Cholera surveillance



for health authorities



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Cholera surveillance for health authorities

Monitoring of outbreaks



With case studies

Get ready for this module

Before taking this module, complete Module 2 'Core functions'



What will you learn?

- **Surveillance strategies** to monitor a cholera outbreak
- How health authorities
 - Monitor that these strategies are effectively implemented
 - **Analyze** data and **investigate** to interpret outbreak dynamics
 - **Disseminate findings to guide the response** •

Get ready to practice



Case studies

- **Based on fictional scenarios**
- To deepen your understanding of how health • authorities monitor cholera outbreaks

Use the GTFCC Surveillance Guidance



https://tinyurl.com/cholerasurv2024

Surveillance to monitor outbreaks

Where

- In surveillance units where there is a probable or confirmed cholera outbreak
 - With community transmission
 - or
 - Deemed community transmission by default
 - e.g., epidemiological links not investigated

How In accordance with this module

measures



To generate information to orient control

To mitigate impact and spread



Reporting and testing strategies

Photo adapted from: WHO / Mulugeta Ayene

Case definition

Suspected cholera case

Any person with AWD (or who died from AWD)

NO criteria on age or severe dehydration

Sensitive and comprehensive monitoring of the outbreak

• To guide the response effectively

Reporting

Suspected cholera cases reported to the health authority on a weekly basis

Routine reporting

- Health facility-based and community-based surveillance
- Weekly reporting •
 - Avoids overwhelming reporting sites
 - Provides sufficiently timely information to routinely monitor the outbreak

Zero reporting

Absence of suspected cases reported weekly

Increased frequency

- At the onset and towards the end of an outbreak, daily reporting •
 - Supports timely and targeted interventions to end the outbreak

Case-based Vs aggregate

Case-based health facility reporting and aggregate community reporting



Learn about reporting in Module 2

Exceptional circumstances

Aggregate health facility-based reporting



- If case-based health facility reporting cannot be sustained
- Overstretched reporting capacity
- Case-based reporting resumes as soon as possible 0

Principles for testing

Some suspected cholera cases are tested



Selection of suspected cases for testing

- Systematic sampling scheme
 - Applied consistently in time and space

Necessary to test SOME

- Monitor circulating strain
 - Including susceptibility to antimicrobials



Testing strategy

If RDTs available

RDT

- First 3 suspected cases
- Per **day** per health facility

Culture or PCR

- 3 RDT+
- Per **week** per surveillance unit

Antimicrobial susceptibility

- 3 culture+ or PCR+
- Per **month** per surveillance unit

Culture or PCR



If RDTs NOT available

• First 3 suspected cases • Per **week** per health facility

Antimicrobial susceptibility

• 3 culture+ or PCR+

• Per **month** per surveillance unit

Oversight of reporting & testing by health authorities



Photo adapted from: WHO / Genna Print

Oversight



Awareness and capacity building

- Health authorities ensure that
 - All reporting sites and laboratories in the surveillance unit
 - Are aware and in capacity to implement reporting and testing in 0 accordance with applicable strategies



Monitoring

- Health authorities monitor surveillance performance indicators
 - At least on a **weekly** basis 0
 - Take supportive measures as needed Ο

Let's pratice

00 Oversight of reporting & testing by health authorities





You are a public health officer on your first day of deployment in a surveillance unit with a confirmed cholera outbreak with community transmission

You review the surveillance performance indicators All surveillance performance indicators' targets have been reached, except for one

Health facility-based surveillance	Target	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
Completeness of reporting	80%	90%	85%	90%	50%	55%	55%	50%

- 1) What is the nature of the issue?
- 2) What can be its impact?
- 3) Is this only an issue with health facility-based reporting?
- 4) What are you going to do?

Answers

1) Issue

Some health facilities do not report

2) Impact



Underreporting

- Magnitude of the outbreak (number of cases) underestimated
 - Outbreak response not calibrated effectively 0
- If localized spatially, spatial extension of the outbreak underestimated •
 - Outbreak response not targeted effectively Ο

Likely to hamper the control of the outbreak



3) Is this only an issue with health-facility based reporting?

Also an issue with health authorities' oversight of reporting



- Incomplete health facility-based reporting ongoing for 4 weeks
 - Health authorities may not have investigated the issue Ο
 - If they did, they have not been able to resolve it yet Ο
- Health authorities responsible for supporting surveillance stakeholders
 - If an issue persists, there is also an issue with how stakeholders are supported Ο

Answers

4) What to do?



