

Cholera surveillance for health authorities

Transcript of online course

MODULE 5

Surveillance to track clusters of cholera cases

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Welcome to Module 5 of the GTFCC online course on cholera surveillance for health authorities.

Slide 2

In this module, we will dive into surveillance to track clusters of cholera cases.

Slide 3

This module goes through the different core functions of health authorities in cholera surveillance and describe how strategies are adapted when the surveillance objective is to track clusters. As a prerequisite to follow this module, you should be familiar with the core functions of health authorities in cholera surveillance. Therefore, if you have not yet already done so, we encourage you to take module 2 of this course before taking this module.

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After completing this module, you will be familiar with surveillance strategies to track clusters of cholera cases including:

- How health authorities monitor that these strategies are effectively implemented;
- How health authorities analyze surveillance data, and investigate cholera cases to understand epidemiological links;
- And how health authorities disseminate findings to guide highly targeted interventions to interrupt transmission and prevent the onset of cholera transmission in the community.

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Case studies are offered throughout this module. They are based on fictional scenarios. These case studies will help you better understand how health authorities track clusters of cholera cases.

We encourage you to download the GTFCC guidance on cholera surveillance. Having it on hand will help you take the case studies. You can download this guidance at https://tinyurl.com/cholerasurv2024 or by scanning this QR code.

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A cholera cluster is when all cases have epidemiological links.

This corresponds to a group of cases who infected one another or were infected with the same source.

Clusters are more likely to occur at the very early stages of an outbreak following the introduction of cholera in a new geographic area.

A cluster is a type of outbreak which requires strong surveillance efforts in order to guide quick and highly targeted interventions around the cases. This aims to interrupt transmission before it spreads in the community and becomes more challenging to control.

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Not all countries aim to track clusters of cholera cases. This is usually recommended in countries which are not frequently affected by cholera; those are non-endemic countries. Tracking clusters is also recommended in countries which used to be endemic for cholera but which are now on the path to eliminate the disease as a threat to public health.

In those countries, tracking clusters is performed to prevent the emergence or reemergence of large cholera outbreaks.

If cholera transmission is detected in a country which does NOT aim to track clusters, then surveillance to monitor an outbreak is implemented by default. To learn more about surveillance by default to monitor an outbreak, we encourage you to go to Module 4.

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Surveillance is implemented to track clusters in any surveillance unit where there is clustered transmission in a country non-endemic for cholera or on the path to eliminate cholera.

The surveillance objective is then to rapidly generate information to guide highly targeted interventions around cases in order to interrupt transmission before it spreads in the community.

For surveillance to reach this objective effectively, it should be implemented in accordance with the recommendations provided in this module.

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Let's see how suspected cholera cases are reported and tested when the surveillance objective is to track cholera clusters.

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When the surveillance objective is to track cholera clusters, a suspected cholera case is any person who has acute watery diarrhoea (AWD) or who died from AWD.

There are no additional criteria on age or severe dehydration to identify suspected cholera cases. This sensitive case definition is used to facilitate the comprehensive identification of suspected cases in order to increase chances to interrupt transmission by implementing interventions around cases.

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Any suspected cholera case detected through health-facility based surveillance, community-based surveillance or event-based surveillance is reported to the health authority within a day.

Prompt reporting is essential in order not to delay interventions around cases. Time is key to interrupt transmission.

If on a given week, no suspected cholera case was detected, the absence of cases is reported to the health authority at the end of the week. This is zero reporting. Zero reporting should be performed by all reporting sites at health facility level and at community level.

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When the surveillance objective is to track clusters, all suspected cholera cases are tested. Exhaustive testing is critical to understand clustered transmission and orient interventions accordingly.

Where rapid diagnostic tests (RDTs) are available, RDTs are used to triage samples for confirmatory testing. Any suspected cholera case is tested by RDT, and confirmatory testing is performed on suspected cases tested positive by RDT.

Where RDTs are not available, samples are not triaged for confirmatory testing, and confirmatory testing is performed on all suspected cholera cases.

Confirmatory testing is performed by culture including seroagglutination, or PCR.

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A core function of health authorities in cholera surveillance is to continuously ensure that suspected cholera cases are reported and tested in accordance with applicable strategies. Let's look into this.

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Health authorities are responsible for ensuring that all reporting sites in the surveillance unit including for health facility-based surveillance and community-based surveillance as well as laboratories performing cholera testing are fully aware of the applicable strategies to report and test suspected cholera cases to track clusters, and are in-capacity to implement reporting and testing accordingly.

Health authorities then monitor surveillance performance indicators at least on a weekly basis to verify that reporting and testing is implemented according to applicable strategies to track clusters. If any reporting site or laboratory does not implement reporting or testing in accordance with applicable strategies, health authorities then take supportive measures to improve reporting or testing.

