

# Humanitarian crisis after the Nepal earthquakes 2015

Initial public health risk assessment  
and interventions

May 2015





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# Acronyms and abbreviations

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<b>EML</b>	Essential Medicines List
<b>EPI</b>	Extended Programme of Immunization
<b>FMT</b>	Foreign Medical Team
<b>IDP</b>	Internally displaced person
<b>IHR</b>	International Health Regulations
<b>MOHP</b>	Ministry of Health and Population
<b>NCDC</b>	National Centre of Diseases Control
<b>NGO</b>	Nongovernmental organization
<b>OCV</b>	Oral Cholera Vaccine
<b>PTSD</b>	Post-traumatic stress disorder
<b>SGBV</b>	Sexual and gender-based violence
<b>STI</b>	Sexually-transmitted infection
<b>WASH</b>	Water, sanitation and hygiene cluster
<b>WHO</b>	World Health Organization

# Preface

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The purpose of this public health risk assessment is to provide all health sector partners, including professionals of local and national authorities, non-governmental organizations (NGOs), donor agencies and United Nations agencies currently working with populations affected by the emergency in Nepal, with up to-date technical guidance on the major public health threats faced by the affected population.

The topic areas addressed have been selected on the basis of the burden of morbidity, mortality and potential for increased burden of disease in the affected areas.

Public health threats represent a significant challenge to those providing health-care services in this evolving situation. It is hoped that this risk assessment will facilitate the coordination of activities among all partners working among the populations currently affected by the crisis and that it helps in guiding needs assessments and the orientation of emergency health response strategies.

# Executive summary

A magnitude 7.8 earthquake occurred on Saturday April 25, 2015 at 11:56 local time (ca. 6.11 UTC) in Nepal. The epicentre of the earthquake was located approximately 77 km northwest of Kathmandu, Nepal's capital city, and 73 km east of Pokhara, another major population centre. The depth of the earthquake was estimated at between 10 -15 kilometres (km). Around 60 aftershocks, of up to magnitudes of 6.6 have occurred and were concentrated in the region of the epicentre and up to 150 kilometres to the east. This is the most severe earthquake to have hit Nepal since an 8.2 magnitude earthquake in 1934, which resulted in an estimated 19 000 casualties.

On 12 May Nepal experienced a second earthquake with a magnitude of 7.3. The epicentre of the earthquake was 76 kilometres east of Kathmandu and resulted in landslides, further deaths, injuries and damage to buildings.

As of 13 May 2015, the government has recorded 8,219 deaths and over 17,866 people injured from the two earthquakes. UNOCHA estimates after the initial earthquake were that 4.2 million people have been affected and 2.8 million people had been displaced.

35 out of 75 districts in the country are affected. They include very densely populated regions and Nepal's two largest cities – greater Kathmandu and Pokhara – as well as mountainous areas in which rural populations are dispersed. The Ministry of Health and Population has identified 14 districts severely affected, including Gorkha, Dhading, Rasuwa, Sindhupalchok, Kavre, Nuwakot, Dolakha, Kathmandu, Lalitpur, Bhaktapur, Ramechhap, Sindhuli, Okhaldhungai and Makwanpu districts. Dolakha and Sindhupalchok are the districts most severely affected by the second earthquake.

## Immediate priorities for health response

Priority interventions should include the following:

- I. Provide access to surgical, medical and emergency obstetric care and proper case management, particularly for trauma, wounds and burns
- II. Organize priority immunizations, including mass vaccination campaign for measles/rubella, and include tetanus immunization as part of wound care
- III. Strengthen communicable disease surveillance and response, including preparedness for epidemic-prone diseases
- IV. Provide sufficient safe drinking water, adequate sanitation and hygiene
- V. Disseminate public health risk communication on hazards avoidance, health promotion and handling dead bodies

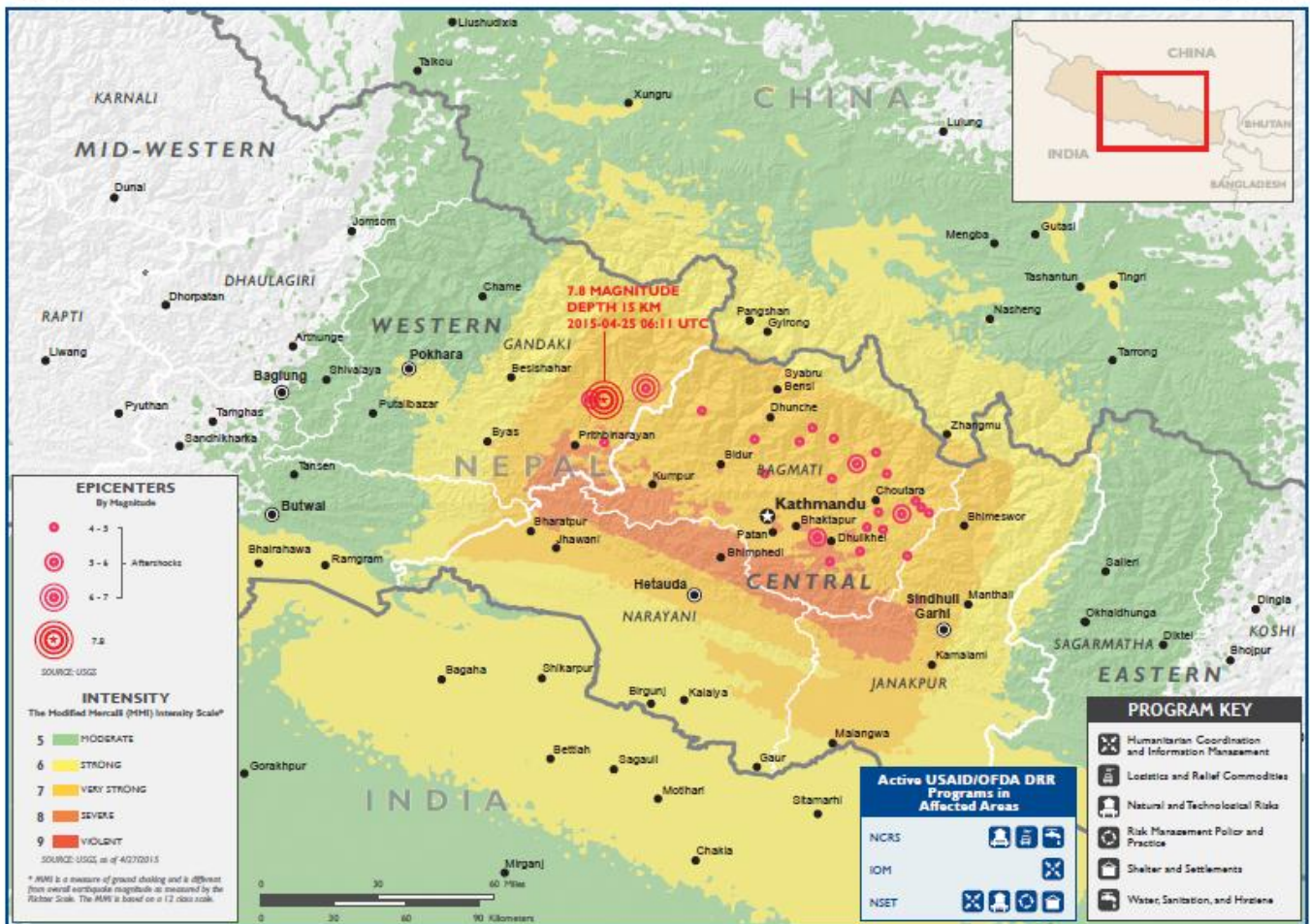


- VI. Organize shelter and site planning
- VII. Provide reproductive health care, especially safe deliveries, obstetric and neonatal care
- VIII. Assure continuity of care for chronic diseases
- IX. Address psychosocial and mental distress
- X. Support appropriate infant and young child feeding and malnutrition management



## NEPAL EARTHQUAKE OVERVIEW

Last Updated 04/28/16



# 1.

# Background and risk factors

## 1.1

### Country information

In 2011 Nepal's population was 26.6 million with a population growth rate of 1.35%. Nepal is predominantly rural despite an increasingly rapid rate of urbanization: from 14% in 2001 to 17% in 2011. Life expectancy at birth continues to increase for both males and females; increasing from 55.0 to 67 years for males and from 53.5 to 68 years for females between 1991 and 2011. As per the 2011 census 37.2% of population was below 15 years, 54.4% between 15 and 59 years, and 8.4% was 60 years and above.

