Basic Concepts and Current Challenges of Public Health in Humanitarian Action

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1 Introduction

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1.1 General Concepts and Approaches

A disaster is commonly defined as 'a serious disruption of the functioning of a society, causing widespread human, material, or environmental losses, which exceed the ability of the affected society to cope using its own resources'.[1]

This definition, by the United Nations Office for Disaster Risk Reduction (UNISDR) disaggregates the concept of disaster into three aspects: the event (disruption), the impact (losses) and the response (cope) and thereby lays the foundation for analysing what can be done to address each aspect, reducing risk. It is also the definition currently used by the World Health Organization (WHO). More recently, UNISDR has defined disaster as

> a serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts.[2]

The annotation to this definition provides:

> The effect may test or exceed the capacity of a community or society to cope using its own resources, and therefore may require assistance from external sources, which could include neighbouring jurisdictions, or those at the national or international levels.[3]

This definition opens up for further analysis, for example moving away from a blanket assumption that the community or society cannot cope.

The literature often refers to 'natural' vs 'man-made' disasters. This categorisation is not consistently applied, but the term 'natural' disaster is often used to refer to earthquakes or hurricanes and sometimes droughts, epidemics and technological disasters, whereas 'man-made' disasters often refer to armed conflict. This approach is increasingly criticised as many 'natural' disasters are influenced by human action (for example, deforestation leading to mud slides or, conversely, strict building codes limiting the damage caused by earthquakes). Disaster management focuses more and more on societal factors that influence risk and vulnerability in order to identify measures for disaster risk reduction.

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[1] WHO, Health Action in Crisis – definitions, http://www.who.int/hac/about/definitions/en/ (accessed 2017.03.08).

[2] United Nations Office for Disaster Risk Reduction (UNISDR), Terminology on Disaster Risk Reduction, http://www.unisdr.org/we/inform/terminology (accessed 10.03.2017).

[3] *Ibid*.

Rather than categorising a disaster as either man-made or natural, it is perhaps more relevant to identify whether or not it involves armed conflict as this is more significant for its root causes, impact, as well as what response would be appropriate. Thus, a complex (political) emergency is commonly defined as 'a situation with complex social, political and economic origins which involves the breakdown of state structures, the disputed legitimacy of host authorities, the abuse of human rights and possibly armed conflict, that creates humanitarian needs'.[4] The term 'is generally used to differentiate humanitarian needs arising from conflict and instability from those that are the result of natural disaster'.[5]

The terms 'disaster', 'complex emergency', 'humanitarian crisis' and many others are at times applied rather inconsistently. Here, we will use the initial definition of 'disaster' as an umbrella working definition for the type of scenario in which public health measures come into play.

Another term that has come into use over the last decade is that of 'fragile states', sometimes referred to as 'failed states', 'fragile situations' or 'chronic disasters'. There is no agreed definition of the term (or indeed that the term refers to a whole nation State), but there is some agreement on its fundamental characteristics. Thus, the World Bank notes:

> State policies and institutions are weak in these countries, making them vulnerable in their capacity to deliver services to their citizens, to control corruption, or to provide for sufficient voice and accountability. They face risks of conflict and political instability [. . . and] (t)wo billion people live in countries where development outcomes are affected by fragility, conflict and violence.[6]

In such situations, health systems are challenged, making it more difficult to prevent or respond to disasters, including 'natural' disasters such as epidemics. In parallel, the term 'resilience' has appeared. The UNISDR defines it as

> [t]he ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions [. . .].[7]

To build resilience, it is important to understand the societal conditions that may turn a hazard into a disaster. 'Humanitarian Action' is based on the concept of 'disaster' as defined above, namely that the society concerned cannot cope with the impact of a hazardous event and therefore needs external assistance. The vulnerability or coping capacity of the affected society—whether it is more or less fragile,

[4] WHO, Health Action in Crisis – Definitions, referring to a definition by ALNAP, http://www.who.int/hac/about/definitions/en/ (accessed 10.03.2017).

[5] *Ibid*.

[6] World Bank (2005), p. v, http://documents.worldbank.org/curated/en/907971468327613700/pdf/34790.pdf.

[7] UNISDR, Terminology on Disaster Risk Reduction, http://www.unisdr.org/we/inform/terminology (accessed 10.03.2017).

more or less resilient—is central to deciding whether humanitarian action is indeed necessary and what form it should take.

It also leads to one of the key challenges of humanitarian action: how a large number of external humanitarian actors should coordinate their actions. A new epoch in international humanitarian action began with the adoption by the United Nations General Assembly of Resolution 46/182 to strengthen coordination of humanitarian emergency assistance. The resolution provides that 'humanitarian assistance should be provided with the consent of the affected country and in principle on the basis of an appeal by the affected country'[8] and that '[i]nter-governmental and non-governmental organizations working impartially and with strictly humanitarian motives should continue to make a significant contribution in supplementing national efforts'.[9]

In practice, local authorities may be temporarily unable to coordinate the flow of external assistance, and it remains a contentious issue. Over the last two to three decades, a great amount of effort has been put into the harmonisation of approaches. This section therefore frequently refers to widely used standards of the so-called Sphere Project and the guidelines of the Inter Agency Standing Committee (IASC).

The WHO defines 'health' as 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity'[10] and public health as '[t]he science and art of promoting health, preventing disease, and prolonging life through the organized efforts of society'.[11]

Public health in humanitarian action (PHHA) builds on these definitions, addressing both preventive and curative measures and both determinants of health, such as nutrition, water, sanitation and hygiene promotion (WaSH) or environmental health, as well as essential health services, such as treatment of injury, control of communicable and non-communicable diseases, and also mental health. Measures such as these, which seek to meet basic needs, are often referred to as 'relief'. In emergencies, human rights abuses that jeopardise life in dignity (for example, gender-based violence) also become public health concerns. Measures to address these issues are usually grouped under the term 'protection'.

There is broad agreement that the overall objective of PHHA, at least in the acute phases of emergency response, is to prevent excess mortality and morbidity and assist those affected by disaster to lead lives in dignity. Mortality is seen as a key measure to analyse how an emergency is evolving.[12] This overall focus on mortality is informed by the dramatic increase in mortality levels that have been observed in

[8]UN General Assembly, 78th Plenary meeting (1991), Strengthening of the coordination of humanitarian emergency assistance of the United Nations, A/RES/46/182, para. 3.

[9]*Id*, para. 5.

[10]WHO (1948): http://www.who.int/governance/eb/who_constitution_en.pdf.

[11]WHO (1998), p. 3 (adapted from the Acheson Report, London, 1988), http://www.who.int/healthpromotion/about/HPR%20Glossary%201998.pdf.

[12]The Sphere Project (2011).

the past, rising to 40–50 times the normal level among refugees, for example those fleeing the Rwandan genocide.[13]

To quantify *excess mortality and morbidity*, the usual approach is to estimate pre-disaster mortality/morbidity levels (for protracted emergencies, sometimes the mortality rate in neighbouring countries is used as a proxy) to arrive at a *baseline mortality*. This is then compared with levels observed during the emergency, to determine *excess mortality*.

The metrics most commonly used to assess mortality are mortality in the overall population and mortality in children under five since, in emergencies, children under five have seen some of the greatest levels of excess mortality.

The threshold level for classifying a situation as an Acute Public Health Emergency (APHE) is often set at levels exceeding one death/10,000 people/day or two deaths of children under five/10,000 children under five/day. These levels were suggested in 1990, when they represented a doubling of baseline levels of mortality in developing countries. Since then, mortality levels have declined. Therefore, some standards such as those of the Sphere Project suggest that the threshold level should also be reduced and be calculated for each emergency as a doubling of the relevant baseline level of mortality.[14]

The standard levels are probably best applied as a way to focus surveillance attention on excess mortality rather than as a fixed level, and they may not be equally relevant for all emergencies.

Even in calmer times, resources are rarely sufficient to meet public health needs, and usually, the response must be prioritised, according to which factors cause the greatest amount of harm, and where a response can do the most to prevent such harm. In disasters, prioritisation becomes especially relevant as health problems may grow rapidly at the same time as local resources to deal with them may be decimated.

Prioritisation is in principle based on risk analysis. Risk analysis is utilised in many fields, but here we will refer to one form of *risk equation* adapted to public health[15]:

$$R = H \times E \times V/C$$

where R signifies risk (for example, the risk of excess deaths due to measles), H signifies hazard (for example, the likelihood and extent of a measles epidemic), E signifies exposure (for example, crowded conditions in refugee camps, leading to higher exposure), V signifies vulnerability (for example, malnutrition, which greatly increases case fatality) and C signifies coping capacity (for example, due

[13]Checchi and Roberts (2005); Toole and Waldman (1990), pp. 3296–3302; Salama et al. (2004), pp. 1801–1813.

[14]Checchi and Roberts (2005); Toole and Waldman (1990), pp. 3296–3302; The Sphere Project (2011).

[15]Boudreau (2009), p. 30; Johns Hopkins and IFRC (2008).

The former source refers to $R = H \times V/C$ whereas the latter source adds E to the equation.

to vaccination). It should be noted that the intention is not to give a mathematically precise formula, but rather an interrelationship.

Prioritisation has developed over time based on experience. Médecins Sans Frontières (MSF) proposed an early listing in 1997, which included 10 actions, such as assessment and measles vaccination. The listing of what to include as priority public health measures has evolved over time. For example, reproductive health issues, or mental health and psychosocial support, have now been included, and most recently, non-communicable diseases are beginning to receive attention.[16] Here, we will follow the listings as given in the Sphere Handbook.

Within many essential health services, detailed guidelines have been developed, with a view to harmonising approaches, notably by the IASC and the Sphere Project.

The time factor is significant in disasters, influencing both the human impact and the appropriate response. Disasters range from 'sudden-onset' (sometimes referred to as 'rapid-onset') events such as earthquakes, which may last seconds, to slow-onset or chronic situations such as droughts, or protracted armed conflict, which may last years or decades.

Over time, frequent reference has been made to the 'disaster cycle' (Fig. 1), reflecting a basic concept of societies shifting between times of what is often termed 'normalcy' and sudden or slow-onset disaster. This cycle is reflected in disaster management: urgent response to the onset of a sudden or slow-onset disaster (for example, surgery), transits into recovery assistance activities (for example, rehabilitation from surgery), mitigation and prevention during non-disaster phases (for

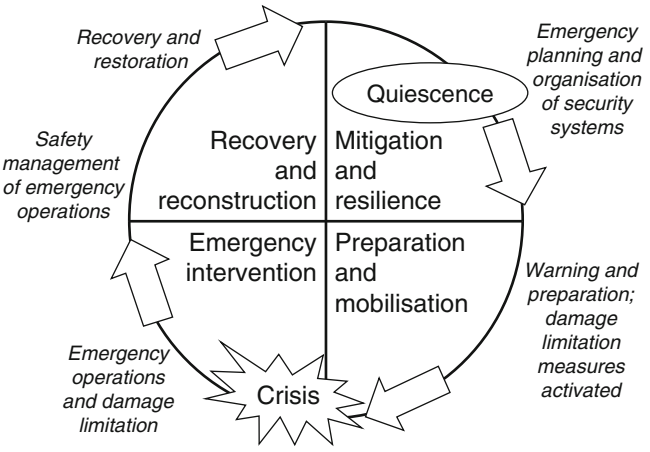

Fig. 1 The disaster cycle. Reproduced by kind permission of the publisher from D.E. Alexander, How to write an Emergency Plan (Dunedin Academic Press, Edinburgh, 2016)

[16]Toole and Waldman (1990), pp. 3296–3302; The Sphere Project (2011); MSF (1997), pp. 43–54; Demaio et al. (2013).

example, improving building codes and practices) and, lastly, preparedness and surveillance (for example, mapping the location of disabled persons who may need assistance in case of an earthquake) in view of coming or impending disasters.

The concept of the disaster cycle has been widely used over the last 30–40 years, with scholars debating its origin. The concept has been challenged since it may provide a somewhat simplistic and sequential impression of the stages of a disaster. However, it remains an important analytical framework.

Disaster preparedness is essential, if quick and effective action is to be taken. Yet disasters are very diverse and often develop in unpredictable ways. Therefore, preparedness is often based on an *all-hazards approach*, with certain standard elements in place, which can then be adjusted as the emergency unfolds.

Decisions must be taken very quickly, often based on incomplete information. Therefore, situation assessment and information management are essential, both at the stage of initial rapid assessment (IRA) and throughout the later process. This includes establishing key demographic and epidemiological indicators.

To strengthen preparedness, a practical PHHA approach is to develop standard preparedness elements based on past experience. One example is the Interagency Emergency Health Kit (IEHK), an agreed list of medicines, pre-packaged and sometimes pre-positioned. The kit is intended to serve 10,000 people for 3 months, at either community, regional or referral clinic/hospital level, based on a standard demographic composition. As information about the specific situation is collected and analysed, such elements can be flexibly deployed and adjusted over time.

1.2 Challenges, Dilemmas, Dos and Don'ts

A central challenge of humanitarian action is to establish its overall goal and level of ambition. During acute phases of an emergency, the stated objective is a return to *normalcy*. During times of recovery, and especially in mitigation or development phases, the objective may be to 'build back better', reducing vulnerability and increasing coping capacity of populations and their health systems in a sustainable manner. The objective of disaster response is to return to normalcy, whereas the objective of mitigation/development may be to change that *normalcy*.

This simple point can be contentious. For example, should a targeted emergency feeding programme aim to give beneficiaries' perfect nutritional levels if the surrounding population has high levels of malnutrition and yet receives no aid? Should an emergency health programme provide services free of cost or subsidise construction of latrines if the surrounding population has to pay for services or receives no subsidies, in accordance with governmental policy? Should humanitarian action address only injury due to an earthquake or also life-threatening injury from traffic accidents, or should they also advocate for a change in building codes to prevent future injury?

This is an eternal and real dilemma. Global frameworks have arguably paid too little attention to the interaction between humanitarian and development assistance, as well as how to facilitate early recovery. The new UN Sustainable Development Goals

adopted by the UN General Assembly in September 2015[17] repeatedly refer to the importance of resilience to natural disasters, which may increase attention. The Sendai Framework for Disaster Risk Reduction, adopted in March 2015, also stresses the need for resilience and 'building back better', notably mentioning improved health not only as a goal in humanitarian response but also as a factor that increases resilience.[18]

Another challenge has been referred to above: how to balance between preparing for generic disasters and ensuring that the response is context specific and culturally suitable. Continual follow-up assessment of responses is essential to help navigate this dilemma.

Finally, one may question the overall focus of humanitarian action on saving lives. What about saving livelihoods?

2 Basic Demographic and Epidemiological Concepts

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Demography is the quantitative study of the structure (age, sex, location) of populations, changes therein (mortality, fertility, migration) and the determinants and consequences of these characteristics.

> Epidemiology is the study of the distribution and determinants of health-related states or events (including disease), and the application of this study to the control of diseases and other health problems.[19]

Given the overriding objective to prevent excess mortality, it is important to establish baseline levels. The two most important ones are as follows:

- *crude death rate (CDR)*: number of deaths per 1000 population (as of mid-year) per year (sometimes expressed as per cent, for example 1% of the population dying in any given year);
- *under-five mortality (U5M)*: proportion of children dying before the age of five, expressed per 1000 live births (sometimes as per cent, for example 10% of children under five dying before they reach their 5th birthday).

In emergencies, mortality levels can change dramatically within days. In such cases, recourse to yearly rates is insufficient, and emergency metrics have been established that are more time sensitive and simple to calculate:

- *crude mortality rate (CMR)*: deaths per 10,000 population per day;
- *under-five mortality rate (U5MR)*: deaths of children <5 per 10,000 children <5 per day.

[17]UN General Assembly Resolution, Transforming our world: the 2030 Agenda for Sustainable Development A/RES/70/1, http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1.

[18]UN, Sendai Framework for Disaster Risk Reduction 2015–2030, A/CONF.224/L.22015.

[19]WHO, Health Topics, Edpidemiology, http://www.who.int/topics/epidemiology/en/.

Comparing emergency and baseline metrics is simple for crude mortality. A CMR of 1/10,000 population per day translates into a CDR of 36.5/1000/year or 3.65%. Present global levels of mortality are around 10/1000 or 1% per year in most countries. Thus, the emergency level represents 3–4 times the baseline level in most countries.

As regards U5M, the comparison is more complicated and confusing. The emergency metric, U5MR, is a simple rate: a level of 2/10,000/day translates into a rate of 73/1000/year. If maintained over 5 years, this results in 36.5% of children dying before the age of five. For the baseline metric, U5M is a cumulative proportion. The global average stands at less than 5% of children dying before the age of five. As it is complicated to calculate U5M life expectancy, and unrealistic to do so in an emergency, the U5MR metric is useful, as long as it is not simply compared to U5M.

Other important concepts related to mortality and morbidity include the following.

Case Fatality, Sometimes Referred to as Case Fatality Rate (CFR) Proportion of people diagnosed with an illness who die from it. It is usually applied to acute, short-term illnesses such as cholera, which can be observed over a limited period. CFR varies greatly depending on the vulnerability of the population and the quality of response and is therefore a useful monitoring indicator. For example, case fatality to measles may be as high as 10–30% in malnourished children living in high-exposure refugee settings, whereas it may be 1% in well-nourished children with lower exposure.

Attack Rate Proportion of people who fall ill after a specified exposure. It is often expressed as a percentage (for example, 10% of the refugees in the camp were diagnosed with cholera during the most recent epidemic).

Case Definition Set of diagnostic criteria that must be fulfilled to identify a case of a particular disease. Case definitions can be based on clinical, laboratory, epidemiological or combined clinical and laboratory criteria. When a set of criteria is standardised for purposes of identifying a particular disease, it is referred to as a 'standard case definition'.

Proportional Mortality It refers to the proportion of all deaths due to a specific cause.

Incidence It is the number of new cases of a disease during a specified period of time, divided by the population number at risk during that period.

Prevalence Number of existing cases of disease at a given point in time divided by the population at risk. The time period is chosen to fit the situation.

Ratio It is a comparison of two numbers, where the denominator and numerator do not necessarily refer to the same population (for example, *sex ratio* refers to the number of males per 100 females).

Rate Measure of the speed or frequency with which an event occurs within a defined population that is at risk in a defined time frame. The numerator refers to

the same population as the denominator (for example, U5MR refers to the number of deaths of children under five, divided by the number of children under five).[20]

Disability-Adjusted Life Years (DALYs) Sum of years of life lost (YLL) to premature mortality within a population and years lived with disability (YLD).[21] This metric was developed for the first 'global burden of disease' study, capturing not only fatalities but also years lived with disability.

Mortality and morbidity may be the most obvious metrics, but others are equally important. They include the following:

Crude Birth Rate (CBR) It refers to the number of live births per population of 1000 (mid-year) per year.

Children Different sources use different age groupings or do not indicate a precise age—for example, 'women and children' is a meaningless metric unless it is clear whether the age grouping refers to children aged 0–4 (under five), 0–17 (under 18) or something else. The Convention on the Rights of the Child is generally taken to refer to children as anyone aged under 18 (that is, minors).

Refugee is defined as a

> [P]erson who [. . .] owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion, is outside the country of his nationality, and is unable to or, owing to such fear, is unwilling to avail himself of the protection of that country or return there because there is a fear of persecution. . .. .[22]

Internally Displaced Persons (IDPs): these are

> [P]ersons or groups of persons who have been forced or obliged to flee or to leave their homes or places of habitual residence, in particular as a result of or in order to avoid the effects of armed conflict, situations of generalized violence, violations of human rights or natural or human-made disasters, and who have not crossed an internationally recognized State border.[23]

Household It refers to one or more persons living together who make common provision for food or other essentials.[24]

Health Facility Utilisation Rate It is the number of outpatient visits per year (may also be calculated for a shorter period).

Number of Consultations/Clinician/Day This pertains to the number of first-time or repeated visits per full-time equivalent clinician per day.

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[20] Checchi et al. (2007).

[21] WHO, Metrics: Disability-Adjusted Life Year (DALY), http://www.who.int/healthinfo/global_burden_disease/metrics_daly/en/.

[22] Art. 1 (A)(1)(2).Convention of 1951 relating to the Status of Refugees and its 1967 Protocol.

[23] Guiding Principles on Internal Displacement (E/CN.4/1998/53/Add.2), 1998, Principles and Scope.

[24] *Cf.* UN Statistics Division, http://unstats.un.org/unsd/demographic/sconcerns/fam/fammethods.htm#A1 (accessed 17 January 2017).

3 The Overall Human Impact of Emergencies

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3.1 Concepts and Baseline Situation

In 2015, the global population stood at about 7.4 billion. The annual number of deaths was approximately 55 million, resulting in a global crude death rate (CDR) of around 8/1000 or, in approximate terms, about 1%.[25] This rate is fairly constant across populations since higher-mortality populations also tend to be younger.

