

# Minimum Standards in Water Supply, Sanitation and Hygiene Promotion



# How to use this chapter

This chapter is divided into seven main sections:

**Water supply, sanitation and hygiene promotion (WASH)**

Hygiene promotion

Water supply

Excreta disposal

Vector control

Solid waste management

Drainage

The Protection Principles and Core Standards must be used consistently with this chapter.

Although primarily intended to inform humanitarian response to a disaster, the minimum standards may also be considered during disaster preparedness and the transition to recovery activities.

Each section contains the following:

- **Minimum standards:** These are qualitative in nature and specify the minimum levels to be attained in humanitarian response regarding the provision of water, sanitation and hygiene promotion.
- **Key actions:** These are suggested activities and inputs to help meet the standards.
- **Key indicators:** These are 'signals' that show whether a standard has been attained. They provide a way of measuring and communicating the processes and results of key actions; they relate to the minimum standard, not to the key action.
- **Guidance notes:** These include specific points to consider when applying the minimum standards, key actions and key indicators in different situations. They provide guidance on tackling practical difficulties, benchmarks or advice on priority issues. They may also include critical issues relating to the standards, actions or indicators, and describe dilemmas, controversies or gaps in current knowledge.

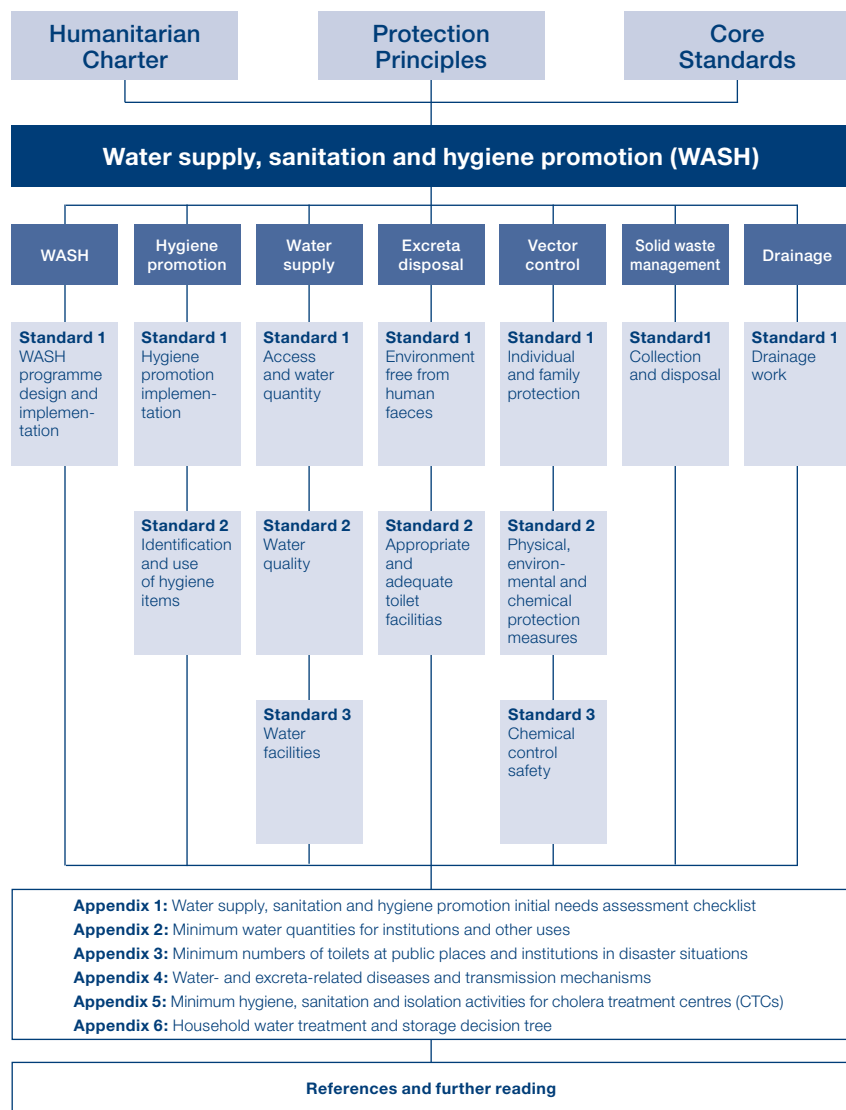
If the required key indicators and actions cannot be met, the resulting adverse implications for the affected population should be appraised and appropriate mitigating actions taken.

A needs assessment checklist is included as Appendix 1; guideline notes are provided in Appendices 2–6; and a select list of references and further reading, which points to sources of information on both specific and general issues relating to this chapter, is also provided.

# Contents

Introduction.....	83
1. Water supply, sanitation and hygiene promotion (WASH).....	88
2. Hygiene promotion.....	91
3. Water supply.....	97
4. Excreta disposal.....	105
5. Vector control.....	111
6. Solid waste management.....	117
7. Drainage.....	121
Appendix 1: Water supply, sanitation and hygiene promotion initial needs assessment checklist.....	124
Appendix 2: Minimum water quantities for institutions and other uses.....	129
Appendix 3: Minimum numbers of toilets at public places and institutions in disaster situations.....	130
Appendix 4: Water- and excreta-related diseases and transmission mechanisms.....	131
Appendix 5: Minimum hygiene, sanitation and isolation activities for cholera treatment centres (CTCs).....	132
Appendix 6: Household water treatment and storage decision tree.....	133
References and further reading.....	134





# Introduction

## Links to the Humanitarian Charter and international law

The minimum standards for water supply, sanitation and hygiene promotion (WASH) are a practical expression of the shared beliefs and commitments of humanitarian agencies and the common principles, rights and duties governing humanitarian action that are set out in the Humanitarian Charter. Founded on the principle of humanity, and reflected in international law, these principles include the right to life and dignity, the right to protection and security and the right to receive humanitarian assistance on the basis of need. A list of key legal and policy documents that inform the Humanitarian Charter is available for reference in Annex 1 (see page 356), with explanatory comments for humanitarian workers.

Although states are the main duty-bearers with respect to the rights set out above, humanitarian agencies have a responsibility to work with disaster-affected populations in a way that is consistent with these rights. From these general rights flow a number of more specific entitlements. These include the rights to participation, information and non-discrimination that form the basis of the Core Standards, as well the specific rights to water, sanitation, food, shelter and health that underpin these and the minimum standards in this Handbook.

Everyone has the right to water and sanitation. This right is recognised in international legal instruments and provides for sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses and accessible sanitation facilities. An adequate amount of safe water is necessary to prevent death from dehydration, to reduce the risk of water-related disease and to provide for consumption, cooking and personal and domestic hygienic requirements.

The right to water and sanitation is inextricably related to other human rights, including the right to health, the right to housing and the right to adequate food. As such, it is part of the guarantees essential for human survival. States and non-state actors have responsibilities in fulfilling the right to water and sanitation. In times of armed conflict, for example, it is prohibited to attack, destroy, remove or render useless drinking water installations or irrigation works.



The minimum standards in this chapter are not a full expression of the right to water and sanitation. However, the Sphere standards reflect the core content of the right to water and sanitation and contribute to the progressive realisation of this right globally.

## The importance of WASH in disasters

Water and sanitation are critical determinants for survival in the initial stages of a disaster. People affected by disasters are generally much more susceptible to illness and death from disease, which to a large extent are related to inadequate sanitation, inadequate water supplies and inability to maintain good hygiene. The most significant of these diseases are diarrhoeal and infectious diseases transmitted by the faeco-oral route (see Appendix 4: Water- and excreta-related diseases and transmission mechanisms). Other water- and sanitation-related diseases include those carried by vectors associated with solid waste and water. The term ‘sanitation’, throughout the Sphere Handbook, refers to excreta disposal, vector control, solid waste disposal and drainage.

The main objective of WASH programmes in disasters is to reduce the transmission of faeco-oral diseases and exposure to disease-bearing vectors through the promotion of:

- ▶ good hygiene practices
- ▶ the provision of safe drinking water
- ▶ the reduction of environmental health risks
- ▶ the conditions that allow people to live with good health, dignity, comfort and security.

Simply providing sufficient water and sanitation facilities will not, on its own, ensure their optimal use or impact on public health. In order to achieve the maximum benefit from a response, it is imperative that disaster-affected people have the necessary information, knowledge and understanding to prevent water- and sanitation-related diseases and to mobilise their involvement in the design and maintenance of those facilities.

The use of communal water and sanitation facilities, for example in refugee or displaced situations, can increase women’s and girls’ vulnerability to sexual and other forms of gender-based violence. In order to minimise these risks, and to provide a better quality of response, it is important to ensure women’s participation in water supply and sanitation programmes. An equitable participation of women and men in planning, decision-making and local management will help

to ensure that the entire affected population has safe and easy access to water supply and sanitation services, and that services are appropriate.

Better disaster response in public health is achieved through better preparedness. Such preparedness is the result of capacities, relationships and knowledge developed by governments, humanitarian agencies, local civil society organisations, communities and individuals to anticipate and respond effectively to the impact of likely, imminent hazards. It is based on an analysis of risks and is well linked to early warning systems. Preparedness includes contingency planning, stockpiling of equipment and supplies, emergency services and stand-by arrangements, personnel training and community-level planning training and drills.

## Links to other chapters

Many of the standards in the other chapters are relevant to this chapter. Progress in achieving standards in one area often influences and even determines progress in other areas. For a response to be effective, close coordination and collaboration are required with other sectors. Coordination with local authorities and other responding agencies is also necessary to ensure that needs are met, that efforts are not duplicated and that the quality of water and sanitation interventions is optimised.

For example, where nutritional standards have not been met, the urgency to improve the standard of water and sanitation is greater as people’s vulnerability to disease will have significantly increased. The same applies to populations where HIV and AIDS prevalence is high or where there is a large proportion of older people or persons with disabilities. Priorities should be decided on the basis of sound information shared between sectors as the situation evolves. Reference is also made, where relevant, to companion and complementary standards.

## Links to the Protection Principles and Core Standards

In order to meet the standards of this Handbook, all humanitarian agencies should be guided by the Protection Principles, even if they do not have a distinct protection mandate or specialist capacity in protection. The Principles are not ‘absolute’: it is recognised that circumstances may limit the extent to which agencies are able to fulfil them. Nevertheless, the Principles reflect universal humanitarian concerns which should guide action at all times.



The Core Standards are essential process and personnel standards shared by all sectors. The six Core Standards cover participation, initial assessment, response, targeting, monitoring, evaluation, aid worker performance, and supervision and support to personnel. They provide a single reference point for approaches that underpin all other standards in the Handbook. Each technical chapter, therefore, requires the companion use of the Core Standards to help attain its own standards. In particular, to ensure the appropriateness and quality of any response, the participation of disaster-affected people – including the groups and individuals most frequently at risk in disasters – should be maximised.

## Vulnerabilities and capacities of disaster-affected populations

This section is designed to be read in conjunction with, and to reinforce, the Core Standards.

It is important to understand that to be young or old, a woman or an individual with a disability or HIV does not, of itself, make a person vulnerable or at increased risk. Rather, it is the interplay of factors that does so: for example, someone who is over 70 years of age, lives alone and has poor health is likely to be more vulnerable than someone of a similar age and health status living within an extended family and with sufficient income. Similarly, a 3-year-old girl is much more vulnerable if she is unaccompanied than if she were living in the care of responsible parents.

