping gather data for the burial permit assessment and assisting in navigating institutional review board approval procedures. We also thank the staff of PSI Tanzania for assisting in data collection.

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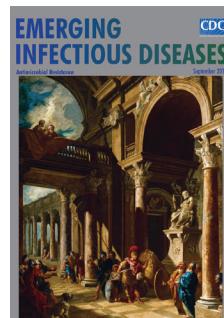
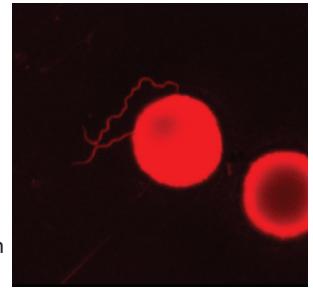
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# EMERGING INFECTIOUS DISEASES

# Cholera Mortality during Urban Epidemic, Dar es Salaam, Tanzania, August 16, 2015– January 16, 2016

## Technical Appendix

### Methods

#### Type of Investigation

This investigation was a descriptive and comparative study of a series of cholera decedents. An attempt was made to compare differences between cholera treatment center (CTC) and community cholera deaths.

#### Investigation Population

The investigation population was a convenience sample of all decedents  $\geq 2$  years of age with suspected or confirmed cholera in Dar es Salaam, Tanzania, from August 16, 2015, through January 16, 2016. The investigation included all persons who died in a hospital or a CTC, in the community, or on the way to a hospital or CTC, and whose burial was assisted with environmental health officers (EHOs). All deaths caused by cholera reported in burial permits in the investigation area were included. Inclusion criteria were a) dying of suspected or confirmed cholera in Dar es Salaam; b) being  $\geq 2$  years of age; c) dying during August 15, 2015–January 16, 2016; and d) having a burial assisted by the municipal burial team from the relevant district in Dar es Salaam. Data from decedents without burial permits and decedents whose caretakers did not consent to the survey were excluded.

#### Investigation Area

The following hospitals and CTCs in Dar es Salaam participated: Amana Hospital, Mwanyamala Hospital, Temeke CTC at Temeke Hospital, Vijibweni CTC, Mburahati CTC at Mburahati Dispensary, and Buguruni CTC. Homes in the wards of districts Ilala, Kinodoni, and Temeke of

Dar es Salaam (Table 1) with reported cholera deaths during August 16, 2015–January 16, 2016, were included in the study.

### **Case Definitions**

A CTC decedent was defined as a patient  $\geq 2$  years of age with suspected or confirmed cholera who died following admission to a hospital or CTC during August 16, 2015– January 16, 2016. A community decedent was defined as a person with highly suspected or culture-confirmed cholera who died in the community during August 16, 2015– January 16, 2016.

### **Case Finding**

To obtain names and wards of residence of CTC decedents, we reviewed registers and patient records at hospitals and CTCs. We also abstracted available information on the patient’s time of admission, treatment, co-morbidities, and laboratory results. To construct a list of community decedents, we reviewed burial permits of persons who were either dead on arrival to referral hospitals and CTCs or were reported to municipal offices. From the permits, we obtained the decedents’ age, sex, residence, date of illness onset, and date of death.

### **Data Collection**

We worked with ward EHOs to obtain the street and administrative leaders of decedents. We requested either the EHO or administrative leader guide us to the home of the decedent. Enumerators interviewed the spouse or caretaker about their knowledge of cholera and water handling behaviors and about the decedent’s demographic characteristics, care-seeking behaviors, treatment received (if any), and barriers to care.

The questionnaire was developed in English, translated into Kiswahili, and back-translated into English. Responses were entered onto Galaxy Tablets (Samsung, Seoul, South Korea) into an XLM form by using Open Data Kit software (<https://opendatakit.org/>), and transferred daily to an encrypted server. Survey results were aggregated into an Epi Info 7 database (<https://www.cdc.gov/epiinfo/index.html>) for analysis.

