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

A crisis within a crisis
EVALUATION REPORT
June 2018

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

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EVALUATION OF THE UNICEF LEVEL 3 RESPONSE TO THE
CHOLERA EPIDEMIC IN YEMEN: A CRISIS WITHIN A CRISIS

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Three United Nations Plaza
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June 2018

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The evaluation team was led by James Darcy, an independent consultant and experienced evaluator. He was joined on the ‘core’ team by Christophe Valingot, an independent epidemiologist and cholera expert; and by Laura Olsen from the UNICEF Evaluation Office in New York. Koorosh Raffii, Senior Evaluation Specialist, managed the overall evaluation process.

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For further information, please contact:

Evaluation Office
United Nations Children’s Fund
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<td>ACF</td>
<td>Action Contre la Faim</td>
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<td>ALNAP</td>
<td>Active Learning Network for Accountability and Performance</td>
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<td>AFRICHLOR</td>
<td>African Cholera surveillance network</td>
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<td>AWD</td>
<td>Acute Watery Diarrhoea</td>
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<td>C4D</td>
<td>Communications for Development</td>
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<td>CERF</td>
<td>Central Emergency Response Fund</td>
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<td>CFR</td>
<td>Case Fatality Rate</td>
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<td>CO</td>
<td>Country Office</td>
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<td>CTC</td>
<td>Cholera Treatment Centre</td>
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<td>DHS</td>
<td>Demographic and Health Survey</td>
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<td>EMT</td>
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<td>FGD</td>
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<td>GARWAP</td>
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<td>HH</td>
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<td>HR</td>
<td>Human Resources</td>
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<td>HQ</td>
<td>Headquarters</td>
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<td>ICG</td>
<td>International Coordinating Group on vaccine provision</td>
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<td>ICRC</td>
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<td>IDP</td>
<td>Internally Displaced Persons</td>
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<td>IEC</td>
<td>Information, education and communication</td>
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<td>INGO</td>
<td>International Non-Governmental Organization</td>
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<td>IPC</td>
<td>Infection Prevention and Control</td>
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<td>Middle East and North Africa</td>
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<td>ORS</td>
<td>Oral Rehydration Salts</td>
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<td>PCA</td>
<td>Programme Cooperation Agreement</td>
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<td>PCR</td>
<td>Polymerase Chain Reaction</td>
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<td>Programme Division</td>
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<td>PME</td>
<td>Planning, Monitoring and Evaluation</td>
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<td>RDT</td>
<td>Rapid Diagnostic Test</td>
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<td>RO</td>
<td>Regional Office</td>
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<td>RRM</td>
<td>Rapid Response Mechanism</td>
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<td>RTE</td>
<td>Real-Time Evaluation</td>
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<td>SAM</td>
<td>Severe Acute Malnutrition</td>
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PREFACE

The evaluation team was led by James Darcy, an independent consultant and experienced evaluator. He was joined on the ‘core’ team by Christophe Valingot, an independent epidemiologist and cholera expert; and by Laura Olsen from the UNICEF Evaluation Office in New York. The team was also joined by Koorosh Raffii, senior evaluation specialist from the Evaluation Office, for the initial scoping phase of the evaluation in December 2017. Due to prevailing insecurities, international staff limits and visa restrictions, the evaluation team was not able to visit Yemen itself. This was a significant limiting factor for the evaluation, but was off-set in two ways. First, the team was able to speak face-to-face with many of the international staff from Yemen Country Office (YCO) as they were evacuated to Amman in December 2017. Second, two Yemeni consultants (Ahmed Noor Aldeen and Adnan Qatinah) were engaged to conduct interviews with local partners, as well as to lead focus group discussions with beneficiaries and local volunteers.

The core team undertook two missions to the UNICEF Regional Office in Amman. The first of these, in December 2017, combined an inception briefing (refining the terms of reference, scoping the evaluation, etc.) with initial fact-finding; the second took place in January 2018 and included more in-depth fact-finding and testing of the provisional findings. The team also visited Geneva to consult some of those involved from the World Health Organization (WHO) headquarters and the global water, sanitation and hygiene (WASH) and health clusters. On the basis of this, and given the urgency of the situation, a short interim report to UNICEF senior managers was prepared at the request of the Director of the Evaluation Office in New York, which included key provisional findings and recommendations for immediate action. The present report is consistent with that interim report, but provides more depth of analysis and expands on the interim findings and recommendations. In addition to a consultation on the draft report, it is proposed that the findings and recommendations be discussed with UNICEF staff in a workshop prior to finalizing the report.

The evaluation team would like to thank all those who gave their time to engage with the evaluation, both inside and outside UNICEF. Particular thanks are due staff from the UNICEF Yemen County Office, who were generous in giving time to the evaluation during a particularly difficult period for the country office. Many thanks are also due to staff in the UNICEF Middle East and North Africa Regional Office in Amman, who both hosted the evaluation team and organized the bulk of the related schedule. In this regard, we would like to thank in particular Roumiana Gantcheva and her team, as well as Evaluation Office colleagues in New York. Finally, we would like to thank the Regional Director and his Deputy, and the Director of the Evaluation Office in New York, for enabling the evaluation to take place and ensuring that its results were acted upon.
EXECUTIVE SUMMARY

1. This evaluation, requested by the UNICEF Middle East and North Africa Regional Office (MENARO), was commissioned and managed by the Evaluation Office in New York. It was conducted between December 2017 and March 2018 by an experienced senior evaluator and an epidemiologist with cholera expertise, with the support and direct involvement of staff from the Evaluation Office. Its main purpose was (a) to help inform the organization’s approach to further potential cholera epidemics in Yemen, based on an analysis of lessons from the response to the 2016-2017 outbreak; (b) to provide some basis of accountability for that response; and (c) to add to the organization’s global learning on cholera prevention and response. Due to security restrictions, the evaluation team was unable to visit Yemen, but it did have face-to-face meetings in Amman with many of the staff from the Yemen Country Office who were evacuated to Jordan in December 2017, as well as remote conversations with others inside and outside UNICEF. A limited number of local partner interviews and focus group discussions with volunteers and beneficiaries were held through consultants based in Yemen. A visit was also made by the team to Geneva to consult some of those involved from the headquarters of the World Health Organization (WHO) and the global water, sanitation and hygiene (WASH) and health clusters.

2. The UNICEF response to the 2017 cholera epidemic in Yemen must be viewed in the context of the wider system response to that epidemic, and more generally to the ongoing political crisis in Yemen. The current armed conflict has had devastating consequences – security, economic and humanitarian – for ordinary Yemenis since 2015. By early 2017, there were (and remain) multiple competing demands on the humanitarian system, not least levels of food insecurity and malnutrition that were already critical and threatened to result in famine. The dramatic decline in public services, in particular the health, water supply and waste treatment systems, had left the country highly exposed to potential epidemics and ill-equipped to respond effectively. Millions of Yemenis are exposed to water-borne disease and are highly vulnerable to its effects.

3. The 2016-2017 cholera outbreak in Yemen had two ‘waves’. While the first (from October 2016) was relatively limited in scale, the second (from late April 2017) was country-wide and of a different order of magnitude. In total, around one million cases of “suspected cholera/acute watery diarrhoea” were reported in this second wave (although this figure is almost certainly inflated because of poor application of case definitions and inclusion of relatively mild diarrhoea cases). Although the proportion of actual cholera cases remains uncertain because of limited testing, this was by any measure a catastrophic outbreak, one that spread with alarming speed across most of the country. In total, over two thousand people are reported to have died from the disease since April 2017, and while the death toll and case fatality rate were less than might have been expected for an epidemic of this scale, inclusion errors in the reported cases probably go a long way toward explaining this.

4. This is not an evaluation of the ‘system-wide’ cholera response. However, consultation with a wide range of observers suggests that the overall response to the 2017 epidemic was too slow to scale up, unable to keep pace with the rapid escalation of the epidemic, and probably had a limited impact on its overall course. This is not to underestimate the value of the work done by multiple actors – many of them volunteers, all working under very difficult conditions – to help protect households and communities from disease and to treat those affected. But the 2017 epidemic, once it escalated in May, was
evidently beyond the capacity of the existing response system to manage. Controlling a cholera epidemic is very challenging even in more favourable operating conditions. In Yemen, a lack of system capacity (local, national and international) and lack of preparedness to respond, coupled with extremely difficult operating conditions, meant that the response was never likely to be adequate to the task.

5. This was an epidemic that could, in theory at least, have been prevented, or at least substantially mitigated. In practice, given the state of the water supply and waste disposal infrastructure, together with very high levels of political instability, the necessary system-level preventive work was not in place (and could yet take years to achieve). Mitigation would have been a more reasonable expectation. The outbreak that began in October 2016 did not trigger the breadth of response it should have, given the extreme vulnerability of the country, and it was not brought fully under control. Nor was a preventive vaccination campaign mounted. When the ‘second wave’ of the outbreak began, more concerted and timely control measures could probably have limited its spread. The humanitarian system appeared to be taken by surprise by the rate of spread of the epidemic, and was unprepared to respond to an epidemic of this magnitude. Given the prevailing risk factors and vulnerabilities in Yemen, and the ongoing cholera outbreak, this system-wide lack of anticipation and preparation for a major epidemic was a significant failing – even allowing for competing demands and the practical limits to preparedness.

6. Such general conclusions are necessarily tentative, given the limited scope of this UNICEF-specific evaluation. But with the prospect of a further outbreak in 2018, they prompt urgent questions for UNICEF and the system as a whole. Have all reasonable steps now been taken to prevent or mitigate a further outbreak? Does the system, and do communities themselves, now have the capacity and tools to effectively identify, control and contain such an outbreak through early interventions? How confident are we that the response would be more timely, joined-up and effective than in 2017? This evaluation attempts to answer these and related questions from a UNICEF perspective, based on an analysis of the organization’s response in 2016-2017 as well as the wider context.

7. Our overall conclusion on the organization’s performance is that given the failure to anticipate the 2017 epidemic – for which UNICEF shares some responsibility – it responded relatively quickly once the scale of the epidemic became apparent, within the limits of its capacity and that of its partners. It adopted essentially the right approach, although this took time to emerge, and full operating capacity was not reached until the epidemic was already well advanced. Working relations with WHO were not as strong as they should have been, and it took time to resolve differences over roles and priorities. Indeed, some of those differences appear to remain unresolved. However, UNICEF worked well with government authorities and the relevant ministries (including in particular the Ministry of Public Health and Population), and it did well to lead and mobilize others around essential cholera-related WASH efforts. Given the major gaps in overall response capacity, UNICEF rightly decided to go well beyond its anticipated sphere of operation in the scale of its health interventions. The WASH cluster was well led by UNICEF and appeared to coordinate effectively with the health cluster, although overall coordination of the response was confused.

8. Timeliness is critical to effective cholera response. Early detection and treatment substantially reduces case fatality rates, and
the response needs to be ahead of the epidemic curve to make a substantial difference in the course of an outbreak. Good working relations with existing partners, the simplified Level 3 crisis (L3) operating procedures, including emergency Programme Cooperation Agreements (PCAs), surge capacity and the Rapid Response Mechanism (RRM), all helped UNICEF move relatively quickly under the circumstances, as did donor flexibility. The WASH Rapid Response Teams (RRTs) that UNICEF organized with government workers and other partners were an essential initiative that allowed flexible, targeted control measures to be implemented in affected areas. But whereas the scale of the epidemic was increasing exponentially in May/June 2017, UNICEF and its partners could only scale up in a more linear way. The programme did not reach its full capacity until August 2017, after the epidemic had peaked.

9. Like other actors, UNICEF found itself chasing the epidemic, but it was among those leading the chase and urging further collective action. It set ambitious service delivery targets for itself and did well to achieve 80-90 per cent average delivery against targets. In striving for maximum coverage, UNICEF struggled to ensure the quality of its interventions through partners – notably in setting up and running diarrhoea treatment centres, as shown by the third-party monitoring reports. More attention is needed in this area in any future response. The effectiveness of some of the organization’s interventions – including its community engagement and sensitization work (C4D) – remains uncertain, partly because follow-up was limited. But UNICEF staff, partners and volunteers deserve great credit for achieving what they did under exceptionally difficult operating conditions. Their extraordinary hard work and dedication saved many lives and protected many more.

10. The second wave of cholera has not (to date) been brought under control, and further outbreaks must be anticipated. UNICEF in Yemen is certainly now better placed to respond to a potential future epidemic, although it faces, together with its partners, a serious challenge in mounting the necessary prevention and preparedness measures. Short-term preventive measures including (crucially) an oral cholera vaccination campaign are needed, together with work to strengthen surveillance and capacities at the community level and the consolidation of supply chains and partnership arrangements.

11. The report makes a number of recommendations based on the evaluation findings. ‘High priority’ recommendations include:

- **Vaccination campaign: vaccine supply.** An urgent request should be placed through the International Coordinating Group (ICG) for enough vaccines to allow a targeted preventive oral vaccination campaign in the highest risk areas on a ‘no regrets’ basis. UNICEF should also stand ready to advocate at the highest level with authorities to ensure that the campaign is allowed to proceed.

- **Regional specialist capacity: epidemiology/cholera.** Specialist in-house epidemiological capacity is an essential component of the UNICEF armoury against cholera and other epidemic disease. The vulnerability of countries in the MENA region is sufficient to justify a dedicated post in the regional office.

- **Cholera task force at RO level.** Different sections in the regional office with responsibility for cholera (WASH, health, C4D and nutrition) should constitute themselves as a ‘cholera task force’ for the duration of an epidemic in order to provide more joined-up advice to the country office and the emergency management team (EMT), with a view to enabling greater coherence in planning, support and programme implementation.

- **UNICEF and WHO: harmonizing approaches and clarifying roles.** A management discussion should take place between UNICEF and
WHO about the lessons from 2017 and how to ensure that future responses are better harmonized between the two agencies. This should include the way in which UNICEF and WHO work together with government authorities and other common partners. It may also require action at regional and headquarters levels.

- **Clarification of coordination processes.** Cholera-related coordination processes and the respective roles of the Cholera Task Force, the EOC, the health/WASH clusters, United Nations Office for the Coordination of Humanitarian Affairs (OCHA) and the Humanitarian Country Team/Inter-Cluster Coordination Mechanism should be clarified and simplified.

- **Scale-up and securing of preventive WASH work.** Crucial short-term preventive measures include system maintenance work and the ongoing supply of fuel, chlorine and spare parts for water supply and waste treatment systems. UNICEF should take all necessary steps to secure supply chains and create contingency stockpiles as appropriate. At the local level, necessary preventive work includes C4D and work on protecting local water sources in high-risk areas.

- **Strengthen national cholera surveillance and reporting in Yemen.** More needs to be done to improve data accuracy and speed of reporting. While primarily the role of WHO, UNICEF should take a proactive role. Specifically, it is recommended that an audit of the local-to-national surveillance system be undertaken with WHO and Ministry of Public Health and Population (MoPHP), with a view to identifying necessary steps to strengthen the system.

- **Strengthen community-based surveillance and response capacities.** This would require work both to enable the identification and notification of cases through community focal points and early treatment of suspected cases through community-level oral rehydration points (ORPs).

- **Enhance rapid response capacities.** UNICEF should build on the RRT and RRM models and take stock with its partners of lessons learned from 2017, in order to strengthen these mechanisms for future responses. This would include revision of RRT Standard Operating Procedures and training modules and trainings in advance of further outbreaks. In addition, UNICEF should play its full part in joint inter-agency contingency planning.

- **Additional response preparedness measures.** Further action should be taken to ensure WASH response capacities, including relevant trainings, sufficient supply of cholera kits, and contingency stocks or purchase arrangements at local and international levels.

- **Monitoring and quality control.** UNICEF should do all it can to strengthen both direct monitoring (through monitoring of partner reporting and field visits) and indirect monitoring (through third parties). An essential corollary to this is that UNICEF finds ways to better utilize the results from programme monitoring to continuously inform the ongoing response and adapt it accordingly.

- **Invest in better understanding of behaviours and transmission contexts.** UNICEF should invest in epidemiological and socio-anthropological research, identifying cholera hotpots, risk factors, community risk behaviours and practices, as well as community uptake of campaign messages.

Further detail on the full set of recommendations can be found in the Conclusions and Recommendations section of the report.
INTRODUCTION

Background and evaluation approach
1.1 CONTEXT FOR THE EVALUATION

Yemen is in the grip of a multi-dimensional humanitarian crisis, currently judged to be the worst in the world.\(^2\) Even before the armed conflict that broke out in 2015, Yemenis were suffering high levels of poverty, weak state services, a faltering economy and severe food insecurity – compounded by the political instability that followed the departure of President Saleh.

The current conflict, and the means by which it has been pursued, has intensified the humanitarian situation to the point where famine is a real possibility, and fatal diseases – notably cholera, and more recently diphtheria – have been allowed to spread. The health system is near collapse, health worker salaries are not being paid, and broken or inadequate water supply and sewage systems mean that access to clean water (always a challenge in Yemen) and a safe environment has been increasingly hard to ensure. Meanwhile, 8.4 million Yemenis are totally dependent on food assistance, and severe acute malnutrition is affecting over 400,000 children, rendering them vulnerable to fatal diseases.\(^3\)

The current operational context for humanitarian assistance in Yemen is extremely challenging. The conflict has resulted in a divided government and the lack of any concerted state response to the humanitarian crisis. Humanitarian efforts were hampered by insecurity and denial of the necessary access permissions and visas. The blockade of Houthi-controlled Red Sea ports (Hodeidah and Saleef), imposed by the Saudi-led coalition, had interrupted both commercial and humanitarian aid traffic, dramatically worsening the humanitarian situation and making it much harder to bring in necessary supplies including fuel, food and vaccines. Though now partially lifted, the blockade remains a significant constraint: the World Food Programme (WFP) estimates that an additional 3.2 million people will be “pushed into hunger.”\(^4\)

Following the assassination of former President Saleh in December 2017, the conflict continues to evolve in unpredictable ways. Fighting along the Red Sea coast raises fears of a battle over Hodeidah, rendering the port unusable. Aid agencies are making contingency plans for such worst-case scenarios – including the effective continuation of the blockade, worsening shortages of fuel, and ongoing inability to deploy international staff in the numbers needed. Meanwhile, the risk factors for cholera remain in place and are perhaps increasing. The window of opportunity for a preventive vaccination campaign will soon close, and urgent action is required if such a campaign is to be mounted in advance of a further (widely-expected) cholera outbreak in the spring of 2018.


\(^3\) Ibid.

\(^4\) Ibid.
Preventive work on strengthening and repairing dilapidated and damaged water and sanitation systems is essential, although at a system-wide level this remains a medium- to long-term undertaking. Ensuring the continued supply of fuel and chlorine for water and sanitation systems is an immediate priority, as is work to strengthen disease surveillance systems and to help households prepare for and defend themselves against any new outbreak.

This evaluation of the UNICEF response to the cholera/acute watery diarrhoea (AWD) outbreak was called for by the Regional Director for Middle East and North Africa region (MENA), in his capacity as Global Emergency Coordinator (GEC), in September 2017. UNICEF has been engaged in a large-scale Level 3 (L3) humanitarian response in Yemen since 2015. The severe outbreak of cholera and acute watery diarrhoea (AWD) in April 2017 was thus a ‘crisis within a crisis’. The organization’s response should be understood against the background of the wider humanitarian crisis and response. It also has to be seen in the context of the overall system response – by government bodies and independent humanitarian agencies – to the 2017 outbreak. While UNICEF has played a leading role in that response, many other actors have been involved.

The present evaluation, designed to be conducted in ‘real time’ (see next section), is intended primarily to help inform ongoing efforts to prevent, prepare for and respond to further outbreaks of cholera in Yemen. It is hoped that it may also have value for organizational learning beyond Yemen, adding to the lessons learned by UNICEF from other recent responses to infectious disease, including the Haiti cholera response and the West Africa Ebola crisis.

1.2 EVALUATION SCOPE, PURPOSE AND APPROACH

Evaluation scope

As noted above, this is an evaluation of an emergency response within a wider humanitarian response. While the focus is on the UNICEF response to the 2017 cholera/AWD outbreak, the response must be seen both in the context of the system-wide response to cholera, and in the context of the prevailing humanitarian crisis in Yemen. Many of the factors affecting the cholera response are common to the wider humanitarian response as well, and the evaluation considers whether the cholera response had a positive or negative effect on that wider response.

Included within the ambit of the UNICEF ‘response’ to the 2017 outbreak are a number of broad-ranging questions:

- What preventive (risk-reduction) work was undertaken in advance of the 2017 outbreak – or is now being undertaken – to try to prevent or mitigate such an outbreak?
- How well prepared was UNICEF to respond to the 2017 outbreak, especially in the wake of the smaller outbreak in late 2016?
- How quickly and effectively did UNICEF respond once the scale of the April 2017 outbreak became clear?
- How well placed is UNICEF to respond to potential future outbreaks?

In each case, the evaluation reviewed the constraining factors involved (internal and external) and asked whether and how these have been addressed. Beyond the organization’s own response, the evaluation considers what role it has played in coordinating, leading

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5 In this report, reference to “the cholera response” should be understood to include the response to all suspected cholera/AWD cases, since in practice a distinction between them was often not made.
or facilitating the response of the wider system, through cluster leadership and otherwise. The full list of guiding questions and sub-questions for the evaluation can be found in Annex B, and the terms of reference are presented as Annex A.

Evaluation purpose

The purpose of the current evaluation is three-fold:

(i) To inform the current and future UNICEF response in Yemen by providing an evaluative analysis of the UNICEF response to the 2017 cholera/AWD epidemic, within the overall context of the Yemen conflict, the epidemiology of the 2017 outbreak, and the wider system response to that outbreak. The intention is that lessons should be identified from this analysis that can help inform current and future responses, and specifically to provide a set of actionable recommendations to strengthen the organization’s response to the current and potential future cholera outbreaks in Yemen. This is particularly pressing given the very real prospect of further outbreaks from spring 2018, and thus the intention has been to provide real-time feedback from the evaluation as it progresses. The interim report mentioned above is part of that ‘real-time’ process.

(ii) To provide a (limited) basis for accountability in respect of the 2017 UNICEF response. The evaluation includes an analysis of what UNICEF did, when and where; whether the response was timely, appropriate and effective; and what were the key internal and external enabling and constraining factors. This includes a judgement of UNICEF performance overall, and some related analysis of its key management and other functions. However, the limited scope of this evaluation means that a fuller analysis of internal UNICEF functions and processes as they relate to the Yemen emergency programme is not included.

(iii) To add to the organization’s wider institutional learning from its responses to cholera and other recent infectious disease outbreaks. As compared to a ‘standard’ evaluation, this report is in some respects a more technical review. It attempts to locate the Yemen response in the wider context of cholera prevention, preparedness and response, and should thereby have wider relevance for the organization’s approach to cholera globally.

Evaluability

Limited time, lack of access to the context and limited resources set some evaluability limits on what could reasonably be expected from this evaluation. In particular, as set out in the Terms of Reference (ToR), it was not expected that the evaluation would demonstrate the impact of UNICEF interventions in terms of (for example) the epidemic curve or the number of lives saved. Apart from the limitations of the current evaluation process, there are simply too many variables to be able to directly attribute any such effects to UNICEF interventions. Some attempt was made, however, to identify correlations between interventions by UNICEF and others and the incidence and prevalence of cholera/AWD – even though the data with regard to recorded cases are known (through a recent verification exercise) to be of limited reliability.

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Evaluation approach and methodology

This evaluation represents a new approach for UNICEF to humanitarian evaluations, under which the standard evaluation process is accelerated with a view to producing real-time results that can feed directly into programme decision-making. Under this ‘rapid and timely’ approach, the intention is that the period from recruitment of the evaluation team to completion of the draft report should be not more than four months. In the case of this evaluation, due to the decision to expand the current evaluation process to include an interim management report and a workshop discussion of the full draft findings and recommendations, this period has extended to approximately six months.

