



# LESSONS LEARNED WORKSHOP ON CHOLERA PREPAREDNESS AND RESPONSE IN NEPAL Workshop Report



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### FOREWORD

I am very happy to be associated with this important workshop on lessons learned on the prevention and response to cholera in Nepal. The Epidemiology and Disease Control Division (EDCD) led a new initiative in 2016 to introduce the comprehensive targeted intervention approach for preventing and responding to cholera outbreaks. I would like to thank the many people who were involved in this successful initiative and this lesson learning workshop.

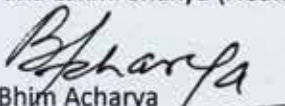
I first of all thank my colleagues in EDCD for their hard work on introducing this new approach, in particular Dr Guna Nidhi Sharma (Chief of Epidemiology and Disaster Section), Badri Nath Jnawali (Chief of Surveillance and Research Section), Resham Lamichhane (Public Health Officer) and Bhim Prasad Sapkota (Public Health Administrator, Ministry of Health).

I would like to thank the Department of Water Supply and Sanitation (DWSS) and its district offices and especially Narayan Prasad Khanal (Chief of Water Quality Section, DWSS) and Phatta Bahadur Chhetri (Chief of SSDWO, Lalitpur).

I also express gratitude to the following organisations and their staff who ensured the success of the CTI project and the workshop:

- The National Public Health Laboratory's Dr Geeta Shakya (Director), Dr Raj Kumar Mahato (Chief Consultant Pathologist) and Jyoti Acharya (Senior Medical Technologist) and their staff for testing samples and training the lab technicians of the sentinel hospitals.
- The staff of Lalitpur, Kathmandu and Bhaktapur district public health offices (DPHOs) for implementing the district level activities on responding to cholera cases and raising awareness on WASH good practices.
- The Group for Technical Assistance (GTA), led by Deepak C Bajracharya (President) and Dr Shyam Raj Upreti (Public Health Advisor) for providing the logistical and technical support for the project and the workshop.
- ENDO, ENPHO, CDO Nepal, Oxfam and other Unicef WASH partners for helping rollout field activities.
- Professor David Sack, Mellisa Roskosky and their associates at Johns Hopkins University for their technical guidance.
- The local people who enthusiastically took part in the community level CTI project activities.
- Stephen Keeling and Kshitij Karki for producing this workshop report.

Finally, I must acknowledge the technical and financial support of Unicef without which this work could not have gone ahead. Thanks to Dr Hendrikus Raaijmakers (then Chief of Health Section), Kazutaka Sekine (Health Specialist), Arinita Maskey (WASH Specialist), Surendra Rana (Emergency Specialist), Karuna Laxmi Shakya (Health Officer) and Luna Kansakar (WASH Officer).

  
Dr Bhim Acharya  
Director, EDCD

**Director**



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# Abbreviations and Acronyms

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AGE	Acute Gastroenteritis
AWD	Acute Watery Diarrhoea
BCC	Behaviour Change Communication
CTI	Comprehensive Targeted Intervention
DoHS	Department of Health Services
DOVE	Delivering Oral Cholera Vaccine Effectively
DPHO	District Public Health Office
DWSS	Department of Water Supply and Sanitation
EDCD	Epidemiology and Disease Control Division
ENDO	Environment and Development Organization
ENPHO	Environment and Public Health Organization
EWARS	Early Warning and Reporting System
FCHV	Female Community Health Volunteer
GTA	Group for Technical Assistance
JHU	Johns Hopkins University
KUKL	Kathmandu Upatyaka Khanepani Limited
KVWSMB	Kathmandu Valley Water Supply Management Board
LSMC	Lalitpur Sub-Metropolitan City
MoH	Ministry of Health
NPHL	National Public Health Laboratory
OCV	Oral Cholera Vaccine
RDT	Rapid Diagnosis Test
RRT	Rapid Response Team
SOPs	Standard Operating Procedures
UEMS	Urban Environment Management Society

Unicef	United Nations Children Fund
WASH	Water, Sanitation and Hygiene
WHO	World Health Organisation
WSP	Water Safety Plan
WSSDO	Water Supply and Sanitation Division Office



## 1.1 Cholera in Nepal

Cholera is endemic in Nepal. In recent years, the Department of Health Services has recorded several cholera cases per year in Nepal including Kathmandu Valley. The actual number of cases is thought to be higher because of the limited coverage of the surveillance system.

Cholera is a public health problem in Nepal as many people still live in unhygienic conditions with only limited access to safe drinking water and sanitation facilities. Cholera thus poses the threat of reaching epidemic proportions in the annual 'cholera season' during each year's monsoon. The cholera threat came to public attention in 2015 when an epidemic was feared in the aftermath of the April and May earthquakes due to the damage to drinking water and sanitation facilities and the displacement of tens of thousands of people. The government declared a local cholera outbreak in Kathmandu District in 2015. There was no epidemic although the potential threat heightened awareness of the need to improve prevention and preparedness capacity.

In order to respond to the potential cholera threat, the Epidemiology and Disease Control Division of the Department of Health Services implemented the 'Comprehensive Targeted Intervention (CTI) for Cholera Control in the Kathmandu Valley' in the year 2016. This project was supported by Unicef Nepal, John Hopkins University's (JHU), Delivering Oral Cholera Vaccine Effectively (DOVE) Project, and the Group for Technical Assistance (GTA) Nepal. The project was implemented from 18 April to 31 December 2016.

### The CTI approach incorporates:

- the enhanced surveillance of acute watery diarrhoea including cholera;
- household investigation and water quality testing in cholera reported communities;
- community awareness raising on good water, sanitation and hygiene (WASH) practices;
- targeted ring vaccination against cholera; and
- improved coordination between government and non-government health and WASH agencies.

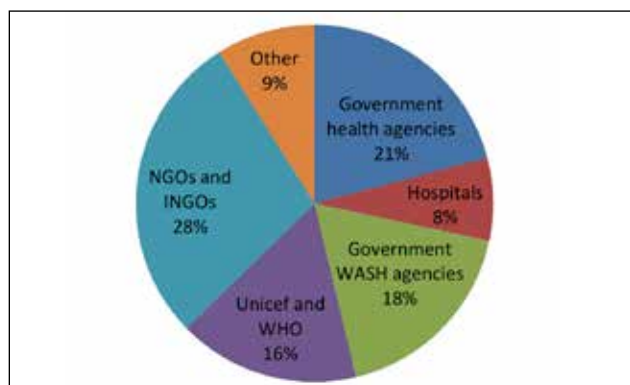
It is the first time that a comprehensive approach was implemented in Nepal to prevent and control cholera. The shape and successes of this initiative are explained in Chapter 3 of this report. The main success was the improved reporting and investigation of all suspected cholera cases and improved laboratory testing for confirming cholera cases. The initiative also led to a more timely, coordinated and integrated response to all the reported cholera cases resulting in no deaths amongst the identified cholera cases while the spread of the outbreak was contained.

## 1.2 Purpose of the Workshop

This document reports the proceedings of a workshop held at the Himalaya Hotel in Lalitpur on 15 December 2016 to reflect the successes and challenges faced by the CTI project and the country's cholera control programme. Sixty-six participants from government, non-government

sector as well as United Nations stakeholders were also present. The meeting was attended by many officials from central, district and line agency WASH and health agencies (see list of participants at Annex 1 and breakdown by type of participant at Figure 1.1).

**Figure 1.1: Cholera lesson learned workshop participants by type**



The overall goal of the workshop was to strengthen government-led preparedness and response for cholera outbreaks.

#### The specific objectives were to:

- bring together the main stakeholders for the opportunity to reflect on cholera preparedness and responses and to discuss lessons learned from the 2016 cholera response; and
- draw out and document insights for a national plan for cholera preparedness and response.

The main purpose was thus to reflect on the experiences of participants, including the lessons learned from the 2016 enhanced response in the Kathmandu Valley, with the aim of contributing to the preparation of a national cholera preparedness and response plan.

### 1.3 Proceeding of the Workshop

The workshop began with presentations on the situation of cholera in Nepal and the 2016 CTI

response in the Kathmandu Valley (see Chapters 2 and 3). Following this, four representatives from major agencies working on cholera prevention and control in Nepal presented on the situation of cholera prevention and preparedness in Nepal. It was followed by the main part of the workshop — seven structured group discussions on the main subject related to cholera prevention and preparedness, which are reported in Chapter 5. A follow-up workshop is planned for early 2017 where the main lessons learned and issues identified from the current workshop will be shared with high level officials from the major stakeholder agencies.

### 1.4 Welcome Address

Dr Bhim Acharya, the director of the Epidemiology and Disease Control Division (EDCD), began the workshop by welcoming all participants. The EDCCD is the lead agency for the health response to cholera in Nepal.

*Cholera outbreaks happen in Nepal every year. Large efforts are still needed to improve Nepal's drinking water infrastructure to remove the main cause of cholera.*

Dr Acharya explained how cholera is a major public health issue in many developing countries, which is directly related to the quality of drinking water, sanitation and hygiene. He further stated that, although the situation has improved in Nepal, greater efforts are still needed to improve Nepal's drinking water infrastructure to eliminate the main cause of cholera. He explained how cholera outbreaks happen in Nepal every year with 169 cases confirmed from the country alone in 2016; although the number of cases is usually under-reported.

