

Cholera surveillance for health authorities

Module 4



GLOBAL TASK FORCE ON
CHOLERA CONTROL

Cholera surveillance for health authorities

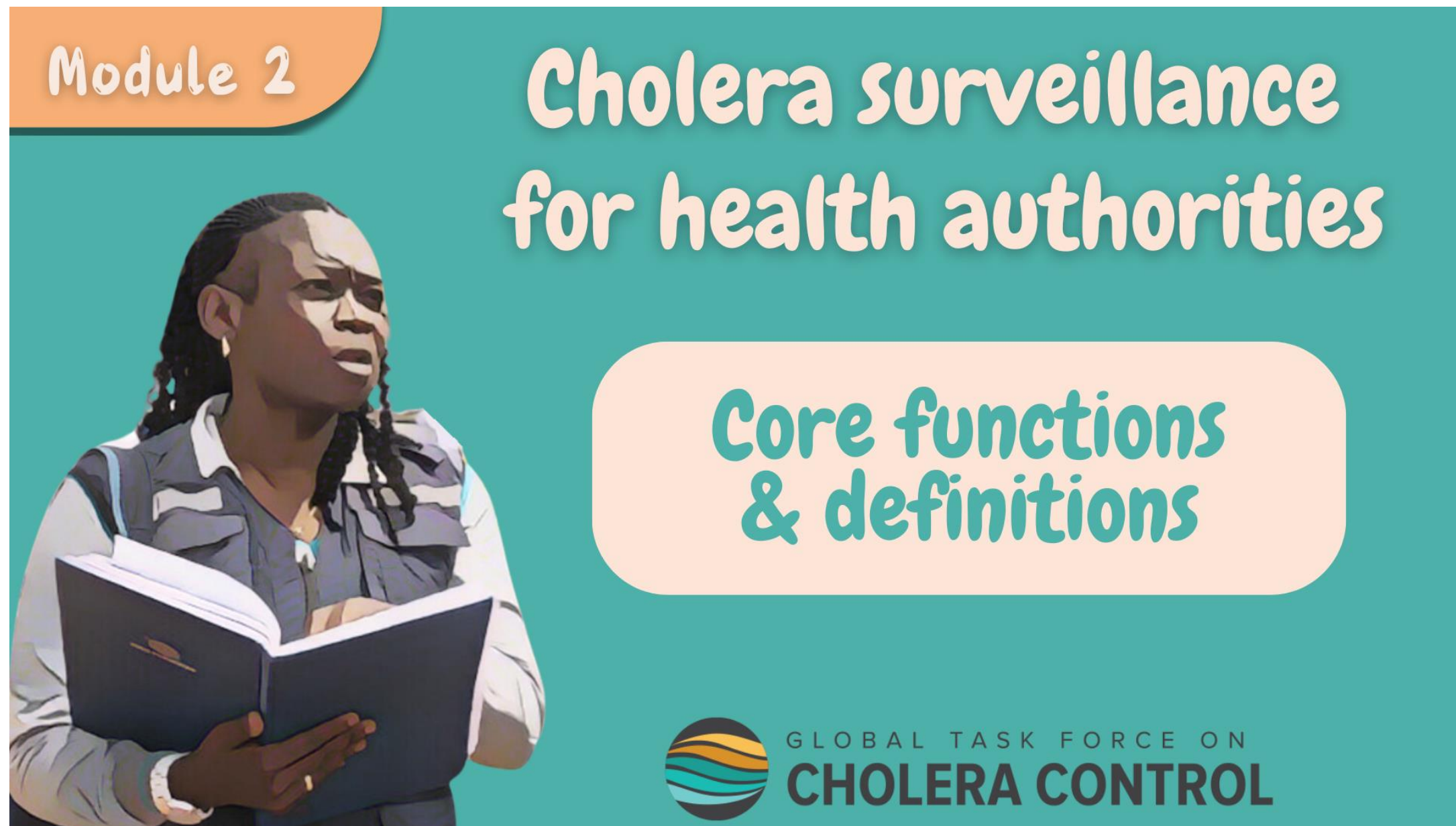
Monitoring
of outbreaks

With case studies



Get ready for this module

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

The graphic is a cover for 'Module 2' titled 'Cholera surveillance for health authorities'. It features a woman with braided hair, wearing a grey vest over a white shirt, holding an open book. The background is a solid teal color. The text 'Module 2' is in a white sans-serif font on an orange curved banner. The main title 'Cholera surveillance for health authorities' is in a large, white, rounded sans-serif font. Below it, a white rounded rectangle contains the text 'Core functions & definitions' in a teal sans-serif font. At the bottom right is the logo for the 'GLOBAL TASK FORCE ON CHOLERA CONTROL', which includes a circular icon with yellow and blue wavy lines and the organization's name in a white sans-serif font.

Module 2

Cholera surveillance
for health authorities

Core functions
& definitions

GLOBAL TASK FORCE ON
CHOLERA CONTROL

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

Why

- ➡ To **generate information to orient control measures**
 - To mitigate impact and spread

How

- ➡ In accordance with this module

A photograph showing a temporary medical facility. In the foreground, a person is lying on a green metal cot, covered with a light blue blanket. Their head is resting on a white pillow. To the right, another person is lying on a similar cot, with their legs raised and supported by a stand. In the background, another cot is visible with a person lying on it. The facility is set up under a large, light-colored tent or canopy. A red bucket is visible in the bottom right corner. The overall scene suggests a temporary healthcare setup in a field or emergency situation.

Reporting and testing strategies

