Bangladesh/Myanmar: Rakhine Conflict 2017

Public Health Situation Analysis and Interventions
10 October 2017

Photo credits: WHO Country Office, Bangladesh

World Health Organization

Contents

List of contents 1
Acronyms and abbreviations 2
Preface 3
Executive summary 4

1 Background and risk factors
1.1 Country information 9
1.2 Crisis impact 12
1.3 Current health situation 13

2 Priority health concerns
2.1 Access to health services 17
2.2 Communicable and infectious diseases 21
2.3 Non-communicable diseases 35
2.4 Mental health 36
2.5 Reproductive and sexual health 37
2.6 Infant and child health 37
2.7 Environmental health and technological hazards 38

3 Risk characterization 39
4 Priority interventions 40

Bibliography

Annex 1 WHO recommended case definitions 46
Annex 2 Indicators for priority emergency response activities 49

Acronyms and abbreviations

ARI - Acute Respiratory Infection
AOG - Armed Opposition Group
ARSA - Arakan Rohingya Salvation Army
CCCM - Camp Coordination and Camp Management cluster
IDP - Internally displaced person
ICDDRB - International Centre for Diarrhoeal Disease Research, Bangladesh
INGO - International nongovernmental organization
ICRC - International Committee of the Red Cross
ISCG - Inter Sectoral Coordination Group
IFRC - International Federation of Red Cross and Red Crescent Societies
LRTI - lower respiratory tract infections
MHPSS - Mental Health & Psychosocial Support Network
IOM - International Organization for Migration
MoH - Ministry of Health
MAM - moderate acute malnutrition
MSF- Doctors Without Borders/ Médecins Sans Frontières
NGO - Nongovernmental Organization
UNOCHA - United Nations Office for the Coordination of Humanitarian Affairs
PHC - Primary health care
PTSD - Post-traumatic stress disorder
RMNCHA - Reproductive, maternal, newborn, child and adolescent health
SAM - Severe Acute Malnutrition
SGBV - Sexual and Gender-Based Violence
STD - Sexually-transmitted disease
UNDP - United Nations Population Fund
UNHCR - Office of the United Nations High Commissioner for Refugees
UNICEF - United Nations Children's Fund
WASH - Water, Sanitation and Hygiene
WHO - World Health Organization

Preface

The purpose of this public health situation analysis is to provide all health sector partners, including local and national authorities, nongovernmental organizations (NGOs), donor agencies and United Nations agencies, an up-to-date technical information on the major public health threats faced by the over half a million people who have crossed over from Myanmar to Cox's Bazar, Bangladesh since 25 August 2017.

The issues have been selected on the basis of the burden of morbidity, mortality and potential risk in in the affected areas / populations.

This assessment is expected to facilitate coordination of activities among partners and support needs assessments and orientation of emergency health response strategies.

Executive summary

Source: Google Maps

Since 25 August 2017, more than half a million people are estimated to have crossed from Myanmar to Cox's Bazar, Bangladesh following violence in Rakhine state, Myanmar. People have moved into settlements/ camps, several spontaneous settlements have come up and many are with host communities. The speed and scale of the influx has resulted in a critical humanitarian emergency with increasing needs for food, health, shelter, water and sanitation, as well as protection and education.

Basic services that were available prior to the influx are under severe strain due to the massive increase in the population. In some of the sites that have spontaneously emerged, there is virtually no access to water and sanitation facilities. Additionally, overcrowded conditions increase the risk of disease outbreak.

Both Bangladesh and Myanmar and their affected regions of Cox's Bazar and Rakhine are endemic for various communicable diseases. Both sites have witnessed in recent times, outbreaks of measles, dengue, chikungunya and malaria. Endemic transmission of HEV and leptospirosis is expected to be high in the affected areas/populations.

While progress has been made in malaria control, Cox's Bazar's continues to be among the malaria endemic districts of Bangladesh. In addition, there is high burden of acute respiratory diseases especially among under five year-olds. Tuberculosis disease burden, including MDR TB rates are high in both countries. Sub-optimal water and sanitation conditions, inadequate vaccination coverage and

vector control capacity are some of the important drivers of common communicable diseases in the two countries.

Against this backdrop of endemicity of communicable diseases and worsening health, nutrition and environmental conditions due to the current crisis, affected populations are at high risk of local outbreaks of waterborne (cholera, hepatitis E, dysentery), foodborne (cholera, dysentery) and vector-borne diseases (dengue, chikungunya, JE, malaria, scrub typhus) as well as skin diseases (scabies).

A site development task force has been established with Ministry of Disaster Management and Relief, Government of Bangladesh (GoB), which is working closely with donor and multilateral agencies, NGOs and international NGOs (iNGO). The Inter Sector Coordination Group (ISCG) was assigned the task of coordinating all the work on the sites, operating as a one stop information hub for agencies like WHO, Doctors Without Borders / Médecins Sans Frontières (MSF), International Organization for Migration (IOM), United Nations High Commissioner for Refugees (UNHCR), United Nations Population Fund (UNFPA), United Nations Children's Fund (UNICEF), Action Contre la Faim (ACF International) Bangladesh (ACF), International Federation of Red Cross and Red Crescent Societies (IFRC), International Committee of the Red Cross (ICRC), Bangladesh Rural Advancement Committee (BRAC), Bangladesh Red Crescent Society (BDRCS), International Committee of the Red Cross (ICRC), MUKTI and International Centre for Diarrhoeal Disease Research (ICDDRB). Since 25 August, 30 000 households, 150 000 people have been provided emergency shelter kits in the Kutupulong, Balukhali, Shamlapur and Leda makeshift settlements in addition to Roikhong/Unchiprang.

Photo credits: WHO SEARO

Overwhelming the health system

The sheer magnitude of new arrivals has put massive pressure on all health services and the cramped living conditions, presenting significant public health risks. Poverty ridden and without access to resources, the vulnerable people are completely dependent on what the Bangladesh government and the relief agencies can provide to them - such as primary and secondary health care, trauma care and rehabilitation, reproductive, maternal, neonatal, child health and mental health services and psychosocial support. The existing facilities in Cox's Bazar and surrounding areas have reported a 150-200% increase in patients, overwhelming current capacity and resources. It is estimated that it will take up to two more months (October and November) to provide basic emergency shelter coverage and water, sanitation and hygiene (WASH) services.

Emerging health needs of the vulnerable population include immunization against vaccine preventable diseases, reproductive health services, referrals to health facilities, prevention of Cholera/acute watery diarrhoea and malaria and services for people subjected to sexual and gender-based violence (SGBV). An early warning and surveillance systems has been established as part of preparedness to mitigate the risk of communicable disease outbreak.

Setting priorities

Based on health needs, priority interventions have been identified and introduced. Health planning at the new locations is being undertaken with government and partners to ensure that health risks of men, women, children and the elderly in the settlements are minimized and precautions are taken to diffuse build-up of any disease outbreak. Some of the urgent next steps that are being taken and strengthened include:

- Establishing health posts within the new settlements especially in areas where people are settling and there are no immediate health services in the vicinity. One health post will aim to cover 20 000 population and will include space and services for outpatient services, reproductive, maternal, newborn, child, and adolescent health (RMNC+A) including family planning, nutrition, family planning, mental health and psychosocial support (MHPSS), sexual and gender-based violence (SGBV) and disability support services;
- Providing immunization and nutrition support through the Ministry of Health as well as WHO and UNICEF who have already carried out one campaign and have launched the second one covering about 150 000 children aged 6 months to 15 years;
- Implementing reproductive health services based on emerging needs; and
- Improving WASH conditions through the assigned Government Agency and UNICEF.

Public health actions

With arrivals of Rohingya reducing in numbers as of 27 September and air loads of supplies, relief and shelter materials being received, a more streamlined and systematic health response is being developed, this comprehends:

- Support given for safe deliveries of over 200 pregnant women who were assisted by 35 specially deputed midwives by UNFPA. Government of Bangladesh has meanwhile stepped up its birth control campaign and has been distributing contraceptives and providing other reproductive health services to the affected population across the makeshift sites;

- Improvment of water and sanitation facilities, which has been ongoing since the time the influx of Rohingyas began. From constructing nearly 250 makeshift toilets to making efforts to halt open defecation to providing drinking water (3.5 litre per person per day) through mobile trucks and installing tubewells, this major concern is being addressed. Water samples are also being tested;
- Early Warning and Surveillance System developed by WHO and the Directorate General of Health Services (DGHS) has been currently put on trial and will soon be fully operationalized. All partners have been asked to report daily data from medical teams to Control Room at Civil Surgeon Office. WHO will be compiling data for disease surveillance and completeness of reporting will be closely monitored and shared.

Qualitative risk assessment on communicable and infectious disease scenario

In the setting of a complex emergency, with a sudden influx of hundreds of thousands of people in a brief period, health needs are bound to be varied and complex. These health needs will necessarily evolve as the crisis evolves.

This qualitative risk assessment based on the available evidence has been done to prioritize and guide public health actions in affected communities covering conditions that include acute febrile illness with rash, measles, dengue and chikungunya, scrub typhus, acute respiratory infection (ARI), influenza, acute diarrheal diseases including cholera and dysentery, acute jaundice syndrome, hepatitis E, leptospirosis, skin disease scabies, acute encephalitis syndrome (AES) and malaria, tuberculosis, HIV/AIDS. This situation analysis aims to provide some direction to government departments, donors and other agencies, which are in the process of mounting a more focused intervention plan.

1. Background and risk factors

1.1 Country information

Understanding how the two bordering countries of Myanmar and Bangladesh are placed geographically will help contextualize the current crisis involving affected people. Myanmar, a country in South-east Asia, borders the Andaman Sea and Bay of Bengal in the south. It is bordered in the north and northeast by China, in east by Laos and Thailand, in west by Bangladesh and the Indian states of Nagaland, Manipur and Mizoram. The country covers an area of 676 578 sqkm of which Rakhine state situated on the western coast has an area of 36 762 sqkm.

Formerly East Pakistan, Bangladesh came into being only in 1971, when the two parts of Pakistan split after a bitter war which drew in neighboring India. Bangladesh was under military rule for 15 years before democracy was restored in 1990. It is one of the world's most densely populated countries, with its people living into a delta of rivers that empties into the Bay of Bengal. The country has in recent years reduced population growth and improved health and education.

Table 1: Demographic data

Demographic data	**Bangladesh**	**Myanmar**
Total population	164 856 278	548 364 83
population density of people per sqkm	of 1 115.62	-
Fertility rate	2.4 children born per woman	-
Crude birth rate	18.775 births/thousand	17.092 births/thousand
Crude death rate	5.265 deaths/thousand	8.333 deaths/thousand
Crude net migration rate	-1.948 people/thousand	-0.182 people/thousand
Life expectancy (both sexes)	72.709 years	66.445 years

Source: UN data, 2017, http://worldpopulationreview.com/countries/myanmar-population/

1.1.1 Health system dynamics

Bangladesh

The health system in Bangladesh comprises of government, private sector and NGOs. While government is responsible for policy and regulating functions of public, private and NGO providers through legislation and regulation, the public health system is highly centralized with Ministry of Health & Family Welfare (MoHFW) managing primary and tertiary care through the Health Service Division and the Medical Education and Family Welfare Division (1). The NGO sector covers the preventive and basic care aspects and also enters into strategic health service partnerships contributing in improving immunization and control of communicable diseases. The private sector works largely through medical colleges, hospitals, clinics, pharmacies and untrained healers. In urban areas, primary health care is the responsibility of the Ministry of Local Government, Rural Development and Cooperatives (MOLGRDC) through city corporations and municipalities in partnerships with NGOs.

