Minimum standards and recommendations for medical teams responding to highly infectious disease outbreaks

EMERGENCY MEDICAL TEAMS

World Health Organization

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Foreword

Infectious diseases with epidemic potential remain a significant and constant threat to the health and security of populations around the world. Recent events have reminded us that disasters, conflicts, disease outbreaks and other health emergencies require robust health emergency preparedness, readiness and response systems and capacities at local and national levels, interconnected regionally and globally. It is vital that lessons learned are translated into guidance on how to strengthen national and global capacities, on how to prepare, prevent, detect, respond to and contain infectious disease outbreaks, how to protect communities and how to effectively coordinate a safe and efficient response from the community to the first responders and across stakeholders.

Emergency response must be built on a foundation of strong national capacities, enabling countries to rapidly scale up with their own deployable surge capacities and expertise. This encompasses a wide range of capacities that can be deployed at short-notice and on a non-routine basis including emergency medical teams, specialized care teams, public health rapid response teams, mobile laboratories, and community-based interventions and resources.

This publication consolidates the expertise and experience of countries and WHO partners who have responded to infectious disease outbreaks, including when these have compounded natural disasters or complex humanitarian emergencies. It is the result of a highly consultative and collaborative process with a range of stakeholders including the Emergency Medical Team (EMT) community and a public health partnership such as the Global Outbreak Alert and Response Network (GOARN).

Emergency Medical Teams (EMTs), the EMT Initiative and its global network focus on establishing common quality standards and recommendations for medical teams to rapidly and effectively respond to health emergencies. In addition to strengthening and supporting national capacities through strong collaboration and coordination, the EMT Initiative enables countries to access trusted partnerships for interoperable surge capacities and facilitate the deployment of their global network to deliver care, if required.

This publication will greatly contribute to the establishment of such critical capacities in a predictable and quality assured manner and enhance interoperability between national, regional, and international capacities based on common quality standards and protocols. Thus, it will provide solid foundations for a common language and approach across the multiple disciplines and components required for comprehensive and coordinated outbreak responses. This will support countries to better prepare and respond to infectious disease outbreaks, honouring the core mission of saving lives, alleviating suffering and protecting the most vulnerable.

Dr. Michael J. Ryan
Executive Director
WHO Health Emergencies Programme

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All members of the Technical Working Group and all external experts completed and submitted a Declaration of Interest (DOI) to WHO, disclosing potential conflicts of interest that might affect, or might reasonably be perceived to affect their objectivity and independence in relation to the subject matter of the guidance. WHO reviewed each of those and had concluded that none could give rise to a potential or reasonably perceived conflict of interest related to the subjects covered by the guidance.

Methodology

Following the identification of the scope of the guidance, a broad literature review and assessment of the available guidance documents and guidelines from WHO, the major internationally recognized institutions and authorities was conducted. Terms of Reference (TORs) for the technical working group (TWG) were developed and a call for Expressions of Interest was sent to partner organizations, academic institutions as well as to the entire EMT network globally. The EMT Secretariat assessed the nominations and applications, and identified participants based on a fair representation of WHO regions, gender, academic background, expertise, and experience. A steering group of experts was identified to guide the project and a technical working group was formed. Identified candidates provided signed Declaration of Interest and Confidentiality undertaking forms. The Technical working group, under the leadership of the EMT Secretariat conducted regular virtual topic-specific expert consultation sessions. Multiple rounds of written submissions and technical contributions were consolidated into a draft and combined with evidence generated by the literature review and existing best practice guidelines. The decisions and consensus of the TWG provided the basis for the development of minimum technical standards and recommendations for medical teams responding to highly infectious disease outbreaks. Following the finalization of the TWG document, and following routine WHO Quality Assurance, Norms and Standards procedures for development of WHO normative and standard-setting products, an external expert review of the final document was sought. Feedback was incorporated and consented by the TWG. Finally, this document was endorsed by the EMT Strategic Advisory Group in December 2023.

Abbreviations

ACH air changes per hour

ALS average length of stay

ARI acute respiratory infection

AWD acute watery diarrhoea

BEmONC Basic Emergency Obstetric and Newborn Care

CEmONC comprehensive Emergency Obstetric and Newborn Care

CDC United States Centers for Disease Control and Prevention

CHW community health workers

COVID-19 Coronavirus disease

EMT Emergency Medical Teams

EMTCC Emergency Medical Team Coordination Cell

EOC Emergency Operations Centre

ETAT Emergency Triage Assessment and Treatment

GTFCC Global Task Force on Cholera Control

GOARN Global Outbreak Alert and Response Network

HAI health-care-associated infection

HCF health-care facility

HID highly infectious disease

IEC information, education, and communication

IMCI Integrated Management of Childhood Illness

IPC infection prevention and control

MAM moderate acute malnutrition

MERS Middle East respiratory syndrome

NCD noncommunicable disease

NGO nongovernmental organization

NIBP non-invasive blood pressure

NIV non-invasive ventilation

ORS oral rehydration salts

ORP oral rehydration point

OSL Operations Support and Logistics

PCR polymerase chain reaction

PFA psychological first aid

POC point of care

POCT point of care testing

POCUS point of care ultrasound

PPE personal protective equipment

RCCE risk communication and community engagement

RDT rapid diagnostic test

RRML rapid response mobile laboratory

RRT public health rapid response team

SAM severe acute malnutrition

SARI severe acute respiratory infection

SCT specialized care team

SDB safe and dignified burial

SGBV sexual and gender-based violence

SOP standard operating procedure

SpO2 oxygen saturation

TB tuberculosis

TWG technical working group

VHF viral haemorrhagic fevers

WASH water, sanitation and Hygiene

WHO World Health Organization

Glossary

Airborne transmission	The spread of an infectious agent through dissemination of droplet nuclei that remain infectious when suspended in air over long distances and time *(1)*.
Air changes per hour (ACH)	Ventilation airflow rate (m^3/hr) divided by room volume. It indicates how many times, during 1 hour, the air volume of a space is entirely replaced with outdoor air *(2)*.
Basic reproduction number (R0)	Epidemiologic metric used to describe the contagiousness or transmissibility of infectious agents. It represents the number of expected infections generated by one person *(3)*.
Body fluids	Urine, faeces, amniotic fluid, mucus, and all other bodily secretions.
Case definition	A surveillance case definition is a set of criteria used to define a disease for public health surveillance and to enable public health professionals to classify and count cases consistently. They are not intended to be used by health-care providers for making a clinical diagnosis or determining an individual patient's treatment needs *(4)*.
Cleaning	Cleaning is the first step in the decontamination process and refers to the physical removal of foreign and organic material *(5)*.
Contact transmission	The spread of an infectious agent caused by physical contact of a susceptible host with people or objects (direct or indirect) *(1)*.
Community health workers (CHW)	Health-care providers who live in the community they serve and that receive lower levels of formal education and training than professional health-care workers such as nurses and doctors. This human resources group has enormous potential to extend health-care services to vulnerable populations, such as communities living in remote areas and historically marginalized people, to meet unmet health needs in a culturally appropriate manner, improve access to services, address inequities in health status and improve health system performance and efficiency *(6)*.
Contact tracing	The process to identify, assess, and manage people exposed to a pathogen (called "contacts"), monitor them for infection and disease and provide the necessary interventions to prevent subsequent exposure in others *(7)*.

Decontamination	The removal of soil and pathogenic microorganisms from objects, to ensure safe handling, subject to further processing, use or disposal. The effective decontamination of medical devices and personal protective equipment (PPE) entails several steps, including but not limited to cleaning, disinfection, and sterilization *(8)*.
Disinfection	Process that reduces pathogenic microorganisms, except for bacterial spores, prions and some viruses *(9)*.
Donning and doffing area	Clearly demarcated area, in which staff puts on (dons) and takes off (doffs) personal protective equipment (PPE). The space and design of this area improves staff safety, influences compliance, and reduces the contamination risk while taking off PPE.
Droplet transmission	The spread of an infectious agent caused by the dissemination of droplets. Droplets are primarily generated by an infected person during coughing, sneezing, and talking *(1)*.
Endemic	The amount of a particular disease usually present in a community is referred to as the baseline or endemic level of the disease *(10)*.
Epidemic	Increase in the number of disease cases above what is normally expected in the population in a specific geographical area or season. Outbreak carries the same definition of epidemic but is often used for a more limited geographic area *(10)*.
Essential critical care	The care that should be provided to all critically ill patients of all ages in all hospitals globally. It is distinguished by three principles. Giving priority to those with the most urgent clinical need, including early identification and timely care, the provision of life-saving treatments that support and stabilize failing vital organ functions, and focus on effective care of low cost and low complexity *(11)*.
Health promotion	Comprehensive approach to increase individual and collective participation in health action by integration of different methods that can contribute to outbreak prevention and control, such as improving individual knowledge and skills through health education, information and communication or strengthening community action through social mobilization *(12)*.

Highly infectious diseases (HID)	In the context of this document, highly infectious diseases refer to infectious diseases with epidemic potential and varying R value. They are transmissible from person to person, their case-fatality rates can be high and there may not be an effective prophylaxis or treatment. They may be difficult to recognize and detect rapidly, and thus present a serious hazard in the community and in health-care settings *(13)*.
High-risk zone	Only patients and appropriately protected staff are allowed in the high-risk zone. Everything in the high-risk zone should be considered contaminated. The main function of the high-risk zone is to care for suspected or confirmed patients. Transmission-based precautions along with standard precautions need to be strictly adhered to.
Health-care-associated infections (HAI)	An infection occurring in a patient in a health-care facility in whom the infection was not present or incubating at the time of admission. This includes infections acquired in the health-care facility but appearing after discharge, and occupational infections among staff of the facility *(14)*.
Infection prevention and control (IPC)	Practical, evidence-based approach, relevant to every health worker and patient, at every health care interaction to prevent harm by avoidable infections *(15)*.
Isolation	The separation of ill or infected individuals from others to prevent the spread of infection *(16)*.
Low-risk zone	The low-risk zone is a staff-only area. This includes medical staff, cleaning staff, water and sanitation, and logistics staff. If protocols are followed, contamination should be minimal, and ideally none.
No touch technique	Approach, in which health and care staff conducting screening do not touch patients and maintain at least 1 meter distance from them.
Outbreak	Sudden increase in occurrences of a disease when cases are in excess of normal expectancy for the location or season. Outbreak carries the same definition of epidemic but is often used for a more limited geographic area *(10)*.

Pandemic	A pandemic is defined as a worldwide epidemic, or occurring over a very wide area, crossing international borders and usually affecting large numbers of people *(10)*.
Personal protective equipment (PPE)	PPE is equipment used to prevent or minimize exposure to hazards such as biological, chemical, and radiological hazards. Without PPE, exposure could lead to injuries and illnesses *(17)*.
Quarantine	Separation of individuals who are not ill but who may have been exposed to an infectious agent or disease, and restriction of their activities with the objective of monitoring their symptoms and ensuring the early detection of cases *(16)*.
Rapid response team (RRT)	An RRT is defined as a multidisciplinary public health team, trained and equipped with the capacity to deploy rapidly to respond to a public health emergency in coordination with other response efforts *(18)*.
Ring vaccination	Strategy to vaccinate individuals at highest risk of infection, contacts of confirmed patients, and people who are in close contact with those contacts. This way, everyone who has been or could have been exposed to a patient receives the vaccine, creating a "ring" of protection that can limit the spread of a pathogen. Ring vaccination can also be useful in limiting the geographic spread of disease by offering vaccines to populations in the periphery of the outbreak or unaffected neighbouring areas *(19)*.
Screening	In the context of this document, screening is the process by which a patient is assessed to see whether they meet a standardized case definition and require further clinical evaluation.
Standard precautions	Standard precautions are the minimum standard of IPC practices and should be used by all health-care workers, during the care of all patients, at all times, and in all settings *(20)*.

Step down capacity	In the context of this document, step down capacities refer to facility-based post-acute care with a focus on rehabilitation. They provide a dedicated inpatient area, in which recovered patients that are not ready to be discharged are temporarily cared for. Patients are being prepared for discharge through nursing care and rehabilitation, focused on addressing impairments following severe disease. They provide discharge planning and relieve medical wards of patients who do not have acute medical needs. They are not intended for acutely unwell patients or for patients who are immediately post critical.
Sterilization	A validated process used to remove viable microorganisms, including viruses and bacterial spores, but not prions from objects *(8)*.
Surge capacity	Ability of a health-care system to alter its usual operations to accommodate increased patient volume due to an emergency, reduced health-care capacity due to damage of existing facilities, and/or a decrease in the available workforce.
Transmission based precautions	Used in addition to standard precautions for individuals that are suspected or confirmed to be infected or colonized with certain infectious agents. Transmission based precautions include contact, droplet and airborne precautions, and should be implemented to prevent infection transmission *(1)*.
Triage	Triage is the systematic process of assessing patients based on acuity. It is used to identify patients who require immediate medical intervention, and those who can safely wait.

Patients in the Samaritan's Purse Diphtheria Treatment Centre, Bangladesh, 2017.
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1. Introduction

In recent years, national and international emergency medical teams (EMTs) have responded not only to natural disasters and conflicts but also increasingly to outbreaks, epidemics and the COVID-19 pandemic. In 2019, several East African countries were hit by cyclone Idai, followed by an outbreak of cholera in several of the affected districts in Mozambique. Two years earlier, in 2017, the already precarious humanitarian situation among the Rohingya refugees in Cox's Bazar, Bangladesh, came to a head when, simultaneously to a measles outbreak and a high prevalence of tuberculosis (TB), the first cases of diphtheria were detected. The 2019 measles outbreaks in Samoa and other Pacific islands or recurrent outbreaks of Ebola in the Democratic Republic of Congo and viral haemorrhagic fevers (VHF) outbreaks in areas that have never faced these diseases before, such as the Marburg outbreak in Equatorial Guinea 2023, have demonstrated the increasing need for rapidly available national and international resources with specialized outbreak response capacities to support affected states. As a consequence, several governments and organizations are developing these capacities, many of which are part of the EMT Network.

The concept of specialized care teams (SCTs) as introduced in Classification and Minimum Standards for Emergency Medical Teams, commonly referred to as the "Blue Book", recognizes the need for more modular and specialized surge support tailored to specific contexts *(21)*. It has been agreed to adopt this term to capture the nature of the offered support. This document complements and expands the guidance provided by the Blue Book and focuses on SCTs responding to outbreaks of highly infectious diseases (HID) with epidemic potential and varying R value *(3)*.

In the context of this document, highly infectious disease (HID) refers to infectious diseases that pose a serious human health threat, is transmissible from person to person, presents a serious hazard in the community and in health-care settings, and there may not be an effective prophylaxis or treatment *(13, 22)*. Medical teams responding to sudden onset disasters, conflict or other emergencies, must be able to screen, isolate, initiate treatment and referral of patients with an infectious disease in a safe way. At the same time, a country that is heavily affected by a large-scale outbreak may request support to ensure the continuation of pre-existing health services, or surge support in the form of outbreak SCTs.

Table 1. Overview of EMT and SCT roles in outbreak versus non-outbreak settings

	National facility or SCT (Outbreak/HID) providing outbreak specific care	National facility or EMT providing care during an infectious disease outbreak	National facility or EMT responding to an emergency in an area with no known infectious disease outbreak
Role	Provide clinical services in response to an infectious disease outbreak, epidemic or pandemic as per the different elements of response outlined in this document.	Provide clinical services as per EMT standards (Blue Book, not outbreak specific). Isolation capacity and referral pathways must be in place to support the outbreak response.	Provide clinical services as per EMT standards (Blue Book). In disaster and emergency settings, the risk for outbreaks may be increased.

Table 1. provides an overview of the roles of EMTs and SCTs in outbreak versus non-outbreak settings. Due to their epidemic potential and the associated implications at national or even international level, this document focuses on three outbreak scenarios: acute watery diarrhoea (AWD), severe acute respiratory infections (SARI), and viral haemorrhagic fevers (VHF) in which human to human transmission occurs.

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2. How to use this guidance

This publication of *minimum standards and recommendations for medical teams responding to highly infectious disease outbreaks* complements and expands on the guidance provided by the *Classification and minimum standards for emergency medical teams.*

The purpose of this document is to provide guidance for Member States, ministries of health, national and international EMTs and other key stakeholders wishing to build this kind of capacity, preparing for, or responding to outbreaks of infectious diseases and to define minimum standards for the development and classification of respective SCTs within the EMT framework. The objective is to maintain a practical and operational perspective which is realistic and implementable with a clear focus on building national response capacities.

Table 2 provides the definitions of minimum standards, recommendations and guidance notes in the context of this publication. Taking into consideration variations in pre-existing capacities and capabilities across different health systems, the technical standard chapters include minimum requirements applicable to all SCTs and recommendations dependent on the context.

Table 2. Definitions of minimum standards, recommendations and guidance notes in the context of this publication.

Minimum technical standards	Promote a consistent approach and a basic level of standardization. They are informed by available evidence, expertise and experience and obtained through a consultative process.
Recommendations for optimal patient care	They cover additional services and procedures that can contribute to achieving optimal care, and ideally should be strived for. Recommendations marked with (!), become minimum standards for international deployments.
Guidance notes	Provide additional information to apply the minimum standards and recommendations.

Minimum standards and recommendations as a basis for classification, were defined for scenario specific outpatient, inpatient and IPC teams. Minimum standards and recommendations outlined in outpatient capacities by default also apply to Inpatient and Inpatient ***PLUS***, and standards and recommendations of Inpatient automatically apply to Inpatient ***PLUS***.

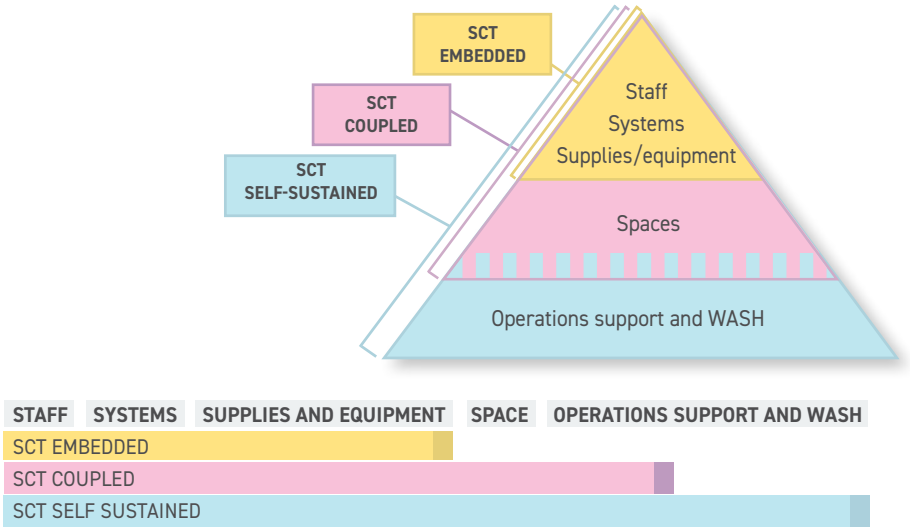
3. Specialized care teams (SCTs)

In recognition of the need for a more context tailored approach to support critical health-care gaps, and following a global consultative process,three different modalities of deployment for SCTs have been defined. Table 3 and figure 1 demonstrate the different modalities of deployment for teams, which may vary depending on context. Regardless of the modality of deployment, teams need to ensure self-sufficiency and the ability to provide the required equipment and consumables to deliver their services for the entire period of their deployment.

Table 3. Overview of the proposed modalities of deployment for SCTs

Modality of deployment	Definition
Embedded	The SCT integrates into an existing facility to provide specialized clinical care. The operations support component is provided by the host, except for specific clinical devices, equipment, consumables and drugs needed for specialized clinical care as defined by the SCT's clinical specialty.
Coupled	The SCT complements an existing facility, by contributing with additional infrastructure, to expand or extend specialized clinical care. The SCT is physically separate from the host facility but co-located on the same site and shares some operations support elements with the host. The SCT may also provide some operations support services.
Self-sustained	The SCT provides specialized clinical care in its own fully self-sustained facilities.

Fig. 1. SCT modalities of deployment



4. Definition of SCTs (outbreak/HID)

Outbreak/HID SCTs are multidisciplinary and offer standardized outbreak-specific services to populations affected by an infectious disease outbreak in support of the country's response. The range of services offered extends from outpatient screening to inpatient critical care as well as technical support (see table 4). Continuity of care for all patients admitted to a treatment facility is ensured through a dedicated coordination mechanism, well established referral pathways and strong collaboration among national and international stakeholders.

4.1 Outpatient

Outpatient teams provide outbreak-specific services that may range from providing screening, stabilization, treatment, and referral as well as health education to patients and families *(12)*. They act as sentinel sites during an outbreak by collecting and sharing epidemiological data.

4.2 Inpatient

Inpatient teams provide outbreak-specific clinical services for suspected and confirmed cases. In addition, inpatient teams offer the full range of outpatient services or cooperate with outpatient facilities, such as for screening purposes. Inpatient teams do not provide critical care. However, they are expected to have the capacity to stabilize critical patients prior to referral and manage comorbidities and/or their exacerbation during admission.

4.3 Inpatient ***PLUS***

Inpatient PLUS teams provide outbreak specific outpatient services and inpatient clinical services including essential critical care *(11)*. Inpatient ***PLUS*** facilities act as referral centres for critical cases and are expected to manage comorbidities and/or their exacerbation during admission.

4.4 Infection prevention and control (IPC)

IPC Specialized Care Teams are multidisciplinary teams consisting of IPC professionals *(23)*, WASH and logistics experts trained to analyse and optimize the IPC and WASH measures at all levels of care. IPC SCTs provide health-care facility-based support with the main objective of ensuring the safety of staff, patients and visitors and preventing further spread of infectious diseases into the community. IPC teams operate in close collaboration with national authorities and within the national IPC framework.

Table 4. Overview of the different SCT (Outbreak/HID) types, their scenario-specific services as further defined in the respective chapters, for classification requirements

Disease Scenario	Outpatient	Inpatient	Inpatient *PLUS*	IPC
AWD	**Outpatient care** Stabilization* Treatment** Referral	**Outpatient and Inpatient care** (only one inpatient capacity in AWD) Stabilization and Treatment***		Interdisciplinary team (IPC, WASH, operation support and logistics) Advice and technical support to health-care facilities
SARI	**Outpatient care** Screening Testing Stabilization Treatment Isolation Pre-referral management Referral	**Outpatient and Inpatient care** for cases that do not require invasive mechanical ventilation. Stabilization Initial treatment, and referral of critical cases.	**Outpatient care** **Inpatient care** Referral-level inpatient care, including essential critical care	
VHF****	Located at the entrance to every health-care facility (HCF) in an outbreak affected area. Screening Initiation of isolation	**Outpatient and Inpatient care** Isolation Diagnostics Stabilization Essential supportive care, if available optimized supportive care Referral	**Outpatient care** **Inpatient care** All levels of optimized supportive care, including essential critical care	

* In AWD outpatient, stabilization refers to oral rehydration therapy.

** Outpatient AWD under the Global Task Force on Cholera Control (GTFCC) *(24)* refers to oral rehydration points (ORPs).

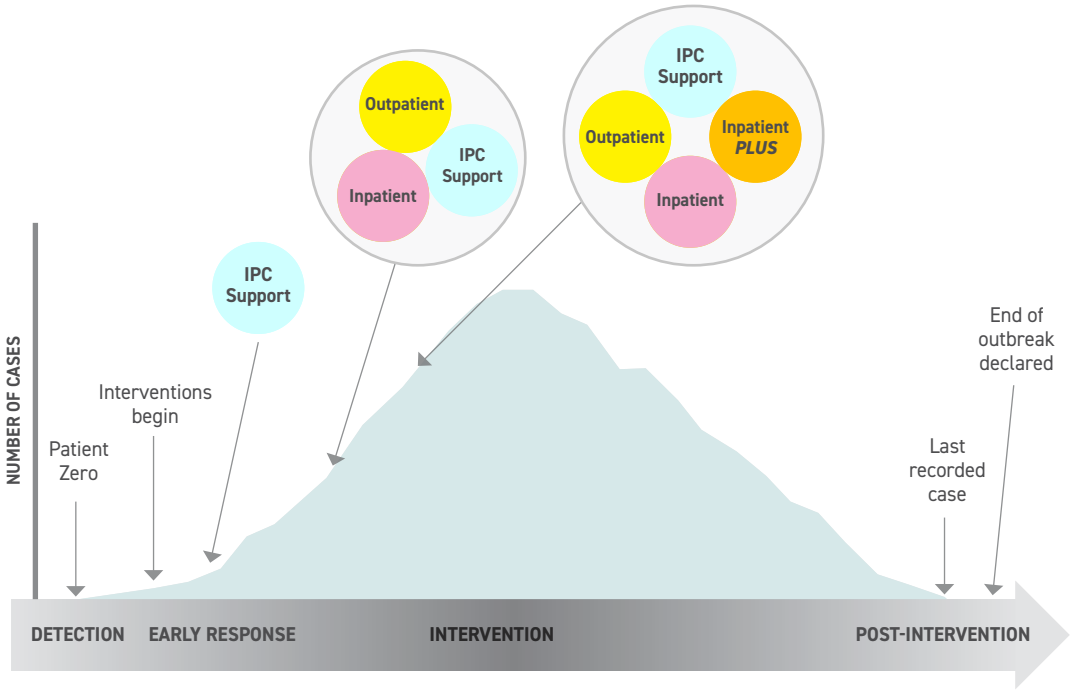
*** Inpatient AWD under GTFCC refers to Cholera Treatment Units/Cholera Treatment Centres

**** Inpatient VHF under WHO refers to ETU/ETC/Marburg Treatment Center *(25, 26)*

The classification criteria and processes described in the Blue Book are retained and expanded upon to address the contexts described in this publication. In some instances, staff shortages present the principal challenge a health-care system faces during an outbreak, epidemic or pandemic. In such circumstances, it may be an option to deploy specialists and clinical staff to provide surge support without an entire team and facility. This kind of clinical surge support, fully integrated into existing health-care structures (embedded), brings expertise in a self-sufficient manner, including sufficient PPE and medicines for the entire time of deployment, while using an established logistics platform and locally available materials and structures.

Clinical surge support can be provided by subnational, national, or regionally sourced teams, that have a well selected and trained roster, who have received EMT induction training and can demonstrate the consistent application of guiding principles and core standards to their professional practice. In the case of large-scale needs, this mechanism may expand by means of an international request for assistance targeting entities and organizations with previously demonstrated capacity to meet predefined minimum standards as part of a structured surge system, such as an already classified EMT. The need for SCTs depends on the characteristics of each outbreak. Figure 2 shows an example of the potential successive mobilization of surge capacity depending on the outbreak dynamics.

Fig. 2. Successive phases of an outbreak response



Adapted from: Polonsky JA, et al. Outbreak analytics: a developing data science for informing the response to emerging pathogens. Philos Trans R Soc Lond B Biol Sci. 2019 Jul 8;374(1776):20180276. doi: 10.1098/rstb.2018.0276. PMID: 31104603; PMCID: PMC6558557.

5. Coordination

EMTs play a crucial role in addressing the excess health-care needs brought about in outbreaks by providing additional expertise and resources as temporary surge support. It is critical to establish a national EMT surge coordination mechanism thus teams must coordinate closely with national health authorities and response structures where public health activities are being organized and implemented. Multiple EMTs or SCTs may be required at various stages of the outbreak. They may deploy simultaneously or in a phased approach. As every outbreak is unique, there is no one-size-fits all solution.

Early detection, notification and response are critical in containing and preventing the spread of outbreaks *(27)*. The timeliness of these actions should be measured against ambitious targets using an early action review approach as early in the process as possible. Countries should consider using the 7-1-7 metric, whereby every suspected outbreak is identified within 7 days of emergence, reported to public health authorities for initiation of investigation and response efforts within 1 day, and effectively responded to within 7 days *(28)*.

One of the key priority actions of outbreak response is to confirm or establish a coordination structure to ensure coherence and operational alignment throughout all pillars of the response at national, subnational and local levels. Coordination ensures consistent and comprehensive implementation of context-appropriate public health and social measures and the simultaneous maintenance of essential health services and systems to reduce mortality from all causes. This structure serves as the platform for ongoing decision-making and course correction on the basis of public health intelligence provided by a comprehensive monitoring system *(29)*.

It is critical that all elements of response clearly understand where they fit within the larger response landscape and what mechanisms exist for real-time information sharing and coordination. As the number and geographical location of cases evolve, so must the outbreak response. The mode of transmission of the pathogen, case fatality rate, preparedness and readiness levels, availability of vaccines, treatment options, population density and movement, geopolitical environment, and existing resources (including national clinical and public health system capacity) are just a few of the many factors that influence how the outbreak may unfold and dictate how best to respond, coordinate and adapt along the way.

Comprehensive outbreak response should include support for the provision of essential primary health-care services (maternal and child health, HIV/TB

programmes, vaccination programmes, continued care for people with mental, neurological and substance use conditions) in districts/regions affected by an outbreak for several reasons, including reduction of the risk of health-care-associated infections (HAIs), to reduce the risk from indirect impact of "disruptive events" on essential health services and to ensure continuity of care of patients discharged from treatment units *(30)*. Ensuring provision of essential primary health-care services also increases or maintains the community's trust in the health system *(31)* and, by extension, acceptance of epidemic measures and services.

To respond effectively to the ever-increasing scale and complexity of health emergencies, many countries and other health emergency stakeholders are adopting a strategic shift towards strengthening five interlinked subsystems that occupy the intersection of health security, primary health care and health promotion. These five emergency subsystems are collectively referred to as the Five Cs, and include collaborative surveillance, community protection, safe and scalable care, access to medical countermeasures, and emergency coordination *(32)*. Coordination of these systems is critical to address gaps, systematically establish and deploy the appropriate resources to prepare for, prevent, detect, alert and respond rapidly, and to prioritize investments in interoperable response capacities to any health emergency. Effective coordination enables all the other subsystems to deliver on their potential.

National outbreak response strategy

National and local health authorities are responsible for planning, implementation and evaluation of outbreak preparedness, prevention and response activities.

In most settings, the ministry of health, in some cases with support from WHO and other agencies, will have or will create a strategic outbreak preparedness and response plan which outlines the nature and scale of the outbreak, key objectives and related activities (often organized into response pillars, roles and responsibilities and required resources.

Response pillars may vary, depending on the nature and scale of the outbreak, the transmission route of the pathogen, whether vaccines are available, and other factors. Some pillars (and activities within them) will always be essential in response coordination, such as case management, logistics, and risk communication and community engagement (RCCE) *(33)*.

Task force

In large outbreaks, a national task force may be activated by the government, usually led by the ministry of health. The main role of the task force is to oversee and coordinate the implementation of the national outbreak response strategy *(34)*, which includes:

- establishing a coherent response strategy and response pillars;
- coordinating resources, such as consumables, equipment, and staff;
- monitoring activities and service delivery;
- ensuring clear and efficient communication between responding capacities, regional actors, the affected population, media, and other stakeholders; and
- coordinating response efforts by guiding and tasking response partners.

The membership of the task force may vary and is determined by the ministry of health. The group is often multisectoral and includes representatives from various government agencies, WHO, international partners, nongovernmental organizations (NGOs), and local institutions. Coordination of specific response pillars may be delegated to United Nations agencies or other implementing partners, however, overall management remains with the ministry of health.

Emergency Operations Centre

A functional health Emergency Operations Centre (EOC) ensures the management and coordination of a response to emergencies from all hazards, and an identified decision-making mechanism and procedures for activation, escalation, and deactivation of emergency operations. Standard functions of the health EOC include management, operations, planning, logistics and finance/administration *(35)*.

In some infectious disease outbreak contexts, the EOC serves as a hub for coordinating the preparation for, response to, and recovery from public health emergencies. The preparation includes planning, such as risk and resource mapping, development of plans and procedures, and training and exercising, whereas the response includes all activities related to investigation, response and recovery. The EOC also serves as a hub for coordinating resources and information to support response actions during a public health emergency and enhances communication and collaboration among relevant stakeholders *(36)*. In contexts where there is an active EOC, the Emergency Medical Team Coordination Cell (EMTCC, see below) would ideally be embedded within this organizational structure.

EMT/surge coordination

Surge capacity refers to the ability of a health-care system to alter its usual operations to accommodate one or more of the following scenarios:

- increased patient volume due to the emergency
- reduced health-care capacity due to damage of existing facilities
- limited capacity due to specialized care requirements
- a decrease in the available workforce.

In medium to large-scale outbreaks of highly infectious disease where clinical surge support is requested or anticipated, an Emergency Medical Teams Coordination Cell (EMTCC) will often be established by health authorities. Its core purpose is the overall coordination of clinical surge capacity and responding medical teams (both national and international) to best meet additional clinical health-care needs. Ideally, the EMTCC should be an entirely internal entity that is activated, managed and staffed by trained and experienced personnel from within the relevant EOC, depending on the coordination structure activated in-country. Embedding the EMTCC within the existing structure provides opportunities for face-to-face interaction which, in turn, facilitates joint analysis and planning, and fosters relationship development and mutual learning.

Ideally, the EMTCC should be entirely internal to the ministry of health or equivalent national authority and is activated, managed, and staffed by trained and experienced personnel. In many cases, the ministry of health may require external support and expertise to operationalize an EMTCC; however, even in these cases, the primary responsibility for coordination remains with the ministry of health or national authority. External support should be used to temporarily fill gaps in EMTCC functioning while working to build and transfer this coordination capacity to the ministry of health.

The expertise provided by the EMTCC relates to the operational and technical aspects of EMT response, the promotion and on-site verification of compliance with EMT guiding principles and minimum standards, and other national requirements to monitor quality of care provided to the affected population. This allows for daily reporting to the ministry of health, which in turn strengthens the public health surveillance system, and places the national authorities in the primary leadership position.

