Integrated Response Plan: Yemen Cholera Outbreak

(23 May 2017)

This plan is put together by the Health and Water, Sanitation and Hygiene Clusters in Yemen and is an evolving document. It will be periodically updated

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EXECUTIVE SUMMARY

Yemen is in the grip of a fast spreading cholera outbreak of unprecedented scale. This plan presents an integrated response to the significant upsurge of acute watery diarrhoea (AWD)/suspected cholera cases[1] across the country, since 27 April. Consequently, as of 14 May, a total of 14,000 suspected cases, with 186 associated deaths (1.6% CFR) were reported from 180 districts (18 Governorates). On 14 May, the MoHP declared a state of emergency stating that the health system is unable to contain this unprecedented health and environmental disaster. An additional, 98,126 cases are projected from the high risk districts in the coming six months.

The plan outlines emergency health, WASH and communications interventions to contain and prevent further spread of the outbreak in the *227* high risk districts, where suspected cholera cases were reported during the period October 2016 to May 2017 (see Annex 1 for details). Health and WASH clusters will continually identify priority districts from at high risk districts, by considering the number of caseload and attack rate. As of 15 May, 30 priority high risk districts (10 Governorates) that report over 100 or more suspected cholera cases have been identified.

A total of $ 66.7 million is required to implement activities outlined in this integrated plan for 6 months from May to October 2017, in order to control the outbreak, prevent further spread, and minimize the risk of recurrence. Considering available resources, including $10 million to be allocated through YHPF, the net requirement totals to $55.4 million.

1. OVERVIEW OF THE CHOLERA OUTBREAK

The Yemen's Ministry of Public Health and Population (MoPHP) confirmed a cholera outbreak in Amanat al Asimah Governorate in October 2016. Subsequently, the outbreak spread to close to 165 districts in 16 Governorates by the end of December 2016. The trend of the cholera outbreak and case-fatality rate then declined during the period January to March, with the number of districts reporting suspected cholera cases dropping to 25. The decline in the epidemic curve could be partly attributed to the health and WASH interventions. A total of 24,504 suspected cases, including 143 associated deaths (with a case-fatality rate of 0.44%) were reported by the end of March 2017.

The resurgence of the outbreak during the last week of April resulted in a cumulative of 14,000 suspected cases, with 186 associated deaths (1.6 % CFR) by 14 May, rapidly spreading to 180 districts (in 18 Governorates[2]). With the rapid spread, the cumulative

1 *Cholera is an acute diarrhoea infection caused by the ingestion of the vibrio cholera bacterium. Transmission occurs through direct Faecal-Oral contamination or through ingestion of contaminated water and/or food. Cholera transmission is closely linked to inadequate access to clean water and sanitation facilities. The consequences of a humanitarian crisis – such as disruption of water and sanitation systems, or the displacement of populations to inadequate and overcrowded camps –increase the risk of cholera transmission, should the bacteria be present or introduced.*

2 *Amanat Al Asimah, Sana'a, Amran, Hajjah, Ibb, Al Mahwit, Al Bayda, Dhamar, Al Dhale'e, Taizz, Abyan, Al Hudaydah, Raymah, Aden, Al Jawf, Sa'ada, Shabwah, and Al Maharah governorates.*

number of cases during the two weeks period equal those reported over a period of the first months in the October 2016 outbreak.

The outbreak is spreading against the backdrop of a major humanitarian crisis. The current upsurge of cholera cases is attributed to prevalence of risk factors including disruption of public health and WASH services amidst increasingly collapsing basic services, displacement, and inadequate sanitation conditions. Less than 45 per cent of all health facilities are fully functional and more than 8 million people lack access to safe drinking water and sanitation.

The situation is further aggravated by high prevalence of severe food insecurity and malnutrition[3]. The health condition of this vulnerable population is already compromised by the deteriorating situation, increasing their susceptibility to cholera infection and associated complications contributing to higher case fatality rate. Two years of conflict, compounded by an economic decline have devastated livelihoods, depleted safety nets, weakened social service delivery, and ability to access social services.

Health and WASH clusters immediately mobilized partners to scale up response. Two emergency operations centres have been established in Aden and Sana'a to oversee surveillance activities and to mobilize. As of 15 May, 37 DTCs have been established to treat severe cases. Additionally, 141 community-level Oral Rehydration Therapy Corners (ORTCs) were opened in Sana'a and other affected governorates to treat moderate and mild cases, with a referral system of severe cases to the DTCs. Partners are re-programming resources to respond to the outbreak.

Despite these, the spread of the outbreak continue to outpace ongoing response efforts, and additional resources are required to scale up interventions to control the outbreak and prevent further spread.

2. OUTBREAK PROJECTIONS FOR THE COMING SIX MONTHS (MAY TO OCTOBER 2017)

In the 227 high risk districts where suspected cholera cases were reported since the onset of the outbreak (see Annex one for details), an additional 84,269 cases are projected during the coming six months, out of an estimated 24 million at risk population (0.5 % attack rate). Moreover, 13,858 people in the 106 low risk risks are likely to be infected in the 106 low risk areas, with an estimated population of 5.5 million (0.25 % attack rate). A cholera prediction model based on the attack rates during October 2016 and May 2017, and other risk factors were applied to make the projections (See Annex 2 for details).