Nepal is a low income country with approximately 25% of the population living in poverty. The economy of Nepal is highly dependent on agriculture and forestry that contribute about a third of the GDP of the country, whereas the industry sector comprises a mere 15% of GDP (FY2014). Agricultural value adding depends very much on the monsoon pattern and has a direct impact on GDP growth. This current large-scale disaster with mass destruction of transportation infrastructure may have a negative impact on agricultural value added as products cannot be shipped to markets.

Nepal is highly vulnerable to various types of disasters, e.g. floods, landslides, earthquake, fire, epidemics as well as the effects of climate change. According to the *Disaster vulnerability and risk assessment study report* (UNDP/BCP 2004), Nepal ranks 11th globally among countries most vulnerable to earthquakes. Similarly, as per the joint ICIMOD UNEP prepared details, out of 2315 glacial lakes in Nepal, 22 are in imminent danger of bursting (ICIMOD/UNEP, 2000). Fire breakouts in rural *Terai* remain a major problem during summer season when temperatures soar to 45 °C.



### Box 1.1 Demographic data: key indicators

**Total population**

26.6 million (2011 Census)

**Population growth rate**

1.35 % per year

**Crude birth rate**

21.6 per 1000 people ( 2012, UNICEF )

**Crude death rate**

6.7 per 1000 people ( 2012, UNICEF )

**Life expectancy at birth**

68 years (2012, UNICEF )

**Fertility rate**

2.6 number of births per woman ( NDHS, 2011 )

**Urban population**

18.2 % of total ( 2011 Census)

## 1.2

### Crisis impact

A magnitude 7.8 earthquake occurred on Saturday April 25, 2015 at 11:56 local time (ca. 6.11 UTC) in Nepal. The epicentre of the earthquake was located approximately 77 km northwest of Kathmandu, Nepal's capital city, and 73 km east of Pokhara, another major population centre. The depth of the earthquake was estimated at between 10 -15 kilometres. Around 60 aftershocks with magnitudes of up to 6.6 have occurred. These were concentrated in the region of the epicentre and up to 150 kilometres to the east. This is the most severe earthquake to have hit Nepal since an 8.2 magnitude earthquake in 1934, which resulted in an estimated 19,000 casualties.

On 12 May Nepal experienced a second earthquake with a magnitude of 7.3. The epicentre of the earthquake was 76 kilometres east of Kathmandu in Dolakha districts and resulted in landslides, further deaths, injuries and damage to buildings placing additional stress on relief and recovery operations.

As of 13 May 2015, the government has recorded 8 219 deaths and over 17,866 people injured from the two earthquakes. UNOCHA estimates after the initial earthquake were that 4.2 million people have been affected and 2.8 million people had been displaced.

35 of 75 districts in the country have been affected. This includes very densely populated regions and Nepal's two largest cities – greater Kathmandu and Pokhara – as well as mountainous areas in which rural populations are dispersed. The Ministry of Health and Population identified 14 districts mostly affected; they include Gorkha, Dhading, Rasuwa, Sindhupalchok, Kavre, Nuwakot, Dolakha, Kathmandu, Lalitpur, Bhaktapur, Ramechhap, Sindhuli, Okhaldhungai and

Makwanpur districts. It is estimated that 1035 Village Development Committees and 60 Municipalities have been affected by the earthquake. In addition, 1 091 019 families have been affected and 645 798 families displaced (7 May 2015, Nepal Red Cross Society).

Many people have remained living outside due to fear of aftershocks. Displacement has been driven by damaged buildings and homes, utility outages and other forms of building inhabitability. It is also aggravated by socio-economic vulnerability. Landslides and avalanches have been reported throughout the mountains. Most areas are without power and water and more than 1.4 million people require food assistance. Food is on the way to affected districts outside Kathmandu Valley yet access remains a challenge due to roads damages and remote areas in mountainous regions can only be accessed by air.

Mobile networks in Kathmandu are functioning but experience outages. All major roads in Kathmandu are open for traffic; however, some side access roads remain blocked. Power throughout the city is limited with most households and offices mainly relying on generator power including for pumping water. As a result, many people are leaving Kathmandu Valley and returning to families in areas, which have not been affected by the earthquake. There have been some reports of unrest in relation to limited water supplies and delivery of relief supplies.

The Kathmandu International Airport is now operating 24 hours and functions as the main logistics hub. However, due to the rapid influx of goods and response teams, as well as departures, it is experiencing congestion. The Humanitarian Staging Area (HSA) is set up in the vicinity of the Airport to ease the flow of relief supplies.

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## 1.3

### Current health situation

Nepal is in the middle of a demographic transition. The current contraceptive prevalence rate is 48% and the population growth rate is 1.35% (National Census 2011). Although the country has a large population of young people (37%, 2011), life expectancy has increased in the past years and this has led to an increase in the proportion of the population over 65 years. 28% of all households are female headed.

Nepal is experiencing a triple burden of diseases from communicable diseases, nutrition associated diseases and an escalation of non-communicable diseases (NCD). Acute respiratory infections and diarrhoeal diseases remain the leading causes of children morbidity and mortality in Nepal. Incidences of diarrhea and ARI were respectively 598/1000 (2010) and 244/1000 (2013) children under five years. In 2014, NCDs accounted for 39 percent of the total country's disease burden, and nearly a half of all deaths were due to NCDs (CVDs, Cancer, Chronic lung Diseases and Diabetes). While there has been an overall reduction in undernutrition, disparity between socio-economic groups and between urban and rural areas is growing and anaemia continues to be very high at 46% among children aged 6–59 months and at 35% among women aged 15–49 years (2011).

There has been significant reduction in the maternal mortality ratio, and under-5 and infant mortality rates have also improved. In contrast to the improvements in child nutritional status, nutritional status of women has not improved greatly in

the past 15 years. In 2011, 18 % of women were malnourished. Neonatal mortality has also been stagnant at 24/1000 live birth since 2006. The neonatal mortality accounts for two-thirds of infant mortality rate and its reduction remains a priority.

Availability and access to health services in Nepal remain challenging especially in rural and remote areas. In some mountainous and hilly regions, people have to travel 1 to 4 hours to reach the nearest health or sub health post. In urban areas, there are insufficient health-care facilities providing public health programmes such as immunization and antenatal care. Analysis of health outcomes data (NDHS) suggests increasing inequities between socioeconomic groups and geographical regions. Furthermore, out-of-pocket expenditure (OOPE) remains very high (55% of total health expenditures). Nepal ranks 133 out of 190 in terms of their health capacity, based on number of physicians, nurses/midwives and hospital beds.

