

Global Action in Healthcare Network Antimicrobial Resistance Module (GAIHN-AR) Interim Guidance for Prevention Activities: Infection Prevention and Control

This guidance is intended for global healthcare settings participating in GAIHN-AR.

Version 1, 2023



**Centers for Disease
Control and Prevention**
National Center for Emerging and
Zoonotic Infectious Diseases

Contents

Glossary	3
Acronyms	5
Introduction	6
Prevention <i>versus</i> Containment Strategies	7
Targeted Prevention Units	7
Key Consideration for Selection of a TPU	7
Infection Prevention and Control (IPC) Practices	8
A. Steps to improving IPC practices in a healthcare facility	9
Step 1. Conduct an IPC practice assessment.	9
Step 2. Provide written recommendations and develop an IPC Action Plan.....	10
Step 3. Implement the IPC Action Plan.	10
Step 4. Monitor the status of actions within the IPC Action Plan to maximize impact.	11
Step 5. Maintain a continuous cycle of IPC improvement.	11
B. Implementation considerations for IPC practices in resource-limited settings	11
1. Hand hygiene	12
2. Contact Precautions	13
3. Environmental cleaning	18
4. Healthcare worker education and training	21
5. Monitoring and feedback	22

Glossary

Antimicrobial-resistant organisms: Some bacteria and fungi are naturally (intrinsically) resistant to certain antimicrobials. For the purposes of this document, this term refers to bacteria that are resistant to one or more classes of antimicrobials to which they are usually susceptible.

Alcohol-based hand rub (ABHR): An alcohol-containing preparation designed for application to the hands to reduce the number of viable microorganisms on the hands. Ideally, such preparations contain at least 60% ethanol or isopropanol.

Carbapenemase-producing carbapenem-resistant Enterobacterales (CP-CRE):

Enterobacterales that test resistant to at least one carbapenem antibiotic and produce or carry genes that encode at least one carbapenemase. CP-CRE are associated with high levels of antimicrobial resistance and difficult-to-treat infections. For more information about CP-CRE, visit <https://www.cdc.gov/hai/organisms/cre/technical-info.html>.

Contact Precautions: Contact Precautions are actions intended to prevent transmission of infectious agents, including CP-CRE, that are spread by direct or indirect contact with infected or colonized patients or the patients' environment. A single-patient room is preferred for those who require Contact Precautions. In multi-patient rooms, ≥ 1 -meter spatial separation between beds is advised to reduce the opportunities for inadvertent sharing of items between the infected/colonized patient and other patients. When healthcare workers are caring for patients on Contact Precautions, a gown and gloves should be worn for all interactions involving contact with the patient and the patient's environment. The use of dedicated patient equipment is also recommended; however, when this is not possible, shared equipment should be cleaned and disinfected immediately after each use. High-touch surfaces in rooms or areas housing patients on Contact Precautions should be cleaned and disinfected at least twice daily. Additionally, the transport of patients outside of their room on Contact Precautions should be limited to medically necessary purposes.

Containment response: Activities described in the GAIHN-AR Interim Guidance for Containment Activities that are implemented in response to detecting a single antimicrobial-resistant threat. While containment can be used for various antimicrobial-resistant organisms, GAIHN-AR currently focuses on implementing a containment response for CP-CRE containing a novel carbapenemase or a rare targeted or non-targeted carbapenemase.

Enhanced cleaning: Involves an increase in the frequency of routine environmental cleaning, as well as disinfection when needed according to risk level, and/or the frequency of monitoring of cleaning practice (beyond the protocols normally specified for the unit), as well as other interventions such as disinfectant substitution.

Environmental cleaning: Environmental cleaning in the context of GAIHN-AR refers to the cleaning and disinfection of environmental surfaces (e.g., bed rails, mattresses, call buttons, chairs) and surfaces of noncritical patient care equipment (e.g., IV poles, stethoscopes).

Environmental surfaces: Furnishings, fixtures, finishes, and other surfaces, such as bed rails, door handles, overbed tables, chairs, and floors, within the built environment of healthcare facilities.

Extended use of gloves: Refers to the practice of wearing disposable medical gloves without changing them between patients or tasks. This practice is not standard of care, and it should only be adopted temporarily when personal protective equipment (PPE) supplies are extremely limited.

Extended use of gowns: Refers to the same gown worn by the same healthcare worker (HCW) without changing it between patients or tasks. In inpatient care settings, this practice should only be adopted temporarily when PPE supplies are extremely limited.

Hand hygiene: The cleansing of hands by either handwashing (washing hands with soap and water), antiseptic hand wash, antiseptic hand rub (i.e., ABHR including foam or gel), or surgical hand antisepsis.

Handwashing: Washing hands with soap and water.