A total of 98,126 cases are, therefore, projected from the at risk areas in the coming six months, in addition to the cumulative 36,287 suspected cholera cases since the onset of the outbreak. Out of the projected caseload, 50 percent (49,063 cases) are expected to experience severe and moderate dehydration, and will likely required intravenous

3 *14 million people in Yemen are food insecure, including 7 million severely food insecure, 3.3 million are acutely malnourished and 462,000 children are in the grip of Severe Acute Malnutrition (SAM).]*

treatment and hospitalization. Of these severe cases, there is a need for additional treatment facilities with 6,542 DTC beds (assuming each case will spend 2 nights in hospital and a duration of 6 months) to accommodate the expected new cholera cases (see Annex 3 and 4 for details). These projections form the basis for estimating the required resources and capacity to adequately respond in the coming six months.

The projection of the caseload and corresponding response is based on the following assumptions:

- *The was no interruption of the outbreak that started in October 2016, so the new increase in number of cases is considered as part of the same outbreak;*
- *Since October 2016 to 14 May 2017, a total of 36,278 suspected cholera were reported from 227 Districts in 17 Governorates in Yemen*
- *All districts that reported cases since October 2016 are considered as high risk areas for cholera.*
- *Districts that were free of infection till 14 May 2017 are considered as low risk areas for cholera*
- *The total number of population in high risk areas (227 Districts) is 24,109,346 and the total population in low risk areas (106 districts) is 5,543,007.*
- *Severe and some moderate cases will need hospitalization (50% of the caseload).*
- *Length of stay at DTCs is 2 days.*
- *Number of beds per DTC is 20 beds as an average.*

3. RESPONSE STRATEGY

The overall goal of this plan is to reduce occurrence and to minimize morbidity and fatality of cholera and AWD through effective prevention and timely response. The response strategy[4] entails two- approaches focusing on control and prevention. The strategy also identifies the criteria for prioritization of response in the most affected districts. (*See Annex 8 for indicators of success for the two approaches)*

The first approach "Control" focusses on districts that reports suspected cases with positive rapid diagnostic test and / or confirmed cases. This approach aims at controlling the spread of the outbreak in the affected districts.

In areas where cholera has been culture confirmed, all cases of AWD should be treated as cholera– without need for laboratory confirmation therefore laboratory tests should be only taken sporadically to oversee the evolution of the outbreak and whether *Vibrio cholerae* O1 is still circulating in the area. When patients present with acute watery diarrhoea, with or without severe dehydration, they should be managed as cholera cases and reported through established cholera surveillance channels. In areas where cholera has not been culture confirmed, all cases of AWD should be managed clinically as if it

[4] This strategy is informed by the Regional "Shield and Sword" strategy that has been implemented to control and prevent cholera in West and Central Africa among other places.

was cholera and testing (RDT and cultures) should be commenced according to guidelines until Cholera culture confirmed.

While the second approach "Prevention" considers intervention in at other risk districts to prevent and / or minimize the chances of introduction of the outbreak to the high-risk but outbreak-free districts. As of May 15, 227 districts have reported suspected cholera cases and these districts will benefit from the control activities, while another 106 districts have not reported any suspected cholera cases and the prevention activities will be implemented. Both approaches include early/rapid response, integrated response activities and integrated prevention activities that will continue until the cholera transmission is interrupted and no new cases are reported.

- **Early/rapid response activities** enable a quick response as soon as suspected cases are reported in an area. Some of these rapid response include enhance early warning surveillance, timely laboratory confirmation, improved case management and infection control, strengthen water, sanitation and hygiene, and provision of essential supplies;
- **Integrated response activities** are based on the epidemiological analysis of the course of the outbreak, including contact tracing, incidence, case fatality rate, attack rate and mapping areas with contaminated water at household level.
- **Integrated prevention activities** are characterized mainly by WASH, Health and Communication for Development (C4D) strategy to protect people at all levels even those live in unaffected but at high-risk areas from AWD/cholera

The two- approaches are defined by the districts affected (table 1). Other districts which do not have any suspected/confirmed cases could be affected at any time; as such, the number of districts targeted in this approach will increase. The two approaches are implemented in parallel, while priority is given to the control activities if insufficient capacity is available to respond to all districts under Prevention and Control approaches.

Depending on funding and capacity of partners, Health and WASH partners will additionally intervene with sustainable and preventive interventions. Additionally, long-term prevention aims at improving water quality, sanitation and hygiene conditions as well as behavioral changes However, it should be noted that all activities take place in a complex emergency setting and therefore sustainable development interventions are not likely to be prioritized or even possible.

4. 1. Control approach:

Goal

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

Geographic Targeting

Districts where cholera cases have been reported and confirmed since October 2016. This will include 227 districts in 17 Governorates with a total of 24,109,346 population.

Other districts which did not have any suspected/confirmed cases could be affected at any time; as such, the number of high risk districts targeted by this approach will increase.

Activities

The control approach one activities are focused on early detection, improved case management/treatment and targeted prevention for districts with confirmed cases:

1) **Early detection activities** aim to increase surveillance and expedite laboratory testing and understand the root of contamination:
    a. Reactivate and sustain an integrated cholera operational room at national and (affected) governorate level
    b. Reactivate cholera task force at national and sub national levels to ensure maximum coordination, gap coverage and concerted approach
    c. Expand community based surveillance and strengthen current surveillance system (e-DEWs)
    d. Strengthen the central public health lab and it's governorate branches and micro biology laboratory in main hospitals in areas without branch, for decentralized testing of samples
    e. Timely outbreak investigation and identify sources of infection
    f. Enhance water testing water sources for cholera by central laboratory
    g. Continue support to rapid response teams at governorate level and establish rapid response teams at district level (in affected districts). At governorate level, the rapid response team will be integrated and include health, WASH and C4D experts.
    h. Improve data management and information dissemination through Health and WASH Cluster