Out of those deaths, in 2015, around 20% were due to what is commonly referred to as 'group 1' diseases (communicable diseases, maternal/perinatal and nutritional disorders), 70% resulted from 'group 2' diseases (non-communicable diseases (NCDs), esp. cardiovascular disease, cancer, diabetes and chronic obstructive pulmonary disease (COPD)) and around 10% were due to a group 3 disease (injury).[26]

Several types of transition influence the evolution of these overall levels and the environment in which PHHA is delivered. The most important of these are as follows.

Demographic Transitions Populations in most countries are ageing and increasingly live in urban areas. Almost all future population growth will take place in urban areas of developing countries, and population will be of older ages.[27] This shift is a main contributor to the increase in NCDs.

Epidemiologic Transitions Most countries, including high-, middle- and low-income countries (HMLICs), have undergone a shift from group 1 to group 2 diseases as the main cause of death. This is due not only to the success of controlling group 1 diseases but also to increasing risk factors associated with ageing and urbanisation. A few decades ago, close to 20% of children died before the age of five, mostly from communicable diseases and malnutrition. Vaccination, antibiotics and improved nutrition and WaSH, as well as general development, have contributed to cutting the U5MR to less than 5%.

Disaster Transitions Many sources point to an observed, and/or expected, increase in the numbers of people affected by extreme weather, especially floods and storms.

[25]UN World Population Prospects, the 2015 Revision; http://esa.un.org/unpd/wpp/DataQuery//dataquery/ (accessed on 10 March 2017).

[26]Global Burden of Disease 2015 Mortality and Causes of Death Collaborators (2016), pp. 1459–1544.

[27]UN World Population Prospects 2015; http://esa.un.org/unpd/wpp/DataQuery//dataquery/ (accessed on 10 March 2017).

There is some variance in what pathways are identified as the cause of such increases—because the number of events has grown or because populations are increasingly concentrated in urban areas vulnerable to such events.[28] Seismic events (earthquakes, tsunamis) are still responsible for the largest number of deaths, but their prevalence seems to remain at a constant level.[29]

Observers also note a shift from international conflicts of defined duration to longer-term, low-intensity situations of violence, often in urban settlements, in *fragile* contexts, and with many involving non-State actors.[30] In recent years, several MICs, rather than LICs, have experienced large-scale emergencies and situations of conflict, with Iraq and Syria being prime examples.

Response Transitions Since 1991, the number of international actors in humanitarian assistance and funding has increased rapidly. Thus, in the aftermath of the 2010 earthquake in Haiti, several hundred international NGOs engaged in relief efforts. Funding has increased from less than 1% of official global development assistance (ODA) to around 10%, although shortfalls remain.[31] A combination of increasing concerns about security, as well as technological innovation, is leading to a rapidly changing role of web-based tools, in collecting information as well as in developing responses—what some observers have termed 'cyber-humanitarianism'.[32] There is also a move toward providing cash or vouchers rather than goods such as food because it is less demanding in terms of logistics and may prove less disruptive for local markets. Emerging donors, including the private sector, increase both the complexity and opportunities of humanitarian action. Transitions provide an increasingly complex image of how the emergency landscape is forecast to change and what the humanitarian consequences might be. The growing number of emergency and fragile situations, leading to population movements, poses major challenges. Lessons from situations such as the Ebola pandemic have added to the evidence base, including by providing one more example that the expressed goal of *involving* local communities has not succeeded,[33] yet is crucial for building resilience. This fact may heighten awareness that anthropological approaches may be useful—where not necessarily bringing in foreign anthropologists but building on local knowledge.[34]

[28]Véron and Golay (2015).

[29]IDMC (2014).

[30]Spiegel et al. (2010), pp. 341–345; IDMC/NRC/UNHCR (2015).

[31]Pan American Health Organization (PAHO) (2010) and Telford and Cosgrave (2006).

[32]OCHA (2012).

[33]ALNAP et al. (2015).

[34]WHO (2015a) and DuBois et al. (2015).

3.2 *Levels and Possible Pathways to Excess Mortality and Morbidity*

Emergencies can cause dramatic increases in mortality.[35] Historically, the big killers were starvation and epidemics, both of which claimed millions of lives. For example, the Spanish flu of 1918 is estimated to have killed 25–50 million people (more than World War I). Famine caused an estimated 20–40 million deaths in China between 1958 and 1961. Conflicts in the twentieth century (especially the two World Wars), are estimated to have claimed a total of 50–100 million lives.[36]

In recent decades, death tolls as a result of disasters are estimated to be lower than these historical levels. Some of the highest fatality numbers occurred during the Rwandan genocide (estimated to have caused 500,000–1,000,000 deaths) or starvation in the Democratic People's Republic of Korea in the mid-1990s (estimated to have resulted in similar numbers). Since 2000, the 2004 Indian Ocean tsunami and the earthquake in Haiti in 2010 are estimated to have caused 200–300,000 deaths each. The conflict in Syria was estimated to have caused around 200,000 deaths in 2014,[37] with newer numbers even higher, but also highly contested.

As horrendous as these numbers are, the one thing that may be encouraging is that recent death tolls are not as high as those seen in more distant history.

As is always the case in epidemiology, it is important to disaggregate these overall death tolls to help identify the pathways leading to excess mortality and morbidity, and ways in which to disrupt those pathways. The level and cause of any death toll are influenced by many variables. Below are some.

Type of Disaster Droughts may cause starvation, whereas injury is the main cause of death in earthquakes.[38] Historically, communicable diseases have caused especially high levels of death. There is growing recognition that this may change, at least where such diseases occur in the wake of natural disasters, as long as health systems remain in place and displacement is limited.[39]

Phase of Disaster Most deaths in the early phases of conflict are related to violence, whereas in later phases, for example after massive displacement, deaths due to communicable diseases may increase, as protective structures break down (for example, WaSH).[40]

Age/Sex After the 2005 tsunami hit Sri Lanka, one study indicated that children under five had the highest mortality, and females aged 20–40 had much higher

[35]Checchi and Roberts (2005); Toole and Waldman (1990), pp. 3296–3302.

[36]Alexander (2006), pp. 1–23.

[37]Price et al. (2014).

[38]Doocy et al. (2013), p. 36.

[39]The Sphere Project (2011); Guha-Sapir et al. (2007), pp. 1338–1341.

[40]Guha-Sapir et al. (2005).

mortality rates than males of the same age.[41] In LMICs, average female mortality has been found to be higher than male mortality in natural disasters. Average female mortality rates are often more elevated in natural disasters, while male mortality rates may be higher in armed conflict.[42] During the 2011 cholera epidemic in Haiti, men were dying at higher rates than women. This was interpreted to be due to men attending cholera treatment centres less frequently than women as men were ill informed about the symptoms of cholera, mistaking them for those of HIV.[43]

Battle/Non-battle Deaths One major challenge in calculating death tolls in armed conflict is to determine how many deaths are directly due to battle injury as opposed to deaths indirectly caused by conflict, especially group 1 causes such as malnutrition or disease. An oft-heard statement is that out of the total number of deaths that World War I caused, 90% concerned combatants and only 10% civilians, whereas the opposite is true for World War II. Although the origin and evidence base of this quote are difficult to trace, several recent studies do estimate levels of indirect deaths in conflict to be many times higher than direct battle deaths.[44]

Physical/Economic Environment Generally, LICs have higher death tolls than MHICs in otherwise similar disasters. Beyond the human impact, it should be noted that economic losses are higher for HICs in absolute terms but lower as a proportion of GDP.[45] Thus, the 2011 Japan and 2010 Haiti earthquakes caused approximately 16,000 and 200,000 deaths respectively, but Japan incurred $200 billion in damages compared to Haiti's $2 billion.

Resilience of Populations/Health Systems Sri Lanka experienced little post-tsunami mortality in 2005, despite warnings that epidemics should be expected. This has been attributed to a resilient health care system, a strong civil society and an educated population.[46] Health systems that are overwhelmed by one type of disaster (for example, Ebola), and where trust in the health system is low, may result in deterioration in health services for other areas, such as maternal health, as the population avoids seeking clinical care.[47]

Forced displacement is a major risk factor. In recent decades, refugee numbers gradually declined and stood at around 15 million, whereas the number of IDPs gradually increased to around 25 million.[48] However, the recent crisis in Syria has

[41]Tellier (2014), p. 22, http://www.acaps.org/search?search_query=demographic+profile&=%E2%9A%B2.

[42]*Ibid.*

[43]DG ECHO Thematic Policy Document no. 6: Gender – Different Needs, Adapted Assistance, July 2013, p. 6, http://ec.europa.eu/echo/files/policies/sectoral/gender_thematic_policy_document_en.pdf.

[44]Geneva Declaration Secretariat (2008), p. 174; Lacina and Gleditsch (2005), pp. 145–166.

[45]Wisner et al. (2004).

[46]Munasinghe (2007), pp. 9–11.

[47]Lyengar et al. (2015).

[48]UNHCR (2014), pp. 2–3.

led to about four million refugees and nine million IDPs (out of a total pre-conflict population of around 20 million). For 2015, this brings the global total of people forcibly displaced as a result of persecution, conflict, generalised violence or human rights violations to around 65 million. This is often misrepresented as being the greatest refugee crisis since World War II. The United Nations High Commissioner for Refugees (UNHCR) and the World Bank have published a correction to that misunderstanding: it is the largest number of refugees since the early 1990s, but with respect to IDPs, whose numbers are only estimated since 1989, the comparison cannot be made.[49] UNHCR identifies situations involving more than 25,000 refugees for more than 5 years as major protracted refugee situations.[50] Using this definition, nearly two-thirds of refugees in the world today—over six million people—are caught in protracted refugee situations. With displacement, life-sustaining coping capacities that populations have built up over centuries (food production, quality WaSH, shelter and family support) may disappear. Recent studies indicate that, within displaced populations, refugees generally have the best health indicators; IDPs have the worst, with those who have not fled conflict areas occupying an intermediate position. The interpretation is that refugees fall under the protection of organisations such as the UNHCR. Those remaining in their homes may still have access to some of the life-support mechanisms that they had before the conflict. However, IDPs often reside in areas where they have little means to support themselves but may indeed have fled because they are at odds with parties to the conflict, so that they cannot expect help.[51]

A group thus far receiving little attention is that of persons displaced by sudden or slow- onset *natural* disaster, including climate change. The terminology and definition are not clear. People concerned are sometimes referred to as '*climate* migrants', 'climigrants' or 'environmental refugees'. Given the difficulties in defining these groups, it is perhaps not surprising that there are as yet few estimates of their numbers. Recent studies estimate the number of people displaced by slow-onset natural disasters to have doubled over the last decades. Such populations are, to some extent, in a governance limbo—no convention or declaration or international organisation is devoted to their protection.[52]

Lastly, the issue of morbidity receives less attention than mortality. However, there is some development, for example, with the increased attention to mental health and psychosocial support, which may not cause death and yet cause major problems, not least in situations of protracted displacement. The 2015 Sendai Framework refers to the importance of chronic disease, maybe indicating increased

[49]World Bank/UNHCR (2016). Forcibly Displaced: Toward a development approach supporting refugees, the internally displaced, and their hosts ADVANCE EDITION. © 2016 International Bank for Reconstruction and Development/The World Bank 1818 H Street NW, Washington, DC 20433.

[50]UNHCR, EC/54/SC/CRP.14, paras. 3–5.

[51]CRED (2013), see p. 6 for a summary of the situation described above.

[52]DMC, Norwegian Refugee Council (2011).

attention by the international humanitarian community.[53] Attention to other chronic non-communicable diseases such as diabetes or heart disease has increased greatly since the beginning of the Syrian crisis, given that the affected population is higher income, as well as older and more urbanised than was the case in earlier crises, and therefore had higher levels of NDCs and also had received better treatment pre-crisis. The inclusion in the Sustainable Development Goals may also help focus attention.

3.3 Challenges, Dilemmas, Dos and Don'ts

Levels of mortality, morbidity and other health-related metrics are extremely difficult to estimate yet are often quoted with misleading precision. For example, excess deaths in the Democratic Republic of Congo are estimated at between 200,000 and over four million, depending on the method of determination used.[54]

Furthermore, the emphasis in recent decades has been on mortality. This chapter discusses public health in humanitarian action, so we can hardly suggest that the study of mortality is unimportant. However, other health metrics, including for morbidity (for example, DALYs), arguably deserve higher prominence than they receive today. Tackling root causes remains a challenge for preparedness.

4 Governance in Humanitarian Action

Andreas Kiaby and Siri Tellier

4.1 The Role of Governance in Humanitarian Action

What makes governance in humanitarian action different from governance in more stable times? To answer this question, let us return to the working definition of disaster, established in Sect. 1, which requires calling a situation a disaster when it is a hazardous event, when it has great impact and when it may be beyond the coping capacity of the society concerned. One major question follows from this definition: if a society is unable to cope with the disaster, what happens to the rules that have governed that society so far?

[53] UN, Sendai Framework for Disaster Risk Reduction 2015–2030, A/CONF.224/L.22015.

[54] Coghlan et al. (2006), pp. 44–51; Coghlan et al. (2009), pp. 88–96; Lambert and Lohle-Tart (2009), http://adrass.net/WordPress/wp-content/uploads/2010/09/Excess-Death-Toll-in-DRC-1998-2004-diffusion.pdf.

During crises, especially in times of conflict, questions abound: is there a legal obligation to provide aid to victims in need? If so, who must fulfil this obligation and according to which standard? To what extent is the State affected by disaster allowed to restrict or deny such help? What rules and principles govern external aid and interventions where the State is unwilling or unable to care for people within its territory? Can States intervene in another State to provide humanitarian support without that State's consent? How can the government cope not only with the disaster but with the international actors?

In peacetime, the obligations of a State during natural disasters towards the population on its territory are primarily regulated by national laws. This means that national laws also define the humanitarian response (sometimes referred to as disaster response law), including issues related to health care. These laws and policies may concern entitlement to free government health care, what is considered to be the right to abortion, qualifications required to practise medicine or rules governing the import of medication.

However, national laws may be at odds with States' international obligations, so that humanitarian operators must find a way to strike the right balance and ensure that every response contributes to the respect, protection and fulfilment of international obligations while considering national specificities.

A key human rights document concerning health care is the International Covenant on Economic, Social and Cultural Rights (ICESCR) of 1966. It establishes the right to health (Article 12) and binds signatory States to 'take steps, individually and through international assistance and cooperation' to achieve the full realisation of this right. This is a direct obligation on States parties to seek and provide international assistance in order to achieve human rights obligations related to health, food, education and shelter. Refusing to request and facilitate such assistance on an arbitrary basis and in times of crisis may, in fact, amount to a violation of human rights law.

There are several reasons why States choose to restrict international assistance during conflict. Security-related concerns, real or not, are among the main grounds. In some cases, denial of consent for humanitarian relief, or constraints imposed on the delivery of such, may even be part of a military strategy of starving the enemy or the civilian population. Another important constraint on humanitarian access is the growing perception over the past years that humanitarian aid has become more and more politicised.

The Geneva Conventions (GCs), the core of international humanitarian law (IHL), have been universally ratified, indicating consensus on the obligations of States to assist and protect their civilian populations against the effects of armed conflict and to grant impartial humanitarian actors access to conflict areas to deliver aid and relief (what is often referred to as 'humanitarian space').The obligation to ensure respect for the GCs means that all States must do everything in their power to end violations of IHL, for example by exercising their influence over their armed forces and by facilitating the delivery of impartial, neutral and independent humanitarian aid, such as health care services and medicine.

Other relevant IHL provisions relate to the respect and protection of humanitarian and medical relief personnel and objects and to the prohibition to use starvation of the civilian population as a method of warfare.

States have expressly recognised that impartial humanitarian organisations have an important role to play in addressing humanitarian needs. Public international law, including IHL, has over time recognised that humanitarian services cannot be regarded as either unlawful interference in domestic affairs of a State or as an unfriendly act. However, impartial efforts must be distinguished from so-called *humanitarian interventions* or actions related to the *responsibility to protect*, which are controversial and highly politicised concepts. Although IHL is relatively clear about the issue of access for humanitarian actors to conflict areas,[55] the reality is that access has to be negotiated on a daily, if not hourly, basis in many current conflicts, for example in Syria.

The humanitarian principles of neutrality, impartiality and independence are reflected in many different cultures and documents and codified particularly in the GCs and a number of UN Security Council and UN General Assembly Resolutions. They are widely cited as the basis for humanitarian action. Impartial action means that the greatest amount of aid is given to those with the greatest need without unlawful discrimination (such as on the basis of political affiliation or ethnicity).

In order to fulfil their mandate impartially, humanitarian organisations must be able to act independently of other interests, such as the priorities of their donors. To receive access to populations in need, organisation and their staff must be perceived as neutral, exemplified by the trust of all parties to the conflict and must refrain from becoming embroiled in controversies.

International refugee law and principles related to IDPs are also relevant where such populations are present. The Refugee Convention came into force in 1951 in the aftermath of World War II, with large populations of refugees.[56] The 1998 Guiding Principles on Internal Displacement were developed in response to the observations that conflicts were increasingly internal and of longer duration, resulting in large numbers of IDPs. However, the Guiding Principles are not yet legally binding.[57] In recent decades, a number of initiatives to protect specific populations are being created.[58]

[55]Arts. 23 GC IV and Art. 70(2) AP I.

[56]UNHCR (2011).

[57]Guiding Principles on Internal Displacement (E/CN.4/1998/53/Add.2), 1998, Principles and Scope.

[58]ICRC (2015), pp. 1–4.

4.2 Challenges, Dilemmas, Dos and Don'ts

Regardless of whether humanitarian relief is sanctioned by law and whether consent has been given or not, the ability to operate depends on the situation on the ground. You as a humanitarian actor are often confronted with practical questions. Do the militia members manning checkpoints trust and respect you? Do the local village chiefs consent to male medical staff providing medical treatment for women of the village? Do you feel your professional ethics dictate you to act in a manner that is not in accordance with national laws? The way actors in conflict perceive you and your actions will often be more crucial than the applicable laws.

Compliance with relevant international obligations is particularly challenging. What do you do when a State's national law is on your side but its rule of law is weak and no one seems to comply? Often, negotiation skills and persuasion, using a mix of arguments drawing on law, religion and local culture may be more appropriate than reciting the GCs. Another dilemma lies in conflicts between humanitarian organisations' moral values and national laws, even where those laws do not violate international norms. For example, how would you react if you were a medical doctor faced with a victim of gang rape who wishes to have an abortion in a country where abortion is illegal under all circumstances, even to save the mother's life? How would you balance when to report and go public with your knowledge of massive human rights abuses with the risk of the government throwing you out of the country for publicly displaying its crimes? The targeting of medical staff shows that such questions are delicate to navigate in often hostile environments and that the humanitarian space is in jeopardy.[59]

5 International Coordination of Humanitarian Aid

Lars Peter Nissen and Siri Tellier

5.1 The Evolution of the International Humanitarian System

The idea that one should help people in need is central to many religions and cultures, but internationally organised humanitarian aid is a relatively recent development. It poses new dilemmas, with one of the most common being that it may be seen as interfering with the concept of national sovereignty.

The first major efforts to provide material assistance to victims of armed conflict were undertaken by the International Committee of the Red Cross (ICRC), founded

[59]ICRC (2011).

in 1863. It provided health care to injured soldiers on the battlefield who were considered *hors de combat*. As noted above, this was only possible because the States concerned had acceded to the GCs, providing the humanitarian space necessary for such action. Over the next decades, many humanitarian organisations emerged. Much later, in 1991, another game-changing milestone came, triggered by images of humanitarian workers handing loaves of bread to Kurdish refugees fleeing the First Gulf War. With the end of the Cold War in 1991 and new challenges looming, new possibilities for joint action seemed possible. UN General Assembly Resolution 46/182[60] called on the UN to take a more active role in coordinating international humanitarian assistance and established structures for the following:

- leadership (including what is now called the Emergency Relief Coordinator, heading the UN Office for Coordination of Humanitarian Action (OCHA));
- operational and technical coordination (including the already mentioned Inter-Agency Standing Committee (IASC)); and
- funding mechanisms (including what is now called the Central Emergency Response Fund (CERF) and the Consolidated Appeals Process (CAP)).

The IASC, as a coordinating body, includes UN organisations as well as well other major actors, including the Red Cross/Red Crescent Movement and several non-governmental organisations (NGOs), either as full members or standing invitees.

In response to the experiences gained over the last decades, the system has undergone major changes. Major inter-agency evaluations of the response to large-scale humanitarian crises such as the Rwandan genocide in 1994, the Indian Ocean tsunami of 2004, the 2010 earthquake in Haiti, and floods in Pakistan have all had an effect.

