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Evaluation of UNICEF Work in Public Health Emergencies

Case study: Cholera in Yemen, 2015–2021

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The case study report was reviewed and finalized by UNICEF Evaluation Office staff members Elke de Buhr (evaluation specialist) and Beth Plowman (senior evaluation specialist), with support by Stephanie Smittkamp (intern).

Abbreviations

CCCs	Core Commitments for Children in Humanitarian Action
CHV	community health volunteer
DTC	diarrhoea treatment centre
eDEWS	Electronic Diseases Early Warning System
KII	key informant interview
MENA	Middle East and North Africa
MoPHP	Ministry of Public Health and Population
OCV	oral cholera vaccine
PHE	public health emergency
RCCE	risk communication and community engagement
RRT	rapid response team
SBC	Social and Behavior Change
WASH	water, sanitation and hygiene
WHO	World Health Organization

Introduction

1.1 Objective of the case study

This case study forms part of the evaluation of UNICEF's work in public health emergencies (PHEs), covering the period from 2015 to the present. The overall objective of the evaluation is to assess the extent to which UNICEF is fit for purpose to prepare for and respond to PHEs, with the specific objectives being to:

1. Examine the appropriateness and adaptability of UNICEF work in PHEs;
2. Examine efficiency and effectiveness – in terms of human and financial resources and capabilities as well as operational policies, procedures and tools – in preparing for and responding to PHEs;
3. Assess the coherence and sustainability of UNICEF work and its synergy with the work of local, national and international actors, including for systems strengthening;
4. Make actionable recommendations that help UNICEF optimize its contribution to PHEs;
5. Identify and capture lessons learned and experiences that can be shared to improve UNICEF's contribution to PHE responses.

The case studies for the PHE evaluation are intended as a deeper dive into the actions and relationships of UNICEF and partners and their effects in relation to specific disease outbreaks. Lessons that could be applied more broadly can be extracted from each of these case studies.

This case study examines Yemen's preparedness for and response to cholera in the country since 2015 and UNICEF's contribution in this regard. The case study builds upon an existing 2018 evaluation of UNICEF's response to the 2016–2017 cholera outbreak in Yemen (United Nations Children's Fund, 2018). The specific research questions for the case study are:

- To what extent have recommendations from the 2018 evaluation of the 2016–2017 cholera outbreak in Yemen, and actions based on lessons from the outbreak more generally, been implemented by UNICEF and key partners in the country?
- What is the current state of cholera preparedness and response in Yemen?
  - What is the role of UNICEF in contributing to preparedness and response?
  - How might UNICEF's contribution be improved?
- To what extent did lessons from the cholera outbreak in Yemen contribute to improving preparedness for other disease outbreaks, including COVID-19?
  - How did UNICEF contribute to this?

Answering these questions required an assessment of the effectiveness of UNICEF's preparations for cholera outbreaks after the 2016–2017 outbreak, using the World Health Organization (WHO) Health Emergency and Disaster Risk Management Framework to provide judgement criteria on preparedness functions such as planning and coordination, human resources, financial resources and strengthened systems. The team also used the Core Commitments for Children in Humanitarian Action (CCC) benchmarks to provide judgement criteria for assessing response to cholera in the country. This case study did not further evaluate UNICEF's response to the 2016–2017 cholera outbreak in Yemen, as this has already been done. Rather, the case study focuses on what actions have been taken between the 2018 evaluation and 2022 and how UNICEF is responding to the continued presence of cholera in Yemen.

1.2 Case study approach and data sources

Data were collected through a document review and primary data collection in the form of key informant interviews (KIIs) with UNICEF staff and other stakeholders involved in cholera preparedness and response in the country.

The case study team conducted the document review, with support from UNICEF's Yemen Country Office in identifying and sourcing relevant documents. Documents reviewed included UNICEF management and reporting documentation, including strategy and planning documents, situation reports and internal documentation relating to cholera outbreaks and UNICEF initiatives, as well as relevant cholera and broader PHE evaluations, surveillance reports and other documents produced by partners and the governments in Yemen.

It is important to note that several evaluations and reviews were conducted for similar issues and time periods as this case study. For example, the Inter-agency Humanitarian Evaluation of the collective humanitarian response in Yemen since 2015 was completed at the start of the document review and was therefore included. UNICEF's Level 3 COVID-19 evaluation commenced in October 2022, and a water, sanitation and hygiene (WASH) review conducted by UNICEF's Office of Emergency Programmes is also in progress. This case study focused on specific research questions and a streamlined document review to limit duplication in analysis and information.

In addition to the document review, the study team conducted interviews with 16 key stakeholders who work on cholera and PHEs in Yemen; these key informants work for UNICEF, local partner organizations, governments in Sana'a and Aden and international organizations. The interviews were conducted in Arabic by Fouad Othman, who worked with the UNICEF Yemen Country Office to identify the list of key informants to interview. The initial list included 58 key informants and was therefore not feasible due to resource and time constraints, so the team created a prioritized list of 28 individuals, 12 of whom were unavailable or declined to participate. All in-country interviews were conducted in person. One additional interview with a representative from the UNICEF regional office was conducted via phone by Catherine Cantelmo. Instruments and consent protocols were developed and reviewed in line with Oxford Policy Management's Ethical Review Committee guidelines and are included as appendices to this report.

1.3 Structure of this report

The remainder of this report is structured as follows. Section 2 provides an overview of the national context and features of cholera outbreaks and PHEs in Yemen. Section 3 reviews the national and UNICEF responses to cholera. Section 4 assesses national preparedness for cholera since 2018 and UNICEF's contribution to this preparedness, while section 5 assesses responses to cholera since 2018. Section 6 summarizes evidence against the evaluation questions for the evaluation as a whole. Section 7 presents the conclusions of the case study as summary answers to the research questions.

Additional information is included in appendices. Appendix A lists the key informants interviewed. Appendix B presents the instruments used for KIIs and Appendix C the consent protocols for KIIs.

National context and cholera in Yemen

This section provides a summary of the national context and cholera outbreaks in Yemen over the period covered by the evaluation.

2.1 Yemen overview

North Yemen became independent from the Ottoman Empire in 1918. The British, who had set up a protectorate area around the southern port of Aden in the nineteenth century, withdrew in 1967 from what became South Yemen. The two countries were formally unified as the Republic of Yemen in 1990. Yemen has long been the poorest country in the Middle East and North Africa (MENA) and is the only country with a republican form of government in the Arabian Peninsula.

Since 2015, Yemen has suffered from deep political fragmentation, and the country remains geographically and politically divided, primarily between the areas under the authority of the internationally recognized government and the parts of the country controlled by the de facto authorities, which include the capital, Sana'a.

Yemen's population of approximately 32 million (as of 2021) (World Bank, 2023) has more than doubled since 1974, making Yemen the second most populous country in the Arabian Peninsula. Over 50 per cent of the population is below the age of 25, and 40 per cent is under the age of 15, with the median age being 18. Population growth is estimated at close to 3 per cent annually. Although cities and towns are expanding rapidly through both natural growth and rural-to-urban migration, nearly 60 per cent of Yemenis live in rural areas (World Population Review, 2023). Yemen ranked 179 out of 189 countries on the 2020 Human Development Index, with approximately three quarters of the population having been affected by poverty in 2020.

2.2 Economic conditions

Yemen is one of the poorest countries in the Middle East but grew strongly in the mid-1990s when oil production began. It is a small oil producer and does not belong to the Organization of the Petroleum Exporting Countries. Unlike many regional oil producers, Yemen relies heavily on foreign oil companies that have production-sharing agreements with the government. Prior to the most recent instability in the country, income from oil production constituted 70–75 per cent of government revenue and about 90 per cent of exports (Australian Government Department of Foreign Affairs and Trade, 2023). Following a decline in oil production capacity, Yemen's economy is now based on agriculture, which suffers from flooding, pests and other issues. Roughly 70 per cent of the economy is informal, and most Yemenis rely on remittances and aid inflows (Fitch Solutions Group Limited, 2023).

The current economic situation is characterized by sharply rising inflation, the fragmentation of economic institutions, a liquidity crisis, the devaluation and split of the Yemeni riyal, the non-payment of civil servants' salaries and high unemployment (European Union, 2021). Food importers are facing major logistical challenges that have increased consumer prices for imported food and non-food items, weakened purchasing power and undermined household income. Yemen must import 100 per cent of its medicine, 90 per cent of its wheat and rice, and 70 per cent of its fuel (BTI Transformation Index, 2022). As a result of conflict and economic collapse, about 40 per cent of households have lost their primary source of income (World Bank, 2022). In addition, most public sector employees have not received their monthly pay since October 2016 (World Bank, 2022). This has left critical basic services on the verge of collapse. The private sector has also suffered severe losses, compounded by difficulties in accessing liquidity or credit and forcing massive layoffs and closures.

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2.3 Conflict and humanitarian crisis

Yemen is facing one of the world's worst humanitarian crises as the war in the country enters its tenth year. The United Nations estimates the war had killed 377,000 people as of the end of 2021, both directly and indirectly through hunger and disease, with children under 5 accounting for nearly 70 per cent of those deaths (Hanna, Bohl and Moyer, 2021).

Yemen has historically been divided based on political, tribal, religious identities and has experienced multiple conflicts that intensified around 2010, with large protests taking place in 2011, internal fighting in 2012–2014, and a war and siege that began in 2015 and continues to date. The current Yemeni conflict is complex and became internationalized when Saudi Arabia and the Gulf states, with arms support from the United States and United Kingdom, began aiding the largely Sunni forces. Concurrently, Iran has increasingly supported the de facto authorities in the north of Yemen. Both groups claim to constitute the official government of Yemen. The conflict has caused massive physical damage, devastated the economy and led to an unprecedented humanitarian crisis (World Bank, 2019). Various third parties have tried to broker ceasefire and peace agreements. In parallel with the political process, the Yemeni government and its international partners have tried to estimate the damage from the conflict in their dynamic needs assessment reports. This process has been challenging, and the estimates rely on strong assumptions (World Bank, 2019). Formerly regularly collected official statistics – such as national accounts, household income and expenditure surveys, and demographic and health surveys – have not been updated since 2014 aside from the recent Multi-indicator Cluster Survey done with support from UNICEF in 2022/2023.

2.4 Yemen's health system

The last nationwide health survey was a Demographic and Health Survey conducted in 2013 (El Bcheraoui et al., 2018). Demographic and health figures for subsequent years are based on projections of trends and assumptions. These figures show that Yemen has poor population coverage of essential health services, including dropping immunization

rates since 2015 that have contributed to measles and diphtheria outbreaks as well as the return of polio to the country. Further, just a quarter of pregnant women are estimated to attend at least four prenatal care visits (El Bcheraoui et al., 2018). Poor service coverage, along with conflict, contributes to high mortality rates in the country. The war is estimated to be the third leading cause of death in the country, following ischemic heart disease and neonatal disorders (World Bank, 2021). COVID-19 has also contributed to high mortality, but there is a lack of data to understand the impact the pandemic has had on mortality.

The total life expectancy at birth is just 66 years old. The 2016 Global Burden of Disease study estimated that the under-five mortality rate rose from 49 deaths per 1,000 in 2013 to 53 per 1,000 in 2015, a rate previously observed in 2009 (Wang et al., 2016). The infant mortality rate is 46 deaths per 1,000 live births, and the neonatal mortality rate is 28 deaths per 1,000 live births (United States Agency for International Development, no date). Yemen's maternal mortality ratio is one of the highest in the region at 164 maternal deaths per 100,000 live births in 2017.

Since the start of conflict in 2015, direct or indirect attacks on health facilities have been a prominent feature of the conflict, with around 8 per cent of facilities in the 2016 WHO Health Resources and Services Availability Monitoring System survey found to have been either partially or completely destroyed at the point of assessment. Attacks on international health organizations have also occurred on a regular basis, including four on health facilities operated by Médecins Sans Frontières, which prompted that organization's withdrawal from all hospitals in Northern Yemen in August 2016. Direct targeting of health facilities, combined with reduced functionality because of damage to vital infrastructure, impaired fuel and electricity supplies, lack of supplies, health care worker shortages, financing problems and restrictions on population movement have made access to basic health services increasingly challenging. The proportion of the population without access to basic health care in August 2015 was estimated at 58 per cent, and although this has since dropped to 54 per cent, over half of the Yemeni population remains without access (United Nations Office for the Coordination of Humanitarian Affairs, 2017). Further, access to health care is highly unequal in Yemen as a result of very low public expenditure. Health care is largely privatized, and even in the public sector, patients must pay out-of-pocket for medicines and consultations. Rural areas have reduced access to health care and fewer female health workers since the war.

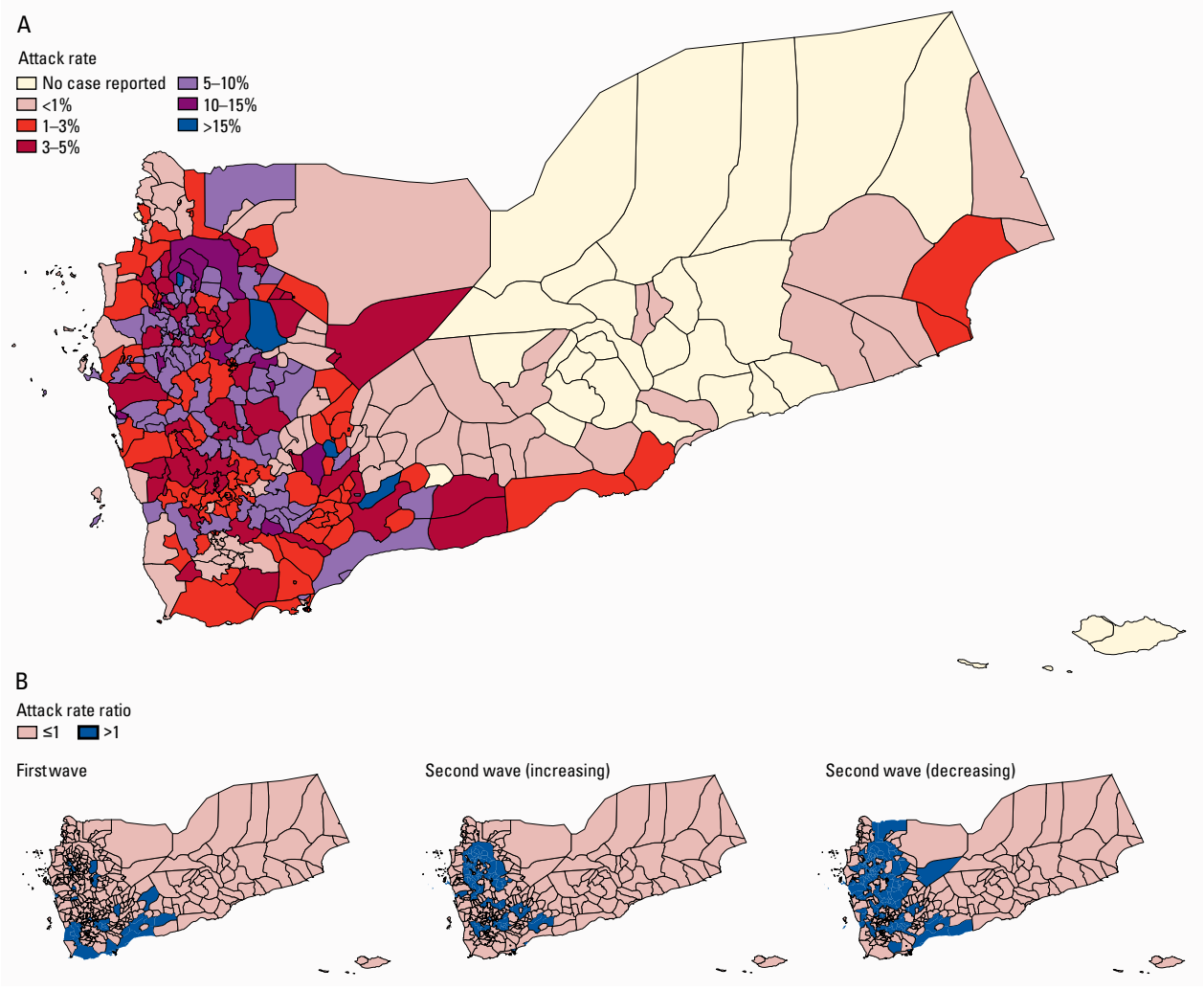
2.5 Cholera in Yemen

Around 18 million Yemenis are without safe water and sanitation, largely due to destruction of water and sanitation infrastructure. As a result, Yemen has grappled with recurring outbreaks of preventable diseases, such as cholera, diphtheria, measles and dengue fever.

