FRAMEWORK AND TOOLKIT FOR INFECTION PREVENTION AND CONTROL IN OUTBREAK PREPAREDNESS, READINESS AND RESPONSE AT THE HEALTH CARE FACILITY LEVEL

World Health Organization

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CONTENTS

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ABBREVIATIONS AND ACRONYMS

ABHR	alcohol-based handrub
AMR	antimicrobial resistance
CDNA	Communicable Diseases Network Australia
CDC	(United States) Centers for Disease Control and Prevention
COVID-19	coronavirus disease
ECDC	European Centre for Disease Prevention and Control
EVD	Ebola virus disease
IPC	infection prevention and control
IPCAF	infection prevention and control assessment framework
IPCAT	infection prevention and control assessment tool
MDRO	multidrug-resistant organism
MERS-CoV	Middle East respiratory syndrome coronavirus
PAHO	Pan American Health Organization
PPE	personal protective equipment
SARS	severe acute respiratory syndrome
SARS-CoV-2	severe acute respiratory syndrome coronavirus 2
USA	United States of America
WASH	water, sanitation and hygiene
WHO	World Health Organization

GLOSSARY

Active surveillance for multidrug-resistant organism (MDRO) carriers: The process to identify patients who are colonized with a targeted MDRO with the objective to institute prompt infection control measures. This approach is based upon the observation that detection of colonization may be delayed or missed completely for some MDROs if culture results obtained in the course of routine clinical care are the primary means of identifying colonized patients.

Antimicrobial resistance (AMR): Antibiotic resistance develops when bacteria adapt and grow in the presence of antibiotics. The development of resistance is linked to how often antibiotics are used. As many antibiotics belong to the same class of medicines, resistance to one specific antibiotic agent can lead to resistance to a whole related class. Resistance that develops in one organism or location can also spread rapidly and unpredictably. For instance, exchange of genetic material between different bacteria can affect antibiotic treatment of a wide range of infections and diseases. Drug-resistant bacteria can circulate in populations of human beings and animals through food, water and the environment, and transmission is influenced by trade, travel and both human and animal migration. Some of these features also apply to medicines that are used to treat viral, parasitic and fungal diseases; hence, the broader term 'antimicrobial resistance' *(1)*.

Communicable disease: Communicable, or infectious diseases, are caused by microorganisms such as bacteria, viruses, parasites and fungi that can be spread directly or indirectly from one person to another. Some are transmitted through bites from insects, some are caused by ingesting contaminated food or water, some can be spread by coughing, sneezing and saliva or mucus on unwashed hands, and others are spread through the exposure to infective bodily fluids, such as blood, vaginal secretions and semen *(2)*.

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 *(3)*.

Health care facility: Any place where people receive health care, for example, hospitals, primary health care centres, isolation camps, burn patient units, feeding centres, ambulatory care, and others *(4)*.

Incident management system: The standardized structure and approach that the World Health Organization (WHO) has adopted to manage its response to public health events and emergencies in order to ensure that it follows best practice in emergency management. WHO's six critical functions for emergency response under the incident management system are: leadership; partner coordination; information and planning; health operations and technical expertise; operations support and logistics; and finance and administration *(4)*.

Infection: The presence of microorganisms in or on the body with clinical signs of infection (for example, fever, lesions, wound drainage) either locally or systemically *(5)*.

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 *(6)*.

Multidrug-resistant organism (MDRO): Many different definitions for multidrug-resistant, extensively drug-resistant and pandrug-resistant bacteria are being used in the medical literature to characterize the different patterns of resistance found in health care-associated, antimicrobial-resistant bacteria. Here, we refer to microorganisms, mainly bacteria, classified as multidrug-resistant by a group of international experts through a joint initiative by the European Centre for Disease Prevention and Control (ECDC) and the United States Centers for Disease Control and Prevention (CDC) to create a standardized international terminology with which to describe acquired resistance profiles *(7)*.

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 behaviour. 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 to the usual background rate for the particular facility or ward;
- a single case for certain rare or epidemic prone diseases;
- a suspected, anticipated or actual event involving microbial contamination of food or water (for example, sink drains, water reservoirs) *(8)*.

Preparedness phase: Generally used to refer to the development of public health emergency response plans for relevant hazards. This includes the mapping of potential hazards and hazard sites, identification of available resources, development of appropriate 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/public health threat *(9)*.

Personal protective equipment (PPE): Specialized clothing or equipment worn to protect the health care worker or any other person from infection. These usually consist of standard precautions: gloves, mask and gown. If bloodborne or airborne infections, these will include face protection, goggles and mask or face shield, gloves, gown or coverall, head cover and rubber boots. *(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. The activities undertaken in this phase may take up to 6 months in in order to ensure readiness for a specific defined threat *(10)*.

Response phase: The setting in which emergency actions exceed the usual level of activities in response to a defined public health threat *(11)*.

Standard precautions: A set of activities designed to prevent the transmission of organisms between patients/staff for the prevention of health care-associated infection. They must be applied to ALL patients who require health care, by ALL health care workers in ALL health settings. They include: hand hygiene; use of PPE; handling and disposal of waste and sharps; handling and management of clean and used linen; environmental cleaning; and decontamination of equipment *(6)*.

Subnational: The term describes any government entity below the national level, regardless of the political, financial and administrative design of the country *(12)*.

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/under investigation for colonization or infection with an infectious microorganism *(6)*.

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BACKGROUND

Infectious disease outbreaks and epidemics pose a major risk to global health, security and socioeconomic stability. From Ebola virus disease (EVD) to influenza, severe acute respiratory syndrome (SARS), Middle East respiratory syndrome coronavirus (MERS-CoV), and severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), outbreaks are increasing in frequency, scale and impact. Health care facilities can amplify the transmission of emerging infectious diseases or multidrug- resistant organisms (MDRO) within their settings and communities. 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 and strengthening IPC preparedness and readiness at the facility level will reduce the health care-associated transmission risk, contribute to the timely outbreak response and containment, and prevent health systems from getting overwhelmed.

> **Note: This framework is developed as a companion to a broader document developed for national level stakeholders. However, the steps have been specifically tailored to a facility-level audience. At times, this has meant removing or streamlining actions or moving actions into a stepwise flow that would better guide facility-level actions.**

The framework provides the overarching principles, as well as a systematic approach towards each management phase, while the toolkit provides links to documents that may be most useful to guide specific relevant actions. The document should be viewed as an operational manual and we have sought to prioritize practicality, relevance and ease of updates.

METHODOLOGY

This document was developed through an evidence review and 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 existing materials available to guide IPC outbreak response coordination was undertaken in early 2020. Articles were reviewed for value and importance related to IPC strategies, operations and technical guidance in epidemic-prone disease outbreak preparedness and response. Of 495 full text articles reviewed, 98 articles were selected (see Framework and toolkit for infection prevention and control in outbreak preparedness, readiness and response at the national level for further details).

The literature review demonstrated a strong body of peer-reviewed and grey literature around broader areas that are external to IPC, but serve to support IPC functions, 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. In particular, the literature on IPC efforts in outbreak readiness was sparse. Findings from the literature review were first used to develop a national framework and a toolkit to support IPC actions at the three emergency management phases (preparedness, readiness and response) and then later adapted to the specific needs of this facility-level outbreak framework and toolkit.

For completeness, this document contains the list of references found in the the National document as generated by this literature review in the Annex. For more methodologic details on how the literature review for the national document was conducted, please refer to the national document link provided above.

SCOPE AND TARGET AUDIENCE

OBJECTIVES

To provide **stakeholders at health facilities** with a set of tools for preparedness, readiness and response to infectious disease and MDRO outbreaks.

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

This document provides guidance and tools for decision-makers responsible for the establishment and monitoring of health care facility-level IPC programmes, including IPC focal points, epidemiologists, public health experts, or key stakeholders. This document is geared towards outbreak response incident managers and any existing facility-level IPC committee. Other users include safety and quality leads and managers, and others involved in IPC activities.

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, primary care and long-term care facilities. This toolkit is intended to support IPC improvements for outbreak management throughout the health system, both in the public and private sectors. This framework provides a stepwise approach to IPC outbreak management and the toolkit provides helpful resources. Of note, 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 key sets of actions that are needed at every communicable disease outbreak management phase. The framework is designed to support healthcare facilities with the development of activities/actions to prepare for and respond to outbreaks. The **toolkit** refers to the resources that are provided at each phase.

The framework and toolkit address the following three critical outbreak management phases, which can ensure the successful control of emerging public health threats when used sequentially: phase 1 – preparedness; phase 2 – readiness; and phase 3 - response (Table 1).

