2015

# A Risk Assessment of Possible Post-Earthquake Cholera Outbreak in Nepal (Assessment report)

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## 22 May 2015

**Conducted by the Epidemiology and Disease Control Division (EDCD) with technical assistance from the Johns Hopkins Bloomberg, School of Public Health, International Vaccine Institute, Nagasaki University and Group for Technical Assistance-Nepal**

**Executive summary:**

**Conclusions:** Based on our assessment, the risk for a cholera outbreak is very high in some of the Earthquake affected districts. The conditions (inadequate water supply, sanitation, and hygiene) are favourable for cholera transmission in the communities. This has been demonstrated by repeated outbreaks over the years. The risk for a cholera outbreak has increased many folds following the recent earthquake. Infectious cholera strains are in circulation and have been reported in numerous publications (both Kathmandu and outside valley) (3). After the earthquake the ability to contain outbreaks is strikingly diminished due to severe constraints in the health system. So, there is increased probability of large if not catastrophic outbreaks similar to the outbreak in Haiti after the earthquake in 2010. In contrast to Haiti, however, some Nepali may be immune against cholera (from previous disease). Nonetheless, considering that protection following cholera is not life-long, there is a large probability that a large susceptible population has accumulated in high risk northern districts most affected by the earthquakes. There is increased concern that the risk for a cholera outbreak could be compounded by monsoon season approaching in a few months. This will further constrain the public health delivery mechanism, particularly in rural villages of the affected districts.

Water supply, sanitation and hygiene are inadequate and need to be improved in many sites we visited during our assessment. Early appropriate treatment emphasising rehydration is key for survival from severe diarrheal illnesses like cholera. Currently the majority of health centres in affected district headquarters have adequate stocks of IV fluids and ORS. The centres, which are out of stock, need to be resupplied. These interventions are appropriate to minimize the risk of deaths if an outbreak does occur.

**Recommendation:** The current situation post-earthquake with the nearing monsoon warrants a pre-emptive i.e. preventive campaign with oral cholera vaccine. Strengthening of existing surveillance is recommendable as additional preparations needed to monitor the ongoing threat level in case the situation changes and aggravates the health situation. The major time constraint is the approaching monsoon season, which usually starts in the second half of June. Heavy rains will make the delivery of the vaccine challenging. Landslides will block road access to remote areas. The earthquake has displaced the most vulnerable segment of the population. The population at high risk for cholera easily exceeds 1 million people. With a stockpile of 700,000 doses sufficient to vaccinate 350,000 people with this 2-dose vaccine, it will be necessary to target communities at highest risk at the earliest before monsoon starts. We make recommendations regarding the ranking of districts most appropriate for the targeting of vaccine campaigns. A working group is being formed which will adapt the ranking and recommended communities for cholera vaccination campaigns in the coming weeks.

**Assessment**

Cholera outbreaks may occur following natural disasters where there is a breakdown of water and sanitation infrastructure. In parallel with timely case management, access to potable water, food hygiene, adequate sanitation and community engagement, the World Health Organization recommends that oral cholera vaccination should be considered in humanitarian crisis where there is a high risk of cholera or as part of a response to a cholera outbreak (1). This is an assessment of the risk for cholera following the April/May 2015 earthquakes in Nepal.

1. **Background:** The recent earthquake affected 14 districts comprising a population of about 5.3 million. According to government figures, 488,579 houses were destroyed and 260,026 damaged. The water resources of about 660,000 to 1.3 million people were affected and between 850,000 to 1.7 million need sanitation support. Out of 5.3 million people in these 14 affected districts, 2.7 million were displaced and are likely to be at an increased risk for cholera. These displaced communities are the most vulnerable population and should have the highest priority for implementation of preventive cholera strategies, including possible mass oral cholera vaccinations. We assessed the number of houses and population affected by Earthquake in Nepal (Table 1). The top rows (in red) are the districts that were most severely affected followed by the rows in orange.

   Among the 14 affected districts, there are five severely affected districts: Rasuwa, Sindhupalchok, Nuwakot, Dhading and Gorkha where more than 80% houses have been destroyed and more than 0.15% of total populations have been killed by the earthquake (shown as red in the table). The proportion of human casualties is highest In Sindhupalchok and Rasuwa where more than 1% of the populations have been killed. Bhaktapur, Dolakha, Kavrepalanchok, Kathamandu and Lalitpur are moderately affected (shown is orange) in terms of human casualties where 0.04% to 0.11% of total population have been killed; however, the proportions of house destruction are more than 90% in two districts: Dolakha and Kavrepalanchok. The remaining four districts Ramechhap, Okhaldunga, Makanpur and Sindhuli have been affected mildly (shown in grey) where human casualties are not more than 0.02%; however, proportion of the house destruction in Ramechhap is over 90%. Among all populations, the displaced communities are the most vulnerable ones; they should be the first priority for preventive cholera vaccinations.

**Table 1: Number (percentage) of houses and population affected by the Nepal earthquakes, by district**

| District | Total No. of Houses | Total Population | Dead | % died | total houses destroyed | % houses destroyed |
|---|---|---|---|---|---|---|
| Rasuwa | 9,778 | 43,300 | 579 | 1.34% | 9,450 | 97% |
| Sindhupalchowk | 66,688 | 287,798 | 3,424 | 1.19% | 66,636 | 100% |
| Nuwakot | 59,215 | 277,471 | 1,058 | 0.38% | 62,172 | 105% |
| Dhading | 73,851 | 336,067 | 728 | 0.22% | 62,612 | 85% |
| Gorkha | 66,506 | 271,061 | 430 | 0.16% | 58,141 | 87% |
| Bhaktapur | 68,636 | 304,651 | 327 | 0.11% | 27,990 | 41% |
| Dolakha | 45,688 | 186,557 | 161 | 0.09% | 52,000 | 114% |
| Kavrepalanchowk | 80,720 | 381,937 | 318 | 0.08% | 73,647 | 91% |
| Kathmandu | 436,344 | 1,744,240 | 1,214 | 0.07% | 87,726 | 20% |
| Lalitpur | 109,797 | 468,132 | 181 | 0.04% | 22,499 | 20% |
| Ramechhap | 43,910 | 202,646 | 39 | 0.02% | 40,069 | 91% |
| Okhaldhunga | 32,502 | 147,984 | 19 | 0.01% | 13,736 | 42% |
| Makawanpur | 86,127 | 420,477 | 33 | 0.01% | 32,277 | 37% |
| Sindhuli | 57,581 | 296,192 | 14 | 0.00% | 20,791 | 36% |
| Total | 1,237,343 | 5,368,513 | 8,525 | 0.16% | 629,746 | 51% |

(Source: http://drrportal.gov.np)

2. **The meaning of risk in the context of this document:** In this document, "risk" is defined as the potential for cholera outbreaks in the community. The risk for cholera outbreaks is an aggregate of environmental, pathogen and host dynamics, as well as the presence of any natural calamities such as flooding or earthquakes. The most vulnerable segment of the population (children, pregnant women and the elderly) are especially at high risk from infectious diseases like cholera. (2)

3. **Past Experience with Cholera:** Cholera has been prevalent in Nepal for at least a century. During the last decade cholera outbreaks have been reported every year in rural and urban areas, including parts of the country that are remote and difficult to access. Previous studies indicate that *V. cholerae* O1 El Tor Ogawa is endemic in Nepal. Previous studies also describe the seasonal nature of cholera in the country with most cases reported during the rainy season, which starts in June and usually ends by October. It has been estimated that nearly 20% of the population of Nepal is at risk for infection by *V. cholerae*. The hill districts are at particularly high risk probably related to inadequate access to health care, unsafe water supply and poor sanitation.