The Health, Nutrition and Population Sector Programme (2017-22), that forms the core of health sector activities, is sanctioned a budget of USD12 billion with government financing 84% of the same (2). The government has revised its essential service package including non-communicable diseases to be implemented at district and sub-district levels. While public health budgets have increased over the last few years, government health spending has reduced.

Extensive health service delivery network (1)

- 928 89 hospital-beds distributed in 128 secondary and tertiary hospitals at central and district levels; and 567 upazila hospitals in sub-district and below
- 784 26 beds within 4596 registered private hospitals and clinics
- 6 hospital-beds per 10 000 populations (SEARO Health Profile, 2016)
- 13 036 community clinics providing basic primary health care services at grass roots level
- Much wider ambulatory service coverage by private sector as compared to public sector
- An improved Electronic Management Information System (MIS)which does not use health MIS data for health planning

Health infrastructure and service delivery network: The country has an organised health service infrastructure, however, it is characterized by shortage of skilled resources and inequitable distribution of trained manpower. In spite of widespread health service arrangements, there are gaps in service delivery readiness at block and district levels. Only 7% facilities at district and upazila (sub-district) level have the capacity to provide normal delivery services; 42% can deliver antenatal care (ANC) and 23% child curative care (3).

Bangladesh, however, is the first low income country to develop a domestic pharma industry. The Essential Drug Co Ltd was set up by the government to supply bulk of public sector medicines facilities (>80%) for medicines (4). However, the public sector is unable to meet the growing demand for medicine by those visiting the public health facilities. It is common to see, stock-out of medicines in public facilities linked to leakage and wastage, making the target of achieving access to medicines difficult.

Health facilities and profile of population living in Cox's Bazar, Sadar

Cox's Bazar has a modest health infrastructure with no designated trauma care facilities. The water and sanitation profile of the area is reportedly satisfactory with 96% houses having access to safe drinking water and 82% to sanitary latrines(5). With one 250 bedded district hospital, seven upazila health complexes (312 beds) and 12 union sub centers, the existing health facilities also include 22

private clinics, 12 NGO clinics and one 10 bedded hospital. In the rural areas, there is only one rural dispensary and 174 community health clinics. There are virtually no ambulances, jeeps, buses, microbuses or pick-ups attached to these facilities potentially limiting mobility and outreach (5).

Out of the 73 posts for physicians at the USC/Union Health and Family Welfare Centres level, 64 are filled up; at the UHC level 71 are filled out of 112 vacancies and at the DH/GH level 43 posts are filled out of a total of 62 posts (6). The district hospital attended to 214 514 outpatient department (OPD) visits in 2016. Patients admitted were mostly cases of pneumonia followed by bronchopneumonia, septicaemia, birth asphyxia and bacterial sepsis. Most common diseases of the 30+ population were asthma, bronchopneumonia, septicaemia, cardiogenic shock and encephalitis. In the case of maternal deaths, it was postpartum haemorrhage, puerperal sepsis, eclampsia and antepartum haemorrhage. Overall, in 2016, as many as 989 major and 15 666 minor surgeries were performed (6).

Myanmar

The Ministry of Health and Sports (MoHS) is the major player in its health sector. It acts both as a governing agency and provider of comprehensive health care. However, over the years as the political and administrative situation changed, different players were assigned different roles. While the MOHS is organized into three departments, it is also supported by NGOs, CBOs and iNGOs. The Department of Public Health is mainly responsible for primary health care and basic health services, nutrition promotion, sanitation, maternal and child health amongst others. In line with the national health policy, NGOs like Red Cross and Myanmar Maternal and Child Welfare Association have the responsibility to contribute to service provision of health care delivery. The country's expenditure on health is among the lowest in the world. Under the military regime, health system spending ranged between 0.5% to 3% of its gross domestic product (GDP) (7).

Health infrastructure and service delivery network: According to the Department of Medical Service report, 2015, the country has 193 private hospitals, 201 private specialist clinics, 3911 private general clinics and 776 private dental clinics. There are many charitable hospitals that are accessed by the poor in addition to private nonprofit clinics run by community based organizations (CBO) and faith based organizations (FBO). Some of them run ambulatory services. Public hospitals are categorized into general hospitals that usually have 2000 beds, specialist and teaching hospitals have 200-500 beds, region/district/state hospitals have 200-500 beds, township hospitals have 25-100 beds and sub-township and station hospitals 16-25 beds (6).

A short profile of Rakhine state

Rakhine state is one of the least developed areas of Myanmar, second only to Chin state in terms of the proportion of the population living below the poverty line. The state fares poorly on most social development indicators and is characterized by high malnutrition, generally low enrolment and completion in primary education and poor access to clean water and sanitation. It is also prone to natural hazards such as storms and floods. In the final report of the Advisory Commission on Rakhine State – a joint project of the Government of Myanmar and the Kofi Annan Foundation - it is recognized that all communities suffer from inadequate medical services.(94) The Rohingya population who has fled to Bangladesh since 25 August 2017 are mostly believed to have originated from the northern townships of Maungdaw, Buthidaung, and Rathedaung in Rakhine State.

1.1.2 Rohingya population and their status in Myanmar and Bangladesh

More than 200 000 Rohingya population already lived in Bangladesh (mainly in Cox Bazar district) before August 2017. Approximately 33 000 of them are registered as refugees in Bangladesh. The first major influx of Rohingya population to Bangladesh happened in 1978 following a major military operation in Myanmar. Similar military operations resulted in more exoduses in the early 1990s (which was also followed by a major repatriation in the mid-90s). Violence of 2012 in Rakhine resulted in more displacement on both sides. Current estimate of Rohingya population in Bangladesh is estimated to be above 700 000 including newly arrived 521 000. They are living in extremely challenging conditions in Bangladesh, mainly in preexisting refugee camps, new spontaneous settlements and host communities.

1.1.3 Scope and methodology of the current assessment

This assessment of public health risks focuses on two distinct population groups settled in Rakhine State, Kachin and Shan States in Myanmar as well as in Cox's Bazar in Bangladesh :

- Refugees in Cox Bazar, estimated to be approximately 521 000 (8); and
- Rohingya in Myanmar estimated to be close to 500 000.

Each group presents differing factors influencing risk of illness. For both the immediate health priorities include provision of emergency medical and surgical care to the injured, food, shelter, adequate water and sanitation resources, and access to health care and basic medicines for communicable and non-communicable diseases.

This assessment has been conducted based on Secondary Data Review from several sources.

1.2 Crisis impact

Bangladesh has for decades faced influx of Rohingya fleeing Myanmar. The country was already home to 200 000 Rohingya before the major influx beginning 25 August 2017.

The current influx is the largest movement to date of the Rohingya minority group into neighbouring Bangladesh (6) seeking shelter in Cox's Bazar (border between Rakhine State and Cox's Bazar is located in 92°11'30"E 21°14'3"N). According to estimates majority of Rohingya population has arrived from adjoining townships of Rakhine state of Myanmar, namely, Maungdaw, Buthidaung and Rathedaung. Within Myanmar, internal displacement has been reported from northern Rakhine to temporary shelters/camp around Sittwe city.

1. .

As of 12 October 2017, over 521 000 Rohingya have crossed over from Myanmar to Cox's Bazar and approximately 26 747 have been internally displaced from northern Rakhine, seeking temporary shelters around Sittwe city in Myanmar.

According to an IOM briefing on 26 September 2017, majority of Rohingya population (old and new arrivals) is now concentrated in 10-11 locations in Cox's Bazar, Bangladesh. The two predominant sites are Kutupalong and Balukhali which have collapsed into one large site with an approximate population of 400 000. Smaller sites that have about 15 000 to 60000 Rohingya population include Mainnerghona, Burma para, Tasnimarkhola, Hakimpara and Jamtoli. Recognizing the need to create more space and also to free up the areas that had been taken over in the other two sites, a third site has been allocated by the government on a 2 000 acre land which will have a new settlement between Kutupalong and Balukali makeshift settlements.

This is one of the most severe humanitarian crisis. Living spaces are stretched. There is a massive struggle to get shelter and other lifesaving needs. In the first few weeks, the sites had virtually no access to water and sanitation facilities, raising the risks of an outbreak of disease.

Photo credits: WHO Country Office, Bangladesh

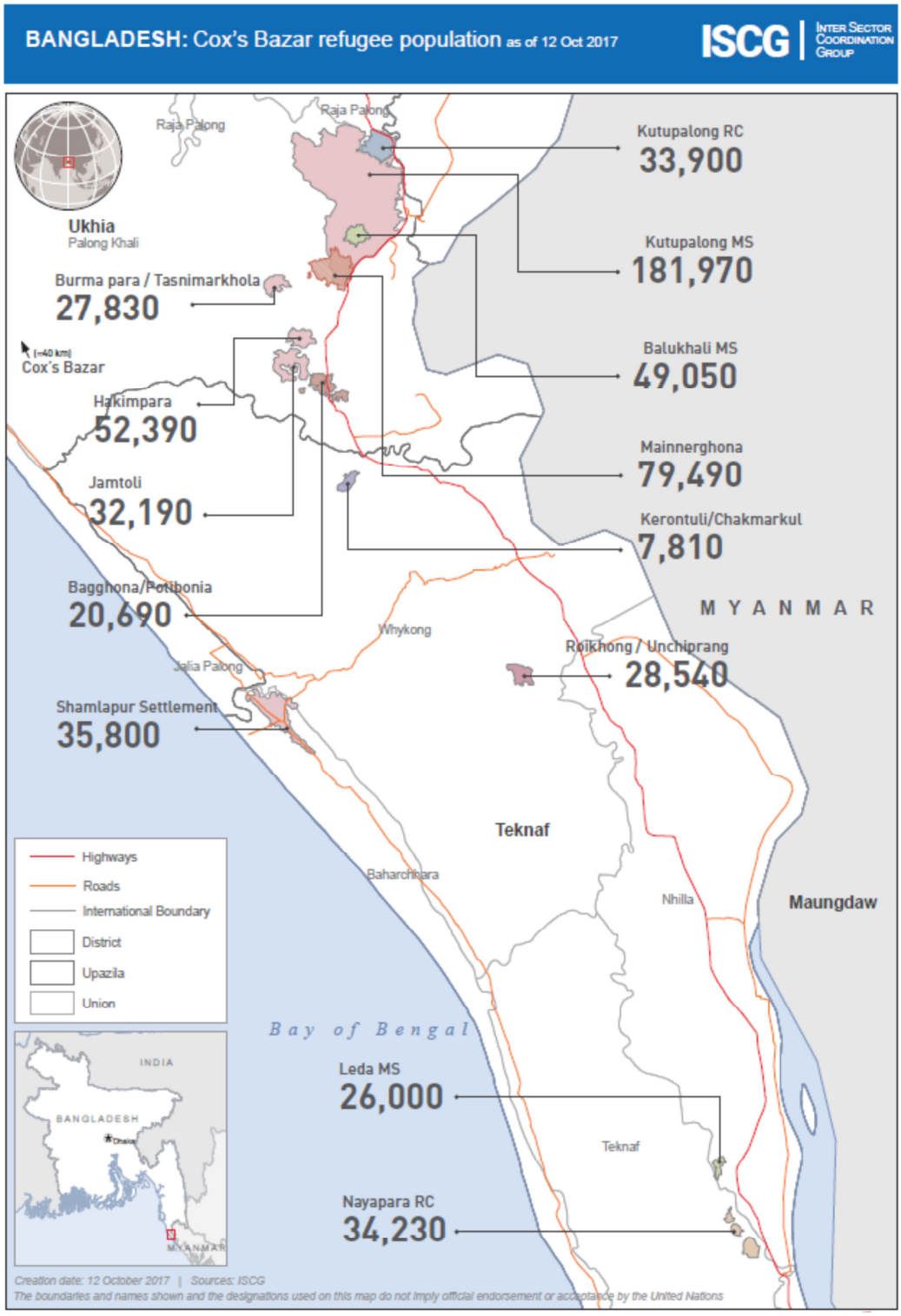
Challenges exist not just for Rohingyas who have come into Bangladesh from Myanmar and those in the affected areas of Myanmar but also the already existing Rohingya community in Bangladesh. More complex conditions relating to sexual abuse, trafficking, pregnant women delivering babies in extremely unhygienic conditions, malnutrition, water-borne and vector-borne diseases, amongst others, are common concerns of agencies working among these vulnerable populations.