Yemen had several small cholera outbreaks prior to 2016; the 2016–2017 outbreak, however, was one of the worst cholera outbreaks in history. The first wave of the 2016 outbreak started on 28 September 2016 and peaked in mid-December 2016 with 1,935 weekly suspected cases. A second, larger wave followed in late April 2017, peaking at the end of June 2017 with 50,832 weekly suspected cases. During the four weeks preceding the start of the second wave, 998 suspected cholera cases were reported in 11 governorates. The second wave occurred synchronously across districts in Yemen, most of which had been affected during the first wave. The period of highest cholera transmission was limited to the four weeks of the spring rainy season, during which the daily national cholera incidence increased by 100 times and cholera spread across the entire country (Camacho et al., 2018).

Figure 1 shows a map of the cholera attack rates (number of cases divided by total population) by district from 28 September 2016 to 12 March 2018. The attack rate ratio (see part B) shows the districts where the attack rates were higher than the national average at that time.

Figure 1. Cholera attack rates and ratio in Yemen, 28 September 2016 – 12 March 2018



Source: Camacho et al., 2018.

In the first quarter of 2019, there was another surge in cholera cases, with Médecins Sans Frontières reporting an increase from 140 to 3,000 cases per week across its health facilities in Amran, Hajjah, Ibb and Taiz. An external briefing released at the time focused on a faster WASH response to outbreaks. Since the 2019 outbreak, there have been no large cholera outbreaks. Throughout 2020, WHO epidemiological monitoring shows that there were fewer than 10,000 cases per month nationally and the case fatality ratio for cholera was within acceptable levels in an emergency setting. In 2021, cholera does not appear to have been a major cause of hospitalization, and epidemiological monitoring for that year does not focus on cholera, again suggesting cholera has not been a major cause of ill health since the 2019 outbreak (Inter-agency Humanitarian Evaluation, 2022).

However, cholera still impacts 93 per cent of Yemen's 333 districts. More than 4,000 people have died of cholera since 2017, with over a million impacted by the disease (World Bank, 2021). Oral cholera vaccination campaigns have distributed over 4.3 million doses to people in Yemen to prevent outbreaks (World Health Organization and United Nations Children's Fund, no date).

2.6 COVID-19 in Yemen

Before the COVID-19 pandemic hit, Yemen was already facing a humanitarian crisis and a weakened health care system due to ongoing conflict. The actual number of COVID-19 cases in the country is unknown, but the official figures are believed to be underreported with a case fatality rate of 19.7 per cent, the highest in the Middle East. From January 2020 to February 8, 2023, 11,945 confirmed cases of COVID-19 and 2,159 deaths were reported to WHO. As of January 2023, 1,242,982 vaccine doses had been administered (World Health Organization, 2023).

The country's health sector is ill prepared to handle the demands of the pandemic, facing a shortage of medical staff, personal protective equipment and medical supplies as well as fragmented health system management. The World Bank Group launched the Yemen COVID-19 Response Project to manage cases, improve laboratories, prevent infections and respond quickly with necessary supplies and equipment. UNICEF established large warehouses to support the COVID-19 response, and WHO focused on setting up COVID-19 centres for severe cases and a network of central public health laboratories. Despite these efforts, inadequate funding has hindered the maintenance of essential health services.

The COVID-19 pandemic has created two other major crises in Yemen: a decrease in humanitarian support and a deterioration of fiscal and external accounts, which threaten the availability of essential necessities and weaken the authorities' ability to deliver basic services. The COVID-19 vaccination campaign has been hindered by limited resources, ongoing conflict and disruptions to the supply chain, but the Yemeni government and international organizations are working to roll out the vaccine to the population (United Nations Development Programme, 2020).

The impact of COVID-19 on the ongoing cholera outbreak in Yemen has been mixed. On one hand, the pandemic has diverted resources and attention away from cholera response efforts. On the other hand, it has led to increased resources for WASH interventions, which can help control the spread of both cholera and COVID-19.

In conclusion, the COVID-19 pandemic has had a devastating impact on Yemen, and despite efforts by the Yemeni government and international organizations to respond, much more needs to be done to control the outbreak, protect the health and rights of Yemenis and provide essential health services. The country's already weakened health care system and ongoing conflict have only compounded the impact of the pandemic, and additional resources and support are needed to effectively address the crisis.

National response to cholera, 2016–2018[1]

3.1 Overview of national and international response

At the onset of the first wave of cholera in late 2016, international non-governmental organizations continued generalized WASH practices with some modifications, such as targeting interventions to cholera hotspots, adding cholera messages to hygiene programming and managing waste in diarrhoea treatment centres (DTCs). In September 2017, 12 months after the start of the first wave of the outbreak and after the peak of the second wave, a cholera-specific WASH response was operationalized. Monitoring using free residual chlorine remained a gap. The main reported barriers to operationalizing a cholera-specific WASH response were insecurity, poor coordination, limited line list access and lack of funding to non-governmental organizations and the government.

WHO led efforts to strategically use oral cholera vaccines (OCVs) to interrupt the spread of the second wave during May and June 2017. Following a second risk assessment by WHO, the Yemeni Ministry of Public Health and Population (MoPHP) and Epicentre in January 2018, the focus shifted towards boosting prevention efforts for an anticipated surge of cholera during the rainy season between April and August 2018.

Community health volunteers (CHVs) supported separately by the MoPHP, the Yemen Red Crescent Society and UNICEF were not mobilized under a single programme for social mobilization, referral and surveillance. While CHVs were well placed to play a role in the response, doing so remained difficult due to the need for training on a massive scale and to assure adequate quality of services.

During the second wave, the World Bank resumed funding (US$483 million) to WHO and UNICEF in response to pre-famine conditions and cholera through a recommitment of cancelled International Development Association grants via the Crisis Response Window. The joint funding ensured that WHO and UNICEF could coordinate closely to effect changes on the ground.

The strategy focused on establishing DTCs (both waves) and oral rehydration corners (second wave only) in or near existing health facilities, covering only the first zone within a district (e.g., within walking distance to a health facility), rather than areas of need and more remote and less accessible areas. Oral rehydration corners provide access to rehydration at the community level and should be the first point of contact for patient care. However, they were established only after the start of the second wave in April 2017.

1 The discussion in this section is based on the 2018 evaluation by UNICEF (United Nations Children's Fund, 2018), except where otherwise indicated.

Although the three main components of the response – health, WASH and Social and Behavior Change (SBC) – were planned together, they were not always harmonized in practice. Nutrition was at first not coordinated with the other components, although this changed over time.

3.2 UNICEF cholera response

On 10 October 2016, four days after the declaration of the first cholera outbreak by the health authorities, UNICEF, with health and WASH cluster partners, agreed on a three-month integrated cholera response plan and presented the plan to the humanitarian country team. The initial 2016 plan contained most of what is usually considered essential in cholera response and control, although it lacked specificity in some areas, including strengthening surveillance, achieving a quick response and tailoring the response to the local context.

The same basic strategy informed the response to the second-wave outbreak, although the design of the response evolved incrementally in three phases, reaching its final form at the beginning of July 2017. The initial phase of response (late April to mid-May) was very quick, thanks to existing capacity, although the outbreak was difficult to keep pace with given the geographic spread of the epidemic and the exponential rate at which the number of cases was increasing.

During the second phase of response (late May to late June), revised epidemiological projections were used to scale up, and a revised response plan was developed that distinguished between (a) "response/control" activities in affected areas to control the spread of the epidemic and (b) a set of "immediate prevention" activities in high-risk areas that had not yet been affected. During the third phase of response (late June to early July), a revised approach was devised, based on the latest projections, to reduce transmissions by sharpening the targeting strategy to deliver rapid and targeted interventions in identified hotspots. During this third phase, the SBC campaign was substantially scaled up.

UNICEF dramatically scaled up its response between May and July 2017 as the full scale of the epidemic became apparent. The targeted number of functional DTCs increased three-fold, from 25 to 75; the targeted number of people benefiting from household-level water treatment and disinfection increased from 500,000 to 12 million; and the targeted number of people reached with cholera key behaviour change practice messages increased from 2 million to 12 million. UNICEF provided safe water to over 1 million people and delivered 40 tons of medical equipment and supplies, including oral rehydration solution, intravenous fluids and diarrhoea kits.

UNICEF ran several cholera awareness campaigns and deployed 20,000 community hygiene promoters. In 2017, UNICEF intensified cross-sectoral interventions that aimed to prevent cholera and to enable rapid response against the spread of the outbreak. In August of the same year, UNICEF conducted the National Cholera Campaign, which included awareness activities, soap distribution and demonstrations on how to make oral rehydration solution as a cholera treatment. Cholera SBC activities accompanied other cross-sectorial activities such as OCV vaccination campaigns.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UNICEF also served as the WASH cluster lead during this time, providing both emergency and long-term WASH assistance with international and local partner organizations. Emergency measures included restoring access to safe water and sanitation by trucking in water, treating piped water, repairing broken water supply and sanitation systems, drilling wells, building temporary bathrooms and distributing hygiene kits and household water treatment tablets. Almost 1 million people gained access to emergency safe water, and 1 million internally displaced persons received WASH assistance in 2018. Long-term WASH measures aim to train local partners to build and maintain infrastructure in their communities. UNICEF oversaw the installation of 29 solar-powered water systems in rural areas affected by cholera that gave 440,000 people access to clean and safe water in 2019.

The role played by UNICEF in ensuring supplies of fuel, chlorine and spare parts to keep existing water and waste treatment systems operating was an essential one, without which the risk factors would have been even higher and the public health outcome likely worse. However, the evaluation team found that more concerted preventive efforts, including a preventive OCV campaign in early 2017, might have significantly limited the scale of the subsequent epidemic.

3.3 Effectiveness of cholera response

Yemen and its partners were poorly prepared to respond to the 2016–2017 cholera epidemic. One study analysed governorates' response time to cholera reporting and found significant variations in response time and that delays were common (Dureab et al., 2019). Another review found that there was a focus on case management rather than prevention, leading to a 16-month delay in delivering OCVs in country (Federspiel and Ali, 2018).

Existing partnerships and programme agreements, long-term agreements with suppliers, and operational protocols established during the response to the 2016 outbreak provided a stronger basis for responding to the second wave, but the scope and scale of the second wave indicated very weak preparedness measures. A comprehensive assessment by the Johns Hopkins Center for Humanitarian Health found weak preparedness for the second wave of cholera, but there were also some successes in the second wave response, including expanded reach into insecure areas, improved collaboration between WHO and UNICEF and health and WASH clusters, increased financing (particularly from the World Bank) to enable a more timely response, a revitalized WASH strategy, and eventual effective use of OCVs (Spiegel et al., 2018).

A recently completed Inter-agency Humanitarian Evaluation found that the international community remains underprepared for cholera in Yemen, but key stakeholders noted faster WASH response times since 2017 and the success of widespread vaccination to protect people against cholera (Inter-agency Humanitarian Evaluation, 2022).

Apart from a lack of preparedness, some other country-level factors had an impact on the speed of the UNICEF response. One of these was a lack of clarity with WHO over the role of UNICEF in the health response, and specifically the establishment and running of the DTCs. The delivery of some elements of the programme, notably the SBC component, lagged behind other elements and was not always well coordinated with them. The fact that the household sensitization campaign was not mounted until August, after the epidemic had peaked, is the most striking example of this delay in response. The lack of pre-existing partnerships in many of the affected areas was also a significant constraint: new partners had to be identified and volunteers trained and deployed against a backdrop of limited access.


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The availability of adequate delivery partnerships was one of the main limiting factors on the UNICEF response to the 2017 epidemic. The lack of international non-governmental organizations with WASH capacity was a major constraint, although this improved to some extent following an international call for additional support in July 2017. Under the circumstances, the operational partnerships formed with the public water authorities and the health authorities were strong and effective, particularly with regard to the rapid response teams (RRTs) and the deployment of CHVs. However, partner capacity was a major constraint on the scale and pace of the UNICEF response. This was in part due to the constraints of the operating environment and the difficulties of obtaining visas for international staff.

Funding was not a significant constraint for UNICEF. Donors were generally supportive of the 2017 response and were a main source of pressure to respond, providing flexible funds and interchangeability of funds between programmes. UNICEF and WHO both had substantial funding for system support from the World Bank, which in the case of UNICEF allowed it to scale up its health, SBC and WASH work to address the 2017 epidemic.

Despite challenges, UNICEF's response was critical. As of November 2017, progress against cholera targets in Yemen included the following: 64 of the targeted DTCs were made functional (85 per cent of the 75 targeted); 632 oral rehydration corners were made functional (79 per cent of the 800 targeted); 5.7 million people living in areas at high risk for cholera gained access to safe drinking water (96 per cent of the 6 million targeted); 9.2 million people in cholera high-risk areas benefited from household-level water treatment and disinfection (77 per cent of the 12 million targeted); 85 per cent of DTCs received WASH services (out of 100 per cent targeted); 17.8 million affected people were reached through interpersonal community engagement efforts promoting four practices for cholera prevention (exceeding the target of 17.5 million); and nearly 39,000 social mobilizers were deployed for key behaviour changing in cholera high-risk areas (97 per cent of the 40,000 targeted). Over 18 million Yemenis were also reached with behaviour change messages, but the effect of community engagement and sensitization activities remains largely unknown, partly due to limited monitoring.