4. **Cholera Case Fatality Rates during Past Outbreaks:** The largest cholera outbreak reported in Nepal in recent years, with more than 30,000 people affected, was in Jajarkot in the Mid-West region in 2009. Tragically, more than 500 people lost their life. In contrast a cholera outbreak during the 2014 monsoon in Rautahat in the Terai region (adjoining northern states of India), which affected more than 600 people did not result in a single reported death.

5. **Factors related to seasons, climate, and social political situations:** In many areas of the country, there is inadequate water and sanitation infrastructure and high rates of open defecation. Nepal has floods and landslides during each rainy season. Furthermore, there is a high rate of rural to urban migration with a steady increase in urban population density. Studies of *V. cholera* in Nepal have shown drug resistance to a number of antibiotics including nalidixic acid and cotrimoxazole. (3). All of these complex and interacting factors raise the possibility of future cholera outbreaks that may be challenging to control. It is critical that Nepal improves its outbreak preparedness by strengthening its early warning and response system, expanding health education, increasing its case management readiness, ensuring the adequate distribution of rehydration supplies, and giving consideration to the provision of the oral cholera vaccine in high-risk communities. In the longer-term, there is a need for improved water and sanitation infrastructure.

6. **Timing of risk assessment:** The risk assessment described in this document is a rapid, field based activity conducted as part of emergency preparedness in close coordination with EDCD. The evaluation of risk should be an ongoing process; this assessment provides only a point estimate of the threat of cholera outbreaks related to the Nepal earthquakes in April/May 2015. This assessment supplements the recommendations of the risk assessment conducted by WHO/UNICEF/IOM.

7. **Strength of this assessment:** Before the conduct of this assessment, **t**he objectives were discussed with the Director General, Department of Health Services, Government of Nepal. Once agreed, this assessment was led by the Epidemiology and Disease Control Division (EDCD) with technical assistance from the Johns Hopkins Bloomberg School of Public Health (JHU), International Vaccine Institute (IVI), World Health Organization (WHO), Nagasaki University and Group for Technical Assistance (GTA)-Nepal and in close coordination with the Health Emergency Operation Center (HEOC), Ministry of Health and Population.

8. **Methodology:** This assessment carried-out from 13 to 17 May, 2015 is based on field observations and in depth interviews with public health managers in the affected districts. It was conducted by a trained health work force that included infectious disease experts, doctors and public health professionals who evaluated most of the affected district headquarters and rural villages in close coordination with district public health / health office (D(P)HO) and key international organizations. Annex 1 show a list of District Public Health Managers interviewed during this assessment. Notably, the interviewers also interacted with local community members including female community health volunteers (FCHV), schoolteachers and villagers. Thus, the evaluation is premised on the understanding of the local context, particularly the organization of health care and the prevailing water, sanitation and hygiene (WaSH) conditions. One of the key components of this assessment is an

evaluation of the local capacity to implement the proposed intervention. We adapted and used an assessment tool developed by STOP CHOLERA, John Hopkins University, USA (https://www.stopcholera.org/).

For this assessment, 5 teams were formed, which visited 14 affected districts. The team members are representatives from JHU, IVI, WHO, Nagasaki University and GTA-Nepal. All the members were briefed on the tools for the assessment before heading to their assigned districts. The team visited villages affected by the earthquakes to get an impression of public health delivery and preparedness to inform the development of strategies to curb possible outbreaks of water-borne illness, primarily cholera. A list of the temporary camps /settlements visited during this assessment is shown in (Annex 2).

The 3 key components of the assessment tool are shown below. This assessment is in clear alignment with the health delivery system that is functional in Nepal. As such, we first approached the district public office / district hospital, then the local community in rural areas of the affected districts:

- District level preparedness in terms of resources and capacity (interview):
  - Preparedness in terms of acute diarrheal management
  - Surveillance / Rapid Response Team
  - District capacity to manage a major cholera outbreak
  - Preventive measures / action plan in case of outbreak(s) at the district level
- Health facility's capacity to manage a major cholera outbreak in camps / temporary settlements (interview)
  - WASH status
  - Preparedness in terms of acute diarrheal management
  - Surveillance / Rapid Response Team
  - Health facility's capacity to manage a major cholera outbreak
  - Preventive measures / action plan in case of outbreak(s) at village level
- Interviewers impression of the camp (impression)
  - Local context
  - Organization of care and prevailing WASH conditions

9. **Findings**: All together we visited 11 districts out of 14 affected districts. We could not visit Dolkha because of road blockade due to landslide after the 2nd earthquake. While we could not visit two other districts (Sindhuli and Makwanpur) due to safety concerns, the district managers were reached through telephone and interviewed. We analysed and report our findings according to three sections: district resources and capacity, description of the camp/temporary settlement and the health facility's capacity to manage a major cholera outbreak. This analysis provides snap shot view of current state of health care resources, capacity at the level of both district and village level.

## Section 1: District resources and capacity

Overall, the key components that were assessed in terms of district resources and capacity to respond to possible outbreak were satisfactory. The only exception was the inadequate or lack of updated training to manage cases should there be an outbreak of acute diarrheal illnesses in the community, especially cholera. Table 2 shows a detailed assessment of resources and capacity by district. In general, districts were stocked with adequate Oral Rehydration Solution (ORS), IV fluids and IV sets. Based on our conversation with district public health managers and Rapid Response Team (RRT) focal persons, we received a clear impression that there exists a well-defined mechanism for reporting of acute diarrheal illness and suspected cholera, as well as suspected outbreaks. However six districts (Lalitpur, Gorkha, Okhaldhunga, Kavre, Makwanpur, Sindhuli) do not have a plan for laboratory confirmation of cholera. Most of the districts stated that they highly consider cholera vaccination as one of the key preventive measures for community protection. They are also very confident and able to vaccinate in the district utilizing resources.