### **Data Analysis**

Data was de-identified and analyzed descriptively by using Epi Info version 7 (Centers for Disease Control and Prevention, Atlanta, Georgia, USA). When possible, deaths occurring in CTCs were compared with those occurring in the community. Because data in this convenience sample were not normally distributed, we used the Mann Whitney U test, a nonparametric

method, to compare the 2 groups. These descriptive statistics and nonparametric tests reviewed attributes of persons dying of cholera in CTCs and in the community.

### **Ethical Consideration**

This evaluation was part of the emergency public health response to the cholera epidemic that was ongoing in Tanzania. We limited data collection to a series of cases in Dar es Salaam, and thus, results were not generalizable. To respect confidentiality, we obtained verbal or written informed consent from all respondents. Unique identifiers were protected throughout the course of the investigation and destroyed following data analysis. We performed data analyses only with deidentified data. We obtained ethical clearance through the Muhimbili University of Health and Applied Sciences institutional review board. The US Centers for Disease Control and Prevention institutional review board had determined that this evaluation was not research because the data generated would not be generalizable and would be collected as part of the response to a public health emergency.

### **Investigation Limitations**

This investigation had 2 main limitations. First, because data collection took place >1 month after the date of death, it was possible that accurate recall was a problem for some survey respondents. This risk was mitigated by careful administration of the survey and assistance through prompts when necessary for some questions. In addition, because recall of profound events such as sudden death is often greater than recall of more mundane occurrences, recall bias might not have had a substantial effect. Second, because this investigation was limited to case findings through burial permit data, it is possible that not all community deaths were captured. This might have been especially true earlier in the outbreak when patients who died rapidly from cholera might not have been identified as cholera patients.

# Cholera Mortality during Urban Epidemic, Dar es Salaam, Tanzania, August 16, 2015– January 16, 2016

## Technical Appendix 2

### MORTALITY INVESTIGATION

Interviewer \_\_\_\_\_

Date of Interview: \_\_\_\_ (day)/ \_\_\_\_ (month)/2015

#### Address of Deceased:

Region: \_\_\_\_\_

District: \_\_\_\_\_

Ward: \_\_\_\_\_

Street \_\_\_\_\_

Date of death reported on burial permit: \_\_\_\_\_ (day)/ \_\_\_\_\_ (month)/2015

Name of the deceased \_\_\_\_\_

DECEDENT UNIQUE ID# \_\_\_\_\_

Collect GPS coordinates at end of interview: Latitude \_\_\_\_\_

Longitude \_\_\_\_\_

#### Informed Consent (English)

##### Introduction and Purpose

Hello, I am working with the Tanzanian Ministry of Health and Social Welfare (MOHSW) to investigate the ongoing cholera outbreak. We are trying to understand why people are dying from cholera so we can prevent more people from dying from cholera in the future. Your answers to these questions may help us prevent other people from getting cholera. You and your family are free to choose whether or not to participate in this investigation. You are also free to say no to any part of this investigation. There is no penalty if you or your family do not want to participate.

##### Procedures

If you decide to participate, we will ask you some questions today. The questions will be about you, your deceased family member, how your family obtained treatment and, if anyone was sick with cholera, details on what happened.

### **Risks or Discomforts**

This study will involve minimal risk to you. Since we will be asking about your deceased family member, some of these questions may make you sad or uncomfortable. You can take a break, skip any questions that are uncomfortable, or end the survey if it is too difficult to talk about your family member.

### **Benefits**

Taking part in the program may help other people because we can learn what communities are doing to deal with the cholera outbreak. The things we learn may prevent other people from dying from cholera in the future and will help to increase support for fighting cholera in communities in Tanzania.

### **Compensation**

There is no cost or payment for being in the study.

### **Confidentiality**

To the extent legally possible, we will keep your answers to all questions secret. All of the information will be password-protected and kept in a special place. We will not put your name or the name of your family members on any report of this project.

### **Right to Refuse or Withdraw**

Your participation today is voluntary. If there are questions you do not like, you do not have to answer them. You can stop at any time after giving your consent. There are no penalties for not being in the study.

### **Contact information for questions and concerns**

If you have questions about the program or feel you have been harmed, you may contact your ten-cell leader or the study coordinator, Amani Massey at 0787754858.