As WASH standards and key actions are implemented, a vulnerability and capacity analysis helps to ensure that a disaster response effort supports those who have a right to assistance in a non-discriminatory manner and who need it most. This requires a thorough understanding of the local context and of how a particular crisis impacts on particular groups of people in different ways due to their pre-existing vulnerabilities (e.g. being very poor or discriminated against), their exposure to various protection threats (e.g. gender-based violence including sexual exploitation), disease incidence or prevalence (e.g. HIV or tuberculosis) and possibilities of epidemics (e.g. measles or cholera). Disasters can make pre-existing inequalities worse. However, support for people's coping strategies, resilience and recovery capacities is essential. Their knowledge, skills and strategies need to be supported and their access to social, legal, financial and psychosocial support advocated for. The various physical, cultural, economic and social barriers they may face in accessing these services in an equitable manner also need to be addressed.

The following highlight some of the key areas that will ensure that the rights and capacities of all vulnerable people are considered:

- ▶ Optimise people's participation, ensuring that all representative groups are included, especially those who are less visible (e.g. individuals who have communication or mobility difficulties, those living in institutions, stigmatised youth and other under- or unrepresented groups).
- ▶ Disaggregate data by sex and age (0–80+ years) during assessment – this is an important element in ensuring that the WASH sector adequately considers the diversity of populations.
- ▶ Ensure that the right to information on entitlements is communicated in a way that is inclusive and accessible to all members of the community.

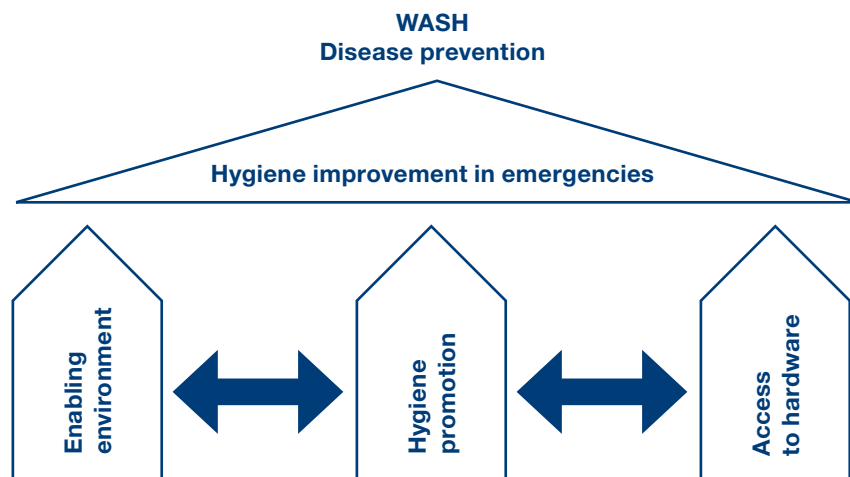


## The minimum standards

# 1. Water supply, sanitation and hygiene promotion (WASH)

The aim of any WASH programme is to promote good personal and environmental hygiene in order to protect health, as shown in the diagram below. An effective WASH programme relies on an exchange of information between the agency and the disaster-affected population in order to identify key hygiene problems and culturally appropriate solutions. Ensuring the optimal use of all water supply and sanitation facilities and practising safe hygiene will result in the greatest impact on public health.

Hygiene promotion is vital to a successful WASH intervention. The focus on hygiene promotion is general and specific. In general terms, hygiene promotion is integral to all of the sections and is reflected in the indicators for water supply, excreta disposal, vector control, solid waste management and drainage. More specifically, the focus narrows on two hygiene promotion standards in this chapter and relates to particular hygiene promotion activities.



### WASH standard 1: WASH programme design and implementation

WASH needs of the affected population are met and users are involved in the design, management and maintenance of the facilities where appropriate.

#### Key actions (to be read in conjunction with the guidance note)

- ▶ Identify key risks of public health importance in consultation with the affected population (see guidance note 1 and Core Standards 1, 3–4 on pages 55–65).
- ▶ Provide and address the public health needs of the affected population according to their priority needs (see guidance note 1).
- ▶ Systematically seek feedback on the design and acceptability of both facilities and promotional methods from all different user groups on all WASH programme activities (see Core Standards 1, 3–4 on pages 55–65).

#### Key indicators (to be read in conjunction with the guidance note)

- ▶ All groups within the population have safe and equitable access to WASH resources and facilities, use the facilities provided and take action to reduce the public health risk (see Hygiene promotion standard 2 on page 94).
- ▶ All WASH staff communicate clearly and respectfully with those affected and share project information openly with them, including knowing how to answer questions from community members about the project.
- ▶ There is a system in place for the management and maintenance of facilities as appropriate, and different groups contribute equitably (see guidance note 1).
- ▶ All users are satisfied that the design and implementation of the WASH programme have led to increased security and restoration of dignity.

#### Guidance note

1. **Assessing needs:** An assessment is needed to identify risky practices that might increase vulnerability and to predict the likely success of both the provision of WASH facilities and hygiene promotion activities. The key risks are likely to centre on physical safety in accessing facilities, discrimination of marginalised groups that affects access, use and maintenance of toilets, the lack of hand-washing with soap or an alternative, the unhygienic collection and storage of water, and unhygienic food storage and preparation. The assessment should look at resources available to the population, as well

as local knowledge and practices, so that promotional activities are effective, relevant and practical. Social and cultural norms that might facilitate and/or compromise adherence to safe hygiene practices should be identified as part of the initial and ongoing assessment. The assessment should pay special attention to the needs of vulnerable people. If consultation with any group of vulnerable people is not possible, this should be clearly stated in the assessment report and addressed as quickly as possible (see Core Standard 3 on page 61).

## 2. Hygiene promotion

Hygiene promotion is a planned, systematic approach to enable people to take action to prevent and/or mitigate water, sanitation and hygiene-related diseases. It can also provide a practical way to facilitate community participation, accountability and monitoring in WASH programmes. Hygiene promotion should aim to draw on the affected population's knowledge, practices and resources, as well as on the current WASH evidence base to determine how public health can best be protected.

Hygiene promotion involves ensuring that people make the best use of the water, sanitation and hygiene-enabling facilities and services provided and includes the effective operation and maintenance of the facilities. The three key factors are:

1. a mutual sharing of information and knowledge
2. the mobilisation of affected communities
3. the provision of essential materials and facilities.

Community mobilisation is especially appropriate during disasters as the emphasis must be on encouraging people to take action to protect their health. Promotional activities should include, where possible, interactive methods, rather than focusing exclusively on the mass dissemination of messages.



### Hygiene promotion standard 1: Hygiene promotion implementation

Affected men, women and children of all ages are aware of key public health risks and are mobilised to adopt measures to prevent the deterioration in hygienic conditions and to use and maintain the facilities provided.

#### Key actions (to be read in conjunction with the guidance notes)

- ▶ Systematically provide information on hygiene-related risks and preventive actions using appropriate channels of mass communication (see guidance notes 1–2).

- ▶ Identify specific social, cultural or religious factors that will motivate different social groups in the community and use them as the basis for a hygiene promotion communication strategy (see guidance note 2).
- ▶ Use interactive hygiene communication methods wherever feasible in order to ensure ongoing dialogue and discussions with those affected (see guidance note 3).
- ▶ In partnership with the affected community, regularly monitor key hygiene practices and the use of facilities provided (see guidance note 3 and Core Standard 5, guidance notes 1, 3–5 on pages 69–70).
- ▶ Negotiate with the population and key stakeholders to define the terms and conditions for community mobilisers (see guidance note 5).

### Key indicators (to be read in conjunction with the guidance notes)

- ▶ All user groups can describe and demonstrate what they have done to prevent the deterioration of hygiene conditions (see guidance note 1).
- ▶ All facilities provided are appropriately used and regularly maintained.
- ▶ All people wash their hands after defecation, after cleaning a child's bottom, before eating and preparing food (see guidance note 6).
- ▶ All hygiene promotion activities and messages address key behaviours and misconceptions and are targeted at all user groups (see guidance note 6).
- ▶ Representatives from all user groups are involved in planning, training, implementation, monitoring and evaluation of the hygiene promotion work (see guidance notes 1–6 and Core Standard 1, guidance notes 1–5, on page 56–57).
- ▶ Care-takers of young children and infants are provided with the means for safe disposal of children's faeces (see Excreta disposal standard 1 on page 105 and guidance note 6).

### Guidance notes

1. **Targeting priority hygiene risks and behaviours:** The understanding gained through assessing hygiene risks, tasks and responsibilities of different groups should be used to plan and prioritise assistance, so that the information flow between humanitarian actors and the affected population is appropriately targeted and misconceptions, where found, are addressed.
2. **Reaching all sections of the population:** In the early stages of a disaster, it may be necessary to rely on the mass media to ensure that as many people as possible receive important information about reducing health risks.

Different groups should be targeted with different information, education and communication materials through relevant communication channels, so that information reaches all members of the population. This is especially important for those who are non-literate, have communication difficulties and/or do not have access to radio or television. Popular media (drama, songs, street theatre, dance, etc.) might also be effective in this instance. Coordination with the education cluster will be important to determine the opportunities for carrying out hygiene activities in schools.

3. **Interactive methods:** Participatory materials and methods that are culturally appropriate offer useful opportunities for affected people to plan and monitor their own hygiene improvements. It also gives them the opportunity to make suggestions or complaints about the programme, where necessary. The planning of hygiene promotion must be culturally appropriate. Hygiene promotion activities need to be carried out by facilitators who have the characteristics and skills to work with groups that might share beliefs and practices different from their own (for example, in some cultures it is not acceptable for women to speak to unknown men).
4. **Overburdening:** It is important to ensure that no one group (e.g. women) within the affected population is overburdened with the responsibility for hygiene promotion activities or the management of activities that promote hygiene. Benefits, such as training and employment opportunities, should be offered to women, men and marginalised groups.
5. **Terms and conditions for community mobilisers:** The use of outreach workers or home visitors provides a potentially more interactive way to access large numbers of people, but these workers will need support to develop facilitation skills. As a rough guide in a camp scenario, there should be two hygiene promoters/community mobilisers per 1,000 members of the affected population. Community mobilisers may also be employed as daily workers, on a contract or on a voluntary basis, and in accordance with national legislation. Whether workers have paid or volunteer status must be discussed with the affected population, implementing organisations and across clusters to avoid creating tension and disrupting the long-term sustainability of systems already in place.
6. **Motivating different groups to take action:** It is important to realise that health may not be the most important motivator for changes in behaviour. The need for privacy, safety, convenience, observation of religious and cultural norms, social status and esteem may be stronger driving forces than the promise of better health. These triggering factors need to be taken into account when designing promotional activities and must be effectively incorporated into the design and siting of facilities in conjunction with the





engineering team. The emphasis should not be solely on individual behavioural change but also on social mobilisation and working with groups.

### Hygiene promotion standard 2: Identification and use of hygiene items

The disaster-affected population has access to and is involved in identifying and promoting the use of hygiene items to ensure personal hygiene, health, dignity and well-being.

#### Key actions (to be read in conjunction with the guidance notes)

- ▶ Consult all men, women and children of all ages on the priority hygiene items they require (see guidance notes 1, 3–4).
- ▶ Undertake a timely distribution of hygiene items to meet the immediate needs of the community (see guidance notes 2–3).
- ▶ Carry out post-distribution monitoring to assess use of and beneficiary satisfaction with distributed hygiene items (see guidance notes 3 and 5).
- ▶ Investigate and assess the use of alternatives to the distribution of hygiene items, e.g. provision of cash, vouchers and/or non-food items (NFIs) (see Food security – cash and voucher transfers standard 1 on page 200).

#### Key indicators (to be read in conjunction with the guidance notes)

- ▶ Women, men and children have access to hygiene items and these are used effectively to maintain health, dignity and well-being (see guidance notes 1, 7 and 9).
- ▶ All women and girls of menstruating age are provided with appropriate materials for menstrual hygiene following consultation with the affected population (see guidance notes 5 and 8).
- ▶ All women, men and children have access to information and training on the safe use of hygiene items that are unfamiliar to them (see guidance note 5).
- ▶ Information on the timing, location, content and target groups for an NFI distribution is made available to the affected population (see guidance notes 3–5).
- ▶ The safety of affected populations and staff is prioritised when organising an NFI distribution (see Protection Principle 1, guidance notes 1–3 on pages 33–34).