**Table 2: Post-earthquake assessment of logistics and service delivery in affected district**

| Districts HQ | Updated training on acute diarrhea training | IV fluid | ORS stock | IV sets | Clear mechanism for reporting | Plan for cholera conformation | Consider Vaccination | Able to vaccinate |
|---|---|---|---|---|---|---|---|---|
| **KTM valley** | | | | | | | | |
| Kathmandu | No | Enough | Enough | Enough | Yes | Yes | No | Yes |
| Lalitpur | No | Enough | Enough | Enough | Yes | No | No | Yes |
| Bhaktapur | Yes | Enough | Enough | Enough | Yes | Yes | Yes | Yes |
| **Outside KTM valley** | | | | | | | | |
| Nuwakot | Yes | Enough | Enough | Enough | Yes | Yes | Yes | Yes |
| Rasuwa | No | Not enough | Enough | Enough | Yes | Yes | Yes | Yes |
| Gorkha | No | Enough | Enough | Enough | Yes | No | No | No |
| Dhading | No | Enough | Enough | Enough | Yes | Yes | Yes | Yes |
| Ramechhap | No | Enough | Enough | Enough | Yes | Yes | Yes | Yes |
| Okhaldhunga | No | Enough | Enough | Enough | Yes | No | Yes | Yes |
| Sindhupalchowk | No | Enough | Enough | Enough | Yes | Yes | Yes | Yes |
| Kavre | No | Enough | Enough | Not enough | Yes | No | Yes | Yes |
| Makwanpur | No | Enough | Enough | Enough | Yes | No | Yes | Yes |
| Sindhuli | Yes | Enough | Not enough | Enough | Yes | No | Yes | Yes |

## Section 2: Description of the camp/temporary settlement

On quick analysis of population structure in the settlements, we found that overall 13% were under 5 years and 24% were less than 15 years of age. However, there was a wide variation in the percentages across the districts, with children under 5 ranging from 1 to 20% and those under 15 varied from 8 to 50% of the population. About 1.4% of the

population were pregnant women. This is based on aggregate data collected from both inside and outside Kathmandu valley (Annex 3). We observed, inspected and assessed water and sanitation conditions in camps/settlements in affected districts both within and outside Kathmandu valley. The results of interviews with 34 respondents from these camps / settlements are shown in Table 3.

**Table 3: Comparison of water and sanitation in camps/settlements in the affected districts within and outside of Kathmandu valley**

| Factors | Variables | Inside Kathmandu valley | | Outside Kathmandu valley | |
|---|---|---|---|---|---|
| | | Number | % | Number | % |
| **Source of drinking water (n=34)** | Piped water into dwelling/yard | 6 | 35 | 1 | 6 |
| | Public tap (Samudaik dhara) | 4 | 24 | 6 | 35 |
| | Well | 0 | 0 | 1 | 6 |
| | Spring (kuwa) | 0 | 0 | 3 | 18 |
| | Bottled / jar water | 7 | 41 | 2 | 12 |
| | Unprotected source (as RIVER) | 0 | 0 | 4 | 24 |
| **Water safe (n=34)** | Yes | 12 | 71 | 5 | 29 |
| | No | 5 | 29 | 12 | 71 |
| **Method of purification* (n=12)** | Chlorination | 11 | 92 | 4 | 80 |
| | Filtration | 2 | 17 | 2 | 40 |
| | SODIS | 2 | 17 | 0 | 0 |
| **Place of water storage* (n=34)** | Bottle (gagri) | 7 | 41 | 11 | 65 |
| | Bucket | 7 | 41 | 6 | 35 |
| | Gagri | 3 | 18 | 8 | 47 |
| | Jar | 11 | 65 | 0 | 0 |
| | Drum | 0 | 0 | 4 | 24 |
| **Latrines (n=34)** | Yes | 13 | 76.5 | 7 | 41.2 |
| | No | 4 | 24 | 10 | 59 |
| **Place of defecation (n=34)** | Latrine | 10 | 59 | 7 | 41 |
| | Open defecation | 2 | 12 | 7 | 41 |
| | Both | 5 | 29 | 3 | 18 |
| **Condition of latrines (n=20)** | Good | 6 | 46 | 4 | 57 |
| | Not good | 7 | 54 | 3 | 43 |

Our key findings are listed as follows:

- Inside Kathmandu valley, 41% of the respondents reported the use of bottled / jar water, which was followed by piped water (35%). While outside Kathmandu valley, 35% reported the use of public tap water (Samudaik Dhara) followed by the use of water from unprotected sources such as rivers (24%).

- Outside of Kathmandu valley, 77% of respondents from camps/settlements reported that their water source is not safe. Those who reported water consumed to be safe were familiar with chlorination and filtration.
- Inside the valley, the majority of respondents reported that they store drinking water in jars, while the majority outside valley still use traditional “gagri” to store water.
- In terms of sanitary hygiene, which is key to prevent enteric illnesses in the community, a significant percentage of the respondents living in temporary settlements inside Kathmandu valley (41%) and more than half of the respondents living in temporary settlements outside Kathmandu valley (59%) practice open defecation.
- We also inspected the latrines temporarily established in camps both outside and inside valley; the majority of them were not in good condition increasing the risk to the community.

**Section 3: Health facility’s capacity to manage a major cholera outbreak**

On visiting the local camps and temporary settlements, we first asked the health personnel serving the local population (including female community health volunteers) what concerned them the most following the recent earthquake. One common concern that stood out is the possible outbreak of acute diarrheal illness, which they suspect will be exacerbated by the coming monsoon season (Table 4).

**Table 4: A comparison of health concerns of health personnel inside and outside Kathmandu valley**

| | Districts | Camps / settlements | Common illnesses of concern |
|---|---|---|---|
| Inside Kathmandu valley | Lalitpur | buspark camp, madan memorial camp, metro camp, bridaashram camp, patan hs school camp, harisiddhi | Diarrhoea, typhoid fever |
| | Bhakatapur | maheswori camp, padma hs school | Allergies, Diarrhoea, typhoid fever |
| | Kathmandu | bhagwati, chuigaun, machchegaun, pangaa, tudikhel, sinamangal, ramkot - 4 camp, sitapaila health post camp, Chuchepati | Diarrhoea, ARI, Pneumonia, Hypertension, Dengue/Malaria, allergies |
| Outside kathmandu valley | Ramechhap | DDC camp, Bhatauli/Thodekhola, Rajagaun, Aakashe,airport, buspark, Mugitar | Diarrhoea, Fever cases, water and soap for handwashing,Mosquito: may cause malaria and dengue |
| | Sindhupalchwok | Chautara, Nearby Hospital,purano bazar, sagam chowk | acute Diarrheal illnesses /Common cold and cough/eye infaction |
| | Kavre | Old buspark Camp, chinese camp | Fever/eye, Dengue |
| | Gorkha | finam | Acute diarrhoea, depression |
| | Dhadhing | khalte vdc | Acute diarrhoea |
| | Nuwakot | Chaugada, Bidur | Diarhhorea , injury |
| | Rasuwa | Dhunche, Haku VDC | Diarrhoea, fever, APD |

We assessed health care-related factors in the camps/settlements within and outside Kathmandu valley (Table 5). Supporting the concerns listed in Table 4,, about 24% of the respondents inside Kathmandu valley and 53% outside Kathmandu valley reported diarrheal cases. There is no health care facility in 59 % and 47% of settlements inside and outside Kathmandu valley, respectively. Equally important, there were inadequate hand washing stations in 35 % and 65% of settlements inside and outside Kathmandu valley, respectively.