He concluded by hoping that the workshop would identify lessons learned from recent initiatives towards improving Nepal's cholera control programme.

# Cholera Epidemiology and Comprehensive Targeted Interventions for cholera control

## CHAPTER 2

Presented by Dr Guna Nidhi Sharma (EDCD) on behalf of Dr Bhim Acharya, Director of Epidemiology and Disease Control Division (EDCD)

### 2.1 Cholera in Nepal

Cholera is constantly present (endemic) in many parts of Nepal. Cases are reported almost every year in the Kathmandu Valley, especially during the annual rainy season. Frequent sporadic outbreaks occur each year in other areas of the country. Cholera cases are published in the Epidemiology and Disease Control Division's (EDCD's) weekly Early Warning and Reporting System (EWARS) bulletins. However, the true picture is not known as the existing surveillance of cholera does only cover 82 sites throughout Nepal (currently operational 61 hospitals).

Between 1,744 and 5,042 clinical cholera cases were recorded by the Health Management Information System (HMIS) in the four years from mid-July 2010 to mid-July 2014 (Table 2.1). The highest proportion of reported cases by region was in the central region in 2013 and 2014.

### 2.2 Rationale of Comprehensive Targeted Interventions

Cholera cases are usually clustered in time and space as shown in the example from Bangladesh at Figure 2.1. This means that persons living nearby a case are at increased risk. The highest risk of other people contracting cholera is in the first week in the same households. The increased risk extends to three weeks from the first occurrence.

The clustering of cases can be due to either to a common source or to transmission from index cases. Comprehensive targeted interventions (CTIs) usually do not assume one or the other cause but do recognize that index cases can be a source of outward transmission.

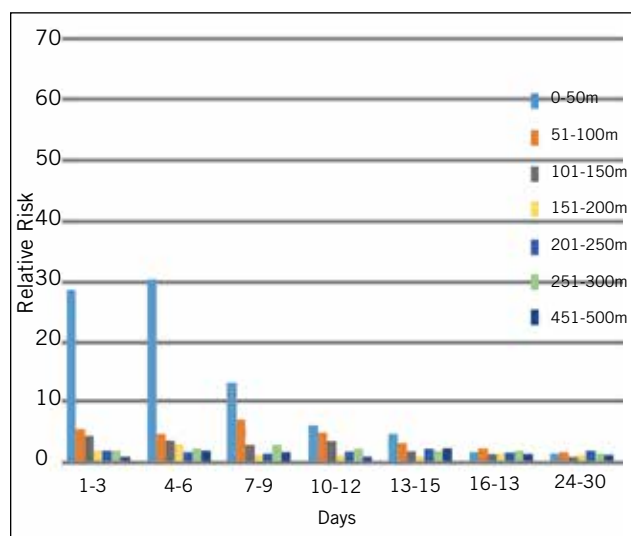
Comprehensive targeted interventions are an attempt to interrupt cholera transmission to those at highest risk by implementing a comprehensive

**Table 2.1: Regional trends of cholera cases (Source: Department of Health Services annual reports)**

		2067/68 (2010/11)		2068/69 (2011/12)		2069/70 (2012/13)		2070/71 (2013/14)	
		n	%	n	%	n	%	n	%
1	Eastern region	2101	45.9	488	28.0	939	18.6	824	19.8
2	Central region	825	18.0	431	24.7	2428	48.2	2616	62.7
3	Western region	443	9.7	302	17.3	447	8.9	205	4.9
4	Mid-Western region	863	18.9	115	6.6	525	10.4	54	1.3
5	Far Western region	345	7.5	408	23.4	703	13.9	471	11.3
	National	4,577	100	1,744	100	5,042	100	4,170	100

and integrated package of enhanced surveillance, improved laboratory work, and appropriate responses including WASH and vaccination interventions. This is usually the most cost effective strategy for containment especially when vaccines are in short supply. CTI is a way of making the best use of limited vaccine supplies.

**Figure 2.1: Cholera cases clustered in time and space (Matlab Bangladesh) (Source: Implications for targeted preventive interventions. Debes AK, et al. Submitted for publication).**



Until 2016, there was little progress on integrating WASH interventions and vaccinations in Nepal as there was no practical way of doing it. *Comprehensive* targeted interventions provide such a technique and are needed as improved surveillance, investigation and WASH and vaccine interventions are all needed to prevent the spread of cholera.

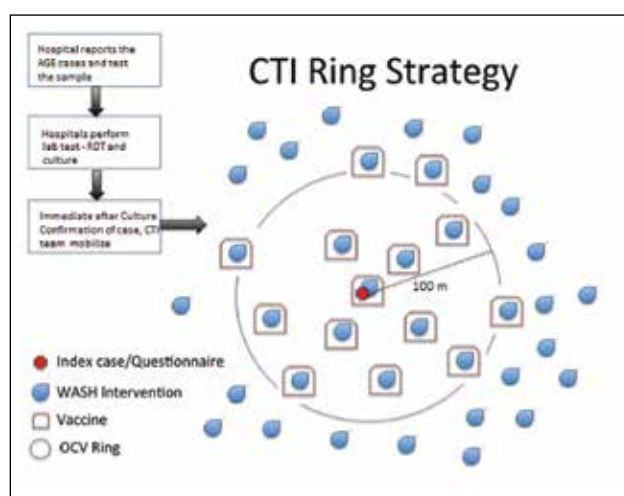
The CTI approach is an integrated comprehensive response to cholera cases to contain outbreaks as:

- it requires clinical, laboratory and field staff to work together as teams;
- it depends on rapid responses with clinicians identifying cases; and
- it depends on rapid responses as cases need to be confirmed by carrying out the dipstick test on faecal specimens. Note that

enriched dipstick tests can initiate action although specimens still need to be sent to a microbiology lab to obtain isolates.

In planning for CTI, WASH and vaccine teams must understand and reinforce each other's messages. WASH messages should reach a wider area but vaccination is needed within 100 metres of index cases (see Figure 2.2). And responses need to happen within 1–2 days of a case being reported as later responses will bring fewer benefits.

**Figure 2.2: The CTI ring strategy**



## 2.3 Enhanced Surveillance in 2016

The introduction of the CTI approach in the Kathmandu Valley in 2016 resulted in:

- enhanced surveillance in 14 Kathmandu Valley hospitals and one Dhulikhel hospital (Table 2.2), with them reporting new suspected cholera cases daily to EDCD's CTI team on a standard format (checklist), which was regularly disseminated to major stakeholders;
- a total of 2,376 acute watery diarrhoea (AWD) cases being reported between 1 June and 14 December 2016 of which 239 were clinically diagnosed as suspected cholera; and
- enhanced laboratory capacity, which identified 169 culture-confirmed cases of *Vibrio cholerae* (O1 Ogawa).

**Table 2.2: The 15 sentinel hospitals**

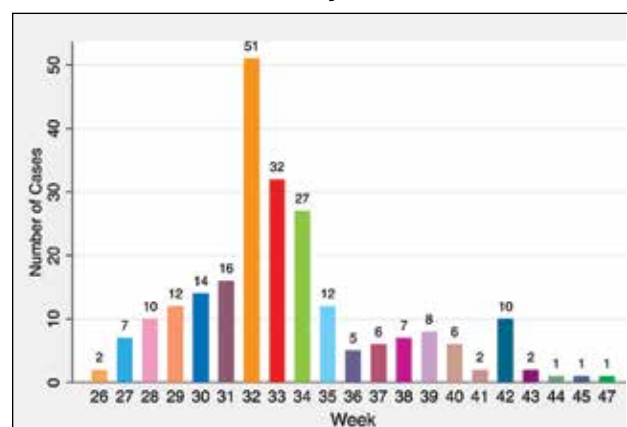
	Hospital	District
1	Bhaktapur Hospital	Bhaktapur
2	Siddhi Memorial Hospital	Bhaktapur
3	Kathmandu Medical College	Kathmandu
4	Kanti Children’s Hospital	Kathmandu
5	Nepal Medical College	Kathmandu
6	Prison Hospital	Kathmandu
7	Sukraraj Tropical and Infectious Disease Hospital	Kathmandu
8	Birendra Sainik Hospital	Kathmandu
9	Patan Academy of Health Sciences	Lalitpur
10	<i>KIST Medical College and Teaching Hospital</i>	Lalitpur
11	B&B Hospital	Lalitpur
12	Star Hospital	Lalitpur
13	Alka Hospital	Lalitpur
14	Sumeru Hospital	Lalitpur
15	Dhulikhel Hospital	Kavre

## 2.4 Distribution of Cholera Cases

The distribution of the laboratory confirmed cholera cases was as follows in terms of timing, age group and gender:

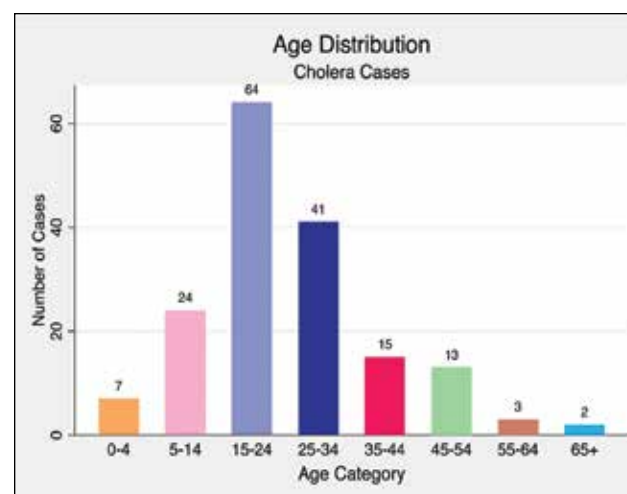
All the confirmed cholera cases happened during the monsoon season (Figure 2.3). Almost a half (47%) of all these cases were reported in a three-week period in August (weeks 32, 33 and 34, i.e. 5-25 August 2016).

