



**World Health  
Organization**

Public health risk assessment  
and interventions

**Conflict and humanitarian  
crisis in South Sudan**

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## Preface

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

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

Public health threats represent a significant challenge to those providing health-care services in this evolving situation. It is hoped that this risk assessment will facilitate the coordination of activities among all partners working among the populations currently affected by the crisis.

# Executive Summary

Since its independence<sup>1</sup>, the Republic of South Sudan has experienced internal conflict which has begun to deteriorate into a civil war. On 15 December 2013, there was an armed confrontation in the presidential palace in Juba between army officers loyal to President Salva Kiir and soldiers backing his ex-deputy Riek Machar. There are reports that thousands have been killed in the civil unrest and tens of thousands displaced along ethnic lines, leading to the current humanitarian crisis.

As of 10 January 2014, the number of people reported displaced by the crisis in South Sudan was up to 201 000, including 60 000 sheltering in ten UN peacekeeping bases. Seven of the ten States are affected by the current wave of armed violence with the most affected being Jonglei, Unity and Upper Nile States.

The number of people who need life-saving assistance such as health care and protection is deemed to continue to increase and the UN foresees a further increase in population displacement (up to 400 000 displaced) in the following weeks.

Priority populations are: children under five years of age, women who are pregnant or of childbearing age, people vulnerable to violence and sexual or gender-based violence (SGBV).

## Principal health issues:

- a. Wounds and injuries as a direct result of violence.
- b. High burden of communicable diseases such as malaria, pneumonia, and diarrhoea (the top three causes of childhood death).
- c. Risk of disease outbreaks related to lack of safe water, poor sanitation and hygiene, overcrowding, and poor vaccination coverage.
- d. Malnutrition: especially in infants and young children, leading to increased and more severe disease.
- e. Reproductive health (especially complications of pregnancy, safe delivery and acute newborn care).
- f. Sexual and gender based violence and sexually transmitted diseases
- g. Mental health and psychosocial conditions
- h. Poor access to health services due to attacks on patients, health care workers, and health facilities, and severe shortages of health staff.
- i. Major disruption in medicines supply chain, including for treatment of trauma, obstetric care, infectious diseases such as malaria, tuberculosis, leprosy, and chronic conditions.
- j. Poor infection prevention and control in health care facilities.

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<sup>1</sup> As of July 9 2011

**Immediate priorities:**

- a. Protection of health care workers and health facilities
- b. Restoration of emergency and essential primary and secondary health services for trauma, infectious diseases, reproductive health (especially safe deliveries/ obstetric care and acute newborn care), care for victims of SGBV, and continuity of treatment of chronic conditions.
- c. Procurement, storage and distribution of life-saving and essential medicines and supplies.
- d. Provision of safe drinking water, adequate sanitation and hygiene facilities.
- e. Strengthen the early warning surveillance and response system for outbreak-prone diseases.
- f. Vaccination against measles (and polio) with vitamin A supplementation.
- g. Referral and care of children with medical complications of severe acute malnutrition
- h. Vector control, especially the provision of Long Lasting Insecticidal nets (LLINs) against malaria
- i. Emergency mental health and psychosocial care
- j. Infection control in health care facilities including safe transfusion and medical waste management
- k. Risk communication to the public.

Staff deploying to the Republic of South Sudan should be appropriately vaccinated and offered malaria prophylaxis.

# 1. Background and Risk Factors

## **Country Information:**

The newly-independent Republic of South Sudan is experiencing a humanitarian crisis resulting from internal conflict which is developing into civil war. On 15 December 2013 there was an armed confrontation in the presidential palace in Juba between army officers loyal to President Salva Kiir and soldiers backing his ex-deputy Riek Machar. Ethnic division particularly within the Dinka and Nuer groups are being employed for political gains. Thousands have reportedly been killed and tens of thousands displaced along ethnic lines.

The Republic of South Sudan is a landlocked country bordered by the Republic of Sudan to the north, Ethiopia to the east, Kenya to the southeast, Uganda to the south, the Democratic Republic of the Congo to the southwest, and the Central African Republic to the west (see Figure 1). The estimated population is 10.8 million.

The Republic of South Sudan is a member state of the United Nations, the African Union and the Intergovernmental Authority on Development. In July 2012, South Sudan signed the Geneva Conventions. The country has experienced internal conflicts since its independence on 9 July, 2011.

The country is covered in tropical forest, swamps, and grassland with the White Nile passing through the country. The climate is Equatorial with a rainy season of high humidity and large amounts of rainfall from May to October followed by a drier season, with March being the warmest month.

South Sudan is one of the world's most underdeveloped countries, with little infrastructure and the highest maternal mortality and female illiteracy rates in the world as of 2011. More than 90% of the population lives on less than US\$1 a day.

South Sudan has some of the worst health indicators in the world. The life expectancy at birth is 54 years. The under-five infant mortality rate is 135.3 per 1000, while maternal mortality is the highest in the world at 2053.9 per 100 000 live births. The epidemiology of HIV/AIDS in the country is poorly documented but the prevalence among adults aged 15-49 years (%) is estimated at 3.1% (WHO Global Health Observatory Data Repository, 2011). South Sudan faces a severe shortage of all categories of trained health professionals, including physicians (1 per 65 574 population) and midwives (1 per 39 088 population). Due to these severe shortages in human resources for health, the country relies on inadequately trained or low skilled health workers. There is also an inequitable distribution of health workers both among the states and between urban and rural areas, where the majority of the population lives.

## Crisis impact:

As of 10 January 2014, the number of people reported displaced by the current crisis in South Sudan was up to 201 000, including 60 000 sheltering in ten UN peacekeeping bases. Seven of the ten States are affected by current wave of armed violence with the most affected being Jonglei, Unity and Upper Nile States.

The number of people who need life-saving assistance such as health care and protection is deemed to continue to increase and the UN foresees further population displacements (up to 400 000 displaced) in the following weeks. South Sudan has experienced internal conflict since its independence.