Coordination, interoperability, and other rapid response capacities

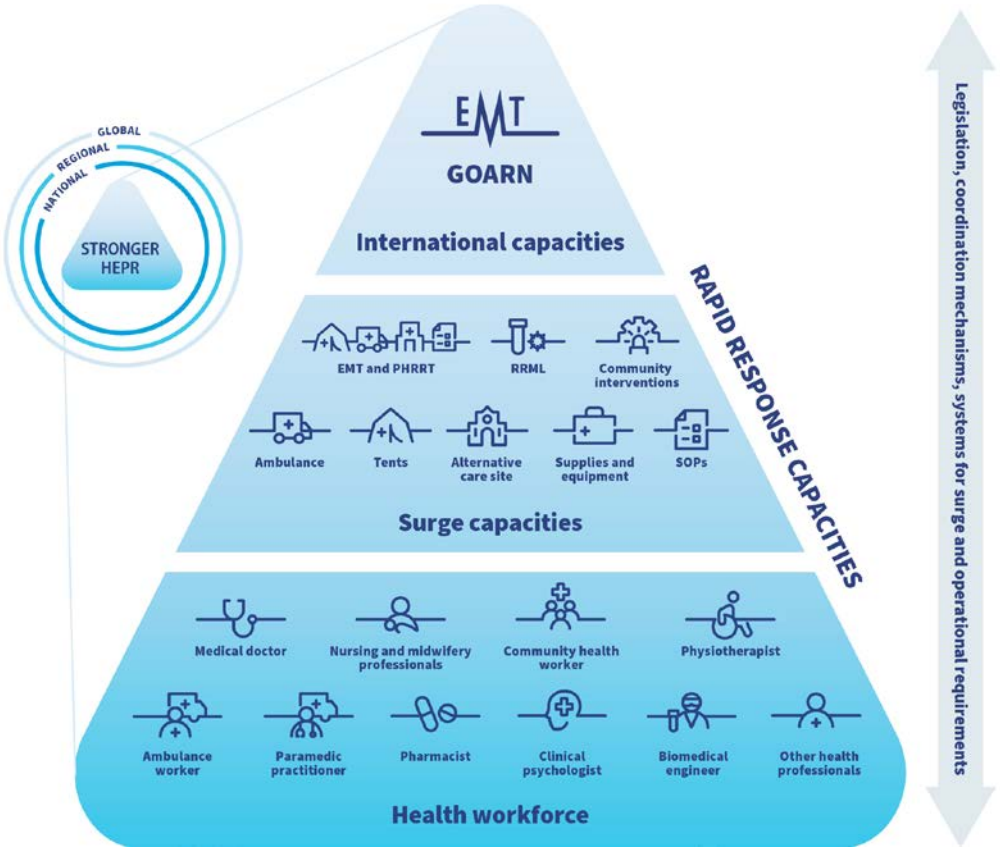
To harness existing national capacities and to respond rapidly and effectively to large-scale health emergencies there is often the need to deploy resources from a global health emergency workforce made up of a pool of national and regional responders, augmented by regional and global capacity provided by WHO, the EMT Network, the Global Outbreak Alert and Response Network (GOARN), the wider United Nations system and the Red Cross and Red Crescent Movement, among others. The main objective of the coordination among rapid response capacities and their interoperability is to streamline detection, investigation, initial treatment and the continuation of care.

Medical surge teams contribute to the overall response by ensuring safe health care and IPC practices and minimizing the risk of health-care associated disease outbreaks. They not only provide safe and context adapted clinical services but also support minimizing the risk of community transmission through proactive dissemination of public health messaging in close collaboration with the risk communication and community engagement pillar, and by acting as a sentinel reporting sites for surveillance. Examples of other elements of response can be found in Annex 2.

The way in which various surge teams deploy and coordinate may vary from one outbreak to another, depending on the specific needs and the request for support. Teams may deploy together, sharing resources and in some cases, reporting lines. They may deploy separately and operate in a hub and spoke model, for example, one rapid response mobile laboratory supporting several medical teams. Teams may deploy separately and operate in different locations, sharing information through a centralized coordination mechanism. Throughout the response, the modality of working must be flexible and adaptable to the changing needs, always with the goal of optimizing the response by harnessing the teams' respective comparative advantage. The EMT 2030 Strategy *(37)* refers to an envisaged worldwide coverage of quality-assured surge response capacities, to provide comprehensive, timely and quality health services to populations affected by any type of health emergency.

Surge responses will ideally be primarily provided by national EMTs and rapid response capacities (Figure 3) and supplemented by regional and global capacities as needed. EMT responses will be efficiently coordinated and led at the national level. Figure 3 provides a schema for an integrated system for developing rapid response capacities with constituent components on three levels: health workforce, surge capacities and international capacities.

Fig. 3. Integrated system for developing rapid response capacities

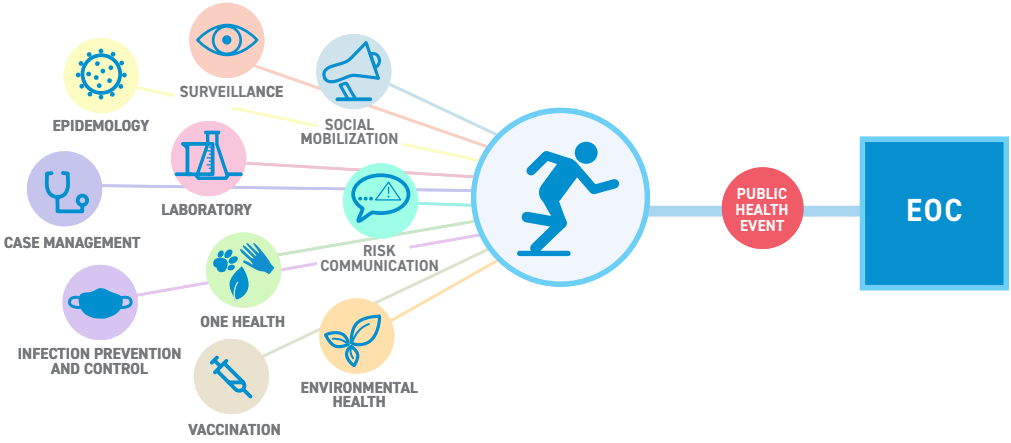


From: World Health Organization. (2023). Emergency medical teams 2030 strategy. https://iris.who.int/handle/10665/372867. License: CC BY-NC-SA 3.0 IGO

Rapid response teams (RRTs)

A rapid response team (RRT) is a multidisciplinary group of professionals trained and equipped with the capacity to deploy rapidly to support public health functions of a health emergency in coordination with local or national response efforts *(18)*. RRTs serve a role distinct from EMTs/SCTs as they focus on supporting the public health response and do not provide direct clinical care for patients.

Fig. 4. Rapid response team configuration



The exception to this general approach of RRTs may be only at the very beginning of a local or subnational health emergency in which the clinical expertise to deal with a specific hazard may only sit at the national or international level, with limited to no capacity for clinical management of that hazard pre-existing at the local level. Until additional assistance for clinical care in the form of a subnational or national EMT (or SCT) arrives, which would ideally only be a matter of hours, some clinicians on the national RRT roster may support provision of direct clinical care. These clinicians on the RRT roster should be trained, equipped and appropriately licensed to support this direct provision of clinical care as any clinician on an EMT roster would be. However, instances of this are rare and should not be used as a standard of practice.

RRTs and EMTs may be combined to form multipurpose surge teams with the capacity to detect, isolate, investigate, test and initiate treatment while the larger

response mechanism is activated. Table 5 provides examples on joint RRT and EMT deployments. This approach harnesses the unique knowledge, expertise and skills of both types of teams and streamlines processes to deliver fast, efficient and high-quality services, ideally at community level. Such an approach may minimize the time required between implementation of elements of response, which in turn, may help to limit the spread of disease while improving individual patient outcomes.

Table. 5. Example of joint RRT and EMT deployment

	Structure	Staff	Supplies/ equipment	Systems*
	Joint RRT/EMT deployment + X weeks bundle** + therapeutics ** Bundle: The essential items needed to safely manage a **pre-identified number of patients** for a **pre-identified number of days depending on context, pathogen and transmission route.**			
Initial days	Each team should have the capacity (4 S) to safely identify, isolate, test and treat the first suspect and confirmed cases. **Example: 2 patients for 6 days**			
Initial weeks	Each team should have the capacity (4 S) to safely identify, isolate, test and treat subsequent suspect and confirmed cases. **Example: 6 patients for 6 weeks**			

* Includes security considerations which vary depending on context.

RRTs and national EMTs both tend to be managed under a country's ministry of health. In some instances, RRTs may be managed under national public health institutes and EMTs under the ministry of defence or foreign affairs, but this is less common. Regardless of which institution manages the team, the preparedness and response cycles are very similar. Cycles consist of standard operating procedure (SOP) development, staffing, rostering, readiness and training, logistics and supply management, activation and pre-deployment, deployment and post-deployment. Synchronization of functions at the local and national level help to maximize human, material and financial resources.

Experts for either RRTs or EMTs can come from the public sector, private sector, academia, NGOs, United Nations, ministry of health, field epidemiology training programmes or other sources. Personnel, especially those in clinical roles, may appear on rosters of both teams. There may also be personnel overlap in response leadership roles, especially at the local/national level. Depending on the context of the emergency, leads at the local level in charge of coordinating field response activities or preparing for deployment could manage both RRTs and EMTs. RRTs can be supplemented by targeted technical expertise through mechanisms such as the Global Outbreak Alert and Response Network (GOARN) or the global EMT Network.

RRTs and EMTs should both be incorporated into the national health emergency management system structure in both the preparedness phase and response phase. They enhance national health emergency management, respond to public health threats, are part of the International Health Regulations (2005), also known as IHR (2005), requirements *(38)* and ultimately contribute to strengthening global health security. Thus, national EMTs and RRTs should be prepared to collaborate and integrate programmes to ensure they achieve the greatest possible effectiveness, efficiency and sustainability.

Rapid response mobile laboratories (RRMLs)

Teams need to anticipate essential laboratory testing needed for clinical care as well as outbreak-specific diagnosis. The identification of pathogens often involves external laboratory services, including RRMLs providing molecular testing such as reverse transcriptase polymerase chain reaction (RT-PCR). In addition to confirmation or exclusion of the outbreak-specific pathogen, differential diagnostics and diagnostics of Coinfections are essential to ensure adequate clinical care and appropriate IPC measures.

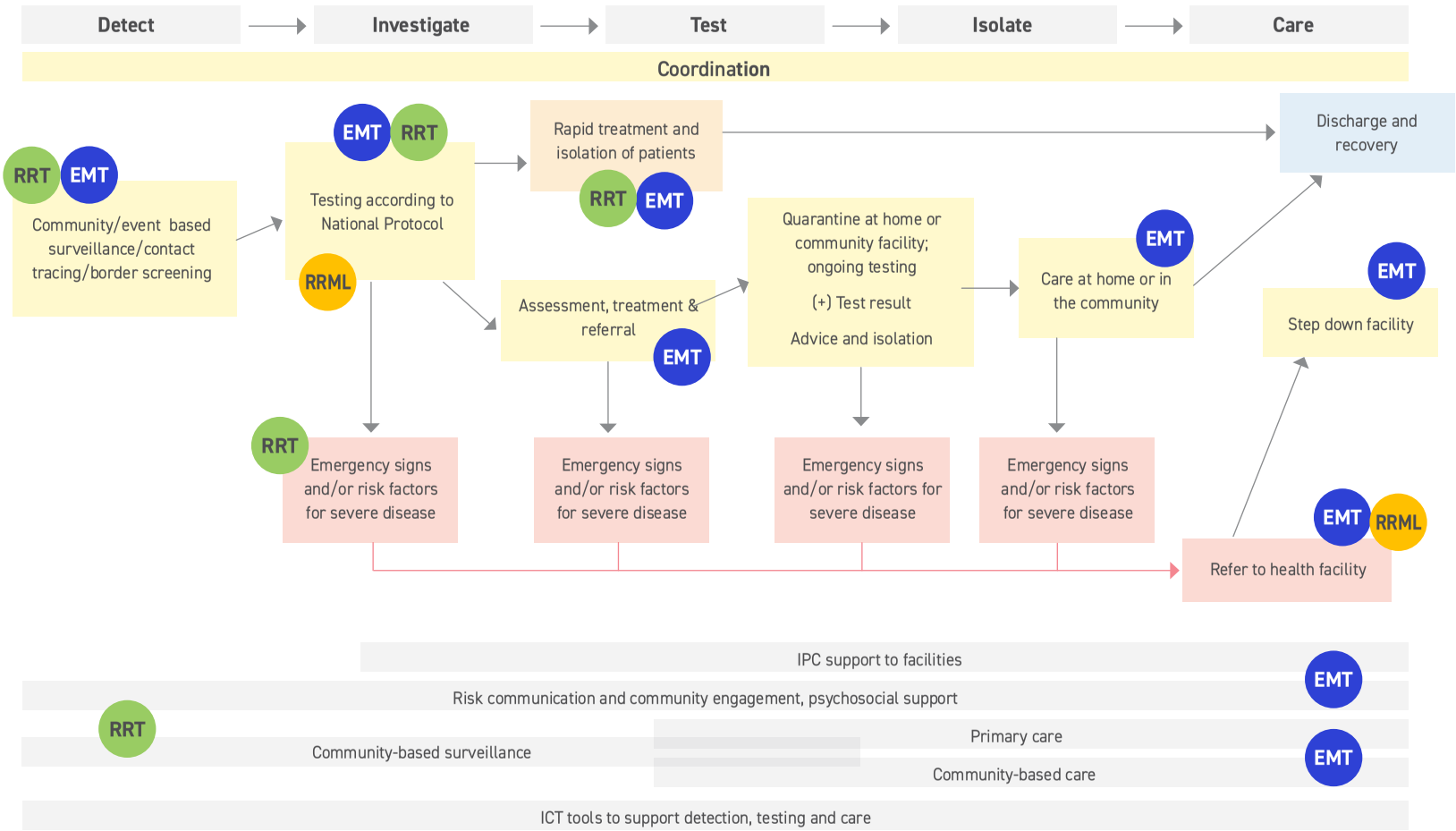
Testing includes rapid diagnostic tests performed by the SCT, as well as the safe collection, packing and shipment of samples for either integrated or external laboratories (national/international, including RRML).

A system of sample collection, transport, testing and reporting is required that can adjust to the evolving situation, such as the increase or decrease in the number of cases and additional laboratory capacities being established. Depending on the scale of an outbreak, diagnostic requirements and availability of capacities laboratory support may involve:

- local laboratories
- national laboratories
- national/regional reference laboratories
- internationally deployed integrated laboratory capacities
- internationally deployed RRML capacities.

The term RRML is used to differentiate between a mobile laboratory used specifically for routine support of national public health systems, and deployable RRMLs that can be used predominantly, but not exclusively, in times of emergency *(39)*. SOPs and agreements between pre-existing health services, surge teams and RRMLs are essential to ensure safe and timely transport of samples, alignment of sample collection materials, agreement upon role division and sampling protocols. Like the model above whereby RRT and EMTs combine to form a single team, and in line with various SCT modalities of deployment, such as coupled and embedded outlined in figure 1, RRMLs may combine with EMTs or SCTs to form a single team in the field, maximizing resource use, reducing response time, simplifying coordination mechanisms and minimizing risk of duplication. Figure 5 demonstrates a conceptual framework of interoperability of surge support during infectious disease outbreaks.

Fig. 5. Conceptual Framework: interoperability of surge support during infectious disease outbreak



Referral and safe patient transfers

Patient referral and transport is often extremely challenging in highly infectious disease scenarios; the existing system may become overwhelmed, may collapse (due to stigma, fear, or other factors) or may become unsafe for patients and health-care workers (due to the risk of infection). Despite the many challenges, well-functioning ambulance and referral services must be put in place and be adapted as needed, safe, well-coordinated and accepted by communities. Close engagement with the affected community is essential, as is strict promotion of and adherence to IPC protocols.

Referral pathways during outbreak scenarios must consider not only infectious patients, but also those who require referral and/or transport between communities, outbreak-focused facilities and non-outbreak (routine essential) medical facilities. It is necessary to minimize any uncontrolled movement of suspected or confirmed cases, to limit the use of public transport, which can be a source of super-spreader events and new chains of contagion.

Surge teams must have protocols in place for patient referral and transfer to deliver quality care outcomes for patients through effective coordination with the EMTCC or a similar coordination body and between referring and receiving health facilities, while ensuring safety, IPC and protection aspects for staff and patients. Teams should ensure that patient referral and transfer is bolstered by clear, transparent, and locally adapted communication as well as compliance and accountability mechanisms between health facilities and with the affected population.

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6. Clinical care technical standards

6.1 Introduction

This document complements the standards covered in the "Blue Book" and focuses on three outbreak scenarios, due to their epidemic potential and the associated implications on a national or even international level. The following chapters thus provide clinical minimum standards and recommendations for acute watery diarrhoea (AWD), severe acute respiratory infections (SARI) and viral haemorrhagic fevers (VHF) in which human to human transmission occurs.

6.2 Acute watery diarrhoea (AWD)

6.2.1 Introduction to AWD

Diarrhoeal disease is a leading cause of morbidity and mortality worldwide *(40)*. It is usually the result of an infection in the intestinal tract, which can be caused by a variety of bacterial, viral and parasitic organisms. Due to its high potential of developing into a widespread outbreak, this document refers mainly to standards around the management of cholera.

Cholera is a life-threatening diarrheal disease caused by ingestion of food or water contaminated with the bacterium Vibrio cholerae. If initiated early, most cases can be successfully treated with oral rehydration solution (ORS), while severe cases require higher levels of care *(41)*.

Multiple factors can cause a concerning increase in the cholera case fatality rate and challenges for both national and international response capacities, such as impaired accessibility and availability of health-care, limited availability of commodities, a lack of oral cholera vaccine (OVC), conflicts, insufficient WASH infrastructures, humanitarian crises and size of outbreaks.

Mass vaccination campaigns with oral cholera vaccine (OCV) should be delivered in conjunction with other prevention and control measures, and are used during ongoing cholera outbreaks for containment, in humanitarian crises with a high risk of cholera, or as part of a preventive cholera control strategy in endemic settings *(42)*. Teams with appropriate skills and the capacity can consider supporting vaccination efforts under the leadership and direction of the ministry of health.

If EMTs respond to an emergency that occurs simultaneously with an outbreak of AWD, they need to be able to provide screening and isolation, and initiate treatment while continuing the provision of health-care services as per the minimum standards outlined in the Blue Book. They could add an oral rehydration point (ORP) or potentially repurpose services to AWD treatment, coordinated through the ministry of health with the support of the EMTCC.

Transmission

Diarrhoeal infections are closely linked to inadequate access to clean water and sanitation facilities and are spread via the faecal oral route through contaminated food or drinking water, or from person-to-person as a result of poor hygiene *(43)*.

Signs and symptoms

While up to 75% of infected patients show no symptoms, among the 25% of symptomatic cases, 20% to 30% are expected to develop severe manifestations *(44)*. Asymptomatic cases continue to shed V. cholerae into the environment through their faeces for up to 10 days after infection, potentially infecting other people and thus becoming the potential source of community or health-care acquired infections *(43)*. People with severe cholera can become dehydrated and go into shock. Children's severity signs can range from drowsiness, seizures to unconsciousness. Without treatment, death can occur within hours.

6.2.2 Overview of the defined SCT capacities in response to AWD outbreaks

In response to an outbreak of acute watery diarrhoea, outpatient and inpatient SCT can be deployed to offer clinical care. Table 6 and 7 provide an overview of their respective roles and patient management capacities.

Table 6. AWD Outpatient service provision overview

Outpatient treatment for cases that do not require inpatient care.

SCT	Key characteristics	Services	Capacity	Opening hours	Modality of deployment
AWD OUTPATIENT*	Outpatient treatment Operate close to affected communities, particularly in remote areas or near health-care facilities.	Screening Assessment Stabilization** Treatment of cases that do not require inpatient care Temporary observation Referral of patients requiring higher levels of care Provision of basic psychosocial support (45) Temporary isolation capacity Patient education Potential support for OCV campaigns	50 outpatients/ day 10 ORP places (seats for rehydration under temporary observation)	Daylight hours	Self-sustained or coupled to an existing health-care facility

* Outpatient AWD under the Global Task Force on Cholera Control (GTFCC) *(24)* refers to oral rehydration points (ORPs).

** In AWD outpatient, stabilization refers to oral rehydration therapy.

Table 7. AWD Inpatient service provision overview

Inpatient facility with outpatient treatment capacities.

SCT	Key characteristics	Services	Capacity	Opening hours	Modality of deployment
AWD INPATIENT*	Inpatient facility with outpatient treatment capacities. Often operate in highly populated areas, act as referral services from ORPs and other community facilities.	Screening Assessment Stabilization Diagnostic testing Treatment Basic emergency obstetric and newborn care (BEmONC) services *(46)* Referral pathways for Comprehensive Emergency Obstetric and Newborn Care (CEmONC). Capacity to accept referrals from ORPs. Referral of patients requiring non-AWD care. Provision of basic psychosocial support. Isolation capacity Patient education Potential support for OCV campaigns	50 outpatients/day 10 ORP places At least 20 inpatient beds (4 m^2 for bedridden patients, 2 m^2 for seated patients).	24 hrs per day/ 7 days per week	Self-sustained or coupled to an existing health-care facility.

* Inpatient AWD under GTFCC refers to Cholera Treatment Units (CTU) and Cholera Treatment Centres (CTC) (41)

6.2.3 Clinical care technical standards – AWD

Minimum standards and recommendations outlined in outpatient capacities by default also apply to inpatient facilities.

6.2.3.1 Screening

Cholera cases are detected based on clinical suspicion in patients who present with severe AWD. While the management of patients with AWD is similar regardless of the illness, it is important to identify cholera because of the potential for a widespread outbreak.

Outpatient*	Inpatient**
	All minimum standards and recommendations in Outpatient apply to Inpatient

MINIMUM TECHNICAL STANDARDS

Screen patients based on the current case definition.

* Outpatient AWD under the Global Task Force on Cholera Control (GTFCC) refers to oral rehydration points (ORPs).
** Inpatient AWD under GTFCC refers to Cholera Treatment Units/Cholera Treatment Centres

6.2.3.2 Triage

In an AWD/cholera outbreak, the focus of triage is the rapid assessment of the disease severity, including the level of dehydration. Triage also must include the rapid identification of vulnerability factors that require special attention, such as pregnancy, infants, elderly or acute malnutrition, isolation, or stabilization and referral *(47)*. In patients presenting with AWD, comorbid conditions need to be considered *(48)*. Suspected infections with high epidemic potential require immediate isolation to limit the risk of spread within the community or health-care facility and appropriate treatment.

Outpatient	Inpatient

MINIMUM TECHNICAL STANDARDS

Assess level of dehydration *(41)*.

Assess indications and provide immediate isolation, if indicated.

Recognize indications for and initiate referral.

6.2.3.3 Treatment

Rapid and appropriate rehydration is pivotal for preventing death in patients with AWD. The treatment of patients is carried out according to existing and current treatment plans *(41)* and is based on the degree of dehydration of the patient. Severe dehydration is a medical emergency and patients must be treated urgently.

Outpatient	Inpatient

All treatment standards and recommendations also apply to the paediatric and pregnant population and need to be adapted accordingly. For additional considerations, please see AWD Obstetric and newborn and Child health chapters.

MINIMUM TECHNICAL STANDARDS

Assessment of level of dehydration.

Stabilization

Oral rehydration treatment according to level of dehydration (treatment plan A).

Referral of patients requiring higher levels of care.

Educate patients on the proper preparation of ORS solution.

Provide temporary observation.

Provide basic psychosocial support.

Have clear SOPs on initiating and receiving referrals.

Provide essential emergency care.

Provide structured intravenous rehydration therapy or alternative access according to degree of severity following national and international protocols (treatment plan B/C).

Closely monitor severely ill patients.

Provide antimicrobial treatment for AWD if indicated, according to national protocol.

Monitor blood glucose and manage hypoglycaemia.

Provide basic psychosocial support and basic mental health care.

Outpatient	Inpatient

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Outpatient	Inpatient
Monitor blood glucose and manage hypoglycaemia. Initiate treatment for severe dehydration, including intravenous (IV) rehydration and refer to higher levels of care if indicated *(49)*. Provide antimicrobial treatment for AWD if indicated, according to national protocol *(41)*. Distribute ORS sachets and water treatment products.	Establish access to safe blood banks *(50)*. Monitor Hb and manage severe anaemia.

GUIDANCE NOTES

Some vulnerable patient groups, such as young children, pregnant women, the elderly with mild symptoms may need temporary observation to ensure adequate oral fluid intake, exclusion and treatment of other non-severe conditions.

Consider the association of pre-existing anaemia, especially in malaria endemic areas, rehydration, and shock *(51)*.

Excessive IV fluid can cause pulmonary oedema or hypoglycaemia and hypokalaemia, especially in children with malnutrition who are rehydrated with Ringer's lactate alone.

Antimicrobial therapy decreases the production of cholera toxin, can reduce the volume and duration of diarrhoea and should be provided according to treatment guidelines.

IV fluid containing only glucose is not indicated in the treatment of cholera and should not be used *(41)*.

The average length of stay in an inpatient facility is 2–3 days. Patients with severe dehydration or complications may remain hospitalized longer.

Outpatient area of a cholera treatment centre, Sudan, 2023. © WHO/ Ala Kheir

6.2.3.4 Obstetric and newborn care

The reduction in access or reluctance to use essential health services during an infectious disease outbreak has a significant impact on pregnant women and newborns. They may suffer complications during pregnancy, childbirth, and the postnatal period, and face the risk of spontaneous abortion, preterm labour, or intrauterine fetal death *(52)*. Special considerations for pregnant patients must be provided *(53)*. If the transfer or referral of a pregnant woman is not possible or if labour starts too quickly, inpatient facilities must be prepared to provide BEmONC *(46)*.

Outpatient	Inpatient
MINIMUM TECHNICAL STANDARDS	
Promote breastfeeding and provide advice on safe breastfeeding during AWD infection.	Provide BEmONC. Establish appropriate referral mechanisms at other facilities for Comprehensive Emergency Obstetric and Newborn Care (CEmONC) *(54)* for any obstetric emergency.
RECOMMENDATIONS FOR OPTIMAL PATIENT CARE	
Explain the impact of vomiting and diarrhoea on oral contraceptive effectiveness and provide alternative means of birth control. Provide safe delivery kits. Provide BEmONC. Assess and manage obstetric complications until referral.	

GUIDANCE NOTES

Wash the neonate with soap and water if it comes into contact with faeces.

Encourage mothers to breastfeed, always adhering to appropriate hygiene measures.

6.2.3.5 Child health

Please also refer to child health standards in the Blue Book.

Children suffering from AWD require immediate treatment, particularly those under age 2. Children with severe acute malnutrition (SAM) are especially vulnerable to complications and require close monitoring during the rehydration progress *(41)*. Teams must be prepared to properly assess and treat children with AWD, considering co-conditions such as SAM or pre-existing conditions including HIV, TB, or other coinfections, and provide adequate treatment conditions.

Outpatient	Inpatient
See AWD treatment chapter. All standards also apply to the paediatric population and need to be adapted accordingly.	

MINIMUM TECHNICAL STANDARDS

	Provide zinc supplementation for children aged 6 months to 5 years according to national protocol *(55)*. Follow the Emergency Triage Assessment and Treatment (ETAT) and Integrated Management of Childhood Illness (IMCI) guidance *(56, 57)*. Prevent and manage hypothermia.

Outpatient	Inpatient

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Prevent and manage hypothermia.

Provide zinc supplementation for children aged 6 months to 5 years according to national protocol.

Follow the Emergency Triage Assessment and Treatment (ETAT) and Integrated Management of Childhood Illness (IMCI) guidance.

Measure haemoglobin in children under 5 years with severe dehydration and signs of severe anaemia *(55)*. (!)

GUIDANCE NOTES

Provide paediatric medication and appropriate dosage, including for the management of coinfections.

Provide child-friendly spaces for paediatric patients with space for one relative to stay with the child.

Do not separate children from caregivers. Where separation is required, ensure both parent and child have visibility of each other and a means of communication.

Ensure privacy for breastfeeding.

As soon as the child is hemodynamically stable and can drink without excessive vomiting, provide WHO standard low-osmolarity ORS to compensate for on-going fluid losses.

Do not use ReSoMal, as its sodium content is not sufficient to replace that lost in cholera *(58)*.

Children are at higher risk of complications, such as fluid overload, dehydration, hypoglycaemia or severe malaria.

Severely malnourished children are particularly vulnerable to hypothermia.

6.2.3.6 Coinfections

Many infectious disease symptoms are not specific to just one disease. Endemic infectious diseases, as well as coinfections requiring immediate isolation and reporting *(59)* always need to be considered.

A patient presenting at the treatment facility may suffer from AWD and a coinfection simultaneously, or may be identified as a non-AWD case, suffering from a different infectious disease, which requires initial management and referral to appropriate local health-care providers.

Delaying initiation of treatment can be associated with preventable mortality. Diagnostic and therapeutic means for the most commonly encountered infections, as well as capacities for temporary isolation of patients with coinfections need to be provided. Teams need to ensure and coordinate continuity of care, including management of complications and linkage to national programmes, such as HIV and TB clinics if indicated.

Outpatient	Inpatient
MINIMUM TECHNICAL STANDARDS	
Recognize danger signs for endemic infectious diseases and immediately initiate isolation, if indicated. Refer non-AWD patients with suspected infectious diseases to appropriate local health-care providers.	Provide temporary isolation capacities for coinfections. Be familiar with differential diagnoses of endemic infectious diseases in the area of deployment, especially those requiring additional IPC measures and immediate reporting. Provide rapid diagnostic test (RDT) for endemic coinfections. Manage uncomplicated cases of coinfections, stabilize and refer cases requiring higher levels of care.

Outpatient	Inpatient

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Perform RDT for endemic coinfections in line with local regulations.

Initiation of treatment of uncomplicated coinfections if personnel is qualified.

Pre-referral management of severe coinfections.

Laboratory staff processing a dengue rapid diagnostic test, Bangladesh, 2023. © WHO/ Fabeha Monir

6.2.3.7 Noncommunicable diseases

Noncommunicable diseases (NCDs) are the leading cause of global mortality, accounting for over 70% of all deaths *(60)*. NCDs often require repeated and long-term access to health care, including access case management, essential medications, and in some cases, rehabilitation services.

Outpatient	Inpatient
MINIMUM TECHNICAL STANDARDS	
	Detect and manage acute exacerbations of chronic conditions. Stabilize, manage, and refer patients with exacerbations from NCDs requiring higher levels of care.

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6.2.3.8 Malnutrition

Vulnerable populations such as women, children and the elderly are at particular risk of malnutrition *(61)*. It increases the morbidity and mortality as well as the risk of complications resulting from an infectious disease.

Outpatient	Inpatient
MINIMUM TECHNICAL STANDARDS	
Screen children from 6 months up to under age 5 using MUAC *(62)*. Have a referral protocol for a therapeutic feeding centre in place for malnutrition management.	Manage children with moderate acute malnutrition (MAM) and SAM *(58)* and any level of dehydration. Stabilize, hydrate and monitor for hypoglycaemia and insufficient or excess hydration *(55)*. Prevent and manage hypothermia.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Provide therapeutic food upon discharge.

GUIDANCE NOTES

Malnourished children are particularly susceptible to conditions often associated with AWD including hypoglycaemia and hypothermia. This should be monitored, and therapy adapted appropriately.

Clinical signs of dehydration may be difficult to evaluate in children with SAM, which can lead to overestimation of degree of dehydration. Re-screen for SAM when the child has been successfully rehydrated *(58)*.

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6.2.3.9 Laboratory and diagnostic testing

Clinical management of AWD cases is guided by the degree of dehydration, regardless of rapid diagnostic testing or laboratory confirmation. However, in the case of cholera, an outbreak can only be confirmed when suspected cases test positive by culture or PCR *(41)*. RDTs *(63)* are used for early outbreak detection, and to help select samples for PCR-testing. Regular microbiological testing of stool samples during an outbreak of AWD allows monitoring for antibiotic resistance. Accurate and reliable test results depend on adequate collection, storage and transport. Teams are required to safely collect, store and transport samples and perform RDTs at a specified frequency as per the policy of the ministry of health.

Outpatient	Inpatient
MINIMUM TECHNICAL STANDARDS	
Ensure that testing SOPs are in place and all testing is aligned with current national and international guidelines and agreed with national authorities. All testing needs to be done using appropriate PPE and all staff always need to strictly adhere to standard and transmission-based precautions and IPC measures.	Ensure safe collection, packaging, storage and transport of samples *(64)*. Perform RDT for AWD. Provide RDTs for endemic coinfections. Collect faecal specimens from suspected cases. Perform blood glucose tests. Provide point of care (POC) Hb testing for children under 5 years with signs of severe anaemia *(55)*. Establish access to external laboratories, including RRMLs for specific and differential diagnostics testing, if indicated *(65)*. Establish access to safe blood banks *(50)*.

Outpatient	Inpatient

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Outpatient	Inpatient
Perform RDTs for AWD in line with local regulations. Perform blood glucose testing. Ensure safe collection, packaging, storage, and transport of samples.	Provide point of care testing (POCT) for electrolytes.

GUIDANCE NOTES

Teams contribute to the ministry of health strategy to monitor the evolution of the outbreak by collecting and sending samples and performing RDT testing according to the national surveillance protocol and at a specified frequency as per the policy of the ministry of health.

If collaborating with external laboratories, consult and agree on sample collection materials, such as swabs and required laboratory request forms to ensure compatibility.

Have SOPs in place to ensure efficient communication with external laboratories to ensure test results reach the correct person for correct action.

Ensure that samples are only sent together with the correct documentation, including laboratory request forms and include any previous test results, such as RDT results.

Clearly indicate treatment facility location, complete address and phone number of the sender and recipient and the patient's name or number on both the case investigation form and samples that are being sent to external laboratories.

Inform the recipient laboratory about the upcoming arrival of samples.

6.3 Severe acute respiratory infections (SARI) with epidemic potential

6.3.1 Introduction to SARI with epidemic potential

Respiratory pathogens, such coronaviruses SARS-CoV-2, SARS-CoV, MERS-CoV, zoonotic or seasonal influenza viruses or bacterial infections, such as diphtheria or plague have shown to have the potential of posing serious public health threats. Depending on the causative pathogen, respiratory infections can be spread from human to human via contact (direct/indirect) with droplets and aerosols *(1)*.

This document focuses on considerations for those respiratory infections that potentially result in high basic reproduction numbers (R0), and ultimately have a high epidemic or even pandemic potential.

Public health social measures and vaccines, if available, are critical components of the prevention and control of many infectious disease outbreaks *(66)*.

Transmission

The transmission of respiratory infection depends on the pathogen and can be via droplets, direct or indirect contact and via infectious aerosols *(1)*.

Symptoms

Symptoms of respiratory infections may differ depending on the pathogen. Patients may present with headache, cough, fever, chest pain or a runny nose, but may also show atypical symptoms, such as gastrointestinal irritations. Physiologic adaptations of pregnancy and adverse pregnancy events, such as dyspnoea, fever, gastrointestinal symptoms, or fatigue, may overlap with influenza-like illness (ILI) symptoms.

6.3.2 Overview of the defined SCT capacities in response to a SARI outbreak

In response to a severe acute respiratory disease outbreak, outpatient, and inpatient SCT can be deployed to offer clinical care. Table 8, 9 and 10 provide an overview of their respective roles and patient management capacities.

Table 8. SARI Outpatient service provision overview

Outpatient treatment for cases that do not require inpatient care.

SCT	Key characteristics	Services	Capacity	Opening hours	Modality of deployment
SARI OUTPATIENT	Outpatient treatment	Screening Triage Assessment Stabilization Isolation Diagnostic testing Reporting Treatment of cases that do not require inpatient care. Temporary observation Referral of patients requiring higher levels of care. Provision of basic psychosocial support. Patient education Potential support for vaccination campaigns. **Recommendation: O_2 provision.**	50 patients/day 8 seats 2 beds/stretchers* Isolation capacities for suspected cases. *The calculation is based on COVID-19 ratios of 80% mild and 20% moderate to severe cases. May vary according to the outbreak.	8 hours/ daytime	Self-sustained or coupled to an existing health-care facility.