In order to achieve results in this time frame, some of the standard phases of evaluation must be merged, shortened or undertaken simultaneously. In this case, the inception phase – during which the evaluation questions from the ToR were elaborated and the methods and lines of enquiry defined – included a substantial component of initial fact-finding, which in turn helped to refine the relevant questions and methods. During this initial phase, key issues and lines of enquiry were identified, together with provisional findings on at least some of the relevant issues. This was followed by a second phase during which the provisional findings were tested through further fact-finding and a more focused enquiry into specific issues, with a view to reaching conclusions on the main issues of concern together with a set of relevant and actionable recommendations.

Following the approach outlined above, the primary methods used in the evaluation were key informant interviews (KIIs), particularly with those directly involved in the cholera response, and documentary review, with a focus on planning, monitoring and decision-making. In order to provide a solid factual basis for the evaluation, the team constructed a timeline of key UNICEF decisions and programme delivery dates against the background of the shifting political context and the course of the 2017 cholera/AWD epidemic. Findings from KIIs conducted outside Yemen were triangulated with the results of partner interviews and focus groups discussions with beneficiaries and local volunteers, which were conducted in country by three Yemen-based consultants. Altogether, around 95 interviewees were consulted for the evaluation, and these are listed in Annex C.

1.3 THEORETICAL BASIS FOR CHOLERA RESPONSE AND PREVENTION

There are three main elements to addressing cholera, each with its own primary objective:

- **Response (I): Reducing mortality**: Case detection and treatment, limiting the consequences of an epidemic. This is often the first priority during the response to a severe outbreak. Life-saving activities include case management; raising cholera awareness (helping the community identify the risk, signs and symptoms and seek early treatment); and increased disease surveillance to be able to detect new affected areas and quickly set up the appropriate response. *Early case detection and treatment is key to reducing mortality (case fatality).*

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7 This section is not intended to provide a complete theoretical overview, but rather to summarize in brief the critical elements of effective cholera response and prevention, so that the evaluation can be read with these in mind. Recent developments in approaches to cholera, which are captured at global level by the Global Task Force for Cholera Prevention and Control (GTFCC), need to be taken into consideration when responding to an outbreak in any given region.
• **Response (II): Reducing transmission (containment):** Control measures, limiting the spread of an epidemic. This objective may be very difficult to achieve but has the biggest potential for limiting the magnitude of the epidemic, by reducing the number of secondary infections around cases in affected areas and avoiding overwhelming health centres. This can only be achieved by a very well informed and targeted response – guided by timely analysis of epidemiological data as well as a sound understanding of the transmission of the disease. Control activities include targeted WASH interventions and community/household sensitization with a view to achieving immediate behaviour changes.

• **Prevention: Reducing epidemic risk:** Reducing the potential for an epidemic to occur, or limiting its likely scale, by reducing individuals’ exposure to the disease and their vulnerability to it. This may include the use of oral vaccines and other short-term measures (including the control measures above). But prevention is essentially a medium- to long-term agenda undertaken in advance of any outbreak, requiring more permanent changes in behaviour and work to improve water supply and waste treatment infrastructure and systems. Cholera risk reduction also helps reduce exposure and vulnerability to other water-borne diseases.

All three components are interlinked. Effective early treatment of cases helps limit transmission. Reducing transmission helps reduce risk, and so on. But each component has its own different challenges, technical and resource demands, and operational time frames, and so should be considered separately.

We note below some of the most important considerations relating specifically to cholera response.

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**FIGURE 1** Schematic representation of cholera transmission

Schematic representation of cholera transmission from an initially-affected area to new areas. The same pattern may apply at neighbourhood, district and at regional / governorate levels.

- **AFFECTED AREAS**
- **NOT YET AFFECTED AREAS**
Given the importance of speed in response, and given that preparedness to respond is essential to achieving a rapid response, we stress the importance of preparedness as an organizational imperative in this and similar high-risk contexts. Indeed, this might be considered a fourth key component to add to the three above. The key components of cholera preparedness are discussed further in section 4.2.

Response and control measures need to follow the rapidly evolving epidemiological situation (see figure 2 below). Responding to an epidemic is like fighting a war against a fast-moving enemy. The response needs to be highly flexible, and revised on a daily/weekly basis to match the quickly evolving situation.

In light of this, any organization involved in epidemic response should prioritize access to epidemiological information as a first step, before any other activity. Support to epidemiological surveillance, data collection, analysis and sharing is the first key element of any epidemic response. Timing of response is almost everything. This is true both for case detection/treatment and for control measures. Early detection and treatment substantially reduces case fatality rates. With regard to control measures, to make a substantial difference to the course of an epidemic, the response needs to be ahead of the epidemic curve.

After the peak of the outbreak, the effectiveness of the response (even if well designed and implemented) will likely be marginal, or at least far more limited than if implemented earlier in the outbreak. The difference may be measured in days. It is important to note that during an outbreak, there is not only one curve, but rather many small curves in multiple locations and at different levels (at governorate, district, and even village level). To be most effective, the control response needs to get ahead of multiple epidemic curves.

**FIGURE 2** Schematic representation of cholera control measures

Schematic representation of the same cholera control measures implemented at the beginning (Scenario A) and after the peak (Scenario B) of an outbreak, and potential cases averted. [Y-axis = incidence of new cases, X-axis = time].
Responding quickly enough to every new outbreak in every new location is very difficult, and can only be achieved through agile and mobile rapid response teams with a very high level of organization, using recently gathered data as a basis for targeted interventions. Therefore, preparedness is crucial to effective response. Without having such systems, roles and capacities pre-established, the response is always likely to lag behind the epidemic curve.

Control measures need to be tailored to local transmission contexts. To effectively control an outbreak, control activities need to address all the relevant transmission contexts and routes.

Understanding the local transmission contexts and risk factors is key to limiting the spread of the disease. Depending on the country, or even the region or the habits of a population, a disease can spread through many routes and at various different occasions. In some places, cholera spread tends to be facilitated by community gatherings or group meals taken during traditional events, or at the occasion of burial ceremonies, for example. Water chlorination and hygiene promotion practices at household level may not be reflected in protective practices during those events – and additional measures during those events might be needed to effectively control the spread of the disease.

Identifying vulnerable populations and specific risk behaviours, practices or beliefs is very important for delivering the appropriate response package and hygiene messages. Assessing the effectiveness of the response – and whether messages are resulting in at least short-term changes in risky practices – should be done in real-time from the outset to enable effective programme adaptation.

Control expectations and response priorities must be adapted to the context. Cholera outbreaks differ in scale, nature and predictability, and are heavily influenced by the existing capacity of the health system to manage crisis and outbreak in particular. The expected level of cholera control efficiency will differ accordingly.

WHO and Global Task Force for Cholera Control (GTFCC) partners distinguish three main contexts for cholera:

- **Endemic contexts**: In these contexts, governments and humanitarian partners should not be surprised by cholera outbreaks. Existing epidemiological knowledge allows for making informed decisions on preparedness and response as well as long-term prevention efforts.

- **Epidemics in non-endemic contexts**: In such contexts, the level of preparedness is likely to be very low, and the outbreak response often suffers important delays and erratic strategic decision-making on what to do and where to concentrate efforts.

- **Crisis-affected contexts**: Crisis-affected contexts are highly diverse in nature, but share a common characteristic: Governments and humanitarian partners are often overwhelmed with multiple complex issues, and have limited available capacities to respond to an additional crisis. A cholera outbreak may even go unnoticed for a period of time. Such contexts demand quick deployment of experienced surge support and the initiation of life-saving activities where access is possible, together with efforts to increase communities’ own capacities to cope with the disease (community oral rehydration points, homemade oral rehydration salts, etc.) and protection (where possible) of vulnerable or hard-to-reach populations through vaccination.

Yemen clearly fell into the latter category in 2016/17. The poor state of water and sanitation systems, limited access to health care, and low hygiene awareness combined with the ongoing effects of conflict, shortage of basic necessities and high levels of malnutrition add up to a very high-risk context. Meanwhile, the operational environment for effective response is extremely challenging. While the awareness of cholera is now much higher than it was in 2016, other factors remain largely the same or worse. The response by UNICEF and others to the cholera epidemic is considered against this backdrop in the following sections.

**Children’s vulnerability.** As the UNICEF “Cholera Quick Note” describes, children are particularly vulnerable to the effects of cholera. “Children dehydrate more rapidly than adults... and they are also more susceptible to the effects of dehydration. Children who are malnourished are at increased risk of severe illness and death. In addition, the diagnosis and treatment of a malnourished child is challenging, adding to this risk.”

The risk to children’s health may also be indirect. Health systems may be overwhelmed during a cholera outbreak, meaning that treatment of other childhood illnesses may be compromised.

The treatment of acutely malnourished children with cholera/AWD must be managed with special care, given the risks associated with potential fluid overload.

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THE 2017 EPIDEMIC
Context, causes and outbreak course
2.1 CONTEXT AND RISK FACTORS

The current context in Yemen is more fully described elsewhere (see for example the Yemen Humanitarian Response Plan 2018). Here we highlight some of the most significant risk factors and vulnerabilities related to the cholera epidemic, the wider humanitarian crisis and the operating environment within which the cholera response was mounted.

• The 2016-2017 cholera epidemic must be understood in the context of the wider humanitarian crisis facing Yemen and the factors shaping it. In particular, the collapse of the economy (the agriculture sector especially), high levels of inflation, and the impact of the conflict on livelihoods have had a dramatic effect on food security, which was already under severe stress before 2015. At the beginning of 2017, before the massive ‘second wave’ of cholera, most humanitarian attention was focused on the potential for famine in Yemen. That threat has not diminished: millions of Yemenis remain acutely food insecure, and the dependence on imported food (as well as fuel and other vital commodities) makes the threat of further blockades or restricted imports very concerning.

• Related to this, levels of both moderate and severe acute malnutrition are very high across the country and the outlook is for this to situation to persist or to deteriorate further. This is one contributory factor to the high levels of vulnerability (particularly among under-5s) to diseases like cholera and other forms of acute watery diarrhoea. It is also a priority response agenda in its own right, and this raises the question – for UNICEF in particular – of how to manage the ongoing emergency nutrition response alongside a major cholera response (along with other elements of the overall crisis response in Yemen).

• With regard to healthcare, the system is in a state of collapse. The Office for the Coordination of Humanitarian Affairs (OCHA) reports that “an estimated 14.8 million people lack access to basic healthcare, including 8.8 million living in severely under-served areas. Medicine and medical supplies/materials are in chronically short supply. According to WHO, more than 1,900 out of 3,507 health facilities in 16 governorates are either non-functional or partially functioning.” The Ministry of Public Health and Population (MoPHP) is unable to pay the salaries of around 60 per cent of its staff, many many of whom are forced to seek other work.


10 Nutrition Cluster interview (i29). OCHA reports that “8.4 million people are severely food insecure and at risk of starvation.” Overall, OCHA reports, “about 4.5 million children and pregnant or lactating women are acutely malnourished. This represents a 148 per cent increase since late 2014. Nearly 462,000 children are suffering from Severe Acute Malnutrition (SAM) – a nearly 200 per cent increase since 2014,” http://www.unocha.org/yemen/about-ocha-yemen, accessed 31 March 2018.

11 Ibid.
In this report, we use the globally-accepted definitions for key terms as follows:

**Acute watery diarrhoea (AWD)**
Acute watery diarrhoea is an illness characterized by three or more loose or watery (non-bloody) stools within a 24-hour period.

**Suspected cholera case**
*In areas where a cholera outbreak has not been declared:* Any patient aged 2 years and older presenting with acute watery diarrhoea and severe dehydration or dying from acute watery diarrhoea.

*In areas where a cholera outbreak is declared:* any person presenting with or dying from acute watery diarrhoea.

**Confirmed cholera case**
A suspected case with vibrio cholerae O1 or O139 confirmed by culture or Polymerase Chain Reaction (PCR) and, in countries where cholera is not present or has been eliminated, the vibrio cholerae O1 or O139 strain is demonstrated to be toxigenic.

**Attack rate (AR)**
The attack rate is the number of new cases of disease (numerator) during a specified time interval within a defined starting population (denominator). Used as a measure of the risk of contracting disease.

**Case fatality rate (CFR)**
The case fatality rate is a measure of the severity of a disease and is defined as the proportion of cases of a specified disease or condition that are fatal within a specified time (expressed as a percentage). With proper treatment, the case fatality rate for cholera should remain below 1 per cent.

**Some facts about cholera**
- Cholera can kill within hours if untreated.
- About 75 per cent of people infected do not develop any symptoms. However, the bacteria are present in their feces for 1-10 days after infection and are shed into the environment, potentially infecting other people.
- Of those who develop symptoms, around 20 per cent develop severe disease (severity describes the degree of dehydration) and 80 per cent mild to moderate disease.

Sources: Global Task Force on Cholera Control; UNICEF ‘Cholera Quick Note’, July 2017; CDC & WHO websites.

- In light of the above, ordinary Yemenis currently face multiple threats to their safety, health and well-being, and have limited resources with which to protect themselves. Cholera is just one of these threats, but the highly infectious nature of the disease and its pace of spread and potentially fatal effects mean that it is a priority for response. These same risk factors and vulnerabilities leave people vulnerable...
to other infectious diseases, particularly water-borne diseases. Actions to prevent cholera help tackle that wider threat.

- Capacity to prevent and respond to cholera in Yemen comes from a mix of local, national and international actors. Despite being divided and severely under-resourced, the governmental bodies with responsibility in this area (including the MoPHP and the water authorities) are active and engaged. Among international actors, UNICEF and WHO play key roles within the UN system, while the International Committee of the Red Cross (ICRC), Médecins Sans Frontières (MSF) and several others have been heavily engaged. Overall, however, and most notably in the WASH sector, there has been a major shortage of international response capacity to respond to the cholera epidemic, particularly amongst international non-governmental organizations (INGOs). Local civil society capacity is limited but plays an essential part in the response. At community and district levels, volunteers have played a crucial role, including awareness-raising, advice on infection prevention at home, promotion of health service-seeking, referrals and reporting, as well as distribution of supplies and demonstration of their proper use.

- The lack of capacity noted above is due in part to the extremely restrictive operating environment for INGOs in particular, both with respect to bringing in relevant experts (visa restrictions) and with respect to accessing affected areas once in the country (security and bureaucratic obstacles). This has severely hampered the response, particularly in a context where speed and agility is crucial to effective cholera control.

**Current and legacy risk factors for cholera in Yemen**

Even before the conflict, Yemen was among the poorest of the Arab countries, beset by circumstances that made it vulnerable to cholera, a water-borne disease with fecal–oral transmission. Afflicted by droughts and a lack of water, it was considered among the most water-stressed countries in the world. According to WHO–UNICEF statistics, in 2014 only 53 per cent of the population used improved sanitation facilities and only 55 per cent had access to drinking water from improved water sources. Since the onset of the conflict, the situation has worsened markedly. Millions of people have been displaced and now live with inadequate shelter, water, sanitation and food. Delivery of health care has been limited by the destruction of approximately half of health sector facilities, including hospitals and clinics. In addition, about 30,000 health care workers have not received their salaries during the past year, and many have fled the country.

A naval and air blockade of rebel-controlled areas has contributed to shortages of food, fuel, and medical supplies. Bombing has destroyed water and sanitation infrastructure in some areas, and many sanitation workers have been on strike for several months. A massive fuel shortage has led to the disruption of sewage management and wastewater treatment facilities and a lack of electricity to run water pumps. The WHO has estimated that approximately 15 million people lack access to basic health care and potable water and sanitation.

2.2 NATURE AND SCOPE OF THE 2017 CHOLERA EPIDEMIC

History of cholera in Yemen: endemic vs. epidemic

The Dictionary of Epidemiology defines an endemic disease as “the constant presence of a disease or infectious agent within a given geographic area or population group.” Cholera endemicity is defined by the Global Task Force for Cholera Control (GTFCC) as follows: “A cholera-endemic area is an area where confirmed cholera cases were detected during three out of the last five years with evidence of local transmission. The area can be defined as a region, a district or a small locality.”

“Epidemic” refers to an increase, often sudden, in the number of cases of a disease above what is normally expected in that population in that area. An epidemic may result from:

- A recent increase in the amount or virulence of the infectious agent,
- Recent introduction of the agent into a setting where it has not been before,
- An enhanced mode of transmission so that more susceptible persons are exposed,
- A change in the susceptibility of the host response to the agent, and/or
- Factors that increase host exposure or involve introduction through new portals of entry.

In a given context, an infectious disease may be endemic and suddenly evolve into an epidemic through a change in conditions and factors favouring the transmission.

It appears from data reported to WHO that, despite a significant earlier outbreak in 2011 (over 30,000 cases), cholera was not endemic in Yemen when the 2017 outbreak occurred. Why does this matter? In cholera-endemic areas, there is usually a certain level of understanding of the disease and capacity to deal with it, both within communities and within the health sector. In places where cholera is not endemic, there is generally far less capacity to recognize and detect the disease, and the reflex to seek early treatment may not be there, leading to elevated levels of mortality. When the cholera outbreak hit Yemen in October 2016, this was the first time in five years and the second time since 1980 that cholera was officially reported in Yemen. Given the prevailing conflict, low level of preparedness for cholera outbreaks, high susceptibility of the population, collapse of the water and sanitation systems and the health sector, and limited humanitarian access, the threat of an epidemic could hardly have been higher.

WHO had identified the region-wide risk of cholera epidemics since 2011: “During the past decade, at least 14 out of 23 countries in the region have reported cholera cases, often in epidemic proportions. The countries in the region facing complex emergencies are particularly at risk.”

2015 had made important recommendations, including strengthening early warning surveillance systems for acute diarrhoea and cholera.\(^{17}\)

**Course and scale of the 2016-early 2017 (‘First Wave’) outbreak**

What happened in 2016 and early 2017 appears to have been a relatively familiar scenario. Cholera happened to be (re-)introduced in Yemen (perhaps through a traveller, though the source was not identified) and transmission started at a low level – not captured by the health system – until it reached one or several urban areas, including a neighbourhood of the capital Sana’a. Because of the higher density of population and favourable conditions in this urban or peri-urban neighbourhood, the transmission rapidly increased and was then detected by the health system. However, because Sana’a is also highly connected to other cities and people are mobile, the spread of the disease to other places had already begun and the outbreak became more difficult to contain. In a context such as Yemen, where the level of protective hygiene practices is low and access to safe water and sanitation services is sub-optimal, the spread was relatively quick, and cholera was introduced in less than three months throughout most of the country.

The time between detection and confirmation of the first cases (one week) was short, although it is not known for how long the disease was circulating before being detected. The time between detection in Week 39 of 2016 (W39) and the epidemic peak (W49) was nine weeks – a little more than two months. The epidemic tail (after the peak) is quite long, with cholera cases being reported during more than 19 weeks after the peak (nearly five months). This reflects *difficulties in controlling the transmission of the disease*, despite a low Case Fatality Ratio (CFR) (0.45 per cent).\(^{18}\) In spite of a decreasing trend, the outbreak was not completely controlled in early 2017 and suspected cholera cases continued to be reported until Week 16.

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17 Ibid. UNICEF was involved in these and the 2013 consultations.
18 On the comparative significance of CFR figures, see next sub-section.
of 2017 (mid-April). At that time, the number of reporting districts had declined to fewer than ten districts, and though the outbreak had not yet been declared over, it was believed to have been brought under control.

The April 2017 epidemic ('Second Wave')

In the final week of April 2017 (W17), a surge in the number of suspected cases is reported, increasing exponentially week after week until it reaches a peak of more than 50,000 suspected cases reported per week during W26 (end of June – beginning of July). The scale of this second wave far exceeds that of the first.

The time between the onset of the second wave (W17-W18) and the epidemic peak (W27) was nine to ten weeks – again, a little more than two months. The epidemic tail (after the peak) is very long, with cholera cases being reported more than 30 weeks after the peak (nearly eight months), which again reflects the huge challenge of controlling transmission in this context, despite a low case fatality ratio (0.21 per cent). By the end of January 2018 (Week 04), 198 districts were still reporting suspected cholera cases.¹⁹

The cumulative total from 27 April 2017 to 28 January 2018 is 1,051,789 suspected cholera cases and 2,252 associated deaths. The national cumulative attack rate (AR) is 379.75 per 10,000 – or around 3.8 per cent, which is extremely high for a national figure (average attack rate 1-5 per cent typically corresponds to a scenario of a refugee camp/urban densely-populated

The five governorates with the highest cumulative Attack Rates per 10,000 are Amran (889), Al Mahwit (848), Al Dhale’e (644), Hajjah (520) and Sana’a (511).

By contrast, the overall CFR – measuring the mortality within cholera treatment centres and health facilities in Yemen – is 0.21 per cent, which is extremely low for any cholera outbreak, and is especially surprising in the Yemen context, where access to health care is already problematic for the population and the security situation further complicates access.

Since CFR measures the number of deaths from cholera divided by the number of suspected cholera cases, the CFR value depends on the accuracy of the figures for suspected cholera cases. Even with a very strong response from the governmental health system and humanitarian partners, it is unlikely that such a low CFR could have been reached. Such a high attack rate and low CFR is a strong indicator that the number of cholera cases was overestimated, although a precise measure of the overestimation cannot be made by this evaluation.

By way of comparison, the cumulative country-wide attack rates of the previous most serious cholera outbreaks in the past decade, in Zimbabwe (2008-2009) and Haiti (2010-2014), were:
- Zimbabwe: 70 per 10,000 people – in one year.
- Haiti: 711 per 10,000 people – but this figure was only reached after four years (2010-2014)

Again for comparison, the cumulative CFR in Zimbabwe (2008-2009) and Haiti (2010-2014) were:
- Zimbabwe: 4.48 per cent (4,282 deaths / 95,531 cases) in one year.
- Haiti: 1.2 per cent (8,646 deaths / 711,442 cases) after four years (2010-2014)
Was the number of cholera cases overestimated?

Several factors lead us conclude that the number of cholera cases was probably significantly overestimated, based on the reporting of suspected cholera/AWD cases. These factors include:

- The very high cumulative attack rate and very low cumulative CFR.
- WHO monitoring visit reports\(^2\) suggest that the case definition was not strictly applied, and that most of the diarrhoeal cases were also registered as “cholera cases,” even if not fulfilling exactly the case definition. Given the high prevalence of diarrhoeal diseases in Yemen,\(^2\) this may have led to an overestimation of the number of cholera cases reported.
- A University of Sana’a study (July 2017)\(^2\) recorded a cholera prevalence of 8.1 per cent amongst all diarrhoea-hospitalized severe cases in Sana’a (although the study included only 345 cases of severe diarrhoea in Sana’a city during a period of 12 days in July 2017).
- The UNICEF verification exercise\(^2\) conducted by third-party monitors (October 2017) reveals lack of adherence to the case definition and over-reporting of suspected cholera cases.
- Laboratory testing results:
  » In total, 28,410 rapid diagnostic tests (RDT) have been performed (corresponding to 2.7 per cent of the number of suspected cases). Of those, 42.2 per cent showed a positive result.
  » Out of the 11,989 RDT positive samples, 2,706 biological cultures have been performed (which represents 22.6 per cent of the samples tested RDT positive). Of those 2,706 biological cultures, 1,102 have been confirmed positive to vibrio cholerae (40.7 per cent of the positive RDTs).

Looking at the available laboratory information, the general understanding is that only a fraction of the suspected cases are confirmed cholera cases. However, because the rate of biological testing is low and not a representative sample (2,706 biological tests done out of more than 1 million suspected cases), it is not possible to draw any firm conclusion.