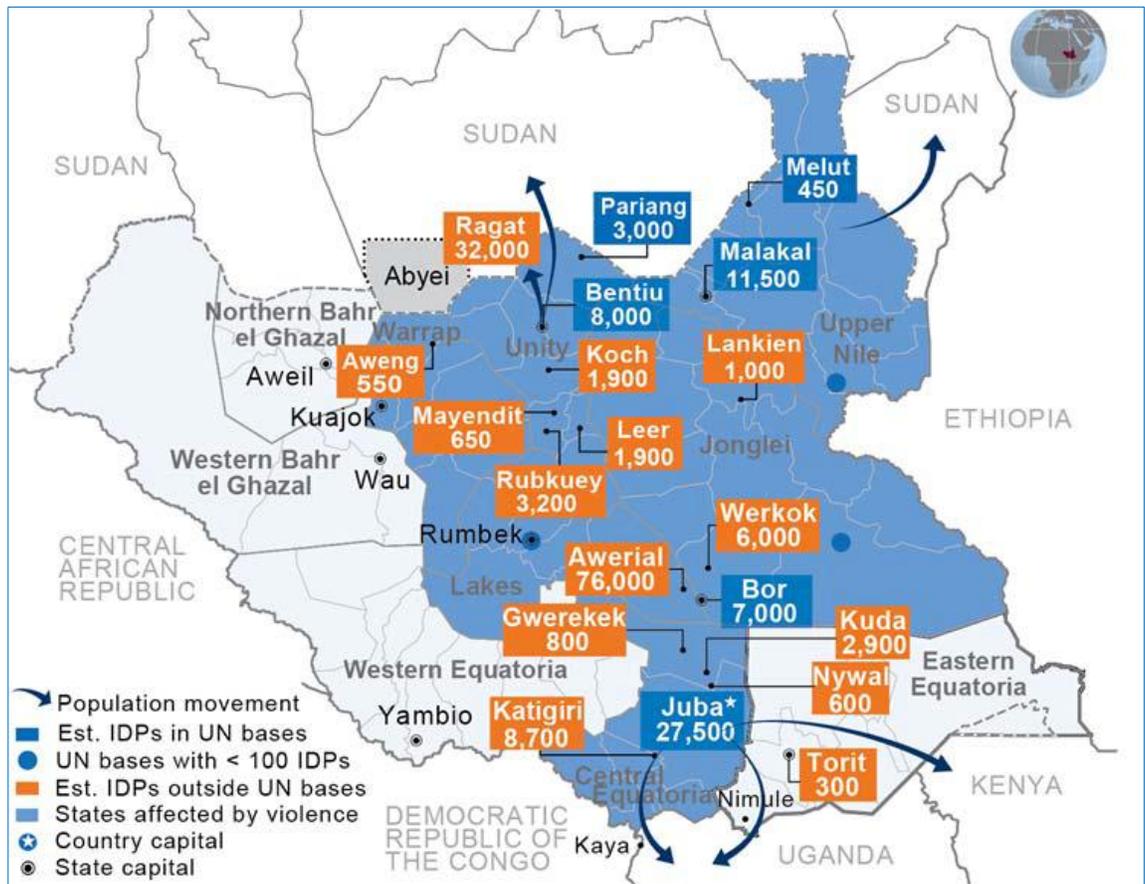


Figure 1: Areas affected by violence and reported concentrations of people displaced as of 1<sup>st</sup> January. Some numbers reported have not been independently verified.

Source: OCHA/UNMISS

## 2. Priority Health Concerns

- a. Wounds and injuries as a direct result of violence.
- b. High burden of communicable diseases such as malaria, pneumonia, and diarrhoea (the top three causes of childhood death).
- c. Risk of disease outbreaks related to lack of safe water, poor sanitation and hygiene, overcrowding, and poor vaccination coverage.
- d. Malnutrition: especially of infants and young children, leading to increased and more severe disease.
- e. Reproductive health (especially complications of pregnancy, safe delivery and acute newborn care).
- f. Sexual and gender based violence and sexually transmitted diseases
- g. Mental health and psychosocial conditions
- h. Poor access to health services due to attacks on patients, health care workers, and health facilities, and severe shortages of health staff.
- i. Major disruption in medicines supply chain, including for treatment of trauma, obstetric care, infectious diseases such as malaria and tuberculosis, and chronic conditions.
- j. Poor infection prevention and control in health care facilities.

### 2.1 Wounds and injuries

With the recent escalation of violence, wounds and injuries have been one of the most important causes of surgical interventions. The management of all injuries may be complicated by delays in presenting for care, the limited access to skilled personnel and the lack of appropriate infection control measures or equipment. Complications of untreated injuries are death, infections, tetanus and long term disability. The prevailing insecurity and ethnic nature of the crisis is also challenging patient's referral, thus further increasing the likelihood of death and long-term disability.

### 2.2 Water/sanitation/hygiene-related and foodborne diseases

#### **Epidemic risk of all waterborne diseases is extremely high**

According to the most recent WHO/UNICEF<sup>2</sup> estimates<sup>3</sup>, access to water and sanitation in South Sudan is one of the lowest in the world with only 9.9% of the population having access to treated water, 15.5% having access to improved sanitation and a large majority (64 - 77%) of the population practicing open defecation. Access to improved water is higher at 68.8% nationally, but even improved access may provide water that

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<sup>2</sup> WHO/UNICEF. Progress on sanitation and drinking-water, 2013 update.

[http://www.wssinfo.org/fileadmin/user\\_upload/resources/JMPreport2013.pdf](http://www.wssinfo.org/fileadmin/user_upload/resources/JMPreport2013.pdf)

<sup>3</sup> Household survey in South Sudan, 2010.

is unsafe/unreliable and thus poses disease risks. Without water, sanitation and hygiene (WASH), the risk of epidemic diseases is greatly increased

The risk of a cholera outbreak is high because of population movement, overcrowding, inadequate hygiene and toilet facilities, limited access to sufficient and safe water, risk of food contamination and unsafe practices in handling and preparing food. Cholera outbreaks occurred in the southern part of Sudan from 2006 to 2009 with a case fatality ratio reaching a peak of 3.64% in 2007. A preventive campaign with oral cholera vaccine was conducted in Maban County from December 2012 to February 2013. If a cholera outbreak were to occur it could spread quickly (attack rates have been noted as high as 5%) in IDP camps and accompanied by a high case fatality ratio due to the vulnerability of the population and currently insufficient facilities for rapid case identification and management. Before the current crisis, the global acute malnutrition rates among those below five years ranged from 17.5% to 30.2% and are well above the WHO emergency threshold of 15%<sup>4</sup>. This figure is likely to worsen and places affected groups at higher risk of severe cholera.

Similarly to cholera, the risk of other waterborne diseases such as hepatitis A or E, shigellosis and typhoid fever outbreak is high particularly in IDP settings.