Table 9. SARI Inpatient service provision overview

Outpatient and inpatient treatment of cases that do not require invasive mechanical ventilation and provision of stabilization, initial treatment and referral of critical cases.

SCT	Key characteristics	Services	Capacity	Opening hours	Modality of deployment
SARI INPATIENT	Outpatient and Inpatient treatment of cases that do not require invasive mechanical ventilation. Stabilization, initial treatment, and referral of critical cases.	Screening Triage Assessment Stabilization Isolation Diagnostic testing Reporting Treatment BEmONC services Referral pathways for CEmONC. Management of comorbidities and complications. Imaging Capacity to accept referrals. Referral of patients requiring higher levels of care. Provision of basic psychosocial support. Patient education Provision of O_2 for all beds O_2 saturation monitoring Rehabilitation Potential support for vaccination campaigns. **Recommended:** Non-invasive respiratory support	**Outpatient:** 50 patients/day 15 seated 5 beds/stretchers for severe patients awaiting transfer. **Inpatient:** 30 bed inpatient ward capacity: 24 regular beds O_2 provision, intermittent saturation monitoring. +2 beds for pregnant patients Designated area for infants and for infants requiring continuous monitoring. **Recommended:** +4 non-invasive respiratory support beds with continuous monitoring.	24/7 Outpatient services may be offered during daytime only.	Self-sustained or coupled to an existing health-care facility.

Table 10. SARI Inpatient PLUS service provision overview

Outpatient and inpatient treatment, including the provision of essential emergency and critical care for severe cases.

SCT	Key characteristics	Services	Capacity	Opening hours	Modality of deployment
SARI INPATIENT *PLUS*	Outpatient and Inpatient care, including essential emergency and critical care. Non-invasive respiratory support and invasive ventilation.	Screening Triage Assessment Stabilization Isolation Diagnostic testing Reporting Treatment, including essential critical care. BEmONC services Referral pathways for CEmONC. Management of comorbidities and complications. Imaging Capacity to accept referrals Palliative care Access to or cooperation with blood bank for transfusion when needed. O_2 provision for all beds Non-invasive respiratory support Mechanical/invasive ventilation O_2 saturation monitoring Rehabilitation Provision of basic psychosocial support Patient education Potential support to vaccination campaigns.	**Outpatient:** 50 patients/day **Inpatient**: 30 bed inpatient ward capacity: 16 regular beds (O2, intermittent saturation monitoring). 2 beds for pregnant patients, ensuring privacy. Designated area for infants requiring monitoring. 10 Non-invasive respiratory support beds with continuous monitoring. 2 Invasive ventilation beds.	24/7	Self-sustained or coupled to an existing health-care facility

6.3.3 Clinical care technical standards – SARI

Minimum standards and recommendations outlined in outpatient capacities by default also apply to Inpatient and Inpatient ***PLUS***, and standards and recommendations of Inpatient automatically apply to Inpatient ***PLUS***.

6.3.3.1 Screening

Screening needs to be done at the first point of contact at the health facility to minimize the risk of HAI transmission. Early recognition of suspected patients allows for timely initiation of treatment and appropriate IPC measures. Continuous monitoring of the screening area needs to be in place to ensure the identification of vulnerable and unwell patients, or patients with signs of coinfections requiring additional preventive measures, such as immediate isolation. During a respiratory disease outbreak, physical distance should be always maintained. Screening always needs to be done at a distance of at least 1 meter, with the use of appropriate PPE and avoiding physical contact where feasible *(67)*.

Outpatient	Inpatient All minimum standards and recommendations in Outpatient apply to Inpatient	Inpatient ***PLUS*** All minimum standards and recommendations in Outpatient and Inpatient apply to Inpatient ***PLUS***
MINIMUM TECHNICAL STANDARDS		
Identify suspect cases. Temporarily isolate suspect cases, including those with potential coinfections. Refer to higher levels of care if indicated. Strictly adhere to transmission-based IPC precautions.		

Outpatient	Inpatient	Inpatient ***PLUS***
MINIMUM TECHNICAL STANDARDS		
Ensure availability of appropriate PPE for staff and the provision of medical masks to patients *(68)*. Set up a clear unidirectional patient flow to the isolation area. Follow local surveillance and reporting protocols *(59)*. Provide basic health education for outpatients and family members on home isolation and care. Provide basic psychosocial support, including ensuring ways to be in contact with family members. Counsel the patient and their family members regarding what to expect and ensure their needs are met.		

GUIDANCE NOTES

Non-suspect cases can continue the regular patient pathway (non-pathogen specific) within the health-care system *(67)*.

Always ensure visibility of patients to identify and address deterioration immediately.

6.3.3.2 Triage

In the context of a respiratory disease outbreak, the initial focus lies on the level of dyspnoea/hypoxemia and the risk of deterioration and complications considering comorbidities and other risk factors. Triage must include the assessment of factors requiring special attention, such as pregnancy or the need for isolation.

Outpatient	Inpatient	Inpatient ***PLUS***
MINIMUM TECHNICAL STANDARDS		
Assess severity of disease *(56)*. Identify need and initiate referral to higher levels of care, including for co-conditions and coinfections. Provide basic health education.		

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6.3.3.3 Treatment

For patients with mild disease, hospitalization may not be required unless there is concern for rapid deterioration and inability to promptly return to the appropriate health facility. Isolation to mitigate pathogen transmission should be prioritized. All patients cared for outside the health facility need to be instructed to manage themselves appropriately during home isolation and return to a health facility if their condition worsens *(69)*. Teams need to closely monitor patients for signs of clinical deterioration and respond immediately. Teams may find themselves exposed to ethical challenges and need to critically assess their treatment decisions before initiation. Regardless of which treatment decision is made, the continuity of care and the local availability of required resources and staff must be ensured beforehand.

Outpatient	Inpatient	Inpatient ***PLUS***

All recommendations, dosages, equipment, and management also apply to the paediatric and pregnant population and need to be adapted accordingly. For additional considerations, please see SARI Obstetric and newborn care and Child health chapters.

MINIMUM TECHNICAL STANDARDS

Outpatient	Inpatient	Inpatient ***PLUS***
Provide a rapid and structured assessment for the cause of respiratory dysfunction/ hypoxaemia and disease severity following the ABCDE approach. Provide treatment for cases that do not require inpatient care, including antimicrobial therapy if indicated. Resuscitate, stabilize and refer patients requiring higher levels of care.	Have clear SOPs on initiating and receiving referrals. Have clear SOPs on airway management, including indications for intubation and mechanical ventilation. Provide clinical management of patients requiring inpatient care *(67)*. Refer patients requiring higher levels of care. Provide oxygen.	Provide essential emergency and critical care *(11)*, such as respiratory support, management of hemodynamic instability and neurological complications. Monitor vital organ functions, such as cardiac, hepatic and renal function *(67)*. Monitor blood gases. Provide thromboembolic prophylaxis and manage thromboembolic events.

Outpatient	Inpatient	Inpatient ***PLUS***
MINIMUM TECHNICAL STANDARDS		
Monitor blood glucose and manage hypoglycaemia. Ensure adequate pain management. Monitor Sp02, respiratory rate, heart rate and level of consciousness. Recognize coinfections and indications for immediate isolation. Recognize and manage acute exacerbations of comorbidities. Provide basic psychosocial support.	Monitor Sp02. Administer intravenous and nebulised drugs. Provide disease specific therapeutics, according to national and international protocols, and manage potential adverse events. Provide nutritional support.	Provide palliative care. Insert and manage chest drains if indicated. Ensure access to safe blood banks, perform and manage blood transfusions, if indicated and be able to manage potential adverse events *(50)*. **Non-invasive respiratory support:** Provide non-invasive respiratory support *(70, 71)*. Provide continuous multiparameter monitoring, including Sp02, ECG and non-invasive blood pressure (NIBP). **Invasive mechanical ventilation (IMV):** Provide IMV *(67)*. Provide continuous multiparameter monitoring, including continuous Sp02, respiratory rate, capnography, ECG, NIBP.

Outpatient	Inpatient	Inpatient ***PLUS***

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Outpatient	Inpatient	Inpatient ***PLUS***
Provide oxygen. !	Monitor blood gases.	Ensure safe administration of vasopressors *(67)*. !
Provide oxygen during referral. !	**Non-invasive respiratory support:** !	
If applicable and available, provide post-exposure prophylaxis to close contacts, such as antibiotics in diphtheria *(72)* or pneumonic plague *(73)* according to national guidelines.	Provide non-invasive respiratory support with close clinical and essential vital sign monitoring, such as heart rate, respiratory rate, NIBP and close oxygen saturation (SpO2) monitoring.	
	Provide continuous monitoring, for severely ill patients with severe respiratory and/or multi-organ dysfunctions until referral. !	
	Monitor vital organ functions, such as cardiac, hepatic and renal function. !	
	Insert and manage chest drains if indicated.	
	Prevent and manage thrombo-embolic events *(67)*.	
	Establish access to safe blood banks *(50)*.	

GUIDANCE NOTES

Assess patients for signs and symptoms of respiratory distress, dysphagia and swelling that may cause airway obstruction.

Ensure provision of empirical broad-spectrum IV antimicrobials as soon as possible for patients with severe disease according to national protocols.

Support an elevated upper body and optimized sitting position as a basic intervention for respiratory distress/failure.

Consider and encourage awake prone positioning as indicated *(67)*.

Patients with SARI should be treated cautiously with intravenous fluids. Aggressive fluid resuscitation may worsen oxygenation, especially in settings with limited availability of mechanical ventilation. This applies to the care of children *(74)* and adults.

Oxygen saturation assessment in a COVID-19 patient in an isolation facility, Somalia, 2020. © WHO/ Ismail Taxta

6.3.3.4 Obstetric and newborn care

Respiratory infections during pregnancy can increase morbidity and mortality, including cardiopulmonary events and neonatal complications *(67)*. Teams need to be prepared to provide a higher level of observation for these patient groups.

Outpatient	Inpatient	Inpatient ***PLUS***
MINIMUM TECHNICAL STANDARDS		
Ability to recognize pregnancy-associated conditions that require referral. Educate on and encourage breastfeeding.	Provide BEmONC. Ensure adequate equipment and supplies to safely provide BEmONC services, such as delivery kits. Assess and manage obstetric complications until referral to higher levels of care. Ensure continuity of care and link to national maternal health programmes as indicated.	Provide or establish referral pathways for obstetric emergencies that require CEmONC *(54)*. Adhere to prevention of mother-to-child transmission (PMTCT) guidelines *(75)*.
RECOMMENDATIONS FOR OPTIMAL PATIENT CARE		
Provide BEmONC.	**Neonatal Health:** Provide heating mattresses/ overhead heaters. Adhere to PMTCT guidelines.	

GUIDANCE NOTES

Develop SOPs for conditions with which the team is less familiar and ensure adequate references are available for the clinical team, including support for survivors of Sexual and Gender Based Violence (SGBV).

Postnatal care during the COVID-19 pandemic, Ghana, 2020. © WHO/ Blink Media Nana Kofi Acquah

6.3.3.5 Child health

Please also refer to child health standards in the Blue Book.

Children under 5, and especially those under two years of age, are at higher risk of developing serious complications from respiratory disease *(76)*. Malnutrition and other factors may contribute significantly to an increased mortality. If the surge of patients resulting from a respiratory outbreak predominantly involves the paediatric population, there may be a need to increase the treatment capacity for severe paediatric cases in coordination with adult treatment capacities.

Outpatient	Inpatient	Inpatient ***PLUS***
See SARI treatment chapter. All standards also apply to the paediatric population and need to be adapted accordingly.		

MINIMUM TECHNICAL STANDARDS

Provide paediatric medication and appropriate dosage, including for the management of coinfections. Provide child-friendly and safe paediatric treatment areas with room for a relative/caretaker with considerations for privacy for breastfeeding. Prevent and manage hypothermia.	Follow ETAT and IMCI guidance *(56, 57)*.	Provide context-adapted essential paediatric emergency and critical care according to international guidelines *(77)*. Provide adequate non-invasive respiratory support modes for children *(78)*. Provide continuous multiparameter monitoring, including O_2-saturation, ECG and NIBP.

Outpatient	Inpatient	Inpatient ***PLUS***
MINIMUM TECHNICAL STANDARDS		
Do not separate children from caregivers unless required by IPC precautions. Where separation is required, ensure both parent and child have visibility of each other and a means of communication. Coordinate with partners that provide care for children of confirmed or close contacts, if needed, in coordination with child protection actors.		
RECOMMENDATIONS FOR OPTIMAL PATIENT CARE		
	Provide adequate non-invasive respiratory support modes for children. !	

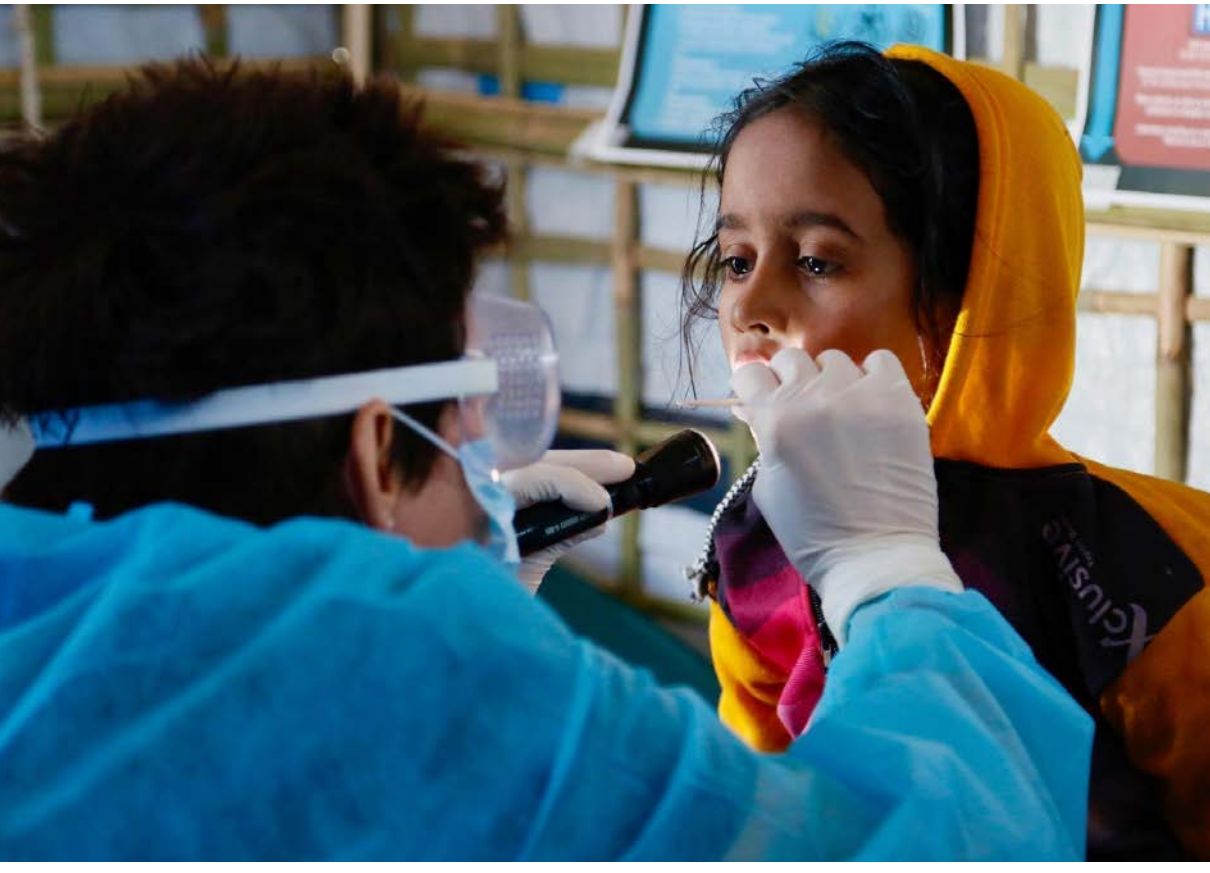
GUIDANCE NOTES

Children are at higher risk of complications, such as fluid overload, dehydration, or hypoglycaemia.

Advanced levels of paediatric critical care, including mechanical ventilation and inotropic support can only be provided by experienced paediatric critical care teams, if contexts, workload and resources allow.

6.3.3.6 Coinfections

Many symptoms encountered in patients during an outbreak are not specific to one infectious disease only, and different respiratory pathogens have a similar clinical presentation. While respiratory symptoms often dominate patient presentation, respiratory pathogens can cause additional symptoms which can be hard to distinguish from other causes, such as diarrhoea. Endemic infectious diseases need to be considered, as well as Coinfections with high epidemic potential that require immediate isolation to limit the risk of spread within the community and facility. It is critical to rapidly assess a differential diagnosis for all patients presenting with an acute severe respiratory infection as this will guide the initial IPC measures, diagnostic tests and treatment measures. A positive diagnostic test for another infection does not exclude the need for further SARI testing.



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Outpatient	Inpatient	Inpatient ***PLUS***
MINIMUM TECHNICAL STANDARDS		
Be familiar with case definitions and differential diagnoses of endemic infectious diseases in the area of deployment, especially those requiring additional IPC measures and immediate reporting *(59)*. Recognize coinfections and indications for immediate isolation. Immediately isolate suspect cases. Manage uncomplicated cases of coinfections, stabilize and refer cases requiring higher levels of care.	Assess and manage coinfections, including the provision of antimicrobial therapy if indicated. Stabilize and refer patients with severe coinfections requiring immediate additional interventions to higher levels of care.	Ensure continuity of care for pre-existing conditions and treatment for coinfections, including opportunistic infections. Link with national TB, HIV, and malnutrition programmes to provide continuous treatment.
RECOMMENDATIONS FOR OPTIMAL PATIENT CARE		
Provide antimicrobial therapy if indicated.	Ensure continuity of care for pre-existing conditions and treatment for coinfections, including opportunistic infections. Link with national TB, HIV, and malnutrition programmes to provide continuous treatment.	

GUIDANCE NOTES

See additional considerations on diphtheria (6.3.4) and measles (6.3.5).

6.3.3.7 Noncommunicable diseases

Patients with underlying NCDs have a higher risk of severe disease in respiratory infections *(79)*. NCD health services may be disrupted during an outbreak and screening programmes for NCDs may be suspended. Anticipating the potentially extended length of stay (LOS) in patients requiring inpatient care, pre-existing medical conditions need to be considered, addressed and managed. This includes ensuring continuity of care after discharge and linkage to national programmes.

Outpatient	Inpatient	Inpatient ***PLUS***
MINIMUM TECHNICAL STANDARDS		
Recognize and stabilize acute exacerbations of comorbidities.	Identify patients with high risk of NCD complications. Manage acute exacerbations of NCDs. Ensure continuity of care after discharge and linkage to national health services.	Monitor and correct imbalances in electrolytes. Monitor and manage kidney function, such as fluid intake, urine output, and laboratory assessment. Provide a two-week supply of needed medication to ensure continuity after discharge.
RECOMMENDATIONS FOR OPTIMAL PATIENT CARE		
Stabilization and referral of patients with severe exacerbations of NCDs.	Monitor and manage kidney function, such as fluid intake, urine output, and laboratory assessment. Provide a two-week supply of needed medication to ensure continuity after discharge.	

6.3.3.8 Malnutrition

Pneumonia and diarrhoea are two of the leading causes for child mortality worldwide *(80)*. Malnutrition increases the risk of infectious diseases and development of severe disease, contributing to increased morbidity and mortality, especially in children suffering from diarrhoea or respiratory infections *(81)*.

Outpatient	Inpatient	Inpatient ***PLUS***
MINIMUM TECHNICAL STANDARDS		
Screen for malnutrition using MUAC. Have clear referral SOPs for all children suspected or confirmed to have MAM or SAM.	Manage cases of moderate malnutrition. Stabilize and refer cases of severe acute malnutrition to appropriate treatment facilities.	Initially manage children with SAM and refer once recovered and tested negative from respiratory disease.
RECOMMENDATIONS FOR OPTIMAL PATIENT CARE		
Manage acute malnutrition without complications and refer to appropriate treatment facilities if indicated, once tested negative. Provide therapeutic foods for home consumption.		
Include a nutrition specialist for specific dietary requirements		

6.3.3.9 Rehabilitation

Rehabilitation is an essential health service and an integral part of inpatient SARI care, as it supports the prevention of deterioration of respiratory symptoms and complications, such as post intensive care syndrome (PICS), diphtheritic polyneuropathy or post-COVID-19 condition. Rehabilitation interventions may reduce the length of stay in critical care *(82)* and address consequences, such as swallowing, functional, and cognitive impairments and critical illness polyneuropathy/myopathy (CIP/CIM).

As teams need to ensure continuity of care, they play a critical role in identifying service gaps and referral pathways. Where necessary, dedicated rehabilitation specialized care teams may be mobilized to provide surge support.

Outpatient	Inpatient	Inpatient ***PLUS***
MINIMUM TECHNICAL STANDARDS		
Provide rehabilitation education and advice around positioning, breathlessness, and activity modifications.	Provide respiratory interventions that assist in improving oxygenation, airway secretion clearance and ventilation/ oxygen weaning. Provide additional support, such swallowing interventions, positioning and early mobilization. Systematically assess all patients before discharge to identify any persistent impairments in function. For patients with persistent functional impairments, ensure referral to an appropriate service for ongoing rehabilitation.	

GUIDANCE NOTES

Patients with significantly reduced function following admission may not be suitable or safe for discharge. If the patient is medically stable and would benefit from rehabilitation, a referral to national rehabilitation facilities, or equivalent, should be done.

Beyond acute care, general rehabilitation services may not be routinely integrated into referral mechanisms in many contexts. Teams need to consider rehabilitation needs at all stages of care. This may include the establishment of step-down units or deployment of specialist care teams in rehabilitation.

Carefully consider the risk of exposing staff to infections versus the benefits of acute inpatient rehabilitation for the patient.

Where dedicated rehabilitation staff is not available, consider remote or tele-rehabilitation and task shifting, such as the "just in time" training of nursing staff to carry out some essential rehabilitation interventions.

6.3.3.10 Laboratory and diagnostic testing

The differential diagnoses for SARI include a wide spectrum of pathogens, including respiratory viruses, bacteria, and other less common microorganisms. In patients presenting with an acute respiratory infection, the collection of respiratory tract samples can guide further management. Testing should be done as soon as possible and inform treatment plans. If rapid diagnostic tests for endemic diseases are available, teams need to provide them. In case molecular test methods are indicated, either for diagnosis, confirmation or for sequencing and surveillance purposes, teams must be prepared to safely collect, store and transport samples in coordination with collaborating laboratories.

Outpatient	Inpatient	Inpatient ***PLUS***
MINIMUM TECHNICAL STANDARDS		
All testing needs to be done using appropriate PPE and all staff need to strictly adhere to standard and transmission-based IPC precautions. Collect specimens from suspected cases. Perform RDTs for respective respiratory disease, if available. Perform RDTs for endemic coinfections aligned with local protocols. Provide basic diagnostic POC testing, including pregnancy test, urine dipstick, blood glucose, haemoglobin testing.	Establish collaboration with external laboratories as indicated. Ensure access to molecular testing, such as reverse transcriptase polymerase chain reaction (RT-PCR) for respiratory pathogens, including for differential diagnosis if available.	Monitor serum glucose, renal function, liver function, electrolytes, and biomarkers, such as C-reactive protein (CRP). Provide blood gas, complete blood count, full serum biochemistry and haematology, as well as D-dimers and other clotting parameter testing *(67)*. Collect samples for bacterial culture, to identify potential bacterial causes of disease and collaborate with external laboratories as needed. Establish referral pathways for resistance testing to designated national or regional reference laboratories if required.

Outpatient	Inpatient	Inpatient ***PLUS***
MINIMUM TECHNICAL STANDARDS		
Ensure safe collection, packaging, storage, and transport of samples *(83)*.		Establish access to safe blood banks. Provide HIV testing in consultation with the patient and according to the ministry of health policy.
RECOMMENDATIONS FOR OPTIMAL PATIENT CARE		
Provide RDT for coinfections, such as HIV. Establish collaboration with external laboratories as indicated. Coordinate access to external laboratories for molecular testing, such as RT-PCR for respiratory pathogens, including for differential diagnosis if available.	Provide renal function, hepatic function, electrolyte and CRP testing. Provide blood gas testing. Collect samples for bacterial culture, to identify potential bacterial causes of disease and collaborate with external laboratories as needed. Establish referral pathways for resistance testing to designated national or regional reference laboratories if required. Provide complete blood count (CBC) testing. (!) Establish access to safe blood banks *(50)*. Provide HIV testing in consultation with the patient and according to the ministry of health policy.	

GUIDANCE NOTES

Ideally collect samples for bacterial culture before initiating antimicrobial therapy.

Do not wait for laboratory results and delay empiric and appropriate antimicrobial treatment in potential bacterial cases of pneumonia and sepsis.

When collaborating with external laboratories, consult and agree on sample collection materials, such as swabs, and required laboratory request forms to ensure compatibility.

Have SOPs in place to ensure efficient communication with external laboratories to ensure test results reach the correct person for action.

Ensure that samples are only sent together with the correct documentation, including laboratory request forms and include any previous test results, such as RDT results.

Clearly indicate treatment facility location, the complete address and phone number of the sender and recipient, the patient's name or number on both the case investigation form and samples that are being sent to external laboratories.

Inform the recipient laboratory about the upcoming arrival of samples.

A rapid response mobile laboratory technician processing respiratory disease samples © WHO/EURO

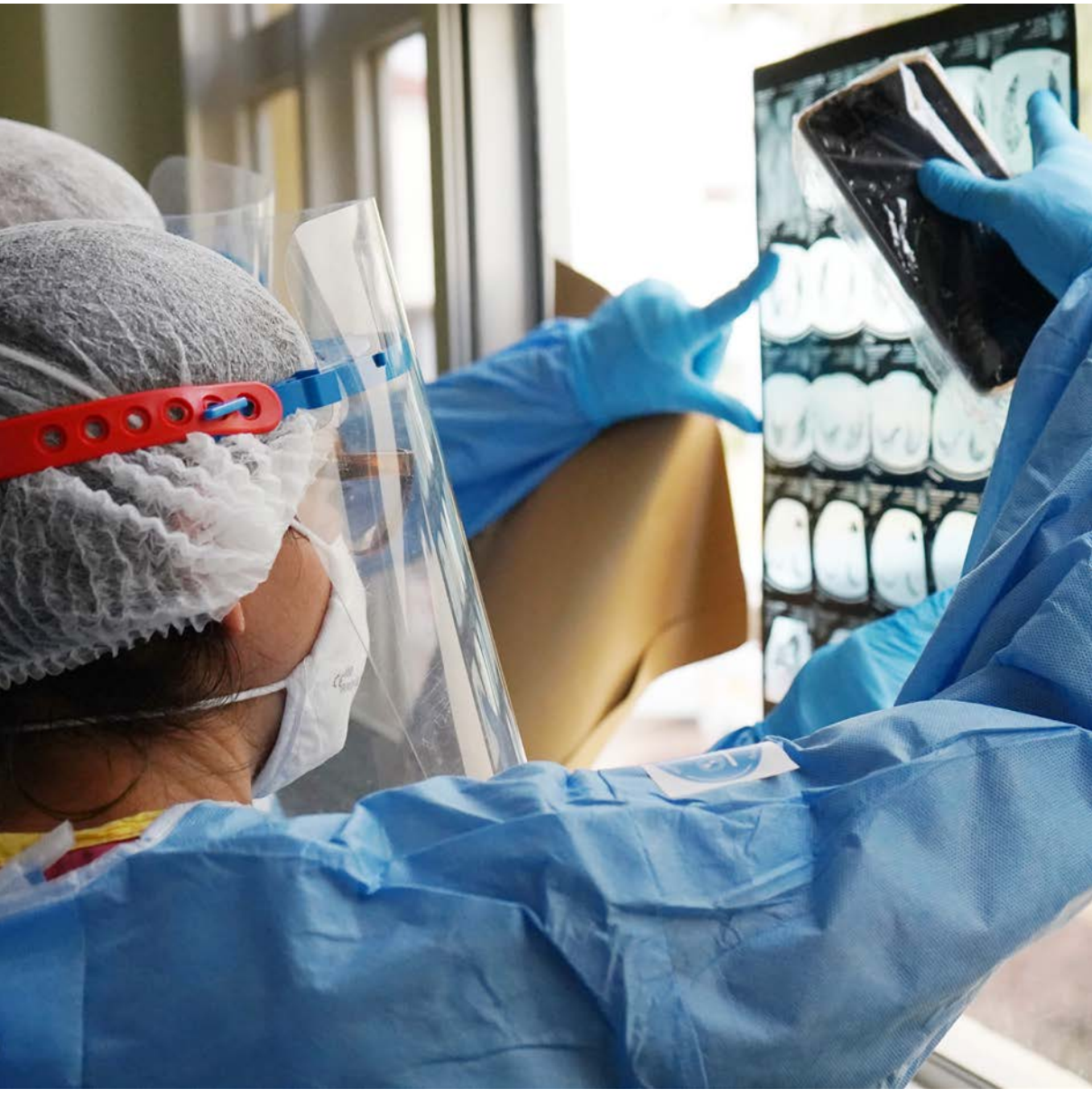
6.3.3.11 Imaging

Imaging plays a variable but important role in many infectious diseases, requiring an understanding of the disease transmission and safe imaging practices *(84)* as this can be beneficial in evaluating diseases with systemic manifestations or infections with predominantly respiratory manifestations.

Radiography and ultrasound can contribute to establishing the diagnosis and monitoring of disease complications. Computed tomography (CT) and Magnetic resonance imaging (MRI), when available, can provide additional information *(67)*, but may not be available in many contexts. In the setting of highly contagious disease outbreaks, it is critical to strictly adhere to IPC and environmental cleaning protocols to minimize HAIs.

Chest X-rays can provide information on the extent of a pulmonary disease but may not be available in all contexts. Point of care ultrasound (POCUS) can be a valid alternative diagnostic tool for the experienced examiner due to its high specificity and sensitivity for the diagnosis and follow-up of pneumonia, as well as being available at a lower cost, and can be performed repeatedly at the bedside *(85)*. It can be used to diagnose conditions such as pneumonia, pulmonary effusions, including empyema, pneumothorax and fluid status, and can facilitate ultrasound guided procedures, such as the provision of chest drains or central lines *(86)*.

Outpatient	Inpatient	Inpatient ***PLUS***
MINIMUM TECHNICAL STANDARDS		
		Ensure X-ray. Provide POCUS.
RECOMMENDATIONS FOR OPTIMAL PATIENT CARE		
	Provide POCUS. Provide X-ray.	



6.3.4 Additional considerations for diphtheria

Diphtheria is an acute, vaccine-preventable bacterial infection, transmitted by respiratory droplets or from exposure to secretions from suspected infection sites of a patient. After an incubation period of 2–5 days, the patients may develop lesions on affected mucous membranes, or wounds, which may be followed by a progressive airway obstruction. Patients may develop complications such as myocarditis, paralytic symptoms and nephritis, and 5–10% of cases are fatal *(72)*.

Diphtheria is a biphasic illness with initial symptoms such as low-grade fever, sore throat, and neck swelling. Diphtheritic polyneuropathy can occur 1–12 weeks after the onset of disease leading to swallowing, vision, breathing and ambulation impairment.

The following table complements the minimum standards and recommendations as outlined in the SARI treatment chapter for the different team capacities in the respiratory scenario and provides additional standards for diphtheria outbreaks.

Outpatient	Inpatient	Inpatient ***PLUS***
MINIMUM TECHNICAL STANDARDS		
Assess differential diagnoses of upper airway obstruction, and other causes of respiratory dysfunction, especially in children. Provide patient education around signs and symptoms of deterioration.	Manage upper airway obstruction and provide appropriate airway management equipment. Provide supportive therapy and antibiotic treatment according to national guidelines. Administer diphtheria antitoxin (DAT) *(87)*. Ensure an adequate clinician-to-patient ratio to allow for continuous observation during and after DAT administration *(88)*. Manage serious adverse reactions, including anaphylactic shock *(55)*.	

Outpatient	Inpatient	Inpatient ***PLUS***

MINIMUM TECHNICAL STANDARDS

Manage coma and convulsions.

Ensure recognition and follow up care for diphtheria associated complications.

Provide patient education around polyneuropathy signs and symptoms with referral pathways to rehabilitation services to manage a potential surge in latent cases for up to 3 months after initial infection.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Provide post-exposure prophylaxis (PEP) according to national guidelines.

GUIDANCE NOTES

Administer DAT as soon as possible after disease onset to probable cases with respiratory diphtheria based on clinical diagnosis. Do not wait for laboratory diagnosis.

Do not perform routine sensitivity testing prior to DAT administration in patients with suspected or confirmed diphtheria, due to the delay in life saving treatment and the relative safety to medically manage DAT reactions. Ensure adequately trained staff and availability of adequate consumables and equipment to manage potential allergic reactions *(87)*.

Ensure age appropriate IV fluid volumes during DAT administration.

Ensure staff expertise in managing children with respiratory dysfunction and particularly with upper airway obstruction.

Subglottic airways may only be considered if expert teams (ENT + anaesthetic team with paediatric experience and appropriate set-up) are available and ensure the follow up until completion of therapy, including decannulation, weaning and potential closure of tracheostomy.

6.3.5 Additional considerations for measles

Measles is a vaccine-preventable, highly contagious acute viral disease with the potential for severe complications. The virus is transmitted via infectious droplets and remains infectious in the air and on surfaces for up to two hours. Early symptoms of measles usually present 10–14 days after exposure to the virus, and last 4–7 days. A runny nose, cough, conjunctivitis, and Koplik's spots can develop in the initial stage. 7–18 days after exposure, patients usually present with a rash, commonly starting on the face and upper neck and eventually reaching the hands and feet *(89)*. Patients are infectious before the onset of the rash. All suspected cases of measles need to be immediately placed on airborne precautions and offered a face mask *(90)*.

Most measles-related deaths are caused by complications, including severe upper and lower respiratory tract infections, encephalitis, severe diarrhoea and multi-organ dysfunction. Other serious complications include acute and delayed neurological complications and blindness, especially in children with pre-existing vitamin A deficiency. Bacterial superinfections can contribute to disease severity.

Risk factors for severe illness or complications from measles include children under 5 years, especially when they are malnourished, or have a compromised immune system, and pregnant women.

There is no specific antiviral therapy for measles. Severe complications from measles can be reduced through supportive care that ensures good nutrition, adequate fluid intake and treatment of dehydration. Antibiotics should be prescribed where applicable to treat bacterial superinfections.

The following table complements the minimum standards and recommendations as outlined in the SARI treatment chapter for different team capacities in the respiratory scenario and provides additional standards for measles outbreaks.

