

# **Epidemic preparedness and response plan for cholera in Syria**

1 November 2015

## Contents

- 1- Introduction
- 2- Objective of the Plan
- 3- Contents of the Plan
  - 3.1. Pre Epidemic Phase
    - 3.1.1. Risk Assessment
    - 3.1.2. Mapping of Resources
    - 3.1.3. Setting up a Committee for Cholera Control/ Coordinating Committee
    - 3.1.4. Preparing Reserves of Medicines and Essential Supplies for Outbreak Response.
    - 3.1.5. Training
    - 3.1.6. Establishing Centers for the Treatment of Cholera and Temporary Rehydration Corners
    - 3.1.7. Laboratory Support
    - 3.1.8. Raising Community Awareness
    - 3.1.9. Surveillance
    - 3.1.10. Monitoring and Supervision
  - 3.2. Alarm Phase of the Onset of Outbreak
    - 3.2.1. Incidents Triggering Alarm
    - 3.2.2. Field Survey
    - 3.2.3. Laboratory Confirmation
  - 3.3. Epidemic Phase
    - 3.3.1. Response Coordination
    - 3.3.2. Surveillance
    - 3.3.3. Reporting
    - 3.3.4. Case Management
    - 3.3.5. Environmental Control Measures
  - 3.4. Post Epidemic Phase

## **1. Introduction**

The current crisis in the Syrian Arab Republic led to population migration in all provinces. There are currently 7.6 million internally displaced people living in shelters or with host communities in all parts of the country. There are also 3.9 million Syrian refugees in neighboring countries. This vast population movement is accompanied by an increase in the risk of spread of infectious and communicable diseases associated with inadequacy of water and sanitation facilities.

Outbreaks can spread quickly especially during the summer months and this constitutes a further health burden especially on most vulnerable groups. The presumed risk of outbreak is not due to conflict but due to the low response capacity which led to the lack of access to health services. Available data reveal that 57% of hospitals and 11% of health centers were damaged or went out of service. In addition, the lack of security in many areas hindered the activity of health service elements with regard to process of reporting to health facilities. Health workforce is in shortage as many health workers have left the country.

### **An Overview of the history of cholera in Syria:**

According to Ministry of Health's Statistics, yearly outbreaks of cholera have taken place and the data on this are available from 1970. For example, there were 2816 laboratory confirmed incidents in 1970 and 8523 in 1977. In 1993 an epidemic spread in all provinces and the number of incidents reached 10917 which was the biggest incidents number reported. In 1996, there were 130 incidents. Epidemics and outbreaks ceased since 1997 except for the year 2008 when 48 incidents were reported in Deir al Zour Governorate and in 2009 when 342 cases were reported in Deir Al Zour and Raqa. No incidents were reported during the crisis.

## **2. The Objective of the Plan**

The purpose of the Plan is to reduce morbidity and mortality resulting from acute watery diarrhea and other diarrhea epidemics among members of the community through timely preparedness for epidemics and early detection of outbreaks in addition to the introduction of appropriate measures to control and contain outbreaks and prevent fatalities.

The plan is specifically expected to:

- Improve coordination for cholera preparedness and response interventions
- Enhance cholera surveillance and unify case reporting
- Establish standard operating procedures for early detection and laboratory confirmation of cholera outbreaks.
- Proper case -management and infection control and prevention during cholera outbreak response.
- Enhance environmental control procedures in response to outbreaks.
- Effective monitoring and evaluation of cholera preparedness and responses



### 3. Components of the Plan:

The Plan has four components each of which involves a public health goal through a series of interventions for preparedness, early detection and response, and the monitoring and evaluation of response. The plan is to be implemented in four stages defined by the concept of “risk on public health” correlated with the expected emergence and development of an outbreak of acute watery diarrhea. Along each stage there is monitoring and evaluation that are considered an integral part of that stage in order to monitor readiness and evaluate the quality of response compared to a series of realizable indicators.