The evaluation made the following recommendations:

1. Secure vaccination supply for further vaccination campaigns. Given the high risk of another cholera outbreak and the vulnerability of the population, the recommendation is to request suppliers through the International Coordinating Group to allow for a targeted vaccination campaign in the highest-risk areas.
2. Establish regional specialist capacity for epidemiology/cholera. This would involve creating specialist in-house epidemiological capacity within UNICEF in the MENA region. This would enable the regional office to work with country offices to conduct risk assessments, draw up contingency plans, assess preparedness capacities, analyse emerging data and support cross-country learning.
3. Build regional response capacity for cholera. UNICEF should build regional response capacity in the MENA region by constituting a network of cholera-experienced staff, conducting regional trainings to share knowledge and global know-how, and supporting countries to prepare guidelines, response plans, standard operating procedures and training packages.
4. Establish a cholera task force at the regional office level. It is recommended that the different sections in the MENA regional office with responsibility in this area (WASH, health, SBC and nutrition) form a cholera task force for the duration of the epidemic to facilitate more coherent planning, support and programme implementation.
5. Harmonize UNICEF/WHO approaches and clarify roles. Ensure that UNICEF and WHO better harmonize their responses by discussing the lessons learned from 2017 and clarifying roles and approaches.
6. Clarify coordination processes. Specifically, clarify and simplify cholera-related coordination processes and the respective roles of different agencies, including the Cholera Task Force, the emergency operations centres, the health/WASH clusters, the Office for the Coordination of Humanitarian Affairs and the Humanitarian Country Team/Inter-cluster Coordination Mechanism.
7. Scale up and secure preventive WASH work. UNICEF should take all necessary steps to secure relevant supply chains and create contingency stockpiles, conduct SBC, and protect water sources in high-risk areas and at the local level.

8. Strengthen Yemen national cholera surveillance and reporting. Work with WHO and the health authorities to strengthen the local-to-national surveillance system in Yemen to improve data accuracy and the speed of reporting.

9. Strengthen community-based surveillance and response capacities. UNICEF should help strengthen community capacities in high-risk areas to prevent, prepare for and respond to outbreaks of acute diarrhoea by enabling the identification and notification of cases through community focal points and early treatment of suspected cases through community-level oral rehydration points.

10. Enhance rapid response capacities. UNICEF should build on the RRT and rapid response mechanism models and take stock of lessons learned to strengthen these mechanisms for future responses, including revising standard operating procedures, conducting trainings, supporting joint inter-agency planning and defining roles and responsibilities.

11. Establish additional response preparedness measures. UNICEF should ensure WASH response capacities, secure the necessary supply for cholera kits and invest in contingency stocks or purchase arrangements at the local and international levels.

12. Strengthen monitoring and quality control. UNICEF should strengthen both direct and indirect monitoring, find ways to better utilize results from programme monitoring to inform the response, and invest in better understanding household and community practices and perceptions concerning cholera and the response.

13. Invest in better understanding of behaviours and transmission contexts. UNICEF should invest in epidemiological and socio-anthropological research to identify cholera hotspots, risk factors, community risk behaviours and practices, and community uptake of campaign messages.

14. Consolidate UNICEF global epidemiological capacity. Given the Yemen experience, UNICEF should establish a network of global and regional cholera experts (internal/external) who would be part of the global exchanges and capitalization efforts. Members of this network might provide additional surge capacity during major outbreaks and play an oversight and monitoring role at the regional and global levels. Related to this, UNICEF should play a greater role in building global epidemiological understanding.

15. Strengthen UNICEF global cholera preparedness. UNICEF should review its preparedness to respond to cholera outbreaks in all high-risk regions and countries. Risk assessments and contingency plans should be built into country plans as appropriate. This should be done in collaboration with WHO and other relevant partners, with a view to ensuring close coordination and collaboration with other international organizations.

16. Revisit current WASH targets. The ongoing cholera outbreak in Yemen makes it clear that the targets that UNICEF has been pursuing in WASH programmes are inadequate and that there is a need for more ambitious targets covering water supply, sanitation and hygiene promotion. This should be done in close collaboration with the relevant local and national authorities, the communities themselves and other key actors. There is also a need for a comprehensive monitoring and evaluation system to support the implementation of these targets.

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3.4 Key points from the management response document

UNICEF prepared a management response that noted agreement with all the recommendations except two (5 and 9), with which there was partial agreement, and reported on actions taken to implement the recommendations up to the end of 2019 (United Nations Children's Fund, 2019). This section highlights some of the key points from the management response document on how UNICEF addressed the recommendations.

To begin with, to address the need for vaccines, UNICEF made an urgent request to supply enough vaccines to allow a targeted preventive oral vaccination campaign in the highest-risk areas. UNICEF also prioritized preventive WASH work and secured supply chains to strengthen cholera surveillance and reporting and community-based surveillance and response capacities.


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Secondly, to address the need for specialized epidemiological capacity, UNICEF ensured sufficient in-house specialized epidemiological capacity through a dedicated post in the MENA regional office.

Additionally, to improve coherence and coordination, UNICEF established a cholera task force at the regional office level comprising different sections (WASH, health, SBC and nutrition). UNICEF also harmonized approaches, clarified roles between UNICEF and WHO, and clarified coordination processes.

UNICEF acted to enhance WASH rapid response capacities, including through relevant trainings, sufficient supply of cholera kits, and contingency stocks or purchase arrangements at local and international levels. UNICEF also invested in better understanding of behaviours and transmission contexts by conducting a knowledge, attitude and practice survey and epidemiological and socio-anthropological research, identifying cholera hotspots and risk factors and examining community risk behaviours and practices as well as community uptake of campaign messages.

To enhance monitoring and quality control, UNICEF exercised continuous efforts to strengthen the quality and effective use of data collected by implementing partners as well as by third-party monitors through the development of tools and training on their use, the regular provision of feedback by third-party monitors, and follow-up on the implementation of identified necessary actions by programme staff.

In addition, to consolidate UNICEF global learning on cholera, UNICEF held an internal learning event that gathered relevant staff to consolidate recent experience on cholera, using Yemen as a key case study. UNICEF also established a network of internal and external global and regional cholera experts and increased its presence in the Global Task Force on Cholera Control.

To strengthen UNICEF global cholera preparedness, UNICEF reviewed its preparedness to respond to cholera outbreaks in all high-risk regions and countries. UNICEF developed an internal document to map out the UNICEF contribution to achieving the targets set out by the Global Task Force on Cholera Control, rolled out emergency preparedness

procedures and made an emergency and preparedness platform operational. UNICEF also developed toolkits and other guidelines to prevent, mitigate and prepare for all health risks, including cholera, and implemented actions at the headquarters, regional and country levels to strengthen collaboration with WHO on a continuous basis.

As mentioned above, UNICEF partly agreed with two recommendations from the evaluation report (5 and 9). In regard to harmonizing its approach with WHO and clarifying roles, UNICEF acknowledged the need for coordination and a harmonized approach but stated that individual personality issues and opinions sometimes adversely affected coordination. UNICEF also recognized that some progress had been made in aligning approaches but further efforts were required.

On the recommendation to strengthen community-based surveillance and response capacities, UNICEF explained that the formal surveillance system should be the primary source of good-quality and timely data and any additional measures are secondary. It further noted that it is already implementing community-based detection of cases of diarrhoea, promoting home care and early care seeking, and providing referrals through its network of community health workers and volunteers.

According to the management response, all the specific actions related to the recommendations were completed by 2019.


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Assessment of national preparedness for cholera post-2018

4.1 Current preparedness for cholera

As discussed above, several evaluations and assessments found that prior to the 2016–2017 cholera outbreak, Yemen and its partners were not well prepared for the cholera outbreak and were slow to respond. There are fewer assessments available on current national preparedness for cholera. One such assessment, the recently completed Inter-agency Humanitarian Evaluation, found that the international community remains underprepared for cholera in Yemen, although key stakeholders noted faster WASH response times since 2017 and the success of widespread vaccination (Inter-agency Humanitarian Evaluation, 2022).

Respondents cited several gains in preparedness since 2016–2017, including better coordination and planning, cholera surveillance, health facility management and community engagement capacity. Most key informants agreed that although the country is better prepared for cholera now than it was immediately before the 2016–2017 outbreak, the country remains underprepared for a cholera outbreak and these gains are currently at risk due to declines in funding for cholera and other factors. Sites hosting internally displaced persons are particularly vulnerable to cholera.

Respondents noted that there are differences between North and South Yemen. There is more capacity to respond to cholera in Sana'a (North Yemen) than in Aden (South Yemen). Further, a lack of willingness to cooperate and reach agreement concerning PHEs between the governments in the North and South continues to pose a challenge for preparedness and response. However, since the 2016–2017 outbreak, the North and South have learned that partnership and coordination with international partners is essential.

A national cholera preparedness plan is in place, developed in 2019 by the ministry of health and ministry of water with input from development partners, but it has not been signed by all parties. Both governments and partners have plans in place for DTCs in case of an emergency; every district in the country is to have an emergency DTC. Respondents said current divisions of roles and responsibilities across organizations and within the cluster system are clear, particularly across sectors (e.g., WASH, health, nutrition). Annual reviews of lessons learned from cholera are used to improve cholera preparedness and response, as well as preparedness and response for other diseases. However, more detailed planning is needed for resource mobilization and use.

Respondents largely agreed that human resource capacity has improved since the 2016–2017 outbreak through training and other initiatives. For example, health staff have been trained (particularly in the South) and are now more knowledgeable about cholera case management. RRTs are in place across the country and are perceived as being very effective. However, many staff members who are experienced in PHEs leave the country if offered the opportunity, which creates gaps. Further, local authorities and CHVs are not a priority for the MoPHP, particularly when it comes to training and building capacity, and the MoPHP's focus is on secondary care rather than primary health care and CHVs. There is a perception of poor management capacity.

A few respondents shared that the country is underprepared in terms of supplies and logistics. One respondent said there is insufficient stock for PHEs in general and that improved central communication and coordination by partners on supplies are needed in case of PHEs in the country. Respondents also noted that current cholera kits are not sufficiently tailored to the country's needs and should be changed to improve preparedness and response. Another respondent said there is a lack of pre-positioning of stocks in the governorates in addition to a central emergency stock. Still, improvements have been made since 2016–2017, especially with the construction of a central warehouse in Aden that received its first shipment in September 2022.

The health system in Yemen remains extremely fragile and entirely dependent on donors. There are major impediments to strengthening health systems, including poor technical expertise on health system strengthening within the government, political instability, lack of sufficient and motivated workforce due to lack of salary payments, poor supply chain systems and, most importantly, lack of funding and donor fatigue. However, cholera activities have been well integrated in nutrition and health projects in the country.

In terms of surveillance, the Yemen health authorities, with support from WHO, established the Electronic Diseases Early Warning System (eDEWS) in Yemen in 2013. eDEWS is a health facility-based disease surveillance system that uses electronic tools and an electronic platform for data collection, management, analysis and visualization using dashboards. eDEWS was initially designed as an early warning system, with Short Message Service alerts sent to all responsible authorities at district, governorate and central levels for rapid response as needed based on pre-defined thresholds for occurrence of disease. All generated alerts need to be triaged, investigated further and verified. Coverage of sites in the system has increased significantly, from just 98 reporting sentinel sites to 1,982 sites in all 333 districts in Yemen by the end of 2016 (Spiegel et al., 2019). Although studies have found the system to be resilient and reliable even during years of conflict in Yemen, government response has been the main challenge in the past. One study found that in 2016, just 21 per cent of all alerts were verified within 24 hours of detection (Dureab et al., 2020).


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Surveillance for cholera has improved since the 2016–2017 outbreak, largely thanks to WHO, as surveillance is part of its mandate. WHO received funds to automate the full line list of 27 diseases, including cholera. The RRT reporting system and investigation form have also become automated, and a public dashboard is now available to analyse cholera cases. RRT terms of reference have shifted to improve preparedness and response to alerts for other diseases, not just cholera. Finally, partners, including UNICEF, coordinate well on reporting into existing data systems. However, there are areas for improvement, particularly regarding data sharing. Since 2020, the MoPHP has stopped publicly sharing line list data.

There is also universal agreement that WASH infrastructure and systems are very poor and therefore the WASH sector is particularly underprepared. There is poor sewage infrastructure, which has been neglected as a preventive measure, as well as a lack of chlorination or disinfection of water sources throughout the country.

Lastly, there is general consensus that a few lessons learned from cholera have been useful for COVID-19 and other PHEs but the contexts are very different. One lesson is the need for strong partner and multisectoral collaboration. However, COVID-19 has also in some ways reduced the country's preparedness for cholera outbreaks, as cholera has been deprioritized compared to COVID-19 given low caseloads in recent years.

4.2 UNICEF contributions to national preparedness for cholera

UNICEF has contributed positively to Yemen's national preparedness for cholera and other PHEs in several ways. UNICEF participated in the development of the preparedness plan with the MoPHP, United Nations agencies and international non-governmental organizations. UNICEF has also integrated cholera preparedness and prevention into existing health development projects. Respondents indicated that UNICEF's work on community awareness linkages to primary health care, developing capacity of health workers and RRTs, and stockpiling of required supplies in case of an emergency has improved preparedness.

Although UNICEF has played a significant role in improving country preparedness, there are areas for improvement. UNICEF should improve the timeliness of its reporting: information is reported through the MoPHP and therefore delayed by two to three months. UNICEF is also the only remaining partner not to report data to the health cluster. Also, because UNICEF used tents for DTCs in 2016–2017, Yemen lacks DTC infrastructure, which puts the country at risk.


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Table 1. Summary of preparedness assessment

Functions	Assessment criteria	Assessment	UNICEF contribution
Policies, strategies and legislation	Structures, roles and responsibilities of governments and other actors for managing cholera risks are clearly defined and agreed; strategies for strengthening cholera risk management capacities are in place.	Policies and strategies for managing cholera risks in Yemen are somewhat defined, but there are challenges in cooperation and coordination between entities. The national cholera preparedness plan and plans for DTCs are positive steps, but detailed planning for resource mobilization and use is needed. The division of roles and responsibilities across sectors is clear, and annual reviews are conducted to improve preparedness and response. The health cluster provides effective coordination and leadership, but challenges remain in coordination and cooperation between entities.	UNICEF has played a role in developing and implementing policies, strategies and plans to manage cholera risks in Yemen. UNICEF has participated in the development of the national cholera preparedness plan in collaboration with the ministry of health and ministry of water, with input from development partners. UNICEF has also integrated cholera preparedness and prevention into existing health development projects and has worked on community awareness, developing the capacity of health workers and RRTs, and stockpiling of required supplies in case of an emergency.
Planning and coordination	Effective coordination mechanisms and effective leadership are in place for planning and operations for managing cholera risks, including across sectors. Contingency plans are in place and response protocols are tested through simulation and exercises.	Efforts have been made towards planning and coordination for managing cholera risks in Yemen, but they face significant challenges, including political issues and lack of funding. Contingency plans and response protocols require more detailed planning for resource mobilization and use. Lack of transparency in data sharing by government and downplaying of risk may give an impression that cholera is no longer endemic in Yemen. Evidence-based resource mobilization efforts can thus be compromised, and sustained advocacy is required at all levels with government counterparts on the prioritization of PHEs.	UNICEF has played a role in improving coordination and planning for managing cholera risks in Yemen and has integrated cholera preparedness and prevention into existing health development projects, as well as worked on community awareness, developing the capacity of health workers and RRTs, and stockpiling of required supplies in case of an emergency. UNICEF has ensured that effective coordination mechanisms and leadership are in place for planning and operations for managing cholera risks, including across sectors, such as the health cluster, which has helped to improve communication and information sharing between partners.