Outpatient	Inpatient	Inpatient ***PLUS***
MINIMUM TECHNICAL STANDARDS		
Ensure early recognition. Immediately isolate clinically suspected measles cases upon identification. Strictly adhere to IPC standard precautions and apply airborne and contact transmission-based precautions.	Provide supportive clinical care and manage complications, following national guidelines *(90)*. Provide vitamin A supplementation *(91)*. Manage complications, such as bacterial infections. Provide antibiotics for pneumonia to all children with measles and signs of pneumonia *(55)*.	
RECOMMENDATIONS FOR OPTIMAL PATIENT CARE		
	Provide post-exposure prophylaxis (PEP) to susceptible contacts within a short time frame after exposure *(91)*.	

GUIDANCE NOTES

Isolate all hospitalized measles cases for at least 4 days after the onset of the rash.

Children with HIV may not display all symptoms, which may complicate the diagnosis of measles.

Anticipate the potential need for prolonged inpatient care and the need for chest drains in severe complications like pleural empyema.

Measles infections can lead to lasting impairments, which may require rehabilitation services in follow-up care.

Ensure post-discharge support and parent education, and coordinate follow-up care in the local health system.

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6.4 Viral haemorrhagic fevers (VHF)

6.4.1 Introduction to VHFs

VHFs are a group of severe systemic febrile illnesses that are caused by several distinct families of viruses, such as Ebola virus or Marburg virus. The term viral haemorrhagic fever refers to a condition that affects many organ systems of the body, and while symptoms can vary, they may include haemorrhage. Some VHFs cause relatively mild illness in most cases, while others can cause severe, life-threatening disease. For most VHFs, there is no specific therapy or vaccine *(92)*. This document focuses on considerations for those VHFs in which human-to-human transmission occurs. While considerations can be applied to other VHFs like Lassa fever and Crimean-Congo haemorrhagic fever (CCHF), this chapter focuses on recommendations for the response to Filovirus diseases.

Currently, there are effective vaccines licensed for the prevention and monoclonal antibodies licensed for the treatment of Ebola virus disease *(93)*. Countermeasures for disease caused by other filoviruses, such as Sudan ebolavirus or Marburg virus are still in development.

Ring vaccination is one of the strategies that may be used during an epidemic to define priority populations for vaccination. It involves vaccination of individuals who might have been infected following a potential exposure, such as contacts of an infected person, before they show signs of disease, or vaccination of everyone in the neighbourhood, or populations within a certain distance to the known case, rather than vaccinating only the known contacts and contacts of contacts, which is referred to as targeted geographic vaccination *(19)*. Other important components of an outbreak response include early detection of new infections through measures such as close monitoring of contacts and other surveillance approaches, laboratory services, isolation of patients to prevent further spread at home or in the community, case management, safe and dignified burials (SDB), and systematically engaging communities in the response *(33)*.

A decentralized approach to a VHF outbreak response improves access to care by initiating essential supportive care to suspect cases as soon as possible. A decentralized approach to a VHF outbreak involves placing a point-of-entry to care (inpatient facilities) closer to where transmission is occurring, allowing patients earlier and easier access to appropriate care.

Patients who are found to have confirmed VHF are referred onward to higher-level definitive care (Inpatient ***PLUS***), and patients who rule out for VHF are referred on to other facilities to receive appropriate care for their condition. This arrangement can reduce the number of patients seen in the Inpatient ***PLUS*** facility, improving their care and the overall efficiency of the system. For any patient discharged from a VHF treatment facility, adequate continuity of care needs to be assured. This includes support to families of survivors and non-survivors.

Transmission

VHF viruses can infect humans through a spillover event following contact with an infected animal and spread from human-to-human through direct contact or contact with bodily fluids of infected people, as well as with contaminated surfaces and materials, such as bedding or clothing *(93)*. In some cases, such as Lassa fever, infections can occur through exposure to faecal matter or urine of an infected rodent *(94)*.

Transmission may also occur through exposure to bodily fluids. Viral RNA has been detected in breast milk, saliva, urine, semen, cerebrospinal fluid, blood and blood derivatives, as well as in amniotic fluid, tears, skin swabs and stool by reverse transcription (RT)-PCR. The virus can persist in immunologically privileged sites, such as testes or the interior of the eyes, and resurgence from viral persistence in survivors has been observed in recent epidemics. There is a very high risk of transmission from deceased patients *(95)*.

Signs and symptoms

Early clinical signs of VHFs are non-specific and often not distinguishable from non-VHF illnesses such as influenza, malaria, typhoid fever or diarrheal diseases *(92)*. Later signs may include internal and external bleeding, such as bleeding from injection sites or gums, blood-stained stools or upper gastrointestinal bleeding, impaired kidney and liver function and abnormal laboratory results. Death typically occurs due to complications which often include multiorgan failure and septic shock *(96)*.

Diagnosis

In areas where VHF viruses are circulating, it is essential to first assess all patients to determine whether there is a clinical suspicion of VHF and to then take all necessary steps immediately to ensure strict IPC measures in all interactions with the patient. Laboratory testing and receiving results will sometimes take several days. Teams need to ensure that this does not lead to a delayed diagnostic work-up and treatment of other infectious diseases or conditions.

6.4.2 Overview of the defined SCT capacities in response to a VHF outbreak

In response to a viral haemorrhagic fever outbreak, SCTs with outpatient (screening) and inpatient capacities can be deployed to offer clinical care. Tables 11, 12 and 13 provide an overview of their respective roles and patient management capacities.

Table 11. VHF Outpatient/screening service provision overview

Provision of screening only, located at the point of entry to any HCF in the outbreak affected area. It can only operate in close coordination with Inpatient capacities. If the attached HCF has no capacity to provide essential treatment, direct referral to a treatment centre (Inpatient or Inpatient ***PLUS***) needs to be initiated.

SCT	Key characteristics	Services	Capacity	Opening hours	Modality of deployment
VHF OUTPATIENT (SCREENING)	Screening only. Screening of all patients, staff, and visitors at the entrance of every HCF in an outbreak affected area. Operates in close collaboration with inpatient capacities. Clear referral pathway to isolation and care unit in the adjacent facility or nearby treatment centre.	Screening Initiation of isolation and care, while awaiting referral and transport. Reporting to national surveillance mechanisms. Simple documentation, such as number of patients, screening outcome, action.	Minimum: 2 persons screening simultaneously during opening hours of adjacent facility.	Depending on opening hours of adjacent facility.	Self-sustained or coupled to existing health care facility.

Table 12. VHF Inpatient service provision overview

Provide rapid access to essential supportive inpatient care for suspect cases in more remote areas, while awaiting transfer to Inpatient ***PLUS*** facilities. Depending on context, they may provide definitive treatment if transfer is not possible or not accepted by the patient. Patients with specific needs, such as pregnant women and critically ill patients with suspected VHF always need to be referred to Inpatient ***PLUS*** for provision of optimized supportive and essential critical care until testing results are available.

SCT	Key characteristics	Services	Capacity	Opening hours	Modality of deployment
VHF INPATIENT	Inpatient facility in remote areas, close to affected communities. Rapid access to essential supportive inpatient care. Initial isolation and treatment while awaiting test results and transfer. Definitive care if referral is not possible or not accepted by the patient.	Screening Triage Assessment and stabilization. Isolation Diagnostic testing (external laboratory support). Reporting Treatment (essential supportive care). BEmONC services Referral pathways for CEmONC. Management of comorbidities and complications. Capacity to accept referrals. Referral of patients requiring higher levels of care. Provision of basic psychosocial support. Patient education Provision of O_2	Private rooms with private bathrooms. Capacity depending on context and availability.	24/7	Self-sustained or part of an existing health-care facility (coupled/ embedded). If self-sustained, own screening and triage area needed. Strong recommendation to consult experts on facility design.

Table 13. VHF Inpatient *PLUS* service provision overview

Inpatient ***PLUS*** provides treatment to suspected and confirmed VHF cases. It has the ability to treat patients with suspected and confirmed VHF with critical illness in need of a more advanced level of care. Suspect/non-confirmed but critically ill patients need to be referred to Inpatient ***PLUS*** immediately. Pregnant patients always need to be referred to Inpatient ***PLUS***, as the risk of deterioration when confirmed is very high. Surge capacity needs to be anticipated and the unit needs to be adaptable to the changing needs of the epidemiological outbreak dynamics.

SCT	Key characteristics	Services	Capacity	Opening hours	Modality of deployment
VHF INPATIENT *PLUS*	Referral-level inpatient treatment, including optimized supportive care and essential critical care for suspected and confirmed cases.	Screening Triage Assessment and stabilization. Isolation Diagnostic testing Reporting Treatment, including optimized supportive care and essential critical care. Management of comorbidities, acute conditions, complications and critical cases. Capacity to accept referrals. Referral of patients requiring specialized and post infection care. Coordination of CeMONC services for maternal indications. Provision of basic psychosocial support. Patient education Provision of O_2 Non-invasive respiratory support. Access to or cooperation with blood bank.	The number of beds for suspect cases vs con-firmed cases will vary depending on setting. **Ratio recommendation:** 30 inpatient beds: 8 to 10 beds for confirmed patients, (cohorting possible). 20 single self-contained isolation rooms for suspected cases.	24/7	Self-sustained or coupled. Ideally linked to a district/ regional hospital.

6.4.3 Clinical care technical standards – VHF

The standard of VHF case management is optimized supportive care *(25)*. However, not all elements, such as blood transfusions or laboratory monitoring may be available in remote areas in the initial phase of the outbreak. Support to essential regular health-care services in outbreak affected districts or regions is essential.

Minimum standards and recommendations outlined in outpatient capacities by default also apply to Inpatient and Inpatient ***PLUS***, and standards and recommendations of Inpatient automatically apply to Inpatient ***PLUS***.

6.4.3.1 Screening

In areas where VHF viruses are circulating, all patients need to be screened strictly following a no-touch approach at the first point of contact with the health system to enable early recognition of suspected cases and rapid implementation of IPC measures. This is done in adequate PPE, with a strict no-touch technique and ideally with a physical barrier separating the staff performing screening from the patient. The required physical distance of at least 1 metre should be increased beyond 1 metre wherever feasible. No testing is to be performed in the screening area. If a patient shows clinical signs suggestive of haemorrhagic fever, and has a known exposure risk *(97)*, the screening facility needs to follow national outbreak specific protocols *(98)*, immediately initiate isolation and care, as well as referral following a clear predefined pathway.

If the patient needs assistance, screening staff needs to request support from staff in adequate PPE, ideally from the adjacent facility. Patients might not be forthcoming with their symptom history, or, in the case of unaccompanied children or those with altered neurological status, be unable to disclose their history and symptoms. Screening staff needs to be trained to observe and interpret a patient's general appearance and be sensitive to discrepancies between clinical observation and symptom history *(99)*.

Outpatient	Inpatient All minimum standards and recommendations in outpatient apply to Inpatient	Inpatient ***PLUS*** All minimum standards and recommendations in outpatient and Inpatient apply to Inpatient ***PLUS***
MINIMUM TECHNICAL STANDARDS		
Screening of all patients, guardians, staff and visitors at access points to every health-care facility. Follow a strict no-touch technique and always maintain a physical distance of at least 1 metre from the patient. Implement VHF-specific IPC measures in addition to standard precautions and transmission-based precautions *(100)*. Initiate temporary isolation and care of suspected cases. Develop SOPs for patient flows and referral pathways. Set up a clear unidirectional patient flow to the isolation area *(101)*. Notify the attached facility's IPC and appropriate staff. Provide basic psychosocial support, including ensuring ways to be in contact with family members.		

Outpatient	Inpatient	Inpatient ***PLUS***
MINIMUM TECHNICAL STANDARDS		
Counsel the patient and their family members regarding what to expect and ensure their needs are met. Provide basic health promotion information.		
RECOMMENDATIONS FOR OPTIMAL PATIENT CARE		
Identify risk and vulnerability factors.		

GUIDANCE NOTES

Clearly display a screening algorithm in the screening area.

Ensure effective and supportive communication between the screener and patient, the family, the contact tracing team, the referring health worker, or surveillance officer to clarify the epidemiological links and contact/exposure history.

Make sure to employ staff who speak the local language or have translation services readily available.

Do not perform any physical examinations or tests in the screening area.

Ensure SOPs address how to manage patients that arrive in the screening area in critical condition.

6.4.3.2 Triage

Triage includes the assessment of vital signs and the evaluation of the disease severity. To obtain appropriate information, close physical contact is required, which implies the need for context appropriate PPE and IPC measures. Validated tools are used and specified investigation forms *(102)* completed.

Outpatient	Inpatient	Inpatient ***PLUS***
MINIMUM TECHNICAL STANDARDS		
	Isolate suspect cases in single rooms with a private bathroom. Adapt triage SOPs to VHF context. Identify risk and vulnerability factors. Initiate patient referral as required. Report suspected cases to the surveillance and contact tracing system within the national health authorities. Support the case investigation team to identify all possible contacts within the health facility.	

GUIDANCE NOTES

Implement VHF-specific IPC measures, when providing care for suspected or confirmed cases.

Use only specifically VHF trained health-care workers for patient care.

Keep a log of everyone who enters and leaves the patient's room.

All staff need to wear appropriate PPE when in the high-risk zone or when admitting or transferring a patient with suspected infection regardless of the patient's clinical status.

No equipment used on a suspected patient may be reused for any other patient unless appropriately decontaminated *(100)*.

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6.4.3.3 Treatment

While there are therapeutics available for Ebola virus disease *(103)*, the current treatment for most VHFs is primarily supportive. Improved patient outcomes are linked to early diagnosis, timely provision of supportive care and, depending on type of VHF and availability, early administration of therapeutics *(104)*. Care should include the systematic assessment and re-assessment of all VHF patients, careful attention to respiratory function, oxygenation, fluid balance, potential electrolyte abnormalities and blood glucose, as well as the management of potential coinfections *(25)*.

Teams may find themselves exposed to ethical challenges and need to critically assess their treatment decisions before their initiation. Regardless of which treatment decision is made, the continuity of care and the local availability of required resources and staff needs to be ensured beforehand.

Outpatient	Inpatient	Inpatient ***PLUS***
All treatment standards also apply to the paediatric population and need to be adapted accordingly.		
MINIMUM TECHNICAL STANDARDS		
Have clear SOPs on initiating referrals. Provide oral rehydration. Provide patients and family with information and basic psychosocial support, including psychological first aid (PFA).	Have clear SOPs on initiating and receiving referrals. Ensure VHF-adapted clinical protocols and documentation. Provide context adapted early supportive care while awaiting test results. Provide IV rehydration. Monitor blood glucose and manage hypoglycaemia. Treat pain, fever, nausea and vomiting.	Manage critically ill patients. Provide optimized supportive care *(25)*. Provide oxygen. Provide non-invasive respiratory support. Monitor vital organ functions, such as cardiac, hepatic and renal function, including fluid intake, urine output and frequent laboratory assessment. Manage hemodynamic instability and haemorrhage.

Outpatient	Inpatient	Inpatient ***PLUS***
MINIMUM TECHNICAL STANDARDS		
	Provide essential management of neurological emergencies, such as coma and convulsions. Ensure sufficient nutrient intake *(107)*. Ensure mental health care and basic psychosocial support. Ensure continuity of care for non-confirmed and recovered VHF patients upon discharge if needed.	Ensure access to safe blood banks, perform, manage blood transfusions if indicated and be able to manage potential adverse events *(50)*. Provide context adapted management of acute kidney injury (AKI) without renal replacement therapy. Administer therapeutics, such as monoclonal antibodies *(105, 106)* and manage potential adverse events including anaphylactic shock.
RECOMMENDATIONS FOR OPTIMAL PATIENT CARE		
	Provide optimized supportive care. Provide oxygen (!) Monitor vital organ functions, such as cardiac, hepatic, and renal function. Monitor and manage electrolyte imbalances. (!) Administer therapeutics, such as monoclonal antibodies and manage potential adverse events, including anaphylactic shock.	Provide vasoactive infusions only if continuous monitoring is available.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

	Manage hemodynamic instability and haemorrhage. Establish access to safe blood banks, perform and manage blood transfusions, if indicated and be able to manage potential adverse events.	

GUIDANCE NOTES

Avoid pain management and antipyretic therapy with NSAIDs to prevent kidney damage and due to the increased bleeding risk.

The indication for surgical procedures, including caesarean sections on pregnant women with VHF need to be evaluated carefully considering individual considerations from the patient and health-care worker.

Advanced levels of care beyond optimized supportive care, which may include renal replacement therapy and mechanical ventilation can only be considered by expert teams in specific contexts and with adequate resources.

6.4.3.4 Obstetric and newborn care

Teams need to be prepared to care for newborns and pregnant or breastfeeding women *(108)*. The focus of pregnant VHF patient management is maternal survival.

Obstetric management includes monitoring and early treatment of haemorrhagic complications and other obstetric emergencies. Provision of essential newborn care needs to be assured. Ebola viruses and Marburg virus have shown to be present in breast milk. In Lassa fever, a high level of viremia implies that the virus may be present in the milk of an infected mother and therefore could be passed on to her child *(109)*.

Inpatient ***PLUS*** facilities need to be prepared to provide CEmONC services *(54)*. If these capacities are not available in the facility, cooperation with partners, available to temporarily surge into the facility to provide these specific services, or coordination with external CEmONC capable inpatient facilities for any obstetric emergency, need to be established.

Outpatient	Inpatient	Inpatient ***PLUS***
MINIMUM TECHNICAL STANDARDS		
	Provide basic maternal care and obstetric emergency care. Provide BEmONC if referral is not possible. Establish protocols and referral pathways for pregnant women requiring caesarean section or other pregnancy-related surgical interventions. Ensure essential newborn care *(30)*.	Provide safe delivery kits. Provide CEmONC or coordinate with CEmONC teams* or other inpatient facilities for any obstetric emergency. Note: maternal indication only. * Teams from local/regional hospitals which can provide maternal indication caesarean sections.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Provide routine antenatal care for all pregnant patients *(110)*.

Ensure adequate equipment and supplies to safely provide BEmONC services, such as safe delivery kits *(111)*.

Perform PCR testing of breastmilk in recovered mothers who wish to breastfeed *(108)*.

Ensure thermal care to prevent and manage hypothermia *(112)*.

If available and in line with national regulations, provide monoclonal therapy to neonates 7 days or younger and of unconfirmed Ebola virus disease status, born to mothers with the confirmed disease *(103)*.

GUIDANCE NOTES

All care provided needs to be done in appropriate PPE in accordance with IPC protocols.

Prioritize the rapid RT-PCR testing of the newborn *(108)*.

Ensure continued contact through measures, such as transparent protective barriers, when initially separating mother and newborn and provide additional mental health care and psychosocial support to the mother.

Ensure continuous surveillance and care of the newborn when a decision is made to separate it from the mother.

Limit obstetric procedures among pregnant women with acute VHF for the purpose of reducing maternal morbidity and not for fetal indications.

Anticipate spontaneous abortion and intrapartum haemorrhage in women with VHF, associated with high perinatal mortality rates among infants of infected women *(113)*.

The treatment facility design needs to include a designated obstetric area that allows privacy, dignity, and safe health-care worker access.

Invasive obstetric procedures on pregnant women with acute VHF, or following recovery, should only be performed by a person experienced in that procedure and able to perform it safely in appropriate PPE. The least invasive option should be taken.

Neonates born to women with confirmed active VHF infection should not be breastfed.

In neonates born to women recovered from VHF infection, breastmilk needs to be tested virus negative on two occasions (interval 48–72 hours), before starting to breastfeed. In the meantime, appropriate breastmilk substitutes must be provided *(108)*.

If safe and appropriate breastmilk substitutes are not available, or the child cannot be adequately cared for, especially children younger than six months of age, considerations may be made to not separate the child and mother and to continue breastfeeding.

Pregnant women recovering from a VHF should be provided with counselling and necessary information regarding associated risks, such as expected pregnancy outcomes and persistent infectivity after recovery, for them to make an informed decision regarding their choice to continue the pregnancy.

Pregnant women should be included and specifically addressed in vaccination strategies given their vulnerability to adverse VHF-related pregnancy events and increased morbidity and mortality *(108)*.

Ensure continuity of care for mothers and newborns after discharge by supporting follow up in the regular health-care system. This also applies to mothers with suspected, but subsequently non-confirmed VHF.

Mothers who survive VHF and leave the treatment centre before delivery, need to return to the treatment centre for delivery with appropriate IPC precautions *(113)*.

6.4.3.5 Child health

Please also refer to child health standards in the Blue Book.

Children are at particularly high risk of infection. Most transmission to children is presumed to be from household contacts, including neighbours and relatives *(114)*. VHF outbreaks may have a significant psychological and social impact on children, including when being kept in isolation or having a caretaker admitted for treatment. In addition to losing a caretaker, orphaned children are at risk of being stigmatized, isolated, or abandoned *(115)*. Coordination with child protection partners needs to be an essential part of any response.

Outpatient	Inpatient	Inpatient ***PLUS***
See VHF treatment chapter. All standards also apply to the paediatric population and need to be adapted accordingly.		

MINIMUM TECHNICAL STANDARDS

	Follow ETAT *(56)* and integrated Management of Childhood Illness (IMCI) *(57)* guidance. Provide child-friendly and safe paediatric treatment areas. Where separation is required, ensure the caregiver and child can see each other and have a means of communication. Ensure provision of psychological support to children and families.	

GUIDANCE NOTES

Consider coordination with partners that provide care for children that survived, and children of confirmed or close contacts, respecting the isolation and quarantine policies and in coordination with child protection actors.

Children are at higher risk of complications, such as fluid overload, dehydration and hypoglycaemia.

Provide more frequent glucose monitoring in children and neonates *(25)*.

6.4.3.6 Coinfections

Common presentations in patients with suspected VHF infections include fever, respiratory and gastrointestinal symptoms, with vomiting, and diarrhoea, and signs of sepsis. Malaria and VHF can be confounded or infect a patient simultaneously, resulting in an increased case fatality rate in coinfected patients *(116)*.

Outpatient	Inpatient	Inpatient ***PLUS***
MINIMUM TECHNICAL STANDARDS		
Identify cases with suspected coinfections requiring isolation and immediate treatment. Initiate isolation.	Provide isolation for patients with suspected or confirmed coinfections, if indicated. Provide treatment for endemic diseases including bacterial infections. Ensure continuity of care for pre-existing conditions and treatment for coinfections, including opportunistic infections. Link with national TB, HIV, and malnutrition programmes to provide continuous treatment.	Ensure continuity of care for pre-existing conditions and treatment for coinfections, including opportunistic infections. Link with national TB, HIV and malnutrition programmes to provide continuous treatment.

GUIDANCE NOTES

Empiric antimalarial therapy should be administered to all febrile patients with suspect and confirmed VHF in an endemic area. The treatment should be stopped as soon as a negative test result is available *(25)*.

6.4.3.7 Noncommunicable diseases

The treatment of pre-existing medical conditions should be continued while the patient receives VHF treatment.

Outpatient	Inpatient	Inpatient ***PLUS***
MINIMUM TECHNICAL STANDARDS		
	Manage pre-existing conditions and their acute exacerbations until patients are cleared for transfer to higher levels of care if needed.	Manage comorbidities, chronic NCDs, such as diabetes, hypertension, asthma, or epilepsy.
RECOMMENDATIONS FOR OPTIMAL PATIENT CARE		
	Manage comorbidities, chronic NCDs, such as diabetes, hypertension, asthma, or epilepsy.	

GUIDANCE NOTES

Consider the patient's pre-existing medication, as some medicines used for VHF treatment may impair cardiac function *(117)*.

6.4.3.8 Malnutrition

On admission, teams need to assess the nutritional status of all patients with VHF. This includes body weight, height, and mid-upper arm circumference. Also look for signs of malnutrition and assess current appetite status.

Outpatient	Inpatient	Inpatient ***PLUS***
MINIMUM TECHNICAL STANDARDS		
	Throughout treatment, screen and monitor the nutritional status of all patients. Recognize and treat SAM and MAM, follow existing guidelines, and adapt fluid management accordingly. Refer to specialized feeding centres if required once the patient is declared a non-suspect case or no longer contagious *(107)*.	Ensure evaluation of patients with VHF by a nutrition specialist daily.
RECOMMENDATIONS FOR OPTIMAL PATIENT CARE		
	A nutrition specialist should evaluate patients with VHF daily. Discharge malnourished patients with therapeutic feeding commodities as suggested in the national treatment protocols. If such protocols do not exist, discharge the patient with a one-month supply of therapeutic food. Link the patient for follow up in their local health-care facility or other existing nutrition programmes.	

GUIDANCE NOTES

Patients with reduced levels of consciousness are at risk for aspiration and should not be forced to eat. IV supplementation may be necessary in situations where patients are unable to tolerate oral feeds *(25)*.

Gradual introduction of enteral fluids/feeds in children recovering from critical illness should follow international critical care recommendations *(77)*.

Ready-to-use fortified nutrient-rich foods should only be given to those patients who are able to drink sufficient water *(107)*.

ALIMA Ebola Treatment Centre, Democratic Republic of Congo, 2018. ©WHO/ Christopher Black

6.4.3.9 Rehabilitation

In high-resourced settings, rehabilitation may play a role in the care of VHF patients *(118, 119)*. However, extreme caution is required when making decisions including rehabilitation in the acute care of VHF, which typically only occurs in specialized units, with individualized isolation of each patient and highly specialized rehabilitation staff. In resource-constrained settings, rehabilitation professionals have traditionally not had a role in acute VHF care where the risks outweigh any benefit at this stage of patient management. However, they may be taking on an advisory and capacity-building role and train health-care staff in basic rehabilitation interventions, including through remote technical support. This may have a positive impact on the patients' psychological and physical well-being, pain management, comfort and mobilization.

VHF infections may result in persistent post-acute and long-term sequelae or secondary complications, such as pain, gait disturbance, fatigue, neuro-developmental delay in children, or neurological impairment, that would benefit from rehabilitation. Specific screening of patients on discharge from acute care regarding rehabilitation needs can help identify complications and facilitate referral. Follow-up services may include dedicated rehabilitation services or rehabilitation as component of a survivors' programme *(113)*. Should national services be unable to address these needs, teams should consider supporting the set-up of post-acute step-down rehabilitation services with partners to support rehabilitation and other aspects of survivor care, or supporting the capacity building of a local service while comprehensive survivor services are being developed.

Outpatient	Inpatient	Inpatient ***PLUS***
MINIMUM TECHNICAL STANDARDS		
	Screen patients for secondary impairment and indications for rehabilitation referral on discharge. Establish direct referral path-ways to survivor programmes that include rehabilitation.	

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

	Where rehabilitation follow up does not exist, consider supporting its establishment through integration into out-patient follow up, the creation of step-down units, capacity building of local services and advocacy for rehabilitation as a key component of survivor programmes.	Train nursing staff on basic rehabilitation interventions in critical care and provide remote technical support to staff working in the high-risk zone.

GUIDANCE NOTES

Rehabilitation specialists can play a role in the interface between clinical care and training, such as training of trainers and other capacity-building activities. As a result, trained clinical staff can initiate a rehabilitation process during the treatment of patients.

6.4.3.10 Laboratory and diagnostic testing

Outpatient	Inpatient	Inpatient ***PLUS***
MINIMUM TECHNICAL STANDARDS		
	All testing needs to be done using appropriate PPE and all staff who collect, pack or transport clinical specimens need to rigorously adhere to IPC standards and other VHF precautions to minimize the possibility of exposure to pathogens *(120, 121)*. Ensure safe collection, packaging, storage and transport of samples *(83)*. Establish collaboration with external laboratories as indicated, allowing access to rapid analysis and results. Have SOPs in place to ensure efficient communication with external laboratories. Perform RDTs for coinfections aligned with local protocols. Provide basic diagnostic POC testing, including pregnancy test, urine dipstick, blood glucose, haemoglobin testing. Ensure access to molecular testing, including for differential diagnosis, such as reverse transcriptase polymerase chain reaction (RT-PCR) and antigen-capture enzyme-linked immunosorbent assay (ELISA) *(93, 94)*.	Provide full serum biochemistry and haematology, and complete blood count testing *(25, 122)*. Establish access to safe blood banks *(50)*. Provide HIV testing in consultation with patients and according to the ministry of health policy.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Perform HIV testing in consultation with patients and according to the ministry of health policy.

Provide full serum biochemistry and haematology, and complete blood count testing.

Establish access to safe blood banks.

GUIDANCE NOTES

Collect a specimen from every suspected case in consultation with the ministry of health surveillance team on admission and prior to discharge according to national guidelines. All specimens need to be regarded as potentially infectious.

Rapid tests should not be used for screening or diagnosis of VHF in living patients, as currently available tests are only approved for postmortem testing.

If the patient has been symptomatic for less than 3 days, and the first PCR is negative, PCR should be repeated after 48 hours *(99)*.

When cooperating with external laboratories, ensure to consistently send samples from the same patient to the same laboratory *(123)*.

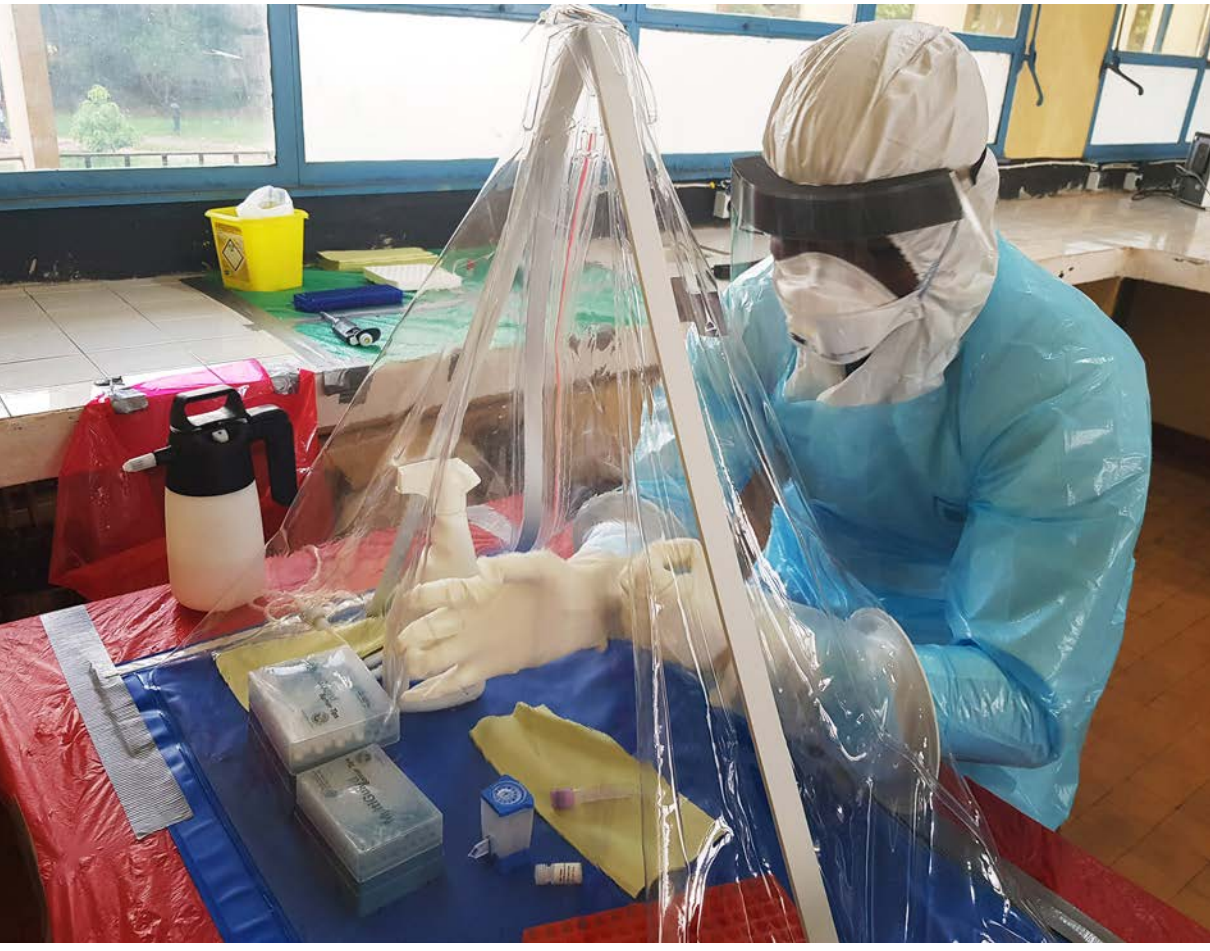
If collaborating with external laboratories, consult and agree on sample collection materials, such as swabs and required laboratory request forms to ensure compatibility.

Have SOPs in place to ensure efficient communication with external laboratories to ensure test results reach the correct person for correct action, while maintaining patient confidentiality.

Ensure that samples are only sent together with the correct documentation, including laboratory request forms and include any previous test results, such as RDT results.

Clearly indicate treatment facility location, complete address and phone number of sender and recipient, patient name or number on both the case investigation form and samples that are being sent to external laboratories.

Inform the recipient laboratory about the upcoming arrival of samples.



Mobile laboratory staff processing samples from patients with Ebola virus disease, Democratic Republic of Congo, 2018.

6.4.3.11 Imaging

In VHF, the main objective of imaging is to monitor the supportive treatment. When imaging of patients with VHF is indicated and adequate resources are available, clear SOPs need to be in place to implement safe and effective procedures. POCUS can be a valid diagnostic tool in the experienced examiner, and can be used for obstetric indications, to assess fluid status, pulmonary, abdominal and cardiovascular status, as well as facilitate ultrasound guided procedures *(124)*.

Medical imaging equipment must be decontaminated before use on other patients, limiting imaging modalities to portable techniques, requiring complex safety protocols. When developing a protocol for safe imaging in VHF patients, it is important to use adequate cleaning products to prevent damage to electrical contact plates of ultrasound batteries, charging docks and ultrasound probes *(125)*.

Outpatient	Inpatient	Inpatient ***PLUS***
MINIMUM TECHNICAL STANDARDS		
		Provide POCUS.
RECOMMENDATIONS FOR OPTIMAL PATIENT CARE		
	Provide POCUS.	

6.4.3.12 Survivor care

Several infectious diseases can cause chronic symptoms that develop or persist after the period of acute infection. Severe disease, such as Ebola or Marburg disease, may put survivors at increased risk for future adverse health events *(113)*. Survivors may experience both short- and long-term manifestations during convalescence, such as mobility limitation, arthralgias, vision impairment and mental health issues for both survivors, family, and community members.

In addition, some viruses such as Ebola virus or Marburg virus may persist in immunologically privileged sites of survivors, such as in semen, which may lead to reintroduction of the virus in areas where transmission has previously been eliminated *(92)*.

Survivors and their families need comprehensive support for the medical and psychosocial challenges they may face and to minimize the risk of continued virus transmission, especially from sexual transmission.