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Let's practice with a case study to better understand how health authorities continuously oversee reporting and testing.

In this scenario, you are a public health officer working in a surveillance unit where a confirmed cholera outbreak with clustered transmission has been detected one week ago.

You review surveillance performance indicators.

Regarding health facility-based surveillance, the completeness of reporting has been 100% and the timeliness of reporting 33%.

Regarding community-based surveillance, the completeness of reporting has been 95% and the timeliness of reporting 90%.

Regarding testing, RDT are not available in your surveillance unit. The adherence to the testing strategy by culture and PCR has been 100% and all samples were received at the laboratory within the expected timeframe.

What is the issue you are most concerned about?

What can be the impact of this issue?

What would you do?

Pause the video, and take the time you need to reflect about this scenario and the appropriate course of action.

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A very concerning issue is that the timeliness of health facility-based reporting is very low, 33%.

This issue compromises the chances to interrupt clustered transmission. Cholera is likely to spread before health authorities are able to take measures to mitigate the risk of transmission around cases reported with delays.

It would be advisable to contact the health facilities which report with delay to sensitize them on the importance of timely reporting and to understand and solve any issue preventing timely reporting.

If that is not sufficient to improve the timeliness of health facility-based reporting, you could also actively contact health facilities on a daily basis to check if any suspected case has been seen at the facility until timeliness of reporting improves.

Overall, this illustrates that as long as surveillance performance indicators are closely monitored, issues with how reporting and testing are performed get detected. From there, it is then possible to work it out and find solutions.

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Moving on to the next core function of health authorities in cholera surveillance, let's look into the analysis and interpretation of surveillance data when the surveillance objective is to track clusters.

To track cholera clusters, time is key. Therefore, as soon as a suspected cholera case or a test result is reported, health authorities immediately analyze and interpret the data.

The surveillance data considered in the analysis are the suspected cholera cases reported by health facility-based surveillance and community-based surveillance, any cholera test results as well as any cholera signal detected by event-based surveillance.

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The analysis of the data focuses on describing the cases by person, place and time at a fine scale in space and time.

Key figures to describe the cases by person include:

- the number of suspected cases;
- the number of confirmed cases;
- the number of health facility deaths;
- and the number of community deaths.

The spatial distribution of suspected and confirmed cholera cases and of community deaths and health facility deaths are mapped, preferably at a fine scale - for example using GIS coordinates.

Lastly, the daily distribution of suspected and confirmed cholera cases and of community deaths and health facility deaths are plotted on epidemic curves.

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Let's move on to case investigation, which is absolutely essential when the surveillance objective is to track cholera clusters.

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Case investigations are critical to identify epidemiological links between cases to determine whether transmission is still clustered or if cholera has started to spread in the community. In addition, the nature of the epidemiological links identified by the case investigations is also taken into consideration to determine appropriate interventions to interrupt transmission.

There is an epidemiological link if in the 5 days before the onset of illness, a case had contact with a confirmed cholera case during his infectious period that plausibly led to infection or if he was exposed to the same source or vehicle of infection as a confirmed cholera case.

Contact that plausibly led to infection includes:

- Contact with vomit or faeces;
- Provision of direct care or bedside visit;
- Having shared housing or shared sanitary facilities;
- Having shared a meal or consumed food or beverage prepared or handled by a confirmed case.

Case investigations should be performed at a minimum on all confirmed cholera cases as well as on any suspected case for which a specimen for laboratory testing was not collected.

All suspected cholera cases are tested and only confirmed cases are considered to determine epidemiological links. Therefore, all confirmed cases must be investigated.

Suspected cases for which a specimen for laboratory testing was not collected are also investigated and a sample for testing is then collected during the investigation.

Given usual delays for laboratory confirmation, in practice, the most pragmatic approach is to undertake case investigation on all suspected cases without waiting for laboratory results. Then, only epidemiological links between confirmed cases are later considered to determine transmission chains.

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Health authorities consider the findings of the analysis of surveillance data and the findings of case investigations in conjunction and interpret them on a daily basis.

This is in order to understand how cholera transmission is currently occurring.

Is there still clustered transmission meaning that all confirmed cases have epidemiological links? Or has transmission in the community started to occur?

If there is still clustered transmission, how can it be ended? Considering the nature of the epidemiological links, which interventions would interrupt transmission rapidly and effectively?

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Let's practice with a case study to better understand how health authorities interpret the surveillance data and the findings of case investigations to characterize cholera transmission.

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You are a public health officer working in a surveillance unit in a country where the previous cholera outbreak was reported 3 years ago.

However, in the last 10 days, 4 suspected cholera cases were reported. They were also tested and case investigations were performed. Here is what happened.