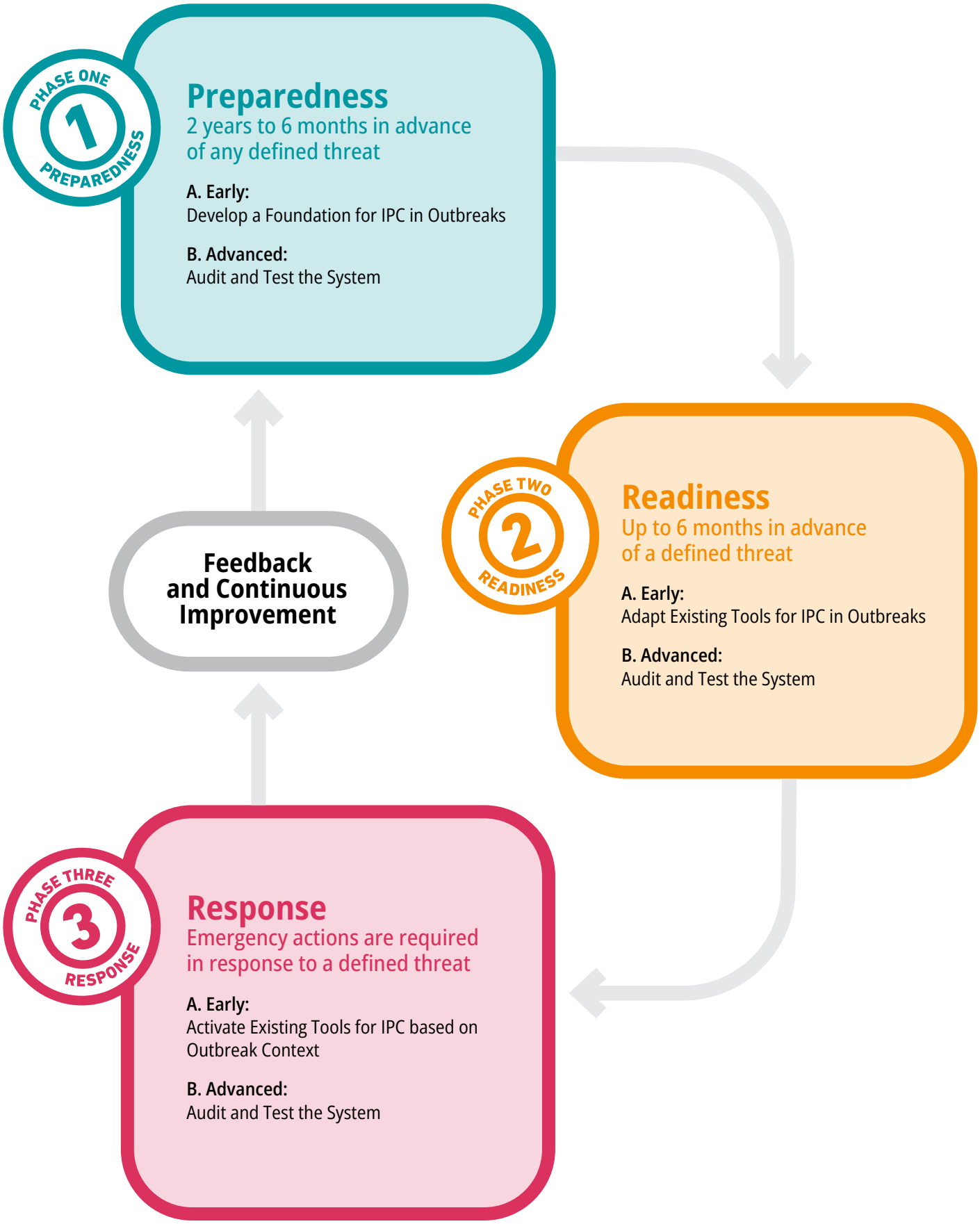
Table 1. Outbreak management phases at the facility level.

	This first stage includes the development of public health emergency response plans for relevant hazards, such as the mapping of potential hazards and hazard sites, identification of available resources, development of appropriate stockpiles of resources, as well as 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/public health threat . At the facility level, this would specifically refer to the development of plans for communicable disease outbreaks in the health care setting, covering topics such as mapping of potential hazards, resources, and the capacity to support facility operations.
	This stage links effective preparedness to an efficient response, that is, 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 . At the facility level, the specific threat would be a communicable disease with the potential to cause an outbreak in the facility within the next 6 months.
	The stage where emergency actions exceed the usual level of activities in response to a defined public health threat . At the facility level, the public health threat refers specifically to a communicable disease outbreak identified in the health care setting.

1. Preparedness. Geneva: World Health Organization; 2017 (https://www.who.int/publications/i/item/a-strategic-framework-for-emergency-preparedness, accessed 29 November 2021).
2. Readiness trainers guide. Addis Ababa and Geneva: World Health Organization/Panafrican Emergency Training Centre; ; 1999 (https://apps.who.int/disasters/repo/5515.pdf, accessed 15 November 2021).
3. Emergency response framework. 2nd ed. Geneva: World Health Organization; 2017 (https://apps.who.int/iris/handle/10665/258604, accessed 15 November 2021).

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

Fig. 1. Infection prevention and control outbreak preparedness, readiness and response framework.



The framework also provides priority actions and activities for each outbreak management phase, which are graded as 'immediate', 'early' and 'advanced' (Table 2).

Table 2. Outbreak management phases at the facility level.

Priority of actions	Definition
Early	The first set of actions required in each phase. The focus is on operationalizing key activities, outlining roles and responsibilities, and the necessary resources.
Advanced	The set of actions to be initiated when immediate and early actions are underway. The focus is on an audit and testing of the system.

CONSIDERATIONS TO NOTE BEFORE USING THE FRAMEWORK AND TOOLKIT

1. THE FRAMEWORK AND TOOLKIT SHOULD BE USED AT THE APPROPRIATE OUTBREAK MANAGEMENT PHASE, REFLECTING THE REALITY ON THE GROUND.

For example, a health care facility should not start with the preparedness phase if there is a pending communicable disease threat, for example, an outbreak declared in the neighbouring area or facility, or isolated cases of concern detected within the facility itself. In this case, the health care facility starts in the readiness phase, while simultaneously strengthening underdeveloped critical areas of IPC. If a health care facility is already in the midst of an outbreak, they should initiate the response phase, while simultaneously establishing any lacking minimum IPC requirements.

The preparedness section of the framework covers planning for potential infectious disease threats with various modes of transmission. More focused planning for existing threats will be covered in the readiness and response sections of the framework, with a particular emphasis on ramping up measures in a relatively short time span. Some examples of how this framework and toolkit could be used for specific communicable disease threats are listed below.

Example: Measles outbreak

- Preparedness phase: In advance of an outbreak of measles cases in your region or setting, verify that immunization records are being reviewed for all incoming health care workers and that staff are aware of the route of transmission and airborne precautions.
- Readiness phase: In advance of a measles outbreak in your facility, ensure that staff are trained to immediately isolate patients with signs and symptoms of measles and that contact tracing workflows are in place and being practised.
- Response phase: If a measles exposure or transmission in the hospital setting occurs, utilize key interventions (contact tracing, isolation, quarantine) and continue surveillance for additional cases.

2. THE FRAMEWORK IS GENERALIZABLE TO OUTBREAKS AND PANDEMICS, REGARDLESS OF THE PATHOGEN OR ROUTE OF TRANSMISSION.

The framework and toolkit described here are designed to target the prevention and control of communicable diseases with ***outbreak potential in the health care setting***. This includes diseases transmitted via contact, blood/bodily fluids, droplets or aerosols, as well as the IPC management of MDROs, such as methicillin-resistant *Staphylococcus aureus* (MRSA) and carbapenemase-producing *Klebsiella pneumoniae*, that may have an impact not only at the facility level, but also have broader implications for the community.

Special consideration: Antimicrobial Resistance (AMR)

Microorganisms with potential to cause health care-associated infections and facility-level outbreaks require special consideration at the health care facility. General guidance will be provided in this document that should help facilities plan for outbreaks of AMR organisms.

For specific guidance, facilities should consult documents such as the Implementation manual to prevent and control the spread of carbapenem-resistant organisms at the national and health care facility level. Additional reference documents are included in the AMR section of the toolkit. These documents provide direction and, in some cases, step-by-step guidance on the preparedness, readiness and response to AMR outbreaks in health care facilities.

Examples of activities for resistant organisms in each phase

- **Preparedness phase:** In advance of any new or emerging MDRO threat in your region or setting, ensure that you have a system set up for AMR surveillance and a relationship with a laboratory capable of detecting key AMR organisms. Ensure that staff are aware of AMR and appropriate IPC precautions.
- **Readiness phase:** In advance of a new or emerging AMR outbreak in your facility, monitor national, regional and facility trends of key AMRs, while simultaneously educating staff on AMRs of concern and bolstering infection prevention measures in high-risk areas.
- **Response phase:** At the time of a new or emerging AMR outbreak in your facility, monitor numbers of cases of a particular AMR organism in a ward or unit, while implementing key mitigation measures in the areas of interest.

3. THE TOOLKIT PROVIDES RESOURCES THAT CAN BE ADAPTED TO INFORM ACTIONS IN THE LOCAL CONTEXT AT EACH EMERGENCY MANAGEMENT PHASE (SOME CORE RESOURCES WILL BE LISTED AS REFERENCES AND WILL BE INDICATED BY ⚘ THROUGHOUT THE TEXT).

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

⚘ Guidelines on core components of infection prevention and control programmes at the national and acute health care facility level. Geneva: World Health Organization; 2016. (https://www.who.int/gpsc/core-components.pdf, accessed 15 November 2021).

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. The reader should expect to see these resources and other key resources listed in multiple sections. These broad documents contain materials that will be helpful at multiple phases and moments of outbreak preparedness, readiness and response.

4. IF IPC COMPONENTS ARE LACKING OR LIMITED, THIS SHOULD NOT PRECLUDE OR DELAY THE USE OF THIS FRAMEWORK AND TOOLKIT.

In facilities where IPC is limited, it is crucial to start by evaluating the existing capacity to establish the critical areas that are missing or need further development. **The framework and toolkit can be used simultaneously at any phase of outbreak management, while building and developing critical IPC components.**

5. REPETITION IS DELIBERATELY USED IN THIS FRAMEWORK AND TOOLKIT TO ENSURE THAT KEY CONCEPTS OR PRACTICES ARE IMPLEMENTED, STRENGTHENED AND REFINED AT VARIOUS PHASES.

Similar concepts and actions will be covered in the preparedness, readiness and response phases. This allows the reader to address the same concept from different perspectives, that is, when an emerging threat has not been identified, when it is an imminent threat, and when an outbreak is occurring.

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 adds to the fund of knowledge in this area and provides a needed resource for the strengthening of IPC in low- and middle-income settings. **The toolkit compiles resources that will need future adaptation and updates based on public health threats/outbreaks.**

PHASE 1 FRAMEWORK: OUTBREAK PREPAREDNESS

USING THIS FRAMEWORK AND TOOLKIT IN PHASE 1: OUTBREAK PREPAREDNESS

'Preparedness' is the stage that includes the development of public health emergency response plans for relevant hazards, including the mapping of potential hazards and hazard sites, identification of available resources, development of appropriate national stockpiles of resources, as well as 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 IPC activities are adequate in the event of future communicable disease threats.

