

Multi-country outbreak of cholera

External Situation Report #1, published 22 March 2023

Risk assessment Global risk – Very high	Countries/areas/territories affected 24
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Highlights

Data as of 20 March 2023

- Since the last disease outbreak news on the [global cholera situation](#) was published on 11 February 2023, the global situation has further deteriorated with four new countries reporting outbreaks. In total, 24 countries are currently reporting cases.
- Since the beginning of 2023, outbreaks have spread further in south-east Africa. The widespread and extended outbreaks in Malawi and Mozambique remain active, and the risk for further deterioration after the impact of cyclone Freddy in March is very concerning. Additional outbreaks have been reported in Tanzania, South Africa, Zimbabwe and Zambia since the start of the year.
- In the greater Horn of Africa, outbreaks continue in Somalia, Ethiopia and Kenya. In March, South Sudan reported a new outbreak in the region.
- The overall capacity to respond to the multiple and simultaneous outbreaks continues to be strained due to the global lack of resources, including shortages of the oral cholera vaccine, as well as overstretched public health and medical personnel, who are dealing with multiple disease outbreaks and other health emergencies at the same time.
- Based on the current situation, including the increasing number of outbreaks and their geographic expansion, as well as a lack of vaccines and other resources, WHO assesses the risk at the global level as very high.

Epidemiological update

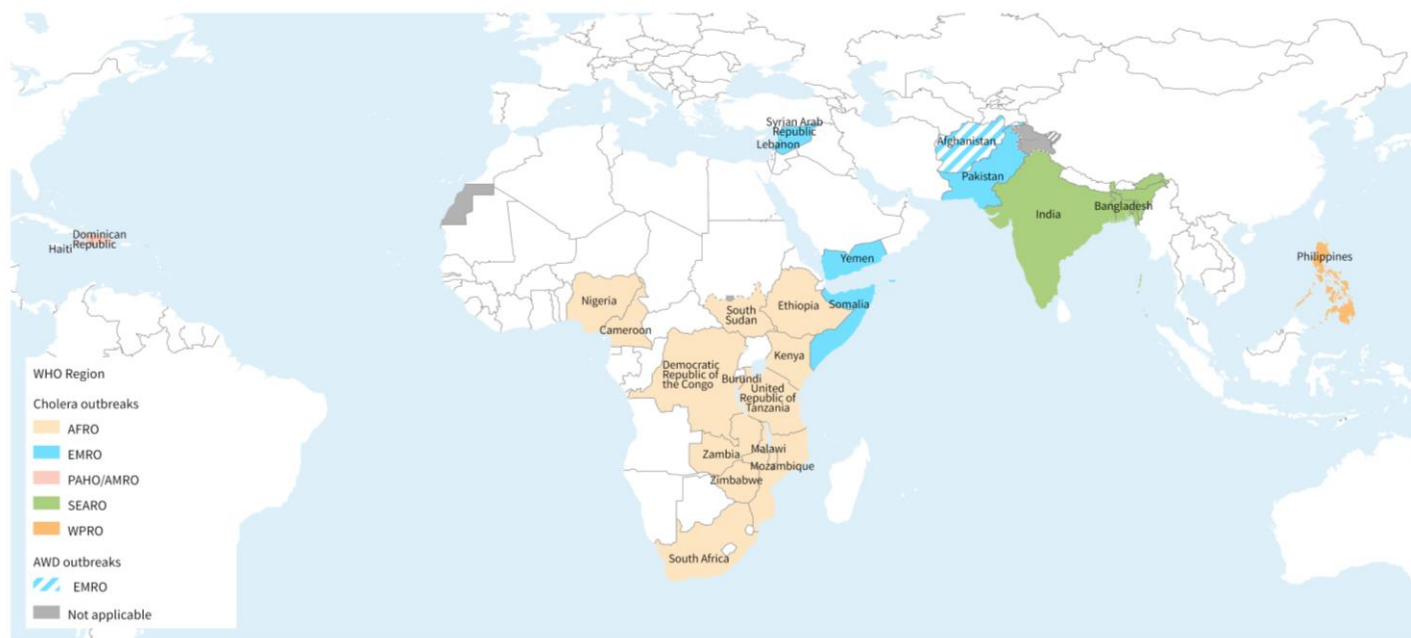
Since mid-2021, the world is facing an acute upsurge of the seventh cholera pandemic characterized by the number, size and concurrence of multiple outbreaks, the spread to areas free of cholera for decades and alarmingly high mortality rates.

The simultaneous progression of several cholera outbreaks, compounded in countries facing complex humanitarian crises with fragile health systems and aggravated by climate change, poses challenges to outbreak response and risks further spreading to other countries.

As of 20 March 2023, at least 24 countries continue to report cholera cases (Table 1). With reference to historical transmission patterns and seasonality, it is important to note that large parts of the world are currently in low or interepidemic transmission periods, therefore this number could increase in the months to come.

The mortality associated with the outbreaks is of particular concern as many countries reported higher case-fatality ratios (CFR) than in previous years. The average cholera CFR reported globally in 2021 was 1.9% (2.9% in Africa), a significant increase above the accepted targeted rate (<1%) and the highest recorded in over a decade. Preliminary data suggests a similar trend for 2022 and 2023.

Figure-1: Global situation of active epidemics of cholera and acute watery diarrhea as of 20 March 2023



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Data Source: World Health Organization
Map Production: WHO Health Emergencies Programme
Map Date: 20 March 2023

Table 1. Cholera cases and deaths reported to WHO from WHO regions, as of 20 March 2023**

Country, area, territory	Suspected/confirmed cases ¹	Total deaths	Cases per 100 000	CFR (%)	Reporting period (DD/MM/YYYY)
Burundi	193	1	2	<1%	08/12/2022 – 19/03/2023
Cameroon	15 309	311	55	2.0	01/10/2021 – 12/03/2023
Democratic Republic of the Congo	24 657	334	26	1.4	01/01/2022 – 2003/2023
Ethiopia	2095	44	2	2.1	01/08/2022 – 20/03/2023
Kenya	7235	116	14	1.6	08/10/2022 – 20/03/2023
Malawi	54 841	1684	272	3.1	01/03/2022 – 20/03/2023
Mozambique	10 854	75	34	<1%	01/09/2022 – 20/03/2023
Nigeria	922	32	<1	3.5	01/01/2023 – 05/03/2023
South Africa	6	1	<1	16.7	01/02/2023 – 04/03/2023
South Sudan	307	1	2	<1%	22/02/2023 – 16/03/2023
United Republic of Tanzania	72	3	<1	4.216	01/02/2023 – 13/03/2023
Zambia	268	7	1	2.6	21/01/2023 – 20/03/2023
Zimbabwe	121	1	1	<1%	12/02/2023 - 19/03/2023
Afghanistan*	22 848	7	57	<1%	01/01/2023 – 20/03/2023
Lebanon	1060	0	19	0	01/1/2023 - 20/03/2023
Somalia	2573	7	101	<1%	01/01/2023 – 12/03/2023
Syrian Arab Republic	21 427	5	101	<1%	01/01/2023 – 11/03/2023
North-west Syria	57 947	23	1252	<1%	16/09/2023 – 18/03/2023
Yemen	1724	3	6	<1%	01/01/2023 – 12/03/2023
Pakistan***	77 714	0	34	0	01/01/2023 – 12/03/2023
Dominican Republic	96	0	<1	0	17/10/2022 – 19/03/2023
Haiti	36 544	632	317	1.7	02/10/2022 – 16/03/2023
Bangladesh (Cox's Bazar)	19	0	-	0	01/01/2023 – 15/03/2023

* Afghanistan reported Acute Watery Diarrhoea (AWD).

** Case and death numbers presented are unreliable due to differences in reporting systems, and underreporting overall. All data are subject to verification and change due to data availability and accessibility. Respective figures and numbers will be updated as more information becomes available. The data in Table 1 includes both the suspected Positive RTD and laboratory confirmed cholera cases. No cholera cases of local transmission have been reported in the European Region.

*** Pakistan is considering AWD as suspected cholera in the areas where there is a laboratory confirmed case only.

¹The headings in Table 1 were adjusted from *Total cases* to *Suspect/confirmed cases* for clarity

Focus on selected countries

The epidemiological situation and additional analysis of selected provinces, countries and regions with active cholera outbreaks as of 20 March 2023 are described below.

Malawi

The cholera outbreak in Malawi has lasted for over a year. From 28 Feb 2022 to 20 March 2023, 54 841 cases and 1684 deaths (CFR 3.1%) have been reported from all 29 districts of the country, making it the biggest active cholera outbreak in Africa currently. Since the beginning of February, new cases and deaths have consistently declined across the country. Most new cases and deaths have been reported from the central and southern districts in the past weeks. Forecasting predicts continued decrease in cases in the most affected districts in the coming three weeks. However, the recent flooding in the aftermath of cyclone Freddy poses renewed risks for outbreak control and disruption of surveillance. Surveillance and response activities should be enhanced in areas affected by cyclone Freddy if the response gains are to be sustained.