#### Stages of the plan are as follows:

Stage	Time	Public health objective	Strategic activities
Pre epidemic phase	When there are no outbreaks  When there is suspected outbreak in any of the provinces , continued valid alarm in unaffected provinces while affected provinces move to next stage	Enhance epidemic preparedness for any acute watery diarrhea due to Vibrio cholerae	<ul style="list-style-type: none"> <li>– Risk assessment</li> <li>– Mapping high risk or hotspot areas</li> <li>– Mapping cholera response capacity both government, civil society and local communities)</li> <li>– Mapping of human and financial resources</li> <li>– Setting up coordination committee for cholera prevention and control</li> <li>– Securing stock of strategic reserves of medicines, essential supplies and logistics</li> <li>– Building local capacity through training and mentoring</li> <li>– Setting and dissemination of standards for case definition, reporting tools, case based investigation, thresholds, case management, infection control and prevention, contact tracing, burial procedures, information management, etc.</li> <li>– Readiness of the rapid response teams in high risk areas</li> <li>– Identifying cholera treatment centers and rehydration corners</li> <li>– Providing/securing supplies for laboratory</li> <li>– Enhancing surveillance</li> <li>– Strengthen information management</li> <li>– Regular monitoring on preparedness</li> </ul>
Alert on epidemic	In the event of an acute watery diarrhea incident or death resulting from it or a	Early detection, verification and lab confirmation of any	<ul style="list-style-type: none"> <li>– Enhance surveillance in high risk areas at health facilities and community levels</li> <li>– Activate rapid response teams for timely</li> </ul>

	cluster of 5 incidents or more of acute diarrhea in a shelter or in a high risk area	suspected outbreak of acute watery diarrhea	<ul style="list-style-type: none"> <li>investigation and verification</li> <li>– Dissemination of SoPs (standard case definitions, thresholds, therapeutic protocol)</li> <li>– Monitoring and evaluation of preparedness and response activities</li> <li>– Verification of rumors</li> <li>– Field investigation</li> <li>– Collection of stool samples and forwarding to reference laboratory for culture and drug sensitivity</li> <li>– Lab confirmation of suspected cases</li> <li>– Activate national or local cholera coordination committees (or task force)</li> <li>– Avail adequate logistic capacity – transportation, funds, communication and others</li> </ul>
Presence of epidemic	When lab confirms Vibrio cholerae in stool of suspected cholera case	Reducing the risk of transmission to vulnerable people and to other areas	<ul style="list-style-type: none"> <li>– Prevention and containment</li> <li>– Coordinating response through national or local committees</li> <li>– Enhancing surveillance at health facilities and community levels</li> <li>– Active case findings and community engagements for contact tracing</li> <li>– Opening CTCs and ORP for proper case management</li> <li>– Reinforce the infection control practice in the CTC and other facilities</li> <li>– Identify potential partners to be assigned different roles and responsibilities for cholera response interventions</li> <li>– Analyse data and produce weekly epidemiologic trends, and disseminate regularly</li> <li>– Control of environmental risk elements</li> </ul>
Post epidemic phase	The epidemic stage is considered over when the lab tests of 20 random samples show negative results of Vibrio cholerae	Assessment of the quality of response to learn lessons on outbreaks	<ul style="list-style-type: none"> <li>– Assessment of effectiveness of surveillance system for early detection of incidents</li> <li>– Assessing the timeliness of detecting the outbreak and the timeliness of response to the outbreak</li> <li>– Evaluation of the cholera response including case management, IPC, burial procedure, contact tracing, information management, coordination, etc.</li> </ul>

### 3.1. Pre epidemic phase

#### General Public health objective:

- Enhancing epidemic preparedness to any acute watery diarrhea caused by Vibrio cholera (refer to table 1)

#### 3.1.1. Risk assessment

It is necessary to conduct a stratified risk assessment for shelters and places of residence to identify highly vulnerable groups and hotspot areas. In the absence of precedent epidemiological data, it is essential to determine a special index for risk stratification that will take into account the current burden of diarrheal diseases transmitted through fecal/oral routes (to determine the degree of endemicity), overcrowded dwelling, access to health services (health service coverage), quality of drinking water in addition to availability of water and sanitation facilities (environmental conditions) in sheltering centers in order to increase resources to the maximum and to optimize planning so that resources are directed towards places with highest needs. It is necessary to divide shelters and temporary dwellings in provinces to places of high risk, moderate risk, and low risk in terms of vulnerability to outbreaks of acute watery diarrhea through the use of a calculated index of vulnerability.

As acute watery diarrhea caused by Vibrio cholera is transmitted through water and food contaminated with feces, then it is essential that we look at sheltering centers and crowded accommodations where other oral/fecal transmitted diseases are recorded and where there is a high risk of outbreak of acute watery diarrhea.