<b>Q#</b>	<b>PRE-INTERVIEW</b>
<b>P.0</b>	Did the interviewee Consent?  1. Yes    0. No    99. Don't Know  <i>If YES → Proceed to P.1</i> <i>If NO → Thank them and end the interview</i>
<b>P.1</b>	Take a picture of the consent form
<b>P.2</b>	Select appropriate enumerator name:  1. **    2. ***    3. ***    4. ***
<b>P.3</b>	Select District
<b>P.4</b>	Select Ward
<b>P.5</b>	Select Unique ID of the person Named

Elicit answers from family member of the deceased (if deceased was <16 → ask mother, if ≥16 → ask for head of household/primary caregiver). **Please use the name of the person who has died wherever it says “deceased”.**

**Thank you. I would like to start by asking you some questions about your deceased family member and the disease called cholera.**

Q#	SCREENING QUESTIONS
1.	<p>Have you ever heard of cholera?</p> <p>1. Yes 0. No</p> <p>If yes → Proceed to Q2            If no → Read: “Cholera is a disease caused by a bacteria. Symptoms often include rapid onset watery diarrhea that looks like rice water. People can dehydrate rapidly from this disease.”</p>
2.	<p>Could you confirm the name of the person who died of rapid onset watery diarrhea (cholera)?</p> <p><i>Input name into text field.</i></p>
3.	<p>Our records indicate a date of death on or around {date of death}. Is this correct?</p> <p>1. Yes 0. No 99. Don't know</p> <p>If yes → proceed to q5            If no → proceed to q4</p>
4.	<p>What date did {name} die?</p> <p><i>Input date into the calendar field.</i></p>
5.	<p>Did they tell you why {name} died?</p> <p>1. Yes 0. No 77. Decline to answer 99. Don't know</p> <p>If yes → What did they tell you was cause of death? (<i>Input cause of death into text field</i>)            If no, decline or don't know → Q6</p>
6.	<p>Did anyone else in your home die of rapid onset watery diarrhea (cholera) in 2015?</p> <p>1. Yes 0. No</p> <p>If Yes → How many? <i>Input number in number field</i>            If No → Q7</p>

**I am very sorry to hear that. Now I would like to ask you some questions about yourself.**

Q#	Respondent Information
7.	Name of Respondent _____
8.	Age of Respondent _____ (years)
9.	Sex of Respondent    1. Male    2. Female
10.	<b>What is your relationship to the deceased?</b> ( <i>try and interview the spouse or main caregiver of the deceased</i> ) <ul style="list-style-type: none"> <li>1. Spouse</li> <li>2. Child</li> <li>3. Parent</li> <li>4. Sibling</li> <li>88. Other (specify) _____</li> </ul>
11.	<b>What is the last year of school which you have completed?:</b> <ul style="list-style-type: none"> <li>1. None</li> <li>2. Some primary school</li> <li>3. Completed primary school</li> <li>4. Some secondary school</li> <li>5. Completed secondary school or higher</li> <li>88. Other (<i>specify</i>) _____</li> </ul>

Now I will ask you some questions about (*name of deceased*)