Access to water and particularly, sanitation is sub-optimal. According to the latest available WHO/UNICEF Joint Monitoring Programme data (2012), 88% of the population has access to improved water, yet only 21% of this is piped on premises. Such water is not necessarily safe or free from faecal contamination, especially protected springs. The sanitation situation is far worse with only 37% of the population with access to improved sanitation and 40% of the population practicing open defecation which poses a serious risk to water sources and potential disease outbreaks.

## 2. Priority health concerns

### 2.1

#### Wounds and injuries

Earthquakes cause high mortality due to trauma. Proportional morbidity and mortality from wounds and injuries will increase due to the initial impact of the earthquake and subsequent rescue and clean-up activities. Surgical needs are critically important during the first days and weeks. The majority of the injured are likely to have minor cuts and bruises, a smaller percentage will suffer from simple fractures, and a minority (but a significant number) will present with serious multiple fractures or internal injuries and crush syndrome requiring surgery, blood transfusion and other intensive treatment. These serious injuries are likely to overwhelm existing treatment capabilities, resulting in further delays. A significant number of burns have also been reported, requiring specific burns care.

Risk of wound infection and tetanus are high due to the difficulties with immediate access to health facilities and delayed presentation of acute injuries. Gangrene is a complication of wound contamination, and prompt wound treatment is critical for its prevention. Gangrenous wounds should be managed aggressively, with surgical removal of gangrenous tissue. There is no risk of transmission of gangrene to unaffected persons.

The vaccination coverage among one-year-old children was DTP3 90% at one year in 2012 and the country achieved the maternal/neonatal tetanus elimination status in 2005. However waning tetanus immunity in adults increases the likelihood of morbidity and mortality from tetanus.

Priority must be given to **providing emergency medical and surgical cares** to people with injury related conditions. These account for many of the health-care needs among those requiring medical attention in the immediate aftermath of the event. Appropriate medical and surgical treatment of these injuries is vital to improve survival chances, minimize future functional impairment and disability and ensure as full a return as possible to community life. In order to prevent avoidable death and disability, field health personnel dealing with injured survivors should observe the following basic principles of trauma care:

- Patients should be categorized by severity of their injuries and treatment prioritized in terms of available resources and chances for survival. The underlying principle of triage is allocation of resources in a manner ensuring the greatest health benefit for the greatest number.
- Open wounds that are infected, contaminated, or over 6 hours old should not be closed. Debridement of dead tissue is essential which, depending on the size of the wound, may necessitate a surgical procedure undertaken in appropriate (e.g. sterile) conditions. Any associated involvement of organs, neurovascular structures, or open bone fractures will also necessitate appropriate surgical care.

- After debridement and removal of dead tissue and debris, wounds should be dressed with sterile dressings and the patient scheduled for delayed primary closure. Patients with open wounds should receive tetanus prophylaxis (vaccine and/or immune globulin depending on vaccination history). Antibiotic prophylaxis or treatment will likely be indicated. Burns often follow earthquakes and should be addressed using the core principles of wound management. It should also be borne in mind that tetanus prophylaxis is indicated. Care must also be given to airway management as there is a risk of obstruction especially in cases of burns from fires in enclosed spaces, which leads to high risk of inhalation injury. Patients with burns who are delayed in presenting for care (as may well be the case following an earthquake), may have severe volume depletion.
- HIV post-exposure prophylaxis (PEP) kits should be available to health-care workers, search and rescue workers in case of accidental exposure to contaminated blood and body fluids.
- Protection of safe blood supply is essential. Blood should be screened under national standards for HIV antibodies, syphilis, malaria and hepatitis B. The emergency relief package should include rapid or conventional test kits to screen donated blood for these diseases which are common in Nepal. A rapid assessment of availability of these tests is necessary.

**Tetanus:** has a high case-fatality rate of 70–100% without medical treatment and is globally underreported. The incubation period is usually three to 21 days. A shorter incubation period is associated with severe disease and a worse prognosis. Appropriate management of injured survivors should be implemented as soon as possible to minimize future disability and to avert avoidable death following the earthquake. All wounds and injuries should be scrutinized as *Clostridium tetani* spores that are present in the soil can infect trivial, unnoticed wounds, lacerations and burns. Health-care workers operating in disaster settings should be alerted by the occurrence of cases of dysphagia (difficulty in swallowing) and trismus ("lockjaw" or tonic contraction of jaw muscles), often the first symptoms of the disease.

Patients should systematically receive prophylactic antibiotics and tetanus toxoid vaccine if non-immune, together with tetanus immune globulin if the wound is tetanus-prone. Tetanus vaccine (TT or Td) AND tetanus immune globulin (TIG) are indicated for those with open wounds/lacerations who have never been vaccinated. TIG is indicated for previously vaccinated people who sustain wounds/lacerations (e.g. clean-up workers) depending on their tetanus immunization history.

## Risk assessment

**Water, sanitation and hygiene-related diseases**

Affected populations in Nepal are at risk from outbreaks in water, sanitation, and hygiene related diseases due to reduced access to safe water and sanitation systems. Disruption of usual water sources and contamination of water by open defecation which is widely practiced in Nepal, sub-optimal latrines and/or damaged sewage infrastructure may result in unsafe drinking water being consumed, increasing the risk of exposure.

**Hepatitis E** is endemic in Kathmandu valley and is the cause of more than 50% of acute jaundices. Its highest incidence is in young adult and is an important cause of maternal mortality. It is mainly caused by the consumption of unsafe drinking water.

**Cholera** is endemic in Nepal and a major public health concern, especially among lower socio-economic groups. Cholera outbreaks commonly occur in different areas of Nepal mostly in the summer/rainy season. Nepal has a monsoon climate and the rainy season usually starts at the end of June and lasts until end of September. Outbreaks of cholera are especially common in the warmer southern regions of the country bordering India.

As reported to WHO:

**2009:** Major outbreak of diarrhoea in districts of mid and far western region, which resulted in more than 70,000 cases including 360 deaths. (*V. cholerae Ogawa O1* was isolated)

**2010:** from 18 April to 21 August: Nepal reported 1,790 cholera cases including 9 deaths in 16 districts (most affected: Banke, Dang, Jajarkot and Baitadi). (same strain as in 2009, *V. cholerae Ogawa O1*).

**2011:** 12 cases, no death

**2012:** outbreaks of cholera were reported in three districts: Doti, Bajhang and Kathmandu located in the western part of the country. Deaths occurred for individuals in remote villages of Doti district.

**2014:** from April to June: 933 cases including 2 deaths from Rauthat and Makawanpur districts.

**Diseases associated with crowding**

Population displacement can result in overcrowding in resettlement areas, raising the risk of transmission of certain communicable diseases that are spread from person to person through respiratory droplets such as **measles, diphtheria and pertussis** and acute **respiratory infections or ARI**. This risk is increased with inadequate ventilation. Overcrowding can also increase the likelihood of transmission of meningitis, waterborne and vector-borne diseases in the weeks and months following the earthquake.

**Acute Respiratory Infections.** ARIs include any infection of the upper or lower respiratory tracts. A major concern is acute lower respiratory tract infection (ALRI) (pneumonia, bronchiolitis and bronchitis) in children under five. Low birth weight, malnourished and non-breastfed children and those living in overcrowded conditions are at higher risk of acquiring pneumonia. Infants of less than six



months of age, who are not breastfed, have an increased risk of dying from pneumonia that is five times higher than in infants who are exclusively breastfed for the first six months.

