



**FRAMEWORK AND TOOLKIT  
FOR INFECTION PREVENTION  
AND CONTROL IN  
OUTBREAK PREPAREDNESS,  
READINESS AND RESPONSE  
AT THE NATIONAL LEVEL**



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Framework and toolkit for infection prevention and control in outbreak preparedness, readiness and response at the national level

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## ABBREVIATIONS

<b>ABHR</b>	alcohol-based hand rub
<b>AMR</b>	antimicrobial resistance
<b>CDNA</b>	Communicable Diseases Network Australia
<b>CDC</b>	United States Centers for Disease Control and Prevention
<b>COVID-19</b>	coronavirus disease
<b>ECDC</b>	European Centre for Disease Prevention and Control
<b>EVD</b>	Ebola virus disease
<b>HCF</b>	health care facility
<b>HCW</b>	health care worker
<b>HH</b>	hand hygiene
<b>ICU</b>	intensive care unit
<b>IHM</b>	infectious hazard management
<b>IMS</b>	incidence management system
<b>IPC</b>	infection prevention and control
<b>IPCAF</b>	infection prevention and control assessment framework
<b>IPCAT</b>	infection prevention and control assessment tool
<b>MDRO</b>	multidrug-resistant organisms
<b>MERS-CoV</b>	Middle East respiratory syndrome coronavirus
<b>MoH</b>	ministry of health
<b>MSF</b>	Médecins Sans Frontières
<b>NGO</b>	non-governmental organization
<b>PAHO</b>	Pan American Health Organization
<b>PPE</b>	personal protective equipment
<b>RCCE</b>	risk communication and community engagement
<b>SARS</b>	severe acute respiratory syndrome
<b>SARS-CoV-2</b>	severe acute respiratory syndrome coronavirus 2
<b>SOPs</b>	standard operating procedures
<b>TOR</b>	terms of reference
<b>UNICEF</b>	United Nations Children's Emergency Fund
<b>VHF</b>	viral haemorrhagic fever
<b>WASH</b>	water, sanitation and hygiene
<b>WHO</b>	World Health Organization

## GLOSSARY

**Framework:** A framework usually denotes a structure, overview, outline, system or plan consisting of various descriptive categories, for example, concepts, constructs or variables, and the relations between them(1).

**Health care facilities:** Health care facilities encompass all formally recognized facilities that provide health care, including primary (health posts and clinics), secondary and tertiary (district or national hospitals); public and private (including faith-run); and temporary structures designed for emergency contexts (e.g. cholera treatment centres). They may be located in urban or rural areas(2).

**Incident management system:** The standardized structure and approach that WHO has adopted to manage its response to public health events and emergencies, and to ensure that the Organization follows best practice in emergency management. WHO has adopted an Incident Management System comprising six critical functions: Leadership, Partner Coordination, Information and Planning, Health Operations and Technical Expertise, Operations Support and Logistics, and Finance and Administration(3).

**Infection prevention and control (IPC) minimum requirements:** IPC standards that should be in place at both national and health facility level to provide minimum protection and safety to patients, health care workers and visitors, based on the WHO core components for IPC programmes. The existence of these requirements constitutes the initial starting point for building additional critical elements of the IPC core components according to a stepwise approach based on assessments of the local situation(4).

**Multimodal strategy:** A multimodal strategy comprises several elements or components (three or more; implemented in an integrated way with the aim of improving an outcome and changing behavior. It includes tools, such as bundles and checklists, developed by multidisciplinary teams that take into account local conditions(4).

**Outbreak:** An outbreak can be described as a group of cases that are linked by both time and place. These disease cases are usually suspected to come from a common source of infection. They can be:

- a greater than expected incidence of infection compared with the usual background rate for the particular facility or ward;
- a single case for certain rare or epidemic-prone diseases; or
- a suspected, anticipated or actual event involving microbial contamination of food or water (e.g. sink drains, water reservoirs)(5).

**Preparedness phase:** The development of public health emergency response plans for relevant hazards; this includes mapping of potential hazards and hazard sites, the identification of available resources, the development of appropriate national stockpiles of resources, and the capacity to support operations at the intermediate and community/primary response levels during a public health emergency. These activities may take 6 months to 2 years in order to be fully prepared for an emerging infectious disease and/or public health threat(4).

**Personal protective equipment:** Equipment used to prevent or minimize exposure to hazards, such as biological hazards, chemical hazards, radiological hazards, electrical hazards, mechanical hazards, etc(6).

**Readiness phase:** The state which links effective preparedness to efficient relief; a statement of the capacity and capability of a relief agency or service. These activities may take up to 6 months in order to ensure readiness for a specific defined threat(4).

**Response phase:** The setting in which emergency actions exceed the usual level of activities, in response to a defined public health threat(4).

**Standard precautions:** A set of activities designed to prevent the transmission of organisms between patients and/or staff for the prevention of infection associated with health care. They must be applied to all patients who require health care, by all health workers in all health settings. They include: hand hygiene; use of personal protective equipment; handling and disposal of waste and sharps; handling and management of clean and used linen; environmental cleaning; and decontamination of equipment(5).

**Subnational:** Any government entity below the national level, regardless of the political, financial and administrative design of the country(7).

**Transmission-based precautions:** Additional measures focused on the particular mode of transmission of the microorganism and always used in addition to standard precautions. They are grouped into categories according to the route of transmission of the infectious agent. Transmission-based precautions should be applied when caring for patients with known infection, patients who are colonized with an infectious organism, and asymptomatic patients who are suspected of or are under investigation for colonization or infection with an infectious microorganism(8).

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## BACKGROUND

Infectious disease epidemics and pandemics pose a major risk to global health, security and socioeconomic stability. From Ebola virus disease (EVD) to influenza, Middle East respiratory syndrome (MERS), and coronavirus disease 2019 (COVID-19), outbreaks are increasing in frequency, scale and impact. Health care facilities can amplify emerging infectious diseases transmission within facilities, communities and across borders; evidence-based infection prevention and control (IPC) measures in health care facilities are critical for preventing and containing outbreaks while still delivering safe, effective and quality health care. Investing in IPC capacity at the national and health care facility level will mitigate health-care-associated transmission risk and contribute to the timely outbreak containment. Strengthening IPC preparedness and readiness will lead to more robust responses, contain outbreaks and prevent health systems from becoming overwhelmed.

The framework and toolkit described here are target the prevention and control of **communicable diseases with community outbreak potential**, which may be amplified in the health care setting; this includes diseases transmitted via contact (blood and bodily fluids), droplets or airborne. The document is not meant to guide IPC management of multidrug-resistant organisms (MDROs) that have limited community transmission.

To mount optimal IPC outbreak management using the strategies and actions in this document, it is preferable that national or subnational IPC programs are in place, supporting dedicated and trained IPC teams at the local and health care facility (HFC) level.

In countries where IPC is limited, it is crucial to start by evaluating the existing IPC capacity to establish the critical areas that are missing or need further development. Continually working towards the implementation of the [core components for IPC programmes](#), beginning with the [IPC minimum requirements](#) will strengthen baseline systems, practices and outbreak response capacity.

**However, if IPC components are lacking or limited, this does not preclude or delay the use of this framework and toolkit; it may be used simultaneously, at any phase of outbreak management, while building and developing critical IPC components.**

## METHODOLOGY

This document was developed through an evidence review and collation of IPC experiences of respective ministries of health (MoH), the United States Centers for Disease Control and Prevention (CDC), the World Health Organization (WHO) and partners in communicable disease outbreaks. The draft was reviewed by a global IPC expert group prior to publication.

To inform the development of the guidance, a peer and grey literature review on IPC outbreak response coordination was undertaken. Articles were reviewed for value and importance related to IPC strategy, operations and technical guidance in epidemic-prone diseases outbreak preparedness and response; of 495 full-text articles reviewed, 98 articles were selected (see Annex 1 for methodology). The review focused on three emergency management phases: **preparedness**, **readiness** and **response**. The results were categorized as initiatives at the international, national or health care facility level, and by themes (mobilizing resources, communication, collaboration and coordination).

The literature review demonstrated a strong body of peer-reviewed and grey literature on broader areas that support IPC, including resource mobilization, communication, collaboration and coordination; however, the links to IPC were not always explicit. Articles focusing on international, national and local efforts tended to be broad and generic without IPC-specific perspectives. The literature on IPC efforts in outbreak readiness in particular was sparse.

The recommendations from the literature review were used to develop a framework and a toolkit to support IPC actions at the three emergency management phases (preparedness, readiness and response).

Additional publications were utilized in the development of the framework, as they became available. Further relevant materials were incorporated in the toolkit/resources section at the recommendation of the expert review group.

## SCOPE AND TARGET AUDIENCE

### OBJECTIVES

To provide national and subnational authorities with:

1. a practical **framework** of actions for strengthening IPC outbreak preparation, readiness and response; and
2. a **toolkit** that provides resources to assist in the development of local contingency or action plans to strengthen IPC outbreak preparedness, readiness and response.

This document is geared towards national and subnational IPC focal points and decision-makers, outbreak response incident managers, outbreak management IPC task force and any existing national IPC committee. Other target audience include safety and quality leads and managers, regulatory bodies and allied organizations, including academia, national IPC professional bodies and non-governmental organizations involved in IPC activity.

While this document focuses on outbreak prevention and management at the national and subnational level, there are operations and links with health care facility level, which will be coordinated by either the national or subnational level. The term “subnational” describes any government entity below the national level, regardless of the political, financial and administrative design of the country; this term is not meant to denote individual health care facilities.

The core principles and practices of IPC are common to any facility where health care is delivered, including not only acute care facilities, but also community facilities, primary care and long-term care facilities. This toolkit is intended to support IPC improvements on outbreak management throughout the health system, both in public services and private sectors. This framework provides a stepwise approach to IPC outbreak management, and the toolkit provides helpful resources; however, it is not designed to be an implementation guide.

## DESCRIPTION OF THE FRAMEWORK AND TOOLKIT, AND INSTRUCTIONS FOR USE

In this context, the **framework** refers to the keys sets of actions that are laid out at every emergency management phase. The framework is designed to support countries with development of activities or actions to prepare and respond to outbreaks. The **toolkit** refers to the resources that are provided at each phase.