Break down the indicator of concern

- At a finer geographic scale and/or by health facility type
- To better assess where/what the issue might be to determine how to resolve it

End of case study (hypothetical scenario)

Completeness of health facility-based reporting by health facility type

	Target	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
Hospitals	80%	90%	85%	90%	80%	90%	90%	85%
CTCS and CTUs	80%	NA	NA	80%	90%	90%	80%	85%
ORPs	80%	NA	NA	NA	0%	0%	0%	0%

- **Oral Rehydration Points** (ORPs) set up on week 4 do not report
- ORPs workers were **not aware** of reporting requirements
- Issue resolved by providing ORPs guidance and tools for reporting

Data analysis and interpretation

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Cases

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Photo adapted from: WHO / NOOR / Alixandra Fazzina

Weekly analysis

Health authorities analyze the data weekly at the surveillance unit level and, where possible, at lower level (e.g., health facility catchment areas)

Data considered

- Data reported by **health facility-based surveillance**
- Data reported by **community-based surveillance**
- Test results reported by **laboratories**
- Signals detected by event-based surveillance

Community-based & health facility-based surveillance data analyzed separately and interpreted jointly

Descriptive analysis

Outbreak described by person, place, time and compared with previous weeks



- Suspected cases
- Health facility deaths (after arrival at a health facility)
- Community deaths (before arrival at a health facility)
- Suspected cases tested and tested positive
 - RDT Ο
 - Culture/PCR \bigcirc

Place (maps)

- Suspected and confirmed cases
- Community and health facility deaths

Time (epidemic curves)

- Suspected and confirmed cases
- Week of onset



Morbidity indicators

Morbidity indicators monitored to assess the extent of the outbreak in the population



Cumulative incidence rate

Total number of cases since the beginning of the outbreak (or beginning of the year)

Population

Interpretation

Impact of the outbreak

Less informative for weekly monitoring

Mortality indicators

Mortality indicators monitored to orient case management and community engagement



Interpretation

Clinical care

Number of community deaths

Number of community deaths

Deaths reported by community-based surveillance • Dead on arrival at health facility

Interpretation

Access to care and care seeking

Test positivity indicators

Test positivity indicators are monitored to interpret cholera outbreak trends

Positivity rate by RDT	Positiv
Number of cases tested positive by RDT	Number of cas
Number of cases tested by RDT	Number

Interpretation

- Compare **trends in positivity rates** with the epidemic curve
 - Interpret cholera outbreak trends compared to trends in other diseases causing AWD Ο

vity rate by culture or PCR

ses tested positive by culture or PCR

of cases tested by culture or PCR

Interpretation

Findings of the analysis interpreted on a weekly basis



Why have the observed trends occurred? What does this imply for interventions?



Contextual information

- Surveillance performance indicators
- Affected and at-risk geographic areas
- Affected and at-risk populations
- Interventions implemented

Outbreak deterioration

A deterioration of an outbreak may be detected as part of the weekly analysis

Epidemiological situation worsens over at least 2 consecutive weeks



- Marked increase in weekly **incidence**
- Spatial extension of the outbreak
- Marked increase in CFR
- Marked increase in the number of **community deaths**
- Shift in the **socio-demographic profile** of cases •

Outbreak response to be strengthened and adapted

Quantitative detection

In surveillance units regularly affected by cholera with weekly historical data (for \approx 5 years), baseline thresholds are used to detect a deterioration

Baseline threshold

Expected baseline level

Deterioration

- An indicator exceeds baseline threshold
- For \geq 2 consecutive weeks





A GTFCC Excel tool automatizes the calculation of baseline incidence thresholds

Weekly incidence Weekly baseline threshold **Deterioration**

Qualitative detection

In surveillance units not regularly affected by cholera or without historical data (for \approx 5 years), a deterioration of an outbreak is detected in a qualitative manner



CFR
Deterioration

Let's pratice



Analyze and interpret surveillance data to monitor an outbreak





You are a public health officer on your first day of deployment in a surveillance unit with a confirmed cholera outbreak with community transmission

You read the latest situation report

Cholera mortality remains high

- Since the beginning of the outbreak, 321 suspected cholera cases have been reported in the surveillance unit, including 16 cholera deaths in total (CFR: 5%)
- In the last epidemiological week (week 7), 52 suspected cholera cases have been reported, including 3 cholera deaths (CFR: 6%)
- **Priority for follow up: Quality of care**

1) What is your interpretation of the CFR?

2) What would you like to check?