Analysing the rate of confirmed cases in other countries and contexts shows that it is not unusual to find this low level of confirmed results from biological testing. To give a comparison, in a nine-country surveillance study led by AFRICHOL\(^2\) (The African Cholera Surveillance Network), on average, only 37 per cent of suspected cases showed positive results through biological testing. In general, recent studies confirm that reliance on ‘suspected’ cases as opposed to biologically-confirmed

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cases – as is usual in national surveillance, especially during outbreaks – can lead to greatly overestimated cholera incidence figures.

Another significant factor that raises doubts about the reliability of the figures is the possibility that health workers may have ‘inflated’ the figures for suspected cholera due to fears that too low a figure, or a declining trend, might result in the closure of the relevant cholera treatment centre. There is a widespread view that such inflation did happen on a significant scale, as told to the evaluation team by a number of interviewees inside and outside UNICEF. Since the team was unable to visit Yemen or otherwise investigate these reports, we are unable to verify or quantify this effect. But we note that it is potentially a significant distorting factor in the reported data.

Some other factors need to be considered here. The data record is based largely on ‘self-presenting’ cases, i.e. those who presented at health facilities. This raises the possibility that there may have been under-reporting as well as over-reporting of cases, or that some of the suspected over-reporting was due to people presenting in larger numbers at health centres than was warranted by actual health risks from cholera or AWD (e.g. with milder cases of diarrhoea). The verification exercise conducted by UNICEF through third-party monitors in October 2017 suggested that line lists included many who did not meet the relevant case definitions (around 50 per cent), and there was said to be an ‘observable difference’ between numbers reported pre- and post-inspection.

Interviews with staff both from UNICEF and other organizations suggest that the number of actual cholera cases was widely understood to be much less than the one million ‘suspected cholera/AWD’ cases reported. It is important to note that this kind of inclusion bias is quite normal in the case of cholera epidemics, but in this case there is reason to think that numbers may have been particularly inflated (deliberately or not) because of poor application of case definitions and inclusion of relatively mild diarrhoea cases. As one senior staff member noted, UNICEF felt it had to take a ‘precautionary’ line on numbers. This appears to the evaluation team to have been a sensible approach.

2.3 CAUSES OF THE 2017 EPIDEMIC: RISK FACTORS AND VULNERABILITIES

Despite a previous outbreak in 2011, and a resurgence of cholera in 2016, only limited information on vulnerable populations and the drivers of cholera outbreaks in Yemen was available to guide the response in 2017. This would have required in-depth epidemiological analysis, linked with thorough investigations and socio-anthropological studies, to identify the main drivers and risk factors, vulnerable populations and hotspot areas, as well as high-risk practices and behaviours. Investigations should have been undertaken in late 2016/early 2017, but it appears that such information either did not exist or was not shared.

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27 Once this was recognized as a potential distorting factor, steps were taken to counteract it by putting treatment centres on a more sustainable footing and moving away from ad hoc closures (interview i12).
28 Efforts were also made to identify cases by the community health volunteers and through the house-to-house awareness-raising campaign.
29 One interviewee from an INGO partner suggested that in the diarrhoea treatment centres (DTCs) their agency ran in Hodeida, only around 10 per cent of the cases were in fact cholera, based on laboratory testing (i28). This may or may not reflect a wider pattern nationally.
30 Interview (i26).
31 For example, interviews (i20, i25, i26).
32 Interview (i25).
During the 2017 outbreak, some limited efforts were made to investigate and identify risk factors and to better understand specific transmission contexts. However, the extent to which the resulting information was shared amongst operational actors and used to improve the response design remains unclear.

Correlation of cholera incidence with rainfall

A study (unpublished) conducted by Epicentre in collaboration with WHO (conducted as part of the oral cholera vaccine risk assessment) shows a statistical correlation between the incidence of cholera cases and cumulative rainfall at district level. Districts showing a high correlation with rainfall also have a higher AR.

This correlation may exist for 2017 in certain districts (46 per cent of the districts had a correlation r>0.8), but it was not necessarily the case for the 2016 outbreak, which started in October (end of the rainy season) in Al Bayda and Sana’a. An in-depth analysis of the relationship between climate/precipitations and incidence of cholera cases could be done by geographical area, to identify possible differences in the climatic parameters between districts.

Such correlation between incidence and rainfall has already been found elsewhere, especially in inland Africa. It is believed that the rainy season may play a role in ‘amplifying’ outbreaks, enabling transmission either through contamination of surface water and open sources, or through population movements related to the

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**FIGURE 6** Correlation between reported cholera incidence and cumulative rainfall, Yemen 2017

![Correlation图](image)

(Source: Epicentre, unpublished.)

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rainy season. This understanding can be used to anticipate periods of higher risk and increase the level of preparedness/prevention just before the start of the rains. It is informing current plans for a phased approach to an oral cholera vaccine (OCV) campaign in Spring 2018.

Children under five

According to WHO in Yemen, children under five years old represent 28.7 per cent of total suspected cases to date (or approximately 301,863 cases). In Yemen, children under fifteen represent 40 per cent of the population, while according to an estimation made by UNICEF in its 2008 Yemen Nutrition Profile, under-5s would represent 16.3 per cent (or c. 4,514,602 children). With due regard for uncertainty regarding population figures, we can estimate the specific attack rate (AR) in under-5s and compare it to the global AR in the general population:

- Estimated attack rate (children under five): \(\frac{669}{10,000}\)
- Attack Rate (General Population): \(\frac{379}{10,000}\)

The comparison between the attack rates in the under-5 population and the general population shows that children under five are at particular risk of contracting cholera and other diarrhoeal diseases.

The high malnutrition rates in children under five in Yemen could explain why this population is at higher risk, as it is believed that an increase in susceptibility to cholera due to malnutrition also results in an increase in the number of cholera-infected individuals in a community.\(^{34}\) Malnourished children are also particularly vulnerable to the effects of the disease, especially if acutely malnourished.\(^{35}\) An age, sex, ethnic, socio-economic group analysis could be conducted to identify specific vulnerable populations.

Particular risk factors and high-risk practices

It appears that no exhaustive and systematic work has yet been done to investigate the potential transmission contexts for cholera in Yemen. However, reviewing the existing information\(^{36}\) already allows us to identify (if not quantify) some particular risk factors or elements to consider in designing the response:

- **Global risk factors**
  - Use of unprotected/surface water source;
  - Poor state of latrines or absence of latrines (this being strongly associated with poverty);
  - Disposal of sewage in the neighbouring environment;
  - Waste and sewage contamination in market places in urban areas;
  - Very low rates of hand-washing at key times (especially after toilet use or before preparing/handling food).

- **More context-specific factors**
  - Shared meals (traditional practices), sometimes with large groups, coupled with poor hand hygiene;

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35 As noted earlier, the treatment of cholera/AWD in a malnourished child also requires particular care. UNICEF has supported the MoPHP to develop separate guidelines and training for appropriate treatment of such children.

36 See, for example, Ministry of Health FETP field investigation reports (referenced above); MSF field investigation work (unpublished, information collected during the evaluation interviews); UNICEF Knowledge, Attitudes and Practices rapid assessment among cholera-affected population in Amanat El Asima (June 2017); University of Sana’a, ‘Epidemiocity of vibrio cholerae in Sana’a city’. 
» Household transmission, or transmission between closely-associated family/friends and neighbours;
» Burial practices and traditional funeral ceremonies;
» Use of old or recycled (uncleaned) jerry cans for water transport and storage;
» General understanding of the severity of the disease BUT low individual risk perception (i.e. feeling that the disease cannot affect them);
» Poor understanding of the transmission route through dirty hands/accessories and related behaviours of not hand-washing after using the toilet, handling nappies or wiping babies’ bottoms;
» Low knowledge of what to do or where to go on appearance of symptoms (hospitals/health centres reported to rather than oral rehydration corners/diarrhoea treatment centres).

Addressing these issues can greatly help contain an outbreak by tackling some key transmission routes and factors not addressed by the standard activities and messaging. Increased efforts are needed during outbreaks to investigate, qualify and quantify the importance of observed risk factors, and this analysis needs to inform both the design and implementation of related response and prevention efforts.

The results of focus-group discussions (FGDs) undertaken for this evaluation are instructive. These were conducted with UNICEF beneficiaries organized into separate groups of men and women/children in Sana’a. The results are summarized below.

**Male participants**

Most participants reported low levels of at-home hygiene in the area. Some 40 per cent of homes rated ‘very poor’ in terms of hygiene due to many factors, including high poverty rates coupled with high costs/prices, lack of hygiene materials and water scarcity, together with a lack of awareness among many people on the importance of hygiene.

The participants stated that most households have latrines, and that perhaps one in ten in the population – mainly people living in shops or single rooms – practice open defecation.

With regard to waste disposal, participants indicated that in most cases pits are dug inside residential areas to bury waste; garbage trucks rarely come. Some manage to burn waste, causing disease and pollution.

Challenges cited by the participants include:
1) Lack of sewage network in the area. While septic tanks are present, most of them are open and overflow occasionally;
2) Families cannot afford suction costs for sewage tanks;
3) Population density in the region, with high poverty rates;
4) Lack of garbage drums. These pile up in the streets and contribute to the spread of disease, especially during rainy days.

Meanwhile, children who attended the session (Ismail, Bilal, Ali, Nashwan) confirmed that there are no playing squares, so they play in the streets instead, beside garbage piles. Some of their friends contracted diseases (including cholera) during the rains. Another male participant said, “The school was renovated about two weeks ago but cleanliness is still an issue. Students go and piss behind the school because there is no water available inside. The water is provided to the teachers only and at their own expense.”
2.4 CHOLERA RESPONSE TIMELINE IN YEMEN: OCTOBER 2016 TO MARCH 2018

2016

- **October 6**
  Ministry of Public Health and Population (MoPHP) of Yemen confirms 11 cases of cholera in the capital, Sana’a.

- **By October 10**
  A joint health/WASH Cholera Task Force comprising UNICEF, WHO as well as health and WASH partners, is established. It develops an Integrated Cholera Response Plan that identifies health, WASH, and communications interventions for targeted governorates.

- **Mid-November**
  4,119 suspected cases of cholera/AWD; laboratory testing confirms 86 are cholera. 8 cholera deaths and 58 AWD deaths are confirmed in 11 governorates.\(^{37}\) The Integrated Response Plan is revised.

2017

- **January**
  UNICEF launches its Humanitarian Action for Children appeal, which includes an overview of the UNICEF response to the crisis in Yemen, including its work to prevent and respond to cholera and AWD.

- **February**
  The Yemen Humanitarian Response Plan is launched, requesting USD 2.1 billion to reach 12 million people with life-saving assistance. The Yemen pooled fund launches a first reserve allocation for the cholera response worth USD 2.7 million.

- **April**
  Cholera and AWD resurge. From 27 April to 8 May 2017, a total of 23,425 suspected cases and 242 deaths are reported, almost twice as much as reported during the first wave.

- **Mid-December**
  The first-wave epidemic curve peaks, yet attack rates remain high.

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many deaths as in the preceding six months combined.38

- **May 14**
The MoPHP declares a state of emergency, stating that the health system is unable to contain the “unprecedented health and environmental disaster”39

- **May**
The Health and WASH clusters respond with a six-month plan. It anticipates just under 100,000 cases over the next six months, and requires USD 66.7 million.

- **June**
Emergency operations centres (EOCs) are opened in Aden and Sana’a to oversee surveillance activities and coordinate the response.

UNICEF develops an integrated AWD/cholera strategy consistent with the national strategy.

- **Last week of June**
There are 43,282 suspected cases, bringing the total number of suspected cases since the beginning of the second wave in late April to 262,650.40

- **Early July**
The Integrated Response Plan is updated based on revised caseload projections. The plan now extends until the end of 2017. The projected number of cases is increased from just under 100,000 to 280,000, and the number of target districts is increased. The previous integrated response plan had required a total of USD 66.7 million; the revised plan requires USD 254 million.

- **July 11**
At a United Nations press briefing in Geneva it is announced the cholera vaccination campaign (outlined in the revised plan) will be “set aside” and the doses are re-routed to another at-risk country.

- **July**
The Humanitarian Coordinator concludes that the outbreak has surpassed the capacity of the WASH and health partners and there is a need for a system-wide response.41

- **August**
UNICEF, in collaboration with the MoPHP and WHO, implements a national house-to-house campaign deploying 40,000 community mobilizers to promote key cholera prevention practices, distribute oral rehydration salts (ORS), soaps, and information materials. The campaign aims to involve all households in 21 governorates, reaching 16 million people over a period of six days.

- **October**
The number of new cholera/AWD cases is declining. An AWD/cholera case verification exercise takes place across 26 per cent of all treatment centres.

- **November**
The number of cases continues to decline. A blockade on commercial and humanitarian shipments is put into effect, which includes the movement of humanitarian workers. It lasts ten days.

- **March 2018**
UNICEF finalizes and begins implementing its updated integrated response, preparedness and prevention plan for AWD/cholera in 2018. The plan focuses on preparedness for a potential third wave. UNICEF puts in place preparedness measures, including contingency partnership agreements and supplies and preparation for an OCV campaign.

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39 Health and WASH Cluster Plan.
40 World Health Organization, ‘Weekly Epidemiology Bulletin 25 June to 1 July’.
**FIGURE 7** Timeline of key events and number of suspected cholera cases per week

- **Contextual or inter-agency milestones (+ dates)**
- **UNICEF milestones (+ dates)**

- **Contextual or inter-agency milestones (+ dates)**
  - UNICEF launches its Humanitarian Action for Children appeal for Yemen in 2017 (USD 236.6 million)
  - including funds for cholera prevention and response
  - Yemen Humanitarian Pooled Fund allocates USD 3 million to address gaps in the cholera response
  - The health and WASH cluster produce a six-month integrated plan (May - October)
  - The MoPHP declares a state of emergency

- **UNICEF milestones (+ dates)**
  - Revision of integrated plan
  - UNICEF requests USD 3.2 million for cholera response
  - UNICEF launches its Humanitarian Action for Children appeal for Yemen in 2017 (USD 236.6 million)
  - Initial outbreak confirmation (25 suspected cases, 11 confirmed)
  - First wave epidemic curve peaks (with remaining high attack rates)
  - Yemen Humanitarian Response Plan launched, requesting USD 2.1 billion to reach 12 million people with live-saving assistance
  - National Cholera Task Force reactivated
  - Integrated response plan updated and extended to end of 2017: Revised budget increases from USD 66 to 254 million
  - UNICEF, in collaboration with the MoPHP and WHO, implements a national house-to-house campaign deploying 40,000 community mobilizers

- **Number of Cases**
  - 0
  - 10,000
  - 20,000
  - 30,000
  - 40,000
  - 50,000

- **Dates**
  - Oct/16
  - Nov/16
  - Dec/16
  - Jan/17
  - Feb/17
  - Mar/17
  - Apr/17
  - May/17
  - Jun/17
  - Jul/17
  - Aug/17
  - Sept/17
  - Oct/17
  - Nov/17
  - Dec/17
  - Jan/18
  - Feb/18
  - Mar/18

- **Notes**
  - Yemen Humanitarian Pooled Fund allocates USD 3 million to address gaps in the cholera response
  - UNICEF launches its Humanitarian Action for Children appeal for Yemen in 2017 (USD 236.6 million)
  - UNICEF requests USD 3.2 million for cholera response
  - Initial outbreak confirmation (25 suspected cases, 11 confirmed)
  - First wave epidemic curve peaks (with remaining high attack rates)
  - Yemen Humanitarian Response Plan launched, requesting USD 2.1 billion to reach 12 million people with live-saving assistance
  - National Cholera Task Force reactivated
  - Integrated response plan updated and extended to end of 2017: Revised budget increases from USD 66 to 254 million
  - UNICEF, in collaboration with the MoPHP and WHO, implements a national house-to-house campaign deploying 40,000 community mobilizers

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**Evaluation of the UNICEF Level 3 response to the cholera epidemic in Yemen: A crisis within a crisis**
UNICEF STRATEGY AND APPROACH TO CHOLERA IN YEMEN
3.1 STRATEGY AND APPROACH DURING THE 2016 OUTBREAK

Early detection and response

It is unclear whether cholera had been circulating for a long time before being detected by the health system, but once identified, the overall system provided a quick response. Investigation teams were sent from the MoPHP to affected areas by 1 October. They identified potential cases and sent stool samples for analysis to the national reference laboratory. Once biologically confirmed, the health authorities immediately declared the outbreak and informed partners (6 October). A joint cholera taskforce was immediately organized and an integrated response plan developed. The entire process took less than a week, which is commendably quick.

The three-month “integrated cholera response plan” was discussed and agreed between health and WASH cluster partners, and presented to the Humanitarian Country Team (HCT) on 10 October, only four days after the declaration of the cholera outbreak by the MoPHP. Initial projections (WHO estimates) put 76,000 people at risk of contracting acute watery diarrhoea (AWD) or cholera in 15 governorates.

The initial 2016 plan contains most of what is usually considered essential in cholera response and control. However, a number of points should be noted:

- **Epidemiological intelligence:** Strengthening surveillance and active case finding is mentioned, but it is not clear what was done in this regard, or how the epidemiological data was used to guide the response. There is also a lack of precision in the targeting strategy: The wording used suggests that targeting is not always directed towards those affected or those at immediate risk of cholera (close contacts of those affected and people living in affected areas, but also other types of vulnerable populations such as internally displaced persons [IDPs], etc.).

- **Timing and agility of the response:** The response was not designed in such a way as to target the affected areas with a quick response (e.g. through Rapid Response Teams [RRTs]) – without which control of the disease is unlikely to be effective.

- **The response remained generic,** and was not tailored to the local transmission contexts, risk factors, and specific socio-anthropological factors. No activity was directed at investigating the local transmission contexts or understanding the particular high-risk practices.

- **Absence of clear distinction between emergency response activities and prevention activities.** The emergency response also encompasses infrastructure works – necessary but mostly not feasible in a very short time frame (i.e. the few weeks within which the response is needed).

- **Redundancy of activities between WHO and UNICEF** – In the areas of community-based surveillance as well as community mobilization, hygiene/health messaging and chlorination product distributions.

- **OCV is not mentioned as an option to be considered and discussed with health authorities.**

- **Oral rehydration therapy is mentioned, but only at health centres or mobile clinics, not in the community.**

- **Water safety at household level is only weakly covered.**

- **Attention to infection prevention and control (IPC) is very limited.**

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42 Source: Central Emergency Response Fund (CERF).
FIGURE 8 Outline of 2016 integrated response strategy*

Overall Objective
Reduce the attack rate and the case fatality rate due to AWD/cholera

Outcome
Lifesaving and emergency WASH interventions and hygiene awareness are provided to 45,000 people at risk of AWD/cholera contamination

Output 1
Sustainable water and sanitation systems and solid waste management systems are maintained and/or restored to prevent water born AWD/cholera mortalities

Activity 1.1 Chlorination of water sources (water trucks, storage facilities and sources) including deployment of technical teams to monitor chlorine level
Activity 1.2 Distribute and communicate at household level the use of Aquatabs, latrine disinfection and other preventive measures

Output 2
Most vulnerable groups receive emergency WASH assistance to prevent AWD/cholera related morbidity and mortality

Activity 2.1 Provision of emergency safe water supply through water trucking with complete treatment to most affected households, CTCs (cholera treatment centres) vulnerable groups (including IDPs) and affected populations
Activity 2.2 Provide WASH to 01 CTC established by WHO
Activity 2.3 Distribute consumable hygiene kits (10 of 80 grams soap, 2 kilos powder/family) and 2 jerry cans at household level in affected areas.

Activity 3.1 Mobilize trained community volunteers, community and religious leaders to conduct counselling and health education sessions on cholera awareness, prevention, management
Activity 3.2 Deliver messages on cholera awareness, health referrals, through household and community activities including reporting and referral of cases and incidences of AWD/cholera
Activity 3.3 Review existing messages and IEC materials for relevance, develop new key messages and produce new materials
Activity 3.4 Production of radio flashes and programmes
Activity 3.5 Production of TV flashes
Activity 3.6 Production of social media messages (audio-visual) for Whatsapp, SMS
Activity 3.7 Orientation of community volunteers on accurate messaging, and responding to public concerns on cholera

Activity 4.1 Increase surveillance sensitivity on AWD/cholera through inclusion of additional reporting sites (mobile clinics, community health volunteers and community midwives)
Activity 4.2 Provide ORS and diarrhoeal kits for health centres and mobile clinics
Activity 4.3 Provide operational and overhead cost for implementation for health centres

Output 3
Strengthen community mobilization for hygiene promotion and behaviour change through IPC approaches and information, education and communication (IEC) advocacy

Output 4
Strengthen and improve AWD/cholera surveillance for early detection and response

*Source: CERF, initial UNICEF situation report.
Key informant interviews for this evaluation suggest that the October 2016 integrated plan was widely felt to be weak, and the donors in particular were sceptical about the plan (see, for example, interview i35). During the first wave, some improvements to the strategy were made. The plan was revised in November 2016 and began to use a more prioritized (less blanket) approach: 29 priority-affected districts were listed at ‘Priority 1’, and 58 high-risk districts were ‘Priority 2’, where cases were suspected, had reported cases in the past, or presented other risk factors. In January, a pilot project with Action Contre la Faim (ACF) developed a rapid response mechanism to investigate and respond to new epidemic developments, but on a limited scale.

At the end of the first wave, two workshops were held (in Sana’a and Aden) on cholera lessons learned and on revising the preparedness and response plan. However, no record of these workshops could be provided to the evaluation team, so it is not possible to determine what influence they had on subsequent measures.

3.2 THE EVOLVING UNICEF RESPONSE STRATEGY DURING THE 2017 OUTBREAK

As described in section 2, the massive escalation of cases from late April 2017 is generally agreed to be part of the same outbreak that began in October 2016, and it is thus described as the ‘second wave’. The same basic strategy informed the response to this second wave, but the design of the response evolved by steps, reaching its final form at the beginning of July 2017.

First phase of ‘second wave’ response (late April - mid-May)

In the last week of April 2017, with the beginning of the second wave, the initial strategy had been to build on the existing response architecture, even if the response efforts had scaled down. The initial response to this second wave was very quick, thanks to the existing capacity (as of 15 May, 37 diarrhoea treatment centres [DTCs] and 141 oral rehydration corners [ORCs] had been established). However, this second wave was much harder to keep pace with than the first, given the geographic spread of the epidemic and exponential rate at which the number of cases was increasing. On 14 May the MoPHP declared a state of emergency. UNICEF was able quickly to mobilize funds for its initial response, in part by diverting resources from a World Bank emergency health and nutrition project (in agreement with the Bank).

Second phase of response (late May to end June)

Revised projections based on the attack rates to date were used to scale up the response; 98,000 new cases were expected between May and October 2017. A new integrated response plan was developed (23 May), based on the ‘shield and sword’ strategy developed in West and Central Africa. This approach distinguishes (i) a ‘response/control’ set of activities in those areas already affected, aimed at controlling the spread of the outbreak; and (ii) an ‘immediate prevention’ set of activities in high-risk but not-yet-affected districts.

In the revised integrated response plan (23 May 2017), the response matrix (Annex 6) presented the activities in an integrated form (WASH-health-communications for development) rather than divided by sector. This revised approach was based on early detection/early response, using the epidemiological data to
guide the response and WASH RRTs to deliver a targeted response.\textsuperscript{43} Earlier intentions to target areas based on laboratory-confirmed cases were abandoned due to the delays involved. Instead, the line list of cases (confirmed or not) was used for targeting purposes.\textsuperscript{44}

**Geographic prioritization**

During the first wave, 223 districts had been affected and could be considered ‘at risk’, the unaffected districts being considered low risk. However, not all districts were affected in the same way. So in mid-May, 30 priority districts in 12 governorates were identified (based on attack rates and CFR) as ‘high-priority districts’ – this initial list being subsequently revised as the situation evolved. The concept of epidemiological prioritization was present at the national level, but within affected districts, a holistic or ‘blanket’ approach was used, with the aim of targeting all households with a distribution of hygiene kits. This approach proved unrealistic, due to the ever-increasing number of affected districts and the logistical impossibility of reaching all households with limited supplies.

