Water, Sanitation and Hygiene (WASH) in health-care facilities in emergencies

Edited by: John Adams, Yves Chartier, Ben Harvey and Dominique Maison
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These recommendations are dedicated to the memory of Yves Chartier who was tragically killed walking in the Jura Mountains near Geneva, on Sunday 8th January 2012, mid-way into their production. Fortunately, Yves had laid out a clear vision of how the guide should be finished and despite these terribly sad events we have tried to complete the recommendations to our best ability to honour the memory of an incredible man.

When remembering Yves, the overwhelming feeling is of great respect. For nearly three decades Yves worked in WASH in the humanitarian and development fields, initially with Médecins Sans Frontières (MSF) and later for the World Health Organization (WHO). He was one of a small group of professionals who, in the 1980-90s, helped to shape and raise the profile of WASH in emergencies, forming a practical approach to implementing basic but often overlooked water, sanitation and hygiene interventions. During his working careers, Yves authored or co-authored numerous manuals and guidelines and much of his work has subsequently influenced policy and practice in the WASH sector. As a result, he influenced and inspired a wide range of people—from refugees to health-care workers, from high-level decision-makers to academics, and improved the lives of huge numbers of individuals in hotspots around the world.

Yves death came suddenly, and ahead of its time, and left us with a sense that he still had much more that he wanted to do to help improve lives around the world. His death is a huge loss, not only for the professional WASH community, but for humanity.
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# Abbreviations and acronyms

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<tr>
<td>CAT</td>
<td>Comprehensive Assessment Tool</td>
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<tr>
<td>CTC</td>
<td>Cholera Treatment Centre</td>
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<tr>
<td>DPD</td>
<td>N.N-diethyl-p-phenylenediamine</td>
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<tr>
<td>DRR</td>
<td>Disaster Risk Reduction</td>
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<td>EEHSHC</td>
<td>Essential Environmental Health Standards in Health Care</td>
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<td>EH</td>
<td>Environmental Health</td>
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<td>GDWQ</td>
<td>Guidelines for Drinking Water Quality</td>
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<tr>
<td>GPS</td>
<td>Global Positioning System</td>
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<tr>
<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
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<tr>
<td>HTH</td>
<td>High Test Hypochlorite</td>
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<tr>
<td>IDP</td>
<td>Internally Displaced Person</td>
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<td>MoH</td>
<td>Ministry of Health</td>
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<tr>
<td>MSF</td>
<td>Médecins Sans Frontières</td>
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<tr>
<td>NGO</td>
<td>Non Governmental Organisation</td>
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<tr>
<td>O&amp;M</td>
<td>Operation and Maintenance</td>
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<tr>
<td>PPE</td>
<td>Personal Protective Equipment</td>
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<td>NTU</td>
<td>Nephelometric Turbidity Units</td>
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<td>RAT</td>
<td>Rapid Assessment Tool</td>
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<tr>
<td>TFC</td>
<td>Therapeutic Feeding Centre</td>
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<tr>
<td>TDS</td>
<td>Total Dissolved Solids</td>
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<td>TWG</td>
<td>Technical Working Group</td>
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<td>UN</td>
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<td>UNHCR</td>
<td>United Nations High Commissioner for Refugees</td>
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<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
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<td>WASH</td>
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1 Introduction

1.1 Purpose, scope and audience

This document contains recommendations for setting minimum Water, Sanitation and Hygiene (WASH) standards in health-care facilities in emergencies in order to provide an adequate and safe level of health-care in addition to minimizing the nosocomial risk to patients, staff and carers and the infectious risk to surrounding communities.

These recommendations have been written for use by emergency response actors, emergency response coordinating bodies, contingency planners, environmental health officers, and health-care facility staff including clinical staff, managers, sanitarians and health promoters. They can be used to:

- Develop specific national or sub-national emergency WASH minimum standards that are relevant to health-care settings in an emergency response.
- Rapidly assess WASH in health-care facilities in emergency situations including the extent to which facilities may fall short of standards.
- Plan emergency WASH interventions for new or temporary health-care facilities (such as cholera treatment centres or therapeutic feeding centres).
- Plan WASH improvements to existing permanent health-care facilities affected by the emergency.
- Monitor WASH interventions in health-care facilities throughout the course of the emergency.
- Prepare response and contingency plans for ensuring basic WASH and infection control in health-care facilities in emergencies.

These recommendations deal with key WASH aspects linked to emergencies in health-care facilities, such as preparedness, response planning, damage assessment, hazard assessment and provision of services. The recommendations deal with a number of technical aspects including water supply (water quality, quantity and access), excreta disposal, drainage, health-care waste management, cleaning and laundry, control of vector-borne disease, infection control and hygiene promotion (including food hygiene). They are designed primarily for use in health-care facilities in precarious situations, and in situations where simple and affordable measures can improve hygiene and health significantly.

The recommendations are intended to be used in relation to existing national standards and guidelines, for creating targets, policies, procedures and standards to be used for the emergency response at a national or sub-national level. In principle, standards are set at the national level and are used at district and local levels to set and work towards specific targets. The use of consistent standards, indicators and targets creates a common reference for the emergency response and at a basic level enables the quality of WASH services

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1 ‘Carers’ is used in these standards to mean family, friends or voluntary workers who accompany patients to a health-care facility and provide basic, non-professional care. Carers may be occasional visitors, or they may stay to cook, clean and care for patients in the health-care facility.
in health-care facilities to be measured, compared and possibly shared. In turn it may help define policies or priorities of action. This document has been written as a complement to the existing WHO publication Essential Environmental Health Standards in Health Care (2008). Whereas the EEHSHC document focuses on WASH in health-care facilities in low-cost settings, this document has been written to provide specific guidance for emergency response. These two documents share a similar approach and share many common WASH recommendations and indicators.

This document also complements much of the guidance provided in the WASH chapter of the SPHERE Project Humanitarian Charter and Minimum Standards in Humanitarian Response (2011). Whereas the WASH chapter of the SPHERE Guide is generally focused on emergency WASH interventions within communities, this document has been written to provide specific guidance for emergency WASH in health-care facilities.

1.2 Rationale for WASH in health-care facilities in emergencies

Health-care facilities play a vital role within the community, especially in low-income countries, by providing essential medical care to the sick, serving as resource centres for prevention, and serving as part of an early warning network of communicable diseases among others. For communities relying on them, their significance goes also far beyond other public facilities.

Any incident which causes loss of health-care infrastructure, loss of electrical power, loss of equipment, loss of staff or staff attrition, interruption to supply chains, or patient surge - such as sudden communicable disease epidemics, natural disasters (e.g. floods, earthquakes), or conflict - requires a holistic health response and recovery effort which includes actions to assess and restore basic WASH services.

In low-cost settings, health-care facilities may have struggled to adequately function during normal operation. Even well managed health-care facilities frequently operate at near capacity in order to remain cost efficient and even modest damage or unanticipated rise in admission volume can be overwhelming.

Effective functioning of health-care facilities depends on a number of different requirements, including safe and sufficient water, basic sanitation, adequate management of health-care waste, appropriate infection control measures and application of hygiene practices. Health-care facilities are environments with a high prevalence of infectious disease agents particularly during emergencies. Patients, staff, carers and neighbours of the health-care facility may face unacceptable risks of infection if health-care facilities are overcrowded and WASH services are inadequate. The health-care facilities might even become the epicentre of outbreaks of certain diseases, such as cholera or viral haemorrhagic fever.

During emergencies, demand for WASH services in the health-care facility may increase significantly, especially if there is a surge in the number of patients as a result of disease outbreak or trauma injuries related to the
emergency. Overcrowding of wards may contribute significantly to the increase in risks of disease transmission. There may be insufficient numbers of toilets, bathing facilities and handwashing stations to cope with demand. Health-care facilities may have insufficient numbers of support staff on hand to deal with additional infection control, cleaning, disinfection, and waste collection requirements.

In some emergency contexts, conflict or natural disaster damage may have interrupted water supply or excreta disposal services and critical WASH supplies such as disinfectants, detergents, soaps and cleaning materials may be in short supply and difficult to procure. In addition, electricity and fuel supplies may be disrupted, affecting water provision, sterilization, laundering and health-care waste disposal activities. In many low-cost settings, WASH services may have been woefully inadequate even before the emergency.

The minimum WASH standards in these recommendations are intended for use in all health-care facilities affected by emergencies regardless of the type or size of the facility or the emergency response context. Health-care facilities that may be affected, or established, during emergencies generally include:

**Central and district hospitals**

Central and district hospitals may be large or small and may be providing a range of outpatient and inpatient care. Disease transmission risks are substantial, given the presence of infectious patients and extended contact with other patients, staff and carers. The full range of WASH interventions covered by these recommendations needs to be provided.

**Rural, peri-urban and urban health centres**

Health centres may be large or small and may be providing a range of outpatient care and outreach activities include primary health-care. As there is normally less inpatient care, disease transmission risks are lower than in hospitals, however extra precautions may be required in health centres providing health-care in urban slums. The full range of WASH interventions covered by these recommendations needs to be provided.

**Temporary clinics or refugee or IDP clinics**

Temporary clinics or refugee or IDP clinics may be established in tents, under plastic sheeting, or inside temporary buildings and may be providing a range of outpatient care and primary health-care activities. Disease transmission risks may be higher due to overcrowding and a lack of adequate water, sanitation and shelter. The full range of WASH interventions covered by these recommendations needs to be provided as if the facilities were permanent structures.

**Mobile clinics**

During an emergency, mobile clinics may be established to provide outpatient care and outreach activities including primary health-care, if affected populations do not have the means to access services. Mobile clinics may provide health-care services in tents, under plastic sheeting, or inside temporary buildings. The relevant requirements for water supply, sanitation
and hygiene facilities and services covered by these recommendations needs to be provided to the same level as if the facilities were permanent structures.

**Cholera treatment centres (CTC) and cholera treatment units (CTU)**

Cholera treatment centres and smaller cholera treatment units provide inpatient care activities for patients with cholera. Disease transmission risks are very high and the full requirements for WASH interventions covered by these recommendations need to be provided.

**Therapeutic feeding centres**

Therapeutic feeding centres provide inpatient medical care for patients (generally children) that are severely malnourished. Disease transmission risks are high and the full requirements for WASH interventions covered by these recommendations need to be provided.

**Isolation areas**

Isolation areas are usually established within part of a health-care facility for emergency treatment of patients during outbreaks of infectious diseases such as cholera and viral hemorrhagic fevers. Disease transmission risks are high and the full requirements for WASH interventions covered by these recommendations need to be provided.

### 1.3 How to use this document

This document is organized into six main sections as follows:

- **Section 1** provides an overview of the purpose, scope and rationale for the recommendations.
- **Section 2** discusses how these recommendations may be used during an emergency response at national, district and local levels, and identifies roles and responsibilities of stakeholders.
- **Section 3** contains 9 recommendations, each of which is accompanied by a set of indicators (measures for whether the recommendations are met) and guidance notes (advice on applying the recommendations and indicators in practice, highlighting the most important aspects that need to be considered when setting priorities for action).
- **Section 4** provides a Rapid Assessment Tool (RAT) that can be used to quickly assess WASH conditions in health-care facilities including the extent to which health-care facilities may fall short of standards.
- **Section 5** contains a Comprehensive Assessment Tool (CAT) that can be used to assess key WASH related public health hazards along the water supply, excreta disposal, health-care waste, and infectious wastewater disposal chains from origin to point of disposal in addition to identifying and prioritizing critical control measures.
- **Section 6** describes WASH related disaster preparedness and risk reduction activities with an emphasis on ensuring that health-care facilities have resilience to withstand emergency hazards.

Specific terms are explained in the glossary (Section 7), and additional references can be found in the further reading list (Section 8).
This section highlights the importance of effective emergency coordination for WASH in health-care facilities during an emergency response. It also provides information on developing minimum WASH standards (including defining indicators and targets); coordinating the assessment of health-care facilities within the emergency affected area; analyzing the results of an assessment and prioritization of interventions; choosing appropriate technology for implementation; and ensuring ongoing monitoring, and information sharing.

2.1 Coordination of WASH in health-care facilities in emergencies

Responsibility for coordination, standards setting, assessment, prioritization, implementation, monitoring, and information sharing for WASH in health-care facilities in emergencies depends upon a number of factors including the presence and effectiveness of any existing coordination mechanisms, the scale of the emergency, the capacity National Governments and State Institutions including the Ministry of Health, the capacity of UN bodies, the capacity of the NGO community, and the anticipated duration of the emergency.

Ideally coordination of WASH in health-care facilities should be led or co-led by the national governmental department responsible for WASH in health-care facilities (typically the Department of Environmental Health within the Ministry of Health) however this is highly dependent on the existence and capacity of this body, in addition to the scale of the emergency. In some cases, responsibility for WASH in health-care facilities may be taken on by the body coordinating the Health emergency response. In other cases, it may be taken on by the body coordinating the WASH emergency response. Regardless of the coordination mechanisms, actors responding to the emergency in health-care facilities should be encouraged to take responsibility for providing a full package of support to health-care facilities that includes meeting the additional minimum requirements for WASH laid out in this document. If they are unable to provide the WASH aspects, they should identify an actor that is willing to support them either by providing WASH technical advice or by implementing and monitoring the WASH corrective measures on their behalf.

Whatever coordination structure exists, or is adopted by the response actors, it must be flexible enough to suit all stages of the emergency response and meet the needs and requirements of a variety of stakeholders. In general, the coordination body, focal agency, or assigned person should be responsible for the following activities:

- Coordinating the development of WASH in health-care facilities standards (including defining indicators and targets).
- Coordinating the development of WASH in health-care facilities assessment formats and assessment methodologies.
- Coordinating the implementation of WASH in health-care facilities assessments, analysis of results, and identification of priority actions.
• Coordinating development of policies and recommendations concerning appropriate WASH in health-care facilities technical interventions.
• Coordinating mapping of interventions 4Ws (Who, What, Where, When).
• Coordinating combined monitoring the quality and progress of the WASH in health-care facilities emergency response.
• Sharing and updating external partners and organizations on the quality and progress of the WASH in health-care facilities emergency response.
• Coordinating WASH in health-care facilities disaster preparedness and risk reduction activities.

During the response, coordination is likely to occur at several levels:

• National level – primarily high-level liaison and strategic decision making.
• Provincial level – primarily for technical and geographic coordination.
• District level – primarily for geographic coordination.
• Health-care facility level – primarily implementation and monitoring.

At all levels, coordination relies on efficient communication to be effective. Identification of a focal person at each level would greatly help in this regard.

2.2 Using the recommendations to set standards for the response

The recommendations in Chapter 3 reflect general WASH principles for providing adequate health-care and minimizing the associated infectious risk to patients, staff, carers and surrounding communities during an emergency. The recommendations, indicators and guidance notes can be used in their current format, or together with national standards and guidelines (where they exist), to create targets, policies, procedures and standards to be used at the national, sub-national, or individual health-care facility levels. The procedure for using the recommendations to set standards for the emergency response is as follows:

• Review the 9 recommendations, which are narrative statements describing the situation to be aimed for.

• Identify major areas that require attention in relation to specific recommendations. Consider on-site conditions that might affect the way that the recommendations are interpreted in practice. Note that any on-site constraints, such as lack of access, lack of funding, lack of staffing, or lack of a suitable water source, should not be taken into consideration at this stage. The aim is first to define appropriate standards required for the emergency response, then to seek ways to meet those standards, rather than defining limited standards that are insufficient.

• Use national standards or the indicators under each guideline to define specific targets or standards, such as the number of users per toilet or the quantity of water per person per day required. The indicators provide benchmarks that reflect current understanding of appropriate levels of service required to create and maintain healthy care environments in an emergency setting. The guidance notes provide advice on taking account of local conditions when using the indicators for setting specific targets or standards and on intermediate steps to reaching them.
The process of defining specific standards, indicators and targets should be transparent and should allow the full participation of all stakeholders. The process of obtaining consensus, while potentially time consuming, is a worthy investment if it results in ownership and actual implementation on the ground.

2.3 Assessing the condition of WASH in health-care facilities during an emergency

Once standards, indicators and targets have been defined, one of the main responsibilities of the WASH emergency coordinating body is to coordinate an assessment of the condition of health-care facilities affected by the emergency (sometimes referred to as a damage assessment) along with identifying any hazards to public health. The key steps are as shown in figure 2.1 below:

Figure 2.1 Key steps in assessment and implementation phases
Step 1 Prepare the WASH assessment methodology and tools

Depending upon the scale of the emergency, this may entail preparing and obtaining consensus around a common assessment tool, determining an appropriate assessment methodology, and coordinating emergency actors (identifying who assesses what, where, when and how). In disaster prone regions, assessment tools and methodologies may already have been defined as part of emergency preparedness activities. The type of assessment to be carried out generally depends on the level of time available and the level of detail required. Two assessment tools have been prepared to help with the assessment phase as part of this document.

The WASH in health-care facilities Rapid Assessment Tool (RAT)

The WASH in health-care facilities rapid assessment tool (RAT – see Chapter 4) is a short, two-page, survey tool that can be used by a non WASH specialist to quickly assess health-care facility related WASH services and sanitary hazards. The tool can also be used to survey multiple facilities at the same time and the hazard scoring system can help coordinating bodies and emergency WASH actors decide which health-care facilities contain the most severe hazards and should be prioritised.

The WASH in health-care facilities Comprehensive Assessment Tool (CAT)

The WASH in health-care facilities comprehensive assessment tool (CAT – see Chapter 5) is a longer, more detailed, 18 page survey tool that can be used as an aide memoire to help a WASH specialist systematically assess WASH services and hazards in a single health-care facility.

It should be noted that both of these tools have been designed to be used with any type and size of health-care facility in any emergency context. However, as these tools cover such a broad range of scenarios, they may require adaptation to the local context, especially if specific standards and targets have been defined for the emergency setting.

Step 2 Physically assess WASH systems and related hazards

Once an agreed assessment methodology and tools have been developed, the next steps are to:

- Assess the condition of health-care facility WASH systems and the interventions required to restore them back to service.
- Assess hazards to public health and control measures required to reduce their impact or likelihood.

The United Nations (2004) has broadly defined a hazard as “a dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage”.

If the rapid assessment tool (RAT) is used, the health-care facility is evaluated against a set of essential WASH indicators. The health-care facility is also given a hazard score based on WASH conditions, which the coordinating body and response actors may decide to use to compare facilities and identify those...
most in need. Control measures are identified to bring WASH services back to the levels described in the recommendations.

If the comprehensive assessment tool (CAT) is used, lists and checkboxes are used as an aide memoire to systematically document the existing condition of WASH infrastructure, including any damage and hazards, plus interventions required to bring them back to the levels described in the recommendations. When using the CAT, the individual WASH systems (water supply, excreta disposal, wastewater disposal, health-care waste disposal, vector control, infection control and hygiene promotion) should be fully assessed for current or potential public-health hazards starting from the source / point of creation (i.e. the water source in the case of water systems, the toilet block in the case of excreta disposal, or the consultation room in the case of health-care waste disposal) and moving through the steps in the system’s chain up to the point of final consumption or disposal (e.g. water point, septic tank, sewer or waste stabilization pond for excreta, or a sharps pit for sharps waste). In addition, basic water quality analysis and key informant interviews concerning WASH services are carried out to identify problems that may not be apparent from the visual assessment.

**Step 3 Analyse, prioritise and plan**

Once assessment data has been collected, the WASH in health-care facilities coordination body should organise analysis of the data, and should work with emergency response actors to prepare a coordinated action plan with priority health-care facilities to be targeted and priority control measures to be implemented. The coordinating body may choose to identify the health-care facilities with the highest need by ranking them using the RAT hazard scoring system.

Once a full understanding of the nature of the damage and hazards has been attained, a list of suitable control measures can be drafted to address the situation. Control measures are interventions which prevent, inactivate, remove or reduce hazards to acceptable levels. Control measures can include a wide range of activities and processes and can be technical, managerial, or behavioural. Determination of control measures to public health in health-care facilities in emergency settings should be carried out by an experienced WASH professional. Control measures are highly contextual and the user should apply their experience and common sense to come up with solutions that are appropriate for the emergency context.

During an emergency response it is better to take a phased approach and spend limited time and resources addressing the hazards in order of priority, starting with the extreme public health hazards (life threatening or potentially life threatening) first. It is typical that resources such as time, money, personnel, vehicles, fuel, WASH equipment (e.g. water bladders, compact water treatment units, pumps, chlorine dosers, mops, buckets, brushes), and WASH consumables (e.g. soap, chlorine, detergents, water purification tablets) are in short supply. In this case, it is essential that response interventions in health-care facilities are carefully planned in a phased manner to address the most critical gaps in the most critical health-care facilities. Later, when time and
resources allow, responding agencies may have the resources to carry out secondary interventions.

If resources are available, it is often prudent to carry out several control measures to address the same hazards, for example it is advised not only to quickly implement measures to chlorinate water supplies, but when time and resources allow to protect the water system infrastructure from contamination, and carry out water testing to ensure the control measures are effective.

Actors responding to the emergency should be willing to share information concerning their response capacity (in terms of WASH human resources and logistic capability) and WASH equipment and supplies. Where necessary, efforts should be made within the coordination mechanism to match WASH actors that have excess supplies to WASH actors that have excess capacity but lack WASH supplies. Actors responding to the emergency should also be willing to share information about their procurement pipelines (when and where they expect WASH equipment and materials to arrive) to allow for consolidated emergency response planning.

Box 2.1 below shows common essential emergency WASH control measures that can be taken to protect health as temporary measures in an emergency until adequate conditions are provided.

**Box 2.1**
**Essential emergency WASH control measures in health-care facilities**

- **Water quality.** Ensure that water for drinking, cooking, personal hygiene, medical activities, cleaning and laundry is treated and safe. Chlorine is the most commonly-used disinfectant for drinking-water in emergencies. When used in low-turbidity water, it is very effective at inactivating and destroying pathogens. All water supplies in health-care facilities, regardless of use, should be chlorinated so there is at least 0.5mg/l free chlorine residual at the tap. During diarrheal disease epidemics this should be increased to 1.0mg/l at the tap.

- **Water quantity.** Ensure that sufficient quantities of water are available for infection control activities, in addition to laundry, bathing, handwashing, drinking and medical procedures. This may require interventions to repair the water supply (or electrical or fuel supply if the water system requires power) or organising water tankering. It may also involve the installation of temporary water storage facilities such as demountable steel water tanks, bladder tanks or polyethylene tanks.

- **Handwashing.** Provide functional handwashing stations with water, soap and safe wastewater disposal in any locations where health-care is provided (wards, consulting rooms, delivery rooms, operating theatres, etc.) in addition to all service areas (kitchen, laundry, showers, toilets, sterilization, laboratory, waste zone and mortuary). This may be carried out using simple equipment, such as a jug of water, a basin and soap. If available, waterless, alcohol-based handrubs may be used for rapid, repeated decontamination of clean hands. However in all scenarios soap and water should be available for cleaning of soiled hands.

- **Water access and facilities.** Ensure that there are sufficient numbers and coverage of appropriate and functional water collection points. If the
health-care facility has inpatients, ensure there is access to sufficient numbers of appropriate laundering, drying and bathing facilities (one functional shower cubicle per 40 users).  

- **Excreta disposal.** Ensure that there are sufficient numbers of adequate, accessible, appropriate and safe toilets for staff, patients and carers that do not contaminate the health-care setting or water supplies (one functional toilet per 20 users). This can be as basic as providing pit latrines with reasonable privacy.  

- **Wastewater disposal.** Ensure that wastewater from handwashing, bathing, cleaning, or laundering is disposed rapidly and safely without contaminating the health-care setting, water supplies or surrounding communities. This can be as simple as installing simple soak-aways equipped with grease traps.  

- **Stormwater management.** Ensure that stormwater does not enter any areas where health-care is delivered, and does not carry potentially infectious material away from the health-care setting into the community. In practice this can be as simple as ensuring that drainage ditches exist, and they are unblocked, properly sized and functional.  

- **Cleaning and disinfecting.** Ensure that the health-care facility has sufficient materials (detergent, mops, buckets, chlorine) and staff to routinely clean and disinfect environmental surfaces. This can be as straightforward as providing additional materials, installing plastic sheeting to facilitate cleaning in temporary facilities, and training cleaning staff in infection control measures. Separate cleaning equipment should be provided for each room. A cleaning schedule should be established so that all areas of the health-care facility are cleaned and disinfected routinely and directly after spills.  

- **Health-care waste management.** Ensure safe segregation, collection, transport, treatment and disposal of health-care waste. This can be as simple as providing sufficient numbers of durable and safe colour-coded containers in all rooms where wastes are generated, creating a dedicated and fenced waste disposal zone, and ensuring staff have appropriate personal protective equipment and are trained in waste management.  

- **Overcrowding.** Ensure that wards are not overcrowded and there is at least 1-2m between beds to reduce droplet and contact based transmission risks. In emergencies this may require working with the health-care facility management to identify and establish new locations for temporary wards such as car parks, courtyards, or spare wards.  

- **Infection control training and personal protective equipment.** Ensure that all staff are correctly trained, are regularly updated in the infection control standard precautions, are properly vaccinated, and have sufficient and adequate personal protection equipment for the tasks they are carrying out (e.g. disposable gloves, single use plastic aprons, single use face masks, overalls, eye glasses, boots, thick gloves, gowns).  

- **Clinical handwashing.** Ensure that staff carry out clinical handwashing before and after every shift, directly before and after every patient contact (even if wearing gloves), directly after handling infectious materials, and when entering and leaving high risk areas such as delivery rooms, surgeries, isolation areas.  