Highest priority interventions should aim to ensure installation of latrines in sufficient numbers, uninterrupted provision of sufficient and safe water, adequate levels of hygiene, a disease surveillance system and early case management.

The use of oral cholera vaccines should be regularly evaluated within the framework for vaccination in humanitarian emergencies

([http://www.who.int/immunization/sage/meetings/2012/november/FinalDraft\\_FrmwrKDocument\\_SWGVHE\\_23OctFullWEBVERSION.pdf](http://www.who.int/immunization/sage/meetings/2012/november/FinalDraft_FrmwrKDocument_SWGVHE_23OctFullWEBVERSION.pdf)).

## Hepatitis E

Hepatitis E virus (HEV), which is transmitted via the faecal-oral route, is the most common cause of acute viral hepatitis globally. Large HEV outbreaks have been documented in crowded settings that have poor water, sanitation, and hygiene conditions. Pregnant women suffer disproportionately high mortality from hepatitis E.

A serosurvey conducted in 2012-2013 in the Jamam refugee camp showed that approximately 54% of the refugees were at risk of hepatitis E<sup>5</sup>. Several outbreaks in refugee camps in South Sudan have been confirmed throughout 2013.

The hepatitis E virus is transmitted mainly through the faecal-oral route due to faecal contamination of drinking water. Other transmission routes have been identified,

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<sup>4</sup> Annual Needs and Livelihoods analysis 2012/2013

<sup>5</sup> [http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6229a2.htm?s\\_cid=mm6229a2\\_e](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6229a2.htm?s_cid=mm6229a2_e)

which include:

- foodborne transmission from ingestion of products derived from infected animals;
- transfusion of infected blood products;
- vertical transmission from a pregnant woman to her fetus.

The current situation puts the IDPs and people living in refugee camps at high risk of hepatitis E.

## 2.3 Vector-borne diseases

### Malaria

There is a high malaria risk due, predominantly to *P. falciparum*, in the whole country including the capital Juba. The risk exists throughout the year and is especially high during the rainy season. Widespread resistance to chloroquine and sulfadoxine–pyrimethamine makes these drugs obsolete for treatment of malaria in South Sudan.

### Yellow fever

Although yellow fever is endemic in South Sudan, no cases have been reported over the past decade. The risk of transmission still exists. Reduced coverage rates for yellow fever immunizations and disruption of mosquito control programmes are likely to have increased this risk. Moreover, population movements resulted in large numbers of people living in conditions of poverty, overcrowding and poor sanitation, all conditions that amplify the risk of transmission.

Cases in neighbouring countries (Sudan and Uganda) were reported at the end of 2013 for which a reactive vaccination campaign was conducted.

## 2.4 Diseases associated with displacement and crowding, including vaccine-preventable disease.

Population displacement can result in overcrowding in resettlement areas, raising the risk of transmission of many communicable diseases. Acute respiratory infection, measles, diphtheria, meningitis, and pertussis are transmitted from person-to-person through respiratory droplets generated during coughing and sneezing, and the risks are increased when shelters are overcrowded and inadequately ventilated. The transmission of meningitis, waterborne and vector-borne diseases is also increased in such conditions.

According to the national EPI coverage survey, vaccination coverage for polio was 80%. The vaccination coverage for measles is 45.9% (MCV).

## **Acute respiratory infection (ARI)**

Among all infections of the upper or lower respiratory system, a major concern is acute lower respiratory (ALRI) tract infection (pneumonia, bronchiolitis and bronchitis) in children under five. ARI kills more children globally than any other disease, especially in Africa. The currently available surveillance data from IDP camps in South Sudan shows that respiratory tract infection are the cause of 35% of all reported morbidity.

Low birth weight, malnourished and non-breastfed children and those living in overcrowded conditions are at higher risk of acquiring pneumonia as well as of experiencing more severe disease and death from pneumonia. Prevention is key. Exclusive breastfeeding, adequate nutrition, and immunization can help reduce infection rates.

Early detection and case management of pneumonia and other common illnesses, guided by the Integrated Management of Childhood Illness (IMCI), will prevent morbidity and mortality in children under five years of age. Trained health care workers should refer to the national IMCI guidelines during and after the emergency.

## **Measles**

The risk of measles outbreak is high because of the low vaccination coverage, population movement and the overcrowding in IDP settings. Data from IDP camps have reported over 20 cases of measles that were clinically confirmed. If an outbreak were to occur, the impact in terms of number of cases and deaths is expected to be high because the setting favours rapid spread of the disease and increases both the susceptibility and vulnerability of the population.

Measles immunization together with vitamin A supplementation for all children 6-59 months old regardless of their vaccination status should be considered as high priority in particular in IDPs camps regardless of whether cases have occurred or not.

## **Tetanus**

Tetanus occurs as a result of contaminated wounds. The disease has a high CFR of 70%-100% without medical treatment and is globally underreported. The incubation period is usually 3 to 21 days. A shorter incubation period is associated with severe disease and a worse prognosis.

Appropriate management of the injured should be implemented as soon as possible to minimize future disability and to avert avoidable death. All wounds and injuries, including trivial, unnoticed wounds, lacerations and burns should be inspected carefully. Health-care workers should be alerted by the occurrence of cases of dysphagia (difficulty swallowing) and trismus (lockjaw), often the first symptoms of the disease. Patients should systematically receive prophylactic antibiotics and tetanus toxoid vaccine if non-immune, together with tetanus immune globulin if the wound is tetanus-prone.

## **Tuberculosis (TB)**

Tuberculosis is still among the leading causes of morbidity and mortality with an incidence at 79/100 000 for new sputum smear positive TB and 140/100 000 for all forms of TB cases<sup>6</sup>. The TB burden is disproportionately high among the poor, the elderly and the male population.

In the acute phase of this emergency, follow-up and continuity of treatment of patients already on care should be maintained when feasible. Other aspects of TB control can be addressed once emergency and basic health care have been re-established.

## **Meningococcal disease**

Meningitis is spread from person-to-person through respiratory droplets from infected people. Transmission is facilitated by close contact and crowded living conditions. Population movement and poor access to health services are two additional important risk factors for meningitis outbreaks. South Sudan is located in the Meningitis belt, where epidemics of meningococcal disease occur mainly during the dry season (i.e. December to May). In 2013, 300 cases of meningitis from *Neisseria meningitidis* serogroup A were reported across South Sudan (196 cases were reported in Malakal county). A vaccination campaign was conducted from 15 to 24 May 2013 with the Meningococcal A conjugate vaccine. Preventive campaigns with the MenA conjugate vaccine were conducted targeting 6 million people aged 1-29 years old.