#### Guidance notes

1. **Basic hygiene items:** A basic minimum hygiene items pack consists of water containers (buckets), bathing and laundry soaps, and menstrual hygiene materials.

#### List of basic hygiene items

10–20 litre capacity water container for transportation	One per household
10–20 litre capacity water container for storage	One per household
250g bathing soap	One per person per month
200g laundry soap	One per person per month
Acceptable material for menstrual hygiene, e.g. washable cotton cloth	One per person

2. **Coordination:** Discuss with the shelter cluster and the affected population whether additional non-food items, such as blankets, which are not included in the basic hygiene items are required (see Non-food items standard 1 on page 269).
3. **Timeliness of hygiene items distribution:** In order to ensure a timely distribution of hygiene items, it may be necessary to distribute some key generic items (soap, jerrycans, etc.) without the agreement of the affected population and come to an agreement concerning future distributions following consultation.
4. **Priority needs:** People may choose to sell the items provided if their priority needs are not appropriately met and so people's livelihoods need to be considered when planning distributions.
5. **Appropriateness:** Care should be taken to avoid specifying products that would not be used due to lack of familiarity or that could be misused (e.g. items that might be mistaken for food). Where culturally appropriate or preferred, washing powder can be specified instead of laundry soap.
6. **Replacement:** Consideration should be given for consumables to be replaced where necessary.
7. **Special needs:** Some people with specific needs (e.g. incontinence or severe diarrhoea) may require increased quantities of personal hygiene items such as soap. Persons with disabilities or those who are confined to bed may



need additional items, such as bed pans. Some items may require adaptation for sanitary use (such as a stool with a hole or commode chair).

8. **Menstrual hygiene:** Provision must be made for discreet laundering or disposal of menstrual hygiene materials.
9. **Additional items:** Existing social and cultural practices may require access to additional personal hygiene items. Subject to availability, such items (per person per month) could include:
  - 75ml/100g toothpaste
  - one toothbrush
  - 250ml shampoo
  - 250ml lotion for infants and children up to 2 years of age
  - one disposable razor
  - underwear for women and girls of menstrual age
  - one hairbrush and/or comb
  - nail clippers
  - nappies (diapers) and potties (dependent on household need).

## 3. Water supply

Water is essential for life, health and human dignity. In extreme situations, there may not be sufficient water available to meet basic needs and in these cases supplying a survival level of safe drinking water is of critical importance. In most cases, the main health problems are caused by poor hygiene due to insufficient water and by the consumption of contaminated water.

### Water supply standard 1: Access and water quantity

All people have safe and equitable access to a sufficient quantity of water for drinking, cooking and personal and domestic hygiene. Public water points are sufficiently close to households to enable use of the minimum water requirement.

#### Key actions (to be read in conjunction with the guidance notes)

- ▶ Identify appropriate water sources for the situation, taking into consideration the quantity and environmental impact on the sources (see guidance note 1).
- ▶ Prioritise and provide water to meet the requirements of the affected population (see guidance notes 2 and 4).

#### Key indicators (to be read in conjunction with the guidance notes)

- ▶ Average water use for drinking, cooking and personal hygiene in any household is at least 15 litres per person per day (see guidance notes 1–8).
- ▶ The maximum distance from any household to the nearest water point is 500 metres (see guidance notes 1, 2, 5 and 8).
- ▶ Queueing time at a water source is no more than 30 minutes (see guidance note 7).

#### Guidance notes

1. **Water sources selection:** The following factors should be considered in water source selection: availability, proximity and sustainability of sufficient



quantity of water; whether treatment is needed; and its feasibility, including the existence of any social, political or legal factors concerning the source. Generally, groundwater sources and/or gravity-flow supplies from springs are preferable, as they require less treatment and no pumping. In disasters, a combination of approaches and sources is often required in the initial phase. All sources need to be regularly monitored to avoid over-exploitation.

- Needs:** The quantities of water needed for domestic use is context based, and may vary according to the climate, the sanitation facilities available, people's habits, their religious and cultural practices, the food they cook, the clothes they wear, and so on. Water consumption generally increases the nearer the water source is to the dwelling. Where possible, 15 litres per person per day (l/p/d) can be exceeded to conform to local standards where that standard is higher.

#### Basic survival water needs

Survival needs: water intake (drinking and food)	2.5–3 litres per day	Depends on the climate and individual physiology
Basic hygiene practices	2–6 litres per day	Depends on social and cultural norms
Basic cooking needs	3–6 litres per day	Depends on food type and social and cultural norms
Total basic water needs	7.5–15 litres per day	

For guidance on minimum water quantities needed for institutions and other uses, see Appendix 2: Minimum water quantities for institutions and other uses. For emergency livestock water needs, refer to Livestock Emergency Guidelines and Standards (see References and further reading).

- Measurement:** Household surveys, observation and community discussion groups are more effective methods of collecting data on water use and consumption than the measurement of water pumped into the pipeline network or the operation of hand pumps.
- Quantity/coverage:** In a disaster, and until minimum standards for both water quantity and quality are met, the priority is to provide equitable access to an adequate quantity of water even if it is of intermediate quality. Disaster-affected people are significantly more vulnerable to disease; therefore, water access and quantity indicators should be reached even if they are higher than the norms of the affected or host population. Particular attention should be

paid to ensure the need for extra water for people with specific health conditions, such as HIV and AIDS, and to meet the water requirement for livestock and crops in drought situations. To avoid hostility, it is recommended that water and sanitation coverage address the needs of both host and affected populations equally (see Appendix 2: Minimum water quantities for institutions and other uses).

- Maximum numbers of people per water source:** The number of people per source depends on the yield and availability of water at each source. The approximate guidelines are:

250 people per tap	based on a flow of 7.5 litres/minute
500 people per hand pump	based on a flow of 17 litres/minute
400 people per single-user open well	based on a flow of 12.5 litres/minute

These guidelines assume that the water point is accessible for approximately eight hours a day only and water supply is constant during that time. If access is greater than this, people can collect more than the 15 litres/day minimum requirement. These targets must be used with caution, as reaching them does not necessarily guarantee a minimum quantity of water or equitable access.

- Queueing time:** Excessive queueing times are indicators of insufficient water availability due to either an inadequate number of water points or inadequate yields at water sources. The potential negative results of excessive queueing times are reduced per capita water consumption, increased consumption from unprotected surface sources and reduced time for other essential survival tasks for those who collect water.
- Access and equity:** Even if a sufficient quantity of water is available to meet minimum needs, additional measures are needed to ensure equitable access for all groups. Water points should be located in areas that are accessible to all, regardless of, for example, gender or ethnicity. Some hand pumps and water carrying containers may need to be designed or adapted for use by people living with HIV and AIDS, older people, persons with disabilities and children. In situations where water is rationed or pumped at given times, this should be planned in consultation with the users including women beneficiaries.



## Water supply standard 2: Water quality

Water is palatable and of sufficient quality to be drunk and used for cooking and personal and domestic hygiene without causing risk to health.

### Key actions (to be read in conjunction with the guidance notes)

- ▶ Undertake a rapid sanitary survey and, where time and situation allow, implement a water safety plan for the source (see guidance notes 1–2).
- ▶ Implement all necessary steps to minimise post-delivery water contamination (see guidance notes 3–4 and Hygiene promotion standard 1 on page 91).
- ▶ For piped water supplies, or all water supplies at times of risk of diarrhoeal epidemics, undertake water treatment with disinfectant so that there is a chlorine residual of 0.5mg/l and turbidity is below 5 NTU (nephelometric turbidity units) at the tap. In the case of specific diarrhoeal epidemics, ensure that there is residual chlorine of above 1mg/l (see guidance notes 5–8).
- ▶ Where household-level water treatment is proposed, ensure that it is accompanied by appropriate promotion, training and monitoring (see guidance notes 3 and 6).

### Key indicators (to be read in conjunction with the guidance notes)

- ▶ There are no faecal coliforms per 100ml of water at the point of delivery and use (see guidance notes 2, 4–7).
- ▶ Any household-level water treatment options used are effective in improving microbiological water quality and are accompanied by appropriate training, promotion and monitoring (see guidance notes 3–6).
- ▶ There is no negative effect on health due to short-term use of water contaminated by chemicals (including carry-over of treatment chemicals) or radiological sources, and assessment shows no significant probability of such an effect (see guidance note 7).
- ▶ All affected people drink water from a protected or treated source in preference to other readily available water sources (see guidance notes 3 and 6).
- ▶ There is no outbreak of water-borne or water-related diseases (see guidance notes 1–9).

### Guidance notes

1. **A sanitary survey and water safety plan:** A sanitary survey is an assessment of conditions and practices that may constitute a public health risk. It covers possible sources of contamination to water at the source in transport and in the home, defecation practices, drainage and solid waste management. Community mapping is a particularly effective way of identifying where the public health risks are and thereby involving the community in finding ways to reduce these risks. Note that while animal excreta is not as harmful as human excreta, it can contain micro-organisms, such as cryptosporidium, giardia, salmonella, campylobacter, caliciviruses and other common causes of human diarrhoea, and therefore presents a significant health risk. WHO recommends the use of its water safety plan (WSP), which is a holistic approach covering hazard identification and risk assessment, an improvement/upgrade plan, monitoring of control measures and management procedures, including the development of supporting programmes (see References and further reading).
2. **Microbiological water quality:** Faecal coliform bacteria (>99 per cent of which are *E. coli*) are an indicator of the level of human and/or animal waste contamination in water and the possibility of the presence of harmful pathogens. If any faecal coliforms are present, the water should be treated.
3. **Promotion of protected sources:** Merely providing protected sources or treated water will have little impact unless people understand the health benefits of this water and therefore use it. People may prefer to use unprotected sources, e.g. rivers, lakes and unprotected wells, for reasons such as taste, proximity and social convenience. In such cases, technicians, hygiene promoters and community mobilisers need to understand the rationale for the preferences so that their consideration can be included in promotional messages and discussions.
4. **Post-delivery contamination:** Water that is safe at the point of delivery can nevertheless present a significant health risk due to recontamination during collection, storage and drawing. Steps that can be taken to minimise such risk include improved collection and storage practices and distribution of clean and appropriate collection and storage containers (see Water supply standard 3 on page 103). Water should be routinely sampled at the point of use to monitor the extent of any post-delivery contamination.
5. **Water disinfection:** Water should be treated with a residual disinfectant such as chlorine if there is a significant risk of source or post-delivery contamination. This risk will be determined by conditions in the settlement, such as population density, excreta disposal arrangements, hygiene practices and the prevalence of diarrhoeal disease. In the case of a threat or the



existence of a diarrhoea epidemic, all drinking water supplies should be treated, either before distribution or in the home. For water to be disinfected properly, turbidity must be below 5 NTU, although for short-term emergency use, water of higher turbidity can be adequately disinfected with double chlorine dosage after filtration until turbidity reduction is achieved (see Appendix 6: Household water treatment and storage decision tree).