**Table 5: Health care-related factors in the camps/settlements within and outside Kathmandu valley**

| Factors | Response | Inside Kathmandu valley | | Outside Kathmandu valley | |
|---|---|---|---|---|---|
| | | n | % | n | % |
| **Presence of diarrhoea in the camp/place after earthquake (n=34)** | Yes | 4 | 23.5 | 9 | 52.9 |
| | No | 13 | 76.5 | 8 | 47.1 |
| **Availability of Health care facility in camps / settlements** | Yes | 7 | 41.2 | 9 | 52.9 |
| | no | 10 | 58.8 | 8 | 47.1 |

| Factors | Response | Inside Kathmandu valley | | Outside Kathmandu valley | |
|---|---|---|---|---|---|
| | | n | % | n | % |
| (n=34) | | | | | |
| Adequacy of Hand washing station in camps / settlements (n=34) | Yes | 11 | 64.7 | 6 | 35.3 |
| | No | 6 | 35.3 | 11 | 64.7 |

**Section 4: Preparedness for response to possible cholera outbreak**

Our team also assessed the preparedness to respond to a potential cholera outbreak in the community (Table 6). Inside Kathmandu valley, the residents seek care either at public health facilities or private health facilities. These are readily accessible if they suffer from severe diarrhea. People outside Kathmandu valley usually rely on public health facilities. In some of the remote villages, local people sometime have to travel a long distance (up to 5 hours of travel time). The availability of ORS was sufficient inside Kathmandu valley while 47% of health facilities located near or in the settlements reported inadequate supply of ORS. We found that 57% and 67% of temporary health facilities inside and outside Kathmandu valley did not have a mechanism for laboratory confirmation of suspected cholera..

**Table 6: Health care-related resources in the camps/settlements within and outside Kathmandu valley**

| Factors | Variables | Inside KTM valley | | Outside KTM valley | |
|---|---|---|---|---|---|
| | | n | % | n | % |
| Health Service seeking behaviour | Public Health facilities | 10 | 58.8 | 15 | 88.2 |
| | Private Health facilities | 7 | 41.2 | 2 | 11.8 |
| Availability of ORS | Yes | 16 | 94.1 | 9 | 52.9 |
| | No | 1 | 5.9 | 8 | 47.1 |
| Stool specimen collection for laboratory confirmation of cholera (n=16) | Yes | 3 | 42.9 | 3 | 33.3 |
| | No | 4 | 57.1 | 6 | 66.7 |

We realise that local health workers / volunteers are involved heavily in providing basic health services in the community. They are the best persons to know the real public health demands in the community. So we interacted with them to understand what they have to say regarding cholera vaccination as an additional tool to control possible outbreaks. Most of the respondents (53% inside and 88% outside Kathmandu valley) expressed a strong need for cholera vaccination and are able to carry-out the campaigns with available resources (Table 7).

**Table 7: Perceptions of local health workers / volunteers inside and outside Kathmandu valley regarding oral cholera vaccination**

| | Variables | Inside KTM valley | | Outside KTM valley | |
|---|---|---|---|---|---|
| | | n | % | n | % |
| **Able to vaccinate people in the community** | Yes | 13 | 76.5 | 16 | 94.1 |
| | No | 4 | 23.5 | 1 | 5.9 |
| **Consideration of vaccination as a tool to prevent epidemic** | Yes | 9 | 52.9 | 15 | 88.2 |
| | No | 8 | 47.1 | 2 | 11.8 |

10. **Interviewer's impression of the camp/ temporary settlements:** We also took into account observational findings noted by each interviewer in the rural villages to give us a glimpse of the "real" public health situation. In order to systematize these observations, we employed two key categories of observations (1) Local Context and (2) Organization of care and WASH conditions. Evaluation of the "Local context" was assisted by answering the following questions:
    - Is the area located on trade routes?
        - Crossed by big roads, bus terminals, junctions
        - With regular influx of travellers, intensive trading activities, market places
    - Is there an unusual weather pattern?
        - Heavy rainy seasons, flooding, droughts, periods of abnormally high temperature
    - Describe the population mobility and lifestyle
        - Urban/Rural setting
        - Ethnicity
        - Does the area have a high population density?
        - Is this a slum or IDP settlement?
        - Has the area been the origin of cholera outbreaks in the past?
    - What are the other contextual factors?
        - Reduced access to WASH or treatment due to security constraints

    To evaluate the "Organization of care and WASH conditions" we assessed:
    - Conditions of care
    - WASH conditions
        - Drainage systems
        - System of waste management
        - System/procedures for the management of dead bodies of cholera

**a. Inside Kathmandu valley**

**i. Kathmandu**: Our team visited 7 out of 17 temporary settlements in the district. One of the key observations is that there were no IV fluids / ORS in some of the health centres in some temporary settlements. We also did not find health facility in two camps - Sinamangal and Chuchepati. There are constraints in disease surveillance, sample

collection and rapid reporting in some of the temporary settlements. Sample collection containers were not always found in some of the settlements.

ii. **Bhaktapur**: We visited four big camps set-up around Bhaktapur. Government Health personnel, national and international volunteers provide health services in the temporary settlements. One camp is managed by local staff. The coordination between camp and DHO appears to be functioning. There was a stool collection facility in some of the settlements with medicine distribution. There was enough stock of IV fluids and ORS. In some settlements, latrine conditions, water supply, drainage systems, and waste disposal are inadequate. We also found some settlement supplied with purified water system. We also observed that most of the settlements are overcrowded. Key health personnel in the settlements expressed fear that there will be outbreaks of enteric diseases with the departure of international teams (e.g. health services provided by the Indonesian team).

iii. **Lalitpur:** We visited 4 out of 12 camps. There were no health personnel in the camps, only Red Cross volunteers. There was no maintenance of medical records by volunteers. Local community members are recording the distribution of ORS. Latrine conditions, water supply, drainage systems, and waste disposal are inadequate.