## **Poliomyelitis**

Supplementary immunization activities are periodically conducted, however coverage is variable by area, and the ability to independently monitor the activities is compromised due to insecurity and inaccessibility in some areas. National Immunization Days and subnational immunization days were conducted in the past six months.

While Sudan (and South Sudan) were declared polio-free in 2009, outbreaks in neighbouring countries prompted immunization campaigns in the higher risk states of South Sudan. Immunization campaigns were organized until December 2013. Unimmunized children remain at risk of infection.

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<sup>6</sup> National TB control programme, 2012

## 2.5 Sexually transmitted infections (STIs) including human immunodeficiency virus (HIV)

### HIV / AIDS

Years of political instability and civil conflict in South Sudan have led to a deterioration of basic health services in the country, thus weakening the national response to the HIV/AIDS epidemic. The biggest concern is the interruption of HIV treatment, drug resistance, antenatal care of HIV infected women, loss to follow up of displaced patients, the stock-out of antiretroviral drugs and disruption of supply chain of drugs and diagnostics. Also of concern is the increased risk of unsafe blood transfusion and the disruption of HIV monitoring and surveillance systems.

The current crisis may increase the exposure of vulnerable people to STIs, including HIV. Risk factors include massive displacement of people from their homes, women and children left to fend for themselves, prevalence of communal violence and human rights violations, social services overwhelmed or destroyed, and a lack of means to prevent HIV infection, such as clean needles, safe blood transfusions and availability of condoms.

The emergency response should ensure good practice to minimize bloodborne virus infections, including the strengthening of standard precautions, with the provision of gloves, sterile needles and syringes, safe waste disposal management in health services, and support to a safe blood transfusion site. Related services such as the provision of condoms, education and prevention messages, and post-exposure prophylaxis for occupational exposure and survivors of rape should be provided when resources become available.

## 2.6 Haemorrhagic fevers

Viral haemorrhagic fever is a general term for a severe illness, sometimes associated with bleeding that may be caused by a number of viruses or bacteria. Several cases of haemorrhagic fevers have been reported over the years in South Sudan. Using a clinical approach to differentiate among them is often insufficient and laboratory testing is often required.

### Ebola

Ebola is transmitted through contact with blood, secretion, organs or other bodily fluids of infected animals or human-to-human with infected people. Bush-meat consumption is considered a risk factor for Ebola transmission. The last outbreak in South Sudan occurred in 2004, in Yambio.

## Rift Valley Fever

Rift Valley Fever is a mosquito-borne viral disease. The vast majority of human infections result from direct or indirect contact with the blood or organs of infected animals during the care or slaughtering of infected animals or possibly from the ingestion of raw milk. Human infection can also result from the bites of infected mosquitoes. Rift Valley Fever outbreaks in East Africa are closely associated with periods of heavy rainfall that occur during the warm phase of the El Niño/Southern Oscillation (ENSO) phenomenon. Rift Valley Fever outbreaks occurred in 2007 in South Sudan (Upper Nile State).

## Tick-borne haemorrhagic fever

A nosocomial outbreak of Crimean-Congo Haemorrhagic Fever<sup>7</sup> occurred in Sudan in 2008 but no other outbreak has been reported since. The risk of large outbreaks remains low as the vector might not easily be in contact with crisis-affected populations.

## Relapsing fever

Relapsing fever is a bacterial, tick-borne, haemorrhagic fever. Outbreaks occurred in South Sudan in 1999. Relapsing fever can be treated by antibiotics such as doxycycline.

## 2.7 Malnutrition

There was already a high malnutrition prevalence in South Sudan prior to the current crisis. Global Acute Malnutrition (GAM) prevalence was above 15% in six states ranging from 17.5-30.2% in a SMART survey<sup>8</sup> completed in 2012.

Under-nutrition leads to increased susceptibility to infection and more frequent and severe episodes of infections., Infections can also aggravate or precipitate under nutrition. Under-nutrition is an important underlying factor contributing to childhood mortality. Under nutrition is also linked with impaired cognitive development. The current lack of access to appropriate food, safe drinking water and to health and nutrition services is further increasing the risk of acute malnutrition. This will disproportionately affect vulnerable groups such as young children, pregnant and lactating women and older persons. Children with moderate acute malnutrition (MAM) need urgent food and medical support before they become severely malnourished and at risk of severe

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<sup>7</sup> Crimean-Congo Haemorrhagic Fever (CCHF) is due to a *Bunyaviridae* virus transmitted by a tick *Hyalomma* genus. CCHF can also be transmitted through contact with infected animals blood or during animal slaughter. Human-to-human transmission may occur through close contact with blood, secretions, organs or bodily fluids of infected persons. CCHF can cause severe haemorrhagic fever with a case fatality-rate up to 40%.

<sup>8</sup> SMART survey in 7 States: Jonglei, Northern Bahr El Ghazal, Lakes, Unity, Upper Nile, Warrap and Western Equatoria. GAM above 15% in 6 States except Western Equatoria State (Annual Needs and Livelihood Analysis Report, March 2013)

infection and death. Children with severe acute malnutrition (SAM) need urgent appropriate medical and nutritional care to increase the survival rates of these children.

It is important to refer cases of severe acute malnutrition to health care facilities so they can receive preventive care or be treated for malnutrition related medical complications. It is important to support exclusive breastfeeding until six months of age and continued breastfeeding for at least two years of age, and to ensure that nutritional needs of the affected population are addressed.

## **2.8 Other major risks and considerations**

### **Reproductive health**

The country's maternal mortality rate is the highest in the world at 2053.9 per 100 000 live births. Socio-cultural practices are a contributing factor to this poor health indicator which may be further exacerbated by the conflict. Pregnant women and women of child-bearing age are therefore at high risk of negative impact from the conflict - including due to sexual and gender based violence as well as difficulty in accessing specialized health services required for their care and their newborns. Comprehensive reproductive health interventions prioritize safe delivery with the assistance of trained birth attendants, a referral system for obstetric emergencies and acute care of the newborn, family planning and prevention of the transmission of sexually transmitted infections (STIs) including HIV, as well as the management of gender-based violence. These interventions are critical components of the Minimal Initial Service Package (MISP) for reproductive health, which is currently recommended for implementation in the acute phase of an emergency.