6. **Household-level water treatment:** When use of a centrally operated water treatment system is not possible, point-of-use water treatment (PoUWT) at household level can be used as an option. The different types of PoUWT options shown to reduce diarrhoea and improve the microbiological quality of stored household water include boiling, chlorination, solar disinfection, ceramic filtration, slow sand filtration and flocculation/disinfection. The most appropriate PoUWT option for any given context depends on existing water and sanitation conditions, water quality, cultural acceptability and the implementation feasibility of any of the options. Successful PoUWT should include the provision of adequate materials and products and appropriate training for the beneficiaries. Introducing an untested water treatment option in a disaster situation should be avoided. In areas with anticipated risk, pre-placement of PoUWT products should be considered to facilitate a quick response. The use of locally available products should be prioritised if continued use in the post-disaster phase is desired. Effective use of PoUWT requires regular follow-up, support and monitoring and this should be a prerequisite to adopting it as an alternative water treatment approach.
7. **PoUWT using chlorine:** Double-dose chlorination can be considered for higher turbidity where there is no alternative water source. This should be attempted only for short periods of time and after educating users to reduce turbidity by filtering, settling and decanting before treatment (see Appendix 6: Household water treatment and storage decision tree).
8. **Chemical and radiological contamination:** Where hydrogeological records or knowledge of industrial or military activity suggest that water supplies may carry chemical or radiological health risks, the risks should be rapidly assessed by carrying out a chemical analysis. A decision that balances short-term public health risks and benefits should then be made. Furthermore, a decision to use possibly contaminated water for longer-term supplies should be made on the basis of a more thorough assessment and analysis of the health implications.
9. **Palatability:** Taste is not in itself a direct health problem (e.g. slightly saline water does not pose a health risk), but if the safe water supply does not taste good, users may drink from unsafe sources and put their health at risk. To avoid this, hygiene promotion activities are needed to ensure that only safe supplies are used.

10. **Water quality for health centres:** All water for hospitals, health centres and feeding centres should be treated with chlorine or another residual disinfectant. In situations where water is likely to be rationed by an interruption of supply, sufficient water storage should be available at the centre to ensure an uninterrupted supply at normal usage levels (see Appendices 2: Minimum water quantities for institutions and other uses and 5: Minimum hygiene, sanitation and isolation activities for cholera treatment centres).

### Water supply standard 3: Water facilities

People have adequate facilities to collect, store and use sufficient quantities of water for drinking, cooking and personal hygiene, and to ensure that drinking water remains safe until it is consumed.

#### Key actions (to be read in conjunction with the guidance notes)

- ▶ Provide the affected population with appropriate water collection and storage facilities (see guidance note 1 and Hygiene promotion standard 2 on page 94).
- ▶ Actively encourage the participation of all affected individuals and vulnerable people in siting and design of water points and in the construction of laundry and bathing facilities (see guidance note 2).
- ▶ Include, at water distribution points and community laundry facilities, private washing basins and laundry areas for women to wash and dry undergarments and sanitary cloths (see guidance note 2 and Hygiene promotion standard 2 on page 94).

#### Key indicators (to be read in conjunction with the guidance notes)

- ▶ Each household has at least two clean water collecting containers of 10–20 litres, one for storage and one for transportation (see guidance note 1 and Hygiene promotion standard 2, guidance note 1 on page 95).
- ▶ Water collection and storage containers have narrow necks and/or covers for buckets or other safe means of storage, for safe drawing and handling, and are demonstrably used (see guidance note 1).
- ▶ There is at least one washing basin per 100 people and private laundering and bathing areas available for women. Enough water is made available for bathing and laundry (see guidance note 2).
- ▶ Water at household level is free from contamination at all times (see guidance note 1).



- ▶ All people are satisfied with the adequate facilities they have for water collection, storage, bathing, hand washing and laundry (see guidance note 2).
- ▶ Regular maintenance of the installed systems and facilities is ensured and users are involved in this where possible (see guidance note 3).

### Guidance notes

1. **Water collection and storage:** People need vessels to collect water, to store it and to use it for drinking, cooking, washing and bathing. The vessels should be clean, hygienic, easy to carry and appropriate to local needs and habits in terms of size, shape and design. Children, persons with disabilities, older people and people living with HIV and AIDS may need smaller or specially designed water carrying containers. The amount of storage capacity required depends on the size of the household and the consistency of water availability, e.g. approximately four litres per person would be appropriate for situations where there is a constant daily supply. Promotion and monitoring of safe collection, storage and drawing is an opportunity to discuss water contamination issues with vulnerable people, especially women and children.
2. **Communal washing and bathing facilities:** People require spaces where they can bathe in privacy and with dignity. If this is not possible at the household level, separate central facilities for men and women will be needed. Where soap is not available, commonly used alternatives, such as ash, clean sand, soda or various plants suitable for washing and/or scrubbing, can be provided. Washing clothes, particularly children's clothes, is an essential hygiene activity; cooking and eating utensils also need washing. The number, location, design, safety, appropriateness and convenience of facilities should be decided in consultation with the users, particularly women, adolescent girls and persons with disabilities. The location of facilities in central, accessible and well-lit areas with good visibility of the surrounding area can contribute to ensuring the safety of users.
3. **Maintenance of water systems:** It is important that the affected population is made aware of and provided with all necessary means to maintain and sustain the systems provided.

## 4. Excreta disposal

Safe disposal of human excreta creates the first barrier to excreta-related disease, helping to reduce disease transmission through direct and indirect routes. Safe excreta disposal is, therefore, a major priority and in most disaster situations should be addressed with as much speed and effort as the provision of a safe water supply. The provision of appropriate facilities for defecation is one of a number of emergency responses essential for people's dignity, safety, health and well-being.

### Excreta disposal standard 1: Environment free from human faeces

The living environment in general and specifically the habitat, food production areas, public centres and surroundings of drinking water sources are free from human faecal contamination.

### Key actions (to be read in conjunction with the guidance notes)

- ▶ Implement appropriate excreta containment measures immediately (see guidance note 1).
- ▶ Carry out rapid consultation with the affected population on safe excreta disposal and hygienic practices (see Hygiene promotion standard 1, guidance notes 1–6 on pages 92–93).
- ▶ Carry out concerted hygiene promotion campaign on safe excreta disposal and use of appropriate facilities (see Hygiene promotion standard 1, guidance notes 1–6 on pages 92–93).

### Key indicators (to be read in conjunction with the guidance notes)

- ▶ The environment in which the affected population lives is free from human faeces (see guidance notes 1–2).
- ▶ All excreta containment measures, i.e. trench latrines, pit latrines and soak-away pits, are at least 30 metres away from any groundwater source. The bottom of any latrine or soak-away pit is at least 1.5 metres above the water table (see guidance note 3).



- ▶ In flood or high water table situations, appropriate measures are taken to tackle the problem of faecal contamination of groundwater sources (see guidance note 3).
- ▶ Drainage or spillage from defecation systems does not contaminate surface water or shallow groundwater sources (see guidance note 3).
- ▶ Toilets are used in the most hygienic way possible and children's faeces are disposed of immediately and hygienically (see guidance note 4).

### Guidance notes

1. **Safe excreta disposal:** Safe excreta disposal aims to keep the environment free from uncontrolled and scattered human faeces. Immediately after a disaster and while an excreta disposal management plan is put in place, consider implementing an initial clean-up campaign, demarcating and cordoning off defecation areas, and siting and building communal toilets. Based on context, a phased approach to solving the sanitation problem at hand is most effective. Involve all groups from the disaster-affected population in the implementation of safe excreta disposal activities. Where the affected population has not traditionally used toilets, it will be necessary to conduct a concerted hygiene promotion campaign to encourage safe excreta disposal and to create a demand for more toilets. In urban disasters where there could be damage to existing sewerage systems, assess the situation and consider installing portable toilets or use septic and/or containment tanks that can be regularly desludged. Due consideration should be given to desludging, handling, transportation and final disposal of the sludge.
2. **Defecation areas:** In the initial phase and where land is available, mark off a defecation field and/or construct trench latrines. This will only work if the site is correctly managed and maintained and the affected population understands the importance of using the facilities provided and where they are located.
3. **Distance of defecation systems from water sources:** The distance of soak pits, trench latrines and/or toilets from water sources should be at least 30 metres and the bottom of the pits should be at least 1.5 metres above the groundwater table. These distances need to be increased for fissured rocks and limestone, or decreased for fine soils. In some disaster response, groundwater pollution may not be an immediate concern if it is not to be directly used for drinking. Instead, household-level water treatment or other options should be adopted (see Water supply standard 2, guidance note 6 on page 102). In flooded or high water table environments, it may be necessary to build elevated toilets or septic tanks to contain excreta and prevent it contaminating the environment. It is also imperative that drainage or spillage

from septic tanks does not contaminate surface water and/or groundwater sources.

4. **Containment of children's faeces:** Give particular attention to the disposal of children's faeces, as they are commonly more dangerous than those of adults (excreta-related infection among children is frequently higher and children may not have developed antibodies to infections). Parents and care-givers should be provided with information about safe disposal of infants' faeces, laundering practices and the use of nappies (diapers), potties or scoops for effectively managing safe disposal.

#### Excreta disposal standard 2: Appropriate and adequate toilet facilities

People have adequate, appropriate and acceptable toilet facilities, sufficiently close to their dwellings, to allow rapid, safe and secure access at all times, day and night.

#### Key actions (to be read in conjunction with the guidance notes)

- ▶ Consult and secure the approval of all users (especially women and people with limited mobility) on the siting, design and appropriateness of sanitation facilities (see guidance notes 1–4 and Protection Principles 1–2 on pages 33–36).
- ▶ Provide the affected people with the means, tools and materials to construct, maintain and clean their toilet facilities (see guidance notes 6–7).
- ▶ Provide an adequate supply of water for hand washing and for toilets with flush and/or hygienic seal mechanisms, and appropriate anal cleansing material for use in conventional pit latrines (see guidance notes 7–8).

#### Key indicators (to be read in conjunction with the guidance notes)

- ▶ Toilets are appropriately designed, built and located to meet the following requirements:
  - they can be used safely by all sections of the population, including children, older people, pregnant women and persons with disabilities (see guidance note 1)
  - they are sited in such a way as to minimise security threats to users, especially women and girls, throughout the day and the night (see guidance note 3 and Protection Principle 1, guidance notes 1–6 on pages 33–34).



- they provide a degree of privacy in line with the norms of the users (see guidance note 3)
  - they are sufficiently easy to use and keep clean and do not present a health hazard to the environment. Depending on the context, the toilets are appropriately provided with water for hand washing and/or for flushing (see guidance notes 7–8)
  - they allow for the disposal of women’s menstrual hygiene materials and provide women with the necessary privacy for washing and drying menstrual hygiene materials (see guidance note 9)
  - they minimise fly and mosquito breeding (see guidance note 7)
  - they are provided with mechanisms for desludging, transport and appropriate disposal in the event that the toilets are sealed or are for long-term use and there is a need to empty them (see guidance note 11)
  - in high water table or flood situations, the pits or containers for excreta are made watertight in order to minimise contamination of groundwater and the environment (see guidance note 11).
- ▶ A maximum of 20 people use each toilet (see guidance notes 1–4 and Appendix 3: Minimum numbers of toilets at public places and institutions in disaster situations).
  - ▶ Separate, internally lockable toilets for women and men are available in public places, such as markets, distribution centres, health centres, schools, etc. (see guidance note 2 and Protection Principles 1–2 on pages 33–36).
  - ▶ Toilets are no more than 50 metres from dwellings (see guidance note 5).
  - ▶ Use of toilets is arranged by household(s) and/or segregated by sex (see guidance notes 2–5).
  - ▶ All the affected population is satisfied with the process of consultation and with the toilet facilities provided and uses them appropriately (see guidance notes 1–10).
  - ▶ People wash their hands after using toilets and before eating and food preparation (see guidance note 8).