The 1994 Rwandan experience focused attention on the need to develop common operational standards and guidelines (for example, IASC guidelines, as well as the Sphere Project, which by now includes hundreds of NGOs, as well as Red Cross/Red Crescent members). In addition to harmonising approaches, such standards also provide a basis to hold humanitarian actors accountable. The Humanitarian Accountability Partnership is another effort at standardising Humanitarian Accountability and Quality Management.

In the wake of the response to the 2004 tsunami, which revealed major operational gaps, and taught humanitarians some severe lessons, a major humanitarian reform was initiated by the then UN Emergency Relief Coordinator, Jan Egeland. To meet the challenges, a *cluster* system was developed (see Part I, Chapter 6, Figure 2 of this textbook), which grouped organisations and assigned leadership duties. For example, WHO is the global lead of the *health cluster*, UNICEF leads WaSH and nutrition, UNHCR heads the protection cluster and UNHCR and IFRC co-lead the shelter cluster. Within clusters, certain organisations may be assigned to

[60]UN General Assembly, 78th Plenary meeting (1991), Strengthening of the coordination of humanitarian emergency assistance of the United Nations, A/RES/46/182, para. 3.

take on special roles: for example, the United Nations Population Fund (UNFPA) is the unofficial lead on reproductive health within the health cluster and on sexual and gender-based violence (SGBV) within the protection cluster. At the local level, operational leadership may also be transferred to another organisation if the global lead has limited capacity.

An increasing focus on local capacity, risk reduction and 'building back better' also fed into the 2005 Hyogo Framework of Action: Building the Resilience of Nations and Communities to Disasters and its follow-up—the 2015 Sendai Framework of Action on Disaster Risk Reduction. It focuses on the issue of health issues, not only as an effect of disasters but also to improve the disaster resilience of communities.

The 2010 earthquakes in Haiti and floods in Pakistan focused attention on the need for extraordinary effort in extraordinary situations, termed 'level 3 emergencies'. The 'transformative agenda' was adopted to try to meet this challenge, as well as to follow up on the humanitarian reform process in general. More recently, then UN Secretary General Ban Ki-moon convened a World Humanitarian Summit (WHS) to follow up on these developments. The WHS was held in Istanbul on 23–24 May 2016, with a focus on four themes:

- humanitarian effectiveness;
- reducing vulnerability and managing risk;
- transformation through innovation; and
- serving the needs of people in conflict.

If one were to point to the most concrete result of the conference, it might be the emphasis on *localisation*, which means that funding streams should increasingly be channelled through local organisations, to build capacity.

5.2 Challenges, Dilemmas, Dos and Don'ts

Coordination remains an area of enormous progress despite the equally enormous challenges that remain. Some of these will be explored in the coming sub-chapters, when we turn to operational issues. These include essential health services (for example, communicable disease control), protection (for example, with respect to sexual and gender-based violence), as well as determinants of health (for example, WaSH).

As mentioned above, in any disaster, prioritisation of actions is crucial. An early attempt at listing such priorities is MSF's *Refugee Health*[61] of 1997. The 2011 Sphere Handbook builds on this work, adding mental health, reproductive health, as well as the beginnings of issues related to non-communicable diseases, and emphasising health systems.

[61] MSF (1997), p. 174.

6 Assessing Humanitarian Needs

Jonas Torp Ohlsen and Siri Tellier

The importance of assessing humanitarian needs is underlined in several instruments. For example, Sphere Handbook core standard number 3 states that '[t]he priority needs of the disaster-affected population are identified through a systematic assessment of the context, risks to life with dignity and the capacity of the affected people and relevant authorities to respond'.[62] This point is reiterated in the Core Humanitarian Standard.[63] There are also a large number of guidelines, which detail the conduct of such assessments, both by content and organisation,[64] including the Multicluster/Sector Initial Rapid Assessment (MIRA).[65] This chapter reflects on the key recommendations of some of these instruments.

6.1 Why Assessments?

Disasters are by their nature chaotic and dynamic, the result of a change from a *normal* situation to an evolving crisis. Demographic and epidemiological data are central in order to assess both the baseline situation as well as the extent of the change caused by the disaster concerned. Information management is one of the most basic skills of humanitarian action.

Specifically, data from such assessments serve, among others, to

- guide operational responses; estimate the overall scale with regard to three dimensions: geography, sector and affected population group; assess needs; monitor progress, including performance, outcomes and impact;
- report to the outside world, advocate for appropriate intervention, raise funds, account for their utilisation; and
- inform security assessments.

Data are essential to give the basis for targeting and prioritisation. One of the most common challenges is that the parties concerned may question why aid is given to one group rather than another. Data can sometimes help to show that such choices are indeed *needs based* and thereby *impartial*.

[62]The Sphere Project (2011), Core Standard No. 3.

[63]Groupe URD HI (2014).

[64]Global Health Cluster Rapid Health Assessment Guidelines, 2007.

[65]IASC (2012).

6.2 When Should Assessments Take Place?

Assessment should be a continuous process, not a one-off event. Data are assembled

- *prior to a crisis*, globally (for example *rules of thumb* or *standard populations*, which can be used as a basis for global preparedness such as health kits) or locally (for example, early warning systems, surveillance);
- *in the first hours after conflict begins or disaster strikes*, before field data can be collected (for example, based on web-based secondary data to adjust global *standard populations* to the local situation and establish baselines);
- *in the first days after the event*: primary data collected in the field can be used as input for an initial rapid assessment; such assessments are often qualitative and not statistically significant;
- *over the next few weeks/months*: sector-specific surveys, including elaboration of statistically sophisticated quantitative data; Fig. 2 is a representation of this timeline.

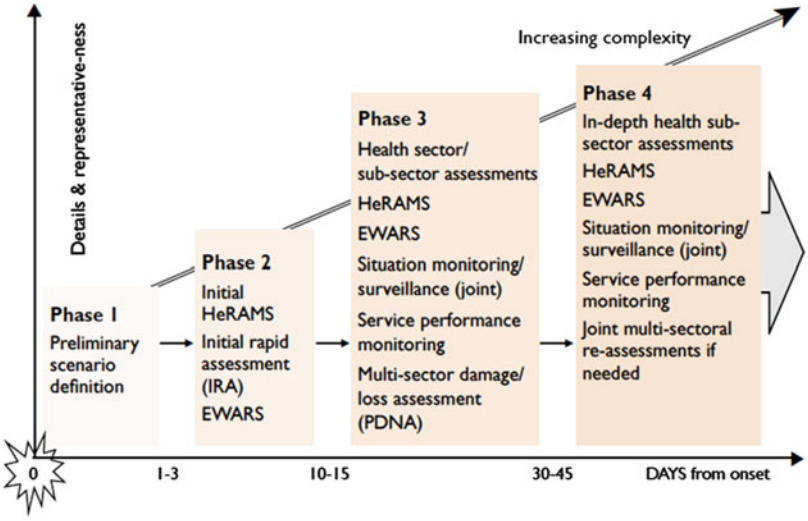

Fig. 2 Phases of data collection, analysis and planning following a major, sudden-onset crisis. Reprinted by kind permission of the WHO from WHO Health Cluster, Provisional Version, Chapter 3, Assessment and Health Situation Monitoring, p. 72, Copyright (2009), http://www.who.int/hac/network/global_health_cluster/chapter3.pdf?ua=1 (accessed on 14 April 2017)

6.3 Basic Principles of Data Assessment

Basic principles include the following, which are well known but inconsistently applied:

- *Do no harm* (do not collect data that hurt the respondent or enumerator).
- *Prioritise* (collect only the data that you need).
- *Adjust to a time frame*.
- *Triangulate* (collect data from different sources: compare them, distinguishing differences due to diverse methods from differences due to trends over time and place).
- *Be aware* of how data are presented to the population (empower people, do not cause panic).
- *Plan carefully* (think about what data and logistics are needed).
- *Coordinate* (do not duplicate what others have collected).

Additionally, as the Assessment Capacities Project (ACAPS) suggests, there are three important principles[66]:

- Know what you need to know. Collect only data which are needed.
- Make sense, not data. Don't collect new data if you can analyse existing data to get the answer you need.
- Don't be precisely right, be approximately right.

As Gilbert Burnham personally suggested to me once, in January 2010: 'public health is about making decisions on incomplete information'. Keeping this in mind, shortcuts and simplified ways of reaching useful data may need to be applied. Here, we emphasise collecting baseline data, including those available from the Internet, and this is for a reason. Local data are often of poor quality and difficult to access, and even more difficult and dangerous to collect *de novo*. For example, on average, about one-third of births and two-thirds of deaths are not adequately registered.

However, there has been an upsurge in high-quality big data available on the Internet. Those data are usually based on local sources but have been analysed and interpreted according to standard procedures, are easily available and sometimes less politically sensitive than local sources. We emphasise *high quality* sources—as is always the case for data, it is important to carefully choose the source, for example the UN and the CIA World Factbook may not be equally acceptable as a source, even if the data they present are the same.

[66]ACAPS Director, Lars Peter Nissen, MIT center for civic media, October 2012 http://civic.mit.edu/blog/mstem/talking-fast-at-crisismappers-the-ignite-talks, accessed 2017.03.11.

Table 1 Demographic profiles of five countries, 2010–2015

	Japan	Brazil	Niger	Afghanistan	Iran
Population, million	126	200	20	32	79
Total fertility rate	1.4	1.8	7.5	5	1.9
Crude birth rate, %	0.8	1.5	5	3.4	1.9
Crude death rate, %	1	0.7	1.3	0.8	0.5
Under 5 mort./1000	3	24	127	92	22
Mat. mort. ratio/100,000 live births	5	56	590	400	23
Children <5, % (aged 0–4)	4	7.5	22	15	9
Women of rep. age, % (15–49)	21	27	20	23	28
'Older' people, % (60+)	33	12	4	4	9

Developed by the authors, Siri Tellier and Jonas Torp Ohlsen, based on data from the United Nations. From World Populations Prospect: The 2012 Revision, Volume II: Demographic Profiles, by United Nations, Department of Economic and Social Affairs © 2013. Reprinted with the permission of the United Nations. http://esa.un.org/unpd/wpp/Publications/Files/WPP2012_Volume-II-Demographic-Profiles.pdf (accessed on 14 April 2017)

6.4 What/How: Demography

Priority humanitarian operational action as outlined above includes such relief measures as providing tents for households, measles vaccinations for children under 5/under 15, age-appropriate food distribution or providing birthing kits and emergency obstetric care for pregnant women. For each of these cases, it is important to determine the demographic composition of the population. Such data are also needed as a denominator for other rates, for example mortality. To determine the demographics at pre-crisis times, *standard populations*, such as those provided in the Sphere Handbook,[67] are widely used.

However, country demographic profiles may vary greatly. For an indication of possible ranges, see Table 1 for five country profiles for the period of 2010–2015.[68]

As a pre-crisis rule of thumb, CBRs are usually in the range of 1% for HICs, 2% for MICs and 4–5% for LICs. CDRs are more uniform around 1% (±0.5%). The percentage of children under five is generally approximately five times the CBR (for example, 5 × 1.5% = 7.5% for Brazil). Mortality rates are almost uniformly higher for males than for females, especially in the age group 0–4, and the proportion of women of reproductive age is 25% (±5%). Generally, there is little reason to use regional averages as even the demographic profiles of neighbouring countries can differ significantly (for example, Afghanistan and Iran in Table 1). When a crisis occurs, these rules of thumb may have to be refined within minutes, by producing a country-specific demographic profile from web-based data, as given above. Where humanitarian action moves into primary data collection, it may be

[67]The Sphere Project (2011).

[68]United Nations Department of Economic and Social Affairs' World Populations Prospect 2012, Volume II: Demographic Profiles, http://esa.un.org/unpd/wpp/Publications/Files/WPP2012_Volume-II-Demographic-Profiles.pdf.

sufficient to use an approximation of 20% of children aged 0–4 rather than conducting large-scale surveys, which may (or may not) arrive at slightly more precise numbers, but which may also leave out many respondents, and may not account for the fact that many people do not know their precise age.

Shortcuts and triangulation methods may be used to compensate for poor data quality, such as categorising any person shorter than 105–110 cm as under 5 years of age or estimating the number of deaths from the number of graves at the site. Some key methods and data references for a more detailed understanding of this matter can be found in the suggested reading section at the end of the public health part.

6.5 What/How: Epidemiology

As per the above-mentioned principles, before beginning the collection of primary data, available secondary data should be assembled. In the first weeks after a crisis, primary qualitative data may be useful if collected in a systematic manner, down to the anecdotal level. Primary quantitative data should preferably be statistically significant. Given the effort involved in collecting primary quantitative data, one should only set out to gather this type of data if all other data seem insufficient. When compiling data, preparation is crucial:

- Think through what data are needed—prepare dummy tables (draft final report).
- Pilot questionnaires and interview technique to ensure questions are understood and acceptable within the respective setting. Translate and back translate to ensure wording is accurate.
- Enumerators must be well trained—language skills are essential.
- Logistics as well as security considerations are key.

Qualitative methods include the following.

Health Walk Observe marketplaces, clinics, fields, pharmacies and note who visits them, what the prices are, whether markets are selling relief goods and get a feel for the current general atmosphere. You could use a systematic questionnaire (or simply take notes).

Focus Group Discussions Ensure that key populations with specific needs, who might otherwise not be heard, are included (for example, women).

In-depth Interviews with Key Informants These may include religious/community leaders, health staff, clients, private pharmacy owners, etc.

Rumour Management Collecting and assessing rumours is a recognised component of epidemiological intelligence. You may (carefully) establish it as part of your health information system, for example by asking health personnel and others to report *cases of acute*, *watery diarrhoea* (suspect cholera).

Quantitative methods, based on sampling (ideally statistically significant), are usually based on a statistical analysis of what the necessary sample size should be,

and the households (individuals) are chosen thereafter depending on the situation according to the following methods.[69]

Convenience Sampling Pick out any sample you find conveniently accessible. Such samples are unlikely to be representative.

Purposive Sampling Pick respondents from each of the groups you find most significant. They will often be outliers, for example the poorest group, orphans, etc. Again, these samples will not be representative but can provide you with important information.

Snowball Sampling Interview one person who can help you identify the next person of importance to your analysis. Again, this method will not lead to representative results.

Simple Random Sampling You can use this method if you know the population size and specific locations (for example, address, registry) so that you can select households randomly. However, this is rarely the case in crisis.

Systematic Sampling You know what you need, for example a 10% sample, and households are arranged in an orderly manner, for example tents or street numbers. You may pick the first household randomly (for example, choose a number between 1 and 10) and then interview every 10th household.

Multistage Cluster Sampling You know the overall population size, but households are not systematically numbered. Here, you would first subdivide into divisions and then into clusters and, lastly, randomly identify the needed number of households within each cluster.

Assessments should be ongoing, and you can feed data obtained by using the methods described above into a health information system to complement service data from health service points.

6.6 Challenges, Dilemmas, Dos and Don'ts

Despite the many existing guidelines on the importance of sharing and harmonising data, humanitarian organisations have generally not followed this advice. Instead, they produce a profusion of uncoordinated reports. There is also criticism that the data collected do often not focus sufficiently on the most pressing issues, for example injury after earthquakes.[70] One of the reasons often mentioned for the lack of coordination is that organisations try to keep data to themselves as prime data enhance their visibility, which in turn makes it easier to obtain funding. Several studies have examined the usefulness of assessment results and data gathering for the planning of operations. They found that agencies, to a certain extent, do not use their data very

[69] IFRC (2013) and MSF (2006).

[70] PAHO (2010).

well; that initial assessments (which are supposed to be prepared in the first 72 h) are often prepared very late; and that there is significant overlap between assessments.[71]

7 Cooperation with Local Health Systems

Jonas Torp Ohlsen and Siri Tellier

Despite the fact that local health systems may temporarily be unable to cope with the effects of humanitarian crises, it is a guiding principle of humanitarian action that international actors should closely cooperate with local health systems (and populations) wherever possible.

7.1 Concepts and Baseline Situation

The WHO has proposed to approach health systems based on the so-called six building blocks (see Fig. 3).

This approach suggests analysing health systems according to the following components.

Health Service Delivery Health services can be provided in various ways, for example via accessible and acceptable service delivery points, often arranged in a three-tier system. For example, there may be one primary service delivery point per

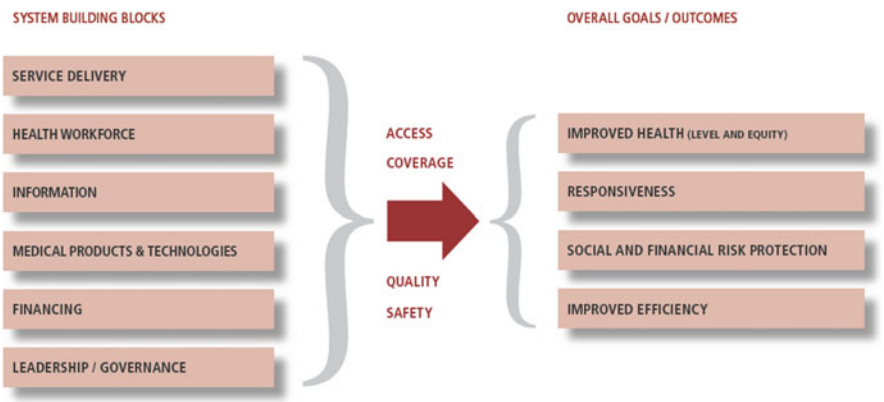

Fig. 3 The six building blocks of a health system: aims and desirable attributes. Reprinted by kind permission of the WHO from WHO, Everybody's Business: Strengthening Health Systems to Improve Health Outcomes. WHO's Framework for Action, Introduction, p. 3, Copyright (2007), http://www.who.int/healthsystems/strategy/everybodys_business.pdf (accessed on 14 April 2017)

[71] Olin and von Schreeb (2014) and Garfield et al. (2011).

population of 10,000; one secondary point per 50,000; and one tertiary/referral point for every population of 250,000.

Human Resources The health field is often regulated in terms of qualifications required to practise. In addition, in many countries, traditional health personnel (for example, traditional birth attendants—TBAs) are major providers, and need to be taken into account, even if they may not be part of the official health system.

Drugs and Medical Supplies These items are in principle regulated by essential drug lists, protocols for prescription or regulations for disposal of outdated drugs. In many States, private pharmacies are *de facto* not only the main source of drugs but also the most used health facility.

Health Financing In LICs, total health expenditure (THE) may be as low as 20 USD per capita per year, compared to 6000 USD in High HICs such as the US. Populations in LICs pay a higher-than-average proportion of THE out of their own pockets, and in some fragile contexts there is often almost no public, taxpayer-financed access to health services.

Health Information Management This may include health information systems (for example, service statistics), surveillance systems and research.

Leadership and Coordination Public health may be planned and regulated by governments or professional organisations.

7.2 Fragility and Resilience of Health Systems in Emergency Situations

In emergencies, the above components of any existing health system may no longer function because the physical infrastructure has been destroyed, because the health providers have been killed or displaced or because the supply of drugs is interrupted. Therefore, humanitarians should map the status of the components and seek ways to build on them wherever possible.

The temptation is often to build parallel systems, and that may indeed be necessary, but such systems make it more difficult to transit to post-emergency recovery. As mentioned above, many local regulations and legal frameworks will remain in force during an emergency and should be followed. The role of traditional healers as well as private pharmacies in the society concerned should be considered. The performance of a health system may be jeopardised when its capacity is swamped. The 2014 Ebola epidemic in West Africa negatively affected the utilisation of all other, non-Ebola-related health services, so that, for example, attendance at maternity clinics declined. To bridge the gap, mobile clinics were established to reach women unwilling to go to health clinics.[72] Some health systems

[72]Bolkan et al. (2014).

seem more resilient than others to the effects of disasters. For example, against all odds, the health system in Sri Lanka apparently continued to function after the 2004 tsunami.[73]

Finally, the sensitive topic of disposal of dead bodies can be a challenge for the health system. It is an important issue to tackle in a dignified manner, and, not least in the light of experience from the Ebola crisis, new guidelines refer exactly to safe and dignified burial. Although it may seem insensitive at first glance, we will refer to this question in sub-chapter 16 on 'waste management'.[74]

7.3 Challenges, Dilemmas, Dos and Don'ts

How should one engage with the local health system? Will engagement delay or jeopardise the quality of service delivery? In case of no engagement, what are the costs of building up a parallel system, possibly jeopardising local trust in the national health system?

How should one engage with local populations? One of the most frequently cited recommendations is to encourage community participation. Yet it is also one of the least followed,[75] with identified reasons being both that it will delay/hamper response and, at times, that it may jeopardise neutrality.