Healthcare facility (HCF): In this document, refers to the hospital setting.

Healthcare worker (HCW): Any healthcare facility personnel with the potential for direct or indirect exposure to patients or infectious materials (e.g., blood, tissue, body fluids); contaminated medical supplies, devices, and equipment; contaminated environmental surfaces; or contaminated air. These personnel include physicians, nurses, nursing aides, emergency medical personnel, students, laboratory technicians, pharmacists, environmental cleaning staff, hospital volunteers, and administrative staff.

High-contact activities: Patient care activities such as: dressing, bathing/showering, transferring, providing hygiene, changing linens, changing briefs or assisting with toileting, device care or use (central line, urinary catheter, feeding tube, tracheostomy/ventilator), wound care of any skin opening requiring a dressing.

High-risk for antimicrobial-resistant organisms: Refers to patient risk factors that place them at higher risk for becoming colonized or infected with an antimicrobial-resistant organism such as CP-CRE compared to other patients. These risk factors can include but are not limited to being critically ill or immunosuppressed, receiving broad-spectrum antibiotics, requiring high levels of care (e.g., bed bound), or requiring invasive devices (e.g., ventilators, urinary catheters, central lines, etc.).

Infection prevention and control (IPC) Action Plans: Implementation planning documents outlining the necessary activities required to mitigate identified IPC gaps, summarize a timeframe for completion, and designate a responsible party.

Noncritical patient care equipment / Noncritical medical equipment: Equipment, such as stethoscopes, blood pressure cuffs, bedpans, and wheelchairs, which comes into contact with intact skin. Noncritical patient care equipment can be further separated into dedicated equipment (used exclusively by one patient during their stay) and shared equipment (used among and between different patients admitted simultaneously).

Prevention activities: Continuous and ongoing activities such as infection prevention and control (IPC) assessments, IPC practice monitoring (auditing), and colonization screening such as admission and routine surveillance screening that are used to limit the transmission of antimicrobial-resistant organisms within a facility and, unlike containment, are not deployed specifically in response to the identification of a patient with CP-CRE.

Point of care: Refers to where a HCW has contact with a patient or their surroundings for the treatment or care of that patient.

Reuse of gloves: Refers to the practice of donning and doffing the same gloves repeatedly. This practice is not standard of care, and it should only be adopted temporarily when PPE supplies are extremely limited.

Reuse of gowns: Refers to the practice of donning and doffing the same gown repeatedly. This practice is not standard of care, and it should only be adopted temporarily when PPE supplies are extremely limited.

Targeted prevention unit (TPU): A unit within an HCF with a higher likelihood of antimicrobial-resistant organism transmission due to care of many patients at higher risk for antimicrobial-resistant organism acquisition and/or transmission (e.g., multiple invasive devices, prolonged lengths of stay, etc.) such as intensive care units or units with a previous history of antimicrobial-resistant organism outbreaks.

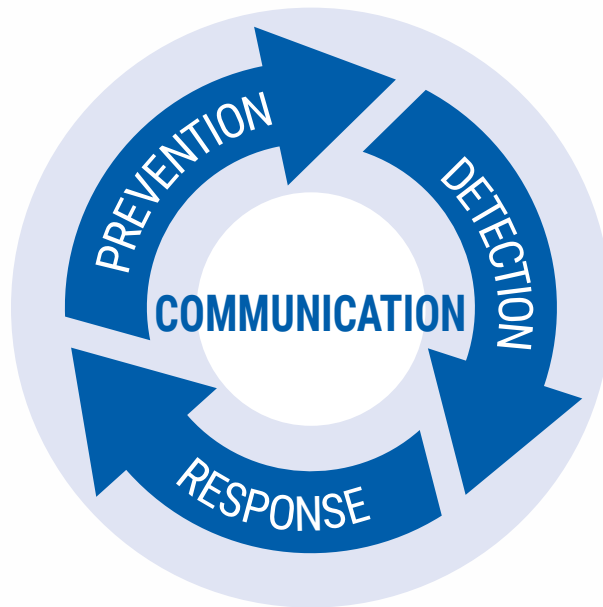
Acronyms

Acronym	Definition
ABHR	Alcohol-based hand rub
CDC	U.S. Centers for Disease Control and Prevention
CP-CRE	Carbapenemase-producing carbapenem-resistant Enterobacterales
GAIHN-AR	Global Action in Healthcare Network-Antimicrobial Resistance Module
HCF	Healthcare facility
HCW	Healthcare worker
IPC	Infection prevention and control
PPE	Personal protective equipment
TPU	Targeted Prevention Unit
WHO	World Health Organization

Introduction

The Global Action in Healthcare Network—Antimicrobial Resistance Module (GAIHN-AR) is a global network of healthcare facilities, laboratories, and infection prevention and control (IPC) teams at the forefront of identifying critical and emerging antimicrobial resistance threats in healthcare facilities and implementing rapid IPC actions to limit their spread and protect patients. It is focused on a continuous cycle of prevention activities, laboratory detection, communication, and real-time response to antimicrobial resistance threats, including containment strategies for novel or rarely identified threats (Figure 1).