### **Mental health**

The current level of violence, danger, loss, changed social conditions and human rights violations are likely to cause an increased and wide range of mental health issues such as grief, non-pathological distress, alcohol and substance abuse, depression and anxiety disorders including post-traumatic stress disorder (PTSD) which need to be urgently addressed so that they do not complicate into longer term or severe mental disorders.

Gender-based violence and abuse of children are also a leading cause of mental disorders. Health care providers should therefore be sensitized to the possibility of increased cases of mental distress. It is important that they can differentiate between normal psychological distress and moderate or severe mental disorders. Normal psychological distress may be reduced through psychological first aid and other non-clinical psychosocial interventions. However, moderate or severe mental disorders require clinical treatment in addition to psychosocial support. Medical case management need to be delivered by a trained health care provider using psychotropic medications that are included in the national or WHO essential drug lists. Continued access to care should be assured for people with severe mental disorders and referral may be needed for severely affected patients.

## **Sexual and Gender Based Violence**

Sexual and gender-based violence includes rape, sexual slavery, forced prostitution, forced pregnancy, enforced sterilization, or any other form of sexual violence against women, men, girls or boys. Such incidents or patterns occur in the context of conflict and may be commanded or condoned as a tactic of war.

Sexual violence can have multiple physical, psychological and social effects on survivors, their social networks and their communities. Sexual and reproductive health consequences include sexually transmitted infections, HIV, unwanted pregnancies, unsafe abortions, gynaecological problems and physical injuries. Psychological/mental health consequences include non-pathological distress (such as fear, sadness, anger, self-blame, shame, sadness or guilt), anxiety disorders (including post-traumatic stress disorder), depression, medically unexplained somatic complaints, and alcohol and other substance use disorders, as well as suicidal ideation and self-harm. Social consequences include stigma and its sequelae – including social exclusion, discrimination, rejection by family and community, and further poverty.

## **Non-communicable diseases (NCDs)**

Cardiovascular diseases (hypertension, ischemic heart disease, cerebrovascular disease and heart failure) accounted for 13% of non-communicable diseases in south Sudan. Other chronic conditions include diabetes, chronic respiratory disease and cancer. Currently the Ministry of Health does not have any policy, programme or action plan to address these diseases. Non-communicable diseases need to be medically managed to avoid increased mortality or complications which places a substantial burden on health services and an impoverishing drain on families and communities. The priorities during the acute phase of this emergency are to treat exacerbations and to minimize treatment interruptions.

## 3. Priority Interventions

- a. Restoration of emergency and essential primary and secondary health services for trauma, infectious diseases, reproductive health (especially safe deliveries/obstetric care and acute newborn care), care for victims of SGBV, and continuity of treatment of chronic conditions.
- b. Procurement, storage and distribution of life-saving and essential medicines and supplies.
- c. Provision of safe water, adequate sanitation and hygiene facilities.
- d. Strengthen the early warning surveillance and response system for outbreak-prone diseases.
- e. Vaccination against measles (and polio) with vitamin A supplementation.
- f. Referral and care of children with medical complications of severe acute malnutrition
- g. Emergency mental health and psychosocial care
- h. Protection of health assets
- i. Infection control in health care facilities including safe transfusion and medical waste management
- j. Risk communication to the public.

### 3.1 Essential health services

Good case management is predicated on ensuring access to care. Access to health clinics for the affected population is critical, including case-management protocols and medications/material to treat likely high-burden conditions (trauma/wounds, communicable and non-communicable diseases, and emergency reproductive health services).

The restoration of emergency and essential priority and hospital health services include

1. Restoration of priority health facilities, establishment of temporary health posts in overcrowded settings such as IDPs camps, enhanced community based health services and the organization of mobile clinics for population hard to reach. With the current violence and looting, it is important that health facilities and assets can be protected by any means.
2. Provision of a comprehensive package of emergency and essential surgical, medical and obstetric care including both preventive (vaccination, growth monitoring, antenatal care, family planning, health education) and curative care in the community, through primary and secondary health centres and referral mechanisms. This comprehensive package of services needs to be based on the current epidemiological and burden of diseases profile, including this public health risk analysis.
3. Support to the return or replacement of Ministry of Health personnel through targeted capacity-building.
4. Re-stocking of priority primary and hospital health facilities with life-saving and essential medicines and supplies, laboratory reagents for safe transfusion and universal precautions materials for infection prevention and control.
5. Ensuring standardized quality health care based on the use of national or WHO standards, case definition and guidelines and regular monitoring of treatment outcomes.

## Trauma care

Priority must be given to providing emergency medical and surgical care to people with traumatic injuries, which account for many of the health-care needs among those requiring medical attention in the acute phase of the conflict. Appropriate medical and surgical treatment of these injuries is vital to improving survival, minimizing future functional impairment and disability and ensuring as full a return as possible to community life. In order to prevent avoidable death and disability, field health personnel dealing with injured survivors should observe the following basic principles of trauma care:

- Patients should be categorized by the severity of their injuries and treatment prioritized in terms of available resources and chances for survival. Referral and medical evacuation need to be organized. The underlying principle of triage is allocation of resources in a manner ensuring the greatest health benefit for the greatest number.
- Open wounds must be considered as contaminated and should not be closed. Debridement of dead tissue is essential which, depending on the size of the wound, may necessitate a surgical procedure undertaken in appropriate (e.g. sterile) conditions. Any associated involvement of organs, neurovascular structures, or open fractures will also necessitate appropriate surgical care.
- After debridement and removal of dead tissue and debris, wounds should be dressed with sterile dressings and the patient scheduled for delayed primary closure.
- Patients with open wounds should receive tetanus prophylaxis (vaccine and/or immune globulin depending on vaccination history). Antibiotic prophylaxis or treatment will likely be indicated.
- HIV post-exposure prophylaxis kits should be available to health-care workers in case of accidental exposure to contaminated blood and body fluids.

## Reproductive health services

The implementation of the Minimum Initial Service Package (MISP) aims to ensure access to comprehensive emergency reproductive and neonatal health services and includes:

- Safe delivery with the assistance of a trained birth attendant,
- Referral system for obstetric emergencies and acute care of the newborn,
- Family planning and prevention of the transmission of sexually transmitted infections (STIs) – including HIV
- Case management for victims of gender based violence.