**Figure 2.3: Distribution of occurrence of lab confirmed cholera cases by week in 2016 (n=232)**



The highest proportion of the 169 lab-confirmed cases were among 15–24 year olds (38%), and 25–34 year olds (24%) (Figure 2.4). Also, the average age of the cholera cases was 10 years less than for acute watery diarrhoea cases, which is a statistically significant difference (Table 2.3).

**Figure 2.4: Distribution of cholera cases by age (n=169)**



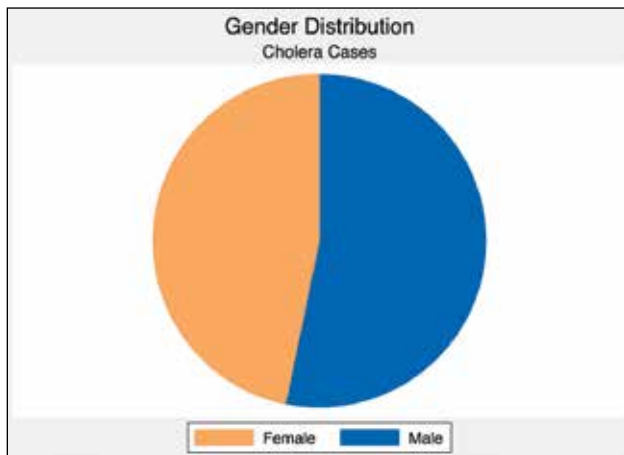


**Table 2.3: Average age of cholera cases and acute watery diarrhoea (AWD) cases**

Group	Cholera	AWD	Combined
No. cases	168	2,186	2,354
Age (years)	25.46	35.20	34.50

Slightly more of the 2016 cholera cases were female cases (Figure 2.5). Also, a slightly higher proportion of cholera cases were male compared to AWD cases (not significant) (Table 2.4).

**Figure 2.5: Distribution of cholera cases by gender (n = 169)**

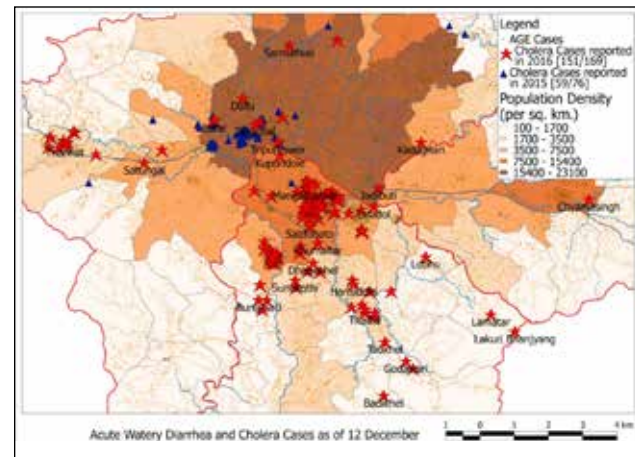


**Table 2.4: Percentage of males among cholera and AWD cases**

Group	Cholera	AWD	Combined
No. cases	169	2,193	2,362
% male	46.75	44.46	44.62

In 2016 the 15 sentinel hospitals reported 169 lab-confirmed cholera cases. These cases originated from six districts. The three Kathmandu Valley districts accounted for 151 (89%) of the 169 cases (Lalitpur 119, Kathmandu 31, Bhaktapur 1) originating from 34 places in the Valley (Figure 2.6). The other 19 cases originated from Dhading, Saptari and Kavre districts. The district was unknown in 3 cases.

**Figure 2.6: Distribution of NPHL-confirmed cholera cases in the Kathmandu Valley in 2015 and 2016**



## 2.5 Case Investigation

Upon the laboratory confirmation of a cholera case, a member of the CTI team administered a questionnaire to the case to capture the socio-demographic characteristics and the sources of drinking water and the WASH related behaviour and practices of the households. Questionnaires were completed for 132 (79%) of the 169 confirmed cholera cases. The missing cases were mostly due to early discharge from hospital and failure to get contact information. Contact information was usually obtained during hospital investigations and the team followed-up by visiting cases at home to conduct in-depth household investigations. The questionnaire was administered either at the hospital or at cases' homes.

A total of 92 household investigations were carried out in 2016 under the CTI project including over 400 individual interviews and the testing of 180 water samples.

Three of these samples were found positive for *V. cholerae* (O1 Ogawa). These positive samples were one each from a traditional stone tap (*dhunge dhara*), stored mains water and stored tanker-delivered water. Coliform bacteria were found in 156 (86%) of 181 tested water sources, thus rendering them unsuitable for drinking.



**Table 2.5: Main sources of drinking water for cholera and AWD cases**

Group	Tap	Jar	Stone tap	Tanker	Spring	Well	Total
Cholera cases	41	24	12	10	7	4	98
%	41.84	24.49	12.24	10.20	7.14	4.08	100
AWD cases	14	8	3	2	4	3	34
%	41.18	23.53	8.82	5.88	11.76	8.82	100
Combined	55	32	15	12	11	7	132

**Table 2.6: Whether or not confirmed cholera cases used treated drinking water at home (n = 132)**

Type	Treated		Not treated		Total
	No.	%	No.	%	No.
Cholera cases	78	79.6%	20	20.4%	98
AWD cases	22	64.7%	12	35.3%	34
Combined (cholera & AWD cases)	100	100%	32	24%	132

## 2.6 Distribution of Water Sources and Water Treatment

Most of the cholera and AWD patients interviewed in the 15 sentinel hospitals reported that tap water as their primary source of drinking water (Table 2.5). Almost a quarter (24%) of cholera and AWD patients interviewed in the 15 sentinel hospitals reported not treating their primary source of drinking water (Table 2.6).

## 2.7 Response Activities – WASH interventions and Ring Vaccination

ECD, in coordination with Kathmandu, Bhaktapur and Lalitpur district public health offices (DPHOs), Unicef, GTA, and other partners subsequently carried out a series of WASH interventions around the cholera case households (see details in Chapter 3 of this report). Ten campaigns were conducted in nine areas of Lalitpur using than 700 volunteers. Activities included health education messaging, the distribution of Piyush for water disinfection and purification, water quality testing, surveys, and the broadcast of health messages (miking). Under the planned ring vaccination activity, oral

cholera vaccine (OCV) was to be provided to all people in index case households and households located within 100 metres of index cases. The recommended practise is for ring vaccination to be carried out even when only a single case is identified. Although preparations were made for carrying out ring vaccination in conjunction with WASH activities, unfortunately the decision to carry it out was delayed and so ring vaccination did not take place.

## 2.8 Lessons

- Comprehensive targeted interventions (surveillance, investigation, WASH interventions and ring vaccination) can strengthen early case detection and prompt action for prevention and control. (Note that no deaths resulted from the 2016 cholera cases reported to the 15 sentinel hospitals).
- The need to strengthen and expand the surveillance and investigation of acute watery diarrhoea and cholera.
- The advantages of enhanced collaboration and coordination with multiple health and WASH stakeholders.

- d) All main stakeholders should be orientated on the concept and implementation modalities of the comprehensive targeted intervention approach at the beginning of such interventions.
- e) Ring vaccination should be carried out in conjunction with WASH interventions.
- F) A cholera preparedness and response plan needs to be urgently developed in Nepal to guide stakeholders for controlling cholera in a coordinated and integrated way.

# The WASH Response to the 2016 Cholera Outbreak in the Kathmandu Valley

## CHAPTER 3

Presented by Phatta Bahadur Chhettri, Water Supply and Sanitation Division Office (WSSDO), Lalitpur

### 3.1 Water and Sanitation for Health (WASH) Situation in Nepal

Although Nepal has made good progress on improving access to safe drinking water and sanitation facilities, further improvements are needed as:

- 83.6% of the population use an improved drinking water source (MDG progress report, 2016);
- the Multiple Indicator Cluster Survey (MICS), 2014 found that 71% of sample households had E. coli in their drinking water sources and 82% had E. coli in their household drinking water; and
- 87.17% of the population have access to sanitation facilities while the MICS survey, 2014 found that only 72.5% of households had a specific place for handwashing where water and soap or other cleansing agent were present.

Many poorer households, migrant workers, slum dwellers and people living in temporary low grade accommodation (including people displaced by the earthquakes) in the Kathmandu Valley also lack access to safe water and sanitation facilities.