The recommendation to work with local health systems often poses a dilemma if one wants to maintain high standards and be perceived to be neutral. At times, local standards are of unacceptable technical or ethical level (for example, discriminatory). On the other hand, parallel systems may cause a drain of human resources from the existing system and have potential issues of sustainability, lack of competence building and problems of exit strategy. Jealousy may arise if the surrounding population is receiving less relief than the affected population.

Standards are not only an issue for national health systems. Foreign medical assistance staff does not always conform to optimal standards with respect to technical skills, knowledge of medical context or experience working in resource-limited situations. Sometimes too many and sometimes too few staff is deployed. There have been many attempts to rectify this with core humanitarian standards, and most recently the WHO has developed guidelines for foreign medical teams.[76] The same is true for medical products—at times, drugs have been dispatched that were inappropriate for the local situation, that were past their expiration date or with insufficient instructions (for example, not in the local language). The WHO inter-agency health kits are one attempt to overcome this challenge.

[73] Munasinghe (2007).
[74] WHO, PAHO, ICRC, IFRC (2006).
[75] ALNAP et al. (2015).
[76] WHO (2013).

Case in Point: Nepal—Please Send No More Dogs
Two weeks after the April 2015 earthquake, Nepal issued a plea to international organisations to stop sending search and rescue teams. So far, 76 teams, comprising some 2242 staff members and 135 trained dogs, had arrived and found 16 bodies.[77] The Nepalese Health Ministry also asked that no more international health staff be deployed since enough medical personnel were available. Any additional staff would have to undergo screening by the WHO.

8 Communicable Diseases and Outbreak Control

Jonas Torp Ohlsen and Siri Tellier

8.1 Concepts and Baseline Situation

Infectious diseases are caused by a pathogen (prion, virus, bacteria, fungus, parasite). The route of infection varies—for instance, directly from one individual to another (for example, measles), indirectly through a vector (for example, malaria) or through the soil (for example, tetanus). The terms 'contagious', 'communicable' and 'infectious' are at times used interchangeably. However, in the humanitarian action framework (such as the Sphere Project), it is more common to use the term 'communicable' disease (CD), which we shall also apply throughout this chapter.

Globally, deaths due to communicable disease have declined over the last two decades and now constitute less than 20% of total deaths.[78] Progress has been particularly rapid for children under five, who were historically the group with the highest death rates. The total number of deaths of children under five has dropped from 12.4 million in 1990 (U5M close to 20%) to less than 6 million in 2015 (U5M less than 5%).[79] The main killers of children used to be diarrhoeal diseases, measles and pneumonia, with under-nutrition being a contributing factor.

Improved nutrition, water and sanitation, increased levels of vaccination, as well as general improvements in living standards and health services, have reduced both the number of cases of these diseases and also their case fatality rates. The neonate age group of children has made the least progress, with pre-term birth and low birthweight remaining problematic, as they are linked to the more complex issues involved in antenatal and obstetric care.

[77]Thomsen (2015).

[78]Global Burden of Disease (GBD) 2015, Mortality and Causes of Death Collaborators (2016), pp. 1459–1544.

[79]UNICEF, Levels and Trends in Child Mortality – Report 2015, Report of the Inter-Agency Working Group on Child Mortality, http://www.childmortality.org/files_v20/download/igme%20report%202015_9_3%20lr%20web.pdf, p. 1.

8.2 *Pathways to Excess Mortality and Morbidity in Emergencies*

Not all emergencies result in outbreaks of CDs, but especially those involving conflict and/or displaced populations, risk poor WaSH, insufficient food, uncontrolled vectors, poor housing, crowding and poor access to health care. Thus, diseases may become more prevalent or reappear, including diarrhoeal diseases, measles, acute respiratory infections, as well as malaria,[80] with children under five at special risk. This chapter provides an overview of the most common CDs relevant to emergencies.

8.2.1 Measles

Baseline Global measles control has seen great progress in the last decades. The estimated number of deaths attributed to measles was at 134,000 in 2015, representing a 79% reduction from the 2000 levels. Globally, measles vaccination has increased from 73% to 85% in the same period.[81] There is wide variation in levels by country, but some are now close to levels often recommended (for example, the Sphere Handbook recommends 90–95%[82]). Particularly important is the improvement in nutritional levels as malnourished children have much higher case fatality than well-nourished children.[83] This, along with general improvements in health care and economic growth in low-income countries, helps explain the progress in measles mortality reduction.

Excess Risk Prevention and treatment of measles is often prioritised as it is one of the most infectious diseases known (spreading by air-borne droplets) and because displaced persons are at a higher risk of exposure (as a result of crowding), vulnerability (due to malnutrition) and lack of coping (restricted access to health care and vaccinations).[84]

Case Definition[85]*:*

- *clinical*: any person in whom a clinician suspects measles infection *or* any person with fever *and* a maculopapular rash (i.e., non-vesicular) *and* cough, coryza (i.e., runny nose or conjunctivitis, for example red eyes);
- *laboratory criteria for diagnosis*: presence of measles-specific IgM antibodies.

[80] Hershey et al. (2011).

[81] WHO Media Centre, Measles, http://www.who.int/mediacentre/factsheets/fs286/en/ (accessed on 10.03.2017).

[82] The Sphere Project (2011).

[83] *Ibid.*

[84] MSF (1997).

[85] WHO (2009).

Management and Outbreak Control Treatment of individual cases comprises general supportive care (fluid, nutrition), vitamin A (reduces mortality) and potentially antibiotics for secondary bacterial infections. Both pre-emptively and as outbreak control, vaccination coverage should be kept above 90%, with the target age group generally being 6 months to 5 years, potentially extending to 15 years based on outbreak analysis. This should include the distribution of vitamin A.[86]

8.2.2 Malaria

Baseline The global level of malaria deaths was estimated at around 429,000 in 2015,[87] a 29% decrease of mortality since 2000,[88] attributed to massive scaling up of measures such as insecticide-treated nets (ITNs) and treatment with artemisinin combination therapies (ACTs), also supported by the much wider availability of rapid diagnostic kits over the last decade. Malaria is concentrated in sub-Saharan Africa, where 92% of deaths occur. The majority of malaria deaths occur in children under 5 years of age.[89]

Excess Risk This includes displaced population,[90] poor environmental sanitation, children and pregnant women.[91]

Case Definition[92]*:*

- *uncomplicated malaria (species: P. falciparum, malaria, ovale, vivax)*: persons with fever or history of it within the last 48 h, with or without nausea, vomiting, diarrhoea, headache, back pain, chills, myalgia, where other obvious causes of fever have been excluded;
- *complicated malaria (species: P. falciparum)*: persons with fever and symptoms as for uncomplicated malaria but with associated signs of disorientation, loss of consciousness, convulsions, severe anaemia, jaundice, haemoglobinuria, spontaneous bleeding, pulmonary oedema, shock;
- *laboratory confirmation*: rapid test (often widely available) or microscopy.

Management and Outbreak Control This involves adequate antimalarial treatment, by mouth or injection according to severity. Transmission reduction includes

[86]MSF (2013).

[87]GBD 2015, Mortality and Causes of Death Collaborators (2016).

[88]*Ibid.*

[89]WHO (2016).

[90]Williams et al. (2013), p. 121.

[91]WHO Media Centre, Malaria, http://www.who.int/mediacentre/factsheets/fs094/en/ (accessed on 10 March 2017).

[92]WHO (2005).

insecticide-treated nets, vector control (environmental sanitation, indoor residual spraying, larviciding), active case finding in the community.

8.2.3 Cholera and Other Diarrhoeal Diseases

Baseline The total number of global deaths from diarrhoeal diseases has decreased from 1.7 million in 2005 to around 1.3 million in 2015,[93] generally attributed to improved WaSH and better treatment. With oral rehydration salts (ORS), CFR has been massively reduced.[94] Although many pathogens may cause diarrhoea, cholera (vibrio cholera) is of special concern in crises due to its potential for large outbreaks.

Case Definition[95]*:*

- *clinical*: in a cholera non-endemic area—a patient over five who develops severe dehydration or dies from acute watery diarrhoea; in a cholera endemic area—a patient aged 5 years or more who develops acute watery diarrhoea, with or without vomiting;
- *laboratory confirmation*: vibrio cholera 01 or 0139 isolated from patient with diarrhoea.

Protocol for Treatment Oral rehydration (ORS) or intravenous fluids according to severity. Antibiotics are of limited value for cholera but relevant for bloody diarrhoea (dysentery). Recent evidence may indicate a role for oral cholera vaccination in the prevention and management of outbreaks.[96]

8.2.4 Acute Respiratory Infections

Baseline Acute respiratory infections (ARIs) cover a vast spectrum from mild to life-threatening diseases. Many different pathogens may cause infection. Severe forms of the disease are often bacterial. Several ARI pathogens are preventable by vaccination.[97]

[93]GBD 2015, Mortality and Causes of Death Collaborators (2016).

[94]Munos et al. (2010), pp. i75–i87.

[95]WHO, Prevention and control of cholera outbreaks: WHO policy and recommendations, http://www.who.int/cholera/technical/prevention/control/en/index1.html. Accessed on 3 May 2017.

[96]Grandesso et al.(2014), pp. 1625–1635; Luquero et al. (2014), pp. 2111–2120.

[97]WHO/UNICEF (2015).

Excess Risk One comparative study shows high percentages of excess morbidity and mortality (20–35% proportional mortality), as well as case fatality (up to 30–35%), due to ARI in humanitarian settings.[98] However, drawing a valid comparison with baseline rates is difficult due to differences in definitions.[99]

Case Definition (for Childhood Pneumonia) Cough and/or difficulty breathing, with fast breathing and/or chest indrawings. If *danger signs* are present, this indicates severe disease.[100] It also includes any case of fever with cough and rapid breathing.

Protocol for Treatment Oral or injectable antibiotics according to severity; oxygen provision (scarce resource due to logistical challenges); rehydration, nutrition.[101] Active case finding and early referral are important.

8.2.5 Outbreak Preparedness and Control

Arguably, any emergency should be analysed to determine whether outbreaks are likely and to evaluate the response capacity of the health system.[102] An outbreak preparedness plan (general or disease specific) should be developed, available (for example, hard copy) and understood by involved parties. Training should be conducted, and it should contain the following:

- coordination/leadership (who, what role, when convened);
- case definitions and management protocols;
- list of contacts for reporting, testing—authorities/the WHO/reference labs;
- stocks of drugs, protective equipment—not necessarily vaccines if cold chain dependent; kits, for example diarrhoeal disease or haemorrhagic fever kits, are commonly stocked;
- plans for procurement of additional commodities;
- plans for isolation facilities; and
- materials for sampling and shipping of samples (in compliance with IATA rules).

Potential outbreaks can be identified by epidemiological surveillance, single-case alerts from health structures within the community or *rumour-checking*. Diseases with epidemic potential (measles, cholera, shigellosis, haemorrhagic fevers) require immediate reporting.[103]

Epidemiological investigations should include clarification of signs and symptoms (verbal autopsy for deceased persons), relevant sample taking and shipping to reference labs, investigations of potential exposure and mapping of cases in time

[98] Bellos et al. (2010).

[99] *Ibid.*

[100] WHO (2014), p. 19.

[101] MSF (2016), p. 71.

[102] The Sphere Project (2011) and WHO (2005).

[103] See *id.* at p. 319 for 10 key steps to investigate potential outbreaks of disease.

and space. Populations that may be at risk should be identified, and the potential scale of outbreak should be analysed.[104]

Outbreak control measures generally comprise the following:

- isolation and treatment of cases;
- proper management of dead bodies and medical waste;
- transmission/source reduction; often cross-sectional with a focus on WASH, environmental sanitation and vector control;
- vaccination campaigns where relevant (measles, consider for cholera);
- health promotion (HP) and community involvement, for example on general hygiene, disease-specific measures, active/early case finding;
- close epidemiological surveillance (using HIS) to characterise the outbreak and evaluate quality of care (CFR $< 1\%$ goal in cholera).

9 Reproductive Health, HIV/AIDS and Sexual and Gender-Based Violence

Wilma Doedens and Siri Tellier

9.1 Concepts

In 1994, the International Conference on Population and Development agreed on a concept of reproductive health referring to a state of complete physical, mental and social well-being related to the reproductive system throughout the life cycle. It includes the ability to go through pregnancy and deliver a healthy infant; the right to freely decide on the timing, number and spacing of children (including issues related to infertility); eliminating unsafe abortion; prevention and cure of sexually transmitted infections, including HIV/AIDS, as well as health in relation to sexuality. It is sometimes referred to as sexual and reproductive health and rights (SRHR). Given the sometimes contentious nature of SRHR, this consensus is important.

Concepts

Maternal mortality ratio (MMR): this refers to maternal deaths per 100,000 live births.

Neonatal (newborn) deaths: these are deaths during the first 28 days of life.

Skilled birth attendant (SBA): accredited health professionals trained in midwifery skills. SBAs are distinguished from traditional birth attendants (TBAs), often

[104] WHO (2012).

community members who traditionally support women in giving birth, irrespective of skills.

Emergency obstetric care (EmOC): this involves life-saving health care to prevent maternal and newborn mortality.[105]

Contraceptive prevalence: this pertains to the percentage of women aged 15–49, married or in union, who use, or whose partners use, any method of contraception.

Unmet need for family planning: this involves that proportion of women aged 15–49 years, married or in union, who report not wanting any more children or wanting to delay the birth of their next child for at least 2 years but who do not use any method of contraception.

Total demand for contraception: it is the sum of contraceptive prevalence and unmet need.

Infertility: it is a disease of the reproductive system defined by the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse (*infecundity*).

Traditional/modern means of contraception: traditional means of contraception include withdrawal or lactational amenorrhoea, whereas modern means refer to methods available at clinics or pharmacies, such as sterilisation, hormonal methods or intrauterine devices. All methods have failure rates, but given that modern methods have lower failure rates than traditional ones, the term 'effective methods' is often used as a synonym for 'modern'.

HIV/AIDS: it is short for human immunodeficiency virus/acquired immune deficiency syndrome. The majority of infections are sexually transmitted.

ART/HAART: it means anti-retroviral therapy and highly active ART.

Sexually transmitted infection (*STI)*: previously referred to as sexually transmitted disease (STD), the use of terminology has changed in recognition of the fact that many cases of STIs are asymptomatic, especially in women. Reproductive tract infections (RTIs) overlap with STIs but refer to the location rather than the manner of transmission.

Sexual and gender-based violence (SGBV): both the acronym and the definition of SGBV are not universally agreed on, including among UN organisations. Alternative acronyms currently in use include GBV (gender-based violence) or VaW (violence against women). Some actors object to the term 'gender' as it refers to socially ascribed roles, which they consider relativistic. IASC uses the term GBV. We refer to SGBV as we deem it the most inclusive term. It is taken to involve acts against another person that are based on socially ascribed gender roles, harmful, against that person's will, of a sexual, physical, traditional, socio-economic emotional or psychological nature.[106]

[105] UNFPA, Standards in emergency obstetric and newborn care, http://www.unfpa.org/resources/setting-standards-emergency-obstetric-and-newborn-care.

[106] Tellier (2016).

9.2 Baseline Situation

9.2.1 Maternal/Neonatal Health

One estimate puts the global number of maternal deaths in 2015 at 275,000, which represents a reduction of 44% compared to 1990.[107] The levels of maternal mortality demonstrate higher disparities within and among countries than almost any other health indicator, with 99% of deaths occurring in LMICs.[108] It is estimated that roughly up to 40% of women may develop complications during child birth, 15% of which may be life threatening.

Most studies show that around 70–80% of maternal deaths stem from direct obstetric conditions, such as post-partum haemorrhage (making up about a third of these deaths), hypertension/eclampsia, sepsis, abortion and miscarriage.[109] The remainder, indirect causes such as malaria, AIDS and heart disease, can aggravate pregnancy conditions. In addition to fatalities caused by complications, a far greater number of women experience morbidities, including fistula and uterine prolapse. Reproductive health includes the health of the newborn, and estimates assume that 2.6 million stillbirths and 2.7 million neonatal deaths occur every year.[110]

Up until the mid-1990s, the understanding was that risk factors for complications of childbirth were to a great extent predictable and that TBAs could be trained to provide pregnant women with the necessary care.

However, it is now assumed that the direct conditions mentioned above can develop unpredictably and suddenly and that any response requires a higher level of skills and clinical surroundings than TBAs are able to provide. Basic skilled EmOC is provided by skilled birth attendants who are trained to deal with complications through so-called signal functions.

These include administering drugs such as oxytocin (to contract the uterus to stop haemorrhage), antibiotics (to counter sepsis), magnesium sulphate (to counter convulsions caused by eclampsia), conducting interventions such as manual removal of the placenta, removal of retained products of conception, assisted vaginal delivery preferably with vacuum extractor (to assist in prolonged labour), as well as basic neonatal resuscitation care to assist newborn babies. Comprehensive EmOC is typically delivered in hospitals and includes these basic signal functions plus caesarean sections, safe blood transfusion and higher-level care for sick or low birthweight newborns. Complications can develop quickly (for example, haemorrhage can result in death in 1–2 h), and reliable transport and cost are key challenges, causing delays in seeking and obtaining health care.

[107] GBD 2015, Mortality and Causes of Death Collaborators (2016).

[108] Tellier (2016) and Say et al. (2014).

[109] Tellier (2016) and Say et al. (2014).

[110] Tellier (2016) and Say et al. (2014).

9.2.2 Contraception

The global contraceptive prevalence rate (CPR) among married or in-union women stood at 64% in 2015.[111] However, there is much disparity in CPR among and within countries, with a rate of 40% in least-developed countries and the lowest, in sub-Saharan Africa, at 24%.[112]

The methods used also vary significantly. Consider that, in Albania, most couples use traditional methods, whereas injectable hormonal methods are common in Uganda. In India, sterilisation is the most common form of contraception. Nevertheless, there is international consensus that approaches should focus on *unmet need*, that is, providing effective contraception to women who do not wish to become pregnant yet but are not using effective methods of contraception.

The issue of infertility has received relatively little attention at the global level. There are few comparable estimates, but levels for lifetime experience of clinical infertility as defined above generally hover around 16–26%.[113] This is true in both LICs and HICs, although the proportion of secondary infertility resulting from poor health care (for example, infections) is higher in LICs.[114]

9.2.3 STIs, HIV/AIDS and SGBV

Globally, the WHO estimates an annual incidence of 499 million new cases of treatable bacterial and protozoal STIs (syphilis, gonorrhoea, chlamydial genital infections and trichomoniasis).[115] In addition, millions are affected by mostly incurable viral infections. New HIV infections peaked at 3.1 million in 199 and decreased to 2.3 million in 2012.[116] AIDS-related deaths have dropped from 2.1 million in 2004 to 1.6 million in 2012.[117] Sub-Saharan Africa still has the highest levels for most indicators but has also seen the greatest levels of improvement, whereas other regions, such as Eastern Europe, still experience rising levels.[118]

The human papillomavirus (HPV) contributes to a large number of cases of cervical cancer every year, which result in 270,000 deaths.[119]

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[111] UN Population Division (2015), p. 1, http://www.un.org/en/development/desa/population/publications/pdf/family/trendsContraceptiveUse2015Report.pdf (accessed 10 March 2017).

[112] *Ibid.*

[113] Tellier and Obel (2015), http://www.globalhealthminders.dk/wp-content/uploads/2015/05/GHM-Infertility-Brief.pdf.

[114] Tellier (2016).

[115] *Ibid.*

[116] *Ibid.*

[117] *Ibid.*

[118] *Ibid.*

[119] *Ibid.*

An infection with one STI increases the risk of becoming infected with another due to higher exposure to risks, for example skin lesions providing easier transmission, and secretions with high levels of white blood cells. Risk factors for increased incidences of STIs/HIV include unprotected sex with multiple concurrent partners, drug use by injection, lack of infection prevention in health settings, as well as mother to child transmission.

Treatment of AIDs has changed radically over time as drugs and treatment strategies have become more effective and prices, including for antiretroviral treatment (AVR), decreased. ARV drugs have contributed to a reduction in transmission[120] since persons who are HIV positive but receive drugs transmit HIV at very low levels. Treatment is now also used to prevent HIV transmission after an act of unprotected intercourse or after occupational exposure.

Levels of SGBV are notoriously difficult to estimate. Recent global prevalence figures indicate that 35% of women worldwide have experienced either intimate partner violence or non-partner sexual violence in their lifetime widely among countries.[121] Risk factors for both becoming a perpetrator and/or a victim include lower levels of education, exposure to child maltreatment or experiences of family violence, harmful consumption of alcohol and drugs, attitudes accepting towards violence and gender inequality.