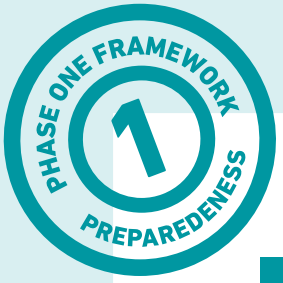
The framework for phase 1 – preparedness provides a method to prepare generally for any outbreak that could arise at the facility level. The toolkit provides reference materials and resources with additional details. The phase 1 preparedness toolkit outlines early priority actions that should be undertaken to lay the foundation for IPC, followed by an assessment step in the advanced priority section.

In phase 1 (preparedness), there is no identified outbreak occurring and it is geared towards setting the baseline for IPC. In phase 2 (readiness), a specific threat has been identified, and in phase 3 (response), the outbreak is underway.

The actions outlined should be executed in a stepwise manner beginning with phase 1, priority A, step 1, that is, an evaluation of existing IPC functions at the facility. **Each step contains the key WHO resources to be used for that action and these are provided in the 'Toolkit for all phases' section, as well as additional resources.** They are grouped by subject matter, thus allowing the reader to select the most applicable resources for their setting.

> 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 simultaneously while developing critical areas of IPC. The reader should prioritize IPC areas which need strengthening to ensure the best public health response.

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



PHASE 1. OUTBREAK PREPAREDNESS: 2 YEARS TO 6 MONTHS IN ADVANCE OF ANY POTENTIAL OUTBREAK

1A. EARLY PRIORITY: DEVELOP AN IPC FOUNDATION

1. Evaluate IPC capacity

Evaluate current IPC function and capacity. Identify IPC areas needing to be strengthened at the health care facility level.

OBJECTIVES

- Conduct a baseline IPC assessment utilizing the tools below to identify key issues requiring attention and improvement. The results should be used to develop an action plan and serve as an indicator of the IPC measures in place. A minimum understanding of the principles of infectious disease transmission should be reinforced.
  - The WHO IPC core components help to plan, organize and implement an IPC programme and should be implemented in line with the priorities of the IPC programme and the resources available.
  - Users should apply the infection prevention and control assessment framework (IPCAF) at the facility level tool in the preparedness phase to determine whether normative IPC measures are in place at the health care facility level.
  - Other tools specific to defined areas (including hand hygiene, MDROs, water, sanitation and hygiene [WASH]) may be used as supplementary material to identify key issues requiring attention and improvement and can be found in 'Toolkit for all phases: resources' under these subject headings.
  - Identify areas in the IPC minimum requirements that need strengthening to ensure the best response to outbreaks at the health care facility level.

CORE RESOURCES

- Core components of infection prevention and control programmes in health care. Geneva: World Health Organization; 2011 (https://www.who.int/csr/resources/publications/AM_CoreCom_IPC.pdf?ua=1).
  - Infection prevention and control assessment framework at the facility level. Geneva: World Health Organization; 2018 (https://www.who.int/infection-prevention/tools/core-components/IPCAF-facility.PDF?ua=1).
  - Minimum requirements for infection prevention and control programmes. Geneva: World Health Organization; 2019 (https://apps.who.int/iris/handle/10665/330080).
  - Hand hygiene self-assessment framework. Geneva: World Health Organization; 2010 (https://www.who.int/gpsc/country_work/hhsa_framework_October_2010.pdf?ua=1).
  - Water, sanitation and hygiene for health facilities improvement tool (WASH FIT): a practical guide for improving quality of care through water, sanitation and hygiene in health care facilities. Geneva: World Health Organization; 2017 (https://apps.who.int/iris/handle/10665/254910).
  - Ensuring a safe environment for patients and staff in COVID-19 healthcare facilities. Geneva: World Health Organization; 2020 (https://www.who.int/publications/i/item/WHO-2019-nCoV-HCF_assessment-Safe_environment-2020.1).

ADDITIONAL RESOURCES

- See the Toolkit for all phases: resources section on IPC programme fundamentals, if needed.

2. IPC programme

Develop or strengthen the health care facility IPC programme based on the evaluation conducted in the previous step.

OBJECTIVES

- Based on the overall evaluation in step 1 above, consider gaps in any areas and define those to be developed, including the following aspects.
  - Ensure that the programme objectives, functions, and activities are clearly outlined.

- Ensure that IPC staffing is adequate:
  - Staffing should be allocated based on the type of facility; for example, for acute care facilities, at least one full-time focal point trained in IPC per 250 acute care beds.
- Ensure that a dedicated IPC budget is available (minimum requirement) with provision for outbreak functions (additional staffing, extra PPE, etc.).
- Ensure that a functional IPC committee is in place with clear roles and functions.
- Ensure that the IPC programme is linked with other relevant programmes (for example, quality improvement).

CORE RESOURCES

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

ADDITIONAL RESOURCES

- See the Toolkit for all phases: resources section on IPC programme fundamentals, if needed.

3. IPC guidelines:

Ensure that IPC guidelines are being appropriately referenced and utilized.

OBJECTIVES

- Consider gaps in any of the following areas in existing IPC guidance and define areas to be developed, including the following aspects.
  - Ensure that evidence-based IPC guidelines adapted to the local context are available, as well as standard operating procedures on standard and transmission-based precautions.
  - Ensure the presence of a system including an active IPC committee to monitor adherence with guideline recommendations (minimum requirement).
- If additional materials are needed, adapt from any available national or subnational documents or consider adapting documents from international sources or other countries, as feasible.

CORE RESOURCES

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

ADDITIONAL RESOURCES

- See the Toolkit for all phases: resources section on national frameworks for IPC, if needed.

4. Outbreak plan:

Reinforce the IPC components of any outbreak preparedness plans in existence; or develop outbreak plans if none exist.

OBJECTIVES

- Review any available national or regional IPC-specific outbreak management guidance. If national or regional guidance is not available, consider adapting international guidance to the local context.
  - Use adapted or available outbreak management guidance and incorporate within any existing IPC guidelines. Specifically ensure that the following areas have been addressed:
    - Overview of IPC goals and objectives in outbreaks;
    - Surge capacity and ways to monitor IPC supplies (PPE, hand hygiene and disinfection supplies) in collaboration with operations and logistics partners.
- Review any national guidance covering the following areas and adapt or refer to them at the health care facility level.
  - Rapid identification and isolation of suspected cases among patients and healthcare workers.
  - Safe processes for sample collection, transport and laboratory analysis.
  - Rapid contact tracing in the health care setting and identification/management of health care contacts.
  - Process to assess and optimize PPE and other supplies, including cleaning supplies and equipment, alcohol-based handrub (ABHR), soap and other hand hygiene supplies, as well as development of contingency plans in case of supply shortages.
- Create roles/responsibilities for IPC members as part of an outbreak response team (IPC outbreak response team could be members of the IPC committee).

CORE RESOURCES

- Minimum requirements for infection prevention and control programmes. Geneva: World Health tion: 2019 Organization; 2019 (https://apps.who.int/iris/handle/10665/330080).
  - Rational use of personal protective equipment for coronavirus disease (COVID-19) and considerations during severe shortages: interim guidance. Geneva: World Health Organization; 2020 (https://apps.who.int/iris/bitstream/handle/10665/331695/WHO-2019-nCov-IPC_PPE_use-2020.3-eng.pdf)
  - Guide to local production: WHO-recommended handrub formulations. Geneva: World Health Organization; 2010 (https://www.who.int/gpsc/5may/Guide_to_Local_Production.pdf),
  - COVID-19 essential supplies forecasting tool (COVID-ESFT). Geneva: World Health Organization; 2021 (https://www.who.int/publications/i/item/WHO-2019-nCoV-Tools-Essential-forecasting-2021-1).
  - Hospital preparedness for epidemics. Geneva: World Health Organization; 2014 (https://www.who.int/publications/i/item/hospital-preparedness-for-epidemics).

5. Training programmes:

Identify or adapt external outbreak training programmes that could be used by the health care facility.

OBJECTIVES

- Evaluate any existing IPC training programmes at the national or subnational level (including those run by external organizations) that could be used in the health care facility.
  - Make these training materials available to key staff at the health facility.
  - Encourage and facilitate ways for key personnel to participate in such training on an ongoing basis.
- Train an IPC outbreak response team in preparation for future outbreak management utilizing any available national or subnational materials.
  - Include drills, simulations or tabletop exercises on outbreak preparedness.
- Utilize national or subnational materials to prepare other IPC staff for potential future outbreaks.
  - Use the IPC response team to play the role of master trainers for the training of other health care workers.

- Develop employee orientation and in-service continuous training on IPC, with support from the facility department responsible for organizing employee training programmes.
  - Ensure that all health care workers meet basic competencies in IPC practices through in-service training including (but not limited to) hand hygiene and donning and doffing of PPE.
  - Ensure regular PPE fit checks (in the case of respirators) and testing to ensure the correct functioning of devices such as powered air-purifying respirators.
  - Consider overarching principles in IPC, as well as specific training for standard and transmission-based precautions.
  - Utilize the following if appropriate for the setting:
    - Master trainers ('train-the-trainers');
    - Interactive and hands-on training techniques;
    - Multimodal teaching formats.

CORE 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).
  - Infection prevention and control training package. World Health Organization; United States Centers for Disease Control and Prevention; University of Washington Global Health E-Learning Program (https://openwho.org/channels/ipc).

ADDITIONAL RESOURCES

- See the Toolkit for all phases: resources section on IPC training and assessment, if needed.

6. Surveillance and reporting:

Ensure that a functioning surveillance system for diseases with outbreak potential is in place using both syndromic and microbiological surveillance, and in line with district and national priorities.

Surveillance and reporting of infections among hospitalized patients and health care workers should be considered as an important support function used to guide appropriate IPC activities.