### 3.2 Kathmandu Valley Cholera Outbreak, 2016

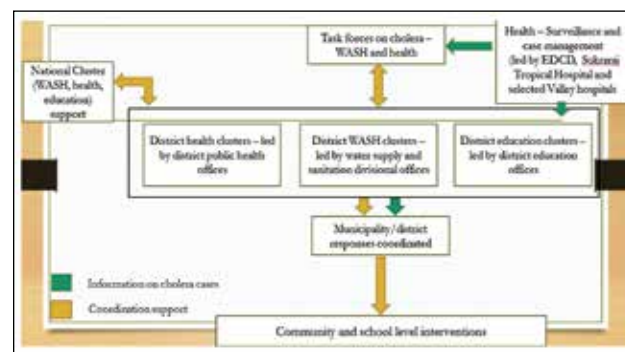
The Kathmandu Valley is densely populated. There was an outbreak of cholera in the Valley in the 2016 monsoon season (July to September

2016) with 120 of the cases in Lalitpur Sub-Metropolitan City (LSMC) and adjoining areas of Lalitpur district to the south (see Figure 2.6 in previous chapter).

### 3.3 National Coordination Mechanism

The national coordination mechanism for responding to cholera outbreaks operates at the national, cluster, district and municipality levels (Figure 3.2). The mechanism is headed by the Cholera Response Task Force, which was formed in 2015 by the Steering Committee for Enteric Disease Control (DoHS).

Figure 3.2: Coordination mechanism for cholera response (Nepal)



This task force is chaired by the EDCD director with membership from concerned health and WASH agencies. The committee's main role is to decide on preparedness and response strategies. District health, WASH and education government and non-government organisations operate in accordance with task force directions in coordination with local government bodies.

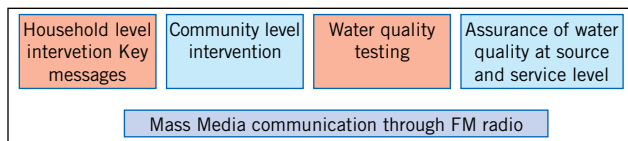
### 3.4 The Response in Lalitpur Sub-Metropolitan City

The response to the 2016 Lalitpur cases was as follows:

- a) The Cholera Response Taskforce was immediately activated.
- b) Lalitpur district health and WASH clusters held a joint meeting and decided on actions to prevent the spread of cholera.
- c) The Health Surveillance Team was activated in Lalitpur, Kathmandu and Bhaktapur districts for detection and follow up in affected areas.
- d) Improved hygiene was promoted by WASH and health personnel and volunteers.

The response happened at the household and community levels and on water testing and quality assurance (Figure 3.3).

**Figure 3.3: Key intervention components – led by LSMC public health division (Lalitpur 2016)**



#### Community and Household Level Response

More than 700 WASH and health volunteers were trained and mobilized and then carried out door-to-door awareness campaigns. The volunteers provided orientations on cholera prevention and distributed information and education communication (IEC) materials on point-of-use water treatment, handwashing and food and personal hygiene. They also carried out water quality testing along with government personnel.

The following other community level interventions were carried out:

- Booth campaigns were run at strategic locations and awareness rallies.
- Cholera prevention messages were broadcast from mobile vehicles and at rallies.

- Awareness raising sessions were run for community groups and key community actors.
- The mass communication of public health messages via various media and special programmes.
- Students from 300 schools were educated on cholera prevention.
- The food authorities and municipalities inspected food outlets.



#### Water Quality Response

The health sector (EDCD) led the carrying out of 650 of two types of tests for the presence of cholera in the July to September 2016 period in areas where cholera had been found:

- H<sub>2</sub>S tests (P/A vial) are a triggering tool for households, schools, community sources, and tanker and jar water.
- Free residual chlorine tests on household and tanker water.

The measures taken for assuring water quality were as follows:

- The Kathmandu Upatyaka Khanepani Limited (Kathmandu Valley Drinking Water Ltd, KUKL) ensured the proper dosing of their water supplies with chlorine.
- The private tanker associations chlorinated their tankers 3,970 times in the July to September 2016 period.
- The Kathmandu Valley Water Supply Management Board (KVWSMB) identified eight locations round the Valley for the regular dosing and regulation of drinking water tankers.
- Jar water was tested and results shared with communities and jar vendors.
- Mass messaging took place around traditional stone water spouts and wells, and this water was tested.
- Commercial black plastic water tank owners and vendors were trained on chlorination.

Chlorine solution, soap, IEC materials, bleaching powder and buckets and mugs were the main supplies used in the enhanced response.



### 3.5 Analysis of Monitoring Data

The following monitoring findings arose out of the 2016 Lalitpur cholera response:

- The common types of media do not reach all the population in urban areas as many urban dwellers are mobile migrants. Other media need identifying to reach all population groups with cholera control messages.
- About a quarter of the population do not treat their drinking water before consumption.
- About half of the population of Lalitpur Sub-Metropolitan City disinfect their drinking water with chlorine.
- It was found that 21% of households who use the chlorine solution Piyush do not use it correctly.
- The need for a sustainable solution to ensure quality water from dug-wells and water tankers.
- The need for continuous systematic processes with a clear mechanism to ensure water quality.

### 3.6 Challenges Faced by 2016 Lalitpur Cholera Response

This was the first time that the CTI approach had been tried in Nepal and the initiative faced a number of challenges:

- Accessing supplies and funding, with a lack of dedicated funds for the response.
- Preventing outbreaks across the diverse range of water sources.
- Sporadic cases spread throughout the urban areas of the Kathmandu Valley.
- Mobilising volunteers in the densely populated urban areas.
- The widespread expectation of immediate behaviour change (which is difficult to achieve).
- The many transient population groups in the Kathmandu Valley with limited public



health awareness and limited access to sanitation and other public health facilities.

- The many unaccountable and often unhygienic mobile food outlets.

Other overall system challenges were the lack of a robust water supply system, the lack of a liquid waste management system, the leak-prone drainage system and the lesser capacity of the many newly formed municipalities to carry out cholera prevention and responses.

### 3.7 Way Forward

Experience shows that the following measures are needed:

a) Strengthen the cholera surveillance system by:

- introducing daily and weekly cholera case reporting;
- strengthening the capacities of the NPHL and hospital laboratories; and
- improving the early warning systems to identify health and WASH problems.

b) Prepare a cholera preparedness and response plan to kick start responses to cholera outbreaks and to improve procedures and protocols for cholera prevention and responses.

c) Carry out the following specific measures to strengthen cholera preparedness and response:

- Build the capacity of district and municipality rapid response teams (RRTs) and volunteers on preventing and responding to waterborne diseases.
- Pre-place supplies, human resources and funds and gather evidence to be better prepared for outbreaks.
- Introduce and follow standard operating procedures for the immediate activation of health and WASH personnel to cholera outbreaks.<sup>1</sup>

<sup>1</sup> Note that standard operating procedures for CTI interventions have recently been produced (see Box 6.1)

- Implement integrated health, WASH, education and nutrition responses to cholera outbreaks.
- Link water surveillance by health and WASH sectors.
- Develop human resources to deploy during cholera responses including improving the knowledge of district WASH and health personnel on water testing.
- Identify and mobilise standby technical and mobilization partners for public health emergencies.
- Identify and mobilise strategic partners in the public and private sector for cholera prevention and response.

### 3.8 Questions Following the Two Presentations

Tai Ring The (Unicef) pointed out that a cholera outbreak had been declared in 2015 (in Kathmandu) but not in 2016. He asked what the threshold is for declaring such an outbreak.

- Answer: The Enteric Disease Control Steering Committee discusses whether to recommend the announcing of such an emergency by MoH.

Badri Nath Jnawali (EDCD) made three points:

- There is only a passive surveillance system. There is an urgent need to expand cholera surveillance and make all large hospitals sentinel sites.
- The need to update and revise the water quality standards (2062). A related pilot project distributed water quality testing equipment to district health offices in eight western districts.
- The need to clearly identify the roles of different agencies in preventing and responding to cholera (EDCD, district water supply offices, etc.).



# Reflections of Leading Stakeholders

## CHAPTER 4

### 4.1 Narayan P. Khanal, Chief Water Quality Section, Department of Water Supply & Sanitation

Mr Khanal explained that the Department of Water Supply and Sanitation (DWSS) is the lead agency for regulating drinking water quality in Nepal. The task is important as many people still lack access to safe water. And improved access needs to be provided in a sustainable way.

He highlighted four issues needing urgent attention:

- The need for a massive awareness campaign and practical measures to improve the quality of drinking water.
- The need to carry out more advocacy on improving the quality of drinking water and especially on reducing bacterial contamination.
- Updating the National Drinking Water Quality Standards (2062 [2005]).
- The need to investigate arsenic and heavy metal contamination of water supplies, especially in the Terai.