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

i 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**

Principles for testing

Some suspected cholera cases are tested

No need to test ALL

- ➡ Treatment depends on dehydration
 - NOT on individual test results

Necessary to test SOME

- ➡ Monitor positivity rate
- ➡ Monitor circulating strain
 - Including susceptibility to antimicrobials

Selection of suspected cases for testing

- **Systematic sampling scheme**
 - Applied consistently in time and space

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

If RDTs NOT available

► Culture or PCR

- 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

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 accordance with applicable strategies



► Monitoring

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

Let's practice



Oversight of reporting & testing
by health authorities

Practice

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



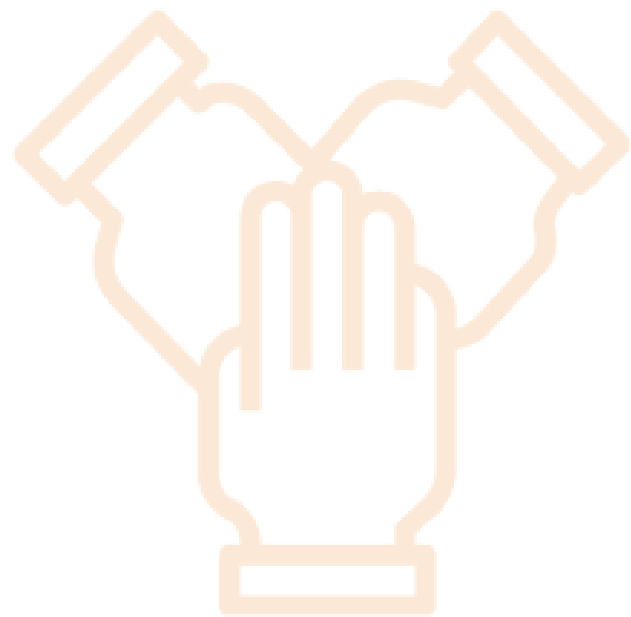
➡ **Underreporting**

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

➡ **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
 - If they did, they have not been able to resolve it yet
- Health authorities responsible for supporting surveillance stakeholders
 - If an issue persists, there is also an issue with how stakeholders are supported

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

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



► Person

- 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
 - Culture/PCR

► 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

Incidence rate

Number of new cases in a week

Population

► Interpretation

- **Speed of transmission**
 - Comparaison between geographic areas

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

Case Fatality Ratio (CFR)

Number of deaths that
occured at a health facility

Number of cases (health facility)