2) **Case management/infection control activities** contribute to decreasing the case fatality rate by:
    a. Establish / reactivate / sustain diarrhea treatment centers (DTCs)[5] with the required health and WASH facilities for management of severe cases
    b. Establish ORS corners, diarrhea treatment units (DTUs) at community and primary health care level for management of mild and moderate cases
    c. For any district that has reported suspected cases, there should be at least one DTC (20 beds on average) or more and at least 5 ORS corners based on the caseload in different locations to cover the district.
    d. Case management and setting for the different types of treatment centers and points should follow WHO standards to ensure quality of health care.
    e. Establish referral system for cases failing to recover or deteriorating to higher health care levels
    f. Training health workers on case definition, diagnosis and management protocols
    g. Training laboratory staff on proper handling and testing of different types of cholera samples

[5] This includes proving food for patients admitted on DTC.

h. Distribution of communication material and treatment guidelines to DTC, ORS corners, DTUs and health workers
i. Procuring and distribution of diarrheal kits (targeting oral and IV rehydration).
j. Promote safe burial practices at health facility level through training the health workers and at the community level through awareness campaigns and disseminating IEC materials
k. Ensure infection prevention and control measures at DTCs, DTUs and ORS centers.
l. Regular joint monitoring of DTCs, DTUs and ORS corners to ensure quality of services
m. Provide household chlorination tablets (aquatabs) and consumable hygiene kits (soap) for 1 month for 1 family and IEC materials and awareness messages for recovered patients and their families, which will be provided to them by DTC staff upon release of the patient. This is as part of discharge procedures.

3) **Integrated prevention activities** to decrease the number of new cases by:

a. Water safety planning as appropriate in rural and urban context;
b. Water quality monitoring at source and point of use of FRC & turbidity. If necessary surveillance of fecal contamination (bacteriological testing);
c. Chlorination of water sources, piped network and private water trucks. Chlorination of unprotected wells should be avoided and instead bucket chlorination should be considered (if appropriate). As a last resort, supply of chlorinated water through water trucking where necessary and appropriate;
d. Cleaning, sterilization and disinfection of water storage facilities at household level;
e. Distribution of consumable hygiene kits and jerry cans (if needed) for households with cases and immediate surrounding households;
f. Distribution of chlorine tablets for water treatment at household level with proper instructions on use of the tablets, targeting households in affected locations.
g. Communication and mass awareness raising, including production and dissemination of IEC materials. Household and community level hygiene promotion, community mobilization and cholera awareness messages by adopting C4D strategy.
h. Sanitation measures to be considered on a case by case basis after better understanding of the situation (including sanitary survey). This includes advocacy to enhance solid and liquid waste management, support to cleaning campaigns and desludging when necessary (overflowing sewage systems, large amounts of uncollected garbage in densely populated areas). In areas with many displaced people without latrines, this could include construction of emergency latrines.

All WASH related activities are guided by a technical document with standard operating procedures developed and approved by the WASH cluster in Yemen.

4.2 Preventions approach:

Goal
To prevent cholera to spread to low risk districts.

Geographic Targeting
Districts that are at risk to report cases due to presence of risk factors with possibility of spread of the infection. These low risk areas include 106 districts with a population of 5,543,007.

Activities
In preventive approach, the activities will focus on integrated prevention activities, including:

1) Early Detection Activities, similar to control approach, the aim is to ensure robust surveillance and timely laboratory tests of suspected cases, including: strengthening current early warning surveillance system (e-DEWs) and expanding community based surveillance.

2) Case management/Treatment activities in this phase aim to reduce the case fatality rate among AWD cases, which includes: preparing the potential DTC, DTUs and ORS corner sites, procuring and prepositioning/stockpiling essential medical supplies, monitoring will take place at different levels for case management.

3) Integrated prevention activities, same activities as in control approach, but with a focus on communication and mass awareness. WASH and health activities focusing on water treatment and water quality surveillance as part of water safety planning, and prepositioning of WASH supplies as preparedness measure (IEC materials, chlorine, consumable hygiene kits and jerry cans) to be able to immediately respond in situations when cholera cases are being detected. Furthermore, as resilience measure, advocacy will be done to ensure water safety planning and promotion of environmental health (solid waste, sewage) to be part of institutional systems. This will be complemented by investments in rehabilitation and regular operation and maintenance of water supply and sanitation facilities.

4.3 Prioritization

Health and WASH clusters will prioritize the response in the affected districts based on the following criteria:

- Absolute number of suspected cases (caseload). This will allow proper response in terms of quantity.
- Attack rate (number of suspected cases as a proportion to the total population in the district). This will indicate the gravity of the situation and will allow mobilization of enough resources for the response.

In-line with the above criteria, 30 priority districts in 12 Governorates were identified as of 15 May, out of the 227 high risk districts (see the list on Annex 5). In the 30 priority districts, more than 5.7 million people were identified to be population in need of humanitarian assistance and more than 1.9 million in acute need- i.e. they need assistance to save or sustain their lives- in the 2017 Yemen Humanitarian Needs Overview (YHRP). Additionally, more than 306,000 Internally Displaced Persons (IDPs) are sheltering in these districts as per the latest Task Force for Population Movement (TFPM).

The clusters will update the priority district list on regular basis (weekly) to capture new developments as the situation evolves.