Figure 1. GAIHN-AR’s cycle of real time action against antimicrobial-resistant threats



This guidance is one of two documents focused on prevention activities to reduce the spread of antimicrobial-resistant organisms in healthcare settings. This document focuses on IPC activities, while the second prevention-related document reviews the role and considerations of active colonization screening surveillance (i.e., admission and routine surveillance screenings). GAIHN-AR also provides guidance on laboratory detection techniques, communication, and response (including containment activities).

Prevention *versus* Containment Strategies

While prevention and containment strategies utilize similar activities, they are different based upon when they should be utilized. As an antimicrobial-resistant organism becomes more prevalent, containment responses to a single patient infected or colonized with that organism are not achievable, and thus efforts should be focused primarily on prevention strategies.

The goal of prevention activities is to limit the spread of antimicrobial-resistant organisms in a healthcare facility (HCF), regardless of how rare or common the organisms are, through the continuous implementation and improvement of IPC practices and laboratory surveillance for both infected and colonized patients. These activities can be proactive and implemented prior to identification of specific antimicrobial-resistant organism in a HCF.

The goal of containment activities is to respond early and aggressively to novel or rare antimicrobial-resistant threats, even after single organism identification, to prevent more widespread transmission within a facility and region. Containment usually requires temporary increases in IPC actions such as rapidly identifying and closing any gaps in IPC practices within affected HCF units and enhanced laboratory surveillance for identification of colonized patients (i.e., contact screening). For additional information on containment, refer to “Global Action in Healthcare Network - Antimicrobial Resistance Module (GAIHN-AR) Interim Guidance for Containment Activities.”

Targeted Prevention Units

While promoting prevention activities to limit the spread of antimicrobial-resistant organisms should be encouraged throughout a facility, due to resource constraints, initial implementation for GAIHN-AR could be prioritized to certain units, referred to as Targeted Prevention Units (TPUs) in this guidance. TPUs should be selected for each facility based on the higher likelihood of antimicrobial-resistant organism transmission, usually due to the care of many patients at high-risk for antimicrobial-resistant organism acquisition and/or transmission (e.g., multiple invasive devices, prolonged length of stay, etc.), such as Intensive Care Units (ICUs) and/or units with a previous history of antimicrobial-resistant organism outbreaks.

Key Consideration for Selection of a TPU

Patient level characteristics:

- Severe illness
- Prolonged lengths of stay
- Invasive device use
- Frequent antibiotic use
- High acuity care needs
- Compromised immune systems

Unit level characteristics:

- Unit with a history of previous antimicrobial-resistant organism transmission, such as a previous outbreak
- Adequate staffing or ability to hire additional staff to implement GAIHN-AR prevention activities
- Engagement and buy-in from HCF leadership and healthcare workers (HCWs), including environmental cleaning staff, to participate in GAIHN-AR
- Reliable access to basic water and sanitation infrastructure, e.g., functioning sinks with running water, personal protective equipment (PPE), and environmental cleaning and disinfection supplies

Infection Prevention and Control (IPC) Practices

While GAIHN-AR's current focus is on certain priority carbapenemase producing carbapenem-resistant Enterobacterales (CP-CRE), much of what is discussed in this guidance document should be applied to other types of antimicrobial-resistant organisms encountered in the healthcare setting.

Evidence-based recommendations for IPC practices to prevent and control the spread of carbapenem-resistant organisms are articulated in the World Health Organization's (WHO) "Guidelines for the prevention and control of carbapenem-resistant Enterobacterales, Acinetobacter baumannii and Pseudomonas aeruginosa in healthcare facilities" (<https://www.who.int/publications/i/item/9789241550178>). WHO's "Implementation manual to prevent and control the spread of carbapenem-resistant organisms at the national and healthcare facility level" (<https://apps.who.int/iris/handle/10665/312226>) was subsequently published, providing practical information on the implementation of these IPC practices.

