

CHOLERA IN TIME OF WAR EVALUATION OF THE MSF-OCBA CHOLERA RESPONSE IN YEMEN

FRANÇOIS GRÜNEWALD AND DR PAULA FARIAS

MANAGED BY THE VIENNA EVALUATION UNIT

JUNE 2018



Cover picture: ©François Grünewald

Disclaimer: *The views expressed in this publication do not necessarily reflect the views of Médecins Sans Frontières or of the Vienna Evaluation Unit.*

©2018 MSF Vienna Evaluation Unit. All rights reserved. Dissemination is welcome, please send a message to the Vienna Evaluation Unit to obtain consent.

VIENNA EVALUATION UNIT

The Vienna Evaluation unit started its work in 2005, aiming to contribute to learning and accountability in MSF through good quality evaluations. The unit manages different types of evaluations, learning exercises and anthropological studies and organises training workshops for evaluators.

More information is available at: <http://evaluation.msf.at>.

Electronic versions of evaluation reports are available on Tukul: <http://tukul.msf.org>.

Table of contents

Executive Summary.....	1
Acronyms.....	5
1 Introduction.....	6
1.1 Structure of the report	6
1.2 Background	6
1.2.1 Geopolitics.....	6
1.3 The current war	7
1.4 Past OCBA operations in Yemen	7
1.5 The cholera epidemic.....	8
1.6 Methodology	10
1.6.1 Objective and purpose of the evaluation: a learning loop.....	11
1.6.2 The evaluation approach.....	11
1.6.3 Deliverables	13
1.6.4 Limits	13
2 Findings.....	14
2.1 The OCBA cholera response and its timeline.....	14
2.1.1 The many dimensions of the response	14
2.1.2 The weight of political and security issues on the operations	14
2.1.3 Lack of alertness and cholera preparedness	15
2.1.4 The 2017 timeline of the OCBA Yemen cholera response	16
2.2 Operational steering and monitoring	18
2.2.1 Uncertainty on the status of the guidelines.....	18
2.2.2 Diagnosis, triage, outbreak monitoring and discharge	18
2.2.2.1 Case definition and triage	18
2.2.2.2 Epidemiological surveillance: data management	18
2.2.2.3 Cholera case confirmation	22
2.2.3 CTC and CTU set up and management.....	23

2.2.3.1	Structures.....	23
2.2.3.2	Separation of “contaminated” and “clean” areas	24
2.2.3.3	Clinical component of the response	25
2.2.3.4	Discharge/ Follow-up /Referral.....	25
2.2.3.5	Management of dead bodies.....	26
2.2.3.6	WATSAN in the CTC/CTU	26
2.2.3.7	Bed capacity	27
2.2.3.8	Crowd control	27
2.2.3.9	Feeding patients, feeding caretakers.....	28
2.2.4	The importance of data.....	28
2.3	Outreach activities and preventive measures	28
2.3.1	Vaccination.....	29
2.3.2	Hygiene promotion.....	30
2.3.3	Watsan.....	30
2.3.4	Communication	31
2.4	Supplies.....	31
2.5	Human resources.....	32
2.6	Coordination	33
2.6.1	Within OCBA.....	33
2.6.2	Coordination with the national institutions	33
2.6.3	Coordination with international institutions.....	34
2.6.4	Intersectional MSF coordination	35
2.6.5	Handover	36
3	Conclusion	37
3.1	Response to the evaluation questions	37
3.2	Working in a war zone	41
3.3	Emergency preparedness and alert.....	41

4 Recommendations	43
4.1 For the short term and in case of a new outbreak in Yemen	43
4.2 Global improvement of the cholera response.....	45
4.2.1 Working in a war zone.....	45
4.2.2 Emergency preparedness and alert	46
4.2.3 The strategic importance of communication	47
4.2.4 The importance of data	47
4.2.5 Handover and longer term issues	48
5 Annex	50
5.1 Terms of reference	50
5.2 Mission calendar	55
5.3 List of interviewees.....	56
5.4 Interview Guide	57
5.5 Maps of Yemen	59
5.6 References	60

Executive Summary

This evaluation was commissioned by OCBA and supported by the MSF Vienna Evaluation Unit. Two independent evaluators conducted the evaluation. More than 50 people were interviewed, many of them face-to-face, others through focus group meetings. The evaluators visited OCBA HQ, Sana'a, Hajja and Abs. This evaluation serves as a capitalisation on experiences, bringing together the different facets of a complex response in a difficult environment.

War-torn Yemen experienced a deadly, widespread cholera epidemic that peaked in Autumn 2016 and again in Spring/Summer 2017. The country has experienced regular outbreaks in the last four decades, but on a much smaller scale and mostly in the South. Several aggravating factors were identified: the impact of the war on health, energy and more globally on the economy created a context of high systemic vulnerability. This type of vulnerability creates a context highly prone to infectious diseases, in particular water borne diseases. Cholera, endemic in the sub-region and in Yemen since many years, could easily take off.

MSF/OCBA has been present in Hajja Governorate, in particular in Abs and Hajja hospitals since 2010 and scaled up its operations with the beginning of the 2015 war. It has provided both direct assistance (war surgery, support to emergency ward) and indirect assistance (general support to health institutions). As there was no emergency preparedness (EPrep), the levels of preparedness were rather low. This made rapid reactions difficult just after the first signals of the outbreak. When cholera cases finally started to arrive in health structures in the area, OCBA started to plan a response, which it then implemented despite many difficulties. Setting up and supporting Cholera Treatment Centres (CTC), Cholera Treatment Units (CTU) and Oral Rehydration Points (ORP) in order to improve medical management were the corner stones of the response. It involved triage, case management, management of risks of nosocomial contamination, management of dead bodies; establishing a data management system with epidemiological analysis; WASH activities in the centres. The WASH components for the population at large and different types of outreach activities for health promotion were largely insufficient. Coordinating with national and local authorities in a very politicized context included difficult negotiations for access. Coordination with other international aid agencies and other MSF Operational Centres was a second significant part of the work with mixed results.

Evaluation questions as per ToR

To what degree did the intervention contribute to the achievement of the overall objective of the intervention (to reduce the morbidity, mortality and human suffering due to cholera)?

There is no doubt that the intervention contributed to reduce morbidity, mortality and human suffering but it is difficult to demonstrate it as demographic data on the area are not trustable and data collection was very chaotic during the first few weeks. The efforts and commitments of all MSF staff to ensure triage, treatment and support to all patients and caretakers largely contributed to the mainly positive achievements of the operation,

despite many constraints and shortfalls. It is important to note that many expatriate staff interviewees underlined the critical role and the engagement of their national colleagues. The capacity for OCBA to finally send some key staff (epidemiologist, cholera focal person) also contributed to these achievements. Yet, lack of cholera expertise within the field teams during the early part of the response and difficulties to ensure continuity of function in the field (especially in the medical sector) due to visa and administrative constraints, significantly hindered the overall management of the response and its effectiveness.

To what extent have the objectives of the strategy been achieved?

Ensure quality case management in CTC and CTU: This was partially achieved. A few difficulties in medical management were due to lack of cholera experience in the team at the beginning and the irregular presence of the Medical Coordinator. The initial limited stocks available in the field and the large numbers of supposed cholera cases that overwhelmed the facilities accentuated this.

Prevent cholera spreading through outreach activities (functioning of ORS sites, WASH and hygiene promotion activities): This turned out to be the weakest point of the operation, largely due to the difficulty of obtaining security clearance for more field activities. Lack of proper IEC material significantly limited the capacity of CHWs to work with the population.

Ensure proper coordination: (to coordinate outbreak response activities with different actors). Coordination with UN agencies and INGOs were often disappointing. Coordination with national institutions proved difficult at the higher level, but much easier in the field. Coordination between OCs was sub-optimal, thus creating a lot of missed opportunities: production of intersectional IEC for outreach activities, deployment of intersectional epidemiologists and GIS capacities and above all, development of a strong MSF voice, for instance on Oral Cholera Vaccination (OCV).

Ensure strategic support (to provide technical support where needed to lobby for activities to be implemented according to needs, based on epidemiological data, to monitor gaps in response and advocate for their coverage): This was hindered by the lack of cholera experience in both the national and international teams, despite the efforts from HQ. In addition, the absence of proper data collection and analysis at the onset of the crisis made it difficult to be “data driven”. Yet, it is important to recall that even with better data, it would have been difficult to react with sufficient capacities as resources were lacking and access was highly constrained.

What were the reasons (internal and external) for the achievement/non-achievement of the objectives? What were the enabling/ blocking factors at different points of time?

The impact of MSF’s cholera response in Yemen can be attributed to the dedication and engagement of MSF staff, both Yemeni and international, who demonstrated a great deal of energy to the cholera response despite their limited experience in dealing with the disease. The main challenges were lack of preparedness and cholera expertise in the mission. This was aggravated by delays of having additional technical staff (difficulties to get visas). The frequent absence and high expatriate turnover in key positions created significant hindrances. This affected many programme components in CTC/CTU as well as the outreach activities.

To what degree was the response appropriate to the context of high insecurity and challenges in terms of limited access and administrative constraints?

The regular information sharing between Heads of Mission (HoMs) from the different OCs, as well as with other organizations, facilitated the management of conflict and security risks issues. Strict security measures were applied to staff movements, housing facilities as well as to all premises where MSF was working. All parties to the conflict were always notified of movements. A big MSF emblem, visible from the sky, duly marked every health facility, where OCBA was treating patients. Yet, the main difficulties were related to visa granting and authorizations to carry out field missions, which significantly hindered the operations. Negotiations with the authorities remained difficult, though there were some improvements in early 2018 and OCBA had to significantly rely on its national staff. Limited intersectional collaboration on visa issues, however, left OCBA in difficult situations as key staff positions could not be filled properly.

How flexible was the response to the contextual changes over time?

The capacity of the response to adjust, as the epidemic evolved, was remarkable, despite all the difficulties involved, such as the difficulty of gaining access to fast, accurate data and being able to do scenario planning. Adapting to internal constraints, such as frequently vacant key positions and the repercussions of this absence, proved to be more problematic than adjusting to contextual changes. Another major hindrance to flexibility came from the application of normal project procedures rather than emergency ones, despite many efforts to simplify and to make procedures more effective in the context of the cholera outbreak.

Key recommendations

Operations/Intersection

- Organize an intersectional meeting on lessons learnt from the 2017 outbreak with a discussion on possible ways forward for future outbreaks.
- Consider the organization of a Cholera conference in Yemen involving all concerned stakeholders including the authorities and Sana'a University (with the objective to improve collaboration and get better support during future outbreaks).
- Consider reinforcing intersectional collaboration in the following areas:
 - Intersectional cholera
 - EPrep
 - Mutualisation of key HR positions (epidemiologist, GIS, communication officer, advocacy advisor, IEC specialist, training specialist, etc.)
 - Common communication strategy
 - Common approach for the negotiation with the authorities (visa, work permits, access, vaccination, support to cholera intervention, etc.)
 - Harmonisation of case definition and data collection tools
 - Elaboration of context specific training curriculum targeting national staff, preparation of training of trainers
 - Production of IEC and training material in Arabic

Operations/mission

- Organize a meeting on lessons learnt from the the 2017 outbreak with a discussion on possible ways forward for future outbreaks (focused on OCBA preparedness and response)
- Make sure that the cholera is elaborated, up to date and discussed at intersectional level with particular focus on:
 - Case definition and data collection tools
 - Identification of adequate sites for CTCs and CTUs and negotiation of their use with the authorities and the communities
 - Thorough planning of key functions in CTCs and CTUs
 - Pre-stocking in place and modalities to activate emergency supply lines
 - Capacity for mapping (availability of GIS officer)
 - WASH and IEC activities being able to start quickly
- Provide cholera training to all concerned national staff based on the newest Cholera guideline
 - With the support of L&D unit elaborate the context specific curriculum and organize the training of trainers
- Clarify the responsibilities between the emergency cell and the regular cell with regards to the future cholera outbreaks

Acronyms

AR	Attack Rate
CFR	Crude Fatality Rate
CHW	Community Health Workers
CTC	Cholera Treatment Center
CTU	Cholera Treatment Unit
EIC	Education Information, Communication
EPP	Emergency Preparedness Plan
EPrep	Emergency Preparedness
ICRC	International Committee of the Red Cross
IOM	International Office for Migration
MedCo	Medical Coordinator
MoH	Ministry of Health
MoU	Memorandum of Understanding
MSF	Médecins Sans Frontières
NGO	Non-Governmental Organisation
OC	Operational Center
OCA	Operational Center Amsterdam
OCBA	Operational Center Barcelona-Athen
OCG	Operational Center Geneva
OCHA	Office Coordination Humanitarian Affairs
OCP	Operational Center Paris
OCV	Oral Cholera Vaccination
ORP	Oral Rehydration Point
ORS	Oral Rehydration Salt
SLC	Saudi-Led Coalition
WFP	World Food Programme
WHO	World Health organization

1 Introduction

1.1 Structure of the report

As part of its learning and accountability approach, the MSF Operational Centre Barcelona Athens launched an external retrospective evaluation of its cholera operations in Yemen with the support of the MSF Vienna Evaluation Unit.

The present evaluation report is structured as follows:

Introduction: background analysis of the context, presentation of OCBA operations in Yemen, methods, tools and limits of the evaluation.

Section 2: findings of the evaluation.

Section 3: answers to the evaluation questions and conclusions.

Section 4: recommendations arising from the findings and the conclusions.

1.2 Background

1.2.1 Geopolitics

Yemen was an area of instability during the Cold War, when it was divided between pro-Western and pro-Soviet entities, but the situation stabilised at the end of the Cold War. The country set out on the road to development, with significant improvement of its infrastructures (roads, ports, education and health facilities, water and sewage systems in the main cities, etc.). However, by the mid-2000s, a complex situation had developed, due to regional competition among key political actors in the Middle East:

- Political confrontation between Houthi supporters and the government;
- Tribal and religious tensions, including the Salafi/Saidi divide.
- The North/South divide;

In the mid-2000s, Yemen was characterized by:

- A significant degradation of the overall economic situation, despite a once flourishing oil extraction sector;
- A high rate of Global Acute Malnutrition, crippling poverty, low educational levels in particular in the rural areas, the near total exclusion of women from almost all fields, apart from health and specific services;
- Increasing links between Yemen and the 'Global War on Terror', with a number of Yemenis connected to Guantanamo and Al Qaida.

1.3 The current war

Since 2011, Yemen has been at war. The conflict has both internal and external roots. On the one hand, it is the result of the failure of a political transition that was supposed to bring stability to Yemen following an uprising that forced its long-time President Ali Abdullah Saleh, to hand over power to Abdrabbuh Mansour Hadi, his Vice President. As the head of the internationally-recognised government, Hadi struggled to deal with a variety of problems, including attacks by al-Qaeda, the activities of a separatist movement in the south, the continuing loyalty of many military officers to Saleh, as well as corruption, unemployment and food insecurity.

The conflict has also been affected by the involvement of a Saudi-led multinational coalition (SLC) that backs the forces loyal to President Hadi in its fight against the Ansar Allah (Houthi) rebel movement.

Since the SLC involvement (from 26 March 2015) the deterioration of the situation has accelerated. The humanitarian response (in particular MSF and ICRC) has dealt with many health issues directly resulting from the ongoing war. These range from the need to cope with the direct impact of the war (the high number of war-wounded people requiring emergency care) and the indirect impact the conflict (the degradation of public health systems, people's fear of using these health structures due to their frequent bombing, significant levels of health-related malnutrition and a cohort of other health and protection issues. More than 8,600 people have been killed and 49,000 injured since March 2015, many of them in air strikes by the Coalition, others due to land warfare involving the shelling of often densely inhabited zones on frontlines. The lack of funds of the State has also induced a systematic delay or absence of salaries for most staff, which has put the health sector in jeopardy. Lack of funds, limited spare part availability and regular destruction due to bombing has accelerated the degradation of key WASH infrastructure. This, together with over-exploitation of water for khat production has created an extremely precarious water and sanitation situation.

Due to problems controlling contagious diseases (measles, ARI), vector -propagated diseases (malaria, dengue fever) and above all water-borne diseases (diarrhoeas of all kinds, diphtheria) and the degraded economic situation (no salaries paid to officials for years, the embargo, and the war situation), the overall degradation of the living conditions of both adult and children populations is dramatic, even though shops and markets are still very active. All presence of all these factors meant that the door was open to a major health crisis.

1.4 Past OCBA operations in Yemen

OCBA has been present in Yemen since 2010. Several projects have been implemented in the Northern part of the country. The oldest of these projects involves HIV patients and is implemented in support of the MoH. In Sana'a, the main project was largely oriented towards improving access to treatment in one of the large hospitals in the city, with the objective of improving access to health services in the context of the conflict. Other parts

of the programme concerned other consequences of the war, including IDP, destruction of water systems, etc. Large parts of the efforts, however, have been concentrated on war surgery, mass casualty management (including triage), and preparedness (training, prepositioning equipment, supplies and action plans). In Rashe (Saida Governorate), close to the active front line, the initial plan was to provide the hospital with full support. In view of the operational difficulties triggered by the security situation and access limitations imposed by the authorities, OCBA finally opted for lighter support in terms of supplies and incentives for the Saida MoH staff.

In Hajja Governorate, OCBA is focusing on supporting the main referral hospital, Hajja Hospital, and a key rural hospital in Abs district (around 200 beds) also close to the frontline. Hajja is the referral hospital for Abs (the two health structures being connected by an ambulance system supported by OCBA). In Hajja, the programme is a light support to the hospital. In Abs, OCBA is more involved and supports the OT, maternal and neonatal care. Abs hospital was severely bombed in 2016 and MSF evacuated it for a couple of months. This evacuation negatively affected the relations with the MoH, but this tension died down when OCBA returned.