9.2.4 Excess Mortality/Morbidity

For maternal/neonatal mortality, one basic point concerns not what is different but what remains the same. At least during the first 9 months after an acute onset emergency, women continue to have babies more or less at the same rate as before, with similar need for EmOC. For example, in the case of Niger, one could expect a CBR of about 5%. Within an affected population of one million, there would be an average of 140 births per day, of which 15% would need EmOC, including a percentage of at least 5% requiring caesarian section. In addition, there may be increases in communicable disease outbreaks, for example cholera or hepatitis E, leading to miscarriages and foetal loss or malaria and malnutrition, causing anaemia, which increases the risk of death from post-partum haemorrhage.

Concerning STIs and HIV/AIDS, there is limited conclusive evidence to indicate an inevitable increase in emergencies. However, there are many risk factors, for example reduced access to health services, family disruption or displacement to a region with higher prevalence of HIV/AIDS.

As regards SGBV, reliable estimates are hard to obtain, partially because survivors/victims find it difficult or dangerous to report. For example, estimates for the 1994 Rwanda crisis state that between 100,000 and 250,000 women were

[120] *Ibid*.

[121] UN Women, Facts and Figures, http://www.unwomen.org/en/what-we-do/ending-violence-against-women/facts-and-figures (accessed on 20 February 2017).

raped. In Liberia, estimates are at 40,000 (1989–2003). Estimates of up to 60,000 rapes have been produced for the wars in Yugoslavia (1992–1995).[122]

Many risk factors leading to increases in SGBV in disasters, especially complex emergencies, have been identified. These situations can weaken protective societal institutions, such as police and health care, and issues including displacement and violence may disrupt the dynamics of communities or families that usually act as protective circles. All of these factors increase levels of domestic violence. Once people fall victim to SGBV, their impetus to seek help may be jeopardised due to fear of the offender and fear of stigma. Where livelihoods are destroyed, the likelihood of vulnerable persons entering the market for transactional sex also rises.[123]

9.3 Existing Approaches and Guidelines

Reproductive health is contentious, in particular where it touches on issues such as abortion and sexuality, including sexual orientation. More than most areas of health, it is closely related to both personal dignity and choice, as well as to physical health. Therefore, in humanitarian settings with multiple actors, the approach towards reproductive health has been influenced by human rights, with a strong component of both protection and relief. At the 1994 UN Conference on Population and Development in Cairo, all 179 attending States agreed by consensus on a definition of reproductive health. It is universally applicable as it is based on wording derived from the human rights framework, including the Convention on the Elimination of all Forms of Discrimination Against Women. Hence, it applies equally to refugees, internally displaced persons and others living in humanitarian settings.

The international community has increasingly focused on addressing the gravity of sexual violence in armed conflict. UN Security Council Resolutions 1325, 1820, 1888 and 1889 on Women, Peace and Security affirm the unique needs, perspectives and contributions of women and girls in conflict settings. For the first time in history, reproductive health was recognised at the Security Council level, with Resolution 1889 explicitly referencing the need to ensure women and girls access to reproductive health services and reproductive rights to achieve better socio-economic conditions in post-conflict situations.

[122]Vu et al. (2014), http://currents.plos.org/disasters/article/the-prevalence-of-sexual-violence-among-female-refugees-in-complex-humanitarian-emergencies-a-systematic-review-and-meta-analysis/; UN, UN outreach programme on genocide in Rwanda, http://www.un.org/en/preventgenocide/rwanda/about/bgsexualviolence.shtml.

[123]IASC (2005), p. 100, http://www.unhcr.org/453492294.pdf.

SRHR, and in particular SGBV, require a multi-sectoral integrated approach. Personnel from sectors such as protection, health, nutrition, WaSH, camp planning, education and community service all have an important role to play in the process.

Strategic and Operational Policy Given their contentious nature, SRHR are relative newcomers to the health services considered essential in emergencies. The issue was not included in the 1997 MSF listing of health priorities. In 1995, an Inter-agency Working Group (IAWG) with more than 100 members from UN and NGO circles was established, producing a field manual on RH in emergencies for testing in 1996 and a full-fledged version in 1999. An update was produced in 2010.[124] It is not a fully fledged IASC manual but remains a version for field review, reflecting its contentious nature, for example related to abortion. IASC for its part has also developed instruments, including successive versions of the HIV/AIDS guidelines[125] and SGBV guidelines.[126]

One of the RH Field Manual's central operational concepts is the Minimum Initial Service Package (MISP). The MISP is intended to be put in place as soon as possible during the first phases of an emergency, before any in-depth analysis of the local situation can take place. It prioritises the actions required to prevent excess mortality and morbidity in the first months of a crisis by setting out five objectives:

- *Ensure* that the health sector/cluster identifies an organisation and an RH officer to lead the implementation of the MISP.
- *Prevent and manage* the consequences of sexual violence (for example, improve security related to WaSH, take care of victims).
- *Reduce* HIV transmission: ensure safe blood transfusion practice, facilitate and enforce respect for standard (universal) precautions, make free condoms available.
- *Prevent* excess maternal and newborn morbidity and mortality: ensure availability of basic and comprehensive EmOC, including newborn care services; establish a referral system to higher-level care where needed; provide clean delivery kits to visibly pregnant women when access to a health facility is not possible.
- *Plan* for comprehensive RH services, integrated into primary health care (PHC), as the situation permits.

There has been a gradual shift in approaches over time. For example, in the 1990s, actors were reluctant to provide treatment for AIDS, given cost and complexity in providing continuity of care. As the costs of treatment decreased while simplicity of administering treatment increased, a 2007 UNHCR guideline proposed a decision tree that recommended initiating ART treatment in cases where funding was available for 12 months to train providers with adequate supervision and protocols, assure confidentiality and ensure access by host populations.[127]

[124] IASC (2010b).
[125] IASC (2010a).
[126] IASC (2005).
[127] UNHCR (2007), http://www.unhcr.org/uk/488495642.pdf.

Within the health cluster (headed by the WHO at the global level), UNFPA is often responsible for SRHR. Given that RH care is commodity dependent, 13 reproductive health kits have been developed by the IAWG and are managed by UNFPA to support the implementation of the MISP. These kits provide supplies for 3 months and target the community and primary health care level (with a population coverage of 10,000), health centre and hospital level (with a population coverage of 30,000) or referral hospitals (covering a population of 150,000). They are composed on the basis of a demographic/epidemiologic standard population (see sub-chapter 4 for average numbers):

- adult males: 20%;
- women of reproductive age (WRA): 25%;
- CBR: 4%;
- complicated abortions/pregnancy: 20%;
- vaginal tears/delivery: 15%;
- caesarean section: 20%;
- WRA using contraception: 15% (oral: 30%, injectables: 65%).

The kits can be ordered from UNFPA.[128] Dignity kits are provided by UNFPA under the protection cluster. They include menstrual hygiene materials, compiled for each setting, based on preliminary discussions with affected women and girls on menstrual protection practice.

Within the protection cluster, headed by UNHCR, UNFPA is responsible for SGBV. The multi-sectoral, survivor-centred programming approach to prevent and respond to SGBV includes camp design (for example, placement of latrines), protection systems for women and girls, making available medical services (emergency contraception, STI and HIV prevention), psychosocial support for survivors and informing the community of available services.

9.4 Challenges, Dilemmas, Dos and Don'ts

SRHR remains a sensitive issue. Experience tells that local authorities may not always be aware of existing international agreements on the topic. Therefore, humanitarian workers should familiarise themselves with global and national policies and instruments. Other lessons from implementation of the MISP include the following:

- Appointment of a strong, respected coordinator is essential. Roles and responsibilities must be clearly divided between humanitarian actors.
- Contraception is important—people use all available methods during an emergency.

[128] UNFPA (2011).

- Where abortion is legal, safe abortion care should be made available (abortion is only completely illegal in six States, but service providers may not know the law).[129]
- Syndromic diagnosis and treatment of STIs should be applied and provided without laboratory testing. Patients should receive a protocol presenting them with clinical symptoms and signs for an STI.
- Ensure that culturally appropriate menstrual protection materials (usually packed with other toiletries in *hygiene or dignity kits*) are distributed to women and girls.

Recent reviews of MISP implementation note increased awareness but also continuing logistical issues and delays in moving toward comprehensive RH programming.[130] Global policies, such as those laid down in UN Security Council Resolution 1325, are an important step but have been criticised for securitising and/or victimising women rather than empowering them.

10 Non-communicable Diseases

Siri Tellier

10.1 Concepts and Baseline Situation

Non-communicable diseases (NCDs) represent a wide range of illnesses, but this chapter refers to four particular NCDs. These are the focus of global consensus documents such as the WHO's Global Action Plan for the Prevention and Control of NCDs 2013–2020 and include cardiovascular diseases, diabetes (Type 2), cancers and chronic respiratory diseases. Besides their non-communicable nature (one cannot catch an NCD from another person, although there are exceptions), these four diseases also share four common, modifiable risk factors—tobacco use, physical inactivity, unhealthy diets and the harmful use of alcohol.

Baseline Mortality As mentioned in the introduction, major transitions in demography (ageing and urbanising populations) and in epidemiology (improved control of communicable diseases, maternal, perinatal and nutritional disorders), as well as the globalisation of food systems, have resulted in a worldwide shift in the burden of disease. Today, NCDs are responsible for 40 million deaths per year globally (or seven in every 10), ending far more lives than communicable diseases and other

[129]Tellier (2016).

[130]*Ibid*; Onyango et al. (2013), pp. 342–356; Chynoweth (2015).

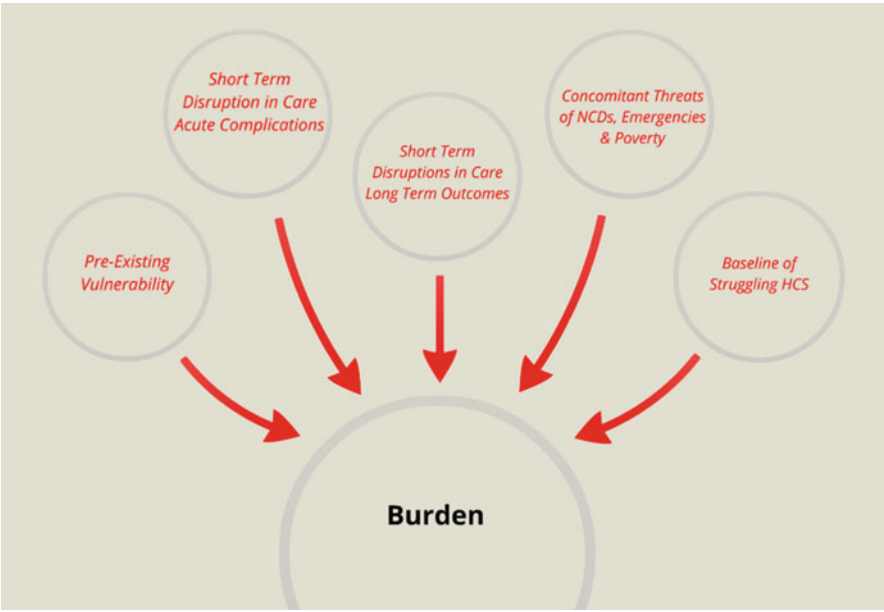

Fig. 4 Pathways to excess mortality and morbidity in emergencies. Developed by the author

factors.[131] The increase in NCDs began in HICs, associated with economic development, but is now also accelerating in LMICs where 87% of 'premature' deaths from NCDs already occur.[132] Therefore, the baseline epidemiology concerning any population in crisis will be different today from what it would have been just a few decades ago. As many recent disasters and population movements have occurred in MICs (such as Iraq or Syria) rather than in LICs, the rise and relevance of NCDs are becoming more prominent. In most situations, NCDs will require long-term care, in particular, at the primary care level. This care is not usually expensive and may cost just a few dollars a month per person but is critical to ensuring secondary prevention of further disease and associated complications.

Excess Mortality Several pathways to excess mortality in emergencies have been identified (see Fig. 4). Due to their chronic or long-term nature, NCDs often represent a unique demand on health systems, requiring consistent care over many years. Unlike more acute conditions, even short interruptions in decade-long treatments can lead to heightened levels of morbidity, sometimes with permanent impacts. Persons with an NCD may be more exposed to crises (for example, if they have mobility problems or, through associations with poverty, may be living in temporary or more vulnerable housing or suburbs), more susceptible to its effects (for example, persons with diabetes are at greater risk of injury developing into

[131] GBD 2015, Mortality and Causes of Death Collaborators (2016).
[132] *Ibid*.

gangrene) or less able to cope (for example, because of interruptions in their medications due to the crisis). Conditions in post-disaster situations may include higher exposure to risk factors (such as tobacco or alcohol use or marketing among displaced populations due to psychological stressors or a breakdown in legal frameworks, respectively) or longer-term consequences due to lack of treatment for communicable diseases (for, example untreated streptococcus infections leading to heart disease), malnutrition or nutritional treatment for malnutrition (for example, rapid nutritional rehabilitation with high-calorie nutritional supplements has been identified as a possible risk for longer-term obesity and diabetes). Maternal malnutrition may contribute to low birthweight babies, which again is a risk factor for later diabetes and heart disease.[133]

General Approaches NCDs generally received limited attention until the last decades. However, this is now changing. The WHO has developed a strategy to combat NCDs, and the UN General Assembly held a High-Level Meeting on the issue in 2011. The WHO created a Global Action Plan for the period from 2013 to 2020, as well as operational guidelines, such as the WHO package for essential non-communicable disease interventions in primary health care in resource-poor settings.[134] While the Millennium Development Goals (MDGs) make no mention of NCDs or their risk factors, the Sustainable Development Goals (SDGs) do.

Emergency Approach The response to NCDs in emergency situations is less advanced but is developing and changing rapidly. NCDs may not cause the quick increase in mortality, which could be expected from diseases such as cholera or measles. Further, since NCDs often are chronic, treatment in emergency situations is jeopardised for logistical and financial reasons, not least in mobile populations.

The 2011 version of the inter-agency emergency health kit did not include drugs related to NCDs, such as insulin,[135] and no IASC guideline on NCDs exists. However, both are under revision as this book went to print. Guidelines such as the 2011 Sphere Handbook include only a few references, which suggest ensuring continuation of drug treatment.

However, there is increasing attention to the fact that a more concerted approach needs to be found.[136] There is also attention towards the very real dilemmas related, for example, to prioritisation of cost.[137] There is further special focus on interaction with other priority areas, for example disability and ageing populations. Typhoon Haiyan, which struck the Philippines in 2013, and the long-term conflict in Syria have increased attention towards NCDS. The populations of both States received comparatively good health care and had a relatively high median age prior to their

[133]Demaio et al. (2013); Roberts et al. (2012), http://www.who.int/bulletin/volumes/90/1/11-098863/en/ (accessed on 31 January 2017).

[134]WHO (2010).

[135]WHO (2011b).

[136]Chan and Kim (2011), pp. 111–114.

[137]Spiegel et al. (2014), pp. 290–297.

respective natural disasters. The baseline situation and population thus had particular health vulnerabilities, where a large proportion of people were already receiving required treatment for NCDs.

According to a Health Access and Utilisation Survey published by UNHCR in October 2014, approximately 15% of Syrian refugees, aged 18 years or older, suffered from at least one chronic condition, and medical care was a major reason cited by refugees for returning to Syria, a trend that MSF studies have since confirmed.[138] Such an epidemiological context presents unique challenges for an emergency health response.

10.2 Challenges, Dilemmas, Dos and Don'ts

Increased attention towards people living with NCDs in emergencies is recent, and most challenges still lie ahead. There is limited high-quality evidence on epidemiology, beyond a few small-scale examples. There is also little consensus on strategic or operational guidelines, except a recommendation to avoid interruption of medication. Operational responses also require a substantial number of commodities and/or funding that are currently not made available for such undertakings. Lastly, logistical and cost-related challenges abound.

Some authors suggest using an approach that aims to integrate the treatment of NCDs into programmes to tackle other chronic, infectious diseases. That way, one could use some of the established decision trees, for example those for HIV/AIDS.

The important issue of treating host populations alongside those particularly affected by disaster poses ethical dilemmas, on which no consensus has yet been reached.

Nevertheless, there are positive signs. For example, the WHO has established and soon will update a framework of evidence-based *best buy* interventions for NCDs. These are cost-effective and easily implemented individual and population-based interventions designed to reduce risk factors and the overall burden of NCDs, and may be adaptable to emergencies. Several humanitarian organisations are seeing it as a priority to identify a realistic way forward.[139] The Sendai Framework in para 30(k) notably refers to chronic diseases, helping to open up discussion.[140]

[138]MSF (2014), http://www.doctorswithoutborders.org/news-stories/field-news/treating-chronic-diseases-among-syrian-refugees.

[139]WHO (2011a).

[140]UN, Sendai Framework, para. 30(k).

11 Mental Health and Psychosocial Support

Kevin Davies and Siri Tellier

11.1 Concepts and Baseline Situation

As mentioned above, the metric of disability-adjusted life years (DALYs), introduced in the 1990s,[141] captures not only fatalities but also years lived with disease. One of the most important effects of introducing the metric was that it drew attention to mental health problems, which do not necessarily kill but may cause major disability.

In 2010, mental and substance use disorders accounted for 7.4% of all DALYs worldwide and were the leading cause of YLDs worldwide. This percentage is made up of the following disorders: depressive disorders accounted for 40.5%, anxiety disorders for 14.6%, illicit drug use disorders for 10.9%, alcohol use disorders for 9.6%, schizophrenia for 7.4%, bipolar disorder for 7.0%, pervasive developmental disorders for 4.2%, childhood behavioural disorders for 3.4% and eating disorders for 1.2%.[142] Dementia, a similar disorder, was not included in the statistics. The burden of disorders increased by 37.6% between 1990 and 2010,[143] mostly driven by population growth and ageing. Although few deaths are attributed directly to such disorders (with the exception of self-harm), they do pose a significant challenge.[144] These figures have been been disputed on methodological grounds by some authors who argue that they "underestimate the burden of mental illness by more than a third" citation (Vigo et al. 2016).

11.2 Excess Mortality and Morbidity

The complete disruption of *normalcy* by a disaster can be expected to cause excess mortality and morbidity.[145] For example, consider that among Manhattan residents directly affected by the 9/11 attacks, high rates of probable post-traumatic stress disorder (PTSD) (7.5%) and major depression (9.7%) were diagnosed 1 month after the events.[146] Given that mental illness in emergencies may, to a large extent, constitute normal and reversible reactions to external events, various measures have

[141] WHO, Health Topics, Edpidemiology, http://www.who.int/topics/epidemiology/en/.

[142] WHO, Health Statistics, Estimates for 2000–2015, http://www.who.int/healthinfo/global_burden_disease/estimates/en/index2.html.

[143] Murray et al. (2012), pp. 2197–2223.

[144] Whiteford et al. (2013), pp. 1575–1586.

[145] Mollica et al. (2004), pp. 2058–2067.

[146] Galea et al. (2003), pp. 514–524.

been developed to assess the mental situation of victims. The simplified distress scale may serve as an example. It focuses on stress rather than disorder and incorporates a number of additive components[147]:

- events;
- disruption of daily functioning;
- reactions (for example, confusion, worry, fear); and
- symptoms.

The Global Burden of Disease Study brought increased attention to mental health. Yet, in LMICs, health systems devote a very low percentage of their already limited financial resources to MHPSS. In this regard, the 1990s saw a growing focus on psychological first aid.

The tsunami disaster of 2004 and subsequent events increased the international community's attention towards the issue.

The IASC guidelines of 2007 were an important achievement in bringing a coherent approach. They refer to 'mental health and psycho-social support' (MHPSS), explicitly including both specialised medical approaches as well as more basic support. The guidelines' *intervention pyramid* (see Fig. 5) provides several rules of thumb to assess the severity of problems, as well as the type of assistance needed, which has since been further developed.[148]

The intervention pyramid complements a model developed by Agger & Strang, emphasising factors that promote individual well-being and resilience (*Psycho-social wellbeing model*), going beyond the traditional focus of mortality and morbidity in disasters and highlighting the relationship between human capacity, social ecology/support system, as well as culture and values of the population at hand.[149]

It also builds on five evidence-based principles in MHPSS interventions identified by Hobfall et al., further supporting the well-being model, and areas for intervention in the immediate and mid-term phases of a post traumatic event: (1) promote safety, (2) promote calming, (3) promote self- and collective efficacy, (4) promote connectedness and (5) promote hope.[150]

Various rules of thumb estimate (very approximately) that around 10% of populations suffer from preexisting conditions that require clinical care, 20–40% have been exposed to aggravated situations (lack of protection/violence) and require paraprofessional care and 50–70% may be temporarily affected and in need of community/family support but return to normalcy once their basic needs are met.[151] In 2010, a follow-up assessment guideline was produced. MHPSS is

[147]IASC (2007), http://www.who.int/mental_health/emergencies/guidelines_iasc_mental_health_psychosocial_june_2007.pdf.

[148]*Id*., pp. 12–13.