### Guidance notes

1. **Acceptable facilities:** Successful excreta disposal programmes depend on an understanding of people’s varied needs and their participation. It may not be possible to make all toilets acceptable to all groups. Special toilets may need to be constructed for children, older people and persons with disabilities, e.g. toilets with seats or hand rails or provision of bed pans, potties or commodes. The type of sanitation facility adopted depends on the time of the intervention, the preferences and cultural habits of the intended users,

the existing infrastructure, the availability of water (for flushing and water seals), the soil formation and the availability of construction materials. Different excreta disposal types for different phases of a disaster response are listed in the table below.

### Possible alternatives for safe excreta disposal

	Safe excreta disposal type	Application remarks
1	Demarcated defecation area (e.g. with sheeted-off segments)	First phase: the first two to three days when a huge number of people need immediate facilities
2	Trench latrines	First phase: up to two months
3	Simple pit latrines	Plan from the start through to long-term use
4	Ventilated improved pit (VIP) latrines	Context-based for middle- to long-term response
5	Ecological sanitation (Ecosan) with urine diversion	Context-based: in response to high water table and flood situations, right from the start or middle to long term
6	Septic tanks	Middle- to long-term phase

2. **Public toilets:** In public places, toilets are provided with established systems for proper and regular cleaning and maintenance. Disaggregated population data are used to plan the number of women’s cubicles to men’s using an approximate ration of 3:1. Where possible, urinals should be provided (see Appendix 3: Minimum numbers of toilets at public places and institutions in disaster situations).
3. **Family toilets:** Family toilets are the preferred option where possible. One toilet for a maximum of 20 people should be the target. Where there are no existing toilets, it is possible to start with one for 50 people and lowering the number of users to 20 as soon as possible. In some circumstances, space limitations make it impossible to meet these figures. In such cases, advocate strongly for extra space. However, it should be remembered that the primary aim is to provide and maintain an environment free from human faeces.
4. **Shared facilities:** Households should be consulted on the siting and design, and the responsible cleaning and maintenance of shared toilets. Generally, clean latrines are more likely to be frequently used. Efforts should be made to provide people living with chronic illnesses such as HIV and AIDS with





easy access to a toilet as they frequently suffer from chronic diarrhoea and reduced mobility.

5. **Safe facilities:** Inappropriate siting of toilets may make women and girls more vulnerable to attack, especially during the night. Ensure that women and girls feel and are safe when using the toilets provided. Where possible, communal toilets should be provided with lighting, or households provided with torches. The input of the community should be sought with regard to ways of enhancing the safety of users (see Protection Principles 1–2 on pages 33–36).
6. **Use of local building material and tools:** The use of locally available material for construction of latrines is highly recommended. It enhances the participation of the affected population to use and maintain the facilities. Providing the population with construction tools will also support this aim.
7. **Water and anal cleansing material:** Water should be provided for toilets with water flush and/or hygienic seal mechanisms. For a conventional pit toilet, it may be necessary to provide toilet paper or other material for anal cleansing. Users should be consulted on the most culturally appropriate cleansing materials and their safe disposal.
8. **Hand washing:** Users should have the means to wash their hands with soap or an alternative (such as ash) after using toilets, after cleaning the bottom of a child who has been defecating, and before eating and preparing food. There should be a constant source of water near the toilet for this purpose.
9. **Menstruation:** Women and girls of menstruating age, including schoolgirls, should have access to suitable materials for the absorption and disposal of menstrual blood. Women and girls should be consulted on what is culturally appropriate. Latrines should include provision for appropriate disposal of menstrual material or private washing facilities (see Hygiene promotion standard 2, guidance notes 2 and 8 on pages 95–96).
10. **Desludging:** When appropriate, and depending on the need, desludging of toilets/septic tanks and excreta containers, including siting of final sewage disposal point, needs to be considered right from the start.
11. **Toilets in difficult environments:** In flood or urban disasters, the provision of appropriate excreta disposal facilities is usually difficult. In such situations, various human waste containment mechanisms, such as raised toilets, urine diversion toilets, sewage containment tanks and the use of temporary disposable plastic bags with appropriate collection and disposal systems, should be considered. These different approaches need to be supported by hygiene promotion activities.

## 5. Vector control

A vector is a disease-carrying agent and vector-borne diseases are a major cause of sickness and death in many disaster situations. Mosquitoes are the vector responsible for malaria transmission, which is one of the leading causes of morbidity and mortality. Mosquitoes also transmit other diseases, such as yellow fever, dengue and haemorrhagic fever. Non-biting or synanthropic flies, such as the house fly, the blow fly and the flesh fly, play an important role in the transmission of diarrhoeal disease. Biting flies, bedbugs and fleas are a painful nuisance and in some cases transmit significant diseases such as murine typhus, scabies and plague. Ticks transmit relapsing fever, while human body lice transmit typhus and relapsing fever. Rats and mice can transmit diseases, such as leptospirosis and salmonellosis, and can be hosts for other vectors, e.g. fleas, which may transmit Lassa fever, plague and other infections.

Vector-borne diseases can be controlled through a variety of initiatives, including appropriate site selection and provision of shelter, water supply, excreta disposal, solid waste management and drainage, provision of health services (including community mobilisation and health promotion), use of chemical controls, family and individual protection, and effective protection of food stores. The nature of vector-borne disease is often complex and addressing vector-related problems may demand specialist attention. However, there is often much that can be done to help prevent the spread of such diseases with simple and effective measures, once the disease, its vector and their interaction with the population have been identified.

### Vector control standard 1: Individual and family protection

All disaster-affected people have the knowledge and the means to protect themselves from disease and nuisance vectors that are likely to cause a significant risk to health or well-being.

**Key actions** (to be read in conjunction with the guidance notes)

- ▶ Raise the awareness of all affected people who are at risk from vector-borne diseases about possible causes of vector-related diseases, methods of transmission and possible methods of prevention (see guidance notes 1–5).



- ▶ Help the affected population to avoid exposure to mosquitoes during peak biting times by using all non-harmful means (such as bed nets, repellent lotions, etc.) that are made available to them (see guidance note 3).
- ▶ Pay special attention to the protection of high-risk groups such as pregnant and feeding mothers, babies, infants, older people, those with restricted mobility and the sick (see guidance note 3).
- ▶ Carry out control of human body lice where louse-borne typhus or relapsing fever is a threat (see guidance note 4).
- ▶ Ensure that bedding and clothing are aired and washed regularly (see guidance note 4).

### Key indicators (to be read in conjunction with the guidance notes)

- ▶ All populations have access to shelters that do not harbour or encourage the growth of vector populations and are protected by appropriate vector control measures (see guidance notes 3–5).
- ▶ All populations at risk from vector-borne disease understand the modes of transmission and take action to protect themselves (see guidance notes 1–5).
- ▶ All people supplied with insecticide-treated mosquito nets use them effectively (see guidance note 3).
- ▶ All food stored at the household level is protected from contamination by vectors such as flies, insects and rodents (see guidance note 4).

### Guidance notes

1. **Defining vector-borne disease risk:** Decisions about vector control interventions should be based on an assessment of potential disease risk, as well as on clinical evidence of a vector-borne disease problem. Factors influencing this risk include:
  - immunity status of the population, including previous exposure, nutritional stress and other stresses. Movement of people (e.g. refugees, internally displaced people (IDPs)) from a non-endemic to an endemic area is a common cause of epidemics
  - pathogen type and prevalence, in both vectors and humans
  - vector species, behaviours and ecology
  - vector numbers (season, breeding sites, etc.)
  - increased exposure to vectors: proximity, settlement pattern, shelter type, existing individual protection and avoidance measures.

2. **Indicators for vector control programmes:** Commonly used indicators for measuring the impact of vector control activities are vector-borne disease incidence rates (from epidemiological data, community-based data and proxy indicators, depending on the response) and parasite counts (using rapid diagnostic kits or microscopy).
3. **Individual malaria protection measures:** If there is a significant risk of malaria, the systematic and timely provision of protection measures is recommended, such as insecticide-treated materials, e.g. tents, curtains and bed nets. Impregnated bed nets have the added advantage of giving some protection against body and head lice, fleas, ticks, cockroaches and bedbugs. Long-sleeved clothing, household fumigants, burning coils, aerosol sprays and repellents are among other protection methods that can be used against mosquitoes. It is vital to ensure that users understand the importance of protection and how to use the tools correctly so that the protection measures are effective. Where resources are scarce, they should be directed at individuals and groups most at risk, such as children under 5 years old, non-immunes and pregnant women.
4. **Individual protection measures for other vectors:** Good personal hygiene and regular washing of clothes and bedding are the most effective protection against body lice. Infestations can be controlled by personal treatment (powdering), mass laundering or delousing campaigns and by treatment protocols as newly displaced people arrive in a settlement. A clean household environment, together with good waste disposal and good food storage (cooked and uncooked), will deter rats, other rodents and insects (such as cockroaches) from entering houses or shelters.
5. **Water-borne diseases:** People should be informed of health risks and should avoid entering bodies of water where there is a known risk of contracting diseases such as schistosomiasis, Guinea worm or leptospirosis (transmitted by exposure to mammalian urine, especially that of rats – see Appendix 4: Water- and excreta-related diseases and transmission mechanisms). Agencies may need to work with the affected population to find alternative sources of water or ensure that water for all uses is appropriately treated.



## Vector control standard 2: Physical, environmental and chemical protection measures

The environment where the disaster-affected people are placed does not expose them to disease-causing and nuisance vectors, and those vectors are kept to a reduced level where possible.

### Key actions (to be read in conjunction with the guidance notes)

- ▶ Settle the displaced populations in locations that minimise their exposure to vectors, especially mosquitoes (see guidance note 1).
- ▶ Clear and/or modify vector breeding and resting sites where practicable (see guidance notes 2–4).
- ▶ Undertake intensive fly control in high-density settlements when there is a risk or the presence of a diarrhoea epidemic (see guidance note 2).
- ▶ Provide working referral mechanisms for people infected with malaria for early diagnosis and treatment (see guidance note 5).

### Key indicators

- ▶ The population density of mosquitoes is kept low to avoid the risk of excessive transmission levels and infection (see guidance note 4).
- ▶ Fewer people are affected by vector-related health problems (see guidance notes 1–5).

### Guidance notes

1. **Site selection** is important in minimising the exposure of the affected population to the risk of vector-borne disease. This should be one of the key factors when considering possible sites. With regard to malaria control, for example, camps should be located 1–2 kilometres upwind from large breeding sites, such as swamps or lakes, whenever an additional clean water source can be provided (see Shelter and settlement standard 2, guidance notes 5–9 on pages 256–257).
2. **Environmental and chemical vector control:** There are a number of basic environmental engineering measures that can be taken to reduce the opportunities for vector breeding. These include the proper disposal of human and animal excreta (see Excreta disposal section on page 105), proper disposal of refuse in order to control flies and rodents (see Solid waste management section on page 117), drainage of standing water, and clearing unwanted

vegetation cover around open canals and ponds to control mosquitoes (see Drainage section on page 121). Such priority environmental health measures will have some impact on the population density of some vectors. It may not be possible to have sufficient impact on all the breeding, feeding and resting sites within a settlement or near it, even in the longer term, and localised chemical control measures or individual protection measures may be needed. For example, spraying infected spaces may reduce the number of adult flies and prevent a diarrhoea epidemic, or may help to minimise the disease burden if employed during an epidemic.