5. OPERATIONAL RESPONSE PLAN AND FUNDING REQUIREMENT

The Health and WASH cluster operational response plan identifies response activities to address the cholera outbreak in the at risk districts during the planning period, based on the response strategy outlined above. The scaled up response interventions aim at reducing morbidity and mortality due to the outbreak. The major expected outputs include: provide leadership and co-ordination of the health and WASH response; strengthen epidemic disease surveillance; improve Case Management at community, primary and secondary care levels; strengthen infection prevention and control at health facility and community levels; build capacity of national counter partners mainly Health and WASH authorities at the central and peripheral levels; and increase community awareness in relation to different aspects of cholera including prevention and control. (See Annex I for the response matrix outlining planned activities, timeline, and partner).

A total of **US$ 66,741,164** is required to implement Health, WASH and communication activities identified in this Integrated Cholera Response plan. Considering available resources amounting to $ 11,340,763, the net requirement stands at **$ 55,400,401** (See Table 1 for details). The available resources include $10 million to be allocated through response for a cholera integrated response.

Table 1: Summary for Funding Requirements for Health and WASH Response *(See Annex 7 for further details)*

Intervention Area	Estimated WASH USD	Estimated Health USD	Total H&WASH USD	Available Resource USD	Gap USD	% Funded
Provide leadership and co-ordination of the Health and WASH response	50,000	50,000	100,000	-	100,000	100.0
Strengthen epidemic disease surveillance	67,500	6,306,831	20,171,564	866,000	19,305,564	13.6
Improve Case Management at community, primary and secondary care levels	2,150,000	28,955,233	17,308,000	474,763	16,833,237	1.5
Strengthen infection prevention and control at health facility and community levels.	26,076,000	-	26,076,000		26,076,000	100.0
Capacity building	600,000	585,600	1,185,600	-	1,185,600	100.0
Community awareness	1,900,000	-	1,900,000	-	1,900,000	100.0
				10,000,000 (HPF)		
Total	**30,843,500**	35,897,664	66,741,164	11,340,763	55,400,401	17.0

- *The budget is calculating the cost to respond to the caseload starting from 15 May 2017.*

6. MONITORING AND REPORTING

6.1 Diarrhea Treatment Centre Reporting

As of 15 May 2017, 37 DTCs DTCs have been established by MoPHP. Many of these DTCs are not supported by health cluster partners and are in urgent need for different type of support. The health cluster is targeting 6,542 DTCs beds and 2,016 ORC stations/chairs in ORS corners to be opened across Yemen providing quality health services to patients. The standards of quality of service provision at the DTCs and ORS Corners are regulated by WHO Yemen Guidelines that are in accordance with the WHO global standards on cholera response. The guidelines include standards on:

- Monitoring, equipment and supplies, infection control measures and sanitation and hygiene measures.
- Diagnosis, clinical management and timely reporting of cholera.
- Technical capacity of care providers to manage cholera patients and structural criteria for DTC.

To ensure these standards are maintained, the coordinators at the DTCs report gaps and challenges to the cholera task force, reports and data are subjected to analysis. At the governorate level, there are the Emergency Health Operation Rooms that focus on surveillance and coordination of health response, they report to MoPHP/WHO.

Using the developed monitoring tools, health and WASH cluster partners will conduct several visits monitoring the DTC standards. The visits will measure the capacity of the DTC, as well as the capacity of the staff, the management of the DTC, knowledge of the guidelines and the quality of the treatment.

6.2 Treatment/Case management

The treatment/case management is regulated by the WHO Yemen Guidelines as described previously. Once a case is identified, the case is subjected to triage and managed or referred accordingly.

6.3 Epidemiological data

The collection of epidemiological data is completed by the DTCs staff in the field, who report directly to the cholera emergency rooms in Aden and Sana'a. The collected data is then "cleaned" and delivered to the taskforce for data analyses and reporting.

Two types of reports are produced, an epidemiological update which provides a brief summary of the outbreak evolvement twice weekly. The second publication is a situational report that includes the epidemiological curve, case fatality rate, and age & sex distribution of cases and map showing distribution of cases by districts.

To improve the data quality, a standard field reporting tool has been developed by WHO Yemen with data validations to minimize the data entry errors expediting the reporting process.

6.4 Response monitoring

The Health and WASH Clusters with partners are coordinating the cholera response monitoring activities which include location of WASH and health activities. This information is shared regularly with the national Cholera Taskforce. Regular joint situational reports are released by the health and WASH clusters, with data provided by the MoPH on new cases.

7 COORDINATION

The health authorities lead the national Cholera Taskforce which is formed of UNICEF/WASH cluster, WHO/health cluster and additional technical staff. The national taskforce discusses updates and strategic issues that will guide cluster partners in their response and reports regularly to their respective clusters and feeds back to the Governorate Health Offices (GHO) and to Sub-national taskforces. The two emergency health rooms in Aden and Sana'a are responsible for surveillance and mobilizing the rapid response teams.

At sub-national level, there are similar integrated task forces, where GHO, health and WASH cluster partners participate. Leadership of the task force depends on the existing capacity on the ground. There is regular communication between task forces at national and sub-national levels.