Early detection and case management of pneumonia and other common illnesses, guided by the Integrated Management of Childhood Illness (IMCI), will prevent unnecessary morbidity and mortality in children under five years of age.

**Seasonal influenza activity mainly associated with influenza A (H1N1) pdm09 virus** was reported in Nepal up to beginning of April (last report week 13). It may continue in May. Nepal's main season of influenza activity however is usually reported during the months of July and August. Influenza is transmitted from person to person by exposure to infected droplets expelled by coughing or sneezing or via contaminated hands or surfaces.

**Meningococcal disease** is spread from person to person through respiratory droplets from infected people. Transmission is facilitated by close contact and crowded living conditions.

**Tuberculosis (TB)** The estimated prevalence of tuberculosis in Nepal is 243 per 100 000 (Global TB Control Report, 2011). The incidence of TB has declined slightly in recent years to 156 per 100 000 (WHO, 2014). TB case detection and the success rate has improved over the years, however there are regional disparities and addressing this will need much more concentrated effort on active case identification. Multi-drug resistance is estimated at 2.2% among new TB cases and 15.4% among previously treated cases. Nepal is one of the few countries with an effective model for multi-drug resistant TB services, however increasing prevalence of drug resistant TB in the country remains a challenge to be addressed in the coming years. (NTP, 2014, Epidemiological Situation, draft National Strategic plan 2015-2020).

#### **Vaccine-preventable diseases and routine immunization coverage**

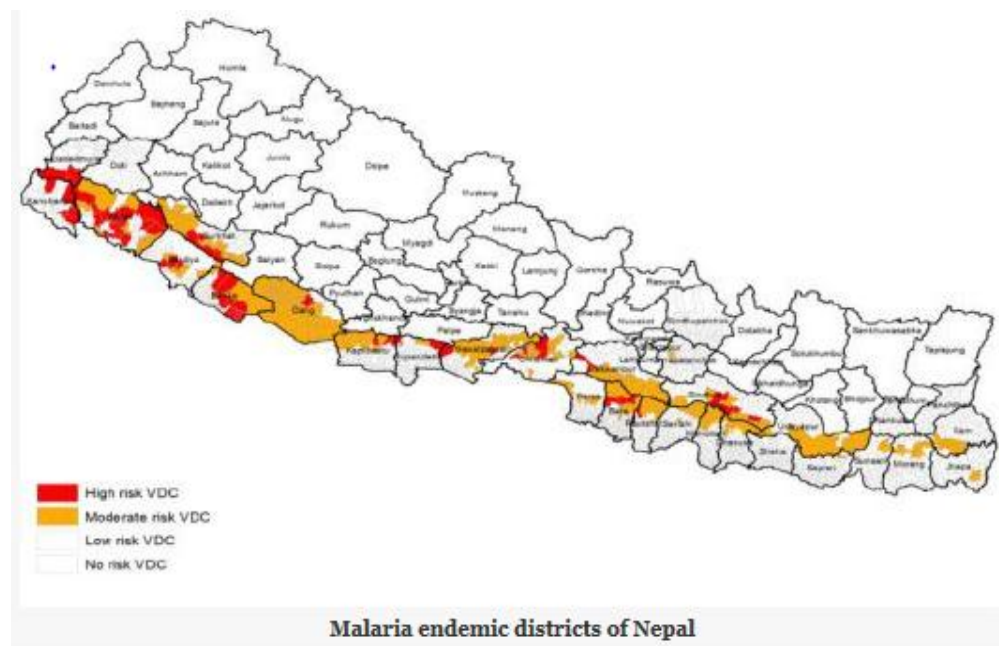
**Tetanus** (See section on wound and injuries)

**Measles, diphtheria, pertussis and polio.** In populations with low vaccination coverage, the crowding associated with displacement may increase the risk of outbreaks from measles, pertussis, and diphtheria. Overall immunization coverage for BCG is 97%, DPT3 92%, OPV3 93% and measles 88% (Nepal Demographic and Health Survey 2011). A national measles vaccination campaign was planned for November 2015 to address the current sub-optimal coverage. Nepal was declared polio free in 2011.

#### **Vector-borne diseases and zoonotic diseases**

**Malaria.** Malaria risk due predominantly to *P. vivax* exists throughout the year in Nepal in rural areas of the 20 *Terai* districts bordering India, with occasional outbreaks of *P. falciparum* from July to October inclusive. Seasonal transmission of *P. vivax* takes place in 45 districts of the inner *Terai* and mid-hills. *P. falciparum* resistant to chloroquine and sulfadoxine–pyrimethamine has been reported. There is limited malaria transmission in Kathmandu, Pokhara and at altitudes above 1400 meters; however there could be possible outbreaks of malaria in affected areas in coming malaria season, usually starting May and lasting till October. The malaria distribution map below shows some overlap with the areas

affected by the earthquake. Some villages in Makawanpur and Sindhuli districts are at high risk of exposure to malaria. Gorkha, Dhading, Sindhupalchowk, Kavre, Ramechhap districts are considered low risk, while Rasuwa, Dolkha, Kathmandu, Bhaktapur and Lalitpur districts are not considered to be exposed.



**Dengue** : Dengue / Severe Dengue is a viral disease transmitted by the *Aedes aegypti* mosquitoes. In Nepal, dengue fever (DF) is an important public health problem occurring in summer during rainy seasons in low land *Terai* region. A series of dengue fever epidemics has been recently observed in Kathmandu Valley and Gorkha districts indicating that dengue is expanding beyond the *Terai* region. In the last epidemic in 2010 there were 4 259 suspected and 917 confirmed cases and 5 deaths. The peak period of transmission was October and November although transmission began in July. There were 79 confirmed cases in 2011, 183 in 2012, 728 cases in 2013 and 356 in 2014. The evidence of all four serotypes (DEN - 1 - 4) increased the public health threat for the occurrence of more severe dengue cases in Nepal however no deaths have been reported from 2011 onwards.

Affected populations may be at an increased risk of malaria and dengue due to lack of adequate shelter resulting in increased exposure to vectors. Localized outbreaks may occur. Surveillance systems must be augmented to detect possible cases so that preventive measures can be implemented in time.

**Leptospirosis** Leptospirosis is a bacterial zoonosis present worldwide. It appears to be increasing in all regions, especially as an urban hazard during heavy rains and floods. While there is limited data on the incidence or burden of the disease in Nepal, a 2010 study amongst military personnel in Nepal found a 9% prevalence of confirmed leptospirosis among hepatitis cases and 8% among febrile cases (Myint et al, 2003). The increased risk of leptospirosis is associated with increased outdoor activities and contact with water and soil. In this situation the disease is likely to be spread through indirect contact with water contaminated with the urine of rodents or other infected animals.

**Lymphatic filariasis** elimination by 2020 is considered on track with effective use of mass drug administration.

Eleven districts are endemic for **Kala Azar** (visceral leishmaniasis) with an average annual incidence rate of 1.3/10000 for the past 5 years.

**Soil transmitted helminths** (hookworm, ascaris and trichuris) is estimated to be prevalent in 50% of children and adolescents nationwide.

**Japanese encephalitis** is a mosquito borne zoonotic disease caused by an arbovirus of *flaviviridae* family. It is endemic in Nepal with highest disease risk occurring in the *Terai* region during and immediately after the monsoon season (June through October).