A lead agency for reproductive health should be identified along with a Reproductive Health Officer to ensure coordination, communication, and collaboration in MISP implementation.

## **Communicable diseases**

Heightened community awareness of the need for early treatment and reinforcement of proper case management are important in reducing the impact of communicable diseases. 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 acute respiratory infections, the main epidemic-prone diseases (including cholera, dysentery, shigellosis, typhoid, dengue, hepatitis, measles, malaria, and meningitis) and sexually transmitted infections. Standard infection control practices, in accordance with national protocols, should also be in place.

Malaria treatment:

- Uncomplicated-unconfirmed: Artemether-Lumefantrine;
- Uncomplicated *P. falciparum* laboratory-confirmed: Artemether-lumefantrine + Primaquine (single dose);
- Severe malaria: Quinine + Tetracycline
- Uncomplicated *P. vivax* Laboratory-confirmed: Chloroquine + Primaquine (14 days).

Tetanus: appropriate management of injured survivors should be implemented as soon as possible to minimize future disability and to prevent avoidable death following disasters.

Tuberculosis: Provision of anti-TB treatment should be ensured for TB patients who were previously receiving treatment in the affected areas. Their treatment should not be interrupted and should be provided in line with the directives of the national TB control programme (NTP) services. All aspects of TB case management should also follow the NTP directives. The drugs used to treat the disease, such as rifampicin or streptomycin, must not be used for the treatment of other illnesses.

HIV/AIDS: Efforts should be made to ensure that HIV/AIDS patients receiving antiretroviral treatment do not have their treatment interrupted and that antiretroviral treatment is provided for the prevention of mother-to-child transmission of HIV.

## **Non-communicable diseases**

Chronic conditions: continuation of treatment for those on medications for chronic conditions, including hypertension, diabetes, chronic respiratory disease and cancer. Where feasible, decentralization of care will increase treatment coverage given the restrictions on movement.

## **Mental health and psychosocial support:**

Psychological and social considerations should be taken into account in provision of general health care. Case management should encompass psychosocial support and, if needed, appropriate medical care delivered by a trained health care provider using medications that are included in the national or WHO essential drug lists. Referral may be needed for severely affected patients.

## 3.2 Water and sanitation

Four water, sanitation and hygiene interventions (WASH)—water supply, improved drinking water quality, sanitation, and hygiene—have been shown to be effective in preventing diarrhoeal disease<sup>9</sup>. Of these interventions, ensuring sufficient provision of safe drinking water may be the most important preventive measure in reducing the risk of outbreaks of waterborne diseases. However, given the extremely high proportion (64-77%) of open defecation in South Sudan immediately providing basic latrines and education on their use should also be a priority. Recommendations on water quantity, quality as well as sanitation and hygiene are highlighted below.

- WHO and SPHERE recommend that each person be supplied with a minimum of at least 15 litres of safe water per day for basic survival needs (drinking, cooking and hygiene) and where possible 20 litres should be provided.
- The provision of appropriate and sufficient water containers, cooking pots and fuel can reduce the risk of cholera and other diarrheal diseases by ensuring that water storage is protected and that food is properly cooked.
- There are a number of water treatment methods (boiling, filtration, chlorine, coagulation-flocculation, and solar) that have demonstrated effective removal of pathogens and reductions in diarrhoea when used in the field.
- 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.

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<sup>9</sup> For more specific information on water, sanitation and hygiene refer to the following:

WHO/WEDC, 2013. WHO/WEDC Technical Notes on WASH in Emergencies.

[http://www.who.int/water\\_sanitation\\_health/publications/technotes/en/index.html](http://www.who.int/water_sanitation_health/publications/technotes/en/index.html)

WHO, 2011. WHO Guidelines on drinking-water quality.

[http://www.who.int/water\\_sanitation\\_health/publications/2011/dwq\\_guidelines/en/index.html](http://www.who.int/water_sanitation_health/publications/2011/dwq_guidelines/en/index.html)

WHO, 2011. Evaluating household water treatment options: microbiological performance specifications.

[http://www.who.int/water\\_sanitation\\_health/publications/2011/household\\_water/en/](http://www.who.int/water_sanitation_health/publications/2011/household_water/en/)

WHO INFOSAN Information note on Food Safety in natural disasters

[http://www.who.int/entity/foodsafety/fs\\_management/No\\_05\\_NaturalDisasters\\_Sept05\\_en.pdf](http://www.who.int/entity/foodsafety/fs_management/No_05_NaturalDisasters_Sept05_en.pdf) ).

WHO, 2013. Safe management of wastes from health care activities.

[http://www.healthcarewaste.org/fileadmin/user\\_upload/resources/Safe-Management-of-Wastes-from-Health-Care-Activities-2.pdf](http://www.healthcarewaste.org/fileadmin/user_upload/resources/Safe-Management-of-Wastes-from-Health-Care-Activities-2.pdf)

WHO, 2002. Environmental health in emergencies and disasters. World Health Organization, Geneva.

[http://www.who.int/water\\_sanitation\\_health/emergencies/emergencies2002/en/](http://www.who.int/water_sanitation_health/emergencies/emergencies2002/en/)

- After 30 minutes, the residual concentration of active free chlorine in the water should be 0.5 mg/litre, which can be determined by using a simple field chlorine test kit.
  - Chlorine is ineffective against certain protozoa, most notably *cryptosporidium*, a pathogen which can cause especially serious health conditions for individuals with HIV. Greater protection of drinking-water sources would combine chlorination with other methods or select a method such as membrane filtration that would effectively protect against the range of pathogens most commonly associated with diarrhoeal diseases.
- Regular monitoring of WASH related health risks through sanitary surveys and use of rapid faecal indicator water quality 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 faecal contamination, where possible.
  - Key messages on food, hand and personal hygiene 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.

### 3.3. Surveillance/early warning and response system

The purpose of the surveillance/early warning and response system is to detect disease outbreaks. Rapid detection of cases of epidemic-prone diseases is essential to ensure rapid control.