Human resources	Plans are in place for staffing, education and training across the spectrum of cholera risk management capacities at all levels, including for the occupational health and safety of personnel.	Human resource capacity for cholera risk management in Yemen is inadequate, with experienced staff members leaving the country and creating knowledge gaps. Some improvements have been made through training, but local authorities and CHVs are not a priority for the MoPHP. Financial resources are necessary to support capacity development for emergency response. Plans for staffing, education and training are needed across all levels.	UNICEF has contributed to the capacity building of cholera risk management in Yemen by working on initiatives to train RRTs and health workers on cholera case management. This work has improved the knowledge and skills of these personnel to better manage cholera outbreaks and enhance the overall capacity for managing cholera risks.
Financial resources	Appropriate financial resources are available to support implementation of cholera risk management activities, capacity development and contingency funding for emergency response and recovery.	Financial resources for cholera risk management in Yemen are limited. There have been significant gaps in funding, with delays in receiving donations impacting the procurement and distribution of essential supplies. While some financial resources are available, detailed planning for resource mobilization and use is needed. Short-term funding has made it difficult to plan and implement long-term interventions, with the decline in funding since 2020 making it even more challenging to sustain cholera-related activities. Overall, appropriate financial resources are lacking to support the full spectrum of cholera risk management activities, capacity development and contingency funding for emergency response and recovery in Yemen.	UNICEF has contributed to the availability of appropriate financial resources for cholera risk management in Yemen by providing financial support for cholera response and prevention efforts. This includes providing funding for health supplies and equipment, which is critical for managing and preventing cholera outbreaks.

Information and knowledge management	Harmonized systems are in place and functioning effectively to provide information on risk assessment, surveillance, early warning, information management, technical guidance and research.	The assessment of information and knowledge management for cholera in Yemen suggests that effective systems are in place, particularly in terms of disease surveillance, which includes eDEWS and WHO's surveillance mandate. UNICEF has played a role in establishing eDEWS and supporting WHO in automating disease line lists and improving RRTs' terms of reference. Partners, including UNICEF, coordinate well on reporting into existing data systems. Harmonized systems are in place and functioning effectively to provide information on risk assessment, surveillance, early warning, information management, technical guidance and research. The information and knowledge management capacity for cholera risk management in Yemen appears to be strong.	UNICEF has contributed significantly to the management of cholera risks in Yemen by supporting various initiatives, including eDEWS, automating the line list, and risk communication efforts. UNICEF has also improved preparedness by working on community awareness, linking to primary health care, developing capacity of health workers and RRTs, and stockpiling of required supplies in case of an emergency. While there is no specific mention of UNICEF's contributions to harmonized information and knowledge management systems, its overall work on information management has improved preparedness for managing cholera risks in Yemen.
Risk communications	Effective communications mechanisms are in place to deliver appropriate, coordinated and trusted information to the general public, including vulnerable groups. Public information activities should be coordinated among stakeholders to avoid dissemination of conflicting information and should be tailored to the risks and needs of diverse at-risk populations, including those with higher levels of vulnerability.	The risk communication strategy for cholera in Yemen needs significant improvement. Major gaps remain, including poor community awareness, delayed reporting, and dissemination of conflicting information. A comprehensive and coordinated risk communication strategy is needed that engages community leaders, tailors messaging to vulnerable groups and avoids conflicting information. Effective communication mechanisms should be in place to deliver appropriate information to the public, including vulnerable groups.	UNICEF has played a significant role in risk communication efforts for cholera in Yemen, contributing to community engagement, social mobilization and the promotion of hygiene and cholera prevention messages. UNICEF has supported the MoPHP in conducting mass cholera vaccination campaigns, integrating risk communication into broader preparedness and response efforts. UNICEF has also provided training for frontline health workers, developed communication materials and coordinated with stakeholders to avoid dissemination of conflicting information. Tailored communication and risk messaging have been developed for diverse at-risk populations, including internally displaced persons living in remote areas.

Health infrastructure and logistics	Safe, sustainable, secure and prepared health facilities, critical infrastructure, and logistics and supply systems are in place to support management of cholera risks.	The available data suggest that the health infrastructure and logistics in Yemen are insufficient to support the management of cholera risks. The health system is fragile and underfunded and lacks necessary resources. Ongoing conflict has further damaged the health infrastructure and logistics, making it more difficult to support cholera management. While some efforts have been made to improve the situation, such as UNICEF's work on cholera preparedness and prevention and the development of emergency treatment centres, there are still significant challenges in scaling up to meet increased health needs and specific risks resulting from a cholera outbreak. Logistics and supply systems are inadequate, and the lack of adequate WASH services in the country contributes to the weak health infrastructure and logistics. UNICEF regularly procures and pre-positions supplies at the governorate level, yet coordination among multiple partners can be an issue, requiring health cluster support.	UNICEF has made significant contributions towards strengthening health infrastructure and logistics in Yemen to support the management of cholera risks. UNICEF has supported the rehabilitation and construction of health facilities, provided essential medicines and medical supplies and facilitated the pre-positioning of essential supplies and equipment at strategic locations for rapid and effective response to cholera outbreaks. UNICEF has also improved the safety and sustainability of health facilities by providing solar power and water supply systems, essential vehicles, and training for health workers. In addition, UNICEF has played a critical role in developing logistics and supply systems and supporting the establishment of emergency supply chain systems during cholera outbreaks. UNICEF has also contributed to national and district-level cholera preparedness and response planning and integration with other relevant sectors such as WASH and nutrition.

Health services	The full range of health and related services required for supporting management of cholera risks is provided, including nutrition, mental health and psychosocial support. Health services have capacity to scale up to meet increased health needs and specific risks resulting from a cholera outbreak.	Based on the available data, the health services in Yemen face significant challenges in providing the full range of health and related services required for managing cholera risks, including nutrition, mental health and psychosocial support. The health system is fragile, underfunded and heavily reliant on donors, with limited technical expertise on health system strengthening within the government. Political instability, lack of funding and donor fatigue are also major challenges to improving the health system, and there is a perception of poor management capacity within the health system.	UNICEF has made significant contributions towards supporting the management of cholera risks in Yemen by improving the full range of health and related services required, including nutrition, mental health and psychosocial support. It has integrated cholera preparedness and prevention into existing health development projects, developed the capacity of health workers and RRTs, and stockpiled required supplies in case of an emergency. Additionally, UNICEF has provided technical support for the development and implementation of cholera surveillance and reporting systems.
WASH services	WASH services (including infrastructure, service management arrangements, and behaviour) are provided to support management of cholera risks.	WASH infrastructure and systems in Yemen are poor, with a lack of chlorination or disinfection of water sources throughout the country. There have been some improvements in cholera surveillance and response, but key areas still need attention, such as the insufficient chlorination of water sources. Significant improvements are needed to support the management of cholera risks, including nutrition and mental health support.	UNICEF has contributed positively to Yemen's WASH services for cholera risk management by integrating cholera prevention into health development projects, improving community awareness and supporting the development of WASH infrastructure and management capacity. It has also pre-positioned supplies for emergencies and provided funding for essential supplies and infrastructure maintenance.

Community capacities for health	Local health workforce capacities are sufficient to address cholera's risks in conjunction with inclusive community-centred planning and action.	Community capacities for health in Yemen are not sufficient to address cholera's risks in conjunction with community-centred planning and action. There are major impediments to strengthening health systems, including poor technical expertise, political instability, lack of funding and poor WASH infrastructure. Although some improvements have been made, there are still gaps in human resource capacity and a lack of focus on primary health care and CHVs. This puts the country at risk for cholera outbreaks.	UNICEF has contributed to improving local health workforce capacities and inclusive community-centred planning and action in Yemen by developing the capacity of health workers and RRTs. It has integrated cholera preparedness and prevention into existing health development projects, linked cholera prevention and preparedness with primary health care and improved community awareness through risk communication and community engagement (RCCE). UNICEF has also stockpiled required supplies in case of an emergency, which has improved preparedness.
Monitoring and evaluation	Processes have been established to monitor progress towards meeting cholera risk management objectives, including monitoring risks and capacities and evaluating the implementation of strategies, related programmes and activities.	Yemen has established processes to monitor progress towards meeting cholera risk management objectives, including an electronic surveillance system that covers all 333 districts and annual reviews of lessons learned from cholera outbreaks. Partners such as WHO and UNICEF report into this system to ensure data sharing and coordination. However, there are areas for improvement, such as the timeliness of reporting and data sharing to the health cluster.	UNICEF was reported as being a good partner in coordinating reporting into Yemen's electronic surveillance system, although there is room for improvement in timeliness of reporting and data sharing to the health cluster.

Policies, strategies and legislation

Based on the data available, policies, strategies and plans are in place to manage cholera risks in Yemen. The national cholera preparedness plan is a positive step towards managing cholera risks, although there is a lack of agreement on roles and responsibilities as it has not been signed by all parties. Both governments and partners have plans for DTCs, and the current division of roles and responsibilities across organizations and within the cluster system is clear. Detailed planning for resource mobilization and use is still needed, however, and there are still significant challenges in working with the government in Sana'a.

UNICEF has played a role in developing and implementing policies, strategies and plans to manage cholera risks in Yemen. To start with, UNICEF has developed a cholera preparedness and response plan, integrated cholera preparedness and prevention into existing health development projects and worked on community awareness and capacity building. Additionally, UNICEF has contributed to the development of the national cholera preparedness plan, although the plan has not been signed by all parties. Overall, while policies, strategies and plans are in place, coordination and cooperation between different entities remain a challenge. While UNICEF's contributions have been positive, detailed planning for resource mobilization and use is still needed to strengthen cholera risk management capacities in Yemen.


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Planning and coordination

Based on available information, there have been efforts towards planning and coordination for managing cholera risks in Yemen, although challenges remain. Respondents indicated that current divisions of roles and responsibilities across organizations and within the cluster system are clear, particularly across sectors such as WASH, health and nutrition. In addition, annual reviews of lessons learned from cholera are used to improve cholera preparedness and response, as well as preparedness and response for other diseases.

Several challenges and gaps were identified, however. Among them are differences between North and South Yemen in terms of capacity to respond to cholera. Working with the government in Sana'a was found to be particularly challenging due to bureaucratic processes, lack of transparency and data sharing, and denial of PHEs. The lack of willingness to cooperate and reach agreement on PHEs between the governments in the North and South continues to pose a challenge for preparedness and response.

Despite these challenges, UNICEF has contributed to planning and coordination efforts for managing cholera risks in Yemen. UNICEF participated in the development of the national cholera preparedness plan and has integrated cholera preparedness and prevention into existing health development projects. Respondents indicated that UNICEF's work on community awareness, linkages to primary health care, developing capacity of health workers and RRTs, and stockpiling of required supplies in case of an emergency has improved preparedness. UNICEF needs to improve the timeliness of its reporting, however, and should ensure that information is reported through the MoPHP in a more efficient manner.

In terms of contingency plans and response protocols, there were indications of a lack of detailed planning for resource mobilization and use. Respondents mentioned a lack of pre-positioning of stocks in the governorates in addition to a central emergency stock. The health system remains entirely dependent on donors in Yemen, and there is a lack of funding and donor fatigue. Nevertheless, cholera activities have been well integrated into nutrition and health projects in the country.

In conclusion, while some planning and coordination mechanisms are in place to manage cholera risks in Yemen, the political situation, lack of funding, and other factors present significant challenges. UNICEF has played a role in improving coordination and planning, but there are still some gaps that need to be addressed.

Human resources

The human resource capacity for managing cholera risks in Yemen is inadequate. While there have been some efforts to improve the capacity through training initiatives, gaps remain due to the departure of experienced staff members who follow opportunities outside the country and a lack of priority given to local authorities and CHVs by the MoPHP. The MoPHP's focus on secondary care rather than primary health care and CHVs has also contributed to this gap. Furthermore, some key informants reported a perception of poor management capacity.

UNICEF has contributed to capacity building initiatives for managing cholera risks in Yemen by training health workers and CHVs on cholera case management, as well as improving the knowledge and skills of RRTs responsible for managing cholera outbreaks. However, it is clear that more needs to be done to strengthen the human resource capacity for managing cholera risks in Yemen. Plans for staffing, education and training across the spectrum of cholera risk management capacities at all levels, including for the occupational health and safety of personnel, are crucial for improving capacity and preparedness for managing cholera risks in the country.

Financial resources

Based on the data available, it appears that the financial resources available to support the implementation of cholera activities in Yemen have been limited. There have been significant gaps in funding, with the 2020 Yemen humanitarian response plan reported to have a 50 per cent funding gap. Additionally, delays in receiving funding from donors have impacted the ability to procure and distribute essential supplies. While some financial resources are available, there is a clear need for more detailed planning for resource mobilization and use. Short-term funding for both health and WASH has made it difficult to plan for and implement long-term interventions. The decline in funding since 2020 due to decreasing cholera caseloads and shifting of focus to COVID-19 has made sustaining cholera-related activities even more challenging.

In terms of UNICEF's contribution to ensuring appropriate financial resources are available to support cholera activities, UNICEF has provided financial support for cholera response and prevention efforts, including providing funding for health supplies and equipment. Given the overall financial challenges faced in Yemen, however, UNICEF's financial support alone is insufficient to meet the needs for cholera activities.

Information and knowledge management

Data show that Yemen has effective systems in place for information and knowledge management for cholera, particularly in disease surveillance. Among them, eDEWS uses electronic tools and platforms for data collection, management, analysis and visualization. There has been an improvement in cholera surveillance since the 2016–2017 outbreak, largely due to WHO's mandate for surveillance, which has been automated with the full line list of 27 diseases, including cholera. WHO has also shifted RRT terms of reference to improve preparedness and response to alerts for other diseases. Additionally, partners have coordinated well in reporting into existing data systems.


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UNICEF has contributed to the development and implementation of eDEWS, supported WHO in automating the line list of 27 diseases, and contributed to risk communication efforts by developing and delivering appropriate, coordinated and trusted information to the general public, including vulnerable groups. UNICEF's work on community awareness, linkages to primary health care, developing capacity of health workers and RRTs, and stockpiling of supplies in case of an emergency have all improved preparedness, which includes information management.

While there may be room for improvement in terms of timely reporting and data sharing, the available data suggest that Yemen has effective systems in place for information and knowledge management related to cholera. UNICEF's contributions have played a significant role in supporting these systems.

Health risk communications

The risk communication strategy for cholera in Yemen needs significant improvement. Respondents reported a lack of community-based risk communication and poor community engagement, which can be addressed by engaging community leaders and influencers to communicate key messages about cholera prevention and response. Furthermore, respondents identified a need for tailored messaging for specific vulnerable groups and more targeted outreach to high-risk areas.

UNICEF has contributed to risk communication efforts for cholera in Yemen by supporting community engagement and social mobilization to promote hygiene and cholera prevention messages in affected communities. UNICEF has also conducted training for RRTs and other frontline health workers on RCCE and has supported the development of communication materials such as posters and radio messages. UNICEF has also worked to tailor communication and risk messaging to the needs of diverse at-risk populations, including those with higher levels of vulnerability, such as internally displaced persons living in remote areas with limited access to health and hygiene services. Additionally, UNICEF has been involved in coordination and information sharing efforts among stakeholders to avoid dissemination of conflicting information.