- **Disease vector control.** Ensure patients, staff and carers are protected from disease vectors. This can be as simple as removing vector breeding
sites, ensuring kitchen and health-care wastes are properly disposed, installing window and door barriers, installing rodent traps, installing window and door screens, and installing insecticide treated mosquito nets in inpatient wards.

- **Food safety.** Ensure all food that is stored, prepared, and consumed by patients, staff, and carers is safe. This can be as simple as ensuring that raw and cooked foods are kept separate at appropriate storage temperatures, food handling is carried out with utmost cleanliness, food is thoroughly cooked, and safe, treated water is used in food preparation.

- **Hygiene promotion.** Ensure that patients, and carers are informed of essential hygiene behaviours repeatedly, starting 30 minutes on arrival.

- **Isolation areas.** Ensure that isolation areas (e.g. for Cholera or Viral Hemorrhagic Fever outbreaks) are fenced and have their own dedicated, functional and safe toilets, showers, laundry, changing area, and health-care waste disposal facilities. Ideally, the isolation area should be located away from the rest of the rest of the health-care facility.

- **Isolation area entrances and exits.** Ensure that entrances and exits of isolation areas have functional foot baths or sprayers with 0.2% chlorine, handwashing stations and permanent guards. This may involve providing basic equipment (handwashing stations, soap, backpack sprayers, chlorine, buckets, mixing spoons, bowls) and training guards to limit the number of people entering the isolation area in addition to ensuring everyone entering and leaving disinfects their hands and feet.

- **Disinfection of isolation area wastes.** Ensure that all infectious wastes, excreta and body fluids created in the isolation area are disinfected with 2% chlorine solution and disposed safely within the isolation area. Ensure that no potentially infectious wastewater flows out of the isolation area and no potential pathogenic reservoir including wastes, food, food containers, or soiled clothing is carried out of the area.

**Further practical guidance on carrying out these interventions can be found in Chapter 8 of this document – Further Reading.**

**Step 4 Implement control measures**

The coordinating body and responding agencies should prepare a clear implementation plan of control measures in terms of Who, What, Where, When and How. At each facility, the responding actors should know:

- Who will carry out the work (facility / agency / contractors / community)?
- What equipment (pumps, tanks, sprayers, buckets, basins), construction materials (cement, sand, gravel, valves, taps, pipes, plastic sheeting) and consumables (fuel, chlorine, alum, soap) will be required?
- How much will the control measures cost? Who will pay?
- What construction tools and equipment are needed to implement the control measures? (spades / mechanical excavators / cement mixers / wheel barrows / pipe threading machines / pipe welding machines)
- What skilled / unskilled labour is needed for the work?
- When will the control measures be carried out?
- Who will oversee implementation of the control measures?
• Who will carry out any operation and maintenance training aspects of the control measures?
• How and how often will the control measures be monitored?

When planning WASH interventions in health-care facilities it is generally recognized as best practice that a successful programme needs complimentary elements of i) hardware, ii) software, and iii) the enabling environment. All too often, emergency response programmes put too much emphasis on distributing hardware without considering software aspects (such as training), and enabling environment interventions (such as establishing protocols, or setting up monitoring systems).

Figure 2.2 The three pillars of WASH programming

Step 5 Establish operational monitoring programmes

A key requirement in identifying control measures is that their performance can be monitored. Thus, operational monitoring procedures should be established for each newly identified or existing control measure. Operational monitoring is used to assess the performance of individual control measures to ensure that they are working effectively, as designed. Monitoring frequencies should be selected to ensure that corrective actions can be introduced in a timely fashion to prevent loss of control and development of hazardous situations. Monitoring plans should address the following questions:

• What will be monitored?
• How will it be monitored?
• Where will it be monitored?
• How often will it be monitored?
• Who will do the monitoring?
• Who will receive the results and where?
• Who will implement any remedial responses?
Operational monitoring at the health-care facility level does not necessarily need to be complex and time-consuming. Rather it should take the form of a planned sequence of inspections of observable features such as checking turbidity and residual chlorine levels at the taps, checking that health-care waste containers are not overflowing, checking that toilet facilities are clean, checking there is soap available in all handwashing stations, checking there is no open defecation or health-care waste in the grounds, and checking that floors are mopped daily (see Table 2.1). Complaints of staff, patients could also be taken as signals to be checked, leading to ad hoc monitoring.

During the response, the coordinating body may ask actors to provide them with frequent (weekly, bi-monthly, monthly – depending on the nature of the response) reports on key WASH indicators so they can track the progress of the overall WASH in health-care facilities response. The coordinating body should consolidate information and may choose to circulate updated lists or maps of ongoing interventions 4Ws (Who is doing What, Where and When). They may also have the resources to carry out additional independent monitoring themselves.

2.4 Technology choice, operation and maintenance

During an emergency response, it is common for the WASH coordinating body to establish Technical Working Groups (TWGs) to produce guidance on technical or policy issues for the emergency response (for example technology choice or common policy for the response). These groups are typically issued with specific terms of reference (ToR) with clearly defined outputs and disband once the outputs delineated in the ToR have been achieved. Composition of such groups is usually determined through a self-selection process depending on available technical skills, interest, and capacities from responding actors. Recommendations on technology choice or policies from the TWG are typically presented at the WASH in health-care facilities coordination mechanism in plenary for final approval.

In general, emergency actors should take into consideration the operation, maintenance, repair and eventual replacement requirements for any WASH equipment used during the emergency phase. As far as possible, WASH equipment and facilities installed in health-care facilities should be durable enough to last beyond the post-emergency phase, and if possible should be able to be operated and maintained without specialist skills or equipment. Technology should be chosen taking account of local capacities for maintenance and repair (locally available spare parts). In some cases, it may be necessary to choose a lower level of service to avoid having equipment that cannot be repaired when it breaks down. For example, it may be better to use a simpler locally available water pump or water treatment unit rather than importing more complex models that cannot be repaired locally.

Responsibilities for operation and maintenance should be clearly defined, and appropriate expertise provided. Maintaining, repairing and replacing water supplies, sanitation, and health-care waste facilities should be planned and budgeted for from the beginning of an emergency programme.
2.5 Coordination within the health-care facility

At the health-care facility level, managing the various and interdependent aspects of any emergency WASH interventions should involve all staff, as well as representatives of patients and carers. Regardless of the size of the health-care facility, there should be a clearly identified committee or individual with responsibility for infection control along with the authority and resources required to address critical WASH issues as they arise. This committee or person may be responsible for all aspects of infection control, or may focus more specifically on water supply, sanitation, hygiene, and health-care waste management.

During the emergency response, the infection control committee should be charged with establishing a functional WASH monitoring system at the health-care facility level. This monitoring system should use a limited set of indicators that are easily and frequently measured (for example monitoring chlorine residual levels at water points, or presence of soap at handwashing stations – see table 2.1). Monitoring could be integrated into the daily activities of health-care facility staff so that items such as water or soap shortages at handwashing points are signalled immediately to caretakers or maintenance staff for action. If possible, standard recording forms should be used to allow data from all health-care facilities to be collated and compared. Non-compliant results should be immediately investigated, rectified, and if necessary procedures should be updated to prevent reoccurrence.

2.6 Staff requirements and training

Infection control is a critical element in an emergency response in a health-care facility and should be given a central place in any emergency refresher training and supervision of health-care workers and ancillary staff.

Many activities that are important for infection control are performed routinely by health-care workers as part of their health-care tasks such as hand hygiene, cleaning, disinfection and sterilizing. In larger facilities, other staff (such as cleaners, kitchen staff, sanitarians, maintenance crews, and waste technicians) are also responsible for infection control. In their training and management, they should be made aware of the importance of their role and should be able to apply the basic principles of infection control to their daily work. All staff should have their vaccinations up to date, and should have the necessary personal protective equipment to enable them to carry out their tasks safely.

Hygiene promotion during emergencies is a critical intervention for staff, patients and carers. They should be given constant reminders of the importance of infection control and the routine measures required to achieve it, e.g. through communication materials, such as posters, clearly showing the correct behaviours in critical locations such as entrances and exits of high risk areas (e.g. delivery rooms, surgeries, or isolation areas). Health promotion may be limited to providing basic information about such things as the location and correct use of toilets and handwashing points. Health-care workers have a primary role in this.
Table 2.1 Example health-care facility WASH monitoring matrix

<table>
<thead>
<tr>
<th>INDICATOR</th>
<th>PARAMETER</th>
<th>FREQUENCY</th>
<th>TARGET</th>
<th>VERIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Water quality</td>
<td>Water quality</td>
<td>Weekly</td>
<td>0 fcu/100ml</td>
<td>Water quality testing at 4 randomly selected water points.</td>
</tr>
<tr>
<td></td>
<td>Chlorine residual</td>
<td>Weekly</td>
<td>0.5mg/l – 1mg/l</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Turbidity</td>
<td>Weekly</td>
<td>&lt;5 NTU</td>
<td></td>
</tr>
<tr>
<td>2. Water quantity</td>
<td>No reported water shortages</td>
<td>Weekly</td>
<td>None</td>
<td>Interview with staff in every department.</td>
</tr>
<tr>
<td>3. Water access</td>
<td>Water available in every area</td>
<td>Weekly</td>
<td>100%</td>
<td>Visual inspection (turn on tap) of all water points.</td>
</tr>
<tr>
<td></td>
<td>where health-care is delivered and all</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>service areas.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Excreta disposal</td>
<td>All toilets clean and functional</td>
<td>Weekly</td>
<td>100%</td>
<td>Visual inspection of every toilet cubicle.</td>
</tr>
<tr>
<td></td>
<td>Health-care facility grounds free from</td>
<td>Weekly</td>
<td>100%</td>
<td>Observation walk around health facility perimeter.</td>
</tr>
<tr>
<td></td>
<td>open defecation.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Wastewater</td>
<td>All wastewater removed rapidly and</td>
<td>Weekly</td>
<td>100%</td>
<td>Observation inspection of all points where wastewater</td>
</tr>
<tr>
<td></td>
<td>safely</td>
<td></td>
<td></td>
<td>generated.</td>
</tr>
<tr>
<td></td>
<td>Health-care facility grounds free from</td>
<td>Weekly</td>
<td>100%</td>
<td>Observation walk around health facility perimeter.</td>
</tr>
<tr>
<td></td>
<td>standing water.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Health-care waste</td>
<td>Absence of health-care waste in</td>
<td>Weekly</td>
<td>100%</td>
<td>Observation walk around health facility perimeter.</td>
</tr>
<tr>
<td></td>
<td>facility grounds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Appropriate waste container in every</td>
<td>Weekly</td>
<td>100%</td>
<td>Observation of all points where health-care wastes are</td>
</tr>
<tr>
<td></td>
<td>location where health-care wastes</td>
<td></td>
<td></td>
<td>generated.</td>
</tr>
<tr>
<td></td>
<td>generated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No overflowing health-care waste</td>
<td>Weekly</td>
<td>100%</td>
<td>Observation of all points where health care wastes are</td>
</tr>
<tr>
<td></td>
<td>containers</td>
<td></td>
<td></td>
<td>generated.</td>
</tr>
<tr>
<td>7. Infection control</td>
<td>Floors mopped daily with detergent.</td>
<td>Weekly</td>
<td>100%</td>
<td>Observation of rooms where health-care delivered.</td>
</tr>
<tr>
<td></td>
<td>Each room with its own mop and bucket.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Staff wash hands with soap directly</td>
<td>Weekly</td>
<td>100%</td>
<td>Indiscrete observation of 4 randomly selected staff</td>
</tr>
<tr>
<td></td>
<td>before and after every patient contact</td>
<td></td>
<td></td>
<td>members.</td>
</tr>
<tr>
<td></td>
<td>At least one month stock of disposable</td>
<td>Weekly</td>
<td>100%</td>
<td>Observation of stocks</td>
</tr>
<tr>
<td></td>
<td>gloves, disposable aprons, face masks,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>overalls, boots, and protective glasses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>At least one month of chlorine, detergent</td>
<td>Weekly</td>
<td>100%</td>
<td>Observation of stocks</td>
</tr>
<tr>
<td></td>
<td>and soap.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Disease vectors</td>
<td>Absence of disease vectors in health-</td>
<td>Weekly</td>
<td>100%</td>
<td>Observation walk around health-care facility and</td>
</tr>
<tr>
<td></td>
<td>care facility or grounds</td>
<td></td>
<td></td>
<td>grounds.</td>
</tr>
<tr>
<td>9. Hygiene</td>
<td>Soap and water available in every area</td>
<td>Weekly</td>
<td>100%</td>
<td>Visual inspection of all handwashing stations.</td>
</tr>
<tr>
<td></td>
<td>where health-care is delivered and all</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>service areas.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Patients and carers informed of essential</td>
<td>Weekly</td>
<td>100%</td>
<td>Interview with 4 randomly selected in-patients (were you</td>
</tr>
<tr>
<td></td>
<td>hygiene behaviours within 30 minutes of</td>
<td></td>
<td></td>
<td>informed on essential hygiene behaviours on arrival?)</td>
</tr>
<tr>
<td></td>
<td>arrival.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
This section contains nine recommendations for setting minimum WASH standards in health-care facilities in emergencies. These recommendations, along with their accompanying indicators, can be used in an emergency in their current format, or can be quickly adapted to develop a national or sub-national WASH policy framework for the emergency response (see Chapter 2).

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Water quality</td>
<td>Water for drinking, cooking, personal hygiene, medical activities, cleaning and laundry is treated, disinfected and safe for the purpose intended.</td>
</tr>
<tr>
<td>2 Water quantity</td>
<td>Sufficient water is available throughout the health-care facility at all times for infection control, medical activities, cleaning, laundry, personal hygiene, drinking and food preparation purposes.</td>
</tr>
<tr>
<td>3 Water facilities and access to water</td>
<td>Sufficient water-collection points and water-use facilities are available in the health-care facility to allow convenient access to water for medical activities, infection control activities, drinking, personal hygiene, food preparation, laundry and cleaning.</td>
</tr>
<tr>
<td>4 Excreta disposal</td>
<td>Sufficient numbers of adequate, accessible, appropriate and safe toilets are provided for patients, staff and carers.</td>
</tr>
<tr>
<td>5 Wastewater disposal and site drainage</td>
<td>Health-care facility wastewater is disposed of rapidly and safely.</td>
</tr>
<tr>
<td>6 Health-care waste disposal</td>
<td>Health-care waste is segregated, collected, transported, treated and disposed of safely.</td>
</tr>
<tr>
<td>7 Infection control</td>
<td>Disease transmission is controlled and the health-care environment and equipment is kept clean, disinfected and sterilized as required.</td>
</tr>
<tr>
<td>8 Control of vector-borne disease</td>
<td>Patients, staff and carers are protected from disease vectors.</td>
</tr>
<tr>
<td>9 Handwashing and hygiene promotion</td>
<td>Sufficient functional handwashing facilities are available in the health-care setting and correct hygiene is encouraged by hygiene promotion activities and by management of staff, patients and carers.</td>
</tr>
</tbody>
</table>
3.1 Recommendations and associated information

The recommendations, indicators and guidance notes in this section are intended to be used, together with existing national standards and guidelines, for creating targets, policies, procedures and standards to be used for the emergency response at a national sub-national level.

3.1.1 Recommendation structure

The recommendations are given in the form of a qualitative statement that describes the minimum levels to be attained and maintained in an emergency response. Each recommendation is specified by a set of indicators that can be used as benchmark values for the following activities:

- Rapid assessment of existing situations
- Planning WASH interventions for new or temporary health-care facilities (such as cholera treatment centres or therapeutic feeding centres)
- Planning WASH improvements to existing health-care facilities
- Monitoring of emergency WASH interventions in health-care facilities.
- Preparing contingency plans.
- Planning risk-reduction activities.

3.1.2 Indicators

These are ‘signals’ that provide a way of measuring and communicating whether a recommendation has been attained. The indicators are based on WHO’s health-care guidelines in addition to a number of other documents that guide WASH practice in emergency response, and are presented in the reference list. These indicators need to be adapted in the light of national standards, local conditions and current practices. They mostly concern results and processes — for example, the quantity of water available (result) or the frequency of cleaning and disinfecting (process).

3.1.3 Guidance notes

The guidance notes provide advice on applying the recommendations and indicators in practice and highlight the most important aspects that need to be considered when setting priorities for action.
3.2 Recommendations

**Recommendation 1  Water quality**

Water for drinking, cooking, personal hygiene, medical activities, cleaning and laundry is treated, disinfected, and safe for the purpose intended.

**Indicators for Recommendation 1**

1. *Escherichia coli* or thermotolerant coliform bacteria are not detectable in any 100- millilitre sample of drinking-water at the health-care facility (see guidance note 1).

2. A sanitary survey of each step in the water chain indicates a low risk of faecal contamination (see guidance note 2).

3. All water supplies in the health-care facility, regardless of use, are treated with disinfectant so that there is a free chlorine residual of at least 0.5mg/l and turbidity is below 5 NTU (nephelometric turbidity units) at the tap. In the case of diarrhoeal epidemics, supplies should be disinfected so there is free chlorine residual of above 1mg/l at the tap (see guidance note 3).

4. Drinking-water meets WHO Guidelines for drinking-water quality (2011) or national standards concerning chemical guidelines and radiological parameters (see guidance note 4).

5. There are no tastes, odours or colours that would discourage consumption or use of the drinking-water (see guidance note 5).

**Guidance notes for Recommendation 1**

1. **Microbiological water quality**

Microbiological quality is of overriding importance for infection control in health-care facilities in emergencies. The water should not present a risk to health from pathogens and should be protected from further contamination inside the health-care facility itself. Drinking-water supplied to health-care facilities should meet national standards for microbiological quality and should follow WHO guidelines for drinking-water quality (WHO, 2011). In practice, this means that preferably the water supply should be from a protected and treated water source, such as a water distribution network, a borehole, spring, or protected dug well. Surface water should be adequately filtered and chlorinated. Rainwater may be acceptable on a temporary basis if it is adequately filtered, chlorinated and the rainwater catchment surface, guttering and storage tank are correctly operated, maintained and cleaned. Rainwater may not be a reliable solution for health-care facilities all year round and a more durable solution should be sought as soon as is possible.
2. **Sanitary survey**

A sanitary survey is an assessment of conditions and practices that may constitute a public health risk. The WASH in health-care facilities Rapid Assessment Tool (RAT) (see Chapter 4) can be used in an emergency to quickly assess possible sources of contamination to water supplies. When more time allows, the WASH in health-care facilities Comprehensive Assessment Tool (CAT) (see Chapter 5) should be used for a more in depth assessment of public health hazards along the water chain including the source, transport, storage, treatment and distribution around the health-care facility. The CAT also allows an assessment of public health hazards along the excreta disposal chains, health-care waste disposal chains, and wastewater disposal chains.

3. **Disinfection**

All water supplies in health-care facilities, regardless of use, should be treated with chlorine to drinking water standards. Exceptions may include water specifically prepared for specific medical purposes (for example dialysis), which should be specially prepared. Disinfection with chlorine is the most widely accepted and appropriate way of providing microbial safety in emergencies. High-Test-Hypochlorite (HTH), bleaching powder, liquid bleach, chlorine tablets and other sources of chlorine may be used, depending on local availability. To ensure adequate disinfection, a contact time of at least 30 minutes should be allowed between the moment the chlorine is added to the water and the moment the water is available for consumption or use. The free chlorine residual (the free form of chlorine remaining in the water) after the contact time should be between 0.5 and 1.0 mg/l (WHO, 2011) in all points of the system, including end-points. If the health-care facility is responding to diarrhoeal epidemics, the level of residual chlorine should be increased to above 1mg/l at end points (SPHERE, 2011). Residual chlorine can be measured with simple equipment (e.g. a colour comparator and DPD tablets).

Mains supply water may need supplementary chlorination to ensure adequate disinfection and a sufficient level of residual chlorine up to the point of consumption or use. Many mains water supplies do not achieve adequate water safety at the point of delivery, due to problems at the water treatment works and contamination in the distribution system. Stored water may also need supplementary chlorination before use.

Effective disinfection requires that the water has a low turbidity. Ideally, median turbidity should be below 1 nephelometric turbidity unit (NTU) (WHO, 2011). However, 5 NTU is the minimum turbidity measurable with simple equipment (turbidity tube), so this level may be used in emergency settings in practice. If turbidity exceeds 5 NTU then the water should be treated to remove suspended matter before disinfection, by sedimentation (with or without coagulation and flocculation) and/or filtration.

Filtration with ceramic (e.g. candle filters) and other technologies that can be used on a small scale may be appropriate for treating water in health-care facilities that are not connected to piped supplies, however the water should be chlorinated after filtration.
Practical guidance on how to carry out batch chlorination, drip chlorination, floating pot chlorination, and automatic chlorination dosing can be found in Section 8 of this document – further reading.

4. Chemical constituents

During an emergency response, chemical constituents in water supplies may be present in excess of WHO or national guidelines for drinking water quality, and it may not be possible, in the short term, to remove them or to find an alternative source of water. In this case, an assessment should be made of the risks caused to patients and staff, given the levels of contamination, the length of exposure (longer for staff than for patients), the degree of susceptibility of individuals (some patients may be highly susceptible to some contaminants) and the use (such as dialysis hygiene, or medical procedures). It may be necessary to provide alternative sources of drinking-water for certain groups or uses e.g. by tanker.

5. Acceptability

Drinking-water should be acceptable (taste, smell, colour) to patients and staff, or they may not drink enough, or may drink water from other, unprotected sources, which could be harmful to their health.

**Recommendation 2 Water quantity**

Sufficient water is available throughout the health-care facility at all times for infection control, medical activities, cleaning, laundry, personal hygiene, drinking and food preparation purposes.

**Indicators for Recommendation 2**

1. Sufficient water quantity is available to meet all the minimum daily requirements in the health-care facility (see guidance note 1).

2. Sufficient water storage volume is available on-site to provide the health-care facility with 24 hours of emergency backup supply (see guidance note 2).

**Guidance notes for Recommendation 2**

1. **Use of recommended minimum water quantities**

The recommended minimum daily water quantity guidance figures include water used for all purposes: medical procedures, infection control, cleaning, laundry, bathing, drinking, hand hygiene, and cooking. The figures should be used for planning and designing water supply systems. The actual quantities of water required will depend on a number of factors, such as climate, availability and type of water use facilities (including type of toilets), level of care and local water use practices. Although figures are provided for the isolation and treatment of patients with cholera, severe acute respiratory syndrome and viral haemorrhagic fever, these may account for relatively few hospitalizations.
However, when assessing a health-care facility or designing a new facility it is prudent to take into account possible increases in patient numbers.

Table 3.1, below, lists the recommended minimum quantity of water that is required for different situations in the health-care setting.

**Table 3.1 Recommended minimum water quantities for health-care facilities**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Quantity of Water Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff</td>
<td>5 litres/person/day</td>
</tr>
<tr>
<td>Outpatients</td>
<td>5 litres/consultation</td>
</tr>
<tr>
<td>Inpatients</td>
<td>40–60 litres/patient/day</td>
</tr>
<tr>
<td></td>
<td>15 litres/carer/day</td>
</tr>
<tr>
<td>Operating Theatre or Maternity Unit</td>
<td>100 litres/intervention</td>
</tr>
<tr>
<td>Dry or Supplementary Feeding Centre</td>
<td>0.5–5 litres/consultation (depend on waiting time)</td>
</tr>
<tr>
<td>Wet Supplementary Feeding Centre</td>
<td>15 litres/consultation</td>
</tr>
<tr>
<td>Inpatient Therapeutic Feeding Centre</td>
<td>30 litres/patient/day</td>
</tr>
<tr>
<td></td>
<td>15 litres/carer/day</td>
</tr>
<tr>
<td>Cholera Treatment Centre</td>
<td>60 litres/patient/day</td>
</tr>
<tr>
<td></td>
<td>15 litres/carer/day</td>
</tr>
<tr>
<td>Acute Respiratory Diseases Isolation Ward</td>
<td>100 litres/patient/day</td>
</tr>
<tr>
<td></td>
<td>15 litres/carer/day</td>
</tr>
<tr>
<td>Viral Hemorrhagic Fever Isolation Ward</td>
<td>300–400 litres/patient/day</td>
</tr>
<tr>
<td></td>
<td>15 litres/carer/day</td>
</tr>
</tbody>
</table>

2. **Sufficient water storage**

During emergencies it is essential that health-care facilities, whether temporary or permanent, have sufficient water storage for infection control and medical activities. On site water reservoirs should hold at least one full day of backup water in case of interruptions to supply, or conflict or natural disaster damage. Water storage at an existing facility can be increased through the installation of demountable steel tanks (Oxfam tanks), water bladders, or polyethylene tanks.

**Recommendation 3 Water facilities and access to water**

Sufficient water-collection points and water-use facilities are available in the health-care facility to allow convenient access to water for medical activities, infection control activities, drinking, personal hygiene, food preparation, laundry and cleaning.
Indicators for Recommendation 3

1. A functional water point is available in every area where health-care is delivered (wards, consulting rooms, delivery rooms, operating theatres, etc.) and all service areas (kitchen, laundry, showers, toilets, sterilization, laboratory, waste zone and mortuary).

2. At least two handwashing basins should be provided in wards with more than 20 beds (see guidance note 2).

3. There are sufficient showers available: one per 40 users for inpatient settings; at least four per outpatient setting (see guidance note 3).