OBJECTIVES

- Evaluate existing health care facility surveillance and reporting systems. Consider gaps in any of the following areas and define those to be developed using available national or subnational resources.
  - Clear objectives and methods.
  - Standardized case definitions for diseases with outbreak/pandemic potential.
  - Process for data analysis and evaluation of data quality.
  - Process for reporting to health care facility leadership or external agencies.
  - Relationships with national or subnational public health laboratories.
- Ensure human and financial resources, including the designation of a technical team or individual overseeing of surveillance for diseases with outbreak/pandemic potential and IPC indicator monitoring.
- Secure support and engagement from hospital leadership.
- Develop adequate microbiology and laboratory capacity either at the health care facility or develop relationships with external laboratories that can support the needs of the facility.
- Ensure adequate surge capacity for surveillance and reporting in the event of a large-scale event.

CORE RESOURCES

- Minimum requirements for infection prevention and control programmes. Geneva: World Health Organization; 2019 (https://apps.who.int/iris/handle/10665/330080).
  - Surveillance standards for vaccine-preventable diseases. 2nd ed. Geneva: World Health Organization; 2018 (https://apps.who.int/iris/handle/10665/275754).

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

ADDITIONAL RESOURCES

- See the Toolkit for all phases: resources section on surveillance, if needed.

7. Outbreak response team:

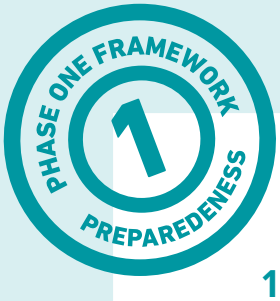
Establish an IPC outbreak response team (as part of the existing IPC team) to revise, adapt and disseminate policies, guidelines, training and other IPC outbreak-related activities as needed.

OBJECTIVES

- Evaluate the existence of an IPC outbreak response team, consider gaps in any of the following areas and define those to be developed, including the following aspects.
  - Establish roles and responsibilities of members:
    - Include members from multiple sectors (for example, hospital leadership, laboratory, nursing, medical, building maintenance);
    - Review scope of work, as well as mode of operation (for example, how to meet, frequency of meetings etc.);
    - Create an IPC structure to cascade and disseminate information from the task force to hospital staff in each department.
  - Identify roles and responsibilities of all partners and ensure that a coordination structure exists to guarantee a clear line of command and avoid duplication of efforts.

CORE RESOURCES

- 2019 Novel coronavirus (2019-nCoV): strategic preparedness and response plan. Geneva: World Health Organization; 2020 (https://www.who.int/docs/default-source/coronaviruse/srp-04022020.pdf).



1B. ADVANCED PRIORITY: AUDIT AND TEST THE SYSTEM

1. Assess IPC outbreak preparedness:
Evaluate the status of IPC outbreak preparedness after early actions have been initiated. Define areas to be adapted or modified based on future threats, including the following aspects.

OBJECTIVES

- Evaluate the status of IPC practices. Utilize standardized tools to identify gaps in any of the following areas and define those to be adapted or modified, including consideration of the following elements.
  - Ensure IPC protocols with standardized procedures are available and functional, which should include a mechanism for periodic monitoring and feedback.
  - Use 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 that management of diseases with pandemic potential;
    - Consider tabletop exercises to develop back-up plans or diversion systems.

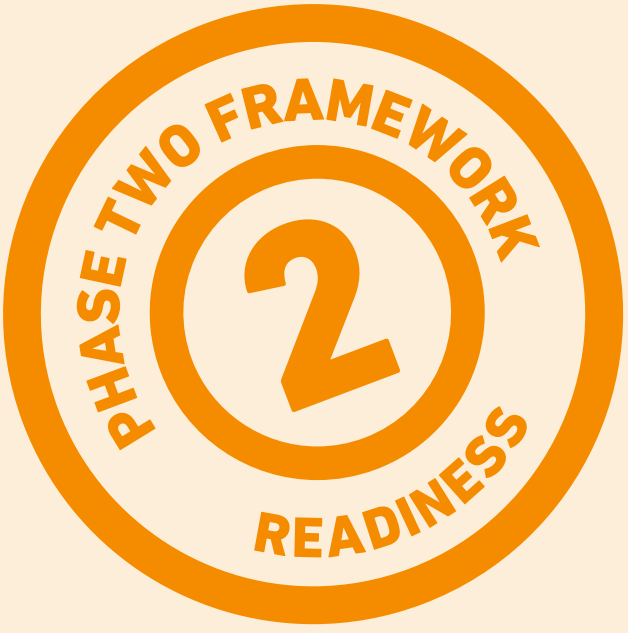
CORE RESOURCES

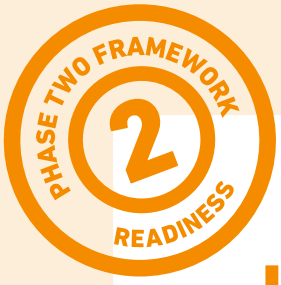
- Infection prevention and control assessment framework at the facility level. Geneva: World Health Organization; 2018 (https://www.who.int/infection-prevention/tools/core-components/IPCAF-facility.PDF?ua=1).
  - Infection prevention and control facility-level assessments using WHO standardized tools in a spirit of improvement. Geneva: World Health Organization; 2018 (https://www.who.int/infection-prevention/campaigns/IPCAF_training-video.EN.pdf?ua=1).
  - 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; 2018 (https://apps.who.int/iris/handle/10665/254741).

ADDITIONAL RESOURCES

- See the Toolkit for all phases: resources section on IPC programme fundamentals, if needed.

PHASE 2 FRAMEWORK: OUTBREAK READINESS





USING THIS FRAMEWORK AND TOOLKIT IN PHASE 2: OUTBREAK READINESS

'Readiness' is the state that links effective preparedness to efficient relief and a statement of the capacity and capability of a relief agency or service. Activities undertaken in this phase may take up to 6 months in order to ensure readiness for a specific defined threat. At the facility level, the specific threat would be a communicable disease with the potential to cause an outbreak in the health care facility within the next 6 months.

Readers may start using the framework and toolkit in phase 2 – readiness as soon as an impending communicable disease threat with the potential to cause an outbreak has been identified.

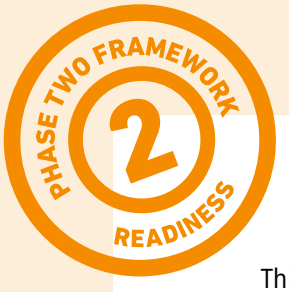
Completing phase 1 – preparedness in its entirety is not a prerequisite to starting phase 2. However, the reader should attempt to complete phase 1, priority A, step 1 'Evaluate IPC capacity', before moving on to phase 2.

If there is not enough time to complete this evaluation step, please refer to the Toolkit for all phases: resources section on rapid checklists and use these for a rapid assessment.

> **If IPC components are lacking or limited, this does not preclude or delay the use of this toolkit. This phase 2 – outbreak readiness framework and toolkit may be used simultaneously while building and developing critical areas of IPC.**

The actions outlined in phase 2 – readiness should be executed in a stepwise manner. Each step contains the key WHO resources to be used for that action, but additional resources grouped by subject matter can be found in the 'Toolkit for all phases: resources', thus allowing the reader to select the most applicable resources for their setting.

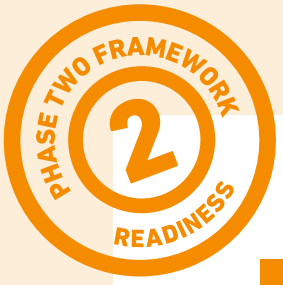
If the reader begins working through the steps of outbreak preparedness with the evaluation of existing IPC outbreak capacity and observes that certain components are incompl, IPC areas that need strengthening should be prioritized to ensure the best public health response.



This framework for phase 2 – readiness provides a method to prepare more specifically for a potential outbreak at the facility level; the toolkit contains reference materials and resources that will provide more details. The toolkit outlines 'early priority' actions in phase 2 – readiness, followed by an assessment step in the 'advanced priority' section.

Given the creation of this toolkit in 2021, some resources provided have a focus on COVID-19. These may be used as examples and additional documents better suited to the outbreak at hand may be needed to supplement the steps and should be tailored to the specific needs, based on the situation.

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



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

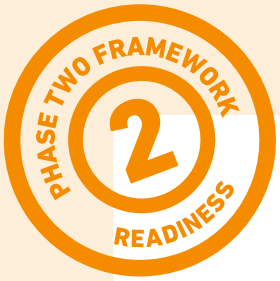
2A. EARLY PRIORITY:
ADAPT EXISTING TOOLS FOR IPC IN OUTBREAKS

1. Outbreak plan:

Update any existing IPC outbreak plans in the readiness phase in order to focus on IPC strategies specific to the threat at hand. Where no plans exist, define priority areas to be tackled.

OBJECTIVES

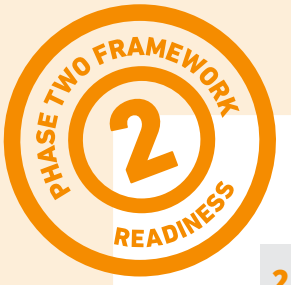
- Identify priority IPC areas to strengthen based on the threat at hand to mitigate the risks of transmission and in preparation for the possibility of community transmission.
- Evaluate any existing IPC response plans. Consider gaps in any of the following areas and define those to be updated or modified. Adapt and utilize national and subnational materials to supplement and update any existing guidance addressing these aspects.
  - Surveillance definitions for diseases with outbreak potential (including syndromic surveillance) and triggers for escalation to health care facility leadership.
  - Standard precautions and transmission-based precautions for patients with suspected, or confirmed infectious diseases with outbreak potential.
  - Rapid identification and isolation of suspected cases among patients and health care workers.
  - Rapid contact tracing in the health care setting, identification of health care contacts, and quarantine of contacts:
    - A policy to test and isolate (if positive) exposed health care workers.
  - A plan for patient placement, transportation and referral.
  - Adaptations of standard operating protocols for visitor management (including PPE for visitors) and crowd control.
  - Review any national guidance covering the following areas, and in coordination with the laboratory task force.
  - Assess and optimize PPE and other supplies, including cleaning supplies and equipment, ABHR/soap/single-use paper towels, as well as contingency plans for distribution.