Outpatient	Inpatient	Inpatient ***PLUS***

MINIMUM TECHNICAL STANDARDS

Educate and counsel all patients about possible sequelae, potential of sexual transmission and psychosocial challenges faced during convalescence prior to discharge.

Inform and educate patients and families about existing support and survivor programme.

Refer or coordinate linkage for patients to join local survivor programmes.

Ensure follow up of patients up to 21 days after discharge by national surveillance teams, depending on national regulations.

Outpatient	Inpatient	Inpatient ***PLUS***

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Schedule or coordinate a follow-up appointment to see a care provider within 2 weeks after discharge.

Provide clear instructions about who to contact if discharged patients encounter health problems or have questions.

GUIDANCE NOTES

When providing instructions to survivors, consider that some viruses can persist in the semen of males for a year or more after acute infection and Ebola virus RNA has been detected in breast milk up to 16 months after onset of symptoms.

Women need to be counselled on pregnancy, abortion, post-abortion care and breastfeeding. Men need to be counselled on semen testing and advised to practise safer sex until semen was tested negative.

Address issues such as confidentiality, avoiding stigmatization and cost of follow-up care.

If significant mental health problems are noted before discharge or anticipated afterwards, consider referring patients directly to a mental health care provider *(113)*.

Suspect cases that tested negative (non-confirmed), still need 21 days follow up as they are considered to be potential contacts after discharge *(126)*.

Thailand EMT monitoring COVID-19 patients, Thailand, 2021.
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7. Technical standards applicable in all scenarios

7.1 IPC

Evidence-based IPC measures are an integral part of health care, and their immediate implementation is crucial for preventing and containing outbreaks while still delivering safe, effective, quality health care. Investing in IPC capacity will reduce the risk of HAIs and the risk of spread into the community *(127)*. To increase patients' and health workers' safety and to lower the risk for HAIs, standard precautions need to be adhered to at all times, independent of any known or suspected infection risk. Transmission-based precautions, including isolation, need to be implemented additionally for patients who are suspected or confirmed to be infected or colonized with certain infectious agents

1. Standard precautions

Standard precautions aim to protect both health workers and patients by reducing the risk of transmission of microorganisms from both recognized and unrecognized sources. As the minimum standard of IPC practices, they should be used by all health-care workers, during the care of all patients, at all times and in all settings *(20)*.

2. Transmission-based precautions

Transmission-based precautions are implemented in addition to standard precautions to interrupt one or more specific routes of pathogen specific transmission. Transmission-based precautions must be taken immediately when a patient presents with symptoms suggestive of an infectious disease. All teams must be able to recognize and adequately respond to all different modes of transmission, including contact, droplet and airborne transmission. It is important to understand that depending on context, transmission can occur by more than one route at the same time. Teams need to have protocols in place that allow for the early detection of cases that require additional IPC measures, need to ensure a correct patient flow, provide temporary isolation capacities and sufficient material resources, such as PPE *(17)* and appropriate disinfectants.

MINIMUM TECHNICAL STANDARDS

All teams need to have an IPC focal point *(23)*.

Ensure that all staff is IPC trained and strictly adheres to IPC protocols.

Develop and implement a comprehensive IPC programme and SOPs that include standard, transmission-based and additional targeted (pathogen-specific) precautions *(128)*.

Manage high-risk exposures, such as needle stick or body fluid exposure.

Ensure adequate supply and access to appropriate resources, such as PPE and disinfectants.

Make sure that the available PPE meets the scenario specific minimum requirements to ensure safety and efficacy *(17)*.

Display job aids, use checklists and provide regular training and supervision to safely put on and take off PPE.

Ensure that trained observers supervise each step of every procedure involving putting on and taking off PPE to correctly complete established protocols, ideally reading out aloud every step in the procedure checklist and visually confirm and document correct completion of every step.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Develop and implement systems to monitor and track HAIs and outbreaks and use this data to improve the IPC programme.

Regularly review and update IPC policies and procedures to ensure they are evidence-based and effective in preventing the spread of infectious diseases.

GUIDANCE NOTES

Consider conducting simulation training for staff and health-care personnel to practise patient care activities while wearing PPE to understand the physical stress that might be involved and determine tolerable shift lengths.

Access to specific laboratory diagnostics can facilitate rapid detection, reporting and establishment of appropriate referral pathways.

7.2 Safe patient transport

The objective of safe patient transport during an infectious disease outbreak is to transfer a patient to an adequate treatment facility while ensuring the safety of the patient and all staff involved. The use of repurposed private vehicles for patient transport in response to infectious disease outbreaks can provide an efficient solution for emergency medical services in areas with limited resources. Context adapted modifications of existing vehicles to include medical equipment and supplies, and the implementation of specific IPC measures, can facilitate the effective and safe transport of patients during infectious disease outbreaks *(see Annex 3: Repurposing of private vehicles for patient transport, for additional information)*.

MINIMUM TECHNICAL STANDARDS

Provide IPC training to all staff involved, including drivers and cleaners.

Develop precise SOPs and provide training in safe patient transfer, including mobilization, context adapted use of PPE, IPC measures, environmental cleaning and decontamination *(129)*.

Have protocols and equipment in place to manage unprotected exposure of staff.

Ensure clear communication with the patient, their family, the referring and receiving facility before and during transfer as well as during handover.

Limit the number of accompanying personnel in direct care of the patient.

Limit the amount of equipment and consumables in the care cabin to what is required for a single transfer to avoid contamination and reduce potential damage of materials due to decontamination procedures.

All equipment must be easily disinfectable, disposable or adequately protected with disposable protective covers for devices such as mobile phones.

Safely manage excreta and bodily fluids, and collect health-care waste produced during transport, clearly mark it with a biohazard symbol and dispose of it before the next transfer.

Clean and disinfect the vehicle, surfaces and equipment with pathogen specific disinfectant and adhere to context adapted decontamination protocols after each transfer *(130)*.

Do not take family members alongside the patient unless a parent is accompanying a sick child. Provide and instruct the parent on the use of PPE and hand hygiene.

Instruct patients on in-transport disease specific IPC measures. If a patient is unable to perform them independently, personnel need to facilitate these measures.

Optimize ventilation in vehicles during transport. Natural ventilation is preferred to reduce risk of transmission of infectious particles *(131)*.

Maintain a transfer log.

Designate a focal point responsible for post-transfer monitoring and documenting the health of transfer personnel daily.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Provide essential care during transfer.

Provide portable oxygen and ensure sufficient supply during transport if indicated.

GUIDANCE NOTES

Consider maintaining a comfortable temperature for both patients and personnel to reduce the risk of thermal shock in health-care workers and loss of PPE protection due to prolonged exposure and excessive sweating.

Calculate en route oxygen consumption, taking expected travel and handover time into account as well as unforeseen circumstances, such as traffic jams and waiting at destination.

Air conditioning should only be used if the driver's cabin is sealed from the patient cabin and HEPA filters are installed and properly maintained *(2)*.

7.3 Mental health and psychosocial support

Mental health and psychosocial support (MHPSS) is a term used to describe any type of local or outside support that aims to protect or promote psychosocial well-being as well as prevent or treat new or pre-existing mental health conditions *(132)*.

Infectious disease outbreaks significantly impact the mental health and psychosocial well-being of those affected, their family, community members and the health workers treating people with the disease. Feelings of worry and sadness are common and for most people improve over time if adequate support is provided. However, rates of mental health conditions are likely to increase due to both the potential impact of the disease itself and the measures to contain it, such as social isolation, impacts on livelihoods and education, and separation from or loss of loved ones. The support and information that is provided to affected individuals are often key to their decisions to enter quarantine or treatment facilities and to cooperate with clinical and infection control procedures, such as isolation and contact tracing. MHPSS should be integral in all clinical care phases and across public health emergency response and preparedness pillars to mitigate protection risks and to reduce psychological distress for outpatients, inpatients, and the family and loved ones of the infected person *(133)*.

A contextualized and multisectoral approach is essential to provide the appropriate services required to promote mental health and psychosocial well-being in a humanitarian emergency *(134)*. MHPSS services provided by medical teams should complement and coordinate with existing services and link to referral pathways with service providers in mental health, social care, protection, including child protection and sexual and gender-based violence (SGBV), while considering existing resources, technical expertise, capacity within the team, strengths and resources of the community, community-based activities, and wider response actors to deliver adequate support.

The mental health and psychological well-being of patients has a considerable influence on their adherence to protocols, safety precautions, treatment, and recovery. Basic psychosocial support such as PFA needs to be provided to all patients at all stages of care, including screening, community outreach, inpatient stays and follow up.

MINIMUM TECHNICAL STANDARDS

Train all staff members in providing basic psychosocial support, such as PFA *(135)*.

Identify MHPSS focal points in each team.

Share accurate, updated, and easily understood information about the outbreak, the patient's condition and treatment with the patient and the patient's contacts.

Identify, care for and refer persons with both pre-existing and emergency-induced mental, neurological and substance use conditions when indicated *(136)*.

Support the dissemination of key messages to promote mental health and psychosocial well-being, support access to services and increase access to information about the situation and positive ways to cope with stress.

Monitor the psychological well-being of all patients daily.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Ensure essential psychotropic medication availability.

GUIDANCE NOTES

MHPSS activities of medical teams should aim to build on local resources and capacities and support the development of sustainable mental health systems.

Where possible, medical team staff providing MHPSS services should be able to speak the local language and be familiar with the local context, culture and customs. Ideally, these are national staff members who have been prepared to respond prior to the outbreak.

Integrate MHPSS specific capacity building and SOPs as a central component of the teams' preparedness and response strategies and test these through simulation exercises.

Include MHPSS considerations to mitigate protection risks and reduce psychological distress for infected persons who are hospitalized or in isolation. This may include to ensure family visits, access to means of communication with family members remotely via phones, facilitation of visits from religious leaders and offer of daily activities, especially for children, such as books and games.

Consider the patient's pre-existing mental, neurological, or substance use conditions, (including intellectual disabilities, history of mental health conditions and whether they are currently taking prescribed psychotropic medication).

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7.4 Reporting

All teams must participate in the required collection of epidemiological data and timely reporting to the ministry of health, which is often daily in the acute phase of an outbreak. Reporting should be conducted using a standardized form which allows for the aggregation of data across teams, which is critical for a timely situational and epidemiological overview.

MINIMUM TECHNICAL STANDARDS

Fulfil all reporting requirements of the ministry of health.

Ensure use of the current and possibly updated or adapted Minimum Data Set (MDS) as specified by the ministry of health and/or local authorities.

Keep records for supply management and epidemiological surveillance (numbers of patients, number of patients transferred, reported deaths in the community and if possible, village or site of origin) *(59)*.

7.5 Team welfare, occupational health and safety

Staff working in outbreak response are exposed to many challenges, including a heavy workload, risk of disease transmission, prolonged use of PPE, stigmatization, discrimination and other issues. It is critical to protect the health, safety and well-being of all staff involved in the response, which requires well-coordinated and comprehensive measures for IPC, occupational health and safety, health workforce management and MHPSS.

It is essential to monitor the health and wellness of all staff to intervene as early as possible in case of potential exposure or infection. Addressing staff health helps the individual health worker and their recovery as well as preventing the spread of disease in the health-care environment *(137)*.

Team members returning from working in outbreak areas, particularly those where they may have experienced high or chronic stress, may experience psychological distress and may be at a higher risk for the onset of new or pre-existing mental health conditions *(138)*.

MINIMUM TECHNICAL STANDARDS

Train all staff on standard and transmission-based precautions and ensure they are competent in performing outbreak-related infection control practices and procedures relevant to their scope of work.

Designate and empower a staff health and safety focal point.

Ensure regular meetings between staff health and safety focal point, management team and the IPC focal point.

Develop SOPs and ensure sufficient resources for staff testing, routinely and post-exposure, depending on context and availability *(139)*.

Screen the infectious disease status of every staff member on entering and leaving the workplace and monitor for symptoms.

Encourage staff to self-monitor and report if they notice symptoms themselves or among colleagues.

MINIMUM TECHNICAL STANDARDS

Provide protocols to prevent stigmatization of health workers generally as well as for those who become infected. Briefing and pre-deployment training is obligatory for all staff. Reminders of safety rules and protocols must take place on a regular basis.

Provide opportunities for recognizing and acting early on mental health symptoms and/or conditions by providing access to appropriate psychological supports or interventions at all phases of deployment.

Strengthen awareness of workers and capacities of field managers to recognize and appropriately respond to workers experiencing stress.

Pre-deployment to outbreak area
Ensure staff access to all relevant pre-deployment medical prophylaxis and vaccinations, guaranteeing that team members have completed full vaccination courses and received any appropriate boosters prior to deployment.

Educate workers about the disease, recommended vaccines and medical prophylaxis, standard and transmission-based precautions, IPC protocols, PPE, and health insurance.

During deployment to outbreak area
Provide pre- and post-exposure prophylaxis if available and indicated for all staff *(140)*.

Remain in contact with all workers, regularly asking about any symptoms of or exposures to infectious disease. Establish well understood follow-up systems for surveillance and contact tracing within staff.

Create a workplace culture and environment in which staff feel safe to come forward with any concerns.

Have SOPs in place to either medically evacuate or refer to designated health-care facilities in the country to treat infected staff members.

Develop SOPs for enhanced hygiene measures and prevention of infection in the team accommodation.

Encourage additional behavioural measures, such as avoiding overcrowded living conditions, performing respiratory etiquette, hand washing and safe food preparation.

Post-deployment to outbreak area
All staff leaving an outbreak area need to undergo a health and exposure assessment before their departure.

MINIMUM TECHNICAL STANDARDS

Stay in contact with all workers for at least the known incubation period of the respective disease after leaving the outbreak area and while they self-monitor for symptoms.

Conduct symptom monitoring at certain time points during that period.

Offer access to mental health care and self-help materials for workers.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Check immunization schedules of locally recruited staff, including health-care workers, cleaners, security guards, and update vaccinations as needed.

GUIDANCE NOTES

Carefully control and adapt work shifts depending on context.

Consider challenges associated with PPE in high temperature environments.

7.6 Risk communication and community engagement

Risk communication and community engagement (RCCE) is guided by the understanding that empowering and enabling communities strengthens their resilience to risks and vulnerabilities *(141)*. It aims to reduce the negative impacts of the outbreak by adopting participatory and evidence-based methodologies with coordinated, context-appropriate approaches to engage local communities, increase social cohesion and trust and end stigma. Direct and open dialogue with the population, community leaders, faith-based organizations and local health workers, will aid in building trust and increase the likelihood that health advice will be followed. RCCE minimizes and manages false information, rumours and misconceptions that can undermine the response and lead to the further spread of the disease.

Engaging communities is a process of including at-risk and affected communities in the outbreak control response throughout the process from planning and surveillance to implementation and monitoring. It promotes and facilitates community ownership in the response.

Medical teams should work closely with the community and local health-care authorities to adapt their services to the local needs, culture, and context and to enable them to gain the trust and acceptance of the host community. There may be a high degree of chaos, suspicion and confusion that can lead to a lack of trust in teams and humanitarian action at large. The population will view the medical actors' missions through their own set of values and beliefs, experiences, and rumours, and may have low or high expectations. Thus, active community engagement becomes a critical element in rebuilding trust and acceptance, securing safe access and managing expectations.

Collaboration with other local and international organizations is essential to consolidate efforts, avoid duplications and waste of resources, and to sustain efforts even after the departure of the team. This will ensure more accountability and equity in response *(142)*.

Gauging perceptions and determining how to best gain acceptance into a community entails establishing relationships and frequent communications framed by active listening, soft skills, humility, respect, civility, gender sensitivity, cultural

sensitivity, empathy and transparency. A degree of openness, transparency and a predisposition to learn from local health providers, local community wisdom, and a willingness to take criticism, reflect and act, can also aid in building trust and strengthening acceptance.

MINIMUM TECHNICAL STANDARDS

Designate a RCCE focal point.

Adapt, test, and update information, education, and communication (IEC) materials to successfully respond to the needs of communities and answer their concerns.

Create mechanisms to bridge health-care workers with the affected communities to improve the trust in the health-care services provided and in health-seeking behaviours.

Identify and cooperate with trusted, community-appointed people as entry points for response teams to work with the at-risk community.

Understand behavioural drivers and determinants to tailor interventions accordingly.

Facilitate routine feedback and engagement between the community and the response team to be able to improve the strategy if needed.

Facilitate or participate in RCCE coordination mechanisms, if available.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Establish community listening mechanisms within the communities and at the health-care facility for feedback, questions and concerns from the community.

Regularly monitor and evaluate the impact and effectiveness of RCCE plan and be prepared to adapt the strategies based on evolving circumstances or communities' needs.

Work in collaboration with relevant government agencies, international organizations, NGOs and other stakeholders to avoid duplication of efforts and maximize resources.

GUIDANCE NOTES

The standards and recommendations should be contextualized based on the needs assessment findings in the affected area.

Engage and involve the affected communities at an early stage. This ensures that RCCE efforts address their specific needs, concerns and cultural sensitivities.

Provide timely and accurate information about the outbreak. Communicate information through multiple channels to reach the target audiences that require different interventions.

Ensure cultural sensitivity and tailor messages and engagement approaches to the cultural and social norms of the affected communities to enhance acceptance.

Ensure that messages are consistent across all communication channels and stakeholders. Avoid conflicting information that may lead to confusion and mistrust. Keep your promises and acknowledge uncertainty.

Engage trusted sources and collaborate with local leaders, community influencers and health workers who are trusted by the community. Their involvement can enhance the credibility and acceptance of the information.

Ensure inclusivity by taking vulnerable groups, the elderly and people with disabilities and other hard-to-reach populations into account in your RCCE plan.

7.7 Safeguarding, protection and prevention and response to sexual exploitation, abuse and harassment

Infectious disease outbreaks may increase protection concerns and may result from a multitude of factors such as isolation, limited access to services and reporting mechanisms, increased psychosocial, emotional and psychological distress, negative mental health impacts among the population and increased exposure to violence and abuse *(143)*. Specific populations are especially vulnerable and at heightened risk during infectious disease outbreaks, including women and girls, children *(144)*, older adults and persons with disabilities.

Community engagement activities during the Ebola virus disease outbreak, Democratic Republic of Congo, 2018.
© WHO/ Eugene Kabambi

Children are particularly vulnerable during infectious disease outbreaks for a variety of reasons. Beyond the immediate impacts on their health and that of their caregivers, the social and economic disruptions caused by outbreaks also present risks to children's well-being and protection *(145)*. The environments in which children grow and develop often experience major disruptions due to outbreaks. Such disruptions coupled with measures used to prevent and control outbreaks can present further risks to children that should be considered by all actors involved in the outbreak response.

Sexual misconduct as exploitation, abuse and violence in humanitarian emergencies is a serious, even life-threatening, public health and human rights concern and must be met with a zero-tolerance approach. The prevention of any actual or attempted abuse of a position of vulnerability, differential power, or trust is the core responsibility of any team to ensure that their personnel and implementing partners do not harm the people they serve or the people they work alongside *(146)*.

The process of incorporating protection principles and promoting meaningful access, safety, and dignity in humanitarian aid, known as protection mainstreaming, should be implemented by all actors in all activities. This can be achieved during outbreaks by practically adjusting interventions to ensure they promote safety, dignity, meaningful access, accountability and participation and empowerment, and by building awareness and capacity of frontline staff *(143)*.

Teams working in infectious disease outbreak contexts must have an awareness of the heightened potential for sexual and gender-based violence (SGBV) and must provide timely and appropriate medical treatment and referral to support services available to survivors *(147)*.

MINIMUM TECHNICAL STANDARDS

Assess whether existing mechanisms and channels for protection services are still accessible, safe, and relevant during the outbreak.

Ensure that all persons with access to children's wards have undergone child protection background checks, received child safeguarding training, and signed a child safeguarding policy.

Appoint a child protection focal point in the team with additional training and experience in child protection.

MINIMUM TECHNICAL STANDARDS

Establish a registration system and recognized procedure to account for all unaccompanied minors in the health facility.

Identify existing coordination mechanisms that can incorporate protection response actions.

Coordinate with partners that trace family contacts (alternative caregivers) or provide appropriate care for children whose parents have been admitted to treatment centres or did not survive.

Develop a code of conduct that addresses sexual abuse and exploitation, to be followed by all staff *(148)*.

Report all suspicions of the existence of acts of sexual exploitation or abuse.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Screen patients that are admitted ensuring that any dependent(s) they have are safe and cared for and link to support services as required.

Work with appropriate agencies to immediately establish procedures to ensure the provision of appropriate care for dependants that are separated from their main caregiver.

GUIDANCE NOTES

Anticipate the risks related to child exploitation, and sexual and gender-based violence in outbreak situations due to disruption of protective family structures, social networks and routines with reduced community supervision.

Health worker supporting the Ebola virus disease outbreak response, Guinea, 2014.
© WHO / Samuel Aranda

8. Operations support and logistics (OSL) and water, sanitation, and hygiene (WASH) technical standards applicable in all defined HID SCTs and outbreak scenarios

WASH and OSL are crucial components in the management of infectious disease outbreaks. They play a critical role in preventing the spread of disease and protecting public health by helping to create resilient communities living in healthy environments. All standards and recommendations in this document provide infectious disease specific guidance and complement the minimum standards and recommendations defined in the WHO publication *Classification and minimum standards for emergency medical teams,* commonly referred to as *Blue Book.*

Operations support and WASH components provided by the different team types that apply to all three outbreak scenarios, are complemented by scenario-specific considerations that are colour coded aligned to the clinical chapters (orange for AWD, green for SARI with epidemic potential and blue for VHF).

8.1 WASH

Safe drinking-water, sanitation and hygiene are crucial prerequisites to human health. The term WASH includes the provision of safe water, sanitation, waste management, hygiene and environmental cleaning *(149)*. Health-care settings in general have a significant presence of transmissible pathogens. If left uncontrolled, HAIs increase and may pose potential outbreak risks. Appropriate control measures are therefore critical to mitigate these risks and even more significantly so during infectious disease outbreaks *(150)*. Consistent application of appropriate IPC practices in health-care settings, facilitated by a robust WASH infrastructure and minimum standards, are core elements to reduce transmission of infectious diseases and help prevent and control outbreaks *(151)*.

8.1.1 Water supply

The functionality of a health-care facility, and its ability to prevent and control the spread of infections, relies on a safe, sufficient and reliable water supply. This requires the correct estimation of minimum and peak water demands based on the number of patients, staff and caretakers present at the facility. A wide range of water needs, such as safe drinking water, water for showering and flushing latrines, cleaning and disinfection, as well as appropriate amounts of water for the provided clinical activity and all WASH and IPC procedures need to be considered.

In infectious disease outbreaks, the required water quantities increase significantly due to the enhanced frequency of environmental cleaning, laundry processing and appropriate IPC practices, as well as due to the increased needs as per the provided clinical activity, such as rehydration. Appropriate forecasting, planning and management of the needed water supply and demand ensures the availability of sufficient quantities of clean water.

MINIMUM TECHNICAL STANDARDS

Ensure provision of sufficient amounts of water as required by context or scenario.

Add an additional 15 litres per caregiver per day if they participate in patient care in the facility *(152)*.

Store a 48-hour supply of water on site at all times to ensure a continuous water supply *(151)*.

Treat all drinking water, including water used for the preparation of oral rehydration solution (ORS).

Ensure that drinking water and ORS are easily accessible to patients and caregivers in separate, clearly labelled, and covered containers with spigots or taps.

Adapt the concentration of chlorine solutions to the susceptibility of the targeted pathogen and intended use.

Ensure safe management of chlorine solutions, including storage, mixing, appropriate concentrations, and use of PPE.

Conduct daily water quality and chlorine concentration checks *(153)*.

Prevent accidental drinking of highly chlorinated water. Use culturally appropriate signage/pictures to warn patients, visitors and staff.

Set up a water distribution system that supplies different water/chlorine solution concentrations for different purposes. See the hygiene and environmental cleaning chapter for concentrations and usage.

MINIMUM TECHNICAL STANDARDS

Clearly label and colour code the piping, taps and containers of the chlorine solutions of different concentrations *(44)*.

Set up the water infrastructure within the low-risk zone of the treatment facility to facilitate easy and safe access for maintenance (water towers/bladders, pumps, filters, main piping) and when opted for water trucking, ensure access for the truck.

Select appropriate, chlorine resistant materials for pumps and plumbing as well as for the water infrastructure, including water tower, bladder, pumps and piping.

AWD water requirements:

- 10 litres per outpatient per day
- 60 litres per inpatient per day *(152)*
- 40–60 litres per staff/caregiver per day

SARI water requirements ***(151)*****:**

- 5 litres per outpatient per day
- 100 litres per inpatient per day
- 40–60 litres per staff/caregiver per day

VHF water requirements ***(154)*****:**

- 5 litres per patient in screening area per day
- 300–400 litres per inpatient per day *(151)*
- 40–60 litres per staff/caregiver per day.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Calculate context-adapted additional amounts of required water supply. For AWD and VHF outbreaks, allow for 72 hours' supply *(151)*.

GUIDANCE NOTES

To perform accurate water quantity calculations, consider the increased water demand for drinking and oral rehydration solution (ORS) preparation, hand hygiene, shower and bathing, cleaning and disinfection *(5)* of floors, surfaces and equipment, cooking and washing dishes, laundry, sluice, cleaning, and disinfecting ambulances/vehicles, as well as dead body management *(155)*.

Do not store ORS for more than 12 hours at room temperature, or more than 24 hours if kept refrigerated.

8.1.2 Hygiene

Hygiene considerations are part of standard precautions that need to be implemented at all times. Hygiene comprises a range of behaviours that help to maintain health and prevent the spread of diseases. They include hand hygiene *(156)*, respiratory hygiene, food hygiene, personal and menstrual hygiene. Additional activities such as hygiene promotion and provision of hygiene kits are critical in outbreak settings.

MINIMUM TECHNICAL STANDARDS

Use clean water and soap for visibly soiled hands especially in the AWD context.

Facilitate 5 moments for hand hygiene by providing alcohol-based hand rubs where appropriate and available, especially in patient care areas *(157, 158)*.

Place functional and regularly maintained hand-hygiene (alcohol-based hand rubs or soap and water) stations at the entrance and exit of every health-care facility, within all patient care areas, including isolation rooms and in donning and doffing areas.

Ensure sufficient hygiene supplies to provide dignified hygiene care, such as bowls, bedside toilet chairs, bedpans, urinals, and ensure privacy with measures such as setting up patient screens.

All hygiene protocols and IEC materials must be made available on-site at all times as reference for staff, with measures, such as laminated cards, posted clearly throughout the structure, especially at hygiene stations.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

If appropriate, provide patients with specific hygiene items and training before discharge.

GUIDANCE NOTES

If soap and alcohol-based hand rub are not available, use 0.05% chlorine solution for hand hygiene as a temporary measure *(159)*. Repeated use of 0.05% chlorine solution for hand hygiene may cause skin irritation.

Spraying rooms with disinfectants, such as chlorine solutions as a standalone cleaning approach is not recommended as the disinfectant may not reach all desired surfaces *(160)*.

Equipment and surfaces need to be cleaned *(5)* before being disinfected, as chlorine is rapidly inactivated by organic material, such as dirt or blood.

When wiping down items, consider natural ventilation to minimize irritation and inhalation of chlorine fumes.

Note that there is no scientific evidence that supports the use of footbaths or foot spraying for infection control.

Due to the implications regarding the management of potentially infectious bodily fluids, menstrual hygiene management requires special attention in some outbreaks and when clinical care may result in a fluid exposure risk.

8.1.3 Environmental cleaning

Environmental cleaning is an essential part of standard precautions in health-care settings. Cleaning and disinfection are critical due to the high number of spills and the need to clean and disinfect frequently touched surfaces, waste containers and covers, vehicles for the transport of patients, reusable medical equipment, PPE and excreta and vomit buckets *(20)*. Teams need to have clear SOPs in place, follow established protocols and use appropriate cleaning and disinfection products to effectively remove dirt, debris, and pathogens from surfaces and equipment.

During an infectious disease outbreak, the importance of environmental cleaning needs to be reinforced and the frequency of cleaning cycles and monitoring visits increased. In the context of an outbreak, cleaning, disinfecting and reprocessing of reusable equipment may be required *(8)*.

MINIMUM TECHNICAL STANDARDS

Ensure appropriate cleaning and disinfection products, with context adapted concentrations and contact time, and consider the specific characteristics of the treated type of material.

Increase environmental cleaning cycle frequency, especially for high-touch surfaces. Increase frequency of monitoring visits.

Ensure that environmental services staff wear recommended PPE to protect against direct skin and mucous membrane exposure of cleaning chemicals, contamination, and splashes or spatters during environmental cleaning and disinfection activities.

Develop clear SOPs and designate an area to safely decontaminate and reprocess reusable medical equipment/devices.

Do not use cleaning equipment from high-risk areas in low-risk areas or vice versa.

Make sure all reusable material can withstand disinfection products, such as chlorine, are easily washable and ensure that deteriorated material is replaced.

Use context adapted disinfection agents/concentrations of chlorine solution to ensure that they can neutralize targeted pathogens, respecting high risk and low risk zones at all times (see table 14) *(151)*.

MINIMUM TECHNICAL STANDARDS

Implement discharge protocols for the management of patients' and caretakers' clothes and belongings as per context and disease scenario.

Set up the dirty laundry area near the ward to minimize movement of dirty laundry and potential cross-contamination throughout the facility.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Set up a covered outdoor drying area with washing lines and drying racks for clean laundry and reusable PPE, such as sterilized boots, aprons and gloves.

Ensure direct staff access to chlorine solutions and wastewater disposal pits.

GUIDANCE NOTES

Plan for sufficient linen buffer stocks to facilitate the option to discard heavily soiled linen and contaminated textiles with infectious waste to reduce exposure among staff and cross-contamination risks.

Where sinks are not available, large plastic tubs can be used on a concrete slab, connected to a soak-away pit, with a grease trap for disposal of wastewater. The concrete slab of the washing area should be cleaned and disinfected daily.

Chlorine solutions are inactivated in the presence of organic material, such as blood and other biological liquids. Clean with detergent and water before applying disinfectant.

Consider adequate coverage and the required wet contact time on surfaces for the disinfectant to be effective *(161)*.

If chlorine solutions are used for hand hygiene, care needs to be taken to use the appropriate concentration (0.05 %) and test concentrations at least daily.

Plan for sufficient space and staff to reprocess soiled linens manually if washing machines are not available.

Drying racks for reusable PPE, Uganda, 2022. © Daniel Elombat/ WHO

Table 14. Context adapted concentrations of chlorine (sodium hypochlorite) solutions

Outpatient	Scenario		
	AWD *(41, 162)*	**SARI** *(163, 164)*	**VHF** *(154)*
Hand hygiene	0.05 %	0.05 %	0.05 %
Reusable PPE (including aprons, boots)	0.2 %	0.1 %	0.5 %
Disinfecting surfaces, floors and objects after cleaning	0.2 %	0.1 %	0.5 %
Blood and body fluid spills	2 %	0.5 %	0.5 %
Stock solution for chlorinating water	1 %	1 %	1 %
Excreta and vomit buckets	2 %		0.5 %
Preparing dead bodies	2 %		0.5 %

8.1.4 Waste management

In an infectious disease treatment facility, all waste generated in the high-risk zone, whether liquid or solid, is considered to be infectious. In addition, the use of single-use PPE items is significantly high. Thus, those facilities produce large volumes of infectious waste on a daily basis. The appropriate selection of waste-treatment technologies is therefore critical.

Direct and unprotected human contact during handling of health-care waste could result in the transmission of an infectious disease. Therefore, a waste management focal point should be assigned, and sufficient human and material resources allocated to safely dispose of potentially infectious health care waste.

Preparation of chlorine solution, cholera outbreak response, Kenya, 2023. © WHO/ Billy Miaron

MINIMUM TECHNICAL STANDARDS

Provide regular training on IPC standard precautions to all staff that is handling health-care waste, including waste management procedures and the appropriate use of PPE *(165)*.

All health-care waste (excluding sharps) produced in the high-risk zone, should be disposed safely in designated covered and hands-free containers with leak proof biohazard bags.

Collect sharps in puncture resistant sharp boxes.

Increase the capacity of waste segregation and containment, such as the number of containers, especially in donning and doffing areas and ensure close monitoring to mitigate overflow.

Strive to treat all infectious waste on-site. If waste treatment is outsourced, ensure safe transport, and understand where and how it will be treated and destroyed. Ensure clear community engagement before opting for outsourcing waste treatment.

Position the waste management site in the high-risk zone separate from the patient treatment areas. Consider the predominant wind direction to minimize the spread of fumes to the patient or staff area.

Ensure that the incinerator capacity (volume and daily maximum operating hours) matches the forecasted waste volume, considering daily PPE consumption and packaging.

Implement measures to prevent or minimize community exposure to incinerator smoke in densely populated areas and ensure strong community engagement.

Have a back-up plan for incinerator breakdown or maintenance, such as temporary volume reducers, a second incinerator, or temporary outsourcing.

Implement separated waste collection routes with dedicated trolleys for each area in the high-risk and low-risk areas.

Minimize storage time to not exceed 24 hours, to reduce the risk of transmission *(165)*.

Exercise specific caution for the management of cartridges used for certain diagnostic systems, such as GeneXpert. Waste derived from these diagnostic systems must not be released into the drainage system and require high temperature incineration *(166)*.

Conduct regular audits and inspections of the waste management process to ensure compliance with established minimum standards.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Use a covered trolley when moving waste in the facility to reduce the potential exposure.

Develop a contingency plan for an unexpected increased volume of waste generation.

GUIDANCE NOTES

Certain types of infectious wastes like vials cannot be treated or disposed of in incinerators. They require enhanced waste segregation strategies.

If thick bags are not available, double bagging within the bin is recommended to reduce tears and leaks *(167)*.

Set up of Ebola treatment centre, Democratic Republic of Congo, 2019. © WHO/ Lindsay Mackenzie

8.1.5 Sanitation

Depending on the infectious disease and the mode of transmission, excreta and other body fluids can contain high pathogen loads. This poses the risk of a potentially increased cross-contamination within the facility as well as in the community. This requires strong risk communication and community engagement measures and sensitization activities, especially in the preparation phase and during the entire operation.

MINIMUM TECHNICAL STANDARDS

Ensure provision of appropriate PPE for all sanitation and waste management staff.

Use chlorine solutions in context adapted concentrations to target surfaces and objects that might be contaminated (see 8.1.3 Environmental cleaning).

Ensure adequate management of wastewater as well as drainage.

Properly manage grey water from patient areas, laundry, or waste areas to avoid backflow, spills and overflow.

Have separate sewage piping for high risk and low-risk zones. If this is not possible, all sewage needs to be treated as high risk.

Collect excreta and vomit in buckets when patients cannot go to toilets and empty into patient latrines.

Install on-site wastewater treatment if the integrity of the existing sewer system is unknown or compromised.

Establish separate latrines for staff and patients.

Depending on context, provide separate toilets or latrines for suspected and confirmed cases.

Provide clear guidance on how wastewater is safely managed.