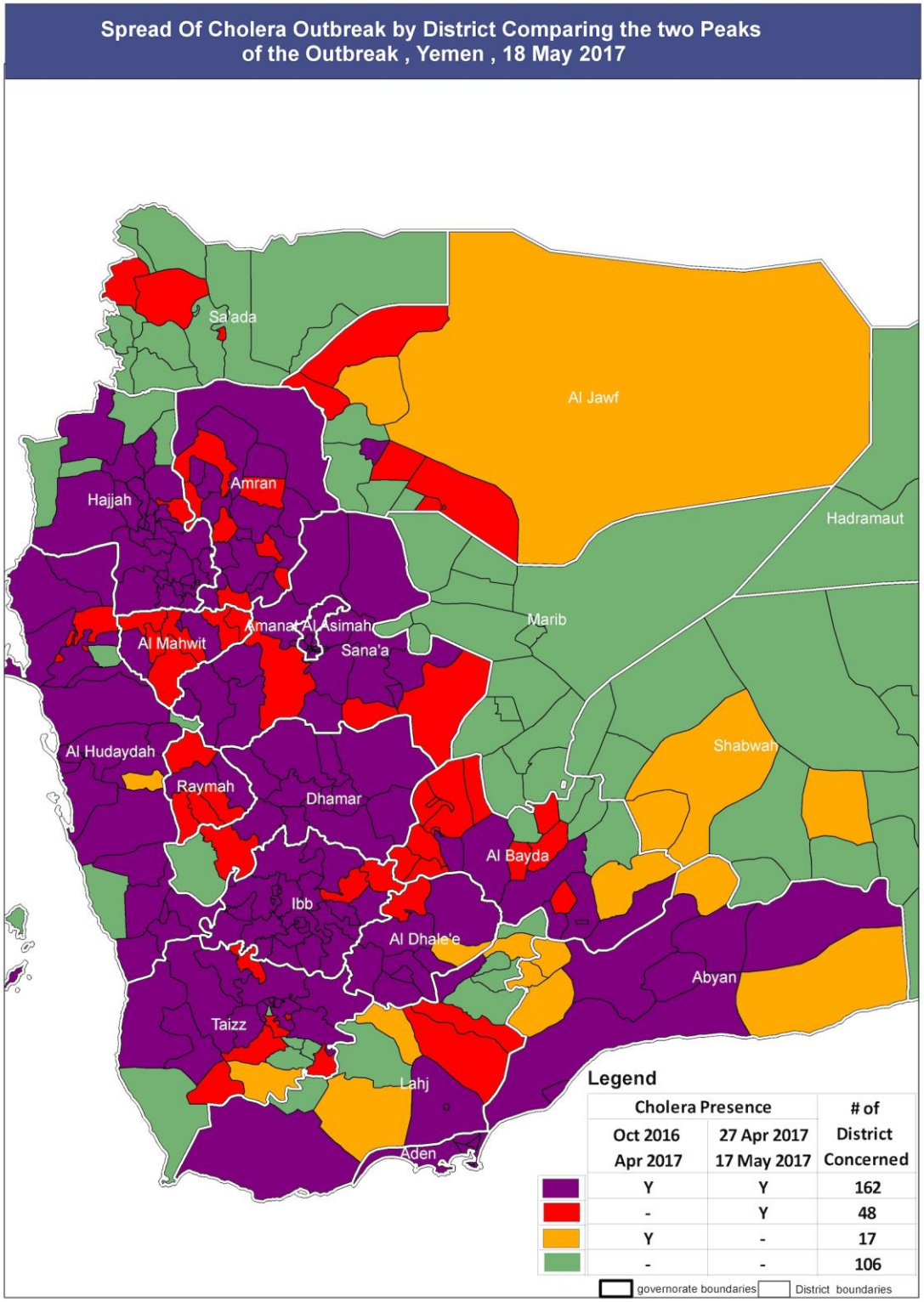
To guide the coordination, there is a response plan matrix developed at national level (see annex 1). This response matrix should be developed at sub national level as well to guide a better coordination of partners on the ground.

Health cluster is coordinating the work of 66 partners of which, 33 active NGOs and UN agencies working closely with MoH at the central and peripheral levels. Health cluster partners are operational in 19 Governorates in Yemen. Partner conducted consultations in April 2017 and are supporting 71 hospitals and 353 primary health care facilities and mobile teams.

The WASH cluster coordinates over 175 partners in Yemen with presence in 20 out of 22 governorates across the country. Most partners are local NGOs with limited access to flexible financial resources, while there are few partners (mainly UN and international NGO) with small amounts of flexible funding for emergency response, including cholera response. An estimated 30 partners (LNGO, INGO and UN) have been involved in the WASH cholera response since October 2016.

The Health and WASH clusters conduct regular joint meetings with partners to enhance cooperation and provide guidance on an integrated response.

ANNEX 1: Spread of Cholera Outbreak by District



Cholera Presence		# of District Concerned
Oct 2016 Apr 2017	27 Apr 2017 17 May 2017	
Y	Y	162
-	Y	48
Y	-	17
-	-	106

Annex 2: Estimation of the Expected Number of Cases in High and Low Risk Areas in Yemen.