### 4.2 Kazutaka Sekine, Health Specialist, Unicef

The extensive damage to the water supply and sanitation infrastructure and the large-scale displacement of people caused by the 2015 earthquakes put Nepal at serious risk of a cholera epidemic. Although there was no epidemic, the fear of one led to enhanced preparedness

including the enhanced response to 2016 cholera cases in the Kathmandu Valley:

- Sentinel surveillance sites were rapidly established generating quality timely data for monitoring disease spread.
- Rapid diagnostic tests were instituted at sentinel sites for the early detection of cholera cases.
- EDCD continued to produce regular situation reports.
- Comprehensive interventions to contain a cholera outbreak were well-coordinated under the district public health offices (DPHOs) and water supply and sanitation division offices (WSSDOs).
- NGO partners took water, sanitation and hygiene (WASH) measures to prevent the spread of cholera.

These initiatives led to there being no reported cholera deaths in the Kathmandu Valley in 2016 and no cholera cases reported in urban camps for persons displaced by the earthquakes. All the above good practices should be replicated and expanded in the future.

The 2016 response faced the long-standing challenges of the lack of reliable safe water supplies, the lack of a water quality monitoring system, the lack of laboratory capacity at regional and district hospitals to isolate *Vibrio cholerae*, and difficulties deploying cholera vaccines on time.

Mr Sekine concluded by expressing his hope that the workshop would help lay the foundations for

a resilient national system to prevent cholera outbreaks in Nepal. He stressed that the workshop was part of the process for developing a national plan for enhanced cholera prevention with the objective of reflecting on cholera preparedness and response and gathering participants' insights and experiences.

### **4.3 Anindya Sekhar Bose, World Health Organisation**

Dr Bose told how he came from the 'home of cholera', Bengal in India. He explained how cholera is an indicator of inequity as many poor people do not have access to and cannot afford

clean drinking water. He stressed how vaccination and other interventions are all needed to prevent the spread of cholera and in particular how Nepal needs a concrete and well-resourced plan to put in place adequate preparedness for future responses.

### **4.4 Raj Kumar Mahato, Closing Remarks**

Dr Mahato brought the first session to an end by stressing on the importance of improved diagnosis of cholera cases, improving water quality across all Nepal's 75 districts, and instituting the regular nationwide all-encompassing surveillance of cholera.

# Group Discussions and Presentations

# 5 CHAPTER

The workshop participants divided into four groups to discuss topics 1–4 (see Table 5.1) in the morning discussion session and into three groups to discuss topics 5–7 in the afternoon session.

Each group was asked to discuss and identify successes and good practices, challenges, gaps, lessons learned and recommendations around predefined pertinent issues. Each group presented its main findings as the last main session of the day (see following templates).

**Table 5.1: Group discussions**

	Group	Group leader
1	Laboratory-based diagnosis	Jyoti Acharya, Senior Medical Technologist, NPHL
2	Cholera surveillance	Badri Nath Jnawali, Chief of Surveillance and Research Section, EDCD
3	Water supply and sanitation infrastructure and system	Narayan Khanal, Chief of Water Quality Section, DWSS
4	Leadership and coordination of cholera response	Guna Nidhi Sharma, Chief of Epidemiology and Disaster Management, EDCD
5	Cholera vaccination	Guna Nidhi Sharma, Chief of Epidemiology and Disaster Management, EDCD
6	Field investigation	Shankar Poudel, RRT Focal Person, Lalitpur DPHO
7	Communication campaigns and social mobilization for safe WASH practices	Arinita Maskey Shrestha, WASH Specialist, Unicef

## 5.1 Cholera Surveillance

Successes and good practices	Challenges	Gaps	Lessons	Recommendations
<p>1. Completeness and timeliness of reporting from sentinel sites</p> <ul style="list-style-type: none"> <li>Most of the sentinel surveillance sites reported completely and timely</li> </ul>	<ul style="list-style-type: none"> <li>Identification of focal points from different background</li> <li>Timely orientation to the concerned health workers</li> </ul>	<ul style="list-style-type: none"> <li>Electronic reporting system not used at all sites</li> <li>Tools for recording and reporting not provided on time</li> <li>Reports from some sentinel sites was not complete and on time</li> <li>Irregular zero reporting from sentinel hospitals</li> </ul>	<ul style="list-style-type: none"> <li>The selection of appropriate focal person in each sentinel sites is vital.</li> <li>Timely supply of recording and reporting tools is essential.</li> <li>Training and monitoring support to focal persons are needed.</li> </ul>	<ul style="list-style-type: none"> <li>Train and orientate sentinel site personnel on the surveillance format (checklist)</li> <li>Identify the appropriate focal person from the sentinel sites</li> <li>Motivate the focal person to use the electronic reporting system</li> </ul>
<p>2. Aggregation, analysis, visualization and interpretation of surveillance data</p> <ul style="list-style-type: none"> <li>Daily situation reports prepared</li> <li>Data were disaggregated by area, gender, age group for analysis to identify risk groups</li> </ul>	<ul style="list-style-type: none"> <li>Trained human resources in data entry, analysis and interpretation</li> </ul>			<ul style="list-style-type: none"> <li>Collaboration and regular meetings with the chief and focal person of the sentinel sites need to be carried out around the year</li> </ul>
<p>3. Preparation and dissemination of situation analysis and reports</p> <ul style="list-style-type: none"> <li>Daily situation reports prepared and disseminated to higher authorities (PM's office, MoH, WHO, Unicef)</li> </ul>	<ul style="list-style-type: none"> <li>No standard situation report format and resource</li> </ul>		<ul style="list-style-type: none"> <li>The situation report was very useful to understand the cholera situation by higher authorities.</li> <li>Surveillance findings need to be widely disseminated to inform the response.</li> </ul>	<ul style="list-style-type: none"> <li>Regular dissemination of surveillance data to higher authorities and the relevant partners</li> </ul>
<p>4. Guidelines on definition of suspected, probable and confirmed cholera cases</p> <ul style="list-style-type: none"> <li>Case definition available in infectious diseases control guidelines and Early Warning and Reporting System (EWARS) guidelines</li> </ul>	<ul style="list-style-type: none"> <li>Orientation of health personnel on the guidelines</li> </ul>	<ul style="list-style-type: none"> <li>All involved health personnel were not trained beforehand</li> </ul>	<ul style="list-style-type: none"> <li>Need to orientate health personnel on main guidelines</li> </ul>	<ul style="list-style-type: none"> <li>Update and revise the guidelines</li> </ul>

## 5.2 Water Supply and Sanitation Infrastructure and System

	Successes and good practices	Challenges	Gaps	Lessons	Recommendations
1. Implementation of water chlorination, its monitoring and quality assurance	<ul style="list-style-type: none"> <li>Regular chlorination of big water supply systems especially KUKL</li> <li>Use of field water test kits by response team – easy to use</li> <li>Coordination with water tanker and other private service providers</li> </ul>	<ul style="list-style-type: none"> <li>Responsibilities for water chlorination during cholera outbreaks was unclear.</li> <li>Regular chlorination of all water supply schemes</li> <li>Assurance of right chlorination dosing (SOPs required)</li> <li>Monitoring mechanism is not systematized to ensure regular quality – for microbiology</li> <li>Accessibility, capacity, knowledge of field test kits</li> </ul>	<ul style="list-style-type: none"> <li>Water quality from tankers are not monitored due to lack of government guidelines for water tankers</li> </ul>	<ul style="list-style-type: none"> <li>Tanker water suppliers are very positive to cooperate for improving the water quality</li> </ul>	<ul style="list-style-type: none"> <li>Institute dedicated water quality monitoring and response teams to avoid work overload</li> <li>Develop the mechanism to bring Department of Food Technology and Quality Control on board</li> <li>Prepare a SOP on the chlorination of water supplies</li> <li>Develop a national guideline to monitor the water quality of water supplied by tankers</li> </ul>
2. Water quality monitoring system	<ul style="list-style-type: none"> <li>Water quality monitoring data as a triggering tool for identifying cholera outbreaks</li> <li>Initiation of directives/policy for water tankers</li> <li>The implementation of district water safety plans</li> </ul>	<ul style="list-style-type: none"> <li>The time and resources needed to monitor water quality to use as a triggering tool</li> <li>Quality assurance from tankers and other sources (community private providers)</li> <li>Continuation of monitoring of water quality</li> <li>Regular water quality monitoring of all water sources (including alternative sources) in communities</li> </ul>	<ul style="list-style-type: none"> <li>Regular sharing of water quality testing results among WASH and health sector including water quality testing methodologies used</li> </ul>	<ul style="list-style-type: none"> <li>Need to strengthen the existing water quality monitoring system from different sources</li> </ul>	<ul style="list-style-type: none"> <li>Scaling up of district-wise water safety plans (WSPs) including point sources</li> <li>Map all available water service providers and sources of particular districts, municipalities and VDCs.</li> <li>Adopt water quality monitoring framework that guides regular monitoring for all available sources</li> <li>Adopt a standard methodology (health and WASH) for water quality testing</li> <li>Develop mechanism for regularly sharing of water quality testing results among WASH and health sectors</li> <li>Make it clear who should monitor water quality including of alternate water sources</li> <li>Train human resources on technical water quality issues</li> </ul>