Some elements of the response did become more targeted at this time. The response began to address specific transmission contexts and factors – safe burials, IPC measures at DTC/ORC levels, hygiene kits for patients and their families, water storage containers at family level, jerry cans, etc. – although it is unclear whether these activities were based on risks identified through investigation. The plan did include some specific activities aimed at investigating local transmission contexts and improving understanding of particular risk practices. It was at this stage that the plan of creating an effective ‘fire-wall’ at the household level was initiated.

At this stage, the response plan only presented emergency response activities and did not include medium- to long-term prevention activities. OCV was still not mentioned as an option. But oral rehydration therapy was mentioned at the levels of health centres and communities. There was also some clarification of roles between WHO and UNICEF and health/WASH sectors, in the form of a joint response matrix.

**Third phase of response**

*(July onwards)*

A revised approach was developed in late June/early July 2017,\textsuperscript{45} when it became clear that it would not be possible to maintain a ‘holistic’ or blanket approach in all affected districts. At that time, WHO projections estimated that at least 540,000 new cases were expected in the next six months. This third approach sharpened the targeting strategy and proposed to deliver quick interventions in affected areas to reduce the transmission in identified hotspots and around clusters of cases (identified through line lists at ORCs/DTCs) and implemented through agile Rapid Response Teams (RRTs). It was intended that more general prevention efforts should continue to be implemented, covering a wider population in at-risk areas.

This targeting strategy was motivated by the fact that the risk of infection is higher among close contacts and neighbours of cholera cases, as has been shown in several epidemiological studies in Bangladesh and in Africa. This

\textsuperscript{43} This revised plan included sanitation, which the donors reportedly had been reluctant to include on cost-effectiveness grounds (UNICEF interview i14).

\textsuperscript{44} Interview (i14).

\textsuperscript{45} Inter-agency integrated response plan (29 June 2017) and UNICEF response plan (4 July 2017).
targeted response approach – commonly used to control cholera as well as other communicable diseases – has recently been validated by science as the best cholera control strategy when resources are constrained, especially in urban areas.46 Of course, the efficiency of this type of response still depends on the relevance of the activities implemented and on the speed with which they are implemented.

During this third phase, the sensitization campaign through communications for development (C4D) was substantially scaled up, including a country-wide household-to-household campaign (August 2017) and expansion of awareness-raising and messaging activities through media outlets and community mobilizers. The RRTs were also part of the process of building awareness at household level through advice on water storage, hygiene practices and sanitation.

Analysis
The new strategy is a considerable advance and is clearly based on the use of epidemiological data to drive the response. The response itself is built around mobile rapid response teams directing intensive response efforts in identified hotspots. The design of messages and other response activities is to be guided by epidemiological investigation and understanding of socio-cultural specificities, knowledge and perception about cholera and care-seeking patterns, as well as monitoring of the uptake of messages to inform the response.

The new strategy also clearly distinguishes between emergency response (Phase 1) activities and medium-term prevention (Phase 2) activities, the latter planned to run until June 2019. OCV is mentioned – both within control and prevention activities – although only in the UNICEF plan, not the revised inter-agency plan. It notes that risk assessment should be conducted and discussions started with the MoPHP regarding feasibility.

The latest version of the strategy is very comprehensive and takes into account most of the current ‘know-how’ for cholera response and control. However, it took more than two months to develop (around Week 27/early July – just after the epidemic peak), and several additional weeks to begin implementation due to the low initial preparedness and capacity. In a fast-moving emergency of this kind, UNICEF and other key actors cannot afford to take so much time to arrive at the right strategy.

3.3 USE OF EPIDEMIOLOGICAL DATA AND ANALYSIS TO GUIDE RESPONSE
Outbreak control involves reducing the number of secondary cases per infected person during his/her infectious period. Control interventions need to be focused (i) in areas where transmission is occurring during the early phase of the local outbreak (to maximize the potential impact of the intervention); and (ii) in areas where transmission is steady or increasing despite the control measures in place, in order to strengthen the control efforts and investigate why they are inadequate or not working properly.

Identifying these areas is a key element of cholera control, which necessitates a well-functioning surveillance system, timely data collection and sharing, and some epidemiological analysis capacity.

The evaluation team found weaknesses in all three of these areas, and these are considered in section 4 below.

To reduce the probability of transmission, both environmental and person-to-person transmission should be addressed. Understanding how the disease may be transmitted from one person to another, or at which occasions/in which contexts a person might be infected, is paramount to establishing effective measures and limiting the spread of the disease. These transmission contexts may vary according to context and populations specificities.

Identifying the local transmission contexts – those contexts relevant to the local spread of the epidemic – is key to interrupting transmission. To identify and quantify the weight of these transmission contexts, field investigations must be routinely organized and questionnaires administered to cholera patients and caretakers.

The evaluation found only limited evidence of such investigations actually taking place in Yemen in 2017, although they are clearly an intended part of the eventual (July) strategy. Little information on transmission routes and contexts was available in 2017, and little is available in the first trimester of 2018 to guide a potential outbreak response. The investigations we are aware of were as follows:

- An investigation questionnaire was developed by UNICEF, WHO and MSF and was supposed to be administrated in each DTC (MSF in Ibb, and UNICEF/WHO-supported DTCs). Though MSF began using it and had some preliminary results, it is not clear if this questionnaire was used in any other structures, and if so, whether the results were shared with operational partners and clusters to inform the response.
- Limited monitoring of the intervention and impact of the messaging seems to have been done. A small knowledge, attitudes and practices (KAP) survey was organized in June 2017, and a larger one was supposed to be organized but has been postponed.47
- ToRs for a specific epidemiological investigation during the outbreak were drafted, but were not implemented; it is unclear why.
- The University of Sana’a made a quick study, but very limited in time and on a very small number of cholera patients in Sana’a only.
- MSF France/Epicentre did a first epidemiological investigation, but it is unclear whether it was shared with all operational partners and it has yet to be made public.

The very limited availability of information on disease transmission contexts in the different regions of Yemen may explain partly why the outbreak appears difficult to contain and transmission is still ongoing.

Recent global studies have shown an increased risk of infection for family members and close neighbours.48 This is a strong argument in favour of targeted interventions around cases and clusters of cases, particularly in urban settings where it might be difficult to target a whole neighbourhood or urban district.

At local level, geolocation and mapping of cholera cases – either through a geographic information system (GIS) or on a paper map – allows identification of clusters of cases (i.e. cases grouped in time and place), investigation of the particular

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47 An earlier survey was reported to have been undertaken in 2016, although the evaluation team could not find evidence that the data had been used to inform the response.
48 Up to 200 metres around cholera patients’ houses and up to one week, this risk decreasing with distance and time.
risk factors involved, and better targeting of interventions to those hotspot areas. Geolocation of a cholera patient’s home is key, and this information can be collected directly in the community or at the health centre/DTC level in the line list.

Identifying priority governorates, districts and communities

Epidemiological data that are sufficiently disaggregated by time and location are essential to guide local control efforts in real time. Cumulative figures over longer periods of time or larger geographic units are less useful in this respect (e.g. cumulative total of new cases per week by governorate), but such information is important for tracking the course of the epidemic and the effect of control efforts.

At present, epidemiological data in Yemen is collected at health facility, DTC or ORC level, then analysed and transmitted to district and governorate levels, before being sent to the national level. The entire process may take a week.

A matrix combining cumulative attack rate (AR), weekly AR evolution, number of cases and number of deaths has been designed by UNICEF to help identify not only the situation in a particular week but also the evolution over time and the changing trends at governorate and district levels.

This tool is very useful to follow the situation from the national / global perspective, to identify larger trends in the outbreak patterns and to channel additional resources to specific governorates. However, due to the aggregate nature of the data and inherent delays in the transmission of that data, it is not precise enough to direct the local control interventions.

At this local level (village/community), the tools and criteria used to identify priority districts for RRT interventions are not sufficient to identify

| Parameters considered for the prioritization: |
| Number of cases (total & evolution over the past 3-4 weeks); AR (outbreak AR, weekly AR evolution, last week AR); Number of deaths (total & over the last 2-3 weeks). |

*As of 3 July, data from week 26 are incomplete and were not used for the analysis.*

**Proposed prioritization of governorates (updated 3 July 2017 with data week 25*)**

| Cases |
| Deaths |

| Parameters considered for the prioritization: |
| Number of cases (total & evolution over the past 3-4 weeks); AR (outbreak AR, weekly AR evolution, last week AR); Number of deaths (total & over the last 2-3 weeks). |

*As of 3 July, data from week 26 are incomplete and were not used for the analysis.*
the localities most intensely affected, i.e. the cholera ‘hotspots’. To identify these, access to the line lists from the DTCs are needed, with the patients’ homes and villages specified. Access to an electronic line list with information from DTCs has been made possible thanks to the work of the health RRTs and WHO information management support; this information was used to identify cholera hotspots on a daily/weekly basis and plan the work of the RRTs. However, the necessary shift to electronic line listing has only been partly achieved to date.49

The evaluation found that capacity within UNICEF to analyse and use the available epidemiological information and to target hotspots was not as strong or consistent as it needed to be. The UNICEF prioritization tool shown above was developed by a surge epidemiologist, experienced in both the practice and current theory of cholera response. He helped to focus the response appropriately, but was deployed only until the end of July. The tool was used by WASH RRTs as well as health rapid response teams at governorate and district levels, but without the consistent support and supervision of an epidemiologist to help interpret the data and determine its implications for operational response.

On surveillance and the quality of the epidemiological data

Good epidemiological intelligence is the first pillar of an effective response. During an epidemic, a good surveillance system has two main characteristics:

1. It gives early warning of unusual events, outbreak suspicions and newly-affected areas, enabling investigation, response and control efforts to be triggered;

2. It allows identification and follow-up of trends and prioritization of interventions into newly-affected areas or areas where incidence is increasing, in order to adjust resources to the needs.

Without these two key elements of surveillance, the response intervention is blind and cannot direct efforts to the areas most in need, leading to inefficiency.

Given the scale of the outbreak and the financial resources dedicated to the response, the evaluation team believes that more effort should have been put into strengthening surveillance and diagnostic capacity from the start. The prevailing access, supply and health system constraints do not fully explain the lack of progress on this crucial component. WHO with its partners (MoPHP, etc.) has made some efforts in this regard, including the introduction of electronic line listing, more general strengthening of the listing process and the establishment of health RRTs on a permanent basis at the governorate level. However, this has not been enough to allow accurate and real-time data sharing to guide the response. 50

Inadequate laboratory capacity for testing samples and limited availability of rapid diagnostic test kits (RDTs) did not allow responders to quickly identify newly-affected areas and follow up on trends. Instead, most of the response has been directed according to trends in the ‘suspected cholera/AWD’ data, which as noted above are possibly biased. While it is possible that all geographical areas were affected in the same way by an overestimation bias, it is also possible that the operation could not allocate resources to the most affected areas, leading to a dispersion of efforts. In such circumstances, even with a good prioritization tool and hotspot mapping approach, it is likely that the ‘targeted response’ will be inefficient.

49 Interview with WHO Yemen (i30).
50 Ibid.
3.4 THE UNICEF STRATEGIC APPROACH TO CHOLERA

The UNICEF Yemen approach is based on the ‘shield and sword’ strategy developed in West Africa. The table below shows the four pillars of the UNICEF integrated cholera plan, including their respective objectives.

The first two pillars focus on the emergency phase:

- Immediate emergency response and control in affected areas
- Emergency prevention in at-risk but not-yet-affected areas

The remaining two pillars are broader and focus on the medium to longer term (to better respond and to prevent or mitigate the impact of future outbreaks).

- Preparedness to respond to future outbreaks
- Prevention or risk reduction

This approach is comprehensive – from response to preparedness to short- and medium/long-term prevention – and aims to better control and respond to the cholera epidemic threat, minimizing the excess morbidity and mortality as well as addressing some of the causes through a more preventive approach.

The diagram on the following page, compiled by the evaluation team, illustrates the four different components and the related interventions, expanding on the logical connections between them and separating interventions made during and those made prior to (in anticipation of) an epidemic. The team has also compiled a more detailed theory of change for each component, as a contribution to UNICEF thinking. This is available in a separate document.

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**OVERALL OBJECTIVE**

To reduce occurrence of AWD and suspected cholera and to minimize the associated morbidity and fatality, through effective prevention and timely response

**RESPONSE OBJECTIVE (PHASE 1)**

To respond to the ongoing cholera outbreak to minimize the case fatality rate and prevent further spread of the disease i.e. reduce the current attack rates

- Emergency response and control in affected areas (Sword)
- Emergency prevention in at-risk but not-yet-affected areas (Shield)

**Specific Objective**

- To contain the cholera outbreak in affected communities and prevent the disease spread in at-risk communities

**RESPONSE OBJECTIVE (PHASE 2)**

To prevent occurrence of an outbreak of cholera in future through system strengthening, preventive intervention and adequate preparedness for rapid response

- Preparedness to respond to future outbreaks
- Prevention/Risk Reduction

**Specific Objective**

- To be better prepared in case of occurrence of a new outbreak
- To reduce the risk of occurrence of new cholera outbreak

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**FIGURE 9** Re-construction of UNICEF intervention logic from the UNICEF response plan (July 2017)
### Different components and related interventions prior and during an epidemic

<table>
<thead>
<tr>
<th>Mode of engagement</th>
<th>Related interventions</th>
<th>Objective / Effect</th>
<th>Aim / Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Emergency response</strong>&lt;br&gt;- targeted in already affected areas (SWORD)</td>
<td>Package of activities aiming at <strong>saving the lives</strong> of affected individuals =&gt; Cholera awareness (signs and symptoms) and life-saving behaviours (early treatment), setting up ORPs / DTCs, ensuring quality of treatment provided</td>
<td>Direct mortality reduction</td>
<td></td>
</tr>
<tr>
<td><strong>Emergency prevention &amp; preparedness</strong>&lt;br&gt;- in at-risk areas (SHIELD)</td>
<td>Package of activities aiming at <strong>interrupting the transmission</strong> and containing it within affected areas by addressing the locally relevant transmission contexts: households, public places, health centres, drinking water, dirty hands, unprotected foods, burials, etc.</td>
<td>Epidemic control (reduced transmission)</td>
<td><strong>OVERALL REDUCTION IN MORTALITY AND MORBIDITY DUE TO CHOLERA</strong></td>
</tr>
<tr>
<td><strong>Preparedness to respond (medium term)</strong>&lt;br&gt;With a focus in high-risk areas (cholera hotspots)</td>
<td>Package of urgent activities aimed at <strong>increasing the capacity of</strong> individuals, communities, health system and agencies to <strong>prevent and respond to cholera in at-risk areas</strong> =&gt; Cholera awareness (messaging) and promotion of protective behaviours, increasing the capacity for early detection and treatment (ORPs, community based surveillance, RDTs), rapid contingency planning and health staff training, increase in water chlorination levels, etc.</td>
<td>Vulnerability reduction in at-risk areas</td>
<td><strong>Increased detection &amp; response capacity</strong></td>
</tr>
<tr>
<td><strong>Prevention (medium – long term)</strong>&lt;br&gt;With a focus in high-risk areas (cholera hotspots)</td>
<td>Package of activities aiming at <strong>increasing the capacity</strong> of individuals, communities, the health system and aid organizations to <strong>detect and respond to cholera in at-risk areas</strong> =&gt; Community preparedness (early detection and treatment through ORPs, community-based surveillance), strengthening epidemic surveillance and alert system, improving epidemiological knowledge and understanding, contingency planning and prepositioning of essential materials, agency capacity mapping, health staff training, developing response plans, setting up rapid response teams, identifying locations for CTCs/DTCs and preparing rapid DTC set up, simulation exercises, etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Package of activities aiming at <strong>reducing exposure and vulnerability to cholera outbreaks</strong> =&gt; Oral cholera vaccination (OCV), strengthening of water and sanitation infrastructure and systems, long-term behaviour change programmes, health system strengthening, etc.</td>
<td>Risk reduction (reduced exposure &amp; vulnerability)</td>
<td></td>
</tr>
</tbody>
</table>
IMPLEMENTING THE STRATEGY

UNICEF prevention, preparedness and response interventions
In a context like Yemen, there is often a wide gap between plans and the reality of delivering them. As one interviewee for the evaluation noted, “The issue is not whether we know what the correct strategy is, but how to operationalize it.”

There is some truth in this, although the previous sections suggest that strategy too is challenging in a fast-moving situation. UNICEF realized relatively quickly what it needed to do, but was faced with multiple challenges in actually doing it. In this section, we consider how well UNICEF was able to put its plans into practice and whether it was able to achieve its goals.

4.1 CHOLERA PREVENTION AND MITIGATION MEASURES

Risk reduction and preventive measures prior to April 2017

Could the 2017 cholera epidemic have been prevented? Any answer is inevitably speculative, but given the operating environment and the deep-seated structural factors involved – including the collapse of water and sewage systems and multiple other risk factors – it may not have been possible in the short term to substantially reduce the risk of a major epidemic. If the ‘first wave’ had been completely contained, the chances of a major escalation would have been reduced. But the more fundamental preventive work required to prevent cholera, by ensuring adequate access to clean water and effective sewage treatment and waste disposal, is by its nature a medium-to long-term enterprise. This is particularly true given the very weak and damaged state of existing systems, taken together with the ongoing effects of conflict, insecurity, lack of capacity, and unstable governance. Even if it had been possible to mount a concerted effort to repair or sustain those systems following the late-2016 cholera outbreak, only limited impact could have been expected on the spread of water-borne disease by the time of the second wave in April 2017. That said, 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 probably worse.

Perhaps more pertinent than the question of prevention per se is whether the scale of any epidemic could have been reduced and its effects mitigated by shorter-term preventive interventions. Here, the evaluation team found that more concerted preventive measures – including a preventive oral cholera vaccine campaign – could have gone at least some way to limiting the scope of the epidemic. A range of factors appears to have combined to prevent the proposed OCV campaign from proceeding after the 2016 outbreak. Those interviewed for the evaluation differed somewhat in their accounts of why it did not occur. At any rate, with a lack of acceptance of the case for vaccination in some quarters, including some of the relevant health officials in Yemen, pressure for a campaign declined as the number of cases fell during first wave – despite what appears in retrospect to have been a strong case for a preventive campaign. The question of an OCV campaign came back onto the agenda when the second wave began in late April 2017.

UNICEF HQ interview (i34).
and a request was made to the International Coordinating Group on vaccine provision (ICG) in Geneva. But the shortage of global supplies and competing demands meant that ICG was unable to provide the number of vaccines requested. This in turn raised political questions about how limited supplies would be allocated between different areas in Yemen. After some weeks, the proposed campaign was cancelled in July. By this time the epidemic was already well advanced and the likely effectiveness of a reactive campaign was doubtful, since most areas had by then been affected. As one interviewee commented: “We missed the window (May/June) for a campaign. We spent one and half months going back and forward. There is a danger we will miss the window again if we don’t give the green light soon [to a campaign in early 2018].”

Within the limited scope of the present evaluation, we are not able to reach a firm conclusion on the prevention question. But it is reasonable to conclude that more concerted preventive efforts, including a preventive OCV campaign in early 2017, might have significantly limited the scope of the subsequent epidemic. The same conclusion applies to a potential future epidemic.

Risk reduction and preventive measures for 2018 and beyond

The same structural risk factors that existed in 2016/2017 are still in place – and again, tackling these is a medium- to long-term agenda. Other interventions have greater prospect of having preventive effect in the shorter term. The UNICEF supply of fuel, chlorine and spare parts remains essential, and steps should be taken to secure the related supply chains (see section 6). Preventive work at the household and community levels, particularly communications aimed at changing hygiene and water-storage practices, is also important, although behaviour change cannot be assumed to happen overnight, depending as it does on effective social marketing. Work done to date on the origins and transmission of the 2017 epidemic suggests that the use of contaminated surface water or water from unprotected sources in the aftermath of rains may have been a significant factor in the spread of cholera. Movements of people in the rainy season may also have been a factor. It is clearly important that Yemenis, particularly in the higher-risk areas, are informed of the risk factors and behaviours in order to help them avoid infection by water-borne disease in general and cholera in particular. A related C4D sensitization campaign should be informed by the results of the planned KAP survey.

Programmes aimed at increasing capacity at community level to detect and treat diarrhoea in the community through oral rehydration points (community ORPs) should also be implemented as a matter of priority. Given the very uncertain operating environment, the ‘system’ response to cholera/AWD is always likely to be restricted, and it is essential to try to build greater resilience at the community level.

For 2018, the case for a targeted, preventive OCV campaign is clear and agreed by most parties, and steps are being taken to ensure the necessary supply of vaccines. The question now is whether it can clear the local political hurdles and be mounted within the necessary time frame (early-mid 2018). Together with other short-term preventive measures, this has the potential to significantly mitigate any further cholera epidemic. See Recommendations in section 6.

52 WHO interview (i30).
53 This is due to be completed May/June 2018.
Phase 2 of the UNICEF integrated plan (covering the medium-term preventive agenda) has to date made only limited progress. As noted above, the preventive WASH agenda funded by the World Bank, while it is essential, cannot realistically be expected to have significant results in the short term beyond avoiding further decline of existing systems. That in itself is a crucial agenda, however, and one that should be prioritized. This macro-preventive work has three strands:

- Maintaining existing infrastructure
- Repair of damaged infrastructure
- Reconstruction of systems

The first two of these are supported by donors, but the last is not. While work on the first two is reported to be proceeding as quickly as can be expected, the infrastructure in general is deteriorating and there are concerns about potential further damage.

4.2 PREPAREDNESS TO RESPOND

Preparedness pre-April 2017

By general agreement, UNICEF was not well prepared to respond to the 2017 epidemic, nor was the response system as a whole. The reduction in cases during the tail end of the ‘first wave’ evidently created a false sense of security and the belief that cholera in Yemen was under control. As noted above, the new seasonal rains may have been a key factor in the sudden escalation of the outbreak in late April 2017. The possibility of an epidemic had been foreseen in the contingency planning exercises of 2016, but not cholera specifically, and nothing on this scale. No particular action was specified, and planning for epidemic response was not given priority among the competing humanitarian priorities. In short, UNICEF had not planned for this eventuality and, along with the rest of the humanitarian system, it was taken by surprise when it occurred.

This is not to say that UNICEF was completely unprepared in April 2017. Its ongoing cholera response meant that it had a basis from

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54 UNICEF interview (i13).
55 UNICEF interview (i18).
56 In the early warning/early action risk assessment process.
which to scale up, albeit a limited one. Existing partnerships and programme agreements, long-term agreements (LTAs) with suppliers, and operational protocols established during the response to the 2016 outbreak all helped to provide a basis for responding to the 2017 epidemic. But the scale and nature of the 2017 outbreak were unanticipated, and the speed and geographical spread of the outbreak meant that such preparedness measures and existing arrangements as were in place were inadequate to the task. Several of those interviewed in UNICEF felt that (in retrospect) more should have been done to line up suppliers, pre-position stocks and prepare contingency programme cooperation agreements (PCAs) with partners. One donor interviewed felt that the clusters had given “quite comforting messages about capacity” which in the event – given the scale of what occurred – proved unrealistic. The same interviewee felt that in the event there was a “massive gap between theory and reality”.