Gov	Cumulative cases	Adjusted population 2017	Current Attack Rate per 100	Predicted AR per 100		Caseload	
				Low Risk 0.25	High Risk 0.5	Expected	Remaining
Ibb	2,957	3,065,230	0.10	7,663	15,326	15,326	12,369
Abyen	979	611,303	0.16	1,528	3,057	3,057	2,078
Sana'a city	4,208	3,308,478	0.13	8,271	16,542	16,542	12,334
Al byada'a	3,386	770,151	0.44	1,925	3,851	3,426	40
AL_jawf	50	648,754	0.01	1,622	3,244	2,770	2,720
Al_Hodyda h	5,865	3,345,560	0.18	8,364	16,728	15,980	10,115
Al_Dhale'a	1,940	753,361	0.26	1,883	3,767	3,767	1,827
Al Mahweet	606	760,725	0.08	1,902	3,804	3,804	3,198
ALMahrah	-	162,385	0.00	406	812	406	406
Taiz	4,352	3,033,524	0.14	7,584	15,168	13,937	9,585
Hajah	3,299	2,219,997	0.15	5,550	11,100	10,769	7,470
Moklla	-	799,268	0.00	1,998	3,996	1,998	1,998
Socatra	-	63,633	0.00	159	318	159	159
Say'on	-	668,880	0.00	1,672	3,344	1,672	1,672
Damar	592	2,121,016	0.03	5,303	10,605	9,959	9,367
Shabwah	85	646,685	0.01	1,617	3,233	1,996	1,911
Sa'adah	-	890,273	0.00	2,226	4,451	2,226	2,226
Sana'a Govt.	3,162	1,250,811	0.25	3,127	6,254	6,254	3,092
Raymah	835	633,758	0.13	1,584	3,169	3,169	2,334
Aden	1,732	956,667	0.18	2,392	4,783	4,783	3,051
Amaran	1,199	1,529,834	0.08	3,825	7,649	7,649	6,450
Lahj	1,031	1,052,545	0.10	2,631	5,263	3,856	2,825
Ma'areb	-	359,586	0.00	899	1,798	899	899
Grand Total	**36,287**	**29,292,845**	**0.12**	**74,131**	**148,263**	**133,514**	**98126**

- ***Detailed analysis is available up to district level***

ANNEX 3: Estimated number of DTC beds and ORS corners stations/chairs

	Low Risk Areas	High Risk Areas	Total
Population at Risk	**5,543,007**	**24,109,346**	**29,652,353**
Attack rate	**0.25%**	**0.50%**	**0.00%**
# Districts	**106**	**227**	
Total number expected patients	13,858	120,547	134,404
Total number of reported cases till 14 May	0	36,278	36,278
Total number of remaining cases	**13,858**	**84,269**	**98,126**
Total Number of DTC beds	**924**	**5618**	**6542**
Total number of DTCs (average 20 beds)	**46**	**281**	**327**

ANNEX 4: Required Medicines and Medical Supplies

	Low Risk Areas	High Risk Areas	Total
Expected number of cases May-Oct 2017	13,858	84,269	98,126
Rehydration Supplies			
ORS packets (for 1 litre each)	2,132	15,096	17,228
Nasog. tubes (adults) 5.3/3.5mm (16 flack) 50cm	462	3,271	3,733
Nasogastric tubes (children)	462	3,271	3,733
Ringer's lactate bags, 1 litre with giving sets	11,548	81,772	93,320
Scalp vein sets	1,386	9,813	11,198
Antibiotics			
Doxycycline, 100mg (adults)	23,097	163,543	186,640
Erythromycin 250mg (children)	5,774	40,886	46,660
Other Treatment Supplies			
Large water dispensers with tap (marked at 5-10L)	693	10,514	11,998
1 litre bottles for ORS solution	19,797	4,906	5,599
0.5L bottles for ORS solution	69,290	140,180	159,977
Tumblers, 200ml	34,645	490,630	559,920
Teaspoons	69,290	245,315	279,960
Cotton wool, kg	277,160	490,630	559,920
Adhesive tapes, reels	138,580	1,962,520	2,239,680

- ***Detailed analysis is available up to district level***

ANNEX 5: List of priority 30 districts for the cholera response, as of 15 May 2017

Governorate	District	Cumulative cases	Cumulative deaths	Adjusted population 2017	Attack Rate per 100
Aden	Dar Sad	645	0	131,295	0.49
Al_byada'a	Mukayras	1,983	0	47,980	4.13
Al_byada'a	Ash Sharyah	1,076	1	45,637	2.36
Al_Dhale'a	Qa'atabah	629	0	144,952	0.43
Al_Dhale'a	Al Husha	621	2	98,588	0.63
Al_Dhale'a	Ad Dhala	448	1	127,324	0.35
Al_Hodydah	Al Hali	3,979	0	251,872	1.58
Al_Hodydah	Al Hawak	1,191	0	233,474	0.51
Al_Hodydah	Al mina	427	0	133,527	0.32
Damar	Dhmar City	336	2	269,058	0.12
Hajah	Hajjah City	797	0	92,796	0.86
Hajah	Al	795	0	79,904	0.99

	Mahabishah				
Hajah	Aflah Al Yaman	411	0	64,964	0.63
Ibb	Al mashan nah	1,235	0	145,408	0.85
Ibb	Ad dihar	397	0	219,166	0.18
Lahj	Tuban	453	0	123,987	0.37
Lahj	Al Madaribh and Al Ar	432	0	71,577	0.60
Raymah	Al Jabin	754	0	132,427	0.57
Sana'a city	Ma'ain	1,133	2	524,630	0.22
Sana'a city	Az'zal	698	7	208,884	0.33
Sana'a city	Bani Al Harith	662	3	341,237	0.19
Sana'a city	As Sabain	655	1	852,603	0.08
Sana'a city	Shu'Aub	383	1	412,010	0.09
Sana'a Govt.	Bani Hushaysh	772	6	102,271	0.75
Sana'a Govt.	Arhab	647	6	122,963	0.53
Sana'a Govt.	Sa'fan	583	0	46,439	1.26
Taiz	Maqbanah	1,860	0	272,738	0.68
Taiz	Sharab Ar Rawnah	1,058	0	209,882	0.50
Taiz	Al Qahirah	523	0	99,152	0.53
Taiz	Mawza	305	0	51,042	0.60
Total		**25,888**	**32**	**5,657,787**	**0.72**