**b. Outside Kathmandu Valley**

i. **Sindhupalchowk**: There were numerous temporary, ill-defined temporary settlements (i.e. no established camps). There were no health facilities found. There was no formal management or administration in these makeshift camps. Water is scarce. It takes more than 1 hour to collect water. No purification systems are in place. Report of some 200 cases of diarrheal diseases in one remote village (Hangma Gaun), 4-5 hours walking distance from Chautara. There appears to be a high risk of a cholera outbreak noted. At Chautara, a Norwegian medical team is supporting a health care facility and will stay at least until August. The Norwegian health camp has registered several cases of watery diarrhoea. No stool samples were tested. The district health office and district hospital were destroyed during the earthquake and services are now delivered in tents. Two health posts were visited. Their former office buildings were destroyed and have relocated under tents. Working CHWs, ANMs reported scarcity of manpower. ORS and IV fluids were available. Water treatment was lacking in one of camp. People from the surrounding region have to walk 2-3 hours to reach these health posts. There was no health service facility in the temporary settlements. Drinking water was not safe in all the temporary settlements. People need to walk 1-2 hours to collect water, no chlorination, physical quality of water reported as bad (with a top floating oily layer). One of the settlements did not have toilets. One week earlier several people in the camp had watery diarrhoea. People are worried about outbreaks of cholera.

ii. **Kavrepalanchok:** At Dhulikhel, a joint health care service has been formed by the Nepalese Army and a Chinese health care facility. In some of the camps, water supply came from Hotel Dwarika. There was no recording or report of treated cases in some of the health facilities. The district public health officer suggested a need for cholera

management training. No water supply and medical services in one temporary settlement. Fumigation for mosquito control was done by a Chinese medical team.

iii. **Nuwakot:** Our team visited 6 camps and also visited District Hospital Nuwakot. The health staffs were found to be overworked. Lack of purified water in the whole district. The residents in camps use spring water directly with purification. Sanitation is inadequate. The majority of camps are informal and poorly defined. In some of the villages drinking water comes from the river.

iv. **Rasuwa**: Three camps visited - two camps located both Nuwakot and Rasuwa. No stock of intravenous fluids in the visited health care facilities. Drinking water comes from a tap without purification. No toilets – only open defecation. Lack of food. No strong mechanism for reporting enteric diseases.

v. **Gorkha**: We met DPHO and the RRT focal person of the rapid response team (RRT) at DPHO. The FP/RRT suggested that there is a high likelihood of cholera and other infectious diseases outbreaks in 8 villages. There are also past reports of acute watery diarrhoea outbreaks in Krishnanagar VDC. There were also reports of poor water supply and sanitation in these villages. At least 80% of people of the district are living in open space in temporary settlements. The established mechanism for disease surveillance is constrained by the consequences of the earthquake. The majority of toilets are broken and sanitation is inadequate. Open Defecation in most parts. Health workers are stressed out in remote areas. We were informed that routine EPI program has been suspended officially untill further notice. Though there is direction from district for SMS reporting, this is not running properly. Bloody diarrhoea seen in some wards of Barpak. Two cases of severe diarrhoea requiring IV fluids have been referred to health care centres. Water supply system was damaged (source to supply).

vi. **Dhading:** Around 80% of the people have been displaced. Clear guidelines for diarrheal disease treatment and reporting have been established. Rapid reporting system is weak. Fear of possible cholera outbreaks was mentioned. There are sufficient quantities of ORS and IV fluids in place. Health personnel from health post to inform DHO in case of an outbreak. GTZ provide the tents for health centre.

11. **Ranking of districts using risk factors to define high risk districts for possible cholera outbreaks:** In order to select the high risk districts for possible cholera outbreak, we utilized the findings that affected the districts in terms water, sanitation and hygiene status; preparedness in terms of capacity to respond to possible cholera outbreaks at the district and settlement level. On ranking based on our findings, we found Rasuwa, Gorkha and Sindhupalchowk as top three districts vulnerable to possible cholera outbreaks. We list high risk districts as shown below in the Table 8:

**Table 8:** Ranking of districts using risk factors to define high risk districts for possible cholera outbreaks

| District | Total Pop. | Household destructed rank | Post Earthquake status | | | | | Risk assessment | | | | | | | | | | | Scoring | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Infrastructure destn | | | | Casualties | Section 1: | | | | Section 2: | | | Section 3 & 4: | | | | | |
| | | | Gravity | | | | Vulnerabilities | Dsitrict level preparedness | | | | WASH status | | | Capacity to manage a major cholera outbreak | | | | | |
| | | | | | | | | Capacity | | Procedure and action plan | | Water | Sanitation | Hygiene | Concern | Human resource | Fluid mngnt | Surveillance | | |
| | | | Household | Health facility destructed ranking | Health | Death ranking | Deaths (% of total pop) | Updated training on acute diarrhea mngmt last 1 year (Y/N) | IV fluid mngt stock (adquate / inadquate) | Clear mechnsm for reporting (exist - Y/N) | Capacity for suspected cholera Investigation (exist - Y/N) | Safe (Y / N) | Open defaecatn (Problem - Y/N) | Adequacy of Hand washing station (Y/N) | Diarrheas common concern (Y/N) | Availability of Health care facility (Adequate - Y/N) | ORS availability (adequate - Y / N ) | Stool sample collection procedure (In place/dequate? - Y / N | Aggregate score | Ranking |
| Dhading | 336,067 | 3 | 85 | 3 | 64.7 | 3 | 0.22 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 16 | 2 |
| Gorkha | 271,061 | 3 | 87 | 3 | 60.3 | 3 | 0.16 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 17 | 3 |
| Rasuwa | 43,300 | 3 | 97 | 3 | 100 | 3 | 1.34 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 18 | 3 |
| Nuwakot | 277,471 | 3 | 100 | 3 | 67.2 | 3 | 0.38 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 13 | 2 |
| Sindhupalchowk | 287,798 | 3 | 100 | 3 | 60.3 | 3 | 1.19 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 17 | 3 |
| Kavre | 381,937 | 3 | 91 | 1 | 14 | 2 | 0.08 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 15 | 2 |
| Dolakha | 186,557 | 3 | 100 | 3 | 55.6 | 2 | 0.09 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 15 | 2 |
| Kathmandu | 1,744,240 | 1 | 20 | | | 2 | 0.07 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 10 | 1 |
| Lalitpur | 468,132 | 1 | 20 | 1 | 19 | 1 | 0.04 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 10 | 1 |
| Bhaktapur | 304,651 | 2 | 40 | 1 | 19 | 2 | 0.11 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 8 | 1 |
| Ramechhap | 202,646 | 3 | 91 | 2 | 36.4 | 1 | 0.02 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 14 | 2 |
| Makawanpur | 420,477 | 2 | 37 | 2 | 31.8 | 1 | 0.01 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 12 | 2 |
| Sindhuli | 296,192 | 2 | 36 | 2 | 21.8 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 11 | 2 |
| Okhaldhunga | 147,984 | 2 | 42 | 2 | 25.5 | 1 | 0.01 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 12 | 2 |

**12. Conclusions and recommendation:**

**A.** Based on our assessment, the risk for a cholera outbreak is very high. The conditions (inadequate water supply, sanitation, and hygiene) favourable for cholera as demonstrated by repeated outbreaks over the years have worsened following the earthquake. Highly infectious cholera strains are in circulation and have been reported in numerous publications (both Kathmandu and outside valley) (3). After the earthquake the ability to contain outbreaks is strikingly diminished and large if not catastrophic outbreaks similar to the outbreak in Haiti after the earthquake in 2010 may occur. In contrast to Haiti, some Nepali may be immune against cholera (from previous disease) but considering that protection following cholera is not life-long, there is likely to be a considerably large susceptible population in Nepal. The risk for a cholera outbreak could be compounded by monsoon season approaching in a few months. This will further constrain the public health delivery mechanism, particularly in rural villages in the affected districts.