GAIHN-AR guidance for prevention activities serves to distill these larger documents into several key concepts that are important for implementation of GAIHN-AR prevention activities. This document is divided into two parts:

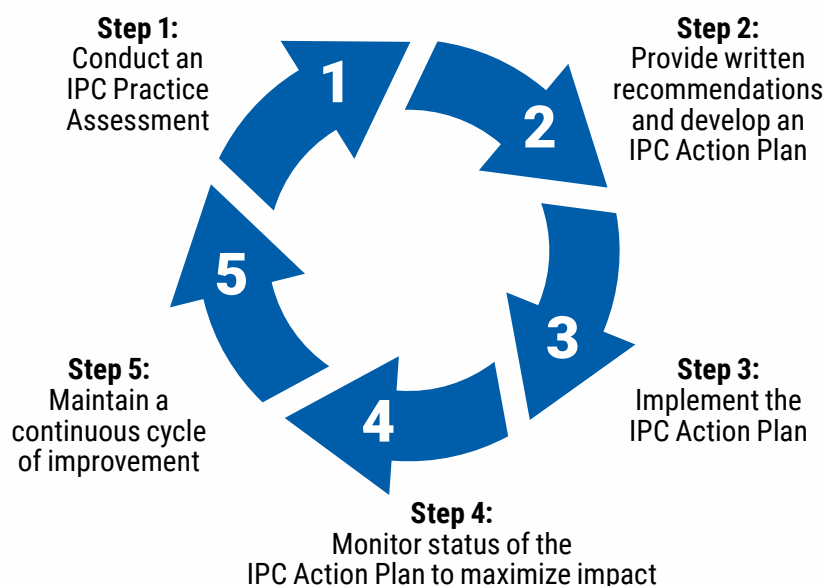
- A. Steps HCFs can take to implement or improve upon existing IPC practices in a progressive, prioritized manner
- B. Best practices and considerations for implementing these IPC practices in HCFs with limited resources

A. Steps to improving IPC practices in a healthcare facility

All HCFs using GAIHN-AR guidance will continuously assess and improve their IPC practices to prevent the spread of antimicrobial-resistant organisms.

This GAIHN-AR Prevention Activities Guidance, adapted from the World Health Organization's continuous cycle of improvement,¹ is focused on practical IPC quality improvements within a facility's TPUs. The improvement activities are an iterative process composed of continuous assessments, [IPC action plan](#) development, and implementation of practices to fill gaps and improve the best IPC practices. The steps within this '**project cycle**' (Figure 2) are summarized below.

Figure 2. GAIHN-AR IPC Project Cycle of Quality Improvement (adapted from the WHO)



Step 1. Conduct an IPC practice assessment.

An IPC practice assessment provides an in-depth understanding of a unit's current IPC practices, by assessing the use and implementation of multimodal strategies. It is not just a review of an HCF's policies and procedures but rather focuses on how those policies are implemented through direct observation and interviews with HCWs on the unit.

An IPC practice assessment is an opportunity to provide HCFs or units within HCFs with feedback on what they are doing well and what areas will benefit from further improvement. It is not meant to be punitive.

Initially, an IPC practice assessment that addresses the three GAIHN-AR priority domains ([hand hygiene](#), [environmental cleaning](#), and implementation of [Contact Precautions](#)) could be conducted to ensure that foundational elements are in place across these domains. After the foundational elements are in place, specific domains can be prioritized for targeted quality improvement initiatives. CDC has developed two sets of IPC practice assessment tools that can be adapted to the HCF's needs and answer keys with references for each of these assessments.

¹ World Health Organization, 2018. [Improving infection prevention and control at the health facility: an interim practical manual](https://www.who.int/publications/i/item/WHO-HIS-SDS-2018.10) (<https://www.who.int/publications/i/item/WHO-HIS-SDS-2018.10>)

The first IPC practice assessment (Part 1) addresses the foundational elements across the three domains, focusing on infrastructure, supplies and equipment availability, job aids and reminders, basic staff training and education, and basic monitoring and feedback. This practice assessment can be used to assess and implement high-priority actions for staff and patient safety (e.g., ensuring [handwashing](#) stations are available on the unit).

After building foundational capacity across the three domains, more comprehensive practice assessments (Part 2) for each of the domains have also been developed, which can be utilized individually (for focused quality improvement) or collectively, depending on local capacity and priorities. Depending on the number and types of gaps identified from Part 1 of the assessment, Part 2 assessments may or may not be conducted during the same 'project cycle.'

Please refer to the [GAIHN-AR External SharePoint site](#) for copies of Part 1 and Part 2 Practice Assessments and their corresponding Answer Keys. These assessment tools are resources that can and should be adapted to the local context.

Assessments can be conducted by an external assessor (e.g., implementing partner staff) or completed as a self-assessment by HCF-based staff if they have the appropriate IPC skill and knowledge and can provide an unbiased analysis of practices. Additional IPC practices beyond the three listed domains can be assessed based upon individual unit priorities and gaps (e.g., medical device reprocessing, injection safety, etc.).

Step 2. Provide written recommendations and develop an IPC Action Plan.