There are still significant gaps in risk communication efforts that need to be addressed, however. A more comprehensive and coordinated risk communication strategy is needed to engage community leaders and influencers and tailor messaging to vulnerable groups. Coordination among stakeholders to avoid dissemination of conflicting information is also needed.

Health infrastructure and logistics

The available information shows that health infrastructure and logistics in Yemen are inadequate to support the management of cholera risks. The health system in Yemen is fragile, is heavily reliant on donors and suffers from political instability, a lack of funding and a shortage of motivated and trained health workers due to lack of salary payments. However, some efforts have been made to improve the situation, and UNICEF has played a significant role in strengthening health infrastructure and logistics to support the management of cholera risks in Yemen.

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UNICEF has contributed positively to Yemen's national preparedness for cholera and other PHEs by integrating cholera preparedness and prevention into existing health development projects, developing capacity of health workers and RRTs, and stockpiling required supplies in case of an emergency. UNICEF has provided support for the rehabilitation and construction of health facilities and has ensured the availability of essential medicines and medical supplies in health facilities to address cholera cases. UNICEF has also facilitated the pre-positioning of essential medical and nonmedical supplies and equipment, including cholera kits, at strategic locations to ensure rapid and effective response to cholera outbreaks. Additionally, UNICEF has contributed towards improving the safety and sustainability of health facilities by providing support for the provision of solar power and water supply systems to health facilities, as well as for the provision of ambulances and other essential vehicles to support patient referral and transportation. UNICEF has also supported the training of health workers on cholera case management and the provision of essential services, including nutrition, mental health and psychosocial support. Furthermore, UNICEF has played a critical role in supporting the development of logistics and supply systems to manage cholera risks in Yemen. UNICEF has worked to improve the logistics and supply management system of health facilities and has provided support for the establishment of emergency supply chain systems to ensure the availability of essential medical and nonmedical supplies and equipment during cholera outbreaks.

In summary, while health infrastructure and logistics in Yemen are insufficient to support the management of cholera risks, UNICEF has made significant contributions towards strengthening these aspects. UNICEF's efforts have focused on providing support for health facility rehabilitation and construction, pre-positioning essential medical and nonmedical supplies and equipment, improving the safety and sustainability of health facilities, supporting the development of logistics and supply systems and providing technical assistance for cholera.

Health services

The health services in Yemen are facing significant challenges in providing the full range of health and related services required for supporting management of cholera risks, including nutrition, mental health and psychosocial support. UNICEF, however, has made a positive contribution towards addressing these challenges. UNICEF has integrated cholera preparedness and prevention into existing health development projects, providing a full range of health and related services required for supporting management of cholera risks. This includes the provision of nutrition, mental health and psychosocial support services, as well as the capacity building of health workers and RRTs to provide these services. Furthermore, UNICEF has contributed to the stockpiling of supplies to ensure that health services have the capacity to scale up to meet increased health needs and specific risks resulting from a cholera outbreak. UNICEF has also provided technical support for the development and implementation of cholera surveillance and reporting systems, which can help to improve the timeliness and accuracy of reporting on cholera cases and outbreaks.

Although UNICEF's efforts are commendable, there are still areas for improvement. For instance, UNICEF must focus more on community-centred planning and action to ensure that local health workforce capacities are sufficient to address cholera risks. Additionally, there is a need for the Yemeni government to improve the funding and management capacity of the health system, and for WASH infrastructure to be strengthened to support the management of cholera risks. Without these improvements, it will be difficult for health services to provide the full range of services required for managing cholera risks and to scale up to meet the increased health needs and specific risks resulting from cholera.

WASH services

The WASH infrastructure and systems in Yemen are very poor, and the WASH sector is particularly underprepared. There is a lack of chlorination or disinfection of water sources throughout the country, and sewage infrastructure has been neglected as a preventive measure. Key stakeholders, however, noted faster WASH response times since 2017 and the success of widespread vaccination to protect people against cholera. There have been improvements in coordination, planning, cholera surveillance, health facility management and community engagement capacity.

There are still areas for improvement, such as the lack of sufficient chlorination and disinfection of water sources. The poor WASH infrastructure and systems in Yemen need to be addressed to support management of cholera risks. In summary, the WASH services provided in Yemen require significant improvement to meet the full range of health and related services required for supporting management of cholera risks, including nutrition, mental health and psychosocial support.

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UNICEF has contributed positively to Yemen's WASH services and therefore to cholera risk management. Respondents indicated that UNICEF's work on community awareness, linkages to primary health care, developing capacity of health workers and RRTs and stockpiling of supplies has improved preparedness.

UNICEF has contributed to improving WASH services in Yemen in several ways. UNICEF has supported the development of national cholera preparedness plans, which include provisions for WASH services. It has also integrated cholera preparedness and prevention into existing health development projects and has been involved in providing community awareness and engagement to promote good hygiene practices and behaviour change.

Additionally, UNICEF has supported WASH infrastructure development, including the rehabilitation and construction of water and sanitation facilities, such as water treatment plants, boreholes and latrines. It has also provided technical assistance to improve the management of WASH services, such as through developing plans for WASH in health care facilities and improving the capacity of WASH sector staff.

Furthermore, UNICEF has supported the pre-positioning of WASH supplies to respond to emergencies, including cholera outbreaks. Finally, UNICEF has provided funding to support the WASH sector in Yemen, including for the procurement of essential WASH supplies, and to support the operation and maintenance of WASH infrastructure.

Community capacities for health

Based on the data available, the community capacities for health in Yemen are not sufficient to address cholera's risks in conjunction with inclusive community-centred planning and action.

While some improvements have been made since the 2016–2017 outbreak, the health system remains fragile and there are major impediments to strengthening health systems in the country. These include poor technical expertise on health system strengthening within the government, political instability, lack of sufficient and motivated workforce due to lack of salary payments, poor supply chain systems and, most importantly, lack of funding and donor fatigue.

Although human resource capacity has improved since the 2016–2017 outbreak through training and other initiatives, there are still gaps because experienced staff members often leave the country. Local authorities and CHVs are not a priority for the MoPHP, particularly where training and building capacity are concerned, and the MoPHP's focus is on secondary care rather than primary health care and CHVs. There is also a perception of poor management capacity.

Although UNICEF has contributed positively to Yemen's national preparedness for cholera and other PHEs in several ways – including by integrating cholera preparedness and prevention into existing health development projects, developing the capacity of health workers and RRTs, and stockpiling required supplies in case of an emergency – there are areas for improvement. UNICEF should improve the timeliness of its reporting, and since UNICEF used tents for DTCs in 2016–2017, Yemen lacks DTC infrastructure, which puts the country at risk.

In summary, the community capacities for health in Yemen are not sufficient to address cholera's risks in conjunction with inclusive community-centred planning and action. There are several challenges, including poor technical expertise, lack of motivated workforce, poor supply chain systems, poor WASH infrastructure and lack of funding.

UNICEF has contributed to improving local health workforce capacities and inclusive community-centred planning and action in Yemen. Specifically, UNICEF has worked on developing the capacity of health workers and RRTs, as well as integrating cholera preparedness and prevention into existing health development projects. UNICEF has also worked on community awareness through RCCE and linked cholera prevention and preparedness with primary health care. Additionally, UNICEF has stockpiled required supplies in case of an emergency, which has improved preparedness.

Monitoring and evaluation

From the KIIs conducted, it is clear that there are established processes to monitor progress towards meeting cholera risk management objectives in Yemen. Yemen has in place an electronic surveillance system, eDEWS, a health facility-based disease surveillance system that uses electronic tools and an electronic platform for data collection, management, analysis and visualization. This system covers all 333 districts in Yemen and has significantly improved since the 2016–2017 cholera outbreak. The system allows for early warning and rapid response to cholera outbreaks, and partners such as WHO and UNICEF report into this system to ensure data sharing and coordination.

In addition, annual reviews of lessons learned from cholera outbreaks are conducted to improve cholera preparedness and response, as well as preparedness and response for other diseases. Respondents noted improvements in cholera surveillance, health facility management and community engagement capacity, which are clear signs that monitoring and evaluation processes are in place.

However, there are still areas for improvement in monitoring and evaluation processes. For example, UNICEF should improve the timeliness of its reporting, and the MoPHP stopped publicly sharing line list data in 2020. Nonetheless, the establishment of eDEWS and annual reviews of lessons learned demonstrate that there are established processes in place to monitor progress towards meeting cholera risk management objectives in Yemen.

UNICEF was mentioned as one of the partners coordinating well on reporting into existing data systems, although there were also areas for improvement, such as improving the timeliness of its reporting and reporting data to the health cluster.

Assessment of response to cholera post-2018

As set out in the inception report, the benchmarks defined in the CCCs are used to provide judgement criteria against which PHE response is assessed in the case studies. The commitments, their corresponding benchmarks and the summary assessment of the extent to which each benchmark was met are shown in the table below.

Table 2. Assessment of PHE response to cholera in Yemen post-2018 against CCC commitments and benchmarks

Commitments	Benchmarks	Extent to which benchmarks have been achieved
1. Coordination and leadership **Effective coordination is established with government and partners.**	**1a)** Inter-agency and intersectoral coordination mechanisms, including cross-border, are in place and allocate clear roles and responsibilities across sectors, without gaps or duplications	**1a)** While efforts have been made towards achieving this benchmark, there are still significant gaps and challenges in achieving it. The Inter-agency Humanitarian Evaluation report (2022) highlighted the need for better coordination and planning, particularly in terms of cholera surveillance, health facility management and community engagement capacity, and noted that the gains made since the 2016–2017 outbreak are at risk due to declines in funding and other factors. Respondents also cited challenges in working with the government in Sana'a due to bureaucratic processes, lack of transparency and data sharing, and denial of PHEs. While there is a national cholera preparedness plan in place, it has not been signed by all parties, and there is a need for more detailed planning for resource mobilization and use. There also are difficulties with collecting data and/or conducting studies, especially when the focus is on women's/girls' issues, which include difficulties with conducting focus group discussions with females (which requires approvals).

	1b) UNICEF-led sectors are adequately staffed and skilled at national and sub-national levels	**1b)** Based on the data available, it is unclear to what extent this benchmark has been achieved. There are some indications that progress has been made in terms of improving human resource capacity for cholera risk management in Yemen, particularly through UNICEF-led efforts in training health staff and building capacity for RRTs. However, there are also indications that significant challenges remain, including a shortage of skilled personnel and experienced staff leaving the country, as well as poor management capacity within the health system.
	1c) UNICEF core leadership and coordination accountabilities are delivered	**1c)** It appears that UNICEF has played a significant role in providing leadership and coordination in addressing cholera risks in Yemen. UNICEF has worked closely with the Yemeni government, other United Nations agencies and international partners to develop preparedness plans, integrate cholera prevention into health and WASH projects, improve community engagement and enhance surveillance and monitoring systems. There are still areas for improvement, however, such as the timeliness of reporting, and ensuring that adequate financial resources are available to support cholera risk management activities. While progress has been made, there is more work to be done to fully meet the benchmark of delivering UNICEF's core leadership and coordination accountabilities.
	1d) Surge deployments and emergency procedures are activated on a no-regrets basis	**1d)** There is no clear evidence provided to assess the extent to which the benchmark has been met.
	1e) In case of the activation of the Inter-agency Standing Committee Protocol[2] for the Control of Infectious Disease Events, response modalities and capacities are adapted and scaled up accordingly	**1e)** Based on the information available, it is difficult to determine the extent to which this benchmark has been met.

2 This protocol is currently undergoing revision.

2. RCCE **Communities are reached with targeted messages on prevention and services and are engaged to adopt behaviours and practices to reduce disease transmission and its impact. They participate in the design, implementation and monitoring of the response for ongoing corrective action.**	**2a)** Communities are reached with gender- and age-sensitive, socially, culturally and linguistically appropriate, and accessible messages on disease prevention, and on promotion of continued and appropriate use of health services	**2a)** It is unclear to what extent this benchmark has been achieved in Yemen. While there are efforts by UNICEF and other organizations to improve risk communication and promote the use of health services, there are still challenges in reaching all communities in a gender- and age-sensitive, socially, culturally and linguistically appropriate, and accessible manner. Ongoing conflict and other humanitarian crises in Yemen have created barriers to effective communication and service delivery, particularly in hard-to-reach areas. Further efforts and resources are needed to ensure that all communities have access to appropriate and effective communication and health services.
	2b) Local actors are supported and empowered to raise awareness and promote healthy practices	**2b)** Some progress has been made towards meeting this benchmark. UNICEF has been working with local partners to support community-based interventions to raise awareness about the importance of hygiene and sanitation practices in preventing cholera. Additionally, UNICEF has implemented programmes to engage with communities and promote healthy behaviours. It is unclear, however, to what extent these efforts have been successful in reaching all members of the community with appropriate and accessible messages, or in supporting and empowering local actors to lead these efforts.
	2c) Systems are in place to allow communities to guide the response and provide feedback for corrective action	**2c)** The benchmark has been mostly achieved, although it is unclear to what extent. Data available suggest that UNICEF has worked to engage and empower local communities and that feedback mechanisms are provided.
3. Strengthened public health response: prevention, care and treatment for at-risk and affected populations **Populations in at-risk and affected areas safely and equitably access prevention, care and treatment to reduce disease transmission and prevent further spread. Specific attention is given to women and children.**	**3a)** The risk of geographical spread of the outbreak and its potential impact are monitored, to inform early response and preparedness in at-risk areas	**3a)** Efforts have been made towards meeting this benchmark in Yemen. There have been measures taken to monitor and respond to outbreaks in at-risk areas, such as through the Early Warning and Alert Response Network and the RRTs that are deployed to support outbreak response. However, it is unclear whether there are specific systems in place to monitor the risk of geographical spread of outbreaks and its potential impact.

3b) Specific needs and vulnerabilities of children and women are considered in prevention and treatment protocols, including in the design of patient-centred treatment programmes	**3b)** While data show that there have been efforts to meet this benchmark, it is unclear to what extent it has been achieved. UNICEF has contributed to the development of guidelines and protocols that take into account the specific needs and vulnerabilities of children and women in prevention and treatment of cholera. For example, UNICEF has worked with partners to provide children and women with access to safe drinking water and improved sanitation facilities to reduce their risk of contracting cholera. Additionally, UNICEF has provided treatment to children suffering from cholera, including through oral rehydration therapy. It is unclear from the available information, however, to what extent these efforts have fully addressed the specific needs and vulnerabilities of children and women in all settings and circumstances.
3c) Communities directly affected by cholera are reached with infection and prevention control activities, including the provision of critical medical and WASH supplies and services at facility, community and household levels and in public spaces	**3c)** Based on the information available, significant efforts have been made towards achieving this benchmark. UNICEF, in collaboration with other organizations, has implemented various interventions to reach communities affected by cholera with infection prevention and control activities. This includes the provision of critical medical and WASH supplies and services at facility, community and household levels, and in public spaces. However, it is unclear whether all communities affected by cholera have been reached with these interventions and whether the interventions have been sustained over time.
3d) Psychosocial support services contributing to reducing transmission and cholera-related morbidity are accessible to individuals and their families directly or indirectly affected by cholera	**3d)** It is unclear to what extent this benchmark has been met. There is some mention of mental health and psychosocial support services being provided, but it is not clear whether they are widely accessible to all individuals and families affected by cholera.
3e) Children directly affected by cholera receive an integrated package of medical, nutritional and psychosocial care	**3e)** It is unclear to what extent this benchmark has been met. While there has been some mention of efforts to provide medical, nutritional and psychosocial care, there is limited information on the specific extent to which children directly affected by cholera have received such care. Additionally, there is no clear information on how the care is integrated or coordinated.
3f) Frontline workers at facility and community level are trained in infection prevention and control and provided with personal protective equipment as appropriate for each situation and role	**3f)** Based on the information available, it is difficult to make a conclusive assessment of the extent to which this benchmark has been met. Respondents mentioned, however, that UNICEF has provided support for training and capacity building for frontline workers, including training in infection prevention and control and provision of personal protective equipment, which suggests that efforts have been made to address this benchmark.