B. We expect large outbreaks considering the extent of the devastation on housing, water and sanitation wrought by the earthquake. Because health care facilities and access have also been severely affected, we are concerned about the potential for high case-fatality rates during such outbreaks. There is a very high probability of cholera outbreaks once the monsoon begins just following this recent earthquake. Water supply, sanitation and hygiene are inadequate and need to be improved in many sites. As of now (based on this assessment), the majority of health centres in affected district headquarters has adequate stocks of IV fluids and ORS. The centres, which are out of stock, need to be resupplied. These interventions are appropriate to minimize the risk of deaths if an outbreak does occur.

C. The current situation post-earthquake with the nearing monsoon warrants a preventive campaign with oral cholera vaccine. The major time constraint is the approaching monsoon season, which usually starts in the second half of June. Heavy rains will make the delivery of the vaccine challenging. Landslides will block road access to remote areas. The earthquake has displaced the most vulnerable segment of the population. The population at high risk for cholera easily exceeds 1 million people. With a stockpile of 700,000 doses sufficient to vaccinate 350,000 doses it will be necessary to target communities at highest risk. Strengthening of surveillance is recommendable as additional preparations needed to monitor the ongoing threat level in case the situation changes.

13. **The most pragmatic target population for pre emptive vaccination among 14 affected districts:** Based on the ranking of the districts affected by earthquake (Annex 4) utilizing the risk factors for possible cholera outbreaks and linking those ranked districts with our findings based on detailed interview with district managers as well as interviewer's close observation of the local context and prevailing WASH situations, we provide the most plausible target population approximately 250,000 (> 1 years of age) among the selected village development committees (VDCs) in high risk districts based on ranking as shown in Table 9.

**Table 9. Pragmatic target population for pre emptive vaccination among 14 affected districts**

| Ranking | Name of District | High risk VDCs (based on district manager's highest priority) | Total pop. High risk VDCs | Under 1 year pop. High risk VDCs | Target for OCV vaccination (> 1yrs) |
|---|---|---|---|---|---|
| 1 | Rasuwa | 9 | 26116 | 583 | 25533 |
| 2 | Gorkha | 9 | 26687 | 578 | 26109 |
| 3 | Sindhupalchok | 6 | 27892 | 622 | 27270 |
| 4 | Dhading | 8 | 35640 | 794 | 34846 |
| 5 | Kavre | 11 | 32902 | 733 | 32169 |
| 6 | Dolakha | 12 | 27486 | 613 | 26873 |
| 7 | Nuwakot | 7 | 37510 | 835 | 36675 |
| 8 | Ramechhap | 9 | 34215 | 763 | 33452 |
| **Total** | | **71** | **248448** | **5521** | **242927** |

**References:**


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**Annexes**

**Annex 1: District Public Health Managers interviewed during this assessment at the district HQ (13 to 17 May, 2015)**

| Districts | Person Interviewed | Position | Contact no: |
|---|---|---|---|
| **Inside Kathmandu valley** | | | |
| kathmandu | Shree Krishna Bhatta | DPHO | 9741117425 |
| Lalitpur | Mohan K . Rijal | PHI | 9841294728 |
| Bhaktapur | Mehesh chandra Dhoubadel | Focal person RRT | 9841394658 |
| **Outside Kathmandu Valley** | | | |
| Nuwakot | Ram mani Ghimire | Focal Person RRT | 9841524461 |
| Rasuwa | Dhan Kumar rai | District Lab Supervisor | 9842289847 |
| Gorkha | Naani Baabu Daani | Focal person RRT | 9845086127 |
| Dhading | Jeevan malla | DPHO | 9841557095 |
| Ramechhap | Keshav phuyal | PHI | 9744023347 |
| Okhaldhunga | Ahmed mansoor | PHI | 9842941143 |
| Sindhupalchowk | Dr.Sagar Raj Bhandari | DHO | 9847668833 |
| Kavre | Dr. Rajendra Prasad | DHO | 11490130 |
| Makwanpur | Bhola Chaulagain | Focal person RRT | 9855067540 |
| Sindhuli | Surendra Pd Chaurasiya | DHO | 9851134018 |

**Annex 2: Temporary camps / settlements visited during this assessment (13 to 17 May, 2015) in 11 affected districts**

| District | No. | Camps / Settlement visited | Person interviewed | Contact number |
|---|---|---|---|---|
| **Inside Kathmandu Valley** | | | | |
| Lalitpur | 1 | Buspark camp | Sanudevi maharjan | 9841228077 |
| | 2 | Madan memorial | Bansidhan bajracharya | 9841549293 |
| | 3 | Lalitpur metro camp | Dipendra K.C | 9841025502 |
| | 4 | Bridaashram camp | Hari maharjan | 9849087895 |
| | 5 | Patan HS School camp | Madan Maharjan | 9841255021 |
| | 6 | Hari Siddhi | Nani Maiya dahal | 9841490982 |
| Bhakatapur | 1 | Maheswori camp | Sunita twanabase | NA |
| | 2 | Padma HS School Camp | Rabin Ray | 9841477590 |
| Kathmandu | 1 | Bhagwati-Sakhu | Nabin Kumar Napit | 9841246487 |
| | 2 | Chuigaun | Subin maharjan | 9841381776 |
| | 3 | Machchegaun | Sharmila sharma | 9841505252 |
| | 4 | Pangaa | Bikash Maharjan | 9841467993 |
| | 5 | Tudikhel | Prayog Jung rana | NA |
| | 6 | Sinamangal | Shobha Pujari | 9841773696 |
| | 7 | Ramkot -4 camp | Om Bahadur | 9841238869 |
| | 8 | Sitapaila health post camp | Narayan Gyanwali | 9847964808 |
| | 9 | Chucepati | Rataram Ghimire | 9851284227 |
| **Outside Kathmandu Valley** | | | | |
| Ramechhap | 1 | DDC camp | Keshav Phuyal | 9744023347 |
| | 2 | Bhatauli/Thodekhola | Shree bdr. Majhi | 9844194185 |
| | 3 | Rajagaun | Tilak maya bhandari | 9849196667 |
| | 4 | Aakashe, Buspark, Airport | Ramesh phuyal | 9841565505 |
| | 5 | Mugitar | Ram prasad pasai | 9844282675 |
| Sindhupalchwok | 1 | chautara | Olaf rosset | 9809675784 |
| | 2 | nearby Hospital | Ram bhandari | NA |
| | 1 | purano bazar | Chandika kakshapati | 9841979494 |
| | 2 | sagam chowk | Kapilo Parajuli | 9843799535 |
| Kavre | 1 | bus Park camp | Jeet Bahadur Shrestha | 9849187906 |
| | 2 | chinese camp | Bimala Gurung | 9741089106 |
| Nuwakot | 1 | Chaugada | Hem B Pyakurel | 9841683484 |
| | 2 | Bidur Municipality | NA | NA |
| Rasuwa | 1 | Haku V.D. C | Narayan pd. Sharma | 9849831294 |
| | 2 | Dunche | Shanti tamang | 9813241051 |
| Gorkha | | finam | Bishnu thapa magar | 9860187922 |
| Dhadhing | | khalte vdc | Ramesh B.K | NA |