Written recommendations outlining how the gaps identified in Step 1 can be mitigated should be provided to the unit. In addition, an [IPC Action Plan](#) should be constructed. This is an implementation planning document outlining the activities required to mitigate the identified gaps from the IPC practices assessment, summarizing a timeframe for completion, and designating a responsible party. Generally, it's advised to develop an IPC Action Plan that is achievable within a reasonable timeframe (e.g., 6-months).

The IPC Action Plan should list actions according to their priority and should include a mixture of quick wins (high impact/low effort) and major projects (high impact/high effort). Any gaps that could endanger staff or patients should always be corrected immediately. The IPC Action Plan should ideally start with filling gaps identified within the Part 1 Practice Assessment, as these represent the foundational elements across each domain.

Please refer to the [GAIHN-AR External SharePoint site](#) for a template IPC Action Plan.

[Section B](#) below summarizes best practices on all the multimodal elements included in the IPC practice assessments, as well as implementation considerations for resource-limited HCFs, which can be used to provide recommendations and identify activities for the IPC Action Plan.

Step 3. Implement the IPC Action Plan.

For most HCFs where the foundational supplies and equipment are in place, the development or improvement of facility-specific IPC policies and standard operating procedures, education and training on these policies, and routine monitoring with feedback to HCWs on their adherence to these policies will play a key role in successful implementation.

If not already conducted prior to the initiation of work duties, annually, and as needed, such as during an outbreak, HCW education on hand hygiene, Contact Precautions and environmental cleaning should comprise

part of the IPC Action Plan. Competency-based education is preferred as it allows HCWs to demonstrate skill proficiency.

Additionally, strongly consider developing or improving an existing system for routine monitoring of HCW performance of hand hygiene, environmental cleaning, and PPE use for those under Contact Precautions as part of your IPC Action Plan. At a minimum, developing a system for conducting quick and routine monitoring of hand hygiene infrastructure (e.g., ensuring [ABHR](#) dispensers contain product and are near the point of care), environmental cleaning supplies and equipment (e.g., availability and condition of cleaning cloths, mops), and Contact Precaution implementation (e.g., signage is hung appropriately, PPE is near the [point of care](#)) is recommended.

Step 4. Monitor the status of actions within the IPC Action Plan to maximize impact.

The status of the selected activities included within the IPC Action Plan should be monitored on an ongoing basis (e.g., monthly), to ensure that progress is being made and sustained during this 'project cycle.' This monitoring may be conducted as part of routine supportive supervision visits by implementing partner staff or facility-based staff.

Step 5. Maintain a continuous cycle of IPC improvement.

Continuously repeat this improvement cycle through repeat IPC practice assessments and modifications to the IPC Action Plan, at least annually if not more often.

B. Implementation considerations for IPC practices in resource-limited settings

The sections below summarize high-level best practices that should be included in IPC practice assessments and implementation considerations for IPC Action Plan development in resource-limited settings for the three priority domains:

1. Hand hygiene
2. Contact Precautions
3. Environmental cleaning

In addition, this section also provides considerations for two cross-cutting elements across the above three domains that **should always comprise part of the IPC Action Plan**. The principles within these sections are applicable across all three domains; however, their implementation may differ.

4. Healthcare worker education and training
5. Monitoring and feedback

Beyond the best practice statements and implementation considerations listed below, refer to the individual Practice Assessment Answer Keys in the [GAIHN-AR External SharePoint site](#) for additional guidance and resources.

1. Hand hygiene

[Hand hygiene](#) practiced at the right moments is an effective and essential way to prevent the spread of antimicrobial-resistant organisms within healthcare settings. The term hand hygiene refers to cleansing of the hands by using either handwashing (washing hands with soap and water), antiseptic hand wash, antiseptic hand rub (i.e., ABHR including foam or gel), or surgical hand antiseptics.

Unit Practices and Protocols

Best Practice Statements	Implementation considerations for resource-limited settings
<ul style="list-style-type: none">■ Hand hygiene should occur prior to patient contact, before an aseptic procedure, after contact with body fluids, after patient contact, and after touching patient surroundings.■ Additionally, hand hygiene should be performed after glove removal.■ Nails should be natural and short (e.g., less than one-quarter inch long).	<ul style="list-style-type: none">■ WHO, 5 Moments of Hand Hygiene
<ul style="list-style-type: none">■ ABHR should be prioritized for use over soap and water unless hands are visibly soiled or there is suspected or known exposure to potential spore-forming pathogens, such as an outbreak of <i>Clostridioides difficile</i>.	<ul style="list-style-type: none">■ ABHR can be produced locally. Formulation recommendations are available from WHO.