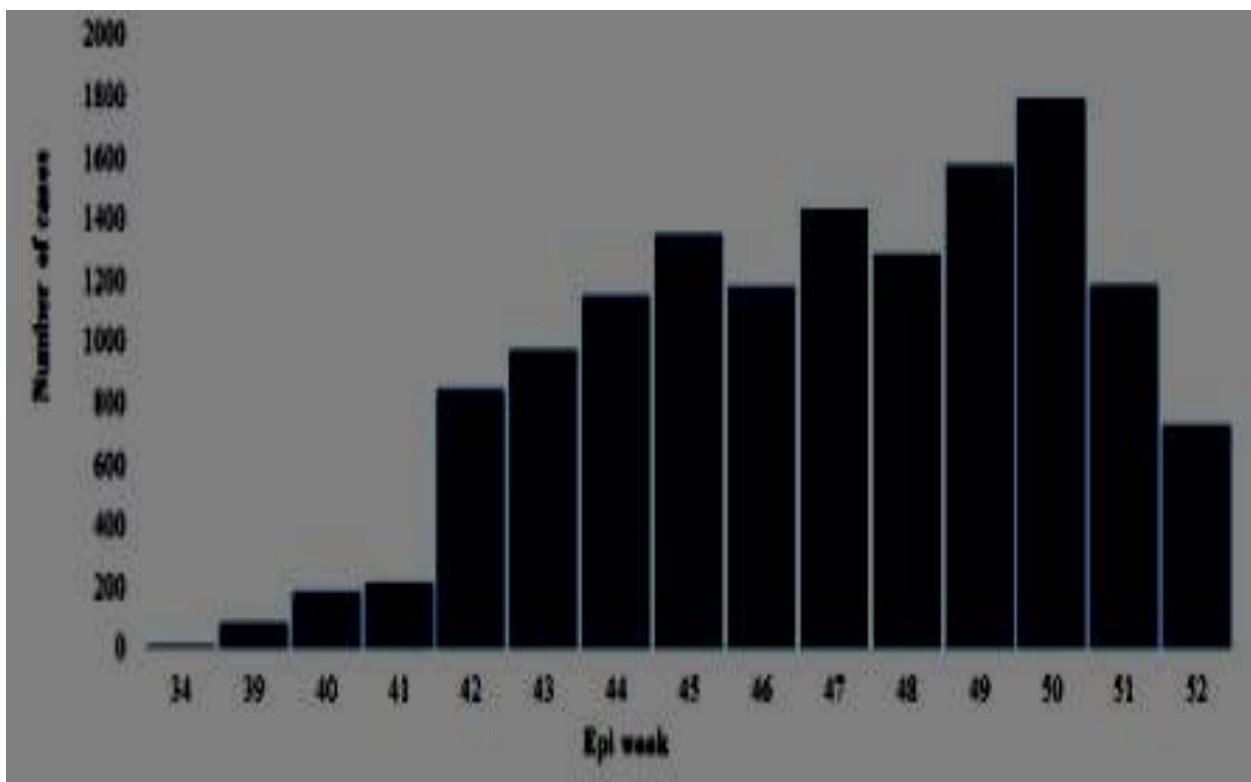
The focus of activities is on nosocomial infection control, regular provision of electricity, and supply of medicine and incentives for the staff. The support of OCBA to Abs hospital is quite comprehensive, including the provision of generators and fuel (WHO supplies water by water trucking). Many of the hospital's staff (around 200 people) are now on MSF's payroll. There had been a plan to develop outreach operations, especially to cover the IDP concentrations around the city with health support including EPI (measles and diphtheria are two emerging threats) but this turned out to be difficult due to the security restrictions.

1.5 The cholera epidemic

Although Yemen is regularly affected by cholera outbreaks of different sizes¹, the two peaks of the deadly, widespread epidemic in 2016 and then in 2017 seem to have taken almost all actors by surprise. The previous major outbreak in 2011, which affected other parts of Yemen, had resulted in over 31 000 suspected cases, including 134 related deaths (case–fatality rate: 0.4%).

2016: After a gap of 5 years, Yemen reported a cholera outbreak that began in October 2016 in a large part of the country, but mainly the south. Cases were reported in the North with cases in Hajja in September/October 2016, although not seen by OCBA Hajja team. On 6th of October 2016 cholera outbreak started spread throughout the country. By the end of December 2016, the Ministry of Public Health and Population reported 15,704 suspected cholera cases, including 98 associated deaths (case–fatality rate: 0.6%) from 157 districts in 15 governorates (Fig. 4). The first cases were laboratory confirmed in October 2016, EPI week 34, as *Vibrio cholerae* 01, coming from two governorates, Sana'a, and Albytha.

¹<http://www.ufiddynamics.org/projects/cholera-data-and-maps-yemen>



Epidemic curve of suspected cholera cases reported in Yemen, Epi weeks 34–52, 2016 (source WHO sitrep)

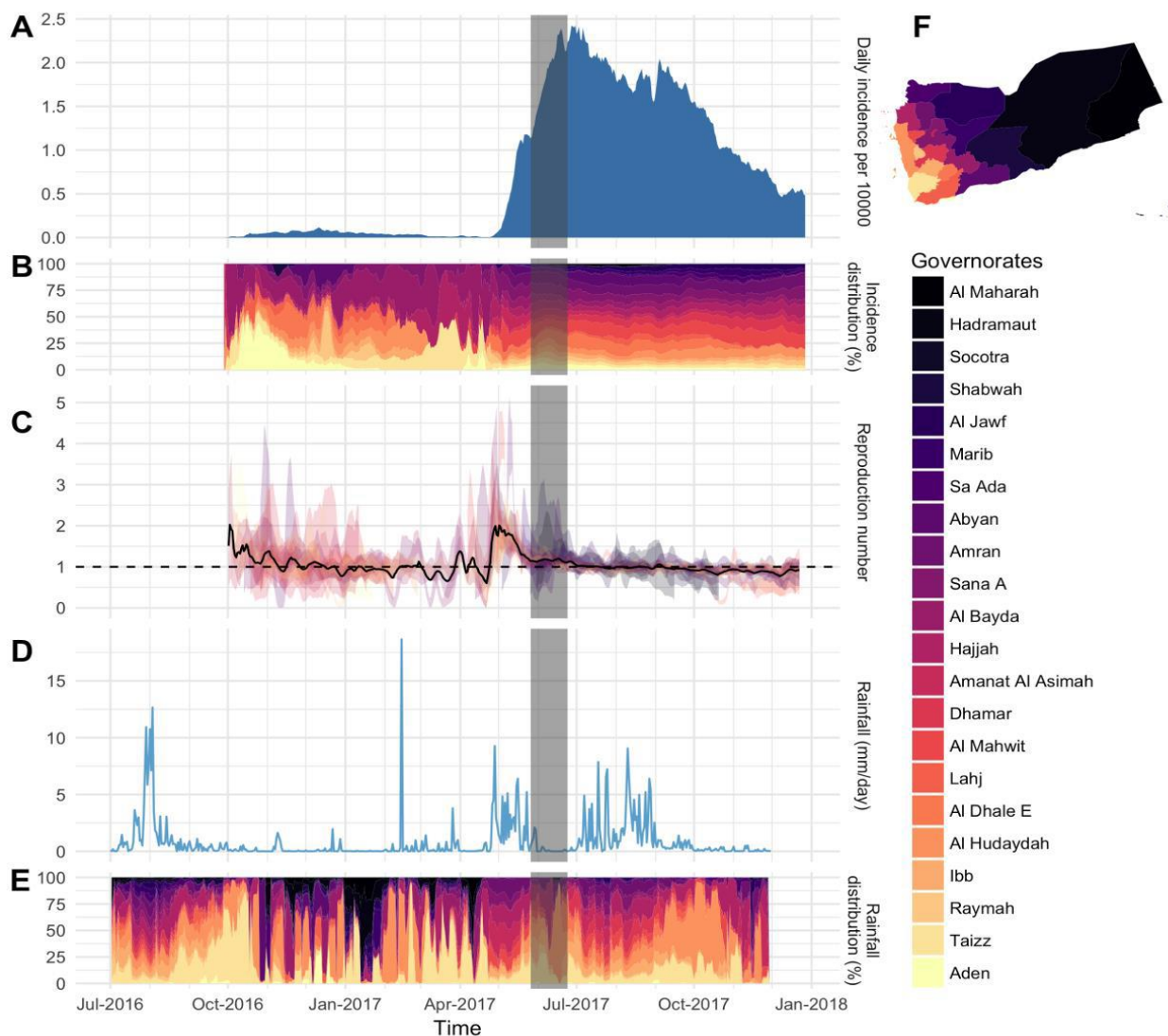
The total number of cases confirmed by laboratory from 6 October to 1 November 2016 is 72 cases from 11 governorates, including (Sana’a Gov, Aden, Lahj, Aldala’a, Hudida, Taiz, Ibb, Sana’a city, Albytha, Amran, and Hajja); the total number of cholera confirmed deaths is 8 from 3 different governorates.

In Hajja as of 1st of Nov 2016 the total number of cholera confirmed cases by laboratory test was 1 case; 1 death; and 338 are cholera suspected cases. MSF in AGH- Hajja prepared one isolation room with 9 beds, and its bathroom for the confirmed and suspected cases of cholera, and there was a plan for training of the staff on case definition and case management, but WHO confirmed that Hajja governorate was in its plan in this training. At that time, WHO did confirm that they could ensure sufficient medical supply and that UNICEF can cover WASH needs.

2017

There were still some cases remaining from the first wave during the early weeks of 2017. A new cholera wave began in the northern part of Yemen and reached its peak during the rainy season, which coincided with Ramadan and Eid and their specific behavioural factors (fasting, not drinking) and social factors (social gatherings at the end of the day, family get-togethers for meals, etc.). New cases of cholera surged again in early spring 2017 mainly in the North and Western coastal parts of the country. The MSF team in Abs hospital started to receive cases from Beni Yous (Hajja Governorate, Abs district) on 30 March. The WHO dated the beginning of the second wave of the cholera outbreak with 27 April 2017. It is interesting to note that this second wave was also bimodal, following rainfall patterns. From this date to the end of August, the total number of suspected cholera cases reported by the World Health Organization (WHO) and the health authorities in Yemen by the end of

December 2017 reached 1,055,788 people with more than 2,000 deaths (2255 according to WHO) with a Case Fatality Ratio of 0,35%. There are also cases in 22 Yemen Governorates out of 23. 297 of the 333 districts of the country were affected. The overall attack rate was 15.3 per 10,000 of the population (with all the uncertainty linked to the weak quality of demographic data) . The epidemic numbers were too high and the geographic distribution too wide for the Yemeni health system, agencies and NGOs (including MSF) to cope fast. For a long period, the response was trying to catch up with needs. The number of cholera and acute watery diarrhoea cases registered weekly in Yemen began to decrease in mid-July and MSF started to scale down its operations. Yet, as the evaluation was being carried out in the field, some worrying signs of a possible resurgence of the diseases were observed, which is not surprising as the situation has not improved. It is interesting to look at how the outbreak unfolded over time and its different parameters.



Source: Corollary of a war: Factors for cholera transmission in Sana’a city governorate during an outbreak in Yemen, 2017 – Interim report , Epicentre , Ministry of Public Health and Population, MSF, Institut Pasteur

1.6 Methodology

1.6.1 Objective and purpose of the evaluation: a learning loop

The Terms of Reference (see annex N°1) clearly underline that the evaluation should adopt a “learning approach”.

OVERALL OBJECTIVE: Capitalization of the intervention in Hajjah Governorate from 30 March to October 2017 to enhance operational performance in the future.

THE PURPOSE: To use the lessons learnt from the cholera response in Yemen to adapt the strategy for future interventions aimed at reducing morbidity and mortality due to cholera outbreaks in similarly complex settings.

1.6.2 The evaluation approach

The evaluation is expected to analyse the MSF OCBA cholera response with regard to the main evaluation criteria presented below (see ToR in annex N°1)

Impact: To which extent did the intervention contribute to the achievement of the overall objective of the intervention? Meaning to reduce mortality and morbidity due to cholera. To what extent have the set objectives of the strategy been achieved?

Effectiveness: What were the reasons for achievement/non-achievement (internal and external)? What were the enabling and blocking factors at different points of time? To what degree did the intervention contribute to the achievement of the overall objective of the intervention (to reduce the morbidity, mortality and human suffering due to cholera)? For instance, how were the Cholera Guidelines used to develop the field operations and how useful were they?

Relevance: To what degree was the response appropriate to the context of high insecurity and challenges in terms of limited access and administrative constraints? How flexible was the response to contextual changes over time? How appropriate have possible adaptations been?

Connectedness: To what extent was the response coordinated with other actors (inside and outside of the MSF Movement – intersection collaboration)? How well did coordination contribute to the intervention’s objective?

The methodology included:

- A review of documents on the Yemen crisis and the recent cholera response, in particular documents produced by MSF (sitreps, lessons learnt, guidelines, epidemiological studies, etc.) or produced by other actors (WHO, ICRC, OCHA, NGOs)
- A series of interviews with OCBA staff not anymore in Yemen (see list in annex): Face to face and distance interviews, as well as focus group meetings were carried out with 20 individuals having been involved in the OCBA response at HQ level or in the field. Some of them were back in HQ, other have been deployed to other operations or are now working with other organizations. They represent the different types of functions (med, admin, log, etc.) that were involved in the operation at HQ, Aman Cell and field levels. Several staff could not be interviewed, as contacts could not be established on time.

- Data analysis to understand the complexity of the cholera crisis in terms of time and geographic expansion in order to assess how MSF was able to adjust to it (medical, WASH, contamination control, etc.), using in particular the recently produced EPICENTRE studies.
- Field visit in Yemen to better understand the operational context in which the cholera response took place. This included:
 - A series of interviews in Sana’a (MSF, WHO, UNICEF, WFP, National Authorities)
 - Field visits in Hajja and Abs. During these field visits, interviews with key MSF staff and stakeholders, focus groups with health staff. (During these exercises, staff had to contribute to the development of the timeline and the analysis of the key difficulties and successes as well as the identification of key lessons), beneficiaries (to gather their perception on the operation) and direct observations contributed to shape the content of the evaluation report. One of the most important tools for the evaluation was to establish a detailed timeline, where all key parameters could be clarified. The preliminary timeline established during the first period of the evaluation was a key tool to engage with a wide range of stakeholders in the field, in particular with the National Authorities and national staff.
 - Feedback loops with the field and OCBA Sana’a office;
 - Feedback with OCBA (CO1, EU & OCBA ESB) and MSF Vienna evaluation unit. For the purpose of these debriefings, a PowerPoint presentation was shared with Cells, Mission, stakeholders from medical departments and other stakeholders for feedback. This report takes their comments into account.

The preparation of the recommendations took into account two elements:

The first set of recommendations has been designed to facilitate the response in the case of a new cholera outbreak in Yemen with a strong focus on preparedness and using the key observations made during the evaluation. They were presented to the field at the end of the mission and raised significant interest. These are easily actionable.

The second set of recommendations is more far reaching and has to be analysed in the context of the preparation or revision of guidance document outlining key points to control in cholera outbreaks/health crisis in similarly complex political contexts, as per the initial Terms of Reference. Some of these recommendations are easily implementable. Others might seem obvious for a MSF person. The fact that they were identified by an experienced evaluator as missing or weak in the Yemen cholera response should call for attention. Others might require internal discussions within OCBA to see how they could be implemented as they require more in depth institutional analysis than what was possible during the evaluation. The evaluation team would be most happy to contribute to the discussion but this would require a different format than just a post mission debriefing.

1.6.3 Deliverables

A set of physical deliverables has to be produced as part of this assignment, as per the ToR (see annex N°1):

- a. An inception report presenting the understanding of the ToR and the way the team planned to approach the evaluation process;
- b. The present evaluation report: It comprises the key findings, the response to the evaluation questions and a set of recommendations.

A series of oral presentations are also planned at different stages of the evaluation process and the utilisation of its results.

1.6.4 Limits

One of the main limits is linked to the fact that this evaluation took place relatively late after the events. There were some difficulties in accessing institutional memory due to staff turnover since the beginning of the cholera crisis.

Initially a real time evaluation (RTE) was foreseen. The first request for this evaluation was made in June 2017. It was only at the end of 2017 that it could be launched. As none of the international staff involved in the response was no longer present in the field at this time, reconstructing the collective memory from diverse sources and triangulating them in order to make sense of all the information collected was a serious challenge. In addition, the limited availability of documents produced during the 2016 outbreak and the first part of the 2017 crisis was a constraint that had to be compensated for by a lot of field interviews. The delay between the emergency operation and the current evaluation is problematic. There are clear reasons why this delay took place (internal debates within MSF, difficulties to mobilize a team, visa issues, etc.), but this situation is of course not ideal to ensure proper collection of information. It made the triangulation process all the more important.

As a result, interviewing all the staff from the exhaustive list of staff that have been involved in the operation that has been shared with the evaluation team by OCBA was not possible despite significant efforts from the evaluation team. Field access was not a significant constraint although every necessary precaution was taken to be ready to adjust to the fast-changing war environment. The evaluation team had remained flexible but finally managed to carry out the field mission not only to Sanna'a but also to Hajja, Abs and beyond.

2 Findings

2.1 The OCBA cholera response and its timeline

2.1.1 The many dimensions of the response

The response to the cholera crisis in Yemen was a multi-section operation involving four MSF Operational Centres (Barcelona, Geneva, Paris and Amsterdam), which, by the end of August, had managed to treat more than 91,645 patients (representing, about 15% of the cholera patients reported in Yemen). With operations in 9 Yemeni governorates (Hajja, Amran, Al-Dhale, Hodaidah, Ibb, Taiz, Sana'a, Aden and Abyan), MSF supported 22 cholera treatment centres and units.