Funding was not a significant constraint for UNICEF, although at least one interviewee felt that donor reluctance to fund sanitation and garbage collection in late 2016 (as well as operations and maintenance interventions like the supply of fuel for pumps) had contributed to the problem and that weak initial donor support made it harder to bring the 2016 outbreak under control. Donors were generally supportive of the 2017 response; indeed they were one of the main sources of pressure to respond, providing flexible funds and fungibility between programmes. UNICEF and WHO both had substantial ‘system support’ funding from the World Bank, which in the case of UNICEF allowed it to scale up its health, C4D and WASH work to address the 2017 epidemic.

Partner capacity, by contrast, was a major constraint on the scale and pace of the UNICEF response. From one major donor’s perspective, “the capacity of agencies [including UNICEF] to scale up was far too limited.” Few of the organization’s typical INGO partners were present with the capacity to deliver on a large scale, in part because of the constraints of the operating environment and the difficulties of getting visas for international staff.

As noted in section 1, preparedness is essential to enable a timely cholera response, and timeliness in turn is crucial to effectiveness. The relative lack of preparedness of UNICEF and its partners therefore had significant knock-on effects. The (collective) failure of the system to foresee the contingency of a major cholera epidemic must be counted a significant failing. Given the risk factors involved, not least the ongoing first wave cholera outbreak, this was a failure of epidemiological and humanitarian risk analysis.

Preparedness in early 2018

Opinions vary as to how well prepared UNICEF is currently to respond to a potential third wave or new epidemic. Some of those consulted were relatively confident in this regard; some felt that UNICEF and others would again be caught out if there was a repeat of 2017, not least because of response capacity deficits, and that this was a serious reputational risk. The evaluation team found that UNICEF was certainly better prepared now than in 2017, but that considerable challenges remained. With regard to the crucial WASH sector, there remains a WASH capacity deficit across the country (with 27 million people vulnerable), but the Yemen office had “identified the capacity to deliver what UNICEF anticipates it can do within this [6-7

57 Donor interview (i35).
58 External interview (i50).
59 Interview (i35).
60 See, for example, UNICEF interview (i13).
The WASH cluster had carried out a capacity mapping exercise, within which UNICEF located its own response ability with its partners. One interviewee, who doubted the organization’s readiness (and the system’s) for a further outbreak, felt that one of the biggest gaps lay in community engagement.61

Asked about preparedness priorities, some of those interviewed stressed the diagnostic functions of the system, specifically cholera surveillance and laboratory testing. These are the primary responsibility of WHO. In-country capacity for testing remains very limited, with laboratories only in Sana’a and Hodeidah. Related to this, it was felt that standards (and accountabilities) related to the proper application of case definitions needed to be reinforced through training. Unless this was addressed, data quality would remain suspect. In other areas too (including WASH), partner training was cited as a preparedness priority.

The evaluation team finds that UNICEF is certainly better prepared to respond than it was in 2017, not least because of the lessons learned from that experience. Preparedness measures include multiple contingency PCAs, operational plans with local authorities and increased stockpiling at strategic locations, together with the integrated cholera plan. Partnerships are now well established, including the rapid response team model with government, although delivery capacity remains uncertain.

The evaluation team suggests that a number of other practical steps should be considered as part of effective preparedness, including an inter-agency lesson learning exercise, review of guidelines and standard operating procedures (SOPs), review of known risk factors and other epidemiological knowledge gained from the earlier response, and refresher training for RRTs, including a simulation exercise to test readiness to respond. Contingency planning and clarification of agency roles is another essential component.

It is hard to draw firm conclusions here, and there are practical limits to how far preparation can be made for any given contingency, albeit one with such a high level of risk. As noted above, no epidemic is predictable in its timing or spread. We believe, however, that work remains to be done to strengthen the working relationship with WHO and to clarify mutual roles and responsibilities.

Surveillance and early warning

Despite the collapse of the health system, the surveillance system in Yemen has been reinforced through continuous WHO support since the 2011 epidemic. An electronic sentinel surveillance system called e-DEWS was introduced in 2013 and expanded to most of the country (1,982 sentinel sites in 2016), with the objective of detecting and responding rapidly to suspected outbreak/clusters of cases alerts. This system works with RRTs prompted by the alert, which are sent to investigate and confirm the outbreaks so that control measures can be implemented as soon as possible to prevent further cases and deaths. All this was in place in 2016, but the surveillance system did not cover the community level, did not have sufficient laboratory capacity to confirm cases, and was not able to report the more detailed information present in the line lists.62 It struggled to provide timely analysis and to disseminate information quickly to operational partners; information might take a week to go from district to governorate to national level.63 Epidemiological information was lacking from the 2011 outbreak (and before), which might have helped

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61 External interview (i31).
62 A complementary electronic line list was implemented during the 2017 outbreak.
63 Interview (i31).
preparedness and targeting of the most at-risk populations, risk factors and practices.

We conclude that intervention to address these weaknesses in the surveillance system is a priority for early action – including but not limited to community-based surveillance.

4.3 THE UNICEF RESPONSE TO THE 2017 EPIDEMIC

In this section we consider how well UNICEF performed in its response to the epidemic, assessing the main components of that response against some of the standard OECD-DAC evaluation criteria.\(^44\) Our ability to assess performance is limited by the relative lack of information by which to judge programme effectiveness in particular (as opposed to delivery of service), as well as the inability of the evaluation team to visit Yemen and make direct observations, for example concerning quality. The findings here are heavily reliant on the testimony of those interviewed in the course of the evaluation, and on the logic of the organization’s own response model applied to the Yemen context, together with the information available from programme reporting.

Coverage and proportionality

The table above (figure 10) shows the dramatically increased ambitions of the UNICEF response between May and July 2017, when the full scale of the cholera/AWD epidemic became apparent. These increased targets put a huge strain on the Yemen Country Office at a time when it was already in full Level 3 (L3)

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emergency mode,\textsuperscript{65} with a particular focus on the nutrition crisis. UNICEF also ran up against the limits of available partner capacity. Yet the evaluation team believes that the organization was right to scale up to this extent, across all three sectors (health, WASH and C4D/community mobilization). No other organization was capable of doing so, and by scaling up to this extent, the UNICEF response became at least proportionate to the scale of the epidemic (in theory if not quite in practice).

Achievements against targets (see figure 12) show an impressively high level of achievement given the scale of ambition, although they also show that providing the necessary WASH services across the entire country was too big a task even for UNICEF as WASH cluster lead and (in theory) provider of last resort. The other major issue is that of timing (see below): UNICEF was unable to reach full capacity until after the epidemic peaked.

\textbf{Timeliness}

As noted above, UNICEF, along with the wider humanitarian system, was taken by surprise by the 2017 epidemic and was not well prepared for it. Following the escalation in reported cases in late April/early May, it took time for the country office to adjust, recognize the scale of the challenge it faced and ask for the help it needed from the wider organization. The visit of the Regional Director at the end of May reportedly had a galvanizing effect in this respect.\textsuperscript{66} Apart from a lack of preparedness, some other country-level factors had an impact on the organization’s speed of response. One of these was a disagreement with WHO over the UNICEF role in the health response, and specifically the establishment and running of DTCs. The relationship was described by one UNICEF interviewee as “tense”, with the two organizations diverging locally in terms of planning, where and how to intervene.\textsuperscript{67} Another interviewee suggested that as a result of this and other factors, there was a delay of three to four weeks in initiating the scale-up of the response.\textsuperscript{68} Still another, however, suggested that the order to fast-track and prioritize the cholera response was made early – with the caveat that the rest of the programme had to be maintained.\textsuperscript{69}

In any process of rapid programme expansion, particularly on this scale and in such a challenging operating environment, there is some inevitable lag. The generic L3 procedures, notably the Simplified Standard Operating Procedures (SSOPs) and emergency PCA process, reportedly helped speed the response in a number of ways. But it takes time to agree on a strategy with multiple actors, and to get the supply, human resources (HR), finance, partner contracts and other necessary elements in place – although many of these elements could have been expedited through better preparedness. Security and bureaucratic obstacles (including visas) slowed the deployment of international staff, and were a particular problem for INGO partners. The related UN ‘slot’ system, which limits the number of international staff deployed in insecure contexts, was a very significant limitation. There were (and are) multiple challenges to working with the government authorities, including politicization of parts of the response.

\textsuperscript{65} A Level 3 Emergency (L3), declared by the Executive Director of UNICEF, signals an organization-wide response.
\textsuperscript{66} UNICEF interview (i2).
\textsuperscript{67} UNICEF interview (i34).
\textsuperscript{68} UNICEF interview (i3).
\textsuperscript{69} UNICEF interview (i17).
However, some of the other delays in the response were not inevitable and should have been avoided. Apart from the disagreement over the respective roles of UNICEF and WHO, the delivery of some elements of the programme – notably the C4D component – lagged behind other elements and was not always well coordinated with them. The fact that the household-to-household sensitization campaign was not mounted until August, after the epidemic had peaked, is the most striking example of this. That said, the scale of the community engagement programme (reaching nearly 18 million people) made it difficult to deliver quickly. The lack of pre-existing partnerships in many of the areas affected was also a significant constraint: New partners had to be identified, and volunteers trained and deployed, against a backdrop of limited access and sometimes conflicting official policy.

One major donor commented that “the bigger the outbreak became, the more it exposed the inability of UNICEF to scale up quickly,” noting that its response hadn’t reach expected levels until July/August 2017, well after outbreak started (particularly as measured from October 2016). This seems too harsh a judgement, given the capacity limits of the system on which UNICEF depended, but it reflects a

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70 Interview (i35).
perception among some other actors that the WASH component of the response in particular was slow to be delivered. Interviewed for the evaluation, the Humanitarian Coordinator for Yemen commented that by July 2017, the health and WASH sectors were struggling to deal with the epidemic, leading him to call for a ‘system-wide’ response involving capacities from all sectors.\(^71\) His perception was that rural areas in particular were being under-served.

UNICEF itself (notably the Office of Emergency Programmes [EMOPS]) led an international call for greater involvement of agencies with WASH capacity, facilitated by the global WASH cluster. The result of these calls appears to have been that some additional capacity was brought to bear, though still far short of what was required.

**Coherence**

As the map above illustrates, although the three main components of the response – health, WASH, C4D – were planned together, they were not always harmonized in practice. As one head of a UNICEF field office noted, “sometimes two components were implemented together, but generally not three”\(^72\) Nutrition was at first not coordinated with the other components, although this changed over time. Cross-referral of severe malnutrition cases from DTCs to therapeutic feeding centres (TFCs) and the four components are now brought together in a minimum integrated response package.\(^73\)

Better harmonized responses, both within the UNICEF programme and across the response system, hold the prospect of greater effectiveness in controlling the epidemic. The current lack of harmonization between the health and WASH RRTs appears to the evaluation team to be a case where more joined-up planning and implementation would achieve better results. That said, ‘combining’ programme elements is not always feasible or desirable. As one interviewee noted, “integration of WASH C4D with [that of] health and nutrition is problematic; there are just too many messages, and you are likely to end up with no behaviour change. You can only expect to change two to three things”.\(^74\)

**Effectiveness**

In terms of the achievement of ‘reach’ in the delivery of services to affected or at-risk populations, UNICEF performance is generally impressive, particularly given the scaled-up ambition of the programme. The table below, taken from a UNICEF cholera situation report (sitrep) for the second half of November 2017, shows percentage achievement against targets across the main elements of the cholera response.

The biggest shortfall is for household WASH interventions, suggesting an over-ambitious target in this area – and no doubt reflecting the lack of partner implementation capacity. The scale of achievement is nevertheless impressive, although it raises questions about how interventions were prioritized within the overall target, i.e. were the 77 per cent of people reached in the highest risk areas? Informant interviews suggest that the shortfall would have been mainly in rural areas. The same question arises for the DTC and ORC shortfalls.

How effective these interventions were in helping to control the epidemic and reduce mortality and morbidity is less clear. A number of factors will have affected this. As noted

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\(^71\) Interview (i20). This call was issued on 3 July 2017.

\(^72\) Interview (i16).

\(^73\) Interviews (i17), (i29). As an example of the lack of earlier integration, the (crucial) guidance from the MoPHP, UNICEF and WHO for DTCs on how rehydrate children with severe acute malnutrition was not issued until August 2017.

\(^74\) UNICEF interview (i13).
above, one is the timing of the interventions relative to the spread of the epidemic. Given the time taken to roll-out the WASH programme, it is doubtful whether it will have had a substantial control effect on the overall course of the epidemic, although it will have provided important protection to households against cholera and other water-borne diseases.

A second factor affecting outcomes is the quality of the interventions – for example, the quality of case identification and management together with infection prevention and control (IPC) in the DTCs, which will have had an impact on health outcomes. The low case fatality rates suggest that treatment in the DTCs was generally successful, although uncertainty over the data means that this has to be interpreted with caution. The apparent failure to provide all DTCs with WASH services (the table above indicates a 15 per cent gap) is not acceptable, and raises questions about IPC in those centres. The third-party monitor reports reinforce this concern – see next page under ‘Quality’.

The scope of the C4D work – 18 million Yemenis ‘reached’ with behaviour change messages – is impressive, but its effects are largely unknown. The spike in admissions to treatment centres appears to indicate some success in terms of health-seeking behaviour. However, several interviewees for the evaluation raised questions about the effectiveness of an approach that was based on the (largely untested) assumption

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75 It is possible that others made up the ‘deficit’, but this is not indicated in the reports.

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**FIGURE 12** Progress against targets, from UNICEF Cholera Sitrep 17-30 November 2017 - Annex 1: Revised Indicators

<table>
<thead>
<tr>
<th>Cholera Response Indicators</th>
<th>UNICEF</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Health) Functional Diarrhoea Treatment Centres (DTCs)</td>
<td><strong>Target</strong></td>
</tr>
<tr>
<td></td>
<td>75</td>
</tr>
<tr>
<td>(Health) Functional Oral Rehydration Corners (ORCs)</td>
<td>800</td>
</tr>
<tr>
<td>(WASH) People living in areas at high-risk for cholera have access to safe drinking water</td>
<td>6,000,000</td>
</tr>
<tr>
<td>(WASH) Number of people in cholera high risk areas benefitting from household level water</td>
<td>12,000,000</td>
</tr>
<tr>
<td>and disinfection</td>
<td></td>
</tr>
<tr>
<td>(WASH) Percentage of DTCs provided with WASH services</td>
<td>100</td>
</tr>
<tr>
<td>(C4D) Affected people reached through interpersonal community engagement efforts promoting</td>
<td>17,500,000</td>
</tr>
<tr>
<td>4 practices for cholera prevention</td>
<td></td>
</tr>
<tr>
<td>(C4D) Social mobilizers deployed for key behaviour changing in cholera high-risk areas</td>
<td>40,000</td>
</tr>
</tbody>
</table>
that a few minutes spent delivering messages would result in people changing their normal behaviours.\textsuperscript{76} The planned KAP survey should shed light on the validity of this assumption. The focus groups discussions conducted for this evaluation with beneficiaries in Sana’a suggest that multiple factors limit people’s options and dictate behaviours, including general poverty, the cost of commercially-provided water, and lack of awareness (particularly among children playing outside) of the dangers of standing waste water.

With regard to WASH, following the logic of the UNICEF control strategy (see section 3), a strong case can be made that by addressing the main known risk factors for water-borne disease, UNICEF WASH interventions would have substantially reduced levels of risk and vulnerability in the areas where they were implemented. To set against this, apart from timing and coverage issues and the poor quality of the available data, it has to be said that what was ‘known’ was for the most part based on general principles rather than on investigation of the context-specific risk factors, behaviours and transmission contexts. A more informed response would have allowed better targeting and potentially greater effectiveness.

The wider effects of UNICEF interventions are even harder to determine. The ambition was not simply to respond to cholera, but to help strengthen systems, including the health and surveillance systems. There is good reason to think that UNICEF – together with WHO and other actors – was at least successful in preventing the further decline of systems. The impact of a range of practical interventions – from provision of fuel for pumps to the payment of incentives for health workers whose salaries had not been paid – suggests that the decline of public services would have been significantly more damaging without those interventions. Only time will tell how sustainable those gains will prove in a highly unstable environment.

Quality of interventions

This is an area where UNICEF acknowledges that it had difficulties. Interviewees suggested that – perhaps unsurprisingly – there was a trade-off between expanded coverage and the quality of the programme.\textsuperscript{77} Lack of sufficient oversight of partner programmes exacerbated this. The third-party monitoring reports raise particular concerns about the quality of service in the DTCs. For example, one such report, based on visits, noted that: “There was no adherence to standard case definition, which resulted in over-registration of cases in majority of the visited sites”; “[Overall], protocols for… case management, IPC and surveillance… were not applied in the visited sites”; “RTD was not available in 88 per cent of the visited sites, and if available… not always done for every tenth case.” This issue of quality in DTCs was raised in an interview with WHO, in which the informant suggested that UNICEF was not setting up ‘proper’ DTCs and that their quality was low. For their part, UNICEF interviewees suggested that maintaining quality was a problem that WHO reportedly also suffered, besides the issue of limited coverage.\textsuperscript{78}

Quality depends on a range of factors, in particular clarity of protocols and expected standards, together with relevant training, and good management and oversight, with related accountability for performance. In the Yemen context, there was inter-agency agreement on protocols and standard operating

\textsuperscript{76} See, for example, interviews (i13), (i15).
\textsuperscript{77} UNICEF interviews (i17), (i31); external interview (i30).
\textsuperscript{78} See, for example, interviews (i37).
procedures for DTCs (although these took time to be produced), but the training, oversight of partners, and accountability elements were evidently weak or missing. This is clearly an area that UNICEF needs to strengthen in any future cholera response.

### 4.4 PROGRAMME MONITORING AND QUALITY CONTROL

As noted above, this was an area where UNICEF was challenged. Programme monitoring and quality assurance is often difficult when operating in very insecure and fast-changing environments. The combination of a massively scaled-up programme, ambitious delivery targets and a lack of adequate partner capacity to deliver meant that adequate programme oversight was always going to be a challenge for UNICEF. Its field officers worked hard in this respect, as did the Planning, Monitoring and Evaluation (PME) team, and their coverage is testimony to their endeavour.79 But with limited staff numbers80 and problems of access, they were inevitably limited in their coverage. Good use was made of third-party monitoring, but while effective at picking up issues retrospectively, this is not a substitute for programme oversight. Despite the ‘integrated’ nature of the programme, joint field monitoring (combining staff from WASH, health and C4D) was rarely achieved, although the use of jointly-compiled checklists helped to ensure that all sectors were covered.81 Perhaps the bigger issues concern the effective use of the data compiled. This was not something that the evaluation team was able to analyse in any detail, but it was raised by several interviewees as an issue and evidently needs further attention. The ‘dislocation’ of the monitoring function from programme decision-making appears (in the experience of the evaluators) to be a common issue in UNICEF.

The quality of third-party monitoring reports appears high, and as noted above, they provided an important window onto both the delivery and quality of the programme. Around 450 third-party monitors were trained by UNICEF in health, C4D and WASH, and specifically in cholera programme monitoring.82 Nevertheless, the organization’s ‘real-time’ picture of what is happening on the ground is too limited and (as one interviewee put it) needs better ‘ground truthing’. This is particularly true given the doubtful reliability of partner reporting data and data from the MoPHP.83

Programme oversight and quality assurance is an issue for the whole response system. UNICEF wisely used third-party monitors not just to conduct regular programme monitoring visits but also to conduct a verification exercise that looked at the way in which cases were being identified and reported from the DTCs. The results were instructive, although here and elsewhere the links between monitoring, programme review and adaptation appeared to be weak.84 Given the overlap of concern and interest here with WHO, this seems an obvious area for closer collaboration between the two organizations. Sharing a monitoring process would also help to ensure application of common standards and enable best practice to be replicated across the two programmes.

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79 Around 16 humanitarian programme monitors were deployed, plus additional monitors specifically for the cholera programme. Interview (i16).
80 The PME team had four international and four national staff (i16).
81 Interview (i24).
82 Interview (i17).
83 Interview (i16).
84 Ibid.
CHAPTER 5: THE EFFICIENCY OF THE UNICEF CHOLERA RESPONSE

Review of external and internal processes
While the limited scope of this evaluation does not permit a thorough review of business and other processes, this section records some of the findings of the evaluation as they relate to external processes (partnerships, collaboration, coordination) and to internal UNICEF processes related specifically to the cholera response.

5.1 WORKING WITH OTHERS: PARTNERSHIPS, COLLABORATION AND COORDINATION

Partnerships

As noted earlier, the availability of adequate delivery partnerships was one of the main limiting factors on the UNICEF response to the 2017 epidemic. The lack of INGO WASH capacity in particular was a major constraint, although this improved to some extent following an international call for additional support in July 2017.85 Under the circumstances, the operational partnerships formed with the public water authorities86 and the MoPHP were strong and effective, particularly with regard to the RRTs and the deployment of community health volunteers. Interviewees suggested that partnerships in C4D ‘could have been more efficient’, although the evaluation team was unable to investigate this.

Relations with donors appeared to be strong, as reflected in donor flexibility in the re-allocation of funds towards cholera response priorities. Partners interviewed in the field noted a similar flexibility on the part of UNICEF, although funds were sometimes slow in arriving. While this evaluation does not cover the question of financial accountability, a lack of sufficient support and oversight of partner programme delivery (e.g. in establishing and supporting DTCs) had implications for programme quality. This is perhaps the most important area for improvement, by UNICEF and other actors, including work to build the delivery capacity of local partners.

The interviews with field partners show a pattern of general satisfaction with the UNICEF partnerships and indeed a good deal of appreciation for the way in which they were conducted. They also highlight some issues that may need to be addressed, such as training. We include here some of the individual partner comments by way of illustration.

“Most supplies such as chlorine and hygiene kits were delivered on time and in sufficient quantities.”

“We had no direct training by UNICEF. As for the overall training support for the project, 40 volunteers were trained in a one-day workshop to carry out awareness-raising campaigns. It should be noted, however, that the project plan agreed to with UNICEF suggested a three-day training workshop, but at the request of UNICEF, it was shortened to just one day while increasing the number of volunteers from 30 to 40. We expected UNICEF to support and train us on areas such as water and water treatment,

85 Some typical partners of UNICEF in this field, such as Oxfam, were able to operate only on a limited scale.
86 Such as, for example, the General Authority for Rural Water Supply Projects (GARWAP).
plus some training on the financial procedures and requirements by UNICEF to facilitate our joint work.”

“UNICEF support for training was not enough because we had to invite volunteers from various sub-districts to come to the district centre for training, which is difficult given the tiny daily allowance paid to them (3,000 YER), because some need to come from remote districts hiring cars for themselves at a high cost, especially female volunteers.”

“Trust between the organization and the society was present and so was coordination between awareness campaigns, the distribution of materials and hygiene kits... To improve and increase effectiveness and response time in the future, we need to coordinate with the various parties and influencers in the field while improving the relations between the organization, the local authorities and the local communities. We should also consider extending the period set for the project to be implemented.”

“Publish partnership requirements and selection criteria on the website so it will be accessible to everyone wishing to apply as an implementer of UNICEF projects.
- Assign certain staff at UNICEF to work as contact points.
- Provide with the results of the final evaluation to learn from and draw lessons learned.”

“Several lessons were learned from this project; most importantly, we should not promise what we do not have... In addition, coordination with local authorities and target communities should be given enough time.”

“The response package was appropriate and consistent with the available resources. If we had additional resources, a much better response could be developed, including identifying the needs of each area separately, as well as providing safe drinking water.”

Collaboration

UNICEF collaboration with government partners was at times frustrating, in part because of the fractured nature of government leadership, gaps in effective governance and the severe under-resourcing of the relevant ministries (of which the non-payment of health workers was just one symptom). As one senior UNICEF manager noted, “we decided we needed to work with the health system, even though it might slow us up”. This was essential in order to achieve scale – particularly with the lack of capacity of some of the organization’s typical international partners. It was also important for sustainability and for building system capacity.87 The evaluation team agrees with this assessment and found that the collaboration with government entities, for all the complications, was both appropriate and largely effective. The RRTs provide the most positive example of this.