#### 3.1.2. Detailed mapping of resources

In order to optimize the use of resources for the purpose of response and to make the optimal choice in terms of places where these resources should be delivered; detailed mapping of outbreak response has to be made for all the resources required, their quantity and the quantity of what is left of resources that were previously available. Distribution tables according to the sheltering centers also have to be prepared. Resources include the following:

- Medicines and medical supplies necessary for outbreak response.
- Trained human resources (doctors, nurses, technicians, etc).
- Health educators (could be volunteers from the community itself).
- Available material for health awareness.
- Available supplies for environmental control.
- Available supplies for cholera treatment center and hydration points.
- Any other resources like incidence forms, investigation forms, etc.

It is necessary to use the attack rate of (0.1-0.2%) in order to determine the number of expected incidents in an outbreak of acute watery diarrhea. The expected need for medicines, medical supplies and other needs can be calculated by using this reference number.

### 3.1.3. Cholera Control Committee/ Coordination Committee

It is necessary to set up a coordination committee that has specific tasks and authorities in every province. The committee is to be headed by the Director of Health with the membership of all health and other related institutions in the province. A Rapid Response Team has been formed in each Directorate of Health. The team is headed by the Health Director or his representative with the membership of representatives from health institutions and relevant authorities. The mission of the team is to respond to epidemics of communicable diseases.

It is necessary to provide the committee with written tasks with detailed roles and responsibilities; the Ministry of Health issues a letter demanding the formation of the Committee and the definition of its duties. The first meeting is held as soon as possible to review preparedness to control cholera outbreaks.

**Note:** The peripheral health council in each governorate, headed by the Governor or his representative, and membership of representatives of all representative entities will coordinate the preparedness and response to the epidemic when it occurs and will convene when the Director of Health calls for a meeting.

### 3.1.4. Provision of essential medicines and supplies for outbreak response

It is essential to determine the general need of provinces for medicines and other essential supplies to respond in the event of an outbreak. This is determined by using an estimated attack rate of 1-2% (according to previous experience). On the basis of these general needs the provision of medicines and essential supplies are made in advance and stored in the warehouses of the various health directorates as reserves to be quickly mobilized to affected areas to deal with the onset of outbreaks. It is essential to carry out periodic inventories of medicines and supplies to replace nearly expired stock (usually six months before expiry date). Supplies needed for environmental control procedures are also secured and stocked in health directorates' warehouses as reserves.

In order to find the estimated number of expected incidents during an outbreak we multiply the number of vulnerable people times (0.01) or (0.02) as the size of the expected outbreak is based on the average attack rate that is used as a reference value which is (1-2%). Once the expected number of incidents is determined, the need for medicines and supplies can be determined according to the following:

- 80% of cases will need only oral rehydration fluid (each case needs at least 6 liters of fluid)
- 20% of cases will need IV fluids (Ringer's Lactate) followed by oral rehydration fluid (each case needs 3000 cc of Ringer's Lactate).
- For adults: each case of severe dehydration (20% of cases) needs 3 capsules (100mg) of Doxycycline or 24 capsules of (250mg) tetracycline.
- For children: each case of severe dehydration needs Erythromycin syrup (200mg) or (7.5 mg/kg) 4 times a day for 3 days.
- Each pregnant woman needs forazolidone (1.25 mg/kg) 4 times a day for 3 days.
- Note: In Syria, antibiotic treatment is given to all suspected cases of diarrhea (with no symptoms of dehydration, with mild symptoms of dehydration or with severe dehydration). Medicines needed should be calculated accordingly.
- It is necessary to work out the amount of medicines needed for people in contact with the case (based



on 10 persons per case).

### **3.1.5. Training**

In order to prepare essential and efficient staff to manage and control outbreaks in a methodological manner, it is necessary to hold the following training workshops for health service providers in sheltering centers and high outbreak risk areas:

- Training on case management and IPC
- Training on laboratory diagnosis.
- Training for the Rapid Response Team on outbreak investigation, verification and response.
- Training community health workers and community volunteers on conducting searches for cases of acute watery diarrhea and providing home treatment for them, referring cases to health institutions for suitable case management, and on promoting personal hygiene and environmental sanitation (chlorinating water, waste disposal, etc).

### **3.1.6. Setting up Cholera Treatment Centers and Rehydration Point**

It is essential to set up temporary hospitals close to high outbreak risk areas to become centers for cholera treatment; and to make provisions for some health institutions that provide outpatient services to serve as hydration corners. This is to enable a big number of patients to access specialized care during outbreaks. It is essential to open up cholera treatment centers or dehydration corners when:

- Cases of acute watery diarrhea are reported in hard to reach geographical areas.
- Cases of acute watery diarrhea are reported in areas or sheltering centers where specialized health facilities for isolation and management of cases are not available or insufficient.