### 5.3 Laboratory-based Diagnosis

	Successes and good practices	Challenges	Gaps	Lessons	Recommendations
1. On-site use of rapid diagnostic tests (RDTs)	<ul style="list-style-type: none"> <li>Rapid diagnostic tests were successfully used.</li> <li>Newly developed SOPs were consistently used, resulting in adherence to high standard in culture confirmation</li> </ul>	<ul style="list-style-type: none"> <li>Long duration of incubation to conduct enriched RDT test (more than 6 hours)</li> </ul>	<ul style="list-style-type: none"> <li>Shortage of trained laboratory technicians</li> </ul>	<ul style="list-style-type: none"> <li>Stocks of test kits need to be in place before 'cholera season' begins</li> </ul>	<ul style="list-style-type: none"> <li>Provide on-site rather than central-level training</li> <li>Train more laboratory technicians with expertise in bacteriology.</li> </ul>
2. Resources for rapid diagnosis and culture confirmation (supplies, human resources)		<ul style="list-style-type: none"> <li>Timely availability of RDTs and supplies for culture confirmation</li> </ul>	<ul style="list-style-type: none"> <li>Availability of RDTs and other diagnostic resources prior to beginning of cholera season</li> </ul>	<ul style="list-style-type: none"> <li>Stock needs to be ready in laboratories before the cholera season</li> </ul>	<ul style="list-style-type: none"> <li>Supplies for culture confirmation to be provided to sites</li> </ul>
3. Protocol and standard operating procedures (SOPs)	<ul style="list-style-type: none"> <li>SOPs were newly developed and put in place</li> </ul>		<ul style="list-style-type: none"> <li>SOPs not provided at beginning of the cholera season</li> <li>SOPs do not cover how to proceed with testing outside normal working hours as samples are received 24 hours a day</li> </ul>	<ul style="list-style-type: none"> <li>SOPs needs to be in place in laboratories</li> <li>Need to develop mechanism for testing outside normal working hours of the laboratory</li> </ul>	<ul style="list-style-type: none"> <li>Revised SOPs to be made available to all sentinel sites on time for next season based on 2016 experiences</li> </ul>
4. Centralization vs decentralization of culture confirmation	<ul style="list-style-type: none"> <li>Where appropriate decentralize culture confirmation</li> </ul>	<ul style="list-style-type: none"> <li>Identifying sites capable of culture confirmation</li> </ul>	<ul style="list-style-type: none"> <li>Untrained personnel performing RDT and culturing</li> <li>Lack of resources to monitor and evaluate sites capable of culture confirmation</li> </ul>	<ul style="list-style-type: none"> <li>Need to provide the antiserum and other supplies for culture confirmation at capable hospitals</li> </ul>	<ul style="list-style-type: none"> <li>EDCD needs to assess the capability of district and regional hospitals for doing culture confirmation</li> <li>Need to provide supplies to capable sites prior to the cholera season</li> </ul>



	Successes and good practices	Challenges	Gaps	Lessons	Recommendations
5. Transportation of stool samples from outside the Kathmandu Valley to the Valley	<ul style="list-style-type: none"> <li>Samples from outside Kathmandu were transported to NPHL properly</li> </ul>	<ul style="list-style-type: none"> <li>Training the involved health personnel</li> </ul>	<ul style="list-style-type: none"> <li>SOPs for sample transport not available</li> </ul>	<ul style="list-style-type: none"> <li>Coordination between DPHO and NPHL is important.</li> </ul>	<ul style="list-style-type: none"> <li>Develop SOPs to DPHOs and orientate them on the SOPs</li> <li>Provide orientation on the SOPs to those who are responsible for transportation</li> </ul>
6. Monitoring of Water Quality after the report of cholera cases	<ul style="list-style-type: none"> <li>Water samples were collected and tested to isolate vibrio cholerae</li> </ul>	<ul style="list-style-type: none"> <li>Identifying potentially contaminated water sources due to a diversity of water sources used</li> </ul>	<ul style="list-style-type: none"> <li>Constraints on trained human resource for sampling water</li> <li>Unavailability of test kits for on-site testing of water samples for cholera</li> </ul>		<ul style="list-style-type: none"> <li>Support the capacity development on on-site rapid testing of water samples</li> <li>Conduct regular monitoring of water quality in hotspots</li> </ul>

## 5.4 Leadership and Coordination of Cholera Response

	Successes and good practices	Challenges	Gaps	Lessons	Recommendations
1. Leadership for direction and strategic planning	<ul style="list-style-type: none"> <li>Under the chairmanship of DoHS DG, technical and strategic direction for cholera control were provided by Steering Committee for Enteric Disease Control and Disaster Health Working Group</li> <li>Directions were given by EDCD in coordination with key stakeholders</li> <li>Comprehensive targeted intervention (CTI) project was planned before a cholera outbreak.</li> <li>District-level Health cluster led by Lalitpur DPHO managed coordination successfully among partners from WASH partners, education</li> </ul>	<ul style="list-style-type: none"> <li>Public health issues were low priority in municipality</li> <li>Clear policy guideline not given to districts to make decisions on OCV vaccination</li> </ul>	<ul style="list-style-type: none"> <li>Responsibilities for cholera response between health and WASH not clearly defined</li> <li>National cholera preparedness and response plan was not in place</li> <li>No cholera vaccination plan in place</li> </ul>	<ul style="list-style-type: none"> <li>Need motivational and encouraging leadership from central and district levels</li> <li>CTI project enhanced strategic planning</li> </ul>	<ul style="list-style-type: none"> <li>Responsibility for cholera response should be well defined at different levels by sectors with overall direction at district level</li> <li>Need SOPs on cholera prevention and response</li> <li>Ensure that vaccination strategy is developed by health authorities</li> </ul>
2. Inter-sectoral coordination	<ul style="list-style-type: none"> <li>Good coordination with non-health sectors such as WASH and education clusters</li> </ul>	<ul style="list-style-type: none"> <li>Response preparedness not planned before this year's outbreak. As a result, a coordination mechanism was provisional.</li> </ul>	<ul style="list-style-type: none"> <li>Lack of coordination with food vendors</li> <li>Instituting a coordination mechanism across concerned sectors</li> </ul>	<ul style="list-style-type: none"> <li>Well managed coordination helped control cholera in a short time interval</li> <li>Coordination with different line ministries took time</li> </ul>	<ul style="list-style-type: none"> <li>The lead agency for cholera responses should be well defined</li> </ul>

	Successes and good practices	Challenges	Gaps	Lessons	Recommendations
3. Coordination between central and district government and municipality offices	<ul style="list-style-type: none"> <li>Good coordination between EDCCD, NPHL, DPHO, municipality and external development partners</li> </ul>	<ul style="list-style-type: none"> <li>Consistent and regular meetings</li> <li>Information sharing at all levels</li> </ul>	<ul style="list-style-type: none"> <li>Reporting was not properly channelized</li> </ul>		<ul style="list-style-type: none"> <li>Develop a daily or weekly reporting mechanism during times of outbreaks</li> </ul>
4. Logistics for rapid responses	<ul style="list-style-type: none"> <li>WASH items were prepositioned before the outbreak</li> <li>IEC materials available</li> <li>Laboratory supplies were sufficient</li> </ul>	<ul style="list-style-type: none"> <li>logistics Securing supplies of vaccines, RDTs, vehicles on time</li> </ul>	<ul style="list-style-type: none"> <li>Mobile water sample testing mechanism</li> <li>Resource mobilization network not developed</li> </ul>	<ul style="list-style-type: none"> <li>Prepositioned items helped make rapid response</li> </ul>	<ul style="list-style-type: none"> <li>Preposition WASH and IEC materials for next cholera seasons</li> <li>Decentralize logistic preparedness</li> </ul>
5. Criteria of declaration of a cholera outbreak	<ul style="list-style-type: none"> <li>A technical team analysed the spread of cholera both as a whole and by area</li> </ul>	<ul style="list-style-type: none"> <li>Threshold setting at different geographical locations as the risk is different</li> </ul>	<ul style="list-style-type: none"> <li>No clear national criteria to declare the cholera outbreak</li> </ul>		<ul style="list-style-type: none"> <li>The Government should come up with the criteria for declaring the cholera outbreak</li> </ul>

## 5.5 Cholera Vaccination

	Successes and good practices	Challenges	Gaps	Lessons	Recommendations
1. Deployment of oral cholera vaccine (OCV)	<ul style="list-style-type: none"> <li>Preventative mass vaccination conducted in Rautahat and Nuwakot in the past</li> </ul>	<ul style="list-style-type: none"> <li>Difficulties deploying OCV due to limited global stockpiles</li> <li>Delay in shipment</li> <li>Financial sustainability for procurement</li> </ul>	<ul style="list-style-type: none"> <li>Lack of national plan on the deployment of OCV</li> </ul>	<ul style="list-style-type: none"> <li>WASH activities should be prioritized, complementing OCV vaccination</li> </ul>	<ul style="list-style-type: none"> <li>Make WASH the priority interventions with complementary OCV campaigns</li> </ul>
2. Decision-making on use of OCV			<ul style="list-style-type: none"> <li>No national plan or policy</li> </ul>	<ul style="list-style-type: none"> <li>Necessary to include cholera vaccination in national cholera preparedness and response plan</li> </ul>	<ul style="list-style-type: none"> <li>Include cholera vaccination in national cholera preparedness and response plan</li> </ul>