Q#	Decedent Information		
12.	Including ( <i>name of deceased</i> ), how many people lived in the house (slept here and shared meals) at the time he/she died?  _____ ( <i>number of persons, including deceased</i> )		
13.	What was the age of {name of deceased}? _____		
14.	What was the sex of (name of deceased)? 1. Male 0. Female		
15.	What was the religion of (name of deceased)? 1. Christian 2. Muslim 88. Other(specify) _____ 99. Don't know		
16.	What was the last year of school ( <i>name of deceased</i> ) completed? ( <i>CIRCLE ONE</i> ) 1. None 2. Some primary school 3. Completed primary school 4. Some secondary school 5. Secondary school or higher 88. Other ( <i>specify</i> ) _____		
17.	What was the occupation of ( <i>name of deceased</i> )? 1. Unemployed 2. Housewife 3. Petty trader 4. Food vendor 5. Healthcare worker 6. Day worker 7. Student 88. Other _____ 99. Unknown		
18.	Do your household own any of the following? ( <i>ASK EACH OPTION</i> )		
		<b>1. Yes</b>	<b>0. No</b>
			<b>99. Don't know</b>
	Radio	<input type="checkbox"/>	<input type="checkbox"/>
	Bank Account	<input type="checkbox"/>	<input type="checkbox"/>
	Iron (Charcoal or electric)	<input type="checkbox"/>	<input type="checkbox"/>
	Motorcycle	<input type="checkbox"/>	<input type="checkbox"/>
	Mobile telephone	<input type="checkbox"/>	<input type="checkbox"/>
	Animals (i.e. cows, goats, chickens, pigs)	<input type="checkbox"/>	<input type="checkbox"/>
	Television	<input type="checkbox"/>	<input type="checkbox"/>
19.	What type of fuel does your household mainly use for cooking? 1. Charcoal 2. Firewood 88. Other _____ 99. Don't know		
20.	What is the main source of energy for lighting in the household? 1. Electricity 88. Other _____ 99. Don't know		

Now I will ask you about the **symptoms** that (*name of deceased*) had during the week prior to dying

Q#	Symptom Information
21.	What symptoms did {name of deceased} have in the week before dying? Vomiting            1. Yes 0. No 99. Don't Know Diarrhea            1. Yes 0. No 99. Don't Know Fever                1. Yes 0. No 99. Don't Know Headache           1. Yes 0. No 99. Don't Know Other                _____
22.	Do you know what date {name of deceased}'s diarrhea began? 1. Yes 0. No  If yes → <i>Fill out date in calendar</i> If no → Q23
23.	On average, how many stools did ( <i>name of deceased</i> ) have after he/she became ill? 1. Less than 3 stools per day 2. Between 3-10 stools per day 3. Greater than 10 stools per day 99. Don't know
24.	Approximately how many hours after developing diarrhea did the deceased die? 1. Less than 4 hours 2. 5-8 Hours 3. 9-12 Hours 4. 13-24 Hours 5. 25-48 Hours 6. Greater than 48 hours 99. Don't know/don't remember
25.	<i>[If deceased was older than 11 and female, ask this question]</i> Was ( <i>name of deceased</i> ) pregnant? 1. Yes 0. No 99. Don't Know
26.	Was the ( <i>name of deceased</i> ) ever told by a health care provider that he/she had any of the following: ( <b>READ EACH CHOICE</b> ) Attention: Ask these questions in a private manner. Tuberculosis    Yes No Don't Know Cancer            Yes No Don't Know HIV/AIDS        Yes No Don't Know Is there any other previous illness that I did not ask about? Other illness _____

We would also like to understand more about the usual health and diet of (*name of deceased*).

27.	<p><i>[If deceased is less than 15 years of age, SKIP to Q30]</i></p> <p>Did the deceased ever drink alcohol (beer, local brew, Mnazi/Chibuku)?</p> <p>1. Yes    0. No    99. Don't Know</p> <p><b><i>If YES → Q28</i></b>  <b><i>If NO → Q30</i></b></p>
28.	<p>Did the deceased drink alcohol every day?</p> <p>1. Yes    0. No    99. Don't Know</p>
29.	<p>Did the deceased drink alcohol the day he or she became ill?</p> <p>1. Yes    0. No    99. Don't Know</p>

Now I will ask you about the care (name of deceased) received **at home** after becoming ill with cholera.