4. Laundry facilities, with soap or detergent, hot water (if appropriate) and a disinfectant (such as chlorine solution), are available for inpatient settings (see guidance note 4).

Guidance notes for Recommendation 3

1. **Water points**

   During emergencies it is essential that there is a sufficiently high coverage of functional water points, in all places where health-care is delivered and in service areas, so that health-care facility staff, patients and carers can easily carry out infection control activities.

   A functional water point is defined as one with continuous supply of water (enough to fill a 20l bucket in under two minutes), soap, and safe disposal of wastewater adequately isolating both users and the environment from contamination.

2. **Handwashing facilities**

   If available, waterless, alcohol-based handrubs may be used for rapid, repeated decontamination of clean hands. However in all scenarios soap and water should be available for cleaning of soiled hands.

   Handwashing with soap is one of the most effective measures for infection control in a health-care setting, especially during emergencies. Water points should be sufficiently close to users to encourage them to use water as often as required. In emergencies, additional temporary handwashing facilities can be set up very simply using a drum of water with a simple tap, soap, and a large plastic laundry bowl for collecting the wastewater (to be disposed of in a safe soak pit that does not contaminate groundwater or the environment). Similarly a handwashing basin, soap and a jug of clean water may be moved around during ward rounds, to encourage handwashing.

   Handwashing facilities and their surroundings should be kept clean, free from dirt, and wastewater. Handwashing areas should be cleaned at least daily with detergent or 0.2% disinfectant solution (see recommendation 7 on infection control).
3. **Showering facilities**

In in-patient settings the recommended ratio of one shower per 40 users (patients, staff and carers) should be used as a planning guideline. However, if there is a rapid increase in the number of inpatients, or new health-care facilities are being constructed in response to the emergency, then this target may be relaxed in the short term with the aim of reaching it as soon as possible. Showers should be available sufficiently close to where health-care is being delivered for patients, and staff and carers in contact with infectious patients, or infectious wastes. Separate showers should be planned for staff and patients, and for both sexes, to ensure that all groups have adequate privacy and safety. Shower stalls should be large enough to allow the bathing of patients by carers.

In outpatient settings, a suitable arrangement is often as follows: one shower for male staff, one shower for female staff, one shower for male patients, and one shower for female patients.

In some emergency contexts (e.g. cold climates), piped hot water may be required and measures should be taken to avoid the proliferation of bacteria in the water system (e.g. *Legionella*, or *Pseudomonas*). For this reason, piped water throughout the hot water network should ideally be maintained at 50°C / 120°F\(^1\).

4. **Laundry facilities**

The ability for carers to safely launder and dry soiled bedding and clothing without contaminating the health-care facility, or community around the health-care facility, is an essential requirement for infection control in a health-care setting, especially during emergencies. Public laundry stations should be sufficiently close to encourage users to use them as often as required. Public laundering areas should provide sufficient privacy for the proper drying of undergarments and menstrual hygiene materials.

In emergencies, additional temporary laundry facilities and drying areas can be set up by installing paved areas close to water points, with safe managed drainage. Large plastic laundry bowls may be required to reduce wastage of water. Potentially infectious wastewater from the public laundering area should be disposed of in a safe soak pit that does not contaminate groundwater or the public environment. Exclusive facilities should be set up for infectious wards to avoid infectious materials leaving the isolation area.

In certain emergency contexts (e.g. cold weather, or cholera emergencies), provision of soap, detergent, and hot water for laundering may be required. Materials should be provided in isolation areas so that soiled bedding or clothing and bedding can be soaked in 0.2% chlorine solution before being rinsed, washed and dried as usual.

\(^1\) Specific cleaning and disinfection procedures against *Pseudomonas* and possibly *Legionella* have to be foreseen.
## Recommendation 4  Excreta disposal

Sufficient numbers of adequate, accessible, appropriate and safe toilets are provided for patients, staff and carers.

### Indicators for Recommendation 4

1. There are sufficient toilets available: one per 20 users for inpatient settings; at least four toilets per outpatient setting (see guidance note 1).

2. Toilets are designed to respond to local cultural and social conditions and all age and user groups (see guidance note 2).

3. A sanitary survey of the excreta disposal chain from point of origin to point of disposal indicates a low level of public health risk for health-care facility staff, patients or the environment at every stage. (see guidance note 3).

4. Toilets have convenient handwashing facilities close by (see guidance note 4).

5. Toilets are easily accessible and no more than 50m / 150ft from all users (see guidance note 5).

6. There is a cleaning and maintenance routine in operation that ensures that clean and functioning toilets are available at all times (see guidance note 6).

7. Toilets are appropriate for local technical and financial conditions (see guidance note 7).

8. The health-care facility grounds and environment is free from human faeces (see guidance note 8).

### Guidance notes for Recommendation 4

1. **Ratio of people per toilet**

In in-patient settings the recommended ratio of one toilet per 20 users (patients, staff and carers) is common and widespread, and should be used as a planning guideline. However, if there is a rapid increase in the number of inpatients, or new health-care facilities are being constructed in response to the emergency, then it is possible to start with one toilet for every 40 users lowering the ratio to one per 20 users as soon as possible. In some cases it may be possible to relax the coverage rate depending on the context, for example if a large proportion of inpatients are using bedpans instead of toilets. The number of women’s cubicles to men’s should be approximately 2:1 depending upon context. Where possible urinals should be provided for men.

In outpatient settings, a suitable arrangement is often as follows: one toilet for staff (two if separate toilets are required for male and female staff), one toilet...
for male patients, one toilet for female patients, and one child’s toilet. In larger outpatient settings, more toilets are required. The number required depends on a number of local factors, including the number of outpatients and the average time patients wait before consultations.

2. Social and cultural considerations

In most cases, separate toilets are required for men and women, and separate toilets should be provided for staff and patients. They should be clearly signposted to help users find them.

Health-care facilities have a high proportion of toilet users who are either sick, frail, heavily pregnant, elderly, or physically handicapped and it is essential that at least one emergency toilet in 3 is equipped to make it accessible to all users (see e.g. Jones and Reed, 2005 for detailed design features).

Special children’s toilets should be provided where many children use the health-care facility. Children’s toilets should generally be clean, light and welcoming for children with suitable support (hand rail), a smaller drop hole or pan than for adults, and space for an accompanying carer.

Toilets should be designed and equipped to respond to cultural practices (e.g. anal cleansing with water).

In health-care facilities where menstrual management materials are provided to inpatients, materials that appropriate to the culture and context should be provided in consultation with representatives of female patients.

3. Sanitary survey

The health-care facility excreta disposal chain may be very simple (e.g. a simple pit latrine, septic tank or sewer), however some systems may involve significant hazards such as hand emptying or transfer, sludge tankering, or uncontrolled dumping of sludge.

In general, all steps of the excreta disposal chain should be assessed so that public health hazards are minimised and excreta disposal systems do not become centres for disease transmission. Toilets should be regularly cleaned, should be free from flies and other disease vectors, and should adequately protect users and the environment from excreta. Latrine pits and septic tank infiltration systems should be at least 30m / 90ft from water sources and the bottom of the pits should be at least 1.5m / 5ft above the groundwater table.

The WASH in health-care facilities Rapid Assessment Tool (RAT) (see Chapter 4) can be used in an emergency to quickly assess excreta related public health hazards. When more time allows, the WASH in health-care facilities Comprehensive Assessment Tool (CAT) (see Chapter 5) should be used for a more in depth assessment of public health hazards along the excreta disposal chain including point of origin, conveyance, desludging, handling, storage, treatment and final disposal. In addition, the CAT can be used to assess other important factors including privacy, security and lighting of toilets.
4. **Handwashing points**

   Water points, with soap and adequate drainage, should be provided within 5m / 15ft of all toilets, and their use should be actively encouraged.

5. **Accessibility**

   All areas of the health-care facility should have a toilet within 50m / 150ft. Time and effort required to reach the toilets need to be taken into account. In multi-storey buildings, there should be toilets available on all floors, and routes used to reach toilets should be smooth and flat, for easy access for people in wheelchairs.

   Toilets in the health-care facility should be accessible 24 hours a day with adequate lighting, door locks, privacy, and clearly marked with locally recognized symbols for male and female.

6. **Cleaning and maintenance**

   Toilets should be cleaned at least twice per day with detergent and water, and whenever they are dirty. Disinfectant (0.2% chlorine) should be used on all exposed surfaces and a brush to remove visible soiling. Strong disinfectants should not be used in large quantities, as this is unnecessary, expensive, potentially dangerous, and may affect the decomposition process.

   In specific contexts (e.g. isolation for cholera patients), half a cup of 2% active chlorine solution is used to disinfect faeces or vomit. Usually the chlorine solution is already contained in the container that will receive the faeces or vomit from the patients in bed.

7. **Local technical and financial conditions**

   If there is sufficient and reliable piped water available and there is a connection to a sewer system or a functioning septic tank and drainage system, flush toilets may be appropriate, depending on materials used for anal cleansing. In other situations, latrines (dry or pour flush types) are appropriate.

8. **Open defecation**

   During an emergency, an influx of users may quickly render toilets unsanitary and some users may resort to open defecation. Open defecation in any setting is a serious public health hazard and if encountered, the health-care facility should start an immediate clean up and sensitization campaign in addition to constructing additional toilets and increasing numbers of cleaning staff.

   During some large influx emergencies, the grounds of public buildings, including health centres, may become occupied by displaced families. Hygiene promotion is an essential intervention in these scenarios, which should include explanations on the importance of defecating in a latrine and maintaining the environment free from excreta.

   Clean up of open defecation within the health-care facility grounds should be carried out by teams of trained sanitary workers equipped with shovels,
buckets with lids, backpack sprayers with 2% chlorine solution, and personal protective equipment (boots, gloves, overalls, aprons). Excreta should be collected in covered buckets and disposed into a safe latrine that does not contaminate the water table or the health-care facility environment. Tools, buckets, overalls, boots and gloves should be cleaned on-site in hot water with detergent followed by disinfecting by rinsing in 0.2% chlorine solution and air drying.

**Recommendation 5  Wastewater disposal and site drainage**

Health-care facility wastewater is disposed of rapidly and safely.

**Indicators for Recommendation 5**

1. Wastewater is removed rapidly and cleanly from the point where it is produced (see guidance note 1).

2. A sanitary survey of the wastewater disposal chain from point of origin to point of disposal indicates a low level of public health risk for staff, patients or the environment at every stage (see guidance note 2).

3. Rainwater and surface run-off is safely disposed of and does not carry contamination from the health-care facility to the outside surrounding environment (see guidance note 3).

**Guidance notes for Recommendation 5**

1. **Wastewater drainage systems**

   Wastewater is produced from washbasins, showers, sinks, etc. (grey water) and from flushing toilets (black water). Ideally, wastewater should be removed in standard waste drainage systems to off-site sewer or on-site disposal systems such as soakage pits and drain fields. During an emergency, wastewater disposal facilities may need to be extended or new soakage pits or infiltration trenches may need to be constructed to safely dispose of wastewater. All open wastewater drainage systems should be covered, to avoid the risks of disease vector breeding and contamination from direct exposure.

   Small quantities of infectious liquid wastes (e.g. blood or body fluids) may be poured into sinks or toilets. Most pathogens are inactivated by a combination of time, dilution and the presence of disinfectants in the wastewater.

2. **Sanitary survey**

   Wastewater disposal systems should be designed, built and maintained so that they adequately protect health-care facility users and the environment from infectious wastewater. The most appropriate wastewater disposal system for health-care facilities is a properly built and functioning sewer system, which is, in turn, connected to an adequate treatment plant or on-site retention system with treatment. However, in emergency situations, it may be necessary to use soakaway pits or infiltration trenches. These should be equipped with grease
traps, which should be checked weekly and cleaned, if needed, to ensure the systems operate correctly. Pits or trenches should not overflow into the health-care facility grounds or surroundings and create insect or rodent breeding sites. Black water should be disposed of in a septic tank, with the effluent discharged into a soakaway pit or infiltration trench. Grey and black water may be treated in the same septic tank and soakaway system, although this requires a larger septic tank than one used for black water alone. All systems that infiltrate wastewater into the ground should be sited so as to avoid contaminating groundwater. There should be at least 1.5m / 5ft between the bottom of the infiltration system and the groundwater table (more in coarse sands, gravels and fissured formations), and the system should be at least 30m / 90ft from any groundwater source.

In some emergency settings, grey water from simple handwashing stations may be collected in a basin and may be manually transported and disposed. All wastewater generated in a health-care environment should be treated as potentially infectious and wastewater that remains in the public environment should have chlorine added up to a 0.2% solution.

The WASH in health-care facilities Rapid Assessment Tool (RAT) (see Chapter 4) can be used in an emergency to quickly assess wastewater related public health hazards. When more time allows, the WASH in health-care facilities Comprehensive Assessment Tool (CAT) (see Chapter 5) should be used for a more in depth assessment of hazards along the wastewater disposal chain including point of origin, conveyance, treatment and final disposal.

3. Rainwater and surface run-off

Rainwater and surface run-off may be managed separately if the system in place for wastewater cannot cope with additional water from sudden heavy rains or rainwater and surface run-off. In that case, it must be managed in a way that does not carry contamination from the health-care facility to the outside surrounding. Correct, separate treatment of rainwater and surface run-off is particularly important for settings such as cholera treatment centres where there is a high prevalence of enteric pathogens that might be washed out of the isolation area into the local environment. Great care should be taken with surface water run-off if cholera patients are being treated in temporary structures in open spaces (e.g. health-care facility courtyards, car parks etc.).

<table>
<thead>
<tr>
<th>Recommendation 6</th>
<th>Health-care waste disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health-care waste is segregated, collected, transported, treated and disposed of safely.</td>
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</tr>
</tbody>
</table>

**Indicators for Recommendation 6**

1. Health-care waste is segregated at the point of generation according to its type, using four categories: sharps, non-sharps infectious waste, non-sharps non-infectious waste and hazardous waste (see guidance note 1).

2. Colour-coded waste containers or containers bearing clearly understood signs and symbols are provided at convenient locations. They are
collected from all health-care services and stored safely before treatment and/or disposal (see guidance note 2).

3. Each category of waste is treated and disposed of according to the safest feasible method available (see guidance note 3).

4. A specific waste-disposal zone exists, where wastes can be stored and disposed of safely and effectively (see guidance note 4).

5. A sanitary survey of the health-care waste disposal chains from point of origin to point of disposal indicates a low level of public health risk for health-care facility staff, patients or the environment at every stage (see guidance note 5).

6. The health-care facility grounds and environment is free from uncontained health-care waste (see guidance note 6).

7. Staff have sufficient and adequate waste handling equipment and personal protective equipment and are correctly trained to collect, handle and dispose of health-care wastes safely (see guidance note 7).

Guidance notes for Recommendation 6

1. Segregation

The four major categories of health-care waste recommended for organizing segregation and separate storage, collection and disposal are:

- sharps (needles, scalpels, etc.), which may be infectious or not
- non-sharps infectious waste (anatomical waste, pathological waste, dressings, used syringes, used single-use gloves)
- non-sharps non-infectious waste (paper, packaging, etc.)
- hazardous waste (expired drugs, laboratory reagents, radioactive waste, insecticides, etc.).

Regardless of the emergency setting or type of health-care facility (temporary or permanent) steps should be taken to ensure that waste is segregated and treated appropriately without risk to staff, patients or the public environment.

2. Storage and collection

In accordance with National and WHO Guideline recommendations, health-care waste should be collected in dedicated colour-coded and labelled containers according to its contents for safe handling. Colour-coding facilitates easy identification and segregation on the basis of waste hazard classification and suitability of treatment and disposal. Colour-coding also makes the segregation process understandable for low-skilled workers with limited literacy. It is essential that the adopted colour-coding system is used consistently throughout the health-care waste management chain (segregation, collection, storage, transport, and disposal) to avoid confusion and mismanagement of the waste.
Sharps should be placed immediately in yellow puncture-proof and covered safe sharps containers, which are regularly collected for disposal. Sharps are potentially the health-care waste item that represents the most acute potential hazard in a health-care facility. Hypodermic syringes should not be manipulated or dismantled after use and sharps boxes should be large enough so that hypodermic syringes can be inserted fully after use, complete with their needles. If puncture-resistant containers are not available, the health-care facility may choose to adapt existing puncture-resistant containers, such as empty water, oil, or bleach bottles made from sturdy plastic.

Non-sharps infectious wastes should be placed immediately in yellow or red waste bags or containers (15–40-litre capacity, with lids). Containers should be collected, emptied, cleaned, disinfected and replaced after each intervention (e.g. in an operating or maternity unit) or twice daily.

Non-sharps non-infectious black waste containers (20–60 litre capacity) should have fitting lids and should ideally be operated with a foot pedal to prevent contaminating hands. Waste containers should be lined with black coloured sacks and should be collected, emptied, cleaned and replaced daily. Temporary covered waste collection containers (e.g. buckets with covers, plastic drums etc.) may be used for the short-term in an emergency provided that they are durable, adequately labelled and sufficiently leak-proof to safely contain the waste from the point of creation to the point of disposal.

Waste containers for sharps and non-sharp infectious wastes should be available within easy arm’s reach of all locations where these wastes are generated. For non-sharp non-infectious wastes, it is recommended that there is at least one waste container in every room and at least one set of waste containers per 20 beds in a ward.

Hazardous waste should be collected and stored in appropriate and labelled containers placed in secure location. Overflowing waste containers is a sign of an insufficient number of containers, insufficient waste management staff, or poor waste management.

Health-care waste containers should be collected frequently, not waiting until they become full. When containers are collected, new or clean containers should be provided in return. Transportation of health-care wastes from the initial point of creation to a point of storage, treatment, or disposal should be done by means of trolleys or handcarts. Bins should be transported carefully to avoid spillage. Bags should be delicately handled by the neck, to prevent tearing and spillage. Any leakages or spills should be cleared up according to recommendation 7, guidance note 5 – clean up of blood and other body fluids.

3. Treatment and disposal

Sharps should be disposed of in a sharps pit (buried drums in small health centres or emergency structures; concrete-lined pits in other settings). In low-cost settings, burning with limited means is too complicated and too energy (fuel) consuming and it is recommended that sharps should be disposed of directly in a sharps pit. Off-site treatment in a centralised facility is not advisable for safety reasons but may be necessary in an urban area where on-site treatment is not feasible because of lack of space.
Non-sharps infectious waste should be buried on-site in a pit fitted with a sealed cover and ventilation pipe in small health-care facilities. Arrangements may be needed for disposing of placentas, according to local custom.

Non-sharps non-infectious waste should be buried in a pit or a landfill site. If space is limited, non-sharps non-infectious waste should be incinerated in a low-temperature incinerator (in emergency settings this may be a simple as an oil-drum type incinerator). Ashes and residues should be buried in a pit. Some wastes, such as pharmaceutical wastes, cannot be disposed of in low-cost settings and should be sent to a large centre for destruction or returned to the supplier. In all cases, national legislation should be followed.

4. Waste-disposal zone

The waste-disposal zone should be situated at least 50m / 150ft (preferably downhill and downwind) from any buildings or public areas. The site should be fenced off and locked and all pits should be adequately locked and covered. The waste-disposal zone should have a water point with soap or detergent and disinfectant for handwashing or to clean and disinfect containers and tools, with facilities for wastewater disposal into a soakaway system or sewer. Ideally there should be a storage area where tools and containers can be dried and stored. The waste-disposal zone should also be located at least 30m / 90ft from groundwater sources with any pits at least 1.5m / 5ft above the groundwater table. Where an incinerator is used, it should be located to allow effective operation with minimal local air pollution in the health centre, nearby housing and crops, and it should be large enough for extension if new pits or other facilities have to be built. Surface water run-on should be managed so that no surface water enters the waste disposal zone area (this may require a surface water diversion canal).

5. Sanitary survey

Staff, patients and the public environment should be protected from infectious wastes at every step along the health-care waste disposal chain. The WASH in health-care facilities Rapid Assessment Tool (RAT) (see Chapter 4) can be used in an emergency to quickly assess health-care waste related public health hazards. When more time allows, the WASH in health-care facilities Comprehensive Assessment Tool (CAT) (see Chapter 5) should be used for a more in depth assessment of hazards along the waste disposal chain including point of origin, conveyance, storage, treatment and final disposal.

6. Dumping of health-care wastes

During an emergency, disruption to health-care waste collection mechanisms or an influx of users may quickly overwhelm health-care facility waste collection and disposal mechanisms. Dumping of infectious health-care wastes in any setting is a serious public health hazard. If infectious health-care waste is encountered in the health-care facility grounds or close to the health-care facility, steps should be taken to start an immediate clean up operation and measures should be put in place to reinforce the health-care waste disposal systems.
7. **Personal protective equipment**

Personnel assigned to manage health-care waste should be properly trained and should wear adequate protective equipment (thick armoured gloves, thick soled boots, work overalls, aprons, masks, eye protection). They should have access to adequate cleaning equipment (brushes, shovels, mops, buckets, wheelbarrows, waste carts etc.) and cleaning supplies (detergents, disinfectants etc.), functional showers and soap. Tools, bins, buckets, overalls, boots and gloves should be cleaned on-site in hot water with detergent followed by disinfecting by rinsing in 0.2% chlorine solution and air drying.

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**Recommendation 7  Infection control**

Disease transmission is controlled and the health-care environment and equipment is kept clean, disinfected and sterilized as required.

**Indicators for Recommendation 7**

1. Staff have sufficient and adequate cleaning and disinfection equipment and personal protective equipment and are correctly trained in infection the infection control standard precautions (see guidance note 1).

2. Beds, floors, walls, toilets, showers, equipment, and surfaces are routinely cleaned and disinfected to ensure that the health-care environment is visibly clean, and free from dust, soil and pathogens. Medical equipment is cleaned, disinfected and sterilized as required (see guidance note 2).

3. Isolation areas have sufficient numbers of exclusive toilets, showers, laundry points and waste disposal facilities (see guidance note 3).

4. Disinfection of hands (with soap or 0.05% chlorine solution) and feet (spraying or footbaths with 0.2% chlorine) occurs at the entry and exit of isolation areas (see guidance note 4).

5. Any areas contaminated with blood, faeces, vomit or body fluids are cleaned and disinfected immediately (see guidance note 5).

6. Soiled linen is placed in appropriate bags at the point of generation and pre-disinfected, washed in water, rinsed and dried in a covered place. Clean and soiled linen are transported and stored separately, in different (marked) bags (see guidance note 6).

7. Beds, mattresses and pillows are changed and cleaned between patients and whenever soiled with body fluids. Beds in inpatient areas are no less than 1m apart (see guidance note 7).

8. Patients and carers are adequately advised of required personal infection control practices within 30 minutes of arrival at the health facility (see guidance note 8).
9. Dead bodies are adequately handled and managed to avoid infectious disease transmission (see guidance note 9).

**Guidance notes for Recommendation 7**

1. **Infection control equipment, supplies and training**

   Preventing the spread of infection to health-care facility staff, patients and visitors is absolutely essential and should be highlighted as an institutional priority. Implementing appropriate measures in normal, routine circumstances will strengthen infection control practice during emergencies. These measures should therefore be part of the health-care facility’s permanent infection prevention and control strategy. Management teams should review and, if necessary, revise the facility’s infection prevention and control protocols. All staff should have their vaccinations up to date, and should have sufficient and adequate personal protective equipment (disposable gloves, disposable aprons, eye protection, boots, face masks) for the tasks they are carrying out.

   All new staff should be trained in the infection control standard precautions for health-care workers (handwashing and antisepsis, use of personal protective equipment, handling of health-care wastes, and vaccination of health-care workers). Refresher trainings for existing staff should be carried out to sustain knowledge and raise awareness. Infection control posters should be positioned around the health-care facility in key areas to act as visual reminders. All staff, once sufficiently trained and equipped, should be sanctioned for non-compliance with reasonable procedures. Senior staff should provide role models by complying consistently with procedures.

   Disposable gloves should be worn for invasive procedures, contact with sterile sites and non-intact skin or mucous membranes, and all activities that have been assessed as carrying a risk of exposure to blood, body fluids, secretions or excretions, or to sharp or contaminated instruments. Disposable gloves should be worn as single-use items. They should be put on immediately before an episode of patient contact or treatment and removed as soon as the activity is completed. Disposable gloves should be changed between caring for different patients, and between different care or treatment activities for the same patient. Disposable gloves should be disposed of as clinical waste and hands decontaminated with soap and water after the gloves have been removed.

   Disposable aprons should be worn when there is a risk that clothing may be exposed to blood, body fluids, secretions or excretions, with the exception of sweat. Plastic aprons should be worn as single-use items, for one procedure or episode of patient care, and then discarded and disposed of as clinical waste.

   Face masks and eye protection should be worn where there is a risk of blood, body fluids, secretions or excretions splashing into the face and eyes. Respiratory protective equipment, for example a surgical mask or particulate filter mask, should be worn when there is a risk of respiratory infection.

   All medical staff should wash their hands with soap and water:
   
   - Before and after a shift.
• Directly before and after every patient contact (including non-invasive procedures, attending to patients, and aseptic procedures such as changing dressing or giving injections) – even when wearing gloves.
• Directly after handling infectious materials or disposing of body fluids – even when wearing gloves.
• When entering and leaving high-risk areas such as delivery rooms, surgeries, isolation areas.

Sharing of towels can result in contamination. Health-care facilities should provide single use paper towels. If they are not available, cloth towels can be used once and then laundered or staff and patients should air-dry their hands.