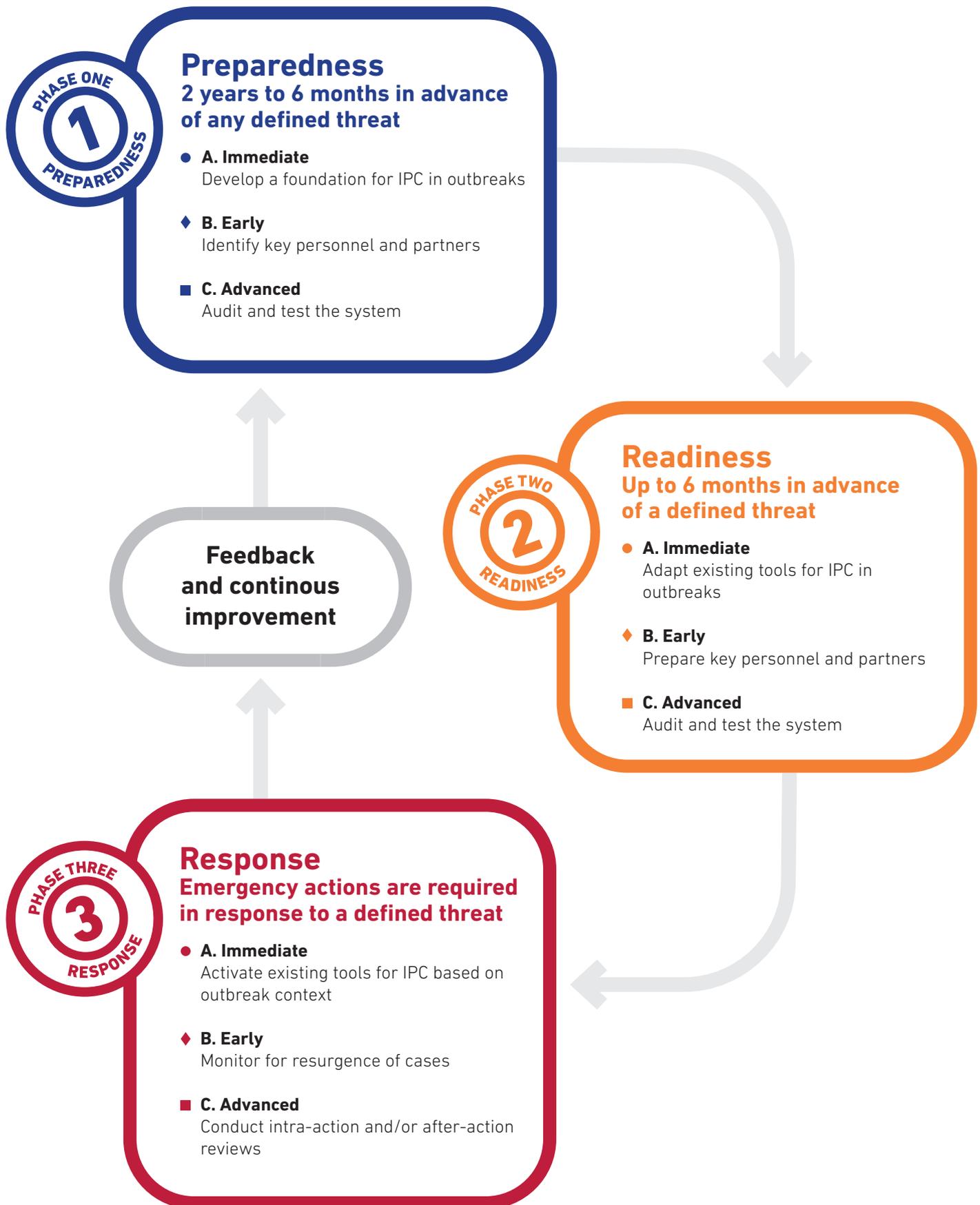
The framework and toolkit address the three critical emergency management phases – Phase 1, preparedness; Phase 2, readiness; and Phase 3, response (Table 1) – to ensure successful control of emerging public health threats.

Table 1. Definitions of the emergency management phases

Emergency management phase	Definition
	<p>The stage that includes the development of public health emergency response plans for relevant hazards: the mapping of potential hazards and hazard sites, the identification of available resources, the development of appropriate national stockpiles of resources, and the capacity to support operations at the intermediate and community and/or primary response levels during a public health emergency. These activities may take 6 months to 2 years in order to be fully prepared for an emerging infectious disease or public health threat.</p>
	<p>The stage that links effective preparedness to efficient response, a statement of the capacity and capability of a relief agency or service. These activities may take up to 6 months in order to ensure readiness for a specific defined threat.</p>
	<p>The stage in which emergency actions exceed the usual level of activities, in response to a defined public health threat.</p>

These phases represent a continuous cycle that includes a feedback element (which will not be elaborated on in this document). While a general framework is proposed, this is flexible and adaptable to the local context (Fig. 1).

Fig. 1. IPC outbreak preparedness, readiness and response framework



The framework also provides priority actions and activities for each phase, described as immediate, early and advanced (Table 2).

**Table 2. Terms used to define priority of actions**

Priority of actions	Definition
● <b>A. Immediate</b> ↓	The first set of actions required in each phase. The focus is on operationalizing key activities, outlining roles and responsibilities, and identifying the necessary resources.
◆ <b>B. Early</b> ↓	The next set of actions required in each phase, subject to local conditions and feasibility. The focus is on identifying key staff and partners.
■ <b>C. Advanced</b>	The final set of actions to be initiated, once immediate and early actions are underway. The focus is on audit and testing of the system.

## CONSIDERATIONS WHEN USING THIS FRAMEWORK AND TOOLKIT

The framework and toolkit should be used at the appropriate emergency management phase, reflecting the reality on the ground. For example, a country should not start in the “**preparedness**” phase if there is a pending public health threat (e.g. outbreak already declared in neighbouring country); in this case, the country starts in the “**readiness**” phase, while simultaneously strengthening underdeveloped critical areas of IPC. If a country is already experiencing an outbreak, the country should initiate the “**response**” phase, while simultaneously establishing any lacking minimum IPC requirements.

1. The framework is generalizable to outbreaks and pandemics, regardless of pathogen or route of transmission.
2. The preparedness section of the framework covers planning for infectious disease threats with various modes of transmission. Focused planning for specific threats should be undertaken in the readiness and response sections of the framework.
3. Different types of resources (e.g. guidelines, implementation manuals, monitoring tools and checklists) are made available as instruments in the toolkit with a focus on IPC.
4. The framework and toolkit are intended to serve as a set of resources that can be adapted to inform actions in the local context, rather than an implementation guidance.

## FUTURE CONSIDERATIONS

The global COVID-19 pandemic has resulted in a proliferation of literature on IPC in the context of a pandemic. In this rapidly changing landscape, the body of literature will continue to expand. The development of this framework contributes to the knowledge in this area and provides a needed resource for the strengthening of IPC, especially in low-and middle-income countries. ***The toolkit compiles resources that may need adaption and updates based on the public health threat or outbreak.***



# **PHASE 1 FRAMEWORK: OUTBREAK PREPAREDNESS**





# PHASE 1 FRAMEWORK: OUTBREAK PREPAREDNESS

**Preparedness is the stage that includes the development of public health emergency response plans for relevant hazards: the mapping of potential hazards and hazard sites, the identification of available resources, the development of appropriate national stockpiles of resources, and the capacity to support operations at the intermediate and community and/or primary response levels during a public health emergency. These activities may take 6 months to 2 years to be fully prepared for an emerging infectious disease and/or public health threat. These activities ensure that baseline infection, prevention and control (IPC) activities are adequate in the event of future communicable disease threats.**

When using this framework and toolkit in Phase 1, it is important to first determine whether the [minimum requirements for infection prevention and control \(IPC\)](#) exist at national and health care facility level. If these are in place, then the user should proceed to utilize the various resources supplied.

When these are not in place, prioritize IPC areas at national level which need strengthening to ensure the best public health response.

**If IPC components are lacking or limited, this does not preclude or delay the use of this Phase 1 Outbreak Preparedness Framework and Toolkit, which should be used while simultaneously developing critical areas of IPC.**

Achieving the IPC minimum requirements as well as more robust and comprehensive IPC programmes according to the World Health Organization (WHO) core components across the whole health system in all countries is essential to sustain outbreak response efforts. The IPC core components help plan, organize and implement an IPC programme, and should be implemented at both national and health care facility level in line with the priorities of the IPC programme and the resources available.

Users should consult the Instructions for the National Infection Prevention and Control Assessment Tool 2 (IPCAT2) the preparedness phase to determine whether normative IPC measures are in place at national level. National or subnational levels should also coordinate and promote the use of the Infection Prevention and Control Assessment Framework at the Facility Level (IPCAF) at health care facility (HCF) level. The goal of this activity is to assess the current IPC situation in HCFs and identify strengths and gaps that can inform future plans. A baseline IPC assessment in HCFs should also utilize tools for hand hygiene (HH) and water, sanitation and hygiene (WASH) assessment to identify key issues requiring attention and improvement. The results can be used to develop an action plan and serve as an indicator of the IPC measures in place



at a facility. A minimum understanding of the principles of infectious disease transmission should be reinforced at the health care facility level.

The resources listed in the paragraph above are the key resources, which the user should become familiar with, and are listed in [Toolkit for all phases: Resources](#) under [IPC Programme Fundamentals](#).

**Before using this document, please see the “Background” and “Description of the framework and toolkit, and instructions for use” sections.**



## PHASE 1 FRAMEWORK. OUTBREAK PREPAREDNESS

2 YEARS TO 6 MONTHS IN ADVANCE  
OF ANY POTENTIAL OUTBREAK

### IMMEDIATE ACTIONS (1A) DEVELOP AN IPC FOUNDATION

#### 1. Evaluate IPC capacity

Identify IPC areas needing strengthening at the national level.

#### OBJECTIVES

- Evaluate whether the minimum requirements or standards for IPC have been established at the national level and, if this has not been done, the national level should undertake this task.
  - Ensure that the HCF level minimum requirements have been communicated and surveyed at the HCF level.
- Identify areas in the IPC minimum requirements that need strengthening at all levels to ensure the best response to public health emergencies.
  - Ensure the programme objectives, functions and activities are clearly outlined.
- Develop outbreak management as a component of a national IPC programme.
  - Ensure that outbreak management is a clearly defined goal and objective.
  - Ensure that a dedicated IPC budget is available with provision for outbreak functions (additional staffing, site visits, etc.).
  - Ensure the outbreak management component of the IPC programme is linked to other relevant programme.

#### RESOURCES

- Minimum requirements for infection prevention and control programmes. Geneva: World Health Organization; 2019 (<https://apps.who.int/iris/handle/10665/330080>).
- Core components for infection prevention and control programmes: assessment tools for IPC programmes. Geneva: World Health Organization; 2011 (<https://apps.who.int/iris/handle/10665/70766>).
- Instructions for the national infection prevention and control



assessment tool 2 (IPCAT2). Geneva: World Health Organization; 2017 (<https://apps.who.int/iris/handle/10665/330078>).

- Infection prevention and control assessment framework at the facility level (IPCAF). Geneva: World Health Organization; 2018 (<https://apps.who.int/iris/handle/10665/330072>).
- For additional resources see [Toolkit for all phases: Resources \(IPC fundamentals and National frameworks\)](#).

## 2. National preparedness plan

Develop or reinforce the IPC components of a national or subnational outbreak preparedness plan.

### OBJECTIVES

- Evaluate the IPC components of any national or subnational preparedness plans. Where no plans or gaps exist, define areas to be developed, including the following.
  - Develop an overall plan including IPC goals and objectives in outbreaks.
  - Develop standard operating procedures (SOPs) or workplans for the following:
    - rapid identification and isolation of suspected cases among patients and workers;
    - safe processes for sample collection, transport and lab analysis;
    - rapid contact tracing in the health care setting, identification and management of health care contacts; and
    - assess requirements for personal protective equipment (PPE) and supplies (including cleaning supplies and equipment, alcohol-based hand rub (ABHR), soap, etc), and develop contingency plans in case of supply shortages.
  - Coordinate IPC national command structures with other ministries or stakeholders, minimizing duplication of efforts.
  - Develop drills, simulations or table-top exercises to test a national IPC outbreak plan.
  - Develop plans for personal protective equipment (PPE) stockpiles and anticipate PPE burn rates.
  - Create budget items for IPC consumables in coordination with finance managers.



## RESOURCES

- Minimum requirements for infection prevention and control programmes. Geneva: World Health Organization; 2019 (<https://apps.who.int/iris/handle/10665/330080>).

See [Toolkit for all phases: Resources](#) (sections on [PPE](#) and [Financing](#)) for additional resources.



### 3. National IPC guidelines

Develop and incorporate IPC outbreak management within national IPC guidelines.

#### OBJECTIVES

- Evaluate any existing national IPC guidelines or applicable guidelines from other ministries or organizations, including non-governmental organizations (NGOs). Consider gaps in any of the following areas and define areas to be developed, including the following.
  - Develop or adapt guidelines from available materials on IPC outbreak management.
    - Ensure that evidence-based, ministry-approved IPC guidelines adapted to the local context are available as well as SOPs on standard and transmission-based precautions.
  - Develop necessary protocols to ensure resources (e.g. funds, infrastructure, supplies) are in place or being addressed to enable IPC outbreak activities.
  - Develop a system to monitor adherence with guideline recommendations.