Public health actions

A site development task force has been established with Ministry of Health, Government of Bangladesh working closely with donor and multilateral agencies, NGOs and iNGOs. The Inter Sector Coordination Group (ISCG) has been assigned the task of coordinating all the work on the sites and is operating as a one stop information hub for all the agencies working on the crisis. Agencies include WHO, MSF, IOM, UNHCR, UNFPA, UNICEF, ACF, HI, IFRC, ICRC, BRAC, MUKTI AND ICDDR,B. Since 1 October 2017 WHO has taken over from IOM the coordination on health issues.

Photo credits: WHO Country Office, Bangladesh

Figure 1: Locations and size of pre-existing and newly arrived Rohingya population, Cox's Bazar *(Source: Situation report: Rohingya refugee crisis, Cox's bazar, 12 October 2017. Inter Sector Coordination Group)*



1.3 Current health situation

In the weeks following 25 August, it became clear that a large medical and humanitarian crisis was looming over what is seen as the largest influx of Rohingyas into Bangladesh. Many arrivals had serious medical needs, such as violence-related injuries, severely infected wounds and advanced obstetric complications. Majority of them moved into existing makeshift settlements or UNHCR-registered camps that were extremely congested. Due to lack of potable water, people were collecting water from paddy fields, puddles and hand-dug shallow wells which were often contaminated with excreta, leading to high incidence of diarrhea, creating a public health scare about an infectious disease outbreak (9).

Vaccination levels in Myanmar's Northern Rakhine State are very low, and people especially new arrivals are at risk of measles and other diseases (10). With limited access to basic health care and referral services of newly arrived population and scaled-up interventions by UN agencies, the situation remains critical as it is unclear as to when the response will meet the Rohingyas' basic public health needs. Existing health personnel are more than overwhelmed as they attempt to cope with increased demand for health services.

2. Priority health concerns

2.1 Access to health services

Photo credits: WHO Country Office, Bangladesh

2.1.1 Health system impact

The existing healthcare delivery system may have difficulty to deal with the situation, be it disease surveillance and health information management or providing services that includes sexual and reproductive health (SRH), GVB and MHPSS case management for health care posts and mobile clinics, including primary and secondary health care, trauma care and rehabilitation, reproductive, maternal, neonatal and child health, SGBV treatment and support services and mental health and psychosocial support.

According to the ICSG situation report of 24 September, current health needs of the vulnerable population were estimated (11). The sheer number of new arrivals had put massive pressure on all health services and the cramped living conditions presented significant public health risks. The following immediate observations have been made:

- sufficient primary health care coverage needs to be urgently established in all new settlements and in the rapidly expanding in existing settlements;

- Insufficient WASH facilities across existing sites and near absence in new settlements were further aggravated due to the rains and water logging, creating high risk for diarrhoeal and other disease outbreaks. The situation became worse with limited disease surveillance and early warning systems. As many as 199 000 people needed support to meet their food requirements;
- existing facilities were reporting 150-200% increase in patients, overwhelming current capacity and resources and requiring additional support to manage increased caseload;
- inadequate referral systems were contributing to patients not receiving appropriate care;
- high levels of stress and serious protection concerns were being reported with insufficient MHPSS services;
- 24 000 pregnant and lactating mothers were in need of maternal health care support;
- Low rates of immunization amongst new arrivals pointed towards their being at risk of several vaccine preventable disease. As people began to visit health facilities, suspected cases were recorded. Three suspected measles cases were reported within a month of the arrivals;
- Rates of severe acute malnutrition (SAM) and moderate acute malnutrition (MAM) were found to be above emergency threshold levels and both clinical and community based nutrition interventions woefully inadequate; and
- **A**gencies and health workers reported high numbers of ARI, lower respiratory tract infections (LRTI), diarrhoeal and skin diseases,

The emerging ground scenario as presented above, combined with the daily reports of the agencies and ICSG's situation report of 24 September, helped identify urgent health needs of the Rohingya population (11). These included:

- increasing primary care coverage in all new settlements and in the rapidly expanding existing settlements;
- providing support to existing health systems which are currently severely overstretched and catering to secondary health care needs and needs of the host population;
- conducting well planned immunization drives and campaigns for vaccine preventable diseases and establishing full EPI programming for Rohingya children;
- providing midwife support to pregnant women helping them deliver in safe and hygienic settings and ensuring they get adequate maternal health care support; also reproductive health services and SGBV support are priority areas, given high ratio of women in newly arrived influx;
- referral systems to and from health facilities to be strengthened including support for transport, treatment and discharge;
- establishing early warning and surveillance systems and adhering to them, given high likelihood of a communicable disease outbreak;
- stepping up outbreak preparedness, including establishment of response capacity given current conditions within new and existing settlements; and
- Scaling-up services related to mental health and psychosocial support.

Photo credits: WHO Country Office, Bangladesh

Priority interventions

Based on these health needs, priority interventions were identified and introduced. With arrivals of the Rohingyas reducing in numbers per day as of 12 October and air loads of supplies, relief and shelter materials being received, a more streamlined and systematic health response is being developed..

Health planning at the new locations was undertaken with government and partners to ensure that health risks of men, women, children and the elderly in the settlements are minimized and precautions are taken to diffuse build-up of any disease outbreak. Some of the urgent next steps that are being strengthened include:

Allocation of a new site: The government has allocated 2000 acres for a new settlement between Kutupalong Makeshift Settlement and Balukali Makeshift Settlement, to the west of the main road where the site is undulating and previously largely uninhabited with no existing services. It is estimated that of the total land area, only approximately 30% of the site is usable. There are concerns regarding the site size, lack of preparedness, access, suitability and density if all new arrivals are located there. It is estimated it will take up to two months to provide basic emergency shelter coverage and WASH service provision. However, people are already on the site and more are moving each day.

Establishing health posts: Multiservice health posts within the new settlements are being set up especially in areas where people are newly settling not where existing services are. Initially these were temporary in the form of mobile teams and tented clinics and were reached by foot as there was no road access into the site. But gradually these are being made into permanent facilities as access improves and the situation stabilizes.

Immunization and nutrition: Support is being provided to MoHFW plan to carry out mass measles, rubella and polio immunization campaign to protect 150 000 children aged 6 months to 15 years. Complimentary nutritional services are being provided at select posts by UNICEF.

Reproductive health: Over 200 deliveries were assisted by 35 specially deputed midwives by UNFPA; GoB has stepped up distribution of reproductive health services and launching a special birth control campaign.

Water and sanitation: water quality surveillance is being introduced to cover all water sources in camps and a sample of water stored in household containers. To date, there is growing evidence that water points from tubewells have been contaminated as well as water samples in households. One surface water source sample, used by the migrants for the first few days was contaminated at very high level of risk (>100 cfu/ 100ml). As of 28 September more than 248 emergency latrines have been installed and mobile toilets under construction. Efforts are being made to give 3.5 litre water per person per day through mobile trucks were carrying drinking water and new tube wells were installed.

Surveillance: Early warning and surveillance system developed by WHO and DGHS has been established and the first bulletin is expected in October. MOH has indicated that one health post will aim to cover 20 000 population and will include space and services for outpatient services, RMNCH+A including family planning, nutrition, family planning, MHPSS, SGBV and disability support services.

Data management and reporting: Early Warning, Alert and Response System (EWARS) requested all partners to report daily data from medical teams to the Control Room at the Civil Surgeon Office. WHO will be compiling data for disease surveillance. Completeness of reporting will be closely monitored and shared. This is a very critical part of the rehabilitation and response system for it will feed into the planning of interventions related to the emerging health situation and strengthening coordination mechanisms with the Government of Bangladesh.

In the coming days, the current parameters of the humanitarian response plan will guide future efforts for a population coverage of 1.2 million, comprising of 200 000 existing population, 500 000 newly arrived, 300 000 possibly more arrivals, and 300 000 host communities. It will cover a six-month period from October 2017 to March 2018. The plan features:

- establishing new health posts (integrated OPD, RMNCHAH+, nutrition, SGBV, MHPSS);
- increasing capacity of existing facilities (including government facilities and district hospital);
- strengthening referral systems (bi-directional);
- EWARS, outbreak preparedness and response;
- SRH/RMNCH+A, SGBV, MHPSS; and
- specific needs for the health posts.

Communicable and infectious diseases

Common communicable diseases syndromes (and infectious diseases) observed in complex emergencies, with crowded populations and poor hygiene and sanitary conditions that are relevant to the Bangladesh/Myanmar crisis have been identified below. A qualitative risk assessment based on the available evidence has been done to prioritize and guide public health actions in affected communities

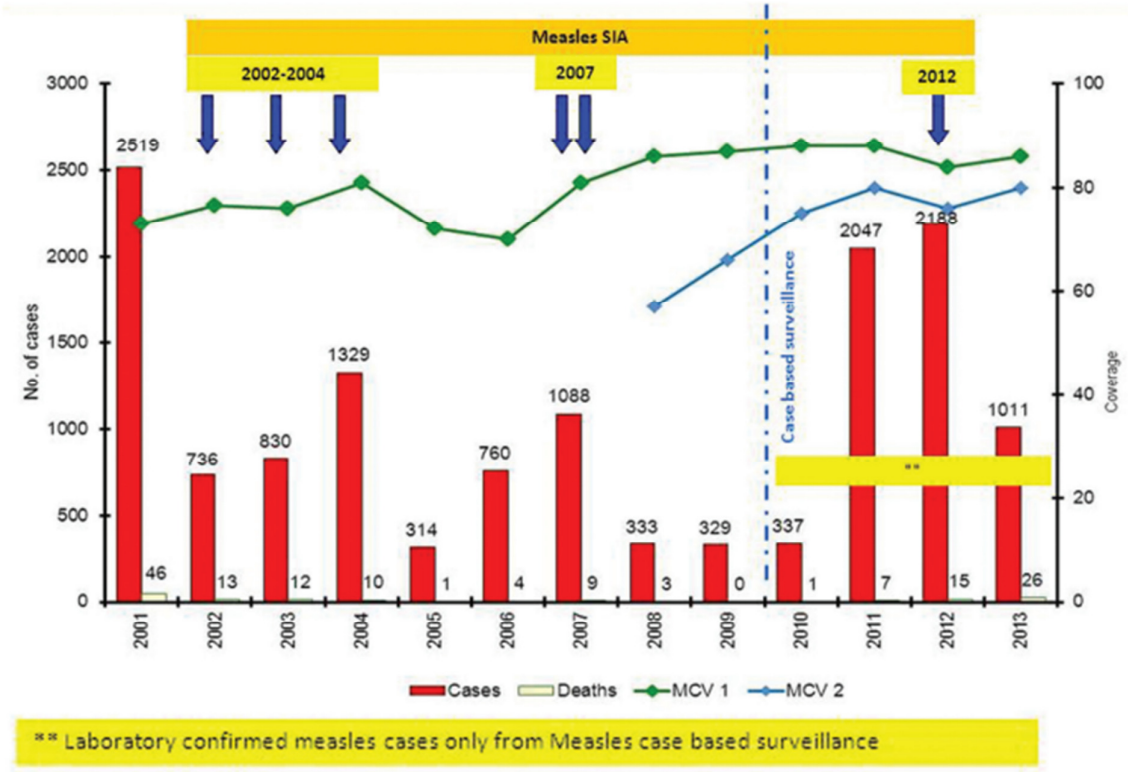
Acute febrile illness with rash

Measles[1]

Measles is endemic on both sides of the borders. In Bangladesh and Myanmar, measles case fatality ratio of up to 4-8% has been reported. Measles is the fifth leading cause of death among children under five years of age in Bangladesh. Annually, an estimated 20 000 children die from measles in the country which has a population of around 146 million (12).