3. **Designing a response:** Vector control programmes may have no impact on disease if they target the wrong vector, use ineffective methods or target the right vector in the wrong place or at the wrong time. Control programmes should initially aim to address the following objectives: reduce vector population density; reduce human – vector contact; and reduce vector breeding sites. Poorly executed programmes can be counterproductive. Detailed study and, often, expert advice are needed and should be sought from national and international health organisations. In addition, local advice should be sought on local disease patterns, breeding sites, seasonal variations in vector numbers and incidence of diseases, etc.
4. **Environmental mosquito control:** Environmental control aims primarily at eliminating mosquito breeding sites. The three main species of mosquitoes responsible for transmitting disease are *Culex* (filariasis), *Anopheles* (malaria and filariasis) and *Aedes* (yellow fever and dengue). *Culex* mosquitoes breed in stagnant water loaded with organic matter such as latrines, *Anopheles* in relatively unpolluted surface water such as puddles, slow-flowing streams and wells, and *Aedes* in water receptacles such as bottles, buckets, tyres, etc. Examples of environmental mosquito control include good drainage, properly functioning VIP (ventilated improved pit) latrines, keeping lids on the squatting hole of pit latrines and on water containers, and keeping wells covered and/or treating them with a larvicide (e.g. for areas where dengue fever is endemic).
5. **Malaria treatment:** Malaria control strategies that aim to reduce the mosquito population density should be carried out simultaneously with early diagnosis and treatment with effective anti-malarials. Such strategies will include eliminating breeding sites, reducing the mosquito daily survival rate and restricting the habit of biting humans. Campaigns to encourage early diagnosis and treatment should be initiated and sustained. An integrated approach, combining active case finding by trained outreach workers and treatment with effective anti-malarials, is more likely to reduce the malaria burden than passive case finding through centralised health services (see Essential health services – control of communicable diseases standard 2, guidance note 3 on page 315).



### Vector control standard 3: Chemical control safety

Chemical vector control measures are carried out in a manner that ensures that staff, the disaster-affected population and the local environment are adequately protected and that avoids creating chemical resistance to the substances used.

#### Key actions (to be read in conjunction with the guidance note)

- ▶ Protect chemical handling personnel by providing training, protective clothing, bathing facilities and restricting the number of hours they spend handling chemicals (see guidance note 1).
- ▶ Inform the disaster-affected population about the potential risks of the substances used in chemical vector control and about the schedule for application. Provide the population with protection during and after the application of poisons or pesticides, according to internationally agreed procedures (see guidance note 1).

#### Key indicators (to be read in conjunction with the guidance note)

- ▶ Accepted international standards and norms are followed in the choice of quality, storage and transport of chemicals for vector control measures. No adverse reactions are reported or observed due to vector control chemicals (see guidance note 1).
- ▶ All vector control chemicals are accounted for at all times (see guidance note 1).

#### Guidance note

1. **National and international protocols:** There are clear international protocols and norms, published by WHO, which should be adhered to at all times. These are protocols for both the choice and the application of chemicals in vector control, including the protection of personnel and training requirements. Vector control measures should address two principal concerns: efficacy and safety. If national norms with regard to the choice of chemicals fall short of international standards, resulting in little or no impact or endangering health and safety, then the agency should consult and lobby the relevant national authority for permission to adhere to the international standards.

## 6. Solid waste management

Solid waste management is the process of handling and disposal of organic and hazardous solid waste which, if unattended appropriately, can pose public health risks to the affected population and can have a negative impact on the environment. Such risks can arise from the breeding of flies and rodents that thrive on solid waste (see Vector control section on page 111) and the pollution of surface- and groundwater sources due to leachate from mixed household and clinical or industrial waste. Uncollected and accumulating solid waste and the debris left after a natural disaster may also create an ugly and depressing environment, which might help discourage efforts to improve other aspects of environmental health. Solid waste often blocks drainage channels and leads to an increased risk of flooding, resulting in environmental health problems associated with stagnant and polluted surface water. Waste pickers, who gain a small income from collecting recyclable materials from waste dumps, may also be at risk of infectious disease from hospital waste mixed with household waste.

### Solid waste management standard 1: Collection and disposal

The affected population has an environment not littered by solid waste, including medical waste, and has the means to dispose of their domestic waste conveniently and effectively.

#### Key actions (to be read in conjunction with the guidance notes)

- ▶ Involve the affected population in the design and implementation of the solid waste disposal programme (see guidance note 1).
- ▶ Organise periodic solid waste clean-up campaigns (see guidance note 1).
- ▶ Consider the potential for small-scale business opportunities or supplementary income from waste recycling (see guidance note 3).
- ▶ In conjunction with the affected population, organise a system to ensure that household waste is put in containers for regular collection to be burned or buried in specified refuse pits and that clinical and other hazardous wastes are kept separate throughout the disposal chain (see guidance note 3).



- ▶ Remove refuse from the settlement before it becomes a health risk or a nuisance (see guidance notes 2–6).
- ▶ Provide additional waste storage and collection facilities for host families, reflecting the additional waste accumulation in disaster situations.
- ▶ Provide clearly marked and appropriately fenced refuse pits, bins or specified area pits at public places, such as markets and fish processing and slaughtering areas (see guidance notes 3–6).
- ▶ Ensure there is a regular refuse collection system in place (see guidance notes 3–6).
- ▶ Undertake final disposal of solid waste in such a manner and place as to avoid creating health and environmental problems for the host and affected populations (see guidance notes 6–7).
- ▶ Provide personnel who deal with the collection and disposal of solid waste material and those involved in material collection for recycling with appropriate protective clothing and immunisation against tetanus and hepatitis B (see guidance note 7).
- ▶ In the event that the appropriate and dignified disposal of dead bodies is a priority need, coordinate with responsible agencies and authorities dealing with it (see guidance note 8).

#### Key indicators (to be read in conjunction with the guidance notes)

- ▶ All households have access to refuse containers which are emptied twice a week at minimum and are no more than 100 metres from a communal refuse pit (see guidance note 3).
- ▶ All waste generated by populations living in settlements is removed from the immediate living environment on a daily basis, and from the settlement environment a minimum of twice a week (see guidance notes 1–3).
- ▶ At least one 100-litre refuse container is available per 10 households, where domestic refuse is not buried on-site (see guidance note 3).
- ▶ There is timely and controlled safe disposal of solid waste with a consequent minimum risk of solid waste pollution to the environment (see guidance notes 4–6).
- ▶ All medical waste (including dangerous waste such as glasses, needles, dressings and drugs) is isolated and disposed of separately in a correctly designed, constructed and operated pit or incinerator with a deep ash pit, within the boundaries of each health facility (see guidance notes 4–7).

#### Guidance notes

1. **Planning and implementation:** Solid waste disposal should be planned and implemented in close consultation and coordination with the affected population and relevant agencies and authorities. This should start in the beginning of the intervention before a solid waste problem becomes a major health risk to the affected population. Depending on the context, periodic clean-up campaigns need to be organised in consultation with the population and responsible local authorities.
2. **Burial of waste:** If waste is to be buried on-site in either household or communal pits, it should be covered daily with a thin layer of earth to prevent it attracting vectors such as flies and rodents where it might become their breeding ground. If children's faeces/nappies are being disposed of, they should be covered with earth directly afterwards. Disposal sites should be fenced off to prevent accidents and access by children and animals. Care should be taken to prevent any leachate contaminating the groundwater.
3. **Refuse type and quantity:** Refuse in settlements varies widely in composition and quantity, according to the amount and type of economic activity, the staple foods consumed and local practices of recycling and/or waste disposal. The extent to which solid waste has an impact on people's health should be assessed and appropriate action taken if necessary. Household waste should be collected in refuse containers for disposal in a pit for burying or incineration. Where it is not possible to provide refuse containers for each household, communal refuse containers should be provided. Recycling of solid waste within the community should be encouraged, provided it presents no significant health risk. Distribution of commodities that produce a large amount of solid waste from packaging or processing on-site should be avoided.
4. **Medical waste:** Poor management of healthcare waste exposes the population, healthcare workers and waste handlers to infections, toxic effects and injuries. In a disaster situation, the most hazardous types of waste are likely to be infectious sharps and non-sharps (wound dressings, blood-stained cloth and organic matter such as placentas, etc.). The different types of waste should be separated at source. Non-infectious waste (paper, plastic wrappings, food waste, etc.) can be disposed of as solid waste. Contaminated sharps, especially used needles and syringes, should be placed in a safety box directly after use. Safety boxes and other infectious waste can be disposed of on-site by burial, incineration or other safe methods (see Health systems standard 1, guidance note 11 on page 300).
5. **Market waste:** Most market waste can be treated in the same way as domestic refuse. Slaughterhouse and fish-market waste may need special



treatment and facilities to deal with the liquid waste produced and to ensure that slaughtering is carried out in hygienic conditions and in compliance with local laws. Slaughter waste can often be disposed of in a large covered pit next to the abattoir or fish processing plant. Blood, etc., can be run from the abattoir or fish processing plant into the pit through a slab-covered channel (which should help reduce fly access to the pit). Water should be made available for cleaning purposes.

6. **Controlled tipping and/or sanitary landfill:** Large-scale disposal of waste should be carried out off-site through either controlled tipping or sanitary landfill. This method is dependent upon sufficient space and access to mechanical equipment. Ideally, waste that is tipped should be covered with earth at the end of each day to prevent scavenging and vector breeding.
7. **Staff welfare:** All involved in the collection, transport, disposal and recycling of solid waste should be provided with protective clothing, including at minimum gloves but ideally overalls, boots and protective masks. When necessary, immunisation against tetanus and hepatitis B should also be provided. Water and soap should be available for hand and face washing. Staff who come into contact with medical waste should be informed of the correct methods of storage, transport and disposal and the risks associated with improper management of the waste.
8. **Management of dead bodies:** The management and/or burial of dead bodies from natural disasters should be dealt with in an appropriate and dignified manner. It is usually handled by search and recovery teams, in coordination with responsible government agencies and authorities. The burial of people who have died due to communicable diseases also needs to be managed appropriately and in consultation and coordination with health authorities (see Health systems standard 1, guidance note 12 on page 300). Further information on how to deal with appropriate burial of dead bodies can be obtained from the materials in the References and further reading section.

## 7. Drainage

Surface water in or near settlements may come from household and water point wastewater, leaking toilets and sewers, rainwater or rising floodwater. The main health risks associated with surface water are contamination of water supplies and the living environment, damage to toilets and dwellings, vector breeding, and drowning. Rainwater and rising floodwaters can worsen the drainage situation in a settlement and further increase the risk of contamination. A proper drainage plan, addressing stormwater drainage through site planning and wastewater disposal using small-scale, on-site drainage, should be implemented to reduce potential health risks to the disaster-affected population. This section addresses small-scale drainage problems and activities. Large-scale drainage is generally determined by site selection and development (see Shelter and settlement standard 2, guidance note 5 on page 256).

### Drainage standard 1: Drainage work

People have an environment in which health risks and other risks posed by water erosion and standing water, including stormwater, floodwater, domestic wastewater and wastewater from medical facilities, are minimised.

#### Key actions (to be read in conjunction with the guidance notes)

- ▶ Provide appropriate drainage facilities so that dwelling areas and water distribution points are kept free of standing wastewater and that stormwater drains are kept clear (see guidance notes 1–2, 4–5).
- ▶ Seek an agreement with the affected population on how to deal with the drainage problem and provide sufficient numbers of appropriate tools for small drainage works and maintenance where necessary (see guidance note 4).
- ▶ Ensure that all water points and hand washing facilities have effective drainage to prevent muddy conditions (see guidance note 2).



### Key indicators (to be read in conjunction with the guidance notes)

- ▶ Water point drainage is well planned, built and maintained. This includes drainage from washing and bathing areas as well as water collection points and hand washing facilities (see guidance notes 2 and 4).
- ▶ There is no pollution of surface water and/or groundwater sources from drainage water (see guidance note 5).
- ▶ Shelters, paths and water and sanitation facilities are not flooded or eroded by water (see guidance notes 2–4).
- ▶ There is no erosion caused by drainage water (see guidance note 5).