The MSF response was based on a number of strategic pillars:

MSF strategic pillars for the Cholera Response in Yemen

1. Preventive activities:
 - a. Infection Control and WASH activities
 - b. Community engagement and Health Promotion activities
 - c. OCB preparation and lobbying authorities to enable its implementation
2. Epidemiological Surveillance
3. Case Management activities:
 - a. Centralized treatment and case management: In Abs and Hajja with CTCs next to the Abs and Hajja hospitals
 - b. Decentralized case management and treatment: Support to Health Units and configuration of Cholera Treatment Units (CTU), Oral Rehydration Points or the establishment of referral focal points in a number of semi-rural locations

2.1.2 The weight of political and security issues on the operations

Ensuring the security of the teams and infrastructures in Yemen is difficult and remains a paramount concern of Head of Missions and their teams.

- This is partly due to the specific type of warfare: air strikes take place every 2 or 3 days, targeting military facilities and often affecting nearby populated areas. In the governorate where OCBA was working, health facilities were sometimes targeted, in particular the Abs hospital in August 2016, leading to the withdrawal of the MSF team from the area. Even Hajja hospital was affected by blasts resulting from bombs falling in its vicinity.
- There have also been confrontations on the ground and a hospital like Hajja is in the line of fire between several key governmental buildings and was caught up in the cross fire a couple of times.

In Sana'a, and in its two main areas of operation, OCBA implemented a number of security measures for its staff: security briefings on situations and procedures, clear instructions about "no-go zones and no-go times", the distribution of telephones, and induction visits in the MSF premises in order to know where safe rooms are located. Systematic notifications of movement were and still are implemented with all parties to the conflict and all MSF premises and vehicles are clearly identifiable from the air.

In addition, due to the high sensitivity of certain areas, the Houthi authorities imposed a lot of political and security restrictions (sometimes clearly for security reasons, but other times for more obscure reasons linked to the war economy or to the internal tensions with the Yemeni side -in particular between the Houthis and former President Saleh's party). These restrictions, which were imposed by the Houthi Security apparatus, with no clear time or geographic patterns, limited access to the field, in particular at the crucial time when large areas should have been covered for cholera assessments, and for the outreach activities later on. This affected all international actors

2.1.3 Lack of alertness and cholera preparedness

Despite regular cases of cholera, **Yemen had not had a large cholera outbreak since 1972. The international community in Yemen, including the MSF movement, did not consider a cholera scenario as a high priority scenario. It was neither mentioned in the MSF OCBA 2015 EPP nor after the Nov 2016 EPP revision**, once the first wave of the epidemic had already started. In the November revision of the EPP, the rapid tests were removed from the stock (as MSF no longer validates any rapid tests) and instead materials for taking samples were included. However, the capacity of the laboratories in Sana'a was not properly assessed. They could not ensure proper culture, which hindered the capacity to confirm the presence of cholera.

Despite the fact that many factors of vulnerability to health crises were well recognized in Yemen, in particular those linked to communicable diseases, and despite the fact that the first cholera outbreak had taken place a few months before, **the level of alertness remained sub-optimal**. In the field, especially in Abs and Sana'a, and at HQ level, the very little preparedness made the reaction significantly slow. Doubt in the face of a potentially serious problem was made worse by the surprising attitude of some high-ranking UN representatives, but also key staff in MSF both in the field and in HQ who felt that the risk was being exaggerated. **The most prevalent assumption was that the issue was acute watery diarrhoea (AWD) rather than cholera.**

OCBA had no emergency preparedness (EPrep) plan for cholera in Yemen although cholera was mentioned as "scenario 10" in terms of likelihood in the 2007 EPrep for Yemen. **Only Operational Centre Amsterdam (OCA) had a cholera EPrep** with a few cholera kits in country before the outbreak and the resources were supposed to be shared with the other OCs. **The OCBA alert capacity was compromised** by the fact that the projects were mainly **hospital-based** and only had a **limited presence in the community** to register and analyse "low noise". The fact that the **teams were evacuated from August to November** after the Abs hospital bombing also seems to have altered the capacity to detect "alert signals".

When the first cases were reported from Beni Yous, it took 2 to 3 weeks for OCBA field teams to understand the nature of the problem. Then they intervened with supply and

trainings for medical staff and cleaners. The CTU in Beni Yous and in a few other locations were set up soon after.

The fact that **nobody had previous cholera outbreak experience** (only one member of staff had received two hours of training in Uganda) aggravated the uncertainty. Even though HQ pushed at the beginning to get more information (the MSF strategy is to get ready for an intervention as soon as the first case of cholera is confirmed), it was difficult to get more clarity on the situation and its severity. These constraints to apprehend the severity and scale of the problem were aggravated by the difficulty of getting laboratory confirmation of the presence of the Vibrio. This continued throughout the duration of the outbreak due to problems with taking and transporting samples as well as with the electricity supply in the laboratory itself.

Although there was some OCA stock that was considered to be international EPP stock, the fact is that no intersectional emergency preparedness plan (EPP) was established in terms of response strategy. The medical supplies in place were not enough for the 4 sections and were very quickly used up, to the point that some sections, including OCBA, were forced to use homemade ORS.

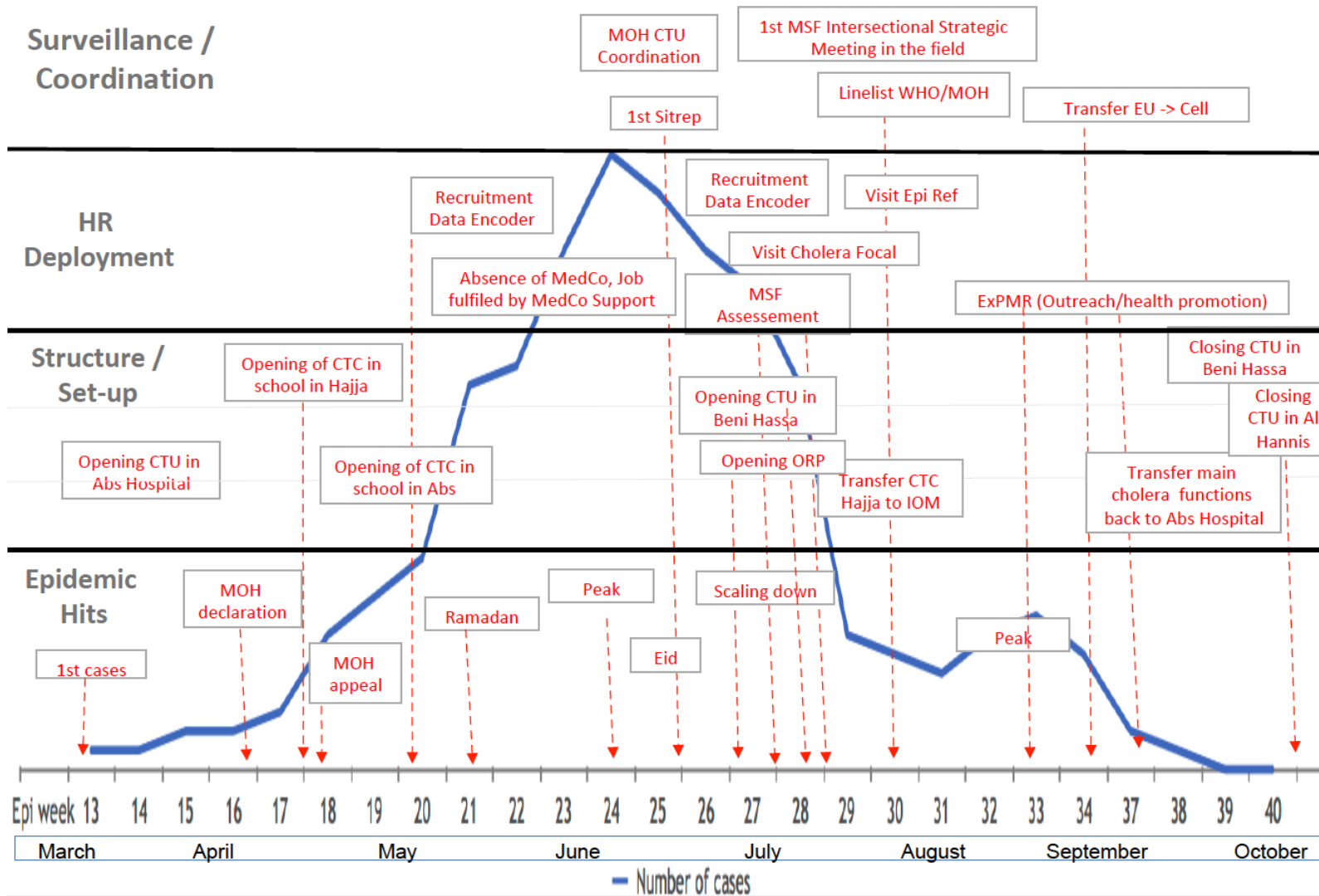
2.1.4 The 2017 timeline of the OCBA Yemen cholera response

Constructing the timeline of the response was critical. The different sources of information used for this were:

- The epidemiological curve established using case reporting procedures and summarized by EpiWeeks;
- Information gathered from different reports (end of mission reports, etc.);
- Information gathered through interviews with key expatriate staff who were involved in the response;
- Information obtained from national staff during the field mission.

Below is an attempt to establish the 2017 timeline. Given the retrospective aspect of the evaluation and the long delay since the involvement of the OCBA Emergency Unit, the retrospective reconstruction of the timeline was an essential part of the evaluation.

Time Line for the 2017 OCBA Cholera response in Yemen



2.2 Operational steering and monitoring

2.2.1 Uncertainty on the status of the guidelines

Only one of the national staff had received a short introduction on cholera in a MSF training in Uganda and had a copy of the powerpoint summarizing the 2004 Guidelines. Then the full text of the 2004 Guidelines were sent and used. The information that these Guidelines would soon be replaced by new ones induced some confusion and the reception of a draft of the 2017 Guidelines did not help as their status was still largely uncertain. Finally, with the support of the MedCo and advice from HQ, the situation stabilized.

2.2.2 Diagnosis, triage, outbreak monitoring and discharge

2.2.2.1 Case definition and triage

There was a lot of confusion about case definition in the health sector during the early part of the crisis and this affected MSF national staff working in the cholera response.

MSF cholera case definition: any patient presenting 3 or more liquid stools and / or vomiting for the last 24 hours (MSF Guidelines 2004)

Given the fact that the cholera case definition is very sensitive but not specific, many other cases presenting similar symptoms were accepted in the CTCs at triage level, especially during the first weeks. This difficulty at the triage level was aggravated by the fact that, with their limited experience, many newly recruited MSF national staff often opted for a “no regrets” approach in order not to exclude possible cases².

With its limited expatriate presence, OCBA could not perform the appropriate supervision in triage, infection control, medical case management, that would have been required in this very complicated and very dynamic context. Many people with AWD were admitted to the CTCs. The largely ineffective documentation process put in place in the triage area during the early days of the crisis led to a series of difficulties for epidemiological studies and proper steering of the operation. This finally ended up with the system being congested, staff overwhelmed and regular shortages of supplies. However, the situation then improved when the CTC in schools were fully operational and when the pace of arrival of cases started to decrease and became more manageable.

2.2.2.2 Epidemiological surveillance: data management

One first difficulty comes from the fact that all demographic data on the area are not trustable. Demographic denominators are known with the high level of uncertainty and calculation of ratio is always a risk endeavour.

² The case definition is mostly an epidemiological tool that facilitates decision during the course of an epidemic by speeding up diagnosis. But the clinical fact is that the admission of a patient when done by experienced staff usually relies on more specific diarrhea features so the positivity rate of these cases is likely to be higher.

Data collection was very chaotic during the first few weeks of the response even if efforts were made quite early in Abs with the recruitment of the first encoder a few days after the opening of the CTC. During the response itself, other key variables to measure mortality and morbidity rates, including the percentage of real cholera cases in the population accepted in the CTC/CTU or receiving assistance in the ORP, were largely unknown. Rapid tests are not seen as reliable by MSF and not useable as admission criteria. None of those available on the market have been validated and thus case validation has been heavily relying on Sana'a laboratories. But there the case confirmation by the central laboratory remained very inconsistent due to many difficulties along the chain, from sample collection to culture in a context of frequent energy cuts and lack of spare parts for the laboratory equipment. The low CFR (Case Fatality Rate) might be a feature of misreporting/underreporting at the beginning of the epidemic (a lot of missing information) or actually a feature of a working system or even a characteristic of the strain of Cholera. Several interviewees suggested that the relatively low Case Fatality Rate (CFR) is linked to the overdiagnosis of Cholera versus AWD caused by E-Choli and other water borne pathogens, a frequent feature in cholera epidemics

It is important to recall that this judgment on CFR, and morbidity rate takes into account the lack of trustable data from the periphery, including underreported cases and deaths. The insufficient post-discharge case follow-up is exacerbating the difficulties to understand key parameters of the outbreak, especially the low CFR. Data management was largely sub-optimal during the first part of the outbreak. This comprised both the registration process at the triage stage and the patient follow-up until discharge.

Data registration systems were not clear enough in the MSF Cholera Guidelines and with the regular absence of a MedCo and limited staff with cholera experience, this turned out to be quite complex for the field teams. The absence of a tool/ software for the immediate activation of a standard line list at the very beginning of the epidemic created a great deal of difficulties. Despite supervision efforts by HQ, the line-lists were not harmonized either across the projects, with the ones used in previous outbreaks or with the ones used by other OCs. Although there was a line list in place from the first patient seen in Abs hospital, its format kept changing until the reference OCBA Epidemiologist arrived (in week 28) and standardized them. The final version made data collection even more difficult as it did not allow adding easily high numbers of data leading to discrepancies of around 300-400 patients.

A complex system had to be put in place for the decentralized health structures: In the CTUs and ORP, photos of the pages of the registry book were taken on a daily basis and send by WhatsApp to a place where they could be formally entered in the electronic line list (Abs and later HQ).

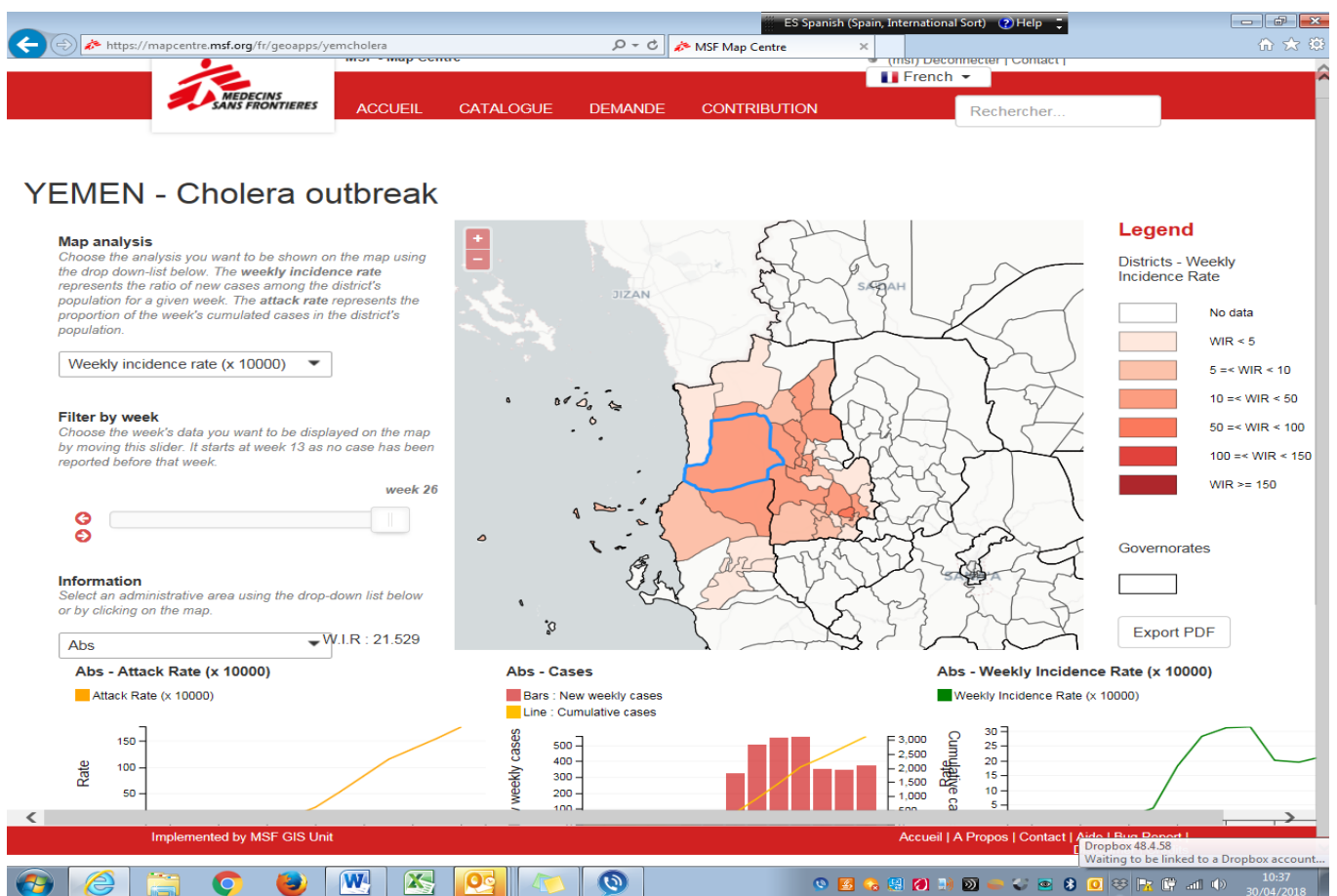
These problems with common and consistent data collection slowed down and jeopardized not only the capacity to analyse the epidemic but also to estimate medical orders.