[149]Strang and Ager (2003), pp. 2–12.

[150]Hobfoll (2009), pp. 229–243.

[151]IASC (2007), http://www.who.int/mental_health/emergencies/guidelines_iasc_mental_health_psychosocial_june_2007.pdf.

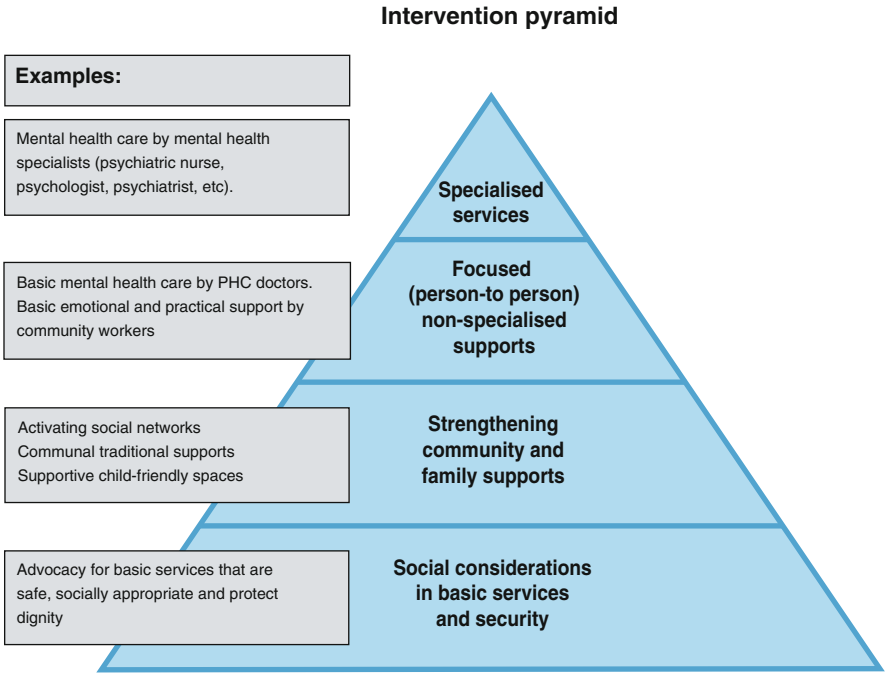

Fig. 5 Intervention pyramid. Reprinted by kind permission of the WHO from IASC Guidelines on Mental Health and Psychosocial Support in Humanitarian Emergencies. What Should Humanitarian Health Actors Know?, Introduction, p. 3, Copyright (2010), http://www.who.int/mental_health/emergencies/what_humanitarian_health_actors_should_know.pdf (accessed on 14 April 2017)

increasingly seen as a standard part of emergency response. The *emergency response units* of the IFRC in Haiti in 2010 may serve as an example.

11.3 Challenges, Dilemmas, Dos and Don'ts

Wessels et al. have analysed many MHPSS approaches to date and identified widespread violations of the 'do no harm' imperative in emergency contexts. Prominent issues include contextual insensitivity to issues such as security, humanitarian coordination and the inappropriate use of various methods; the use of an individualistic (Western) orientation that does not necessarily fit the context and culture of the populations affected; an excessive focus on deficits and victimhood that can undermine empowerment and resilience; the use of unsustainable, short-term approaches that breed dependency, create poorly trained psychosocial workers

and lack appropriate emphasis on prevention; and the general imposition of outsider approaches.[152]

A 2014 review of the guidelines credited them with assisting in creating an overall improvement in the quality of MHPSS response. However, many challenges remain, including inter-agency competition, lack of coordination and an imbalance in funding between the more clinical approaches positioned at the top level of the IASC pyramid, generally supported by the WHO and medical organisations, and more community and socially based interventions, often supported by organisations such as UNICEF/UNHCR. Lastly, it is problematic that external funding at times establishes systems that are not sustainable.[153]

12 Forms of Injury and Treatment

Dan Brun Petersen and Siri Tellier

12.1 Concepts and Baseline Situation

Concepts

Multiple casualty event: an incident in which the number of casualties overextend but do not overwhelm the health system. Priority is accorded to the most life-threatening cases.

Mass casualty event: an incident in which the number of casualties overwhelms the health system. Priority is accorded to treating people with the greatest chance of survival.

Triage: it is the process of categorising patients according to the severity of their injuries/illness, prioritising treatment by availability of resources and the patient's chances of survival.

Penetrating trauma or blunt trauma: it involves trauma (not) involving skin penetration.

First aid medical care for injury: it refers to the treatment of injury by way of non-operative functions, prior to transfer to a referral centre for more advanced functions, such as advanced surgery.

[152]Wessells (2009), pp. 842–854.

[153]IASC Reference Group on Mental Health and Psychosocial Support in Emergency Settings, Review of the Implementation of the IASC Guidelines on Mental Health and Psychosocial Support in Emergency Settings, 2014.

Baseline The variety of forms and methods of treatment highlight the challenge for PHHA actors to make decisions as to who should receive priority of medical attention where needs overstretch given capacities and how to augment these capacities in order to treat as many patients as possible.

The global burden of disease due to injury (group 3 diseases) makes up less than 10% of all deaths. This includes unintentional (3–4 million a year) as well as intentional deaths, the latter of which includes self-inflicted harm (about one million) interpersonal (about half a million) and collective violence (on average about 200,000 a year).[154] Injury due to exposure to the forces of nature accounted for another average of around 100,000 deaths over the last decade.[155]

Group 1 deaths (communicable disease, nutritional conditions, perinatal and maternal deaths) disproportionately affect children under the age of five. Group 2 (NCDs) mostly affect persons over 45. However, Group 3, intentional or unintentional injury, mostly affects young adults, especially males. For that group, they are the leading cause of death. Young males are the demographic group that has experienced the least improvement in mortality over the last decades,[156] and increasing urbanisation and motorisation could make it difficult to address this issue. The main immediate causes of death due to injury are damage to the central nervous system and substantial blood loss.

12.2 Excess Mortality and Morbidity: Levels and Pathways

The level and type of injury incurred vary according to the specific type of emergency and phase in which injury was suffered.

In rapid-onset natural disasters, such as earthquakes, fractures and crush syndrome are frequent. Crush syndrome occurs when muscle tissue is crushed, and the body subsequently attempts to rid itself of the waste products, flooding the kidney and causing renal failure. During droughts and heat waves, heat exhaustion and heat stroke contribute to excess mortality. Fatal hypothermia can be caused both by low temperatures and exposure to water. Volcanoes cause both burns and problems related to inhalation of fumes.

In conflict and post-conflict situations, mines and unexploded ordnance can result in both penetrating and blunt injury. This distinction is important with respect to the risk of infection. The time factor is particularly crucial in alleviating the consequences of injury: what is sometimes referred to as the ‘golden hour’ captures the fact that breakdowns of the central nervous system or respiratory failure may happen within minutes and massive bleedings within hours.

[154]GBD 2015, Mortality and Causes of Death Collaborators (2016).

[155]*Ibid*.

[156]Gillespie et al. (2014), pp. 1003–1017.

12.3 Approaches for Response

There is no single approach that encapsulates how to best respond to injury in emergency situations, although several organisations, such as the WHO,[157] have developed guidelines. As for other essential health services, in a rapidly changing and overwhelming emergency situation, continuing assessment of the seriousness of the situation and the capability to respond are crucial. Assessment involves making tough decisions: is the victim's condition life or limb threatening? Is it salvageable? Are resources and time available to conduct treatment? Should and could the case be referred?

Some assessment and triage tools are included in Advanced Trauma Life Support (ATLS), which builds on the main risk factors mentioned above. It is used to prioritise action for individual patients or patient populations, by following the ABCDE steps:

A:. Airway—if airways are blocked, remove the obstruction (for example, suction, tube).
B:. Breathing—if breathing is irregular, use ventilation, a tube, oxygen.
C:. Circulation—if there is massive bleeding, compress to control bleeding, use a tourniquet, provide IV fluids to restore circulating volume.
D:. Disability—immobilise to prevent injury (splint).
E:. Exposure—ensure that the patient is protected from hot/cold (blankets).

Throughout the procedure, treat wounds, provide tetanus vaccination if it has not already been done and provide pain killers.

In situations involving mass casualties, a system of prioritisation will often include categorising patients according to the following criteria:

T1 Red	(serious, treatable);
T2 Yellow	(less serious, can wait);
T3 Green	(not serious, must wait);
T4 Black	(life threatening but not salvageable).

12.4 Challenges, Dilemmas, Dos and Don'ts

Surgical teams can be geared towards treating combat injuries. However, the proportion of injury due to violence is relatively limited with many cases the result of emergencies such as natural disasters. Non-intentionally caused injury (for example, traffic accidents, obstetric) suffered outside conflict settings may increase and soon account for the majority of cases. Thus, surgical teams must adapt their

[157] WHO_HAC (2007).

priorities accordingly.[158] However, prioritisation efforts are hampered by extremely poor data, for example because assessments do not classify death or deteriorating health due to injury.[159]

13 Nutrition

Vibeke Brix Christensen and Siri Tellier

13.1 Concepts and Baseline Situation

Concepts

Malnutrition: malnutrition refers to either over-nutrition or under-nutrition. Under-nutrition may be due to a lack of micronutrients (vitamins and minerals, especially vitamin A and zinc) or a lack of macronutrients (protein, carbohydrates, fats). Extreme malnutrition may result in marasmus (extreme thinness, with children under 18 months especially affected) and kwashiorkor (two-sided oedema, swelling due to fluid retention, particularly prevalent in children of the same age group).

Stunting/wasting: stunting refers to low height relative to age (usually the result of chronic malnutrition), whereas wasting refers to low weight as related to height.

Z-score: the *Z*-score represents a standard deviation—for example, if a person's nutritional *Z*-score stands at 0, he or she is at the median level. If it stands at −1, his or her score is one standard deviation below the mean. For example, a person's weight to height ratio may, for example, lie within the lowest 5%. A *Z*-score of −2 indicates that the respective person is within the lowest 1%, and a *Z*-score of −3 signifies that he or she belongs to the lowest 1/1000 of the population.

SAM: severe acute malnutrition—*Z*-score for weight to height is below −3.

MAM: moderate acute malnutrition—*Z*-score for weight to height is below −2.

MUAC: mid-upper-arm circumference—the MUAC measure[160] is a long strip with a series of colour bands. It is used to screen children with various nutritional levels, to help detect the seriousness of their condition and thereby help to indicate the most apt form of treatment. It is based on the finding that the MUAC is rather stable across the age levels of 6–59 months (and therefore

[158] Chu et al. (2010), pp. 262–263.

[159] PAHO (2010).

[160] For an illustration, see: https://www.unicef.org/supply/files/Mid_Upper_Arm_Circumference_Measuring_Tapes.pdf.

can be applied without knowing the patient's exact age). A green band (>125 mm) indicates a normal state of nutrition, yellow (115–125 mm) signifies a moderate level of malnutrition, whereas red (<115 mm) represents severe malnutrition and risk of death. The 115 mm cut-off point is an indicator of marasmus and highlights a need for special feeding.

Body mass index (BMI): weight (in kg)/height (in metres) × 2—a value below 18.5 signals underweight, whereas a value over 25 indicates overweight, and over 30 obesity.

Baseline Malnutrition is increasingly recognised as a contributor to disease rather than an outright main cause of death. Historically, starvation killed a large number of people, whereas today, death from starvation has become rare. The proportion of children under five who are stunted was estimated at a quarter in 2012, down from 40% in 1990, with the highest rates in South Asia. Despite this improvement, undernutrition is still estimated to be a contributing factor in close to 50% of all child deaths.[161] It reduces the resilience and immune defences of the child, increases case fatality rates for CDs such as measles and contributes to impaired mental development. Malnutrition particularly affects young children since the strongest growth happens within the first 3 years of life.

Over-nutrition and obesity, risk factor for many NCDs, are also increasing, often due to the transitions mentioned in sub-chapter 3, especially urbanisation. Obesity affects both children and adults and is globally estimated to be responsible for more deaths than underweight.[162] However, there is great disparity among different populations. Thus, in Syria in 2012, close to 40% of females aged 20 and above were estimated to be obese (and close to 30% of children under five were estimated to be stunted), whereas the corresponding numbers for Japan were around 3% for each.[163]

13.2 Pathways to Excess Mortality and Morbidity in Emergencies

Disasters and conflicts may destroy food production and other livelihoods. Such situations put a strain on health systems and lead to increased levels of stress for caregivers, who may be unable to care for children, all of which increases the risk of malnutrition. Displaced populations in particular may run the risk of incurring negative nutritional effects as a result of particular nutritional factors, including increasing use of unhealthy food and reduced levels of exercise, which may further obesity.

[161] WHO, Media Centre, Children: reducing mortality, http://www.who.int/mediacentre/factsheets/fs178/en/ (accessed on 10 March 2017).

[162] *Ibid*.

[163] WHO Country health profiles, http://www.who.int/countries/en/ (accessed on 10 March 2017).

One important correlation is between maternal starvation and child health. There is robust evidence that highly undernourished pregnant women may also give birth to low birthweight babies, who may be at risk of developing NCDs (diabetes, heart disease) later in life. There is also some evidence, although less robust,[164] that suggests that these persons' own children are low birthweight, in other words a transgenerational epigenetic effect.

13.3 Existing Approaches and Guidelines for Response

Nutrition is an area of humanitarian action that has seen great advances over the last decades. Both the means to monitor levels and screen patients, as well as feeding programmes and products, have undergone major changes.[165]

In order to prevent malnutrition, breastfeeding of infants is recommended during their first 6 months. If women continue to partially breastfeed children until they reach the age of 2 years, this alone would prevent around 20% of child deaths, mostly those occurring as a result of pneumonia or diarrhoeal disease. Feeding programmes usually aim at providing 2100 kcal per adult, (10% protein and 17% fat), with the precise composition determined by age and living situation. Aggravating circumstances include cold weather (under 10°C), poor health conditions (a situation where CMR is above 1/10,000), as well as individual factors such as pregnancy.

Concerning treatment, the focus lies on SAM and MAM rather than micronutrient deficiencies or stunting since they are most likely to develop following an emergency, are most easily identified and cause the highest levels of excess mortality, whereas they can be relatively easily treated.

Rapid assessment is extremely important, even if often conducted under difficult conditions, where simplified methods of screening are necessary. For both SAM and MAM, patients are identified by MUAC screening, weight/height measurements are conducted to determine their respective *Z*-score and observations are made to detect possible oedema. The same is true for adults (using the BMI measurement). Children with SAM (*Z*-scores above three) require treatment in a health care facility. Hence, special feeding products have been developed, such as plumpy'nut (see Fig. 6) or BP100 (see Fig. 7). In cases of MAM, feeding can usually take place at the home or community level and includes training of caregivers.

Supplemental feeding programmes have had great positive effect, but there is also some evidence that rapid recovery from malnutrition may lead to adverse health effects during later stages in life, for example NCDs.

[164] Stein and Lumey (2000), pp. 641–654; Painter et al. (2008), pp. 1243–1249.

[165] Young et al. (2004), pp. 1899–1909.

Fig. 6 Plumpy'nut package. Reproduced by kind permission of copyright owner, Nutriset

Fig. 7 BP-100 package. Reproduced by kind permission of GC Rieber from http://www.gcrieber-compact.com/product-range/malnutrition/treatment-severe/bp-100/

14 Environmental Health, Including Water, Sanitation and Hygiene

Niall Roche and Siri Tellier

Environmental health/WaSH is one of the key public health priorities in any humanitarian context and is a sector that is often populated by engineering professionals but demands a range of *softer* skills to complement those delivering the *hardware*. Environmental health/WaSH staff comes from a variety of disciplines.

Environmental Health In 2006, the WHO defined environmental health, sometimes referred to as environment and health, as 'A conceptual domain covering the interrelationship between human health and the environment, linking improvement of human health, now and in future generations, to the protection, restoration and improvement of environmental quality'.[166] This definition goes beyond the normal interpretation of WaSH in that it has the scope to address many other environmental determinants of health. It is mainly focused on the interaction between human health and the built environment and addresses not only the communicable disease

[166]WHO Europe (2006), p. 10, http://www.euro.who.int/__data/assets/pdf_file/0019/130177/E88308.pdf.

burden, which WaSH normally works to address, but also the ever-increasing non-communicable disease burden.

WaSH WaSH has been defined in different ways but is generally regarded as including all aspects of water supply, sanitation (excreta management, waste management and drainage), plus hygiene promotion. Sub-sectors of WaSH as outlined in the Sphere Project Handbook (2011) are hygiene promotion, water supply, excreta disposal, vector control, solid waste management and drainage.

Sanitation Sanitation was officially defined during the International Year of Sanitation in 2008 and is 'the collection, treatment and disposal or reuse of human excreta, domestic wastewater and solid waste and associated hygiene promotion'.[167]

Hygiene Promotion Hygiene promotion is essentially a sub-component of wider health promotion but is focused on the environmental or WaSH determinants of health. One definition from Ferron et al. (2000), defines hygiene promotion as 'the planned and systematic attempt to enable people to take action to prevent water and sanitation related illness, and to maximise the benefits of improved, water and sanitation facilities'.[168]

Despite these clear-cut definitions, the existing literature does not provide a clear indication of what WaSH actually is. In some organisations, the sub-components of environmental health/WaSH will include vector control, medical waste disposal, provision of bathing and laundry facilities, food safety, shelters, responder safety and even radiation. Regardless of the sub-components listed in various places, the key to sound environmental health, like any other public health intervention in humanitarian action, is to properly assess the health risks and to address them in a prioritised fashion.

For the purposes of this section, the key components of environmental health and WaSH deemed most relevant in humanitarian action are as follows:

- water supply;
- excreta management;
- liquid and solid waste management, including dead body management;
- health and hygiene promotion;
- vector control;
- housing/shelter and settlement/site planning; and
- control of pollution with a focus on household air quality.

Housing/shelter and settlement/site planning fall under the responsibility of the shelter cluster,[169] but due to the role of overcrowding in the transmission of many communicable diseases in particular, we also include it here.

[167] See definition developed for the International Year of Sanitation 2008 by the Water Supply and Sanitation Collaborative Council, cf. http://www.unece.org/fileadmin/DAM/env/water/meetings/wgwh/Firstmeeting_2008/IYS.pdf.

[168] Ferron et al. (2000)—cabdirect.org.

[169] Davis and Lambert (2002); The Global WASH Cluster, http://washcluster.net/.

Baseline There has been a great deal of progress in WaSH, yet globally around 660 million people are not using an improved source of water.[170] One billion are practising open defecation, and only 19% use soap after using the toilet.[171]

Evidence Base The evidence base for the effect of WaSH and wider environmental health on the communicable disease burden dates back more than 150 years to the 1850s, when John Snow (the father of epidemiology) advised authorities in London to take the handle off the Broad Street handpump, the effect of which was a marked decline in the incidence of cholera. Readers of the BMJ (British Medical Journal) in a vote declared *sanitation* the most important medical advance since 1840, when the journal was founded. In many respects, WaSH has become the 'forgotten foundation of health'.

Relative Effect of Different Components While the broad evidence of the effect of WaSH on health has been known for a long time, the relative impact of its different components is currently best encapsulated by Fewtrell et al.'s Systematic Review of 2005. It determined with respect to diarrhoea (the second biggest killer of children under five and one of the four key communicable diseases in emergencies) that handwashing with soap as an intervention delivers the biggest reduction in incidence (as much as 47%), followed by water quality at the household and sanitation, which, in turn, is followed by water quantity. Providing good quality water at the source (like a handpump), while important, delivers the least amount of impact in terms of reduced incidences of diarrhoea. It is important to remember this when determining what aspects of WaSH and wider environmental health to emphasise.

The 'F' Diagram (Fig. 8) Much of the work in WaSH centres around the 'F' diagram, which helps to illustrate the areas of focus within WaSH in order to prevent the transmission of pathogens through the faecal-oral route.

15 Water Supply: The Water Safety Chain

Niall Roche and Siri Tellier

The key concept to capture with regard to water supply is the 'Water Safety Chain', which focuses attention on the need to protect and possibly treat water from the source all the way to the point of consumption or point of use. The following outlines the different stages in water supply provision to ensure that beneficiaries are enabled to have access to safe water in sufficient quantities.

[170] Progress on Sanitation and Drinking Water – 2015 update and MDG Assessment, UNICEF and WHO, 2015.

[171] Freeman et al. (2014).