### Guidance notes

1. **Site selection and planning:** The most effective way to control drainage problems is in the choice of site and the layout of the settlement (see Shelter and settlement standards 1–2 on pages 249–254).
2. **Wastewater:** Sullage or domestic wastewater is classified as sewage when mixed with human excreta. Unless the settlement is sited where there is an existing sewerage system, domestic wastewater should not be allowed to mix with human excreta. Sewage is difficult and more expensive to treat than domestic wastewater. At water points and washing and bathing areas, the creation of small gardens to utilise wastewater should be encouraged where possible. Special attention needs to be paid to prevent wastewater from washing and bathing areas contaminating water sources.
3. **Drainage and excreta disposal:** Special care is needed to protect toilets and sewers from flooding in order to avoid structural damage and leakage.
4. **Promotion:** It is essential to involve the affected population in providing small-scale drainage works as they often have good knowledge of the natural flow of drainage water and of where channels should be. Also, if they understand the health and physical risks involved and have assisted in the construction of the drainage system, they are more likely to maintain it (see Vector control section on page 111). Technical support and tools may then be needed.
5. **On-site disposal:** Where possible, and if favourable soil conditions exist, drainage from water points, washing areas and hand washing points should be on-site rather than via open channels, which are difficult to maintain and often clog. Simple and cheap techniques such as soak pits or the planting of banana trees can be used for on-site disposal of wastewater. Where off-site disposal is the only possibility, channels are preferable to pipes. Channels should be designed both to provide flow velocity for dry-weather sullage and to carry stormwater. Where the slope is more than 5 per cent, engineering

techniques must be applied to prevent excessive erosion. Drainage of residuals from any water treatment processes should be carefully controlled so that people cannot use such water and it does not contaminate surface or groundwater sources.



# Appendix 1

## Water supply, sanitation and hygiene promotion initial needs assessment checklist

This list of questions is primarily for use to assess needs, identify indigenous resources and describe local conditions. It does not include questions to determine external resources needed in addition to those immediately and locally available.

### 1 General

- ▶ How many people are affected and where are they? Disaggregate the data as far as possible by sex, age, disability, etc.
- ▶ What are people's likely movements? What are the security factors for the affected population and for potential relief responses?
- ▶ What are the current, prevalent or possible water- and sanitation-related diseases? What is the likely extent and expected evolution of problems?
- ▶ Who are the key people to consult or contact?
- ▶ Who are the vulnerable people in the population and why?
- ▶ Is there equal access for all to existing facilities including at public places, health centres and schools?
- ▶ What special security risks exist for women, girls and vulnerable people?
- ▶ What water and sanitation practices were the population accustomed to before the disaster?
- ▶ What are the formal and informal power structures (e.g. community leaders, elders, women's groups)?
- ▶ How are decisions made in households and in the community?

### 2 Hygiene promotion

- ▶ What water and sanitation practices were the population accustomed to before the disaster?
- ▶ What practices are harmful to health, who practises these and why?
- ▶ Who still practises positive hygiene behaviour and what enables and motivates them to do this?
- ▶ What are the advantages and disadvantages of any proposed changes in practice?
- ▶ What are the existing formal and informal channels of communication and outreach (community health workers, traditional birth attendants, traditional healers, clubs, cooperatives, churches, mosques, etc.)?
- ▶ What access to the mass media is there in the area (radio, television, video, newspapers, etc.)?
- ▶ What local media organisations and/or non-governmental organisations (NGOs) are there?
- ▶ What segments of the population need to be targeted (mothers, children, community leaders, community kitchen workers, etc.)?
- ▶ What type of outreach system would work in this context (volunteers, health clubs, committees, etc.) for both immediate and medium-term mobilisation?
- ▶ What are the learning needs of hygiene promotion staff and volunteers?
- ▶ What non-food items are available and what are the most urgent based on preferences and needs?
- ▶ How effective are hygiene practices in health facilities (particularly important in epidemic situations)?

### 3 Water supply

- ▶ What is the current water supply source and who are the present users?
- ▶ How much water is available per person per day?
- ▶ What is the daily/weekly frequency of the water supply availability?
- ▶ Is the water available at the source sufficient for short-term and longer-term needs for all groups in the population?
- ▶ Are water collection points close enough to where people live? Are they safe?
- ▶ Is the current water supply reliable? How long will it last?





- ▶ Do people have enough water containers of the appropriate size and type?
- ▶ Is the water source contaminated or at risk of contamination (microbiological or chemical/radiological)?
- ▶ Is there a water treatment system in place? Is treatment necessary? Is treatment possible? What treatment is necessary?
- ▶ Is disinfection necessary, even if the supply is not contaminated?
- ▶ Are there alternative sources of water nearby?
- ▶ What traditional beliefs and practices relate to the collection, storage and use of water?
- ▶ Are there any obstacles to using available water supply sources?
- ▶ Is it possible to move the population if water sources are inadequate?
- ▶ Is it possible to tanker water if water sources are inadequate?
- ▶ What are the key hygiene issues related to water supply?
- ▶ Do people have the means to use water hygienically?
- ▶ In the event of rural displacement, what is the usual source of water for livestock?
- ▶ Will there be any environmental effects due to possible water supply intervention, abstraction and use of water sources?
- ▶ What other users are currently using the water sources? Is there a risk of conflict if the sources are utilised for the new populations?

#### 4 Excreta disposal

- ▶ What is the current defecation practice? If it is open defecation, is there a designated area? Is the area secure?
- ▶ What are current beliefs and practices, including gender-specific practices, concerning excreta disposal?
- ▶ Are there any existing facilities? If so, are they used, are they sufficient and are they operating successfully? Can they be extended or adapted?
- ▶ Is the current defecation practice a threat to water supplies (surface- or groundwater) or living areas and to the environment in general?
- ▶ Do people wash their hands after defecation and before food preparation and eating? Are soaps or other cleansing materials available?
- ▶ Are people familiar with the construction and use of toilets?

- ▶ What local materials are available for constructing toilets?
- ▶ Are people prepared to use pit latrines, defecation fields, trenches, etc.?
- ▶ Is there sufficient space for defecation fields, pit latrines, toilets, etc.?
- ▶ What is the slope of the terrain?
- ▶ What is the level of the groundwater table?
- ▶ Are soil conditions suitable for on-site excreta disposal?
- ▶ Do current excreta disposal arrangements encourage vectors?
- ▶ Are there materials or water available for anal cleansing? How do people normally dispose of these materials?
- ▶ How do women manage issues related to menstruation? Are there appropriate materials or facilities available for this?
- ▶ Are there any specific facilities or equipment available for making sanitation accessible for persons with disabilities or people immobile in medical facilities?
- ▶ What environmental consideration should be assessed?

#### 5 Vector-borne diseases

- ▶ What are the vector-borne disease risks and how serious are they?
- ▶ Are there traditional beliefs and practices (for example, the belief that malaria is caused by dirty water) that relate to vectors and vector-borne disease? Are any of these beliefs or practices either useful or harmful?
- ▶ If vector-borne disease risks are high, do people at risk have access to individual protection?
- ▶ Is it possible to make changes to the local environment (by drainage, scrub clearance, excreta disposal, refuse disposal, etc.) to discourage vector breeding?
- ▶ Is it necessary to control vectors by chemical means? What programmes, regulations and resources exist for vector control and the use of chemicals?
- ▶ What information and safety precautions need to be provided to households?

#### 6 Solid waste management

- ▶ Is accumulated solid waste a problem?



- ▶ How do people dispose of their waste? What type and quantity of solid waste is produced?
- ▶ Can solid waste be disposed of on-site or does it need to be collected and disposed of off-site?
- ▶ What is the normal practice of solid waste disposal for the affected population (compost and/or refuse pits, collection system, bins, etc.)?
- ▶ Are there medical facilities and activities producing waste? How is this disposed of? Who is responsible?
- ▶ Where are menstrual pads disposed of and is their disposal discreet and effective?
- ▶ What is the effect of the current solid waste disposal on the environment?

## 7 Drainage

- ▶ Is there a drainage problem, e.g. flooding of dwellings or toilets, vector breeding sites, polluted water contaminating living areas or water supplies?
- ▶ Is the soil prone to water logging?
- ▶ Do people have the means to protect their dwellings and toilets from local flooding?
- ▶ Are water points and bathing areas well drained?

# Appendix 2

## Minimum water quantities for institutions and other uses

Health centres and hospitals	5 litres per outpatient 40–60 litres per inpatient per day Additional quantities may be needed for laundry equipment, flushing toilets, etc.
Cholera centres	60 litres per patient per day 15 litres per carer per day
Therapeutic feeding centres	30 litres per inpatient per day 15 litres per carer per day
Reception/transit centres	15 litres per person per day if stay is more than one day 3 litres per person per day if stay is limited to day-time
Schools	3 litres per pupil per day for drinking and hand washing (Use for toilets not included: see Public toilets below)
Mosques	2–5 litres per person per day for washing and drinking
Public toilets	1–2 litres per user per day for hand washing 2–8 litres per cubicle per day for toilet cleaning
All flushing toilets	20–40 litres per user per day for conventional flushing toilets connected to a sewer 3–5 litres per user per day for pour-flush toilets
Anal washing	1–2 litres per person per day
Livestock	20–30 litres per large or medium animal per day 5 litres per small animal per day



## Appendix 3

### Minimum numbers of toilets at public places and institutions in disaster situations

Institution	Short term	Long term
Market areas	1 toilet to 50 stalls	1 toilet to 20 stalls
Hospitals/medical centres	1 toilet to 20 beds or 50 outpatients	1 toilet to 10 beds or 20 outpatients
Feeding centres	1 toilet to 50 adults 1 toilet to 20 children	1 toilet to 20 adults 1 toilet to 10 children
Reception/transit centres	1 toilet to 50 individuals; 3:1 female to male	
Schools	1 toilet to 30 girls 1 toilet to 60 boys	1 toilet to 30 girls 1 toilet to 60 boys
Offices		1 toilet to 20 staff

Source: Adapted from Harvey, Baghri and Reed (2002)

## Appendix 4

### Water- and excreta-related diseases and transmission mechanisms

<b>Water-borne or water-washed</b>	Cholera, shigellosis, diarrhoea, salmonellosis, etc. Typhoid, paratyphoid, etc. Amoebic dysentery, giardiasis Hepatitis A, poliomyelitis, rotavirus, diarrhoea	<b>Faecal-oral bacterial</b> <b>Faecal-oral non-bacterial</b>	Water contamination Poor sanitation Poor personal hygiene Crop contamination
<b>Water-washed or water-scarce</b>	Skin and eye infections Louse-borne typhus and louse-borne relapsing fever		Inadequate water Poor personal hygiene
<b>Excreta-related helminths</b>	Roundworm, hookworm, whipworm etc.	<b>Soil-transmitted helminths</b>	Open defecation Ground contamination
<b>Beef and pork tapeworms</b>	Taeniasis	<b>Man-animal</b>	Half-cooked meat Ground contamination
<b>Water-based</b>	Schistosomiasis, Guinea worm, clonorchiasis, etc.	<b>Long stay in infected water</b>	Water contamination
<b>Water-related insect vector</b>	Malaria, dengue, sleeping sickness, filariasis, etc.	<b>Biting by mosquitoes, flies</b>	Bite near water Breed near water
<b>Excreta-related insect vectors</b>	Diarrhoea, dysentery	<b>Transmitted by flies and cockroaches</b>	Dirty environment



# Appendix 5

## Minimum hygiene, sanitation and isolation activities for cholera treatment centres (CTCs)

### Essential principles that all health facilities and CTCs must follow:

1. Isolate severe cases
2. Contain all excreta (faeces and vomit)
3. Have only one carer per patient
4. Wash hands with chlorinated water
5. All floors must be washable
6. Disinfect feet when leaving the centre
7. Disinfect clothes of infected people before leaving the centre (by boiling or disinfection)
8. Provide regular cleaning of floors and all areas of the centre
9. Provide separate toilets and bathing areas for patients and carers
10. Prepare food in the centre. If brought from outside, food should be transferred from container at the gate to prevent the container taking cholera-causing micro-organisms (vibrio) out of the centre after use
11. Follow up on the families and relatives of the patient, ensure there are no other cases. Disinfect the house and give hygiene information
12. If people arrive by public transport, disinfect the vehicles
13. Contain and treat run-off from rain and wastewater within the isolation camp area
14. Treat waste within the isolation camp area.