Q#	Care at Home
30.	<p>Did (<i>name of deceased</i>) take any medicine or treatment <u>at home</u> after this illness began?</p> <p>1. Yes    0. No    99. Don't know</p> <p><b><i>If YES → Q31</i></b>  <b><i>If NO or Don't know → Q32</i></b></p>
31.	<p>What medicines did he/she take <u>at home</u>? (<b><i>Do NOT READ, CHECK ALL THAT APPLY</i></b>)</p> <p>1. Antibiotic Specify antibiotic (if caregiver knows) _____</p> <p>2. ORS</p> <p>3. Traditional medicines/herbs</p> <p>88. Other (<i>specify</i>) _____</p> <p>99. Don't know</p>
32.	<p>Did (<i>name of deceased</i>) take ORS at home?</p> <p>1. Yes    0. No    99. Don't know</p> <p><b><i>If YES → Q33</i></b>  <b><i>If NO → Q34</i></b>  <b><i>If don't know → Q35</i></b></p>
33.	<p>Where was the ORS obtained? (<b><i>CIRCLE ONE</i></b>)</p> <p>1. Health Center (Dispensary)</p> <p>2. Market</p> <p>3. Pharmacy</p> <p>4. From a petty trader</p> <p>5. From a friend/neighbor/family member</p> <p>6. Red Cross</p> <p>7. Another NGO</p> <p>88. Other (<i>please specify</i>):- _____</p> <p>99. Don't know</p>

34.	Why didn't (name of deceased) take ORS at home? (DO NOT READ, circle all that apply) <ol style="list-style-type: none"> <li>1. He/she did not know what ORS was</li> <li>2. ORS was too expensive</li> <li>3. ORS was not available in the local stores</li> <li>4. He/she did not know where to find ORS</li> <li>5. He/she did not think ORS would help the symptoms of this illness</li> <li>88. Other (<i>please specify</i>):- _____</li> <li>99. Don't know</li> </ol>
35.	Did the deceased drink fluids at home after the illness began? <ol style="list-style-type: none"> <li>1. Yes</li> <li>0. No</li> <li>99. Don't know</li> </ol> <p><b><i>If YES → Q36</i></b>  <b><i>If NO or Don't know → Q37</i></b></p>
36.	What did they drink? ( <b><i>CIRCLE ALL THAT APPLY</i></b> ) <b>READ ALL OPTIONS</b> <ol style="list-style-type: none"> <li>1. Water</li> <li>2. Juice/soda/soft drink</li> <li>3. Home-made Water/sugar/salt solution</li> <li>4. Traditional medicine/herbs</li> <li>88. Other _____</li> <li>99. Don't Know</li> </ol>

Now I will ask you about the care (*name of deceased*) received outside the home **after** becoming ill with cholera. This could be at a hospital, dispensary, or care given by a traditional healer.

Q#	Outside Care
37.	Once your family member became ill, how long did it take for he or she to seek care?  _____ Hours or Days (circle one)
38.	Did the ( <i>name of deceased</i> ), or a relative acting on their behalf, seek any type of care outside the home (such as at a health center/hospital/CTC ) after this illness began? <ol style="list-style-type: none"> <li>1. Yes</li> <li>0. No</li> <li>99. Don't know</li> </ol> <p><b><i>If YES → Q41</i></b>  <b><i>If NO → Q39</i></b></p>

<p><b>39.</b></p>	<p>What is the main reason (<i>name of deceased</i>) did <b>NOT</b> go to a hospital or health center for treatment?  <b>(DO NOT READ. CIRCLE ONLY ONE)</b></p> <ol style="list-style-type: none"> <li>1. Died in transit/on the way to the health center</li> <li>2. Cost of care at the health center was too much</li> <li>3. Did not have transportation</li> <li>4. Did not feel safe travelling at night</li> <li>5. Transportation cost too much</li> <li>6. Clinic was too far</li> <li>7. Too ill to leave home</li> <li>8. Did not know s/he had cholera</li> <li>9. Did not know that cholera could be treated</li> <li>10. Did not want others to know that s/he was sick (shame)</li> <li>11. Did not think s/he needed medical care</li> <li>12. Thought God would cure them</li> <li>13. Preferred a traditional healer</li> <li>14. Facility was closed</li> <li>15. Too long of a waiting time at health center</li> <li>16. Fear of mistreatment by the medical staff</li> <li>88. Other _____</li> <li>99. Don't Know</li> </ol>
<p><b>40.</b></p>	<p>Are there any other reasons that he/she didn't seek care at the hospital or health center?  <b>(DO NOT READ. CIRCLE ALL THAT APPLY)</b></p> <ol style="list-style-type: none"> <li>1. Died in transit/on the way to the health center</li> <li>2. Cost of care at the health center was too much</li> <li>3. Did not have transportation</li> <li>4. Did not feel safe travelling at night</li> <li>5. Transportation cost too much</li> <li>6. Clinic was too far</li> <li>7. Too ill to leave home</li> <li>8. Did not know s/he had cholera</li> <li>9. Did not know that cholera could be treated</li> <li>10. Did not want others to know that s/he was sick (shame)</li> <li>11. Did not think s/he needed medical care</li> <li>12. Thought God would cure them</li> <li>13. Preferred a traditional healer</li> <li>14. Facility was closed</li> <li>15. Too long of a waiting time at health center</li> <li>16. Fear of mistreatment by the medical staff</li> <li>88. Other _____</li> <li>99. Don't Know</li> </ol>