ANNEX 6: Response Matrix

Key Component	Activity	Timeline 2017	Partner
Leadership/ Coordination	Reactivate cholera task force at national and sub national levels to ensure maximum coordination, gap coverage and concerted approach.	May	MoPHP, Health & WASH Clusters
	Reactivate and sustain an integrated cholera operational room at national and (affected) governorate level.	May	MoPHP, Health & WASH Clusters
Surveillance	Expand community based surveillance and strengthen current surveillance system (e-DEWs).	May	MoPHP, Health & WASH Clusters
	Strengthen the central public health lab and its governorate branches and micro biology laboratory in main hospitals in areas without branch, for decentralized testing of samples.	May – Oct	MoPHP, WHO
	Outbreak investigation and identify sources of infection.	May - Oct	MoPHP, Health & WASH Clusters
	Test water sources for cholera by central laboratory.	May - Oct	MoPHP, WASH Clusters
	Continue support to rapid response teams at governorate level and establish rapid response teams at district level (in affected districts). At governorate level, the rapid response team will be integrated and include health, WASH and C4D experts.	May - Oct	MoPHP, WHO
Case Management	Conduct cholera risk assessment to identify hotspot areas for possible oral cholera vaccine	May 2017	WHO
	Establish ORS corners, diarrhea treatment units (DTUs) at community and primary health care level for management of mild and moderate cases.	May	MoPHP, Health Cluster
	Establish referral system for cases failing to recover or deteriorating to higher health care levels.	May	MoPHP, Health Cluster
	Establish / reactivate / sustain diarrhea treatment centers (DTCs) with the required WASH facilities for management of severe cases.	May - Oct	MoPHP, Health & WASH Clusters
	Procuring and distribution of cholera kits (targeting oral and IV rehydration) and other medical supplies	May - Oct	Health Cluster (WHO, Unicef, other NGOs)
	Promote safe burial practices at health facility level through training the health workers and at the community level through awareness campaigns and disseminating IEC materials.	May - Oct	MoPHP, Health & WASH Clusters
Capacity Building	Training health workers on case definition, diagnosis and management protocols.	May - June	MoPHP, Health & Cluster
	Training laboratory staff on proper handling and testing of different types of cholera samples.	May - June	MoPHP, WHO
	Training of hygiene promoters on cholera awareness messages	May - July	WASH Cluster
	Training of chlorinators on proper handling, storage and dosing of chlorine and monitoring of residual chlorine levels	May - July	WASH Cluster
Infection Prevention and Control	Ensure infection prevention and control measures at DTCs and other treatment points	May - OCt	MoPHP, Health & Cluster
	Regular joint monitoring of DTCs, DTUs and ORS corners to ensure quality of services.	May - Oct	MoPHP, Health & WASH Clusters
	Provide household chlorination tablets (aquatabs) and consumable hygiene kits (soap) for 1 month for 1 family and IEC materials and awareness messages for recovered patients	May - Oct	WASH Clusters

	and their families, which will be provided to them by DTC staff upon release of the patient. This is as part of discharge procedures.		
	Water safety planning as appropriate in rural and urban context.	May - Oct	WASH Clusters
	Water quality monitoring at source and point of use of FRC & turbidity. If necessary surveillance of fecal contamination (bacteriological testing).	May - Oct	MoPHP, Health & WASH Clusters
	Chlorination of water sources, piped network and private water trucks. Chlorination of unprotected wells should be avoided and instead bucket chlorination should be considered (if appropriate). As a last resort, supply of chlorinated water through water trucking where necessary and appropriate.	May - Oct	WASH Clusters
	Disinfection of water storage facilities at household level.	May - Oct	WASH Clusters
	Distribution of consumable hygiene kits and jerry cans (if needed) for households with cases and immediate surrounding households.	May - Oct	WASH Clusters
	Distribution of chlorine tablets for water treatment at household level with proper instructions on use of the tablets, targeting households in affected locations.	May - Oct	WASH Clusters
	Sanitation measures to be considered on a case by case basis after better understanding of the situation (including sanitary survey). This includes advocacy to enhance solid and liquid waste management, support to cleaning campaigns and desludging when necessary (overflowing sewage systems, large amounts of uncollected garbage in densely populated areas). In areas with many displaced people without latrines, this could include construction of emergency latrines.	May - Oct	WASH Clusters
Public Awareness	Communication and mass awareness raising, including production and dissemination of IEC materials.	May - Oct	Health & WASH Clusters
	Household and community level hygiene promotion, community mobilization and cholera awareness messages.	May - Oct	Health & WASH Clusters
	Distribution of communication material and treatment guidelines to DTC, ORS corners, DTUs and health workers.	May - Oct	MoPHP, Health & WASH Clusters

ANNEX 7: Detailed Budget

WASH

	WASH Coordinated Activities	Quantity	Unit cost	Total cost	Comment
Provide leadership and co-ordination of the Health and WASH response					
1	Coordination			$ 50,000	
Strengthen epidemic disease surveillance					
2	WASH staff inclusion in rapid response teams (15+30)	45	1,500	$ 67,500	
Improve Case Management at community, primary and secondary care levels					