In recent times in Cox's Bazar area of Bangladesh, measles outbreaks have been reported in 2016 and continued in 2017. First round of campaign for measles was conducted in December 2016 for the two Upazilas (Ukhiya and Teknaf) of Cox's Bazar which reported high number of measles cases, particularly among the migrants from Myanmar (13).

Myanmar made efforts towards the goal of mortality reduction due to measles by routine measles first dose immunization and the provision of second opportunity in supplementary immunization activities (SIA) implemented in 2002 - 2004 and in 2007 nationwide. In spite of the immunization efforts against measles, outbreaks continued to occur almost once every three to four years due to accumulation of susceptible population (Figure) (14).



Source: Hla Y. **Epidemiology of measles and rubella in Myanmar.** Myanmar Med J [Internet]. 2015;57(301):30–7. Available from: http://imsear.li.mahidol.ac.th/bitstream/123456789/164717/1/3138.pdf

After the 25 August 2017 crisis, a vaccination campaign against measles, rubella and polio combined with Vitamin A distribution is underway to immunize 150 000 Rohingya children below the age of 15 years in 12 refugee settlements close to the border with Myanmar (15). However, due to continuous rain fall, flooding and military crises, the coverage is still not fully achieved.

Dengue & Chikungunya[2]

The risk of dengue/chikungunya transmission in refugee populations in affected areas may be increased because they typically have fewer resources available to treat, control and prevent the disease, and a higher population people are living in temporary shelters and/or overcrowded conditions, particularly where fresh water is stored in unprotected water containers and rainfall collects in other artificial containers, allowing mosquitoes vectors to proliferate. Refugee camps face additional risk due to the large numbers of people originating from a number of different localities; aggregating these groups can expose these displace populations to diseases to which they have no previous immunity, and enhance the spread of opportunistic diseases who take advantage of this largescale movement of people to hitch a ride into new areas.

Both Bangladesh and Myanmar (and their respective refugee areas) are endemic for dengue and chikungunya. Most of the dengue cases in Bangladesh are reported during June and October as intermittent rains and high temperature and humidity during the months create the ideal breeding conditions for *Aedes*. Specifically in Chittagong, a high prevalence of 45% dengue positive cases has been reported among suspected patients (16). No major chikungunya outbreak has been reported since 2008 in Bangladesh but recently, Institute of Epidemiology, Disease Control and Research and other sources have reported chikungunya outbreaks in the Dhaka city (17). Evidence also points

towards limited availability of diagnostics at health facilities. Similarly, a very limited vector surveillance for *Aedes* has been reported (18).

In Myanmar, dengue fever (DF)/dengue haemorrhagic fever (DHF) is one of the leading causes of morbidity and mortality among children under the age of 10 years, with approximately 85% of cases occurring in this age group (19). Recently, Myanmar recorded 14 919 cases and 81 deaths of dengue infection from 1 January to 22 July 2017. Most of the deaths were from Ayeyarwady Region, followed by Yangon and Bago Regions. In Rakhine State, about 1 800 people were infected, and 18 died from the infection. High occurrence was observed in Minbya, Sittwe and Toungup Townships (20). Evidence from past post disaster response indicates vulnerability to dengue transmission in makeshift settlements.

Scrub typhus[3]

Scrub typhus infections are under-diagnosed causes of febrile illness across the tropics, and it is not known how common they are in Bangladesh and Myanmar. A seroepidemiologic survey across six major teaching hospitals in Bangladesh by using an IgM enzyme-linked immunosorbent assay reported recent exposure i.e. 287 of 1 209, 23.7% seropositive for Orientia tsutsugamushi. Patients between June–August 2010 at Chittagong district, the major area of settlement of Myanmar refugee since 25 August 2017, were also included. Farming as an occupation was reported as significantly associated with Orientia tsutsugamushi infection (21).

Considering the influx of nearly half a million people from Myanmar, majority people with low socio-economic conditions, adopting preventive measures for scrub typhus is not an option. Majority of the people are living in a single room with over 10 people living in a single household. Given the presence of mites in the region and vulnerable population, scrub typhus is a threat.

Acute respiratory infection (ARI) [4]

In both Bangladesh and Myanmar, ARI poses a serious problem. In Bangladesh, ARI/pneumonia is a leading cause of under-five morbidity and mortality. Most pneumonia deaths occur under two years of age and account for 77.5% of deaths in the first year of life. Children of 2-6 months of age have been found to have 2.6 times higher chance of death due to pneumonia (22). The proportions of pneumonia deaths of children under two years are mostly in winter and spring (64.3%), the peak season of RSV bronchiolitis (22).

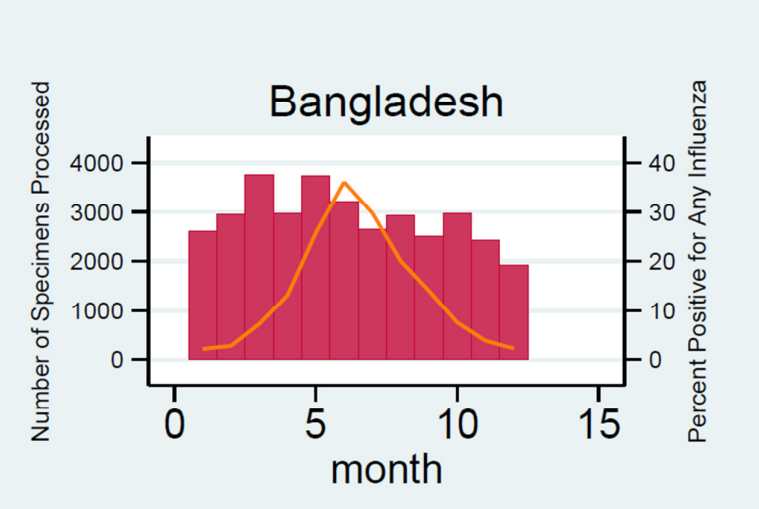
According to a UNICEF Myanmar report, morbidity and mortality among children due to severe respiratory infections, particularly pneumonia, continues to be high at 21% of under-five deaths and 27.6% of deaths among children aged between one month and five years. Care is sought for suspected pneumonia in around 66% of cases, but it is not clear what proportion received appropriate treatment (23). Both are reflective of poor health care access/delivery and quality of care.

Influenza

The influenza/acute respiratory illness season in Bangladesh follows the Southern Hemisphere season pattern, following the start of monsoon, with the peak incidence falling in June or July and declining thereafter. Myanmar has a similar season to Bangladesh. The subtypes of influenza A and the lineages of influenza B are similar to those found in other Southern Hemisphere pattern countries (24).

Bangladesh has some limited data on other viruses causing influenza-like illness. In a recent study of hospitalized children under five, using nasal swabs:

- Of 165 infected cases, 43.5% (n = 87) cases had a single viral pathogens. In symptomatic cases, human rhinovirus was detected as the predominant virus (31.5%), followed by RSV (31%), HMPV (13%), HBoV (11%), HPIV-3 (10.5%), and adenovirus (7%) (25).



Myanmar does not have any published data on other viruses other than influenza. In June-July 2017, there potentially was a higher than normal season for influenza in the country, but rates have since declined for the months of August and September. Available data for SARI is limited outside of Yangon.

Figure: Number of specimens processed and % positive for influenza by month – Bangladesh, 2010 to 2016.

(Source: FluNet, average number of specimens processed per month in a given year is closer to 600)

Acute diarrheal diseases including cholera and dysentery

Cholera [5]

WHO recognizes that cholera is endemic in Bangladesh. Burden of disease modelling estimated that the country bears ~110,000 cases with ~4,500 deaths each year (Ali M 2015). All seven divisions and about all 64 districts report epidemics of severe acute watery diarrhoea (MoHFW Source). Sentinel surveillance data gathered over several years by the icddr,b showed that about 20% of diarrheal patients admitted to the icddrb hospitals, in Mirpur and Mohakhali, are infected with *Vibrio cholerae.* National data of such a rate does not exist. In Bangladesh, estimates showed the highest resistance to trimethoprim-sulfamethoxazole (100% in Mirpur) and lowest resistance to ciprofloxacin (0% in Dhaka, Matlab and Mirpur) and azithromycin (30% in Dhaka to 7% in Mirzapur). Multidrug resistance (≥ 3 antibiotics) for Shigella was Mirzapur (50%); Dhaka (36%); Matlab (23%) and Mirpur (37%); and for *V. cholerae* it was 26%, 37%, 49% and 23% respectively.

Assessing the exposure to cholera among refugees, one must look into the potential circulation of the Vibrio in Northern Rakhine, Myanmar. In general, Myanmar is considered endemic to cholera; however, three epidemics have only been documented between 2003 – 2013 including two located in in Yangon and Mandalay. In Myanmar, majority of the Rohingya population have settled in temporary settlements in Rakhine State. Internally-displaced-person camps of Rohingya in Northern Rakhine have regularly reported cases of severe acute watery diarrhea for the past five years; unfortunately, no testing was performed to confirm presence of *V cholerae* (WHO unpublished data).

Rakhine fares poorly on most social development indicators and is characterized by high malnutrition, generally low enrolment and completion in primary education, and poor access to clean water and sanitation. According to the latest assessment, more than half (52%) of the total Rakhine state's population has no access to improved sanitation facilities. Also, around 45% of the population has no access to and/or is not using improved water supply facilities that conform to the Sustainable Development Goals (SDG) standards (10).

As result, it is possible that vulnerable populations in Myanmar have been exposed to *Vibrio* while living in Northern Rakhine. However, the presence of Vibrio and the extent of its transmission have not been documented among the Rohingya population and Northern Rakhine

No boiling of water was observed in the population, as there is limited access to firewood and other sources of fuel. Based on field assessments conducted in the newly established settlements and makeshift camps, the water and sanitation conditions are way below any acceptable minimum standard. Sanitation facilities range between is one latrine per 1000 people to one latrine for 5000 people. Open defecation is a widespread practice which when coupled with rainfall poses a very serious public health threat. Likewise, there is a severe shortage of clean drinking water, estimated at 0.5-1 litre per person, per day.