1) CFR interpretation



With the information provided, CFR challenging to interpret

- Unclear whether "16 cholera deaths in total" include all type of cholera deaths •
- If all type of deaths included, CFR might be misleading

2) To be checked



Type of deaths and CFR calculation

Cholera deaths by time, place, and person



You went through the cholera database and extracted information on the 16 cholera deaths You noted that the 321 suspected cases mentioned in the situation report were reported by health-facility based surveillance

Surveillance stream	Outcome	Week of outcome	Place of residence (Admin -3)
Health facility-based	Died at health facility	Week 3	Area 1
Health facility-based	Dead on arrival	Week 3	Area 5
Health facility-based	Dead on arrival	Week 5	Area 5
Health facility-based	Dead on arrival	Week 6	Area 5
Health facility-based	Died at health facility	Week 6	Area 3
Health facility-based	Dead on arrival	Week 7	Area 5
Community-based	Dead	Week 1	Area 5
Community-based	Dead	Week 2	Area 5
Community-based	Dead	Week 3	Area 2
Community-based	Dead	Week 4	Area 5
Community-based	Dead	Week 4	Area 5
Community-based	Dead	Week 5	Area 5
Community-based	Dead	Week 6	Area 4
Community-based	Dead	Week 6	Area 5
Community-based	Dead	Week 7	Area 5
Community-based	Dead	Week 7	Area 5



low many health facility deaths and how nany community deaths have been reported?

What is the CFR?

considering the mortality indicators you omputed, and the spatial distribution of holera deaths, what do you recommend as a riority for follow up?

Answers

1) Number of health facility deaths and community deaths



- 2 deaths at health facility
- 4 deaths on arrival
- 10 deaths in the community
- Dead on arrival are community deaths

2) CFR



- CFR calculation
 - Deaths at health facility (2) Ο
 - Suspected cases reported by health facility-based surveillance (321) Ο

CFR: 0.6%

 \neq situation report (5%)

2 health facility deaths

14 community deaths

Answers

3) Priorities for follow up considering mortality indicators

Mortality indicators

- CFR: 0.6%
- 14 community deaths, including 12 (86%) in geographic Area 5 Ο

Priorities for follow up



Access to care

- Are there sufficiently accessible treatment facilities in Area 5? Ο
- Should CTCs/CTUs or ORPs be set up, and where? Ο

Care seeking behavior

• Are community members of Area 5 reluctant to seek care, and why?



Continuation of scenario

You continue to read the latest situation report

Cholera incidence remains stable

- Since the beginning of the outbreak, 321 suspected cholera cases have been reported in the surveillance unit by health facility-based surveillance
- In the last epidemiological week (week 7), 61 suspected cholera cases have been reported by health facility-based surveillance

200

From review of surveillance performance indicator (1st case study)

Health facility-based surveillance		Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
Completeness of reporting	80%	90%	85%	90%	50%	55%	55%	50%

1) What is your interpretation of the incidence trend? 2) What would you like to do?





Answers

1) Interpretation of incidence trend



Trend in incidence derived from health facility-based surveillance lacks reliability It cannot be concluded that incidence has remained stable

2) What to do?



- Compare trends in incidence derived from health facility-based with those derived from community-based surveillance
- No surveillance data were reported from ORPs (1st case study)
 - Check ORPs records to retrieve the weekly **number of suspected cases at ORPs**





You managed to retrieve community-based surveillance data and surveillance data from ORPs



Number of suspected cholera cases reported by community-based surveillance



Increasing trend in cholera incidence How does this compare with baseline?



Health facility-based surveillance data initially reported

Number of suspected cholera cases reported by health facility-based surveillance with ORP data retrieved



Continuation of scenario

You compare weekly incidence with historical baseline using the GTFCC Excel tool, already filled with historical data for previous years (2020-2024)

Download the GTFCC Excel tool with prefilled data



https://tinyurl.com/gtfccincidence

Go to the sheet Data

- Add 2025 weekly incidence (weeks 1 to 7)
- Do not modify data for previous years (2020-2024)
 - 1. Explore the sheets Weekly summary, Weekly graph (full time series), Weekly graph (last 52 weeks)
 - 2. As of week 7, is there a deterioration of the cholera outbreak?