The quality of collaboration with WHO was much more mixed. As noted above, relations were reported to have been difficult and involved a lot of technical negotiations around issues that should have been resolved more quickly. There appeared to be a gap between agreements at a global level between the two organizations and local working realities. While relations at regional and headquarters (HQ)

87 Interview (i25).
levels were reported to be good, there were clear differences of narrative and perceptions that emerged from the evaluation interviews with staff from each organization. To be fair, both organizations were overwhelmed with the scale of the task and as one interviewee put it, “neither could cope”. But tensions are apparent between the more policy and protocol-focused approach of WHO and the more operational approach of UNICEF.

Whatever the merits of the arguments involved, the middle of a major cholera epidemic is not the time to have such debates. The dynamic is familiar enough from this and other contexts that it is clearly an issue that needs further attention from UNICEF and WHO management.

In some areas, the evaluation team believes that UNICEF was over-dependent on WHO, and perhaps overly concerned about respecting the latter’s ‘territory’. The locus of decision-making on the issue of oral cholera vaccines, for example, appeared unclear between the two organizations, at least to the evaluation team (and a number of those interviewed). In a context like Yemen, where capacities are stretched beyond their limits, UNICEF must be prepared to extend its reach, particularly given its scope of responsibility. It rightly did so with regard to the scale of its health-related work in Yemen, and we suggest that greater in-house capacity is needed in epidemiological analysis (see section 6).

Coordination

Within the scope of this evaluation, the team was not able to undertake a full review of the relevant coordination mechanisms between the various agencies and bodies concerned with response to the cholera/AWD epidemic. However, some comment is warranted here, based on what was reported to the team in interviews with (mainly) UNICEF staff.

Overall coordination of the 2017 response in Yemen appeared confused, with multiple mechanisms overlapping and running in parallel. In particular, the respective roles of the clusters (health/WASH) and of the Emergency Operation Centres (EOCs) were poorly defined. The EOC model itself was not rolled out across the country as planned, and appears not to have worked well. One of those interviewed felt that it had become a ‘reporting shop’, rather than a locus for decision-making. Others felt that the EOC model had led to ‘parallel coordination’ with the clusters, and that it required a culture change from both the authorities and aid agencies. Many felt that the plans for the EOC were simply too ambitious, especially since it was introduced in the middle of the response. There were political factors here too. As the UNICEF Cholera Sitrep for November 17-30 notes: “The political situation and the power struggle among health officials are making continued coordination of the response very difficult…”

Regarding EOCs, the sitrep notes:

The Emergency Operations Centre in Sana’a was established in the MoPHP. For the last several weeks, however, the EOC is not active in its current physical location as both MoPHP staff and those deployed by various agencies to the EOC are unable to access the premises due to security issues. In terms of functions, the EOC team has taken over the production of the weekly sitrep (previously joint health-WASH cluster sitreps); however, it does not yet have the capacity to manage the ongoing response.

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88 Interview (i32).
89 Interview (i15).
90 Interviews (i30), (i33).
CHAPTER 5: THE EFFICIENCY OF THE UNICEF CHOLERA RESPONSE

5.2 UNICEF MANAGEMENT AND SUPPORT FUNCTIONS

Overview

Although management issues have not been a specific focus of this evaluation, the evaluation team found that the overall management of the UNICEF response appeared relatively strong, with good leadership at both country and regional levels. Nothing heard from key informants contradicted this view. Although, as noted above, UNICEF as a whole was slower than it could have been in scaling up its response, it was relatively swift in its reactions compared to other organizations and took a leading role in the subsequent response. The L3 SSOPs were generally agreed to have helped in this respect, particularly the emergency PCA procedures. ‘Surge’ mechanisms proved essential, but limited availability of cholera-experienced staff (internal and external) was a significant hindrance.

Senior staff in country acknowledged that the cholera response had had some knock-on effects on the rest of the programme, particularly the nutrition and internally displaced persons (IDP) responses, at least in terms of management attention. This had been a conscious re-prioritization. Nutrition services had continued, achieving around 70 per cent of the target, but a number of factors were said to have contributed to that shortfall. The wider knock-on effects on the organization are hard to quantify, but it is striking that (as one EMOPS interviewee noted) UNICEF is currently dealing with seven L3 situations, raising doubts about what an ‘organizational priority’ actually means. The inevitable result is that resources available for support and oversight are over-stretched,

This function remains with the relevant cluster and inter-cluster coordination mechanisms. The second central EOC in Aden has also been non-functional for the last month. Governorate EOCs are in the process of being set up at varying degrees of functionality – none yet able to fully manage/co-ordinate the response.

This is clearly an issue that needs to be reviewed before any further potential response. The lessons learned exercise that was planned by the HCT/Inter-Cluster Coordination Mechanism (ICCM) at the end of 2017, and which had to be abandoned when security deteriorated and staff were evacuated, should be rescheduled. There evidently needs to be clarification and simplification of the cholera-related coordination processes and the respective roles of the Cholera Task Force, the EOC, the health/WASH clusters, OCHA and the HCT/ICCM. Operational coordination processes in particular need to be agile, streamlined and localized to the extent possible. Information management should be streamlined where possible.

Inter-sector coordination (between the clusters) was reported to be relatively strong. The working relationship between the health and WASH clusters, in particular, was good, and they worked closely together to produce the integrated response plan around which the response was largely built. Indeed, this appeared to be the essential ‘pivot’ around which effective coordination on the epidemic response happened, both at a strategic and operational level. As noted above, the Humanitarian Coordinator subsequently brought in other sectors, but this was less to do with concerns about coordination than about delivery capacity.

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91 Interview (i36).
92 This issue, along with the SOPs for L3 and L2 emergencies, is reported to be under review both within UNICEF and as part of an inter-agency process.
with many key staff members committed elsewhere and unavailable for re-deployment at short notice.

We consider below a few of the more specific organizational aspects of the cholera/AWD response that had a bearing on UNICEF performance overall. The evaluation team was unable to make a thorough investigation into these areas, so what is offered here are observations and suggestions rather than more solid findings.

**Internal coordination and management**

UNICEF did not lack for internal coordination mechanisms on the epidemic response; indeed, as one interviewee put it, there was “almost too much internal process”.

Overall, this appeared to work well. The cholera response was an L3 response within a wider, system-wide L3 response, and UNICEF was quick to adapt the Emergency Management Team (EMT) mechanism to the outbreak, with weekly cholera/AWD EMT meetings initiated soon after the second wave began in April 2017. These appeared to function well in harmonizing the various components of the organization’s response and the support needed to mount it. In addition to these UNICEF-wide EMTs, Yemen Country Office (YCO) holds its own EMTs (bringing together programme sections and operations) as well as monthly programme coordination meetings and weekly heads-of-section meetings. All of this is in addition to the regular Country Management Team and senior staff meetings. UNICEF senior managers attend the external HCT and ICCM meetings, and UNICEF is represented on the Cholera Task Force and EOCs.

As is normal in UNICEF, accountability for delivery is shared between programme sections and operations. The sections hold the relevant budgets and are accountable for these and the related strategies. Day-to-day responsibility for delivery of the field programme and liaison with partners lies with the Chief of Field Operations and the heads of the various field offices. Together with the PME staff, they are responsible for oversight of delivery by partners, though because of capacity and access constraints, much of the monitoring is contracted out to third-party monitors. As a result, the oversight function appears to have been stretched beyond effective limits, and this requires attention. The evaluation team also found that responsibilities sometimes appeared to fall between the sections and operations staff (e.g. for contracting local partners) although no deeper investigation of this was possible.

**Advisory support to Yemen Country Office**

Colleagues in YCO generally felt well supported by the MENA Regional Office (MENARO). The sections in Amman provided remote support, advice and guidance on strategy, in liaison with colleagues in New York. In some cases – notably WASH – the head of section was able to visit the programme and help revise the strategy at a fairly early stage (June in the case of WASH). In the case of C4D, the relevant advisor’s attempts to visit were frustrated by the UN ceiling on the number of internationals in country and by inability to obtain a visa.

This may help explain why there appeared to be some divergence of views between MENARO and YCO on the appropriate C4D approach.
The evaluation team suggests that the advice from the regional office on the cholera response could be better ‘joined up’ across the sections. With that in mind, it is recommended that the relevant advisors from WASH, health, C4D and nutrition constitute themselves as a ‘cholera task force’ for the duration of the epidemic and in planning for potential future outbreaks. See section 6.

On the headquarters side, technical advice is provided by Programme Division (PD). As noted above, the organization’s global support capacity is stretched, and one interviewee questioned whether PD advisors (e.g. in WASH) had been able to be sufficiently ‘hands on’ in their support. This is noted here as a question rather than a finding. The same capacity issue probably also applies to EMOPS, and it may be worth reviewing how – between them – PD and EMOPS can better monitor and provide support to an emergency response within an existing crisis response, as in this case.

At both regional and HQ/global levels, the evaluation team found that UNICEF lacked the necessary cholera and epidemiological expertise – or at least the ability to deploy it when needed. While it has many staff with experience and expertise in cholera response, these are already committed elsewhere in their respective regions and difficult to re-deploy. This proved the case in Yemen, with the crucial but delayed surge deployment of a cholera-experienced epidemiologist from southern Africa. The evaluation team believes that UNICEF is currently too dependent on epidemiological analysis from WHO in what is a core area of concern for the organization. In this case, we believe that this dependence was detrimental to UNICEF decision-making. Recommendations for boosting the organization’s capacity in this regard, both at the regional level and globally, are set out in section 6.

Human resources

Despite the use of L3 simplified operating procedures, UNICEF found it challenging to deploy the necessary support staff to the cholera response in a timely way. Given its lack of standby capacity, there was a high level of dependence on ‘surge’ deployments both from inside and outside the organization, with the attendant limitations on availability noted above. External factors, in particular the ceilings for international put in place by UN security (the UN ‘slot’ system) and visa restrictions, meant that these and other deployments were often delayed by weeks. As a result, one interviewee suggested, the country office was already ‘overwhelmed’ by the time the surge capacity arrived. There was considerable pressure to scale up the response, and HR in New York was reported to have been very supportive.

The evaluation team suggests that UNICEF review its standby partnership capacity in the cholera-related sectors, given the capacity limits encountered in Yemen. In particular, it recommends establishing a roster of cholera-experienced specialists (inside and outside UNICEF) who can be approached when a crisis like this occurs. Such expertise was needed at all levels of the Yemen in-country response.

One limitation on the utility of international staff deployed to Yemen was the fact that, with few exceptions, they were unable to speak Arabic. Since English is generally not spoken in Yemen, and meetings with government officials in particular are conducted in Arabic, this

97 Interview (i36).
98 See, for example, interviews (i13), (i14), (i15).
99 Interview (i4).
100 EMOPS is reported to be developing a health emergency roster.
meant that communications were hampered. When an Arabic-speaking WASH expert was deployed from Syria, this was reported to have added great value, particularly in understanding the nuance of what was said in meetings. A number of YCO staff suggested that wherever possible, UNICEF try to deploy Arabic speakers to support the programme. One area in which this would be particularly beneficial would be in conducting discussions with ordinary Yemenis at community and household levels, as well as in communication with local partners and volunteers.

Supplies and logistics
This aspect of UNICEF operations, while it sometimes goes unrecognized, has been pivotal to what UNICEF has been able to achieve, both in the Yemen crisis response generally and in the cholera/AWD response specifically. All the relevant levels of UNICEF – Supply Division, Djibouti, regional and country offices – have been fully involved. As noted earlier, the supply of chlorine and spare parts to keep water supply and waste treatment systems running has been an essential intervention. As of early March 2018, the UNICEF proposal to supply some 4.5 million doses of oral cholera vaccine to targeted districts in Yemen had been approved by the relevant authorities and shipment was expected to take place mid-March. Assuming the campaign goes ahead, this could prove a crucial preventive intervention. On the subject of vaccines, one senior interviewee questioned the governance and accountability of the International Coordination Group for cholera vaccines, and the criteria by which it made its supply decisions. The evaluation team was unable to investigate this issue further.

UNICEF use of small own-flagged ships reportedly proved valuable in the Yemen context, allowing manual unloading of goods when port services were disrupted. UNICEF did well to maintain supply shipments via its Djibouti logistics hub when the Red Sea port of Hodeidah was effectively blockaded in late 2017. Although UNICEF and others were not prepared for an epidemic response on this scale, some of the necessary supply and logistic components were already in place. For example, UNICEF had good LTAs already established for transportation and warehouse services (all set up pre-2015). The LTA suppliers for provision of hygiene kits and jerry cans were reported to have been highly responsive when scaled-up orders were placed. Nevertheless, the volume and timescale of supply requirements (such as the need to procure ten million bars of soap in two weeks) was extremely demanding. Although local partners reported delays in household supplies (soap, kits) reaching them for distribution – in part because local suppliers proved over-optimistic about their ability to supply at short notice – UNICEF generally did well to meet demands as they arose. The prepositioning of stocks within UNICEF warehouses, as well as with partners at strategic locations, helped in this regard.

Given the continued volatility of the situation in Yemen conflict, contingency plans should include the possibility of further blockades of Hodeidah or other major logistic obstacles. Steps should be taken (if they have not already been taken) to secure sufficient stocks of essential items in country, including chlorine, fuel and Aquatabs.

101 Interview (i49).
102 Interview (i49).
103 The Djibouti logistics team was particularly praised for their efficiency by the Yemen supply team (i50).
External communications

Before the 2017 epidemic, UNICEF and other humanitarian organizations had difficulty keeping Yemen in the public eye. The lack of access for journalists meant that little was available by way of news or other coverage. For UNICEF this meant that, in the words of one senior interviewee, “we had to do the journalists’ job.”\textsuperscript{104} As well as working with freelance photo journalists and videographers, UNICEF staff themselves also provided video footage and pictures, and broadcasters and news outlets picked up the resulting images.

As well as its intrinsic significance, the cholera/AWD epidemic proved an essential peg on which to hang the wider story of children in Yemen and how desperate their situation had become since the conflict escalated in 2015. Doing this made good sense: By situating the cholera story within the wider story of the Yemen crisis, UNICEF was able to secure a great deal of coverage for a situation that was largely out of the public eye. One interviewee questioned whether UNICEF had done enough to use the humanitarian advocacy potential of the cholera outbreak, to highlight the impact of the conflict (and the way it is being pursued) on children in particular and Yemeni civilians generally, and perhaps also to argue for a humanitarian pause.\textsuperscript{105}

\textsuperscript{104} Interview (i23).
\textsuperscript{105} Interview (i23).

In using the cholera crisis to increase the profile of the Yemen crisis more generally, there was some danger that the cholera story itself would become distorted or exaggerated. As noted earlier in this report, the question of the number of cholera cases – and the true scale of the cholera epidemic – is a fraught one. UNICEF was careful to refer to ‘suspected’ cholera cases from the outset, but did not at first reference AWD. This changed when WHO challenged the use of terms (July 2017), after which UNICEF along with other actors agreed to use the formulation ‘suspected cholera/AWD’ cases. Nevertheless, the unqualified statement that there have been ‘a million cholera cases’ in Yemen since April 2017 has taken hold in some parts of the media, and has proved persistent.

The communications work on Yemen has been essential in raising the profile of the situation and brought much-needed resources. UNICEF needs to remain vigilant in its own communications on this and potential future cholera outbreaks to ensure that it does not paint a misleading picture. Continued close liaison and (where appropriate) joint communications with WHO on this issue are essential.
6 CONCLUSIONS AND RECOMMENDATIONS
6.1 OVERALL CONCLUSION

Although this is not an evaluation of the ‘system-wide’ cholera response, it is hard to escape the conclusion that the overall response to the 2017 epidemic was too slow in scaling up, unable to keep pace with the scale of the epidemic, and probably had a limited impact on its course. This is not to deny the value of the work that was done by multiple actors – many of them volunteers, all working under very difficult conditions – to help protect households and communities from disease and to treat those affected. But the 2017 epidemic, once it escalated in May 2017, was evidently beyond the ability of the response system (as it stood then) to control.

All of this must be qualified by acknowledging the exceptionally challenging context. There were multiple competing demands on the humanitarian system, not least the food security and nutrition situation, which was already critical and which threatened to precipitate famine. The dramatic decline in public services since 2015, in particular the health and water supply/waste disposal systems, had left the country highly exposed to potential epidemics and ill-equipped to respond effectively. For reasons outlined above, millions of Yemenis are exposed to water-borne disease and are highly vulnerable to its effects. Controlling a cholera epidemic is very challenging even in more favourable operating conditions. In Yemen, a lack of system capacity (local, national and international) and preparedness to respond, coupled with extremely difficult operating conditions, meant that the response was never likely to be equal to the task in 2017.

This was an epidemic that could, in theory at least, have been prevented, or at least substantially mitigated. In practice, given the state of the water supply and waste disposal infrastructure, together with very high levels of political instability, the necessary system-level preventive work was not in place (and could yet take years to achieve). Mitigation would have been a more reasonable expectation. The outbreak that began in October 2016 did not trigger the breadth of response it should have, given the extreme vulnerability of the country, and it was not brought fully under control. Nor was a preventive vaccination campaign mounted. When the ‘second wave’ of the outbreak began, more concerted and timely control measures could probably have limited its spread. The humanitarian system appeared to be taken by surprise by the rate of spread of the epidemic, and was unprepared to respond to an epidemic of this magnitude. Given the prevailing risk factors and vulnerabilities in Yemen, and the on-going cholera outbreak, this system-wide lack of anticipation and preparation for a major epidemic was a significant failing – even allowing for competing demands and the practical limits to preparedness.

The general conclusions outlined above for the overall response are necessarily tentative, given the limited scope of this UNICEF-specific evaluation. But with the prospect of a further outbreak in 2018, they prompt urgent questions for the system as a whole. Have all reasonable steps now been taken to prevent a further outbreak? Does the system, and do communities themselves now have the capacity and tools to effectively identify, control and contain such an outbreak through early interventions? How confident are we that the response would be more timely, joined-up and effective than in 2017? This evaluation attempts to answer these and related questions from a UNICEF perspective, based on an analysis of the organization’s response in 2016-2017 as well as the wider context.
Our overall conclusion regarding UNICEF performance is that given the failure to anticipate the 2017 epidemic – for which UNICEF must take at least a share of responsibility – it responded relatively quickly once the scale of the epidemic became apparent, within the limits of its capacity and that of its partners. It adopted essentially the right approach, although this took time to emerge, and full operating capacity was not reached until the epidemic was already well advanced. Working relations with WHO were not as strong as they should have been, and it took time to resolve differences over roles and priorities. Indeed, some of those differences appear to remain unresolved. UNICEF worked well with government authorities and the relevant ministries, and did well to lead and mobilize others around essential cholera-related WASH efforts, though it was less effective in community engagement. Given the major gaps in overall response capacity, it rightly decided to go beyond its anticipated sphere of operation in the scale of its health interventions. The WASH cluster was well led and appeared to coordinate effectively with the health cluster, at a time when overall coordination of the response was confused.

Like other actors, UNICEF found itself chasing the epidemic, but it was among those leading the chase and urging further collective action. In striving for maximum coverage, UNICEF struggled to ensure the quality of its interventions through partners (notably in setting up and running diarrhoea treatment centres), though it was not alone in this. The effectiveness of some UNICEF interventions – particularly its community engagement and sensitization work – remains uncertain, partly because monitoring was limited. But UNICEF staff, partners and volunteers deserve considerable credit for achieving what they did under exceptionally difficult operating conditions. Their extreme hard work and dedication saved many lives and protected many more.

6.2 SPECIFIC CONCLUSIONS

Context and cholera prevention

The findings of this evaluation must be read in the context of the prevailing situation in Yemen. Four factors in particular should be noted. First, the risk of a major cholera epidemic in the country in 2017 was very high (given the breakdown of systems, effects of conflict, etc.), and the potential for this was foreseeable. Second, the vulnerability of the population to such an epidemic – including prevailing hygiene practices, widespread malnutrition and multiple simultaneous threats to well-being – was correspondingly high. Third, given the collapse of public services, non-payment of health workers, and limited national and international capacity to assist, the response system was seriously under-equipped to deal with such an event. Finally, the constraints of the operating environment (including insecurity, blockade and political or bureaucratic obstacles) coupled with internal organizational limitations (particularly of capacity) were such that, even using ‘fast-track’ L3 emergency procedures, it proved impossible to scale up the international response quickly to match the scale and pace of the epidemic.

The 2017 cholera epidemic could possibly have been prevented, or its spread substantially limited, but this is speculative. Concerted preventive measures, including a preventive oral cholera vaccine campaign, could have gone at least some way to limiting the scope of the epidemic. The factors that prevented the proposed OCV campaign from proceeding appear to have been partly political and cultural (in-country resistance), and partly related to shortage of global supplies. But there seems also to have been delay caused by policy debates and a lack of concerted ‘push’ on the part of international agencies and donors. The more fundamental preventive work required to ensure adequate access to clean water
and effective sewage collection, disposal and treatment is by its nature a medium-to-long-term enterprise. This is particularly true given the very weak and damaged state of existing systems, taken together with the ongoing effects of conflict, insecurity, lack of capacity, and unstable governance. Even if a concerted effort to repair or sustain those systems had been mounted following the late-2016 cholera outbreak, only limited impact could have been expected on the spread of water-borne disease by the time of the ‘second wave’ cholera outbreak in April 2017. Similarly, the current preventive WASH agenda funded by the World Bank, while essential, cannot be expected to have significant results in the short term beyond avoiding further decline of existing systems.

Other interventions have greater potential for prevention in the shorter term. The UNICEF supply of fuel, chlorine and spare parts to enable existing water and waste treatment facilities to continue to function has been (and continues to be) an essential intervention – although in the longer term, fuel supply in particular may be challenging and UNICEF should explore with other actors alternative means of covering these needs. Preventive work at the household and community levels, particularly communications aimed at changing hygiene and water-storage practices, is also important, although behaviour change itself cannot be assumed to happen overnight, depending as it does on effective social marketing. Work done to date on the origins and transmission of the 2017 epidemic suggests that the use of contaminated surface water or water from unprotected sources in the aftermath of rains may have been a significant factor in the spread of cholera. Movements of people in the rainy season may also have been a factor.

In short, within the scope of the present evaluation, we are not able to reach a firm conclusion on the prevention and mitigation question. But it is reasonable to conclude that more concerted preventive efforts, including a preventive OCV campaign in early 2017 and stronger donor support to system maintenance, could have significantly limited the scope of the epidemic. For 2018, the case for a targeted, preventive OCV campaign is clear and agreed by most parties, and steps are being taken to ensure the necessary supply of vaccines. The question now is whether it can clear the local political hurdles and be mounted within the necessary time frame (early to mid-2018). Together with other short-term preventive measures, this has the potential to mitigate any further cholera epidemic. See 6.3 under recommendations.

Preparedness to respond

Whether or not it was preventable, the potential for such a country-wide epidemic was foreseeable given the prevailing risk factors, the history of cholera in the region, and the fact that the 2016 outbreak had not been brought under control. No epidemic is predictable in its timing, course or scale, but the fact that a public health crisis of this magnitude was not foreseen as part of contingency planning is troubling, and represents a failure of epidemiological and humanitarian risk analysis, which negatively impacted preparedness. WHO has the primary responsibility in this area, and the evaluation concludes that UNICEF and others were overly reliant on WHO analysis and alerts in their own planning. It also took too long for UNICEF institutionally to recognize the scale of the challenge and deploy its regional and global resources to tackle it. Given the scale of the risks posed to children and adults alike, we suggest that UNICEF urgently needs to strengthen its own epidemiological surveillance and analysis capacities (see below under recommendations).