To be effective, a surveillance system needs to:

- Focus on the communicable diseases most likely to occur in the disaster-affected population
  - Be simple to use, uniform in style and include standard case definitions and reporting forms (for WHO case definitions, see Annex 1) for detection of acute watery diarrhoea, acute bloody diarrhoea, measles, acute respiratory infection, malaria, jaundice syndrome, meningitis, tetanus, unexplained fevers, unexplained cluster of events
  - Include an alert system for immediate reporting and prompt investigation of priority epidemic-prone diseases such as cholera, hepatitis E, shigellosis and measles
  - Include outbreak preparedness, with development of specific outbreak response plans and adequate stockpile of supplies such as oral rehydration salts, Ringer's Lactate for cholera, ciprofloxacin for Sd1, amoxicillin and vitamin A for measles, Coartem™ for malaria, intravenous solutions, as well as outbreak investigation kits
  - Be sensitive to unusual emerging and re-emerging communicable diseases of major public concern
  - Identify key laboratories for prompt diagnosis and confirmation of the main communicable disease threats, as well as protocols for sample collections, transport and tracking of specimens

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

### 3.4 Immunization

- Mass vaccination against measles is recommended in children six months to 15 years. Infants 6-11 months should receive 100 000 IU of vitamin A and children 12-59 months should receive 200 000 IU of vitamin A. Re-vaccination of infants who received their first dose of measles vaccine at 6-8 months of age is recommended once they reach nine months; the minimum interval between doses is one month.
- A single suspect measles case is sufficient to prompt the immediate implementation of activities to control measles.
- Given the threat of reintroduction of poliomyelitis into the area due to suboptimal vaccination coverage, every opportunity should be taken, if feasible, to give oral poliovirus vaccine to all children younger than age five.
- Mass tetanus vaccination programmes to prevent disease are not indicated. Wounds or lacerations may occur from objects submerged in floodwaters. Tetanus vaccine (TT or Td) and tetanus immune globulin (TIG) is indicated for those with open wounds/lacerations who have never been vaccinated. TIG is indicated for previously vaccinated people who sustain wounds/lacerations, depending on their tetanus immunization history.
- Mass vaccination against influenza is not indicated.
- When the situation stabilizes, vaccinations routinely offered by the national immunization program should be made available to all infants, pregnant women and other people as part of the provision of basic emergency health-care services.
- Effective vaccine hepatitis A exists and may be used in outbreaks settings accordingly with the framework for deciding on vaccination in acute emergencies<sup>10</sup> and other relevant decision-making tools. Vaccination efforts should always be supplemented by health education and improved sanitation.
- Typhoid vaccination, in conjunction with other preventive measures, may be useful to control typhoid outbreaks, depending on local circumstances.
- Oral cholera vaccines (OCV). In the current context of IDPs living in poor sanitation conditions, overcrowding and with limited opportunity to rapidly scale-up hygiene and sanitation conditions to appropriate standards, the decision to use OCV in emergency-affected populations is to be considered to effectively complement other control measures. The decision to use OCV should be guided using a WHO risk assessment tool including identification of highest-risk populations and evaluation of logistic and security issues. This tool enables assessment whether it is possible to effectively complement other control measures with oral cholera vaccination.
- Special attention should be paid to the safe management and disposal of waste from immunization activities to prevent the transmission of bloodborne pathogens.

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<sup>10</sup> SAGE working group on vaccination in acute humanitarian emergencies: a framework for decision making (WHO/IVB/13.07)

[http://www.who.int/iris/bitstream/10665/92462/1/WHO\\_IVB\\_13.07\\_eng.pdf](http://www.who.int/iris/bitstream/10665/92462/1/WHO_IVB_13.07_eng.pdf)

- Stockpiles of vaccine for yellow fever, meningitis and cholera epidemics for emergency situations may be accessed through the International Coordinating Group on vaccine provision (ICG)<sup>11</sup>.

### 3.5. Prevention and Management of malnutrition

- Infants should normally start breastfeeding within one hour of birth and continue breastfeeding exclusively (with no food or liquid other than breast milk, not even water) until six months of age. The aim should be to create and sustain an environment that encourages frequent breastfeeding for children up to 2 years of age. Infants who are not breastfed are vulnerable to infection and diarrhoea.
- Exclusive breastfeeding (for under 6 month olds) and continued breastfeeding should be encouraged and supported. Donations of milk powder supplies usually increase in emergency situations which contribute to an increased number of infants with diarrhoea and pneumonia and further exacerbate the low percentage of exclusively breastfed infants. For those unable to be breastfed, the following hierarchy of feeding should be followed: expressed breast milk by mother, breastfeeding from surrogate donors and donor expressed breast milk. The few infants who have no access to breast milk require an adequate supply of infant formula, safe water and clean utensils. For those few cases, health-care providers, including mothers, should be provided with guidance on the safe preparation of infant formula products.
- Many adults will have been or will now also be of borderline nutritional status, and given that diarrheal disease will further compromise this, attention must be paid not only to the equitable distribution of food, but also to maintaining adequate nutrition of pregnant women and lactating mothers.
- Bacterial infections are very common in severely malnourished children on initial admission to hospital. Clinical management of severely malnourished patients, including fluid management, must be thorough, carefully monitored and supervised. Common problems encountered in severe malnutrition include hypothermia, hypoglycaemia, dehydration and electrolyte disturbances. It is important that the phases and principles of management of severely malnourished children are followed as outlined in WHO guidelines.
- Populations dependent on food aid need to be given a food ration that is safe and adequate in terms of quantity and quality (covering macro- and micro-nutrient needs). Infants from 6 months onwards and older children need hygienically prepared, and easy-to-eat, digestible foods that nutritionally complement breast milk. Regular assessments of households' access to food (including market prices) need to be undertaken and emergency food aid needs to be adapted accordingly. Households' access to facilities for the safe preparation of their food should also be

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<sup>11</sup> Request form for stockpile for yellow fever, meningitis and cholera are accessed through the International Coordinating Group on vaccine provision (ICG). Request forms and further information can be found here:

- Yellow Fever : [http://www.who.int/csr/disease/yellowfev/global\\_partnership/en/](http://www.who.int/csr/disease/yellowfev/global_partnership/en/)
- Meningitis : <http://www.who.int/csr/disease/meningococcal/icg/en/>
- Cholera: [http://www.who.int/cholera/vaccines/ocv\\_stockpile\\_2013/en/index.html](http://www.who.int/cholera/vaccines/ocv_stockpile_2013/en/index.html)

assessed on a regular basis and emergency supplies of necessary utensils and appropriate energy sources for cooking should be adapted accordingly.