The analysis done by the epidemiologist at the medical department was more descriptive (quantitative) than operational and analytical, and lacked recommendations or conclusions. As such, being able to use this analysis depended on staff having a certain

epidemiological capacity or cholera experience, which was not the case during this outbreak.

In November 2017 the first EPICENTRE reports were produced bringing a broad overview of the dynamics of the 2017 cholera outbreak.

Mapping of the outbreak is often a useful tool to understand patterns of outbreaks and steer outreach interventions. Even without a GIS officer at that time, OCBA started from May 2017 to map cases and create maps to help to follow the evolution of the outbreak. The tool produced displays the weekly incidence rate and attack rate from week 13 (end of March 2017) to week 26 (end of June 2017) in different administrative areas (see picture below). OCBA wanted to apply the model intersectionally, but other OCs opted to the EPICENTRE model. Thus this mapping was discontinued.



YEMEN - Cholera outbreak

Map analysis

Choose the analysis you want to be shown on the map using the drop down-list below. The weekly incidence rate represents the ratio of new cases among the district's population for a given week. The attack rate represents the proportion of the week's cumulated cases in the district's population.

Weekly incidence rate (x 10000) ▾

Filter by week

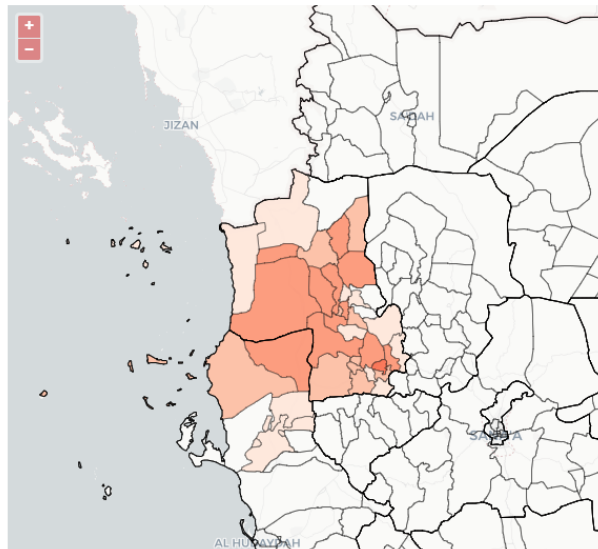
Choose the week's data you want to be displayed on the map by moving this slider. It starts at week 13 as no case has been reported before that week.

week 26
◀ ◯ ▶

Information

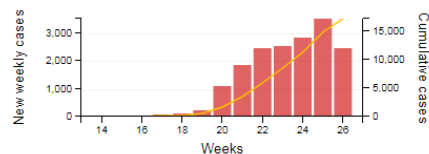
Select an administrative area using the drop-down list below or by clicking on the map.

Select an administrative area... ▾



Overall - Cases

Bars : New weekly cases
Line : Cumulative cases



<https://mapcentre.msf.org/fr/geoapps/yemcholera>

OCBA's inability to continue to produce maps due to the competitive intersectional process impacted its geographic analysis of the outbreak and therefore its power of advocacy towards the Authorities in order to orient the response to the outbreak.

However, it should be kept in mind in the Yemeni context, where authorisation to travel to remote areas is seldom granted, that continuous GIS would have been more useful for advocacy and to identify areas from which staff could have been invited for training and support (additional ORP and cholera focus points in the countryside).

It is important to recall that demographic data about Yemen has a significant margin of error as the last census (2010) was based largely on approximations and little is known about the demographic changes that have taken place since then.

Below, we look at a series of key parameters of managing the outbreak:

The attack rate was unclear during a large part of the crisis. The lack of an established system to record data during the first part of the 2017 outbreak, the fact that figures on rural populations could not be triangulated and the high mobility of the population, made the quantification of the attack rate a difficult task. The very liberal way case definition was used, as well as the **political motivations behind presenting high numbers of cases**, also played a role in the elaboration of the final figures.

The debate about the level of the case fatality rate (CFR) compared to other cholera outbreaks underlined some of the difficulties of understanding the crisis in Yemen.

The fact that the **mortality rate was seen as lower than in a “typical” cholera outbreak** raised different issues: At one stage, **the question of the virulence of the strain was raised**. Its analysis in the Institut Pasteur confirmed that it was the same strain as in other cases in Yemen and the sub-region, was not playing a role in the low CFR³. During the 2016 phase of the epidemic, the CFR was of the same magnitude as in other outbreaks in the region (3-4%). This therefore supported the idea that the virulence was not the issue. Other factors had to be explored to understand these morbidity and mortality rates including social factors and bias in the diagnosis chain. As indicated above, several medical staff interviewed mentioned the fact that the low CFR could be explained by an **over-diagnosis of cholera**, due to rather open clinical approach of the case definition, and the relatively systematic recourse to IV fluids. Nevertheless, there are still some question marks about the low CFR in the sense that under-reporting and poor case follow-up were a constant feature during the outbreak. In order to clarify this issue, **the results of a retrospective mortality study by EPICENTRE will be most useful**.

In the end, some attempts were made to improve data management and its usability for analysis and research.

2.2.2.3 Cholera case confirmation

Use of rapid tests (Crystal VC O1 & O139) was largely promoted by WHO and MoH and partly used by MSF and its local MoH partners, despite all the concerns the MSF family has about its reliability; in addition, the Cristal VC (o1+o139) was taken out of the MSF catalogue due to an unreliable production process, with a lot of false positive results creating significant confusion. The alternative was to analyse cultures tests in a certified laboratory in Sana’a. However, the process for getting confirmation from a culture test is itself complex and did not facilitate quick decision-making. Nevertheless, the first cholera cases in Abs hospital were declared confirmed by the local health Authorities on the basis of a rapid test from WHO. The samples were then sent to the central laboratory in Sana’a, but the cultures were too often negative. Several reasons can explain why the confirmation of cholera through cultures was very difficult in Yemen and why most samples were classified as “cholera negative”: The problems started at the sample collection phase: sample might have been polluted by chlorine, or patients might have received antibiotic treatment prior to the collection of the sample). Then there is the lack of appropriate means of transportation, the fact that the temperature in the cold box is often too low, and the duration of the transportation (all Vibrios are dead after 48 hours), which significantly limits the chance of a sample arriving in good condition. Internal coordination difficulties within OCBA logistics did not help. It is important to recall that the central laboratory in Sanaa did not accept the tests sent with filter paper that is MSF standard (provided with in the cholera kit). At the laboratory level, the frequent electricity cuts and the state of a lot of equipment made the situation worse. Despite the dedication of its

³ [https://www.thelancet.com/journals/langlo/article/PIIS2214-109X\(18\)30230-4/fulltext](https://www.thelancet.com/journals/langlo/article/PIIS2214-109X(18)30230-4/fulltext)

staff, the laboratories proved unable to play the role they were expected to play in a response of this kind.

2.2.3 CTC and CTU set up and management

2.2.3.1 Structures

To carry out the evaluation, the team referred to the main tasks that have to be conducted as part of a CTC operation:

A CTC should be able to perform a series of tasks while ensuring it does not become a secondary source of contamination and contribute to spreading the disease. On the basis of MSF experience (which as used as a standard for the evaluation), it should:

- Conduct proper triage and orientation of patients in order to distinguish the patients needing oral or IV rehydration (proper use of the appropriate case definition), to orient them to right areas for isolation and proper treatment. The “screen out” individuals have to be reoriented to ensure that they remain outside of the contaminated parts of the CTC;
- Manage “clean and contaminated” flows (humans, goods, clothes, waste, water) to avoid both nosocomial and external contamination;
- Provide medical care according to the best professional practices given the resources available in each environment;
- Refer patients when required (complications, kidney failure, etc.);
- Manage dead bodies in a proper and dignified way;
- Help to stabilise an environment rather than be a source of fears and worries for the population.

The existing health structures in Hajja and Abs were not designed or run to follow these standards. The classical WHO supported Diarrhoea Treatment Centre (DTC) that was set up in the Hajja hospital at the beginning of the outbreak was more a risk than an asset, due to the fact that it would be very difficult to establish proper triage, isolation and circulation of cholera cases and items in the middle of already crowded and bustling hospitals. During the first few weeks of the outbreak, several CTU were opened around Abs (Beni Hassam, etc.) to cope with the influx of patient as upstream as possible, but the crisis rapidly reached Abs. Abs Hospital was not designed to have a proper system for a large cholera operation. The small CTU in the premises of Abs hospital that was established during the first few weeks of the response was rapidly overwhelmed by the size of the outbreak.

OCBA staff looked for alternatives, and in both cases these turned out to be nearby schools. The chance was the time of the outbreak acceleration coincided with the Holydays and these schools were thus empty. These provided an easy water supply by connecting the school to the hospital, easy connection to water and electricity, a significant number of rooms and free space to accommodate a large number of beds, ensure proper gender separation, and also separation by severity, as well as a significant number of existing latrines connected to septic tanks. As such the schools were physically appropriate and represented good options as CTC to scale up the response quickly. At the beginning, things

went relatively well, but Abs CTC was rapidly overwhelmed. Moving to the second floor of the school was not easy: there were no latrines on the second floor and MSF had to create them before allowing patients to move there. In addition, the fact that the second and third floors were mainly made of small rooms created significant complication: the HR required to manage these multiplication of small sites was huge and also the fact that the big space that we theoretically had was spread into second and third floors and small rooms. The fact of having lot of small rooms rather than fewer bigger rooms increased the number of staff required for their management and OCBA had to hire much more nurses than anticipated. Fast track training became indispensable.

The creation of these CTC outside of the hospitals had some drawbacks. **Some staff from the local hospital lost significant levels of power and income** (the cholera incentives and supplies from WHO that would have come with the running of a cholera centre) and **became actors of blockage in the response** (creating tensions with the security apparatus, for instance).

More important was the reluctance of surrounding communities, who were concerned to see large-scale cholera management taking place in the middle of their territory. Indeed, **the establishment of a CTC creates not only possible risks of contamination, they also lead to traffic jams, night traffic, large amounts of waste and possible contamination.** It took a lot of effort to recover from these tensions, and some of them are still perceptible.

2.2.3.2 Separation of “contaminated” and “clean” areas

The set-up of the Hajja and Abs CTC was done in an organic way, following the Guidelines but adapting the recommendations to an existing structure (school), initially without any OCBA staff (expat or national) with cholera experience and without much technical supervision from HQ. But as a school is not designed to be a CTC, choices had to be made by the local staff and the few expatriates present in the field to adjust the Guidelines, and in most instances, these choices made sense. As a result of this situation, designing flows turned out to be complicated and risks of cross contamination were high. But with a lot of efforts and investment to understand how to use the 2004 Guidelines and the 2017 draft Guidelines, it was possible to manage situations and to limit significantly the risk of cross contamination. However, the situation remained difficult during the first phase of the epidemic as the daily influx of patients was massive and it was difficult to control the movement of patients within the CTC. The cholera focal person arrived in week 28 (July) and revisited to site and made proposals to redesign some parts of the system (in particular to prepare the morgue and to set up more washing points). He also improved the flow out of the triage by proposing another way out and flows within the CTC in order to reduce further the risks created by the uncontrolled flow of care-takers, often in high numbers and not really aware of the contamination risks and how to mitigate these (despite efforts made by the OCBA team to “educate them”).

To limit movement of contaminated clothing and to avoid unnecessary movement of contaminated material from the CTC, two cleaning machines were installed on site. In Hajja, the clean and decontaminated cloths were then brought to the hospital where there is a well-functioning drying machine (part of an effort by OCBA in 2015 to improve the laundry system of Hajja Hospital).

2.2.3.3 Clinical component of the response

The Yemeni standards of care and the lack of cholera experience of the national medical staff created some difficulty to ensure compliance with MSF protocols and procedures for cholera interventions (MSF 2017 Guidelines). This was compounded by the lack of strong medical leadership (mainly because of the frequent gaps in the presence of MedCos). Nevertheless, the high prevalence of NCDs in this population had to be taken into consideration. On the other hand, due to the Yemeni health seeking behaviour and the high standards of care before the war, most of these cases admitted had already received some with IV lines, (sometimes more than one as many of them arrived at the triage with an IV line from private clinics). They were thus demanding more IV and not trusting ORS. Yet, as there was little time and capacity to follow each and every patient and to advise them to drink ORS when there were no caretakers, giving more IV than really needed became a “safety option” for overwhelmed staff.

2.2.3.4 Discharge/ Follow-up /Referral

Many people were rapidly in better condition after rehydration (oral and IV), and immediately discharged to free beds for new patients (no data available on bed occupation rate but ranging between a few hours to 3 days. In Abs, discharged patients were given a Hygiene Kit, with some ORS, but not in Hajja. The team there realised too late that this option would have been useful, but could also even be better with a proper IEC. It was already the end of the outbreak and the delay to get these IEC would have taken too long to be effective. The lack of insistence for discharged patients to continue rehydration with ORS once home is a missed opportunity.

There were regular cases of kidney failure and heart complications and the CTCs and CTUs had very limited capacity to cope with them. Referring patients to better equipped hospitals (from Abs to Hajja or from Hajja to Sana’a) was sometimes seen as the only solution, in particular by Yemeni doctors who were not used to cholera related dehydration⁴, even if there was with no certainty that proper patient care would be available (kidney failure requiring dialysis is very costly). As the number of equipped ambulances was limited, many of the referrals were done with private cars and supported financially by OCBA.

Focus group with former cholera patients treated in both Abs and Hajja CTC and in several CTU underline one area where there is need for more IEC in favour of the population to clarify some points: information about cholera, the possible side effects (many patients said they felt very weak and were very worried about this), the possibility of post-cholera acquired immunisation, and measures to prevent the recurrence of the disease. The uncertainty resulting from lack of information seems to have been a source of much anxiety and concern.

⁴ The increase in creatinine is an indicator of acute renal failure and most patients saw their creatinine level normalized after adequate rehydration. The main issue was that its measurement during the beginning was mostly useless and would increase the workload. This issues were discussed largely and unsuccessful with the medical department

It turned out difficult to monitor discharged patients, as they often did not want to leave. This raised the question if food availability for patients and caretakers was an incentive to stay?

2.2.3.5 Management of dead bodies

Dead body management was a complex issue due to culturally sensitive factors and the importance of Islam and its post-mortem rituals. As bodies are highly contagious, it was critical to ensure proper cleaning with chlorine solution, to block all orifices and to cover the body in a water-tight body bag. This raised several issues as these measures mean that the traditional cleaning of the body by the family and the last kiss before burial could not take place. In Abs, where more than hundred people died in the CTC, the team had to be very engaged in the discussions with the population. This was less a problem in Hajja, as less people died.

For each CTC, this required

- An infrastructure to carry out the relevant cleaning and use of body bags
- Providing a lot of explanations to the family

In the two CTCs, a special location was designated for this purpose. In Hajja it was significantly improved by the visiting Wash Co, to limit the infiltration of contaminated water into the underground water table. In both locations, they were discreet and were a key part of the overall concept of the CTC. One difficulty lies with the fact that families often wanted to get the body fast after decease. Sometimes bodies even just disappeared despite efforts to explain the risks involved in manipulating cholera dead victims.

2.2.3.6 WATSAN in the CTC/CTU

In Hajja CTC, it seems that this was done appropriately by national MSF staff at a time when they were alone during the early part of the outbreak and had only the 2004 Cholera Guidelines and the January 2017 new draft to refer to. The possibility of connecting the hospital water system rapidly to the nearby school was a great asset. This was more complicated in Abs where the only solution was water trucking.

In Hajja and Abs CTC, school latrines had to be used as both latrine and showers, which is not optimal. As all the dirty and possibly contaminated water had to go through the city sewage, chlorine was regularly injected into the system. No verification of chlorine residue could be implemented downstream. Massive use of chlorine to clean patients' rooms, latrines, and all kinds of areas in the school led to a risk of environment problems. Indeed, OCBA's Yemeni staff in the field understood very quickly how important it is to maintain the best WASH situation in cholera treatment sites. The advice provided at a distance by OCBA WASH advisers was very useful. After some difficulties in obtaining visas, a WASH Coordinator finally came and helped to fix some issues, such as the morgue, improving the circulation of people in the CTC and streamlining waste management. In Abs, during the first part of the response when the CTU was in place in the Hospital compound, it was possible to use the Hospital laundry.

When the CTC opened, they had to find a special area in the school compound to locate the laundry for medical clothes and bedsheets. This was much more difficult for patients and caretakers' clothes. There was not enough space to wash and dry all these clothes and patients and care takers sometimes had to keep the same clothes on for days. Spraying chlorine was often the only solution to keep the smell and flies under control.

2.2.3.7 Bed capacity

With the difficulties at triage level and the intake of many non-cholera patients in the CTCs, bed capacity in the structures became a daily headache. Luckily, there was enough space in both Abs and Hajja schools to extend the area to be used, just by moving from one floor of the school to the next and to add extra beds or sleeping areas. However, very few cholera beds were available and at one stage had to be built in Yemen. The limited and inappropriate quality of the beds and their limited number soon created a "capacity problem" in the CTC and thus had some repercussions for clinical care, infection control and space management. The quantity available and the pace of ordering could not cope with the pace and scale of the outbreak (50 beds for a CTC that got 475 admissions per day during the peak).

Beds had to be ordered but those that finally arrived were too large and of an inappropriate design. Nevertheless, they had to be used. They limited the space between beds, adding to the overcrowding of the place. During the peaks of the outbreak, some patients had to be placed on mattresses directly on the floor. As a whole, bed capacity remained a difficulty until patient arrivals started to decline.

There is no accurate data on bed occupancy, but what comes out of the interviews is a very fluid and difficult situation until the peak. The decrease in number of cases of course significantly eased the management of the beds.