Looking ahead, because the transmission of cholera has not yet been interrupted, and favourable conditions for further transmission
still prevail, a further wave of cholera is widely anticipated in early to mid-2018. Effective preparedness to respond to this is urgent. Based on interviews with staff inside and outside UNICEF, we believe that the level of preparedness to respond to a further epidemic is much higher than in 2017, although significant capacity and access constraints remain. The potential for the ongoing conflict or political factors to frustrate delivery of a future cholera response by both national and international actors highlights the crucial importance of building community preparedness for cholera, including surveillance and alert systems, allowing early detection and treatment of suspected cases. Given the enormous challenges of controlling an epidemic in a context like Yemen, and the potential for disruption of any response, it is essential to diversify the basis of response, and specifically to help empower communities as far as possible (as the first responders) to recognize and deal with the effects of any such epidemic.

**Strategy, data use and targeting approach**

The strategy adopted by UNICEF as part of the integrated plan of the health and WASH clusters (July 2017) was developed by a process of evolution, as described in section 3 above. In its final form, the strategy and related plan appear to the evaluation team to be comprehensive and appropriate to the context. However, it took too long to reach this final form, and specifically, too long to agree on a targeted approach to response guided by the epidemiological data. This hampered the initial response and contributed to a rather diffuse and unfocused early approach based on unrealistic expectations of coverage. Once the strategy was revised, it (perhaps inevitably) then took several additional weeks to implement to scale. In a fast-moving emergency of this kind, UNICEF and other key actors cannot afford to take so much time to arrive at the right strategy. The earlier deployment to the country of an epidemiologist with cholera experience could have helped considerably in this regard.

UNICEF was right to conclude that epidemiological data should be used to target and guide the response. But the capacity within UNICEF to analyse and make use of the available information in order to target hotspots was not as strong or consistent as it needed to be. It took the arrival of a UNICEF epidemiologist on surge deployment to change the strategy and provide a basis for making operational decisions using the epi-data. That person could not be deployed to Yemen until June 2017, partly for reasons beyond UNICEF control. Had specialist capacity been available at the regional level, that time lag might have been avoided.

The validity of this approach to targeting depends in part on the quality of the data. There is good reason to believe that the reported data (derived from line lists in treatment centres) were unreliable and subject to an overestimation bias (see section 2 above). In particular, inadequate laboratory capacity and limited availability of rapid diagnostic test kits (RDTs) meant that the accuracy of the epidemiological data could not be routinely verified, allowing for possible mis-targeting. The verification exercise commissioned by UNICEF highlighted issues with data inclusion and reporting. This indicates the need to invest in strengthening epidemiological surveillance, reporting and analysis, without which an operational response cannot be adequately targeted. Although this responsibility lies mainly within the domain of WHO, we believe that UNICEF must be pro-actively engaged in this area to ensure that its responses can be properly designed and targeted.
UNICEF response to the 2017 epidemic

Appropriateness

The package of measures on which UNICEF based its response was broadly the right one, its limitations linked more to implementation than programme design. The evaluation team believes that more effort should have been put into strengthening surveillance and diagnostic capacity. This lies more in the domain of WHO, but we believe that UNICEF too has an essential role to play here, particularly at the community level. The decision to establish the WASH rapid response teams was an excellent one, and we believe that UNICEF was right to extend beyond its normal sphere of operation to scale up its role in establishing DTCs and ORCs, given the vacuum of operational capacity.

Timeliness

Limited preparedness, as discussed above, had an impact on the timeliness of the response. Once UNICEF recognized the scale of the 2017 epidemic, the organization moved quickly within the limits of its own and its partners’ capacity. The simplified L3 operating procedures, emergency PCAs, surge capacity and the RRM mechanism all helped in this regard, as did donor flexibility. But whereas the scale of the epidemic was increasing exponentially in May/June 2017, UNICEF and its partners could only scale up in a more linear way. The programme did not reach its full capacity until August 2017. The C4D component in particular seemed to lag behind the rest. Although media and other communication campaigns were mounted earlier, the house-to-house campaign with MoPHP and WHO was not mounted until August – after the epidemic had peaked.

Overall, the UNICEF response – though quicker than many – was slower than it needed to be. There is some inevitable ‘lag’ in gearing up a response, agreeing on the strategy, coordinating with others, getting the supply, HR, finance, partner contracts and other necessary elements in place. Some of the delays in the response, however, were not inevitable and should have been avoided. Better preparedness would have helped considerably, including clarity on protocols and organizational roles; in particular, uncertainty and disagreement over the respective roles of UNICEF and WHO created avoidable delays. From the point when it began using the available epi-data, UNICEF came closer to a timely response to local outbreaks. But the data were often out of date, and even with this more flexible and targeted approach, UNICEF was generally chasing the epidemic rather than getting ahead of it.

Coherence

While integrated planning brought the relevant sectors together on paper (health, WASH, C4D and later nutrition), the response was less well harmonized in practice, particularly in the first few weeks of the response. As reported by field officers, two core components were sometimes implemented together in the same place, but rarely all three. Interviews with partners confirm this. Some of the apparent gaps may, however, relate to the fact that other actors were responding in the same areas as UNICEF and covering the relevant sectors. As of January 2018, a minimum integrated response package has been agreed, including nutrition.

Effectiveness

UNICEF set very ambitious, scaled-up targets for itself, and was largely successful in delivering against them (hitting on average 80-90 per cent of target under the main interventions). This is very creditable in the circumstances. The most significant shortfalls were in some of the ‘core’ UNICEF areas, notably in household
WASH interventions (23 per cent below target by December 2017) and establishment of ORCs (21 per cent deficit). This suggests over-ambitious targets for these programme elements, and no doubt reflects the lack of available partner implementation capacity.\textsuperscript{106}

It is difficult to state with confidence whether the agency’s various interventions achieved their objectives. The multiplicity of factors makes causality difficult to establish in many cases. However, when judged against the criterion of whether the interventions helped reduce risk and vulnerability to cholera by tackling the known risk factors, more definite conclusions can be reached. There is good reason to think that the rapid and targeted WASH responses, in particular, helped significantly to reduce risk of water-borne disease (including cholera) in the areas targeted, largely by enabling households to access clean water. Targets proved over-ambitious in some cases, and the programme was evidently stronger in urban and peri-urban areas than in rural ones. While the quality of treatment provided in the ORCs and DTCs is questionable, there is little doubt that many lives were saved in the treatment centres and through oral rehydration, and that the effects of acute diarrhoea were mitigated. From the point of view of containing or slowing the pace of the epidemic, however, the timing of the response leads us to conclude that any control effect, though important, will have been relatively limited. That said, we believe it had a significant impact in terms of reducing the case fatality rate among those infected.

The scope of the C4D and community engagement work – 18 million Yemenis ‘reached’ with behaviour change messages – is impressive, but its effects are largely unknown. Several interviewees raised questions about the effectiveness of the approach. More should be known about this – and about the baseline for household awareness and attitudes to good hygiene practice – once the planned KAP survey has been completed.

**Proportionality**

While UNICEF, like others, struggled to match the necessary scale and coverage, it scaled up to the limit (and perhaps beyond) of its capabilities. The decision to scale up targets for DTCs and ORCs was a brave one and we believe fully justified by the circumstances. However, there was an evident trade-off between coverage and quality (see below). UNICEF did well to work closely with government and civil society and to mobilize through teams of community volunteers, which greatly extended its reach, particularly in community engagement and C4D. Ultimately, limits to scale and coverage were set by the capacity limits of UNICEF and its partners, and by the very restrictive operating environment.

**Quality**

While the evaluation team was not able to visit Yemen and assess first-hand the quality of work undertaken, many informants suggested that UNICEF struggled to meet agreed standards and comply with protocols in its treatment centres. The self-reporting by partners and monitoring reports seen by the evaluation team do not provide assurance on quality. This reflects in part the difficulty UNICEF faced in ensuring oversight of its programme, the limits of its direct and indirect (third-party) monitoring

\textsuperscript{106} It may also reflect funding uncertainty or shortfalls, or the re-prioritization of available resources between sectors. The evaluation team was not able to establish the contributory factors in each case.
capacity, and the challenge of managing a massively scaled-up response. Questions also arise about the quality of the C4D work undertaken, as noted above.

Allowing for the constraints imposed by the context, we suggest that any future response needs to place greater emphasis on the question of quality. In matters like good case management or infection prevention and control, the failure to do so can lead to interventions actively causing harm and potentially increasing the transmission of cholera.

Working with others

Partnerships

UNICEF forged strong and effective working partnerships with the (divided) water and health authorities, whose own capacities have been severely eroded in the past three years. In some ways, UNICEF and WHO have had to substitute for a vacuum of effective governance in the health and WASH sectors, but appear to have done so in a supportive way and have helped strengthen the relevant authorities and allowed some continuity of service (e.g. by organizing compensation payments for health workers whose salaries were not being paid). The organizing of rapid response teams using government workers has been impressive, as has the mobilization of community health volunteers.

UNICEF has not been able to rely on its usual INGO partnerships to deliver its programme. This is due to a combination of lack of presence and WASH capacity among the traditional partners (somewhat remedied after a global call led by UNICEF and the cluster) and operating conditions that make it almost impossible for INGOs to operate quickly and flexibly. The RRM mechanism operated by ACF appeared to work well and flexibly, but on a limited scale.

UNICEF scaled up its local partnerships with Yemeni NGOs to good effect. Interviews conducted with local partners for this evaluation produced largely positive feedback on UNICEF as a partner. Among the issues raised was the perceived gap in coordination between UNICEF sections (WASH, health, C4D) that was felt to limit the effectiveness of the response package.

Collaboration

As noted above, the organization’s primary collaboration has been with governmental water and health authorities. These appeared to work well given the prevailing circumstances, the political divisions and severely compromised capacities of the relevant ministries. UNICEF collaboration helped to maintain basic services (including through provision of fuel and chlorine) while providing important interventions in the fight against cholera. Although the evaluation team sought feedback on this collaboration from government authorities themselves, it was unable to get a response.

Within the international response system, strong collaboration between UNICEF and WHO is crucial to the delivery of an effective cholera response. The evaluation found that the in-country working relationship between the two agencies was not as effective as it could have been, with sometimes diverging priorities and approaches. Both were overwhelmed by the scale of the demands. Tensions are apparent between the more policy and protocol-focused approach of WHO and the more operational approach of UNICEF.

The result of these tensions was a delay – significant but hard to quantify – in the collective response. We suggest that action to prevent such differences from occurring is an institutional priority for both organizations, both in their preparedness for future outbreaks in Yemen and at a more global level.
Coordination
Overall coordination of the cholera response was confused throughout 2017. Various bodies, including the Cholera Task Force, the EOC, the health and WASH clusters and the HCT had roles in coordinating the response, and these roles were not well harmonized or clearly understood. The Cholera Task Force was not felt to have provided the necessary strategic steer. The EOC model was never rolled out, being essentially confined to Sana’a, and none of those interviewed felt that it performed well. The timing of its introduction (mid-epidemic) may be one factor in this, but the model should be reviewed and better aligned with the inter-cluster coordination processes.

The working relationship between the health and WASH clusters is strong, and indeed this appears to have formed the main locus of effective coordination. There are some advantages to this model, including the potential for effective coordination at governorate level as well as nationally. It seems that this potential was not fully realized, in part because of capacity constraints.

6.3 RECOMMENDATIONS
The recommendations below follow from the conclusions and findings of the evaluation. Some have already been accepted and acted on, based on the interim management note submitted in February 2018; they are included here, with their status noted. This section focuses on what we believe to be the main priorities for action that should be included in a management response. Other suggested actions and approaches are noted throughout the report.

R1: Vaccination campaign: vaccine supply
Given the very high risk of a further cholera outbreak, the vulnerability of the population and the limits to humanitarian response, the case for a preventive oral vaccination campaign in early 2018 is compelling. Pending political agreement with the relevant authorities in Yemen, it is recommended that an urgent request to the suppliers should be placed through the International Coordinating Group (ICG) for enough vaccines to allow a targeted campaign in the highest risk areas. The window of opportunity for such a preventive campaign is rapidly closing. We believe that a purchase decision on this scale is fully justified on a ‘no regrets’ basis, and that the risk of the campaign being subsequently frustrated for political or other reasons is one that UNICEF, WHO and their donors should be ready to accept, given the threat posed by cholera to children in particular. UNICEF should also stand ready to advocate at the highest level with the authorities in Sana’a and Aden on behalf of children to ensure that the campaign is allowed to proceed.

» Priority: Top urgent
» Status: Accepted, in process
» Time frame: Immediate
» For action by: UNICEF HQ/Supply Division, MENARO and YCO
» In coordination with: WHO and donors

R2: Regional specialist capacity: epidemiology/cholera
The evaluation team believes that specialist in-house epidemiological capacity is an essential component of the UNICEF armoury against cholera and other epidemic disease. Reliance on internal surge capacity to fulfil this role proved too slow in Yemen in 2017. The vulnerability of countries in the MENA region is sufficient to justify a dedicated post in the
regional office, and this should be seen as part of a regional capacitation approach in which the RO:

- Supports country offices to conduct risk assessments and draw up contingency plans
- Routinely assesses countries’ preparedness capacity
- Analyses emerging data on cholera or other epidemics and where necessary challenges data interpretation
- Supports cross-country lesson learning
- Conducts regional epidemiological studies
- Triggers system responses when necessary
- Proposes appropriate intervention strategies

Such specialist capacity could usefully form part of a global peer group on cholera/epidemiology, and should be seen as a complement (not a challenge) to the leading role of WHO in this area. The experience from other regions should be noted here.

- **Priority:** High, urgent
- **Status:** Accepted, in process
- **Time frame:** Short-term
- **For action by:** UNICEF MENARO
- **In coordination with:** Chief of Health Emergencies in Programme Division

### R3: Building regional response capacity for cholera

Related to the above, we recommend that UNICEF build a regional response capacity in the MENA region by constituting a network of cholera-experienced staff, conducting regional trainings to share the latest knowledge and global know-how from other regions and exposing them to experience responding to cholera in other countries. Members of the network might be quickly deployed for a limited time in an affected country. Countries should be supported to prepare guidelines, response plans, SOPs and training packages so as to be ready to respond.

- **Priority:** Medium
- **Status:** Pending
- **Time frame:** Medium-term
- **For action by:** UNICEF MENARO
- **In coordination with:** Chief of Health Emergencies in Programme Division

### R4: Cholera task force at RO level

One of the findings of the evaluation is that there is some lack of coherence both in the advisory input on cholera from different UNICEF sections and between different components of the UNICEF programme. With regard to advisory input, we recommend that the different sections in the regional office with responsibility in this area (WASH, health, C4D and nutrition) constitute themselves as a ‘cholera task force’ for the duration of an epidemic in order to provide more joined-up advice to the country office and the EMT, with a view to enabling greater coherence in planning, support and programme implementation.

- **Priority:** High
- **Status:** Actioned
- **Time frame:** Immediate
R5: UNICEF and WHO: harmonizing approaches and clarifying roles

The evaluation found that working relations between these two key actors in cholera response were sometimes fraught, and that differences of view over roles took time to resolve. This had a detrimental impact on both the timing and coherence of the response overall, particularly with regard to the establishment and running of treatment centres (ORCs and DTCs). It is essential that there be no repeat of this in future responses. One central component of preparedness for a further epidemic or third wave should be a management discussion between UNICEF and WHO about the lessons from 2017 and how to ensure that future responses are better harmonized between the two agencies. This should include the way in which UNICEF and WHO work together with government authorities and other common partners. It may also require action at regional and headquarters levels.

- **Priority:** High
- **Status:** Pending
- **Time frame:** Short-term
- **For action by:** Principally YCO; MENARO and HQ as necessary
- **In coordination with:** WHO

R6: Clarification of coordination processes

Coordination of the 2017 response in Yemen was confused, with multiple mechanisms overlapping and running in parallel. In particular, the respective roles of the clusters (health/WASH) and of the EOC were poorly defined. The EOC model was not rolled out across the country as planned, and appears not to have worked well, perhaps because it was introduced in the middle of the response. In any case, another essential component of preparedness is clarification and simplification of the cholera-related coordination processes and the respective roles of the Cholera Task Force, the EOC, the health/WASH clusters, OCHA and the HCT/Inter-Cluster Coordination Mechanism. Operational coordination processes in particular need to be agile, streamlined and localized to the extent possible. Information management should be streamlined where possible.

- **Priority:** High
- **Status:** Pending
- **Time frame:** Short-term
- **For action by:** YCO
- **In coordination with:** Government authorities, WHO, OCHA, HCT/ICCM

R7: Scale-up and securing of preventive WASH work

While much of the essential preventive WASH agenda is medium- to longer term (including infrastructure strengthening), some components are crucial to prevention in the shorter term. This includes system maintenance work and the ongoing supply of fuel, chlorine and spare parts for water supply and waste treatment systems. Given the volatility of the situation in Yemen, UNICEF should take all necessary steps to secure the relevant supply chains and to create contingency stockpiles as appropriate. At the local level, necessary preventive work includes C4D and work on protecting local water sources in high-risk areas. These should be prioritized.

- **Priority:** High
- **Status:** Pending
R8: Strengthen national cholera surveillance and reporting in Yemen

Despite progress on the local-to-national surveillance process and introduction of electronic line listing, more needs to be done to strengthen this national process in order to improve data accuracy and speed of reporting. This is primarily the role of WHO, but given UNICEF dependence on the effectiveness of this system, we suggest it take a proactive role in promoting such strengthening. Specifically, we recommend that an audit of the local-to-national surveillance system be undertaken with WHO and MoPHP, with a view to identifying necessary steps to strengthen the system. Necessary preventive measures also include efforts to detect and control cholera until transmission is completely stopped, as well as identifying the sources and routes of possible re-introduction. Additional efforts to detect and control a cholera outbreak early will all reduce the cholera risk (probability and consequences) in the medium- to long-term.

R9: Strengthen community-based surveillance and response capacities

Particularly in view of the security and access challenges, UNICEF with its partners should help to strengthen community capacities in high-risk areas to prevent, prepare for and respond to outbreaks of acute diarrhoea (identification of cases and early treatment or referral). This would require work both to enable the identification and notification of cases through community focal points and early treatment of suspected cases through community-level ORPs.

R10: Enhance rapid response capacities

UNICEF should build on the RRT and RRM models and take stock with its partners of lessons learned from 2017, in order to strengthen these mechanisms for future responses. This would include revision of RRT SOPs and training modules and trainings in advance of further outbreaks. Appropriate pre-agreements and contracts should be put in place with operational partners and suppliers. In addition, UNICEF should play its full part in joint inter-agency contingency planning – including precise definition of roles and responsibilities, and running of simulation exercises.
R11: Additional response preparedness measures

In addition to the preparedness-related measures noted above, the evaluation recommends that further action be taken (acknowledging that much of this is already in process) to: ensure WASH response capacities, including relevant trainings; ensure the necessary supply for cholera kits (Aquatabs, soap, etc.); and invest in contingency stocks or purchase arrangements at local and international levels.

» **Priority:** High
» **Status:** Pending
» **Time frame:** Short- to medium-term
» **For action by:** YCO
» **In coordination with:** Government health authorities, WHO, implementing partners

R12: Monitoring and quality control

UNICEF monitoring and programme follow-up in 2017 faced the challenge of covering a massively scaled-up programme with relatively limited resources and difficulties of access. This is of concern both from an accountability perspective and in terms of quality control, and is a problem for the system as a whole. Since concern about programme quality was one of the findings of the evaluation, we recommend that UNICEF do all it can to strengthen both direct monitoring (through monitoring of partner reporting and field visits) and indirect monitoring (through third parties). An essential corollary to this is that UNICEF finds ways to better utilize the results from programme monitoring to continuously inform the ongoing response and adapt it accordingly. Consultations with staff suggest that the link between monitoring, analysis and decision-making is weaker than it should be. The evaluation team was unable to identify more specifically where the problems lay in this regard, though they may include a lack of clarity of communication with partners on necessary adaptations to delivery practice based on monitoring findings.

» **Priority:** High
» **Status:** Pending
» **Time frame:** Short- to medium-term
» **For action by:** YCO
» **In coordination with:** Implementing partners, third-party monitors, WHO, EMOPS

R13: Invest in better understanding of behaviours and transmission contexts

There is general agreement that the 2017 response was not well enough informed about household and community practices, or about people’s knowledge, attitudes and practices concerning cholera and the response to it. This is of particular importance for the C4D and community engagement processes, but also to inform WASH interventions and the composition of cholera kits. A KAP survey is currently planned, but this should be supplemented by ongoing efforts to understand household perceptions and challenges during the course of any outbreak response. In addition, more consistent efforts to understand the relevant transmission contexts is essential to control any outbreak. UNICEF should invest in epidemiological and socio-anthropological research, identifying cholera hotspots, risk factors, community risk behaviours and practices, as well as community uptake of campaign messages.

» **Priority:** High
» **Status:** Pending
R14: UNICEF global learning on cholera

UNICEF has learned a great deal from the experience of responding to the 2017 cholera epidemic in Yemen. It has also learned much from other recent major cholera epidemics in Haiti, Zimbabwe and South Sudan, from the regional cholera initiatives in West Africa, Eastern and Southern Africa, as well as from other forms of epidemic response (notably Ebola). We recommend an internal learning event, ideally bringing relevant staff together in New York, to consolidate the more recent experience on cholera in particular, using Yemen as a key case study. This would be consistent with the idea of building a global UNICEF peer group of cholera-experienced practitioners. It might also provide a basis for subsequent engagement with WHO in particular on lessons learned.

» **Priority:** Medium
» **Status:** Pending
» **Time frame:** Short- to medium-term
» **For action by:** HQ Programme Division, EMOPS

R15: UNICEF global epidemiological capacity

In light of the Yemen experience, we recommend that UNICEF establish a network of global and regional cholera experts (internal/external), who would be part of the global exchanges and capitalization efforts (GTFCC, institutional capitalization and research). Members of this network might provide additional surge capacity during major outbreaks as well as playing an oversight and monitoring role at regional and global levels. Related to this, UNICEF should play a fuller part in building global epidemiological understanding, including investment in research collaborations with academic institutions, in partnership with other global stakeholders such as WHO, the Red Cross and MSF.

» **Priority:** Medium
» **Status:** Pending
» **Time frame:** Short- to medium-term
» **For action by:** HQ Programme Division, EMOPS, regional offices

R16: 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. This might include agreement of Memoranda of Understanding (MoUs) signed in advance, clarification of partnership arrangements, and agreement on roles and responsibilities during any cholera emergency response.

» **Priority:** Medium
» **Status:** Pending
» **Time frame:** Short- to medium-term
» **For action by:** HQ Programme Division, EMOPS, regional offices

For the summary of this report prepared for the UNICEF Executive Board or for the Management Response to this evaluation please visit: https://www.unicef.org/evaldatabase/index_102910.html
BACKGROUND

Two years since the escalation of violence in Yemen, a second wave of fast-spreading cholera of unprecedented scale broke out in Yemen in April 2017, endangering the health and lives of people and disproportionately affecting the poor. Specifically, in October 2016, the Ministry of Public Health and Population in Yemen announced a cholera outbreak in the capital city of Sana’a, with a total of 11 confirmed cases as of 6 October 2016. According to the World Health Organization (WHO), the total number of suspected cholera cases in Yemen hit the half a million mark in August 2017, with an estimated 2,000 deaths since April, when the outbreak began to spread rapidly. While the overall caseload nationwide has declined since early July, particularly in the worst-affected areas, suspected cases of the deadly water-borne disease continue to be reported across the country, infecting an estimated 5,000 people per day.