Figure-2: Malawi national cholera cases, deaths and case fatality rate reported per epidemiological week as of 20 March 2023

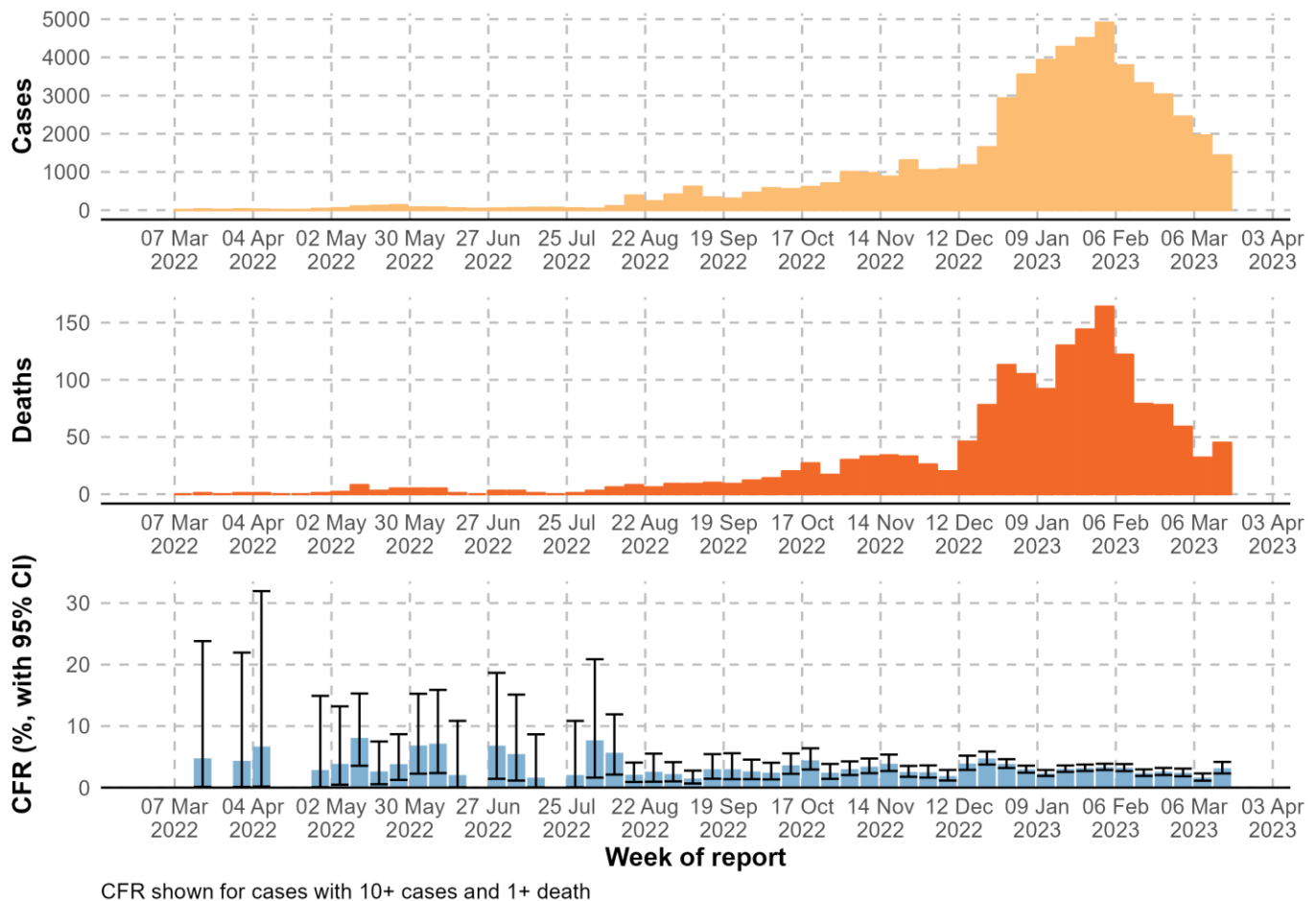
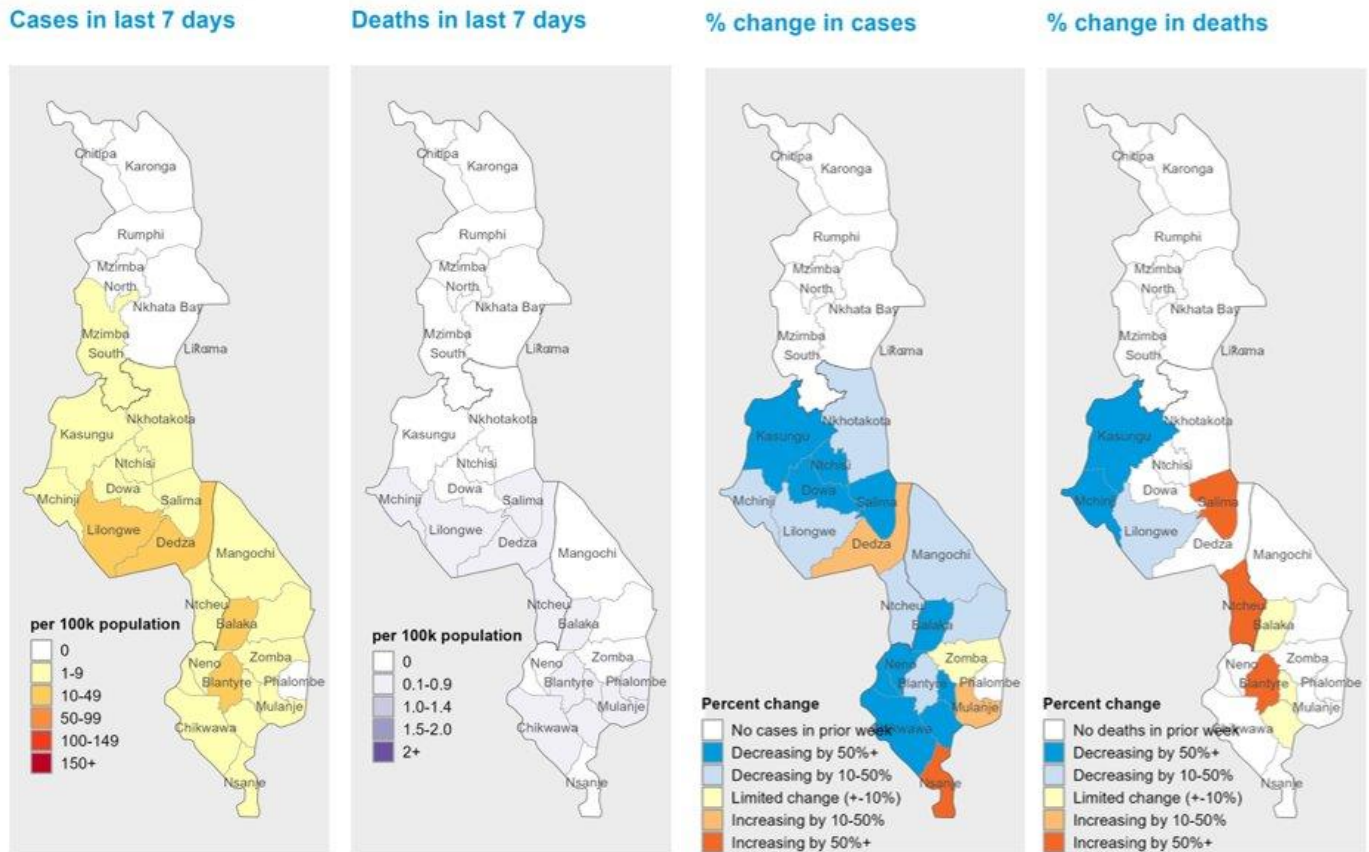


Figure-3: Malawi cholera cases and deaths reported in the past seven days per district as of 20 March 2023



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Data Source: World Health Organization, Ministry of Health of Malawi
 Map Production: WHO Health Emergencies Programme
 Map Date: 21 March 2023



Figure-4: Malawi cholera national growth rate trends. Methodology is shown in annex 2.