► Calculation

- **Does not include**
 - Dead on arrival at health facility

► Interpretation

- **Clinical care**

Number of community deaths

Number of community deaths

► Calculation

- **Includes**
 - 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

Number of cases **tested positive by RDT**

Number of cases **tested by RDT**

Positivity rate by culture or PCR

Number of cases **tested positive by culture or PCR**

Number of cases **tested by culture or PCR**

► Interpretation

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

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

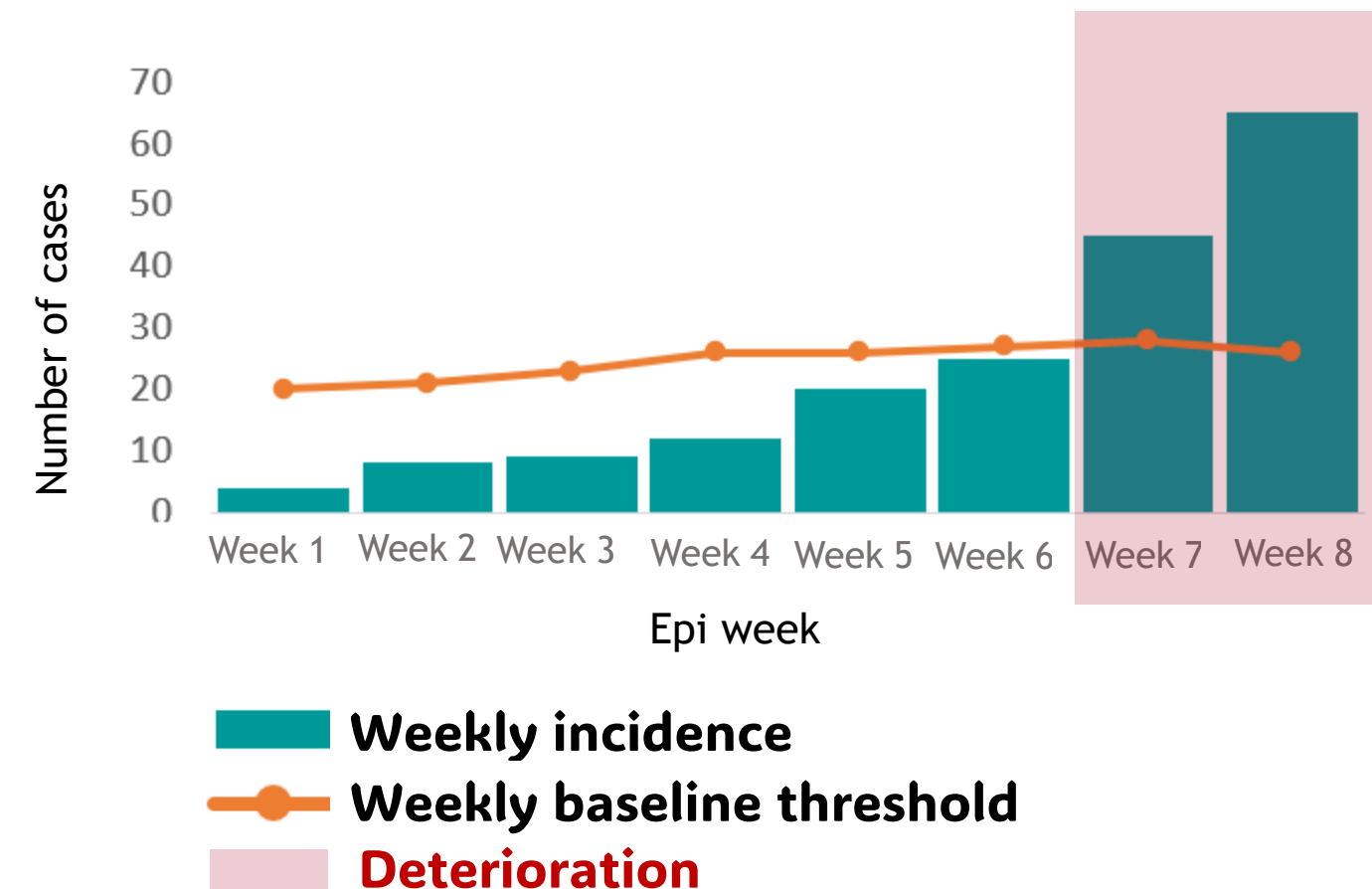
In surveillance units regularly affected by cholera with weekly historical data (for ≈ 5 years), **baseline thresholds** are used to detect a deterioration