**Annex 3: Population landscape based on conversation with local health workers in camps and settlements**

| Districts | | Camps/settlements | Total population | Under 5 | | Under 15 | | Pregnant women | |
|---|---|---|---|---|---|---|---|---|---|
| | | | n | n | % | n | % | n | % |
| Inside Kathmandu Valley | Lalitpur | Buspark camp | 1000 | 50 | 5.0 | 100 | 10.0 | 2 | 0.2 |
| | | Madam memorial | 600 | 50 | 8.3 | 115 | 19.2 | 3 | 0.5 |
| | | Lalitpur metro camp | 600 | 40 | 6.7 | 160 | 26.7 | 6 | 1.0 |
| | | Bridaashram camp | 300 | 4 | 1.3 | 30 | 10.0 | 0 | 0.0 |
| | | Patan HS School camp | 300 | 20 | 6.7 | 30 | 10.0 | 0 | 0.0 |
| | | harisiddhi | 350 | 40 | 11.4 | 30 | 8.6 | 2 | 0.6 |
| | | **Subtotal** | **3150** | **204** | **6.5** | **465** | **14.8** | **13** | **0.4** |
| | Bhakatapur | Maheswori camp | 2100 | 300 | 14.3 | 900 | 42.9 | 5 | 0.2 |
| | | Padma HS School Camp | 3000 | 500 | 16.7 | 500 | 16.7 | 5 | 0.2 |
| | | **Subtotal** | **5100** | **800** | **15.7** | **1400** | **27.5** | **10** | **0.2** |
| | Kathmandu | Bhagwati-Sakhu | 250 | 25 | 10.0 | 50 | 20.0 | 0 | 0.0 |
| | | Chuigaun | 90 | 10 | 11.1 | 20 | 22.2 | 0 | 0.0 |
| | | Machchegaun | 353 | 47 | 13.3 | NA | NA | 5 | 1.4 |
| | | Pangaa | 2500 | NA | NA | 50 | 2.0 | 10 | 0.4 |
| | | Tudikhel | 4548 | 632 | 13.9 | 632 | 13.9 | 75 | 1.6 |
| | | Sinamangal | 1500 | 250 | 16.7 | 500 | 33.3 | 10 | 0.7 |
| | | Ramkot -4 camp | 500 | 15 | 3.0 | 30 | 6.0 | 5 | 1.0 |
| | | Sitapaila health post camp | 100 | 4 | 4.0 | 8 | 8.0 | 0 | 0.0 |
| | | Chucepati | 2000 | 400 | 20.0 | NA | NA | 17 | 0.9 |
| | | **Subtotal** | **11841** | **1383** | **11.7** | **1290** | **10.9** | **122** | **1.0** |
| Outdside Kathmandu valley | Ramechhap | DDC camp | 300 | 40 | 13.3 | 100 | 33.3 | 3 | 1.0 |
| | | Bhatauli/Thodekhola | 250 | 35 | 14.0 | 80 | 32.0 | 5 | 2.0 |
| | | Rajagaun | 700 | 50 | 7.1 | 120 | 17.1 | 5 | 0.7 |
| | | Aakashe, Buspark, Airport | 500 | 50 | 10.0 | 120 | 24.0 | 4 | 0.8 |
| | | Mugitar | 350 | 50 | 14.3 | 110 | 31.4 | 7 | 2.0 |
| | | **Subtotal** | **2100** | **225** | **10.7** | **530** | **25.2** | **24** | **1.1** |
| | Sindhupalchwok | chautara | 300 | 50 | 16.7 | 150 | 50.0 | 2 | 0.7 |
| | | nearby Hospital | 100 | 10 | 10.0 | 15 | 15.0 | 0 | 0.0 |
| | | purano bazar | 200 | 15 | 7.5 | 20 | 10.0 | 0 | 0.0 |
| | | sagam chowk | 150 | 20 | 13.3 | 15 | 10.0 | 0 | 0.0 |
| | | **Subtotal** | **750** | **95** | **12.7** | **200** | **26.7** | **2** | **0.3** |
| | Kavre | bus Park camp | 18 | 4 | 22.2 | 10 | 55.6 | 0 | 0.0 |
| | | chinese camp | 200 | 30 | 15.0 | 40 | 20.0 | 0 | 0.0 |
| | | **Subtotal** | **218** | **34** | **15.6** | **50** | **22.9** | **0** | **0.0** |
| | Gorkha | finam | 3000 | 500 | 16.7 | 850 | 28.3 | 89 | 3.0 |
| | Dhadhing | khalte vdc | 7000 | 798 | 11.4 | 2600 | 37.1 | 209 | 3.0 |
| | Nuwakot | Chaugada | 1500 | 400 | 26.7 | 700 | 46.7 | 5 | 0.3 |
| | | bidur | 55 | 13 | 23.6 | 23 | 41.8 | 1 | 1.8 |
| | | **Subtotal** | **1555** | **413** | **26.6** | **723** | **46.5** | **6** | **0.4** |
| | Rasuwa | Dunche | 67 | 22 | 32.8 | 39 | 58.2 | 0 | 0.0 |
| | | Haku V.D. C | 600 | 200 | 33.3 | 350 | 58.3 | 22 | 3.7 |
| | | **Subtotal** | **667** | **222** | **33.3** | **389** | **58.3** | **22** | **3.3** |
| **Total** | | | **35381** | **4674** | **13.2** | **8497** | **24.0** | **497** | **1.4** |

**Annex 4: Ranking of 14 affected districts based on key factors assessed during our field visits**

Copy of Risk ranking new.xlsx

**Annex 5: Risk assessment tools adapted from DOVE project / John Hopkins University**

**District:** _____

**Respondent:** _____

**Position:** _____

**Tel./Mobile #:** _____

**Person completing**: _____

**Date:** _____

**Note:**

Do not forget to collect Photo Evidence of anything relevant to this assessment.
Eg; Flooding, landslides, glimpse of settlement, stool from the patient, condition of water and sanitation, food hygiene and feeding practice

## Section 1: District resources and capacity

| | Question | Yes | No | Remarks |
|---|---|---|---|---|
| 1 | Has there been updated training of providers in diarrhoea case management during the last year? | | | |
| 2 | Is a stock of Ringer's lactate available in case of a cholera outbreak? | | | How many bottles? ..... |
| 3 | Is a stock of ORS available in case of an outbreak? How many Sackets? | | | How many Sets? ..... |
| 4 | Is a stock of IV sets available in case of a cholera outbreak? | | | How many Sets? ..... |
| 5 | Is there a designated person responsible for receiving emergency calls from health facilities in case cholera cases are diagnosed? | | | Name and Contact number ..... ..... |
| 6 | Is the telephone number for such emergency calls known by each of the facilities in the district? | | | Emergency Contact number ..... |
| 7 | Does the district have clear mechanisms for reporting cases of cholera? | | | Do you have a protocol? ..... |
| 8 | Does the district have a plan for confirming the diagnosis of cholera from a representative sample of patients suspected of having cholera? | | | Do you have a protocol? ..... |
| 9 | Have you considered vaccination among the tools to prevent or | | | If No, explain (tell us why?) ..... |

| | Question | Yes | No | Remarks |
|---|---|---|---|---|
| | control a cholera epidemic? | | | |
| 10 | If yes, would you be able to vaccinate the people in your camp/place? | | | |
| 11 | Do you the number of camps in the district? | | | If yes, Specify the number of camps ..... |
| 12 | Do you know how many people are displaced in the district? | | | If yes, Specify the estimated number of displaced population ..... |