Where did (name of deceased) seek care? [read choices, check all that apply, travel time to facility in hours/minutes, how long they waited at the treatment facility, record if they spent the night and if they were discharged alive)

Circle all that apply	Primary Mode of Transport used 1. Taxi 2. Bajaji 3. Walked 4. Boda boda 5. Dala dala 6. Carried by family/ friends 7. Ambulance 8. Other	How long did it take {name deceased} or the relative to get from home to treatment location? (integer) <hr/> Hrs / Minutes (circle)	Waiting time at the location/ health facility 1. Immediate care/no wait 2. <1 hour 3. 1 – 3 hours 4. >3 hours	Treatment received? (CIRCLE)	Spend the night? (CIRCLE)	Discharged Alive? (CIRCLE)
<b>42. Pharmacy</b> 1. Yes 2. No 99. DK (name) _____ _____ Who sought care? 1. Relative 2. Deceased		Hrs / Minutes		1. ORS 2. IV fluids 3. Antibiotics 4. Other: _____	Not applicable	1. Yes 2. No 99. DK
<b>43. Traditional healer</b> 1. Yes 2. No 99. DK (name) _____ _____ Who sought care? 1. Relative 2. Deceased		Hrs / Minutes		1. ORS 2. IV fluids 3. Antibiotics 4. Other: _____	1. Yes 2. No 99. DK	1. Yes 2. No 99. DK
<b>44. Dispensary</b> (name) _____ _____ 1. Yes		Hrs / Minutes		1. ORS 2. IV fluids 3. Antibiotics 4. Other:	1. Yes 2. No 99. DK	1. Yes 2. No 99. DK

2. No 99. DK				_____			
<b>45. Hospital Name:</b> _____ 1. Yes 2. No 99. DK		Hrs / Minutes		1. ORS 2. IV fluids 3. Antibiotics 4. Other: _____	1. Yes 2. No 99. DK	1. Yes 2. No 99. DK	
<b>46. CTC/Transit Center Name:</b> _____ _____ 1. Yes 2. No 99. DK		Hrs / Minutes		1. ORS 2. IV fluids 3. Antibiotics 4. Other: _____	1. Yes 2. No 99. DK	1. Yes 2. No 99. DK	
<b>47. Other (specify):</b> _____		Hrs / Minutes		1. ORS 2. IV fluids 3. Antibiotics 4. Other: _____	1. Yes 2. No 99. DK	1. Yes 2. No 99. DK	

Now I will ask some questions about cholera in general.