► Baseline threshold

- Expected baseline level

► Deterioration

- An indicator exceeds baseline threshold
- For ≥ 2 consecutive weeks



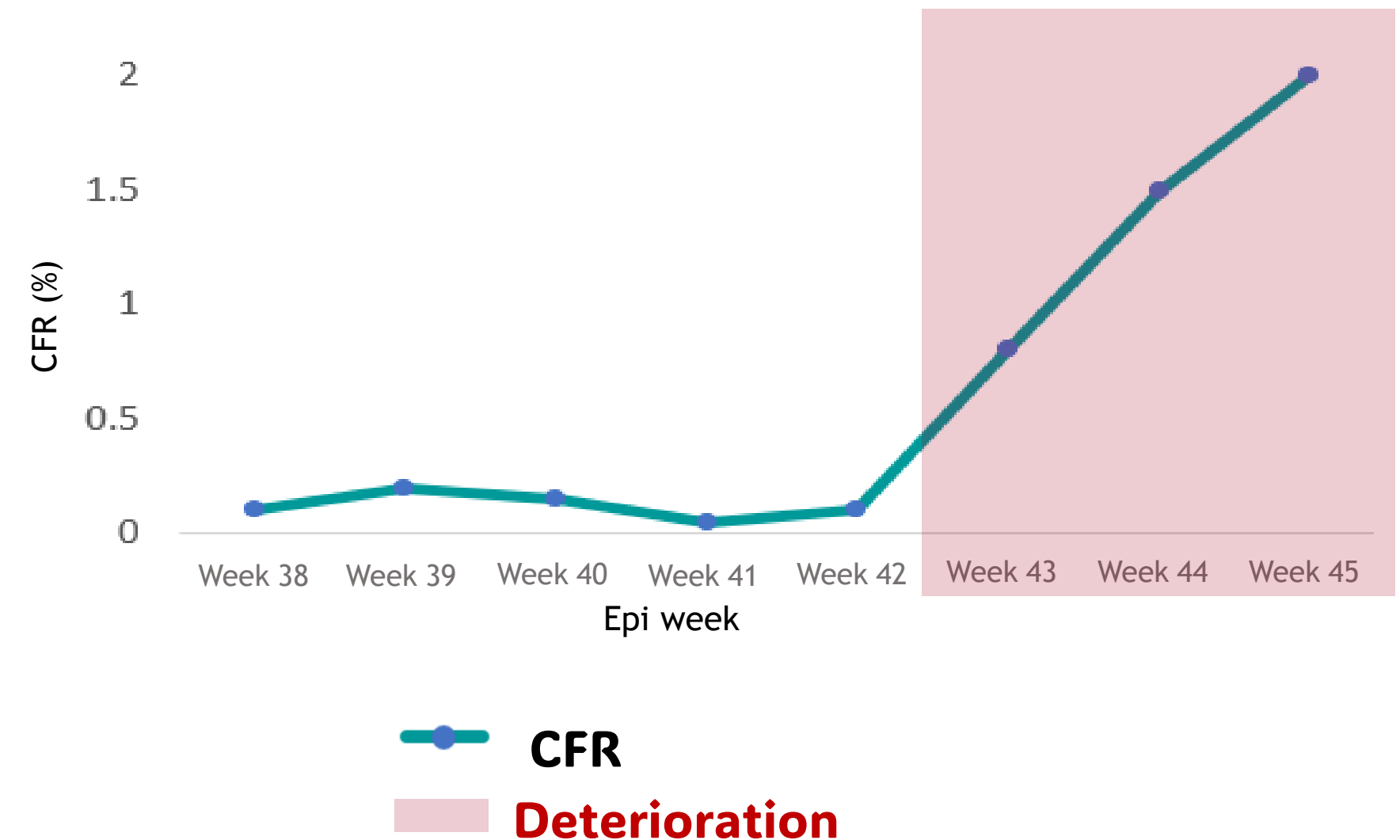
A **GTFCC Excel tool** automatizes the calculation of baseline incidence thresholds