On 21 June, Mister M returned from a cholera affected area in a neighboring country and went directly back to his home with improved WASH facilities in the capital city where he lives with his wife (Miss M).

During the night of 21-22 June, Mister M started having AWD. Miss M cared for him. On the morning of 22 June, he was transferred by ambulance to the capital hospital. This hospital has very high infection prevention and control standards. On 23 June, Mister M PCR test results returned positive for cholera.

On 24 June, Miss M had AWD. Her aunt rapidly came from a neighboring village which is in the same surveillance unit to take care of her; they both stayed at home.

On 25 June, Miss M was transferred by ambulance to the capital hospital and she tested positive for cholera by PCR on 26 June.

On 27 June, the aunt of Ms M went back to her village, in a rural area with unimproved WASH facilities. She had AWD on 28 June, and she tested positive for cholera by PCR on 29 June.

A suspected cholera case was reported in the hometown village of the aunt of Miss M on 30 June. Case investigation did not identify direct or indirect contact between this suspected case and the aunt of miss M. On 01 July, this suspected case tested negative for cholera by PCR.

What is the cholera situation in your surveillance unit as of 23 June, 26 June, 29 June, and 01 July?

Pause the video, and take the time you need to reflect about this scenario.

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As of 23 June, there is a confirmed cholera case (Mister M) who is an internationally imported case. This is not a confirmed cholera outbreak because the confirmed case is not a locally acquired case.

As of 26 June, there is a confirmed cholera case (Miss M) who is locally acquired. This case has an epidemiological link with a confirmed cholera case (Mister M). Therefore, this is a confirmed cholera outbreak with clustered transmission.

As of 29 June, there is another confirmed cholera case (the aunt of miss M) who also has an epidemiological link with a confirmed cholera case (Miss M). The cholera situation remains a confirmed cholera outbreak with clustered transmission.

As of 01 July, the suspected cholera case without established epidemiological links with a confirmed cholera case (the aunt of Ms M) tested negative. Since he tested negative, he is not considered to determine transmission chains. The cholera situation remains a confirmed cholera outbreak with clustered transmission.

Overall, this illustrates how surveillance data, tests results, and findings of case investigations need to be considered rapidly, and in conjunction, to characterize an evolutive cholera situation.

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Moving on to the last core function of health authorities in cholera surveillance, disseminating the surveillance outcomes for public health response.

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When there is clustered transmission, health authorities prepare daily situation reports that describe and interpret the cholera situation and ensure that they are broadly disseminated.

Stakeholders to be updated daily on the cholera situation include the upper-level health authority; stakeholders, partners, and agencies from all sectors involved in responding to cholera as well as health facility workers, community health workers or volunteers.

The epidemiological situation should be discussed and assessed daily in a multisectoral manner to guide the decision-making on quick and highly targeted interventions to interrupt transmission.

Highly targeted interventions should be rapidly implemented to prevent secondary cases, and interrupt transmission.

Interventions may include Cases-Area Targeted Interventions (CATI) at and around the household of cases. For example, this may include raising awareness on how cholera spreads and promoting hand washing with soap, treatment of water, and food safety. WASH kits can also be distributed as needed.

Infection prevention and control (IPC) measures should also be considered by sensitizing health workers on how to prevent contaminations in health care settings.

In addition, targeted measures to prevent and interrupt transmission should be determined taking into account the findings of the investigations regarding the nature of the epidemiological links, the source or vehicle of infection, and the individuals identified as at-risk of exposure.

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Clustered transmission is usually a temporary situation which does not last for an extended period of time. Clustered transmission can evolve in two directions.

The most favorable evolution is that transmission has been successfully ended; this is the end of the outbreak.

Clustered transmission has been successfully ended when for a minimum of four consecutive weeks, all suspected cholera cases have a negative test result by RDT, culture, or PCR.

A more pejorative evolution is when transmission continues but is no longer occurring in clusters. Instead, transmission is occurring in the community.

There is community transmission if all confirmed cases no longer have documented epidemiological links.

It can be that epidemiological links can no longer be established if investigation fails to identify any links between some cases.

Or it can be that epidemiological links can no longer be investigated in a timely and comprehensive manner, for example due to an increase in the number of cases resulting in overstretched investigation capacities.

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If the criteria to consider the end of a cholera outbreak with clustered transmission are met, the surveillance strategies need to be adapted as the surveillance objective becomes to detect any new outbreak early. Health authorities should inform and train surveillance stakeholders on the new surveillance strategies.

Surveillance stakeholders to be sensitized include health facility workers, community health workers and volunteers, and laboratories.

For a refresher on the applicable surveillance strategies, we encourage you to go back to module 3.