- Create roles/responsibilities for IPC members of rapid response teams and roster staff who can contribute to the IPC elements of a rapid response team.
- Use drills, simulations or tabletop exercises to test the health care facility IPC outbreak plan.
- Ensure that plans are in place for PPE stockpiles and anticipate PPE burn rates (or rates of utilization/needs for additional procurement).
- Review budget items for IPC aspects of response in coordination with finance managers.
- Review plans for refresher IPC training.

CORE RESOURCES

- Hospital preparedness for epidemics. Geneva: World Health Organization; 2014 (https://www.who.int/publications/i/item/hospital-preparedness-for-epidemics).
- Rational use of personal protective equipment for coronavirus disease (COVID-19) and
- considerations during severe shortages: interim guidance. Geneva: World Health Organization; 2020 (https://apps.who.int/iris/bitstream/handle/10665/331695/WHO-2019-nCov-IPC_PPE_use-2020.3-eng.pdf).
- Guide to local production: WHO-recommended handrub formulations. Geneva: World Health Organization; 2010 (https://www.who.int/gpsc/5may/Guide_to_Local_Production.pdf).
- COVID-19 essential supplies forecasting tool (COVID-ESFT). Geneva: World Health Organization; 2021 (https://www.who.int/publications/i/item/WHO-2019-nCoV-Tools-Essential-forecasting-2021-1).



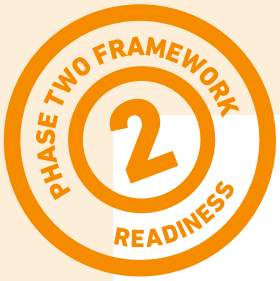
2. Surveillance and reporting:

Ensure that a functioning surveillance system for diseases with outbreak potential is in place with both syndromic and microbiological surveillance and in line with district and national priorities.

Surveillance and reporting of infections among hospitalized patients and health care workers should be considered as an important support function used to guide appropriate IPC activities. Health care facility-level surveillance programmes are crucial (especially for tertiary and secondary care facilities) for the early detection of outbreaks where cases are described by the identification of the pathogen or by the resistance profile (as with MDROs).

OBJECTIVES

- Review existing health care facility surveillance and reporting systems. Consider gaps in any of the following areas and define those to be adapted or modified based on the threat at hand using available national or subnational resources, including the following aspects.
  - Clear objectives and methods.
  - Adequate microbiology and laboratory capacity or relationships with external laboratories that can support the needs of the health care facility.
  - Standardized case definitions for diseases with outbreak/pandemic potential.
  - Process for data analysis and evaluation of data quality.
  - Process for reporting to health care facility leadership or external agencies.
  - Relationships with national or subnational public health laboratories.
- Adapt the existing framework to analyze and track the specific epidemiological situation at hand and to implement IPC response activities, including the following aspects.
  - Generate regular reports at the health care facility level; analyze available reports at the local, national and international levels and disseminate to health care facility leadership/key stakeholders.
  - Develop IPC indicators for an impending outbreak (for example, health care worker infections, percentage of trained health care workers, IPC supplies).



- Develop and/or establish a local network between health care facilities for epidemiological forecasts and response projections to inform strategic and operational planning at the facility level.
- Plan for communication of findings and escalation to health care facility leadership.

- Ensure that human and financial resources are available, including designating a team or individuals overseeing surveillance for diseases with outbreak/pandemic potential and monitoring of IPC indicators.
  - Ensure that support and engagement from hospital leadership exist.
  - Ensure that adequate microbiology and laboratory capacity exists at the health care facility, or develop relationships with external laboratories that can support the needs of the facility.

CORE RESOURCES

- Minimum requirements for infection prevention and control programmes. Geneva: World Health Organization; 2019 (https://apps.who.int/iris/handle/10665/330080).
  - Surveillance standards for vaccine-preventable diseases. 2nd ed. Geneva: World Health Organization; 2018 (https://apps.who.int/iris/handle/10665/275754).
  - Communicable disease surveillance and response systems: guide to monitoring and evaluating. Geneva: World Health Organization; 2006 (https://apps.who.int/iris/handle/10665/69331).
  - 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).

ADDITIONAL RESOURCES

- See the Toolkit for all phases: resources section on surveillance, if needed.

3. Outbreak team:

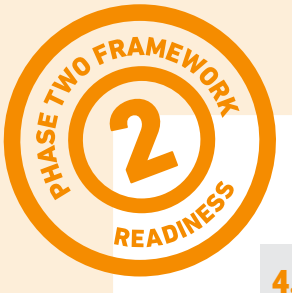
Coordinate any existing IPC outbreak response team to revise, adapt, and disseminate policies, guidelines, training and other IPC outbreak-related activities, as needed. If an IPC outbreak team does not exist, establish one with the inclusion of key IPC committee members. Ensure that roles are well defined to minimize duplication of efforts.

OBJECTIVES

- Coordinate any existing IPC outbreak team if an outbreak response team does not exist and designate individuals in the IPC team for outbreak response. Consider gaps in any of the following areas and define those to be adapted or modified based on the threat at hand, including the following aspects.
  - Prepare the IPC outbreak team to adapt policies, guidelines, training and other IPC- related activities specific to any threat at hand from national and subnational sources and disseminate these resources across the entire health care facility.
  - Identify roles and responsibilities of partners within the health care facility and ensure that a coordination structure exists to avoid duplication of efforts.

CORE RESOURCES

- 2019 Novel coronavirus (2019-nCoV): strategic preparedness and response plan. Geneva: World Health Organization; 2020 (https://www.who.int/docs/default-source/coronaviruse/srp-04022020.pdf).

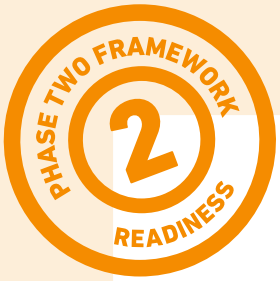


4. Surge capacity:

Adapt plans for surge capacity and IPC resources specific to the outbreak at hand (at a minimum, consider PPE, hand hygiene and disinfection supplies) in collaboration and partnership with subnational (regional/ district/local) and national level agencies and networks.

OBJECTIVES

- Review existing surge capacity plans and leverage in any existing subnational or national guidance documents. Consider gaps in any of the following areas and define those to be adapted or modified based on the threat at hand, including consideration of human resources, financial and logistical issues.
  - Detailed inventory mapping of existing capacities, for example, number of hospital and intensive care unit beds, and equipment.
  - Consider establishing a stockpile of IPC supplies and equipment.
    - Anticipate supply shortages and coordinate with vendors and the health care facility about availability and prioritization of supplies.
    - Provide contingency plans to respond to limited IPC resources or stock-outs.
  - Determine alternate service delivery models that will be used (telehealth, alternate care sites) to conserve PPE and reduce the burden on the healthcare system.
  - Develop surge plans for handling higher numbers of patients requiring isolation, or higher than normal numbers of staff on sick leave.
  - Develop plans to protect and expand workforce (for example, rosters of staff who could be called in during case surges).
  - Refine IPC plans for handling larger numbers of deaths than normal.
  - Refine plans for escalation of needs to health care facility leadership.



CORE RESOURCES

- Rational use of personal protective equipment PPE for coronavirus disease (COVID-19) and considerations during severe shortages: interim guidance. Geneva: World Health Organization; 2020 (https://apps.who.int/iris/bitstream/handle/10665/331695/WHO-2019-nCov-IPC_PPE_use-2020.3-eng.pdf).
- COVID-19 essential supplies forecasting tool (COVID-ESFT). Geneva: World Health Organization; 2021 (https://www.who.int/publications/i/item/WHO-2019-nCoV-Tools-Essential-forecasting-2021-1).

ADDITIONAL RESOURCES

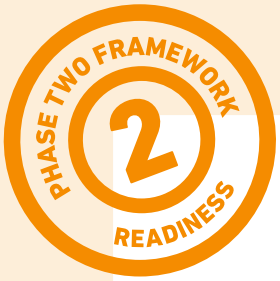
- See the Toolkit for all phases: resources sections on PPE and supply planning and surge capacity, if needed

5. Communication strategy:

Adapt any existing communication strategies for the specific outbreak/pandemic threat at hand and ensure it integrates with the broader outbreak communication strategy at the national or subnational level.

OBJECTIVES

- Adapt any existing communication framework to the threat at hand. For widespread threats, adapt and/or translate national guidance; for local outbreaks, subnational (regional/district/local) materials may be used.
  - Disseminate IPC information to various groups (health care workers, local leadership, community, social media; consider hotlines, etc.).
  - Adapt and utilize national messaging to describe when patients should come to health facilities to receive care, as well as describing any alternate service delivery models that will be used (telehealth, alternate care sites) and visitor management rules:
    - Ensure that messaging is in an appropriate language/s and relevant to the local setting.
  - Ensure that the hospital leadership and administration are supportive and involved in decision-making regarding internal and external communications.

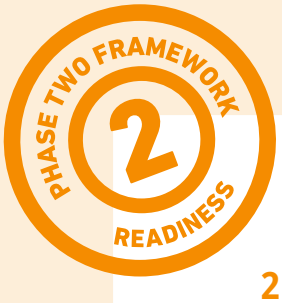


CORE RESOURCES

- Outbreak communication planning guide. Geneva: World Health Organization; 2008 (https://www.who.int/ihr/elibrary/WHOOutbreakCommsPlanngGuide.pdf?ua=1).
  - Crisis and emergency risk communications plan. Implementation for a severe pandemic. Pan American Health Organization. 2013 (https://www.paho.org/disasters/dmdocuments/RespToolKit_21_Tool%2013_CommunicationsPlanImplementationforaSeverePandemic.pdf).
  - Communicating during an outbreak or public health investigation. Atlanta, GA: Centers for Disease Control and Prevention; 2018 (https://www.cdc.gov/eis/field-epi-manual/chapters/Communicating-Investigation.html).
  - Risk communication. Geneva: World Health Organization; 2021 (https://www.who.int/emergencies/risk-communications).

ADDITIONAL RESOURCES

- See the Toolkit for all phases: resources section on crisis communication, if needed.