Association between open defecation and cholera is well known. Open-defecation is a common practice among displaced populations. In several settlements and camps, people are resorting to use of surface water from streams and ditches, which is highly polluted. WASH interventions appeared to be difficult as number of influx is increasing every day and people remain scattered across multiple locations including road side areas. Based on the current number of Rohingya people (estimated as 515 000), it was estimated that 19 000 latrines and 4000 hand pump tubewells are required to be installed. Since all the Rohingya will be placed in 12 camps, these WASH components will need to be installed in those 12 camps proportionate to the population. However, national authorities, as of now have only planned to install 1200 tubewells and 1200 latrines for all the camps, leaving a considerable unmet need. As of 16 September-26 September Department of Public Health Engineering (DPHE) had completed installation of 26 tubewells and 183 latrines. WHO emphasized the need to ensure proper collection, handling and storage of water at the point of use.

~47% of the refugee population needs to walk over 1/2 hours to have access to healthcare facilities and medicines (10).

Whilst oral rehydration salts (ORS) have been distributed to existing settlements in the past (200 000), there has not been largescale distribution to new arrivals (436 000) or those in spontaneous new settlements (200 000).

Rotavirus[6]

Rotavirus causes between18 and 28% of diarrhoea in Bangladesh [1]. Bangladesh plans to introduce the rotavirus vaccine into its routine EPI schedule in 2018.

Dysentery[7]

In Bangladesh, Shigella represents from 2 to 13% of isolates identified among patients with diarrhoea, depending on location and age group sampled (26). Adults tend to have a lower percentage than children. Specific data on locations in the areas affected are not available. *Salmonella typhi* dysentery represents 11% of the non-malaria febrile illness in Chittagong (the district adjacent to Cox's Bazar in which many of the Rohingya have arrived) in 2016 (27). No recent data on causes of dysentery in Myanmar is available, but a study with data from 1993 found as much as 23% of the diarrhoea specimens with both blood and mucus from the Infectious Diseases Hospital of Yangon were *Shigella* (28).

Given the challenges with WASH in the most of the current settlements, dysentery should be anticipated. As the waters recede during the dry season, the risk for dysentery will increase. Proper hand hygiene becomes increasingly difficult when water resources are scarce.

As for antibiotic resistance 28% of Shigella isolates were resistant to ciprofloxacin in Mirzapur, and 12% to mecillinam. In Dhaka, the figures for Shigella were 45% and 50%, in Matlab 35% and 15%, and in Mirpur 41% and 8% respectively. Susceptibility of Shigella to azithromycin and ceftriaxone in Dhaka was 74% and 95%, and in Mirpur 88% and 92% respectively.

Acute jaundice syndrome

Hepatitis E[8]

Bangladesh is endemic for HEV. Although no recent outbreaks have been reported, a recent study estimated a baseline prevalence of antibody to hepatitis E virus (anti-HEV) of 22.5%. Sero-incidence was 60.3 per 1000 person-years during the first 12 months and 72.4 per 1000 person-years from >12 to 18 months (during the monsoon season), peaking by age 50 years and with low rates during childhood (29). In another study, annual mortality rate from HEV in Bangladesh was estimated as 3.9 per 100000 people. No recent outbreak has been reported from Myanmar, however, smaller outbreaks of HEV have been reported in the past (30). Recent studies have found serological evidence of infection with hepatitis in 117 (32%) among 403 subjects (213 healthy persons and 190 liver disease patients (31). Studies from other parts of the world reported rural dwelling, farming as occupation, open defecation and stream/river as a source of drinking water as risk factors for transmission of HEV (32).

Leptospirosis[9]

Limited evidence on leptospirosis from Bangladesh points towards a wider presence of the disease, at least in urban areas. A recent prevalence study assessing aetiologies of fever in rural and semi-urban areas of Bandarban district, an area approximately 100 KM from Cox's Bazar, revealed high proportions (44%) of seropositivity for leptospirosis in cases misdiagnosed as malaria (33). This points towards major persistent reservoir of leptospirosis. In cases misdiagnosed as malaria; illustrates major persistent reservoir of leptospirosis. Another study in low income urban community in Bangladesh found 8.4% of febrile patients meeting the criteria for definite or probable (34). Though there is limited peer reviewed evidence related to risk factors associated with the transmission of leptospirosis, World Health Organization has suggested unusual flooding in Bangladesh causing overflowing of rodent-infested sewers that exposes inhabitants to Leptospirosis infection (35).No evidence is available from recent past from Myanmar related to burden of leptospirosis.

Acute hemorrhagic fever

Dengue hemorrhagic fever[10]

Dengue is endemic in both Bangladesh and Myanmar. Both primary and secondary dengue infections have been implicated in severe dengue or DHF in both countries (36–38). Surveillance data from Bangladesh reveals up to 40% of dengue cases as DHF (39,40). In Myanmar, data on proportion of DHF cases in recent past is not available. However, dengue fever (DF)/dengue haemorrhagic fever (DHF) is recognized as one of the leading causes of morbidity and mortality among children under the age of 10 years, with approximately 85% of cases occurring in this age group (41).

Mortality following dengue infection is a reflection of severe dengue or DHF. However, it is also an indicator of robustness of clinical management standards and capacity to follow and enforce protocols. From a clinical outcome perspective, no official figures have been issued on the case fatality rate of dengue by government or multilateral agencies due to absence of data on annual incidence of dengue and related deaths in Bangladesh. However, one study reported CFR as 1.7% for Bangladesh which is more than double the regional average of 0.79 (42) (43). In Myanmar, however, WHO SEARO in 2009 reported a CFR of 0.75, which is slightly lower as compared to the regional average of 0.79 (42). Data on DHF/DSS/severe dengue specific mortality is not available for the two countries.

An outbreak of dengue fever with a substantial proportion of severe dengue cases can test any health system in peace times. Burden on existing health services and ever increasing need for secondary care in complex emergencies is likely to be further compromised, including clinical management protocols, when managing severe dengue cases. This might have decisive influence on clinical outcomes in such cases.

Crimean Congo Hemorrhagic Fever[11]

CCHF transmitting Hyalomma tick vector is found in Bangladesh (44). Similarly, confirmed human cases have been reported in the past, both of which along with the eco-epidemiology increase the probability of occurrence of CCHF in the country.

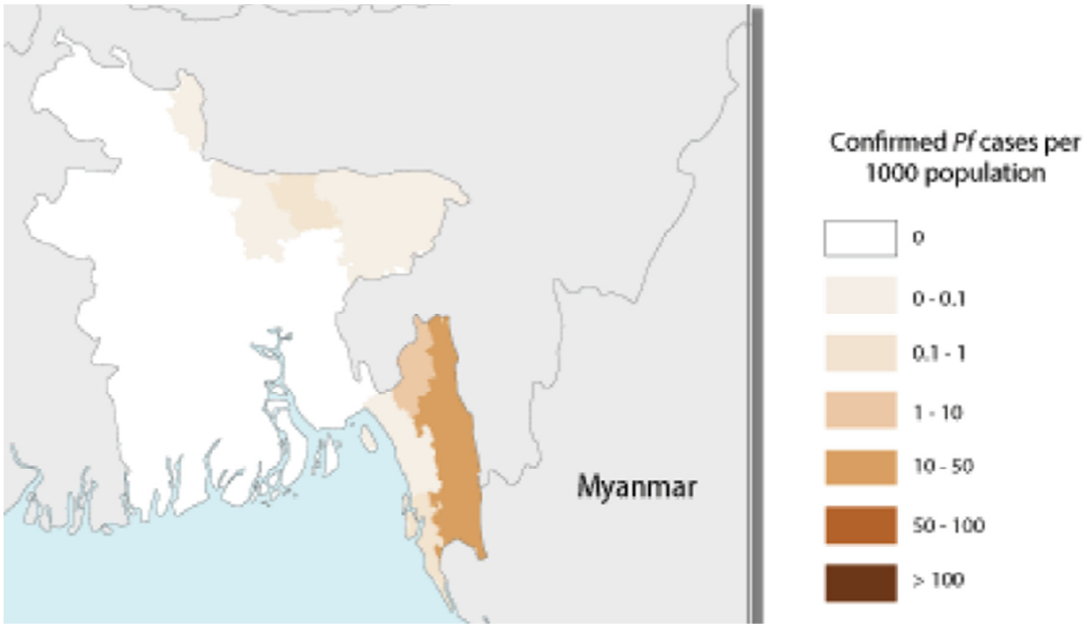
Myanmar shares border with Bangladesh, which reported confirmed cases of CCHF. Moreover, ticks responsible for transmission of CCHF are also known to exist in Myanmar (44), hence putting it at risk for CCHF virus. High risk of Myanmar for CCHF is also in line with recent evidence where in there are parts of the country where humans are predicted to be at potential risk for CCHF, yet where evidence is most lacking and thus where surveillance is a priority (45).

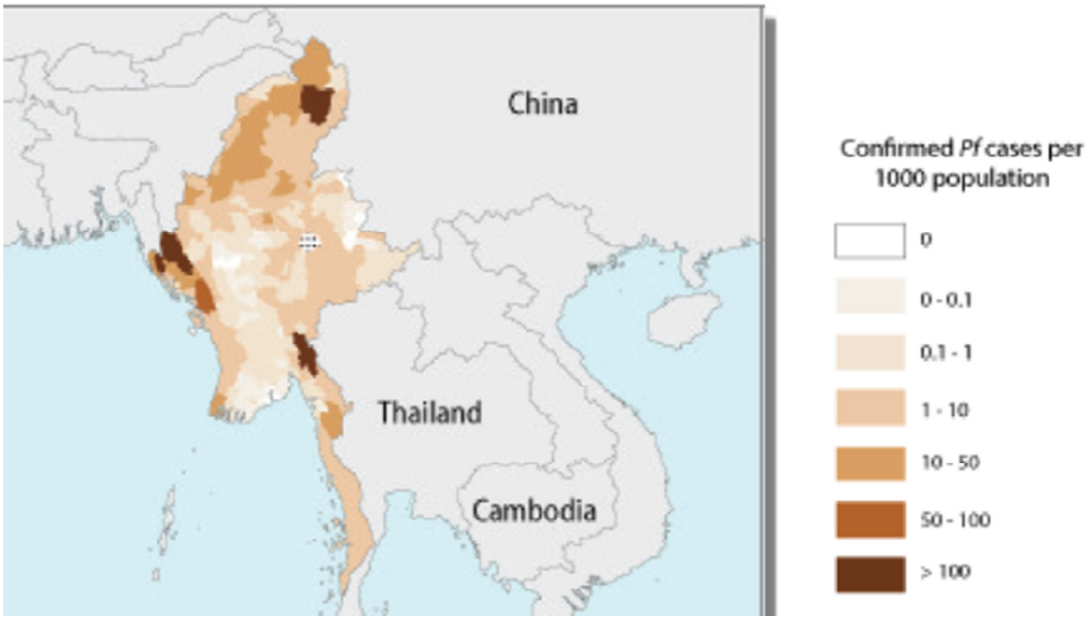
There is significant overlap of presentation, clinical scenario and lab abnormalities between dengue and CCHF. Both Bangladesh and Myanmar are endemic for dengue and hence differential diagnoses are an issue, until late into the illness. In the absence of clinical suspicion by treating physicians, CCHF could spread undetected and soon become a public health threat including in a complex emergency setting with crowded populations. This is especially true for Myanmar where human cases of CCHF have never been reported. Recent risk assessment has also revealed limited human and vector surveillance for CCHF in Bangladesh, further adding to the risk (46).