**Typhus** is transmitted by the human body louse that becomes infected by feeding on the blood of patients with acute typhus fever. Currently the risk factors in Nepal could include the disturbance of ecosystem and many people spending time outdoors which increases risk of bites. Transmission may also be associated with vector biology when there are more larval mites, particularly when the rains start, and with decreased facilities for bathing. Fetal loss is high in pregnant women infected by typhus. Untreated typhus also carries a high mortality rate.

**Human Rabies** is transmitted by dogs and monkey. While there are not a high number of stray dogs in Nepal, there may be an increased risk of rabies transmission from animal bites following the earthquake.

### Priority intervention for the control and management of communicable diseases

Ensuring **uninterrupted and sufficient provision of safe drinking-water** is the most important preventive measure in reducing the risk of outbreaks of waterborne diseases.

- UNHCR, WHO and SPHERE recommend that each person be supplied with at least 15–20 litres of clean water per day.
- There are a number of water treatment methods (boiling, filtration, chlorine, coagulation-flocculation, and solar) that have demonstrated effective removal of pathogens in the laboratory and reductions in diarrhoea when used in the field (WHO, 2011). WHO has recently begun international testing of water treatment technologies according to WHO performance standards (WHO, 2012) and the latest list of tested technologies and their performance should be consulted. The preferred method or combination of methods depends on a number of factors including turbidity or number of suspended particles in the water, existing methods in use and accepted by the population, supply chains, and cost.
- Chlorine is often used in emergencies as it is inexpensive and in certain forms easy to transport. Several considerations should be given to chlorine including:
  - For household water treatment, the most practical forms of free chlorine are liquid sodium hypochlorite, sodium calcium hypochlorite and bleaching powder.
  - The amount of chlorine needed depends mainly on the concentration of organic matter in the water and has to be determined for each situation. Chlorine may be ineffective with

water which is highly turbid, such as from rivers and/or ponds. In such cases other treatment options, such as filtration or coagulation-flocculation should be considered.

- After 30 minutes, the residual concentration of active free chlorine in the water should be 0.5 mg/litre, which can be determined by using a simple field chlorine test kit.
  - Chlorine is ineffective against certain protozoa, most notably *cryptosporidium*, a pathogen which can cause especially serious health conditions for individuals with HIV. Greater protection of drinking-water sources would combine chlorination with other methods or select a method such as membrane filtration that would effectively protect against the range of pathogens most commonly associated with diarrhoeal diseases.
- Regular monitoring of WASH related health risks through sanitary surveys and use of rapid faecal indicator water quality test is an important mechanism for assessing and managing risks. A number of field kits are available for assessing water quality and efforts should be made to quantify faecal contamination, where possible.
  - Key messages on food hygiene and regular hand washing with soap should be promoted to sensitize communities to the relevant health risks.
  - In addition, adequate sanitation facilities should be provided in the form of improved and well maintained latrines or designated, protected defecation areas. Sanitation efforts should also incorporate behaviour change approaches considering the common practice of open defecation.
  - All health-care waste (for example, contaminated syringes and needles) should be properly segregated and disposed of in designated containers and destroyed as appropriated. The safest and most environmentally friendly method is autoclaving, however this requires reliable water and power. Incineration is the next preferred option, using dual chamber, high temperature equipment. If no other options are available burning in pits or burying may be a temporary measure.

**Shelter and site planning** are other important consideration for the prevention of communicable disease.

- Wherever possible shelters for the displaced or homeless must be positioned with sufficient space between them and should be aimed at preventing diseases related to overcrowding or lack of ventilation, such as measles, ARI, diarrhoeal diseases, TB and vector-borne diseases.
- Domestic waste should be disposed in a pit, away from shelters and protected from rodents to reduce the exposure of the population to rodents and other vectors of disease.
- Shelters should be equipped with long-lasting insecticidal nets (LLIN) for each sleeping space to prevent malaria transmission
- In addition, adequate sanitation facilities should be provided in the form of latrines or designated defecation areas. These should be separate sex-specific facilities designed and located with attention to security issues.

**Surveillance/early warning and response system** for rapid detection of cases of epidemic-prone diseases is essential to ensure rapid control. The surveillance/early warning and response system should:

- focus on the priority epidemic-prone communicable diseases most likely to occur in the disaster-affected population;
- be simple to use, uniform in style and include standard case definitions and reporting forms (for WHO case definitions, see Annex 1)
- include an alert system for immediate reporting and prompt investigation of priority epidemic prone diseases such as diarrhoea and acute respiratory infections;
- include outbreak preparedness, with development of specific outbreak response plans and adequate stockpile of supplies as well as outbreak investigation kits and transport material for laboratory specimens;
- complement existing surveillance structures;
- be sensitive to unusual emerging and re-emerging communicable diseases of major public concern, including dengue and diphtheria;
- identify key laboratories for prompt diagnosis and confirmation of the main communicable disease threats, as well as protocols for transport and tracking of specimens;
- ensure data is forwarded to the local health authorities and the WHO office.

### **Immunization**

Immunisation for **Measles/rubella** is recommended for all persons 6 months to 35 years of age. The vaccine of choice is either measles-rubella containing vaccine (MR) or measles-rubella-mumps containing vaccine (MMR). A measles vaccination campaign has been initiated - ahead of the campaign planned for November 2015. It has started in the IDP camps and will be further expanded into the district. Emergency public health personnel, both national and international, should be routinely vaccinated against measles and rubella, regardless of age.

Given the current situation in Nepal, the fact that the country is endemic for **Cholera** and the start of the monsoon season towards the end of June (the usual time of occurrence of cholera outbreaks in the country) there is a risk of outbreak amongst the population. A risk assessment to help decide on where and how to use Oral Cholera Vaccine (OCV) is on-going within the framework for vaccination in humanitarian emergencies (WHO, 2012).

When the situation stabilizes, **routine vaccinations** offered by the national immunization programme should be made available to all infants, pregnant women and other people as part of the provision of basic emergency health-care services.

**Public Health Communication.** Information may be the most important commodity during emergencies. Information may also be the most rapid public health response ahead of the delivery of aid. In addition, the dissemination of information in a timely and transparent manner also helps generate trust and credibility in response activities and agencies providing relief. Heightened community awareness of the need for early treatment and reinforcement of proper case management are important in reducing the impact of communicable diseases.

It is important to convey to all parties that corpses do not represent a public health threat. When death is due to the initial impact of the event and not because of disease, dead bodies have not been associated with outbreaks. Standard infection control precautions are recommended for those managing corpses.

**The use of standard treatment protocols** in health-care facilities with agreed-upon first-line drugs is crucial to ensure effective diagnosis and treatment for ARI, the main epidemic-prone diseases (including cholera, dysentery, shigellosis, typhoid, dengue and DHF, hepatitis, leptospirosis, measles, malaria, meningitis and influenza A and STIs).