An outbreak of acute watery diarrhea due to *Vibrio cholerae* is expected to last 6-8 weeks at maximum if appropriate prevention and response interventions are implemented. Because the incubation period is very short (2 hours - 5 days), incidence rate may rise so rapidly to exceed the capacity of the health system to deal with the emerging situation. It is therefore essential to set up temporary hospitals (cholera treatment centers) or hydration corners in advance in order to manage the cases efficiently and swiftly to control the outbreak.

In order to treat 100 patient daily during an outbreak, the following numbers and types of human resources are required:

- Doctors (4)
- Nurses (3)
- Cleaners (2)
- Educators (2)

### 3.1.7 Laboratory support

For rapid and efficient laboratory support, it is essential to ensure that the following preparatory procedures are carried out:

- The provision of at least 20 Cary Blair mediums with rectal swabs for each sheltering center or high outbreak risk area in order to collect and transport stool samples.
- The provision of sufficient quantities of Rapid Diagnostic Test for cholera, collection and transport mediums and SoPs in all the laboratories that have been developed in order to allow the collection and transportation of at least 50 samples of stool from the field at any time.
- The provision of sufficient laboratory reagents to be stocked as reserves in the labs developed in provinces to ensure the ability of any lab to prepare at least 100 stool specimens for culturing at any given time.

### 3.1.8. Promoting community awareness

It is essential to prepare those responsible for promoting personal hygiene in each area or sheltering center beforehand if possible in order for them to be able to present short concentrated messages that stimulate the community to pay attention to personal hygiene during outbreaks. Health messages have to be tested before they are presented. Supplies for health education purposes have to be stocked (posters, leaflets, messages targeting the community, etc).

During cholera outbreak, it is essential that at sheltering centers there is at least one community health worker or home visitor / 2500 people living in sheltering centers, trained on promoting community awareness procedures.

### 3.1.9. Surveillance

It is necessary to strengthen the surveillance system for acute watery diarrhea during pre-epidemic stage, and to cover more than 90% of all health institutions by an early warning and rapid response system and by a surveillance system that achieves at least 85% timely reporting and more than 85% complete reporting.

Surveillance tools that should be all set for the process of reporting cases include the following:

- Standard case definition.
- Case Series Report to report suspected cases.
- Tools for data collection when investigating outbreaks (line listing form, investigation forms, etc).
- Guidelines on collecting stool samples and transporting them.
- Guidelines on outbreak detection, response and laboratory verification.
- Protocols for data entry and analysis including drawing charts.

### 3.1.10. Monitoring and supervision

Periodic monitoring and supervision is necessary in order to review preparedness, which includes the continuous assessment of risk on public health. It is essential to set up specific standards during the implementation of the procedures that enable qualitative and quantitative measurement of preparedness based on attainable indicators.

### 3.2. Epidemic Alert Phase

**General public health objective:** early detection and lab confirmation of outbreak including monitoring and assessment of risk on public health. This phase includes a successive series of tiered events starting from setting off alarm activities and accelerating until laboratory confirmation of the outbreak is reached.

#### 3.2.1. Setting off alarm incidents

Alarm on the outbreak of acute watery diarrhea is set off when:

- Someone suffers from severe dehydration or dies as a result of acute watery diarrhea (warning on outbreak incident caused by *Vibrio cholera*), or
- There is an unusual number of acute diarrhea cases during one week, or
- There is a continuous increase of reported cases (during a period of more than a week) and all the cases share the common following symptoms:
  - Suffering from the same diarrhea symptoms (typical symptom: rice water diarrhea)
  - Clustering of cases in one place
  - Sharing water supply, or
- There are an abnormal number of deaths with acute diarrhea.

It is essential that any warning should trigger prompt investigation and field survey by the Rapid Response Team. It is necessary to investigate all alerts and rumors (100%) during a period of at least 6 hours after reporting to determine any occurrence of an outbreak.

After the reporting of such incidents from any source, the local health authority and its partners immediately start with the investigation and field survey.

#### 3.2.2. Outbreak investigation

It is essential to conduct a field investigation immediately after the reporting of a suspected outbreak and this is done through using the case investigation and line listing forms in order to verify the following:

- The case/cases reported match the standard definition of a case of acute watery diarrhea.
- A cluster of cases/deaths (more than one) in the same area, compatible with the standard definition.
- Epidemiological linkage of the cases

It is essential to conduct the field investigation within 12-24 hours by RRT after receiving the alarm.