2B. ADVANCED PRIORITY: AUDIT AND TEST THE SYSTEM

1. Assessment:
Evaluate the status of IPC outbreak readiness after early actions have been initiated. Define areas to be adapted or modified based on the threat at hand, including the following aspects.

OBJECTIVES

- Evaluate the current status of IPC practices. Utilize standardized tools to identify gaps and inform priority actions. Consider gaps in any of the following areas and define those to be adapted or modified based on the threat at hand, including consideration of the following aspects.
  - Ensure that IPC protocols with standardized procedures are available and functional, including 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 of IPC in particular areas:
    - Review the surge capacity for the management of diseases with pandemic potential;
    - Consider tabletop exercises to develop back-up plans or diversion systems.

CORE RESOURCES

- Infection prevention and control assessment framework at the facility level. Geneva: World Health Organization; 2018 (https://www.who.int/infection-prevention/tools/core-components/IPCAF-facility.PDF?ua=1).
  - 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).
  - Rapid hospital readiness checklist: interim guidance. Geneva: World Health Organization; 2020 (https://www.who.int/publications/i/item/WHO-2019-nCoV-hospital-readiness-checklist-2020.1).

ADDITIONAL RESOURCES

- See the Toolkit for all phases: resources sections on IPC programme fundamentals and rapid assessment checklists, if needed.

PHASE 3 FRAMEWORK: OUTBREAK RESPONSE

USING THIS FRAMEWORK AND TOOLKIT IN PHASE 3: OUTBREAK RESPONSE

Readers may start using the framework and toolkit in phase 3 – outbreak response if an infectious disease threat is causing a health care facility outbreak or impacting on the community, with the potential to be amplified in the health care setting.

Health care facility IPC staff, in consultation with the chair of the IPC committee, may determine if an outbreak is occurring at the health care facility level, based on a comparison with the baseline incidence of disease. If needed, see additional resources on declaring an outbreak in 'Toolkit for all phases: resources'. For local, regional, or national outbreaks, this determination would be made at the subnational or national level.

Completing **phase 1 – preparedness and phase 2 – readiness** in their entirety are not prerequisites to starting a **phase 3 – outbreak response. However, the reader should attempt to complete phase 1, priority A, step 1 'Evaluate IPC capacity' while simultaneously starting phase 3.**

If there is insufficient time to complete this evaluation step, please see the Toolkit for all phases: resources section on rapid checklists and use these checklists for a rapid assessment.

> **If IPC components are lacking or limited, this does not preclude or delay the use of this toolkit. This phase 3 – outbreak response toolkit may be used simultaneously while building and developing critical areas of IPC.**

The actions outlined in phase 3 – outbreak response should be executed in a stepwise manner. **Each step contains the key WHO resources to be used for that action, but additional resources grouped by subject matter can be found in the 'Toolkit for all phases: resources',** thus allowing the reader to select the most applicable resources for their setting.

A the reader begins working through the steps of the outbreak response with the evaluation of existing IPC outbreak capacity and observes that certain components are found to be lacking, IPC areas that need strengthening should be prioritized to ensure the best public health response.

This framework for the **phase 3 – outbreak** response provides a method to

prepare for a specific outbreak at the facility level and the toolkit provides reference materials and resources with more details. The toolkit outlines 'early priority' actions in phase 3, followed by an assessment step in the 'advanced priority' section.

Given the creation of this toolkit in 2021, some resources provided in phase 3 focus on COVID-19 and can be used as examples. However, additional documents better suited to the outbreak at hand may be needed to supplement the steps and should be tailored according to the situation being faced.

Before using this document, please see the 'Background' (page 1) and 'Description of the framework and toolkit and instructions for use' (page 3) sections.

PHASE 3. OUTBREAK RESPONSE: EMERGENCY ACTIONS IN RESPONSE TO AN OUTBREAK

3A. IMMEDIATE PRIORITY: ACTIVATE EXISTING AND ADAPTED TOOLS FOR IPC BASED ON THE OUTBREAK CONTEXT

1. Outbreak response team:
Activate the IPC outbreak response team to review, revise, adapt and disseminate IPC-related information across the health care facility.

OBJECTIVES

- Activate any existing IPC outbreak response team. If an IPC outbreak response team does not exist, designate individuals from the IPC committee to the outbreak response. Ensure that roles are well defined to minimize duplication of efforts.
- Focus on rapidly identifying and adapting national or subnational materials specific to the outbreak at hand, with consideration of the following elements.
  - Guidelines, training and other IPC-related information across all levels of the health care system specific to the threat at hand.
  - Roles and responsibilities of partners in other departments, as well as ensuring that a coordination structure exists to avoid duplication of efforts.
- If the outbreak is large (regional or national/international level), ensure that coordination exists between the outbreak response team and any local or subnational task force or incident command structure, which in turn should coordinate with national and international agencies.

CORE RESOURCES

- 2019 Novel coronavirus (2019-nCoV): strategic preparedness and response plan. Geneva: World Health Organization; 2020 (https://www.who.int/docs/default-source/coronaviruse/srp-04022020.pdf).
- COVID-19 strategy update. Geneva: World Health Organization; 2020 (https://www.who.int/docs/default-source/coronaviruse/covid-strategy-update-14april2020.pdf?sfvrsn=29da3ba0_19).

2. Outbreak plan:

Activate any existing outbreak plans in the response phase with a focus on IPC strategies specific to the threat at hand. Where no plans exist, define priority areas to be tackled.

OBJECTIVES

- Identify priority IPC areas to strengthen based on the threat at hand in order to mitigate the risks of transmission and in preparation for the possibility of community transmission.
- Activate any existing IPC response plans. Consider any gaps, and update plans and standard operating protocols as new information and scientific evidence arrive.
- Adapt and utilize national and subnational materials to update any existing IPC guidance based on what is known about modes of transmission, incubation period, duration of illness, immunization, and the population at risk of disease.
- Consider issues from a hierarchy of controls perspective, including the following aspects.
  - Transmission-based precautions for patients with suspected, or confirmed communicable diseases with outbreak or pandemic potential.
  - Cleaning and disinfection.
  - Waste management.
  - The plan for patient placement, internal transfers, transportation and referral.
  - PPE requirements for health care workers, other staff and visitors.
  - Controls to limit the number of visitors in the health care facility.
  - A policy to test and manage exposed health care workers.
  - A strategy to deal with patient/s exposed to confirmed cases.
  - A strategy to supply staff to support workforce.
  - A strategy to train volunteers (non-health care workforce).
- Evaluate PPE stockpiles and calculate PPE burn rates.
- Consult with finance/budget colleagues on activating outbreak response financing plans.

CORE RESOURCES

- 2019 Novel coronavirus (2019-nCoV): strategic preparedness and response plan. Geneva: World Health Organization; 2020 (https://www.who.int/docs/default-source/coronaviruse/srp-04022020.pdf).
  - Operational considerations for case management of COVID-19 in health facility and community: interim guidance. Geneva: World Health Organization; 2020 (https://apps.who.int/iris/handle/10665/331492).
  - Infection prevention and control of epidemic- and pandemic-prone acute respiratory infections in health care. Geneva: World Health Organization; 2014 (https://apps.who.int/iris/handle/10665/112656).

ADDITIONAL RESOURCES

- See Toolkit for all phases: resources section on hierarchy of controls, if needed.

3. Surveillance and reporting:

Coordinate with existing subnational and national surveillance networks if relevant and ensure that syndromic and microbiological surveillance is ongoing for the specific outbreak at hand. If surveillance is lacking, utilize any existing systems and adapt surveillance definitions from other sources as needed.

OBJECTIVES

- Adapt existing framework to analyze and track the epidemiological situation and to implement IPC response activities. This should include the following aspects.
  - Strengthen microbiology and laboratory capacity at the health care facility or develop relationships with external laboratories, which can support the needs of the facility.
  - Generate regular reports at the health care facility level; analyze available reports at the local, national and international levels and disseminate key information to facility leadership/key stakeholders.
  - Ensure that the correct IPC indicators are being used for the current outbreak (for example, health care worker infections, percentage of trained health care workers, IPC supplies).

- Utilize national or subnational epidemiological forecasts and response projections to inform strategic and operational planning at the health care facility level.
- Use available data on modes of transmission to inform IPC policies.
- Plan for communication of findings and escalation to health care facility leadership.

- Access subnational and national materials to compile an outbreak-specific toolkit based on mode of transmission and specific needs. For example:
  - Case investigation/reporting forms for health care-associated infections;
  - Risk assessment and management workflows for exposed health care workers;
  - Data collection and line list templates (that is, tables that contain key information about each case in an outbreak) for suspected health care clusters;
  - Active case-investigation protocols at health facilities to identify sources of transmission.
- Plan for continued surveillance and monitoring of case trends; remain vigilant for surges of infection.
  - If a surge is detected or anticipated, consider returning to step 2 above in order to better refine and adapt the outbreak plan.

CORE RESOURCES

- Surveillance standards for vaccine-preventable diseases. 2nd ed. Geneva: World Health Organization; 2018 (https://apps.who.int/iris/handle/10665/275754).
  - Communicable disease surveillance and response systems: guide to monitoring and evaluating. Geneva: World Health Organization; 2006 (https://www.who.int/csr/resources/publications/surveillance/WHO_CDS_EPR_LYO_2006_2.pdf).

ADDITIONAL RESOURCES

- See the Toolkit for all phases: resources sections on surveillance and outbreak investigation, if needed.

4. Surge capacity:

Activate existing plans for surge capacity and IPC resources specific to the outbreak at hand (consider at a minimum: staff, hand hygiene, PPE, and disinfection supplies) in collaboration and partnership with subnational (regional/district/local) and national level agencies/networks.

OBJECTIVES

- Activate existing surge capacity plans. Consider gaps in any of the following areas and define those to be adapted or modified based on the threat at hand, including consideration of human resources, financial and logistical issues.
  - Update any existing inventory mapping of IPC capacity pertaining to the threat at hand.
  - Identify additional staff who may be deployed in high priority areas, including intensive care units, isolation facilities and emergency departments.
  - Anticipate supply shortages and coordinate with vendors and the health care facility about availability and prioritization of supplies.
  - Provide contingency plans to respond to limited IPC resources, including PPE, or stockouts.
  - Determine alternate service delivery models that will be used (telehealth, alternate care sites) to conserve PPE and reduce the burden on the healthcare system.
  - Consider strategies to optimize the availability of PPE.
  - Activate IPC plans for handling greater numbers of deaths, if needed.
  - Activate plans for the escalation of needs to health care facility leadership.