Qualitative detection

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

► Deterioration

- Marked increase in an indicator
- Detected visually by assessing weekly trends



Let's practice



Analyze and interpret surveillance data
to monitor an outbreak

Practice

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?**

Answers

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

Practice

Continuation of scenario

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



- 1) How many health facility deaths and how many community deaths have been reported?
- 2) What is the CFR?
- 3) Considering the mortality indicators you computed, and the spatial distribution of cholera deaths, what do you recommend as a priority 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 health facility deaths
- 14 community deaths

2) CFR



- CFR calculation
 - Deaths at health facility (2)
 - Suspected cases reported by health facility-based surveillance (321)
- CFR: 0.6%
- ≠ situation report (5%)

3) Priorities for follow up considering mortality indicators

- **Mortality indicators**

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

- **Priorities for follow up**



- **Access to care**

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

- **Care seeking behavior**

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

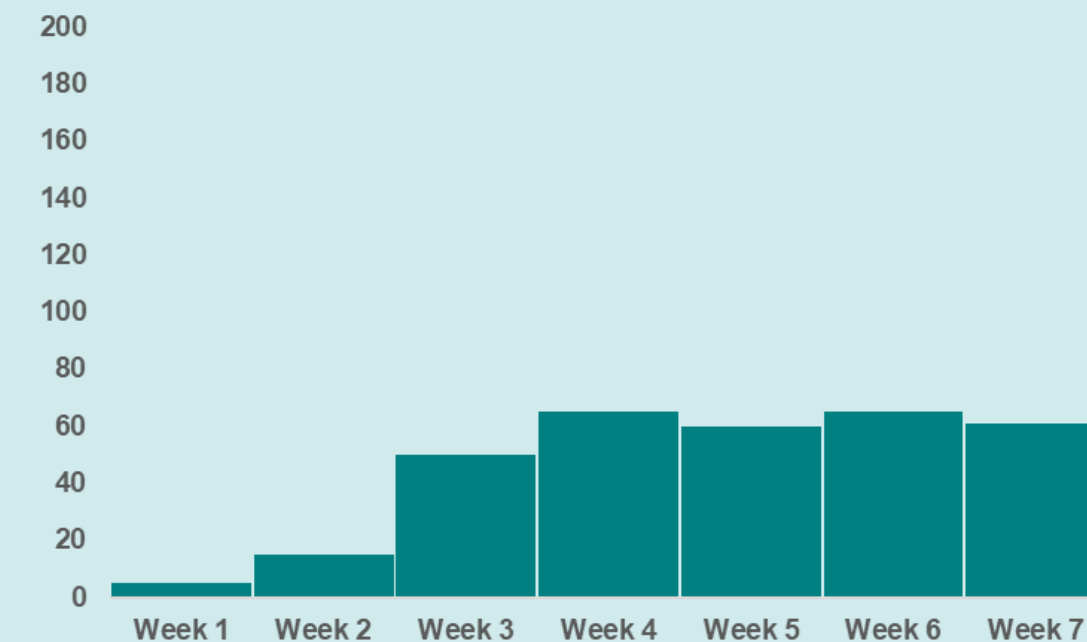
Practice

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



➡ 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**

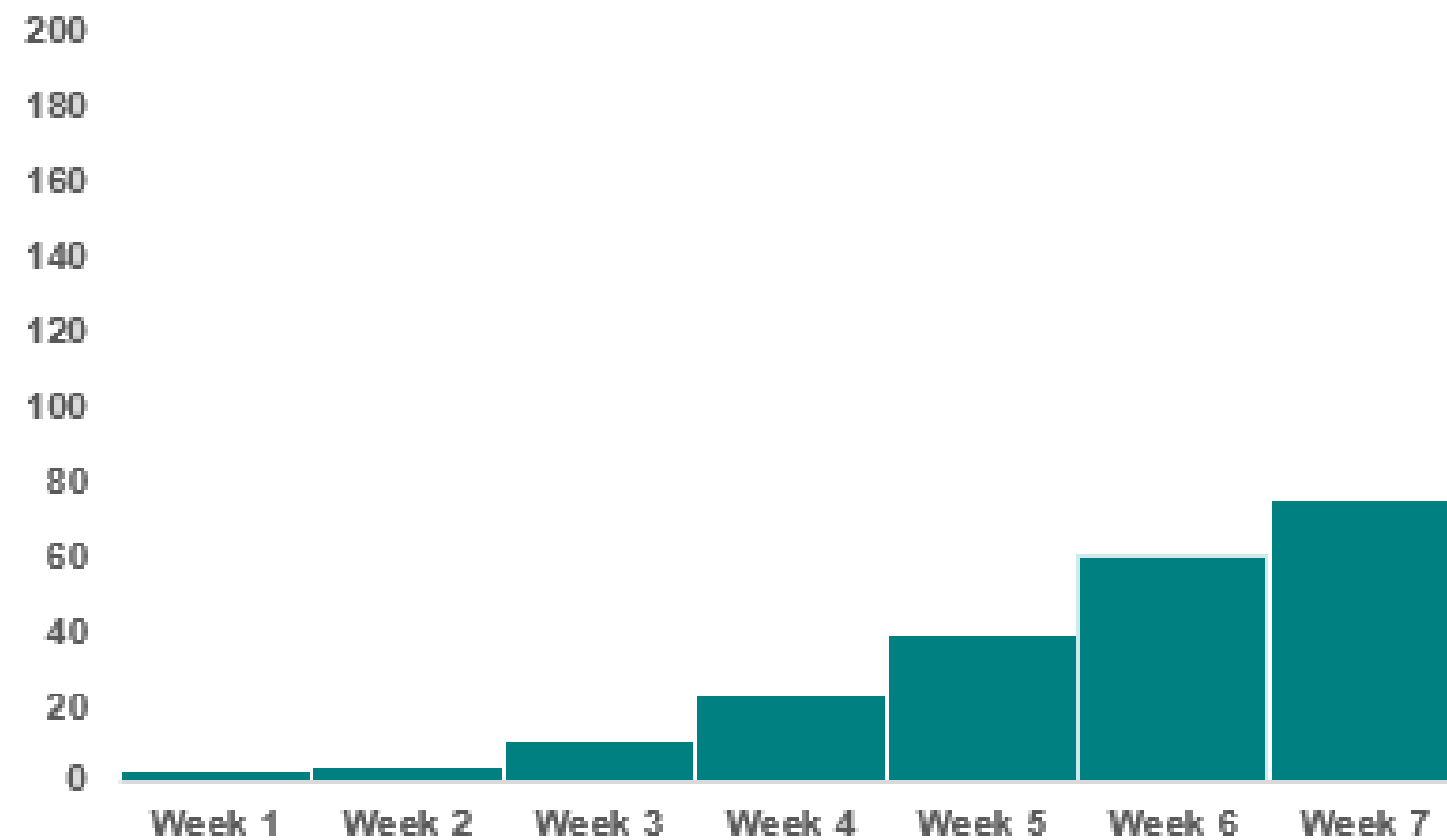
➡ No surveillance data were reported from ORPs (1st case study)

- Check ORPs records to retrieve the weekly **number of suspected cases at ORPs**