3	Provision of chlorinated water and other WASH support to ORTs (500 ORTs)	500	2,500	$ 1,250,000	
4	Provision of chlorinated water and other WASH support to DTCs	30	30,000	$ 900,000	
Strengthen infection prevention and control at health facility and community levels					
5	Assessment and mapping of water and sanitation infrastructure, including sanitary surveys	227	1,000	$ 227,000	
6	Provision of chlorinated water through water trucking (only where necessary and appropriate - estimated for 100,000 people for 3 months)	100,000	6	$ 1,800,000	
7	Chlorination of water sources (piped network, private water trucks)	12,000,000	0	$ 1,200,000	
8	Bucket chlorination (only when necessary and appropriate)	50,000	6	$ 300,000	
9	Disinfection of water storage facilities at household level (200,000 hhs)	1,400,000	1	$ 1,400,000	
10	Water quality monitoring (FRC and NTU) at source and point of use (household level) including supplies (pool tester, consumables etc)	227	7,000	$ 1,589,000	
11	Provision of WASH supplies (aquatabs, jerry can, consumable hygiene kits and IEC materials for three months) to high risk communities	700,000	9	$ 6,300,000	
12	Emergency latrine construction	25,000	25	$ 625,000	
13	Desludging cess pits, ceptic tanks and latrines			$ 500,000	
14	Provision of WASH supplies (aquatabs, consumable hygiene kits and IEC materials) to recovered patients upon discharge of DTC	100,000	4	$ 400,000	
15	Monitoring	100	2,000	$ 200,000	
16	Water Safety Planning (WSP)	227	5,000	$ 1,135,000	Phase II

17	Repair/Rehabilitation of water systems (O&M)	100	80,000	$ 8,000,000	Phase II
18	Repair and O&M of waste water and sewage systems	1	1,000,000	$ 1,000,000	Phase II
19	Cleaning campaigns	1,400,000	1	$ 1,400,000	Phase II
Capacity building					
20	Trainings on hygiene promotion & chlorination	2,000	300	$ 600,000	
Community awareness					
21	Hygiene promotion, community mobilization and cholera awareness message at community level	1,400,000	1	$ 1,400,000	
22	Mass media communication			$ 500,000	
	WASH Coordinated Activities Total			**$ 30,843,500**	
	[1] All activity costing are estimates and include operational costs such as staffing, transport etc.				

Health

Type	Items	Quantity	Duration (month)	Unit Cost USD	Total Cost USD	Total Cost Area of work USD
Coordination	Coordination (meetings and missions)				50,000	50,000
Surveillance	Rapid response team 423 team, 5 persons/team; incentives/transport	423 teams	3	4,039.72	5,126,400	6,306,831
	Support eDWES operational cost	1	3	393,477	1,180,431	
Case Management	Medical supplies (cholera kit)	523		8,023	4,196,833	29,955,233
	Lab supplies (tests)	12,000		25	300,000	
	DTC/CTC establishment	328 (20 beds each)	3	14,665	4,810,000	

	Operational cost for CTC/DTC	328 (20 beds each)	3	11,015	10,838,400	
	Establish ORS corner	1640 ORS corner	3	1,329	6,540,000	
	Operational cost for ORS	1640 ORS corner	3	665	3,270,000	
Capacity building	Training of 6 medical staff for 3 days from 328 DTCs and 1 person from 1640 ORS corners (3608 Staff)	120 training sessions		4,880	585,600	585,600
Total					**36,897,664**	**36,897,664**

ANNEX 8 – Indicators of success

Indicators for Control Approach

Indicators of success

The main indicators of success for Control Approach) are:

1) The Cholera/AWD case fatality rate as an indicator to treatment success (Target: <1%).
2) The Cholera/ AWD Incidence rate as an indicator for the effectiveness of prevention efforts (Target: <1% of population at risk).

Early Detection indicators include:

- Number of orientation sessions conducted for emergency medical mobile teams, community health volunteer, community midwives in priority areas completed in each affected governorate (Target: 15)
- % of reports received from operational rooms in affected districts/governorate (Baseline: 50%; Target: 85%)
- % of alerts reported by eDEWs focal points within 24 hrs (Baseline: 50%; Target: 85%)
- Number of rapid response teams established and activated in targeted districts (Target: 174)
- % of alerts investigated within 72 hours (Target: 90%)
- % of collected laboratory samples tested (weekly) (Baseline: 50%; Target: 80%)

The indicators for case management/treatment:

- % of DTC applying standard operating procedure regarding case isolation (target: 75%)
- Number of DTC established and functional (Target: 864 beds)
- % of DTC reporting shortages of essential medical supplies and/or WASH supplies (Target: <10%)

Specific Integrated prevention activities indicators are:

- % beneficiaries receiving soap and Aqua tabs and properly utilize the materials (target: 75%)

- % of tested chlorinated water with Free Residual Chlorine > 0.2 ppm (mg/l) and Turbidity < 10 NTU (target: 90%)
- % of affected villages sensitized on cholera prevention and water treatment. (target: 75%)

Indicators for Prevention Approach

Indicators of success

The main indicator for success in Prevention approach:

1) The Cholera/ AWD Incidence rate as an indicator for the effectiveness of prevention efforts (Target: <1% of population at risk).

Specific indicators of success are listed below:

Early Detection:

- % of daily reports received from operational rooms in targeted governorate (Baseline: 50%; Target: 85%)
- % of alerts reported by eDEWs focal points within 24 hrs (Baseline: 50%; Target: 85%)
- % of alerts investigated within 72 hours(Target: 90%)
- % of collected laboratory samples tested (weekly) (Baseline: 50%; Target: 80%)

Case management:

- % of DTC reporting shortages of essential medical supplies and/or WASH supplies (Target: <5%)

Integrated prevention activities:

- % beneficiaries receiving soap and Aqua tabs and properly utilize the materials (target: 75%)
- % of tested chlorinated water with Free Residual Chlorine > 0.2 ppm (mg/l) and Turbidity < 10 NTU (target: 90%)
- % of affected villages sensitized on cholera prevention and water treatment (target: 75%.