2.2.3.8 Crowd control

The difficulties in crowd control were major in both Hajja and Abs CTCs. At the entrances, the guards could not fully control the flow of caretakers (particularly due to gender and cultural issues, but also because many people came from far away and had no other place to stay). This led to many difficulties inside the CTCs as overcrowding rapidly became a significant constraint for both medical care and nosocomial control.

People were coming from far away, sometimes arriving at night. When they reached the CTC gate, people were tired and afraid and sick people in a state of severe dehydration and thus had to be screened "in". The lack of expatriate logisticians put the task of crowd control in the hands of either extremely busy medical staff or untrained guards, which was far from a satisfactory solution. This was made further complicated as caretakers and potential patients knew exactly what to say to the guards to get in: they know perfectly how to describe cholera symptoms.

2.2.3.9 Feeding patients, feeding caretakers

Ensuring proper food to the patients and the caretakers was another area where solutions had to be identified: in Hajja, the kitchen of the hospital, relatively well equipped, managed to cope relatively well with this new population to feed. In Abs, a private company was contracted to cook and deliver the food to the centre. The fact that this issue was solved relatively well contributed largely to the fact that calm prevailed in the centers.

2.2.4 The importance of data

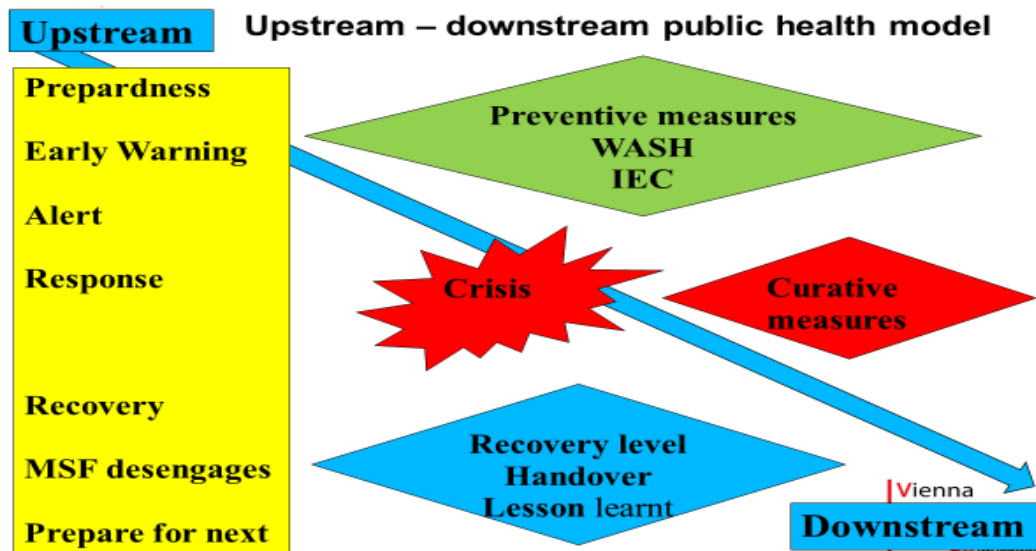
Although initiated from the beginning of the outbreak, the establishment of an optimal data gathering system took a lot of time and was often changed. The limited quantity of data available at the beginning of the crisis or the fact that the data was available through a time consuming process during the early part of the 2017 cholera outbreak reveals the “ad-hocism” of the response. Data collection was not prioritized in the response, largely in an “emergency response mode”, where saving life is prioritized over any other tasks.

The fact that better understanding of the outbreak through data management could have contributed to a better steering of the operation, thus more lives saved, was not seen as a priority. This was aggravated by the absence of line list tools in the Guidelines. This led to the uncoordinated establishment of a number of line-lists and to frequent changes in their format (see **Error! Reference source not found.** The Importance of Data).

The real time analysis of the data was a weak point mentioned in several interviews. The epidemiologist sent by EPICENTRE was more a support to OCP than an intersectoral one. Later in the course of the outbreak, an OCBA epidemiologist came for one month and could revised procedures and data and improved data management. A first model of GIS based mapping of the outbreak was produced in the second half of May. Yet, this GIS effort initially thought to be intersectional ended in focusing on OCG data only and didn't succeed to help the other sections. Although data regarding where the patients came from was available through most of the outbreak but it there were significant concerns regarding their reliability and completeness. The absence of continuous GIS capacity in OCBA limited the capacity to map out flows of people, identify areas of origin in a more visual manner and to easily follow of the geographic patterns of the outbreak. This might also represent a missed opportunity for advocacy with the authorities, a chance to develop further outreach activities and a possibility to map out areas of origin and spreading lines of the virus that could represent key information for further outbreak management.

2.3 Outreach activities and preventive measures

This was the weakest part of the intervention, and represented a significant hole in the global management of the “upstream / downstream” public health model:



Source: Pierre Perrin, ICRC, “Health in crisis” an ICRCManual

From the beginning, outreach activities (health, WATSAN, hygiene promotion, and surveillance) were supposed to be one of the main pillars of the strategy. However, very little could be done due to the administrative limitations to access (no movement authorisation granted) imposed by the authorities (in Abs, the proximity of the border, and the lack of willingness of the authorities to have NGOs around). The regular vacancies in key positions (Medco, Fieldco) and the shortage of human resources dedicated to this area contributed to this weak performance.

Outreach activities are by essence multidisciplinary activities requiring experience; and, in a context like Yemen, they require strategic planning skills and enough time to allocate to them. As the health response was peaking and most resources were being concentrated on it, outreach was a bit in the shadow. The only area that functioned a bit was outreach IEC activities with the CTC using WHO material.

2.3.1 Vaccination

Since the beginning of the second wave of the epidemic, OCBA was pushing for a reactive vaccination as a strategy, firstly alone and afterwards with support from OCG. OCP argued that the low CFR would mean less real cholera cases and foresaw many difficulties in the implementation of the vaccination campaign due to security and administrative constraints, and never endorsed the idea.

The number of doses available for Yemen and the wide geographical distribution of the epidemic lead to a proposal for vaccination only in the places that were under 0.2 Attack Rate, which left out all the places where OCBA was operational. Nevertheless, using attack rate in a more disaggregated way, but also WASH score and vulnerability analysis would have made it possible to include certain OCBA locations, especially areas with displaced populations, provided access had been possible.

The lack of proper mapping of the epidemic (no continuous GIS capacity) made area identification difficult. Also the probable overestimation of the attack rate limited the inclusion of OCBA locations in the vaccination plan.

Differences in approaches between MoH, WHO Yemen and WHO Geneva significantly delayed the decision and the submission of the request to the ICG (International Coordination Group on Vaccine Provision). In parallel, the ICG took a conservative approach, proposing a vaccination in two phases due to lack of confidence in the current implementing capacities as a consequence of discrepancies between number of doses agreed and the number ordered, as well as with the lack of partners in the implementation (all controlled by MOH) These two facts, together with the offers made by the World Bank to fund a preventive vaccination for 2018- 2019 for 10 million people, all managed directly by the MoH, led the MoH to cancel the vaccination campaign. So, despite the fact that there was a clear case for reactive vaccination, it did not take place for reasons out of OCBA's and MSF's hands. Nevertheless, as MSF managed to get a strong voice in the ICG (MSF has done 80% of the cholera vaccinations implemented since 2012), there was room for more lobbying, especially to question the way the system was established. Indeed, as it was largely supposed to function on the basis of incentivized MoH staff, the economic interest that were thus created became an hindrance in possible MSF engagement in the vaccination campaign.

2.3.2 Hygiene promotion

Despite being one of the pillars of the intervention strategy, the **implementation of hygiene promotion activities through IEC remained far below what should have been expected** in a cholera response. Hygiene promotion was limited to activities within the remit of the CTC and CTU where most of the Community Health Workers (CHW) were mobilized. This was indeed essential to have them there and they largely contributed to the mitigation of the risk of significant contamination within the CTC. Their role in disseminating Hygiene messages to the communities living in the vicinity of the CTC was also significant to reduce misunderstandings and tension. At the same time, both were **limited by the availability of IEC** materials. Outreach activities in the areas of contamination would have required a significant logistical set up (stocks, procurement, and dispatch) and enough IEC material in Arabic for distribution in the villages and to Imams, traditional opinion leaders, etc. These came far behind medical priorities.

2.3.3 Watsan

The WATSAN situation is very bad almost everywhere in Yemen, but the area of Abs is probably one of the worst (low alluviatic plain with an underground water nearing the surface, a high prevalence of open defecation). In many areas, electricity production has been brought to a standstill by the war and as a result water and sanitation plants have stopped functioning. Open defecation is very frequent in Abs. As the area is flat, the surface and underground waters are easily contaminated, in particular during the rainy season. Water and sanitation activities were supposed to be a central pillar of the cholera response There was a big limitation in terms of HR as only one WATSAN expert was assigned for both CTC and had to mobilize a lot of his energy on logistical issues in the absence of a proper logistician. This meant that there was very little room for manoeuvre to do WATSAN activities outside the CTC. As there was no outreach OCBA Watsan specialist in the field, alternative mechanisms were explored, for example an enhanced

collaboration with OXFAM, to establish remote controlled WASH activities with decentralized health posts. This was not as successful as expected as OXFAM budget was tied to IDP camps and could not be redirected significantly to cholera related WASH programming.

2.3.4 Communication

During several periods of the operation, communication came clearly as a weak element. Communication around the CTC would have helped preventing misinformation about its operations. Several interviewees mentioned that a Facebook campaign about MSF contributing to the spreading of cholera due to bad waste management in front of the entrance of the CTC could have been better managed if communication activities on MSF activities would have been seen as important. Similarly campaigns attempting to discredit MSF were launched and not strategically acted against.

2.4 Supplies

Supply worked properly as special channels were opened, making orders arrive quicker than for the regular missions, and there were no special constraints for the Custom administration (in contrast to requests for visas). Thus supply shortages were not a major issue. International orders were requested on time and emergency procedures were implemented and no major delays took place, but underestimated quantities meant that two extra orders needed to be made in a very short period of time. The reason behind the underestimation was a miscalculation of the size of the target population and use of an inaccurate attack rate. Nevertheless, as most of the supplies were locally purchased, gaps were covered locally to the extent that local market ran out of some items (ORS, gloves).

The impressive number of AWD and related over-diagnosis of cholera, together with the cultural health seeking habits in this middle income economy (used to a relatively high level of health standards before the war) led to a very high level of reliance of IV medication, leading to a significant consumption of Ringer lactate solution and perfusion material, not to mention the overuse of antibiotics. However, this forced the teams to look for solutions on the local market while waiting for pending orders. This created an extra stress factor for an inexperienced team already working under pressure. By chance, a lot of ringer was dispatched by WHO to Yemeni health structures in addition to the supplies ordered by MSF.

It is important to point out that the new MSF Cholera Guidelines indicate that the supplies should be based on using IV for 25% of the suspected cases and more importance should be given to the systematic use of ORS, which would reduce the need for Ringer's lactate solution. However this was not the reason of the shortage in the supply as the orders were still being made for "cholera kits" where it is recommended to plan for 75% of the patients to be covered by IV fluids, as per the previous Cholera Guidelines. In a context such as the 2017 cholera outbreak in Yemen, the new policies would have created a very difficult situation. This issue should be kept on mind for future interventions.

2.5 Human resources

The dedication of local staff was mentioned repeatedly in interviews. They showed great imagination in finding solutions and were flexible and gave priority to the cholera response at the expense of their personal lives.

The above-mentioned discussion on the reality of the risks and the severity of the outbreak resulted in the risk of a cholera outbreak being purposely excluded from the possible scenarios for 2017. This led to significant difficulties to ensure proper HR to manage the second wave of the epidemic, both in the field and at the headquarters: slow and insufficient request from the field, HQ confronted with recruitment and the “visa crisis”.

The shortage in expat logisticians forced the medical teams to take on part of the logistical functions, and given the already overwhelming medical needs, this meant that logistics were not supervised properly.

In the field, largely understaffed local teams with no cholera experience had to assume a lot of responsibility during the acute phase of the emergency. They got some support, but mainly from expats with limited prior exposure to cholera operations themselves. Teams had to work on the basis of the 2004 Cholera Guidelines and the recently issued and still incomplete January 2017 Draft Cholera Guidelines.

The first request for more staff made to HQ was responded to positively, but not necessarily with the appropriate profiles, as some profiles are more difficult to find than others. Some positions were not requested but were added by HQ. In addition, key positions remained unstaffed for a long time or were staffed irregularly. The difficulties to get visa for MedCo and to get sufficient access to the contaminated or at risk areas led to the decision to create the position of « Cholera focal point ». The regular gaps in the presence (largely due to personal issues) of the Medcos were a crucial factor, breaking the communication between the field and HQ.

The arrival of the different technical focal points (an epidemiologist and a cholera focal point) significantly helped to improve the response and to adjust some key stumbling blocks but was rather late in the course of events, underlining how a rapid arrival of these capacities would have helped from the onset of the crisis.

Staff who were used to normal hospital-based health projects found it difficult to adjust to an effective cholera mindset, as they had not received any specific training. Strong medical leadership is needed in these circumstances. Training sessions were organized on the spot, but it was difficult to ensure that everyone received it. People were working in 12 hours shift; Ramadan period limited their availability and the influx of patient did not allow the extract too many medical staff from duties for training.

In the field, there were regular gaps in expatriate logisticians throughout the whole intervention. The constant gap filling from the capital for short periods led to a lack of minimum standard logistic procedures and activities, pushing the medical team to assume logistical responsibilities.

The fact that there was no expatriate staff with cholera experience in the field is an unusual situation for OCBA. It had a significant impact at the beginning of the response. This situation was the consequence of OCBA's current global operational portfolio and the type of operations it had been involved in in Yemen before the cholera outbreak, which was mainly hospital support with an increasing focus on other parts of the intervention spectrum (focus on HIV control, psychosocial support, etc.). This will require specific choice on OCBA if it wants to keep some key know-how in its institutional capacities.

2.6 Coordination

2.6.1 Within OCBA

Despite slow reactivity during the early part of the cholera response and a shortage of HR, the EU managed to set up a very acceptable intervention with a low CFR (despite all the other factors that led to a low CFR) and reached MSF standards in the second cholera peak of 2017 of the intervention. However, though the EU knows how to operate in an emergency mind-set, with flexibility as a key point, they had difficulties to adjust the procedures (in particularly in procurement) in the very specific Yemen operation where the EU manages regular programmes and had to adapt to their lengthy administrative procedures and related delays. Issues on fast procurements without tendering processes were mentioned more than once. The question is how to ensure the proper interoperability of procedures when there is a transfer of responsibility between an Emergency Cell and a Regular Cell when contexts shifts from acute emergency to chronic crisis and reverse. The perceived absence of an ergonomic "fast track" system might be one of the explanations.

2.6.2 Coordination with the national institutions

Coordination with the national and local authorities is quite difficult in Yemen. The political spectrum is relatively complicated in the North between the Houthis, who are more tribal fighters with limited public administration competences and the supporters of late President Saleh. These two groups do not work easily together even since the death of president Saleh. During the 2017 cholera crisis, these two groups were always present in all ministries and administration. While it was relatively easier to talk with people from the former Saleh Government, it was much more complicated to engage with the Houthis, who tend to have a relatively restrictive approach to security issues, thus limiting access to field and to entry visas. The decentralized decision making and territorial perception between the Centre and the periphery had some visible impacts. You can have the green light for a field trip from the MoH top leadership, but the mission can be blocked by the largely Houthi managed security apparatus at local level. This made the field assessment of cholera rather difficult. It took more than a month after the first cases of cholera were detected before access was granted to OCBA.

Several reasons were identified to explain the difficulties:

- As OCBA's institutional set-up in Yemen was always incomplete due to the visa issue, negotiations were difficult. The frequent absence of a Medco weakened the medical leadership and significantly hampered the relations with the MOH.
- OCBA seems to be perceived to be less receptive to certain demands from the Authorities than other OCs who demonstrated more flexibility and willingness to adapt to the government's requests, even if the later raised some ethical questions. Its position was also weakened by the fact that OCBA left Abs hospital after the latter was bombed. The fact that other actors (UN, NGOs) were more flexible in their dealings with the authorities, also reduced the operational space for more principled MSF.

2.6.3 Coordination with international institutions

MSF was not alone in the cholera response. The Ministry of Health at the central and governorate levels got a lot of support from other agencies such as WHO, UNICEF, ICRC and several international and national NGOs. Coordination was thus a major issue.

The collaboration with international actors was highly variable. It was good with ICRC. With WHO/UNICEF, coordination was relatively hectic, with some specific tension when WHO tried to evaluate the MSF response in Hajja and Abs with clearly hostile intentions. Luckily, the quality of the work done on both sites managed to significantly change WHO's position. Although IOM is not a medical nor a WASH organisation, it demonstrated a strong willingness to get involved and mobilized significant means, so OCBA decided to hand over its Hajja CTC to IOM, and this required significant preparation and coordination before the transition. At the end, IOM took over the "full package", including all staff and equipment. The CTC closed shortly after, however, as the Outbreak was coming to significantly reduced pace.

The absence of MSF at the Cholera Task Force until June limited the impact of MSF advocacy even at a time when the whole MSF movement was treating 50 % of the caseload and reflects the different approaches of the OCs towards inter-agency coordination. At a stage (June), efforts to coordinate with UN and INGO became more significant, but often leading to disappointing results in particularly with WHO.

Operational coordination with OXFAM was also relatively good in Abs, where OCBA and OXFAM were the main agencies dealing with cholera and AWD. This took the form of regular dialogue for the identification of areas where WASH intervention was needed. The fact that OXFAM was present in the area before the cholera outbreak for WASH interventions for IDPs was seen very useful. However, their capacity to shift from a classical IDP operation to a cholera intervention was neither as rapid nor efficient as expected (they needed to secure ECHO funding for the cholera intervention).