- It is necessary, as part of the field investigation, to collect stool samples on Cary Blair transport media from all cases that are compatible with the standard definition for acute watery diarrhea. It's advisable to use RDT for cholera in case laboratory confirmation may take more time. On the other hand, stool samples from 10-20 suspected cases are collected if the number of cases in the area is very big or the cases were clustered. It is necessary to take precaution when collecting stool samples so as:
  - The patient has not taken any antibiotics, and

- Is currently suffering from watery diarrhea.

When the presence of an outbreak of acute watery diarrhea is clinically verified, it is essential to conduct an investigation on any presence or appearance of environmental risk factors or any other vehicle of transmission.

### 3.2.3. Laboratory confirmation

It is essential to carry out tests for laboratory confirmation and sensitivity to antibiotics by the Ministry of Health reference laboratory for the initial cases of acute watery diarrhea when a patient is suffering from acute watery diarrhea and *Vibrio cholerae* (O1, O139) are isolated. However, treatment of patients with dehydration should not be delayed (including treatment with antibiotics) until the lab results from stool samples are obtained.

- Laboratory confirmation for the first 10-20 cases is necessary to be certain that the outbreak is caused by *Vibrio cholerae*.
- It is essential to discover the first indicative case to start immediately with containment procedures.
- It is necessary to collect around 20 samples for laboratory testing in order to verify the end of the outbreak.

### 3.3. Epidemic Stage

**General Public Health Objective:** Reducing the risk of transmission among most vulnerable people in addition to the prevention of the disease being spread to other areas.

It is necessary to activate the response phase of the epidemic as soon as a laboratory confirmation of *Vibrio cholerae* for suspected cases is obtained. The plan focus is changed from prevention to containment in order to:

- Reduce the risk on public health.
- Stop the spread of the outbreak.
- Limiting the transmission of infection between most vulnerable people in affected areas.
- Prevention of mortalities from acute watery diarrhea

According to the above, it is essential to initiate the following activities:

#### 3.3.1. Coordinating the Response

The Committee for Cholera control that was set up during the previous phase is immediately activated if not activated already. This committee will take the full responsibility of coordinating response with regard to combating and controlling the outbreak. The committee advises the official reporting of an outbreak of acute watery diarrhea by the various health directorates to the Ministry of Health and to take the appropriate measures to contain it.

During the first few days, the committee will reassess risks of the outbreak on public health and will demand the mobilization of resources and emergency supplies, usually on the national level. The committee meets daily during the outbreak to monitor and follow up decisions taken on implementing containment specific procedures.

### 3.3.2. Surveillance

It is necessary to commence reporting on all suspected and laboratory confirmed cases of acute watery diarrhea in all areas including those made from selected reporting centers set up to report on cases of acute watery diarrhea.

It is important to use the Case Series Form prepared during the pre-epidemic phase to report all suspected cases in order to obtain laboratory confirmation on *Vibrio cholerae*. It is also necessary to activate the following procedures that are considered fundamental in the surveillance of acute watery diarrhea:

- Active case search in areas where there is laboratory confirmation of *Vibrio cholerae*.
- Using a unified case definition when reporting on all suspected cases.
- Daily reporting on cases and deaths (including zero cases).
- Preparing a case series report for all suspected cases that match the standard definition.
- Setting up a community based mobile team in addition to surveillance centers to report on all suspected cases.
- Weekly analysis of data in case series reports to better understand the direction of the spread and the changing of epidemiological pattern of the outbreak.
- Geographical mapping to show case distribution and determine the areas where most cases are concentrated in order to optimize the targeting of affected areas with chlorination and promotion of sanitation.

When there is laboratory confirmation of the spread of acute watery diarrhea resulting from *Vibrio cholerae*, it is no longer necessary to take samples from each case with acute diarrhea. However, it may be useful to continuously collect some random samples during the outbreak to monitor the type of transmission and to conduct antibiotic sensitivity tests.

### 3.3.3. Reporting:

It is necessary that reporting is made comprehensive once there is laboratory confirmation on the outbreak of acute watery diarrhea caused by *Vibrio cholerae*. Data is collected daily from all surveillance units and sent to the Cholera Control Committee with a report on epidemiological situation and the general trend of the outbreak. While the basic purpose of the general reporting system is to deal with information that is documented in a clear and transparent way, the main use for these reports is to:

- Calculate incidence rate and case fatality rate.
- Evaluate the spread and development of the outbreak
- Planning extra supplies for treatment and containment procedures and for the appropriate changes of procedures.
- Assessment of control and containment procedures.