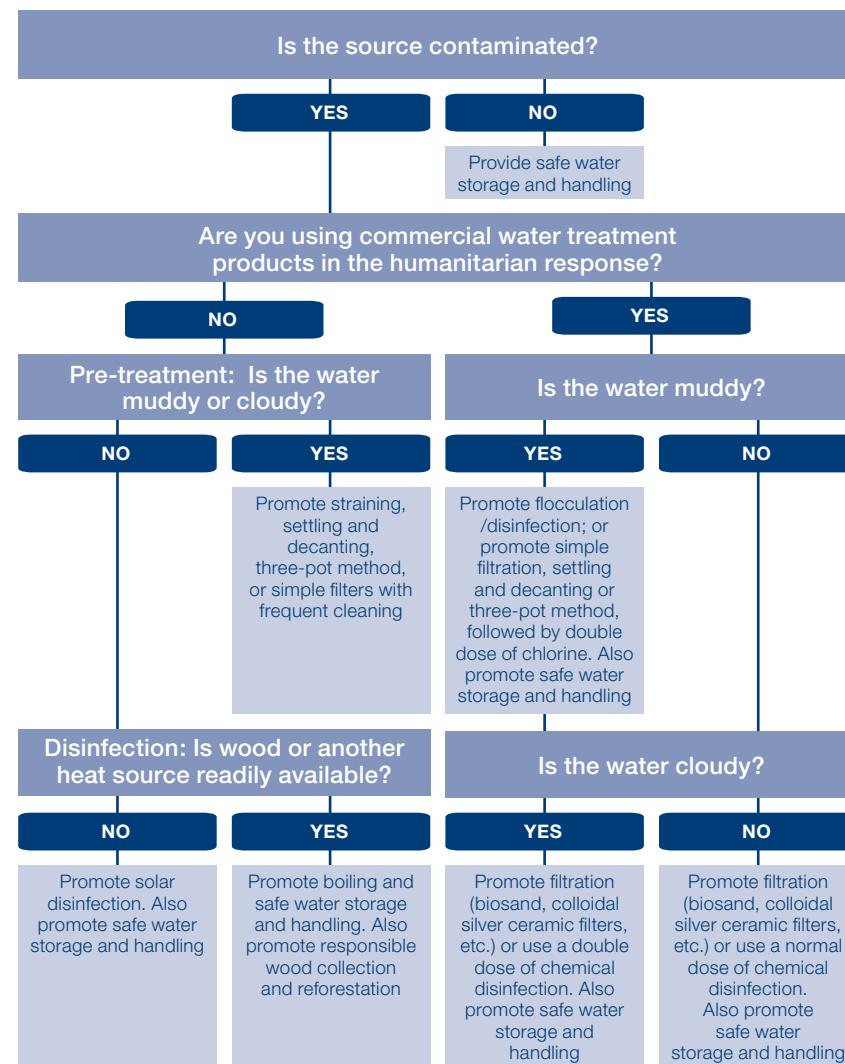
### Chlorine solutions for CTCs

Chlorine % for different uses	2% solution	0.2% solution	0.05% solution
	Waste and excreta Dead bodies	Floor Objects / beds Footbaths Clothes	Hands Skin

NB: The solutions should be freshly prepared every day, since light and heat weaken the solution

# Appendix 6

## Household water treatment and storage decision tree



Source: Adapted from IFRC (2008), Household water treatment and safe storage in emergencies manual.



# References and further reading

## Sources

### International legal instruments

The Right to Water (articles 11 and 12 of the International Covenant on Economic, Social and Cultural Rights), CESCR, General Comment 15, 26 November 2002. UN Doc. E/C.12/2002/11. Committee on Economic, Social and Cultural Rights.

### General

Davis, J and Lambert, R (2002), *Engineering in Emergencies: A Practical Guide for Relief Workers*. Second Edition. RedR/IT Publications. London.

Inter-Agency Network for Education in Emergencies (INEE) (2010), *Minimum Standards for Education in Emergencies, Chronic Crises and Early Reconstruction*. New York. [www.ineesite.org](http://www.ineesite.org)

Médecins sans Frontières (1994), *Public Health Engineering in Emergency Situations*. First Edition. Paris.

Walden, VM, O'Reilly, M and Yetter, M (2007), *Humanitarian Programmes and HIV and AIDS; A practical approach to mainstreaming*. Oxfam GB. Oxford. [www.oxfam.org.uk/what\\_we\\_do/emergencies/how\\_we\\_work/resources/health.htm](http://www.oxfam.org.uk/what_we_do/emergencies/how_we_work/resources/health.htm)

### Sanitary surveys

British Geological Survey (2001), *ARGOSS manual*. London. [www.bgs.ac.uk](http://www.bgs.ac.uk)

### Gender

Inter-Agency Standing Committee (IASC) (no date), *Gender and Water, Sanitation and Hygiene in Emergencies*. IASC Gender Handbook. Geneva. [www.humanitarianreform.org/humanitarianreform/Portals/1/cluster%20approach%20page/clusters%20pages/WASH/Gender%20Handbook\\_Wash.pdf](http://www.humanitarianreform.org/humanitarianreform/Portals/1/cluster%20approach%20page/clusters%20pages/WASH/Gender%20Handbook_Wash.pdf)

## Hygiene promotion

Almedom, A, Blumenthal, U and Manderson, L (1997), *Hygiene Evaluation Procedures: Approaches and Methods for Assessing Water- and Sanitation-Related Hygiene Practices*. The International Foundation for Developing Countries. Practical Action Publishing. UK.

Ferron, S, Morgan, J and O'Reilly, M (2007), *Hygiene Promotion: A Practical Manual for Relief and Development*. Practical Action Publishing. UK.

Humanitarian Reform Support Unit. WASH Cluster Hygiene Promotion Project. [www.humanitarianreform.org/humanitarianreform/Default.aspx?tabid=160](http://www.humanitarianreform.org/humanitarianreform/Default.aspx?tabid=160)

## Water supply

Action against Hunger (2006), *Water, Sanitation and Hygiene for Populations at Risk*. Paris. [www.actioncontrelafaim.org/english/](http://www.actioncontrelafaim.org/english/)

House, S and Reed, R (1997), *Emergency Water Sources: Guidelines for Selection and Treatment*. Water, Engineering and Development Centre (WEDC), Loughborough University. UK.

## Water needs for food security

Food and Agriculture Organization of the United Nations. *FAO Water*: [www.fao.org/nr/water/index.html](http://www.fao.org/nr/water/index.html)

## Livestock water needs

LEGS (2009), *Livestock Emergency Guidelines and Standards (LEGS)*. Practical Action Publishing. UK. [www.livestock-emergency.net/userfiles/file/legs.pdf](http://www.livestock-emergency.net/userfiles/file/legs.pdf)

## Water quality

World Health Organization (WHO) (2003), *Guidelines for Drinking-Water Quality*. Third Edition. Geneva. [www.who.int/water\\_sanitation\\_health/dwq/guidelines2/en/](http://www.who.int/water_sanitation_health/dwq/guidelines2/en/)

## Water safety plan

WHO (2005), *Water safety plans: managing drinking-water quality from catchment to consumer*. [www.who.int/water\\_sanitation\\_health/dwq/wsp0506/en/](http://www.who.int/water_sanitation_health/dwq/wsp0506/en/)



## Excreta disposal

Harvey, P (2007), Excreta Disposal in Emergency, An inter-agency manual. WEDC, Loughborough University, UK. <http://wedc.lboro.ac.uk/>

## Vector control

Hunter, P (1997), Waterborne Disease: Epidemiology and Ecology. John Wiley & Sons Ltd. Chichester, UK.

Lacarin, CJ and Reed, RA (1999), Emergency Vector Control Using Chemicals. WEDC, Loughborough University, UK.

Thomson, M (1995), Disease Prevention Through Vector Control: Guidelines for Relief Organisations. Oxfam GB.

## Solid waste

Centre for appropriate technology (2003), Design of landfill sites. [www.lifewater.org](http://www.lifewater.org)  
International Solid Waste Association: [www.iswa.org](http://www.iswa.org)

## Management of dead bodies

WHO (2009), Disposal of dead bodies in emergency conditions. Technical Note for Emergencies No. 8. Geneva. [http://wedc.lboro.ac.uk/resources/who\\_notes/WHO\\_TN\\_08\\_Disposal\\_of\\_dead\\_bodies.pdf](http://wedc.lboro.ac.uk/resources/who_notes/WHO_TN_08_Disposal_of_dead_bodies.pdf)

## Medical waste

Prüss, A, Giroult, E and Rushbrook, P (eds) (1999), Safe Management of Health-Care Wastes. (Currently under review.) WHO. Geneva.

## Drainage

Environmental Protection Agency (EPA) (1980), Design Manual: On-Site Wastewater Treatment and Disposal Systems, Report EPA-600/2-78-173. Cincinnati, USA.

## Further reading

### General

WHO and Pan American Health Organization (PAHO), Health Library for Disasters: [www.helid.desastres.net/en](http://www.helid.desastres.net/en)

WHO (2002), Environmental health in emergencies and disasters. Geneva.

## Excreta disposal

Harvey, PA, Baghri, S and Reed, RA (2002), Emergency Sanitation, Assessment and Programme Design. WEDC, Loughborough University, UK.

## Vector control

UNHCR (1997), Vector and Pest Control in Refugee Situations. Geneva.

Warrell, D and Gilles, H (eds) (2002), Essential Malariology. Fourth Edition. Arnold. London.

WHO, Chemical methods for the control of vectors and pests of public health importance. [www.who.int](http://www.who.int).

## Management of dead bodies

PAHO and WHO (2004), Management of Dead Bodies in Disaster Situations. Disaster Manuals and Guidelines Series, No 5. Washington DC. [www.paho.org/English/DD/PED/ManejoCadaveres.htm](http://www.paho.org/English/DD/PED/ManejoCadaveres.htm)

## Medical waste

WHO (2000), Aide-Memoire: Safe Health-Care Waste Management. Geneva.

WHO, Healthcare waste management: [www.healthcarewaste.org](http://www.healthcarewaste.org)

WHO, Injection safety: [www.injectionsafety.org](http://www.injectionsafety.org)

## Disability and general vulnerability

Jones, H and Reed, R (2005), Water and sanitation for disabled people and other vulnerable groups: designing services to improve accessibility. WEDC, Loughborough University, UK. <http://wedc.lboro.ac.uk/wsdp>

Oxfam GB (2007), Excreta disposal for physically vulnerable people in emergencies. Technical Briefing Note 1. Oxfam, UK. [www.oxfam.org.uk/resources/learning/humanitarian/downloads/TBN1\\_disability.pdf](http://www.oxfam.org.uk/resources/learning/humanitarian/downloads/TBN1_disability.pdf)

Oxfam GB (2007), Vulnerability and socio-cultural considerations for PHE in emergencies Technical Briefing Note 2. Oxfam, UK. [www.oxfam.org.uk/resources/learning/humanitarian/downloads/TBN2\\_watsan\\_sociocultural.pdf](http://www.oxfam.org.uk/resources/learning/humanitarian/downloads/TBN2_watsan_sociocultural.pdf)