Malaria

Malaria is a public health problem in Bangladesh. The disease is high endemic in 13 border districts facing international boundaries with the eastern states of India (Assam, Tripura and Meghalaya) and part of Myanmar. The forested and hilly terrain has the geo-physical potential for intense malaria transmission throughout the year, and increased mobility of the non-immune population in the Hill Tract Districts further adds to the risk of transmission. Chittagong District is one of the highest risk area, where some of the formal and informal settlements of Rohingya are a part. Cox's Bazar where some of the newer settlements has a lower number of cases. The two main species of malaria – *Plasmodium falciparum* and *P. vivax* are found on both sides of the Bangladesh-Myanmar border, although *Plasmodium falciparum* is found more commonly (93% *P falciparum*, 7 % *P. vivax*). Reported rates of malaria in the Cox's Bazar and Chittagong districts vary from 0.1 to 50 per 1 000 for *P. falciparum* and 0.1 to 10 for *P. vivax*, with the greater rates found within Chittagong district (47).

In Myanmar, on the other hand, between the years 2005 and 2014 there has been an 81.1% decline in the reported annual incidence of malaria in (1 341.8 cases per 100 000 population to 253.3 cases per 100 000 population) (48). In the same period, there was a 93.5% decline in reported annual mortality from malaria (3.8 deaths per 100 000 population to 0.25 deaths per 100 000 population) and a 87.2% decline in the proportion of hospitalizations due to malaria (7.8 to 1.0%) (48). However, low socioeconomic status, poor schooling and close proximity to water bodies and forest areas comprise important risk factors for continued transmission (49). Artemisinin-based combination therapy (ACT) is a key strategy for global malaria elimination efforts. However, the development of artemisinin-resistant malaria parasites threatens progress and continued usage of oral artemisinin monotherapies (AMT) predisposes the selection of drug resistant strains. This is particularly a problem in Myanmar. Private healthcare facilities and drug shops and providers who prioritize consumers' demand instead of recommended practices, have been found to be more likely to stock oral AMT (50). Additionally, over the past decade, a dramatic rise in fake anti-malarial has become one of the top public health issues in Myanmar. Newton *et al.* found that of 104 shop-bought 'artesunate' samples from South Asian countries including Myanmar, 38% did not contain ACT (51).





Skin disease

Scabies[12]

Though scabies is not routinely reported from Bangladesh but the parasite is known to be present in the country and the environment is conducive for the same. During a study conducted in Dhaka medical college in 2010 among 67 000 OPD patients, significant number of case were reported scabies affected (52). Limited evidence is available from the two countries related to scabies, however studies from other parts of the world reported young age, presence of many children in household, low socio-economic status, poor housing and sharing of clothes as major risk factors associated with scabies infection (53).

Considering the Rohingya crisis, as near to half a million people migrated from Myanmar and settled in temporary arrangements in Cox's Bazar province of Bangladesh with UN refugees camps, number of people sharing common space and proportion of people: households must be high.. These conditions give a conducive environment to scabies causing parasite to proliferate and transmit between people sharing same household as well as with others sharing the same facility.

Acute encephalitis syndrome (AES)

Japanese encephalitis[13]

Bangladesh is endemic for JE. The country has regularly reported Japanese encephalitis cases since the last decade. In 2011, a study estimated JE incidence as 2.7/100 000 population in Rajshahi (95% CI = 1.8-4.9), 1.4 in Khulna (95% CI = 0.9-4.1), and 0.6 in Chittagong (95% CI = 0.4-0.9) (54). On the other hand, data on JE in Myanmar are limited. From 2006-2015, the country reported 259 confirmed cases of JE .

Within Myanmar, JE is endemic in Rakhine State of Myanmar due to virus circulation among domestic animals through *Culex* mosquito; Rakhine State and Yangon Region are highest reporting regions. In

2014, an outbreak of JE occurred in Rakhine State clearly illustrated the vulnerability of Rakhine to JE [21 confirmed cases out of 49 JE suspected in 46 villages of nine townships, including 10 fatal cases (CFR=20.4%)] (55).

Existing evidence suggests that both Bangladesh and Myanmar suffer from poor VBD surveillance and control activities (46). Inspite of high endemicity, both countries are yet to introduce a JE immunization programme in the country (56,57). In addition, in both countries and especially in areas affected in the current crisis, risk factors for JE transmission include close co-habitation of humans and animals (domestic pigs and cattle), extensive paddy cultivation, limited use of long-lasting insecticide treated net and no prior vaccination in affected people and pigs. Also, awareness about JE or knowledge related to transmission and prevention of the disease is limited in local communities.

Nipah virus disease[14]

Outbreaks of Nipah virus have occurred in Bangladesh, north and west of Dhaka (58). The last outbreak occurred in 2013. The *Pteropus* fruit bat has been identified as the primary host of the disease (59), and the major risk factor for infection is the consumption of either raw or fermented raw date palm sap (60).

Tuberculosis and HIV/AIDS

Tuberculosis

Tuberculosis is high in both countries with prevalence of 365 per 100 000 individuals in Myanmar (19th highest TB prevalence) and 225 per 100 000 individuals in Bangladesh (35th highest TB prevalence) (61). Given the decreased access to medical care within Myanmar, it can be assumed that the prevalence of TB among the Myanmar nationals is higher than the published rates. Another important challenge is Multi Drug Resistance Tuberculosis (MDR TB) - with an estimated 9700 MDR cases per year in Bangladesh and an estimated 9000 cases in Myanmar each year; extensively drug-resistant TB (XDR-TB) has been detected in Myanmar. MDRTB is estimated at 1.5 to 5% of new cases (Bangladesh and Myanmar respectively) and 25 to 29% of previously treated cases (Myanmar and Bangladesh). The association between poverty and TB is well-recognized, and the highest rates of TB were found in the poorest section of the community (62). TB occurs more frequently among low-income people living in overcrowded areas and persons with little schooling (63). Poverty may result in poor nutrition which may be associated with alterations in immune function. On the other hand, poverty resulting in overcrowded living conditions, poor ventilation and poor hygiene-habits is likely to increase the risk of transmission of TB (64). Considering the crowded situation of the settlement with minimal support to preventive and curative services related to TB, there is a reasonable expectation that TB cases will rise and so would MDR-TB among the TB cases identified.

HIV/AIDS

HIV rates in Bangladesh are low (65). Bangladesh's latest round of serological surveillance (2011) showed that HIV prevalence among all key populations remained below 1 percent with the exception of injecting drug use (IDU). Although the overall prevalence of HIV was 1.2% among IDU in 2007/08, there is a concentrated epidemic among male IDU in Dhaka. The prevalence of HIV in this cluster increased from 4% in 2002 to 7% in 2007/08, which fell slightly in 2010 to 5.3% (66).

Similarly, in Myanmar, the overall HIV epidemic in Myanmar seems to be declining with HIV prevalence among adults, 15 years and older, estimated to be less than 0.6% nationally. There were an estimated 224 795 people living with HIV (PLHIV) including those aged under 15, one-third of whom were female (67). Though both the countries have lower prevalence compared to the average of the south Asian region, the current crisis and possibility of transmission of HIV among the vulnerable population is high. The victims of sexual violence in the recent turmoil in Myanmar may face a risk for HIV going on to form what would be a vulnerable group.

2.3 Non-communicable diseases

The prevalence of non-communicable diseases in the Rohingya population in Bangladesh remains to be quantified. While data are available from national prevalence surveys conducted in Myanmar, this data is not disaggregated by state or ethnicity. Therefore, it may not be generalizable to the Rohingya population in Bangladesh, or applicable given the significant and sudden change in the social and environmental determinants of health for this population.

Among the Rohingya population, field workers and physicians in health facilities indicated frequent diagnosis of chronic obstructive pulmonary disease, particularly in males. Musculoskeletal pain is also a common presentation. There are sporadic presentations of heart failure and suspected angina, and even fewer reports of cancers. There were also patients who self-reported diabetes and hypertension. Within the district hospital, the most common non-communicable disease admissions in the Rohingyas who recently arrived were injuries including and especially from gunshot wounds (17% of families according to the Oct. 2017 assessment report - IRC), chronic obstructive pulmonary disease and chronic liver disease with underlying hepatitis C infection.

Risk factors for NCDs are observable in the Rohingya and host population including tobacco use, particularly by men, frequent betel nut chewing by men and women, and indoor air pollution from household cooking within the camps.

Many practical issues are to be accounted for when managing cases of NCDs. Challenges include human resource shortage within the primary health care facilities and district hospital to meet the additional patient load. Furthermore, at the primary health care level, training on the prevention and management of NCDs is required. Most important needs in terms of essential medicines and equipment are anti-hypertensives, oral hypoglycaemics, glucometers and glucometer strips, ECG machines and nebulizers, and higher quality sphygmomanometers and stethoscopes to effectively diagnose and manage NCDs.
Data on mental disorders and NCDs would need to be collected through registries via DHIS 2. Time and human resources to analyse this data are needed, in addition to improvement in the indicators to be more disease specific.

2.4 Mental health[15]

Mental health is one of the main response priorities to be addressed in the present situation. A comprehensive and holistic mental health oriented response for Rohingya populations should consider the role and effects of environmental stressors and effects of stateless conditions associated with life in refugee camps. On top of this, there has been reports of physical and mental trauma from violence, including sexual and gender based violence; however, the extent of it has not been assessed (WHO unpublished).

Another cross-sectional study based on several methodologies examined trauma history, daily environmental stressors, and mental health outcomes for 148 Rohingya adults residing in Kutupalong and Nayapara refugee camps in Bangladesh (68). Results indicated high levels of mental health concerns: post-traumatic stress disorder (PTSD), depression, somatic complaints, and associated functional impairment. Participants also endorsed local idioms of distress, including somatic complaints and concerns associated with spirit possession. The study also found very high levels of daily environmental stressors associated with life in the camps, including problems with food, lack of freedom of movement, and concerns regarding safety. Regression and associated mediation analyses indicated that depression symptoms were mostly associated with daily stressors, but not prior trauma exposure, despite there was a direct effect of trauma exposure on mental health outcomes (PTSD symptoms). Findings indicate that daily stressors play a pivotal role in mental health outcomes of populations affected by collective violence and statelessness.

Trauma related symptoms are frequently reported, including nightmares, flashbacks, anxiety, dissociation, and fear. One can anticipate high prevalence of anxiety, depression and suicidal ideation. Depression, particularly in females, has contributed to malnutrition in families.

2.5 Reproductive and sexual health

Based on case studies from 2012-2017, there is a need for improved reproductive health services in Rakhine State. In Rakhine State, access to antenatal care by a skilled provider (71%), delivery at birth by a skilled provider (30%), and delivery at birth in a health facility (19%) remains one of the weakest in Myanmar (69). Contraceptive use is the lowest in both men (70%) and women (38%) in Rakhine State compared to other areas of Myanmar.

A case study in two refugee camps (Kutupalong and Nayapara) in Rakhine state – conducted prior to 25 August 2017 revealed that the number of medical doctors (4 per camp) and qualified nurses (6 per camp) was significantly low compared to those in need, for both camps (70).

As of 2015, Myanmar had 220 000 people living with HIV, with the highest prevalence in rural areas, such as Rakhine state (98). The percentage of the population with awareness about HIV prevention was low in both men (21%) and women (7%) (69). Sexual abuse is high in Rakhine state, men reported more sexual abuse than women (17% compared to 3%) (70).