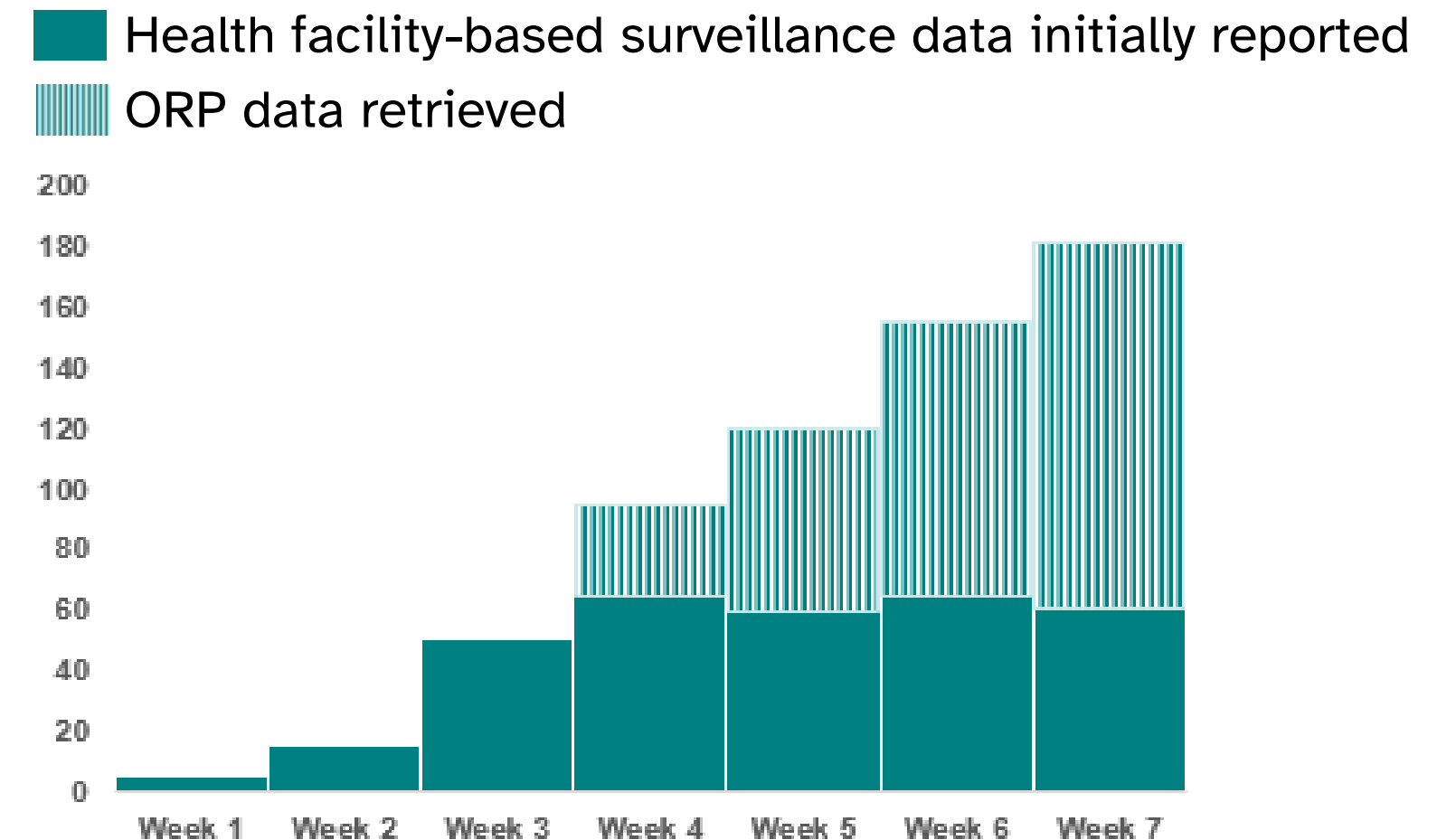
Practice

Continuation of scenario

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



Number of suspected cholera cases reported by community-based surveillance



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



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

Practice

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)

Weekly incidence (2025)

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



- 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?**

Answers

Sheet data

2025 data entered (week 1 -7)

YEAR FILL DATA (Format: YYYY)	WEEK FILL DATA (Format: Isoweek 1 to 52 or 53)	INCIDENCE FILL DATA
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	