The fact that MoH staff at all levels had not been paid for many months created a system of induced loyalty to whoever was paying incentives, thus creating competition among aid organisation that made coordination difficult. As MSF pays its staff real salaries that are higher than UN incentives, this created tension, but not as a blanket incentive to MoH staff. The fact that MSF is one of the very few agencies with international presence in the field turned out to be both a strength and a risky exposure.

2.6.4 Intersectional MSF coordination

MSF has been present in Yemen for some time, but there are a lot of differences between sections. OCP has been in the country for more than a decade and OCG has only been present for a little over a year. OCBA and OCA have also significant Yemeni experience. Intersectional MSF coordination, an essential element of the image and perception of MSF, took several forms. There was a certain geographic distribution, with OCP covering the South and Amrahn in the North, OCA involved in many areas in frontline areas and Thais, OCBA responding to the needs in Hajja and Abs and in Sidaa until late 2016.

Discussion between desks of the different OC has been regular. Similarly, regular meetings of Heads of Mission brought together OCP, OCG, OCA and OCBA to share analysis of the context, relations with key national and international stakeholders and security concerns. Yet, the fact that there were significant differences regarding access and visas between sections (OCP having for instance less difficulties that OCBA in the North as their HoM was very well accepted by the Houthis) did not lead to significant collaboration between OC to ease the situation for the sections in difficulty, in particular OCBA. This had significant repercussions on the conduct of the operations and in the capacity to ensure proper support and steering in Hajja and Abs. At the more technical level, the Med-Cos of the different sections exchanged regularly on medical issues and, when needed, collaborated with each other on supply issues, when one section needed something that another section had in stock. The turnover of key positions became a constraint in a context where knowledge of the context and gaining the confidence of key players are essential. In addition, there were some significant differences of approach between the OCs on specific issues, such as vaccination and the credibility of different confirmation procedures (rapid tests, improved rapid tests, or culture tests in laboratories) and it was somewhat difficult to get to a common position.

A strong collective MSF voice could have been heard only twice:

- Once when an intersectional position document was prepared and presented to a high level UN delegation (made of UNICEF, WHO and WFP DGs) asking for more efforts in terms of prevention, because reactive case management is not enough to cope with a large-scale cholera outbreak.
- A second time when OCP decided to close its CTC and all the OC joined on the press release. See: www.msf.org/.../yemen-msf-reduces-its-cholera-response-admissio.. Interesting is to see that in April 2018, the tone of the new OCP press release was again very alarming <https://www.msf.fr/communiqués-presse/dans-le-yemen-en-guerre-l-epidémie-de-cholera-risque-de-devenir-incontrôlable>

There were interesting attempts to establish an “Intersection Humanitarian Advisor” position, which was staffed for a few weeks and late in the crisis. This created an interesting collective dynamic but was not continued further. The efforts to have an Intersection Epidemiologist and an Intersection GIS Officer did not succeed, although the EPICENTRE studies on cholera received data from all sections (in addition to MoH, WHO and the Institut Pasteur). Some sections, including OCBA, finally brought their own epidemiologist, but unfortunately late in the process.

2.6.5 Handover

Different processes were implemented for closing or handing over CTCs and CTUs and phasing out the emergency phase (CTC and CTU closure or handover to the authorities or other aid agencies, the transition between emergency units and normal MSF Cells, etc.).

In Hajja city, the transfer of the CTC to IOM was relatively smooth as IOM took over the “full package”, including staff who had developed a significant experience working under OCBA supervision.

In Abs CTC, OCBA could control the full dismantling of the CTC, including the termination of many contracts and a very thorough decontamination of the place. Key to the success of this phase was the intensive communication with Abs city and health authorities, with neighboring communities and with opinion makers (Imams, sheiks, professors and Father Council of the school) and the explanation of the procedures to decontaminate the school and to ensure full safety for the return of students.

In Abs, the transfer of CTU supported by OCBA to NGO could not take place, as there was no partner in the areas with the capacity to operate in this highly sensitive frontline area.

3 Conclusion

3.1 Response to the evaluation questions

To what degree did the intervention contribute to the achievement of the overall objective of the intervention (To reduce the morbidity, mortality and human suffering due to cholera)?

There is no doubt that the intervention contributed to reduce morbidity, mortality and human suffering but it is difficult to demonstrate it as demographic data on the area are not trustable and data collection was very chaotic during the first few weeks. The efforts of all, in particular local staff to ensure triage, treatment and support to all patients and caretakers largely contributed to the largely positive achievements of the operation, despite many constraints and shortfalls. The capacity for OCBA to finally send some key staff (epidemiologist, cholera focal person also contributed to these achievements. Yet, lack of cholera expertise within the field teams during the early part of the response and difficulties to ensure continuity of function in the field (especially in the medical sector) due to visa and administrative constraints, significantly hindered the overall management of the response and its effectiveness.

To what extent have set objectives of the strategy been achieved?

Ensure quality case management in CTC and CTU: (to ensure proper triage, medical follow-up and discharge). This was partially achieved. A few difficulties in medical management were due to lack of cholera experience in the team and the irregular presence of MedCo. This was accentuated by the limited stocks of assets (beds for instance) in CTU and the high flow of potential patients overwhelming existing capacities and hindered the possibilities to have quality triage and discharge processes and contributed to overwhelming treatment capacities.

Prevent cholera spreading through outreach activities (functioning of ORS sites, WASH and hygiene promotion activities): This turned out to be the weakest point of the operation, largely hampered by political difficulties to get visa for expatriate staff and security clearances for field activities. Lack of proper EIC material significantly limited the capacity of the CHW to work with the populations

Ensure proper coordination: (to coordinate outbreak response activities with different actors). This functions quite well with international organisations, strangely not as satisfactory between OCs (even if each of them was working in its own area, technical dialogue could have taken place) and very complex with national institutions, which tend to see or want to maintain MSF mainly as a “financial donor” (bringing cash and goodies). This was also hampered by lack of staff at key positions.

Ensure strategic support: (to provide technical support where needed to lobby for activities to be implemented according to the needs based on epidemiological data to monitor gaps in response and advocate for their coverage. This was hindered by the lack of Cholera experience in the team, which made them extremely reliant on MSF cholera Guidelines with a 2004 version being replaced by more recent draft not yet validated. In addition, guidelines without somebody with experience to support their utilization proved

not enough. In addition, the absence of proper data collection and analysis at the onset of the crisis (no clear methodology and data collection tools to establish time-list and analyse data, and the late arrival of an epidemiologist to help to set up a appropriate system made it difficult to be as “data driven” that one would expect in a response to a contagious disease.

What were the reasons for achievement/non-achievement (internal and external). What were the enabling and blocking factors at different points of time?

The impact of MSF’s cholera response in Yemen can be attributed to the dedication and engagement of MSF staff, both Yemeni and international, who demonstrated a great deal of energy to the cholera response despite their limited experience in dealing with that disease. Second element is that despite limited cholera experience, both national and international staff managed to make good use of existing Guidelines.

The main challenges have been the lack of preparedness and cholera expertise during the first part of the mission until July. The delay to have additional support in terms of expatriates (due to the lack of visas) and the absence of expats in key position (MedCo, WATSAN, epidemiologist, outreach nurse for instance) created significant difficulties in the management of the different parts of the programme.

As a consequence, networking and external coordination was initially and during most periods of the interventions poor. This affected many components of the programme for instance health promotion activities.

Analysis of enabling and blocking factors

	Internal	External
Blocking factors	<p>Initial phase (from March to May):</p> <ul style="list-style-type: none"> • Limited alertness and reactivity • Team composition/ experience • No Cholera EPrep at the end of 2016 • Difficulties to establish an homogeneous line list • Difficulties in data management • Lack of staff in key position (no epidemiologist or GIS person) <p>Phase 2 (from May-September):</p> <ul style="list-style-type: none"> • No Medco during a long time • other key personnel missing (outreach nurse) • Difficulties to manage crowd, resulting in high risk of contamination 	<ul style="list-style-type: none"> • Access limitations due to administrative constraints imposed by the Authorities, which were reluctant to see international organizations in the countryside • Difficulties for the population to understand OCBA’s activities due to the absence of proper communication strategy and tools • Difficulties to have communities accepting the presence of CTC or waste control site in their neighborhood. • Hostility of some MoH staff • Difficulties with WHO
Enabling factors	<ul style="list-style-type: none"> • National staff dedicated • Capacity to find solution (creation of maternity and child feeding units in the CTC) 	<ul style="list-style-type: none"> • High visibility of Yemen crisis and its cholera subset allowing good flow of resources

	<ul style="list-style-type: none"> • HQ mobilized to get more staff in the field, despite all the difficulties 	<ul style="list-style-type: none"> • Good capacity to ensure “deconfliction with the Coalition for the safety of premises and movements • Many organizations (WHO, UNICEF) provided key items (ringer, ORS, etc.) during key gaps • Authorities and international coalition find agreement of import of key relief items despite the embargo.
--	---	--

To what degree was the response appropriate to the context of high insecurity and challenges in terms of limited access and administrative constraints?

Thanks to the presence of experienced HoM and exchanges of information between the HoM of the different OC as well as with other organizations, the conflict and factors of insecurity were appropriately taken care of. Security measures for staff movement and housing facilities were stringent with movements always notified to all parties to the conflict. Health institutions where MSF was working are also systematically marked by a MSF emblem visible from the sky and notified to the parties in order to reduce the risk of them being bombed. Each MSF premises had a fully equipped save room. The main difficulties came as part of a complex set of political, security and administrative from a rather worried Yemeni side, with a complex set up of technical actors (MoH more open) and security apparatus and gatekeepers (more reluctant to grant access). Due to all kinds of suspicions, they granted access to the field in a restricted way, thus limiting the capacity to carry out early assessments and to develop outreach activities. This was aggravated by the fact that OCBA had to pay the price of its decision to leave Abs Hospital in 2016 after the bombing in terms of confidence by the local Authorities, although with the work done for the cholera response OCBA managed to regain that confidence.

How flexible was the response to the contextual changes over time?

The capacity to adjust with the evolution of outbreak was quite remarkable, despite all the difficulties, including these linked to the difficulties to access fast proper data and to be able to do some scenario planning (see timeline). The main difficulties were more to adapt to internal constraints, including the frequently vacant key positions and the repercussions of this absence, rather than to adjust to contextual changes. For instance, the difficulties to get a MedCo medical team leaders in the field led to the decision to create the position of a « Cholera focal point », a medical team leader focusing on the cholera issue. Yet, some key pillars of the management of a cholera outbreak, such as intensive and fast moving outreach in WASH and hygiene promotion in areas identified as origin of new cases could not be implemented seems to underline the difficulties to find solutions to this type of problem. The administrative difficulties resulting from the application of normal project procedures in the time of a very fluid outbreak were unfortunately numerous.

How appropriate have possible adaptations been?

Several key adaptations took place very appropriately, for instance moving from the precarious CTU in Abs hospital to the CTC in the school, setting up units for pregnant women and malnourished children in the CTC. Similarly, modifying designs of the circulation systems in the CTC to keep up with the growing flow of patients was essential to keep up with the increase of cases. Many adaptations were made by applying additional levels of pressure to already overwhelmed national and international staff. While this largely managed to keep OCBA on line with required changes, this was done at a high price in terms of staff fatigue. The dedication of the Yemeni teams has been repeatedly underlined in many interviews.

To what extent was the response coordinated with other actors (inside and outside of MSF)? How well did coordination contribute to the intervention's objective?

Within OCBA, coordination between Sana'a, Hajja and Abs has been good in general and contributed significantly to help remove hindrances in the operations but also suffered from two weaknesses: the regular vacancy of key positions and the difficulties to manage perception in the field where comments are often taken as criticism by exhausted staff working under pressure. The perception of the complexity of dealing with an emergency using "normal procurement and recruitment procedures" created regularly some tensions.

Coordination between OCs is one of the very weak points of the operation. Exchanges at the Sana'a level on political issues was good, in particular on situational and security issues, although some rivalry between OC led to limited exchange on issues such as visa difficulties encountered by some OC. While regular exchanges took place between MedCos, "intersectional" collaboration was minimal. Missed opportunity have been identified, such as the absence of debate between OC to initiate a rapid and collective production of MSF branded IEC cholera material, which would have been both technically efficient and strengthening MSF collective visibility. The absence of inter-OC mobilization of epidemiological capacity negatively impacted the overall reading of the crisis and impacted negatively the collective MSF voice. Such collective MSF voice was heard only twice during the crisis (visit of the DGs of UN agencies and at the time of closure of CTC).

Efforts to coordinate with UN and INGO was rather haphazard, with some presence in the HCT and limited engagement in the Cholera task Force until June. The coordination with UN agencies was rather disappointing, in particularly with WHO.

Coordination with national institutions proved difficult at the higher level, much easier in the field where local institutions and staff were extremely dependant on MSF support (financial for their incentives and logistical for the supply of goods).

Is OCBA prepared and ready to cope with another cholera crisis in Yemen?

The response at this stage is mixed. There is a lot of experience from the 2017 crisis and building emergency stocks from the unused 2017 outbreak was initiated. The EU in collaboration with the cell and the medical department were in the process of developing a contingency plan when this evaluation started. Three cholera kits were prepositioned in Sana'a the warehouse (3-4 days of response in Hajja during the early phase of the 2017 operation). No additional cholera training was in place at the time of the evaluation. Critical will be to ensure that WASH and outreach activities can be more developed. The consultant was asked to fully debrief with the team before departure with a strong focus

on Emergency Preparedness. It was underlined that an intensive inter-agency lobby towards the Authorities should be implemented for them to understand and recognized that cholera is first and foremost a WASH issue to be dealt with at the “watershed level”, with a lot of upstream preventive activities and not merely at the downstream receiving end in the health structures.

3.2 Working in a war zone

Although MSF is extremely experienced in working in war zone, the ToR of the evaluation required the team to explore this specific component of the response in order to see if an external eye could validate the approach or identify areas which should require addition “home work” and clarification.

Several key parameters linked to the way the conflict significantly contributed to the development of the outbreak and affected the response capacity in the actual Yemen context. They can inform additional policy work on “health crisis in war time”:

The management of highly insecure context hindering access to affected areas and patients, including the bombing of hospitals by the coalition air force, required specific approaches (notification, specific marking of vehicles, offices, houses and health structures);

The management of access constraints due to bureaucratic procedures within the Yemeni system, distrust and manipulation of international actors by certain stakeholders (in particular the security apparatus) remained a highly unpredictable factor. It is important to develop the right communication channels with the key “gatekeepers”.

Wars affect always the health systems, by their direct repercussions (destructions of health structures, energy and water systems, killing of medical staff, etc.) and indirect consequences (increased poverty, incapacitation of the command and control chains, breakdown of supply lines, accelerating mobility, etc. which are all strong contributors to potential spread of contagious diseases.

In addition, when war takes place in contexts used to NCD (urban contexts in countries in economic transition), the impact of the war on patients is extremely severe as treating these diseases is costly and requires specific equipment (dialyses in Yemen for instance);

Rapid identification of alternatives to alleviate the impact of blockades hampering logistics and the appropriate flow of equipment and consumables

3.3 Emergency preparedness and alert

A key question is linked to the quality of the alert and the risks of a wrong designed and managed response when it is based on unprecise initial diagnosis and questionable assumptions. Here there is no simple solution and the reality of the decision making process is often reduced to a simple choice: either to respond with a “no regret” approach and to take the risk of “overreacting”, or ignoring the signals on the basis of their weakness.

In order to ensure better “evidence based” alert systems, it would be important to ensure a systematic strong and rapid mobilization of “diagnosis task force, probably under WHO, and connected with laboratories in the country (and able to support them very fast) and with the few external laboratories with a rapid capacity to confirm or disconfirm the presence of the deadly agent. The high level of deterioration of the health and WASH systems and the occurrence of the 2016 outbreak did not ring the bell on possible higher risks of cholera raises the question on the functioning of the surveillance and alert epidemiological systems in Yemen and the work of WHO. In addition, the weak level of emergency preparedness before October 2016 (risk identification, contingency plan, use of lessons learnt from previous MSF experiences) despite a strong presence of the MSF movement, and to what extent anything was developed between December and April 2017 (the beginning of the second wave) raises another set of questions.

4 Recommendations

The preparation of these recommendations took into account two elements:

- The first set of recommendations has been designed to facilitate the response in the case of a new cholera outbreak in Yemen with a strong focus on preparedness and using the key observations made during the evaluation.
- The second set of recommendations is more far reaching and has to be analysed in the context of the preparation or revision of guidance document outlining key points to control in cholera outbreaks/health crisis in similarly complex political contexts, as per the initial Terms of Reference. Some of these recommendations are easily implementable. Others might seem obvious for an MSF person but correspond to weak elements in the response. Some other seemingly obvious recommendations would require some attention from a longer-term policy development.

4.1 For the short term and in case of a new outbreak in Yemen

The evaluation underlined that timeliness is the essence of successfully managing a cholera outbreak. As the rainy season is nearing and numerous suspected cholera cases have been identified in different areas, there should be a strong, decisive and rapid preparedness effort. Although many of these recommendations are normally in a cholera EPP, the evaluation team decided to remind them. This led to a very useful and constructive discussion with the Sana'a team prior to the departure of the evaluation mission. Taking into account the key lessons from the evaluation, the following set of recommendations has been elaborated.