All health-care facilities should have sufficient and adequate cleaning (brushes, mops, buckets, cloths, detergents etc.), disinfecting (chlorine etc.) and sterilizing equipment (e.g. steam or heat based autoclaves). Staff preparing chlorine solutions should have access to adequate personal protective equipment (i.e. gloves, aprons, boots, and eye glasses). In low-cost settings, facilities may require support for additional equipment, materials, and staff to cope with infection control demands during the emergency.

2. **Cleaning, disinfecting and sterilizing**

Routine cleaning should be organized by classifying areas of the health-care facility into three areas, each with a specific cleaning routine (WHO, 2002b):

<table>
<thead>
<tr>
<th>Daily sweeping:</th>
<th>• Offices and other non-patient areas</th>
</tr>
</thead>
</table>
| Daily wet mopping: | • Waiting areas
• Consulting rooms
• Non-infectious disease wards
• Pharmacy |

| Daily cleaning with a detergent or 0.2% disinfectant solution, or whenever soiled and after each intervention (in the case of operating suites and delivery rooms). Use separate cleaning equipment for each room daily. | • Infectious disease or isolation wards
• Operating suites and delivery rooms
• Intensive care units and premature baby units
• Casualty departments
• Laboratory
• Laundry and sterilization services
• Kitchen
• Toilets
• Morgue |

Floors and other washed surfaces should be made of a suitable, non-porous material that is resistant to repeated cleaning with hot water and detergents or disinfectants. In emergencies, white plastic sheeting may be used to facilitate the cleaning of floors in temporary wards or isolation areas.

Medical equipment should be cleaned immediately after use, to remove any organic matter, with hot water and detergent, followed by either chemical disinfection, steam pressure sterilization, or heat sterilization. Any medical equipment in contact or entering a sterile part of the body must be sterilized.

In isolation areas, a 0.2% chlorine solution should be used for cleaning floors, walls and beds daily and whenever soiled. Soiled clothing and bedding should
be disinfected in 0.2% chlorine solution for 10 minutes and then rinsed, before being washed and dried as usual.

Outside of isolation areas, beds, floors, walls, toilets, showers, equipment, and surfaces should be routinely cleaned and disinfected to ensure that the healthcare environment is visibly clean and free from dust, soil and pathogens. Ninety per cent of microorganisms are present within visible dirt, which should be eliminated by routine cleaning. Wet mopping with hot water and detergent, if available, is recommended, rather than sweeping which may facilitate airborne distribution of pathogens (WHO, 2002b). If hot water is not available, a 0.2% chlorine solution of cold water should be used. Detergent is sufficient for normal, domestic cleaning of floors and other surfaces that are not in contact with hands and medical instruments.

3. Organization of isolation areas

![Plan of an emergency cholera treatment centre](MSF, undated)

*Figure 3.1 Plan of an emergency cholera treatment centre (MSF, undated)*
Isolation areas should be adequately fenced-off from the rest of the health-care facility (plastic sheeting may be appropriate for short-term emergency response) and should have their own exclusive toilets, showers, laundring, handwashing and wastes disposal facilities.

Within the isolation area, toilets and showers should be segregated for separate use by patients and by carers. All wastes created in the isolation area should be treated with 2% chlorine solution and should be disposed of safely inside the isolation area waste area.

Cholera Treatment Centres are generally organised into three areas with an additional area for stores and offices.

**Entry and observation**

In the entry and observation area the condition of the patient is assessed. Patients with moderate or severe symptoms pass directly to the treatment section. Patients with mild symptoms are kept under observation and treated with oral rehydration solution (ORS). Those whose symptoms improve are discharged once it is clear that they do not need further treatment. Those whose symptoms deteriorate are transferred to the treatment section. The entry and observation section is a potential source of contamination, as all patients pass through.

**Hospitalization wards**

Patients are installed on beds and rehydrated with ORS or by intravenous drip for 1-4 days, depending on the severity of the symptoms and speed of recovery. In the hospitalization wards, patients discharge large quantities of stools and vomit, which must be collected and disposed of rapidly and safely. This section is a great potential source of contamination.

**Recovery**

Once the symptoms of vomiting and diarrhoea have stopped, and all other health indicators are normal, patients are moved to the recovery section for about 1 day before being discharged from the CTC. Although most patients will continue to shed cholera bacteria in their stools, there will not be a significant risk of contamination due to uncontrolled defecation or vomiting.

**4. Infection control at entry and exits of isolation areas**

During infectious disease outbreaks it is a common infection control measure to position guards at entry and exit points of isolation areas to ensure that the feet of every person entering and leaving the isolation area are disinfected with 0.2% chlorine solution and the person washes their hands with soap or 0.05% chlorine solution. The use of backpack sprayers for disinfecting feet is generally more efficient than footbaths, which tend to quickly become dirt laden. This infection control practice is more important at the exit (to reduce the risk of pathogens leaving the isolation area), however it also serves as a visual reminder to those entering the isolation area. At the exits, guards may ask to inspect any goods that are being carried out of the isolation area. Any food stuffs, food containers, or any potential reservoirs for infectious pathogens (e.g. soiled bedding or clothing) should be confiscated, disinfected or destroyed (see health-care waste disposal recommendation 6).
The passage of people entering and leaving the isolation area should be limited to medical staff and carers only. Patients should be limited to one carer only.

5. **Clean up of blood or other body fluids**

Chlorine solution (2%) is adequate for cleaning and disinfecting blood or body fluid spills. Large spills should first be removed with absorbent material, which should then be properly disposed of (see health-care waste disposal recommendation 6) before disinfecting and cleaning.

6. **Transporting and cleaning of soiled linen**

Soiled linen should not be sorted in patient-care areas, and should be handled with minimum agitation to avoid releasing pathogens. Securely closed impermeable bags should be used for transporting linen heavily soiled with body substances or other fluids (WHO, 2004d). Soiled bedding from isolation areas should be disinfected in 0.2% chlorine solution for 10 minutes and then rinsed, before being washed and dried as usual. Soiled medical linens should be cleaned and autoclaved. Cleaned linen should be stored and transported separately to soiled linen in different marked bags.

7. **Beds, bedding and bed spacing**

Mattresses should have waterproof protective covers for easy cleaning. In an emergency, plastic sheeting can be added to provide water proof protective covering to normal mattresses. Mattresses and pillows should be treated, as required, to control lice, bedbugs and other nuisances or disease vectors. Beds should be wiped with a disinfectant solution (e.g. 0.2% chlorine solution) between each hospitalization. If woven mats are used instead of, or on top of, mattresses, they should be destroyed (burned) and replaced between patients.

Overcrowding of wards directly increases transmission risks. Beds should be no less than 1m apart (preferably at least 2m) to reduce the risk of direct or droplet transmission (WHO, 2004d). The number of visitors and carers should be strictly controlled.

8. **Infection control promotion**

Patients and carers arriving at the health-care facility should be adequately advised on how, why, where and when to carry out personal infection control practices. This briefing should take place on arrival at the health-care facility, preferably within 30 minutes.

Before the patient and carer leave the health-care facility they should be reminded of infection control measures to reinforce promotion in the community. This is particularly important if they are going back to communities that are hot spots for the epidemic.

9. **Handling and management of dead bodies**

Dead bodies arising from disease epidemics in the health-care facility pose a serious infection risk and should be handled, moved and managed according to the infection control standard precautions. Contact with the dead body should
be minimized and overalls, masks, gloves and disposable aprons should be worn. The corpse should be lightly disinfected with a strong 2% chlorine solution and the mouth and anus should be plugged with cotton wool soaked in 2% chlorine solution. Bodies should be placed in waterproof body bags ideally stored at 4°C. Any areas previously in contact with the dead body should be cleaned with 2% chlorine solution following the same procedures for the cleanup of blood or body fluids (see guidance note 5). After handling the body hands should be washed with soap and water and disposable gloves and aprons should be disposed in the infectious waste bin. Funeral gatherings, ritual washing or embalming of the dead, and funeral feasts should be avoided and burial or cremation should take place as soon after death as possible, near the place of death. Graves should be at least 50m (150ft) from water sources and at least 1.5m (5ft) above the ground water level.

Recommendation 8  Control of vector-borne disease
Patients, staff and carers are protected from disease vectors.

Indicators for Recommendation 8

1. The number of vectors in the health-care setting is minimized (see guidance note 1).

2. Patients, staff and carers are protected from potential disease-transmitting vectors (see guidance note 2).

3. Spread of vector-borne diseases is minimized by preventing contact with infected substances or materials (see guidance note 3).

4. Staff carrying out vector control activities have adequate personal protective equipment (see guidance note 4).

Guidance notes for Recommendation 8

1. Minimizing disease vectors

Appropriate and effective methods for excluding or reducing vector numbers depend on the type of vector; the location and number or size of breeding sites; vector habits, including places and times of resting, feeding and biting; and resistance of specific vector populations to control chemicals.

Basic environmental control methods, such as proper drainage, waste disposal and food hygiene, should be the basis of any strategy.

Mosquitoes and flies can effectively be excluded from buildings by covering opening windows with fly screens and fitting self-closing doors to the outside.

Any use of chemical controls requires specialist advice, such as for residual insecticide spraying, in and around the health-care facility. Advice should be available from within the ministry of health.
2. **Protect patients and staff from vector-borne diseases**

Once inside the health-care facilities, patients, staff and carers may be protected from certain vectors through the use of barriers (e.g. insecticide bednets against mosquitoes or covered food storage to prevent contamination by rats and flies) or repellents.

If insecticide-treated nets are used on beds, they should be washed and reimpregnated every 6 months (or following local guidance for fibre type, insecticide type, model) or whenever soiled. If used for patients with infectious diseases (cholera, haemorrhagic fevers, etc.), they should be washed and reimpregnated between patients and whenever soiled.

Patients with vector-borne diseases, such as malaria, Lassa fever and typhus, should be treated or protected to ensure that the related vectors do not transmit the disease from them to other people in the health-care facility. This may require removal of the vectors (e.g. insecticide dusting to remove lice from typhus patients) or the use of a barrier (e.g. insecticide bednets to isolate yellow fever patients from mosquitoes).

3. **Prevent spread of vectors**

Infectious substances such as excreta and soiled dressings should be disposed of immediately and completely to prevent flies and other mechanical vectors from carrying pathogens to food, eyes, wounds, etc., or distributing them to the environment (see recommendation 6 – health-care waste disposal).

4. **Personal protective equipment and training**

All public health chemicals are toxic to some degree and absorption can occur through skin contact, inhalation and ingestion. All health-care facility workers involved in vector control activities with chemicals should ensure they have the correct personal protective equipment for the activity being carried out (i.e. face shield or safety glasses, face mask or respirator, protective hat, overalls, waterproof apron, boots, and gloves). All health-care facility workers involved in vector control activities should be adequately trained in health and safety procedures related to the activity being carried out.

**Recommendation 9  Handwashing and hygiene promotion**

Sufficient functional handwashing facilities are available in the health-care setting and correct hygiene is encouraged by hygiene promotion activities and by management of staff, patients and carers.

**Indicators for Recommendation 9**

1. A functional handwashing point with soap is available in every area where health-care is delivered (wards, consulting rooms, delivery rooms, operating theatres, etc.) and all service areas (kitchen, laundry, showers, toilets, sterilization, laboratory, waste zone and mortuary) (see guidance note 1).
2. Patients and carers are informed about essential hygiene behaviours necessary for limiting disease transmission in the health-care setting repeatedly, starting within 30 minutes of arrival (see guidance note 2).

3. Food for patients, staff and carers is stored and prepared in a way that minimizes the risk of disease transmission (see guidance note 3).

Guidance notes for Recommendation 9

1. **Sufficient handwashing facilities**

   Staff, patients and carers should not be expected to adopt behaviours that are inconvenient, uncomfortable or impractical. For example, staff are unlikely to comply fully with handwashing procedures if there are no handwashing facilities close to where they care for patients, or there is no soap or water.

   Functional handwashing facilities equipped with soap, and safe wastewater disposal, should be present in any location where health-care is provided (e.g. consultation rooms, maternity wards, delivery rooms, surgery) in addition to and all service areas (kitchen, laundry, showers, toilets, sterilization, laboratory, waste zone and mortuary).

2. **Behaviours for limiting disease transmission**

   Handwashing with soap is one of the most effective measures for infection control in a health-care setting, especially during emergencies.

   Patients and carers arriving at the health-care facility should be adequately advised on how, why, where and when to carry out personal infection control practices including handwashing with soap. This briefing should take place repeatedly, starting as soon as possible on arrival, preferably within 30 minutes. Information about behaviours for limiting disease transmission should be provided verbally by staff, who should have the time to explain clearly to patients and carers. All carers should be encouraged to wash their hands:

   - Directly before preparing food.
   - Directly before and after feeding a patient, giving medication or water.
   - Directly before and after every patient contact (including changing a patient, bathing a patient, moving a patient).
   - Directly after handling infectious materials (e.g. soiled clothing / bedding).
   - When entering and leaving high-risk areas such as isolation areas.
   - Directly after using the toilet.

   All patients should be encouraged to wash their hands with soap and water:

   - Directly before handling food, water, or medication.
   - Directly after using the toilet.
   - Directly after handling infectious materials (e.g. soiled clothing / bedding).
   - When entering and leaving high-risk areas such as isolation areas.
Posters and other visual information should be used to promote infection control measures among staff, patients and carers. Visual information should be relevant to risk practices, it should be understood by the target audience and it should provide practical and realistic advice and information. Posters reminding staff of the correct medical handwashing procedure should be present close to the scrubbing up areas for the delivery room and surgery.

Patients’ and carers’ contact with the health-care setting should be used as a means to promote hygiene in the community. Both during normal periods and during epidemics, health-care facilities should be actively involved in preventive health-care through hygiene promotion.

3. Safe food hygiene in the health-care facility

Food handlers should be trained in basic food safety and steps should be taken to ensure the following:

1. Food handling and preparation is done with utmost cleanliness.
2. Contact between raw foodstuffs and cooked food is avoided.
3. Food is cooked thoroughly.
4. Food is kept at safe temperatures.
5. Safe water and raw ingredients are used.
6. Powdered infant formula is prepared appropriately.

Food handlers should wash their hands after using the toilet and whenever they start work, change tasks, or return after an interruption. Soap and water should be available at all times during food preparation and handling, to ensure that handwashing can be done conveniently (see guidance note 1).

Kitchen staff and carers with colds, influenza, diarrhoea, vomiting and throat and skin infections, or those who have suffered from diarrhoea and vomiting within the past 48 hours, should not handle food unless it is packaged. All infections should be reported and sick staff should not be penalised.

Food-preparation premises should be kept meticulously clean. Surfaces used for food preparation should be washed with detergent and safe water and then rinsed, or wiped with a clean cloth that is frequently washed. Scraps of food should be disposed of rapidly, as they are potential reservoirs for bacteria and can attract insects and rodents. Refuse should be kept in covered bins and disposed of quickly and safely (see recommendations 6, 7 and 8 on waste disposal, infection control and disease vector control).

Eating utensils should be washed immediately after each use with hot water and detergent, and air-dried. The sooner utensils are cleaned the easier they are to wash. Drying cloths should not be used, as they can spread contamination.

In many inpatient settings, carers may bring food to patients, or may prepare food at the health-care setting. In these cases, staff should seek to ensure that food is prepared hygienically and that cooked food is consumed immediately. Cooking facilities may need to be provided to carers.

Separate equipment and utensils, such as knives and cutting boards, should be used for handling raw foods or they should be washed and sanitized in
between uses. Food should be stored in containers to avoid contact between raw and prepared foods. Raw meat, poultry and seafood should be separated from other foods.

Cooked or perishable food should not be left at room temperature for more than two hours, and should be prepared or supplied fresh each day. All food should be kept covered to protect it from flies and dust.

Food should be protected from insects, rodents and other animals, which frequently carry pathogenic organisms and are a potential source of contamination of food (see recommendation 8 on disease vector control).

Only safe water should be used for food preparation, handwashing and cleaning. For specification of safe water (see recommendation 1 on water quality).

Fruit and vegetables should be washed with safe water. If there is any doubt about the cleanliness of raw fruit and vegetables, they should be peeled.

Powdered infant formula, where required, should be prepared with water that is not cooler that 70°C (in order to kill Enterobacter sakazakii), stored and handled in accordance with how to prepare powdered infant formula in care settings (WHO and FAO, 2007).
4 WASH Rapid Assessment Tool

4.1 How to use the Rapid Assessment Tool

The WASH in health-care facilities Rapid Assessment Tool (RAT) is a short, two-page, emergency response survey tool that can be used to quickly assess sanitary hazards in health-care facilities – for example existing permanent health structures such as clinics and hospitals or temporary facilities such as cholera treatment centres, therapeutic feeding centres, temporary clinics, or mobile clinics. The RAT has been kept as short and simple as possible so that it can be quickly completed by multiple responding actors whose staff may not be WASH specialists (for example a member of the medical team visiting the health-care facility). The RAT can be used to assess WASH hazards in a single facility or it can also be used at a coordination level to survey many facilities at the same time and help coordinating bodies and emergency WASH actors decide which facilities should be prioritised. Finally, the RAT can also be used as a routine monitoring tool to track progress of the overall WASH in health-care facilities response.

The RAT uses a simple scoring system to give an overall indication of WASH-related sanitary hazards in the facility, and identify the areas that are of greatest concern. The RAT should be completed by using a combination of direct observation of WASH infrastructure and casual interviews with facility staff (medical and non-medical). The RAT is completed by filling in all parts of the form, noting the scores for each section and the total hazard score at the bottom of the form. If other problems are identified, the assessor should describe them briefly, but should not include them in the overall hazard score. During the assessment, the assessor should aim to visit all parts of the health-care facility, including the grounds, facility perimeter, and any isolated spots. It is often helpful to follow the movement of water, excreta, health-care waste, grey water, and stormwater through the health-care facility from “point of origin to point of final disposal” assessing hazards along the way.

The assessor should attempt to take into account the current situation in the facility, including possible increases in patient numbers and damage to, or loss of, infrastructure and supplies as a result of the emergency. There is space for additional comments in the right-hand column if they are needed to help understand the results of the assessment, for example if there are problems that are not listed on the form, the assessor is not sure of some data, the assessor considers that the situation is likely to change significantly in the short term, or the assessor wants to highlight a problem that they feel is of extreme importance or urgency. In all cases the assessor should discuss the results with staff before departing. If there are any matters of extreme importance or urgency, this should be communicated immediately to the health-care facility management and WASH coordinating body so that rapid action can be taken.

The two-page RAT form has been designed to be used as a stand alone document without additional supporting material, however there is also a set of guidance notes for further clarification of the hazard factors if required. A two-page sample report has also been included to show how the RAT may be deployed to compare multiple health-care facilities.
WASH IN HEALTH FACILITIES IN EMERGENCIES RAPID ASSESSMENT FORM

Assessor(s): ____________________________  Contact Details: ____________________________
______________________________  Date of Assessment: __________ / _______ / _______

SECTION I: HEALTH FACILITY GENERAL INFORMATION

Health Facility Name and location (District, Town, Village etc.): ____________________________
Number of Staff: ____________
Number of Inpatients: ____________

GPS Long: ______°____ʹ____"  GPS Lat: ______°____ʹ____"  Number of Beds: ____________
☐ Hospital  ☐ Clinic  ☐ Health Post  ☐ Temp. Clinic  ☐ Cholera Treatment Centre
Occupancy Rate: ______%  Other ____________
Outpatients / Day: ____________
Contact Person: ____________________________  Position: ____________________________
Phone Number: ____________________________

SECTION II: WATER QUANTITY  
Tick the hazards encountered (one point for each):

☐ Insufficient water quantity\(^1\) for all the daily needs in the health facility.
Comments: ___________________________________________________________________________
☐ Daily interruptions in water supply or insufficient power or fuel supplies.
Comments: ___________________________________________________________________________
☐ Insufficient water storage (less than 24 hours backup supply).
Comments: ___________________________________________________________________________

SECTION III: WATER QUALITY  
Tick the hazards encountered (one point for each):

☐ Water is from an unimproved source\(^2\) or sources of contamination (latrines, waste, animals etc.) within 30m / 100ft of the water source.
Comments: ___________________________________________________________________________
☐ Water is unchlorinated, insufficiently chlorinated\(^3\) or is turbid (cloudy).
Comments: ___________________________________________________________________________
☐ Broken water pipes, or uncovered or unsanitary water reservoirs.
Comments: ___________________________________________________________________________

SECTION IV: WATER POINTS  
Calculate functional water point coverage and hazard score

(A) Estimate the maximum number of people\(^4\) at the health facility ____________
(B) Count the number of functioning water points ____________
(C) Calculate # people per functioning water point (divide A by B) ____________

<table>
<thead>
<tr>
<th>Hazard score</th>
<th>0 points</th>
<th>1 point</th>
<th>2 points</th>
<th>3 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>people per functional water point</td>
<td>&lt;50</td>
<td>50-100</td>
<td>100-150</td>
<td>&gt;200</td>
</tr>
</tbody>
</table>

SECTION V: EXCRETA DISPOSAL  
Calculate functional toilet coverage and hazard score

(A) Estimate the maximum number of people\(^5\) at the health facility ____________
(B) Count the number of functional toilets ____________
(C) Calculate # people per clean functional toilet (divide A by B) ____________

<table>
<thead>
<tr>
<th>Hazard score</th>
<th>0 points</th>
<th>1 point</th>
<th>2 points</th>
<th>3 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>people per clean functional toilet</td>
<td>&lt;25</td>
<td>25-50</td>
<td>50-100</td>
<td>&gt;100</td>
</tr>
</tbody>
</table>

Evidence of open defecation. (1 point)

---

1. Sufficient water quantity defined as at least 5 litres/consultation/day for outpatients, 40 litres/patient/day for inpatients, 60 litres per/patient/day for CTCs, 30 litres/patient/day for therapeutic feeding centres, 100 litres/patient/day for respiratory disease isolation centres, 300 litres/patient/day for viral hemorrhagic fever isolation, 100 litres/intervention for operating theatres. See guidance notes.
2. Unimproved drinking water sources include unprotected wells, unprotected springs, rivers, ponds, streams, and open canals.
3. Insufficiently chlorinated defined as less than 0.5mg/l free chlorine residual at the tap or <1.0mg/l during diarrheal disease epidemics.
4. Maximum number of people is defined as an estimate of the daily total number of staff, outpatients, inpatients plus inpatient carers.
5. A functional water point is defined as one that is in good working order supplying treated water for drinking, handwashing, cleaning or other uses with adequate flow rate (enough to fill a 20l bucket in under two minutes).
6. A functional toilet is defined as one that is clean, in working order, of a type and location acceptable to users, and that safely separates excreta from users, groundwater and the environment. Toilets that are full, dirty, broken, or inaccessible should not be counted.
## SECTION VI: DRAINAGE

**Tick the hazards encountered (score one point for each):**

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pools of standing water observed at water points.</td>
<td>☐</td>
</tr>
<tr>
<td>Potentially infectious wastewater from bathing, cleaning, or laundering activities visible in the health facility environment.</td>
<td>☐</td>
</tr>
<tr>
<td>Stormwater drains or canals blocked, non-existent, or non-functional.</td>
<td>☐</td>
</tr>
</tbody>
</table>

**Comments:**

## SECTION VII: WASTE MANAGEMENT

**Tick hazards encountered (one point each):**

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insufficient⁷, inadequate⁸ or overflowing waste disposal containers.</td>
<td>☐</td>
</tr>
<tr>
<td>No source separation of wastes (e.g. infectious, non-infectious, sharps).</td>
<td>☐</td>
</tr>
<tr>
<td>Health-care wastes (needles, dressings etc.) observed in health facility grounds or public spaces or health-care waste disposal area unfenced.</td>
<td>☐</td>
</tr>
</tbody>
</table>

**Comments:**

## SECTION VIII: DISEASE VECTOR CONTROL

**Tick hazards (one point each):**

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of impregnated bed nets, indoor residual spraying, or damaged mosquito window screens in mosquito-borne disease risk areas.</td>
<td>☐</td>
</tr>
<tr>
<td>Kitchen stores or prepared food unprotected from flies, other insects or rats.</td>
<td>☐</td>
</tr>
<tr>
<td>Breeding sites (stagnant pools, food waste etc.) identified in / around facility.</td>
<td>☐</td>
</tr>
</tbody>
</table>

**Comments:**

## SECTION IX: INFECTION CONTROL

**Tick hazards encountered (one point for each):**

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of at least one month supply of chlorine products, detergent or soap, sufficient cleaning equipment (buckets, mops etc.), or cleaning staff.</td>
<td>☐</td>
</tr>
<tr>
<td>Inadequate⁹ disinfection of beds, floors, walls, equipment, surfaces, or inadequate¹⁰ disposal of faeces and vomit from infectious patients.</td>
<td>☐</td>
</tr>
<tr>
<td>Lack of disinfection of hands (with soap or 0.05% chlorine solution) and feet (spraying or footbaths with 0.2% chlorine) at entry / exit of isolation areas.</td>
<td>☐</td>
</tr>
<tr>
<td>Lack of personal protective equipment (disposable gloves, aprons, masks).</td>
<td>☐</td>
</tr>
</tbody>
</table>

**Comments:**

## SECTION X: HANDWASHING

**Tick hazards encountered (score one point for each):**

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absence of functional¹¹ handwashing points in ANY area where health-care is delivered (wards, consulting rooms, delivery rooms, operating theatres, etc.) or service areas (kitchen, laundry, toilets, waste zone, mortuary etc.)</td>
<td>☐</td>
</tr>
<tr>
<td>Patients and carers not informed of essential hygiene behaviours repeatedly starting within 30 minutes of arrival.</td>
<td>☐</td>
</tr>
<tr>
<td>Absence of posters reminding users of correct handwashing procedures.</td>
<td>☐</td>
</tr>
</tbody>
</table>

**Comments:**

---

**Use the space below or additional pages to capture any additional notes, comments, recommendations, actions, or drawings.**

**Total Hazard Score _____ / 30**

*add individual scores together*

---

**Any Additional Comments:**

---

Send the completed form to: ___________________________ email address as soon as it is completed.