## 5.6 Field Investigation

	Successes and good practices	Challenges	Gaps	Lessons	Recommendations
1. Tracking affected households for household investigation	<ul style="list-style-type: none"> <li>Most cholera cases were tracked down because of early reporting</li> </ul>	<ul style="list-style-type: none"> <li>Incomplete contact information recorded at sentinel hospitals</li> <li>Denial by some patients to participate in household investigation</li> <li>Loss to follow-up due to movement</li> </ul>	<ul style="list-style-type: none"> <li>Inability to track down all confirmed cases due to incomplete information</li> </ul>	<ul style="list-style-type: none"> <li>Timely, appropriate training and orientation to focal persons, medical recorders, medical teams</li> </ul>	<ul style="list-style-type: none"> <li>Make it compulsory to collect and record a phone number of all cholera patients</li> <li>Carry out in-depth interviews at household level</li> <li>Hospital reporting to EDCC and concerned DPHO for immediate field investigation</li> <li>Orientations to rapid response teams (RRTs)</li> </ul>
2. Water sample testing to isolate V. cholerae	<ul style="list-style-type: none"> <li>Water samples collected from households on time</li> </ul>	<ul style="list-style-type: none"> <li>Difficulties identifying actual sources of drinking water due to use of multiple sources</li> </ul>		<ul style="list-style-type: none"> <li>Need to track and test all water sources used by cholera patients</li> </ul>	<ul style="list-style-type: none"> <li>Collect more samples from probable contaminated sources</li> <li>Maintain cold chain and prompt transport of samples to laboratories</li> <li>Strengthen the capacity of district labs for water quality testing</li> </ul>
3. Monitoring for food safety			<ul style="list-style-type: none"> <li>No implementation of food safety monitoring due to low perceived priority and lack of coordination with concerned authorities</li> </ul>		<ul style="list-style-type: none"> <li>Coordinate with Department of Food Technology &amp; Quality Control for the monitoring of food safety</li> </ul>
4. Data analysis to identify risk factors for cholera transmission	<ul style="list-style-type: none"> <li>Timely, proper analysis of available data</li> </ul>	<ul style="list-style-type: none"> <li>Insufficient &amp; Incomplete data collection</li> </ul>	<ul style="list-style-type: none"> <li>Could not conduct comprehensive data analyses on risk factors</li> </ul>	<ul style="list-style-type: none"> <li>Complete and sufficient data is required for rigorous analyses</li> </ul>	<ul style="list-style-type: none"> <li>Complete analysis of the risk factors should be done after household investigation</li> </ul>

## 5.7 Communication Campaigns and Social Mobilization for Safe WASH Practices

	Successes and good practices	Challenges	Gaps	Lessons	Recommendations
1. Targeting (populations, areas)	<ul style="list-style-type: none"> <li>Optimal prioritization of at risk populations</li> <li>Timely expansion of interventions to cover larger areas</li> </ul>	<ul style="list-style-type: none"> <li>Reaching mobile populations</li> <li>Resistance to adapt WASH practices from some communities</li> </ul>		<ul style="list-style-type: none"> <li>The local level participation for planning of BCC is critical</li> <li>Need updated district and municipality demographic profiles</li> <li>Needs to tailor BCC strategy to the needs and perceptions of different groups</li> </ul>	<ul style="list-style-type: none"> <li>Hold regular inter-sectoral meetings in communities for BCC and not just during outbreaks</li> </ul>
2. Planning and implementation of BCC interventions (timeliness, acceptability)	<ul style="list-style-type: none"> <li>Joint plan made by health and WASH clusters</li> <li>Timely response in affected areas</li> </ul>	<ul style="list-style-type: none"> <li>Timely sharing of epidemiology information to facilitate planning</li> <li>Fund management for communication campaigns</li> <li>Linking knowledge and awareness into behaviour change</li> </ul>	<ul style="list-style-type: none"> <li>Lack of preparedness plan of BCC interventions</li> <li>Timely sharing of water sample testing results, which guides planning of BCC interventions</li> </ul>	<ul style="list-style-type: none"> <li>Effective coordination helped achieve wide coverage of BCC interventions</li> </ul>	
3. Community mobilization and engagement	<ul style="list-style-type: none"> <li>Effective door-to-door visits</li> <li>Mass media campaigns reached beyond target areas</li> <li>Mobilization of FCHVs &amp; volunteer networks from affected communities</li> <li>Held community events for mass campaigning</li> </ul>	<ul style="list-style-type: none"> <li>Limited resources available for mass mobilization</li> <li>Limited time for volunteer training on community mobilization and BCC</li> </ul>	<ul style="list-style-type: none"> <li>Lack of exit plan</li> </ul>	<ul style="list-style-type: none"> <li>Need updates of existing networks, volunteers, organization in districts and municipalities</li> <li>Need to orient community volunteers in normal times</li> </ul>	<ul style="list-style-type: none"> <li>Provide community-based BCC interventions on WASH throughout the year</li> <li>Develop ToRs on WASH and health for volunteers as a guide of BCC interventions</li> </ul>

	Successes and good practices	Challenges	Gaps	Lessons	Recommendations
4. Monitoring and follow-up visits	<ul style="list-style-type: none"> <li>Conducted joint monitoring</li> <li>A checklist developed by the CTI project was followed by partners</li> <li>LSMC had established a good monitoring mechanism</li> </ul>	<ul style="list-style-type: none"> <li>Frequency of monitoring and follow-up</li> </ul>	<ul style="list-style-type: none"> <li>Unavailability of a dedicated team for monitoring</li> <li>Timely compilation of monitoring data for further follow-up</li> </ul>	<ul style="list-style-type: none"> <li>Standby capacity for monitoring needs to be in place</li> <li>Using standard formats facilitated monitoring and reporting</li> </ul>	<ul style="list-style-type: none"> <li>Institute a monitoring and reporting mechanism</li> </ul>
5. Supplies and logistics	<ul style="list-style-type: none"> <li>Consistently used IEC materials developed by the WASH cluster to spread standardized messages</li> </ul>	<ul style="list-style-type: none"> <li>The timely distribution of IEC materials in affected areas</li> </ul>	<ul style="list-style-type: none"> <li>No funding sources of the government to initiate immediate response</li> <li>IEC materials that are responsive to the needs of specific age groups</li> <li>No stock of IEC materials at municipality and district levels</li> </ul>	<ul style="list-style-type: none"> <li>Need to map out the need of IEC materials in all districts and municipalities</li> <li>Need to stock a minimum quantity of IEC materials at I municipality and district levels</li> <li>Use digital networks and social media to spread messages</li> </ul>	<ul style="list-style-type: none"> <li>Sensitize media on public health messages during normal times and outbreaks</li> <li>Provide BCC training to health and WASH volunteers</li> </ul>



## 6.1 Conclusions

EDCD director Dr Bhim Acharya thanked all participants for their participation in the workshop and summarised the main findings of the group discussions. He said that the group discussions had shown how many lessons had been learned about how to overcome the challenges of responding to cholera outbreaks in Nepal's urban areas. He particularly emphasised the need to i) improve cholera surveillance, ii) update the related guidelines and iii) most importantly, to institute regular and improved water quality testing in line with WHO guidelines.

He ended by looking forward to the forthcoming sharing meeting that would share the lessons learned from the 2016 cholera response in the Kathmandu Valley with high level officials.

## 6.2 Main Recommendations

The main recommendations that emerged from the workshop were as follows:

### Cholera Surveillance:

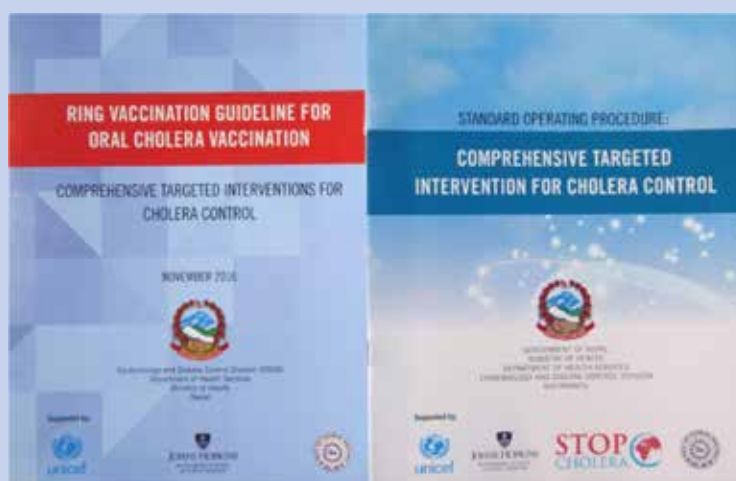
- Update and revise the guidelines for the confirmation of cholera cases.

### Water supply and sanitation infrastructure and system:

- Develop methods to detect cholera in food and a mechanism to bring the Department of Food Technology and Quality Control on board for improved cholera control.
- Produce standard operating procedures on the chlorination of drinking water.

### Box 6.1: New guidelines and procedures

Note that all workshop participants were provided with copies of the recently published new guidelines on ring vaccination and standard operating procedures on comprehensive targeted interventions. Their availability addresses several of the recommendations from the discussion sessions. They were produced as part of the CTI project.