2.6 Infant and child health

Access to care

Rohingya children born in Myanmar face restrictions on birth registration in government hospitals, limiting their access to hospital services and well-child preventive care (71). It can be expected that many children may be affected by preventable childhood morbidities, including vaccine-preventable diseases (discussed above), hearing, vision and mobility problems, and developmental issues.

Child mortality

Mortality in children younger than 5 years in the Rohingya-predominant northern region of Rakhine State is 224 per 1000 livebirths in Butheetaung township and 135 per 1000 livebirths in Maungdaw

township, compared with 77 per 1000 livebirths in the non-Rohingya-predominant Sittwe region of Rakhine state (10).

Child Malnutrition

Malnutrition is one of the key issues faced by Rohingya, and is expected to be exacerbated during the present crisis due to lower access to food and interruption of breastfeeding. According to national statistics, 22.6% of under -fives in Myanmar nationwide are moderately under - weight, and 5.6% of children are severely underweight; 35.1% are moderately stunted or too short f or their age while 12.7% are severely stunted; 7.9% of children are moderately wasted or too thin for their height; and 2.1% are severely wasted. In 2013, the UN screened 77 000 Rohingya children younger than 5 years living in Rakhine State, and found that 30% were in need of micronutrient supplementation (71).

In Rakhine state, 13.9% of children surveyed in the 2015 Demographic and Health Survey had moderate acute malnutrition, while 3.7% were below -3z scores of the median WHO growth standards of weight for height. Among the state/regions, children in Rakhine are more likely to be stunted (38 percent), wasted (14 percent) and underweight (34 percent) (69).

Amongst Rohingya refugees already present in Bangladesh, stunting exists in 60% of children (70,71).

Anemia

According to the 2015 Demographic and Health Survey, amongst children under 5 in Rakhine state, 59.9% have some degree of anemia, of which 29.8% have mild[1] anemia, 29.7% have moderate, and 0.5% have severe anemia. Amongst women aged 15-49 years in Rakhine state overall, 57.2% have some degree of anemia, of which 44.4% have mild anemia, 12.8% have moderate, and none have severe anemia (69).

Breastfeeding

Rakhine state has the lowest rates of exclusive breastfeeding in Myanmar at 1.3% (as compared to a national average of 23.6% according to MICS data 2010). This low rate of breastfeeding further compounds risk of malnutrition and infectious diseases in Rohingya children (72).
An IRC assessment report conducted among newly arrived Rohingyas showed that breastfeeding and pregnancy among 44% and 18% of families respectively.

2.7 Environmental health and technological hazards

The Cox's Bazar area is currently experiencing heavy rain and flooding, which carries with it a variety of floodwater-associated environmental hazards, including water-borne diseases (discussed above), chemical exposure, skin infections, injury, and electrocution risk.

While there exists a risk of occupational exposure to a variety of environmental/technological hazards in Bangladesh (potentially including chemical exposure in a variety of occupational settings such as tanning, ship breaking, textile factories, chemical manufacture, and e-waste recycling), these settings

[1] Prevalence of anemia, based on hemoglobin levels, is adjusted for altitude (for children and women) and smoking (for women) using CDC formulas (CDC 1998). Women and children with <7.0 g/dl of hemoglobin have severe anemia women and children with 7.0-9.9 g/dl have moderate anemia; and nonpregnant women with 10.0-11.9 g/dl and children and pregnant women with 10.0-10.9 g/dl have mild anemia.

are not concentrated in the Cox's Bazar area and are unlikely to pose a major risk for the displaced Rohingya populations in the short term (73).

National mapping of at-risk areas of natural arsenic contamination in soil and water showed the Cox's Bazar area is among the regions in BAN with the lowest risk.

Risk characterization

The latest influx in Cox's Bazar is in addition to pre-existing population of 36 000 registered Rohingyas and 164 000 who were residing in camps/makeshift settlements prior to 25 August 2017. The speed and scale of the influx has resulted in a critical humanitarian emergency. Basic services that were available prior to the influx are under severe strain due to the massive increase in people in the area. In some of the sites that have spontaneously emerged, there is no access to water and sanitation facilities and along with cramped and crowded living conditions there is a significant risk of disease outbreaks.

There are massive unmet shelter and site management needs across all sites. Newly created spontaneous sites are not yet suitable for mass habitation, with a lack of basic infrastructure, water and sanitation facilities. The land allocated for the new site is not suitable for habitation yet as it lacks road access. The population density in accessible areas is extremely high which poses multiple risks. Conditions across all sites have been severely affected by heavy rains. Crucially there is limited access to the site which is preventing the development of infrastructure including water and sanitation facilities.

From the food and nutrition perspective, all new arrivals are in need of emergency food assistance. Amongst the new arrivals, there are an estimated 55 770 pregnant and lactating women, children under five, and adolescent girls that require targeted food and nutrition assistance.

Finally, both Bangladesh and Myanmar and their affected regions of Cox's Bazar and Rakhine are endemic and have high burden of different communicable diseases. Both sites have witnessed in recent times, outbreaks of measles, dengue, chikungunya and malaria. Endemic transmission of HEV and leptospirosis is also likely to be high including in affected areas/populations. While progress has been made in malaria control, Cox's Bazar's continues to be among the malaria endemic districts of Bangladesh. In addition, there is a high burden of acute respiratory diseases especially in under five year-old children. There is high burden of MDR TB rates in both countries. Sub-optimal water and sanitation, vaccination coverage, surveillance and vector control capacity are some of the important drivers of common communicable diseases in the two countries.

Against this backdrop of high background endemicity of communicable diseases and worsening health, nutrition and environmental conditions due to the current crisis, affected populations are at high risk of local outbreaks of waterborne (Cholera, Hepatitis E, Dysentery), foodborne (cholera, dysentery) and vector-borne diseases (Dengue, Chikungunya, JE, Malaria, Scrub typhus) as well as skin diseases (Scabies).

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 (vaccine-preventable diseases), and ARI.

This risk is increased with inadequate ventilation. Overcrowding can also increase the likelihood of transmission of meningitis, tuberculosis, flu, waterborne and vector borne diseases in the weeks and months following the influx of refugees. Lack of adequate shelter for affected populations may also increase the risk of malaria and dengue due to increased exposure to vectors.

Diseases such as dengue/DHF, JE and nipah virus disease are endemic in Bangladesh and Myanmar, and can present with severe clinical manifestations requiring critical secondary care. Such cases, especially in an outbreak form, are likely to further compromise the already stretched health services in refugee areas.

Particular attention was given to cholera for which a specific WHO-led risk assessment was conducted between stakeholders. The assessment addressed the risk for a large cholera outbreak.
As a result, it is highly likely that small size clusters of cholera will occur in refugee settlements (high level of confidence). Furthermore, the risk of a large outbreak is considered high among new arrivals as well; however, our level of confidence regarding for such as statement is moderate. All criteria to recommend pre-emptive vaccination campaigns for the Rohingya population are fulfilled as described above.

There is an urgent and immense need for mental health and psychosocial support in the Rohingya population. The non-communicable disease (NCD) and risk factor burden in the Rohingya and host population remains challenging to quantify. Mental health and NCD needs may currently be masked by the overwhelming infectious disease burden, but also undetected due to health system constraints.

Priority interventions

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 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 fecal indicator water quality tests, 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 fecal contamination, where possible;
- Key messages on food hygiene and regular handwashing 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; and
- 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/management are other important considerations for the prevention of communicable disease. Wherever possible, shelters for the displaced or homeless must be positioned with sufficient space between them and aimed at preventing diseases related to overcrowding or lack of ventilation, such as measles, ARI, diarrhoeal diseases, TB and vector borne diseases also ensure:

- 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; and
- 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 Annexe 1 for detection of acute watery diarrhoea, acute bloody diarrhoea, measles, acute respiratory infection, dengue, malaria, jaundice syndrome, meningitis, tetanus, unexplained fevers, any unusual/unexpected public health events, including disease clusters and unexplained disease);
- include an alert system for immediate reporting and prompt investigation of priority epidemic prone diseases such as bloody diarrhoea, measles and DHF;

- 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; and
- Ensure data is forwarded to the local health authorities and the WHO office.

Immunization 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). Vaccine should be administered as soon as they enter an organized camp or settlement, regardless of previous vaccination or history of measles disease, neither of which are contraindications to receiving the vaccine. Emergency public health personnel, both national and international, should be routinely vaccinated against measles and rubella, regardless of age. Given the current situation in Bangladesh, the fact that the country is endemic for cholera and the usual time for cholera outbreaks is the start of the monsoon season (June), OCV to protect the population most at risk against the disease is a critical intervention. A risk assessment will help decide on where and how to use OCV should be conducted as soon as possible and should be done within the framework for vaccination in humanitarian emergencies. 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.

Risk Communication, Accountability with Affected Population and Community engagement are crucials. 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 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 dead bodies 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 has to be addressed in the emergency phase with severe falciparum malaria being treated with artemether by the intramuscular route as an acceptable and practical

alternative. However, as soon as intensive case monitoring becomes possible, artesunate by the intravenous or intramuscular route should be used as the treatment of choice, followed by intravenous quinine.

- Provision of anti-TB treatment must be ensured for TB patients who were previously receiving treatment in the affected areas.

NCD and mental health

The underlying capacity of the health system, particularly trained human resources, to detect, prevent and manage mental disorders and noncommunicable diseases is low and presents a fundamental challenge to providing such care during this emergency. Providing human resources to deliver health care in Cox's Bazar is a priority. Strengthening NGO and government collaboration, particularly referral and supervisory arrangements, can minimize the gap in mental health care. Training on prevention and management of common mental disorders and NCDs for non-specialists would increase capacity for care. Procurement of sufficient and quality essential NCD medicines and equipment at the peripheral level would enable health care workers to improve health outcomes for those with NCDs.

Photo credits: WHO Country Office, Bangladesh

Annex 1 WHO recommended case definitions

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.

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)[10]

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.

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.

[10]An interim recommended case definition.

Meningitis

Suspected case:

- sudden onset of fever (>38.5 ℃) 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 purpural rash.

Confirmed case of meningococcal meningitis:

- suspected or probable case, as defined above, with either positive-CSFantigen 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 ℃) 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

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	Coverage of measles vaccination (%)	Measles coverage refers to the percentage of children who have received at least one dose of measles-containing vaccine in a given year. This indicator is 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 DPT3 coverage.
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 a verting 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.

1. Measles is a highly contagious infection which spreads easily through the coughs and sneezes of those infected. Nine out of ten people who are not immune and share living space with an infected person will catch it (74). Testing for the virus in suspected cases is important for public health efforts. Immunization is the only and most effective preventive measure against acquiring measles. The live attenuated measles vaccine induces an immune response that is similar to naturally acquired immunity and can be boosted by challenge from wild or vaccine virus (74).

2. Dengue is a mosquito-borne viral infection causing a severe flu-like illness and, sometimes causing a potentially lethal complication called severe dengue. Up to 50-100 million infections are estimated to occur annually in over 100 endemic countries, putting almost half of the world's population at risk. Dengue flourishes in urban poor areas, suburbs and the countryside but also affects more affluent neighborhoods in tropical and subtropical countries(75). In the ideal situation, case-fatality rate of Dengue Haemorrhagic Fever (DHF) should be lower than 1%, but it can be as high as 20% in the absence of prompt diagnosis and proper treatment (76). Dengue prevention and control depends on effective vector control measures. Dengue is caused by *Aedes aegypti* mosquito (75).