Supplies and Equipment

Best Practice Statements	Implementation considerations for resource-limited settings
<ul style="list-style-type: none">■ Both soap and water and ABHR should be readily available on the unit at the point of care.	<ul style="list-style-type: none">■ For units with limited or no access to piped water in patient care areas, portable handwashing stations (e.g., a Veronica bucket with a tap and a basin to collect handwash water) can be placed at points of care as an interim solution. (See Handwashing-Compendium edition 2 (globalhandwashing.org) Section 2.2.1.2). For longer-term interventions to improve access to piped water and hand hygiene supplies, users can refer to WASH FIT: A practical guide for improving quality of care through water, sanitation and hygiene in health care facilities. Second edition (who.int).■ If handwashing and ABHR supplies are limited, prioritize supplies for units providing the highest acuity care (e.g., ICUs, oncology units).■ If handwashing and ABHR supplies are limited, consider prioritizing supplies for cohort units housing patients with antimicrobial-resistant organisms and dedicated HCWs.■ Additional considerations can be found in WHO Improving infection prevention and control at the health facility, Section III, p. 99-101, and in the WHO Implementation manual, p. 56, Table 8.
<ul style="list-style-type: none">■ For handwashing, materials should be single-use (e.g., disposable towels, liquid soap in dispensers).	<ul style="list-style-type: none">■ If disposable hand-drying materials are unavailable, cloths can be used and laundered after each use.■ The use of bar soap is less ideal; however, if the only option for hand hygiene, the soap should be kept dry in between uses.

Job Aids and Reminders

Best Practice Statements	Implementation considerations for resource-limited settings
<ul style="list-style-type: none">■ A written protocol should be available within the unit describing the indications and facility expectations for hand hygiene.	<ul style="list-style-type: none">■ Hand hygiene guidance is available from WHO and CDC. Guidance should be tailored to meet local regulations.
<ul style="list-style-type: none">■ Posters illustrating proper handwash and ABHR techniques at point of use, and posters illustrating indications for hand hygiene (e.g., the Five Moments) should be displayed in multiple areas within the unit.	<ul style="list-style-type: none">■ Hand hygiene posters are available from WHO:<ul style="list-style-type: none"><input type="checkbox"/> Handwashing<input type="checkbox"/> ABHR<input type="checkbox"/> 5 Moments of Hand Hygiene

2. Contact Precautions

Contact Precautions are a type of Transmission-Based Precaution intended to prevent transmission of infectious agents, such as carbapenem-resistant organisms, which are spread by direct or indirect contact with the patient or the patient's environment. Contact Precautions should always be used in addition to Standard Precautions.

Unit Practices and Protocols

Best Practice Statements	Implementation considerations for resource-limited settings
<ul style="list-style-type: none">■ Contact Precautions should be implemented when caring for patients colonized or infected with antimicrobial-resistant organisms that spread via direct or indirect contact with a patient or their environment (e.g., carbapenem-resistant organisms).	<ul style="list-style-type: none">■ If there are limited resources for implementation of Contact Precautions, facilities may need to prioritize which antimicrobial-resistant organisms they will implement Contact Precautions for such as those that are less commonly encountered in the facility.■ For carbapenem-resistant organisms, facilities may choose to prioritize using Contact Precautions for organisms with known carbapenemase production [CDC, Facility Guidance for Control of Carbapenem-resistant Enterobacteriaceae].

Continued

Best Practice Statements	Implementation considerations for resource-limited settings
<ul style="list-style-type: none"> ■ Ideally, patients requiring Contact Precautions are placed in a single-patient room. 	<ul style="list-style-type: none"> ■ When there are only a limited number of single-patient rooms, it is prudent to prioritize them for patients with conditions that may facilitate transmission of antimicrobial-resistant organisms to other patients (e.g., draining wounds, stool incontinence, uncontained secretions) [CDC, Guideline for Isolation Precautions, pages 58-59]. ■ If single-patient rooms are limited, consider cohorting patients with the same resistant organism. It is important to avoid cohorting patients with different targeted resistant microorganisms (e.g., cohorting carbapenem-resistant Enterobacterales with carbapenem-resistant <i>Acinetobacter baumannii</i>). Ideally, each cohort will have dedicated HCWs and equipment. <ul style="list-style-type: none"> □ The type of carbapenemase produced by the isolated organism should be taken into consideration meaning patients with different mechanisms of resistance (e.g., NDM, KPC, etc.) should be placed in separate cohorts or at least geographically separated from one another [WHO Implementation manual, p. 53, Box 16]. ■ For shared rooms, facilities can still strive to limit transmission of antimicrobial-resistant organisms between roommates by ensuring as many of these practices are implemented as possible: <ul style="list-style-type: none"> □ Place at least 1 meter of distance between beds □ Use privacy curtains to limit direct contact between patient areas □ Clean and disinfect each bed as if a separate room □ Ensure personal protective equipment (PPE) is changed and hand hygiene performed between patients □ Ensure personal patient items are not shared [CDC, Infection Prevention and Control for Candida Auris].
<ul style="list-style-type: none"> ■ Consider preemptively using Contact Precautions while awaiting laboratory testing for those considered at high-risk for antimicrobial-resistant organism infection or colonization. This may include patients referred from another facility at high-prevalence settings. 	<ul style="list-style-type: none"> ■ Preemptive use of Contact Precautions may be particularly important for facilities with long laboratory turnaround- times. ■ While awaiting testing results, facilities could prioritize gown and glove use for high-contact activities. ■ If resources for preemptive Contact Precautions exist, facilities will have to decide which antimicrobial-resistant organisms they will use it for based on their local epidemiology. <ul style="list-style-type: none"> □ This may be especially important for organisms that are not yet endemic in a region.
<ul style="list-style-type: none"> ■ Consider assigning HCWs to care for patients on Contact Precautions, especially if cohorting is utilized. 	<ul style="list-style-type: none"> ■ CDC, Facility Guidance for Control of Carbapenem-resistant Enterobacteriaceae
<ul style="list-style-type: none"> ■ Limit transport of patients on Contact Precautions to medically necessary purposes. 	