---

⁷ Sufficient waste containers defined as at least 1 container <5m of where waste is generated or 1 container per 20 inpatients.
⁸ Adequate waste containers defined as containers which protect staff and patients from the health-care waste (typically yellow puncture proof boxes for sharps, and color coded and lined 15-40 litre containers with lids for infectious, non infectious and hazardous waste).
⁹ Adequate disinfection defined as at least daily cleaning of floors with detergent and disinfection of surfaces with 0.2% chlorine solution.
¹⁰ Adequate disposal defined as disposal into a structure that separates the contents from users, groundwater and environment.
¹¹ Functional handwashing station points as one with continuous supply of water, soap, safe disposal of gray water, and possibly alcohol hand rub for repeat decontamination of clean hands. In all cases, there should also be soap and water for cleaning soiled hands.
WASH IN HEALTH-CARE FACILITIES
EMERGENCY RAPID ASSESSMENT TOOL - EXAMPLE ONE PAGE REPORT

The WASH in health-care facilities Rapid Assessment Tool was used to evaluate key WASH parameters in [GEOGRAPHICAL AREA] by [NAMES AND NUMBER OF ORGANIZATIONS] on the [DATES]. The assessment form was translated into [LANGUAGE] and a [DURATION] short training session was organized by the Health and WASH Clusters. In total [NUMBER OF HEALTH-CARE FACILITIES] health-care facilities were assessed including [NUMBER] Hospitals [NUMBER] Clinics and [NUMBER] Health Posts. Data was analyzed in Microsoft Excel. Key findings are:

### WATER SUPPLY

- % Health-care facilities reporting insufficient water for all daily needs: 64.3% (9/14)
- % Health-care facilities reporting daily interruptions in water supply: 42.9% (6/14)
- % Health-care facilities with insufficient water storage (less than 24 hours): 50.0% (7/14)
- Average functional water point coverage (persons / functional water point): 62.2
- % Health-care facilities with source of contamination within 10m of water source: 21.4% (3/14)
- % Health-care facilities with insufficient water storage (less than 24 hours): 50.0% (7/14)

### EXCRETA DISPOSAL AND DRAINAGE

- Average functional and clean toilet coverage (persons / functional toilet): 49.73
- % Health-care facilities with standing water at water points: 21.4% (3/14)
- % Health-care facilities with grey water visible in environment: 14.3% (2/14)
- % Facilities with stormwater drains / ditches blocked or non-functional: 21.4% (3/14)

### WASTE MANAGEMENT

- % Health facilities with insufficient, inadequate or overflowing waste containers: 35.7% (5/14)
- % Facilities with no separation of wastes (e.g. infectious, non-infectious, sharps): 21.4% (3/14)
- % Facilities lacking fenced disposal area or health-care waste in environment: 50.0% (7/14)

### DISEASE VECTOR CONTROL

- % Health-care facilities with beds that are missing impregnated mosquito nets: 21.4% (3/14)
- % Health-care facilities with food stuffs unprotected from flies, insects, rats: 14.3% (2/14)
- % Health-care facilities with vector breeding sites identified in / around facility: 21.4% (3/14)

### INFECTION CONTROL AND HANDWASHING

- % Facilities lacking one month supply of chlorine or cleaning equipment: 28.5% (4/14)
- % Health-care facilities with floors, walls, equipment, bedding visibly insanitary: 85.7% (12/14)
- % Facilities lacking functional hardwashing points where health-care delivered: 78.6% (11/14)
- % Health facilities lacking soap and handwashing reminders: 78.6% (11/14)

### FOR DEMONSTRATION PURPOSES ONLY

**Figure 1** Ranking of Health Facilities
4.2 Rapid Assessment Tool – Hazard Guidance Notes

<table>
<thead>
<tr>
<th>Activity</th>
<th>(A) Quantity of Water Required</th>
<th>(B) Number Persons</th>
<th>(A X B) Daily Requirement (litres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff</td>
<td>5 litres/person/day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outpatients</td>
<td>5 litres/consultation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inpatients</td>
<td>40–60 litres/patient/day</td>
<td>15 litres/carer/day</td>
<td></td>
</tr>
<tr>
<td>Operating Theatre or Maternity Unit</td>
<td>100 litres/intervention</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dry or Supplementary Feeding Centre</td>
<td>0.5–5 litres/consultation</td>
<td>(depend on waiting time)</td>
<td></td>
</tr>
<tr>
<td>Wet Supplementary Feeding Centre</td>
<td>15 litres/consultation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inpatient Therapeutic Feeding Centre</td>
<td>30 litres/patient/day</td>
<td>15 litres/carer/day</td>
<td></td>
</tr>
<tr>
<td>Cholera Treatment Centre</td>
<td>60 litres/patient/day</td>
<td>15 litres/carer/day</td>
<td></td>
</tr>
<tr>
<td>Acute Respiratory Diseases Isolation Ward</td>
<td>100 litres/patient/day</td>
<td>15 litres/carer/day</td>
<td></td>
</tr>
<tr>
<td>Viral Hemorrhagic Fever Isolation Ward</td>
<td>300–400 litres/patient/day</td>
<td>15 litres/carer/day</td>
<td></td>
</tr>
</tbody>
</table>

Estimate of total quantity of water required per day for health-care facility (litres)

Hazard Scoring:
Once the total quantity of water required per day for the health-care facility has been calculated, ask staff at the health-care facility if they actually receive this quantity of water. In some cases staff may be unsure how much water they actually receive. If so, ask staff their perceptions of whether there is sufficient water for infection control activities. Score one hazard point if calculations, or qualitative interviews with staff, reveal the health-care facility receives insufficient water.
Hazard 2-2: Daily interruptions in water supply or insufficient power or fuel supplies

Rationale:
An uninterrupted supply of water is essential for health-care facility infection control and medical activities. Water supplies may become disrupted due to problems outside the health-care facility or because of insufficient power or fuel supplies to run water systems. Interruptions to piped water supplies can put the system at risk by creating negative pressures, drawing in contamination.

Definition of Terms:
Daily interruptions in water supply are defined as an average of at least one or more unscheduled breaks in supply every day, of one hour or more. Insufficient fuel supply defined as less than two weeks provision.

Hazard Scoring:
Score one point if there are daily interruptions or insufficient power or fuel.

Hazard 2-3: Insufficient water storage (less than 24 hours backup supply)

Rationale:
On site water reservoirs should hold at least one full day of back-up water in case of interruptions to supply, or conflict or natural disaster damage.

Definition of Terms:
Insufficient water storage is defined as the total volume of water storage on-site being less than the total quantity of water required per day.

Hazard Scoring:
The total quantity of water required per day for the health-care facility should have already been estimated for hazard factor 2-1. Ask health-care facility staff to show you any on-site water reservoirs and calculate the volumes manually (if they are circular, multiply the base area [ Area = 3.14 x radius² ] by the height). Check that the storage capacity is actually in use (the tanks are not empty). Score one point if the total volume of water storage at the health-care facility is less than the total quantity of water required per day.

Hazard 3-1: Water is from an unimproved source or there is contamination (latrines, waste, animals etc.) within 30m / 100ft of the water source

Rationale:
All water supplies at health-care facilities should be safe to drink and free from bacteriological or chemical contamination. The water should preferably come from an improved drinking water source such as a protected well, protected spring, protected borehole, chlorinated mains supply, or rainwater catchment (if the catchment is adequately cleaned and maintained). There
should not be any potential sources of contamination within 30m/100ft of the water source.

**Definition of Terms:**
Unimproved drinking water sources include unprotected wells, unprotected springs, and surface water sources such as rivers, ponds, streams, and canals.

**Hazard Scoring:**
Visible inspect the water source. Score one point if the water supplying the health-care facility is from an unimproved water source, or there are sources of contamination (latrines, waste, animals etc.) within 30m/100ft of the source.

| Hazard 3-2: | Water is unchlorinated, insufficiently chlorinated or is turbid (cloudy) |

**Rationale:**
It is a WHO requirement that all water supplies in the health-care facility, regardless of use, are treated with disinfectant so that there is a free chlorine residual of at least 0.5mg/l and turbidity is below 5 NTU (nephelometric turbidity units) at the tap. During diarrheal disease epidemics it is recommended that this is increased to 1.0mg/l. Chlorination is important not just for making water safe but for keeping it safe (residual protection) as it moves around the facility.

**Definition of Terms:**
Insufficiently chlorinated is defined as less than 0.5mg/l free chlorine residual at the tap or less than 1.0mg/l during diarrheal disease epidemics. Free chlorine residual is usually measured using a chlorine ‘pool tester’. Effective chlorination also requires water that is free of organic matter with a turbidity of less than 5 NTU. Water of less than 5 NTU can be considered as perfectly clear to the naked eye.

| Hazard 3-3: | Broken water pipes, or uncovered or unsanitary water reservoirs observed |

**Rationale:**
It is vitally important that steps are taken to ensure that the safe water supplied to the health-care facilities does not become re-contaminated as it moves around or is stored at the health-care facility.

**Definition of Terms:**
Unsanitary water reservoirs are defined as water reservoirs that are not clean (i.e. visible signs of scum, deposits, dirt, or mould).
**Hazard Scoring:**
Score one hazard point if there are any risks of contamination along the health-care facility water chain from source to consumer – e.g. broken or leaking pipes, pipes laid in drains, reservoirs that are uncovered, or unsanitary.

### Hazard 4-1: Functional water point coverage

**Rationale:**
A sufficiently high coverage of functional water points is essential so that health-care facility staff and patients can easily carry out infection control activities.

**Definition of Terms:**
A functional water point is defined as one that is in good working order supplying treated water for drinking, handwashing, cleaning or other uses with adequate flow (enough to fill a 20-l bucket in under one minute).

**Hazard Scoring:**
Ask the health-care facility staff how many functional water points there are in the health-care facility. Visibly inspect each water points and assess if the water point is functional or not. Ask health-care facility staff to estimate the current total number of staff, outpatients, inpatients and inpatient carers. Divide the total number of people by the total number of functional water points to get the functional water point coverage and score using the table below.

<table>
<thead>
<tr>
<th>Hazard score</th>
<th>0 points</th>
<th>1 point</th>
<th>2 points</th>
<th>3 points</th>
</tr>
</thead>
<tbody>
<tr>
<td># People per functional water point</td>
<td>&lt;50</td>
<td>50-100</td>
<td>100-150</td>
<td>&gt;200</td>
</tr>
</tbody>
</table>

### Hazard 5-1: Clean and functional toilet coverage

**Rationale:**
Clean and functional toilets that do not contaminate groundwater or the environment are essential not only for staff and patient dignity but also so health-care facilities do not become a source of transmission.

**Definition of Terms:**
A functional toilet is defined as one that is clean, in full working order, of a type and location acceptable to users, that safely separates excreta from users, groundwater and the environment, and has a functional handwashing station within 5m / 15ft of the toilet with soap, water, and safe grey water disposal. A clean toilet is defined as one that is cleaned at least twice a day and has no visible traces of excreta on the toilet itself or in the toilet cubicle. Toilets that are full, dirty, broken, or inaccessible should not be counted.

**Hazard Scoring:**
Ask the health-care facility staff how many functional toilets there are in the health-care facility for both staff and patients. Visibly inspect each toilet cubicle in turn and assess if the toilet is clean and functional or not. Ask
health-care facility staff to estimate the current total number of staff, outpatients, inpatients and inpatient carers. Divide the total number of people by the total number of clean and functional toilets to get the coverage level and score using the table below.

<table>
<thead>
<tr>
<th>Hazard score</th>
<th>0 points</th>
<th>1 point</th>
<th>2 points</th>
<th>3 points</th>
</tr>
</thead>
<tbody>
<tr>
<td># People per clean and functional toilet</td>
<td>&lt;25</td>
<td>25-50</td>
<td>50-100</td>
<td>&gt;100</td>
</tr>
</tbody>
</table>

**Hazard 5-2: Evidence of open defecation around the health-care facility**

**Rationale:**
Toilets at a temporary or permanent health-care facility may quickly become unsanitary during an emergency and users may resort to open defecation. Open defecation in any setting is a serious public health hazard regardless of whether there is a disease outbreak.

**Definition of Terms:**
Open defecation is described as the presence of uncontained human excreta within or close to (within 10m) the boundary of the health-care facility.

**Hazard Scoring:**
Ask the health-care facility staff to walk you around the physical boundary of the health-care facility grounds. Walk along the boundary and between any buildings looking for signs of human open defecation. Look at typical open defecation locations including behind walls, behind latrine blocks, between buildings, and behind trees and undergrowth. Score one hazard point if you encounter any evidence whatsoever of human open defecation.

**Hazard 6-1: Pools of standing water observed at water points**

**Rationale:**
Patients may use water points to wash themselves, soiled clothes, or bed linen and it is essential that contaminated water is prevented from running out into the human environment. Wastewater from any points where water is collected should drain into a functional wastewater disposal system such as a soakaway, infiltration trench, septic tank or sewer. Removal of pools of standing water also prevents disease vector breeding sites.

**Definition of Terms:**
Standing water is defined as wastewater that is present in pools and does not readily flow into a functional wastewater disposal system.

**Hazard Scoring:**
Ask the health-care facility staff to show you all of the water points at the health-care facility. Visit each one in turn and score one point if you encounter any that have pools of standing water present.
Hazard 6-2: Potentially infectious wastewater from bathing, cleaning, or laundering activities visible in the health-care facility environment

**Rationale:**
Grey water from cleaning activities, patient bathing, or cleaning of soiled bed linen or clothing can be highly infectious. Grey water from any bathing, cleaning, or laundering activities should drain into a functional grey water disposal system such as a soakaway, infiltration trench, septic tank or sewer to prevent disease vector breeding and transmission of contaminated water into the human environment.

**Hazard Scoring:**
Ask the health-care facility staff to show you all of the bathing and laundering points in the health-care facility. Visit each one in turn and score one point if you encounter any that do not immediately divert greywater into a treatment or disposal system such as a soakaway, infiltration trench, septic tank or sewer.

Hazard 6-3: Stormwater drains or canals blocked, non-existent, or non-functional

**Rationale:**
Functional stormwater drains and canals are essential for ensuring that the health-care facility is adequately drained – in particular during the rainy season. If stormwater drains and canals are blocked, non-existent, or non-functional the consequent standing water and localized flooding can contribute to the transmission of pathogenic organisms in addition to breeding of disease vectors. Flooding of health-care facilities during times of disease outbreaks can significantly contribute to transmission of pathogenic organisms to patients and nearby communities.

**Definition of Terms:**
Functional stormwater drains and canals are defined as those that adequately convey rainwater away from the health-care facility to a point of treatment and/or safe disposal without causing localized flooding or standing water.

**Hazard Scoring:**
Talk to health-care facility staff and ask them whether the stormwater drains and canals function adequately during the rainy season. Ask the health-care facility staff to show you all of the stormwater drains and canals that run through the health-care facility. Visit each one in turn and score one point if you encounter any that are blocked or have pools of standing water present.

Hazard 7-1: Insufficient, inadequate, or overflowing waste disposal containers
**Rationale:**
Dedicated general and health-care waste disposal containers should be present within convenient distance of where wastes are being generated. Waste containers for infectious waste, non-infectious waste, hazardous waste, and sharps need to be clearly identified and should adequately protect medical staff, patients, and waste management personnel from infection. During an emergency, the capacity of existing health-care facility mechanisms to safely manage above normal levels of health-care wastes may be quickly exceeded. Overflowing containers is a sign of an insufficient number of containers or poor waste management.

**Definition of Terms:**
Sufficient health-care waste containers is defined as at least one waste container within dropping distance of where health-care waste is being generated and one general waste container per 20 inpatients. Adequate health-care waste containers defined as containers which protect staff and patients from the waste (typically yellow puncture proof boxes for sharps, and colour coded and lined 15-40 litre containers with lids for infectious, non infectious and hazardous waste).

**Hazard Scoring:**
Talk to health-care facility staff and ask them to show you how health-care and general wastes are managed in the health facility. Ask to be shown each step in the health-care facility medical and general waste collection chain from point of creation to final disposal. Score one point if you encounter parts of the health-care facility without health-care waste containers, or if you see overflowing waste containers, or if you see health-care waste containers that do not adequately protect people from the waste or if there are less than one general waste bin for every 20 inpatients.

| Hazard 7-2: | No source separation of wastes (e.g. infectious, non-infectious, sharps) |

**Rationale:**
Infectious wastes (soiled bandages, dressings, rubber gloves, etc.) and sharps require specialized handling and disposal methods and should not be mixed in with general wastes (paper, plastic, organic matter etc.). During an emergency, an increased amount of infectious waste may be generated and the capacity of existing health-care facility mechanisms to safely separate and manage health-care wastes may be quickly exceeded.

**Hazard Scoring:**
Talk to health-care facility staff and ask them to show you how health-care and general wastes are managed in the facility. Ask to be shown each step in the health-care and general waste collection chain from point of creation to final disposal. Score one point if you encounter any mixing of sharps, infectious and non-sharp non-infectious wastes.
Hazard 7-3: Health-care wastes (needles, dressings etc.) observed in health-care facility grounds or public spaces or health-care waste disposal area unfenced?

Rationale:
Health-care wastes may end up being dumped in areas accessible by the general public. Dumping of health-care wastes poses a health hazard not just for health-care facility visitors but also to communities around the health-care facility.

Definition of Terms:
A fenced health-care waste disposal area is defined as one having a continuous barrier around it effectively preventing access by the general public.

Hazard Scoring:
Talk to health-care facility staff and ask them to walk you around the physical boundary of the health-care facility grounds. Walk along the boundary and between any buildings looking for signs of health-care wastes (syringes, dressings, etc.) in the environment. Look at typical dumping locations including behind walls, behind latrine blocks, between buildings, and behind trees and undergrowth. Score one point if you encounter any evidence whatsoever of health-care waste being dumped into the public environment or the designated health-care waste disposal area does not have continuous barrier around it effectively preventing access by the general public.

Hazard 8-1: Lack of impregnated bed nets, indoor residual spraying, or damaged mosquito window screens in mosquito-borne disease risk areas

Rationale:
During emergencies, the capacity of a health-care facility may be quickly exceeded and patients may be housed in corridors, spare rooms, waiting areas, or temporary overflow areas, without impregnated bed nets, indoor residual spraying or mosquito screening. Without control measures, mosquitoes may transmit mosquito borne disease from infected patients to others.

Hazard Scoring:
Ask the health-care facility staff to show you the inpatient wards and explain the mosquito control measures in place. Score one point if there is a malarial risk and if there are no mosquito control measures (i.e. patients without impregnated bed nets, wards without indoor residual spraying, or damaged mosquito screening).

Hazard 8-2: Kitchen stores or prepared food unprotected from flies, other insects, rats or other animals
**Rationale:**
It is essential that health-care facilities take steps to reduce disease vector populations in order to prevent disease transmission to staff, patients and communities living close to the facility.

**Hazard Scoring:**
Ask the health-care facility staff to show you where staff or inpatient carers are storing, preparing, cooking, eating and disposing of food. Score one point if at any stage you observe either stores of food, cooked food or food wastes that are unprotected from flies, insects, rats, or other animals.

**Hazard 8-3:** Breeding sites (stagnant pools, food waste etc.) identified in / around facility

**Rationale:**
During disease outbreaks, flies, insects, and rats and other animals can act as disease vectors facilitating the spread of pathogenic material from the health-care facility to communities around the facility. Steps should be taken to minimize disease vectors and disease vector breeding sites around the health-care facility.

**Hazard Scoring:**
Ask the health-care facility staff to walk you around the health-care facility grounds and look for signs of flies, rats, and other animals. Score one point if you encounter any evidence of disease vectors or evidence of potential breeding sites including piles of food wastes, piles of solid waste, rodent holes, pools of standing water, festering latrines, piles of animal excreta, etc.

**Hazard 9-1:** Lack of at least one month supply of chlorine products, detergent or soap or insufficient dedicated cleaning equipment (buckets, mops etc.) for each zone, or dedicated cleaning staff.

**Rationale:**
Chlorine products, detergents and soaps and basic cleaning equipment such as buckets and maps are essential items for infection control in a health-care setting. Natural disasters, disease outbreaks, or conflict may reduce access to cleaning supplies or supplies may be used up at a significantly faster rate. To limit the potential spread of infection, each zone in the health-care facility should have its own set of cleaning equipment.

**Hazard Scoring:**
Ask the health-care facility staff to show you their cleaning supplies. Score one point if they do not have at least one month supply of chlorine, detergent, or soap or they have do not have sufficient dedicated mops and buckets for each health-care zone or they do not have a dedicated person in charge of hygiene and cleaning.
Hazard 9-2: Inadequate disinfection of beds, floors, walls, equipment, surfaces, or inadequate disposal of faeces and vomit from infectious patients

**Rationale:**
The health-care facility cleaning capacity may be quickly exceeded and cleaning staff may not be able to keep up with demand for disinfecting beds, floors, walls, equipment and surfaces. It is also essential that faeces and vomit from infectious patients is disposed of into a dedicated latrine that does not contaminate the groundwater or environment.

**Definition of Terms:**
Adequate disinfection is defined as at least daily mopping of floors with detergent and disinfection of surfaces in isolation areas with 0.2% chlorine solution, and immediate clean up and disinfection with 2% chlorine solution of soiled surfaces after spills of body fluids. Adequate disposal defined of faeces and vomit defined as disposal into a structure that separates the contents from users, groundwater and the environment.

**Hazard Scoring:**
Ask the health-care facility staff to show you their cleaning supplies. Ask them how often they clean floors and surfaces of isolation areas, and where they dispose of faeces and vomit from infectious patients. Score one point if they state they do not disinfect walls and surfaces on a daily basis or walls and surfaces are made from materials that cannot be adequately cleaned or disinfected or faeces and vomit are not disposed of into a structure that separates the contents from users, groundwater and the environment.

Hazard 9-3: Lack of disinfection of hands (with soap or 0.05% chlorine solution) and feet (spraying or footbaths with 0.2% chlorine) at entry / exit of isolation areas

**Rationale:**
During an infectious disease outbreak it is a common infection control measure to position guards at entry and exit points of isolation areas to ensure that the feet of every person entering and leaving the isolation area are disinfected with chlorine and the person washes their hands with soap.

**Hazard Scoring:**
Ask the health-care facility staff to show you the isolation areas and if possible, observe the practices of people entering and leaving. Score one hazard point if you observe a lack of disinfection of hands and feet or there is a lack of necessary equipment at every entry and exit (handwashing stations with soap and water and spraying or footbaths / sprayers with 0.2% chlorine). If there are no isolation areas it is not necessary to assess this hazard.

Hazard 9-4: Lack of personal protective equipment (disposable gloves, overalls, masks etc.) for staff.
**Rationale:**
It is essential that general medical staff, and personnel working in isolation areas, health-care waste collection, chlorine solution preparation, laundry or vector control activities have adequate protective equipment to safeguard themselves from the risk of disease transmission and handling of any harmful chemicals (e.g. chlorine).

**Hazard Scoring:**
Ask each type of health-care facility staff to show you their personal protective equipment. Score one point if they do not have the correct sufficient or adequate personal protective equipment.

<table>
<thead>
<tr>
<th>Hazard 10-1: Absence of functional handwashing points in any location where health-care is delivered (wards, consulting rooms, delivery rooms, operating theatres, etc.) or service areas (kitchen, laundry, toilets, waste zone, mortuary etc.)</th>
</tr>
</thead>
</table>

**Rationale:**
Decontamination of clean hands with alcohol hand rub, and handwashing with soap are two of the most effective measures for infection control in a health-care care setting, especially during emergencies. If alcohol-based handrubs are used for rapid, repeated decontamination of clean hands, there should also be soap and water available for cleaning of soiled hands. Operational handwashing facilities should be present in any location where health-care is provided (e.g. consultation rooms, maternity wards, delivery rooms, surgery) in addition to at the entrances and exits of isolation areas, and health-care facility service areas (such as kitchens, laundry, toilets, waste zone, mortuary etc.). Operational handwashing facilities should also be available in places where food is prepared and consumed, and within 5m / 15ft of each toilet block.

**Definition of Terms:**
An operational handwashing station is defined as one with a continuous supply of water, soap, safe disposal of grey water and possibly alcohol hand rub for repeat decontamination of clean hands. In an emergency setting a simple handwashing stations could be established with a drum of water with a simple tap, soap, and a large plastic laundry bowl for collecting the grey water (to be disposed of in a safe soakaway pit that does not contaminate groundwater or the environment).

**Hazard Scoring:**
Ask the health-care facility staff to show you all of the locations where health-care is provided (e.g. consultation rooms, maternity wards, delivery rooms, surgery), in addition to any isolation areas, kitchen areas, eating areas and staff and patient toilets. Score one point if any of these locations are missing operational handwashing stations.
Hazard 10-2: Patients and carers not informed of essential hygiene behaviours, starting within 30 minutes of arrival.