#### RESOURCES

- Minimum requirements for infection prevention and control programmes. Geneva: World Health Organization; 2019 (<https://apps.who.int/iris/handle/10665/330080>).

See [Toolkit for all phases: Resources](#) (sections on [Transmission-based precautions](#)) for additional resources.

### 4. National IPC training programme

Develop or strengthen an outbreak training programme to be incorporated into the national or subnational IPC training programme.

#### OBJECTIVES

- Evaluate any existing national IPC training programme as well as those run by other organizations, including NGOs. Consider gaps in any of the following areas and define areas to be developed,



including the following.

- Define a target audience, learning objectives, competencies, and teaching strategy.
  - Consider how to collaborate with public health institutes, departments of epidemiology and disease control.
- Ensure that IPC professionals with training skills and IPC core competencies are available to play the role of master trainers for national and local IPC training of health care workers (HCWs).
- Train a rapid response team in preparation for future outbreak response.
- Develop IPC curricula including outbreak management.
  - Consider overarching principles, as well as specific training for standard and transmission-based precautions.
- Develop employee orientation and in-service continuous training on IPC.
  - Ensure all HCWs meet basic competencies in IPC practices through in-service training (minimum requirement), including (but not limited to) hand hygiene (HH) and donning and doffing of PPE.
  - Ensure regular PPE fit checks and testing.
- Utilize the following if appropriate for the setting:
  - master trainers;
  - interactive and hands-on training techniques; and
  - multimodal teaching formats.

## RESOURCES

- Core competencies for infection prevention and control professionals. Geneva: World Health Organization, 2020 (<https://apps.who.int/iris/handle/10665/335821>).

See [Toolkit for all phases: Resources](#) (section on [IPC training and assessment](#)) for additional resources.



## 5. National surveillance and reporting programme

Coordinate with national and subnational surveillance networks that include syndromic and microbiologic surveillance for diseases with outbreak potential.

Surveillance and reporting of infections, **especially among hospitalized patients and HCWs**, should be considered an important support function used to guide appropriate IPC activities. National surveillance programmes are crucial for the early detection of some outbreaks in which cases are described by the identification of the pathogen concerned.

### OBJECTIVES

- Evaluate existing national and subnational IPC surveillance and reporting systems. Consider gaps in any of the following areas and define areas to be developed, including the following.
  - Procure support and engagement by governments and IPC authorities.
  - Ensure human and financial resources, including the establishment of a multidisciplinary technical dedicated to surveillance for diseases with outbreak/pandemic potential and to IPC indicator monitoring.
  - Develop adequate microbiology and laboratory capacity.
  - Develop a surveillance strategy with:
    - clear objectives and methods;
    - standardized case definitions for diseases with outbreak/pandemic potential; and
    - process for data analysis, reporting and evaluation of data quality.
  - Ensure adequate surge capacity for surveillance and reporting in the event of a large-scale event.

### RESOURCES

- Overview of VPD surveillance principles. Geneva: World Health Organization ([https://www.who.int/immunization/monitoring\\_surveillance/burden/vpd/WHO\\_SurveillanceVaccinePreventable\\_01\\_Overview\\_R2.pdf?ua=1](https://www.who.int/immunization/monitoring_surveillance/burden/vpd/WHO_SurveillanceVaccinePreventable_01_Overview_R2.pdf?ua=1)).
- WHO, Communicable disease surveillance and response systems:



Guide to monitoring and evaluating. Geneva: World Health Organization ([https://www.who.int/csr/resources/publications/surveillance/WHO\\_CDS\\_EPR\\_LYO\\_2006\\_2.pdf](https://www.who.int/csr/resources/publications/surveillance/WHO_CDS_EPR_LYO_2006_2.pdf)).

See [Toolkit for all phases: Resources](#) (section on [Surveillance](#)) for additional resources.



## 6. National or subnational IPC communication strategy

Develop an outbreak communication strategy as it relates to IPC and integrate with the broader outbreak communication strategy. Work in collaboration with risk communication and community engagement (RCCE) partners.

### OBJECTIVES

- Evaluate the existing national or subnational IPC communication strategy, including NGO support where applicable. Consider gaps in any of the following areas and define areas to be developed, including the following.
  - Develop communication strategy to disseminate IPC information to various groups (HCFs, HCWs, community and public, social media).
  - Identify designated spokesperson(s). Develop and verify standard communication materials.
  - Identify scalable messaging channels that can be easily activated in the outbreak situation.

### RESOURCES

- Risk communications. Geneva: World Health Organization (<https://www.who.int/emergencies/risk-communications>).
- Outbreak communication planning guide. Geneva: World Health Organization; 2008 (<https://apps.who.int/iris/handle/10665/44014>).

See [Toolkit for all phases: Resources](#) (section on [Communication](#)) for additional resources.



## 7. Surge capacity plans for IPC resources

Develop management plans for surge capacity and ways to monitor IPC supplies in collaboration with operations and logistics partners.

### OBJECTIVES

- Evaluate any existing national surge capacity plans. Consider gaps in any of the following areas and define areas to be developed, including consideration of human resources, finance and logistical issues.
  - Conduct inventory mapping of existing capacities: number of hospital beds, intensive care unit (ICU) beds and equipment.
  - Estimate and plan for increased IPC personnel requirements during an outbreak situation.
    - Ensure that HCFs have inventory of available staff, level of IPC training and contact numbers.
  - Estimate and plan for adequate PPE for surge capacity.
  - Estimate and plan for adequate IPC plans for handling larger numbers of deaths.
  - Develop a national system to monitor real-time health care capacities and IPC resources.

### RESOURCES

- Rational use of personal protective equipment (PPE) for coronavirus disease (COVID-19): interim guidance. Geneva: World Health Organization; 2020 (<https://apps.who.int/iris/handle/10665/331498>).
- Guide to local production: WHO-recommended handrub formulations. Geneva: World Health Organization; 2010 (<https://apps.who.int/iris/handle/10665/332005>).
- COVID-19 essential supplies forecasting tool (COVID-ESFT). Geneva: World Health Organization; 2021 (<https://apps.who.int/iris/handle/10665/340747>).
- Personal protective equipment (PPE) burn rate calculator. Atlanta: Centers for Disease Control and Prevention; 2021 (<https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/burn-calculator.html>).

See [Toolkit for all phases: Resources](#) (sections on [PPE](#) and [Surge capacity](#)) for additional resources.



## EARLY ACTIONS (1B) IDENTIFY KEY ROLES AND PARTNERSHIPS

### 1. IPC outbreak taskforce

Establish an IPC outbreak taskforce or working group to develop, revise, adapt and disseminate policies, guidelines, training and other IPC outbreak-related activities across all levels of the health care system (e.g. national, sub-national and facility). Ensure that roles are well defined, minimizing duplication of efforts.

### OBJECTIVES

- Evaluate the existence of an IPC outbreak taskforce (or working group) as part of a potential incident management system. Consider gaps in any of the following areas and define areas to be developed, including the following.
  - Establish terms of reference (TORs) for IPC outbreak taskforce and roles and responsibilities of members.
  - Include members from multiple sectors (e.g. government, NGOs, private sector, academia, IPC professional associations, HCFs).
  - Create an IPC structure to cascade and disseminate information from the national level to the facility level.
  - Identify roles and responsibilities of national and international partners and ensure that a coordination structure exists to ensure clear line of command and avoid duplication of efforts.
  - The task force should be familiar with the national outbreak preparedness plan and contribute as required.

### RESOURCES

- COVID-19 strategic preparedness and response plan: Operational planning guidelines to support country preparedness. Geneva: World Health Organization; May 2020 (<https://www.who.int/publications/i/item/draft-operational-planning-guidance-for-un-country-teams>).

See [Toolkit for all phases: Resources](#) (section on [Incident management system](#)) for additional resources.



## 2. IPC partner mapping and networking

Develop a network of national or subnational partners for IPC outbreak response coordination.

### OBJECTIVES

- Evaluate the existent status of IPC partner mapping and national and international coordination, considering the following.
  - Identify partners who have a known track record and an established history of offering assistance or resources in outbreak situations.
  - Identify neighbouring countries and organizations with whom outbreak response could be aligned in the future.
  - Establish lines of communication and establish potential roles and relationships in an outbreak setting.
  - Establish regular forums for discussion such as IPC partner coordination meetings.
    - IPC stakeholders who are working in IPC implementation, but not necessarily working on outbreak preparedness should be involved.
    - Partner mapping should be conducted regularly, and lists or directories should be regularly updated.
- Establish networks of IPC stakeholders reaching the HCF level, for example, IPC leaders at the health care facility level, hospital administrators and key decision-makers for outbreak preparedness.

### RESOURCES

- Health systems for health security. Geneva: World Health Organization; 2021 (<https://extranet.who.int/sph/health-systems-for-health-security>).



## ADVANCED ACTIONS (1C) AUDIT AND TEST THE SYSTEM

### 1. Assess IPC outbreak preparedness

Evaluate the status of IPC outbreak readiness after immediate and early actions have been initiated. Define areas to be adapted or modified based on specific threats of concern.

#### OBJECTIVES

- Evaluate the status of IPC practices. Utilize standardized tools to identify gaps in any of the following areas, and define areas to be adapted or modified based on any threats of concern, including consideration of the following.
  - Ensure that IPC protocols with standardized procedures are available and functional, which should include a mechanism for periodic monitoring.
  - Utilize a strategy to evaluate and revise guidelines, plans and IPC activities according to audit findings, as needed.
  - Identify gaps and deficiencies in the performance in particular areas.
    - Review the surge capacity for management of diseases with pandemic potential.
    - Undertake simulation exercise (e.g. tabletop exercises) to test the system, and develop or improve backup plans or diversion systems.

#### RESOURCES

- Instructions for the national infection prevention and control assessment tool 2 (IPCAT2). Geneva: World Health Organization; 2017 (<https://apps.who.int/iris/handle/10665/330078>).
- Infection prevention and control assessment framework at the facility level (IPCAF). Geneva: World Health Organization; 2018 (<https://apps.who.int/iris/handle/10665/330072>).

See [Toolkit for all phases: Resources](#) (section on [Assessment tools](#)) for additional resources.



# PHASE 2 FRAMEWORK: OUTBREAK READINESS





## PHASE 2 FRAMEWORK: OUTBREAK READINESS

**Readiness refers to the stage that links effective preparedness to efficient response, and is a statement of the capacity and capability of a relief agency or service. These activities may take up to 6 months to ensure readiness for a specific defined threat. These activities are designed to mitigate the impact of a specific outbreak on the health system, and reduce morbidity and mortality, as details on a communicable disease threat are emerging. By flattening the epidemic curve and avoiding a sharp peak of cases, the impact on the population and on health care system capacity can be better controlled.**

Readers may start utilizing the framework and toolkit in Phase 2 (Readiness) if an impending infectious disease threat with the potential to cause a community outbreak has been identified. Completing Phase 1 is not a prerequisite to starting Phase 2.

If using this framework and toolkit starting in Phase 2, it is important to determine whether the [minimum requirements for infection prevention and control \(IPC\)](#) exist at the national and health care facility level. If minimum requirements are not in place, prioritize the areas that need strengthening to ensure the best response to public health emergencies.