Continued

Best Practice Statements	Implementation considerations for resource-limited settings
<ul style="list-style-type: none">■ Ensure that whenever a patient infected or colonized with an antimicrobial-resistant organism is transferred within or between healthcare facilities, the need for Contact Precautions and other required IPC actions (e.g., specific disinfectant agents) is communicated to the receiving unit/facility.■ Facilities can note a patient’s history of infection or colonization with an antimicrobial-resistant organism within the medical record to facilitate the re-initiation of Contact Precautions upon re-admission or transfer.	<ul style="list-style-type: none">■ Ideally, both a phone call and written documentation are used to communicate the needed IPC actions upon patient transfer. An example CDC transfer form to aid in written documentation can be found here: CDC Transfer Form.■ Facilities with electronic health records could consider adding an alert “flag” within a patient’s record to notify providers of a patient’s antimicrobial-resistant organism colonization or infection status.■ For facilities without electronic health records, physical alerts such as stickers or forms placed in the paper chart can serve as an alert to providers.

Job Aids and Reminders

Best Practice Statements	Implementation considerations for resource-limited settings
<ul style="list-style-type: none">■ Contact Precautions signage should be visible prior to the room/bed space entry.■ Designated HCWs should be responsible for ensuring that Contact Precautions signage is hung until patient discharge or discontinuation of precautions.	<ul style="list-style-type: none">■ Several examples of Contact Precautions signage exist online, which facilities can either use or modify to fit their own needs.<ul style="list-style-type: none">□ CDC Contact Precautions signage: https://www.cdc.gov/infectioncontrol/pdf/contact-precautions-sign-p.pdf

Supplies and Equipment follows next page.

Supplies and Equipment

Best Practice Statements	Implementation considerations for resource-limited settings
<ul style="list-style-type: none">■ While on Contact Precautions, gowns should be worn for all patient care; donned prior to entering the room/bedspace and doffed prior to exiting.■ Gowns should cover the arms, torso, and legs.■ The reuse or extended use of gowns is not recommended as these practices can increase the risk of antimicrobial-resistant organism spread among patients. If used in times of severe shortages, these measures should be temporarily instituted with care.	<ul style="list-style-type: none">■ If gown supplies are low:<ul style="list-style-type: none">□ Prioritize their use for implementation of Contact Precautions on units that care for a higher number of patients at high-risk of antimicrobial-resistant organism acquisition, such as intensive care units.□ Prioritize their use for Contact Precautions implementation while caring for patients at higher risk of transmitting antimicrobial-resistant organisms to others such as those with uncontrollable secretion or excretions (i.e., diarrhea, draining wounds).□ Prioritize their use for high-contact activities (e.g., wound care, bathing, transferring, etc.) while caring for patients on Contact Precautions.□ Prioritize their use for patients with antimicrobial-resistant organisms of highest threat within the facility such as those that are less commonly encountered or carry carbapenemase genes.■ Consider the use of cloth gowns, which can be worn multiple times after being laundered, instead of disposable ones. Cloth gowns should ideally be laundered after each use. Reusing cloth gowns without laundering after each use should be instituted with care to include in the donning and doffing process, storage of the gown, and dedication of the gown to only one patient. These gowns should be sent for laundering at the end of each shift.<ul style="list-style-type: none">□ Cloth gowns may not have the same fluid resistance/impermeability as disposable gowns.■ Disposable gowns should not be reused.■ Extending the use of the same gown to care for multiple patients can increase the risk of transmitting antimicrobial-resistant organisms and should be avoided. This practice may be adopted when supplies are very limited in a cohort unit with the same organism and/or mechanisms of resistance. However, caution should still be taken with this practice as patients in the cohort could be co-colonized with multiple antimicrobial-resistant organisms/mechanisms of resistance or other pathogens, some of which may not be detected by laboratory testing.
<ul style="list-style-type: none">■ While on Contact Precautions, gloves should be worn for all patient care; donned before entering the room/bedspace and doffed before exiting.■ Hand hygiene should always be performed after glove removal.■ In general, double gloving or cleaning the gloves between patients is not recommended.■ The reuse or extended use of disposable gloves is not recommended during any patient care.	<ul style="list-style-type: none">■ If glove supplies are low, consider prioritizing for use during activities that involve contact with body fluids as dictated by Standard Precautions (e.g., wound care, device care, etc.).