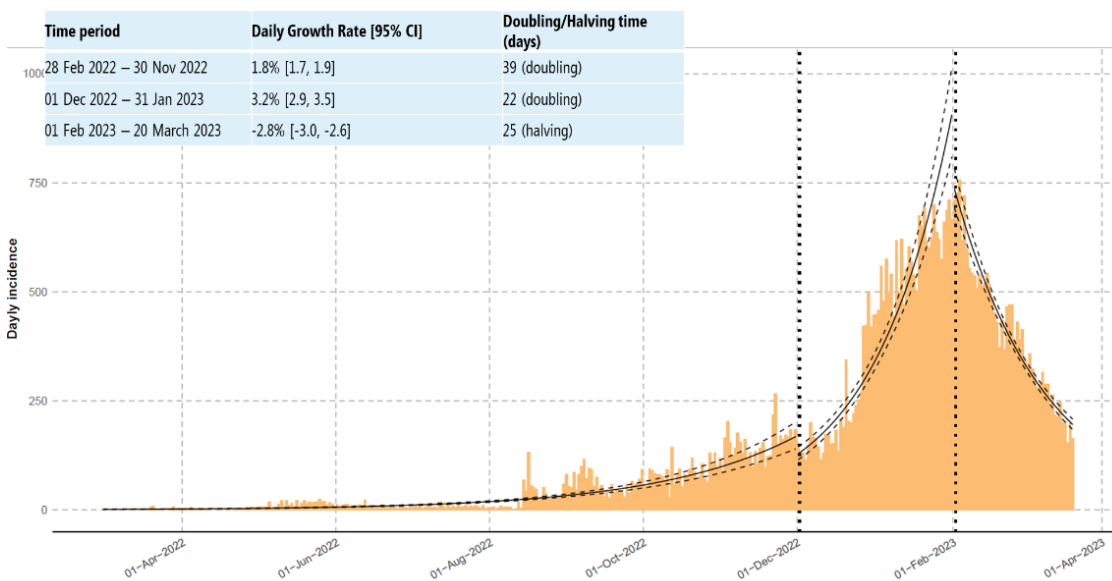
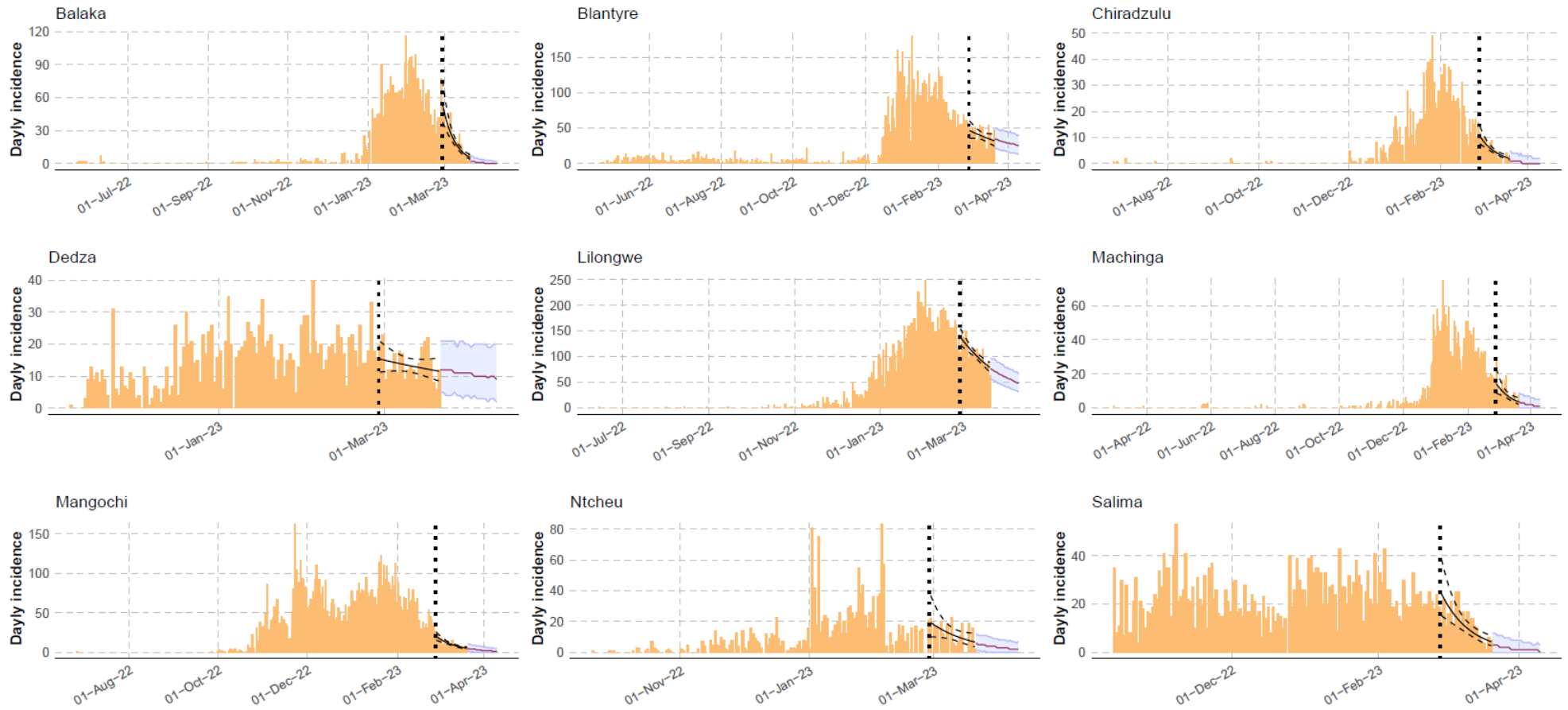


Figure-5: Malawi projected cholera cases for three-week period (21 March to 10 April) based on growth rate for previous 3-week period (1 to 20 March) for the most affected districts. Dark purple line indicates median of 1000 simulations, with 99% confidence intervals in light purple. Methodology is shown in annex 2.



Mozambique

The current cholera outbreak in Mozambique started in September 2022, in Niassa province. Since then, the number of cases as well as the geographic scope have continued to increase. As of 19 March 2023, 10 854 cases and 75 deaths (CFR 0.7 %) have been reported from 42 districts in eight provinces. Most affected are Niassa, Sofala and Tete province. Since February, heavy rains and the impact of cyclone Freddy have further worsened the situation, causing a recent spike in cases in mid-March. In the past weeks, Zambezia, Inhambane and Cabo Delgado provinces started reporting confirmed cholera cases.

Figure-6: Mozambique national cholera cases, deaths and case fatality rate reported per epidemiological week as of 20 March 2023

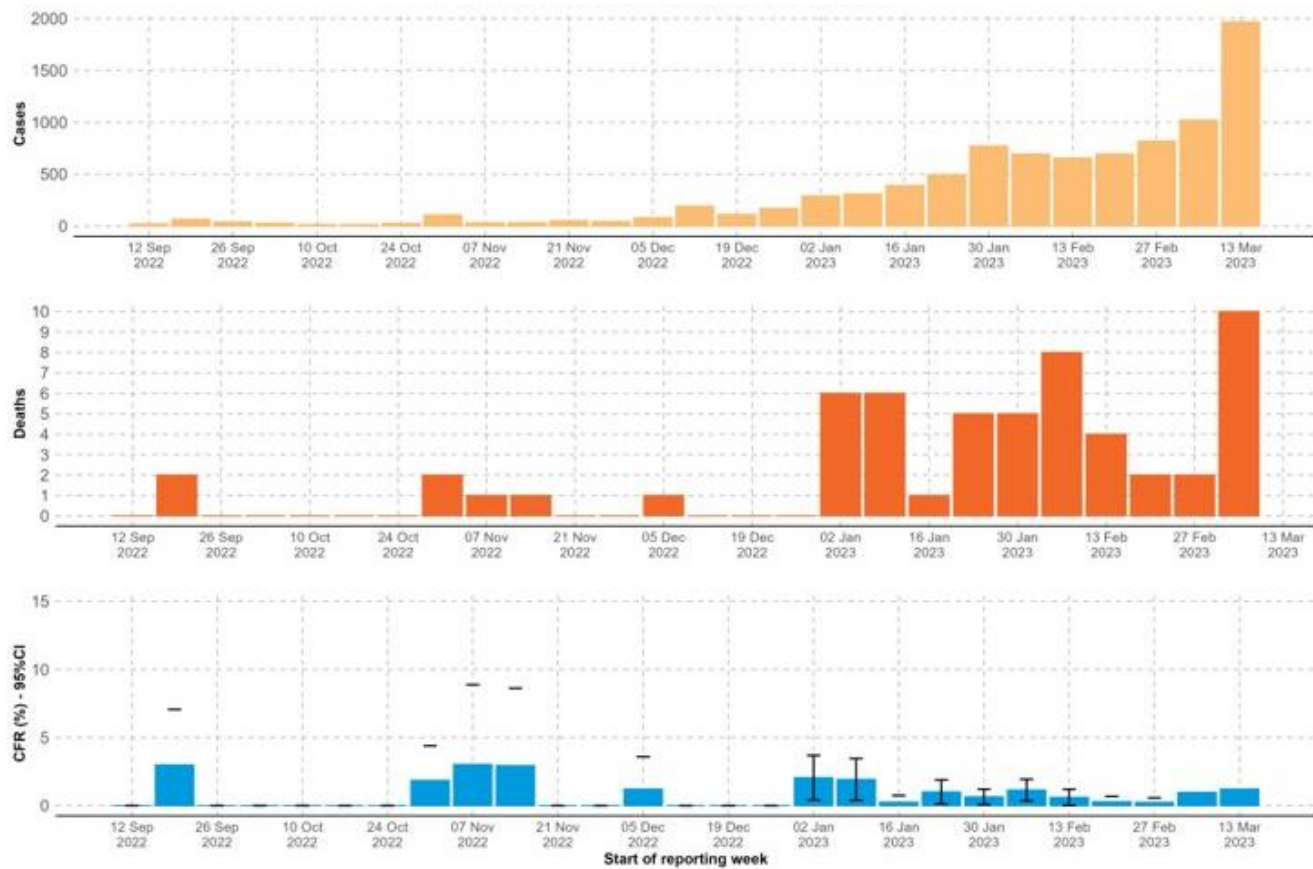


Figure-7: Mozambique cholera cases reported per epidemiological week per province as of 20 March 2023