**If IPC components are lacking or limited, this does not preclude or delay the use of this Phase 2 Outbreak Readiness Framework and Toolkit, which may be used while simultaneously building and developing critical areas of IPC.**

If feasible, and time constraints are not a limiting factor, users may consult the Instructions for the National Infection Prevention and Control Assessment Tool 2 (IPCAT2) in the readiness phase to determine whether the recommended IPC core components are in place. This may be used in conjunction with the Infection Prevention and Control Assessment Framework at the Facility Level (IPCAF) tool at the acute health care facility level. The WHO Rapid Readiness checklist tool can help to identify gaps and major IPC areas that require investment and action for the development of hospital readiness improvement plans.

The resources listed in the paragraph above are the key resources that the user should become familiar with, and are included in [Toolkit for all phases: Resources](#) under [Assessment Tools](#).

**Before using this document, please see the “Background” and “Description of the framework and toolkit, and instructions for use” sections.**



## PHASE 2 FRAMEWORK. OUTBREAK READINESS UP TO 6 MONTHS IN ADVANCE OF ANY OUTBREAK

### IMMEDIATE ACTIONS (2A) ADAPT EXISTING TOOLS FOR IPC IN OUTBREAKS

#### 1. IPC outbreak taskforce

Coordinate the IPC outbreak taskforce to revise, adapt and disseminate IPC-related information across all levels of the health care system (e.g. national, sub-national and facility). If an IPC outbreak taskforce does not exist, establish one. Ensure that roles are well defined, minimizing duplication of efforts.

#### OBJECTIVES

- Evaluate the existing IPC task force constituents and their roles in a future incident management system. Consider gaps in any of the following areas and define areas to be adapted or modified based on the threat at hand, including consideration of the following.
  - Prepare the IPC outbreak task force to develop, revise, adapt and disseminate policies, guidelines, training and other IPC-related activities across all levels of the health care system (e.g. national, subnational and facility) specific to the threat at hand.
  - Review terms of reference (TOR) and scope of work as well as mode of operation (e.g. how to meet, frequency of meetings, etc.).
  - Identify roles and responsibilities of national and international partners and ensure a coordination structure exists to avoid duplication of efforts.

#### RESOURCES

- COVID-19 strategic preparedness and response plan: Operational planning guidelines to support country preparedness. Geneva: World Health Organization; May 2020 (<https://www.who.int/publications/i/item/draft-operational-planning-guidance-for-un-country-teams>).

See [Toolkit for all phases: Resources](#) (section on [Incident management system](#)) for additional resources.

## 2. Ready the national response plan

Adapt the IPC components of any existing national or subnational outbreak or pandemic preparedness plans to develop IPC strategies specific to the threat at hand. Where no plans or gaps exist, define priority areas to be tackled, including the following.

### OBJECTIVES

- Identify priority IPC areas to be strengthened based on the threat at hand to mitigate the risks of transmission and in preparation for widespread community transmission.
- Evaluate any existing IPC components of national or subnational response plans. Consider gaps in any of the following areas and define areas to be adapted or modified. Review and update, if necessary, guidelines addressing:
  - outbreak management and preparedness;
  - standard precautions and transmission-based precautions for patients with suspected or confirmed communicable diseases with pandemic potential;
  - the plan for patient placement, transportation and referral;
  - adaptation of standard operating procedures (SOPs) for visitor management (including personal protective equipment (PPE) for visitors) and crowd control;
  - a policy to test and isolate (if positive) exposed health care workers; and
  - a strategy to deal with staff or patients exposed to confirmed cases.
- Review and adapt checklists and SOPs for specific threats, including
  - rapid identification and isolation of suspected cases among patients and health care workers;
  - safe processes for sample collection, transport and lab analysis in coordination with the laboratory taskforce;
  - rapid contact tracing in the health care setting, identification of health care contacts and quarantine of contacts; and
  - assess and optimize PPE and other supplies including cleaning supplies and equipment, ABHR or soap, as well as contingency plans for distribution.
- Develop an outbreak-specific toolkit based on mode of transmission and specific needs. For example:
  - case investigation and/or reporting forms for nosocomial infections;
  - risk assessment and management for exposed health care workers;

- investigation protocols for suspected health care clusters; and
- active case-finding protocols at health care facilities and identification of sources of transmission.
- Coordinate national command structures with other ministries or stakeholders, minimizing duplication of efforts.
- Create roles and responsibilities for IPC members of rapid response teams and roster staff who can contribute to the IPC-related parts of a rapid response team.
- Utilize drills, simulations or table-top exercises to test the national IPC outbreak plan.
- Review budget items for IPC aspects of response in coordination with finance managers.

### RESOURCES

- Considerations for integrating infection prevention and control into national pandemic preparedness and response planning for coronavirus 2019. Atlanta: Centers for Disease Control and Prevention (<https://www.cdc.gov/coronavirus/2019-ncov/downloads/hcp/COVID-19-pandemic-plan-IPC-considerations-050820.pdf>).
- COVID-19 strategic preparedness and response plan: Operational planning guidelines to support country preparedness. Geneva: World Health Organization; May 2020 (<https://www.who.int/publications/i/item/draft-operational-planning-guidance-for-un-country-teams>).

See [Toolkit for all phases: Resources](#) (particularly the section on [COVID-19](#) as an example) for additional resources.

### **3. Surge capacity plans for IPC resources**

Adapt plans for surge capacity and IPC resources specific to the outbreak at hand (consider at a minimum PPE, hand hygiene (HH) and disinfection supplies), in collaboration with operations and logistics partners.

### OBJECTIVES

- Review existing national surge capacity plans. Consider gaps in any of the following areas and define areas to be adapted or modified based on the threat at hand, including consideration of human resources, financial and logistical issues.
  - Conduct detailed inventory mapping of existing capacities, including number of hospital beds, intensive care unit (ICU)

beds and equipment.

- Ensure that health care facilities (HCFs) have an inventory of available IPC-competent personnel and their contact numbers.
- Establish a national stockpile of IPC supplies and equipment.
- Anticipate PPE burn rates.
- Anticipate supply shortages and coordinate with vendors and HCF on the availability and prioritization of supplies.
- Provide contingency plans to respond to limited IPC resources or stockouts.
- Determine alternate service delivery models that will be used (telehealth, alternate care sites) to conserve PPE and reduce the burden on the health care system.
- Develop IPC plans for handling larger numbers of deaths.

### RESOURCES

- Rational use of personal protective equipment (PPE) for coronavirus disease (COVID-19): interim guidance. Geneva: World Health Organization; 2020 (<https://apps.who.int/iris/handle/10665/331498>).
- Guide to local production: WHO-recommended handrub formulations. Geneva: World Health Organization; 2010 (<https://apps.who.int/iris/handle/10665/332005>).
- COVID-19 essential supplies forecasting tool (COVID-ESFT). Geneva: World Health Organization; 2021 (<https://apps.who.int/iris/handle/10665/340747>).

See [Toolkit for all phases: Resources](#) (sections on [PPE](#) and [Surge capacity](#)) for additional resources

#### 4. National IPC training programme

Develop or adapt a national or subnational IPC training programme that provides outbreak training at the national and HCF level.

### OBJECTIVES

- Evaluate the existing national IPC training programme as well as those run by other organizations, including non-governmental organizations (NGOs). Consider gaps in any of the following areas and define areas to be adapted or modified, including consideration of the following.
  - Adapt IPC curricula to target the specific outbreak at hand.
  - Undertake rapid deployment of refresher courses and updates.

## RESOURCES

- Core competencies for infection prevention and control professionals. Geneva: World Health Organization, 2020 (<https://apps.who.int/iris/handle/10665/335821>).
- OpenWHO; Geneva: World Health Organization (<https://openwho.org/courses?channel=ipc>).

See [Toolkit for all phases: Resources](#) (section on [Training and assessment](#)) for additional resources.

### 5. National surveillance and reporting programme

Coordinate with the national and subnational surveillance networks to include syndromic and microbiologic surveillance for the specific outbreak at hand. If specific tools or policies are lacking for the specific threat at hand, they will need to be developed or adapted from other sources as needed.

## OBJECTIVES

- Review existing national and subnational IPC surveillance and reporting systems. Consider gaps in any of the following areas and define areas to be adapted or modified based on the threat at hand, including the following.
  - Adapt the existing framework to analyse and track the specific epidemiological situation at hand, and to implement IPC response activities. This should include:
    - regular analysis and reports on current epidemiological and response circumstances at district, national and international levels;
    - develop IPC indicators for an impending outbreak (e.g. health care worker (HCW) infections, percentage of trained HCWs, IPC supplies);
    - develop epidemiological forecasts and response projections to inform strategic and operational planning at the HCF level; and
    - utilize available information systems to improve accuracy, quality and timeliness of reporting to ensure timely interventions at the HCF level.

## RESOURCES

- Overview of VPD surveillance principles. Geneva: World Health

Organization ([https://www.who.int/immunization/monitoring\\_surveillance/burden/vpd/WHO\\_SurveillanceVaccinePreventable\\_01\\_Overview\\_R2.pdf?ua=1](https://www.who.int/immunization/monitoring_surveillance/burden/vpd/WHO_SurveillanceVaccinePreventable_01_Overview_R2.pdf?ua=1)).

- Communicable disease surveillance and response systems: guide to monitoring and evaluating. Geneva: World Health Organization; 2006 (<https://apps.who.int/iris/handle/10665/69331>).

6. See [Toolkit for all phases: Resources](#) (section on [Surveillance](#)) for additional resources.

### National or subnational IPC communication strategy

Adapt the existing communication strategy for the specific outbreak or pandemic threat at hand, integrating with the broader outbreak communication strategy. Work in collaboration with partners in risk communication and community engagement (RCCE).

### OBJECTIVES

- Evaluate the existing national or subnational IPC communication strategy, including support from NGOs or other organizations where applicable. Consider gaps in any of the following areas and define areas to be adapted or modified based on the threat at hand, including the following.
- Adapt existing communication framework for the threat at hand:
  - disseminate IPC information to various groups (HCFs, HCWs, community, social media; consider hotlines etc.) in coordination with RCCE colleagues;
  - develop public messages describing when patients should come to HCFs to receive care, describing any alternate service delivery models that will be used (telehealth, alternate care sites) and visitor management rules;
  - decide modes of information deliverables, frequency, content, and surge capacity; and
  - ensure that messaging is in appropriate language(s) and language relevant.

### RESOURCES

- Risk communications. Geneva: World Health Organization (<https://www.who.int/emergencies/risk-communications>).



- Outbreak communication planning guide. Geneva: World Health Organization; 2008 (<https://apps.who.int/iris/handle/10665/44014>).

See [Toolkit for all phases: Resources](#) (section on [Communication](#)) for additional resources.



## EARLY ACTIONS (2B) PREPARE KEY PERSONNEL AND PARTNERSHIPS

### 1. IPC partner mapping

Prepare and coordinate with national or subnational partners for IPC outbreak readiness.

#### OBJECTIVES

- Evaluate the current status of IPC partner mapping and international coordination. Consider gaps in any of the following areas and define areas to be adapted or modified based on the threat at hand, including consideration of the following.
  - Review partner plans for surge capacity.
  - Maintain lines of communication, established roles and relationships in IPC outbreak readiness.
  - Establish regular forums for discussion, such as IPC partner coordination meetings.
  - Review coordination and roles, including bilateral or partner-level communication strategies .

### 2. IPC stakeholder networks

Prepare IPC leader networks in health care facilities, for example, IPC leaders at the health care facility level, hospital administrators and key decision-makers for outbreak readiness.

#### OBJECTIVES

- Evaluate the status of networks of IPC stakeholders at the HCF level. Consider gaps in any of the following areas and define areas to be adapted or modified based on the threat at hand, including consideration of the following.
  - Test communications systems and solicit feedback on the function of the system.
  - Prepare for additional messages, and updates at various levels.
  - Establish modes of communicating with HCFs and communities at various levels.