- Institute a water quality monitoring framework for the regular monitoring of all the main sources of drinking water.

#### **Laboratory-based diagnosis:**

- Train laboratory personnel on testing and analysis for cholera.
- Decentralize laboratory testing services to the district health office/district hospital levels.

#### **Leadership and coordination of cholera response:**

- Produce a national cholera prevention and response plan.
- Clearly define sectoral leadership at different levels and for overall direction at the district level.

#### **Field investigation:**

- Strengthen district level laboratories for water quality testing.
- Regularly test food from different kinds of food outlets.

#### **Communication campaigns and social mobilization for safe WASH practices:**

- Media sensitization on public health messaging- for normal and emergency situation,
- Hold regular inter-sectoral meetings on BCC (not just during outbreaks)
- Clearly define the BCC responsibilities of WASH and health volunteers (in ToRs).

#### **Cholera vaccination:**

- Include a national policy on OCV in the national cholera prevention and preparedness plan.

# Workshop Participants

# ANNEX 1

## Lessons Learned Discussion Workshop on Cholera Preparedness and Response in Nepal, 2016

### A. Government Health Agency Participants

1. Dr Bhim Acharya Director, Epidemiology and Disease Control Division (EDCD)
2. Badri Nath Jnawali Planning, Surveillance and Research Section, EDCD
3. Dr Guna Nidhi Sharma Chief of Epidemiology and Disaster Management Sections, EDCD
4. Resham Lal Lamichhane Public Health Officer (PHO), EDCD
5. Atmaram Karki EDCD
6. Hari Prasad Acharya EDCD
7. Dabal Bahadur BC EDCD
8. Samu Ranjitkar EDCD
9. Bhim Prasad Sapkota Public health administrator, Ministry of Health (MoH)
10. Dr Raj Kumar Mahato Chief consultant pathologist, National Public Health Laboratory (NPHL)
11. Dr Runa Jha Chief consultant pathologist, NPHL
12. Jyoti Acharya Senior medical technologist, NPHL
13. Nisha Rijal Microbiologist, NPHL
14. Ravi Kanta Mishra National Health Education, Information and Communication Centre (NHEICC)

### B. Hospital Participants

15. Dr Ramesh Kharel Director, Sukraraj Tropical & Infectious Disease Hospital
16. Dr Anup Bastola Sukraraj Tropical & Infectious Disease Hospital
17. Dr Piyush Shrestha Patan Hospital
18. Dr Kabita Hada KIST Hospital
19. Dr Bikal Shrestha Birendra Sainik Hospital

## C. WASH Agency Participants

20. Narayan Pd Khanal	Chief of Water Quality Section, Department of Water Supply and Sanitation (DWSS)
21. Phatta Bahadur Chhettri	Chief, Water Supply and Sanitation Division Offices (WSSDO), Lalitpur
22. Manish Kumar Raj	WSSDO Bhaktapur
23. Bodhraj Dahal	Kathmandu Valley Water Supply Management Board (KVWSMB)
24. Gyanendra Bdr Karki	Laboratory, Kathmandu Upatyaka Khanepani Limited (KUKL)
25. Bishwo Raj Joshi	Lalitpur Focal Person, KUKL Lalitpur
26. Surendra Himalaya	Bhaktapur Focal Person, KUKL Bhaktapur
27. Bijay Man Shrestha	Kathmandu Focal Person, KUKL Kathmandu
28. Shankar Poudel	Rapid Response Team (RRT) focal person, District Public Health Office (DPHO), Lalitpur
29. Dhurba Kumar Adhikari	RRT focal person, DPHO, Kathmandu
30. Umesh Chandra Dwabadel	RRT focal person, DPHO, Bhaktapur
31. Shivendra Jha	Regional Monitoring and Supervision Office (RMSO), Kathmandu

## D. United Nations Agency Participants

32. Kazutaka Sekine	Health Specialist, Unicef
33. Arinita Maskey Shrestha	Water, sanitation and hygiene (WASH) expert, Unicef
34. Karuna Laxmi Shakya	Health officer, Unicef
35. Luna Keshari Kansakar	WASH officer, Unicef
36. Tameez Ahmed	Chief of WASH, Unicef
37. Tai Ring The	WASH specialist, Unicef
38. Sanju Bhattarai	Communication for Development (C4D) officer, Unicef
39. Surendra Singh Rana	Emergency specialist, Unicef
40. Dr Anindya Sekhar Bose	World Health Organisation (WHO) Immunization Preventable Diseases and Medical Officer, Expanded Programme on Immunization
41. Dr Sudan Raj Panthi	WHO
42. Dr Abhiyan Gautam	Water and Enteric Diseases Surveillance Officer (WEDS) Officer, WHO

## D. NGO and INGO Participants

43. Ankit Aryal	Environment and Public Health Organization (ENPHO)
44. Pramina Nakarmi	ENPHO
45. Biju Dangol	WASH team leader, OXFAM
46. Yaba Laxmi Shrestha	Environment and development organization (ENDO)
47. Krishna Tamang	ENDO
48. Manisha Shrestha	ENDO
49. Bikash Shrestha	ENDO
50. Robindra Basukala	Society for Youth Activity
51. Herina Joshi	Urban Environment Management Society (UEMS)
52. Guheswari Tuladhar	UEMS
53. Smriti Shah	Noble Compassionate Volunteer group (NCV)
54. Kshitij Karki	Group for Technical Assistance (GTA)
55. Rakesh Yadav	Microbiologist, GTA
56. Dr Priti Acharya	Public health officer, GTA
57. Smriti Shrestha	Microbiologist, GTA
58. Nirmal Burlakoti	GIS specialist, GTA
59. Subash Poudel	Data manager, GTA
60. Ramesh Barakoti	Public health officer, GTA
61. Dr Shyam Raj Upreti	Public health expert, GTA

## Other Participants

62. Sarita Maharjan	Lalitpur Sub Metropolitan City
63. Aatmaram Satyal	Mahalakshmi Municipality
64. Mellisa Roskosky	Researcher, John Hopkins University
65. Javed Khan	Photographer
66. Stephen Keeling	Writer and editor
67. Daniel Mahat	Journalist, Online Patrika

# Workshop Schedule

# ANNEX 2

## Lessons Learned Discussion Workshop on Cholera Preparedness and Response in Nepal, 2016

Thursday 15 December 2016, Himalaya Hotel, Lalitpur, Nepal

Time	Activity	Speaker/Facilitator
9:30	Arrival and registration of participants	Workshop secretariat
10:00-10:10	Welcome remarks	Dr Bhim Acharya, Director, EDCD
10:10-10:30	<b>Presentation 1</b> Cholera Epidemiology and Comprehensive Targeted Interventions for cholera control	Dr Guna Nidhi Sharma, EDCD
10:30-10:50	<b>Presentation 2</b> The WASH Response to the 2016 Cholera Outbreak in the Kathmandu Valley	Mr Phatta Bahadur Chhetri, Chief WSSDO Lalitpur
10:50-11:00	Remarks	Mr Narayan Khanel, Chief Water Quality Section, DWSS
11:00-11:10	Remarks	Mr Kazutaka Sekine, Health Specialist, Unicef Nepal
11:10-11:20	Remarks	Anindya Sekhar Bose, Medical Officer, WHO IPD
11:20-11:30	Remarks	Raj Kumar Mahato, Chief Consultant Pathologist, NPHL
11:30-11:40	Tea break	
11:40-12:20	<b>Group Discussion 1</b> Surveillance Water supply and sanitation infrastructure and system Leadership and coordination of cholera response Field investigation	Mr Badri Nath Jnawali, Chief of surveillance and research section, EDCD Mr Narayan Khanal, Chief of Water Quality Section, DWSS Dr Guna Nidhi Sharma, Chief of epidemiology and disaster management, EDCD Mr Shankar Poudel, RRT focal person, Lalitpur DPHO



12:20-01:00	<b>Group Discussion 2</b> Laboratory-based diagnosis Communication campaigns and social mobilization for safe WASH practices Cholera vaccination	Ms Jyoti Acharya, NPHL Ms Arinita Maskey Shrestha, Unicef Dr Guna Nidhi Sharma, Chief of epidemiology and disaster management, EDCD
01:00-02:00	Lunch	
02:00-15:10	Presentations by seven groups	Group facilitators
15:10-15:40	Q&A session	Mr Bhim Prasad Sapkota, Public Health Administrator, MoH
15:40-15:50	Closing remarks	Dr Bhim Acharya, Director, EDCD

# Glimpses of the Workshop

# ANNEX 3



The welcome address



Presentation 1: Cholera Epidemiology and Comprehensive Targeted Interventions, Dr Guna Nidhi Sharma



Presentation 2: 2016 cholera response in the Kathmandu Valley, Phatta Bahadur Chhetri



Discussion point from the floor



Stakeholder reflection 1: Narayan Prasad Khanal



Stakeholder reflection 2: Kazutaka Sekine



Stakeholder reflection 3: Dr Anindya Sekhar Bose, WHO



Stakeholder reflection 4: Dr Raj Kumar Mahato



Group discussion underway



Another of the group discussion sessions