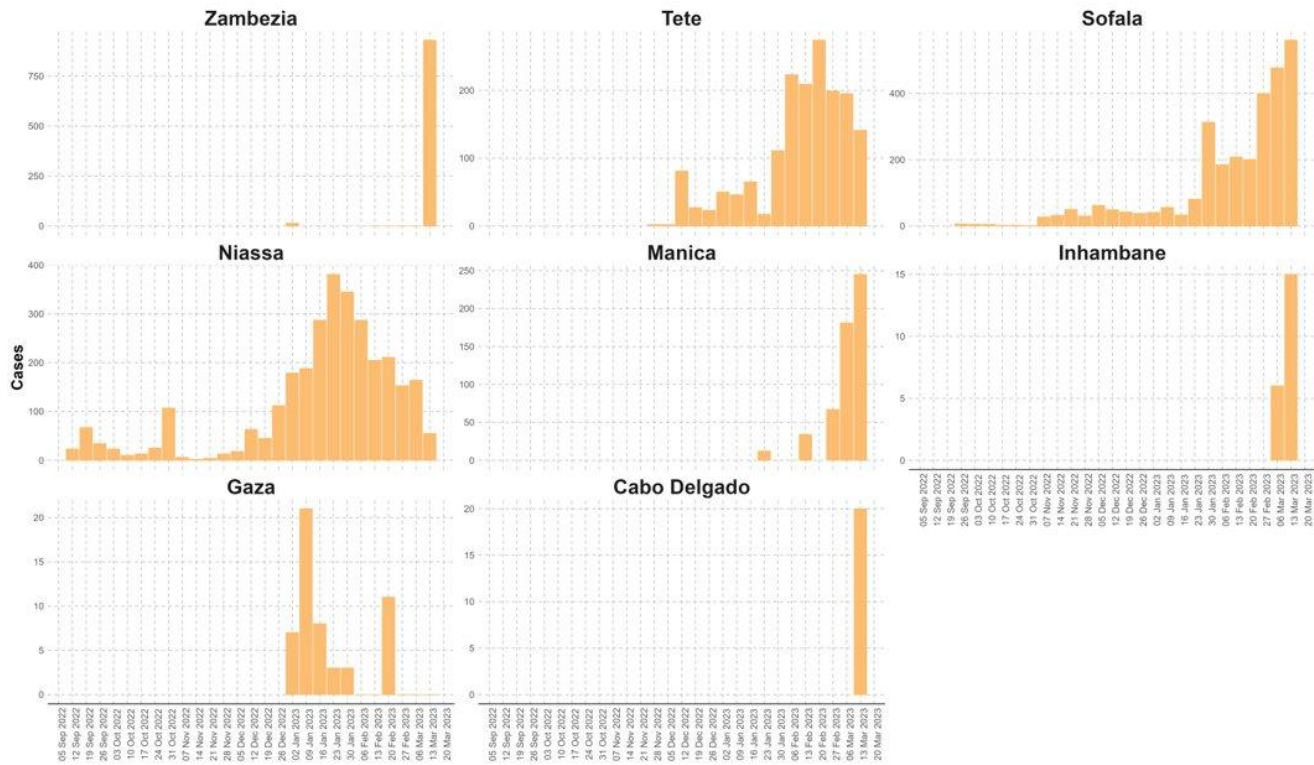
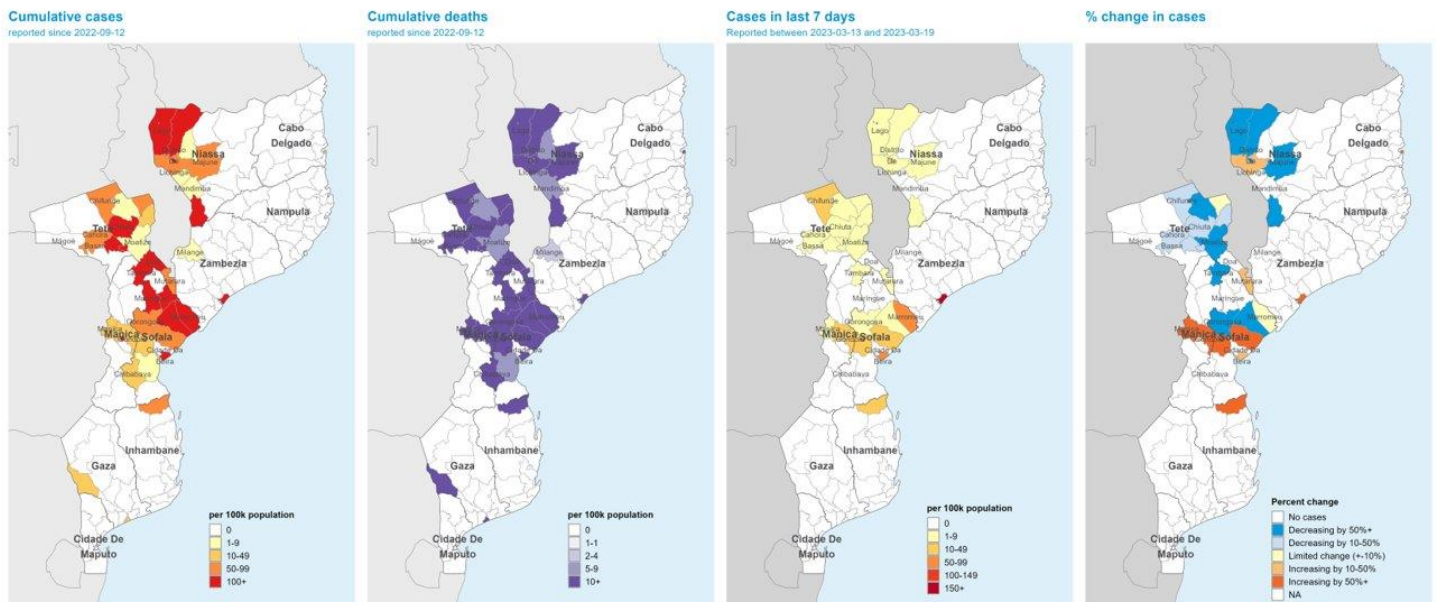


Figure-8: Mozambique cholera cases and deaths reported in the past seven days per district as of 20 March 2023



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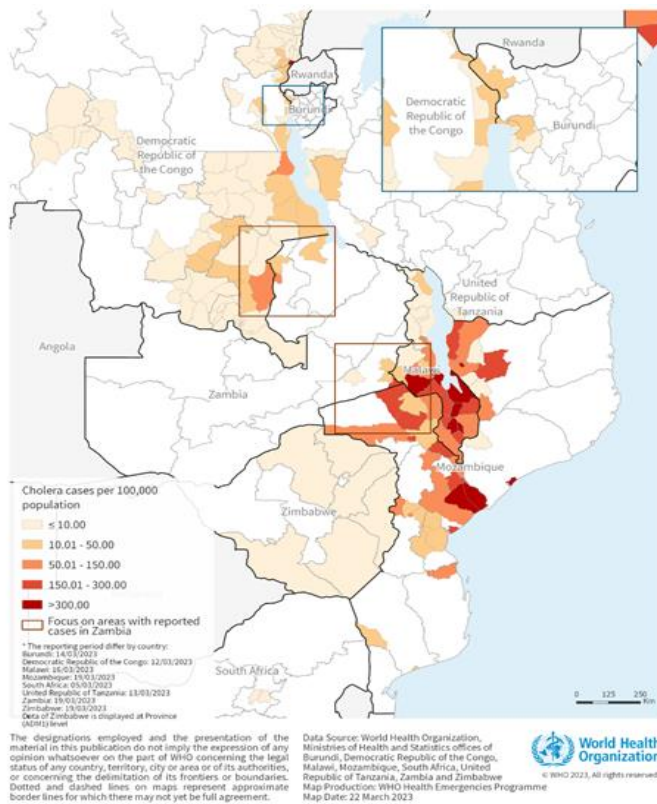
Data Source: World Health Organization, Ministry of Health of Mozambique
 Map Production: WHO Health Emergencies Programme
 Map Date: 21 March 2023

 **World Health Organization**
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Regional Overview: South-East Africa

Since 2022, Malawi and Mozambique are experiencing widespread and large cholera outbreaks, which have spilled across borders into neighboring countries in the beginning of 2023. On 26 January 2023, Zambia notified WHO of a cholera outbreak in the Eastern province bordering Malawi and Mozambique. Shortly after, a second outbreak in the Luapula province bordering the Democratic Republic of the Congo (DRC) was notified. An additional outbreak in the Northern province was notified in the past week. As of 20 March, 268 cases and seven deaths (CFR 2.6%) have been reported in seven districts in the three provinces of Zambia. Since mid-February up to 19 March, Zimbabwe has reported 121 cases and one death (CFR 0.7%) in six out of its 10 provinces. In the beginning of February, Tanzania reported a new outbreak in Ruvuma region, on the border to Mozambique. Until 13 March, 72 cases and three deaths (CFR 4.2) have been reported from four regions of the country. The ongoing outbreak in Burundi started in December 2022, in districts bordering DRC. By 19 March, 193 cases and one death (CFR 0.5%) were reported from seven districts, including the city of Bujumbura. The ongoing rainy season and repeated cyclones have worsened the cholera situation in the south-east of Africa and the risk for additional regional spread remains high.