## ADVANCED ACTIONS (2C) AUDIT AND TEST THE SYSTEM

### 1. Assess IPC outbreak readiness

Evaluate the status of IPC outbreak readiness after immediate and early actions have been initiated. Define areas to be adapted or modified based on the threat of concern, including the following.

#### OBJECTIVES

- Evaluate the status of IPC practices. Utilize standardized tools to identify gaps and inform priority actions. Consider gaps in any of the following areas and define areas to be adapted or modified based on the threat at hand, including consideration of the following.
  - Undertake simulation exercises focusing on IPC (e.g. tabletop exercises) to test the system.
  - Identify gaps and deficiencies in the performance in particular areas, including surge capacity.

#### RESOURCES

- Rapid hospital readiness checklist for COVID-19. Geneva: World Health Organization; 2020 (<https://apps.who.int/iris/handle/10665/332778>).
- Comprehensive hospital preparedness checklist for coronavirus disease 2019 (COVID-19). Atlanta: Centers for Disease Control and Prevention; 2020 ([https://www.cdc.gov/coronavirus/2019-ncov/downloads/HCW\\_Checklist\\_508.pdf](https://www.cdc.gov/coronavirus/2019-ncov/downloads/HCW_Checklist_508.pdf)).

See [Toolkit for all phases: Resources](#) (section on [Assessment tools](#)) for additional resources.



# **PHASE 3 FRAMEWORK: OUTBREAK RESPONSE**





## PHASE 3 FRAMEWORK: OUTBREAK RESPONSE

**Response is the stage in which emergency actions exceed the usual level of activities, in response to a defined public health threat. Readers may start utilizing the framework and toolkit in Phase 3 (Response) if an infectious disease threat is causing a community outbreak and has the potential to be amplified in the health care setting. An early and effective response is crucial for changing the trajectory of an outbreak. Actions taken in the first 72 hours can have long-lasting impacts on the duration and outcome of the outbreak.**

Completing Phases 1 (Preparedness) and 2 (Readiness) is not a prerequisite to starting Phase 3. If this framework and toolkit is started in Phase 3, it may not be possible to conduct a formal analysis of whether the minimum requirements for infection prevention and control (IPC) exist at the national or health care facility (HCF) level. If there are known areas in which IPC minimum requirements are not in place, prioritize areas that urgently need strengthening to ensure the best response to the public health emergency at hand.

**If IPC components are lacking or limited, this does not preclude or delay the use of this Phase 3 Outbreak Response Toolkit, which may be used while simultaneously building and developing critical areas of IPC.**

If possible, national leadership should support the use of the World Health Organization (WHO) infection prevention and control health care facility response for coronavirus disease (COVID-19) at the health care facility level and may also consider collecting and reviewing the results. This can be used to identify gaps and major IPC areas that require investment and action for the development of hospital readiness improvement plans.

**Note: Depending on the type of outbreak encountered, the response phase may be characterized by spikes or resurgences of cases in between periods of lower transmission. If a resurgence of cases is expected or encountered, this will require reverting to Phase 3 early actions and possibly conducting intra-action reviews to determine IPC best practices, as well as areas needing urgent strengthening. Actions related to resurgence of cases are highlighted with the following symbol:**



**Before using this section, please read the “Background” and “Description of the framework and toolkit, and instructions for use” sections.**



## PHASE 3 FRAMEWORK. OUTBREAK RESPONSE

### EMERGENCY ACTIONS IN RESPONSE TO AN OUTBREAK

#### IMMEDIATE ACTIONS (3A)

### ACTIVATE EXISTING AND ADAPTED TOOLS FOR IPC BASED ON OUTBREAK CONTEXT

#### 1. IPC task force

Once an outbreak has been declared and the incident management system (IMS) activated, convene the IPC outbreak taskforce. The taskforce will revise, adapt and disseminate IPC-related information across all levels of the health care system (e.g. national, sub national and facility). If an IPC outbreak task force does not exist, urgently establish one. Ensure that roles are well defined, minimizing duplication of efforts.

#### OBJECTIVES

- Activate a national or subnational IPC outbreak taskforce within the incident management system (IMS) for the outbreak at hand, with consideration of the following.
  - Focus on developing, revising, adapting and disseminating policies, guidelines, training and other IPC-related information across all levels of the health care system (e.g. national, sub-national and facility) specific to the threat at hand.
  - Identify roles and responsibilities of national and international partners and ensure a coordination structure exists to avoid duplication of efforts.
  - Activate existing networks of IPC stakeholders at the local and HCF level.
- 📊 A resurgence of cases while in later stages of Phase 3 should trigger the recovering of the IPC taskforce.

#### RESOURCES

- COVID-19 strategic preparedness and response plan: Operational planning guidelines to support country preparedness. Geneva: World Health Organization; May 2020 (<https://www.who.int/publications/i/item/draft-operational-planning-guidance-for-un-country-teams>).

See [Toolkit for all phases: Resources](#) (section on [Incident management system](#)) for additional resources.

## 2. National response plans

Activate the IPC components of any existing national or subnational outbreak response plans specific to the threat at hand. If specific tools or policies are lacking for the specific threat at hand, they will need to be developed or adapted from alternative sources as needed.

### OBJECTIVES

- Identify priority IPC areas to strengthen based on the threat at hand to mitigate the risks of transmission and in preparation for widespread community transmission.
- Consult with finance and budget colleagues on activating outbreak response financing plans.
- Evaluate any existing IPC components of national or subnational response plans. Trigger activation of plans as needed for the outbreak at hand.
  - Consider any gaps, and update plans and standard operating procedures (SOPs) as new information and scientific evidence become available.
  - Adapt/update IPC guidance based on what is known about modes of transmission, incubation period, duration of illness, immunization and population at risk of disease.

 New transmission or epidemiological data gathered during a resurgence of cases should trigger a reevaluation of response plans.

### RESOURCES

- Considerations for integrating infection prevention and control into national pandemic preparedness and response planning for coronavirus 2019. Atlanta: Centers for Disease Control and Prevention (<https://www.cdc.gov/coronavirus/2019-ncov/downloads/hcp/COVID-19-pandemic-plan-IPC-considerations-050820.pdf>).
- COVID-19 strategic preparedness and response plan: Operational planning guidelines to support country preparedness. Geneva: World Health Organization; May 2020 (<https://www.who.int/publications/i/item/draft-operational-planning-guidance-for-un-country-teams>).

See [Toolkit for all phases: Resources](#) (particularly the section on [COVID-19](#) as an example) for additional resources.

### 3. Surge capacity plans for IPC resources

Activate existing plans for surge capacity and IPC resources specific to the outbreak at hand (consider at a minimum: staff, hand hygiene (HH), personal protective equipment (PPE), and disinfection supplies), in collaboration with operations and logistics partners.

#### OBJECTIVES

- Evaluate existing national surge capacity plans for IPC resources. Consider gaps in any of the following areas and define areas to be adapted or modified based on the threat at hand, including consideration of human resources, financial and logistical issues.
  - Compile a detailed inventory mapping of existing IPC capacities pertaining to the threat at hand.
  - Ensure that HCFs have an inventory of available IPC-competent personnel and their contact numbers.
  - Develop and refine IPC plans for handling larger numbers of deaths.
  - Establish a national stockpile of IPC supplies and equipment including PPE.
    - Calculate PPE burn rates.
    - Consider strategies to optimize availability of PPE.
    - Anticipate supply shortages and coordinate with vendors and HCFs on the availability and prioritization of supplies.
    - Provide contingency plans to respond to limited IPC resources, including PPE, or stockouts.
    - Determine alternative service delivery models that will be used (telehealth, alternative care sites) to conserve PPE and reduce the burden on the health care system.

 Surge capacity should be reevaluated if a resurgence of cases is observed or expected.

#### RESOURCES

- Rational use of personal protective equipment (PPE) for coronavirus disease (COVID-19): interim guidance. Geneva: World Health Organization; 2020 (<https://apps.who.int/iris/handle/10665/331498>).
- Guide to local production: WHO-recommended handrub formulations. Geneva: World Health Organization; 2010 (<https://apps.who.int/iris/handle/10665/332005>).
- COVID-19 essential supplies forecasting tool (COVID-ESFT). Geneva:



World Health Organization; 2021 (<https://apps.who.int/iris/handle/10665/340747>).

See [Toolkit for all phases: Resources](#) (sections on [PPE](#) and [Surge capacity](#)) for additional resources.



#### 4. National IPC training programme

Leverage any existing national or subnational IPC training programmes; if none exist, create rapid outbreak response training modules that include updated guidance for IPC in the current outbreak setting.

#### OBJECTIVES

- Identify any relevant national or subnational IPC training programmes, as well as those run by other organizations, including non-governmental organizations (NGOs). If pertinent training programs do not exist, collaborate with other organizations to create rapid IPC training modules needed for the outbreak at hand, including the following.
  - Develop/update educational material to:
    - provide PPE refreshers;
    - brief and train providers in the specific thematic areas to address the outbreak response (e.g. burial teams, hospital hygiene); and
    - provide training that is specific to the outbreak at hand and considers available information on modes of transmission and disease epidemiology.

 Training should be updated if new data become available on modes of transmission or disease epidemiology, for example during a resurgence of cases.

#### RESOURCES

- Core competencies for infection prevention and control professionals. Geneva: World Health Organization, 2020 (<https://apps.who.int/iris/handle/10665/335821>).
- OpenWHO; Geneva: World Health Organization (<https://openwho.org/courses?channel=ipc>).

See [Toolkit for all phases: Resources](#) (section on [Training and assessment](#)) for additional resources.

## 5. National surveillance and reporting programme

Coordinate with the national and subnational surveillance networks to include syndromic and microbiologic surveillance for the specific outbreak at hand.

### OBJECTIVES

- Activate and adapt existing national and subnational IPC surveillance and reporting systems to analyse and track the epidemiological situation, and to implement IPC response activities. If specific tools or policies are lacking for the specific threat at hand, they will need to be rapidly developed or adapted from other sources as needed. The following should be included:
  - regular analysis and reports on current epidemiological and response circumstances at district, national and international levels;
  - epidemiological forecasts and response projections to inform strategic and operational planning at the HCF level;
  - use of available data collected from outbreak toolkits to respond to and inform IPC policies; and
  - review of surveillance definitions and toolkit components, as new data become available.

 Review and update of surveillance definitions, forecasts and response projections may be required if there is a resurgence of cases.

### RESOURCES

- Overview of VPD surveillance principles. Geneva: World Health Organization ([https://www.who.int/immunization/monitoring\\_surveillance/burden/vpd/WHO\\_SurveillanceVaccinePreventable\\_01\\_Overview\\_R2.pdf?ua=1](https://www.who.int/immunization/monitoring_surveillance/burden/vpd/WHO_SurveillanceVaccinePreventable_01_Overview_R2.pdf?ua=1)).
- Communicable disease surveillance and response systems: guide to monitoring and evaluating. Geneva: World Health Organization; 2006 (<https://apps.who.int/iris/handle/10665/69331>).

See [Toolkit for all phases: Resources](#) (section on [Surveillance](#)) for additional resources.

## 6. National or subnational IPC communication strategy

Activate specific IPC communication strategies for the outbreak at hand, which integrate with the broader outbreak communication strategy. Work in collaboration with risk communication and community engagement (RCCE) partners.

### OBJECTIVES

- Consult the existing national or subnational IPC communication strategy, including support from NGOs or other organizations where applicable. Activate components as needed for the outbreak at hand, including the following.
  - Disseminate IPC information to various groups (HCFs, health care workers (HCWs) community, social media).
  - Develop public messages describing when patients or visitors should come to HCFs to receive care.
  - Decide modes of information deliverables, frequency, content and surge capacity.
  - Ensure that messaging is in appropriate language(s) and language relevant.
  - Engage other disciplines including behavioural and/or social science on messaging and communication strategy as needed.
- If new information on epidemiology or transmission becomes available, IPC messaging will need to be reviewed and updated.
- 📊 A resurgence of cases should trigger a review of existing language and content of IPC messaging.