- **Standard Precautions** aim to ensure hand hygiene and the avoidance of direct contact with blood and body fluids. Therefore essential supplies should include waterless hand antiseptics and personal protection (e.g. gloves). Additional specific (transmission-based) precautions should be determined by risk assessment. It is important that Standard Precautions should be used not only at health-care facilities, but also by health-care workers providing care in the field.
- **Malaria treatment:** Prevention in the malaria transmission risk districts of lower than 1 000 meters altitude bordering India (Risk of of *P. falciparum*) should consist of Mosquito bite prevention in combination with atovaquone–proguanil or doxycycline (select according to reported side - effects and contraindications). The needs for indoor residual spraying and long-lasting insecticide treated nets are being assessed by WCO in close collaboration with the national malaria programme. In all rural areas between 1000 and 100 meters altitude with low risk of malaria infection, mosquito bite prevention should be combined with stand-by emergency treatment (SBET) consisting of a curative dose of Artemisinin Lumefantrin combination therapy in case of fever.
- Provision of **anti-TB treatment** must be ensured for TB patients who were previously receiving treatment in the affected areas.
- **Leptospirosis** should be considered in the differential diagnosis of febrile illnesses and icteric syndromes in Nepal.
- Diagnosis of **typhus** is to be included in the fever algorithm. The manifestations of the disease are varied so lab tests are needed to confirm. Empirical therapy with tetracycline for fevers of more than approximately 4 days could also be considered.

## 2.3

### Reproductive and sexual health

#### Risk assessment

Access to reproductive health services, including obstetric emergency care can be badly affected during earthquake due to damaged, overwhelmed facilities or limited access. Nepal's maternal mortality ratio is 229 with a total fertility rate of 2.6. Almost 60% of women in Nepal receive antenatal care from a skilled provider and approximately 35% of deliveries occur at health facilities. It is anticipated that the proportion of births occurring outside healthcare institutions and without specialist obstetric care may increase with possible consequences for maternal and neonatal mortality.

There are 60,000 pregnant women and 637,000 adolescent girls in the 14 districts most severely affected by the earthquake. An estimated 10,000 babies will be born every month across these districts and about 1,500 pregnant women are likely to experience complications during pregnancy and childbirth requiring medical care.



During emergencies, vulnerable people may be subjected to situations that substantially increase their exposure to STIs, including HIV. Risk factors include massive displacement of people from their homes, women and children left to fend for themselves, prevalence of domestic violence, social services overwhelmed or destroyed, and a lack of means to prevent HIV infection, such as clean needles, safe blood transfusions and availability of condoms.

HIV prevalence among the adult (15-49 years) population has decreased over the years and now estimates at 0.23%. The distribution of total estimated HIV infections (15+ years) in the country among key and high-risk populations is: male sex workers (MSW) transgender and clients (7.2%); other men having sex with men (MSM) who do not buy or sell sex (14.4%); clients of females sex workers (4.4%); people who inject drugs (2.2%); female sex workers (1.5%) and male labour migrants (27%). Remaining male and female populations, who are classified as low-risk populations, accounted for 16% and 27.3%, respectively. The total number of HIV-positive pregnant women requiring preventing mother-to-child transmission (PMTCT) service is 933. The estimated total ART need is 27 288 persons (CD4+ below 350) in 2011 and the coverage for is ART is 24%.

Interventions targeting key populations have had good impact on overall HIV prevalence among adults (aged 15–49 years). Prevalence has been declining since it peaked at 0.42% in 2004, and is projected to decline slowly to about 0.19% by 2020. New HIV infections have declined from a peak of 8,329 in 2002 to 1,408 in 2013 and are projected to decrease further to 720 in 2020 (NCASC, 2014 Country progress report in HIV AIDS).

With scale up of services and integration of ART services and coordinated efforts between TB, HIV and maternal and child health services, the gap is minimizing between the estimated numbers and the identified numbers. Prevention of Mother to Child Transmission (PMTCT) and ART treatment coverage has also improved with scale up of these services.

### Priority Interventions

The emergency response should include access to emergency reproductive health (RH) services and implementation of the Minimum Initial Service Package (MISP) for Reproductive Health. The role of a lead agency is key to ensure priority RH needs are addressed and that there is coordination, communication and collaboration in MISP implementation.

Excess maternal and new-born morbidity and mortality should be prevented, including through unhindered access to basic and emergency obstetric care for antenatal care, safe delivery and postnatal care. Efforts to minimise the risk of gender based violence and services for the support of and treatment for survivors should be established.

A minimum package of HIV prevention, treatment and care services, including the strengthening of standard precautions, with the provision of gloves, sterile needles and syringes, and safe waste disposal management in health services.

Additional services should include provision of condoms, education and prevention messages, and post-exposure prophylaxis for occupational exposure and survivors of rape. Needle and syringe exchange programmes should be maintained. Efforts should be made to ensure that HIV/AIDS patients receiving ART do not have their treatment interrupted and that ART is provided for the prevention of mother-to-child transmission of HIV.

## Malnutrition

### Risk assessment

Nepal is notoriously food insecure mostly due to its topography. Malnutrition rates are high. Forty-one percent of children under five are stunted, 29 percent are underweight and 11 percent are wasted. The prevalence of stunting in the hills and mountains of the mid- and far-western regions is extreme, with rates above 60 percent. Micronutrient deficiencies are also widespread; in particular, 46 percent of children 6-59 months, 35 percent of women of reproductive age and 48 percent of pregnant women are anaemic.

In 2008, 34% of infants 0-6 months were exclusively breastfed (DHS)

The populations affected by the earthquake will be at increased risk of moderate and severe acute malnutrition if there is a lack of access to appropriate and adequate food, increased cases of diarrhoeal diseases and reduced access to health and nutrition services. Additionally, the risk may be increased by lack of support for mothers or caretakers for breastfeeding, relactation or appropriate complementary feeding. Uncontrolled donations of infant formula and other breast-milk substitutes can increase morbidity and mortality in infants and young children.

This will disproportionately affect vulnerable groups such as young children, pregnant and lactating women and older persons.

### Priority Interventions

- Infants should normally start breastfeeding within one hour of birth and continue breastfeeding exclusively (with no food or liquid other than breast milk, not even water) until 6 months of age. The aim should be to create and sustain an environment that encourages frequent breastfeeding for children up to 2 years of age. Infants who are not breastfed are vulnerable to infection and diarrhoea.
- Supplies of infant formula usually increase in emergency situations which tend to further exacerbate the low percentage of infants being exclusively breastfed. Donations of breast milk substitutes should be avoided. Reconstituting milk powder in settings where safe water supplies are compromised significantly adds to the risk of infants dying from diarrhoea. Only infants who have no access to breast milk require an adequate supply of appropriate breast milk substitutes. In situations where an infant cannot be breastfed and has no access to breast milk, health-care providers including mothers/caretakers should be provided with guidance on appropriate alternatives to breastfeeding such as ready-to-use liquid infant formula and how they are to be used. If powdered infant formula is to be given to the infant then health-care providers including mothers or caretakers should be given information on the safe preparation of these products.
- Bacterial infections are very common in severely malnourished children on initial admission to hospital. Clinical management of severely malnourished patients, including fluid management, must be thorough, carefully monitored and supervised. Common problems encountered in severe malnutrition include hypothermia, hypoglycaemia, dehydration and electrolyte disturbances. It is important that the phases and principles of management of severely malnourished children are followed thoroughly.

- Screening of children for the development of severe acute malnutrition should be implemented at community level and a community-based treatment programme implemented early.
- Populations dependant on food aid need to be given food rations that are safe and adequate in terms of quantity and quality (covering macro- and micro-nutrient needs). Infants from 6 months onwards and older children need hygienically prepared, and easy-to-eat, digestible foods that nutritionally complement breast milk.
- After the acute phase of the emergency, efforts should be made to improve household access to food in Children with moderate acute malnutrition (MAM) need urgent food support or they will move into severe acute malnutrition (SAM) and potentially severe infection and death.