If greywater is disposed of in a soakaway pit, the pit must be fenced off within the health facility grounds to prevent tampering and to avoid possible exposure in the case of overflow *(154)*.

MINIMUM TECHNICAL STANDARDS

Calculate the proportion of toilets per user type (inpatient, outpatient, staff) following a recommended ratio considering gender, vulnerable populations including children and users with reduced mobility, as well as patients in isolation *(151)*.

Minimize handling of excreta and vomit from suspected or confirmed cholera cases.

In the case of pre-existing patient latrines connected to the main sewage system (within existing health structures), treat effluent between latrines and the sewage system *(168)*.

Use clearly labelled and different coloured buckets for excreta and vomit. Do not use these buckets for clean activities, such as preparation of ORS or transport of potable water.

Provide patients with suspected or confirmed respiratory disease with a toilet or latrine that has a door and is separated from other patients' rooms.

For flush toilets, use standard, well-maintained plumbing such as sealed bathroom drains, and backflow valves on sprayers and taps, to prevent aerosolized faecal matter from entering the plumbing or ventilation system *(163)*.

Minimize handling of excreta and vomit from suspected or confirmed VHF cases.

Follow standard wastewater treatment procedures when flush toilets are used, including at least on-site septic tank treatment with controlled removal for further treatment *(154)*.

All staff handling excreta must do so in full PPE at all times and exercise caution to avoid splashing.

Ensure body fluid buckets (including excreta and vomit) are emptied in a specifically dedicated latrine.

Ensure pre-treatment of effluent between latrines and the sewage system if pre-existing patient latrines are connected to the main sewage system (within existing health-care structures).

Use clearly labelled and different coloured buckets for excreta and vomit.

Do not use these buckets for “clean” activities, such as preparation of ORS, transport of potable water.

GUIDANCE NOTES

Hydrated lime (30 % suspensions) or 2 % chlorine solutions may offer a simple public health protection measure for the containment, safe handling and disinfection of human excreta during humanitarian emergencies *(168)*.

PPE equipment for sanitation staff includes heavy duty rubber gloves, impermeable gown, impermeable apron, closed shoes, such as boots, facial protection (mask and goggles or face shield) and ideally a head cover.

If infectious disease treatment facilities are connected to sewers, carry out a risk assessment to confirm that wastewater is contained within the system, and it does not leak before it arrives at a functioning treatment or disposal site.

If there is a high groundwater level or a lack of space to dig pits, excreta should be retained in impermeable storage containers and left as long as is feasibly possible to allow for reduction in virus levels before moving such waste off-site for additional treatment and safe disposal *(154)*.

Do not pour large amounts of undiluted chlorine directly into latrines, as this can lead to chemical reactions that generate toxic gas and can damage the structure of the latrines.

8.1.6 Dead body management

Safe dead body management in the context of some outbreaks is essential to protect staff and the affected population from highly infectious disease transmission. Some pathogens require specialized SDB procedures, whereas others can be managed by medical teams. Dead body management includes all steps from safe body preparation and decontamination, potential body viewing, safe storage and transport to the burial or cremation site to the supervision of a safe funeral ceremony. Before starting any procedure, the family must be prepared, with all steps and the burial/cremation process explained, especially with regard to dignity and respect for the deceased person. Once agreed and understood, the burial/cremation can be performed. No burial/cremation process should take place until agreement is obtained.

MINIMUM TECHNICAL STANDARDS

Ensure that only specifically trained personnel handle dead bodies during an outbreak caused by a pathogen that is known to be transmitted post-mortem.

Ensure that personnel who interact with the body (health care or mortuary staff, and the burial/cremation team) strictly adhere to standard precautions, including hand hygiene before and after interaction with the body. Use appropriate PPE according to the transmission route of the disease and the level of interaction with the body *(169)*.

Ensure safe and sufficient morgue space and anticipate surge capacity.

Prepare for potential extended body storage time.

Ensure an SOP is in place to manage and disinfect vehicles used to transport dead bodies.

Work closely with religious and community leaders to ensure that cultural and religious concerns are being taken into account.

Develop SOPs to safely coordinate with burial teams.

Ensure the understanding and obtain the agreement of the deceased person's family on the steps to prepare a body for funeral rites.

Ensure procedures are in place to allow a designated family member or religious/cultural leader to witness or participate in body preparations.

MINIMUM TECHNICAL STANDARDS

Keep handling of dead bodies to a minimum and conduct burials as quickly as possible (preferably within 24 hours after death) to reduce the risk of transmission caused by high concentrations of V. cholerae in body fluids.

Preparation of the deceased includes washing the body and disinfecting the body with a 2% chlorine solution *(152)*.

The dead body should be placed in a nonporous body bag with two disposable under pads (one placed under the head, the other under the buttocks) to absorb possible leaks through the mouth and anus. The bag is closed until burial or cremation *(44)*.

The body should be buried at least 50 metres from a water source and at least 1.5 metres deep *(152)*.

If a body is selected for autopsy, ensure that safety measures, including standard precautions as well as transmission-based precautions are in place to protect those performing the autopsy.

Closely coordinate with specialized SDB teams *(170)*.

Only personnel trained in handling dead bodies and wearing recommended PPE *(171)* should touch, handle, or move any dead body of a person who has died from a VHF with high risk of postmortem transmission.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

If available, opt for a temperature-controlled room for dead body storage.

GUIDANCE NOTES

The morgue design should include a safe area dedicated to the family for body exposition; transparent screens could be used for this purpose.

The dead body should not be prepared on the ward (never in view of other patients) and should be transported to the morgue as quickly as possible.

The morgue should be located close to the outer perimeter of the facility to allow for specific and discreet exit of dead bodies.

It is important to make communities aware of the risks of contagion from practices such as traditional washing of the dead. Also, any large gathering, including a funeral, can be a way of spreading an epidemic.

In community settings or in health-care settings when sampling has not yet been performed, laboratory-epidemiology or SDB team should collect a postmortem sample for confirmation before placing the body into the body bag *(170)*.

Safe dignified burial team, Democratic Republic of Congo, 2019. © WHO/ Christopher Black

8.2 Operations support and logistics (OSL)

Logistics plays an essential role in the context of highly infectious diseases, as it ensures that necessary supplies and equipment, such as PPE, are available and can be quickly mobilized to where they are needed. Adequate logistics planning and management can help prevent shortages and ensure that health-care workers have the tools they need to provide continuous care safely.

8.2.1 Power and fuel

To ensure uninterrupted power supply, the facility should be equipped with a primary reliable electrical source and a backup system in case of emergencies. It is essential to consider patient and staff comfort along with the use of clean energy during the design phase whenever possible.

In infectious disease treatment facilities, it is crucial to have a clear distinction between low-risk and high-risk circuits in the power supply system. This differentiation is necessary to ensure the safety of workers, patients, and visitors while effectively controlling and preventing infections.

MINIMUM TECHNICAL STANDARDS

Locate power generation areas and fuel storage tanks away from clinical care areas to restrict unauthorized access.

Ensure sufficient generator capacity if the facility depends on generator power.

Provide for waterproof and chemical-resistant electrical components within clinical care areas to prevent damage during decontamination procedures (disinfectant).

Install control and security panels outside the clinical care area to facilitate safe and faster access to operations support personnel during handling and management.

Provide each area within the health-care facility (clinical care, administrative management, operational management and living area) with independent electrical circuits, correctly marked and controlled by a control panel with safety and protection switches.

Anticipate the increased use of electrical and electronic medical devices with increasing complexity of care when calculating electrical consumption and designing the electrical installation of each care area and ensure a reliable, regulated and safe power supply to operate correctly *(172)*.

GUIDANCE NOTES

In comparison to emergency non-HID operations, infectious disease treatment facilities require heightened electrical capacity and planning due to the specific nature of the services provided and the need for infection control measures. The separation of low risk/high risk circuits is a key component in achieving a safe and efficient power supply system for such facilities.

In acute watery diarrhoea outbreaks, the electricity consumption is not significant, however, due to the high usage of latrines, showers and disposal points, it is necessary to provide proper lighting and access to these facilities, as well as to ensure that the electrical power for drinking water and sewage pumping equipment is sufficient.

In case of self-production of medical oxygen, carefully consider the additional need for power supply.

8.2.2 Communications

To reduce transmission during infectious disease emergencies, health-care facilities need to ensure a safe communication system between staff, patients and visitors, which maximizes patient care and minimizes the movement of personnel between low-risk and high-risk areas.

Patient isolation may have an adverse psychological effect on both patients and family members *(173)* that can be mitigated by providing means of communication between the two.

It is crucial to establish a safe and efficient means of communication between patients and staff to minimize potential exposure time, time needed to don and doff PPE and to complete appropriate disinfection of surfaces and equipment. Efficient means of communication, including the provision of visibility, also facilitate the reduction of personnel movements between high-risk and low-risk areas.

MINIMUM TECHNICAL STANDARDS

Design highly infectious disease treatment facilities in a way that allows for communication and contact between staff, patients, and families and reduces the risk of transmission.

Ensure back-up solutions for the communication system, supervised, and validated by an IPC specialist.

All communications equipment needs to be disinfectable or used in combination with disposable protective covers.

Have clear SOPs in place for disinfection of telecommunications equipment.

All staff working in the facility must be trained and briefed on how to safely communicate, including the use of all communication equipment, especially between high and low risk zones.

Keep telecommunication equipment used within high-risk areas within that zone until demobilization and terminal decontamination.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Use hand-free communication tools within the high-risk zone that do not require close proximity to the head, such as video conferencing equipment, loudspeakers and hands-free intercoms.

GUIDANCE NOTES

Telecommunications equipment, similar to electromedical equipment in patient treatment areas, can be disinfected using similar protocols and detergents. If these detergents cannot be used, use pathogen specific and appropriate disposable disinfection wipes.

Use of waterproof communications equipment may provide better protection for electronic components against the effects of disinfectant liquids. Additionally, protecting the equipment from atmospheric conditions such as humidity, heat and cold can extend the equipment's lifespan.

8.2.3 Food

Food service delivery in infectious disease treatment facilities requires special IPC measures to avoid disease transmission. The complexity of these measures will increase from low risk to high-risk areas.

MINIMUM TECHNICAL STANDARDS

Conceptualize the food service delivery system to minimize the risk of disease transmission.

Clearly designate areas for safe food preparation and serving that are separate from high-risk areas.

Store food in a clean and well-ventilated area with temperature control, separate from the high-risk area.

Clean and sanitize all work surfaces and counters daily and more frequently as needed.

Train all nutrition and food service delivery personnel in IPC how to handle the food safely, including meticulous hand hygiene, the use of PPE and isolation precautions.

All food waste in the high-risk area should be collected and disposed of as infectious waste, following appropriate guidelines and procedures for safe disposal.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Ensure the provision of a work table with buckets for waste segregation and one or more buckets with a context-adapted chlorine solution in the utensil disinfection station between the high-risk area and the low-risk area. This will help to maintain proper hygiene and prevent the risk of disease transmission during food preparation and handling.

8.2.4 Warehouse management

The main objective of warehouse management during an outbreak response is to ensure timely and accurate delivery of critical items such as medical equipment and consumables, including medicine, as well as non-medical supplies. Adequate provision of supplies, including chlorine, residual chlorine testers, cleaning materials, hand-washing stations, waste bins, trolleys, wheelbarrows, body bags, and large quantities of PPE can significantly impact the effectiveness of the intervention. The specific requirements for warehouse management may vary depending on the scenario, with an increased focus on medical supply and PPE stocks in the infectious disease outbreak context.

MINIMUM TECHNICAL STANDARDS

Implement an inventory management system to prevent shortages of supplies such as PPE and critical medications, with a 7-day stock capacity.

Closely monitor critical items such as PPE and medication to ensure staff and patient safety.

Limit stock in high-risk areas to prevent waste and implement proper disposal protocols for items that cannot leave high-risk areas.

Organize warehouse storage in multiple zones based on contamination risk and handle all items in high-risk zones as potentially infectious.

Have SOPs in place for dealing with temperature excursions to ensure that items that may have been exposed to improper temperatures are either discarded or quarantined for further evaluation before use.

Set up a designated area for the isolation of returned, faulty, recalled or otherwise withdrawn goods until a decision is made regarding disposal or re-stocking *(174)*.

Anticipate adequate warehouse capacity is required for large quantities of medicines such as ORP, IV fluids, medical supplies as well as WASH related products.

Anticipate additional storage capacity for safe storage of oxygen.

Anticipate additional storage capacity for safe storage of oxygen.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Ensure a comprehensive monthly inventory and analysis to make sure that stock levels never fall below the defined threshold.

Physically separate storage areas or structures for health-care-related materials from operations support materials, in order to control access and prevent cross-contamination.

GUIDANCE NOTES

When managing inventory in outbreak contexts, consider the use of single-use items versus reusable items.

Anticipate higher consumption of certain items in outbreak contexts, such as thermometers and reusable PPE.

Consider keeping additional buffer supplies of critical items, such as PPE, to support health facilities referring to the outbreak SCT and anticipate increased demand or unexpected shortages.

8.2.5 Pharmacy supply chain and medical stock management

Infectious disease outbreaks put a significant strain on health-care systems and require careful planning and coordination to ensure that essential equipment, medicines and medical supplies are readily available and reach the patients in need. In this context, it is important to understand the specific needs of each type of outbreak and to take the logistics and supply chain requirements of the essential medicines and medical supplies required into account *(175, 176)*.

MINIMUM TECHNICAL STANDARDS

Ensure cold chain management for items that have specific temperature requirements such as vaccines, blood products and some medicines throughout the entire supply chain, as this is crucial to their efficacy and safety.

All staff handling oxygen needs to be trained and understand associated risks.

Anticipate the high logistical capacity to provide intravenous fluids and consider it as part of the logistics supply chain.

If oxygen is needed in the scenario-specific clinical management approach *(177)*, ensure sufficient supplies.

GUIDANCE NOTES

Anticipate that some vaccines and medicines may need ultra-cold chain management.

Samaritan's Purse pharmacy tent, Mozambique, 2019. © WHO/ Mark Nieuwenhof

8.2.6 Donation management

In many contexts, international organizations that have established highly infectious disease treatment facilities will eventually transition the facility to local authorities once the outbreak or pandemic has subsided and cases have decreased.

MINIMUM TECHNICAL STANDARDS

Ensure that all unused consumables that are stored within a high-risk area are treated following strict waste management protocols. Do not, under any circumstances, donate those consumables for use outside the high-risk zone.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Include post-donation support for repair, maintenance, and supply of consumables as part of the comprehensive handover approach when transferring responsibility of a treatment centre to local authorities.

GUIDANCE NOTES

Keep appropriate packaging materials such as pallets, boxes, film, stickers and adhesive tape readily available for preparing donations.

Prepare to repackage items for safe and proper transport and storage during response operations if initial packaging is damaged or disposed of.

8.2.7 Safety and security

The safety and security of those within an outbreak treatment facility, including staff, patients and visitors is a shared responsibility of both the organization and the individuals within it. Working in these settings requires adapting and making additional efforts to ensure the safety and well-being of all involved.

When working in outbreak contexts, it is important to consider both biological and environmental risks as well as potential psychosocial reactions such as fear, stigmatization, and lack of knowledge among staff and the community. To reduce risks in highly infectious disease treatment facilities, it is crucial that IPC and epidemiological experts, as well as social scientists are involved in developing health and safety plans. This will help ensure that all necessary measures are in place to minimize the risk of infections and other hazards and provide a safe and healthy working environment for all.

MINIMUM TECHNICAL STANDARDS

Review and adapt insurance policies, procedures and health and safety plans to the context before initiating an outbreak response.

The security manager must have training and/or experience in outbreak contexts.

Develop and validate outbreak-specific safety and security plans, taking IPC, cultural and social aspects into account.

All staff handling oxygen must be trained in safe use.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Consult multidisciplinary experts, such as epidemiologists, and social scientists, for outbreak-specific safety and security plans.

GUIDANCE NOTES

Consider the time required for putting on and taking off PPE to enter or exit high-risk areas when developing and implementing safety plans.

Place fire extinguishers in safe areas within the high-risk zone and train personnel in their use to reduce potential response time to prevent injuries and the need for evacuation.

Facilitate the follow-up of safety measures by hanging up plasticized and disinfectable posters in all areas of the health-care facility to remind staff and patients of fire extinguisher locations and evacuation routes.

Avoid mixing patients and staff from high and low-risk areas during evacuation, prioritizing the safety of patients and personnel.

8.2.8 Facility structure and design, environment and ventilation

Planning of an infectious disease treatment facility should be done by a multi-disciplinary team with expertise in facility design, clinical case management, IPC, WASH, logistics, and safety and security. Evidence-based structural design considerations for an infectious disease treatment facility aim at facilitating the clinical care for patients while minimizing the risk of HAIs and should be an integral part of any outbreak response to protect caregivers, patients, and family members as well as facilitating optimal and safe patient care.

The division between high and low-risk areas facilitates the adherence to IPC principles and allows the rational use of PPE. Treatment design that enables patient visibility impacts quality of care, increases efficiency and reduces the time needed to put on and take off PPE for activities that can then be performed from the low risk zone, such as monitoring or documenting. Additional factors, such as context-adapted size and environmental control, such as lighting, temperature, pressure, humidity and air quality of the workspace further contribute to IPC, occupational safety and safe and appropriate patient care.

MINIMUM TECHNICAL STANDARDS

Establish and clearly mark one directional staff, patient and visitor, consumable and equipment flow to allow for safe clinical activity, accessibility for people with reduced mobility and reduced movement in shared space.

Mark and control flows between clearly defined areas based on mode of transmission, infection risk (high and low risk areas), type of patient, disease specific patients care pathway, level of clinical care, and established IPC procedures.

Set up designated donning and doffing areas to facilitate infection prevention and control and rationalized use of PPE.

Ensure a safe, patient-centred design and facilitate the provision of essential critical care while allowing visibility and continuous clinical surveillance of patients from the low-risk zone, with physical barriers, such as plastic enclosures.

Set up safe visitor areas for relatives of isolated or admitted patients, taking infection risks into account.

MINIMUM TECHNICAL STANDARDS

Provide child-specific treatment areas with space for accompanying caretaker, or visibility if children must be separated from their caregivers. Parents and children need to be able to see each other.

Ensure privacy for obstetric patients.

Maintain a safe distance between individual patients, based on the transmission route.

Select building material and surfaces that are easily washable, resistant to water, fire, and disinfectants. Depending on outbreak context, use non-permeable materials.

Locate all areas in which ventilation systems, natural, mechanical, or hybrid, *(130)* exhaust air, at a safe distance from shared spaces and adequately mark them to avoid exposure.

All areas in which patients are cared for that require respiratory support, must be equipped with pulse oximeters, functioning oxygen systems and disposable, single-use oxygen-delivering interfaces.

Set up floors and walls, using non-permeable, durable materials that can withstand frequent cleaning and disinfection.

Equip all areas to which confirmed and suspected patients are admitted, with non-permeable, highly resistant, and easily washable/disinfectable floors, washable and resistant walls and proper ventilation and ensure adequate spatial design.

Ensure a rate of six air changes per hour (ACH) in case of natural ventilation and 12 ACH in case mechanical ventilation systems are used (131).

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Bring equipment for measuring and monitoring indoor air quality and ventilation parameters, such as thermometers, hygrometers, CO_2 meters and anemometers.

Provide a minimum hourly averaged ventilation rates of 160 l/s/patient for airborne precaution rooms, 80 l/s/patient in naturally ventilated spaces and 60 l/s/patient for general wards and outpatient departments in naturally ventilated spaces *(131)*.

GUIDANCE NOTES

Tents made of cotton, either the outer layers or the inner layers, require immersion in disinfectant solutions to perform a complete disinfection. This requires time and can be difficult due to the excessive weight of the materials once immersed and absorbing the water.

Avoid all porous materials, such as wood or ceramics for the construction of infectious disease treatment facilities. If this is not possible in the local context, take additional measures to cover the pores, either by using overlying materials, such as plastics and metals, or with varnishes and plastic paints.

When selecting tents, consider the possibility of dismantling and exchanging the tent floors. While non-permeable floors, such as vinyl floors, are highly resistant, they may eventually wear and tear when installed on arid soils. The use of firm mats under the floors, or installation over concrete or asphalt pavements will extend the floor-life.

Consider reorganizing bed spaces and patient flow to allow for different ratios of confirmed to non-confirmed beds depending on outbreak dynamics.

Consider the three basic elements of building ventilation, including ventilation rate, airflow direction and air distribution or airflow pattern *(2)*.

In case of natural ventilation, consider that cross ventilation, as it is more efficient than single-sided ventilation.

Position portable structures such as tents or containers perpendicular to wind direction to maximize wind-induced natural ventilation.

Allow for natural ventilation whenever possible and consider the cost associated with the acquisition, installation, operation, and maintenance of mechanical ventilation systems, as well as the need for qualified maintenance personnel.

Where available, negative pressure rooms are used to isolate patients with contagious, airborne diseases *(90)*.

Occupancy limitations are based on the assessed environmental risk and can be determined by the assessed ventilation rate *(178)*, the physical parameters of the room to enable at least 1 metre physical distancing, and how recently the room and patient environment has been cleaned and disinfected.

Anticipate that the number of isolation and care beds required will depend on context, size of affected population, outbreak dynamics, the size of the facility, the number of patients seen at the facility and the availability of resources.

Community acceptance is an essential component of VHF treatment unit design.

Visitors are critically important for the patient's well-being. Visitor areas should be located in the low-risk zone, ideally outside the treatment facility and close enough to the patient quarters for visitors to be able to talk to patients from a safe distance. In the case of critically ill patients, consider guiding visitors into the facility along a safe, one directional pathway within the low-risk zone. Enable visitors to safely communicate with patients from the low-risk zone through measures such as non-permeable but transparent screens.

The VHF treatment centre design should facilitate continuous observation of confirmed or suspected VHF patients from the low-risk zone, either via simple windows or screens, or through the use of specific operation units, such as CUBEs (Chambre d'Urgence Biosécurisée pour Epidémies) *(26)*. This setup allows constant interaction between patients, health workers and relatives.

Establish a single-entry point for patient presentation with consideration for safety and security.

All VHF treatment centres should have a designated reception area for patient transfers/ ambulances.

SOPs should be in place for safely admitting the patient and decontaminating the vehicle afterwards. This area should be separated from the patient walk-in areas.

8.2.9 Site assessment, selection and planning

Site assessment, selection and planning are crucial parts in identifying a location that is best suited to set up a health post or treatment facility and the decision on design specifics of the infectious disease treatment facility.

MINIMUM TECHNICAL STANDARDS

Conduct site assessments to understand the characteristics of a potential site for the set-up of an infectious disease treatment facility and to determine the safety, feasibility and necessary actions to be taken.

For site selection, ensure a clear understanding of the facility planning and installation needs.

For planning, clearly define areas based on infection risk, provided services, work areas and flows of patients, staff, visitors and materials.

Marburg treatment centre, Equatorial Guinea, 2023. © WHO/ Luca Fontana

8.2.10 Mobilization

When developing a staff and equipment mobilization plan, it is essential to anticipate potential challenges, such as restrictions on transportation, access and mobility within the outbreak-affected area which can significantly impact a team's ability to move to the deployment site. The key is to consider all necessary precautions to minimize the risk of exposure to infectious agents for staff and patients, regardless of the type of outbreak.

MINIMUM TECHNICAL STANDARDS

Develop and secure a transportation plan for personnel and equipment that anticipates any restriction on transportation, access to the outbreak area, and mobility within the affected area.

Provide all personnel involved in SCT assembly tasks with a sufficient initial supply of context adapted IPC and WASH items for their personal safety, including PPE and alcohol-based hand rub.

GUIDANCE NOTES

Country-level entry and exit restrictions may be applied during an infectious disease outbreak. These measures may include mandatory quarantine, proof of vaccination and special visas.

Teams are required to obtain the necessary information regarding travel restrictions before implementing the transportation plan.

8.2.11 Demobilization

Teams require a clear framework for safe and well-coordinated demobilization and decommissioning of their infectious disease treatment facility. Depending on the context, the facilities may be repurposed for other uses. This however needs to be done by following evidence-based approaches to minimize the associated environmental, health, safety and social risks.

MINIMUM TECHNICAL STANDARDS

In case of facility handover, provide a manual with clear guidelines as to how the treatment centre can be safely decontaminated/decommissioned after the outbreak has ended.

Prepare for decommissioning and plan required pre-and post-decontamination actions.

Ensure that decommissioning is carried out by trained and experienced staff and supervised by the designated IPC focal point.

Prevent possible exposure to contaminated structures, equipment, or material by completing a proper decontamination before assessing, dismantling and/or repurposing the facility.

All staff involved in the decontamination and dismantling process must wear context specific and appropriate PPE.

Inform, consult, engage and reassure the surrounding community in regard to the decommissioning process.

Monitor all predefined areas, such as low-risk areas and latrines during the whole decontamination phase.

Clearly demark areas during the operation and identify the disinfected areas.

Validate the proper cleaning and decontamination of the structures (IPC focal point), before initiating the dismantling process.

Designate a well demarcated “clean” zone within the low-risk area to temporarily store disinfected equipment and materials from the low-risk area.

Depending on context, conduct a risk assessment, including soil type, water table and hydraulic gradient for the decommissioning of latrine pits or septic tanks, to ensure the safety of new installations.

MINIMUM TECHNICAL STANDARDS

Comply with international and local regulations when officially transferring responsibility and ownership of the facility's equipment and medicines.

Ensure a comprehensive handover and provide technical training on the management and maintenance of the treatment facility's equipment and structures, both medical and non-medical.

Provide potentially necessary spare parts and consumables to ensure a continued functionality of the treatment facility.

All latrines and soak-away pits (if established specifically for the outbreak) need to be decommissioned, including those used for showers and bathing units. Unless the facility is coupled to an existing health structure that will continue to use the waste zone, all pits need to be filled.

Pits for organic waste need to be backfilled with soil, sharps pits need to be filled with concrete *(152)*.

Implement security measures to prevent theft of contaminated or unsafe materials.

If the infectious disease treatment facility is being handed over to another organization before decommissioning, provide clear protocols for safe dismantling.

GUIDANCE NOTES

Consider the environmental impact of disinfectants and choose ecologically-friendly options when possible.

Consider regular practical exercises for the sequential build-down of temporary facilities to improve safety precautions and reduce deployment and construction time.

Health workers putting on PPE at the Ebola treatment centre, Uganda, 2022. © WHO/ Esther Ruth Mbabazi

9. IPC SCTs

IPC is a practical, evidence-based approach to prevent avoidable health-care associated infections. During outbreaks, the immediate adaptation and implementation of IPC measures in health-care facilities is critical to prevent and contain outbreaks while delivering safe, effective and quality health care *(128)*.

IPC SCTs are multidisciplinary teams of experts including IPC professionals, WASH and logistics experts trained to analyse and optimize the IPC and WASH measures at all levels of care *(23, 179)*. IPC SCTs provide health-care facility-based support with the main objective of ensuring the safety of staff, patients and visitors and prevent further spread of infectious diseases into the community. To efficiently do so, IPC teams must accompany and supervise the implementation of IPC measures at facility level, which need to be considered when planning the deployment period (see table 15).

9.1. Overview of the defined IPC SCT capacities

Table 15. IPC SCT service provision overview

SCT	Key characteristics	Services	Deployment period	Modality of deployment
IPC	Multidisciplinary team providing health-care facility-based IPC support.	Assessment Capacity building and training Information and education Engineering controls Administrative controls	Minimum deployment period of 4 weeks. 2 weeks: assessment, implementation of IPC measures, provision of training. 2 weeks: supervision and monitoring (on site). Recommended: conduct follow-up visits. Provide extended deployments based on need.	Embedded

9.2 Technical standards for IPC SCTs

Depending on the outbreak epidemiology and the location of the supported health-care facility, IPC activities may focus on outbreak control (response) or outbreak prevention (readiness). IPC SCTs need to prioritize their activities and target infrastructures in close coordination with local health-care authorities.

The needs-based provision of essential IPC supplies such as PPE and disinfectant for health-care facilities is highly recommended during the initial phase of the response. This is, however, not a minimum standard given that IPC SCTs may select secondary or tertiary care facilities as targets for interventions, in which case the provision of supplies will likely exceed the capacities of teams.

9.2.1 Assessment

MINIMUM TECHNICAL STANDARDS

Support or conduct rapid IPC and WASH needs assessments of health-care facilities *(180)*.

Report findings to the leadership of the health-care facilities and local authorities, such as the ministry of health and coordinating bodies.

Develop and execute an action plan to address identified needs together with the leadership of the health-care facility and in consultation with the ministry of health and coordinating bodies *(128)*.

Conduct regular follow-up assessments using the same tools to determine the adherence to implemented IPC measures and the effectiveness of the plan or train and support facility-based IPC focal points to do so.

9.2.2 Capacity building and training

MINIMUM TECHNICAL STANDARDS

Identify context specific training needs and gaps.

Provide technical mentorship, capacity building, context adapted participatory IPC and WASH training for all staff (clinical and non-clinical), including standard precautions, transmission-based precautions, training on handling of exposure events, and task- and transmission-based simulation training, such as safe donning and doffing of PPE *(128)*.

Identify and train facility-based IPC focal points (minimum 1 per institution).

Provide or organize ongoing support through IPC professionals (on site and remote).

Define a follow-up mechanism with local IPC focal point and conduct follow-up visits.

Provide training for safe specimen collection, if possible, in collaboration with laboratories.

Support, develop and provide basic training for caretakers, patients, their families and visitors, including safe use of PPE.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Provide regular refresher training for staff to maintain knowledge obtained in the initial training.

Provide support on evaluation of adherence and implementation status *(180)*.

9.2.3 Information and education

MINIMUM TECHNICAL STANDARDS

Set up clear signage and information posters for staff, patients and visitors, including one-directional patient and staff flow and behavioural advice.

Ensure transparent information to the public at the entrance of each health-care facility.

ALIMA Ebola Treatment Centre, Democratic Republic of Congo, 2019. © WHO/ Christopher Black

9.2.4 Engineering controls

Engineering controls include measures that reduce or prevent high-risk exposures or infections of staff such as adaptation of equipment and workspace, implementation of barriers and modification of ventilation *(181)*.

Patient flow and referral

MINIMUM TECHNICAL STANDARDS

Support the implementation of safe screening of all patients and visitors for signs of infection before entering the facility.

Support the immediate isolation of suspect cases.

Advise on safe patient, visitor, staff, supply, and medical equipment flow to minimize the risk of cross-contamination and spread of the infection within the health-care facility.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Support the establishment of safe referral pathways for transfer and care of patients requiring isolation and external medical services.

Provide advice on the safe repurposing of vehicles for patient transport, including the development of decontamination SOPs *(see Annex 3)*.

Isolation capacities

MINIMUM TECHNICAL STANDARDS

Identify an isolation surge strategy.

Provide advice on cohorting options for patients, if applicable.

Support the set-up of temporary isolation capacities, including donning and doffing areas, safe access to handwashing facilities and potable water, and safe waste and excreta management.

Hand hygiene, environmental cleaning and disinfection

MINIMUM TECHNICAL STANDARDS

Install hand hygiene stations at the entry and exit of the health-care facility, every patient care area and other areas such as the donning and doffing area and specimen collection area.

Provide training on the preparation and safe use of different disinfectant solutions.

Ensure adherence to the 5 moments of hand hygiene *(157)*.

Implement the use of context and pathogen adapted items for hand hygiene, surface disinfection and environmental cleaning.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Provide context and pathogen adapted items for hand hygiene, surface disinfection and environmental cleaning for the facility.

Water

MINIMUM TECHNICAL STANDARDS

Provide technical advice on provision of sufficient quantity, quality and accessibility of water.

Provide technical advice on or facilitate water quality testing for water treatment.

Provide technical advice on or facilitate bulk water treatment and safe storing of water.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Provide technical advice on the design and establishment of water supply systems.

Sanitation

MINIMUM TECHNICAL STANDARDS

Advise and support repair or siting and construction of additional latrines and other sanitation facilities, if indicated.

Provide technical advice on safe excreta disposal.

Provide technical advice on safe wastewater management.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Provide additional latrines and other sanitation facilities as needed.

Support faecal sludge management.

Waste

MINIMUM TECHNICAL STANDARDS

Provide advice on safe waste management and treatment, such as incineration, burial, or pick-up, including sharps.

Conduct practical training on safe waste management such as the operation of incinerators.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Provide additional bins and sharps containers according to needs assessment.

Build or repair waste management solutions, such as a fenced area for waste, as needed.

Ventilation

MINIMUM TECHNICAL STANDARDS

Provide advice on adequate ventilation to prevent airborne transmission.

Vector control

MINIMUM TECHNICAL STANDARDS

Provide technical advice on the implementation of non-chemical and chemical vector control methods, and integration with other disease control measures.

Dead body management

MINIMUM TECHNICAL STANDARDS

Provide guidance on dead body management within the health-care facility and for the transfer of dead bodies to burial teams.

Coordinate with with SDB teams.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Provide body bags.

9.2.5 Administrative controls

Administrative controls focus on the adaptation of work practices and standard operating procedures to minimize the risk of high-risk exposures or infection of staff *(181)*.

Facility-based leadership and IPC programme management

MINIMUM TECHNICAL STANDARDS

Develop or adapt and implement guidelines and SOPs to improve the health-care environment to prevent the transmission of HAIs.

Adapt or support the development of SOPs on standard and transmission-based precautions in health-care facilities.

Develop or adapt and implement evidence-based strategies, SOPs and training resources on appropriate cleaning, disinfection and sterilization processes.

Provide technical advice on the establishment and implementation of adequate protocols for the management of high-risk exposures and accidental contamination.

Based on assessed gaps and needs, develop or adapt and implement evidence-based, facility and context specific IPC guidance, SOPs for IPC relevant processes, training resources and monitoring tools in close collaboration with local authorities and leadership of the respective health-care facility.

IPC in clinical practice

MINIMUM TECHNICAL STANDARDS

Assure the implementation of standard precautions together with the facility-based and local IPC team, unit heads and facility staff.

Implement transmission-based precautions according to risk assessment and in relation to the suspected or confirmed microorganism(s) through working with the facility-based and local IPC team, unit heads and other facility staff.

Ensure adequate cleaning, disinfection and sterilization processes together with the facility-based and local IPC team, unit heads and other facility staff.

Develop and implement strategies for the detection, investigation and management of health-care-associated outbreaks.

Provide context-adapted advice on staff rostering and potential split team arrangements to minimize the risk of workplace transmission, cross-contamination, and disruption to patient care *(182)*.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Undertake monitoring and feedback activities to assess compliance with standard and transmission-based precautions.

Microbiology, surveillance and reporting

MINIMUM TECHNICAL STANDARDS

Support the implementation or adapt existing HAI surveillance and reporting systems.

Support or implement contact tracing and identification of contacts within the facility. Provide technical advice on the investigation and management of transmission events within health-care facilities.

Provide technical advice on reporting of suspected or confirmed infections, as well as surveillance and investigation of health worker infections.