### RESOURCES

- Risk communications. Geneva: World Health Organization (<https://www.who.int/emergencies/risk-communications>).
- Outbreak communication planning guide. Geneva: World Health Organization; 2008 (<https://apps.who.int/iris/handle/10665/44014>).

See [Toolkit for all phases: Resources](#) (section on [Communication](#)) for additional resources.



## EARLY ACTIONS (3B) MONITOR FOR RESURGENCE OF CASES

### 1. Monitor for resurgence of cases

If a resurgence is detected, key immediate actions will need to be repeated. Revert to Phase 3A and pay close attention to sections highlighted with the symbol:





## ADVANCED ACTIONS (3C) CONDUCT INTRA-ACTION AND/OR AFTER-ACTION REVIEWS

### 1. Assess IPC outbreak response

Evaluate the status of IPC outbreak response after immediate and early actions have been initiated.

#### OBJECTIVES

- Conduct the review of IPC practices. Define areas to be adapted or modified.
- Utilize a strategy to evaluate and revise guidelines, plans and IPC activities according to audit findings, as needed.
- Define an ongoing review strategy, that include both intra-action and after-action reviews to identify gaps and deficiencies in the performance of any areas.

#### RESOURCES

- Guidance for conducting a country COVID-19 intra-action review (IAR). Geneva: World Health Organization; 2021 (<https://apps.who.int/iris/handle/10665/341024>).
- Guidance for after action review (AAR). Geneva: World Health Organization; 2019 (<https://apps.who.int/iris/handle/10665/311537>).



# **TOOLKIT FOR ALL PHASES: RESOURCES**

## TOOLKIT FOR ALL PHASES: RESOURCES

### Additional resources for establishing infection prevention and control (IPC) in outbreak preparedness, readiness and response

WHO and other key resources are listed first in each section

#### AMBULATORY CARE

- Infection prevention for ambulatory care centers during disasters. Washington, DC: Association for Professionals in Infection Control and Epidemiology; 2013 ([https://apic.org/wp-content/uploads/2019/02/2013\\_Ambulatory\\_Care\\_during\\_Disasters\\_FINAL.pdf](https://apic.org/wp-content/uploads/2019/02/2013_Ambulatory_Care_during_Disasters_FINAL.pdf), accessed 7 August 2021).

#### ASSESSMENT TOOLS

- Rapid hospital readiness checklist: interim guidance: harmonized health service capacity assessment in the context of the COVID-19 pandemic. Geneva: World Health Organization (<https://www.who.int/publications/i/item/WHO-2019-nCoV-hospital-readiness-checklist-2020.1>, accessed 7 August 2021).
- Infection prevention and control health-care facility response for COVID-19: a module from the suite of health service capacity assessments in the context of the COVID-19 pandemic: interim guidance. Geneva: World Health Organization; 2020 (<https://apps.who.int/iris/handle/10665/336255>, accessed 7 August 2021).
- Core components for infection prevention and control programmes: assessment tools for IPC programmes. Geneva: World Health Organization; 2011 (<https://apps.who.int/iris/handle/10665/70766>, accessed 7 August 2021).
- Instructions for the national infection prevention and control assessment tool 2 (IPCAT2). Geneva: World Health Organization; 2017 (<https://apps.who.int/iris/handle/10665/330078>, accessed 7 August 2021).
- Infection prevention and control assessment framework at the facility level (IPCAF). Geneva: World Health Organization; 2018 (<https://apps.who.int/iris/handle/10665/330072>, accessed 7 August 2021).
- Infection prevention and control facility-level assessments using WHO standardized tools in a spirit of improvement. Geneva: World Health Organization; 2018 ([https://www.who.int/infection-prevention/campaigns/IPCAF\\_training-video.EN.pdf?ua=1](https://www.who.int/infection-prevention/campaigns/IPCAF_training-video.EN.pdf?ua=1), accessed 7 August 2021).
- Facility infection prevention and control (IPC) assessment for coronavirus disease 2019 (COVID-19) infection prevention and control considerations in non-US healthcare settings. Atlanta: Centers for Disease Control and Prevention; 2019 ([https://www.cdc.gov/coronavirus/2019-ncov/downloads/hcp/non-us-settings/249\\_IPC\\_FacilityAssessmentTool\\_20200925.pdf](https://www.cdc.gov/coronavirus/2019-ncov/downloads/hcp/non-us-settings/249_IPC_FacilityAssessmentTool_20200925.pdf), accessed 7 August 2021).
- WHO simulation exercise manual: a practical guide and tool for planning, conducting and evaluating simulation exercises for outbreaks and public health emergency preparedness and response. Geneva: World Health Organization, 2017 (<https://apps.who.int/iris/handle/10665/254741>, accessed 7 August 2021).
- Comprehensive hospital preparedness checklist for coronavirus disease 2019 (COVID-19). Atlanta: Centers for Disease Control and Prevention; 2020 ([https://www.cdc.gov/coronavirus/2019-ncov/downloads/HCW\\_Checklist\\_508.pdf](https://www.cdc.gov/coronavirus/2019-ncov/downloads/HCW_Checklist_508.pdf), accessed 7 August 2021).
- Guidance for conducting a country COVID-19 intra-action review (IAR). Geneva: World Health Organization; 2020 ([https://www.who.int/publications/i/item/WHO-2019-nCoV-Country\\_IAR-2020.1](https://www.who.int/publications/i/item/WHO-2019-nCoV-Country_IAR-2020.1), accessed 7 August 2021).
- Guidance for after action review (AAR). Geneva: World Health Organization; 2019 (<https://www.who.int/publications/i/item/WHO-WHE-CPI-2019.4>, accessed 7 August 2021).

## COVID-19

- Infection prevention and control health-care facility response for COVID-19: a module from the suite of health service capacity assessments in the context of the COVID-19 pandemic: interim guidance. Geneva: World Health Organization; 2020 (<https://apps.who.int/iris/handle/10665/336255>, accessed 7 August 2021).
- Community-based health care, including outreach and campaigns, in the context of the COVID-19 pandemic: interim guidance. Geneva: World Health Organization and United Nations Children's Emergency Fund; 2020 (<https://apps.who.int/iris/handle/10665/331975>, accessed 7 August 2021).
- COVID-19 strategic preparedness and response plan: Operational planning guidelines to support country preparedness. Geneva: World Health Organization; May 2020 (<https://www.who.int/publications/i/item/draft-operational-planning-guidance-for-un-country-teams>, accessed 7 August 2021).
- Operational considerations for case management of COVID-19 in health facility and community: Interim guidance. Geneva: World Health Organization; 2020 (<https://www.who.int/publications/i/item/10665-331492>, accessed 7 August 2021).
- WHO Covid-19 Strategy Update. Geneva: World Health Organization; 2020 (<https://www.who.int/publications/m/item/covid-19-strategy-update>, accessed 7 August 2021).
- Preparedness for COVID-19. Solna: European Centre for Disease Prevention and Control; 2021 (<https://www.ecdc.europa.eu/en/covid-19/preparedness-and-response>, accessed 7 August 2021).
- COVID-19 overview and infection prevention and control priorities in non-US settings. Atlanta: Centers for Disease Control and Prevention; 2021 (<https://www.cdc.gov/coronavirus/2019-ncov/hcp/non-us-settings/overview/index.html>, accessed 7 August 2021).
- Operational considerations for the identification of healthcare workers and inpatients with suspected COVID-19 in non-US healthcare settings. Atlanta: Centers for Disease Control and Prevention; 2021 (<https://www.cdc.gov/coronavirus/2019-ncov/hcp/non-us-settings/guidance-identify-hcw-patients.html>, accessed 7 August 2021).
- Interim operational considerations for public health management of HCWs exposed to or infected with COVID-19: non-US healthcare settings. Atlanta: Centers for Disease Control and Prevention; 2020 (<https://stacks.cdc.gov/view/cdc/92664>, accessed 7 August 2021).
- Management of visitors to healthcare facilities in the context of COVID-19: non-US healthcare settings. Atlanta: Centers for Disease Control and Prevention; 2020 (<https://www.cdc.gov/coronavirus/2019-ncov/hcp/non-us-settings/hcf-visitors.html>, accessed 7 August 2021).
- Comprehensive hospital preparedness checklist for coronavirus disease 2019 (COVID-19). Atlanta: Centers for Disease Control and Prevention; 2020 ([https://www.cdc.gov/coronavirus/2019-ncov/downloads/HCW\\_Checklist\\_508.pdf](https://www.cdc.gov/coronavirus/2019-ncov/downloads/HCW_Checklist_508.pdf), accessed 7 August 2021).
- Facility infection prevention and control (IPC) assessment for coronavirus disease 2019 (COVID-19) infection prevention and control considerations in non-US healthcare settings. Atlanta: Centers for Disease Control and Prevention; 2019 ([https://www.cdc.gov/coronavirus/2019-ncov/downloads/hcp/non-us-settings/249\\_IPC\\_FacilityAssessmentTool\\_20200925.pdf](https://www.cdc.gov/coronavirus/2019-ncov/downloads/hcp/non-us-settings/249_IPC_FacilityAssessmentTool_20200925.pdf), accessed 7 August 2021).
- Interim additional guidance for infection prevention and control recommendations for patients with suspected or confirmed COVID-19 in healthcare settings. Atlanta: Centers for Disease Control and Prevention (<https://www.esrdnetwork.org/sites/default/files/Infection%20and%20Prevention%20-%20CDC.pdf>, accessed 7 August 2021).
- Strategic priority infection prevention and control activities for non-US settings. Atlanta: Centers for Disease Control and Prevention; 2020 (<https://www.cdc.gov/coronavirus/2019-ncov/hcp/non-us-settings/ipc-healthcare-facilities-non-us.html>, accessed 7 August 2021).
- Considerations for integrating infection prevention and control into national pandemic preparedness and

- response planning for coronavirus 2019. Atlanta: Centers for Disease Control and Prevention (<https://www.cdc.gov/coronavirus/2019-ncov/downloads/hcp/COVID-19-pandemic-plan-IPC-considerations-050820.pdf>, accessed 7 August 2021).
- National COVID-19 preparedness and response plan. Republic of Malawi: Ministry of Disaster Management and Affairs and Ministry of Health; 2020 ([https://reliefweb.int/sites/reliefweb.int/files/resources/National-COVID-19-Preparedness-and-Response-Plan\\_08-04-2020\\_Final-Version.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/National-COVID-19-Preparedness-and-Response-Plan_08-04-2020_Final-Version.pdf), accessed 7 August 2021).
  - National preparedness and response plan for COVID-19. Dhaka: Ministry of Health and Family Welfare, Government of the People's Republic of Bangladesh; 2020 ([https://reliefweb.int/sites/reliefweb.int/files/resources/nprp\\_covid-19\\_v6\\_18032020.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/nprp_covid-19_v6_18032020.pdf), accessed 7 August 2021).
  - CDNA national guidelines for the prevention, control and public health management of COVID-19 outbreaks in residential care facilities in Australia. Communicable Diseases Network Australia; 2020 (<https://www.health.gov.au/sites/default/files/documents/2020/03/coronavirus-covid-19-guidelines-for-outbreaks-in-residential-care-facilities.pdf>, accessed 7 August 2021).
  - Office of emergency management. COVID-19 response plan. Washington, DC: Veterans' Health Administration; 2020 ([https://www.va.gov/opa/docs/VHA\\_COVID\\_19\\_03232020\\_vF\\_1.pdf](https://www.va.gov/opa/docs/VHA_COVID_19_03232020_vF_1.pdf), accessed 7 August 2021).
  - Coronavirus disease 2019 (COVID-19) preparedness and response plan for Libya. Tripoli: Health Sector Libya; 2020 ([https://www.humanitarianresponse.info/sites/www.humanitarianresponse.info/files/health\\_sector\\_libya\\_covid-19\\_response\\_plan.pdf](https://www.humanitarianresponse.info/sites/www.humanitarianresponse.info/files/health_sector_libya_covid-19_response_plan.pdf), accessed 7 August 2021).
  - National Contingency Plan for Novel Corona Virus (COVID-19). Eswatini: United Nations Children's Emergency Fund; 2021 (<https://www.unicef.org/eswatini/documents/national-contingency-plan-novel-coronavirus>, accessed 7 August 2021).
  - Africa joint continental strategy for COVID-19 outbreak. Addis Ababa: Africa Centres for Disease Control and Prevention ([https://au.int/sites/default/files/documents/38264-doc-africa\\_joint\\_continental\\_strategy\\_for\\_covid-19\\_outbreak.pdf](https://au.int/sites/default/files/documents/38264-doc-africa_joint_continental_strategy_for_covid-19_outbreak.pdf), accessed 7 August 2021).