Sheet Weekly summary

Incidence above threshold
for two consecutive weeks

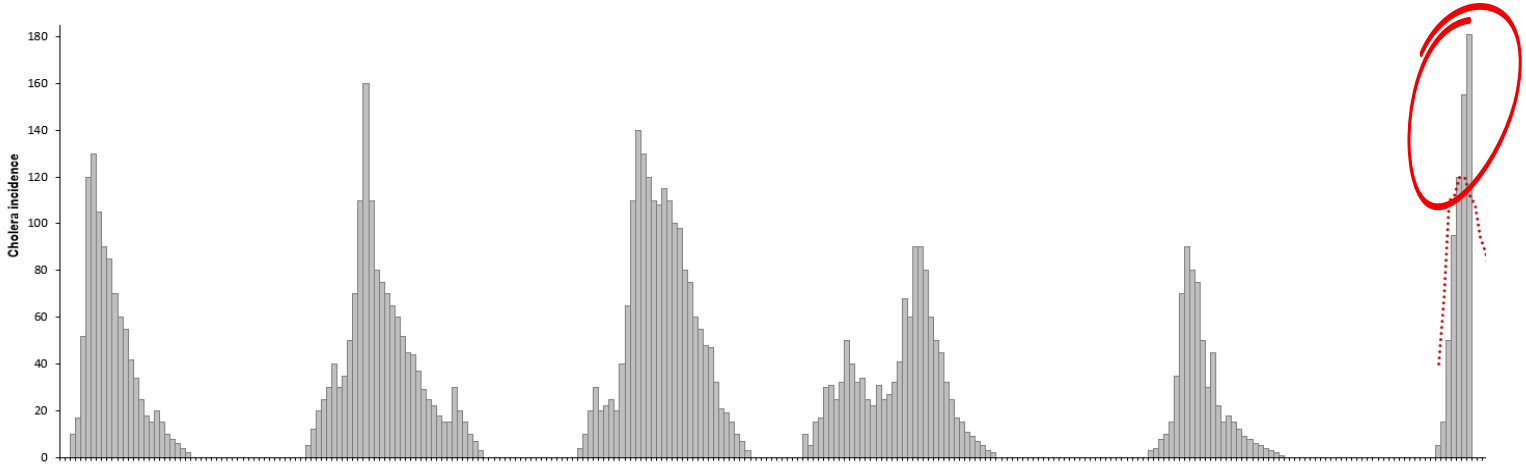
There is a deterioration

Week	Current weekly data below or above weekly threshold?
n°	
1	●
2	●
3	●
4	●
5	●
6	●
7	●

- Below threshold
- Above threshold

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

Current outbreak compared with historical baseline



Full time series



Last 52 weeks



Investigation

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



► Onset of an outbreak

- **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



Update stakeholders

Situation reports disseminated **weekly**



► Stakeholders

- Upper-level health authority
- Multisectoral stakeholders, partners, agencies involved in the response
- Health professionals, community health workers / volunteers
- Etc

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
- Laboratories



Learn about surveillance for early detection in Module 3

Wrap up

Routinely

If a deterioration is detected

Oversee
reporting
and testing



Monitor that suspected cases are **reported weekly** and a **subset** of suspected cases are **tested**

Transmit,
analyze,
interpret data



Analyze the reported data and test results on a **weekly** basis and interpret the outbreak dynamics

Disseminate
outcomes



Inform all stakeholders of the cholera situation on a **weekly basis**

Respond



Guide **multisectoral interventions** across all pillars

Investigate



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



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
 - 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 2



► **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 community-based surveillance and analyze them jointly to have a comprehensive description of the outbreak situation
- b) Analyze data reported by health facility-based surveillance and data reported by community-based surveillance separately but interpret them jointly to have a sound understanding of the outbreak situation

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 community-based surveillance and analyze them jointly to have a comprehensive description of the outbreak situation
- b) Analyze data reported by health facility-based surveillance and data reported by community-based surveillance separately but interpret them jointly to have a sound understanding of the outbreak situation**

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 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**

Together we can
#Endcholera



GLOBAL TASK FORCE ON
CHOLERA CONTROL