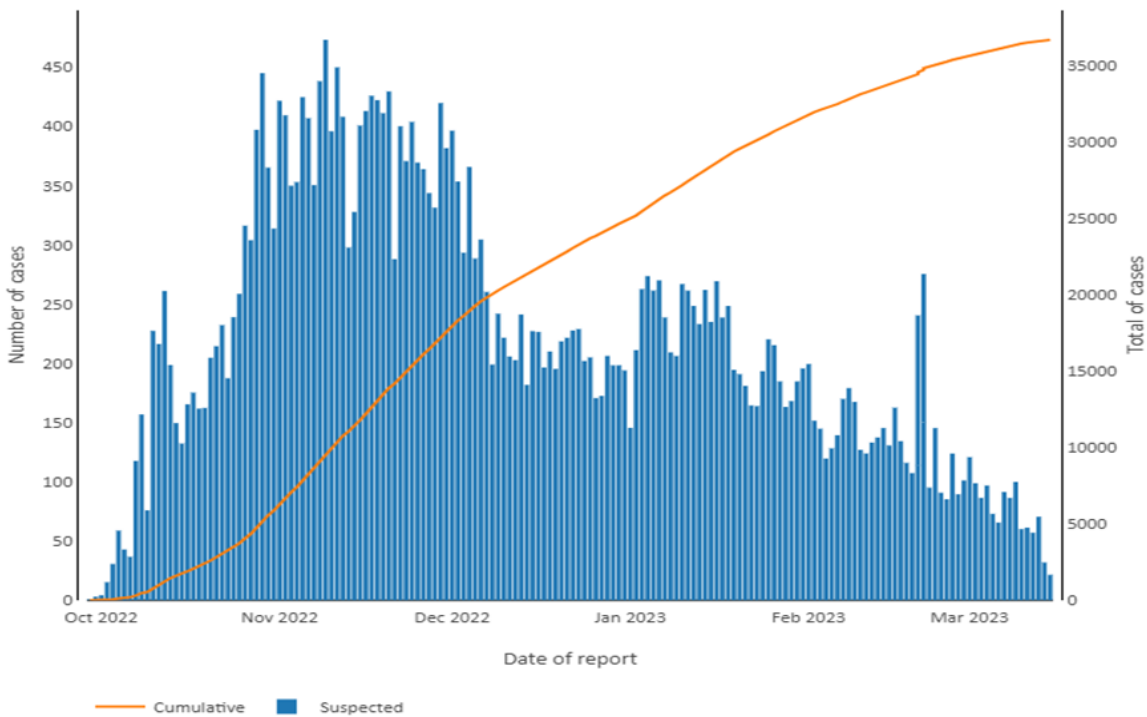
Figure-9: South-east Africa attack rate per 100 000 (suspected and confirmed cholera cases) between Jan-March 2023, as of 20 March 2023



Haiti

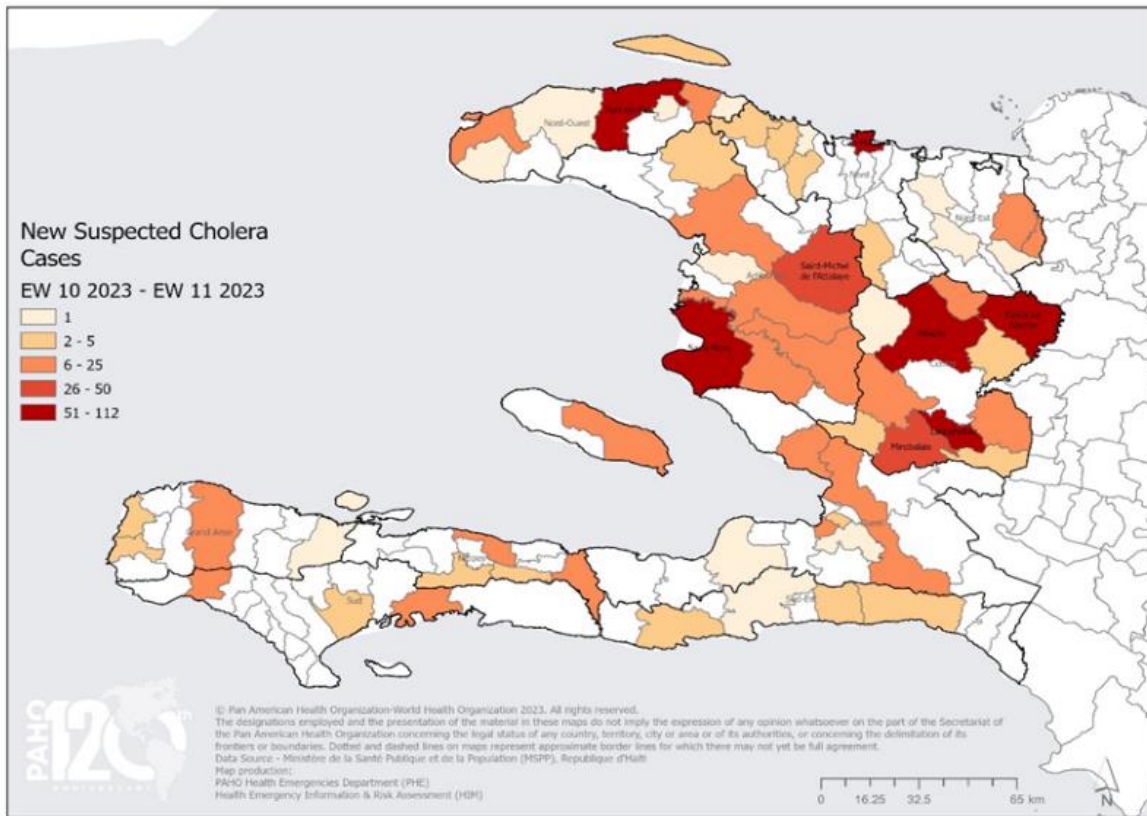
As of 16 March 2023, 36 544 suspected cases, of which 2519 were lab-confirmed, and 632 deaths (CFR 1.7%) have been reported in all 10 departments of the country. The majority of the confirmed cases were reported from the Ouest and Centre departments. Since February, the trend in reported cases seems to be declining, but the complex humanitarian and socio-political crisis, with increasing levels of insecurity in the past weeks, continues to be a major challenge in the surveillance and control of the cholera outbreak. These challenges have led to an underreporting of cases. In this complex scenario, it will be important to take into account said biases when analyzing the epidemiological situation.^{1,2,3}

Figure-10: Daily distribution of suspected cases of cholera in Haiti from 29 September 2022 to 16 March of 2023



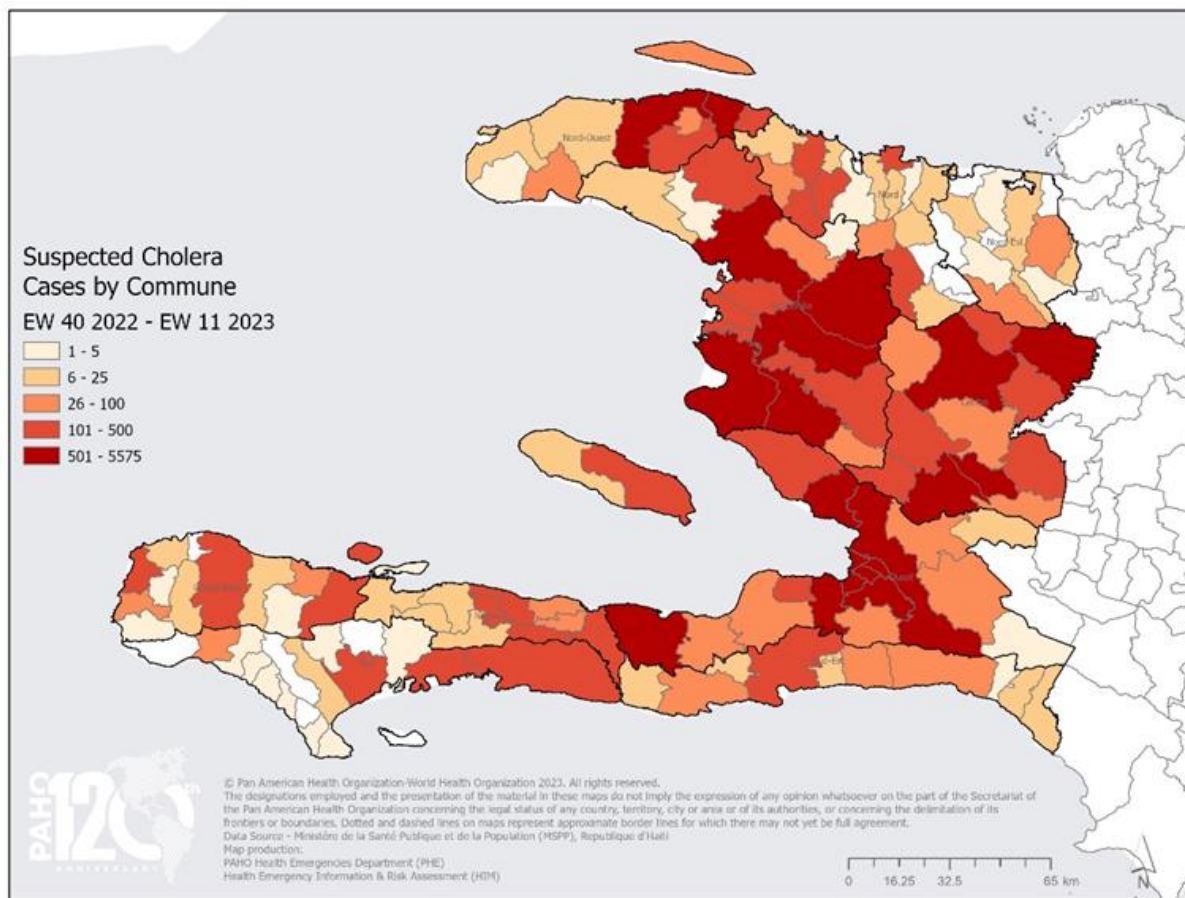
Source: Haïti Ministère de la Santé Publique et de la Population (MSPP). Graph generated by PAHO/WHO.