Weekly incidence (2025)

- Week 1: 5
- Week 2: 15
- Week 3: 50
- Week 4: 95
- Week 5: 120
- Week 6: 155
- Week 7: 181

Answers

Sheet data

2025 data entered (week 1 -7)

YEAR FILL DATA (Format: YYYY)	WEEF FILL DA (Format: Iso to 52 or	(TA week 1 53)		INCIDEN FILL DA	NCE TA
2025		1			5
2025		2			15
2025		3			50
2025		4			95
2025		5			120
2025		6			155
2025		7			181
2025		8			
2025		9			
2025		10			
2025		11			
2025		12			
2025		13			
2025		14			
2025		15			
2025		16			
2025		17			
2025		18			
2025		19			
2025		20			
2025		21			
2025		22			
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Sheet Weekly summary

Incidence above threshold for two consecutive weeks

There is a deterioration



Above threshold

Current outbreak compared with historical baseline





Sheets Weekly graph (full time series) and Weekly graph (last 52 weeks)



Investigation



Photo adapted from: WHO / NOOR / Alixandra Fazzina

Case investigation

On a routine basis, performing case investigation is not necessary to monitor an outbreak

Case investigations performed when additional information needed to understand the cholera situation



- **All** suspected cases
- To orient initial field investigation and immediate control measures

Deterioration of an outbreak

- **A subset** of suspected cases
- To orient field investigations and control measures

Towards the end of an outbreak

- All confirmed cases
- To orient highly targeted interventions to end the outbreak





Field investigation

A field investigation is performed at the onset of an outbreak or if it deteriorates

Onset of an outbreak

- Assess the risks
- Orient the response accordingly

Deterioration of an outbreak

- Assess the conditions that led to the deterioration
- Adapt the response accordingly



Dissemination of outcomes and response

Photo adapted from: WHO / NOOR / Billy Miaron

Update stakeholders

Situation reports disseminated weekly



Stakeholders

- Upper-level health authority
- Health professionals, community health workers / volunteers
- Etc

Multisectoral stakeholders, partners, agencies involved in the response

Orient the response

Information used to guide multisectoral interventions and monitor their impact



Case management

- Where to set up treatment facilities or referral system
- Quantify needs for treatment supplies
- Identify issues with access to health care or treatment

Community engagement

- Where to promote behaviors and practices to prevent cholera
- Where to encourage early care seeking

WaSH

Where to provide emergency WaSH

Vaccination

Identify areas and populations to be targeted by vaccination

End of outbreak

A probable or confirmed outbreak is over when, for a minimum of 4 consecutive weeks, all suspected cases tested negative (RDT, culture, or PCR)

Period longer than four weeks advisable

- - If surveillance performance targets not met or
 - If testing lacks reliability

Adaptive surveillance

End of outbreak

Surveillance strategies adapted for the early detection of an outbreak



Inform and train surveillance stakeholders

- Health facility workers
- Community health workers / volunteers \bullet
- Laboratories

Learn about surveillance for early detection in Module 3





suspected cases are tested

weekly basis and interpret the outbreak dynamics

situation on a weekly basis

If a deterioration is detected

Investigate

Respond

Perform a **field** investigation to assess the cause of the deterioration to adapt the response accordingly

Guide multisectoral interventions across all pillars





Question 1



When the surveillance objective is to monitor a cholera outbreak, health authorities review surveillance performance indicators to monitor that: Select all that apply

- 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

Question 1 – Answers



When the surveillance objective is to monitor a cholera outbreak, 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
- e) All suspected cholera cases are tested for cholera
- sampling scheme are tested for cholera

d) The absence of suspected cholera cases is reported on a weekly basis

f) A subset of suspected cholera cases selected according to a systematic

Question 2



When the surveillance objective is to monitor a cholera outbreak, health authorities:

- description of the outbreak situation
- sound understanding of the outbreak situation

a) Add up data reported by health facility-based surveillance and data reported by community-based surveillance and analyze them jointly to have a comprehensive

b) Analyze data reported by health facility-based surveillance and data reported by community-based surveillance separately but interpret them jointly to have a

Question 2 – Answer



When the surveillance objective is to monitor a cholera outbreak, health authorities:

- a) Add up data reported by health facility-based surveillance and data reported by description of the outbreak situation
- b) Analyze data reported by health facility-based surveillance and data jointly to have a sound understanding of the outbreak situation

community-based surveillance and analyze them jointly to have a comprehensive

reported by community-based surveillance separately but interpret them

Question 3



If a deterioration of a cholera outbreak is detected:

- a) Surveillance modalities should be adapted, and all suspected cholera cases should be tested to verify that the deterioration is due to cholera
- b) A case investigation should be performed on all suspected cholera cases reported in the surveillance unit
- c) A field investigation should be rapidly performed

Question 3 – Answer



If a deterioration of a cholera outbreak is detected:

- a) Surveillance modalities should be adapted, and all suspected cholera
- reported in the surveillance unit
- c) A field investigation should be rapidly performed

cases should be tested to verify that the deterioration is due to cholera

b) A case investigation should be performed on all suspected cholera cases

Together we can #Endcholera



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