Laboratory

MINIMUM TECHNICAL STANDARDS

Provide technical advice on safe sampling including safe use of PPE, sharps and waste management.

Provide technical advice in collaboration with laboratories on the implementation of safe specimen packaging, storage, and transport to laboratories to reduce the risk of infection and cross-contamination.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Facilitate coordination with national and international laboratories including RRML.

PPE and safety

MINIMUM TECHNICAL STANDARDS

Advice on forecasting needs and safe storing of appropriate PPE.

Provide technical advice on options of safely repurposing reusable PPE.

Provide technical advice on safe donning and doffing procedures.

Provide technical advice on decontamination measures for PPE if indicated.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Implement distribution of PPE such as masks for patients and visitors.

Supplies

MINIMUM TECHNICAL STANDARDS

Bring sufficient IPC equipment, including PPE, cleaning supplies, surface disinfectant and alcohol-based hand rub for all IPC SCT team members for the entire deployment period.

RECOMMENDATIONS FOR OPTIMAL PATIENT CARE

Provide a stockpile of adequate PPE for a minimum of 2 weeks for the receiving facility.

Provide further IPC and WASH supplies based on identified critical gaps.

Provide context and pathogen adapted items for hand hygiene, surface disinfection and environmental cleaning for the facility.

Provide materials such as eye wash stations to manage high risk exposure.

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Annex 1. Human resources and training

Staffing

Human resources are the backbone of every comprehensive operation and ensuring adequate quality and quantity of well-trained staff in a timely manner will facilitate an efficient and safe response to infectious disease outbreaks. Depending on context, surge capacities need to be anticipated. When coordinating a comprehensive response, support of the regular health-care system (such as support to local emergency and essential critical care departments, HCF assessment, key structure support of district hospitals with staff/equipment depending on needs) and continuity of care in the affected area needs to be considered.

Countries and regions need to invest in developing essential public health functions that consist of a diverse and multidisciplinary workforce from the health sector and the non-health sector *(183)*. These comprise diverse overlapping fields of public health professionals, such as epidemiologists, health-care professionals and allied occupations, such as water and sanitation specialists, supply chain professionals, and others.

The objective of the following overview is to provide a reasonable approximation of staffing needs while clearly stressing that these are non-exhaustive considerations based on experience, existing literature, multiple consultation rounds with experts within WHO, the EMT network, partners, and members of the technical working group (TWG). This information aims to support national authorities to estimate staffing requirements to safely run a highly infectious disease treatment facility and other specialized care teams (SCT) presented in this document depending on the epidemiological trend and context.

All considerations in this chapter need to be contextualized. Teams need to anticipate a prolonged duration of response and have the flexibility to scale up and down as the outbreak dynamic evolves. The team roster needs to reflect shift patterns and potential mandatory quarantine. Depending on context, split team arrangements, meaning assigning staff to mutually exclusive teams that have no contact between each other, can be considered to minimize the risk of workplace transmission, cross-contamination, and disruption to patient care.

As staffing numbers greatly depend on context and the available health workforce, these suggestions provide guidance on competencies and functions and complement staffing recommendations provided in the Blue Book. Additional functions, such as RCCE focal point, MHPSS, social workers, security personnel and others need to be anticipated.

All teams responding to infectious disease outbreaks need to have an IPC focal point to provide supervision and advice. Every staff member needs to be appropriately trained in IPC standard and transmission-based precautions for their tasks.

In each of the scenarios, staffing considerations need to provide a rough estimation of the expected percentage of severe or critically ill versus non-severe cases and patients with specific needs, such as vulnerable groups. It is helpful to break down the expected mix of inpatients as per disease severity, specific needs of different age groups (young children need continuous observation and their medical procedures take longer) and associated levels of care to adapt staffing needs.

The WHO Workload Indicators of Staffing Need (WISN) provides a systematic way to determine how many health workers of a particular type are required to cope with the workload of a given health facility, and while developed for regular health-care services, may help with staffing decisions to optimize the available human resources *(184)*.

All clinical staffing considerations are minimum requirements for international deployments for teams seeking global classification status.

Training

In addition to standardized EMT training and onboarding, teams deploying to highly infectious disease scenarios need to ensure that all staff are able to safely and competently adapt their practice to the specific clinical, OSL/WASH and IPC needs resulting from the outbreak. When preparing to respond and/or deploy, teams need to conduct "Just In Time Training" to refresh and update their capability and to address particular training needs relevant to the operational context, including disease specific pre-deployment training *(185)*. The format and complexity of training provided should be tailored to the various profiles and their expected/required level of knowledge and understanding, awareness, skilled or expert. Teams are responsible for adequate and task-specific training as well as supervision of locally hired staff.

The dynamics of outbreaks, such as outbreak response strategy, availability of treatment options, antimicrobial resistance or testing regimens, might require further training during deployment.

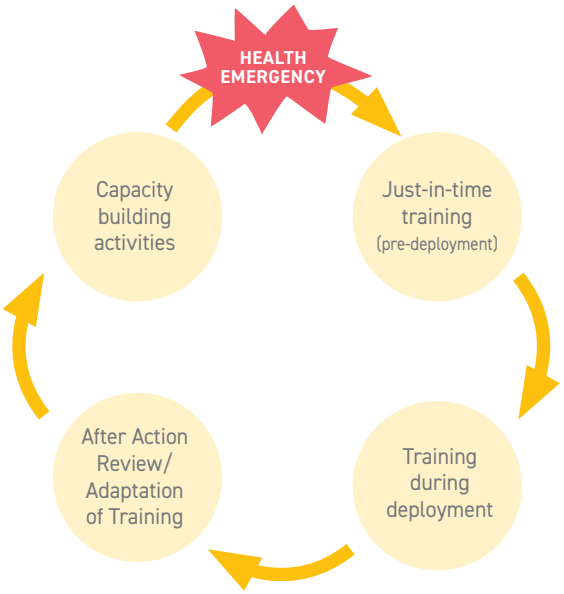
Experiences and lessons learned during deployments should be analysed and used to improve the ongoing or future training and deployments (see figure A1.1.). Ideally, lessons learned will be made available to the EMT community and other stakeholders.

Simulation exercises (SimEx) can help assess and test the functional capabilities of procedures and mechanisms to respond to outbreaks and can facilitate the validation and enhancement of preparedness and response plans. WHO defines different types of exercises, including discussion-based tabletop exercises as well as operations-based exercises such as drills, functional exercises, and field/full scale exercises *(186)*.

Training content

Technical training courses provide context specific clinical skills, such as disease specific clinical care, public health (disease prevention, health systems, management of epidemics) or logistics (shelter, water, and sanitation). Non-technical subjects include ethics, cultural awareness, leadership, communication or understanding of the humanitarian structure.

Fig. A1.1.



Adapted from: Amat Camacho N et al. Education and Training of Emergency Medical Teams: Recommendations for a Global Operational Learning Framework *(187)*.

Given the complexity of an outbreak response, staff training needs to cover multiple topics, including:

- IPC – standard and transmission-based precautions, scenario specific use of PPE;
- behaviour and appropriate public health measures in an outbreak setting within and outside of the facility;
- scenario specific clinical case management;
- context adapted screening and triage;
- staff safety, supply, equipment, and patient flow (low risk, high risk, suspected, confirmed cases);
- self-care (monitoring own health, rights, and duties); and
- epidemiological data collection and reporting following national instructions.

Reference to training above does not necessarily mean separate courses, but rather modules to be embedded within existing training, online e-learning, and/or specialized courses. This is determined by the background and skill/knowledge baseline of the target audience.

Functions applicable to all scenarios

Table A1.1 provides an overview of functions and competencies applicable to all outbreak scenarios. Scenario-specific clinical staffing considerations are listed in tables A1.2 to A1.9. Table A1.10. provides additional considerations for the team configuration of an IPC SCT. Additional auxiliary functions, such as screeners, assistants or cleaners must be considered as well.

Table A1.1. Functions and competencies of staff in outbreak response

Function	Competencies/functions
Leadership/ coordination (no clinical responsibilities)	· Experienced in infectious disease outbreak response, in charge of the overall operation. · Oversees overall operation. · Coordinates with the ministry of health/EMTCC/EOC.
Pharmacy*	· Pharmacy management · Responsible for stock and supply of inpatient facilities and dependent peripheral outpatient posts.
Nutritionist	· Performs nutritional assessments and provides guidance on patient dietary needs.
RCCE	· Experience in social sciences and health promotion and community health. · Knowledge of RCCE principles. · Ability to develop and implement RCCE plans. · Skills in facilitating and maintaining effective partnerships and collaboration with relevant stakeholders, such as national health authorities, affected community members' operational clusters and local organizations. · Experience in working in humanitarian emergencies, preferably with a focus on infectious disease outbreaks or pandemics. · Cultural sensitivity, empathy, and respect for diversity, as well as the ability to adapt to different contexts and audiences. · Communication skills: ability to communicate openly and honestly with the affected populations and other stakeholders to ensure accountability and transparency.

Function	Competencies/functions
MHPSS	▪ Trains staff in basic psychosocial support and identification and referral of people with mental health and psychological problems. ▪ Identifies and manages people with mental, neurological and substance use conditions (including assessment and first-line clinical interventions and understanding drug-drug interactions, such as between medications for managing infectious diseases and psychotropic medication. ▪ Links and refers to people with mental health and psychosocial issues as indicated, including outside the health sector. ▪ Engages in MHPSS coordination mechanisms in emergency settings, as a lead or as a participant in MHPSS TWGs. ▪ Ensures that health facilities are equipped with needed supplies of essential psychotropic medications. ▪ Integrates data on comorbid mental health conditions in clinical forms and health information systems. ▪ Demonstrates familiarity with local context, culture and customs. ▪ Includes MHPSS considerations to mitigate protection risks and reduce psychological distress for infected persons who are hospitalized and family members, such as facilitating communication with family members.
Health promotion	▪ Trained in PFA (psychological first aid), communication with the community. ▪ Identify social needs/support re-integration. ▪ Liaise with CHWs that accompany patients home upon discharge, if applicable. ▪ Organize community communication with patients' community/environment.
WASH*	▪ Experienced in infectious disease outbreak WASH management. ▪ Works in close collaboration with IPC and OSL. ▪ Ensures provision of clean water and adequate sanitation facilities for patients and staff. ▪ Responsible for the set up and maintenance of WASH related equipment and components of the facility, such as the potable water distribution and excreta management systems. ▪ Responsible for medical waste management. ▪ Implements WASH activities in accordance with national guidelines. ▪ Ensures proper handwashing facilities and hygiene promotion activities. ▪ Monitors and reports water quality regularly. ▪ Responsible for excreta management. ▪ Role may be distributed across multiple outpatient locations *(188).*

Function	Competencies/functions
WASH support	▪ Works under supervision of the WASH specialist ▪ Supports all WASH related activities, the set-up, installation and maintenance of WASH related equipment and components of the facility, such as the potable water distribution and excreta management systems. ▪ Monitors and reports water quality regularly.
Hygiene	▪ IPC trained. ▪ Responsible for all environmental cleaning tasks, such as cleaning, decontamination, laundry, waste management and the management of excreta and vomit buckets. ▪ Prepare disinfectant solutions. ▪ If applicable, cleaning, disinfection and decontamination of transport vehicles and ambulances in the facility's vehicle decontamination bay.
IPC	▪ Health care professional with completed certified postgraduate IPC training course, or a nationally or internationally recognized postgraduate course on IPC, or another core discipline including IPC as a core part of the curriculum. ▪ Experienced in scenario-specific IPC management. ▪ Provides supervision and support to the facility-based IPC link person (support may be remote). ▪ Provides IPC advice during the initial set-up phase of the facility and makes regular follow up visits. ▪ Performs risk assessments. ▪ Implements transmission-based precautions according to the suspected or confirmed pathogen. ▪ Develops or adapts evidence-based IPC SOPs. ▪ Develops, organizes, and provides training and education for all staff on standard and context specific transmission-based precautions. ▪ Supports information and education of patients, families, and visitors on IPC measures. ▪ Monitors and assesses adherence to IPC measures.
IPC support*	▪ IPC trained health-care professional working in clinical services. IPC is not their primary role. ▪ Experienced in scenario-specific IPC requirements. ▪ Works under supervision of IPC focal point (support may be remote). ▪ Supports the IPC focal point in the implementation of IPC practices, ensures adherence of all staff members to IPC measures and supports risk assessments, to identify areas for implementation or strengthening of appropriate standard and transmission-based precautions. ▪ Supports mentorship and training of colleagues, monitoring activities and alerting on possible infectious risks.

Function	Competencies/functions
Waste management	▪ Reception and containment of waste from the facility according to clearly defined protocols. ▪ Operation of all required waste management technologies for waste management such as incinerator, vial crusher and ash pits. ▪ Designing a collection schedule for waste management. ▪ Regular visits to high-risk areas for training and supervision of waste segregation according to SOPs.
Logistics*	▪ Experienced in the infectious disease outbreak context. ▪ Experienced in the set-up of infectious disease treatment units and consults with facility design experts. ▪ Responsible for overseeing the delivery and distribution of context specific supplies and equipment. ▪ Coordinates with the storage/warehouse staff to ensure timely delivery of supplies. ▪ Maintains records of supplies and equipment and provides regular reports on the status of supplies and equipment. ▪ Ensures that all deliveries are properly secured and transported according to national guidelines and regulations. ▪ Responsible for reliable functioning of electricity systems. ▪ Ensure adequate supplies and equipment are available for the clinical services provided. ▪ Coordinates with suppliers for timely delivery of essential supplies. ▪ Ensures maintenance and repair of equipment as needed.
Logistics support	▪ Supports the logistics lead. ▪ Oversees stock consumption, focusing on PPE and other materials, through weekly inventory checks and stock card maintenance. ▪ Maintains a comprehensive list of warehouse stock. ▪ Monitors the use of all warehouse supplies. ▪ Generates a detailed weekly inventory report during the deployment phase.
Registration	▪ Assists patients with registration and potential follow-up scheduling
Data management	▪ Experienced in demographic information collection and data management.

Function	Competencies/functions
Fleet management	▪ Responsible for vehicle dispatch. ▪ Coordinates with security counterparts for daily fleet planning. ▪ Oversees vehicle maintenance in coordination with drivers. ▪ Coordinates and communicates the arrival of vehicles with the data manager. ▪ Provides clear instructions to drivers for access to the decontamination and wash stations. ▪ Collaborates with the facility manager on the coordination of hygienists and waste management personnel in support of vehicle cleaning and decontamination.

* This is a role, not necessarily a separate position. Can be simultaneously covered by someone in another position in small operations.

Considerations for scenario specific HID SCT configuration

Considerations for HID SCT configuration in the AWD scenario

Table A1.2. Considerations for HID SCT AWD outpatient team configuration

Outpatient services provide evaluation, early treatment and advice to patients, communities, and local health posts. Every AWD outpatient facility/post needs to have at least two staff members present at all times during opening hours. Ensure staff are trained on treatment protocols and IPC, adequate supplies are available and job aids are in place.

	Team configuration	Competencies/functions
	Daytime service only Anticipate and provide surge capacity depending on context. 50 outpatients/day, 10 ORP places	
	PATIENT CARE	
OUTPATIENT	1 CHW or equivalent/ 25 patients	▪ Experienced in the infectious disease outbreak context ▪ IPC trained ▪ Completed comprehensive context adapted training ▪ Rapid evaluation of all patients on arrival ▪ Evaluation of the degree of dehydration ▪ Decision on treatment plan ▪ Registration of patients/record keeping ▪ Temporary observation ▪ Oral rehydration treatment for mild cases of dehydration ▪ Health promotion/patient education ▪ Distribution of ORS and water treatment products ▪ Provision of basic psychosocial support ▪ Recognizes danger signs and critical conditions that require immediate action ▪ Initiates referral/transfer of cases that need higher levels of care ▪ Documentation and daily reporting (including case numbers) ▪ Patient hygiene ▪ Preparation and distribution of ORS

Table A1.3. Considerations for HID SCT AWD inpatient team configuration

Inpatient facility with outpatient treatment capacities. The inpatient facility must be functional 24 hours a day, 7 days/week. Establish a plan for rotation of staff.

Team configuration	Competencies/functions
INPATIENT	
Outpatient: daytime, 50 outpatients/day, 10 ORP places Inpatient: 24/7, 50 inpatient beds Anticipate and provide surge capacity depending on context.	
MEDICAL	
1 Medical doctor: 50 to 100 beds/daytime/ can be on call at night, depending on context	▪ General medicine with in-depth knowledge of AWD/cholera, especially case-management. ▪ Experienced in the management of critically ill patients. ▪ General knowledge of medical care of the adult and paediatric population as well as pregnant women.
NURSING	
Outpatient: Refer to staffing in Outpatient AWD Inpatient: 1 Nurse: 10–15 patients with IV treatment 1 trained CHW or equivalent: 20 patients with oral treatment	▪ Experienced in AWD case management in the adult and paediatric population as well as in maternal and paediatric medicine. ▪ Rapid evaluation of all patients and the degree of dehydration. ▪ Experience in safe sample collection and packaging. ▪ Experience in nutrition/malnutrition management in an infectious disease context and ability to follow national protocols. ▪ Patient record keeping. ▪ Provision of basic psychosocial support. ▪ Health promotion/patient education. ▪ Experience in pharmacy management. ▪ Supports patient hygiene. ▪ Preparation and distribution of ORS.

Considerations for HID SCT configuration in the SARI scenario

Staff considerations below are largely based on estimates derived from the available COVID-19 data collected prior to the availability of treatment and vaccines and Middle East respiratory syndrome (MERS) data, largely based on experiences in Saudi Arabia, which remains the country most affected by MERS-CoV *(189, 190)*. In the COVID-19 context, 80% of the patients with laboratory-confirmed disease had mild-to-moderate disease, 13.8% developed severe disease and 6.1% developed a critical stage requiring intensive care *(191)*. Among persons with confirmed MERS-CoV, around 34% of confirmed cases were admitted through an intensive care unit. During an average hospital stay of 18 days, 64% developed complications involving liver, lungs, or kidneys, 29% required ventilation and 21% died *(192)*.

Table A1.4. Considerations for HID SCT SARI outpatient team configuration

	Team configuration	Competencies/functions
OUTPATIENT	Daytime service only 50 patients/day Outpatient treatment for cases that do not require inpatient care. Isolation capacities for suspect cases Anticipate surge capacity depending on context.	
	MEDICAL	
	1 Medical doctor: outpatient capacity, available for direct or remote support and consultation	▪ General medicine, experienced in respiratory disease management. ▪ General knowledge of medical care of the adult and paediatric population as well as pregnant women. ▪ At least 3 years' experience in emergency care and in the treatment of critically ill patients as well as experience in infectious disease management.

OUTPATIENT

Team configuration	Competencies/functions
	NURSING
1 Nurse/25 patients	▪ Experienced in general medicine, respiratory disease management including oxygen provision, maternal and paediatric medicine. ▪ Experience in the stabilization and treatment of critically ill patients. ▪ Experience in pharmacy management. ▪ Experience in safe sample collection and packaging if applicable. ▪ Health promotion. ▪ Evaluation and initiation of referral if needed. ▪ Management of isolation capacities for suspected cases.
	ADDITIONAL STAFF
Biomedical technician	▪ Experienced in biomedical equipment management in the context of SARI. ▪ Trained in safety issues concerning oxygen cylinders (transportation, storage, and usage, as well as, if applicable, refilling). ▪ Knowledge on maintenance of equipment. ▪ Keeps inventory. ▪ Recognizes malfunctioning equipment and organizes replacement/ repair.

Table A1.5. Considerations for HID SCT SARI Inpatient team configuration

Team configuration	Competencies/functions
INPATIENT	
Outpatient and Inpatient treatment of cases that do not require invasive mechanical ventilation. Initial treatment of critical cases and referral. Isolation capacities for suspected, non-confirmed cases. Cohorting of confirmed cases if context allows.	
MEDICAL	
Outpatient: 1 Medical doctor: outpatient capacity, available for direct or remote support and consultation **Inpatient:** 1 Medical doctor: 10 patients*	▪ Physician with general knowledge of medical care of the adult and paediatric population and pregnant women. ▪ Experience in respiratory disease management. ▪ At least 3 years' experience of emergency care and in the treatment of critically ill patients and in the management of infectious diseases.
NURSING	
Outpatient: 1 Nurse/25 patients **Inpatient:** 1 Nurse/8 ward beds 1 Nurse/4 non-invasive respiratory support beds	▪ General knowledge of medical care of the adult and paediatric population as well as pregnant women and newborns. ▪ Experience of emergency care and in the treatment of critically ill patients and in the management of infectious diseases. ▪ Experience in respiratory disease management. ▪ Experience in pharmacy management (in case this role is assigned to nursing staff). ▪ Experience in safe sample collection and packaging (in case this role is assigned to nursing staff). ▪ Experience in nutrition/malnutrition management in an infectious disease context and ability to follow case management pillar and nutrition cluster guidance. ▪ Health Promotion ▪ Screening

INPATIENT

Team configuration	Competencies/functions
	ADDITIONAL STAFF
Biomedical technician	▪ Experienced in biomedical equipment management in the context of SARI. ▪ Trained in safety issues concerning oxygen cylinders (transportation, storage, and usage, as well as, if applicable, refilling. ▪ Experience and knowledge on maintenance of equipment in the context of respiratory diseases. ▪ Keeps inventory. ▪ Recognizes malfunctioning equipment and organizes replacement or repair.
Radiology technician	▪ Experienced in examination methods and safety around radiation protection if applicable. ▪ Experienced in the calibration and maintenance of radiology equipment.
Laboratory	▪ Experienced in safely collecting and packaging samples. ▪ Experienced in analysing samples, interpreting, and recording the findings of analyses. ▪ Experienced in using, calibrating, and maintaining laboratory equipment and maintaining a safe working environment.
Rehabilitation staff	▪ Experience in adult care and paediatric respiratory rehabilitation (if possible respiratory physiotherapist(s) or national equivalent), capable of managing severe respiratory distress, especially those requiring non-invasive respiratory support, including for paediatric, elderly, and palliative care patients.

* Recommendation to adapt ratio to context, e.g., Diphtheria treatment → Ensure a high-enough clinician-to-patient ratio to allow for continuous observation during and after DAT administration.

Table A1.6. Considerations for HID SCT SARI Inpatient *PLUS* team configuration

Team configuration	Competencies/functions
INPATIENT *PLUS*	
Outpatient care Inpatient care, including essential critical care. Isolation capacities	
MEDICAL	
Outpatient: 1 Medical doctor: outpatient capacity, available for direct or remote support and consultation **Inpatient:** 2 Medical doctors at all times 1 Medical doctor**: 10 severe/critical cases/patients	▪ General medicine with general knowledge of medical care of the adult and paediatric population and pregnant women. ▪ Experience in respiratory disease management. ▪ At least 3 years' experience of emergency care and in the treatment of critically ill patients, including mechanical ventilation and in the management of infectious diseases.
NURSING	
Outpatient: 1 Nurse/25 patients **Inpatient:** Regular/ward beds/shift: 1 Nurse: 10 beds Intermediate/non-invasive respiratory support beds: 1 Nurse: 4 beds 1 critical care nurse: 2 critical care beds/invasive ventilation	▪ General knowledge of medical care of the adult and paediatric population and pregnant women. ▪ Experience in respiratory disease management. ▪ Trained and experienced in essential critical care. ▪ Experience in pharmacy management (in case this role is assigned to nursing staff). ▪ Experience in safe sample collection and packaging (in case this role is assigned to nursing staff). ▪ Experience in nutrition/malnutrition management in an infectious disease context and ability to follow case management pillar and nutrition cluster guidance. ▪ Health promotion

INPATIENT *PLUS*

Team configuration	Competencies/functions
	ADDITIONAL STAFF
Biomedical technician	▪ Experienced in biomedical equipment management in the context of SARI. ▪ Trained in safety issues concerning oxygen cylinders (transportation, storage, and usage, as well as, if applicable, refilling. ▪ Trained in safety issues concerning oxygen cylinders (transportation, storage, and usage, as well as, if applicable, refilling. ▪ Experience and knowledge on maintenance of equipment in the context of respiratory diseases ▪ Keeps inventory. ▪ Recognizes malfunctioning equipment and organizes replacement/ repair
Rehabilitation	▪ Experience in adult care and paediatric respiratory rehabilitation (If possible respiratory physiotherapist(s) or national equivalent), capable of managing severe respiratory distress especially those requiring non-invasive respiratory support) and ensuring early functional rehabilitation for patients.
Radiology	▪ Experienced in examination methods and safety around radiation protection. ▪ Experienced in the calibration and maintenance of radiology equipment.
Laboratory	▪ Experienced in safely collecting and packaging samples. ▪ Experienced in analysing samples, interpreting, and recording the findings of analyses. ▪ Experienced in using, calibrating, and maintaining lab equipment and maintaining a safe working environment.

** Adapt ratio to context, e.g. diphtheria treatment → patient: physician ratio during antitoxin administration 1:1

Considerations for HID SCT configuration in the VHF disease scenario

Staff considerations below are based on estimates derived from the available data collected during previous VHF outbreaks *(193)*. The available data suggests that approximately 10% of suspected cases will be identified as confirmed with 20 to 30% of these critically ill at any given time and in need of some form of pre-referral management before referral to higher levels of care. Specific considerations need to be made for more vulnerable patient groups, such as under 5-year-olds (13% of the cases) and pregnant women (5%) as they need additional attention (higher nursing and MD ratio) *(194, 195)*. The ratio will adapt during the epidemic evolution, unit configuration needs to be adaptable to the epidemic evolution. The median length of stay (LOS) was 2 to 3 days for non-confirmed cases and 11 days for confirmed cases. 50% bed capacity needs to be calculated for suspect/non-confirmed cases (isolation beds in single room isolation capacity to prevent cross infection/contamination). Bed spaces and patient flow can be reorganized to allow for different ratios of confirmed: non-confirmed beds depending on outbreak dynamics. Surge capacity needs to be anticipated.

Table A1.7. Considerations for HID SCT VHF Outpatient Team configuration

	Team configuration	Competencies/functions
OUTPATIENT (SCREENING)	Screening at the entrance to every HCF in an outbreak-affected area	
	STAFF: capacity needs to be adapted to context and outbreak dynamics	
	Teams of at least 2 screeners at all times 1 screener (CHW)/25 patients Capacity to be adapted to context and outbreak dynamics	Ideally 1 screener with VHF experience ▪ Trained in IPC and health promotion. ▪ Recognizing danger signs and critical conditions that require immediate action ▪ Communication with community ▪ Understanding communication and reporting pathways

Inpatient

Capacity to initiate treatment in more remote areas, urban and rural, while awaiting transfer as well as potentially providing definite treatment if transfer is not possible. Suspect/non-confirmed but critically ill patients need to be referred to higher levels of care (Inpatient B for more advanced care). Pregnant patients always need to be referred to inpatient B (CeMONC capacities), as risk of deterioration when confirmed is very high.

Table A1.8. Considerations for HID SCT VHF Inpatient Team configuration

	Team configuration	Competencies
INPATIENT		MEDICAL
	Minimum: 1 Medical doctor: Inpatient capacity (surge capacity needs to be anticipated for increasing numbers and/or needs of critically ill patients t hat cannot or do not want to be referred to Inpatient ***PLUS***) 1 observer per MD***	▪ General knowledge of medical care of the adult and paediatric population and pregnant women. ▪ At least 3 years' experience in emergency care, the treatment of critically ill patients and infectious disease management. ▪ Experience in VHF-specific case management, including indications for administration of specific therapeutics, management of adverse drug reactions and complications. ▪ Pre-referral management for critically ill patients.

*** Working in a pair system, existing staff teams up to control correct procedures to put on and take off PPE.

INPATIENT

Team configuration	Competencies/functions
	NURSING
Nurse: patient ratio: 1:8 for non-critical patients 1:4 in critically ill patients At least 2 nurses per shift (in 4 to 6 bed facility) 1 observer per nurse***	· Experience in general medical care of the adult and paediatric population and pregnant women. · Experience in emergency care and in the treatment of critically ill patients. · Experience in VHF management. · Pre-referral management for critically ill patients. · Experience in pharmacy management. · Experience in safe sample collection and packaging (in case this role is assigned to nursing staff). · Experience in nutrition/malnutrition management in an infectious disease context and ability to follow national protocols. · Health promotion · Surge capacity needed for small children (need continuous attention).
	ADDITIONAL FUNCTIONS
Biomedical technician	· Experienced in biomedical equipment management in the VHF context. · Trained in safety issues concerning oxygen cylinder transportation, storage, and usage, as well as, if applicable, refilling. · Keeps inventory · Recognizes malfunctioning equipment and organizes replacement/repair.
Laboratory	· Experienced in safely collecting and packaging samples. · Experienced in analysing samples, interpreting, and recording the findings of analyses. · Experienced in using, calibrating, and maintaining laboratory equipment and maintaining a safe working environment.

*** Working in a pair system, existing staff teams up to control correct procedures to put on and take off PPE.

Inpatient *PLUS*

Inpatient treatment for suspected and confirmed cases, ideally linked to a district hospital. Ability to treat patients with suspected and confirmed VHF with critical care illness in need of a more advanced level of care, for example, patients with suspected VHF and specific needs, such as pregnant women with complications, risk of onset of labour or already in labour.

Table A1.9. Considerations for HID SCT VHF Inpatient *PLUS* team configuration

	Team configuration	Competencies/functions
INPATIENT *PLUS*		**MEDICAL**
	1 medical doctor: 10 patients (ratio needs to be adapted to 1:5 in critically ill patients) 1 observer per MD***	· General knowledge of medical care of the adult and paediatric population and pregnant women. · At least 3 years' experience in emergency care and in the treatment of critically ill patients and experience in infectious disease management. · In-depth knowledge of VHF case-management, including specific therapeutics, managing adverse drug reactions and complications.
		NURSING
	Nurse: patient ratio: 1:4 per shift Ratio needs to be adapted to cater to critically ill patients 1 nurse: 2 critically ill patients 1 observer per nurse***	· Experience in VHF management · Experience in general medical care of the adult and paediatric population and pregnant women. · Experience in emergency care and in the treatment of critically ill patients. · Experience in pharmacy management · Experience in safe sample collection and packaging (in case this role is assigned to nursing staff). · Experience in nutrition/malnutrition management in an infectious disease context and ability to follow national protocols. · Health promotion

INPATIENT *PLUS*

Team configuration	Competencies/functions
	ADDITIONAL FUNCTIONS
Biomedical technician	▪ Experienced in biomedical equipment management in the VHF context. ▪ Trained in safety issues concerning oxygen cylinders (transportation, storage, and usage, as well as, if applicable, refilling. ▪ Recognizes malfunctioning equipment and organizes replacement/repair.
Laboratory	▪ Experienced in safely collecting and packaging samples. ▪ Experienced in analysing samples, interpreting, and recording the findings of analyses. ▪ Experienced in using, calibrating, and maintaining laboratory equipment and maintaining a safe working environment.

*** Working in a pair system, existing staff teams up to control correct procedures to put on and take off PPE.

Table A1.10. Considerations for IPC SCT team configuration: facility based

Team configuration	Competencies/functions
IPC SCT	
The number of team members and their roles may vary depending on request, need and scenario. In addition to suggestions below, consider surge capacity depending on context.	
IPC lead	• Health-care professional with specialized IPC training. • Leads and oversees IPC activities. • High level of knowledge covering all areas relevant to IPC, including patient and staff safety and quality improvement. • Performs risk assessment. • Implements and strengthens appropriate standard and transmission-based precautions according to the suspected or confirmed pathogen. • Develops or adapts IPC SOPs. • Develops, organizes, and provides training and education for all staff on standard and context specific transmission-based precautions. • Advises on education of patients, families, and visitors on IPC measures. • Monitors and assesses IPC activities and adherence *(23)*.
IPC support	• Health-care professional with additional IPC training and experience. • Supports IPC lead in the implementation of IPC measures.
WASH	• Leads and oversees WASH activities. • Professional with relevant education and significant work experience in infectious disease contexts.
Logistics	• Supports provision of supplies and modifications of health facilities.
	RECOMMENDATION
Infectious disease expert support	• Medical professional with expertise in infectious disease. • Provides expert clinical advice regarding IPC measures and patient care.
Training and education	• Supports the development and provision of targeted training for health workers and other staff of health-care facilities.

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Annex 2. Additional considerations and examples for public health teams

Disease outbreaks with epidemic potential pose a substantial public health threat and may have a devastating impact on people's lives and well-being. The challenges faced during an infectious disease outbreak are complex and need to be effectively and comprehensively addressed by multidisciplinary sectors to identify and manage gaps and advance coordination. Table A2.1 provides key considerations on additional activities that require further expansion but need to be considered and coordinated during an infectious disease outbreak. They can be combined to form "Public Health Teams".

Table A2.1. Additional considerations and examples for public health teams

Type	Descriptor	Potential activities
VACCINATION CAMPAIGNS	Vaccines, if available, are a critical component of the prevention and control of many infectious disease outbreaks. It is important to monitor the latest developments and recommendations. Mass vaccination campaigns and ring vaccinations, have been conducted successfully in various disease outbreaks, including but not limited to cholera, measles, Ebola and more recently, COVID-19. A primary preventive vaccine strategy was used in some countries during the multi-country outbreak of Mpox in 2022. Teams with appropriate skills and capacity can consider supporting vaccination efforts under the leadership and direction of the ministry of health. Vaccination programmes must be complemented by thorough surveillance and contact tracing efforts, and accompanied by an information campaign and pharmacovigilance, ideally with standardized protocols and data collection tools *(66)*.	· Provide assistance to national authorities in developing and implementing vaccination plans and policies. · Preparation, including microplanning, cold chain preparation, logistics and social mobilization to ensure high vaccine coverage. · Support to set up and run vaccination sites. · Provide logistical support for the transportation and distribution of vaccines. · Coordinate with local health-care providers and facilities to ensure that vaccines are delivered and administered in a timely and effective manner. · Work with public health officials to develop and implement communication strategies to promote vaccination and dispel misinformation about vaccines. · Support community outreach efforts to educate the public about the importance of vaccination and how to access vaccines.

Type	Descriptor	Potential Activities
HOME CARE	In some contexts, and for certain pathogens, to reduce the burden on hospitals and other health facilities, care may be provided to individuals in their own homes. Home care may also be considered for patients who have been discharged from hospital and require follow-up care.	▪ Establish protocols and procedures for providing home-care services, including symptom management, medication management, and psychosocial support. ▪ Coordinate with hospitals and other health-care facilities to ensure that health-care professionals providing home care have access to the necessary supplies and equipment. ▪ Establish bi-directional communication and referral mechanisms to ensure that patients can quickly and easily access additional support and resources as needed. ▪ Regularly monitor and evaluate the effectiveness of home-care services and adjust as needed based on the evolving situation and new information.
ISOLATION AND QUARANTINE	Quarantine and isolation are public health strategies aimed at containing disease outbreaks by stopping a communicable disease's transmission chain and protecting the public by preventing exposure to a contagious disease *(196)*.	▪ Develop guidance and support the implementation of home quarantine programmes for contacts of confirmed cases. ▪ Support primary health-care services in community-based quarantine facilities. ▪ Develop guidance and support implementation of home isolation for people who test positive and do not require facility-level medical interventions. ▪ Support design and set-up of community-based isolation facilities for patients who test positive and do not require higher levels of care. ▪ Provide outbreak specific care for patients in community isolation facilities who do not require advanced care. ▪ Develop and support referral pathways between isolation facilities and health-care facilities. ▪ Provide primary health-care services in isolation facilities.