Figure-11: New suspected cholera cases in Haiti reported comparing epidemiological weeks (EW) 10 and 11 of 2023



Source: Haïti Ministère de la Santé Publique et de la Population (MSPP). Map generated by PAHO/WHO.

Figure-12: New suspected cholera cases in Haiti reported comparing EW 40 of 2022 and EW 11 of 2023



Source: Haïti Ministère de la Santé Publique et de la Population (MSPP). Map generated by PAHO/WHO.

The Democratic Republic of the Congo (North Kivu)

Since November 2022, the ongoing conflict in the province of North Kivu in the Democratic Republic of the Congo (DRC) continues, leading to unceasing influx of internally displaced people (IDPs) to camps close to Goma. Since the beginning of the year up until 15 March, 3739 cholera cases and nine deaths (CFR 0.2%) have been reported in North Kivu province alone. The lack of access to water and sanitation in the camps continues to pose a threat to the control of the outbreak, reversing the trend in decreasing cases in the past weeks. Forecasting predicts an increase of cases, especially in the health zone of Nyiragongo in the coming weeks.

Figure-13: Cumulative cholera cases per health zone in North Kivu province in DRC as of 14 March 2023. Source: North Kivu Provincial Health Division.

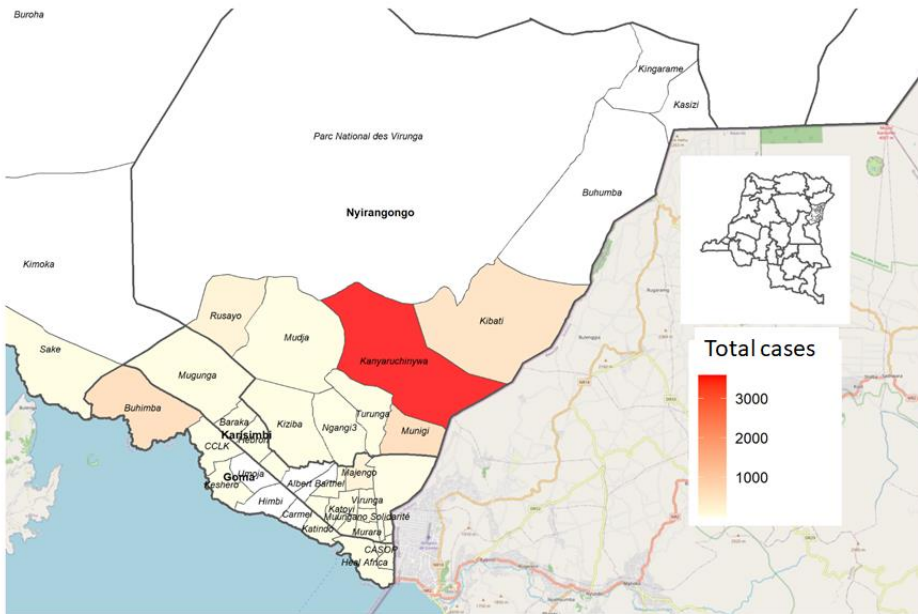


Figure-14: Forecasting of cholera cases in North Kivu province in DRC. Methodology is shown in annex 2

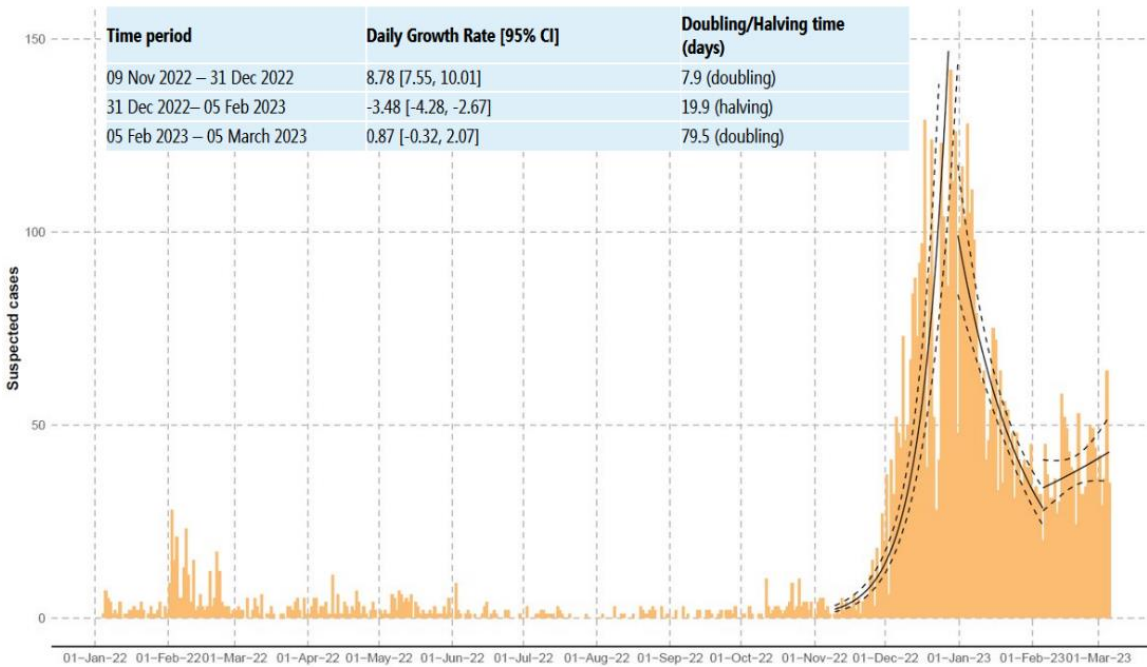
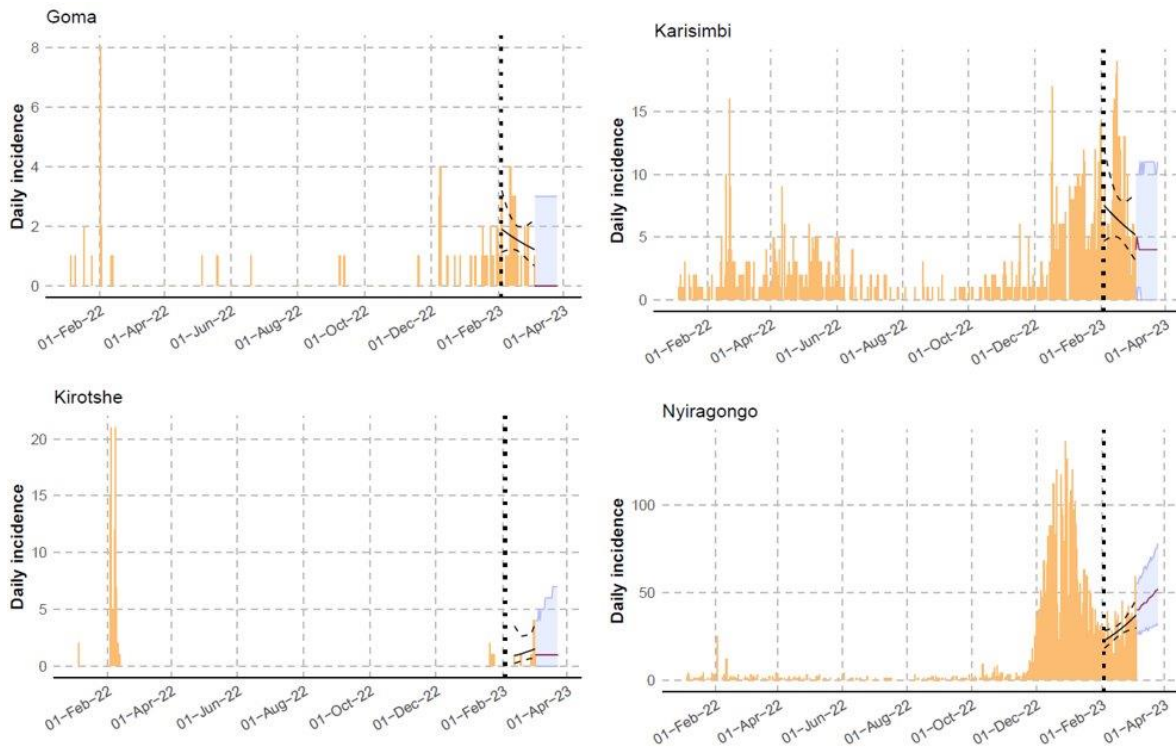


Figure-15: Forecasting of cholera cases per affected health zone in North Kivu province in DRC. Methodology is shown in annex 2.



Lebanon

In Lebanon, the first outbreak of cholera in almost 20 years was reported in 2022, with a probable link to the outbreak in Syria. This outbreak has occurred amidst a highly fragile health system, poor access to clean water and sanitation and an ongoing economic crisis. Since the start of the outbreak in October 2022 up until 20 March 2023, a total of 7022 suspected cases, with 671 confirmed cases and 23 confirmed deaths (CFR 0.3 %) have been reported. Since the beginning of 2023, 1060 suspected cases, one confirmed case with no death have been reported. In the past 7-day period (13 March – 20 March), there have been 134 suspected cases with no confirmed case or death reported. The last death was reported on 6 December 2022 and the last confirmed case was reported on 5 January 2023. Of the cumulative suspected cases reported, 54% are female and 29% are children aged 0-4 years; 18% required hospital admission.