4. Continuity of essential services and humanitarian assistance **Essential services and humanitarian assistance are maintained and scaled up as necessary, and communities can safely and equitably access them.**	**4a)** Needs assessments are conducted early and regularly to ascertain the impact of the outbreak on the population, humanitarian needs and underlying needs not yet addressed	**4a)** This benchmark has been partially met. While needs assessments have been conducted to ascertain the impact of the outbreak on the population, humanitarian needs and underlying needs not yet addressed, it is not clear whether they were conducted early and regularly as per the benchmark. Therefore, more information is needed to make a definitive assessment.
	4b) Essential services and humanitarian assistance in health, WASH, nutrition and HIV are maintained and scaled up as necessary, and communities can access them in a safe and equitable manner	**4b)** Progress has been made towards meeting this benchmark, but it is not entirely clear whether it has been fully achieved. Some of the data describe efforts to maintain and scale up essential services and humanitarian assistance in health, WASH, nutrition and other areas. Additionally, there have been efforts to ensure that communities can access these services safely and equitably. There have also been challenges, however, such as funding shortages and difficulties in reaching certain populations. It is likely that further work is needed to fully meet this benchmark.
	4c) Protection services, including case management and psychosocial support services, are accessible to individuals and their families in a safe and equitable manner	**4c)** It is difficult to assess the extent to which this benchmark has been met, as there was no specific mention of protection services such as case management and psychosocial support in relation to cholera in Yemen.
	4d) Continued and safe access to education is maintained	**4d)** There are no data specifically addressing the benchmark.
	4e) Existing social protection mechanisms are maintained and expanded as necessary, including through establishing or scaling up humanitarian cash transfers	**4e)** Based on the data available, it is not possible to make a definitive assessment of the extent to which the benchmark has been met. The data did not provide enough information about the specific efforts or contributions of UNICEF or other actors.

Evidence summary for the PHE evaluation

This section summarizes the evidence from this case study against the evaluation questions for the PHE evaluation as a whole. This summary has informed the development of the consolidated evaluation findings.

6.1 Relevance

Evaluation question	Evidence summary
A. Relevance: The extent to which UNICEF's work on PHEs in Yemen has been aligned with the needs and priorities of affected populations and key stakeholders and adapts as needed	
A.1 To what extent has UNICEF's work on cholera in Yemen been aligned with the needs and priorities of those most affected and at risk (especially children and the most vulnerable groups)?	Respondents generally noted that UNICEF aligns its work closely with the needs and priorities of children and other vulnerable groups in Yemen, but inconsistency and incompleteness of data due to restrictions have affected UNICEF's ability to systematically identify and meet the needs of the most affected and at risk. Despite funding constraints, UNICEF has made efforts to ensure an equitable, inclusive and effective response to cholera in Yemen by integrating cholera response into other relevant projects.
A.2 To what extent has UNICEF's work on cholera in Yemen contributed to a common vision with national government policies and plans?	UNICEF's work on cholera in Yemen has contributed to a common vision with national government policies and plans to some extent. Respondents noted that UNICEF's work in Yemen was to support the government activities and therefore aligns itself to the government's priorities, policies and plans. UNICEF has worked closely with the ministry of health and ministry of water to align its activities with relevant ministries. Some coordination issues with the MoPHP were reported, however, and UNICEF was reported to use inaccurate information at times, possibly due to reported data collection challenges in Yemen. UNICEF has also faced challenges in aligning with both governments in Yemen, as one side may agree to some activities while the other side may turn them down.

A.3 How successfully and in what ways has UNICEF adapted its work on cholera in Yemen to evolving circumstances and changing needs and priorities?	UNICEF has demonstrated flexibility and adaptability in its work on cholera in Yemen by expanding its scope to improve access to clean water and sanitation services in conflict-affected areas, providing targeted health education and promoting behaviours that reduce cholera transmission. Despite limited support for secondary care and an over-focus on primary health care and nutrition, UNICEF has effectively responded to evolving circumstances and changing needs and priorities. UNICEF has maintained systems in changing contexts, adapted its response based on emerging needs, prepared and updated an internal multisectoral plan and regularly met with relevant ministries to ensure engagement and alignment of agendas. Another example of its adaptation given by respondents was that during the diphtheria outbreak in Yemen, UNICEF successfully supported the establishment of intensive care units.

6.2 Effectiveness

Evaluation question	Evidence summary
B. Effectiveness: The extent to which UNICEF work on PHEs in Yemen has achieved its intended results and contributed to key outcomes	
B.1 To what extent and how has UNICEF contributed to improving preparedness to address cholera in Yemen?	As noted in section 4, UNICEF has contributed significantly to improving preparedness to address cholera in Yemen by building the capacity of the health system, improving access to clean water and sanitation services, leading the cholera task force, ensuring a contingency plan is in place, enabling standby partnership agreements, keeping track of cholera cases, conducting biweekly task force meetings and updating the epidemiological situation. There is still a need for more in-depth interventions, however, such as allocating rapid response funds to more long-term activities and conducting preventive activities to eliminate problems at their origin. Overall, UNICEF's efforts have helped to improve preparedness to address cholera in Yemen, but there is still work to be done to address the root causes of the problem, mainly poor WASH infrastructure.
B1.1 What factors have facilitated or constrained this contribution?	Factors that have facilitated UNICEF's contribution to improving preparedness include significant knowledge and awareness among health staff regarding response measures and procedures, as well as good WASH technical capacity. Additionally, UNICEF's past emergency experiences have better prepared it for outbreaks such as COVID-19. Several limitations have constrained UNICEF's contribution, however. Government constraints and bureaucratic restrictions, especially in the North, poor WASH infrastructure, political conflict and divide, and multiple layers of bureaucracy have also posed significant challenges. Short-term funding for both health and WASH has made it difficult to plan and implement long-term interventions. Due to the fragile system, UNICEF and its partners know how to manage an outbreak but not prevent it, and a lack of funds has left them inadequately prepared for cholera outbreaks in recent times. Moreover, transparency by authorities with partners and data sharing are essential for preparedness and response, and data sharing from government authorities stopped after incentives were stopped.
B.2 To what extent and how has UNICEF contributed to effective response to cholera in Yemen through its partnerships and programmes?	UNICEF has contributed to an effective response to cholera in Yemen through its partnerships and programmes, including building partnerships with local communities and health care providers, and improving the capacities of the local health workforce through training and capacity building programmes. Data from the respondents, however, show that while UNICEF's partnerships and programmes have been instrumental in contributing to an effective response to cholera in Yemen, there have been limitations and challenges that need to be addressed to improve the response.

B.2.1 What factors have facilitated or constrained response?	Facilitators mentioned by the respondents included good relationships with authorities, working with partners and involvement of communities in programme design. Constraints include political influence, ineffective decision-making, bureaucratic restrictions, political conflict, and poor impact compared to resources invested. UNICEF has worked to overcome some of these challenges through measures such as access assessments by the United Nations Office for the Coordination of Humanitarian Affairs to ensure support in conflict areas. An example of poor decision-making given by one of the respondents was that some decisions made through the partnerships have not worked out well, such as the distribution of hygiene kits in health facilities to cholera patients, which led to false reporting, with the respondent mentioning that the kits should have been distributed in the community.
B.3 How well has UNICEF supported innovation, including product innovation and appropriate use of new technologies, to respond to cholera in Yemen and mitigate impacts?	The respondents reported that UNICEF has supported innovation to respond to cholera in Yemen and mitigate impacts to a certain extent. UNICEF has implemented a community awareness programme through technology and Short Message Service as well as a cholera dashboard produced by a cluster that reports on cholera activities. Additionally, UNICEF has integrated cholera response with other primary care interventions, offered high-quality and effective training for capacity building, engaged with communities to co-create and co-fund solutions and built the capacities of partners. The extent to which these innovations have mitigated the impacts of cholera in Yemen, however, is unclear from the data.
B.4 To what extent is UNICEF's work on cholera in Yemen informed by evidence including from evaluation, research and integrated multisector outbreak analytics?	Based on the data from the respondents, UNICEF's work on cholera in Yemen is informed by evidence, including evaluations and research. It was also reported that UNICEF contextualizes its global response guidelines to country-specific needs, shares its experiences as lessons with other partners and conducts WASH RRT evaluations. UNICEF was also reported to use lead agencies to provide verified information during outbreaks and prioritize areas for OCV based on WASH indicators, and to regularly conduct its own surveys and internal data collection. One respondent, however, reported an instance in which UNICEF used data directly taken from facilities and not verified to shorten response time, which may indicate a potential weakness in its data management processes.

6.3 Efficiency

Evaluation question	Evidence summary
C. Efficiency: The extent to which UNICEF has made optimal use of its human and financial resources to respond to PHEs in Yemen	
C.1 To what extent has UNICEF had the right people, systems and structures in place to contribute to preparedness and effective response to cholera in Yemen?	Overall, the respondents noted that UNICEF has had a strong mechanism, staff and leadership in place to respond to cholera in Yemen. It has expanded its health and nutrition capacity on the ground and has a staffing system based on interventions and teams, with no cholera-specific staff. Area-specific experts have been deployed, and RRTs have been beneficial for emergency work. UNICEF was reported to have great capacity due to its extensive experience in emergencies and outbreaks, and respondents noted instances in which they brought in experts from other countries and their headquarters as needed. There have, however, been some challenges associated with multiple sectors within UNICEF creating confusion and a need for staff to be present in both Sana'a and Aden to ensure an effective response across the country.

C1.1 What factors have influenced UNICEF's staffing, systems and structures in relation to cholera in Yemen?	The respondents noted a decline in funding since 2020, which has led to a reduction in staff for cholera due to the decreasing caseload. This has also resulted in staffing as per available funding. In addition, the declining cholera caseload has influenced UNICEF's staffing and structure in Yemen. The reduction in caseload has resulted in a reduction in staff for cholera. Finally, respondents mentioned that the needs and priorities of the cholera-affected populations have influenced UNICEF's staffing, systems and structures in Yemen as UNICEF has had to prioritize the most urgent needs of the cholera-affected populations with the available resources.
C.1.2 How have staffing issues affected UNICEF's work on cholera in Yemen?	One of the respondents noted that despite good mechanisms and staff, there is still a delay in receiving data from UNICEF. This may be related to staffing issues, but this assumption remains unconfirmed from the data available.
C.2 How appropriate, clear and well aligned have been the activities and approaches among different divisions and offices within UNICEF in relation to cholera in Yemen? How well have headquarters and the regional office supported the Yemen Country Office?	Based on the data from the respondents, the activities and approaches among different divisions and offices within UNICEF in relation to cholera appear to be generally appropriate, clear and well aligned, with a clear focus on WASH and nutrition as the main areas of concern. UNICEF's headquarters staff has also provided support to the country office through the offer of expertise to address cholera. Additionally, all teams were reported to work together as one operation from start to end, which indicates good coordination. There have, however, been some challenges in terms of confusion among local partners due to differences in requests from central and field offices of UNICEF. This suggests that communication and coordination between different offices may need to be improved to ensure effective and efficient response to cholera. Furthermore, the data suggest that the focus on cholera has not been as strong or received the same level of attention as WASH and nutrition.
C.2.1 What factors have influenced organizational relationships?	UNICEF has developed a multisectoral cholera prevention, preparedness and response plan that is regularly updated as it is a living document. It is developed as a result of close coordination, discussion and contribution across health, nutrition, WASH, social and behaviour change, and emergency sections from the central and field office levels. Secondly, UNICEF has established the Cholera Task Force. This is activated during the rainy season, and the chief of health chairs the meeting while the emergency section facilitates. This forum also brings together different sectors within UNICEF Yemen. Periodic capacity building sessions on the basics and epidemiology of cholera are led by the regional office, while cholera global and regional calls and a global cholera newsletter are managed by UNICEF headquarters.
C.2.2 How have relations between different parts of UNICEF affected its work on cholera in Yemen?	
C.3 To what extent were supply operations efficient in providing timely inputs to address cholera in Yemen, including local and international procurement?	Overall, supply operations for addressing cholera in Yemen were reported to be efficient in providing timely inputs, as indicated by the positive forecasting tool and timely fulfilment of needs and regular meetings to inform repositioning and continuous stock availability. Some challenges and inefficiencies were noted, however, including delays in providing necessary supplies and kits, and the need for additional procurement. Respondents mentioned that UNICEF made efforts to address these challenges and ensure timely inputs, including through local and international procurement.

C.3.1 What factors have influenced supply performance in responding to cholera in Yemen?	Several factors were mentioned as having influenced supply performance in responding to cholera, including the challenging security situation, which has impacted the movement of supplies and resulted in the loss of vehicles for some partners. The limited funding after 2020 has also been a challenge, as has the lack of local procurement due to the war and conflict situation, which restricts the supply chain. On the positive side, logistics and other support systems were reported to have been expanded with staff, supplies, long-term agreements and a new supply hub established in Oman. It was also mentioned that local procurement of some medicines is not allowed though WASH procurement is conducted locally. Other challenges mentioned were lack of mapping of supplies and kits supplied by partners and issues with the movement of stocks due to the political crisis in Yemen.
C.3.2 How has the performance of supply operations affected UNICEF's work on cholera in Yemen?	Delays in the provision of supplies and kits and arrivals of supplies in multiple batches instead of one batch have caused difficulties for UNICEF's response efforts. At times, the kits supplied to communities were not useful and required additional funds from other organizations to purchase necessary drugs.
C.4 How efficiently were funds mobilized, allocated and used to address cholera in Yemen?	UNICEF's mobilization, allocation and use of funds to address cholera in Yemen have been impacted by funding constraints in the last two years. Delays in the reimbursement of partners have resulted, in turn causing partners to prioritize operational costs over paying salaries.
C.4.1 What factors have influenced financial management performance in relation to cholera in Yemen?	There is insufficient evidence available to report against this evaluation question.
C.4.2 How has financial management affected UNICEF's work on cholera in Yemen?	The respondents noted that during the peak of the cholera outbreak, there was a large amount of funding available, which had a positive impact on reducing the number of cholera cases. This funding was not sustained, however, and as the number of cases declined, so did the funding. This loss of funding led to the integration of activities into other programmes. This may have potentially reduced the capacity of UNICEF to respond to future emergencies, but the data available are not sufficient to substantiate this claim.