If transmission is no longer occurring in cluster but instead transmission in the community has been detected, the surveillance strategies need to be adapted as the surveillance objective becomes to monitor the outbreak. Health authorities should inform and train surveillance stakeholders on the new surveillance strategies.

Surveillance stakeholders to be sensitized include health facility workers, community health workers and volunteers, and laboratories.

For a refresher on the applicable surveillance strategies, we encourage you to go back to module 4.

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Let's practice with a case study to better understand how health authorities target interventions to interrupt transmission at cluster stage.

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In this scenario, you still are a public health officer in a surveillance unit with a confirmed cholera outbreak with clustered transmission. The scenario is the same as the one used in the previous case study, up to the return of the aunt of Miss M in her village where she becomes symptomatic.

In this scenario, what is your assessement of the greatest risk for onset of community transmission? What would you have recommended to prevent this and when?

What are other risks for secondary transmission? What would you have recommended to prevent this?

Pause the video, and take the time you need to reflect about this scenario and the best course of actions.

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There is high risk that community transmission could start in the village of the aunt of Miss M considering unimproved sanitation facilities in this village where she became symptomatic.

Interventions to prevent the onset of community transmission should have been considered as soon as the case investigation indicated that the aunt of miss M provided care to Miss M, before the aunt of miss M became symptomatic.

For example, the aunt of Miss M could have been informed about how cholera spreads and what to do if she developed AWD. She could have been provided with hygiene kits. Depending on the sanitation facilities she could have access to in her village, she could have been encouraged to stay for example at her niece's home during the incubation period (that is for 5 days, at least until 30 June).

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Other risks for secondary transmission include the ambulances which transported Mister and Miss M as they may have contaminated the vehicles with feces or vomits. If so, the ambulance drivers and other patients transported could be at risk of exposure if the vehicles were not cleaned according to appropriate protocols.

Other risks for secondary transmission also include the capital hospital where Mister and Miss M were hospitalized. This hospital reportedly has high IPC standards, however, hospital staff could be at risk of exposure if there were any breaches in IPC protocols.

For example, to prevent secondary transmission, the ambulance drivers that transported Mister and Miss M could have been traced and the hospital staff who provided care to Mister and Miss M could have also been traced. They could have been interviewed to better assess their risk of exposure to mitigate associated risks of secondary transmission accordingly.

Overall, this illustrates how essential surveillance and investigations are to orient interventions to interrupt transmission at cluster stage, and prevent further spread.

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As we wrap up this module, here is a summary of the key role of health authorities when the surveillance objective is to track cholera clusters.

Health authorities monitor that any suspected cholera case is reported within a day and that all suspected cholera cases are tested.

Health authorities analyze the reported data and test results immediately and perform case investigations to determine epidemiological links between cases.

Health authorities update all relevant stakeholders on the cholera situation on a daily basis, and they orient highly targeted interventions to interrupt transmission.

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Before moving on to the next module, we encourage you to take a short quiz. There are three questions in this quiz.

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Question 1. Select all that apply. When the surveillance objective is to track cholera clusters, health authorities review surveillance performance indicators to monitor that:

- a) Suspected cholera cases are reported within 24 hours.
- b) Suspected cholera cases are reported on a weekly basis.
- c) The absence of suspected cholera cases is reported within 24 hours.
- d) The absence of suspected cholera cases is reported on a weekly basis.
- e) All suspected cholera cases are tested for cholera.
- f) A subset of suspected cholera cases selected according to a systematic sampling scheme are tested for cholera.

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The correct answers are a, d and e. When the surveillance objective is to track cholera clusters, health authorities review surveillance performance indicators to monitor that suspected cholera cases are reported within 24 hours, that the absence of suspected cholera cases is reported on a weekly basis, and that all suspected cholera cases are tested for cholera.

Question 2. When the surveillance objective is to track cholera clusters, health authorities:

a) Analyze reports of suspected cholera cases, test results, and findings of case investigation as soon as they are available to rapidly orient highly targeted interventions;

b) Compile and analyze reports of suspected cholera cases, test results, and findings of case investigation on a weekly basis to characterize transmission dynamics in a robust manner.

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The correct answer is a. When the surveillance objective is to track cholera clusters, health authorities analyze reports of suspected cholera cases, test results, and findings of case investigation as soon as they are available to rapidly orient highly targeted interventions.

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Question 3. This is the last question. To characterize the type of cholera transmission in a surveillance unit (clustered transmission or community transmission), health authorities determine epidemiological links (or lack of thereof) between:

a) Suspected cholera cases;

b) Suspected cholera cases tested positive by RDT;

c) Confirmed cholera cases.

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The correct answer is c. To characterize the type of cholera transmission in the surveillance unit, health authorities determine epidemiological links between confirmed cholera cases.

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We have now completed this module.