Rationale:
Patients and carers arriving at the health-care facility should be adequately advised on how, why, where and when to carry out personal infection control practices including handwashing with soap. This briefing should take place repeatedly during the stay starting as soon as possible on arrival, preferably within 30 minutes. Information about behaviours for limiting disease transmission should be provided verbally by staff, who should have the time to explain clearly to patients and carers.

Hazard Scoring:
Ask at least three inpatient carers if they have received a verbal briefing (at least five minutes) from health-care facility staff concerning good infection control practices - in particular handwashing with soap. Score hazard point if any of these inpatients report that they have not received a briefing.

Hazard 10-3: Absence of posters reminding users of correct handwashing procedures

Rationale:
Handwashing with soap is an important infection control intervention in health-care facilities, and handwashing stations are good places to install posters or other visual reminders showing users of the correct handwashing procedure to follow in health settings (e.g. in consultation rooms, maternity wards, delivery rooms, outside surgery rooms, isolation areas, toilets, kitchens, dining rooms).

Hazard Scoring:
Ask the health-care facility staff to show you all of the locations where health-care is provided (e.g. consultation rooms, maternity wards, delivery rooms, surgery), in addition to any isolation areas, kitchen areas, eating areas and staff and patient toilets. Score one hazard point if any of these locations are missing handwashing posters reminding users of the correct handwashing procedures to follow.
5 Comprehensive Assessment Tool

5.1 How to use the comprehensive assessment tool

The WASH in health-care facilities Comprehensive Assessment Tool (CAT) is a detailed, assessment template that can be used in emergencies to document the condition of, or damage to, WASH infrastructure and services, and identify major sanitary hazards (or areas where WASH service delivery is below standard). The tool can also be used to help prioritize actions that should be taken. If possible, the CAT should be completed by a qualified and experienced WASH professional. In order to complete the assessment in a single visit it may be necessary that at least two staff carry out the assessment: a WASH engineer for the infrastructure assessment and water quality testing, and a programme staff member for the key informant interviews.

**Box 5.1 Recommended field equipment for comprehensive assessment**

- Field notebook and pens / pencils
- Digital camera
- GPS unit
- Tape measure 5m / 16 feet
- Long measuring tape 30m / 100ft
- Stopwatch
- Calculator
- Chlorine residual and pH tester with consumables
- Conductivity meter
- Sterilized sample bottles for faecal coliform testing.
- Powerful flashlight
- Overalls
- Hard hat
- Waterproof boots
- Rubber gloves
- Well dip meter 50m / 160ft (if onsite groundwater source)
- Crow bar 1m / 3ft
- Spade
- Bucket 20 litres / 5 gallons
- Turbidity tube
- Photocopies of CAT forms

The CAT is completed by filling in parts of the form that are relevant to the size and type of health-care facility, using a combination of direct observation and interviews with facility staff (medical and non-medical). The assessor should attempt to take into account the current situation in the health-care facility, including possible increases in patient numbers and damage to, or loss of, infrastructure and supplies as a result of the emergency. There is space for additional comments if they are needed to help understand the results, for example if there are hazards that are not listed on the form, the assessor is not sure of some data, the assessor considers that the situation is likely to change significantly in the short term, or the assessor wants to highlight a problem that they feel is of extreme importance or urgency. In all cases the assessor should discuss the results with the facility staff before departing. If there are any matters of extreme importance or urgency, this should be communicated immediately to the facility management and WASH coordinating body so that rapid action can be taken. The CAT has twelve sections as follows:

1. Water Supply
2. Excreta Disposal
3. Wastewater and Site Drainage
4. Waste Management
5. Disease Vector Control
6. Infection Control
7. Handwashing
8. Water Quality Testing
9. Key Informant Interview
10. Plan Sketch
11. WASH Action Plan
12. Hazard Assessment Summary
When using the CAT assessment tool it is highly recommended that each of the WASH sections are completely assessed sequentially and individually (i.e. it is recommended that the complete water chain is assessed for damage and sanitary hazards in its entirety from water abstraction, to treatment, to storage, through to the entire distribution network and water collection points – before attempting to assess another WASH system such as the sanitation chain, wastewater disposal chain, or health-care waste disposal chain). In practice, this means that the assessor may make several tours of the health-care facility, however this significantly reduces the risk of overlooking hazards.

The CAT checklists serve as an aide memoire to help the assessor complete the following tasks:

**Figure 5.1 Key steps in the Comprehensive Assessment Tool (CAT)**

**Step 1: Describe WASH Systems**
Describe the key characteristics of each of the WASH systems (water supply, excreta disposal, grey water disposal, health-care waste, vector control infection control, handwashing) from source to disposal noting any emergency related damage along with actions required to bring back into service.

**Step 2: Assess Hazards**
Assess current (or potential) public health hazards of each of the WASH systems from source to disposal along with control measures.

**Step 3: Assess Water Quality**
Perform basic water quality testing to ensure that water is fit for human consumption.

**Step 4: Key Informant Interviews**
Interview key health-care facility staff to ascertain their perception of WASH related problems and ideas for potential solutions.

**Step 5: Determine Control Measures**
Prepare a comprehensive list of critical control measures to address WASH systems damage and public health hazards and bring WASH services up to the levels described in Chapter 3.

**Step 6: Prepare a WASH Action Plan**
Prepare a comprehensive WASH Action Plan clearing describing who will do what, where, when and how, what resources are required, who will pay, and who will monitor.

**Step 1 Describe the WASH systems**
The CAT contains checklists and blank forms to allow the assessor to describe each of the WASH system components along with its current condition (or
damage sustained) and interventions required to bring it back to service (see example in figure 5.2 below).

Figure 5.2 Example CAT assessment checklist for boreholes and wells

As much information as possible should be recorded to describe the technical characteristics, nature and condition of each part of the WASH systems. The CAT has been designed to cover a broad set of scenarios, however the Engineer should use a field notebook to record any additional information.

The best way to compile the detailed system breakdown is to ask a facility staff member to physically show you the steps of each of the different WASH systems starting from the source / point of creation (i.e. the water source in the case of water systems, the toilet block in the case of excreta disposal, or the consultation room in the case of health-care waste disposal) and moving through the steps in the system’s chain up to the point of final consumption or disposal (e.g. water point, a septic tank, sewer or waste stabilization pond for excreta, or a sharps pit for sharps waste). Each of the stages in the WASH system, and the method of conveyance between stages, should be noted. It may be helpful to talk to the health-care facility management before undertaking the assessment as they may have copies of existing plans of the WASH systems (in particular the water, sanitation or drainage system).

Step 2 Assessment of hazards

Once the steps in the health-care facility WASH system (water supply, excreta disposal, wastewater disposal, or health-care waste disposal) has been described in detail, the next step is to document any current public health hazards (or any hazards that are likely to be encountered during the emergency phase). The best way to assess these hazards is to ask a health-care facility staff member to physically walk you through the steps of each of the different WASH systems. The CAT form contains checklists of potential public health hazards (CAT Section I to Section VII) to help with this process (see example in figure 5.1 above). To use the CAT, find the relevant section and tick the boxes of hazards that are encountered. It should be noted that during the emergency phase it may not be worth documenting hazards that are unlikely to occur during the emergency response phase, or that have minor or insignificant consequences to health.

Users should be aware that the CAT form has been designed to be used with any size of health-care facility from a small health post to a complete hospital, therefore the user should only complete the sections that are relevant to the infrastructure being assessed. In addition, users should take into consideration that public health hazards are highly contextual and the user should apply common sense and document any additional public health hazards that are encountered.
Step 3 Assess water quality

The next step in the comprehensive assessment is to perform a basic water quality analyses to ensure that water being used in the health-care facility is fit for human consumption.

Relevant water quality parameters to be tested vary from context to context depending upon the nature of the source of water (e.g. groundwater or surface water), the nature of rocks making up groundwater aquifers, and the nature of land use (industrial and agricultural activity) around the health-care facility.

If groundwater aquifers are known to contain traces or arsenic, fluoride, or local medical officers or community reports show evidence of arsenic or fluoride linked diseases, then these parameters should be tested. All groundwater used should be tested for arsenic, fluoride if no water testing has ever been attested at the facility (e.g. no record available). Surface waters in areas where industrial or agricultural activities are commonplace should be sent to national laboratories for broad spectrum testing of multiple industrial and agricultural contaminants.

All water supplies, regardless of source of origin, should be tested for faecal coliforms. If a sanitary survey shows there is a risk that water could be contaminated from latrines, septic tanks, sewers, or agricultural activity then the water should be tested for nitrates in addition to faecal coliforms. If the health-care facility is supplied with mains water from a reliable public network, it is still necessary to test for free chlorine residual and faecal coliforms.

Water samples should be taken at a minimum from the water source and point of water collection. Complex water systems may require samples at intermediary stages e.g. storage or following treatment.

A summary of the suggested parameters for testing can be found in part VIII of the CAT form (see part of this form in figure 5.3 below).

<table>
<thead>
<tr>
<th>Location</th>
<th>Parameter</th>
<th>Frequency</th>
<th>Standard / Threshold</th>
<th>Means of Verification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groundwater source</td>
<td>Faecal contamination</td>
<td>Monthly</td>
<td>0 fcu/100ml</td>
<td>Water sampling at point of abstraction</td>
</tr>
<tr>
<td></td>
<td>pH</td>
<td>Monthly</td>
<td>6.5 – 8.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Turbidity</td>
<td>Monthly</td>
<td>&lt;5 NTU</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Arsenic</td>
<td>Quarterly</td>
<td>0.05 mg/l</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fluoride</td>
<td>Quarterly</td>
<td>1.0 – 1.5 mg/l</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Iron*</td>
<td>Quarterly</td>
<td>0.3 mg/l</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Manganese*</td>
<td>Quarterly</td>
<td>0.1 mg/l</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TDS</td>
<td>Quarterly</td>
<td>1000 mg/l</td>
<td>Water sampling at point of abstraction</td>
</tr>
<tr>
<td>Surface water source</td>
<td>Faecal contamination</td>
<td>Monthly</td>
<td>0 fcu/100ml</td>
<td></td>
</tr>
<tr>
<td></td>
<td>pH</td>
<td>Monthly</td>
<td>6.5 – 8.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Turbidity</td>
<td>Monthly</td>
<td>&lt;5 NTU</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TDS</td>
<td>Quarterly</td>
<td>1000 mg/l</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Broad spectrum contaminant analysis</td>
<td>Quarterly</td>
<td>- - -</td>
<td></td>
</tr>
</tbody>
</table>

Figure 5.3 Extract from CAT Section VIII – Suggested water quality parameters and monitoring frequencies for various water sources
During the emergency phase it may be valuable to increase the monitoring frequencies of various parameters (in particular free chlorine residuals) to a daily basis, depending on local constraints. In more stable situations, the monitoring frequency will be less. Some parameters are unlikely to change much over time (such as the levels of groundwater mineral contaminants such as arsenic and fluoride). At a minimum, these indicators need to be measured once as a baseline and then at least quarterly throughout the emergency response.

**Step 4  Key informant interviews**

During the comprehensive assessment, it is essential to collect additional background information concerning WASH services that may not be apparent from a visual assessment alone. It is also very helpful to understand what health-care facility staff are the key public health hazards, including underlying causes, and what they feel are the solutions. Many WASH problems may not be technical in nature and could be due to social, managerial or financial reasons.

Section IX of the CAT form contains a range of open questions that are designed to help investigate potential problems with WASH services. The list of questions is not exhaustive and is merely intended as an *aide mémoire*. There is also no need to ask all questions on the list. The list of questions is intended to cover a wide range of scenarios and so the list should be reviewed and only the questions that are relevant to the context should be posed. Additional questions should be formulated based on the replies received and the emergency context. The assessor should try not to simply read the questions directly off the list but instead use the themes as conversation starters. It is helpful to sincerely ask staff for their opinions and important to keep asking probing questions such as ‘why?’, ‘how?’ or ‘can you explain what happened?’ The assessor should try to avoid overburdening respondents - concentrate on factors that pose the greatest health risk first.

During the key informant interview stage, the assessor should try to interview a number of key staff (Director, Head Sanitarian, Medical Staff) and triangulate responses. It may be helpful to review the list of questions and construct conversation guides for each specific person. The interviews can also be used to debrief staff if they are carried out after the infrastructure assessment part of the exercise.

**Step 5  Determine control measures**

Control measures are barriers to public health hazards. They work by preventing, inactivating, removing or reducing them to acceptable levels. Control measures can include a wide range of activities and processes and can be technical, managerial, or behavioural. Determination of control measures to public health hazards in health-care facilities in emergency settings should be carried out by an *experienced WASH professional*. Many potential control measures for WASH in health-care facilities are described in the guidance notes in Chapter 3 of this document. **Control measures are highly contextual and the user should apply their experience and common sense to come up with solutions that are appropriate for the emergency context.**
At the end of the CAT there are sheets (Section XII) that can be used to summarize the main elements of each of the WASH systems along with current or potential hazards and proposed control measures (see the example in figure 5.3 below).

**Figure 5.3  Example CAT water source assessment template**

One sheet should be completed for each different type of WASH system in place. Additional sheets may need to be completed if there are multiple WASH systems in use for example there are more than one water source, excreta is managed differently in different parts of the health-care facility, wastewater disposal is handled differently in laundry and shower areas, or there are different systems in place for the management of infectious wastes.

**Step 6  Prepare a WASH action plan**

The final section of the CAT contains a sample WASH action plan that should be used to describe exactly what actions should be carried out in terms of what, by whom, by when, the tools and equipment that are required, the materials and consumables that are required, the skilled and unskilled labour that is required, the approximate cost, and most importantly who pays.
WASH IN HEALTH-CARE FACILITIES IN EMERGENCIES
COMPREHENSIVE WASH ASSESSMENT TOOL

- This comprehensive assessment tool (CAT) has 12 sections: water supply, excreta disposal, wastewater and site drainage, waste management, disease vector control, infection control, handwashing, water quality testing, key informant questions, a sketch map, an action plan template and a hazard summary template.
- The CAT has been designed to be used with any size of health-care facility from a small health post to a complete hospital, therefore only complete the sections that are relevant to the infrastructure being assessed.
- The main purpose of the CAT is to identify problems and generate control measures to bring conditions up to the recommendations in Chapter 3. Refer to the guidance notes in Chapter 3 for clarification on definitions.
- Ask staff to guide you along the WASH systems (water, excreta, waste, wastewater) from origin to disposal and document the type, size and specification of the system’s component elements including any damage. Tick the boxes of major hazards that are encountered (or are likely to occur during the emergency phase).
- As you follow the systems, talk to users about problems, take photos, and ask for their ideas for solutions.
- This form attempts to capture most public health hazards, however the user should apply common sense and document any additional hazards that are encountered in the spaces provided.
- Take into account the current situation, including possible patient increase or loss of infrastructure & supplies.
- Discuss results with the facility staff before departing. Matters of extreme urgency should be communicated immediately to the facility management and WASH coordinating authorities so rapid action can be taken.

### SECTION I: HEALTH-CARE FACILITY WATER SUPPLY COMPREHENSIVE ASSESSMENT

<table>
<thead>
<tr>
<th>□ Piped Water</th>
<th>(provide installation data and tick all hazards that apply, add others if needed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Pipe Material(s)</td>
<td>□ Pipe Lengths (m) □ Diameters (mm) □ Water Source</td>
</tr>
<tr>
<td>□ Intermittent supply / negative or low pressures?</td>
<td>□ Illegal water connections? □ Lack of backflow prevention?</td>
</tr>
<tr>
<td>□ Insufficient chlorination?</td>
<td>□ Bad smell, taste, colour or other problems with acceptability? □ Inadequate cold protection?</td>
</tr>
<tr>
<td>□ Visible water leaks?</td>
<td>□ Water network flooded?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>□ Borehole □ Protected Well □ Unprotected Well</th>
<th>(provide installation data and tick hazards that apply)</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Static Groundwater Depth (m) □ Well / Borehole Diameter (m) □ Apron Diameter (m)</td>
<td></td>
</tr>
<tr>
<td>□ Sanitary Seal Depth (m) □ Headwall Height (m) □ Design Abstraction Flow Rate (l/s)</td>
<td></td>
</tr>
<tr>
<td>□ Latrine, sewer, septic tank, waste, stagnant water, flood water within 10m / 30ft?</td>
<td>□ Cracks, leaks or visible openings around pump attachment? □ Lack of fence?</td>
</tr>
<tr>
<td>□ Insufficient chlorination?</td>
<td>□ Concrete apron &lt; 3m / 9ft wide? □ Poor drainage?</td>
</tr>
<tr>
<td>□ Sanitary seal &lt; 3m / 9ft?</td>
<td>□ Abstraction risk (e.g. bucket)? □ Groundwater seasonal?</td>
</tr>
<tr>
<td>□ Scale, microbial growth?</td>
<td>□ No surface water protection? □ Bad smell, taste, colour or other problems with acceptability?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>□ Stream □ River □ Pond □ Lake □ Creek / Marsh □ Irrigation Canal □ Kareze</th>
<th>(tick all that apply)</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Intake Width (m) □ Height (m) □ Length (m) □ Material □ Flow Rate (l/s)</td>
<td></td>
</tr>
<tr>
<td>□ Human settlements or activity upstream?</td>
<td>□ Cracks, leaks or visible openings into intake structure? □ Surface water seasonal?</td>
</tr>
<tr>
<td>□ Latrine, septic tank, waste, stagnant water within 100m / 300ft of collection point?</td>
<td>□ Insufficient chlorination? □ Lack of fence?</td>
</tr>
<tr>
<td>□ Poor drainage around intake?</td>
<td>□ Lack of routine water testing?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>□ Protected Spring □ Unprotected Spring</th>
<th>(provide installation data and tick hazards that apply, add others if needed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Width (m) □ Height (m) □ Length (m) □ Altitude (m) □ Material □ Flow Rate (l/s)</td>
<td></td>
</tr>
<tr>
<td>□ Human settlements or activity above catchment?</td>
<td>□ Cracks, leaks or visible openings into spring capture? □ Walls inadequately sealed?</td>
</tr>
<tr>
<td>□ Latrine, sewer, septic tank, waste, stagnant water, flood water within 10m / 30ft?</td>
<td>□ Inadequate capping / sealing? □ Lack of fence around spring?</td>
</tr>
<tr>
<td>□ Insufficient chlorination?</td>
<td>□ Lack of upstream surface water diversion canal? □ Poor drainage around spring?</td>
</tr>
<tr>
<td>□ Bad smell, taste, or colour?</td>
<td>□ Spring seasonal?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>□ Rainwater</th>
<th>(provide installation data and tick all hazards that apply, add others if needed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Roof Area (m²) □ Roof Material □ Gutter Length (m) □ Gutter Material</td>
<td></td>
</tr>
<tr>
<td>□ Roof or gutter contamination (plants, dirt etc)?</td>
<td>□ Inappropriate roof material (e.g. asbestos)? □ Absence of first flush diverter?</td>
</tr>
<tr>
<td>□ Overhanging trees?</td>
<td>□ Roof poorly maintained? □ Entry not covered / screened?</td>
</tr>
<tr>
<td>Water Supply</td>
<td>Transport</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------</td>
</tr>
<tr>
<td>□ Water Tanker</td>
<td>□ Volume (m³)</td>
</tr>
<tr>
<td>□ Handpump □ Rope Pump □ Windlass □ Rope and Bucket □ Shadoof □ Submersible Pump</td>
<td>□ Device Make □ Device Model □ Design Flow Rate (l/s) □</td>
</tr>
<tr>
<td>□ Infiltration Gallery □ UV Irradiation □ Membrane Filtration □ Reverse Osmosis □ Other</td>
<td>□ Total Daily Users</td>
</tr>
<tr>
<td>□ Concrete / Brick / Stone Tank □ Metallic Tank □ Elevated Tank □ Oxfam Tank □ Onion Tank</td>
<td>□ Brand □ Volume (m³) □ Daily Supplied Volume (m³) □ Material</td>
</tr>
<tr>
<td>□ Subsurface Tank □ Polyethylene Tank □ Bladder Tank □ Jerry Cans □ Buckets □ Other</td>
<td>□ Insufficient storage (one days supply)? □ Inadequately sealed / covered / leaking?</td>
</tr>
<tr>
<td>□ Piped Network □ Water Collection Points □ Handwashing Sinks □ Dishwashing Sinks</td>
<td>□ Coverage Rate</td>
</tr>
</tbody>
</table>
### SECTION II: HEALTH-CARE FACILITY EXCRETA DISPOSAL ASSESSMENT

**Toilet Superstructure**
- **Number of Cubicles**
- **Total Daily Users**
- **Coverage Rate**
- **Coverage Rate (persons/toilet)**

**Disposal**
- **Sewers**
- **Transportation**
- **Excreta Handling**

<table>
<thead>
<tr>
<th>Toilet block unsanitary (excreta on toilet surface, or inside cubicle / bathroom)?</th>
<th>Lack of dedicated cleaning equipment (buckets / mops, brushes, detergent etc.)?</th>
<th>Fly infestation (flies observed during assessment period)?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toilet block flooded?</td>
<td>Insufficient water for adequate operation (flush not working)?</td>
<td>Lack of dedicated toilets within isolation areas?</td>
</tr>
<tr>
<td>Insufficient # of toilets?</td>
<td>Lack of functional handwashing station within 5m / 15ft of toilet?</td>
<td>Insufficient number of toilets for vulnerable groups (elderly / infirm / disabled / children)?</td>
</tr>
<tr>
<td>Insufficient toilet distribution (no toilets &lt; 50m / 150ft of where health-care delivered, or food prepared or eaten)?</td>
<td>Evidence of open defecation?</td>
<td>Lack of personal protective equipment for cleaners (gloves, aprons, overalls, boots)?</td>
</tr>
<tr>
<td>Lack of privacy?</td>
<td>Inadequate cleaning of toilet block (&lt; twice a day or strong smell of excreta or urine)?</td>
<td>(provide installation data and tick all hazards that apply)</td>
</tr>
<tr>
<td>Lack of security (lack of functional lock or lighting)?</td>
<td>Culturally inappropriate design?</td>
<td></td>
</tr>
</tbody>
</table>

**Collection / Storage**
- **Vault / Pit Capacity**
- **Used Volume**
- **Coverage Rate**

<table>
<thead>
<tr>
<th>Excreta containment structure inadequately covered or sealed?</th>
<th>Fly infestation (flies observed during the assessment period)?</th>
<th>Excreta containment structure full or overflowing?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Containment structure &lt; 1.5m / 5ft of groundwater?</td>
<td>Excreta containment structure visibly cracked / broken / leaking / flooded?</td>
<td>Presence of vermin or other vectors?</td>
</tr>
</tbody>
</table>

**Human Emptying**
- **Motorized Emptying**
- **Buckets**
- **Vacuum Pumps**
- **Diaphragm Pumps**

**Excreta Handling**
- **Device Make**
- **Device Model**
- **Power**

<table>
<thead>
<tr>
<th>Excreta leakage?</th>
<th>Desludging equipment or vehicles inadequately cleaned or disinfected (0.2% chlorine), between desludging?</th>
<th>Lack of personal protective equipment for desludging staff?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct contact between excreta and personnel?</td>
<td>Inadequate disposal of desludging cleaning water?</td>
<td>Lack of on-site showers for desludging staff?</td>
</tr>
<tr>
<td>Visible traces of excreta on equipment during transportation or storage?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Sludge Tankers**
- **Sludge Carts**
- **Sealed Drums**
- **Other**

<table>
<thead>
<tr>
<th>Volume (m³)</th>
<th>Type</th>
<th>Emptying Frequency</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excreta transportation tank overflowing, leaking, or poorly sealed / covered?</td>
<td>Visible traces of excreta on transportation system?</td>
<td>Fly infestation (flies observed during assessment period)?</td>
<td></td>
</tr>
<tr>
<td>Unauthorized dumping?</td>
<td>Visible traces of excreta along transportation route?</td>
<td>Insufficient fuel / capacity?</td>
<td></td>
</tr>
</tbody>
</table>

**Sewers**
- **Sewer Material**
- **Lengths**
- **Diameters**

<table>
<thead>
<tr>
<th>Sewer pipes or inspection chambers overflowing, blocked or leaking?</th>
<th>Sewer pipes exposed or buried less than 0.5m / 2ft?</th>
<th>Fly infestation (one or more flies observed on inspection)?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insufficient retention times?</td>
<td>Inspection chambers or rodding eyes inadequately sealed?</td>
<td></td>
</tr>
</tbody>
</table>

**Disposal**
- **Fill And Cover**
- **Leach Field**
- **Other**

<table>
<thead>
<tr>
<th>Untreated disposal of excreta into water bodies?</th>
<th>Fly infestation (flies observed during the assessment period)?</th>
<th>Lack of personal protective equipment?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excreta disposal location less than 1.5m / 5ft above groundwater level?</td>
<td>Application of untreated excreta to directly to land, or inadequate soil cover depth?</td>
<td></td>
</tr>
</tbody>
</table>

---

**Device Make:**
- **Device Model:**
- **Power:**
### SECTION II: HEALTH-CARE FACILITY EXCRETA DISPOSAL ASSESSMENT CONTINUED...