CORE RESOURCES

- Rational use of personal protective equipment for coronavirus disease (COVID-19) and considerations during severe shortages: interim guidance. Geneva: World Health Organization; 2020 (https://apps.who.int/iris/bitstream/handle/10665/331695/WHO-2019-nCov-IPC_PPE_use-2020.3-eng.pdf).
  - Guide to local production: WHO-recommended handrub formulations. Geneva: World Health Organization; 2010 (https://www.who.int/gpsc/5may/Guide_to_Local_Production.pdf).

- COVID-19 essential supplies forecasting tool (COVID-ESFT). Geneva: World Health Organization; 2021 (https://www.who.int/publications/i/item/WHO-2019-nCoV-Tools-Essential-forecasting-2021-1).

ADDITIONAL RESOURCES

- See the Toolkit for all phases: resources sections on PPE and supply planning and surge capacity, if needed.

5. Communication strategy:

Activate specific communication strategies for the threat at hand, which integrate with the broader outbreak communication strategy at the national or subnational level.

OBJECTIVES

- Adapt any existing communication framework to the threat at hand. For widespread threats, adapt and/or translate national guidance; for local outbreaks, subnational (regional/district/local) materials may be utilized.
  - Brief and train providers in the specific required topics to address the outbreak response (for example, modes of transmission, cleaning and disinfection).
  - Provide training that is specific to the outbreak at hand and takes into account available information on modes of transmission and disease epidemiology. This includes training for non-clinical staff who may have specialized roles (for example, patient transportation, security, kitchen staff, etc.).
  - Provide resources for PPE refresher courses.
  - Adapt national or subnational messaging for the public, in particular, describing when community members should seek testing, medical care, treatment or vaccination:
    - Ensure that messaging is in an appropriate language/s and relevant to the local setting.
  - Ensure that hospital leadership and administration are supportive and involved in decision making regarding internal and external communications.

- Activate communications systems and prepare for additional messages to the health care facility and the public (if necessary). Utilize materials from the subnational and national levels if available. Consider using the following communication modes depending on the specific scenario and needs:
  - Webinars and other live streaming platforms (for example, Zoom, Project ECHO);
  - Collaboration with IPC or relevant clinical professional societies;
  - E-mail 'listserv' (a piece of software used to run a group email discussion list) that includes all health care facilities in the local area;
  - Social media platforms, such as Twitter or Facebook;
  - Group messaging apps, such as WhatsApp.

CORE RESOURCES

- Outbreak communication planning guide. Geneva: World Health Organization; 2008 (https://www.who.int/ihr/elibrary/WHOOutbreakCommsPlanngGuide.pdf?ua=1).

ADDITIONAL RESOURCES

- See the Toolkit for all phases: resources section on crisis communication, if needed.

3B. ADVANCED PRIORITY: AUDIT AND TEST THE SYSTEM

1. Assess the IPC outbreak response:
Evaluate the status of the IPC outbreak response after immediate actions have been initiated.

OBJECTIVES

- Conduct a review of IPC practices, with a specific focus on those that are considered critical to control the outbreak at hand. 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 includes both intra-action and after-action reviews to identify gaps and deficiencies in the performance of any areas.
- Remain vigilant for further surges of infection, even after the early response phase has been completed. Continue surveillance and monitoring of case trends.
  - If case numbers or local/regional data indicate that a surge is imminent, return to phase 3, priority A, step 2 and reactivate the outbreak response plans.

CORE RESOURCES

- Guidance for conducting a country COVID-19 intra-action review (IAR): addendum 1, 28 April 2021. Geneva: World Health Organization; 2010 (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 the outbreak response components of an infection prevention and control programme

AMBULATORY CARE

- Hand hygiene in outpatient and home-based care and long-term care facilities: a guide to the application of the WHO multimodal hand hygiene improvement strategy and the 'My 5 moments for hand hygiene' approach. Geneva: World Health Organization; 2012 (https://www.who.int/publications/i/item/9789241503372, accessed 15 November 2021).
- Strengthening infection prevention and control in primary care. Geneva: World Health Organization; 2021 (https://www.who.int/publications/i/item/9789240035249, accessed 15 November 2021).
- Infection prevention and control in primary care: a toolkit of resources. Geneva: World Health Organization; 2021 (https://www.who.int/publications/i/item/9789240037304, accessed 15 November 2021).
- 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, accessed 15 November 2021).

ANTIMICROBIAL RESISTANCE

Note: AMR organisms require special consideration at the health care facility level due to their potential to cause health care-associated infections and facility-level outbreaks. The documents listed below will provide direction and, in some cases, step-by-step guidance on the preparedness, readiness, and response to AMR outbreaks in health care facilities.

- Resource materials for in-country development and implementation of antimicrobial resistance national action plans. Geneva: World Health Organization; 2019 (https://www.who.int/antimicrobial-resistance/national-action-plans/AMR-Resource-Pack-ENG-FR-JULY-2019.pdf, accessed 15 November 2021).
- Infection prevention and control to combat antimicrobial resistance in health care settings. Geneva: World Health Organization; 2019 (https://www.who.int/infection-prevention/tools/student-handbook_AMR-prevention.pdf, accessed 15 November 2021).
- Antimicrobial resistance in the Western Pacific Region: a review of surveillance and health systems response. Manila: World Health Organization Regional Office for the Western Pacific; 2015 (https://apps.who.int/iris/handle/10665/208222, accessed 15 November 2021).
- Advanced infection prevention and control training. Infection prevention and control to combat antimicrobial resistance in health care settings: trainer's guide. Geneva: World Health Organization (https://www.who.int/infection-prevention/tools/trainer-guide_AMR-prevention.pdf, accessed 15 November 2021).
- Implementation manual to prevent and control the spread of carbapenem-resistant organisms at the national and health care facility level. Geneva: World Health Organization; 2019 (https://apps.who.int/iris/bitstream/handle/10665/312226/WHO-UHC-SDS-2019.6-eng.pdf?sequence=1&isAllowed=y, accessed 15 November 2021).
- Guidelines for the prevention and control of carbapenem-resistant Enterobacteriaceae, *Acinetobacter baumannii* and *Pseudomonas aeruginosa* in health care facilities. Geneva: World Health Organization; 2017 (https://www.who.int/publications/i/item/9789241550178, accessed 15 November 2021).
- Global antimicrobial resistance surveillance system (GLASS) report: early implementation 2020. Geneva: World Health Organization; 2020 (https://apps.who.int/iris/handle/10665/332081, accessed 15 November 2021).

- GLASS whole-genome sequencing for surveillance of antimicrobial resistance. Geneva: World Health Organization; 2020 (https://apps.who.int/iris/handle/10665/334354, accessed 15 November 2021).
- National antimicrobial resistance surveillance systems and participation in the Global Antimicrobial Resistance Surveillance System (GLASS): a guide to planning, implementation, and monitoring and evaluation. Geneva: World Health Organization; 2016 (https://apps.who.int/iris/handle/10665/251554, accessed 15 November 2021).
- Multidrug-resistant organisms (MDRO) management. Atlanta, GA: Centers for Disease Control and Prevention; 2006 (https://www.cdc.gov/infectioncontrol/guidelines/mdro/index.html, accessed 15 November 2021).

SPECIFIC TOOLS FOR METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* AND OTHER GRAM-POSITIVE ORGANISMS

- Ayliffe, AJ, World Health Organization. Division of Emerging and other Communicable Diseases Surveillance Control. Recommendations for the control of methicillin-resistant *Staphylococcus aureus* (MRSA). Geneva: World Health Organization; 1996 (https://apps.who.int/iris/handle/10665/62984, accessed 15 November 2021).
- Healthcare settings. Preventing the spread of MRSA. Atlanta, GA: Centers for Disease Control and Prevention; 2019 (https://www.cdc.gov/mrsa/healthcare/index.html, accessed 15 November 2021).
- Pannewick B, Baier C, Schwab F, Vonberg RP. Infection control measures in nosocomial MRSA outbreaks—results of a systematic analysis. PLOS One 2021; 16(4): e0249837 (https://doi.org/10.1371/journal.pone.0249837).

SPECIFIC TOOLS FOR CARBAPENEM-RESISTANT ORGANISMS AND OTHER RESISTANT GRAM-NEGATIVE ORGANISMS

- Implementation manual to prevent and control the spread of carbapenem-resistant organisms at the national and health care facility level: interim practical manual supporting implementation of the Guidelines for the prevention and control of carbapenem-resistant Enterobacteriaceae, *Acinetobacter baumannii* and *Pseudomonas aeruginosa* in health care facilities. Geneva: World Health Organization; 2019 (https://apps.who.int/iris/handle/10665/312226, accessed 15 November 2021).
- Guidelines for the prevention and control of carbapenem-resistant Enterobacteriaceae, *Acinetobacter baumannii* and *Pseudomonas aeruginosa* in health care facilities. Geneva: World Health Organization; 2017 (https://apps.who.int/iris/handle/10665/259462, accessed 15 November 2021).

ASSESSMENT TOOLS

- Rapid hospital readiness checklist: interim guidance. Geneva: World Health Organization; 2020 (https://www.who.int/publications/i/item/WHO-2019-nCoV-hospital-readiness-checklist-2020.1, accessed 15 November 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 15 November 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 15 November 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 15 November 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 15 November 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, accessed 15 November 2021).
- Facility infection prevention and control assessment for coronavirus disease 2019 (COVID-19) infection prevention and control considerations in non-US healthcare settings. Atlanta, GA: Centers for Disease Control and Prevention; 2019 (https://www.cdc.gov/coronavirus/2019-ncov/downloads/hcp/non-us-settings/249_IPC_FacilityAssessmentTool_20200925.pdf, accessed 15 November 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 15 November 2021).
- Comprehensive hospital preparedness checklist for coronavirus disease 2019 (COVID-19). Atlanta, GA: Centers for Disease Control and Prevention; 2020 (https://www.cdc.gov/coronavirus/2019-ncov/downloads/HCW_Checklist_508.pdf, accessed 15 November 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, accessed 15 November 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 15 November 2021).