Figure-16: Lebanon cholera cases reported by epidemiological week per governorate as of 20 March 2023

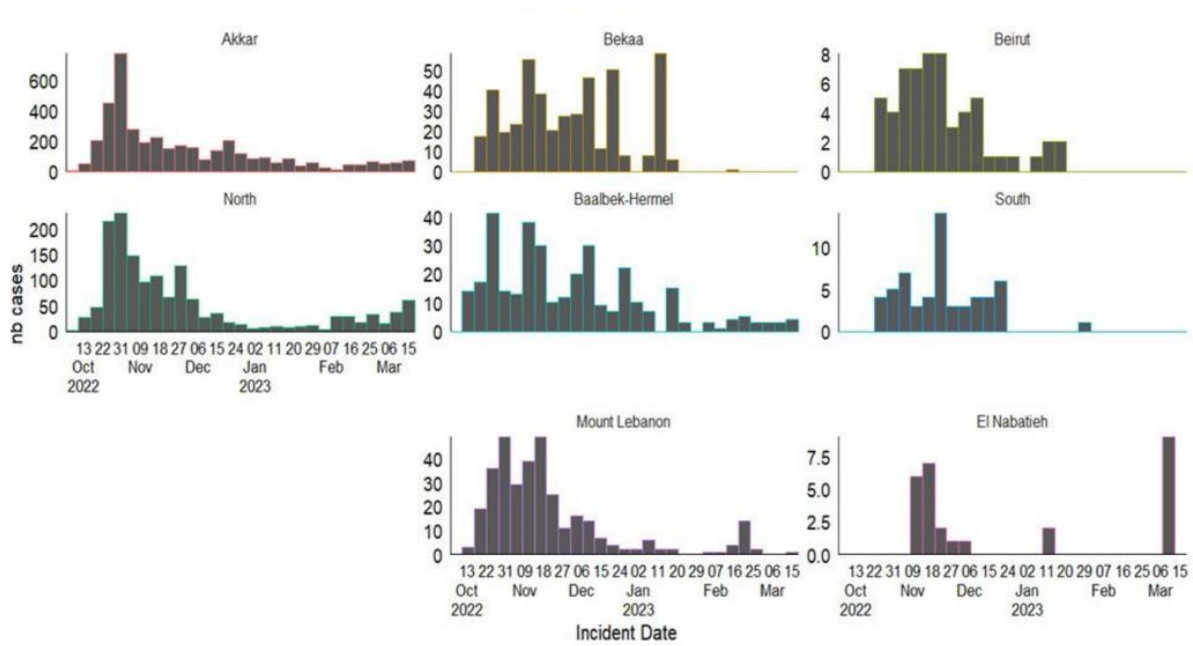
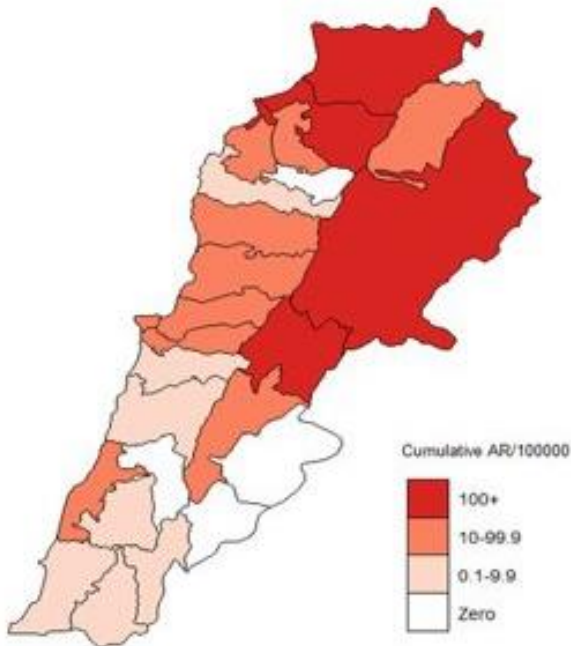


Figure-17: Lebanon cumulative attack rate per 100.000 (suspected and confirmed cholera cases) as of 20 March 2023



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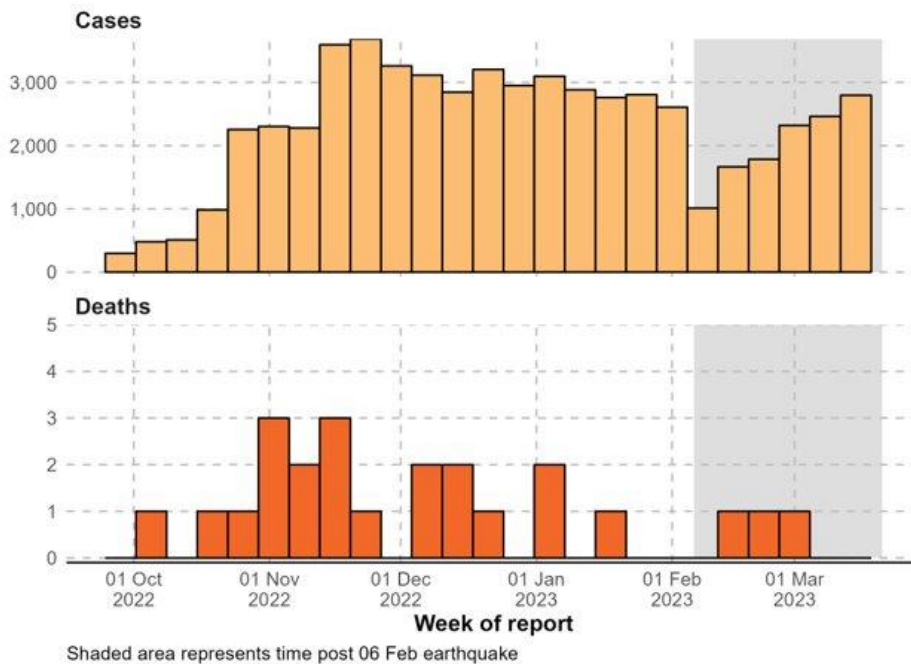
Data Source: World Health Organization, Ministry of Health of Lebanon
 Map Production: WHO Health Emergencies Programme
 Map Date: 21 March 2023



North-west Syria

From 16 September 2022 to 18 March 2023, 57 947 suspected cholera cases, 578 confirmed cases, and 23 deaths have been reported in north-west Syria (CFR <1%). Half (48%) of all suspected cases were reported from two districts in the Idlib governorate (Harim, Idlib). Reporting sharply dropped from week 5 (30 January – 4 February 2023) to week 6 (5 – 12 February 2023) and has subsequently consistently increased. This is likely the result of disruption to surveillance activities following the earthquake on 6 February 2023. Cumulatively, 44.7 % of all suspected cases are between 0 and 4 years of age. The positivity rate was low in week 11 (0.8%; 1/122) when compared to the cumulative positivity rate since the beginning of the outbreak (15.3%; 578/3 822).

Figure-18: North-west Syria national cholera cases and deaths reported per epidemiological week as of 18 March 2023



The short-term extensions of the Cross-Border Mandate of the UN and partners to deliver humanitarian support to north-west Syria are creating an unsustainable situation for NGOs responding to cholera on the ground. This has manifested in short-term (1-3 months long) projects, high turnover of frontline staff, and a lack of operational continuity. A continuous cholera response remains challenging as a result of this instability. Current surveillance systems are weak, and laboratory capacity needs substantial improvement. The water and sanitation network has been destroyed, and there is contamination of underground water with sewage, poor hygiene and limited funding for Water, Sanitation and Hygiene (WASH), increasing the risk of further spread. The significant infrastructure damage following the earthquake on 6 February 2023 has further compounded the situation. There is a continuing need for more risk communication and community engagement (RCCE) to familiarize the population with AWD/cholera. Population displacement continues. All the above complex factors pose a strong threat to cholera becoming endemic in north-west Syria.

Response pillar updates

WHO is working with partners at global, regional & country level to support Member States in the following cholera outbreak response activities:

- **Coordination**

- Providing a forum for technical expertise exchange through the Global Task Force on Cholera Control (GTFCC) coordination, and cooperation on to strengthen the countries' capacity to prevent and control cholera.
- Following resurgence of outbreaks in numerous regions and needs for enhanced coordination of response and support to Member States, WHO graded the multi-region cholera event as a grade 3 emergency at the global level on 26 January 2023. This is the highest level of emergency grading at WHO's disposal. WHO has set up coordination structures at headquarters, regional offices and in affected countries.
- Liaison between WASH and Health Clusters / Sectors in countries where these mechanisms are activated.
- Collaborating with key partners (UNICEF, MSF) to coordinate supply and optimal access to supplies.
- Leveraging resources to support global monitoring of the cholera pandemic, provide technical support to countries, enhancing data collection and reporting, strengthen advocacy, and provide medical and non-medical items to countries in need, especially for case management and diagnosis.
- Supporting the deployment of experts through Global Outbreak Alert and Response Network (GOARN), and Standby Partners.
- Conducting advocacy and resource mobilization activities to support cholera prevention and control at national, regional, and global levels.
- Ensuring that a robust mechanism on prevention and response of sexual misconduct is on place across the operations., with clear PRSEAH activities (briefing sessions, community awareness messages etc) aimed to inform all personnel involved in the response as well as the communities on Code of conduct, reporting mechanism, referral pathways for victims. Those activities should be done in close coordination with the inter-agency SEAH network aiming also to have a safe community-based complaint mechanism widespread among community members and key stakeholders.