Recommendations	Target
<p>Recommendation N°1: Reinforce the intersectional collaboration in a systematic and strategic manner at both HQ and Field. This would mean more exchange, more efforts in resources mutualisation</p> <ul style="list-style-type: none"> • in human resources including staff in key functions -epidemiologist, GIS, humanitarian advocacy advisor, IEC specialist, etc.), • in collective action (production of MSF branded IEC material), • in collective advocacy and approach to the authorities (visas, permission, etc). 	<p>Intersection Mission Cell/EU Ops</p>
<p>Recommendation N°2: Ensure that teams are ready. All necessary human resources (medical, logistical, WASH, Communication, CWH, mental health, data management, etc.) have been identified and trained. All necessary human resources (medical, logistic, WASH, IEC, mental health, data</p>	<p>Mission Cell Ops</p>

<p>management, etc.) are identified and trained. New MSF Cholera guidelines should be printed and ready for distribution to the staff. Discussions on lessons learnt from 2017 have to be organized. Training sessions are put in place on Case definition, case management, CTC-CTU-ORP set up and management, Data management systems –line list software, GIS)</p>	
<p>Recommendation N°3: Ensure that proper sites for CTCs and CTUs have been identified and negotiated with the authorities and the communities, as the ergonomics of the site is key to the success of the operation. Start an active campaign with neighboring communities to explain what will happen if the site is transformed into a cholera management site and the measures that will be taken to protect the community.</p>	<p>Mission</p>
<p>Recommendation N°4: Ensure that pre-stocking is in place and modalities to activate emergency supply lines ready. While some stock of Ringer’s lactate and IV fluid equipment from last year are available in the Sana’a Pharmacy, it is important to ensure that a comprehensive list of requirements is updated and that sufficient equipment is available in “at-risk areas” to initiate the response (in particular ORS and basic equipment to establish isolation areas in at least 3 health structures) as soon as the alert is triggered.</p>	<p>Mission Cell/EU Ops</p>

<p>Recommendation N°5: Ensure that key functions in CTCs and CTUs are properly planned for. This implies proper scenario planning for reception and triage, observation, discharge, medical treatment, water supply, laundry (hospital clothes, bedsheets, patients and caretakers clothes), food supply, dead body management, the reception of pregnant women and malnourished children, psychosocial support to staff and patients. This also means strong investment in training.</p>	<p>Mission Cell/EU Tech Dpt</p>
<p>Recommendation N°6: Ensure that WASH and IEC interventions can start fast. This should be a priority for both prevention and cholera management sites, in neighboring communities and in areas where cases appear. WASH interventions, in particular cleaning and treating contaminated water points is essential. IEC is key not only for cholera management but also for acceptance and security. Preparing, designing, and printing enough material in Arabic should start ASAP and different products should be prepared for different targets (large posters for health structures and public locations, including in neighborhoods where CTCs, CTUs and ORPs are located, leaflets for the Authorities, leaflets for the general population -to be distributed to care-takers entering to any health structure and as part of the Discharge kit).</p>	<p>Mission Cell/EU</p>

<p>Recommendation N°7: MSF as a key actor of the response, with a strong voice in the ICG, should ensure that MSF and other actors can have more autonomy in the implementation of vaccinations.</p>	<p>Intersection Cell/EU Ops</p>
<p>Recommendation N°8: Reinforce dialogue with all authorities to ensure that they will provide sustained support during the possible response. As Yemeni Authorities are known as being very sensitive to marks of respects, high ranking visit should be planned ASAP for that purpose. Creative options can be identified, such as the organization of a Cholera conference with Sana’a University. HoM visits to Hajja and Abs are also extremely appreciated and should be made more frequent.</p>	<p>Mission Intersection Ops</p>

4.2 Global improvement of the cholera response

4.2.1 Working in a war zone

It is important to underline several key situational parameters that have significantly affected the response capacity and have shaped the actual field response and to see how they can be transformed in recommendations for health crises in war contexts:

The highly insecure context, including the bombing of hospitals by the coalition air force and a history of hostage taking induced the implementation of certain procedures, such as risk analysis, the marking of all premises and vehicles, and the notification of movements. This significantly constrained staff movements and hampered the response to a certain extent;

Access was limited due to bureaucratic procedures and distrust of international actors by certain stakeholders and parties to the conflict. Lobbying of the Yemeni authorities asking them to provide a more enabling environment for OCBA actions was unsuccessful. Strategic support to national staff in order to allow them to take more responsibility was not significant attempted.

Quality and status of staff matters in these difficult situations: Agility and adaptation in these dangerous contexts require innovative and risk-taking. Ensuring to have fast highly experienced staff to manage the complexity of health crisis in complex situations is a “must”. As supply lines are often fragile due to the conflict, alternatives need to be found rapidly to alleviate the impact of blockades hampering logistics and the appropriate flow of equipment and consumables.

A series of specific recommendations have been elaborated. Some of them might look as “MSF common sense”. Experience demonstrated that it is not always so and the vigilance is always needed.

Recommendations	Targets
<p>Recommendation N°9: Ensuring Identification of key areas for intersection collaboration should be seen as a priority and carried out as fast as possible. This should be both to develop a stronger MSF advocacy position, but also to explore sharing of resources (Epi, GIS, etc.)</p>	<p>Intersection OCBA directorate</p>
<p>Recommendation N°10: Continue to develop and strengthen methodologies for identifying, recording and managing risks linked to health crises in war zones including</p> <ul style="list-style-type: none"> • identification of direct and indirect health risks related to the impact of the war on the population and health structures, • early identification of difficulties to access outbreak zone and the means for strengthening access negotiations, • identification of vulnerability in supply lines and identification of alternatives, etc.). <p>Intersectional efforts would be an asset</p>	<p>Mission Intersection Ops</p>

4.2.2 Emergency preparedness and alert

Many interviewees raised the issue of the responsiveness to the alert on the looming situation and the risks of a poorly designed and managed response when it is based on an inaccurate initial diagnosis and questionable assumptions. The decision-making process is often reduced to either responding with a “no regrets”-approach and taking the risk of “over-reacting”, or ignoring the warning signs because they are too weak. The evaluation team feels it is very important that WHO allows multi-stakeholder “diagnostic task forces” connected to laboratories both inside and outside the country to be systematically involved so that samples can be analysed rapidly. Questions remain about the effectiveness of the health monitoring and related warning systems in Yemen.

Recommendations	Targets
<p>Recommendation N°11: EPP should be always updated for the cholera scenario in a context with aggravating factors even if there is no history of recent epidemics. Review EPP and all its components (stock availability, etc.) and ensure dialogue on strategy between OCs both at field and HQ.</p>	<p>Mission Cell/EU Ops</p>
<p>Recommendation N°12: In a context where many factors can aggravate a situation, always credibility to the “low noises”, unless trustable data can invalidate them. Resources should be allocated to these validation exercises</p>	<p>Mission Intersection Ops</p>

<p>Recommendation N°13: The issue of the visas and how the government had the control of the operations through it should bring in a reflexion on the set up of the ops in the Yemen.</p> <p>Regarding cholera, to strength the national staff autonomy in cholera management is a must. To set up a core group and to invest in training of trainers through face-to-face courses or on line models is recommended.</p>	<p>Cell, Mission HR, Ops</p>
<p>Recommendation N° 14: In a context where there is no cholera experience and where national health standards can be relatively high, ensure that there is a very strong medical leadership to steer the operation and facilitate all the required adaptations.</p>	<p>Mission Cell</p>

4.2.3 The strategic importance of communication

Communication about a health crisis is particularly important in a war context when rumours can be instrumentalized by parties of the conflict, and the procedures implemented to manage an outbreak, such as the isolation of patients, can be perceived as hostile acts if they have not been properly explained.

Recommendations	Targets
<p>Recommendation N°15: Deploy a strong communication strategy, if possible on an intersectional basis, vis-a-vis the authorities for them to understand the importance of WASH outreach and contagion containment activities. If required, dispatch high-ranking and experienced staff systematically, even if necessary from HQ, and potentially at the intersectional level, to support the field teams in difficult negotiations.</p>	<p>Mission Intersection</p>
<p>Recommendation N°16: It is important to establish a communication strategy from day one. This should include the identification of target groups (the authorities, armed groups, the general population, and specific population groups), key messages per target group, etc. Also ensure that the strategy is implemented rapidly (training of CHW, printing EIC, etc.).</p>	<p>Mission Intersection</p>

4.2.4 The importance of data

The fact that the data gathering system was established so slowly seems difficult to understand for an institution that is well known for data-driven decision making. The limited quantity of data available in the early part of the 2017 outbreak seems to have

been the result of working in “emergency mode”, where saving lives is prioritized over any other tasks, even though more data could have contributed to the operation being steered more effectively, and thus more lives being saved. The problems in establishing line-lists was largely the result of the absence of a line-list model in the MSF Cholera Guidelines, limited staff with sufficient cholera experience and regular lack of leadership in the medical domain, even though enough information was available in the Guidelines. In addition GIS has demonstrated its importance in mapping the evolution of outbreaks, to identify areas of origin of epidemics and to understand their mechanisms of contamination.

Recommendations	Targets
<p>Recommendation N°17: Develop (at the intersection level) a simple, excel-based data-management system (or use data management software) to help teams to set-up data collection and establish a coherent timeline. If it is not included in the guidelines at least it should be included in the EPP. Ensure that GIS capacity is also mobilized from the onset of the outbreak.</p>	<p>Mission Intersection Ops</p>
<p>Recommendation N°18: Ensure that guidance is sent rapidly to make data collection systems an early priority. An Epidemiologist, or at least a Medco with epidemiological capacities, as well as staff with GIS capacities, should be implicated at field level from the very beginning of an outbreak.</p>	<p>Mission Intersection Ops</p>

4.2.5 Handover and longer term issues

Different processes were implemented for closing or handing over CTCs and CTUs and phasing out the emergency phase (CTC and CTU closure or handover to the authorities or other aid agencies, the transition between emergency units and normal MSF Cells, etc.)

Recommendations	Targets
<p>Recommendation N°19: Improve internal procedures to increase administrative agility and facilitate transition when a contextual evolution implies rapid adaptation of operations</p>	<p>Mission Cel/EU</p>
<p>Recommendation N°20: Allocate sufficient resources for the identification, analysis and strengthening of the possible “hand over” exercises. Don’t plan to leave too fast in extremely fragile contexts and ensure that all possible efforts are made to properly facilitate the transferal of competences and responsibilities to the chosen “hand over partner”, be it national institutions, NGOs, international agencies or another organization.</p>	<p>Mission Cel/EU</p>

<p>Recommendation N°21: As the lack of cholera experience faced during the emergency is in part a consequence of the current operations and contexts, measures should be taken to keep the cholera expertise and know-how in the OC, and specifically in the emergency team (cholera trainings for all emergency missions, e -learnings, training while in stand-by, regular organization of cholera webinars, etc.)</p>	<p>Cel/EU Ops HR</p>
<p>Recommendation N°22: OCBA should reassess how it articulates the responsibilities between EU and the regular missions in order to ensure that it keeps the emergency mind-set of the EU while being able to promptly transfer operations to regular cells once the clear acute phase of the emergency is over or the context evolving towards a chronic crisis.</p>	<p>Cell EU Ops</p>

5 Annex

5.1 Terms of reference

Evaluation of MSF OCBA response to Cholera outbreak in Hajja, Yemen	
Commissioned by	Deputy Head of Emergency Unit
Duration of evaluation	3 months (November-January)
Time period that is evaluated	30/03/2017 – 31/07/2017
ToR elaborated by	Emergency Unit

1. CONTEXT

The current cholera outbreak in Yemen began in October 2016. The first confirmed cases were reported in Sana'a, however the outbreak quickly extended to other governorates. Until the end of 2016, a total of 15,748 suspected cholera cases were reported in 156 districts in the country.

The cases of cholera surged again in spring 2017: The MSF team in Abs started to receive cases coming from Beni Youss (Hajja governorate) to the hospital on 30 March. WHO dated the beginning of the second wave of the cholera outbreak in 27 April 2017.¹ From this date to the end of August the total number of suspected cholera cases reported by World Health Organization (WHO) & health authorities in Yemen by end of August 2017 is 575,249 with more than 2,000 deaths (CFR=0,35%) in 95.6% (22/23) of Yemen governorates, and 89.2% (297/333) of the districts. The overall attack rate is 15.3 per 10,000 of population.

Out of 23 governorates in the country, 21 have reported cases. The five most affected governorates are Amanat Al Asimah, Al Hudaydah, Hajjah, Amran and Dhamar. 296 out of 333 districts in the country have reported cases.

The second surge of the cholera outbreak coincided with the previous days of the Ramadan commencing on 26/05 (which corresponds to beginning of epi week 21) and Eid celebration took place on 24/06 (which corresponds to the end of epi week 26). After over two and half years of conflict, Yemen is a humanitarian emergency. The situation, already dire before the conflict, has progressively deteriorated since the war broke out. The conflict is showing no sign of abatement and airstrikes by the Saudi-led coalition reported between January and July 2017 have already exceeded the total number of airstrikes reported in 2016. Airstrikes and ground fighting in many areas in Yemen are banning people from free movement and worsening the living conditions.

The cholera outbreak hits a population facing a humanitarian crisis exacerbated by the ongoing conflict: Nearly 60 percent of the Yemen's total population is estimated food insecure and a further 7 million severely food insecure of the 27, 58 Million inhabitants severely food insecure.² Even before the onset of the war, most of the population did not have access to clean water and proper sanitation. Infrastructure has been severely damaged due to fighting.

4 MSF Operational Centers were involved in the cholera response in Yemen. Among all sections, by the end of August, MSF has treated more than 91,645 patients since the beginning of the outbreak, about 15% of the cholera patients reported in Yemen. MSF has supported 22 cholera treatment centres and units in 9 Yemeni governorates ((Hajja, Amran, Al-Dhale, Hodaidah, Ibb, Taiz, Sana'a,

Aden and Abyan). There is a decrease in the number of cholera and acute watery diarrhea cases registered weekly in Yemen since mid-July.

In Hajjah governorate, MSF OCBA was present before the outbreak supporting the hospital in Abs and Hajjah city. By the beginning of May, 6 districts were affected in the governorate and the MoH launched an appeal to respond to the cholera outbreak in Hajjah governorate, on 4th of May.

Since the beginning of the response, MSF OCBA has treated 14,276 patients in Abs Cholera Treatment Center (CTC) (as of 31/07) and 5,465 patients in Hajjah CTC (as of 31/07).³ Approximately 42% of all cases reported in Hajjah governorate have been treated by MSF in both CTCs. We have also received in both CTCs (majority in Abs) patients coming from the neighboring governorate of Al Hudaydah, corresponding to approximately 5% of cases reported in that governorate.

In Hajjah district, the epidemiological curve from MSF CTC admissions shows that the peak has been reached in week 25 with a very fast and drastic decrease in the number of cases after that.

The overall objective of the response of MSF OCBA was: To reduce the impact of the Cholera outbreak in Hjjja Governorate reducing its mortality and morbidity.

MSF OCBA response proposal consisted of the following components:

1. Preventive activities:
 - a. Infection Control and WASH activities
 - b. Community engagement and Health Promotion activities
 - c. OCV preparation and lobbying with authorities to enable its implementation
2. Epidemiological Surveillance
3. Case Management activities
 - a. Centralized Treatment and case management: In Abs and Hajja with CTCs next to the Abs and Hajja hospitals
 - b. Decentralized case management and treatment: Support to Health Units and configuration of Cholera Treatment Units (CTU) , Oral Rehydration Points or the establishment of referral focal points in a number of semirural locations

As of end of July, the MSF Emergency Unit handed over its interventions: A number of activities have been handed over to other actors operating in the area, as well as to the local Ministry of Health, while some activities are still being implemented through MSF OCBA's Operational Cell.

Among the implementation constrains faced by the teams were: the highly insecure context, access constraints in terms of security but also bureaucratic, limitations in the possibility to send cholera experienced staff due to VISA blockage, unsuccessful lobbying efforts for the OCV implementation, etc.

2. OVERALL OBJECTIVE and PURPOSE

OVERALL OBEJCTIVE

Capitalization of the intervention done in Hajjah governorate between 30 March until the 31st of July to enhance operational performance in the future.

THE PURPOSE

To use the lessons learnt from the cholera response in Yemen for adaptation of the strategy for future interventions aimed at reducing morbidity and mortality due to Cholera outbreaks in similarly complex settings

3. KEY EVALUATION QUESTIONS

- To what degree did the intervention contribute to the achievement of the overall objective of the intervention (To reduce the morbidity, mortality and human suffering due to cholera)?
- To what extent have set objectives of the strategy been achieved?
- What were the reasons for achievement/non-achievement (internal and external). What were the enabling and blocking factors at different points of time?
- To what degree was the response appropriate to the context of high insecurity and challenges in terms of limited access and administrative constraints?
- How flexible was the response to the contextual changes over time?
- How appropriate have possible adaptations been?
- To what extent was the response coordinated with other actors (inside and outside of MSF)? How well did coordination contribute to the intervention's objective?

4. EXPECTED RESULTS and INTENDED USE OF THE EVALUATION

(Concrete outputs the evaluation process should aim to achieve):

1. Overall report including:
 - a. Detailed description of the outbreak & the response, including problems encountered, challenges and constraints identified & the way they were managed.
(Challenges/constraints faced, identified and listed in the report)
 - b. Timeline of cholera outbreak in Hajja governorate, related developments and corresponding operational decisions (by HQ and field management)
2. Facilitation of workshop consisting of
 - a. Presentation of findings, conclusions and recommendations and
 - b. Joint development of key points (incl. adaptation of strategy) to take into consideration for effective control of future Cholera Outbreaks in similarly complex contexts and an action list
3. Guiding document outlining key points for control of cholera outbreaks in similarly complex contexts

Responsible for considering recommendations and their implementation:

The Emergency Unit /Operation department

5. PRACTICAL IMPLEMENTATION OF THE EVALUATION

The evaluation can be conducted by a single evaluator or by a team.⁵

Task	Days
For preparation, document review and inception report	8
For field visit	21
For interviews (in HQ in Barcelona and from off-site)	8
Data analysis, report writing, integration of feedback and preparation of Workshop/presentation	10
For workshop/presentation and development of guiding document for Cholera outbreak control in complex contexts	5
Total time required (days)	52

6. TOOLS AND METHODOLOGY PROPOSED (if any)

- Review and analysis of project documents
- Analysis and interpretation of project data base related to Cholera in Yemen
- Interviews with key-team members at HQ and field levels
- Interviews with key informants (e.g. health professionals from MoH, other NGOs, IOM?)
- DOCUMENTATION FOR READING
- Project documents: Project proposal, Strategy for cholera outbreak intervention, sitreps.
- Guidelines: Cholera, others?
- Data files
- Intersectional website,
- WHO sitreps, bulletins, etc.
- MSF Documents on Cholera interventions (e.g. General lessons learnt, Recommendations and Reminders on several Cholera outbreak interventions (2012). MSF)

7. STAKEHOLDERS AND INTERVIEWEES

Primary Stakeholders:

- Emergency Unit, Reco, DepReco, TesaUe, TeloUE, FinoUE, HRUE.
- Interviewees:
- HQ: Epidemiologist, Cholera Referent, Mio Infection Control, Vaccination Referent

⁵ The indicated outline of the number of days is done under the assumption that one evaluator would be carrying out the evaluation. In case a team of two evaluators would be selected, the number of days could be adapted.