COVID-19

- 2019 Novel coronavirus (2019-nCoV): strategic preparedness and response plan. Geneva: World Health Organization; 3 February 2020 (https://www.who.int/docs/default-source/coronaviruse/srp-04022020.pdf, accessed 15 November 2021).
- Covid-19 strategy update. Geneva: World Health Organization; 14 April 2020 (https://www.who.int/docs/default-source/coronaviruse/covid-strategy-update-14april2020.pdf?sfvrsn=29da3ba0_19, accessed 15 November 2021).
- Considerations in the investigation of cases and clusters of COVID-19: interim guidance, 2 April 2020. Geneva: World Health Organization; 2020 (https://apps.who.int/iris/handle/10665/331668, accessed 15 November 2021).
- Preparedness for COVID-19. Stockholm: European Centre for Disease Prevention and Control; 2021 (https://www.ecdc.europa.eu/en/covid-19/preparedness-and-response, accessed 15 November 2021).
- Strategic infection prevention and control activities for containment and prevention of COVID19 cases at healthcare facilities in non-US settings. Atlanta, GA: Centers for Disease Control and Prevention; 2020 (https://www.cdc.gov/coronavirus/2019-ncov/hcp/non-us-settings/overview/index.html, accessed 15 November 2021).
- Operational considerations for the identification of HCWs and inpatients with suspected COVID-19 in non-US healthcare settings. Atlanta, GA: Centers for Disease Control and Prevention; 2020 (https://www.cdc.gov/coronavirus/2019-ncov/hcp/non-us-settings/guidance-identify-hcw-patients.html, accessed 15 November 2021).
- Interim operational considerations for public health management of HCWs exposed to or infected with COVID-19: non-US healthcare settings. Atlanta, GA: Centers for Disease Control and Prevention; 2020 (https://www.cdc.gov/coronavirus/2019-ncov/hcp/guidance-risk-assesment-hcp.html, accessed 15 November 2021).
- Management of visitors to healthcare facilities in the context of COVID-19: non-US healthcare settings. Atlanta, GA: Centers for Disease Control and Prevention; 2020 (https://www.cdc.gov/coronavirus/2019-ncov/hcp/non-us-settings/hcf-visitors.html, accessed 15 November 2021).
- Comprehensive hospital preparedness checklist for coronavirus disease 2019 (COVID-19). Atlanta, GA: Centers for Disease Control and Prevention; 2020 (https://www.cdc.gov/coronavirus/2019-ncov/downloads/HCW_Checklist_508.pdf, accessed 15 November 2021).
- Facility infection prevention and control assessment for coronavirus disease 2019 (COVID-19). Infection prevention and control considerations in non-US healthcare settings. Atlanta, GA: Centers for Disease Control and Prevention; 2019 (https://www.cdc.gov/coronavirus/2019-ncov/downloads/hcp/non-us-settings/249_IPC_FacilityAssessmentTool_20200925.pdf, accessed 15 November 2021).
- Interim infection prevention and control recommendations for patients with suspected or confirmed COVID-19 in healthcare settings. Atlanta, GA: Centers for Disease Control and Prevention (https://www.cdc.gov/coronavirus/2019-ncov/hcp/infection-control-recommendations.html, accessed 15 November 2021).
- Strategic infection prevention and control activities for non-US settings. Atlanta, GA: Centers for Disease Control and Prevention; 2020 (https://www.cdc.gov/coronavirus/2019-ncov/hcp/infection-control-recommendations.html, accessed 15 November 2021).
- National COVID-19 preparedness and response plan. Republic of Malawi. Lilongwe: Ministry of Disaster Management Affairs and Public Events; 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, accessed 15 November 2021).

- National preparedness and response Plan for COVID-19 – Bangladesh. Dhaka: Directorate of General Health Services, Government of the People's Republic of Bangladesh; 2020 (https://reliefweb.int/sites/reliefweb.int/files/resources/nprp_covid-19_v6_18032020.pdf, accessed 15 November 2021).
- Considerations for integrating infection prevention and control into national pandemic preparedness and response planning for coronavirus 2019. Atlanta, GA: Centers for Disease Control and Prevention; 2020 (https://www.cdc.gov/coronavirus/2019-ncov/downloads/hcp/COVID-19-pandemic-plan-IPC-considerations-050820.pdf, accessed 15 November 2021).
- COVID-19 pandemic guidance for the health care sector. Government of Canada; 2020 (https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/health-professionals/covid-19-pandemic-guidance-health-care-sector.html, accessed 15 November 2021).
- Communicable Diseases Network Australia (CDNA) national guidelines for the prevention, control and public health management of COVID-19 outbreaks in residential care facilities in Australia. Communicable Diseases. Department of Health, 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 15 November 2021).
- Novel coronavirus 19 (COVID-19). Washington, DC; United States Department of Veterans Affairs; 2020 (https://www.va.gov/opa/docs/VHA_COVID_19_03232020_vF_1.pdf, accessed 15 November 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, accessed 15 November 2021).
- National contingency plan for novel coronavirus (COVID-19). World Health Organization; United Nations Children's Fund; United Nations Population Fund; Government of Eswatini; 2021 (https://www.unicef.org/eswatini/media/771/file/National-novel-coronavirus-preparedness-and-response-plan-2020.pdf, accessed 15 November 2021).
- Water, sanitation, hygiene, and waste management for SARS-CoV-2, the virus that causes COVID-19: interim guidance, 29 July 2020. Geneva: World Health Organization & United Nations Children's Fund (UNICEF); 2020 (https://apps.who.int/iris/handle/10665/333560, accessed 25 November 2020).
- Africa Joint Continental strategy for COVID-19 outbreak. Addis Ababa: Africa Centres for Disease Control and Prevention; African Union Commission; 2021 (https://au.int/sites/default/files/documents/38264-doc-africa_joint_continental_strategy_for_covid-19_outbreak.pdf, accessed 15 November 2021).

CRISIS COMMUNICATION

- Risk communication. Geneva: World Health Organization; 2021 (https://www.who.int/emergencies/risk-communications, accessed 15 November 2021).
- Outbreak communication planning guide. Geneva: World Health Organization; 2008 (https://www.who.int/ihr/elibrary/WHOOutbreakCommsPlanngGuide.pdf?ua=1, accessed 15 November 2021).
- Crisis and emergency risk communications. Plan implementation for a severe pandemic. Washington, DC: Pan American Health Organization; 2018 (https://www.paho.org/disasters/dmdocuments/RespToolKit_21_Tool%2013_CommunicationsPlanImplementationforaSeverePandemic.pdf, accessed 15 November 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, accessed 15 November 2021).
- Framework for developing an integrated communication strategy for the introduction of oral cholera vaccine in cholera prevention and control programmes. New York, NY: United Nations Children's Fund; 2014 (https://sites.unicef.org/cholera/files/Cholera-FrameworkBookV2.pdf, accessed 15 November 2021).
- Communicating during an outbreak or public health investigation. Atlanta, GA: Centers for Disease Control and Prevention (https://www.cdc.gov/eis/field-epi-manual/chapters/Communicating-Investigation.html, accessed 15 November 2021).
- Crisis & emergency risk communication (CERC). Atlanta, GA: Centers for Disease Control and Prevention; 2018 (https://emergency.cdc.gov/cerc/, accessed 15 November 2021).

COMMUNITY ENGAGEMENT

- Working with communities during a pandemic. Geneva: Doctors Without Borders/Médecins Sans Frontières; 2020 (https://www.msf.org/working-communities-niger-during-covid-19-pandemic, accessed 15 November 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 15 November 2021).

DECLARING AN OUTBREAK

- WHO outbreak investigation and response 2009. Geneva: World Health Organization; 2009 (https://www.who.int/diseasecontrol_emergencies/publications/idhe_2009_london_outbreaks.pdf for additional details about declaring an outbreak, accessed 15 November 2021).
- Guide for clinical case management and infection prevention and control during a measles outbreak. Geneva: World Health Organization; 2020 (https://apps.who.int/iris/handle/10665/331599, accessed 15 November 2021).
- First steps for managing an outbreak of acute diarrhoea. Geneva: World Health Organization; 2004 (https://apps.who.int/iris/handle/10665/69073, accessed 15 November 2021).

EBOLA VIRUS DISEASE

- Infection prevention and control guidance for care of patients in healthcare settings, with focus on Ebola. Interim guidance. Geneva: World Health Organization; 2014 (https://www.who.int/csr/resources/publications/ebola/filovirus_infection_control/en/, accessed 15 November 2021).
- 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 15 November 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 15 November 2021).
- Ebola virus disease (EVD): key questions and answers concerning water, sanitation and hygiene. Updated July 2021. Geneva: World Health Organization & United Nations Children's Fund (UNICEF); 2021 (https://apps.who.int/iris/handle/10665/345522, accessed 25 November 2021).

EMERGENCY PREPAREDNESS

- Emergency preparedness. Washington, DC: Association for Professionals in Infection Control and Epidemiology; 2013 (https://apic.org/professional-practice/emergency-preparedness/, accessed 15 November 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 15 November 2021).
- Osewe P. Options for financing pandemic preparedness. Bull World Health Organ. 2017; 95(12):794-794A (http://dx.doi.org/10.2471/BLT.17.199695, accessed 15 November 2021).

HAND HYGIENE

- Hand hygiene self-assessment framework. Geneva, World Health Organization; 2010 (https://www.who.int/gpsc/country_work/hhsa_framework_October_2010.pdf?ua=, accessed 15 November 2021).
- WHO 5 Moments hand hygiene observation form. Geneva: World Health Organization (https://www.who.int/gpsc/5may/Observation_Form.doc, accessed 15 November 2021).

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