## COMMUNICATION

- Risk communications. Geneva: World Health Organization (<https://www.who.int/emergencies/risk-communications>, accessed 7 August 2021).
- Outbreak communication planning guide. Geneva: World Health Organization; 2008 (<https://apps.who.int/iris/handle/10665/44014>, accessed 7 August 2021).
- Communicating during an outbreak or public health investigation. Atlanta: Centers for Disease Control and Prevention (<https://www.cdc.gov/eis/field-epi-manual/chapters/Communicating-Investigation.html>, accessed 7 August 2021).
- Crisis & emergency risk communication (CERC). Atlanta: Centers for Disease Prevention and Control; 2018 (<https://emergency.cdc.gov/cerc/>, accessed 8 August 2021).
- Crisis and emergency risk communications: communications plan implementation for a severe pandemic. Washington, DC: Pan American Health Organization ([https://www.paho.org/disasters/dmdocuments/RespToolkit\\_21\\_Tool%2013\\_CommunicationsPlanImplementationforaSeverePandemic.pdf](https://www.paho.org/disasters/dmdocuments/RespToolkit_21_Tool%2013_CommunicationsPlanImplementationforaSeverePandemic.pdf), accessed 7 August 2021).
- Creating a communication strategy for pandemic influenza. Washington, DC: Pan American Health Organization; 2009 ([https://www.paho.org/hq/dmdocuments/2010/PAHO\\_CommStrategy\\_Eng.pdf](https://www.paho.org/hq/dmdocuments/2010/PAHO_CommStrategy_Eng.pdf), accessed 7 August 2021).
- Framework for developing an integrated communication strategy for the introduction of oral cholera vaccine in cholera prevention and control programmes. New York: United Nations Children's Emergency Fund; 2014 (<https://sites.unicef.org/cholera/files/Cholera-FrameworkBookV2.pdf>, accessed 7 August 2021).

## COMMUNITY ENGAGEMENT

- Working with communities during a pandemic. Geneva: Médecins sans Frontières; 2020 ([https://www.msf.org/working-communities-niger-during-covid-19-pandemic?gclid=CjwKCAjw0\\_T4BRBIeIwAwoEiAdwnuFL94DgT2LqnMft5PqknPfyseUsg7xo61naly8y8Y3VjnMXbZxoC8ZMQAvD\\_BwE](https://www.msf.org/working-communities-niger-during-covid-19-pandemic?gclid=CjwKCAjw0_T4BRBIeIwAwoEiAdwnuFL94DgT2LqnMft5PqknPfyseUsg7xo61naly8y8Y3VjnMXbZxoC8ZMQAvD_BwE), accessed 7 August 2021).

## DECONTAMINATION AND STERILIZATION

- Decontamination and reprocessing of medical devices for health-care facilities. Geneva: World Health Organization, 2016 (<https://apps.who.int/iris/handle/10665/250232>, accessed 7 August 2021).

## EBOLA

- Personal protective equipment for use in a filovirus disease outbreak: rapid advice guideline. Geneva: World Health Organization; 2016 (<https://apps.who.int/iris/handle/10665/251426>, accessed 7 August 2021).
- Infection prevention and control guidance for care of patients with suspected or confirmed filovirus haemorrhagic fever in health-care settings, with focus on Ebola. Geneva: World Health Organization; 2014 (<https://apps.who.int/iris/handle/10665/130596>, accessed 7 August 2021).
- Guideline on hand hygiene in health care in the context of filovirus disease outbreak response: rapid advice guideline. Geneva: World Health Organization; 2014 (<https://apps.who.int/iris/handle/10665/144578>, accessed 7 August 2021).

## EMERGENCY PREPAREDNESS

- A strategic framework for emergency preparedness. Geneva: World Health Organization; 2017 (<https://apps.who.int/iris/handle/10665/254883>, accessed 7 August 2021).
- Emergency preparedness. Washington, DC: Association for Professionals in Infection Control and Epidemiology; 2013 (<https://apic.org/professional-practice/emergency-preparedness/>, accessed 7 August 2021).

## FINANCING OUTBREAKS

- Financing outbreak preparedness: where are we and what next? Washington, DC: Center for Global Development; 2018 (<https://www.cgdev.org/blog/financing-outbreak-preparedness-where-are-we-and-what-next>, accessed 7 August 2021).
- Osewe PL. Options for financing pandemic preparedness. Bull World Health Organ. 2017;95(12):794–794A. doi:10.2471/BLT.17.199695.

## HAND HYGIENE

- A guide to the implementation of the WHO multimodal hand hygiene improvement strategy. Geneva: World Health Organization; 2009 (<https://apps.who.int/iris/handle/10665/70030>, accessed 7 August 2021).
- Hand hygiene. Geneva: World Health Organization (<https://www.who.int/teams/integrated-health-services/infection-prevention-control/hand-hygiene>, accessed 7 August 2021).
- Hand hygiene implementation tools. Geneva: World Health Organization (<https://www.who.int/teams/>

[integrated-health-services/infection-prevention-control/hand-hygiene/tools-and-resources](#), accessed 7 August 2021).

- Resource considerations for investing in hand hygiene improvement in health care facilities. Geneva: World Health Organization; 2021 (<https://apps.who.int/iris/handle/10665/341128>, accessed 7 August 2021).
- Hand hygiene self-assessment framework 2010. Geneva: World Health Organization ([https://www.who.int/gpsc/country\\_work/hhsa\\_framework\\_October\\_2010.pdf](https://www.who.int/gpsc/country_work/hhsa_framework_October_2010.pdf), accessed 7 August 2021).
- 5 Moments hand hygiene observation form. Geneva: World Health Organization ([https://www.who.int/gpsc/5may/Observation\\_Form](https://www.who.int/gpsc/5may/Observation_Form), accessed 7 August 2021).
- Tartari E, Fankhauser C, Peters A, Sithole BL, Timurkaynak F, Masson-Roy S, et al. Scenario-based simulation training for the WHO hand hygiene self-assessment framework. *Antimicrob Resist Infect Control*. 2019;8:58. doi:10.1186/s13756-019-0511-9.

## INCIDENT MANAGEMENT SYSTEM

- Incident command and management system: public health guidance for community-level preparedness and response to severe acute respiratory syndrome (SARS). Atlanta: Centers for Disease Prevention and Control (<https://www.cdc.gov/sars/guidance/a-command/incident.html>, accessed 7 August 2021).

## INFLUENZA

- Pandemic influenza risk management: a WHO guide to inform and harmonize national and international pandemic preparedness and response. Geneva: World Health Organization; 2017 (<https://apps.who.int/iris/handle/10665/259893>, accessed 7 August 2021).
- Global planning. Atlanta: Centers for Disease Control and Prevention (<https://www.cdc.gov/flu/pandemic-resources/planning-preparedness/global-planning.html?web=1&wdLOR=c9893EB56-1DDE-CE4A-9E1A-6DED747F9006>, accessed 7 August 2021).
- Pandemic influenza preparedness and response plan. State of Illinois: Illinois Department of Public Health; 2014 ([http://www.idph.state.il.us/pandemic\\_flu/Illinois\\_Pandemic\\_Flu\\_Plan.pdf](http://www.idph.state.il.us/pandemic_flu/Illinois_Pandemic_Flu_Plan.pdf), accessed 7 August 2021).
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## IPC IN LIMITED-RESOURCE SETTINGS

- Reference manual for health care facilities with limited resources. Module 11: Infection prevention and control program management. Baltimore: John Hopkins Medicine; 2018 ([https://www.jhpiego.org/wp-content/uploads/2020/03/IPC\\_M11\\_Preparing\\_for\\_ManagingOutbreaks.pdf](https://www.jhpiego.org/wp-content/uploads/2020/03/IPC_M11_Preparing_for_ManagingOutbreaks.pdf), accessed 7 August 2021).

## IPC PROGRAMME FUNDAMENTALS

- Infection prevention and control assessment framework at the facility level (IPCAF). Geneva: World Health Organization; 2018 (<https://apps.who.int/iris/handle/10665/330072>; accessed 7 August 2021).
- Interim practical manual: supporting national implementation of the WHO guidelines on core components of infection prevention and control programmes. Geneva: World Health Organization; 2017 (<https://apps.who.int/iris/handle/10665/330073>, accessed 7 August 2021).
- Improving infection prevention and control at the health facility: interim practical manual supporting

implementation of the WHO guidelines on core components of infection prevention and control programmes. Geneva: World Health Organization; 2018 (<https://apps.who.int/iris/handle/10665/279788>, accessed 7 August 2021).

- Instructions for the national infection prevention and control assessment tool 2 (IPCAT2). Geneva: World Health Organization; 2017 (<https://apps.who.int/iris/handle/10665/330078>, accessed 7 August 2021).
- Minimum requirements for infection prevention and control programmes. Geneva: World Health Organization; 2019 (<https://apps.who.int/iris/handle/10665/330080>, accessed 7 August 2021).
- Core components for infection prevention and control programmes: assessment tools for IPC programmes. Geneva: World Health Organization; 2011 (<https://apps.who.int/iris/handle/10665/70766>, accessed 7 August 2021).

## LONG TERM CARE FACILITIES

- Interim infection prevention and control recommendations to prevent SARS-CoV-2 spread in nursing homes. Atlanta: Centers for Disease Control and Prevention; 2021 (<https://www.cdc.gov/coronavirus/2019-ncov/hcp/long-term-care.html>, accessed 9 August 2021).

## NATIONAL HEALTH SECURITY ACTION PLANS

- Health systems for health security. Geneva: World Health Organization; 2021 (<https://extranet.who.int/sph/health-systems-for-health-security>, accessed 7 August 2021).
- United States health security national action plan: strengthening implementation of the international health regulations. Washington, DC: Public Health Emergency, United States Department of Health and Human Services; 2016 (<https://www.phe.gov/Preparedness/international/Documents/jee-nap-508.pdf>, accessed 7 August 2021).