Type	Descriptor	Potential Activities
SURVEILLANCE AND CONTACT TRACING	Early detection, case investigation, contact tracing, trend monitoring, and information dissemination are crucial to guide appropriate response measures. Continuous systematic identification, collection, analysis and interpretation of disease occurrence and public health event data facilitates timely and appropriate action, such as disseminating the resulting information to the relevant stakeholders, coordination bodies or decision-makers. Surveillance facilitates planning, implementation, monitoring, and evaluation of public health practice and for directing resources to where they are most needed and beneficial.	· Develop and implement a surveillance plan for the infectious disease outbreak. · Coordinate with local, national, and international partners to share information and resources. · Conduct active case finding to identify cases of the disease in the community. · Regularly review and update the surveillance plan based on the evolving situation and new information.
BORDER HEALTH AND POINTS OF ENTRY	Implementation of evidence-informed and risk-based border health measures to mitigate the risk of exportation, importation, and further transmission of infectious diseases, as well as to manage public health events at points of entry.	· Conduct population mobility mapping to identify priority locations and groups in situations of vulnerability and inform the implementation of public health interventions during outbreak response. · Develop and test contingency plans and SOPs at relevant points of entry for the identification and management of suspect cases, and train relevant personnel for their adequate execution. · Apply evidence-informed, risk-based entry and/or exit control measures at relevant points of entry, when necessary. · Identify referral transportation as well as medical, veterinary, and other support facilities for the isolation, quarantine and treatment of suspect travellers or animals identified at points of entry. · Allocate adequate resources and personnel for the disinfection or decontamination of baggage and cargo when needed.

Type	Descriptor	Potential Activities
MASS GATHERINGS	Implementing evidence-informed and risk-based measures within the context of mass gathering events to mitigate the risks of disease exportation, importation and transmission, while also effectively managing public health incidents during mass gatherings.	▪ Strengthen mass gathering host countries' preparedness and response by capacity building through the provision of resources and training of the relevant stakeholders for utilization of the mass gathering-relevant-relevant tools developed by WHO. ▪ Provide training and guidance about the implementation of the EMT's minimum technical standards for mass gatherings, recognizing their crucial role in both medical planning and response. ▪ Provide training and guidance about the implementation of the risk-based approach focused on the evaluation, mitigation, and communication of risk, for an early identification of public health risks to support countries in health planning and delivery of safer mass gatherings. ▪ Utilize evidence-informed mass gatherings RCCE practices, guided by WHO's recommendations and tools, to effectively manage risks and outbreaks associated with mass gatherings. ▪ Conduct country simulation exercises and reviews for mass gathering planning and evaluation, providing hosting countries with the opportunity to test and assess their preparedness and response capabilities. ▪ Facilitate the process of event legacy and evaluation documentation to capture valuable lessons learned and promote the transfer of knowledge for future mass gathering events. ▪ Provide operations support to establish and execute mass gathering event-based surveillance within the framework of the Event Information and Operations System (EIOS).

Type	Descriptor	Potential Activities
HEALTH AND HYGIENE PROMOTION 	Health and hygiene promotion activities aim to educate communities and individuals about the importance of health and hygiene and promote behaviours to cope with and address health challenges *(197)*.	· Increase health literacy through education. · Collaborate with partners and stakeholders such as public health and medical professionals, community health workers, spiritual leaders, community elders, educators, and others to create and disseminate health promotion information and materials. · Support the use of multimedia, social media, and new technologies to engage audiences.
SAFE AND DIGNIFIED BURIALS 	SDB, and related available guidance focuses on management of the bodies of persons who die during VHF outbreaks. Suitably adapted, existing guidance is also relevant to the management of deaths from other infectious diseases where safe procedures for handling and burying the dead are necessary. The need for SDB depends on the specific disease, its transmission routes, and the epidemic dynamics. Only teams with appropriate training, resources and supervision should engage in SDB programming *(198)*.	· Coordinate with partners and agencies to ensure a coordinated and comprehensive response. · Provide training and capacity building to local health care providers and other responders on the safe handling and management of dead bodies. · Provide technical assistance and guidance on the use of PPE and other IPC measures. · Provide transportation and logistical support to facilitate the movement of dead bodies and other materials. · Conduct community outreach and education programmes to raise awareness about the importance of SDB and promote healthy behaviours. · Coordinate with local authorities and communities to identify and establish appropriate burial sites and procedures. · Support the development and implementation of systems for tracking and recording the location and disposition of dead bodies.

Type	Descriptor	Potential Activities
SAFE PATIENT TRANSFER 	Adaptation and support to pre-existing patient transfer systems or creation of surge outbreak-specific patient transfer mechanisms are often required to prevent infection of patients, drivers or accompanying personnel during transfer and transport to, from or between health-care facilities. Implementation of IPC precautions is essential as is a common understanding of SOPs among stakeholders.	▪ Support the potential repurposing of private vehicles for patient transport, including decontamination and disinfection. ▪ Provide training in safe patient transfer including mobilization, rational use of PPE and IPC measures adapted to the pathogen. ▪ Support the development and dissemination of outbreak and context-specific transfer SOPs. ▪ Support or conducting mapping and real-time oversight of available resources and capacity of health facilities. ▪ Support the development of an information management system or transfer log to track all movements and inform contact tracking in case of potential transmission. ▪ Support the development of systems for management of infectious and non-infectious waste resulting from transport. ▪ Support forecasting, procurement and replenishment of consumables required for safe patient transfer and transport.
RISK COMMUNICATION AND COMMUNITY ENGAGEMENT 	Listen and assess the needs and challenges of the community to tailor the response to their needs and create a constant feedback mechanism.	▪ Maintain and build public trust in public health authorities through bidirectional information sharing. ▪ Provide relevant public health information to the public, partners, and stakeholders to allow them to make well-informed decisions, to take appropriate actions to protect their health and safety and to minimize social and economic disruption. ▪ Adapt outbreak response activities to meet the specific needs of the community.

Type	Descriptor	Potential Activities
ENVIRONMENTAL DECONTAMINATION	Prevention of the spread of infectious diseases and protection of individuals in communities. Different approaches for household decontamination, depending on the specific disease and context. If local capacity allows, trained professionals provide decontamination service for households, using specialized equipment and techniques. Provision of decontamination kits and training instructions to households on how to conduct a decontamination process safely and appropriately.	· Develop procedures and protocols for fleet and household decontamination, appropriate to the specific disease and context. · Provide training in safe decontamination, including mobilization, the rational use of PPE, and IPC measures adapted to the specific disease and context. · Facilitate the decontamination of patient transfer vehicles, affected and contaminated households, and health-care facilities. · Establish a network of fleet and household decontamination services. · Consider community-based activities that include awareness-raising about environmental cleaning and the distribution of household cleaning and disinfection kits, rather than outreach activities. · Hold and distribute stocks of cleaning and disinfection supplies to replenish affected and contaminated households.
COMMUNITY WASH INTERVENTIONS	Community WASH interventions strive to increase access to clean water, adequate sanitation facilities, and enable and promote proper hygiene practices.	· Build and maintain water and sanitation infrastructure. · Improve waste management and provide specialized waste management equipment, such as garbage trucks, and waste disposal facilities. · Chlorinate community water sources. · Build simple community latrines. · Provide household treatment technologies. · Build handwashing facilities. · Train on proper hygiene practices. · Ensure WASH standards are met in temporary shelters. · Implement pest control interventions.

Type	Descriptor	Potential Activities
INFECTIOUS WASTE MANAGEMENT 	Implementation of appropriate procedures and systems for handling and disposing infectious waste safely and effectively *(199)*.	▪ Establish a waste management system to optimize resources, improve response times and ensure the coverage of the affected area. ▪ Ensure safe transport of highly hazardous waste from hospitals and laboratories to a safe management site. ▪ Minimize uncontrolled movement of infectious waste and have systems in place to effectively manage large quantities of waste. ▪ Define safe waste management standards and equipment, such as PPE, burners, incinerators, and others. ▪ Support or provide training in safe waste management, including mobilization, rational use of PPE and IPC measures adapted to the disease. ▪ Develop procedures and protocols for the collection, transport, management, and final disposal of waste. ▪ Support repurposing of vehicles for safe transport of infectious waste.
CORE RELIEF AND NON-FOOD ITEM DISTRIBUTION 	Procurement and distribution of core relief items, including context adapted non-food items, such as essential household items and hygiene kits *(200, 201)*.	▪ Procure and distribute core relief items. ▪ Coordinate with local health-care providers and facilities. ▪ Monitor and evaluate distribution efforts.

Type	Descriptor	Potential Activities
RESUPPLY CENTRE/WAREHOUSE 	Ensures access to necessary resources and helps prevent shortages and disruptions in the response efforts.	· Hold and distribute stocks of PPE and other essential supplies, such as oxygen, to health care facilities and other responders. · Provide medical logistics support to ensure that health-care providers and other responders have access to the supplies and equipment they need. · Support the purchase and distribution of PPE and other supplies and ensure that they meet appropriate standards and are of high quality. · Implement systems for tracking and monitoring the movement and distribution of supplies to ensure that they are being used effectively and efficiently. · Coordinate with other organizations and agencies to ensure that the resupplying centre or warehouse is integrated into the overall response efforts. · Provide training and capacity building to local health care providers and other responders on the use and handling of supplies and equipment to ensure that they are used safely and effectively.

196 United States Centers for Disease Control (USCDC); Port Health; Quarantine and isolation; https://www.cdc.gov/quarantine/index.html

197 World Health Organization (2013); Technical notes on WASH in emergencies; Hygiene Promotion in Emergencies; https://cdn.who.int/media/docs/default-source/wash-documents/who-tn-10-hygiene-promotion-in-emergencies.pdf?sfvrsn=978aac2f_4

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Annex 3. Repurposing of vehicles for the transport of patients

Also see chapter 7.2 Safe patient transport

In the event of an infectious disease outbreak, the demand for medical transportation may increase significantly. Depending on context, the pre-existing amount of available ambulances may not be sufficient to manage the surge in patients needing transport to and between health-care facilities. The use of repurposed private vehicles for the transport of patients can provide an efficient solution for emergency medical services in areas with limited resources. By modifying existing vehicles and implementing appropriate IPC measures, repurposed vehicles can effectively contribute to the safe transport of patients and serve as essential mobile medical units during infectious disease outbreaks. With proper planning, training and implementation, repurposed vehicles help ensure that essential medical services are delivered to those in need.

Recommended steps for repurposing private vehicles for patient transport during an infectious disease outbreak

Converting a vehicle for the transport of patients during an infectious disease outbreak requires resources, significant expertise and involves a number of context adapted modifications. These modifications include the installation of context specific medical equipment, such as oxygen tanks and supplies, and changes to the interior of the vehicle to ensure a safe and contained environment for transporting patients. This may include the addition of protective barriers, such as plastic curtains, and easy-to-clean stretchers or seats that can be converted into stretchers. In addition, the exterior of the vehicle may be updated with emergency lighting and other visual indicators to make it easily recognizable as patient transport.

Repurposing private vehicles for patient transport during an infectious disease outbreak

1. Vehicle selection

Consider vehicle size, capacity, adaptability, and reliability to allow for a context adapted modification. To create a safe and efficient environment for both the patient and the accompanying personnel, a number of factors need to be carefully considered and assessed when selecting a vehicle.

Capacity/space

The vehicle needs to meet the necessary space requirements to safely accommodate patients (lying down on a stretcher), accompanying personnel, medical equipment, and supplies, while ensuring the adherence to appropriate IPC measures.

Accessibility

The vehicle should be easily accessible, especially for patients with vulnerabilities, mobility impairments or that are weak or incapacitated. Consider vehicles with large doors or ideally a rear entrance.

Vehicle type

When selecting a suitable vehicle, a number of considerations need to be made. While sedan cars may be more widely available, due to their compact size, they may present most limitations. Vans and buses often prove to be a good option due to their size and accessibility. Depending on context and availability, other types of vehicles, such as trucks or even large sport utility vehicles (SUVs), may also be considered. (See more detailed overview and examples below).

Vehicle condition

Ensure that the selected vehicle is in good working order and consider having it inspected by a mechanic. Any necessary repairs or maintenance should be carried out before the vehicle is repurposed.

2. Vehicle modification and adaptation

Space optimization

Organize the interior layout of the vehicle with the objective of maximizing space for medical equipment, supplies, and patient care, while allowing for easy and safe movement of accompanying personnel.

Adapt the interior by considering context adapted precautions, such as adding protective barriers and easy-to-clean stretchers or seats.

Depending on vehicle type, consider removing or rearranging existing seats, such as the passenger seat and back seats, or other interior features to create room for medical equipment and patient transport.

Consider retractable shelves, collapsible storage units, and modular setups that can be adjusted based on the specific needs of each operation and available space.

Equipment

Install context adapted medical equipment, such as oxygen tanks and concentrators. This may require modifications to the vehicle's electrical systems to ensure reliable powering of specialized medical equipment during transport.

Safely fix medical equipment to the vehicle frame, by using temporary anchor points or by welding strong anchor points to the vehicle for heavy equipment.

Attach stretchers to factory-fitted brackets using heavy-duty straps designed for heavy loads., temporary anchor points, screws, or by welding strong anchor points to the vehicle frame.

Barrier installation

Establish a spatial separation between the patient and the driver compartment, while maintaining visibility, by installing physical barriers, made of clear, durable, impermeable, and easily cleanable materials like thick plastic or acrylic. Depending on context, ensure that the barrier is properly sealed or liquid-tight to reduce the risk of transmission.

Securely fix and extend these barriers from the roof to the floor of the vehicle, leaving no gaps.

Constantly assess and re-evaluate the integrity of the partition, as frequent cleaning and disinfection may compromise the material, potentially reducing its effectiveness in preventing transmission and impair the partition's safety.

Use barriers in combination with the use of appropriate PPE, physical distance whenever possible and routine disinfection of high-contact surfaces.

Remove or cover any sharp edges or potential items that could damage PPE.

Ventilation and temperature control

Consider the option of natural ventilation. If possible, opening windows can establish an effective cross-ventilation and specific airflow patterns can minimize the risk of transmission in diseases, such as respiratory infections *(202, 203)*.

If indicated and available, consider modifications to the vehicle's heating, ventilation and air condition (HVAC) systems, such as installing portable air purifiers with HEPA filters. Depending on available space, the number of air purifiers with HEPA filters needs to be adapted.

Temperature control

Effective temperature control is important for both patient comfort and care, as well as for the effectiveness of certain medical equipment and supplies that may be sensitive to temperature fluctuations.

Modification of the vehicle's exterior signage

Before repurposing private vehicles for patient transport, teams need to ensure approval and licensing by national authorities. Modifications to the exterior of a vehicle need to meet all requirements for identification as patient transport. This can be achieved by adding emergency lighting, sirens, flashing lights, and other visual indicators, such as signage, reflective decals or markings. The signage needs to be large and clear, including a symbol or word that is universally understood and makes the vehicle easily recognizable as an ambulance.

3. IPC

Strictly adhere to context and pathogen specific IPC protocols.

The vehicle should be easy to clean and disinfect. Consider non-porous interior surfaces and using materials and construction methods that can withstand deep, rigorous cleaning regimens in line with relevant IPC requirements. Avoid vehicles with fabric upholstery, as these can be difficult to clean thoroughly.

Consider using draping techniques to cover the interior of the vehicle, such as plastic sheeting or similar impermeable barrier cloth and duct tape, to protect surfaces from exposure to infectious material. When opting for the use of drapes, it is critical to understand and respect its limitations and potential risks and to continuously ensure its integrity. The draping must not impede access to medical equipment and supplies and staff needs to be trained regularly in order to use this approach safely.

Equip vehicles with sufficient IPC supplies, such as appropriate hygiene, surface cleaning and disinfection supplies, waste bags, body bags and sufficient amounts of appropriate personal protective equipment (PPE) to support the expected duration of the transport plus additional time in the event of delays or patient related events.

Spare PPE and hand disinfectant should always be available but must be safely stored to minimize the risk of contamination. Staff needs to be trained to manage unforeseen contamination, such as blood spills or vomit and have all materials available to manage spill events.

Install hand hygiene stations.

Limit the amount of equipment and medical supplies inside the patient care cabin. Only carry the minimum required consumables for a single transfer and restock them after each use, to facilitate the cleaning and disinfection process, to reduce waste, the risk of cross-contamination and damage due to decontamination procedures.

Regularly review updated guidelines for the adaptation of vehicles for patient transport in the infectious disease context *(204)*.

4. Equipment safety, accessibility and maintenance

All equipment must be easily disinfectable, disposable or adequately protected with disposable protective covers for devices, such as mobile phones.

Ensure all equipment, including communication devices, is safely stored and easily accessible.

Securely fix all equipment and attach it to the vehicle frame.

Stretchers or seats that can be converted into stretchers need to be attached to brackets using heavy-duty straps designed for heavy loads.

Test all equipment, including the connections to the vehicle's power sources for full functionality prior to each transport.

Connect equipment such as oxygen concentrators to the vehicle's power source and test them to ensure they are operating correctly and safely before each transport.

Carry only essential medical equipment and supplies in the patient compartment sealed inside clear plastic bags for easy access.

Stow away additional medical equipment in the patient compartment behind disposable barriers, to reduce the risk of unnecessary exposure, but ensuring availability if needed by cutting drapes.

5. Communication and technology

Install communication equipment that can be easily disinfected or decontaminated.

Use disposable protective covers for mobile phones and other devices.

6. Vehicle maintenance

Cleaning and disinfection

Carry leak-proof containers and safely manage excreta and bodily fluids.
Collect health-care waste produced during transport, clearly mark it with a biohazard symbol and dispose of it before the next transfer.

Thoroughly clean and disinfect the vehicle, surfaces, floor, and equipment that has been used with pathogen specific disinfectant and adhere to context and pathogen specific cleaning and decontamination protocols after each transfer.

Mechanical maintenance

Conduct regular mechanical maintenance to ensure the vehicle's reliability.

In the infectious disease context this includes the maintenance of any additional components and structural modifications that have been made to the vehicle.

7. Patient comfort and care

Provide clean drinking water for patients and ORS if indicated.

8. Staff comfort and care

Consider the potential for thermal shock to health-care workers and loss of PPE protection due to prolonged exposure and excessive sweating *(205, 206)*.

9. Staff training

Train medical personnel on the proper use of the vehicle's medical equipment and on protocols for safely transporting patients.

Train non-medical personnel, such as drivers, on the vehicle's basic functions, safety features, and emergency protocols, ensuring they can support the medical team during patient transport.

Develop and implement SOPs and protocols for patient transport, such as how to respond to emergency calls and how to coordinate with other emergency services.

Provide specific instructions for managing the risk of infection, including how to properly use PPE, decontamination procedures, and infection control protocols.

Respiratory diseases

Equip ambulances with a sufficient oxygen supply for transport.

Ensure effective ventilation and, if available, install filtration systems, such as High Efficiency Particulate Air (HEPA) filters *(2)*.

Implement droplet precautions by using appropriate PPE, setting up physical barriers, such as plastic curtains or screens and by maintaining a physical distance of at least 1 meter whenever possible.

For airborne diseases, install an airtight barrier, using materials such as heavy-duty tape, to isolate the driver's area from the patient compartment, ensuring no air exchange between the two spaces.

Viral haemorrhagic fevers

Install a partition that is impermeable to liquids, effectively isolating the driver's cabin from the patient compartment to prevent any potential fluid transfer *(207, 208)*.

Ensure sufficient oxygen supply during transport.

Anchor point securing the stretcher © Norwegian Directorate of Health

Potential challenges and possible solutions

The transfer of infectious patients poses multiple challenges, to which table A3.1 provides potential solutions.

Table A3.1. Potential challenges associated with the transfer of infectious disease patients

Potential challenge	Possible solution
Inadequate vehicle modification	Work with a professional specialized in biohazard containment and vehicle modification, experienced in adapting vehicles for medical and infectious disease transport, ensuring safety protocols are met and the risk of contamination is minimized.
Insufficient training	Provide comprehensive context adapted training for all staff.
Poor maintenance	Set up a regular mechanical maintenance schedule and strictly adhere to cleaning and disinfection protocols after each use.
Resource constraints	Seek partnerships or funding to acquire necessary resources. Liaise and coordinate with local organizations, NGOs, or government agencies that can provide support or share resources to address the constraints.
Regulatory compliance	Comply with all local legal regulations and consult with legal experts.
Community acceptance	Develop a communication strategy and work closely with RCCE counterparts to gain community acceptance.
Draping integrity	Only use plastic sheeting or similar impermeable barrier cloth and duct tape. Overlap all seams by at least 2.5 centimetres *(204)*. All staff needs to undergo regular training and refresher courses to ensure safe execution of draping technique. Constantly re-evaluate the quality and integrity of the drapes, as repeated cleaning and disinfection may damage the material and impair the partition`s safety. Adhere to strict SOPs on the correct application of draping techniques. Anticipate environmental factors such as humidity, temperature fluctuations, and wind, and prepare strategies to mitigate their impact on draping integrity. For instance, using moisture-resistant materials in humid areas or securing drapes more firmly in windy conditions.

Options on how to repurpose private vehicles for patient transport in the context of a highly infectious disease outbreak

1. Sedan cars

Sedans, due to their compact size, may not be the most appropriate option for conversion for infectious disease patient transport.

Space optimization

Remove the back seats to create a flat surface. This space can be used to lay down a patient on a stretcher or for seating.

Barrier installation

Install a clear plastic barrier between the back of the driver's seat and the beginning of the back seat area. Ensure the barrier is securely fastened using heavy-duty straps or brackets and use silicone sealant or rubber gaskets to seal the edges of the plastic sheet, making it airtight.

2. SUVs and minivans

The use of a cabin vehicle like vans or SUVs allows for a higher degree of comfort and space for the patient and accompanying personnel. Due to sufficient space, a cabin vehicle facilitates the separation of a dedicated patient or isolation area, minimizing the risk of exposure.

Space optimization

Remove the back seats and, if possible, the passenger seat. This creates room for medical equipment and patient transport.

Barrier installation

Install a clear plastic partition from ceiling to floor, to create a barrier between patient and accompanying personnel. If the space allows, consider creating a sealed patient compartment using a clear plastic partition or prefabricated isolation compartments.

Repurposing of a pick up truck for patient transport, Democratic Republic of Congo, 2019. © WHO/ Julio Martinez

3. Pickup truck or van conversion

Pickup trucks offer a high degree of flexibility and off-road capabilities, facilitating access to remote or hard to reach locations and navigating challenging terrain. The open bed of a pickup truck can be converted into a patient compartment with a temporary, sealed cover or by attaching modules that create a dedicated space for patients.

Pickup trucks or vans can be converted for patient transport by attaching modules that create a dedicated space for patients and can provide a safe transport option for patients, while providing the option of isolation and protection for patients and accompanying personnel.

The adaptation of pick-up trucks and the installation of modules requires significant resources and expertise, and it is critical to ensure that it does not impede the driving capabilities of the vehicle and it is still able to navigate through challenging terrain. Modules need to be securely attached to the vehicle and connected to its power source, to ensure the safe and reliable operation of the medical equipment during transport.

Space optimization:

- The bed of the pick-up truck can be converted into a patient transport area, by installing a canopy if not already present and ensuring it is sealed properly, using weather-resistant sealing materials like duct tape, silicone sealants or rubber gaskets.

- When installing a module, it should be designed to make the most efficient use of the available space. This may involve removing unnecessary seats or other interior features to create room for medical equipment and patient transport.

Barrier installation:

- Barrier installation facilitates the physical separation between the patient and the accompanying staff, aiming at reducing the risk of exposure and disease transmission.
- In a pick-up, the cabin is separated from the bed. It's essential to maintain visibility to ensure continuous monitoring of the patient.

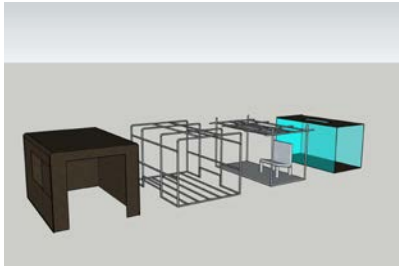
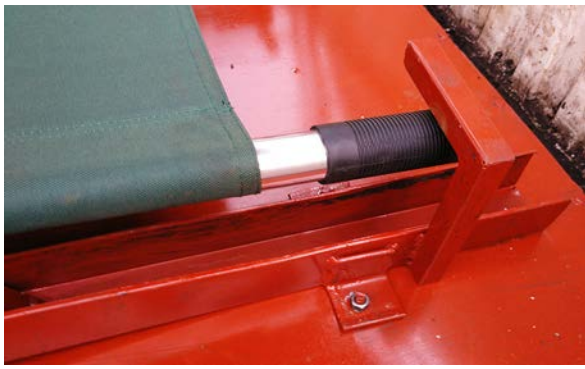


Illustration of repurposing steps © WHO/ Julio Martinez

The concept of prefabricated cabins for pick-up trucks above features a double chamber design with an inner chamber made of plastic and waterproof materials, providing a space that is easily cleaned and disinfected. The outer chamber protects the inner chamber. The stretcher is designed with a hooking system that does not contain any spare or moving parts that could be damaged by the use of chlorine.

Example of a design to secure stretchers inside a vehicle, with strong anchor points, welded to the cabin´s frame, and parallel rails for additional support.

Module to adapt a pick-up truck for patient transport, Democratic Republic of Congo, 2019.
© WHO/ Julio Martinez

Adaption of a pick-up truck for patient transport, Democratic Republic of Congo, 2019.
© WHO/ Julio Martinez

4. Buses and larger vans

These larger vehicles offer the most space and flexibility for conversion.

Space optimization

- Remove rows of seats to create space for multiple patients. The larger space can also accommodate more medical equipment.
- Safely fix medical equipment and attach stretchers to the vehicle frame.

Barrier installation

- Create individual isolation compartments using clear plastic curtains or by using prefabricated units.

5. Adapting an existing ambulance

Adapting an existing ambulance is a viable option for providing medical transport in the context of highly infectious disease outbreaks *(209)*. Ambulances are typically equipped with specialized medical equipment and supplies designed for use in emergency situations, including oxygen tanks, defibrillators, and other life-saving equipment. Ventilation and temperature control, as well as interior lighting, are critical factors to consider, especially in extreme climatic conditions, as they can have a significant impact on the comfort and safety of patients and accompanying personnel.

Space Optimization

In most cases, standard ambulances are already designed to maximize space for medical equipment, supplies, and patient care. However, the context of highly infectious diseases may require additional adaptations or specialized setups that go beyond the norm. This may include adding isolation units or specialized ventilation systems to prevent disease transmission.

Barrier installation

Barrier installation facilitates the physical separation between the patient and the accompanying staff, aiming at reducing the risk of exposure and disease transmission.

Protective barriers such as plastic sheeting and duct tape may be damaged and lose their integrity through repeated cleaning and disinfection and isolation screens may fail to provide adequate protection between the patient and the driver's compartment.

Retrofitting a vehicle with a patient isolation unit

Depending on context, a vehicle may be retrofitted with a modular patient isolation unit, providing another level of barrier protection as an alternative to drapes or other methods of source control. While providing a safe solution for transporting highly infectious patients, it is critical to understand the limitations of patient isolation units. Retrofitting a vehicle with such a unit can be costly and requires specialized equipment and training to operate. SOPs on patient management and cleaning, disinfection and disposal need to be in place. It needs to be anticipated that some patients may not tolerate this option due to the spatial confinement and that patient access is impaired, which may impact patient management.

ALIMA Ebola Treatment Centre,
Democratic Republic of Congo, 2023.
© WHO/ Junior D. Kannah

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Annex 4. Pre-deployment briefing checklist for outbreak response

Table A4.1 presents a sample of questions the organization or team may ask prior to deployment and related actions that may be taken in order to maximize efficiency and ensure appropriate planning and resource allocation.

Table A4.1. Pre-deployment briefing checklist

Category	Questions during pre-deployment briefing	Action prior to deployment	☒
General context	What is the overall situation? (Context, security, population, climate, accessibility etc.)	Ensure the team has access to the latest situational reports from national authorities and other relevant partners.	☐
	What is the local setting of the outbreak (rural/urban, climate, population numbers, language(s) spoken)?	Adapt base camp and team composition accordingly.	☐
	What is the current epidemiological situation?	Forecast consumables and adapt packing list accordingly.	☐
	Are there restrictions on cross-border movement? Quarantine on arrival or other public health measures that may impact movement?	Plan accordingly.	☐
	Are there security concerns? How are they addressed?	Brief team accordingly.	☐
	Are there cultural or social factors that could impact the response?	Brief the team on local customs, beliefs and taboos.	☐
	What was the general health system capacity prior to the outbreak? How has it been impacted?	Consider adapting team composition and packing list accordingly.	☐
Response and coordination	What coordination mechanisms are in place (national and local levels)? Has the health cluster been activated?	Note meeting times and locations, contact information.	☐
	Has an EMTCC been established?	Note location and contact information.	☐
	What is the current and expected response capacity and gaps?	Ensure planned deployment meets needs and avoids duplication.	☐
	What other partners are on the ground?		☐
Clinical case management	What clinical protocols and guidelines are to be used?	Ensure the team has access to all relevant protocols and guidelines for clinical case management.	☐
	Are there specific treatments such as monoclonal antibodies available for this disease? If so, are they available locally?	Ensure appropriate treatments are procured and made available.	☐
	Are there other endemic diseases that the team should be aware of?	Ensure appropriate tests, treatment and PPE are available.	☐

Category	Questions during pre-deployment briefing	Action prior to deployment	☒
IPC	Are there IPC gaps that have been identified?	Ensure the team has a designated IPC focal point.	☐
	What PPE is indicated and what is the availability in-country? Are there identified existing or anticipated PPE shortages or ruptures?	Ensure adequate stock of PPE and adapt packing list accordingly and explore possible supply chain options (for re-supply) through national and international partners.	☐
	If the team is to be embedded or coupled, what is the IPC capacity of the existing facility?	Adapt team and packing list accordingly.	☐
	Are local or national IPC guidelines available?	If applicable, obtain national guidelines/policies and link team with local or national (or WHO) IPC focal points.	☐
Rehabilitation	Are rehabilitation services available in the country and what referral pathways are in place?	Brief team accordingly.	☐
	If applicable, is there a survivor programme in place?	Brief team accordingly.	☐
Safe patient transport	How is patient referral, transfer and transport organized?	Brief team accordingly.	☐
	Is there a functional referral system?	Brief team accordingly.	☐
	Is patient transport available? Ambulance? Other?	Brief team accordingly.	☐
	Are there any current or anticipated challenges (resources, geography, others) with patient transport?		☐
MHPSS	What MHPSS services are available and what referral pathways are in place?	Brief team accordingly.	☐
		Ensure the team has a designated MHPSS focal point.	☐
Laboratory and diagnostic testing	What is the national testing protocol?	Align SOPs and brief team	☐
	What material is needed for specimen collection and/or testing? Are testing materials available locally or should teams bring necessary supplies?	Adapt packing list and SOPs accordingly.	☐
	Are rapid diagnostic tests available for the disease? If so, are they available locally?	Arrange for pre-deployment or local purchase.	☐
	What is the local laboratory capacity?		☐
	Are there existing referral or coordination mechanisms for advanced services?		☐
	If embedded or coupled, what is the host facility's laboratory capacity?	Adapt packing list and SOPs accordingly.	☐
	Has surge laboratory capacity (RRML or others) been deployed?	Map laboratory services and contact information, arrange a pre-deployment call if applicable.	☐
Surveillance and reporting	What is the procedure (who, when, how) for reporting suspected or confirmed cases?	Ensure roles and responsibilities are clear and brief team accordingly.	☐
	What surveillance system is in place?		☐
	Is the EMT MDS being used in this context?		☐
Team welfare, occupational health and safety	Are there any context-specific concerns regarding team welfare, occupational health, and safety?	Ensure the team has a designated staff health focal point and brief accordingly. Ensure team members are appropriately vaccinated and have access to prophylactic medications if applicable.	☐
	Is there a plan for mental health support for team members?	Ensure there is an MHPSS focal point and staff MHPSS policy.	☐
		Ensure existing health insurance policies and coverage including medivac are sufficient in this context.	☐

Category	Questions during pre-deployment briefing	Action prior to deployment	☒
Training and capacity building	Is there a need for training sessions before deployment?	Schedule necessary training for team members	☐
	What local capacity exists that can be built upon?	Identify local resources and plan for capacity-building activities.	☐
RCCE	Has an RCCE coordination mechanism been activated?	Note lead agency and contact information.	☐
	What is the local perception and understanding of the disease and the outbreak? Are there any issues around terminology?	Brief team accordingly	☐
	Are local organizations and communities involved in the response?		☐
	Are translators available to ensure communication with local communities?		☐
	What is the local perception of surge teams on the ground?	Brief team accordingly	☐
	Is information material available in local languages and if not, can they be translated and printed locally?	If not, prepare prior to deployment.	☐
Safe-guarding and pro-tection	What services and referral pathways are in place?	Ensure the team has a designated focal point.	☐
	Are there specific safeguarding or protection concerns that have been noted in this outbreak or previously in this context?	Brief team accordingly.	☐
	Who is the lead national department or agency for coordination of safeguarding and protection issues?	Brief team accordingly.	☐
OSL	Are there any issues related to importing medical supplies or equipment?	Brief team and adapt packing list accordingly.	☐
	Is oxygen available locally (if applicable).	Brief team and adapt packing list accordingly.	☐
	Is warehousing available upon arrival?	Brief team and plan accordingly.	☐
	Is cold chain or ultra-cold chain required?	Brief team and adapt packing list accordingly.	☐
	Are there any OSL gaps identified, including availability of vehicles for hire, Internet connectivity, physical access to response areas, access to water?	Brief team, plan and adapt packing list accordingly.	☐
WASH	What are the local WASH practices and beliefs?	Brief the team on local WASH practices to ensure cultural sensitivity.	☐
	Are there WASH supplies (for example, soap, sanitizers) available locally?	Adapt packing list to include necessary WASH supplies if not available locally.	☐
	Are there any WASH-related restrictions or guidelines from local or national authorities?	Ensure the team is aware of and complies with any guidelines or restrictions.	☐
SDB and manage-ment of the dead	Is SDB indicated in this outbreak? If yes, is there a system in place and who is the lead agency?	Brief team accordingly, provide contact information for field-level coordination.	☐
	If SDB is not required, are there any context-specific burial practices to respect?	Brief team accordingly.	☐

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