| MANAGEMENT | Excreta Treatment | Grey Water Collection | Transport | Offsite Sewage Treatment Works | Waste Stabilization Ponds | Anaerobic Digester | Constructed Wetlands / Reed Beds | Septic Tank | Trickling Filter | Activated Sludge | Thickening Ponds | Drying Beds | Composting | Other |
|------------|-------------------|-----------------------|-----------|____________________________|________________________|__________________|______________________________|____________|________________|________________|_______________|____________|____________|_______|
| Width: ____ (m) Height: ____ (m) Length: ____ (m) | Volume: ____ (m³) | Flow Rate: ____ (l/s) | Insufficient treatment or retention times? | Presence of excreta in the facility public environment? | Lack of maintenance equipment (buckets, shovels, brushes, etc.)? | Inadequate fencing? | Poor maintenance schedule / lack of cleaning / replacement? | Lack of on-site showers for personnel? | Lack of personal protective equipment for workers? | |

<table>
<thead>
<tr>
<th>Number of Cleaners #</th>
<th>Number of Sanitarians #</th>
<th>Cleaning Stocks (weeks)</th>
<th>Insufficient cleaning and maintenance staff?</th>
<th>Poor routine cleaning and maintenance schedule?</th>
<th>Lack of personal protective equipment for health-care waste personnel?</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td># Shovels #</td>
<td># Wheelbarrows #</td>
<td># Buckets #</td>
<td># Brushes #</td>
<td># Mops #</td>
<td># Aprons #</td>
<td># Backpack Sprayers #</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number</th>
<th>Insufficient cleaning and maintenance staff?</th>
<th>Poor routine cleaning and maintenance schedule?</th>
<th>Lack of personal protective equipment for health-care waste personnel?</th>
<th>Inadequate fencing?</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td># Shovels</td>
<td># Wheelbarrows</td>
<td># Buckets</td>
<td># Brushes</td>
<td># Mops</td>
<td># Aprons</td>
</tr>
</tbody>
</table>

### SECTION III: HEALTH-CARE FACILITY WASTEWATER DISPOSAL ASSESSMENT

<table>
<thead>
<tr>
<th>Bucket</th>
<th>Drum</th>
<th>Basin</th>
<th>Wastewater Holding Tank</th>
<th>Other</th>
<th>Handwashing Points with Grey water Collection</th>
<th>Handwashing Points with Grey water Disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk of spillage or contact with grey water during movement / emptying?</td>
<td>Grey water collection vessel overflowing, leaking?</td>
<td>Grey water from cleaning / bathing / handwashing or laundering visibly present in public environment?</td>
<td>Insufficient number of grey water collection points?</td>
<td>Lack of dedicated grey water disposal for isolation areas?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of disinfection of grey water from isolation areas up to 0.2% Cl.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Open Drainage Canal</th>
<th>Covered Drainage Canal</th>
<th>Wastewater Pipe</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canal / Pipe Lengths ____ (m)</td>
<td>Canal / Pipe Diameters ____ (mm)</td>
<td>Canal / Pipe Material</td>
<td></td>
</tr>
<tr>
<td>Grey water canal blocked / leaking / overflowing into public environment?</td>
<td>Grey water conveyance system uncovered / open to environment?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Offsite Sewage Treatment Works</th>
<th>Soakage Pit</th>
<th>Infiltration Trenches</th>
<th>Combined Sewer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined Septic Tank</td>
<td>Constructed Wetlands</td>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment / Disposal</th>
<th>Width ____ (m) Height ____ (m) Length ____ (m)</th>
<th>Volume ____ (m³)</th>
<th>Design Flow Rate ____ (l/s)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Unsafe disposal of grey water from cleaning / bathing / laundry / handwashing?</td>
<td>Wastewater treatment / disposal system structure cracked / broken / leaking?</td>
<td>Incorrect flow rates (too high)?</td>
<td>Final effluent disposal &lt; 1.5m / 5ft above groundwater level?</td>
<td>Lack of disinfection of wastewater from isolation areas up to 0.2% Chlorine?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stormwater</th>
<th>Conglomerate Lined Drain</th>
<th>Concrete Lined Drain</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drain Width ____ (m) Drain Depth ____ (m) Drain Length ____ (m)</td>
<td>Stormwater drains carrying potentially infectious material out of health-care facility?</td>
<td>Stormwater drains poorly levelled (standing water)?</td>
<td></td>
</tr>
<tr>
<td>Absence of stormwater drain network?</td>
<td>Stormwater drains blocked / overflowing / inadequate?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **WASTE**
- **CARE**
- **FACILITY**
- **WATER**
### SECTION IV: HEALTH-CARE WASTE MANAGEMENT ASSESSMENT

<table>
<thead>
<tr>
<th>Collection</th>
<th>Storage</th>
<th>Conveyance</th>
<th>Treatment / Disposal</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td># Sharps Boxes</td>
<td># Sealed Puncture-Proof Sharps Box</td>
<td># Number of High Temp Incinerators</td>
<td>Lack of waste segregation?</td>
<td># Insufficient numbers of health-care waste staff?</td>
</tr>
<tr>
<td># Non Sharp Infectious Waste Bins</td>
<td># Strong Leak Proof Plastic Bags</td>
<td># Number of Low Temp Incinerators</td>
<td>Lack of waste colour coding?</td>
<td># Insufficient numbers of health-care waste staff?</td>
</tr>
<tr>
<td># General Waste Bins</td>
<td># Plastic Waste Bins</td>
<td># Number of Trolleys</td>
<td>Waste containers full or overflowing?</td>
<td>Staff insufficiently trained?</td>
</tr>
<tr>
<td>(provide data and tick all hazards that apply)</td>
<td># Wooden Baskets</td>
<td># Number of Carts</td>
<td>Waste containers or bags inadequately covered, sealed, or leaking fluids?</td>
<td>Lack of waste containers?</td>
</tr>
<tr>
<td></td>
<td># Other</td>
<td># Number of Wheelbarrows</td>
<td>Lack of personal protective equipment?</td>
<td>Lack of waste containers?</td>
</tr>
<tr>
<td></td>
<td>□ Sealed Puncture-Proof Sharps Box</td>
<td>□ Lack of immediate disposal of used sharps at generation?</td>
<td>□ Insufficient # of containers (one container within dropping distance of every location where waste generated, or one general bin per 20 patients)?</td>
<td>□ Lack of personal protective equipment?</td>
</tr>
<tr>
<td></td>
<td>□ Strong Leak Proof Plastic Bags</td>
<td>□ Irregular container cleaning / disinfection (minimum weekly)?</td>
<td>□ Sharps container not puncture-proof or tamper proof</td>
<td>□ Lack of waste related injury reporting, logging and action?</td>
</tr>
<tr>
<td></td>
<td>□ Plastic Waste Bins</td>
<td>□ Fly or other vector infestation?</td>
<td>□ Lack of immediate disposal of used sharps at generation?</td>
<td>□ Lack of clean-up equipment?</td>
</tr>
<tr>
<td></td>
<td>□ Wooden Baskets</td>
<td>□ Lack of waste management staff?</td>
<td>□ Lack of waste related injury reporting, logging and action?</td>
<td>□ Lack of on-site showers for health-care waste workers?</td>
</tr>
<tr>
<td></td>
<td>□ Other</td>
<td>□ Lack of on-site showers for health-care waste workers?</td>
<td>□ Insufficient numbers of health-care waste staff?</td>
<td>□ Lack of on-site showers for health-care waste workers?</td>
</tr>
</tbody>
</table>

**Note:** storage of health-care waste is only acceptable if there is a routine collection service e.g. in urban areas. In all other cases, wastes should be disposed of immediately in an on-site facility.
### SECTION V: HEALTH-CARE FACILITY DISEASE VECTOR CONTROL HAZARD ASSESSMENT

<table>
<thead>
<tr>
<th>Breeding Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Observation of disease vector infestation?</td>
</tr>
<tr>
<td>- Solid waste or food waste visible in environment?</td>
</tr>
<tr>
<td>- Standing water or grey water present?</td>
</tr>
<tr>
<td>- Blocked ditches?</td>
</tr>
<tr>
<td>- Water sources inadequately sealed from vectors?</td>
</tr>
<tr>
<td>- Long grasses &lt;100m / 300ft of health facility?</td>
</tr>
<tr>
<td>- Floors and surfaces unsanitary (lack of daily cleaning with detergent and hot water)?</td>
</tr>
<tr>
<td>- Latrine pits, septic tanks, or waste pits inadequately protected from vectors?</td>
</tr>
<tr>
<td>- Bathrooms, kitchens, wards, waste area unsanitary (presence of wastes, excreta)?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Lack of window and door screens (&lt;1.5mm / 1/16”)?</td>
</tr>
<tr>
<td>- Unprotected openings into health facility structure?</td>
</tr>
<tr>
<td>- No mosquito screen (&lt;1.5mm / 1/16”) around latrine vent pipes.</td>
</tr>
<tr>
<td>- Inadequate fly screens or food covering in kitchen area.</td>
</tr>
<tr>
<td>- Lack of insecticide treated mosquito nets for inpatients.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemicals</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Lack of routine residual spraying or fogging program in mosquito prone areas.</td>
</tr>
<tr>
<td>- Lack of annual bed net retreatment with insecticide at the start of the mosquito season.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Food Wastes</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Inadequate protection of food stores from vectors?</td>
</tr>
<tr>
<td>- Kitchen or eating area surfaces, floors or utensils inadequately cleaned?</td>
</tr>
<tr>
<td>- Uncovered / leaking food waste bins?</td>
</tr>
<tr>
<td>- Food wastes inadequately disposed in facility grounds or waste disposal area?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Staff insufficiently trained on use of vector control equipment and chemicals?</td>
</tr>
<tr>
<td>- Lack of personal protective equipment for vector control personnel (overalls, boots, gloves, aprons, eye protection, masks)?</td>
</tr>
<tr>
<td>- Lack of on-site showers for vector control staff?</td>
</tr>
</tbody>
</table>

### SECTION VI: HEALTH-CARE FACILITY HANDWASHING ASSESSMENT

<table>
<thead>
<tr>
<th>Hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Absence of handwashing stations &lt; 5m / 15ft of every toilet, where health-care is provided, where food is prepared or eaten or at isolation entry &amp; exits?</td>
</tr>
<tr>
<td>- Grey water disposal system does not protect users or environment from contamination?</td>
</tr>
<tr>
<td>- Absence of soap or water?</td>
</tr>
<tr>
<td>- Unsanitary hand drying operations?</td>
</tr>
<tr>
<td>- Absence of critical handwashing supplies (soap)?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Promotion</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Absence of posters reminding users of correct handwashing procedure?</td>
</tr>
<tr>
<td>- Lack of basic hygiene information during visit starting within 30 mins of arrival?</td>
</tr>
<tr>
<td>- Lack of dedicated hygiene promoters?</td>
</tr>
</tbody>
</table>
### SECTION VI: MANAGEMENT

#### Laundry
- Isolation Areas
- Cleaning / Disinfection
- Personal Protective Equipment

#### Clinical Handwashing
- Laun<br>dry
- Isolation Areas

#### Transport and Infection Control
- Lack of staff handwashing before and after a shift?
- Inadequate handwashing: when entering and leaving high risk areas such as surgeries, delivery rooms, and isolation areas?
- Absence of posters reminding staff of correct clinical handwashing procedures?

#### Personal Protective Equipment
- Lack of dedicated staff and management of dead bodies
- Inadequate handling and storage of bed linen and medical garments?
- Lack of dedicated staff and visitor changing area for PPE?

#### Training Programme
- Lack of infection control monitoring and follow-up?
- Lack of training for infection control workers?

#### Health-Care Facility Infection Control Assessment

<table>
<thead>
<tr>
<th>Water</th>
<th>Soap</th>
<th>Paper Towels</th>
<th>Electric Dryers</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th># Functional Handwashing Points</th>
<th># Total Daily Users</th>
<th># Coverage Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th># Disposable Gloves</th>
<th># Disposable Plastic Aprons</th>
<th># Overalls</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th># Brushes</th>
<th># Mops</th>
<th># Buckets</th>
<th>Qty Detergent (litres)</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th># Foot Sprayers</th>
<th># Footbaths</th>
<th># Handwashing Stations</th>
<th># Entry / Exit Guards</th>
<th># Dedicated Toilets</th>
<th># Dedicated Showers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th># Dedicated Laundry Points</th>
<th># Dedicated Waste Disposal Points</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th># Laundry Collection Bins</th>
<th># Laundry Collection Bags</th>
<th># Laundry Trolleys</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th># Drying Facilities (m²)</th>
<th>Ironing Facilities</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**INFECTION CONTROL ASSESSMENT**

**Lack of infection control policy**
- Lack of written and enforced infection control policy?
- Inadequate handling and management of dead bodies?
- Absence of disciplinary measures related to breaches in infection control?
- Insufficient stocks of personal protective equipment?

**Lack of infection control**
- Inadequate numbers of staff for laundry / cleaning?
- Lack of infection control policy?
- Inadequate infection control basic precautions?
- Lack of written and enforced infection control policy?

**Lack of infection control staff**
- Absence of head infection control staff?
- Absence of infection control staff training?
- Absence of infection control staff qualifications?

**Lack of infection control policy**
- Lack of infection control policy?
- Inadequate infection control policy?
- Inadequate infection control policy?
- Lack of infection control policy?

**Lack of infection control staff**
- Absence of infection control staff training?
- Absence of infection control staff qualifications?
- Absence of infection control staff monitoring?

**Lack of infection control policy**
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- Inadequate infection control policy?
- Inadequate infection control policy?
- Lack of infection control policy?

**Lack of infection control staff**
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- Absence of infection control staff training?
- Absence of infection control staff qualifications?
- Absence of infection control staff monitoring?

**Lack of infection control policy**
- Lack of infection control policy?
- Inadequate infection control policy?
- Inadequate infection control policy?
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- Absence of infection control staff qualifications?
- Absence of infection control staff monitoring?

**Lack of infection control policy**
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- Inadequate infection control policy?
- Inadequate infection control policy?
- Lack of infection control policy?

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- Absence of infection control staff qualifications?
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- Inadequate infection control policy?
- Lack of infection control policy?

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- Absence of infection control staff monitoring?

**Lack of infection control policy**
- Lack of infection control policy?
- Inadequate infection control policy?
- Inadequate infection control policy?
- Lack of infection control policy?
### SECTION VIII: HEALTH-CARE FACILITY WATER QUALITY TESTING

- Relevant water quality parameters to be tested vary from context to context depending upon the nature of the source of water (groundwater or surface water), the nature of rocks making up groundwater aquifers, and the nature of land use (industrial and agricultural activity) around the health-care facility.
- During the emergency phase it will be valuable to monitor these indicators (in particular free chlorine residuals if water chlorination activities are being initiated) on a daily basis. In more stable situations, the frequency will be less. Some parameters are unlikely to change much over time (such as the levels of groundwater mineral contaminants such as arsenic and fluoride). At a minimum, these indicators need to be measured once as a baseline and then at least quarterly throughout the emergency response.
- If the health-care facility is supplied with mains water from a reliable public network, it is still necessary to test for free chlorine residual and faecal coliforms.
- If groundwater aquifers are known to contain traces or arsenic, fluoride, iron, manganese, or other minerals then these parameters should be tested.
- Surface waters in areas where industrial or agricultural activities are commonplace should be sent to national laboratories for broad spectrum testing of multiple industrial and agricultural contaminants.
- If a sanitary survey shows there is a risk that water could be contaminated from latrines, septic tanks, sewers, or agricultural activity then the water should be tested for nitrates in addition to faecal coliforms.
- Water samples should be taken at a minimum from the water source and point of water collection. Complex water systems may require samples at intermediary stages e.g. storage or following treatment.

<table>
<thead>
<tr>
<th>Location</th>
<th>Parameter</th>
<th>Frequency</th>
<th>Standard / Target</th>
<th>Means of Verification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groundwater source</td>
<td>Faecal contamination</td>
<td>Monthly</td>
<td>0 fcu/100ml</td>
<td>Water sampling at point of abstraction</td>
</tr>
<tr>
<td></td>
<td>pH</td>
<td>Monthly</td>
<td>6.5 – 8.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Turbidity</td>
<td>Monthly</td>
<td>&lt;5 NTU</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Arsenic</td>
<td>Quarterly</td>
<td>0.05 mg/l</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fluoride</td>
<td>Quarterly</td>
<td>1.0 – 1.5 mg/l</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Iron*</td>
<td>Quarterly</td>
<td>0.3 mg/l</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Manganese*</td>
<td>Quarterly</td>
<td>0.1 mg/l</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TDS</td>
<td>Quarterly</td>
<td>1000 mg/l</td>
<td></td>
</tr>
<tr>
<td>Surface water source</td>
<td>Faecal contamination</td>
<td>Monthly</td>
<td>0 fcu/100ml</td>
<td>Water sampling at point of abstraction</td>
</tr>
<tr>
<td></td>
<td>pH</td>
<td>Monthly</td>
<td>6.5 – 8.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Turbidity</td>
<td>Monthly</td>
<td>&lt;5 NTU</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TDS</td>
<td>Quarterly</td>
<td>1000 mg/l</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Broad spectrum contaminant analysis</td>
<td>Quarterly</td>
<td>- - -</td>
<td>Water sampling at point of abstraction</td>
</tr>
<tr>
<td>Piped mains water</td>
<td>Faecal contamination</td>
<td>Monthly</td>
<td>0 fcu/100ml</td>
<td>Water sampling at point of entry</td>
</tr>
<tr>
<td></td>
<td>Free chlorine residual</td>
<td>Weekly</td>
<td>&gt;0.5 mg/l</td>
<td></td>
</tr>
<tr>
<td></td>
<td>pH</td>
<td>Monthly</td>
<td>6.5 – 8.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Turbidity</td>
<td>Weekly</td>
<td>&lt;5 NTU</td>
<td></td>
</tr>
<tr>
<td>Water collection point</td>
<td>Faecal contamination</td>
<td>Monthly</td>
<td>0 fcu/100ml</td>
<td>Random selection of 4 water collection points</td>
</tr>
<tr>
<td></td>
<td>Free chlorine residual</td>
<td>Weekly</td>
<td>&gt; 0.5mg/l</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Turbidity</td>
<td>Weekly</td>
<td>&lt; 5 NTU</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flow</td>
<td>Quarterly</td>
<td>0.33 l/s</td>
<td></td>
</tr>
</tbody>
</table>

* Levels of Iron and Manganese of above 0.3 mg/l and 0.1 mg/l are not hazardous to health, however the adverse taste may causes users to abandon the source in favour of another unprotected source.
### SECTION IX: HEALTH-CARE FACILITY WASH ASSESSMENT - KEY INFORMANT QUESTIONS

These key informant primer questions have been compiled as an aide-memoire to help find out:
- What health-care facility staff feel are the key public health hazards including underlying causes?
- What health-care facility staff feel are the solutions to various public health hazards?
- The aim of the tool is to help collect background information on WASH issues that may not be obvious from direct observation, in particular any underlying non-technical causes (e.g. social or managerial).
- Try to interview a number of key staff (Director, Head Sanitarian, Medical Staff) and triangulate responses.
- The list of questions is not exhaustive and is merely intended as a conversation primer.
- It may be helpful to review the list of questions and construct conversation guides for each specific person.
- Additional questions should be formulated based on the replies received and the emergency context.
- Try not to simply read the questions directly off the list. Instead use the themes as conversation starters.
- There is no need to ask all questions on the list. Choose only the themes that are relevant to the context.
- Try to interview a number of key staff (Director, Head Sanitarian, Medical Staff) and triangulate responses.
- Avoid overburdening respondents - concentrate on factors that pose the greatest health risk first.
- You can use the interview to debrief staff - if it is carried out after the infrastructure assessment.

#### #1. General background information on number of staff and users.
- How many staff, inpatients, inpatient carers, and outpatients are present in the health facility every day?
- Have you seen the number increase as a result of the emergency or do you expect it to increase?
- What is the capacity (number of beds) and do you have temporary space for expansion if required?

#### #2. General perceptions of key public health hazards in the health-care facility.
- What do you feel are the biggest challenges in ensuring that the facility is free from public health risks?
- Where are the biggest hazards out of water quality, water quantity, excreta disposal, infection control, health-care waste management, laundring facilities, bathing facilities, handwashing and vector control?
- Where geographically in the health-care facility are the biggest hazards?
- What do you feel are the solutions?

#### #3. Perceptions concerning water quantity for the health-care facility.
- How much water is typically available / collected per day?
- Do you feel there is enough for cleaning, laundering, handwashing, drinking, bathing, infection control?
- Was there more water before the emergency or has the emergency caused interruptions in supply?

#### #4. Perceptions concerning water quality in the health-care facility.
- Do you feel the water is of good quality?
- Was the quality of the water better before the emergency?
- Do some parts of the health-care facility have better water quality than others?
- Where along the water chain do you feel are the biggest risks to water quality?
- What do you feel could be done to improve the water quality?

#### #5. Discussion concerning water sources supplying the health-care facility.
- What are the main sources of water for the health-care facility?
- How far are these water sources? Who takes care of these sources?
- Is there any change in the water collection pattern during the year?
- Do you feel these water sources are sufficiently safe and sanitary?
- Are there any safer alternative water sources that could be exploited?

#### #6. Discussion concerning water management and what happens during system breakdown.
- Does the water system ever break down?
- Whose responsibility is it to get the system working when the water source/system breaks down?
- Do you feel there are enough staff to operate and maintain the water supply system?
- Do you feel they have sufficient tools, materials, and training?

#### #7. Discussion concerning safe water storage in the health-care facility.
- How is water stored in the health-care facility?
- Do you feel there is enough water storage? Does water ever run out?
- Is drinking water stored separately from water for washing, cooking, bathing or cleaning?
- How often are the water storage vessels cleaned, how are they cleaned, and who cleans them?

#### #8. Discussion concerning safe water treatment in the health-care facility.
- Is any form of water treatment practiced in the health-care facility (boiling, filtering, chlorination)?
- Can you suggestion any improvements that can be made to the treatment practices?

#### #9. Discussion concerning access to water points in the health-care facility.
- Are there water points in every part of the health-care facility where health-care is being provided?
- Are there any parts of the health-care facility with access problems (e.g. low flow rates, poor quality)?
- Do infection wards have their own dedicated water points?
- Do you feel that generally there are enough water points?
### Discussion concerning access to toilet facilities in the health-care facility.
- Are there toilet facilities in every part of the health-care facility where health-care is being provided?
- Are there any parts of the facility with problems (e.g. full, leaking, fly infestation, cleanliness)?
- Do you feel that generally there are enough toilets?

### Discussion concerning public health hazards from toilet facilities in the health-care facility.
- Where along the sanitation chain do you feel are the biggest public health hazards?
- Are there any high risk activities such as excreta conveyance, handling, tankering, lagooning?
- Where is the excreta finally disposed?

### Discussion concerning toilet design in the health-care facility.
- Do you think the toilet design is generally acceptable to children, the elderly, the infirm, disabled users?
- Do you have any suggestions for improving the design?

### Discussion concerning toilet cleaning, operation and maintenance.
- Who is responsible for cleaning the toilets and how often are they cleaned?
- Who is responsible for repairing, emptying or unblocking the toilets and sanitary systems?
- Do you feel there are enough staff considering the size of the health-care facility and number of toilets?
- Do you feel the staff have the correct tools, cleaning equipment, consumables and personal protection?

### Discussion concerning infectious grey water disposal in the health-care facility.
- How is infectious grey water from laundering of soiled bedding, cleaning of isolation areas, patient bathing areas, or handwashing activities disposed?
- Do you have any suggestions for reducing the public health hazards from infectious grey water?

### Discussion concerning surface water management.
- When it rains, are there any problems with surface water drainage of the site?
- Are there any risks that contaminated rainwater could leave the site and contaminate the community?
- Who is responsible for clearing ditches and maintaining the drainage network?
- Do the staff have the correct tools and personal protective equipment to carry out this work?
- Do you have any suggestions for improving surface water management?

### Perceptions concerning waste generation and collection in the health-care facility.
- How much sharps waste, infectious waste, and non-infectious waste is generated per day?
- Do you feel there are enough appropriate waste collection containers?
- Do you feel health-care wastes are adequately separated and managed?
- Do you have any suggestions for improving current practices?

### Perceptions concerning waste movement and storage at the health-care facility.
- How is health-care waste moved around the facility?
- Is health-care waste stored anywhere while it waits for treatment, collection or final disposal?
- What do you feel could be done to improve the movement or storage of wastes?

### Discussion concerning waste treatment and disposal at the health-care facility.
- How are the different wastes treated and finally disposed of at the health-care facility?
- Do you feel that the waste disposal site is large enough for the health-care facility?
- Do you have any suggestions for improving how health-care waste is treated or disposed?

### Discussion concerning waste disposal operation and management.
- Do you feel there are enough staff to collect and dispose of the waste at the health-care facility?
- Do you feel they have sufficient tools, materials and personal protective equipment, and training to keep the waste disposal chain safe for staff, patients and the environment?

### Discussion concerning disease vectors in the health-care facility.
- Do you have any problems with the presence of disease vectors in and around the health-care facility (such as vermin, bats, birds, mosquitoes, ants, cats, dogs)?
- Do you have any problems with stagnant water, blocked ditches, long grasses, infestations in latrine pits or septic tanks, or food or infectious waste management?
- Do you have any suggestions how vector control problems mentioned can be addressed?

### Discussion concerning disease vector control activities in the health-care facility.
- What sorts of vector control activities do you carry out (e.g. clearing breeding sites, barriers and screens, use of bed nets, waste management, cleaning and disinfecting, indoor residual spraying, and fogging)?
- Do you have any suggestions for improvements to vector control activities in the health-care facility?