## 2.5

### Non communicable diseases

#### Risk assessment

People suffering from chronic diseases may suffer from reduced access to health facilities and medications. Regular monitoring of patients may be compromised and there may be some disruptions of treatment with increased risk for complications and deaths.

In 2014, NCDs accounted for 39 percent of the total country's disease burden, and nearly a half of all deaths were due to NCDs (CVDs, Cancer, Chronic lung diseases and Diabetes). Out of all deaths, 22 percent were attributed to CVDs, 7 percent to cancers, 5 percent to respiratory diseases and 1.7 percent to diabetes.

Because a large proportion of the population does not measure their blood pressure and blood glucose; most cases of hypertension and diabetes remain undetected. Overall, 20.6 % of the population aged 15-69 years suffers from hypertension, 87.1% of whom are without medication. 3.2% of the population 15-69 suffers from elevated blood sugar (Diabetes Mellitus) with 59% Men & 56% Women not under medication. The prevalence of raised total cholesterol is also alarming, with more than one fifth of the adult population having raised total cholesterol.

The MOHP intends to reorient and augment its primary health care system to include early detection and treatment of NCD (PEN package) including cervical and breast cancer in its Nepal Health Sector Programme (NHSP3) to start in July 2015. As of now such services are not routinely provided through public District Health Services.

#### Priority Interventions

The priorities during the acute phase of this emergency are to treat exacerbations and minimize treatment interruptions. Management of acute life threatening conditions which are likely to be on the increase should be prioritized. The following actions, in particular, should be prioritised:

- Assess needs based on knowledge of pre-emergency NCD patterns
- Ensure continuity of NCDs treatment. Acute trauma care can be also compromised by inadequately controlled NCDs (e.g. orthopedic surgery is much higher risk if a patient has poorly controlled cardiovascular or diabetic disease).

- Ensure access to essential diagnostics (blood pressure, blood glucose), drugs and supplies
- Re-establish access to screening and treatment of pre-cancerous lesions to prevent cervical cancer
- Speed up implementation of the early detection and treatment (PEN) package guidelines
- Include measures to reduce the risk factors especially on containment of alcohol and tobacco use into MHPSS activities
- Encourage FMT and NMTs to deliver basic NCD care as per PEN guidelines.
- Monitor and audit the short and long term effects of emergency response on NCDs.

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## 2.6

### Mental Health and Psychosocial support

#### Risk assessment

Much of the affected population is likely to be burdened by a wide range of symptoms of normal distress caused by severe loss, trauma, continuing danger, and constrained social and living conditions. It is important for health services to differentiate between normal psychological distress and moderate or severe mental disorders. WHO estimates that approximately 450 million people suffer from mental, neurological, behavioural or substance use disorders worldwide and that one in every four persons will be affected by a mental and neurological disorder at in some stage in life. Four out of five people in low- and middle-income countries who need services for mental and neurological and substance use disorders do not receive it. While Nepal's mental health policy and the essential free health care package include community-based mental health programmes, such services are currently available only in a few pilot sites which are managed by NGOs and the Mental Hospital.

#### Priority Interventions

Health care providers should therefore be sensitized to the possibility of increased cases of mental distress. It is important that they can differentiate between normal psychological distress and moderate or severe mental disorders. Normal psychological distress may be reduced through psychological first aid and other non-clinical psychosocial interventions such as the support to culturally appropriate mourning and community self-help. Moderate or severe mental disorders require clinical treatment in addition to psychosocial support. Medical case management need to be delivered by a trained health care provider using psycho tropic medications that are included in the national or WHO essential drug lists. Continued access to care should be assured for people with severe mental disorders and referral may be needed for severely affected patients.

## Environmental risks

Environmental risks may exist from damaged hazardous installations such as industrial facilities, damaged oil and gasoline depots, warehouses in which agricultural, industrial or other chemicals are stockpiled, as well as damaged technical equipment (e.g. transformers, medical equipment with radiological sources). Most of Nepal's industry is located around Kathmandu. Health workers should look out for patients' symptoms that may be consistent with chemical intoxication, especially skin irritation and chemical burns. Poor management of waste, including health-care waste, can potentially expose health-care workers, waste handlers, patients and the community at large to infection, toxic effects and injuries as well as increasing the risk of polluting the environment.

Asbestos cement is widely used as a construction material in Nepal, e.g. for roofing. Cutting or otherwise breaking up asbestos cement during clear-up operations may expose workers to asbestos fibres, which are harmful to health in the longer term. Care should be taken when handling damaged asbestos cement to minimise fibre release.

**Acute diarrhoea**

Acute diarrhoea (passage of three or more loose stools in the past 24 hours) with or without dehydration.

**Suspected cholera**

In an area where cholera is not known to be present:

- a person aged > 5 years with severe dehydration or death from acute watery diarrhoea with or without vomiting.

In an area where there is a cholera outbreak:

- a person aged > 5 years with acute watery diarrhoea with or without vomiting.

To confirm a case of cholera:

- isolation of *Vibrio cholera* O1 or O139 from a diarrhoeal stool sample.

**Bloody diarrhoea**

Acute diarrhoea with visible blood in the stool.

To confirm a case of epidemic bacillary dysentery:

- take a stool specimen for culture and blood for serology,
- isolation of *Shigella dysenteriae* type 1.

**Acute flaccid paralysis (suspected poliomyelitis)**

Acute flaccid paralysis in a child aged < 15 years, including Guillain–Barré syndrome, or any acute paralytic illness in a person of any age in whom poliomyelitis is suspected.

**Acute Haemorrhagic Fever Syndrome**

Acute onset of fever (duration of less than 3 weeks) and any of the following:

- haemorrhagic or purpuric rash,
- vomiting with blood,
- cough with blood,
- blood in stools
- epistaxis, or
- other haemorrhagic symptoms.

**Suspected Ebola or Marburg cases for routine surveillance**

Illness with onset of fever and no response to treatment for usual causes of fever in the area, and at least one of the following signs: bloody diarrhoea, bleeding from gums, bleeding into skin (purpura), bleeding into eyes and urine.



### **Confirmed Ebola or Marburg cases for routine surveillance**

A suspected case with laboratory confirmation (positive IgM antibody, positive PCR or viral isolation)

### **Acute Jaundice Syndrome**

Illness with acute onset of jaundice and absence of any known precipitating factors and/or fever.

### **Acute lower respiratory tract infections/ pneumonia**

In children aged less than five years old:

- cough or difficulty breathing, and
- for infants aged 2 months to 1 year, breathing 50 or more times per minute, or
- for children aged 1 to 5 years, breathing 40 or more times per minute, and
- no chest in-drawing, no stridor, no general danger signs.
- Severe pneumonia:
- cough or difficulty breathing and one or more of the following:
- inability to drink or breastfeed,
- severe vomiting,
- convulsions, lethargy or unconsciousness, or
- chest in-drawing or stridor in an otherwise calm child.

### **Acute viral hepatitis (A or E)**

Any person with discrete onset of an acute illness with signs or symptoms consistent with acute viral hepatitis typically including fever, acute jaundice, nausea, dark urine, anorexia, malaise, extreme fatigue, and right upper quadrant tenderness and/or elevated serum aminotransferase levels (ALTs) (>2.5 times the upper limit of normal, as defined by the performing laboratory).