6.4 Coherence

Evaluation question	Evidence summary
D. Coherence: The extent to which UNICEF has designed, implemented and monitored its work on PHEs in Yemen in coherence and coordination with other PHE actors and utilizes its comparative advantage	
D.1 To what extent was UNICEF's work in relation to cholera in Yemen coherent with the activities, approaches and responses of partners?	UNICEF's work in PHEs, including its response to cholera in Yemen, was generally coherent with activities, approaches and responses. UNICEF worked jointly with WHO, partners and government ministries to prepare a national response plan, conducted risk analysis and priorities jointly with the WHO task force and allocated OCVs based on this analysis. UNICEF and WHO also coordinated to conduct OCV campaigns by dividing roles and responsibilities clearly. Good inter-cluster relationships existed, although further alignment of activities is needed to ensure complementary work with WHO. UNICEF generally aims to be coherent with its partners and stakeholders, although at times there may have been a closer relationship with the government that impacted its relationship with partners, for example when decisions were made between UNICEF and the government without involving partners.

D.1.1 What factors affected the extent of coherence?	UNICEF's work in cholera was positively affected by data sharing and avoiding competition with partners, clear definition of roles and responsibilities, and openness to inputs and discussion from partners. Coherence, however, was impacted by differences in indicators and outcomes among clusters and by the government's direct reach-out to UNICEF for project-related activities, which was not appreciated by partners and led to lack of coherence. The need for UNICEF to improve inter-cluster coordination and to conduct more regular meetings to improve coherence was also noted. Additionally, there were initial challenges between UNICEF and WHO, but they later coordinated to work together, resulting in the elimination of duplication of work and a better working relationship.
D.1.2 How has the level of coherence affected UNICEF's work on cholera in Yemen?	Based on the information provided by the key informants, the level of coherence has had both positive and negative impacts on UNICEF's work on cholera in Yemen. The positive factors such as data sharing, defined roles and responsibilities, and avoidance of competition have helped UNICEF work effectively with its partners. Challenges, however, such as delays in reporting due to the need to report through the MoPHP, as well as political and authority factors, have made it challenging to conduct OCV campaigns and other related work in a timely manner.
D.2 To what extent has UNICEF's role (including its leadership role) in addressing cholera in Yemen reflected UNICEF's comparative advantage?	Based on the data provided by the respondents, UNICEF's role in addressing cholera in Yemen has reflected its comparative advantage in some areas, specifically in community and RCCE and coordination. UNICEF's strengths in community and RCCE have been recognized by partners, who noted the importance of open discussions and inputs from partners and the need to avoid competition between agencies. UNICEF's expertise in this area has likely helped to facilitate coordination between different actors involved in the cholera response. There are also indications, however, that UNICEF's role may not have fully reflected its comparative advantage. For example, UNICEF's reports on indicators have been delayed due to the reporting process through the MoPHP. This suggests that UNICEF's strengths in data management and reporting may not have been fully utilized in this context.
D.3 To what extent has UNICEF provided effective leadership and coordination in addressing cholera in Yemen?	Based on the information provided by the respondents, it appears that UNICEF has provided effective leadership and coordination in addressing cholera in Yemen to some extent. UNICEF has taken the lead in the WASH RRT and has a mandate for anything outside health facilities in emergencies. Additionally, UNICEF has strengths in community engagement and risk communication, which are important in addressing cholera outbreaks. Some respondents reported challenges, however, particularly with competitiveness in the field and meetings. One respondent noted that at times criticism has been taken as an attack instead of constructive advice.

6.5 Gender, equity and rights

Evaluation question	Evidence summary
E. Gender, equity and rights: The extent to which gender, equity and rights (particularly the CCCs) are reflected in UNICEF's work on PHEs in Yemen	
E.1 To what extent and how has UNICEF's work on cholera in Yemen contributed to protecting children, women and adolescent girls and other vulnerable groups?	UNICEF's work on cholera in Yemen was reported to be mostly successful in contributing to the protection of vulnerable groups. UNICEF's strengths in RCCE and protective mandate were reported to have been utilized to reach out to far-flung and conflict areas by engaging local partners and internally displaced persons through mobile medical teams for health and nutrition activities. UNICEF supported 200 mobile teams to reach vulnerable groups and ensured service provision to all suspected cholera cases, including integrating mid-upper arm circumference screening in the cholera line list. UNICEF provided guidance on disaggregation of data by gender, and clusters reached out to vulnerable groups to ensure the response was aligned with their needs and priorities. There were still gaps, however, in addressing the needs of internally displaced persons, especially in WASH activities, and implementation of the protective mandate remains a challenge because UNICEF is seen as too lenient with the government. Part of UNICEF's preparedness and response was the 50/50 male/female representation in RRTs, which were trained to identify and treat cases quickly as well as provide community awareness through the WASH programme.
E.2 To what extent and how has UNICEF's work on cholera in Yemen been accountable to affected populations?	UNICEF's work on cholera in Yemen has been accountable to affected populations to a significant extent. UNICEF has a commitment to working with communities and stakeholders to ensure programmes are responsive to needs and are implemented in an accountable and transparent manner. Feedback mechanisms are available, including a complaint mechanism, and there is ongoing monitoring and evaluation of the impact of its programmes and activities. Accountability to affected populations is included in all UNICEF projects based on a global mandate, and clusters ensure partners include this in their projects. UNICEF has been responsible for risk communication during OCV campaigns, and the communication strategy improved after 2020. Health awareness and community awareness through various mediums has been successful in reaching a large population and maintaining a low case fatality rate.
E.2.1 What factors have influenced accountability?	Factors include transparency and communication with affected populations, the existence of complaint mechanisms, the level of stakeholder engagement and the presence of adequate monitoring and evaluation systems.
E.2.2 How has the level of accountability affected UNICEF's work on cholera in Yemen?	UNICEF's commitment to accountability to affected populations has helped to ensure that its programmes are responsive to the needs of the communities they serve. Feedback mechanisms and complaint mechanisms have allowed communities to voice their concerns and ensure that their needs are being met. On the other hand, lack of accountability, particularly from other stakeholders such as the government, has been a challenge for UNICEF. The government's compliance with the implementation of programmes has at times been a challenge, and UNICEF was criticized by one respondent for being too lenient with the government in this regard.
E.3 To what extent and how has UNICEF's work on cholera in Yemen promoted and reflected gender, disability, age and human rights standards and commitments (including the CCCs)?	The respondents noted that UNICEF's work on cholera in Yemen has promoted and reflected gender, disability, age and human rights standards and commitments. UNICEF has approached its response with a gender focus, including encouraging recruitment of female staff and female CHVs. Gender was integrated in all UNICEF interventions and responses, with a gender-based violence specialist at the country office to ensure gender mainstreaming in all interventions. Gender issues were raised in all forums, with priority given to issues coming from the field. Separate treatment sections for males and females were established, and mother and child hospitals had their own DTCs and oral rehydration corners.

E.4 To what extent has UNICEF had the required capacity and resources (human resources, tools, procedures, leadership, disaggregated data and evidence) to address gender, equity and child rights in its work on cholera in Yemen?	According to the data available, UNICEF has demonstrated some capacity and resources to address gender, equity and child rights in its work on cholera in Yemen. UNICEF has incorporated a gender component in its interventions, including the inclusion of female staff in teams, and has ensured that data are disaggregated by age and gender for reporting and analysis. There were challenges in data sharing, however, particularly as the situation in Yemen became more difficult. It is unclear from the information provided whether UNICEF had all the required capacities and resources to fully address gender, equity and child rights in its cholera response in Yemen.
E.4.1 What factors have influenced the level of capacity and resources for addressing gender, equity and rights in UNICEF's work on cholera in Yemen?	While UNICEF had data on vaccination, for surveillance it had to depend on WHO to programme its activities accordingly. In addition, receiving and sharing data was difficult due to challenges from the authorities (both North and South).
E.4.2 How has the level of capacity and resources for gender, equity and rights affected UNICEF's work on cholera in Yemen?	There is insufficient evidence available to report against this evaluation question.

6.6 Sustainability

Evaluation question	Evidence summary
F. Sustainability: The extent to which the benefits of UNICEF's work on PHEs in Yemen, including improved preparedness and systems strengthening, are sustainable beyond the intervention period	
F.1 To what extent did UNICEF contribute to strengthening Yemen's health system to address cholera?	UNICEF has contributed significantly to strengthening Yemen's health system to address cholera through various efforts, including supporting infrastructure development, integrating emergencies with multisector approaches for sustainability, engaging CHVs and local authorities, supporting a large number of primary health care centres, providing supplies, capacity building, rehabilitation and provision of equipment, and conducting workshops on water resource management, climate change and drought. Respondents noted, however, that UNICEF did not significantly invest in infrastructure and sustainable solutions to address the root causes of the cholera outbreak, such as the lack of access to clean water. Additionally, while raising awareness is crucial, it alone cannot solve the problem of contaminated water sources.

F.1.1 What were the factors that supported or hindered this strengthening?	UNICEF played a significant role in strengthening Yemen's health system to address cholera. It supported infrastructure development, such as shifting the provision of fuel to solarizing water resources. UNICEF also integrated emergencies with multisector approaches to ensure sustainability and engaged CHVs and local authorities in every step. It worked closely with the health ministry to ensure that activities were aligned with the ministry's priorities and conducted training for health care workers to enhance their capacity. Several factors hindered the strengthening process. One major factor was the lack of funding for infrastructure development, which is crucial for addressing the root causes of the cholera outbreak. Additionally, the health ministry prioritized secondary care over primary health care and CHV training, which hindered the development of a strong health system. Another hindering factor was the payment of incentives for each reported case, leading to over-reporting from health facilities. This over-reporting could distort the true picture of the outbreak and make effective response difficult.
F.2 To what extent did UNICEF contribute to strengthening community systems and community engagement to address cholera in Yemen and improve resilience?	UNICEF made significant contributions to strengthening community systems and engagement to address cholera in Yemen and improve resilience. It engaged a large number of CHVs who were recruited from the same location as their duty station. UNICEF provided regular training and awareness sessions to CHVs and conducted refresher training sessions to improve their capacity. Incentives were also provided regularly to motivate the CHVs. Despite the health ministry's focus on hospital care, UNICEF worked to support the role of CHVs in the community. It provided water to communities and supported the development of water treatment plants to ensure access to clean water. UNICEF also supported community participation and engagement by encouraging ownership through the donation of land for health facilities by the community. The engagement of a large number of CHVs and the implementation of WASH RRTs led to the strengthening of community engagement. The CHVs played a significant role in creating awareness and mobilizing communities to adopt healthy practices to prevent the spread of cholera. The community engagement approach was successful as it helped to build trust and foster a sense of ownership, which ultimately improved resilience.
F.3 To what extent did UNICEF contribute to local ownership and capacity development in Yemen?	UNICEF made significant contributions to local ownership and capacity development in Yemen. It supported the capacity building of local staff to respond to emergencies including cholera and paid incentives to motivate and retain staff members. UNICEF also supported the capacity building of water authorities and institutional capacity building to improve service delivery and sustainability. To further promote local ownership and sustainability, UNICEF incorporated long-standing emergencies, such as cholera, into existing projects. For example, cholera was incorporated into health and nutrition activities, and WASH interventions were integrated into the broader development agenda. UNICEF worked with CHVs who were recruited from the local community to improve local ownership and capacity. It provided CHVs with hygiene kits and diagnostic confirmation tests for admitted patients. UNICEF also trained CHVs to identify and report cases of cholera and other diseases and take action to prevent their spread. Finally, UNICEF used its convening power and advocacy role to bring together different stakeholders, including communities, local authorities and other partners. This helped to build a more coordinated and effective response and to ensure that the needs of different groups were taken into account. These efforts contributed significantly to the development of local ownership and capacity in Yemen.

F.4 To what extent has UNICEF ensured linkages, coherence and mutual reinforcement of its response to cholera in Yemen with longer-term development objectives?	UNICEF has taken a comprehensive and integrated approach to address the cholera outbreak in Yemen, linking its response to the longer-term development objectives in the country. This has been achieved by ensuring that its response to cholera is coherent with long-term development objectives, such as supporting capacity building, institutional strengthening and infrastructure development. To ensure coherence, UNICEF has integrated oral rehydration corners within MoPHP-supported primary health care facilities to maintain the response and support after funding ceases. UNICEF has also requested an exit strategy with any cholera activity, always focusing on longer-term impact and sustainability. UNICEF has trained CHVs to play a key role in identifying and reporting cases of cholera and other diseases, and to take action to prevent their spread. This helps to improve community resilience and reduce the risk of further cholera outbreaks and has also contributed to the development of local capacity. UNICEF has also ensured that its response is linked to longer-term development objectives by mobilizing communities and engaging them in the response to the outbreak. This approach helps to ensure that the needs of different groups are taken into account and that the response is locally owned and sustainable. Furthermore, UNICEF has integrated the cholera response with its health and nutrition programming, recognizing that a long-term solution to the cholera outbreak in Yemen requires a comprehensive approach that addresses underlying health and nutrition challenges. This helps to ensure that the response is sustainable and that the health and nutrition needs of people in Yemen are met. Finally, UNICEF has supported maintenance of infrastructure, such as the solarization of water resources and central warehouses, to ensure that the response is effective in the long term.
F4.1 What factors have influenced the extent to which this has been achieved?	Several factors have influenced the extent to which UNICEF has been able to achieve linkages, coherence and mutual reinforcement of its response to cholera in Yemen with longer-term development objectives. One of the key factors has been the lack of funding for long-term development projects and infrastructure development, which has limited the ability to make sustainable improvements to the health system and address the underlying causes of cholera. Another factor has been the prioritization of hospital care by the health ministry, which has not always aligned with the focus on community-based interventions and the engagement of CHVs that UNICEF has emphasized. This has made it challenging to build local ownership and capacity and to ensure a coordinated and effective response to cholera. In addition, the ongoing conflict in Yemen has presented significant challenges to the delivery of health services and has made it difficult to reach and engage communities. It has also limited the ability to develop longer-term solutions to the cholera outbreak.

Conclusions

7.1 Implementation of recommendations from the 2018 evaluation of the 2016–2017 cholera outbreak in Yemen by UNICEF and key partners

UNICEF and its partners have implemented many of the recommendations from the 2018 evaluation of the 2016–2017 cholera outbreak in Yemen, as well as actions based on lessons learned from the outbreak more generally.

In terms of specific actions, UNICEF has trained implementing partners on key guidelines, including treatment protocols and standard operating procedures for DTCs, oral rehydration points, and infection prevention and control. There have also been efforts to strengthen communication between monitoring teams and programme staff to ensure timely feedback and corrective measures for quality issues.

To better understand transmission contexts, UNICEF has conducted a knowledge, attitude and practice survey on cholera practices, as well as regular data collection on risk behaviours and hygiene practices through third-party monitoring teams. UNICEF has also invested in research and has conducted regular qualitative research in hotspots to maintain an updated understanding of perceptions of risk and response.

Efforts have also been made to consolidate UNICEF global learning on cholera and to strengthen engagement with academic institutions. In addition, UNICEF has worked to strengthen its global epidemiological capacity and increase its presence in the Global Task Force on Cholera Control.