The cholera epidemic in Yemen, currently the largest in the world, has spread rapidly, with the United Nations Children’s Fund (UNICEF) and WHO indicating that the reasons behind the rapid spread include high rates of malnutrition, food insecurity, and collapsing health, sanitation and clean water systems, which in turn are due to the country’s ongoing conflict. The health system is struggling to cope, with more than half of all health facilities closed due to damage, destruction or lack of funds, and shortages in medicines and supplies are persistent and widespread.

As stated above, the situation is aggravated by high rates of severe food insecurity and malnutrition. Children suffering from severe acute malnutrition are ten times more likely to die than their healthy peers. Acute malnutrition weakens the immune system, leaving children at increased risk of diseases. The ongoing conflict, compounded by an economic decline, has devastated livelihoods, depleted safety nets, and weakened social services and the population’s ability to access social services.

The following is a joint statement by the Executive Director of UNICEF and the Director-General of WHO during a visit in July: “This deadly cholera outbreak is the direct consequence of two years of heavy conflict. Collapsing health, water and sanitation systems have cut off 14.5 million people from regular access to clean water and sanitation, increasing the ability of the disease to spread. Rising rates of malnutrition have weakened children’s health and made them more vulnerable to disease. An estimated 30,000 dedicated local health workers who play the largest role in ending this outbreak have not been paid their salaries for nearly a year.”

<table>
<thead>
<tr>
<th>Title</th>
<th>UNICEF Response to the Cholera Outbreak in Yemen Terms of Reference for a Rapid and Timely Humanitarian Evaluation</th>
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ANNEXES

ANNEX A: ABRIDGED TERMS OF REFERENCE
The UNICEF response brings together health, water, sanitation and hygiene (WASH) and communications for development (C4D) in an integrated approach at household, community, facility and institutional levels and central level, for a comprehensive public health approach. The Yemen Country Office has prepared the ‘Integrated Cholera Response, Prevention and System Strengthening Plan’, the goal of which is to: contribute to the overall objective of reducing occurrence of acute watery diarrhoea (AWD) plus suspected cholera cases and to minimize the associated morbidity and fatality, through effective prevention and timely response. The UNICEF strategy is built on five key principles: (i) integration of WASH, health and C4D response; (ii) partnership and coherence with health and WASH clusters; (iii) a focused approach on priority districts and hot spots; (iv) addressing the ongoing outbreak (response and control); and (v) prevention of future outbreaks (prevention, preparedness and health system strengthening).

Since the start of the outbreak, UNICEF has been working with partners to respond not only to the broader crisis, but also the cholera outbreak. To date, UNICEF has provided safe water to over one million people across Yemen, and delivered over 40 tonnes of lifesaving medical equipment – including medicine, oral rehydration salts, intravenous fluids and diarrhoea disease kits. Additionally, UNICEF is the WASH cluster lead, C4D ad hoc sector lead, an active member of the health cluster, and is part of a task force that discusses status, updates and strategic issues to guide the cholera response. Since the resurgence of the outbreak in April, UNICEF has prioritized hygiene promotion activities, with over 20,000 community mobilizers currently deployed in districts reaching over five million individuals through partnerships with government ministries and NGOs. Campaigns using national media and social media continue to be used to engage communities by discussing key practices and messages. Cholera brochures have also been printed and disseminated during house-to-house cholera awareness campaigns. In August 2017, a national cholera awareness campaign was implemented by the Ministry of Public Health and Population (MoPHP) with the collaboration of UNICEF and WHO as part of the UNICEF and WHO cholera response.

Despite high results achieved in treatment (diarrhoeal treatment centres/oral rehydration centres, etc.), WASH coverage and awareness-raising campaigns, there has been another cholera spike recorded. Recent data reveal that there has been some decrease in the attack rates in some governorates, while there has been an increase in others. Also, the incidence of diarrhoeal diseases has not been reduced in spite of this response. This raises questions about the effectiveness of the cholera response and calls for a more in-depth review of the cholera crisis response with a fresh lens, examining issues such as data accuracy, case definition and management, testing and quality of the containment and prevention strategies.

PURPOSE AND OBJECTIVES

UNICEF plays multiple roles in the response, beyond its own programme and within the Humanitarian Country Team architecture. The proposed Real-Time Evaluation (RTE) will fulfill both accountability and learning purposes. The RTE will assess the effectiveness of the containment and prevention activities for which UNICEF has provided leadership in the response, and also consider to what extent the response has been conducted in an appropriate, coordinated, efficient and timely manner, taking into account that the UNICEF Yemen Country Office (YCO) is also responding to the ongoing humanitarian crisis. The RTE should identify challenges and success factors in the UNICEF response and determine why there has been a surge in
some of the governorates, and a reduction in others, despite the high coverage of treatment and WASH interventions and awareness-raising campaigns. This will support the learning function that should inform improvement of UNICEF interventions. Accountability is important, given the substantial human, supply and financial resources UNICEF continues to allocate to the response. The evaluation results should help to show to what extent these resources have been used appropriately, effectively and to good effect, in response to the cholera outbreak.

The RTE will not be able to address issues of impact. For example, it will not answer questions regarding how many lives have been saved as result of UNICEF interventions. The RTE will consider whether the response has established readiness to manage any resurgence of the outbreak through preparedness and prevention activities in potentially high-risk areas, and to what extent the organization is preparing the ground to support system strengthening efforts as set out in the Cholera Response Plan. The evaluation will review the coverage of the UNICEF response, the partnerships put in place, as well as its management and internal and external coordination.

INTENDED USE AND USERS

The RTE will have a strong utilization focus and is expected to capture forward-looking lessons, conclusions and recommendations that will be used to strengthen the ongoing response. The primary users of the RTE are the UNICEF Yemen management and programme staff, as well as UNICEF staff in the regional office (RO) and headquarters (HQ) divisions supporting the response. Secondary users include government stakeholders, partners and donors. The intended uses of the real-time evaluation are:

1. To inform UNICEF Yemen management in its effort to implement the integrated cholera response, prevention and system-strengthening plan. Specifically, to identify rapid corrective action as appropriate during the ongoing cholera outbreak to better respond to the needs of affected populations in Yemen.

2. To capture findings and lessons learned to support advocacy efforts, both internally within the country, and externally with relevant partners.

3. The evaluation is also intended to contribute to global knowledge in line with the UNICEF evaluation policy. The final report and management response will be uploaded into the UNICEF evaluation database and relevant websites.

SCOPE

Institutional scope:

While noting the multi-agency dimensions to the cholera response (in particular, the role played by other agencies, including WHO), this RTE is limited to evaluating the work of UNICEF and its downstream partners in responding to the cholera outbreak. However, this needs to be set within the wider framework of the government and agencies involved and an analysis of roles, responsibilities and expectations. Within UNICEF, the evaluation will focus on the work of the country office, but does consider support from RO and HQ.

Programmatic focus:

– household, community, facility and institutional level, and central level – to ensure a comprehensive public health approach. The RTE will however focus on the following:

1. How UNICEF and its partners have raised awareness and engaged communities in cholera prevention and treatment through sensitization on the importance of hygiene, sanitation, food safety, and care for patients with acute watery diarrhoea (AWD). It will consider how the social mobilization interventions were diversified and tailored to the local behavioural customs; scale and quality of outreach with the various engagement methods (community meetings, household visits, house-to-house campaigns, media, interpersonal communication at points of service provision, etc.). The RTE will also explore the levels of trust and appreciation by households of those involved in community engagement at the frontline, depending on access and availability of data.

2. Inter-sectorality within the UNICEF response and within broader partnerships. Focus will be on the effectiveness of coordination and collaboration between the different sectors within UNICEF involved in the response, i.e. health, WASH, C4D, as well as between prevention and treatment interventions. The RTE will explore to what extent the interventions were implemented in an integrated manner and complement each other, e.g. whether community campaigns in the most affected areas were complemented by provision of appropriate health services and interventions for ensuring safe water. It will explore how coordination was ensured (or if it was not, why not) and the degree to which the approach had a direct effect on challenges faced by UNICEF or its partners.

3. In addition to these priority areas, UNICEF has given close attention to partnerships and coordination, including working with government and other partners in the response. Within the frameworks of the HCT and inter-cluster collaboration, UNICEF is the WASH cluster lead, the C4D ad hoc sector lead, and is present in other inter-agency forums and bilateral coordination (e.g. with WHO). The RTE will consider this important aspect with a view to determining how far achievements were supported or constrained by these factors.

Geographic focus:

It is recognized that the outbreak has not been in a particular location, but has affected various localities and shifted over time. The evaluation team will consider the governorates/districts most affected by the outbreak, and at the inception phase establish a methodology for sampling and visiting affected localities.

Resources:

While the evaluation will give priority to the programmatic issues noted above, close attention will also be given to human, supply and financial resources as factors supporting or constraining programme delivery. The evaluation will consider issues of human and financial resource mobilization, deployment and management, including the consequences of utilizing resources from the ongoing crisis to support the cholera outbreak.

Time frame:

The evaluation will consider the entire span of the outbreak, giving particular attention to the period from April 2017, when the outbreak resurfaced, to date.
EVALUATION QUESTIONS

The RTE will be framed using the OECD/DAC evaluation criteria and other criteria specific to evaluation of humanitarian action. Specifically, the evaluation questions below will need to be refined by the evaluation team during the inception phase of the RTE process.

1. **Appropriateness**: To what extent has the UNICEF response met the needs of women and children in the affected areas? How appropriate has the focus of the social mobilization (risk communication and community engagement/C4D), health and WASH interventions been in reaching the most affected populations? How well have these messages been understood, and have they influenced change of behaviours by household members (e.g. hand-washing with water and soap at critical times, water treatment, food handling, solid waste disposal, care for patients with AWD, seeking medical consultations)?

2. **Coordination**: How effectively and efficiently has UNICEF fulfilled its sectoral leadership obligations? How effectively has UNICEF coordinated its response with other key actors? Internally, how effective, efficient and timely has coordination been between the various sectors (health, WASH, C4D), as well as between prevention and treatment interventions? To what extent have the various programmatic interventions complemented each other? For example, were community campaigns in the most affected areas complemented by provision of appropriate health services and interventions for ensuring safe water? How was inter-sectoral coordination ensured, and if it was not, why not?

3. **Effectiveness**: How successful has UNICEF been in achieving the aims set out in the Cholera Response Plan – e.g. the containment and prevention activities for which UNICEF has provided leadership in the response? What factors contributed to success and what factors constrained UNICEF success? To what extent are the results achieved attributable to UNICEF? Were affected communities satisfied that their needs and expectations were adequately acknowledged and addressed? Were the results achieved broadly equitable and were the needs of children and women adequately met?

4. **Efficiency**: What costing options were considered for each intervention, and how was the optimum costing option selected? How did actual costs vary from planned costs? How timely or delayed was the response?

5. **Coverage**: To what extent was the affected population adequately identified, targeted and reached by UNICEF and its partners with key health, WASH, C4D interventions? How successful has UNICEF been in reaching the most vulnerable groups, including children? Which community interventions are seen as most successful, and why?

6. **Connectedness**: To what extent is the UNICEF response to the cholera outbreak contributing to the longer-term goal of enhancing preparedness and prevention of future outbreaks, and systems strengthening to improve resilience and capacity to respond rapidly and efficiently?

The above questions will be discussed with YCO and modified at the inception phase of the RTE. The availability of data to assess each one of the areas mentioned above must first be
determined during the inception phase; based on data availability, the questions above may need to be modified.

**METHODOLOGY AND APPROACH**

Due to the complex context of the country and the ongoing conflict, the RTE will rely heavily on existing information and analysis, and will include undertaking a document review of programme reports, meeting reports, sitreps, reports from reviews, joint missions, and programme information that is available at YCO, the RO or within HQ divisions. YCO has contracted third-party monitors, who have generated useful reports that may be used by the RTE team. While recognizing the constraints of time, resources, and the continuing burden on all involved in the response, the evaluation will aim to be systematic and evidence-based, taking care to triangulate and verify data and analysis. If possible, some non-representative, qualitative primary data collection will be undertaken. The evaluation will be geared toward utilization of its results and will aim to engage staff at key moments in the process and generate material in user-friendly formats.

**LIMITATIONS OF THE RTE**

The following limitations of the proposed evaluation can be identified at this early stage:

1. The RTE will not resolve the issue of inappropriate case count. However, the planned actions to improve case identification will contribute to a better estimation of the UNICEF response to the crisis. If these actions have been initiated, a rapid review of the process may be considered.

2. Due to the complex context of the country, the RTE will heavily rely on secondary analysis of existing documentation. Primary data may be collected on a small scale using qualitative methods, if the evaluation team is given the necessary access and permissions granted for data collection. Thus, statistically significant results should not be expected.

3. The RTE cannot provide knowledge of the impact of the response, i.e. it cannot be expected to assess how many children’s lives have been saved due to UNICEF interventions, or to fully explain the cholera-cases curve.

4. Visas to Yemen are becoming increasingly difficult to obtain; remote interviews may be the only option if visas cannot be obtained for the evaluation team.

**Management and Governance Arrangements**

In keeping with the corporate nature of the UNICEF response, the Evaluation Office will manage the evaluation, in close collaboration with the country office, regional office, and relevant HQ divisions. An evaluation manager will lead the process, under the guidance of the Director of Evaluation. The Evaluation Office will commission a team of external consultants to undertake the evaluation, and will provide overall management of the evaluation process.

A small Reference Group for the evaluation will be established, and this team will contribute to ensuring the relevance, accuracy and hence credibility and utility of the evaluation. The Reference Group will have an advisory role, the main responsibility being to review and comment on key evaluation outputs (i.e. this ToR, the inception report, reports on emerging findings, the draft and final reports). Final decisions on the evaluation process and quality assurance of outputs rests with the Evaluation Office.
ENDNOTES


4 Ibid.

5 UNICEF Integrated Cholera Response Plan.


7 UNICEF Integrated Cholera Response Plan, which contains the details of the response strategy, will be an annex to this ToR.


ANNEX B: GUIDING QUESTIONS FOR THE EVALUATION

A set of guiding questions was included in the Terms of Reference for this evaluation. These were revised during the course of the inception phase, and the result is a set of ten overarching guiding questions, set out below. These subsume and build on the questions in the ToR.

A. CONTEXT DESCRIPTION AND ANALYSIS

1. What is the context for the 2017 cholera/AWD epidemic? What has been the course of the 2017 outbreak, what explains it, and what are the prospects of future outbreaks? What has been the overall ‘system’ response – national and international – to the cholera/AWD crisis?

2. What in factual terms has been the UNICEF contribution to the wider effort against cholera/AWD? What have UNICEF and its partners done, when and where? What is UNICEF planning to do?

B. UNICEF STRATEGY, PLANNING AND USE OF INFORMATION

3. How appropriate have the organization’s own strategy and programmatic choices been for cholera/AWD prevention and response?

4. How well prepared was UNICEF for the 2017 outbreak? How well prepared is it for potential future outbreaks in 2018?

5. How well informed have UNICEF decisions been? What has been the quality of assessment, surveillance, monitoring and other data – and how have they been used?

C. UNICEF PROGRAMME RESPONSE PERFORMANCE

6. Has the UNICEF programmatic response to the 2017 outbreak been:
   • Timely? With regard to the onset and spread of the epidemic.
   • Coherent? Between health, WASH, C4D + nutrition, communications.
   • Effective? In achieving stated objectives.
   • Proportionate? In scale and coverage.
   • High quality? Consistent with relevant standards and policies.

7. How well have partnerships worked to deliver the programmatic response?

8. How efficient has the UNICEF response been with regard to business processes, management, technical support and otherwise? Were internal accountabilities clear?

D. UNICEF SYSTEM-WIDE ROLES AND OVERALL PERFORMANCE

9. How well has UNICEF performed its system-wide coordination and leadership roles – including in WASH and health clusters and in the area of C4D? How well has it collaborated with other agencies on these agendas in response to the cholera epidemic?

10. Overall, what has been the value of the UNICEF contribution to the cholera/AWD response? What effects can be reasonably attributed to UNICEF with regard to the course of the epidemic and the impacts on those affected by it? What have been the key internal success factors and limiting factors?

During the process of enquiry in the inception phase, a range of additional questions arose. Some of these were broad questions, including some hypothetical and counterfactual questions (for example, Could the 2017 cholera outbreak have been prevented?), that appeared important to ask even though difficult to answer with any certainty. But most of these additional questions were more specific subsidiary questions to the ten questions set out above.
ANNEX C:
LIST OF INTERVIEWEES

UNICEF HEADQUARTERS

Shanelle Hall
Deputy Executive Director, (Field Results)

Etleva Kadilli
Director a.i., Supply Division

Freya von Groote
Emergency Specialist, Office of Emergency Programmes

Kate Alley
Emergency Specialist, Office of Emergency Programmes

Ted Chaiban
Director, Programme Division

Cecilia Sanchez Bodas
Programme Specialist, Humanitarian Action & Transition

Dr. Naqib Safi
Senior Emergency Coordinator, Office of Emergency Programmes

Manuel Fontaine
Director, Office of Emergency Programmes

Vidhya Ganesh
Deputy Director, Programme Division

Ketan Chitnis
Communication for Development Specialist

Paloma Escuerdo
Director, Communications

Imran Mirza
Health Specialist, Programme Division

Luwei Pearson
Principal Adviser, Health Section

Tim Grieve
Senior Adviser, WASH Section

Laure Anquez
WASH Specialist

UNICEF MENA REGIONAL OFFICE

Geert Cappelaere
Regional Director

Bertrand Bainvel
Deputy Regional Director

Anirban Chatterjee
Regional Health and Nutrition Adviser

Paul Molinaro
Regional Chief of Supply

Roumiana Gantcheva
Regional Monitoring and Evaluation Adviser

Juliette Touma
Chief of Communication

Lieke van de Wiel
Chief of Programme and Planning

Omar El Hattab
WASH Regional Adviser

Vincent Petit
C4D Regional Adviser

Michele Servadei
Regional Emergency Advisor

Nuhu Maksha
Health Specialist (Emergency)

Vilma Tyler
Senior Nutrition Specialist

Shoubo Jalal
Gender Adviser
**UNICEF YEMEN COUNTRY OFFICE**

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
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<tbody>
<tr>
<td>Meritxell Relano</td>
<td>Representative</td>
</tr>
<tr>
<td>Sherin Varkey</td>
<td>Deputy Representative</td>
</tr>
<tr>
<td>Zainab Al-Azzari</td>
<td>Chief of Planning, Monitoring and Evaluation</td>
</tr>
<tr>
<td>Claude Dunn</td>
<td>Chief of Field Operations</td>
</tr>
<tr>
<td>Saifeldin Nemir</td>
<td>Chief of Field Office (Aden)</td>
</tr>
<tr>
<td>Fouzia Shafique</td>
<td>Chief Health and Nutrition</td>
</tr>
<tr>
<td>Justus Olielo</td>
<td>Chief of C4D</td>
</tr>
<tr>
<td>Nisar Sayed</td>
<td>Chief of WASH</td>
</tr>
<tr>
<td>Waleed Norman</td>
<td>Chief of Field Office, (Sana’a)</td>
</tr>
<tr>
<td>Joseh Sikueya</td>
<td>Chief of Human Resources</td>
</tr>
<tr>
<td>Elias Diab</td>
<td>Emergency Specialist</td>
</tr>
<tr>
<td>Justin Rashid</td>
<td>Security Specialist</td>
</tr>
<tr>
<td>Christine Muthee</td>
<td>Programme Specialist HACT</td>
</tr>
<tr>
<td>Yuji Taketomo</td>
<td>Supply and Logistics Specialist</td>
</tr>
<tr>
<td>Kinlay Penjor</td>
<td>Planning, Monitoring and Evaluation Specialist</td>
</tr>
<tr>
<td>Aamer Khan</td>
<td>Planning, Monitoring and Evaluation Specialist</td>
</tr>
<tr>
<td>Karanveer Singh</td>
<td>Nutrition Manager</td>
</tr>
<tr>
<td>Nuzhat Rafique</td>
<td>Health Manager</td>
</tr>
<tr>
<td>Peter Tubman</td>
<td>Reports Officer</td>
</tr>
<tr>
<td>Waleed Ghabban</td>
<td>Supply and Procurement Officer</td>
</tr>
<tr>
<td>Nicoline Landman</td>
<td>Country Security Adviser</td>
</tr>
<tr>
<td>Abdoulaye Faye</td>
<td>Emergency WASH Specialist</td>
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**PARTNERS**

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<thead>
<tr>
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<tbody>
<tr>
<td>Jamie McGoldrick</td>
<td>UN Resident Coordinator/Humanitarian Coordinator</td>
</tr>
<tr>
<td>Salah Addin</td>
<td>Cholera Programme Manager, Tayba</td>
</tr>
<tr>
<td>Najib Ghazi</td>
<td>Cholera County Director, Tayba</td>
</tr>
<tr>
<td>Fedorico Soranzo</td>
<td>Deputy Country Director Yemen, Action Contre la Faim</td>
</tr>
<tr>
<td>Alaa Abou Zeid</td>
<td>Yemen Health Cluster Coordinator</td>
</tr>
<tr>
<td>Marije Broekhuijsen</td>
<td>Yemen WASH Cluster Coordinator</td>
</tr>
<tr>
<td>Methqal Qohom</td>
<td>Building Foundation for Development</td>
</tr>
<tr>
<td>Elena Grandio</td>
<td>Medical Coordinator, Medecins Sans Frontiers</td>
</tr>
<tr>
<td>Dr Nevio Zagaria</td>
<td>Representative, WHO Yemen</td>
</tr>
<tr>
<td>Abdinasir Abubakar</td>
<td>Epidemiologist, World Health Organization, EMRO</td>
</tr>
</tbody>
</table>
Marzook AbdulHakem  
Senior WASH Engineer, Care Yemen

Dr. Sunita Sharma  
WASH Coordinator, IMC Yemen

Pilar Bauza Moreno  
Health Coordinator, ICRC

Martha Getachew Metaferia  
Senior Humanitarian Affairs Officer, OCHA Yemen

Jean Francois Briere  
Senior Humanitarian Adviser, DFID

Fergus McBean  
Senior Humanitarian Adviser, DFID

Ali Al Emad  
WASH Coordinator, DRC

Torben Bruhn  
Regional Health Expert, ECHO

Dominique Porteaud  
Global WASH Cluster Coordinator

Franck Bouvet  
Deputy Global WASH Cluster Coordinator

Marc Poncin  
MSF Emergency Coordinator for Yemen

Mickael Touzinaud  
MSF

John Fitzgerald  
Senior WASH Cluster Coordinator

Global WASH Cluster

Dr. Veronique Urbaniak  
Incident Manager for Cholera Response, WHO

Ali Assana  
Nahdha Maker Organization (NMO)

Khaled Al Babaly  
Soul

Maha Basudan  
SAWT

Anas Mohammed  
Al-Tawasul Organization

Awsan Jurhoom  
GARWAP, RRT, Aden

Ahlam Al- Esawi  
Badeer Foundation

Laila Al-Faqih  
Generation Without Qat

Ahmed Surur  
Local WASH Cluster (YFCA)

Jameel Mohtsen al Qanazy  
Rawabi Al Nahdah Developmental Institution Hajjah Office

Muna Alsrari  
NFDHR

Kamal  
GARWAP - Saada branch

Nawal Al Fadhl  
Sama Al-Yemen Development Foundation

Nawal Ismael Al Zahi  
Sama Al-Yemen Development Foundation

Abdulsalam Al-Sharki  
Community Uplift Foundation

Ahmed Mohammed Al-Matari  
Environment and Social Development Association

Riham Abdelkarim Al-Gharazi  
Khadija Foundation for Development

Samah Saad Nassari  
Khadija Foundation for Development

Reem Abdo Saleh  
Khadija Foundation for Development

Talal Al-Quds  
WASH Cluster Government Co-Chair

Fateh Alansi  
WASH Cluster Government Co-Chair