- Field: HoMs, Fieldcos of different projects, Medco, Assistant Medco, PMRs, Cholera focal person Staff from Operational Cell 1
- MSF staff from other OCs involved in response i Yemen WHO staff in Yemen
- MoH staff in Yemen

Relevant stakeholders in the community

8. JOB PROFILE/S of EVALUATOR/S

For the present assignment a team of evaluators is going to be formed. The following skills and expertise need to be met by the team:

- Medical background (either Medical doctor, Public Health background or Nursing School)
- Proven experience in management of complex operations
- Proven experience in collection and analysis of quantitative epidemiological data
- Previous experience working in Cholera interventions
- Extensive evaluation experience in humanitarian approaches and programs.

Moreover, we also expect the following:

- Extensive expertise in designing and implementing evaluations of complex programs
- Solid experience in data collection methodology and analysis of qualitative data
- Thorough knowledge/working experience in Yemen Desirable:
- Experience in working with MSF
- Arabic language proficiency
- Strong facilitation skills

5.2 Mission calendar

Period	Action	stakeholders	objectives
November 2017	Contractual arrangements, team recruitment	MSF Vienna / Groupe URD	Negotiation on contract, methodology, task allocations, etc.
1 to 15 december 2017	series of on line interviews	Evaluation Team with OCBA staff outside of Yemen	Interviews with OCBA staff involved in the cholera response
18-20th December 2017	Brefing in Barcelona	MSF OCBA	Briefing , interviews and focus groups with different segments of MSF OCBA
From 10 to 26 February 2018	Interviews with different staff of MSF	TL with various stakeholders (MSF, UN, ICRC, NGO, national Authorities)	Collection of information using the Interview Guide
	Visits in Sana'a, Hajja and Abs		Interviews, field observations
			Focus groups with MSF staff, Hospital staffs and beneficiaries
			Debriefing with OCBA
From 02 to 30 Mars	Preparation of 1 draft of evaluation report	Evaluation team	
	Additional intevIEWS		
	preparation of report		
	Presentation of the draft report	Evaluation team, OCBA, MSF Vienna	Phone and skype call
Up to end of April	Finalization of the report	Evaluation team, OCBA, MSF Vienna	

5.3 List of interviewees

MSF Spain / OCBA	
HQ and staff involved in the cholera response but not anymore in the operation	
Murata , Shinjiro	Head of Mission
Valencia, Helena	Head of Mission
Nanglares, Carolina	Cholera Focal in the mission
Alia, Miriam	MIO vaccines
Ortiz , Llanos (individually in focus group)	Emergency Unit Deputy Head
Sanchez, Gabriel	OCBA Emergency Unit Head
Lanusse, Candela	OCBA Emergency Unit Health Advisor
Brown Katy(individually and in focus group)	OCBA Emergency unit support to health advisor
Mlrале, Romain	OCBA Emergency Unit supply
Illanes, Victor	OCBA Cholera Referent
Salgado, Maria Jose(individually and in focus group)	OCBA Epidemiology Referent
Perez, Monica	OCBA Emergency Unit HR
Delgado, Maite	OCBA Emergency unit Financial
Fjord, Anni	Hajja Nurse activity manager
Monse Ercruela	Nutrition advisor, OCBA
Cristian Casademont – focus group	Deputy Medical Director/Head Medical Unit
OCBA Sana'a	
Martins, João	HoM MSF OCBA Yemen
Norman, Hanna	Med Co Support
Grandio, Elena	MedCo
José Sanchez	Medical Team Leade
Muriel Boursier	Project Coordinator
Abdul Aliomar Abdu	
Abdufatha Al Alimi	Project medical referent
Rami Abdulrazek Abass	Referent focal Point
Saddam Alazi	HR CTC
Nabil Al Orabi	Mission chain supply manager
Dr Hanna Fadhl Nouman	MedCo Support
OSBA Hajja and Abs	
Abdu	nurse supervisor,
Ammar Alnaqa	data entry for cholera
Tareq Farhan	Outreach nurse activity manager
Sadam	supervisor of CHW in ctc and in outreach
Abdullah	log supervisor –watsan
Samer	HR Assistant Abs
Hamed	FC Assist
Dr. asmaa	Medical
yasmeen Hakami	CHW Supervisor in CTC
yousef khalufa	store keeper
MSF other OC	
Sandrine Guendhoul	OCP Emergency Coordination for Cholera
Dr Ana Nery	OCP Med Co
Luquero, Francisco	Epicentre
Frederic Pelat	OCG HoM
Ximena Campos	Med Co
Poncin, Marc	OCG Geneva HQ (Humanitarian advocacy advisor
Justin Armstrong	OCA Head of Mission

National Yemeni Authorities	
Dr Abdula Rahman	Deputy director of Central Lab
Dr Fouad Baza	Director of Microbiology dept
Dr Mouna Abdulla	Dr of Health in Central Lab
Dr Samar Saeed Nasheer	Responsible for Cholera in central lab
Dr Abdul Razed	Health Manager; Hajja City
Dr Majed Ahmed Alsagiq	Director Abs Hospita
Dr Ibrahim Al Kuhlany	Health manager Abs Hospital
Dr Othman	Deputy director, Abs Hospital
External actors	
Alexandre Thaite	ICRC Head of Delegation, Sana'a
Pilar Maria	ICRC medical coordinator, Sana'a
Mosa Drwesh	OXFAM deputy head of office, Abs
Santha Kumar	OXFAM head of log department, Abs
Gadir Derchem	OXFAM, Public health officer
Florence Vinineza	OXFAM cholera specialist
Dr Sumaia AlAila	IOM cholera coordinator
Dr Ahmed Ali Kaid Thabet	WHO Pandemic and Epidemic disease officer
Christophe Morard	WFP, Logistic cluster coordinator

5.4 Interview Guide

NAME OF INTERVIEWED PERSON :

PRESENTATION OF THE EVALUATION

Background

Team

Timeframe

Methodology

(most question will require a narrative and a rating between 1 and 6

1 : inexistent ; 2 : very bad, 3 : bad, 4 ; acceptable ; 5 Good ; 6 : excellent)

A FEW POINTS ON THE INTERVIEWED PERSON

Role and location :

Timing of involvement of interviewed person in the response :

YOUR PERSONAL EXPERIENCE IN THE RESPONSE

Briefing before arriving and upon arrival

(rate from 1 to 6)

Best subject of satisfaction :

Frustration and/or regrets :

YOUR OWN ASSESSMENT ON YOUR WORKING ENVIRONMENT

Did you get a proper security briefing ?

(from 1 to 6)

How was security managed ?

(from 1 to 6) 5 :

How would you rate coordination with National/local institutions ?

(from 1 to 6)

How would you rate coordination with international actors ?
From 1 to 6 : 5

YOUR OWN ASSESSMENT ON MSF RESPONSE TO THE CHOLERA CRISIS

Responsiveness :

(from 1 to 6)

Level of preparedness ;

(from 1 to 6)

Relevance of the strategy :

(from 1 to 6)

Use of lessons learnt from other cholera interventions

(from 1 to 6)

Functioning of the CTC/CTU

(from 1 to 6)

Functioning of the CFP system

(from 1 to 6)

What were the most important constraints in case management :

Functioning of the Outreach system

(from 1 to 6)

Functioning of the Water and sanitation interventions :

(from 1 to 6)

Functioning of the hygiene promotion interventions.

(from 1 to 6)

Functioning of the Data management system

(from 1 to 6)

Functioning of Logistics

(from 1 to 6)

Functioning of HR Support

(from 1 to 6)

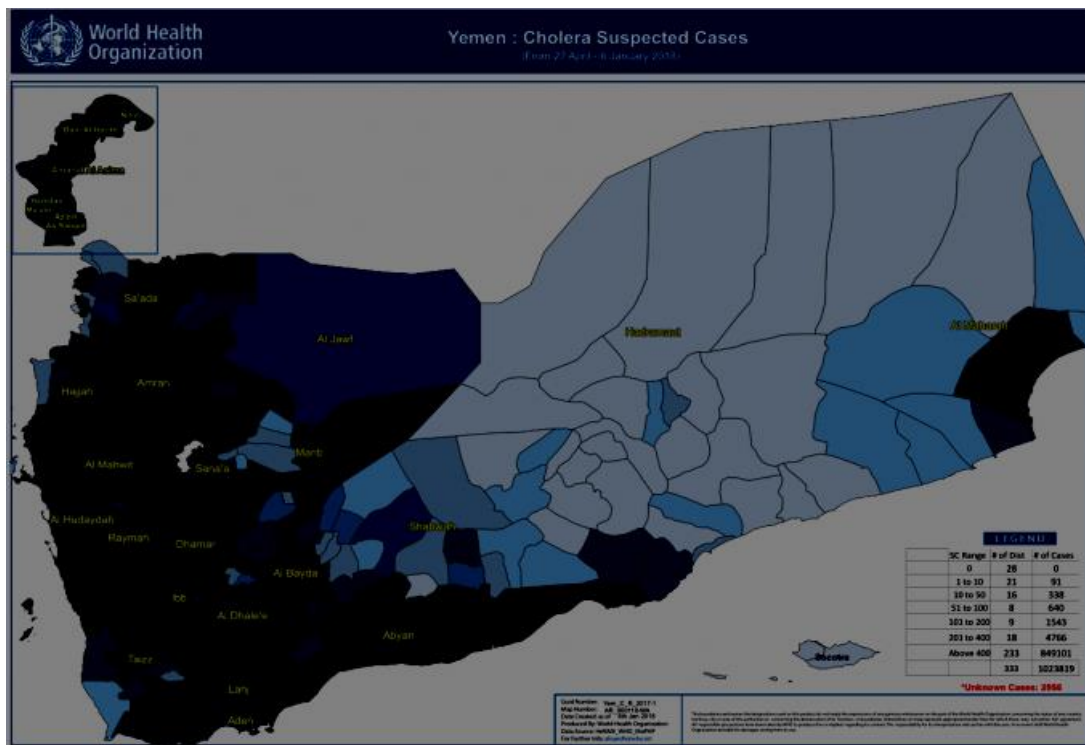
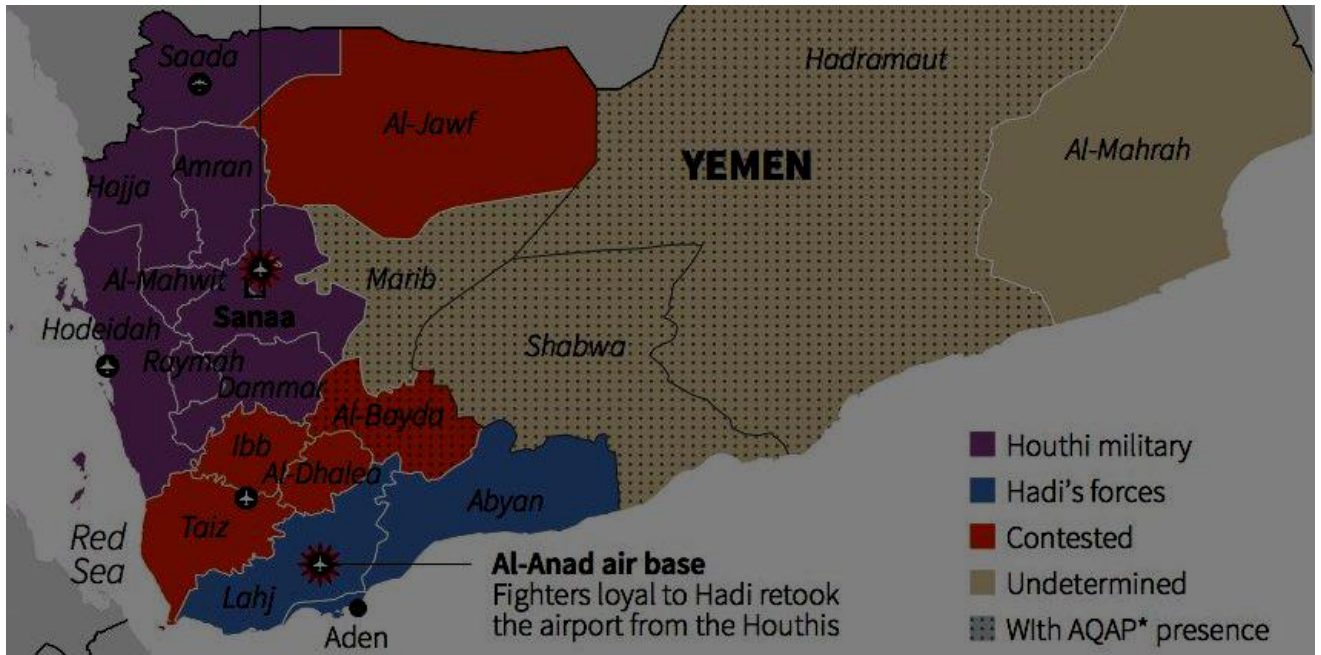
How would you explain Fatality Case evolution

According to you what were the most important constraints of the cholera response ?

In general

During your period of involvement

5.5 Maps of Yemen



5.6 References

- BAUERNFEIND, Ariane et al. (2004), Cholera Guidelines, Médecins Sans Frontières.
- BROWN, Vincent (2011), Haiti Cholera Day, MSF-OCP Cross-disciplinary Review & Discussion, Minutes, Médecins Sans Frontières, 8 avril 2011.
- CAMACHO, Anton, LUQUERO, Francisco (2017), Cholera in Yemen: the seed, the rain and the bloom, Epicentre, World Health Organization, Ministry of Health of Yemen, Médecins Sans Frontières.
- FJORD, Anni (2017), End of Mission Report, Médecins Sans Frontières, septembre 2017.
- GLOBAL TASK FORCE ON CHOLERA CONTROL (2017), Ending Cholera: A Global Roadmap to 2030.
- ISCLA, Marta, General Lessons Learned, Recommendations and Reminders of several Cholera outbreaks interventions Zambia 2004-2006-2008-2010 (OCBA), Guinea Bissau 2005-2008 (OCBA), Juba 2006 (OCBA), Haiti 2010-2011 (OCBA) Angola 2006 (OCB, OCA, OCBA), Zimbabwe 2009(OCB, OCA, OCBA)
- LARREA, Ainhoa (2017), Cholera overview, Médecins Sans Frontières, 25 mai 2017.
- MEDECINS SANS FRONTIERES (2017), MSF Yemen – Crisis Info 16/September 2017.
- MEDECINS SANS FRONTIERES (2017), MSF Yemen/ Cholera Update # 8, 31 août 2017.
- MEDECINS SANS FRONTIERES (2017), Yemen: Dialysis support in Yemen.
- MEDECINS SANS FRONTIERES (2012), General Lessons Learned, Recommendations and Reminders of several Cholera outbreaks interventions, Version 1 Draft, 30 mai 2012.
- MEDECINS SANS FRONTIERES (2017), MSF-OCBA, Cholera-Yemen, juillet 2017.
- NANCLARES, Carolina, SAGRADO, Maria Jose (2017), Strategy for cholera outbreak intervention – Yemen Mission, Médecins Sans Frontières, juillet 2017.
- OCHA (2016), Yemen: Humanitarian Needs Overview 2017, novembre 2016.
- OHCHR | Yemen: An ‘entirely man-made catastrophe’ – UN human rights report urges international investigation.
<http://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=22025&LangID=E%20>. (accessed Dec 6, 2017).
- RAKESH, Ankur (2017), Corollary of a war: Factors for cholera transmission in Sana’a city governorate during an outbreak in Yemen, 2017 –Interim report, Epicentre, Ministry of Public Health and Population, Médecins Sans Frontières, Institut Pasteur.
- Sanchez, gabriel. REco mision visit report, 30 july-6 august 2017
- OCBA Cholera yemen Sitreps
- OCBA yemen ops punto info
- OCBA press release
- OCBA rapid assesment report, abs hospital may 2017
- OCBA strategy for cholera outbreak intervemtion, yemen mision july 2017
- OCBA chlera intervention action plan
- OCBA cholera strategy fro control of cholera outbreak HAJjah governorate
- OcBARaft proyect proposal cholera hajja province. may 2017
- UNICEF. Yemen Humanitarian Situation Report. 2017; published online Jan 4.
https://www.unicef.org/yemen/YEM_sirteps_Mar2017.pdf.
- VALENCIA, Helena, End of mission report, june 2017
- VON SEIDLEIN, L., DEEN, JL (2018), Preventing cholera outbreaks through early targeted interventions, PLoS Med 15(2).
- WORLD HEALTH ORGANIZATION (2016), Situation Report: Acute watery diarrhoea/cholera, Yemen, 13 November 2016.
- WORLD HEALTH ORGANIZATION (2015), Health system in Yemen close to collapse. Bull World Health Organ 2015; 93: 670–1.