- After the acute phase of the emergency, efforts should be made to improve household access to food in a more sustainable way (e.g. seed distribution, land/crop management, income- generation activities) and to institute appropriate child-feeding and caring practices, including diversifying diets and improved hygiene. It is important to emphasize that poor hand hygiene exacerbates the spread of diarrhoeal diseases, even in the presence of adequate nutrition.

### **3.6 Risk communication**

Risk communication is a critical tool for effective management of public health emergencies. When the public is at risk of a real or potential health threat, treatment options may be limited, direct interventions may take time to organize and resources may be few. Communicating advice and guidance, therefore, is often the most important public health tool in managing a risk.

## 3.7 Specific messages:

### Safe water

- Even if it looks clear, water can contain germs. Under the present emergency situation in South Sudan, water in the affected areas should be assumed to be contaminated.
- Use an effective water treatment option (filtration, chlorination, boiling, coagulation-flocculation) before drinking or using water for food preparation.
- Keep drinking water in a clean, covered jerry can with a small opening and a cover. It should be used within 24 hours of collection.
- Pour the water from the container – do not dip a cup into the container.
- If dipping into the water container cannot be avoided, use a single cup or other utensil with a handle and which is attached to the container.

### Promote good hygienic practice

- Wash hands with soap, ash or lime:
  - before cooking, before eating and before feeding children;
  - after using the latrine or cleaning children after they have used the latrine;
  - wash all parts of hands – front, back, between the fingers and under the nails.

### Avoid mosquito bites

- Sleep under an insecticide-treated bednet.
- Wear protective clothing at times when mosquitoes and other biting insects are active.
- Remove, destroy or empty small rain-filled containers near the house or tent/shelter.

### Five keys to safer food

- Keep clean (hand hygiene)
- Separate raw and cooked food
- Cook food thoroughly
- Keep food at safe temperature (piping hot)
- Use safe water and safe raw materials

### Seek treatment early

- Diagnosis and treatment of fever, diarrhoea and other illnesses should be within 24 hours from observation of first signs of symptoms.
- For diarrhoea, oral dehydration salts made with safe (boiled and chlorinated) water should be consumed.

## 4. Staff Health

Emergency settings differ vastly, including their epidemiological context. It is thus essential that medical preparation for staff is as comprehensive as possible (within the limitations imposed by departure at short notice) and tailored specifically for South Sudan.

A minimum period of time is required following vaccination, to build up protective levels of antibodies. A series of injections may also be necessary. It is advised that staff receive vaccinations two weeks in advance of departure if possible (see table below). In the event of immediate departure, the duration of the mission may influence the choice of vaccines.

Personal protection against mosquito bites, both during the day and at night is important in preventing vector-borne diseases such as malaria (long-sleeved clothes, repellents, mosquito nets).

Basic knowledge of first aid and stress management is important. Some teams may have to handle large numbers of dead bodies. The emotional overload in performing such an unusual and heavy task without specific training can provoke significant reactions of traumatic stress and even lead to psychological trauma. Although not always avoidable, good preparation can be useful in preventing and limiting stress.

### Vaccination recommendations

	Vaccine	Validity	Comments
<b>Essential</b>	Diphtheria	10 years	Can be combined with tetanus
	Yellow fever	Life	Yellow fever vaccination is mandatory and will be requested at ports of entry into country for all travellers over 9 months of age
	Tetanus	10 years	Booster does is recommended if not taken in the last 10 years
	Polio	10 years	
	Typhoid	3 years	
	Hepatitis A	Life	If there is no proof of immunity by vaccine or illness, even if departure at short notice. Can be combined with Hepatitis B.
	Hepatitis B	15 years	
	Meningitis 135	ACYW 3 years	No recent outbreak, but potential risk of cases in such context (prolonged mission).
<b>Optional</b>	Cholera	6 months	If there is sufficient time, 2 oral doses to be taken one week apart. Immunity is obtained 1 week after the second dose of the Dukoral™ vaccine which can provide protection from both Vibrio cholera serotype O1 and ETEC (enterotoxigenic E. Coli).
	Measles		Potential risk in emergency situation. If not fully immunized in childhood, obtain vaccination.

## Malaria prevention, prophylaxis and treatment

Mosquito bite prevention consists of the use of repellents on skin, use of insecticidal room spray on clothes and strict use of impregnated mosquito nets at night.

Malaria prophylaxis is recommended regardless of the duration of the stay, the location within the country or the season. The recommended drugs for prophylaxis are:

Medication	Start of treatment	Dosage
Atovaquone 250 mg and Proguanil 100 mg (Malarone)	One day before exposure	One tablet daily until 7 days after last exposure
Doxycycline 100 mg	One day before exposure	One tablet daily until 4 weeks after last exposure
Mefloquine 250 mg	One week before exposure	One tablet weekly until 4 weeks after last exposure

It is recommended that individuals carry supplies of reserve treatment for all missions lasting longer than eight days, in view of the potential difficulty in accessing health services. The recommended treatment for malaria is Artemether-Lumefantrine (20/120) combination tablet (Coartem™). In case of suspected malaria, take 4 tablets per day at once during three consecutive days.

### Other precautions

To consider for teams

- Medical kits, including chlorine tablets for water purification or water filter.
- Post-exposure prophylaxis (PEP) kit
- Surgical masks and gloves
- Mosquito nets and mosquito repellent.
- Food and water: given that there will be an extreme shortage of basic food and drinking water.

# 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
- 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 under five years old**

- Cough or difficulty breathing and
- Breathing 50 or more times per minute for infants aged 2 months to 1 year
- Breathing 40 or more times per minute for children aged 1 to 5 years and
- No chest indrawing, no stridor, no general danger signs.

Note: 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) - interim recommended case definition**

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

To confirm a case of measles:

- Presence of measles-specific IgM antibodies.

## **Meningitis**

### **Suspected case**

- Sudden onset of fever ( $>38.5$  °C) with stiff neck.
- In patients aged  $<12$  months, a suspected case of meningitis occurs when fever is accompanied by a bulging fontanelle.

### **Probable case of bacterial meningitis**

- Suspected case of acute meningitis, as defined above, with turbid cerebrospinal fluid.

### **Probable case of meningococcal meningitis**

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

### **Confirmed case of meningococcal meningitis**

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

## **Tetanus**

### **Adult tetanus**

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

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

### **Neonatal tetanus**

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

## **Unexplained Fever**

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

### **Unexplained cluster of health events**

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