## NATIONAL FRAMEWORKS FOR IPC

- Transmission-based precautions. Atlanta: Centers for Disease Control and Prevention (<https://www.cdc.gov/infectioncontrol/basics/transmission-based-precautions.html>, accessed 7 August 2021).
- National infection prevention and control action plan. Ministry of Health and Sanitation, Government of the Republic of Sierra Leone; 2019 (<https://mohs2017.files.wordpress.com/2017/06/national-ipc-action-plan-2016-2019.pdf>, accessed 7 August 2021).
- National infection prevention and control strategic framework. Department of Health, Republic of South Africa; 2020 (<https://www.nicd.ac.za/wp-content/uploads/2020/04/National-Infection-Prevention-and-Control-Strategic-Framework-March-2020-1.pdf>, accessed 7 August 2021).
- National guidelines for infection prevention and control in healthcare facilities. Ministry of Health and Family Welfare, Government of India; 2020 (<https://www.mohfw.gov.in/pdf/National%20Guidelines%20for%20IPC%20in%20HCF%20-%20final%281%29.pdf>, accessed 7 August 2021).
- The national infection prevention and control standards for acute healthcare facilities. Ministry of Health, Singapore; 2019 ([https://www.moh.gov.sg/docs/librariesprovider5/resources-statistics/guidelines/national-infection-prevention-and-control-standards\\_2019.pdf](https://www.moh.gov.sg/docs/librariesprovider5/resources-statistics/guidelines/national-infection-prevention-and-control-standards_2019.pdf), accessed 7 August 2021).
- National standards for infection prevention and control in community services. Health Information and Quality Authority, Republic of Ireland; 2018 (<https://www.hiqa.ie/sites/default/files/2018-09/National-Standards-for-IPC-in-Community-services.pdf>, accessed 7 August 2021).
- The GCC (Gulf Cooperation Council) infection prevention and control manual, 3rd Edition. Ministry of National Guard, Health Affairs, Kingdom of Saudi Arabia; 2018 (<http://gdipc.org/wp-content/uploads/2018/07/The-GCC-Infection-Prevention-and-Control-Manual-3rd-Edition.pdf>, accessed 7 August 2021).

## OUTBREAK INVESTIGATION

- Outbreak investigation in healthcare settings. Atlanta: Centers for Disease Control and Prevention (<https://www.ndhealth.gov/disease/hai/Docs/WebEx/OutbreakWebinar.pdf>, accessed 7 August 2021).
- Line list template. Atlanta: Centers for Disease Control and Prevention (<https://www.cdc.gov/urdo/downloads/linelisttemplate.pdf>, accessed 7 August 2021).
- Outbreak investigation. Oregon: Oregon Health Authority; 2017 (<https://www.oregon.gov/oha/PH/DiseasesConditions/CommunicableDisease/ReportingCommunicableDisease/ReportingGuidelines/Documents/outbreak-investigations.pdf>, accessed 7 August 2021).
- COVID-19 Outbreak investigation manual: a practical guide and manual for healthcare facilities. National Institute for Communicable Diseases, South Africa ([https://www.nicd.ac.za/wp-content/uploads/2020/06/COVID-Outbreak-Investigation-Guidelines\\_Finaldraft\\_20200624.pdf](https://www.nicd.ac.za/wp-content/uploads/2020/06/COVID-Outbreak-Investigation-Guidelines_Finaldraft_20200624.pdf), accessed 7 August 2021).

## PPE AND SUPPLY PLANNING

- Rational use of personal protective equipment (PPE) for coronavirus disease (COVID-19): interim guidance. Geneva: World Health Organization; 2020 (<https://apps.who.int/iris/handle/10665/331498>, accessed 7 August 2021).
- Guide to local production: WHO-recommended handrub formulations. Geneva: World Health Organization; 2010 (<https://apps.who.int/iris/handle/10665/332005>, accessed 7 August 2021).
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# **ANNEX**

## **Literature review**

## **ANNEX**

### **Literature Review**

#### **OBJECTIVE**

Our primary aim was to develop resources for infection prevention and control (IPC) in health care, in the context of readiness and response to outbreaks, with a focus on resource-limited countries. To achieve this, we conducted a review of the published literature (both peer-reviewed and grey) on IPC in international outbreak response coordination in order to determine the current resources available. We then used this literature review to create a toolkit for outbreak response coordination, including a rapid readiness assessment tool of core components, training materials and standard operating procedures.

#### **METHODS**

We conducted a rapid review of published articles in academic journals and grey literature, including meeting reports and relevant country webpages (Fig. A1). We searched databases including PubMed (encompassing Medline), OpenGrey (the System for Information on Grey Literature in Europe), a non-governmental organization search facility, an international governmental organization search facility and the Worldwide Database for Nosocomial Outbreaks. For search terms, see Tables A1 and A2. We considered articles, reports and guidelines published in English, French, Portuguese and Spanish without placing any restrictions such as study quality. Reports were excluded if deemed inappropriate, for example, if the report was not generalizable or if it focused solely on technical IPC techniques rather than coordination of response. See Table A3 for further details on literature excluded from the review.

#### **RESULTS**

We delivered a literature review, describing the available resources, identifying gaps in information and recommending priority areas for resources development, by 15 March 2020. From our literature review, we determined that the toolkit: (i) should focus on broad, generalizable IPC topics, with a view of the supporting themes of mobilizing resources, communication, collaboration and coordination as they relate to IPC; (ii) should focus on an audit of preparedness while covering more detailed planning in the readiness section, with a focus on quickly escalating measures over a relatively short period; (iii) should provide checklists and audits as instruments, again with a clear focus on IPC and the pillars that support IPC; (iv) could be useful in the current pandemic situation and should also be generalizable to other similar incidents in the future; it should have a clear and consistent message, while remaining adaptable to local contexts and future infectious disease threats; and (v) should build upon the current body of literature, with input from IPC and IPC-related technical groups, to ensure harmonization of documents and recommendations from WHO.

#### **CONCLUSIONS**

We also delivered a document including strategic, operational and technical directions for IPC at national and health care facility (HCF) level in the context of readiness and response to outbreaks, as well as a draft response rapid assessment tool for national and HCF level to support IPC in the context of readiness and response in outbreaks, by 31 December 2020.

Fig. A1. Search and selection process applied

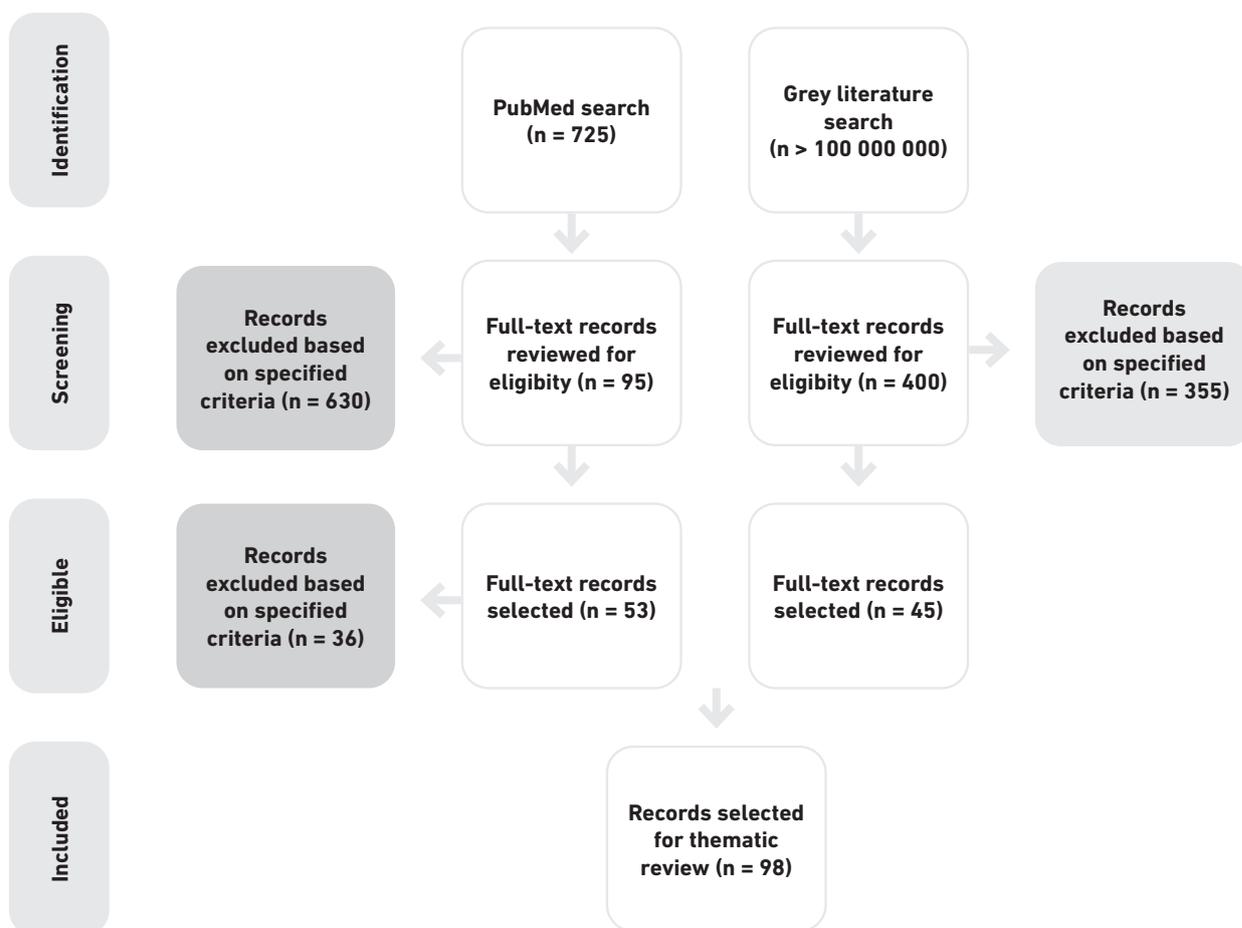


Table A1. Search terms used to review the peer-reviewed literature

**SEARCH TERMS COMBINED USING AND; REFINED TO INCLUDE ONLY LITERATURE RELATING TO HUMANS**

- international outbreak response AND infection prevention AND lessons learned
- international outbreak response AND infection prevention AND coordination
- outbreak preparedness AND lessons learned
- international outbreak preparedness AND infection prevention AND coordination
- outbreak readiness AND lessons learned
- outbreak readiness AND infection prevention AND coordination
- viral haemorrhagic fever AND human AND outbreak response AND coordination
- Ebola AND human AND outbreak response AND coordination
- Lassa fever AND human AND outbreak response AND coordination
- coronavirus AND human AND outbreak response coordination
- influenza AND human AND outbreak response coordination
- cholera AND human AND outbreak response coordination

**Table A2. Search terms used to review the grey literature**

SEARCH TERMS
■ outbreak response AND lessons learned
■ outbreak response AND infection prevention
■ outbreak preparedness AND infection prevention
■ outbreak readiness AND infection prevention

**Table A3. Exclusion criteria**

TOPICS EXCLUDED	JUSTIFICATION
Gastroenteritis, norovirus Polio Dengue, malaria, yellow fever HIV, hepatitis Sexually transmitted infections Rabies	Decision was made to focus on respiratory illnesses and viral haemorrhagic fever; illnesses transmitted by faecal–oral, vector-borne or sexually transmitted routes deemed to have different IPC approaches
Bioterrorism, anthrax	Bioterrorism agents deemed to have different issues to consider outside of IPC
Routine healthcare associated infections or outbreaks (e.g. central line-associated bloodstream infection, catheter-associated urinary tract infection, carbapenem-resistant Enterobacteriales, Clostridium difficile or other routine bacterial pathogens); antimicrobial resistance	Routine bacterial pathogens, deemed unlikely to be associated with national-level outbreaks
Public health policy, health promotion; historical information	Not generalizable to IPC
Specific focus outside the realm of IPC (e.g. infant feeding formula, mobile populations at porous border crossings, one specific WHO regional office, maritime experience)	Deemed too specific to be generalizable
Opinion pieces or narrative experiences of health care workers that were not generalizable to other contexts	Not generalizable
Treatment-focused, laboratory-specific, testing-specific reports; single case reports or small case-series	Not generalizable to IPC
Non-technical information designed for the public; description of a meeting or conference	Does not provide adequate technical detail

*IPC, infection prevention and control; WHO, World Health Organization.*



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