### **Influenza-like illness (ILI)**

An acute respiratory infection with :

Measured fever of  $\geq 38^{\circ}\text{C}$

And cough

With onset within the last 10 days

### **Severe acute respiratory infection (SARI)**

An acute respiratory infection with

History of fever or measured fever of  $\geq 38^{\circ}\text{C}$

And cough

With onset within the last 10 days

And requires hospitalization

### **Malaria**

Person with current fever or history of fever within the past 48 hours (with or without other symptoms such as nausea, vomiting and diarrhoea, headache, back pain, chills, muscle pain) with positive laboratory test for malaria parasites (blood film, thick or thin smear) or rapid diagnostic test).

#### In children

Uncomplicated malaria:

- Fever and no general danger signs such as lethargy or unconsciousness, convulsions, or inability to eat or drink. Where possible, confirm malaria with laboratory test.

Severe malaria:

- Fever and general danger signs (lethargy or unconsciousness, convulsions, or inability to eat or drink).

### **Measles**

Fever and maculopapular rash (i.e. non-vesicular) with:

- cough and coryza (i.e. runny nose), or
- conjunctivitis (i.e. red eyes).
- Any person in whom a clinical health worker suspects measles infection.

To confirm a case of measles:

- Presence of measles-specific IgM antibodies.

### **Meningitis**

Suspected case:

- sudden onset of fever (>38.5 °C) with stiff neck.
- in patients aged < 12 months, fever accompanied by a bulging fontanelle.
- Probable case of bacterial meningitis:
- suspected case of acute meningitis, as defined above, with turbid cerebrospinal fluid.

Probable case of meningococcal meningitis:

- suspected case of meningitis, as defined above and Gram stain showing Gram-negative diplococcus, or
- ongoing epidemic or petechial or purpurial rash.

Confirmed case of meningococcal meningitis:

- suspected or probable case, as defined above, with either positive-CSF antigen detection for *Neisseria meningitidis* or positive CSF culture or blood with identification of *N. meningitidis*.

### **Tetanus**

Adult tetanus

Either of the following signs 3–21 days following an injury or wound:

- trismus of the facial muscles or risus sardonicus
- painful muscular contractions.

**Neonatal tetanus**

Any neonate with normal ability to suck and cry during the first 2 days of life who, between day 3 and day 28, cannot suck normally, or any neonate who becomes stiff or has spasms or both.

**Unexplained Fever**

Fever (body temperature  $>38.5$  °C) for  $>48$  hours and without other known aetiology.

**Unexplained cluster of health events**

An aggregation of cases with similar symptoms and signs of unknown cause that are closely grouped in time and/or place.

# Annex 2 Indicators for priority emergency response activities<sup>11</sup>

Code	Sub-Domain	Title	Description
H-C.1	H1 General clinical services & essential trauma care	Number of outpatient consultations per person per year (attendance rate or consultation rate)	Proxy indicator for accessibility and utilization of health services that may reflect the quality of services. It does not measure the coverage of this service, but the average number of visits in a defined population.
H-A.1.a	H1 General clinical services & essential trauma care	Number of functional basic health units/10 000 population	Proxy indicator of geographical accessibility, and of equity in availability of health facilities across different administrative units.
H-A.1.b	H1 General clinical services & essential trauma care	Number of functional health centres/50 000 population	Proxy indicator of geographical accessibility, and of equity in availability of Health Facilities across different administrative units
H-A.1.c	H1 General clinical services & essential trauma care	Number of functional district-rural hospitals/250 000 population	Proxy indicator of geographical accessibility, and of equity in availability of Health Facilities across different administrative units.
H-A.9a	H1 General clinical services & essential trauma care	Number and Percentage of non functional health facilities	Indicator of the consequence of the crisis on the availability of the health services
H-A.9b	H1 General clinical services & essential trauma care	Number and Percentage of health facilities supported by humanitarian organisations	Indicator of support by health cluster partners beside MoH to the health system; in very disrupted health system can be a proxy for functional health facilities/services as non-supported health facilities have stopped functioning
H-A.5	H1 General clinical services & essential trauma care	Number of inpatient beds per 10 000 population	Indicator for the availability of hospital beds across crisis areas and proxy indicator of equity in the allocation of resources.
H-A.7	H1 General clinical services & essential trauma care	Number of health workers per 10 000 population	Key indicator to monitor the availability of health workers. It can serve as a proxy to monitor equity in the allocation of resources by humanitarian actors across different groups within the humanitarian case load and/or crisis affected population versus local populations.
H-A.8	H1 General clinical services & essential trauma care	Number of community health workers per 10 000 population	Indicator monitoring the availability of human resources key to delivering community-based intervention.
H-C.2	H1 General clinical services & essential trauma care	Number of consultations per clinician per day	Measure for the workload and proxy indicator of the quality of care.
H-A.9	H1 General clinical services & essential trauma care; H2 Child health; H3 Communicable diseases; H4 Sexual and Reproductive Health	Number and percentage of functional health facilities providing selected relevant services	Proxy indicator for the physical availability and geographical accessibility of selected services relevant to the local context.
H-C.3	H5 Non communicable diseases and mental health; H6 Environmental Health		
H-C.4	H2 Child health	Coverage of DTP3 in < 1 year old (%)	Indicators used for estimating the vaccine coverage of the total EPI strategy. To avoid overestimation, measles vaccination coverage is often used as a proxy since it is usually lower than DTP3 coverage.

Code	Sub-Domain	Title	Description
H-R.3	H3 Communicable diseases; H5 Non communicable diseases and mental health	Case Fatality Ratio (CFR) for most common diseases	Probability of dying as a result of a given disease. Is a result of a mixture of disease severity and quality of health care.
H-A.2a	H4.2 Maternal and newborn care	Number of functional health facility with Basic Emergency Obstetric Care (BEmOC) per 500 000 population	Proxy indicator for the physical availability and geographical accessibility of emergency obstetric services and their distribution across districts. An unbalance between the availability of BEmOC and CEmOC (with too few BEmOC) is often observed.
H-A.2	H4.2 Maternal and newborn care	Number of functional health facilities with Comprehensive Emergency Obstetric Care (CEmOC) per 500 000 population	Proxy indicator for the physical availability and geographical accessibility of emergency obstetric services and their distribution across districts in the affected areas. An unbalance between the availability of BEmOC and CEmOC (with too few BEmOC) is often observed.
H-C.5	H4.2 Maternal and newborn care	Percentage of births assisted by a skilled attendant	Proxy measure for the utilization rate of obstetrics services in health facilities and in communities where Village-Trained Midwives are operating. It is a measure of a health systems ability to provide adequate care for pregnant women during labour and delivery.
H-C.6	H4.2 Maternal and newborn care	Percentage of deliveries by caesarean section	The proportion of all deliveries by caesarean section in a geographical area is a measure of access to and use of a common obstetric interventions for averting maternal and neonatal deaths and for preventing complications such as obstetric fistula. Of all the procedures used to treat major obstetric complications, caesarean section is one of the commonest, and reporting is relatively reliable.
H-A.6	H4.3 Sexual violence	Percentage of functional health facilities with clinical management of rape survivor services	Key indicator to measure the allocation of resources and the availability of services to address consequences of sexual violence.

## Annex 3

# Heatmap of health risks in the current crises

Public health risks	Heat matrix
Disruption of health services	In the short term
Trauma and Injuries	
Acute Watery Diarrhoea & Water, hygiene and sanitation associated diseases	Short to medium term
Acute Respiratory infections	Short to medium term
Maternal and Neonatal mortality	Short to medium term
Complications of NCDs	Medium term
Mental Health disorders	Short to medium term
Severe acute malnutrition	Medium to long term
Chemical hazards	

### Legend

Very high	High	Moderate	Low
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