- **Surveillance**

- **Public health surveillance**
 - Disseminating GTFCC revised guidance on [public health surveillance for cholera](#).
 - Disseminating GTFCC technical recommendations on standard data and metadata sets for cholera [reporting to the regional and global level](#) and [template](#)
- **Laboratory**
 - Conducting rapid laboratory capacity assessments with support of regional laboratory focal points
 - Working with countries to identify needs for field testing and sampling (Rapid Diagnostic Tests (RDTs), sample transport media etc.) and laboratory testing reagents/supplies for Cholera confirmation
 - Providing technical assistance on the testing strategy and prioritization of testing and laboratory resource

- Updating and disseminating technical materials for trainings of Rapid Response Teams and health care facility staff on sample collection and transport
 - Planning for training of laboratory personnel on cholera diagnostics
- **Vaccination**
 - Providing guidance to countries to identify target populations and hotspots for vaccination and supporting countries to prepare submissions for requests of Oral Cholera Vaccine (OCV) through the [International Coordinating Group \(ICG\)](#) mechanism, in the context of an acutely limited global supply. The global surge in cholera cases over the past two years has put unprecedented stress on the OCV supply chain, resulting recently in the [decision to temporarily suspend the standard two-dose vaccination](#) regimen in cholera outbreak response campaigns, using instead a single-dose approach, as well as impossibility to supply countries who submitted requests for preventive use. The global supply capacity in 2022 was 36 million doses whereas demand exceeded 70 M, of which 50 million doses were approved for outbreak response (41,9 M) and multi-year preventive campaign (9,9M).
 - In the first quarter of 2023, 11.7 million doses have been requested (by six countries) of which 2.2million doses have been shipped, in addition to over 3,2 M doses which have been shipped for requests from 2022.
 - Providing guidance to countries on optimal OCV campaign implementation.²
- **Case management**
 - Strengthening access and improving care quality for patients by setting up dedicated healthcare facilities (Cholera Treatment Centers (CTCs) and Cholera Treatment Units (CTUs)) which provide: 1) high-quality triage; 2) focused and protocolized clinical management; 3) identification and management of complications.
 - Embedding Oral Rehydration Points (ORPs) into the response to provide early intervention, which reduces the risk of severe disease and improves the referral processes when hospitalization is required.
 - Harmonizing clinical data collection, reporting, and enabling quality improvement and audit through case report forms and common documentation – data input, and analysis plan in place. Local (closed) dashboard in place to feedback to individual sites.
 - Training materials continue to be refined, including posters and tools for frontline medical staff.
- **Infection Prevention and Control (IPC)**
 - Supporting countries to assess and implement safety and quality of care interventions in health facilities to reduce risk of health care associated cholera infection.

² About the International Coordinating Group (ICG) on Vaccine Provision [WWW Document], n.d. URL <https://www.who.int/groups/icg/about> (accessed 12.12.22)

- Trainings and resources in development to enable health workers to perform risk assessment and apply standard precautions where/when transmission risks are identified
- **Risk communication and community engagement (RCCE)**
 - Mapping partners and working closely with communities, Member States and partners to establish RCCE coordination mechanisms embedded within the broader outbreak response, and to identify priority response activities
 - Providing support to maintain and build trust and manage risk perception and knowledge among communities about the disease, its symptoms, associated risks, precautions to take, and when to ensure adequate hydration and seek treatment when symptoms appear. Developing and disseminating key risk communication and community engagement messaging on these topics (available in [English](#), [French](#) and [Spanish](#) – pending in Arabic, Russian, Chinese and Portuguese). A Q&A for the public on cholera outbreaks has been published [here](#). Translations pending.
 - Collecting, analysing and using social and behavioural data to inform the outbreak response to understand behavioural drivers of transmission, effective interventions and knowledge, attitudes and practices over time.
 - Conducting regular social listening using on-and off-line channels; establishing community feedback mechanisms to promote accountability and ensure that community beliefs, questions, concerns and suggestions are heard.
 - Training of the community health workforce, including frontline workers, volunteers, community leaders and community/social mobilisers from civil society organizations, faith-based organizations, local women and youth groups, empowering them and allowing issues to be solved locally.
 - Engaging and collaborating with media, influencers and stakeholders who can listen, advocate, educate, address rumours and misinformation, and build health literacy.
 - Coordinating a series of webinars to provide a platform for communities to share lessons, experiences and best practices with other communities. The first in the series focussing on WASH was conducted on 7 March (recording available [here](#)). The second focussing on the role of communities in case management and community-based surveillance was held on 21 March (recording available [here](#)). For information and register for other webinars in the series, see [here](#).
- **Water, Sanitation, and Hygiene (WASH)**
 - Supporting countries for the implementation of effective cholera control strategies and monitoring of progress.
 - Supporting communities to advocate for, plan and implement sustainable WASH interventions to reduce the risk of cholera outbreaks and support response efforts.
- **Operation Support and Logistic (OSL)**
 - Ordered a stock of essential items for case management of 200 000 cholera patients, against a situation of unprecedented demand on cholera supplies, including cholera kits. The stock is being stored in WHO's warehouse in Dubai.
 - Fluids such as ringer lactate have also been prepositioned in Brindisi (UNHRD) and Amsterdam.

- Bulk items have been sent to DRC, Malawi, Mozambique, Syria and Turkey (drugs and fluids for up to 20 000 cases in each country)
 - Organized a charter flight with the support of Airlink has been to Haiti with Ringer lactate (100 000 l.) and accessories (catheters, infusion sets)
 - Shipment of cholera kits and laboratory material to reinforce diagnosis and surveillance in Zimbabwe, Zambia, Tanzania, Mozambique and Malawi
 - Replenished regional stocks of key cholera supplies in AFRO, PAHO and EMRO.
 - Supported the elaboration of an OSL concept of operation in liaison with Readiness teams for the African region, covering 17 countries in the region.
 - Collaborations with partners have been reinforced to share stocks and pipeline (with dashboards to monitor global supplies)
- **Information Network for Epidemics (EPI-WIN) webinars on cholera**
 - Organizing webinar series on cholera through the EPI-WIN platform to improve awareness and provide technical information required by frontline workers in responding to the current cholera outbreaks, understanding possible risks of spread, improving case management and reducing mortality.
 - Topics for these webinars will focus on the five-pillar approach proposed by the GTFCC in the cholera roadmap.

Annex 1. Data, table, and figure notes

Caution must be taken when interpreting all data presented. Differences are to be expected between information products published by WHO, national public health authorities, and other sources using different inclusion criteria and different data cut-off times. While steps are taken to ensure accuracy and reliability, all data are subject to continuous verification and change. Case detection, definitions, testing strategies, reporting practice, and lag times differ between countries/territories/areas. These factors, amongst others, influence the counts presented, with variable underestimation of true case and death counts, and variable delays to reflecting these data at the global level.

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Annex 2. Methodology for growth rate projections

Epidemic growth rates and doubling time are calculated using weekly incidence data. Exponential models are fit to incidence data for the indicated period. To simulate short-term predictions (implemented using package `predictions`³ in R) data on daily incidence, the serial interval and the reproduction number are used to simulate plausible epidemic trajectories and project future incidence. The serial interval has been taken as a gamma distribution with shape 0.5 and rate 0.1.⁴ The reproduction number is calculated based on serial interval and the growth rate over the previous three-week period. The simulations do not consider the population size, immunity or outbreak response actions. They are statistical extensions based on the observed incidence to date. Therefore, they should be interpreted as potential and not definitive trajectories. Analysis code can be made available upon request.

³<https://www.repidemicsconsortium.org/projections/>

⁴ Kahn, Rebecca, et al. "Incubation periods impact the spatial predictability of cholera and Ebola outbreaks in Sierra Leone." *Proceedings of the National Academy of Sciences* 117.9 (2020): 5067-5073.

Technical guidance and other resources

- [Cholera fact sheet](#)
- [Ending Cholera, A Global Roadmap To 2030](#)
- [Disease outbreak news Cholera – Democratic Republic of the Congo](#)
- [Disease outbreak news Cholera – Haiti](#)
- [Disease outbreak news Cholera – Malawi](#)
- [Disease outbreak news Cholera - Mozambique](#)
- [Disease outbreak news Cholera-Global situation](#)
- [Global Task Force on Cholera Control \(GTFCC\)](#)
- [AFRO Weekly outbreaks and emergency bulletin](#)
- [WHO AFRO Cholera Dashboard](#)
- [Cholera outbreak in Hispaniola 2022 - Situation Report](#)
- [WHO Health Emergency Appeal 2023](#)
- [Cholera in Lebanon](#)

References

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2. PAHO/WHO Cholera dashboard. Available at: <https://shiny.pahobra.org/cholera/>
3. World Health Organization (13 December 2022). Disease Outbreak News; Cholera – Haiti. Available at: <https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON427>