It is necessary to include the following information during daily reporting:

- Number of cases and deaths
- Case fatality rate
- Epidemiological outline showing daily development of cases; and it is necessary to include the

following weekly required data:

- Weekly numbers of cases and deaths.
- Weekly case fatality rate.
- Epidemiological outline showing weekly development of cases.
- Geographical distribution of cases (according to areas).
- Demographic distribution of cases by age and sex.
- Estimated attack rate/incidence rate.

#### **3.3.4. Case Management**

It is essential to apply proper unified management for all suspected cases in order to prevent fatalities and reduce the risk of infection. It is essential to implement the following procedures related to case management:

- Distribution of case management and IPC guidelines and algorithms to assess the severity of dehydration to all health care providers in areas affected by the epidemic.
- Setting up isolation wards in hospitals.
- Providing the appropriate treatment to all suspected cases (patients suffering from severe dehydration in isolation wards) in accordance with the national treatment plan.
- Cleaning and washing patients' beds and bed covers using disinfectants or through boiling; and the safe disposal of medical waste of patients (vomit and excretion /stool)
- Allocating separate lavatories to patients in the hospital.
- Providing patient's families with the relevant information on the preventive measures that should be taken within the household / home.
- Health care providers should comply with personal hygiene procedures (washing hands with soap and water, cleaning and disinfection of food ...etc)
- Setting up temporary cholera treatment centers to improve access to treatment.
- Assess estimated need for essential medicines and emergency supplies in order to manage cases in light of the current epidemiological situation so as to determine the critical value of reserves and rapidly replace depleted stocks and prevent shortages.

The main purposes of case management during an outbreak of acute watery diarrhea resulting from *Vibrio cholera* are to:

- Refer all suspected and confirmed cases to CTCs within the health institutions for appropriate treatment.
- Ensure that IPC guidelines are implemented accordingly to avoid spread of infection within the health facility settings
- Ensure that all suspected cases receive treatment within 2-4 hours of onset of the disease.
- ORPs are operational to reduce the congestion of CTCs
- More than 95% of cases receive treatment in accordance with the national treatment plan for acute watery diarrhea.
- Reduce case fatality rate to less than 1% (if case fatality rate is higher than 5% investigations have to be made and appropriate correction measures have to be taken).

### 3.3.5. Environmental control procedures

It is essential that environmental control interventions include:

- Chlorination of the sources of drinking water.
- Improving sanitation.
- Promoting personal hygiene at home.
- Ensuring the safety of food.
- Proper handling of contaminated material.

While the geographic distribution of suspected cases answers questions related to which areas to target with chlorination and promotion of sanitation, it is necessary to adopt the following special procedures in order to achieve the goal of containing the outbreak through identifying environmental risk factors and stressing the following:

- Access to sufficient amount of appropriate water.
- Improving access to sanitation.
- Chlorination of government water supplies used for drinking (surface and ground water) and making it free of contamination.
- Access to adequate amount of soaps and antiseptics at home.
- Promoting healthy behavior especially hand washing with soap and water.
- Improving food safety procedures.
- Disinfecting contaminated objects with chlorine (2%)
- Restrictions on burial procedures.

The main goals for environmental control procedures during cholera outbreak are:

- Reaching zero *Escherichia coli* in every 100 ml of water for all types of public water supplies.
- Maintaining the lowest concentration of free chlorine at the user end of the network (0.5 ml/liter).
- Ensuring that each member of the community has access to at least (250 g) of soap per month for personal and home sanitation purposes.

### 3.4. Post epidemic phase

**General Public Health Objective:** Assessment of the quality of response to learn lessons on outbreaks

It is essential to assess the outbreak in terms of the quality and timeliness of response and to set specific indicators for the evaluation of response.

While surveillance allows preparedness for response through establishing rapid containment procedures in affected areas, assessment of the post epidemic phase will permit archiving the following:

- Epidemic characteristics of the outbreak.
- Sensitivity of the predictive value for early detection of any outbreak.
- Quality of surveillance for forecasting and alert.
- Assessment of the timeliness of discovery of the outbreak.
- Assessment of timeliness from discovery of the outbreak until response.
- Assessment of the general quality of response.