Information available shows that UNICEF made an urgent request for vaccine supply to allow a targeted preventive oral vaccination campaign in the highest-risk areas. Additionally, UNICEF has worked to improve monitoring and quality control and to harmonize approaches and clarify roles with WHO.

Efforts to prioritize preventive WASH work and secure supply chains, as well as to strengthen national cholera surveillance and reporting and community-based surveillance and response capacities, have also been ongoing. Enhancing rapid response capacities and acting to enhance WASH response capacities, including relevant trainings, supply of cholera kits, and contingency stocks or purchase arrangements at local and international levels, have also been a focus.

7.2 Current state of cholera preparedness and response in Yemen

Cholera preparedness in Yemen has improved since the 2016–2017 outbreak, with faster WASH response times, successful vaccination, better coordination and planning, improved cholera surveillance, improved health facility management and enhanced community engagement capacity. There is a national cholera preparedness plan in place, and both governments and partners have plans for DTCs in case of an emergency. UNICEF has integrated cholera preparedness and prevention into existing health development projects, and its work on community awareness, linkages to primary health care, developing capacity of health workers and RRTs, and stockpiling of supplies has improved preparedness. Finally, UNICEF has contributed to strengthening the coordination and planning of cholera response efforts, particularly in the areas of WASH, health and nutrition.

Significant gaps still need to be addressed, however, including the lack of detailed planning for resource mobilization and use, donor fatigue and dependence on donors. The situation is different in North and South Yemen, with more capacity in the North but challenges in working with the government in Sana'a and lack of cooperation between the governments. Overall, the country remains vulnerable to a cholera outbreak, particularly in sites hosting internally displaced persons, and declining funding poses a risk to these gains. Additionally, COVID-19 has deprioritized cholera preparedness. Cholera response in Yemen faces challenges due to the ongoing conflict and political crisis, lack of funding and other factors, but there have been efforts towards strengthening planning and coordination.

To improve UNICEF's contribution to cholera preparedness and response in Yemen, there is a need to focus on long-term solutions that address the root causes of cholera, such as improving water and sanitation infrastructure, increasing access to health care and education and addressing inequalities, including gender inequalities and inequalities in access for vulnerable groups such as internally displaced persons. It also is important to continue investing in community engagement and health worker training, strengthening national cholera surveillance and reporting, including with disaggregated data, and enhancing rapid response and WASH capacities. UNICEF needs to continue to build its capacity and resources to fully address gender, equity and child rights in its cholera response in Yemen, ensuring that all communities are reached in the most gender- and age-sensitive, socially, culturally and linguistically appropriate, and accessible manner. To improve accountability and further strengthen preparedness and response, UNICEF should utilize the information received through complaint and feedback mechanisms to adjust and improve the response for the needs of affected communities and vulnerable groups. Based on the available information, UNICEF could make forecasts by extrapolating the spread of cholera and take proactive, preventive measures. Additionally, improving coordination and collaboration with other organizations and agencies may help fill gaps in funding and resources. Finally, there is a need for UNICEF to improve timeliness of reporting and data sharing to the health cluster.

7.3 Lessons from Yemen's cholera outbreak: Improving preparedness for disease outbreaks including COVID-19

Lessons learned from the cholera outbreak in Yemen have contributed to improving preparedness for other disease outbreaks, including, to some extent, for COVID-19. One of the lessons learned from the cholera outbreak was the need for strong partner and multisectoral collaboration, which has been applied to the COVID-19 response in Yemen.

UNICEF has contributed to improving preparedness for disease outbreaks, including COVID-19, by integrating disease prevention and preparedness into existing health development projects, investing in community awareness and engagement, developing the capacity of health workers and RRTs, and stockpiling required supplies. UNICEF has also been involved in strengthening rapid response and WASH capacities. Additionally, UNICEF's past emergency experiences have better prepared it for outbreaks such as COVID-19.

However, there is a general consensus that the contexts for cholera and COVID-19 are very different, and COVID-19 has in some ways reduced the country's preparedness for cholera outbreaks. As COVID-19 has taken centre stage, cholera has been deprioritized, given the low caseloads in recent years.

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A

Appendix A: Key informants

Name	Organization	Title
Dr. Fawad Khan	WHO	National Health Cluster Coordinator
Dr. Qais Jassar	Save the Children	Health and Nutrition Coordinator in Hajjah Office
Dr. Mohammed Al-Weshali	INTERSOS	Deputy Health Coordinator in the North (acting for Health Coordinator)
Dr. Maha	Field Medical Foundation	Executive Director
Dr. Nedhal Al-Badah	Building Foundation for Development	Head of Health and Nutrition Department
Dr. Mohammed Mustafa	Ministry of Public Health and Population – Aden	Director of Primary Health Care
Dr. Rema Al-Yousify	Ministry of Public Health and Population – Sana'a	Director of the Electronic Integrated Disease Early Warning System and Rapid Response Program
Dr. Jamilah	UNICEF – Aden Office	Health and Nutrition Specialist (retired)
Ansar Rashad	UNICEF	Head of Social and Behaviour Change Section – UNICEF Aden Field Office
Dennise Chimenya	UNICEF	Chief of Social and Behaviour Change (previously C4D)
Dr. Arwa Baider	UNICEF	Head of Child Health
Dr. Murad Dahan	UNICEF	Previously Health and Nutrition Officer 2017–2021 (now Nutrition Officer)
Ahlam Al-Mutawakil	UNICEF	WASH specialist
Ahmed Soror	UNICEF	Roving WASH cluster coordinator
Denise Assaf	WHO	Epidemiologist
Dr. Abdulrahim Al-Hutami	WHO	Epidemiologist

B

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Appendix B: Key informant interview guide

Part 1: Information about this study/Introduction

Purpose:

The main research questions for the case study are:

1. To what extent have recommendations from the 2018 evaluation of the 2016–2017 cholera outbreak in Yemen, and actions based on lessons from the outbreak more generally, been implemented by UNICEF and key partners in the country?
   - The extent of dissemination of those recommendations internally (within UNICEF main office departments and to the field offices) and externally with health authorities, WHO and other partners
   - Recommendation implementation during next cholera alerts, COVID-19 pandemic, polio, measles and whooping cough hot spots reported after 2018
2. What is the current state of cholera preparedness and response in Yemen?
   - **a.** What is the role of UNICEF in contributing to this?
   - **b.** How might UNICEF's contribution be improved?
   - Cholera situation updates
   - Joint UNICEF work with the other actors for preparedness and response.
   - Success and weakness in cholera preparedness and response after 2018 recommendations
3. To what extent did lessons from the cholera outbreak in Yemen contribute to improving preparedness for other disease outbreaks, including for COVID-19?
   - **a.** How did UNICEF contribute to this?

The full set of evaluation questions is included in the inception report and can be mapped to each of the three main research questions above. The selection of questions used for data collection will depend on the type of respondent. Questions for consideration in addition to those included in the inception report evaluation matrix are:

- How is the ongoing political and humanitarian crisis in Yemen affecting public health emergency preparedness, including for cholera?
  - How is UNICEF's work affected by the crisis?
- Access, other risks, economic, supply chain, funding status (donor fatigue), divided health authorities with different perspectives and priorities.

This interview aims to identify the progress, achievements, main barriers or challenges that are facing the preparedness and response to cholera in Yemen. It will focus on thematic areas from the **WHO Health Emergency and Disaster Risk Management (EDRM) Framework for cholera**. That is:

1. Policies, Strategies and Legislation
2. Planning and Coordination
3. Human Resources
4. Financial Resources
5. Information and Knowledge Management
6. Risk Communications
7. Health Infrastructure and Logistics
8. Health and Related Services
9. Community Capacities for Health EDRM
10. Monitoring and Evaluation

OR: Cholera preparedness response:

- Leadership and coordination structures
- Preparedness, and response planning
- Resource planning and mobilization
- Supplies and logistics
- Health care system strengthening
- Surveillance, reporting and outbreak response
- Use of oral cholera vaccine
- Community engagement and risk communication

Risks and discomforts:

No expected risk as the information will be confidential and no sensitive information will be collected. if the interview exceeds the time limit for the participant, the participant can ask to end it soon.

Benefits:

Your participation is likely to help the evaluation team and UNICEF/other actors in identifying the current situation related to cholera in Yemen, including preparedness and response, lesson learned and challenges and how to improve the ways to serve Yemeni people in a timely, effective and efficient manner. We hope that the acquired evidence will help the relevant parties mentioned above to better prepare for and respond to outbreaks in Yemen in the future. No financial benefits will be given to any of the participants as participation will be voluntary.

Sharing the findings:

UNICEF will share the findings with all parties and stakeholders using the proper ways of communications.

Who to contact:

If you have any questions, you may ask them now or later, even after the study has started. You may contact any of the following:

- Dr. Catherine Cantelmo – international consultant
- Dr. Fouad Othman – national consultant
- Dr. Arwa Baider – UNICEF Yemen country team
- Dr. Saadia – UNICEF Yemen country team

Read the informed consent form to the respondent(s) and sign it. (Form is attached)

Part 2: General information

These will be conducted with MoPHP officials (directors and local representatives of the ministry of health) and representatives from local health authorities, UNICEF Yemen staff and other United Nations, international and local partners.

Title	
Gender	Male Female
Duration in this role/ position	…….. in years
Position/pole in cholera preparedness & response	……. ……. ……. ……
Time interview started	Date :……/……/2022 At: …….: …….. AM/PM
Time interview ended	Date :……/……/2022 At: …….: …….. AM/PM
Name of interviewer	

Are you a representative of .....: (READ THE RESPONSES BELOW AND CHECK ALL THAT APPLY)

	The ministry of health Local health authority---------- UNICEF Yemen WHO Yemen INGO ---------- LNGO---------- Observer
	Other (SPECIFY):

Part 3: Role in cholera preparedness & response

1. What is your current/past position related to cholera preparedness and response? (WRITE THE RESPONSE BELOW)

2. Can you please tell us about your role/experience in cholera preparedness & response from 2018 onward?

   Probe:

   - What was your exact role?
   - How were you involved in cholera preparedness & response?
   - What activities were you involved in? (Participation in planning, managing, implementing, monitoring, evaluating cholera preparedness & response activities?
   - Any other activities?

Part 4: Current cholera situation

- What are the main sources of information on cholera situation/updates? - Epi Bulletin?
- What is the current trend of cholera/suspected cholera cases in Yemen?
- Has any alert been recently reported? If yes, when and where?
- What are the factors affecting this trend?
- What is the status of data sharing from the health authorities (national/subnational) on the cholera situation?

Part 5: UNICEF recommendations from 2018 evaluation

- Do you know about those recommendations? If yes:
- How did you come to know about them? UNICEF/ other sources?
- What are the recommendations you see linked to your work?

Part 6: National/UNICEF cholera preparedness & response

Probing issues: as per position

- **Leadership and coordination structures**
  - structure and effectiveness of the management and coordination of the response
  - application of standard operating procedures related to coordination at national, provincial and district level
  - cluster and partner coordination mechanisms
  - functionality of emergency operations centres for cholera control
- **Preparedness and response planning**
  - availability and effectiveness of the response plans and contingency plans
  - risk assessment processes
  - identification of hotspots
  - risk factors analysis and burden estimates, and their inclusion in the preparedness and response plans
- **Resource planning and mobilization**
  - effectiveness of the mobilization of resources for the response
- **Supplies and logistics**
  - procurement, stockpiling and pre-positioning of supplies

- **Health care system strengthening**
  - availability and utilization of guidelines in case management and the capacity building activities on case management
  - surveillance, reporting and outbreak response
  - laboratory capacities, operations and activities, including use of rapid diagnostic tests, for cholera confirmation
  - third-party monitoring
  - nutrition role in cholera case management
- **Surveillance, reporting and outbreak response**
  - cholera surveillance, data collection, management, information flow and analysis
  - outbreak detection, notification, and investigation
  - the cholera alert management system
  - the roles of the two different RRTs (WASH and health), their effectiveness and how they can collaborate better in the future
  - the RRT system of deployment, operations, supplies and equipment (specifically the RRT kits); review how they responded
  - the internal communications and information sharing system for preparedness and response
- **Use of oral cholera vaccine**
  - OCV deployment for response campaigns
  - pre-emptive OCV campaigns
  - WASH activities during OCV campaigns
- **Water, sanitation and hygiene**
  - coordination between UNICEF, ministry of health and ministry of water for WASH activities
  - current safe water solutions
  - current safe hygiene solutions
  - long-term WASH solutions
- **Community engagement and risk communication**
  - the effectiveness of community engagement and community-based campaigns
  - information and education communication materials and the precision of the information products
  - communication strategies with communities for safe behaviours and risk reduction
  - systems for mobilizing communities

Part 7: Status of other outbreaks (COVID-19/polio/measles) preparedness and response: learned from cholera

- Leadership and coordination structures
- Preparedness and response planning
- Resource planning and mobilization
- Supplies and logistics
- Health care system strengthening
- Surveillance, reporting and outbreak response
- Use of OCV
- Community engagement and risk communication

Another framework:

Cholera Preparedness (WHO EDRM):

1. Policies, Strategies and Legislation
2. Planning and Coordination
3. Human Resources
4. Financial Resources
5. Information and Knowledge Management
6. Risk Communications
7. Health Infrastructure and Logistics
8. Health and Related Services
9. Community Capacities for Health EDRM
10. Monitoring and Evaluation

Evaluation of the UNICEF Level 3 response to the cholera epidemic in Yemen

RECOMMENDATIONS:

R1: Vaccination campaign: vaccine supply

R2: Regional specialist capacity: epidemiology/ cholera

R3: Building regional response capacity for cholera

R4: Cholera task force at regional office level

R5: UNICEF and WHO: harmonizing approaches and clarifying roles

R6: Clarification of coordination processes

R7: Scale-up and securing of preventive WASH work

R8: Strengthen national cholera surveillance and reporting in Yemen

R9: Strengthen community-based surveillance and response capacities

R10: Enhance rapid response capacities

R11: Additional response preparedness measures

R12: Monitoring and quality control

R13: Invest in better understanding of behaviours and transmission contexts

R14: UNICEF global learning on cholera

R15: UNICEF global epidemiological capacity

R16: UNICEF global cholera preparedness

C

Appendix C: Consent protocol

CONSENT FORM FOR KEY INFORMANT INTERVIEWS

Key Informant Interview Consent Form

Statement	Please initial each box
I have received and read/have been read the information sheet provided by the researchers that explains in detail the reasons for the study. I have read, discussed and understood the purpose of the research. I have asked all the questions that I have about the purpose of the research and feel happy that I have enough information about it.	
I understand that my interview may be recorded.	
I understand that data collected during the study will not be seen by other researchers and regulatory authorities.	
I understand the reasons for this interview and am willing and happy to participate in it.	
If I agree to participate in this interview I understand what I will be required to do.	
I know that I have the right to leave the interview at any time or to refuse to answer any questions.	
If I do not agree to take part in this interview I understand that I will not be penalized for doing so by any entity.	

I voluntarily agree to take part in this interview.

..../...../..... .....

Name of participant (BLOCK CAPITALS) **Date** **Signature**

..../...../..... .....

Name of interviewer **Date** **Signature**

unicef

for every child

For further information, please contact:

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