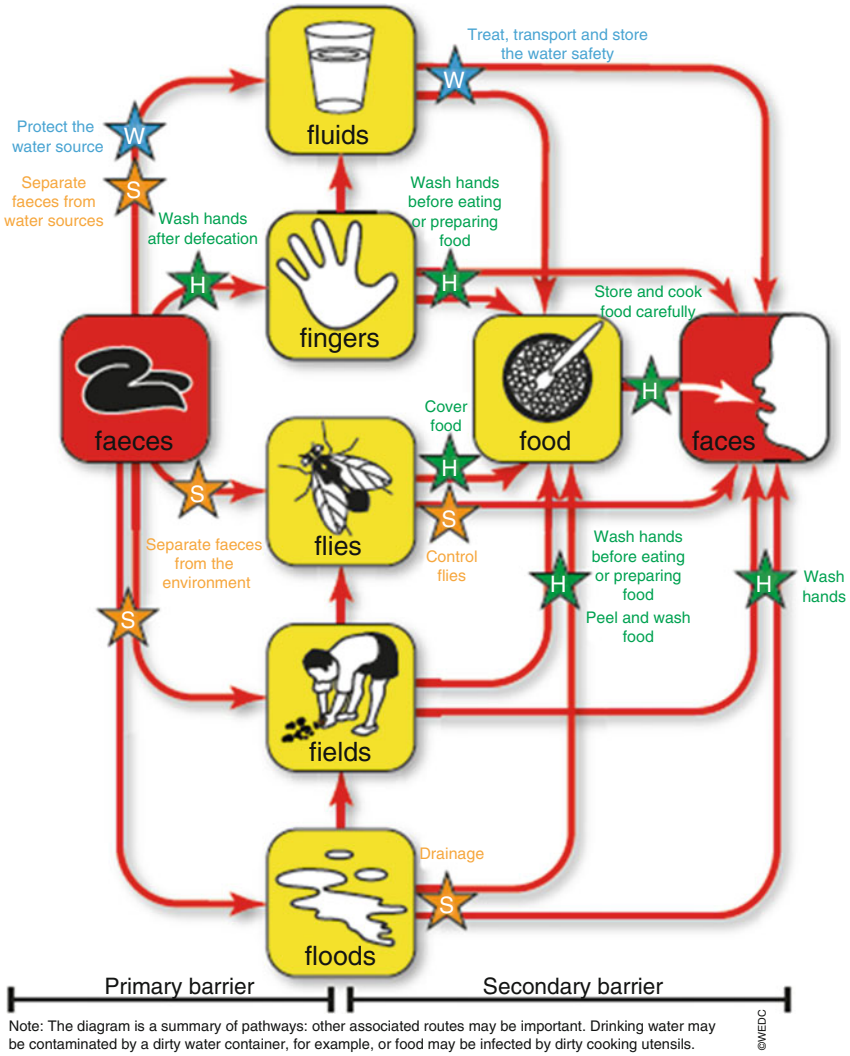

Fig. 8 The 'F' diagram. Reproduced by kind permission of The Water, Engineering and Development Centre (WEDC) from WEDC, The 'F' Diagram, Poster 04, http://wedc.lboro.ac.uk/resources/posters/P004_The_F_Diagram.pdf (accessed on 14 April 2017)

15.1 Water Sources and Demand

Water essentially comes from four different sources:

- surface water (rivers, lakes and ponds);
- ground water (wells, boreholes, tube wells, springs);
- rainwater; and
- sea water (which can be desalinated).

Daily demand for water varies among the regions of the world, populations and cultures, but need is determined by the variety of uses people have for water, some of which take place outside the home. Domestic water need generally refers to water for the purposes of (1) drinking, (2) washing (of cooking utensils, clothes and personal) and (3) cooking. The Sphere Project Handbook assigns an absolute minimum standard of 15 l of water per person per day for these purposes.[172] Consider that daily demand in Ireland for domestic water is 150 l per person per day, illustrating how varied demand can be.

Beyond domestic needs, water has a multitude of uses, including but not limited to water for construction (mud blocks, for example); drinking water for animals (a cow may consume up to 40 l of water in a day); water for irrigation of crops, including vegetables; water for religious purposes (needed before praying); water for excreta management (water is needed to flush many types of toilets), plus the added demand for water at institutions such as schools, hospitals, cholera treatment centres, administrative centres, etc.

In humanitarian contexts, where affected populations engage in crop production, the demand for water can be up to 70 times the water needed for domestic purposes, and therefore those responsible for allocating water supply need to take account of the varying demand for water for different purposes, which may also fluctuate over the seasons. Management of water calls for what is termed integrated water resources management (IWRM), where household water demand is just one part of the entire equation.

15.2 Source Selection, Advantages and Disadvantages

Choosing water sources to utilise in a humanitarian situation will depend on a number of key criteria that include but are not limited to the following:

- the number of people in need of water and their culture;
- the uses of water needed and the quality of water needed for each use (for example, water for consumption will need to be of the highest quality, whereas water for bathing could be of a lower quality);
- the standards to be applied, which must be suited to the context, which may differ between nations;
- the phase of the emergency that humanitarians find themselves in as development of groundwater sources may take time;
- construction issues surrounding finance, human resources and material resources needed to develop a source;
- operation and maintenance issues to sustain a particular source; and
- environmental sustainability of the source.

[172]The Sphere Project (2011).

Each source has certain advantages and disadvantages. Surface water sources tend to be easy to access, and it is often easier to quantify the amount of water available. However, surface water sources are easily contaminated, and the water will need treatment. Groundwater sources tend to provide water of a high quality (microbiological quality at least) but are often more difficult to access. Rainwater provides water of a good quality if collected in a clean manner but may not be available all year round.

15.3 Construction and Protection of Sources and Sustainable Supply

Most surface water sources are naturally occurring rivers or lakes, but in some cases such sources are also constructed. For example, constructed ponds are a common feature in Cambodia, and in parts of Eritrea micro dams have been built to capture and retain rainwater as an adaptation measure in response to climate change. As with any source, protecting it from contamination is paramount, and surface water sources can be protected by keeping concentrations of people away from the source, fencing to prevent human and animal access and the provision of platforms to enable people to have access to water without entering and potentially transmitting schistosomiasis and guinea worm.

Ground water sources such as wells are either dug or drilled. *Shallow wells* of less than 10 m can easily be dug but beyond that depth tend to be drilled and may extend to depths of 45–60 m and sometimes beyond 100 m. Springs can be developed by the construction of a spring protection box. Shallow wells often have open access where people use a rope and bucket to collect their water. However, such wells can be protected through a series of progressive steps ultimately leading to the fitting of a handpump.

Part of the sustainability question is dealt with under environmental sustainability, but one of the biggest challenges with respect to water supply in later phases of an emergency and in recovery is the sustainability of operation and maintenance through community participation. Some of the issues that need to be addressed under this question include the level of community contribution expected, including financial contributions, the choice of technology, the availability of spare parts, skilled pump mechanics to repair non-functioning handpumps and the role of the government in monitoring and technical support.

15.4 Water Transport, Storage and Distribution

The stages in a water supply system include the following[173]:

- abstraction and transmission;
- storage;

[173]Davis and Lambert (2002).

- treatment; and
- distribution.

The chain of supply may not follow the stages in this order, with treatment, for example, sometimes preceding storage (at the household level, for example). However, whatever chain is followed, the ultimate aim is to ensure that the available water is fit for human consumption.

Water is transported to an affected population in one of two ways, either by trucking or through a pipeline, if not directly accessed from a source by those affected. Pipes come in various types and sizes and may extend for several kilometres depending on the distance from the source to the people being served.

If people are accessing water from a source directly, they may collect and transport it in a variety of containers made from different materials and of various sizes. Standard *jerrycans* used for collection tend to be made of plastic with a capacity of 15–20 l.

Storage of water for supply to a community can be in reservoirs or large storage tanks. Storage tanks vary in size and construction from bladder tanks to the Oxfam tanks, which can reach capacities of 95,000 l.

From storage facilities, water is directed to a distribution point or series of distribution points. For treated water, this is often achieved through tap stands (often containing 4–6 taps) with each tap expected to serve 250 people. If water is accessed directly from a well or borehole (fitted with or without a handpump), the ratio can be higher, often one well per 500 people served. Distribution points should, of course, be accessible not only in terms of distance (the sphere standard is 500 m) but also in terms of time so that people do not spend significant quantities of time queuing for water.

15.5 Water Treatment at the Community and Household Level and Testing

In order to render water safe for human consumption, it may be necessary to treat it. In general, surface water sources need the most amount of treatment to ensure that faecal coliforms are not present. There are four stages to the treatment process, and depending on the quality of the raw water accessed, up to all stages may need to be followed. They are as follows:

- coagulation (using ALUM (aluminium sulphate)) and flocculation;
- sedimentation;
- filtration; and
- disinfection.

The three stages prior to disinfection aim to remove as much organic matter and pathogens from the water as possible in order to maximise the disinfectant (normally chlorine) applied. In humanitarian contexts, the chlorine product procured for disinfection normally comes in granular form and would be known as

HTH (high-test hypochlorite) delivered in concentrations of 55–70%. Chlorine can be applied to batches of water as in trucks or can be delivered continuously in water treatment plants. To be effective, the chlorine normally needs a contact time of 30 min. Water that is supplied to communities either through trucks or pipelines should contain a residual chlorine level of 0.2–0.5 mg/l at the point of use. This excess is provided to deal with any post-treatment contamination that may occur during transmission to the point of use. Normally, a swimming pool comparator is used to determine if there is chlorine residual in the water at the point of use and the level of residual present. It should be noted that the treatment of water in this way only deals with microbiological quality and does not remove chemical impurities in the water.

At the household level, there are a number of treatment options, including boiling, household filters, solar disinfection and chlorine-based products that often come in liquid or tablet form. Some products for use at the household level combine flocculation and chlorination actions.

Water must be tested to ensure that it is safe for human consumption in accordance with the WHO Guidelines on Drinking Water Quality or National Equivalents. Often, water is tested at the point the source is identified and before the source is developed. There are three broad sets of parameters tested: physical parameters such as colour, taste and smell; microbiological parameters as an indicator of faecal contamination; and chemical parameters such as iron and arsenic, to name just two. Special kits are available to test key parameters in the field, which is particularly important for microbiological testing, as samples need to be analysed soon after collection.

A key temptation in water supply is to aim strictly for the sphere standard of 15 l per person per day and not to contextualise the situation and adapt the standard aimed for in accordance with cultural practices and demand for water beyond the needs for domestic purpose. A second key challenge is to ensure that the issue of gender is adequately mainstreamed into planning for water supply as the majority of the burden for collecting, transporting and storage lies with women and children.

16 Excreta and Waste Management

Niall Roche and Siri Tellier

16.1 Excreta Management

16.1.1 Concepts

Some people view excreta as public enemy number one. This is perhaps not surprising considering that 1 g of faeces contains a reported 10 million viruses,

one million bacteria, one thousand parasite cysts and one hundred parasite eggs.[174] As with water, the concept of the 'sanitation safety chain' ensures that excreta once produced are kept from coming in contact with the human population either directly or indirectly. The following section will mainly deal with the options available to do so, explain key principles to consider, as well as touch upon ways to improve *sanitation coverage* in later phases.

In the majority of cases, excreta management is referred to as sanitation, and in the context of development goals reference is often made to 'basic sanitation', 'improved sanitation' and the 'sanitation ladder'. Over time, people move up the sanitation ladder from open defecation to the complete separation of excreta from human contact through a system of sewers.

Diarrhoea and intestinal parasites are the key illnesses that excreta management aims to prevent, but one needs to be mindful of the link with environmental enteropathy (a condition that shows no clear clinical signs but contributes to reduced nutritional outcomes). In terms of terminology, some now suggest that we refer to faecally transmitted infections to help capture environmental enteropathy, diarrhoeal diseases and intestinal parasites. The importance of excreta management is exemplified by the events that took place in Goma, Zaire (today's Democratic Republic of the Congo), in 1994, where there was only one latrine for every 1029 inhabitants, and over a 3-week period a total of over 45,000 people died from cholera.

16.1.2 What Latrines Do: Components and Options

Latrines, the term most often used to describe toilets in resource-poor settings, serve a number of functions. They not only protect health but should also provide comfort, privacy and safety for users. A latrine has three principle components:

- a pit, often 2–3 m deep, which may be unlined or lined (to prevent the soil from collapsing);
- a floor slab or platform that is often set up for sitting, although more often than not for squatting;
- a superstructure or housing facility the user enters.

In the early phases of many emergencies, toilets simply do not exist (such as in the case of refugees fleeing to a greenfield site), or where they do, they may be damaged and in need of repair or have to be adapted to suit the situation faced. The following outlines the options for managing excreta and essentially follows steps along the sanitation ladder. Successful provision of toilets/latrines may depend on knowing what step on the sanitation ladder those affected are on in times of normalcy:

[174] UNICEF and LSHTM (1999).

- open defecation—in some situations this may be a normal practice for the affected;
- defecation fields—an immediate and short-term solution;
- communal latrines—a medium-term solution but difficult to maintain and which poses protection issues;
- family latrines—a medium- to long-term solution, often provided at the ratio of one latrine for 20 people, equivalent to four families and considered the target to reach in order to enhance cleaning of latrines and extend their lifespan.

In public health terms, the ventilated improved pit (VIP) latrine is a preferred technical option to control flies in pit latrines, but resources may not suffice to provide this type of latrine. Once fully used, many pit latrines can simply be covered with soil, and a new pit may be dug, with the option of reusing the floor slab and possibly the superstructure.

The lifespan of a latrine depends on several factors, including the number of users, the volume of the pit, the sludge accumulation rate for each user and the infiltration capacity of the soil. As a rough estimate, consider that each person produces approximately 175 g of excreta per day, and a standard pit latrine may last for up to a maximum of 6 months.

Not all excreta are disposed of, and in some cultures the reuse of excreta may be a cultural norm. Certain latrines may include options that allow for the recovery of excreta and urine for reuse, often as a fertiliser. These types of latrines are known as composting latrines, Ecosan latrines or urine diversion latrines.

In some contexts, such as urban environments or areas with high water tables, excreta management options can be limited. Buckets or bag options (one is known as the pee poo bag) or the use of portable toilets may be feasible solutions to this problem.

Portable toilets and some pit latrines need to be emptied from time to time. When this happens, the excreta have turned into what has become known as faecal sludge. The proper management of faecal sludge is critical to ensure that human contact with the sludge is kept to a minimum, both for the workers removing the sludge from latrines, septic tanks or portable toilets as well as for the general public.

Toilets may also need to be provided and/or managed at institutional and public areas, especially schools, health centres, hospitals, market areas and administrative offices, which may need additional support to mount this challenge.

16.1.3 Cross-Cutting Issues

There are a number of key cross-cutting issues relevant to excreta management in addition to the issues of protection, environment and responder safety already mentioned.

Gender issues are of equal importance: normally, latrines are demarcated along gender lines with a larger number of latrines allocated to women, whereas men are often provided with urinals. Depending on the methods used, special waste or washing facilities may be provided in toilets to support menstrual hygiene.

Toilets must be accessible to all sections of the community, including the elderly, the disabled and the young children. The excreta of very young children may have to be additionally managed through the provision of nappies and/or potties, possibly included under a hygiene kit.

As with any development in humanitarian action, effective planning is key to successful excreta management. Participation of the affected in all stages of the project cycle will contribute to success. Understanding existing cultural norms and practices is particularly important, one example being the need to establish beforehand whether the population to be served consists of 'washers' or 'wipers', terms denoting the preferred method of anal cleansing.

The background situation with respect to *sanitation* coverage may be very low when one considers how many people do not use *basic* or *improved* sanitation as we now move towards targets set under the Sustainable Development Goals. In the context of Linking Relief and Rehabilitation to Development (LRRD), one may have to implement excreta management activities along the lines of higher development. Many countries have now adopted the CLTS (Community-Led Total Sanitation) approach to sanitation, in which communities are *triggered* to build their own sanitation facilities without any subsidies or inputs from external agents. Social marketing of sanitation is another common approach that utilises the 4 Ps of marketing where the toilet (product) is sold (at the right price) in a market (in the right place) through marketing (promotion).

16.1.4 Challenges, Dilemmas, Dos and Don'ts

Excreta management should not be seen as an isolated public health priority. Poorly designed or maintained latrines are a breeding ground for flies, a key vector of disease. Toilets are also important to ensure protection and dignity and have a role to play in menstrual hygiene management.

Do not assume that once faecal sludge has been removed from a latrine or portable toilet it will be disposed of in a proper manner. One must ensure that faecal sludge is managed properly all the way to the end of the sanitation safety chain.

Reaching a defined ratio of latrines to users (for example, 1:20) does not equal success. Excreta management is about more than outputs in the form of latrines constructed; it is also about use, proper operation and maintenance of these facilities, the elimination of open defecation and proper decommissioning of facilities once the emergency is over.

16.2 Waste Management

16.2.1 Concepts

Waste is not only unsightly and often smelly but has the potential to pose serious public health risks to populations affected by disaster, whereas other waste, such as the rubble generated following an earthquake, may simply inhibit access to affected areas and limit the effectiveness of the overall humanitarian response. The following health risks are associated with waste:

- Waste provides a source of harbourage and food for flies, rats, dogs, snakes and other scavengers, many of whom are vectors of communicable diseases, flies being perhaps the most important.
- Waste may also provide a breeding site for mosquitos, such as *aedes aegypti* or the tiger mosquito, responsible for the transmission of dengue fever. They are often found breeding in pools of water inside waste tyres.
- Waste may pose a fire risk and source of pollution if burned.
- Waste may pose a risk of physical injury.
- Waste may also contribute to the pollution of water sources.
- Waste may block drains and contribute to flooding events.

16.2.2 Types of Waste and Strategies for Dealing with Them

For the purposes of this chapter, we outline the following categorisations of waste:

- storm water (a significant issue in monsoon-affected countries);
- solid waste, which can be sub-categorised into (1) domestic/household waste, (2) hazardous waste, (3) vegetation/soil/sediment, (4) relief waste (plastic bottles, fish tins, etc.) and (5) demolition waste;
- wastewater (sometimes known as sullage or grey water) from kitchens, bathhouses and laundry;
- health care waste.

Storm water drainage problems can be prevented or solved in a number of ways. Linking again to site selection, it is important to try and identify sites that are not prone to flooding and have sufficient slope to allow for drainage. Drainage must be planned in accordance with the expected rainfall and either removed or harvested as a potential source of water. Once constructed, drains need to be kept clear and not allowed to block up with silt or other solid waste.

Solid waste can come in a variety of forms, and most implementing agencies engaged with waste management will deal with solid waste from the domestic environment, which may be broadly classified into organic (compostable) and inorganic material (glass, plastic, etc.). Hazardous waste can cover a multitude of types, including waste oil, batteries, pesticides, asbestos, etc.

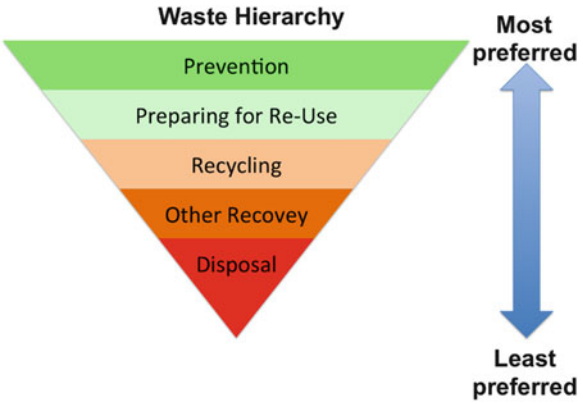

Fig. 9 Good waste management hierarchy. Reproduced by kind permission of Carbon Footprint Ltd from www.carbonfootprint.com, http://www.wastefootprint.com/ (accessed on 14 April 2017)

The principal strategy to good waste management is to try and follow the waste hierarchy (see Fig. 9), which aims to prevent the generation of waste in the first place, passes through minimisation, reuse, recycling and, lastly, disposal, the least favoured option.

Humanitarian agencies in keeping with mainstreaming the environment into their actions have a responsibility to reduce or minimise the amount of waste they generate. Reuse of materials may be common in some emergency contexts where, for example, bricks could be reused in construction. Recycling is another option, a good example being the crushing of rubble following an earthquake for use as an aggregate in the making of concrete or a road surface. Organic waste at the household level can be made into compost for the cultivation of crops.

Disposal of waste is the least favoured but often a necessary and expensive action to undertake. The stages of solid waste disposal cover collection (household bins, for example), transport and disposal. Disposal normally passes by one of two ways: burning or burying. In the majority of cases, it is buried either on-site or off-site in a landfill.

Deciding how to dispose of solid waste depends on a number of factors, including the types of waste generated and locally available options to deal with such waste. In many cases, there may be opportunity to segregate the waste and follow a decision pathway for each type of waste, to reuse it, recycle it or dispose of it.