Q#	Knowledge
48.	Please name all the ways you received information about cholera? ( <i>Do not read, CIRCLE ALL THAT APPLY</i> ) <ol style="list-style-type: none"> <li>1. Radio</li> <li>2. Television</li> <li>3. Newspaper</li> <li>4. Flyer/brochure/poster</li> <li>5. Community health worker</li> <li>6. Community meeting</li> <li>7. Street chairperson</li> <li>8. 10 cell leader</li> <li>9. Health care facility staff</li> <li>10. Friend</li> <li>11. Family member</li> <li>12. Public dances</li> <li>13. Students from the local schools</li> <li>88. Other (specify) _____</li> <li>99. Don't know/don't remember</li> </ol>
49.	Can cholera be prevented? 1. Yes 2. No 99. Don't know If Yes →50 If No → 51
50.	<i>If yes, Please name all the ways to prevent cholera (DO NOT READ, CIRCLE ALL THAT APPLY)</i> <ol style="list-style-type: none"> <li>1. Boil or treat water with chlorine</li> <li>2. Build and use latrines</li> <li>3. Wash hands with soap and water (ash or sand)</li> <li>4. Cook food well</li> <li>5. Cover food to protect from flies</li> <li>6. Wash vegetables and fruit</li> <li>7. Clean house with chlorine solution</li> <li>8. Seek treatment for watery and/or bloody diarrhea</li> <li>9. Take an antibiotic pill</li> <li>10. Cholera cannot be prevented</li> <li>11. Not touching someone with cholera</li> <li>12. Avoid sharing food</li> <li>13. Avoid gatherings</li> <li>14. Vaccine</li> <li>88. Other (specify) _____</li> <li>99. Don't know</li> </ol>
51.	Do you think cholera can be treated? 1. Yes 0. No 99. Don't Know

52.	Please name all the things you would do if you were suffering from cholera. ( <b>DO NOT READ, CIRCLE ALL THAT APPLY</b> ) <ol style="list-style-type: none"> <li>1. Drink oral rehydration solution/ ORS</li> <li>2. Go to a pharmacy and buy antibiotics</li> <li>3. Go to a health facility</li> <li>4. Go to a cholera treatment center</li> <li>5. Go to a traditional healer</li> <li>88. Other (specify) _____</li> <li>99. Don't know</li> </ol>
53.	Do you think it is necessary to go to a medical facility, like a health center, clinic, or hospital, if you have cholera? <p>1. Yes    0. No    99. Don't know</p> <p><b>If YES → Q54</b>  <b>If NO/Don't know → Q55</b></p>
54.	When should you go to a medical facility if you think you have cholera? ( <b>Do not read, CIRCLE ONE</b> ) <ol style="list-style-type: none"> <li>1. Immediately</li> <li>2. After 24 hours (1 day)</li> <li>3. If there is vomiting and you cannot drink ORS or fluids</li> <li>4. If there is blood in the stool</li> <li>5. If diarrhea does not stop</li> <li>88. Other (specify) _____</li> <li>99. Don't know</li> </ol>

Now, I will ask you some questions about your drinking water.

Q#	Water Information
55.	Did your household treat your drinking water before ( <i>name of deceased</i> ) became ill with cholera? <p>1. Yes    0. No    99. Don't know</p> <p><b>If YES → Q56</b>  <b>If NO/Don't know → Q57</b></p>
56.	What treatment method(s) did you use? ( <b>CIRCLE ALL THAT APPLY</b> ) <ol style="list-style-type: none"> <li>1. Boil</li> <li>2. jik/chlorine</li> <li>3. Aquatabs</li> <li>4. Waterguard</li> <li>5. Filter</li> <li>88. Other (specify) _____</li> <li>99. Don't Know</li> </ol>