### Discussion concerning vector control operation and management.
- Do you feel there are enough staff to carry out vector control activities at the health-care facility?
- Do you feel you have sufficient tools, equipment, materials and personal protective equipment, and training to carry out disease vector control activities?
- Do you have any access to specialist advice and services for vector control? What access have you had in the past, what access now, what access do you consider necessary?
### #23. Discussion concerning access to laundry facilities in the health-care facility.
- Are the health facility facilities for laundering, drying and storing bed linen and medical linen sufficient?
- Do you feel there are enough locations for public laundering and clothes / bedding drying?
- Do isolation areas have their own dedicated public laundry facilities?
- Are you aware of any problems with the laundering facilities and can you suggest any ways that laundry at the health-care facility can be improved?

### #24. Discussion concerning laundry operation and management.
- Do you feel that soiled linen and medical linen is safely handled, transported, and disinfected?
- Do you feel there are enough staff to carry out laundry activities at the health-care facility?
- Do you feel they have sufficient disinfecting equipment, materials and personal protective equipment to carry out laundering activities?
- Can you suggest any ways that laundry operations can be improved?

### #25. Discussion concerning access to bathing facilities in the health-care facility.
- Do you feel there are enough functional showers on-site for medical staff and other staff involved in the handling of infectious wastes (cleaners, sanitation workers)?
- Do you feel there are enough functional public showers for patients and carers?
- Are there bathing facilities within easy access of every part of the facility where health-care is provided?
- Do any of the showers have problems (e.g. low flowrates, blockages, water of poor quality)?
- Do infection wards have their own dedicated public showering facilities?
- Are you aware of any problems with the bathing facilities and can you suggest any ways that bathing at the health-care facility can be improved?

### #26. Discussion concerning bathing facility operation and management.
- Do you feel there are enough staff to ensure bathing facilities are adequately cleaned and operational?
- Do you feel they have sufficient tools, spare parts, disinfecting equipment, materials and personal protective equipment to ensure bathing facilities are clean and operational?
- Can you suggest any ways that bathing operations can be improved?

### #27. Discussion concerning food storage, preparation and food safety in the health-care facility.
- How is food stored, prepared, cooked, consumed, stored and disposed of in the health-care facility?
- Are food storage, preparation surfaces and cooking and eating utensils generally clean and sanitary?
- Are there issues with disease vectors around the food storage, preparation and consumption areas?
- Have there ever been any problems related to food safety in the health facility?
- Do you feel they have sufficient tools, spare parts, disinfecting equipment, and soap to ensure handwashing facilities are clean and operational?
- Do you feel there is any way that food safety can be improved at the health-care facility?

### #28. Discussion concerning access to handwashing facilities in the health-care facility.
- Do you feel there are enough functional handwashing points within easy access of every part of the facility where health-care is provided, in every toilet block and where food is prepared or eaten?
- Do any of the handwashing points have problems (e.g. low flowrates, blockages, lack of soap)?
- Are you aware of any problems with the handwashing facilities and can you suggest any ways that handwashing at the health-care facility can be improved?

### #29. Discussion concerning handwashing promotion and practice in the health-care facility.
- Are there any ongoing activities related to the promotion of handwashing in the health-care facility?
- Do you feel medical staff are correctly training in correct handwashing procedure?
- Do you feel inpatients, carers and visitors are sufficiently informed of the importance of handwashing?
- Do you feel there are sufficient visual reminders concerning the importance of handwashing?

### #30. Discussion concerning handwashing facility operation and management.
- Do you feel there are enough staff to ensure handwashing facilities are adequately operational?
- Do you feel they have sufficient tools, spare parts, disinfecting equipment, and soap to ensure handwashing facilities are clean and operational?
- Can you suggest any ways that handwashing operation and maintenance can be improved?

### #31. Discussion concerning cleaning, disinfection and sterilization.
- How many cleaning staff do you have? How often is each part of the health-care facility cleaned?
- Do you feel there are enough staff for routine cleaning and disinfection of floors and surfaces?
- Do you feel you have sufficient dedicated cleaning equipment (mops, buckets, etc) and consumables (detergent, chlorine) for each health-facility zone?
- How are blood and body fluids absorbed, disinfected and disposed of?
- How is soiled linen handled, disinfected and cleaned?
- What procedures are in place for disinfecting beds between patients?
- What is the average spacing between beds? Do you feel the wards are overcrowded?
- What equipment do you have available for sterilizing medical equipment (autoclaves etc.)?
- Can you suggest any ways that cleaning, disinfection and sterilization operations can be improved?
#32. Discussion concerning infection control management

- What procedures are in place for infection control? Do you have an infection control policy or protocol?
- Do you feel staff are fully aware and sufficiently trained in the infection control basic precautions (handwashing and antisepsis, use of personal protective equipment, safe handling of health-care wastes, management of isolation areas)?
- When was the last time refresher training was carried out? What training is given to new staff?
- Is there a disciplinary system in place for staff that do not respect infection control protocols?
- Are staff vaccinations against common infectious diseases up to date?
- Are disposable gloves worn for all invasive and non-invasive patient contact?
- Are disposable gloves worn as single use items, changed between each activity and between patients?
- Are disposable plastic aprons worn when there is a risk of exposure to blood or body fluids as single use items for each episode of patient care?
- Are disposable face masks, or glasses worn when there is a risk of blood or body fluid sprays?
- Do you feel you have sufficient supplies of personal protective equipment? How many months of stock do you currently have?
- Are clinical handwashing procedures respected by all staff (handwashing with soap before and after every shift, when entering and leaving isolation areas or high risk areas such as delivery rooms, directly after handling infectious materials and before and after each patient contact even if wearing gloves)?
- Can you suggest any ways that infection control can be improved?

#33. Discussion concerning isolation areas

- How are your isolation areas organized? Are any special procedures in place for isolation areas?
- Are entry and exits guarded and equipped with handwashing stations and foot sprayers/baths?
- Do you have adequate supplies of fencing, handwashing stations, backpack sprayers, footbaths?
- Do isolation areas have dedicated toilet, bathing, laundering, and health-care waste disposal areas?
- Can you suggest any ways that isolations areas can be improved?

#34. Dead body handling and management

- How are dead bodies handled and managed in the health-care facility?
- Do you have sufficient supplies of body bags, personnel protection equipment and chlorine?
- Are staff adequately trained in the handling and management of dead bodies?
- Where are dead bodies normally buried/cremated?
- Can you suggest any ways that management of dead bodies in the health-care facility can be improved?

#35. Disaster preparedness and risk reduction

- What back-up arrangements for water and power do you have (e.g. backup pumps, generators)?
- What measures have you taken to ensure that critical WASH equipment (e.g. pumps, generators, water treatment units) are kept well maintained?
- What measures have you taken to ensure there is sufficient storage of water for the health-care facility?
- What measures have you taken to ensure that critical WASH equipment and supplies are adequately protected from flood water levels, or conflict damage?
- What back-up stocks of critical WASH supplies do you maintain (fuel, soap, chlorine, detergent, disposable gloves, disposable aprons, water treatment chemicals, water pump and water treatment unit spare parts, health-care waste bags, body bags etc.)?
- Do infection control, health-care waste, cleaning and WASH staff members have clearly defined emergency response roles and are they adequately trained in emergency response actions?
- Do you keep a reserve roster of trained WASH personnel that can be drawn on in times of disaster?
- Have you pre-identified physical spaces (car parks, courtyards, spare wards, additional sites that may be converted to patient care areas e.g. hotels, schools, community centres), staffing and supplies required for temporary expansion of inpatient capacity during patient surge?
- Is there a designated health-care facility emergency focal point to ensure appropriate coordination and management of each aspect of WASH service provision (water supply, excreta disposal, wastewater and site drainage, waste management, disease vector control, infection control, handwashing, hygiene promotion)?
- Can you suggest any ways that the health-care facility can prepare for emergencies?
SECTION X: PLAN VIEW SKETCH OF THE OVERALL FACILITY AND ITS GROUNDS

Mark the following plus any additional features:
- Buildings
- Pathways
- Access roads
- Fences, gates & entrances
- Parking areas
- Streams
- Wells
- Borehole
- Springs
- Ponds
- Water storage or treatment infrastructure
- Water pipe networks
- Stormwater channels
- Water collection points and grey water channels
- Toilets
- Septic tanks
- Sewers
- Bathing areas and grey water channels
- Laundering areas and grey water channels
- Laundry drying areas
- Isolation areas
- Waste pits
- Incinerators
- Waste disposal area
- Surface water drainage channels
- Cooking areas
- Storage facilities
- Play areas

Mark any potential hazards & control measures:
- Flooding
- Damaged infrastructure
- Open defecation
- Uncontrolled health-care waste
- Potential areas for installing additional water storage
- Potential areas for new sanitation facilities
- Potential water collection point upgrade / expansion
- Potential bathing area upgrade / expansion
- Potential laundering area upgrade / expansion
- Potential waste disposal area upgrade / expansion
- Wastewater channels lining / covering / infiltration
- Potential improvement of stormwater management - stormwater ditches / filling of areas of ponding
- Potential vector control activities
- Potential paving of areas for emergency expansion

Note I: Use a larger sheet of paper if this page is too small.
Note II: Talk to the facility management – they may have copies of existing plans for the facility that you can photocopy.
Use this template to summarize the detailed water chain from source to point of consumption / use.
Ask a staff member to show you the water source and ask them to physically walk you through the water network (i.e. from source, to storage, to treatment, to distribution, to consumption).
As you follow the system, talk to users about problems, take photos, and use the hazard assessment questions in Section I of the CAT to help identify current or potential hazards.
Note the top three hazards for each stage. Do not include hazards that are unlikely during the emergency phase or that have minor or insignificant consequences to health.

<table>
<thead>
<tr>
<th>System Element</th>
<th>Current / Potential Hazards</th>
<th>Level</th>
<th>Control Measures</th>
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Note I: Use a larger sheet of paper if this page is too small.
Note II: You may need to photocopy this page if there are multiple water sources.
**SECTION XI: HEALTH FACILITY HAZARD ASSESSMENT SUMMARY – EXCRETA DISPOSAL CHAIN**

- Use this template to summarize the detailed excreta disposal chain from origin to disposal.
- This may be incredibly simple (e.g. a simple pit latrine) – however in recent emergencies (e.g. Haiti) the sanitation chain has been complex resulting in significant public health hazards.
- Ask a facility staff member to show you the toilets and ask them to physically show you the elements (i.e. from toilet, to storage, to transfer station, to treatment / reuse / septic overflow / leach field etc).
- As you follow the system, talk to users about problems, take photos, and use the hazard assessment questions in Section II of the CAT to help identify current or potential hazards.
- Note the top three hazards for each stage. Do not include hazards that are unlikely during the emergency phase or that have minor or insignificant consequences to health.

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**Note I:** Use a larger sheet of paper if this page is too small.

**Note II:** You may need to photocopy this page if there are multiple excreta disposal systems.
Use this template to summarize the detailed grey water disposal chain from origin to disposal.

This may be incredibly simple (e.g. the use of simple soakaway pits) or it may be more complex if grey water is being collected, stored or moved (e.g. from temporary handwashing facilities).

Ask a facility staff member to show you the places where grey water is created (i.e. showers, handwashing stations, laundering points) and ask them to physically show you the elements of the disposal system (i.e. canals, storage, septic systems, treatment systems, leach fields etc).

As you follow the system, talk to users about problems, take photos, and use the hazard assessment questions in Section III of the CAT to help identify hazards, along with any control measures.

Note the top three hazards for each stage. Do not include hazards that are unlikely during the emergency phase or that have minor or insignificant consequences to health.

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Note I: Use a larger sheet of paper if this page is too small.

Note II: You may need to photocopy this page if there are multiple wastewater disposal systems being used.
Use this template to summarize the detailed health-care waste chains from origin to disposal.

Ask a facility staff member to show you the places where health-care waste is created (i.e. wards, consultation rooms, delivery rooms, surgery, lab) and ask them to physically show you how each of the different waste types (i.e. sharps, non-sharp infectious wastes, non-infectious wastes, and hazardous wastes) are handled, moved, stored and finally disposed.

As you follow the systems, talk to staff about problems, take photos, and use the hazard assessment questions in Section IV of the CAT to help identify hazards, along with any control measures.

Note the top three hazards for each stage. Do not include hazards that are unlikely during the emergency phase or that have minor or insignificant consequences to health.

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Note I: Use a larger sheet of paper if this page is too small.
Note II: You will need to photocopy this page for each type of waste being disposed.
Use this template to document the infection control, disease vector, handwashing and hygiene promotion related hazards.

Ask a facility staff member to show you the places where infection control, disease vector and handwashing and hygiene activities are carried out (i.e. wards, isolation areas, consultation rooms, delivery rooms, surgery, lab, kitchen, morgue).

As you move around the facility, talk to staff about problems, take photos, and use the assessment questions in Section IV of the CAT to help identify hazards, along with any control measures.

Note the top three hazards for each stage. Do not include hazards that are unlikely during the emergency phase or that have minor or insignificant consequences to health.

**Cleaning / Disinfection Current & Potential Hazards**

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**Protective Equipment Current & Potential Hazards**

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**Isolation Area Current & Potential Hazards**

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**Disease Vector Current & Potential Hazards**

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**Handwashing Current & Potential Hazards**

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**Hygiene Promotion Related Current & Potential Hazards**

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**Note I:** Use a larger sheet of paper if this page is too small.
### FACILITY WASH ACTION PLAN

<table>
<thead>
<tr>
<th>WHAT? (List of priority control measures)</th>
<th>BY WHOM?</th>
<th>BY WHEN?</th>
<th>TOOLS / EQUIPMENT REQUIRED? (e.g. spades, wheelbarrows)</th>
<th>MATERIALS / CONSUMMABLES REQUIRED? (e.g. cement, pipes, soap, chlorine)</th>
<th>SKILLED LABOR REQUIRED? (man-days)</th>
<th>UNSKILLED LABOR REQUIRED? (man-days)</th>
<th>APPROX. COST? (USD$)</th>
<th>WHO PAYS?</th>
<th>WHO MONITORS?</th>
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<tr>
<td>e.g. Chlorination of health-care facility water supply</td>
<td>Health facility Sanitarian / NGO</td>
<td>End of week</td>
<td>Chlorine doser, plumbing wrenches, hacksaw, pipe threading machine</td>
<td>Buckets, 200l drum, chlorine, mixing stick, measuring cylinder, chlorine residual tester</td>
<td>1 man-day</td>
<td>1 man-day</td>
<td>400 USD$ + 20 USD$ per month</td>
<td>NGO</td>
<td>NGO / Health-care Facility</td>
</tr>
</tbody>
</table>

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**NOTE:** You may need to photocopy this table if there are lots of urgent WASH control measures required.
6 Disaster Preparedness and Risk Reduction

Health-care facilities play a vital role during emergencies and it is essential that health-care facility management take steps to ensure that facilities have the required resilience to withstand disasters and are able to continue to provide essential services. The following checklist provides a number of tasks that should be undertaken to ensure disaster readiness.

Box 6.1  WASH preparedness and risk reduction checklist

- Ensure back-up arrangements for water and power (e.g. backup pumps, generators).
- Ensure that critical WASH equipment (e.g. pumps, generators, water treatment units) are kept well maintained.
- Ensure that critical WASH equipment and supplies are adequately protected from flood water levels, or conflict damage.
- Estimate the expected weekly consumption of critical WASH supplies (fuel, soap, chlorine, detergent, disposable gloves, disposable aprons, water treatment chemicals, water pump and water treatment unit spare parts, health-care waste bags, body bags etc.) under various emergency response scenarios (earthquakes, floods, landslides, conflict, mass population displacement, disease outbreaks, etc.) and ensure sufficient stockpiles. Ensure there is a functional shortage alert mechanism in place.
- Ensure that all WASH staff members have been adequately trained on WASH emergency response actions; ensure that other health-care facility staff are aware of their roles.
- Develop job action sheets that briefly list essential duties and resources required for WASH personnel during emergency response activities.
- Maintain a reserve roster of trained WASH personnel that can be drawn on in times of disaster.
- Calculate maximal case patient admission capacity, determined not only by available space but also by human resource availability, and availability of essential resources.
- Identify physical spaces (car parks, courtyards, spare wards), staffing and supplies required for temporary expansion of inpatient capacity.
- In coordination with local authorities, identify additional sites that may be converted to patient care areas (e.g. hotels, schools, community centres).
- Designate an area for use as a temporary morgue.
- Ensure that infection control and health-care waste management protocols are strictly followed during normal operation so good practice is already instilled for periods of emergency response.
- Ensure staff have the appropriate vaccinations.
- Ensure there is a designated health-care facility emergency focal point or committee to ensure appropriate coordination and management of each aspect of WASH service provision (water supply, excreta disposal, wastewater and site drainage, waste management, disease vector control, infection control, handwashing, hygiene promotion).
### 7 Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assessment</strong></td>
<td>A systematic way of gathering relevant information, analysing and making judgment on the basis of the available information.</td>
</tr>
<tr>
<td><strong>Black water</strong></td>
<td>Wastewater containing faecal matter and urine.</td>
</tr>
<tr>
<td><strong>Carer</strong></td>
<td>Family, friends or voluntary workers who accompany patients to a health-care setting and provide basic, non-professional care. Carers may be occasional visitors, or they may stay to cook, clean and care for patients in the health-care setting.</td>
</tr>
<tr>
<td><strong>Changing room</strong></td>
<td>Area within an isolation area where health workers dress in protective clothing, disinfect hands and gloves, and dispose of soiled and contaminated protective clothing.</td>
</tr>
<tr>
<td><strong>Cleaning</strong></td>
<td>Removal of any soiling or other material on equipment or surfaces before disinfection or sterilization.</td>
</tr>
<tr>
<td><strong>Coagulation–flocculation</strong></td>
<td>Coagulation is the clumping of particles, which causes impurities to settle to the bottom. It may be induced by coagulants (e.g. lime, aluminium sulphate and iron salts). Flocculation in water and wastewater treatment is the agglomeration or clustering of colloidal and finely-divided suspended matter after coagulation by gentle stirring (by either mechanical or hydraulic means) so the suspended matter can be separated from water or sewage.</td>
</tr>
<tr>
<td><strong>Colour comparator (or colour-match comparator)</strong></td>
<td>Equipment used to measure a chemical parameter (e.g. chlorine in water) by adding a specific reagent to the sample and comparing the colour obtained with a colour scale (e.g. DPD for testing chlorine in water).</td>
</tr>
<tr>
<td><strong>Contamination</strong></td>
<td>Presence of infectious agent in blood and other body fluids, on body surfaces and medical equipment, clothing and supplies. Contact with contaminated body fluids or items are risks for disease transmission.</td>
</tr>
<tr>
<td><strong>Disaster</strong></td>
<td>Situation or event, which overwhelms local capacity, necessitating a request to national or international level for external assistance.</td>
</tr>
<tr>
<td><strong>Disaster Risk Reduction</strong></td>
<td>An approach where the likelihood and potential impact of disaster events are assessed by identifying and analysing hazards, the vulnerabilities of communities to these hazards, and their capacities to deal with these events</td>
</tr>
<tr>
<td><strong>Disinfection</strong></td>
<td>A process of removing or inactivating microorganisms without complete sterilization.</td>
</tr>
<tr>
<td><strong>DPD</strong></td>
<td>A reagent used for determining chlorine residuals in water by colour comparison (abbreviation of N,N-diethyl-p-phenylenediamine).</td>
</tr>
<tr>
<td><strong>Environmental surfaces</strong></td>
<td>Floors, walls, ceilings, table tops, etc.</td>
</tr>
<tr>
<td><strong>Emergency</strong></td>
<td>Sudden, unexpected, or impending situation that may cause injury, loss of life, or damage which therefore requires immediate assistance or relief.</td>
</tr>
<tr>
<td><strong>Epidemic</strong></td>
<td>The occurrence of cases of disease clearly in excess of normal expectancy.</td>
</tr>
<tr>
<td><strong>Grey water</strong></td>
<td>Wastewater generated from cleaning activities such as laundry, dishwashing, floor cleaning and bathing.</td>
</tr>
<tr>
<td><strong>Hazard</strong></td>
<td>A biological, chemical, physical or radiological agent that has the potential to cause harm.</td>
</tr>
<tr>
<td><strong>Health-care associated</strong></td>
<td>An outcome (usually an infection) that occurs in any health-care setting as a result of medical care. The term “health-care associated” replaces “nosocomial”, the latter term being limited to adverse infectious outcomes occurring only in hospitals.</td>
</tr>
<tr>
<td><strong>Health-care worker</strong></td>
<td>Any person trained to provide patient care (medical, nursing, paramedical, emergency room nurses, community health workers).</td>
</tr>
<tr>
<td><strong>Health-care facility</strong></td>
<td>Any hospital, health centre or clinic with inpatient or outpatient facilities. Also any facility providing emergency, temporary, or first-service care.</td>
</tr>
<tr>
<td><strong>Housekeeping surfaces</strong></td>
<td>Environmental surfaces that are not involved in direct delivery of patient care in health-care settings.</td>
</tr>
<tr>
<td><strong>Incinerator</strong></td>
<td>An apparatus for burning infectious waste material at high temperatures until it is reduced to ash.</td>
</tr>
<tr>
<td><strong>Indicator</strong></td>
<td>Signals that provide a way of measuring and communicating whether a standard has been attained.</td>
</tr>
<tr>
<td><strong>Infiltration trench</strong></td>
<td>A shallow trench, containing gravel and a porous pipe, which enables water to percolate into the soil over a larger area, and therefore with a greater infiltration capacity, than a soakaway pit.</td>
</tr>
<tr>
<td><strong>Isolation area</strong></td>
<td>The area in the health-care facility used for housing suspected infectious patients. It includes the ward along with its associated isolated changing facilities, toilets, health-care waste disposal, laundering, showering and storage facilities.</td>
</tr>
<tr>
<td><strong>Personal Protective Equipment</strong></td>
<td>Masks, gloves, gowns, eyeglasses, caps, aprons, and boots. Provides protection against splashes or spills of infectious material when examining patients or handling infectious fluids, waste or laundry.</td>
</tr>
<tr>
<td><strong>Preparedness</strong></td>
<td>The knowledge and capacities developed by governments, professional response and recovery organizations, communities, and individuals to effectively anticipate, respond to, and recover from the impacts of likely, imminent, or current hazard events or conditions.</td>
</tr>
<tr>
<td><strong>Risk</strong></td>
<td>The likelihood of identified hazards causing harm in exposed populations in a specified time frame, including the magnitude of that harm and/or the consequences.</td>
</tr>
<tr>
<td><strong>Sedimentation</strong></td>
<td>The act or process of depositing sediment from suspension in water. The term also refers to the process whereby solids settle out of wastewater by gravity during treatment.</td>
</tr>
<tr>
<td><strong>Sharps container</strong></td>
<td>Puncture-resistant container for collecting used needles and syringes.</td>
</tr>
<tr>
<td><strong>Soakaway pit or soakpit</strong></td>
<td>A simple excavation in the ground, either lined or filled with stones, that allows water to percolate into the surrounding soil.</td>
</tr>
<tr>
<td><strong>Standard</strong></td>
<td>A qualitative statement that describes minimum levels to be attained and maintained.</td>
</tr>
<tr>
<td><strong>Sterilization</strong></td>
<td>The use of a physical or chemical procedure to destroy all microbial life. The most practical method in health-care settings is saturated steam sterilization: exposure to steam saturated with water at 121°C at 1.05 bar for 30 minutes, or 134°C at 2.10 bar for 13 minutes in an autoclave.</td>
</tr>
<tr>
<td><strong>Surge capacity</strong></td>
<td>The ability of a health service to expand beyond normal capacity to meet an increased demand for clinical care.</td>
</tr>
<tr>
<td><strong>Thermotolerant coliform bacteria or faecal coliforms</strong></td>
<td>Bacteria that are used as indicators of faecal contamination of water, for example, as water quality indicators. The bacteria in the coliform group are able to form colonies on selective media at 44°C. Typically, most thermotolerant bacteria are of the species Escherichia coli, which is commonly found in faeces.</td>
</tr>
<tr>
<td><strong>Turbidity</strong></td>
<td>Cloudiness in water caused by particles in suspension, which makes chemical disinfection of the water less effective. Turbidity is commonly measured in nephelometric turbidity units (NTU) and can be determined visually using simple equipment.</td>
</tr>
</tbody>
</table>
8 Further Reading

Cholera control


Chlorination of water supplies


Disease vector control


Excreta disposal


Food hygiene


WHO (2004b). *First adapt then act! A booklet to promote safer food in diverse settings*. New Delhi, World Health Organization Regional Office for South-East Asia (http://www.searo.who.int/LinkFiles/Food_and_chemical_Safety_first_adapt__then_a ct.pdf)


General WASH emergency references


**Handwashing**


**Health-care waste management**


**Hygiene promotion**


Infection control


WHO (2004d). Practical guidelines for infection control in health care facilities. New Delhi/Manila, World Health Organization (South-East Asia Regional Office/Western Pacific Regional Office), (SEARO Regional Publication, No. 41/WPRO Regional Publication) (http://www.searo.who.int/LinkFiles/publications_PracticalguidelinSEAROpub-41.pdf)


Management of dead bodies


WASH for disabled people and other vulnerable groups


WASH in health-care facilities


Wastewater drainage and disposal


Water quality


Water supply


**Water treatment**


**Water trucking**