**Name of the camp/temporary settlement:**_____

**District:** _____

**Respondent:** _____

**Affiliation:** _____

**Tel./Mobile:** _____

**Person completing**: _____

**Date:** _____

## Section 2: Description of the camp/temporary settlement

| | Question | Answer | Remarks |
|---|---|---|---|
| 1 | How many people are temporarily sheltered in this camp/place? | Specify the number ..... | |
| 2 | How many of the residents are children under 5yr? | Specify the number ..... | |
| 3 | How many residents are under 15yr? | Specify the number ..... | |
| 4 | How many pregnant women are in the camp/place? | Specify the number ..... | |
| 5 | Where does the water come from? Indicate source and distance? | Specify the source ..... | 1. Spring water *(Kuwa)*<br>2. Pond<br>3. River<br>4. Tap water<br>5. Others..... |
| 6 | Does the water supply appear safe? | Tick one<br>a. Yes b. No | If No, explain .....<br>.....<br>..... |

| | | | |
|---|---|---|---|
| 7 | If yes, how do you treat? | | 1. Boiling<br>2. Chlorination *(Piyush/Waterguard)*<br>3. Filtration<br>4. SODIS |
| 8 | Where do people store their drinking water?<br>Water for washing? | | |
| 9 | Do the camp/place residents have enough food? | | |
| 10 | Are there latrines? | | |
| 11 | If yes, what type of latrines? | Categorize<br>..... | |
| 12 | Are they in good hygienic condition? | Tick one<br>a. Yes b. No | |
| 13 | How many latrines in the camp/place?<br>(to calculate number latrines/residents) | Number<br>..... | |
| 14 | Are people using the latrines or use open defecation? | Tick one<br>a. Latrine b. Open defecation | |
| 15 | Do you have electricity in the camp/place | Tick one<br>a. Yes b. No | |

## Section 3: Health facility's capacity to manage a major cholera outbreak

| | Question | Answer | Remarks |
|---|---|---|---|
| 1 | Is there a health care facility for camp/place residents? | Tick one<br>a. Yes b. No | |
| 2 | Do you know what is **CHOLERA**? | Tick one<br>a. Yes b. No | |
| 3 | If yes, do you report **CHOLERA immediately** ? | Tick one<br>a. Yes b. No | |
| 4 | If yes, how do you report **CHOLERA** cases **immediately** ? | Explain | To whom do you report cholera cases? |
| 5 | Does the facility keep records of cholera patients and their clinical outcome? | Tick one<br>a. Yes b. No | If yes, do you have the clinical cholera case history/records? |
| 6 | Does the facility have supplies (swabs, container with transport media) for obtaining a stool specimen from a suspected cholera patient in order to confirm the diagnosis? | Tick one<br>a. Yes b. No | |
| 7 | If yes, how do you transport maintaining cold chain, and where? | | |
| 8 | Can you provide IV fluids for | Tick one | |

| | Question | Answer | Remarks |
|---|---|---|---|
| | patients with acute watery diarrhoea? | a. Yes b. No | |
| 9 | How many health care provider are working in this health care facility? | Mention the Number ..... | |
| 10 | Is the clinic open 24 hours a day? | Tick one<br>a. Yes b. No | |
| 12 | How many health personal are available to work 24 hours a day? | | |
| 13 | Are hands washing stations adequate? | Tick one<br>a. Yes b. No | |
| 14 | Was there cholera outbreak in past year in the neighbourhood? | Tick one<br>a. Yes b. No | If yes, mention year and place of outbreak |
| 15 | Number of Diarrheal cases reported Post Earthquake (Current trend) | | |

| Age | 26 | 27 | 28 | 29 | 30 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <5 | | | | | | | | | | | | | | | | | | | | | | |
| >5 | | | | | | | | | | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | | | | | | | | | | |

| | | | |
|---|---|---|---|
| 16 | What is the biggest health problem in your camp/place right now? | Explain | Enquire about<br>**1**. **Typhoid fever**<br>**2. Viral Hepatitis**<br>**3. Fever cases**<br>**4. Safety**<br>**5. Others.....** |

## Section 4: Preparedness for response to possible Cholera Outbreak

| | Topic | Answer | Remarks |
|---|---|---|---|
| 1 | Has the community recently received key messages about cholera symptoms? | Tick one<br>a. Yes b. No | |
| 2 | Where should people seek treatment if they have severe diarrhoea? | Mention the place<br>..... | 1. Public Health facilities<br>2. Private Health facilities<br>3. Traditional healers<br>4. At home |
| 3 | How long it takes from the community to nearest health facility? | Hours/minutes<br>..... | |
| 5 | Is oral rehydration solution (packets) available in the community/camp for patients? | Tick one<br>a. Yes b. No | Where you will get ORS *(Jeevanjal)* ? |
| 6 | If a patient dies of severe diarrhoea in the community, are there ways that the death | Tick one<br>a. Yes b. No | If yes, explain how? |

| | Topic | Answer | Remarks |
|---|---|---|---|
| | can be quickly reported to the district health authorities? | | |
| 7 | Have you considered vaccination among the tools to prevent or control a cholera epidemic? | Tick one<br>a. Yes b. No | |
| 8 | Would you be able to vaccinate the people in your camp/place? | Tick one<br>a. Yes b. No | |

**For the interviewer**:

| Category | Criterion | Impressions |
|---|---|---|
| Local context | Areas located on trade routes<br>• Areas crossed by big roads, bus terminals, junctions<br>• Areas with regular influx of travelers, intensive trading activities, market places | |
| | Unusual weather pattern<br>• Heavy rainy seasons, flooding, droughts, periods of abnormally high temperature | |
| | Population mobility and lifestyle<br>• Urban/Rural setting<br>• Population type (ethnicity)<br>• High population density<br>• Areas with slums or IDP settlements<br>• Areas at the origin of cholera outbreaks in the past | |
| | Other contextual factors<br>• Reduced access to WASH or treatment due to security constraints | |
| Organization of care and capacity to improve | Conditions of care<br>• Availability of ambulance(s) at all time | |
| | WASH conditions<br>• Drainage systems<br>• System of waste management<br>• System/procedures for the management of dead bodies of cholera | |

Based on the criterion above, what is your impression of the camp/place? Do you think this camp/place is at high risk for a cholera outbreak? Can you explain why or why not?