Wastewater can be generated from a number of sources, including overflows from tap stands, household and communal washing areas (i.e., public showering rooms) and possibly centralised kitchens. Such waste, if not directed into a public drainage system or water course, can be utilised as a resource for irrigation or disposed of as is the norm in a soak pit. Kitchen waste in particular may contain oils and fats, which need to be removed before discharge into the drainage system.

Dealing with health care waste requires specialist expertise as parts of it are medical or clinical waste. This concerns about 10–25% of the waste generated at health care facilities. The remaining general waste can be dealt with like other categories of solid waste, for example burned or buried. Medical waste can be

subdivided into a number of different categories, including infectious waste, pathological waste and sharps (for example, syringes, scalpels, etc.). Segregation of waste at the point of generation or accumulation is key, with sharps needed to be segregated immediately. As with other categories of waste, medical waste can be burned/incinerated or buried/contained (placentas in a placenta pit). Incineration to achieve certain temperatures is necessary for some categories of medical waste.

16.2.3 'Managing the Dead': Or 'Safe and Dignified Burial'?

Classically, the issue of burying the deceased was discussed within the category of waste management. This chapter is an opportunity to interject a comment on how insensitive this placement may seem to the communities affected and how, beyond the emotional aspects, this vantage point may affect operational issues. The Ebola pandemic is one recent event that has drawn attention to the critical role of burial practices in response to the epidemic.

To some people, the management of the dead is a waste management issue while understanding the emotional sensitivity surrounding the issue. Sudden-onset events like genocide, an earthquake or epidemics like Ebola or cholera may lead to very high numbers of deaths. In general, the dead do not pose an immediate risk to physical health unless the cause of death is a highly infectious disease like Ebola or cholera. Hence, the priority for humanitarians should be on the survivors.

Following a disaster, WaSH personnel are often designated to deal with the dead. The first priority then is to ensure the safety of those undertaking this task. The staff has to be aware of the risks in handling dead bodies and accessing those bodies in often dangerous circumstances. They should be provided with PPE, be enabled to wash and change clothes after work, have first aid available and be vaccinated to ensure that they are covered against diseases like tetanus. Where bodies are recovered, facilities should be available to store them, identify them and deal with them in a culturally sensitive way. Information has to be managed and communicated carefully. Families and relatives of the deceased must receive support. In the majority of cases, the issue of burial should be approached in accordance with the customs and norms of the respective societies.

The exception may be in relation to *infectious dead*, who may have died from infections such as Ebola, Marburg or cholera. Special precautions must be taken when handling infectious dead. Such precautions may include extra PPE for handlers, the use of body bags (bodies in West Africa during the Ebola crisis of 2014/2015 were double bagged), the use of a disinfectant (a 2% chlorine solution), limited or no contact with the body and immediate burial. Facilitating dialogue with communities, informing the family about the process will help alleviate fear and facilitate acceptance.[175]

[175] WHO (2015b).

16.2.4 Challenges, Dilemmas, Dos and Don'ts

In resource-poor settings, waste is often seen more as a commodity to be exploited than disposed of, and the recovery of waste from landfill sites often becomes a means of livelihood. This fact should be considered in waste management planning. Special reference also needs to be made to the fact that certain categories of waste should not be reused or recycled. One-time-use syringes, for example, must be disposed of.

Humanitarians should not be in a rush to dispose of the dead in mass graves for fear of an epidemic. Such a frenzied approach may lead to resistance from communities, which have been known to hide bodies in order to avoid mass burial. Such burials may also cause other problems for relatives of the deceased who may not be able to properly grieve or prove a relative's death to insurance companies.

17 Health and Hygiene Promotion

Niall Roche and Siri Tellier

17.1 Concepts

Hygiene promotion is an essential component of WaSH but is often seen as something that is tacked on to the more prominent and tangible components of providing water, excreta and waste management facilities. An early global WaSH cluster meeting once indicated that many people did not understand the purpose of hygiene promotion, its expected outcomes and the common ways in which it is implemented. As a concept, hygiene promotion is essentially a sub-component of wider health promotion. The Ottawa Charter of 1986 defined health promotion as 'the process of enabling people to increase control over their lives so that they may maintain and improve their health. . .'.[176]

Promoting health in its widest sense addresses many of the social determinants of health, including peace, access to education, food, income and equity and not just some of the more direct determinants such as access to safe water. There are several different approaches to health promotion, which is not limited to formal education. For example, the Irish Road Safety Strategy promotes health through a reduction in road deaths and injuries through what is referred to as the 4 E's. Education is one of them, but road safety is also promoted through engineering (making roads safer), enforcement (for example, of laws that punish people for drinking and driving) and evaluation

[176]WHO Europe (1986), http://www.euro.who.int/__data/assets/pdf_file/0004/129532/Ottawa_Charter.pdf?ua=1.

(to measure performance). Similar approaches can be taken to promote health in humanitarian contexts. Many of them refer to the combination of *hardware* (engineering work) and *software* (education work) to deliver on health objectives.

Hygiene promotion as defined by Ferron et al. is 'the planned and systematic attempt to enable people to take action to prevent water and sanitation related illness, and to maximise the benefits of improved water and sanitation facilities'.[177] Hygiene education can therefore be viewed as part of wider hygiene promotion with the purpose of providing knowledge and information and developing the necessary skills (for example, making ORS to treat diarrhoea) so that people can make an informed choice about their health behaviour.

The terminology used with respect to health and hygiene promotion includes behaviour change communication (BCC), information, education, communication (IEC), and dialogue and action. The term 'Dialogue and Action' in particular helps to stress that health/hygiene promotion starts by engaging with affected populations to understand existing beliefs and behaviours in a spirit of true participation in the programme development process.

A common framework used to help understand the interrelationship between different components is the Hygiene Improvement Framework (see Fig. 10) as it refers to not only access to hardware and hygiene promotion but also the enabling environment. In humanitarian contexts, the enabling environment may be regarded as the commitment and capacity of implementers to conduct hygiene improvement effectively.

17.2 Communication Channels

Much of what we call health or hygiene promotion tends to actually be health/hygiene education with the provision of hardware captured under the water and sanitation parts of WaSH. The provision of non-food items to further enable people to utilise the knowledge they have been given may form a part of the hygiene promotion response or be delivered under other clusters.

17.2.1 Steps in Health/Hygiene Promotion

The key steps to planning and implementing effective hygiene promotion activities require you, as humanitarians, to do the following:

- Make contact with communities in a spirit of participation ensuring you do not bypass leadership. Make special efforts to consider marginalised/vulnerable groups.
- Deepen understanding of the community, including gathering baseline data, identifying risks, understanding motivational factors towards certain behaviours and family dynamics in the household.

[177] Ferron et al. (2000), p. 12.

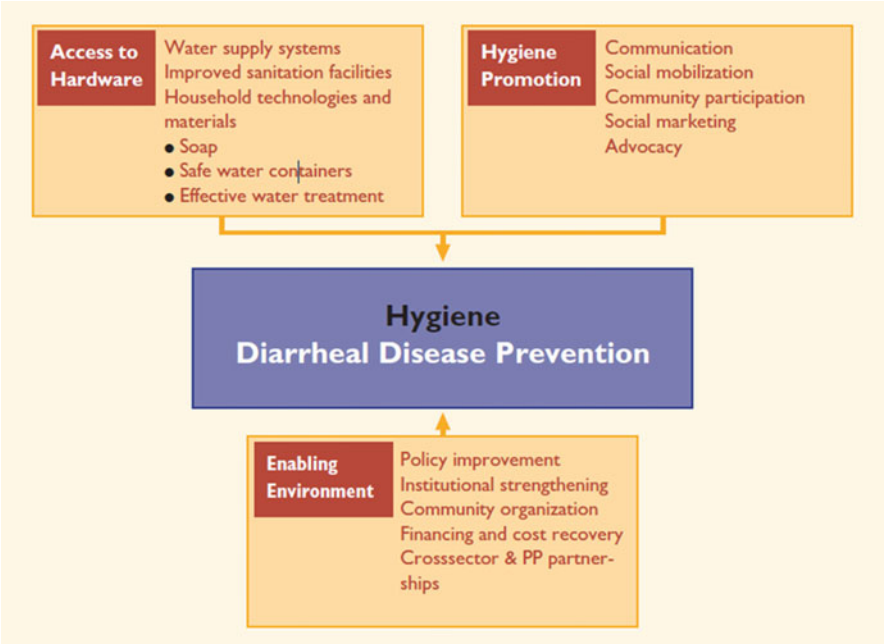

Fig. 10 The hygiene improvement framework. Reprinted by kind permission of the WHO from WHO, Sanitation and Hygiene Promotion.Programing Guidance, Figure 1, page 2, Copyright (2005), http://www.who.int/water_sanitation_health/hygiene/sanhygpromo.pdf (accessed on 14 April 2017), and by kind permission of USAID from USAID et al., The Hygiene Improvement Framework: A Comprehensive Approach for Preventing Childhood Diarrhea, page 10, (2004), http://www.ehproject.org/PDF/Joint_Publications/JP008-HIF.pdf (accessed on 14 April 2017)

- Identify target groups, be it mothers, children, men, etc. Some may be regarded as your primary audience (i.e., children), while others will be secondary (i.e., parents).
- Define your objectives and indicators for measuring progress and impact.
- Decide on outreach structure and human resource requirements. Many personnel may already exist within the health system and be known as community health workers or similar.
- Decide on the methods to use (usually a combination of mass media and interpersonal methods) and settings to target (community health clubs, for example) and prepare (IEC) materials. These materials must be pre-tested to ensure understanding of the message.
- Initiate training of staff and the community.
- Monitor progress utilising the community as much as possible.

17.2.2 Communication Channels

Hygiene promotion tends to be delivered in two ways:

- through mass media; and
- through a people-centred or interpersonal approach.

Mass media are a convenient way to deliver health messages, and numerous avenues can be utilised, including radio, posters, leaflets, campaigns (such as the annual campaign for Global Handwashing Day on 15 October each year), street theatre, social marketing or social media and other technology-related methods, such as texting health messages to community members. In this way, it is possible to convey simple messages, to support behavioural change if other enabling factors (handwashing stations, for example) are present and thus to put specific health issue on the public agenda. There are, however, limitations to mass media impacts. Maximum levels of effectiveness can be reached if media strategies are integrated into wider campaigns, such as advisory campaigns (taking place, for example, in a doctor–patient setting) or group sessions (for example, teachers and school children or imam/priest and religious followers).

In interpersonal settings of hygiene promotion, the status of the messenger is of great importance. That person must be someone who the recipient of the information respects and will believe, such as is usually the case with doctors, who are generally regarded as trustworthy.

17.2.3 Measuring Health/Hygiene Promotion

Part of the challenge with respect to health/hygiene promotion lies in measuring the level of change achieved through promotion. Tap stands and toilets are somewhat easy to count as an output, but successful health/hygiene promotion is not measured simply by the number of leaflets distributed or the number of hygiene sessions conducted by community health workers. Measuring success is more complicated and requires significant qualitative and quantitative research skills.

The key hygiene behaviours promoted in humanitarian contexts tend to focus around handwashing with soap at critical times and after going to the toilet, safe disposal of excreta and safe storage of water at the household level. All of this behavioural advice addresses key risks for communicable disease, associated with emergencies. Other behaviour that should be promoted may include sleeping under a bednet to prevent malaria and keeping children out of the reach of cooking fires to limit exposure to household air pollution. Some of these are specific to WaSH, while others are not. Hence, they are mentioned here under the joint heading of health and hygiene promotion.

Implementers of hygiene promotion measure performance through Knowledge Attitude and Practice (KAP) surveys in which baseline knowledge, attitude and practice levels are measured at the beginning of any response. This baseline is later

used to compare changes in knowledge, attitudes and behaviours at or near the end of the intervention from an end-line KAP survey. Unfortunately, KAP surveys are prone to social desirability bias (meaning respondents provide answers that they think the enumerator would like to hear), which can lead to giving misleading results in terms of the behaviour examined, for example handwashing. To overcome this bias, it is recommended to measure performance through formative research that includes tools such as structured observation, household surveys, behaviour trials, in-depth interviews and focus group discussions to help triangulate findings.

17.2.4 Hygiene Related Non-food Items

A large number of health/hygiene non-food items (NFIs) may be distributed as part of an emergency response. More recently, the mechanisms are changing to include cash or vouchers so that beneficiaries can procure the items they need for themselves. Standard items often considered important to distribute that *enable* or support behaviour change include water containers (jerrycans) for transport and storage of water (some with a built-in tap to aid handwashing), household water treatment products such as disinfection tablets, mosquito nets and hygiene kits. The latter may contain soap, toothbrushes, toothpaste, nail cutters, sanitary pads and razors, etc. Determining what the exact content of hygiene-related distributions should include is tricky. Whereever possible, distribution should be based on prior consultation with the affected populations.

17.3 Challenges, Dilemmas, Dos and Don'ts

Every culture has its specific approaches towards hygiene. Hence, one must not assume that once people have received certain information they will change their behaviour. Behavioural change is a complicated process, and many forces determine motivation towards a certain behaviour, deviating from that behaviour or adopting a different type of behaviour. Soap manufacturers, for example, sell soap not by promoting its health benefits but, more often than not, by indicating how fresh and beautiful you may feel after using it. The importance of understanding one's *market* cannot be overemphasised. Inconsistent or unadjusted messaging risks not achieving the hygiene promotion objectives. It is therefore important to understand beliefs and customs around hygiene and to harmonise messaging among actors and over time.

18 Vector Control, Settlement Planning and Household Air Pollution

Niall Roche and Siri Tellier

18.1 Vector Control

18.1.1 Concepts

Vector control refers to the prevention and control of diseases spread through vectors such as mosquitoes and flies. Two of the four big killers in emergencies, diarrhoeal diseases and malaria, are spread in this way. Flies (which physically transport pathogens from excreta to food, for example) transmit diarrhoeal diseases, whereas anopheles mosquitoes pick up parasites from the blood of infected individuals, spreading malaria by enabling the parasite to undergo life cycle changes in the mosquito. Other common disease vectors include rats, fleas, cockroaches, mites, lice and ticks.

The key to vector control is integrated vector management, which demands a wide public health approach. Vector control is not just about spraying chemicals but also includes drainage (to limit breeding sites), good engineering (of latrines to control flies) waste management (to limit access to food for rats), working towards behavioural changes (sleeping under a bednet, covering water jars) and even animal husbandry (to limit the potential spread of zoonotic diseases that are spread from animals to humans (for example, Crimean-Congo haemorrhagic fever spread from donkeys to humans in Afghanistan via ticks).

18.1.2 Strategies for the Control of Vectors

The stepped strategy outlined below can help determine what interventions to engage in and at what moments. At the height of an epidemic, you, as a humanitarian, may skip some of the steps and tackle the immediate problem if large numbers of the adult vector are present:

- *Know your enemy*, which entails understanding as much as possible about the vector to be targeted—where does it lay its eggs, what types of environments does it breed in and where does it like to rest? Some mosquitos prefer to rest indoors, making indoor residual spraying a feasible option.
- *Prevent the vector from breeding in the first place*: drainage work and the removal of waste can limit a vector's breeding opportunities.

- *Control the vector as early as possible in its life cycle*: mosquito larvae are easier to target than mosquitoes flying around. Larvicides may be added to water storage jars to control the mosquito responsible for dengue fever.
- *Control of the adult vector*: thermal fogging and indoor residual spraying may be implemented to control mosquitos, whereas rats may be caught in traps or poisoned, and fleas may be controlled by dusting.
- *Personal protection* includes the use of bed nets, repellents and coils. Vaccination is feasible for some vector-borne diseases, and even treatment is a form of prevention as it removes the source of infection.

18.1.3 Bednets and Indoor Residual Spraying with Respect to Malaria

Bednets, also known as insecticide-treated nets (ITNs) or long-lasting insecticidal nets (LLINs), and indoor residual spraying (IRS) alongside intermittent preventive treatment for pregnant women (IPTp) are primary tools for the control of malaria. Bednet coverage in sub-Saharan Africa, where the majority of deaths occur, has increased substantially in recent years due to the impact of the Global Fund. IRS may be implemented using a variety of different insecticides, including DDT. Ideally, IRS (where the chemical is sprayed on wall surfaces of domestic dwellings) should take place in advance of the malaria transmission season and continue its effect over many months.

18.1.4 Challenges, Dilemmas, Dos and Don'ts

End-user compliance with respect to using bednets effectively is a challenge and again linked to behavioural communication and enabling targeted groups to use the nets. Factors that can contribute to uptake include previous experience in using nets, the time of year in which distribution takes place, colour, mesh size, type of housing people, as well as shape of the nets.

18.2 Household Air Pollution

Household air pollution (HAP), sometimes referred to as indoor air pollution, is not listed as a public health priority with respect to humanitarian situations. However, in a context where air pollution in general, and HAP more specifically, is one of the biggest risk factors to health and the single biggest risk factor in Asia, one could argue that there is some justification to address it. People affected by disasters tend to be the poorest in already vulnerable situations, often relegated to using the dirtiest fuels such as crop waste and dung to cook and, in some cases, heat their homes.

The WHO estimated that, in 2012, air pollution accounted for seven million deaths globally (one in every eight), and HAP alone accounted for 4.3 million with over 580,000 of those deaths occurring in sub-Saharan Africa.[178] Put in perspective, this is nearly three times the number of deaths attributed to HIV and AIDS.

Inefficient cooking fires, using dirty fuels in unventilated environments often occupied by the most vulnerable (women and children) and other like-minded behaviour produce a cocktail of pollutants, including particulates and carbon monoxide. The health impacts are also numerous, including cancer, chronic obstructive pulmonary diseases and acute lower respiratory infections. People living in poverty and those affected by disaster are often exposed to pollution levels that far exceed those that would be considered safe in an industrial environment.

Solutions to household air pollution can be found at three levels:

- tackling the source of pollution by switching to cleaner fuels such as LPG (liquid petroleum gas) or kerosene—in many contexts, this is simply not a feasible option in the short term;
- adjusting the living environment by supporting the use of more fuel-efficient stoves (may be distributed as part of NFI distribution), improving ventilation in shelters and supporting the cooking of food outdoors;
- improving behaviours around cooking/heating through health education and promotion—information provided may include advice on keeping children away during cooking, drying fuel properly before use and simply using a lid on the cooking pots, which can reduce cooking time substantially.

One should not assume that just because others are not addressing household air pollution and it is not considered WaSH that it is not an issue deserving of attention in the context of public health interventions. Impacts extend beyond health, to include protection of the environment through reducing levels of fuel needed and protection of vulnerable people, as women would not have to spend time at risk in the bush collecting fuelwood, where HAP is properly addressed.

18.3 Shelter/Housing and Site/Settlement Planning

In the majority of cases, people displaced by crisis or disaster decide themselves where they are going to stay during the crisis. However, in many cases, sites can be identified and prepared in advance. For example, as part of its contingency plan for dealing with floods, the Government of Malawi has preselected *evacuation sites* suitable to house displaced people affected by floods. Site selection is critical as many of the public health problems associated with camps are attributable to unfavourable selection of sites (located in a flood-prone zone or in an area where

[178] WHO Media Centre, 7 million premature deaths annually linked to air pollution, http://www.who.int/mediacentre/news/releases/2014/air-pollution/en/ (accessed on 10 March 2017).

malaria is endemic) and/or poor site planning that fosters overcrowding, producing conditions suitable to the spread of communicable diseases. Poor planning may also constitute a great source of stress and psychological harm to beneficiaries.

While it may be practically impossible to find sites that meet all the criteria suitable for the protection of public health, one must identify criteria that need to be considered and select sites fulfilling the most critical. For example, following the 11 September attacks, large sites on Pakistani soil were identified and prepared in advance of an anticipated influx of refugees from Afghanistan. The criteria of security, water supply and access (all year round) were considered the most critical determinants in approving suitable sites. Other criteria may include sufficiency of space (typically 45 square metres per person) for each person to be housed, including space for potential new arrivals, elevation to ensure optimal drainage, soil conducive to the digging of pit latrines, location of the water table to access water but also opportunities of limiting contamination of ground water supplies and vegetative cover to help keep dust levels down around health centres and provide shade.

Site planning is an additional part of the equation and must be conducted with great care. From a WaSH perspective, good site planning alone can enable affected populations to access the services they need and protect them from harm. For example, site planning that fails to account for latrines from the beginning creates a number of potential problems that could be avoided, such as forcing implementing agencies to place latrines on the edge of camps. This may discourage some people from using them as they may deem them to be too far away from their dwellings, as well as generating a protection risk.

An often-overlooked challenge with respect to camps concerns issues arising once they are vacated. In these cases, much of the camp infrastructure needs to be decommissioned. Particular care must be applied where pit latrines are concerned. Staff engaged in closing down latrines needs to be adequately protected from the risk of infection, and latrines need to be backfilled with additional soil to allow for settlement and thereafter be marked and possibly mapped.

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Further Reading

Section 1

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