   Chikungunya is transmitted by the same vector that is responsible for the transmission of dengue. Serious complications are not common, but in older people, the disease can contribute to the cause of death. Often symptoms in infected individuals are mild and the infection may go unrecognized, or be misdiagnosed in areas where dengue occurs. The disease mostly occurs in Africa, Asia and the Indian subcontinent (WHO) (77).

3. Scrub typhus, also known as bush typhus, is a disease caused by a bacteria called Orientia tsutsugamushi. Scrub typhus is spread to people through bites of infected chiggers (larval mites). The most common symptoms of scrub typhus include fever, headache, body aches, and sometimes rash. Most cases of scrub typhus occur in rural areas of Southeast Asia, Indonesia, China, Japan, India, and northern Australia. No vaccine is available to prevent scrub typhus (78). To reduce risk of getting scrub typhus, avoiding contact with infected chiggers is the major preventive measure. When travelling to areas where scrub typhus is common, avoid areas with lots of vegetation and brush where chiggers may be found. Scrub typhus can be treated with antibiotics (tetracycline and doxycycline) (78).

4. Acute respiratory infections **(**ARI) 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 (79). 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), prevents avoidable morbidity and mortality in children under five years of age (79).

5. Cholera is caused by the bacterium, *Vibrio cholerae serogroup* O1 or O139. This bacterium can survive in water for a very long time, probably indefinitely, even without human infections. The cholera patient's stool contains large numbers of bacteria that can then spread through contaminated water or through unclean hands onto food (80).

Whether a person is infected depends on how many bacteria s/he consumes as well as level of immunity from previous exposure. The number of susceptible people decrease as the population becomes immune. Malnutrition can make cholera more severe as the body's immunity is already weakened. Each of these factors contributes to the severity of the outbreak. Treatment of severe cases is not complicated and is always successful if given properly. However, effective treatment must be provided quickly and efficiently. Without treatment, the case fatality rate (CFR) for severe cholera patients is about 50% (81).

There are currently two WHO-prequalified Oral Cholera Vaccines (OCV), namely Dukoral® and Shanchol. Results of clinical trials with Dukoral® show 85-90% protection at six months in all age groups, and 62% at one year in adults, after two doses. The clinical efficacy diminishes to 18%, three years after the vaccination. The Dukoral® vaccine was also shown to cross-protect against enterotoxigenic E coli (ETEC) in several studies. Efficacy of OCV is less in children under five years. Vaccinating 50% of the population could control cholera transmission in endemic regions (i.e. where there is a high level of natural immunity). Where natural immunity is lower, a larger proportion of the population would need to be immunized. Mass immunization of e.g. 70% of a population should be achievable, but for maximal protection against *V. cholerae*, two doses of OCV must be given two weeks apart (for Shanchol® – the stockpiled OCV) (82).

According to WHO, Use of OCV is highly recommended if there frequently has been cholera in the area and one or more of the following factors occur(83):

* A sudden deterioration of the water/ sanitation;
* Civil unrest;
* Major change in the climate (e.g. drought or flood); and/or
* Sudden movement of large numbers of people, especially if there is no organized camp where improved water can be provided.

6. Rotavirus is responsible for more than a third of deaths caused by diarrhoeal diseases in young children throughout the world. Children who get infected may have severe watery diarrhoea, often with vomiting, fever and abdominal pain. Vomiting and watery diarrhoea can last from 3 to 8 days. Additional symptoms may include loss of appetite and dehydration (loss of body fluids), which can be especially dangerous for infants and young children.

7. Dysentery is bloody diarrhoea, i.e., any diarrhoeal episode in which the loose or watery stools contain visible red blood. Dysentery is most often caused by Shigella species (bacillary dysentery) or *Entamoeba histolytica* (amoebic dysentery). Other causes include *Campylobacter, E. coli* (EHEC), and Salmonella species of bacteria. The frequency of each pathogen varies considerably in different regions of the world. For example, shigellosis is most common in Latin America while Campylobacter is the dominant bacteria in Southeast Asia. The vast majority of infections are self-limited and resolve spontaneously without treatment. However, in a minority of cases, *Shigella* spp and *Enterohemorrhagic Escherichia coli* (EHEC) can cause a severe disease called haemolytic uremic syndrome (HUS) wherein the red blood cells block the entrance to the kidneys, leading to anemia, low platelet counts, and kidney failure. A very severe infection like this can be fatal within 24 hours. Prevention of dysentery relies primarily on good sanitation and the availability of clean drinking water.

8. Hepatitis E is a liver disease caused by infection with a virus known as hepatitis E virus (HEV). Every year, there are an estimated 20 million HEV infections worldwide, leading to an estimated 3.3 million symptomatic cases of hepatitis E and approximately 44 000 deaths (accounting for 3.3% of the mortality due to viral hepatitis) (84). The virus is transmitted via the faecal-oral route, principally via contaminated water. Hepatitis E is found worldwide, but the prevalence is highest in East and South Asia. Prevention of Hepatitis E relies primarily on good sanitation and the availability of clean drinking water. Boiling and chlorination of water will inactivate HEV. Immune globulin is not effective in preventing Hepatitis E (84).

9. Leptospirosis is a widespread zoonotic disease that is increasingly being recognized in urban settings in developing countries (85). Human infection results from exposure to pathogenic spirochetes of the genus *Leptospira*, often by skin contact with contaminated water or soil (86). In low-income urban neighbourhoods, rats are important carrier mammals and excrete the organism in urine. Conditions of poor sanitation, flash flooding, and overcrowding are considered to be the most important risk factors facilitate transmission of the disease (87). The risk of acquiring leptospirosis can be greatly reduced by avoiding contact with water that is contaminated with animal urine, or eliminating contact with potentially infected animals. Leptospirosis is treated with antibiotics, such as doxycycline or penicillin, which should be given early in the course of the disease (88).

10. Dengue fever is a common mosquito-borne illness in many tropical and subtropical countries. Symptoms can be mild and include fever, rash, muscle and joint pain. Dengue fever rarely causes death. However, the infection can progress into a more serious condition known as severe dengue or dengue hemorrhagic fever. Repeated exposure to the dengue virus increases the likelihood of developing dengue hemorrhagic fever. The best way to prevent dengue fever is protection from being bitten by mosquitos. (89).

11. The Crimean-Congo haemorrhagic fever (CCHF) virus causes severe viral haemorrhagic fever outbreaks. CCHF outbreaks have a case fatality rate of up to 40%. The CCHF virus is primarily transmitted to people either by tick bites or through contact with infected animal blood or tissues during and immediately after slaughter (90). The majority of cases have occurred in people involved in the livestock industry, such as agricultural workers, slaughterhouse workers and veterinarians. Human-to-human transmission can occur resulting from close contact with the blood, secretions, organs or other bodily fluids of infected persons. CCHF is endemic in Africa, the Balkans, the Middle East and Asia, in countries south of the 50th parallel north. There is no vaccine available for either people or animals. The only way to reduce infection in people is by raising awareness of the risk factors and educating people about the measures they can take to reduce exposure to the virus (90).

12. Scabies is a skin infestation caused by a mite known as the *Sarcoptes scabiei*. Scabies is characterized by an itchy, red rash to form on the skin. There are approximately 130 million cases of scabies in the world at any given time(91). It's a highly contagious condition that can easily be passed from one person to another through direct skin contact. It may also be transmitted through infested clothing or bedding. Scabies is prevented by avoiding direct skin-to-skin contact with an infected person or with items such as clothing or bedding used by an infected person. According to WHO, scabies can spread easily under crowded conditions where close body and skin contact is common. Few studies also reported the possible linkage of scabies to a higher number of children per family and the tendency to live in single-room houses (92).

13. Japanese encephalitis virus (JEV) is a flavivirus related to dengue, yellow fever and West Nile viruses, and is spread by the *Culex* mosquitoes. JEV is the main cause of AES in many countries of Asia with an estimated 68 000 clinical cases every year. JE has a case fatality rate that can be as high as 30% among those with disease symptoms; 20-30% of those who survive suffer permanent neuropsychiatric sequelae. There is no cure for the disease. But safe and effective vaccines are available to prevent JE In endemic areas, JE can become a serious public health problem in the conflict regions where immunization coverage is not operationally feasible (93).

14. Nipah virus (NiV) is a member of the family *Paramyxoviridae, genus Henipavirus* which causes disease both in human and animals. NiV was initially isolated and identified in 1999 during an outbreak of encephalitis and respiratory illness among pig farmers and people with close contact with pigs in Malaysia and Singapore. Its name originated from Sungai Nipah, a village in the Malaysian Peninsula where pig farmers became ill with encephalitis. Clinical presentation can range from asymptomatic infection to fatal encephalitis. Those infected initially have a sudden onset of flu-like symptoms such as fever, headaches, pain in the muscles, vomiting and sore throat, followed by dizziness, drowsiness, altered consciousness (partial or complete loss of consciousness) and focal neurological signs indicating acute encephalitis. Encephalitis and seizures occur in severe cases. This progresses to coma within 24-48 hours.

15. Mental disorders account for four of the ten leading causes of disability worldwide, but mental health is among the most under-resourced areas of health care. Few countries meet their clinical mental health needs in normal times, let alone in emergencies. Those clinical mental health services that do exist in low-and middle-income countries tend to be hospital –based in large cities, and are often inaccessible to the wider population. It has been projected that in emergencies, on average, the percentage of people with a severe mental disorder (e.g. psychosis and severely presentations of mood and anxiety disorders) increases by 1% over and above an estimated baseline of 2-3%. In addition, the percentage of people with mild or moderate mental disorders, including most presentations of mood and anxiety disorders (such as post-traumatic stress disorder or PTSD) may increase by 5-10% above an estimated baseline of 10%. In most situations natural recovery over time (i.e. healing without outside intervention) will occur for many-but not all –survivors with mild and moderate disorders. The acute disorders seen in an emergency setting could be pre-existing or emergency induced and include the following conditions:
    - Psychosis of all kinds
    - Severely disabling presentation of mood and anxiety disorders (including severely disabling presentations of PTSD)
    - Severe mental disorders due to use of alcohol or other psychoactive substance use
    - Severe behavioural and emotional disorders among children and youth
    - Severe pre-existing developmental disabilities
    - Neuropsychiatric disorders including epilepsy, delirium and dementia and mental disorders resulting from brain injury or other underlying medical conditions (e.g. toxic substance, infection,)
    - Risk behaviours commonly associated with mental disorder (e.g. suicidal feelings, self-harm behaviour)

    People with mild mental health conditions may present themselves with medically unexplained somatic complaints. The challenge lies with people with severe mental disorders who fail to seek medical help due to isolation, stigma, fear, self-neglect, disability or poor access. These people are doubly vulnerable, both because of their severe disorder and because the emergency may deprive them of social support that had previously sustained them. There is a gap in most emergencies

between mental health and psychosocial supports (MHPSS) and general healthcare. The way in which health care is provided often affects the psychosocial well-being of people living through an emergency. Compassionate, continually supportive care protects the well-being of survivors, whereas disrespectful treatment or poor communication threatens dignity, deters people from seeking health care and undermines adherence to treatment regimes. A key element to better understanding to these problems is a better understanding of needs and resources. It is of utmost importance to assess the mental health and psychosocial issues in humanitarian settings.

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