57.	<p>Did you treat your drinking water today?  1. Yes    0. No    99. Don't know</p> <p><b><i>If YES → Q58</i></b>  <b><i>If NO/Don't know → Q59</i></b></p>	
58.	<p>What treatment method(s) did you use? (<i>CIRCLE ALL THAT APPLY</i>)</p> <ol style="list-style-type: none"> <li>1. Boil</li> <li>2. jik/chlorine</li> <li>3. Aquatabs</li> <li>4. Waterguard</li> <li>5. Filter</li> <li>88. Other (specify) _____</li> <li>99. Don't Know</li> </ol>	
59.	<p>Did you collect your drinking water for the household from a DAWASCO source?  1. Yes    0. No    99. Don't know</p> <p><b><i>If yes → Q60</i></b>  <b><i>If No or Don't know → Q61</i></b></p>	
	<p><b><u>60. Select all that apply:</u></b>  <u>DAWASCO SOURCE</u></p> <ol style="list-style-type: none"> <li>1. Open deep well</li> <li>2. Protected or covered deep well</li> <li>3. Borehole</li> <li>4. Piped water to house</li> <li>5. Community tap/kiosk</li> <li>6. Water tank</li> <li>7. Water bowzer/truck</li> <li>8. Water vendor (jerrycan)</li> <li>9. Bottled water</li> <li>10. Other (specify) _____</li> </ol>	<p><b><u>61. Select all that apply:</u></b>  <u>NON-DAWASCO SOURCE</u></p> <ol style="list-style-type: none"> <li>1. Open deep well</li> <li>2. Protected or covered deep well</li> <li>3. Shallow well/hand-dug well</li> <li>4. Lake/Pond/River/Stream</li> <li>5. Borehole</li> <li>6. Rain water catchment</li> <li>7. Piped water to house</li> <li>8. Community tap/kiosk</li> <li>9. Water tank</li> <li>10. Water bowzer/truck</li> <li>11. Water vendor (jerrycan)</li> <li>12. Bottled water</li> <li>13. Other (specify) _____</li> </ol>
62.	<p>“Do you have any products used for water treatment in the house?”  1. Yes    0. No</p> <p><b><i>If YES → Q63</i></b>  <b><i>If NO → Q64</i></b></p>	

63.	<p><i>If YES, "MAY I SEE THE PRODUCT?" (CIRCLE ALL THAT APPLY)</i></p> <ol style="list-style-type: none"> <li>1. jik/chlorine</li> <li>2. Aquatabs</li> <li>3. Waterguard liquid/powder</li> <li>4. Filter</li> <li>88. Other (specify) _____</li> </ol>
64.	<p>"Do you have ORS in house?" (PLEASE OBSERVE DIRECTLY)</p> <ol style="list-style-type: none"> <li>1. Yes    0. No</li> </ol>
65.	<p>Do you know how to make oral rehydration salts?</p> <ol style="list-style-type: none"> <li>1. Yes    0. No</li> </ol> <p><b>If yes → Q66</b> <b>If no → Q67</b></p>
66.	<p>"Please tell me how you prepare ORS." (ANSWER: Take 1L of water into a container, <u>treat the water</u>, and stir-in the ORS packet)</p> <ol style="list-style-type: none"> <li>0. Do not know how to correctly make ORS</li> <li>1. Correctly identify steps to make ORS</li> </ol>
67.	<p><b>Would you be willing to speak with some of our team and other families that also had relatives die from cholera? (Do not read, but <i>this is for people that would be interested in focus groups</i>)</b></p> <ol style="list-style-type: none"> <li>0. No</li> <li>1. Yes → Take the name and phone number of the relative _____</li> </ol>

*Make the below quick observations regarding the home. If the interview is taking place outside the home, please ask the interviewee the following questions and read each option out loud.*

Q#	<b>HOUSEHOLD OBSERVATIONS</b>
68.	<p><i>What type of roofing does this household have (CIRCLE ONE)(OBSERVATION ONLY)</i></p> <ol style="list-style-type: none"> <li>1. Thatch</li> <li>2. Metal/iron sheet</li> <li>3. Tile</li> <li>4. Wood</li> <li>5. Cement</li> <li>88. Other: _____</li> </ol>
69.	<p><i>What type of flooring does this household have (CIRCLE ONE) (OBSERVATION ONLY)</i></p> <ol style="list-style-type: none"> <li>1. Mud</li> <li>2. Wood</li> <li>3. Cement</li> <li>4. Tile/linoleum</li> <li>88. Other: _____</li> </ol>

<b>70.</b>	<i>What type of material is used for the walls (CIRCLE ONE) (OBSERVATION ONLY)</i> 1. Mud 2. Metal 3. Wood 4. Cement/plaster 5. Bricks/blocks/stones 88. Other: _____
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**Thank you very much for your participation. We are very sorry for the loss of (*name of decedent*)**

*COLLECT GPS COORDINATES OF THE HOME FOR THIS SURVEY AT ITS CONCLUSION.*

**The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of CDC.**