Continued

Best Practice Statements

Implementation considerations for resource-limited settings

- Systems should be in place to ensure adequate availability and placement of PPE at the point of care for appropriate implementation of Contact Precautions. For example, designate a person who is responsible for placing and refilling supplies.
-

- Non-critical medical equipment should be dedicated to patients on Contact Precautions.

- If sharing non-critical medical equipment is unavoidable, clean and disinfect such equipment before use on another patient. It is essential that HCWs know who is responsible for reprocessing this equipment and provide the necessary training and access to cleaning/disinfection supplies to perform this duty.
 - If cohorting areas are utilized, consider dedicating equipment for that area only. However, the individual equipment, even within the cohort unit, should still be cleaned and disinfected between each patient.
-

3. Environmental cleaning

[Environmental cleaning](#) is part of Standard and Transmission-Based Precautions and should be implemented using a multimodal approach to ensure that activities are effective, sustainable, and can be improved over time. Environmental cleaning in the context of GAIHN-AR refers to the cleaning and disinfection of [environmental surfaces](#) (e.g., bed rails, mattresses, call buttons, chairs) and surfaces of [noncritical patient care equipment](#) (e.g., IV poles, stethoscopes).

Unit Practices and Protocols

Best Practice Statements	Implementation considerations for resource-limited settings
<ul style="list-style-type: none">■ High-touch environmental surfaces and dedicated, non-critical patient care equipment in all inpatient rooms/areas in high-risk units should be cleaned and disinfected at least once daily.■ Shared non-critical patient care equipment should be cleaned and disinfected before and after each use.■ Clean, noncritical patient care equipment should be stored in a location or way that clearly denotes that it has been reprocessed (e.g., stored in the 'clean' area, tagged). It should also be stored in such a way as to prevent contamination prior to use; this can be achieved by storing it in a distinctly separate area from soiled reprocessing areas, on shelves that are smooth, nonporous, and protected from water, soil, dirt, and dust.■ Dedicated areas where soiled patient care equipment is reprocessed (i.e., sluice or "dirty utility" rooms or areas) should be cleaned and disinfected at least once daily.■ Areas with a higher risk of contamination, specifically handwashing sinks, patient showers, and shared toilet areas, should be cleaned and disinfected twice daily.■ High-touch surfaces in rooms or areas on Contact Precautions should be cleaned and disinfected at least twice daily; these rooms/areas should be cleaned after other patient areas and reusable cleaning supplies (e.g., mops, cloths) should be sent for reprocessing (i.e., cleaning and disinfection) immediately after use in these areas.■ Outbreaks of antimicrobial-resistant organisms (e.g., carbapenem-resistant organisms) may necessitate enhanced cleaning procedures, including increased frequency of cleaning and disinfection and increased monitoring of cleaning practice (see Monitoring and Feedback section below).	<ul style="list-style-type: none">■ Prioritize routine daily cleaning and disinfection in TPUs and other units that provide high acuity care (e.g., ICU), including handwashing sinks; toilet, showering, and sluice rooms; or areas servicing these units. Progressively improve environmental cleaning frequency in other wards based on risk level, as resources allow. See Environmental Cleaning Program Improvement Toolkit: Section A—Tools (cdc.gov) for step-by-step instructions for completing a risk assessment at unit or sub-unit level.■ If space isn't available to store reprocessed noncritical patient care equipment separate from patient areas, implement a clear tagging system and a standard protocol of cleaning and disinfecting them before each use.■ When responding to outbreaks of antimicrobial-resistant organisms (e.g., carbapenem-resistant organisms), prioritize increasing monitoring frequency to ensure thorough and consistent cleaning and disinfection practices, rather than trying to increase frequency of cleaning and disinfection without the ability to monitor practice.

Job Aids and Reminders

Best Practice Statements	Implementation considerations for resource-limited settings
<ul style="list-style-type: none">■ Standard operating procedures (SOP) and/or job aids (e.g., pictorial instructions, checklists) should be developed for all cleaning procedures, including routine and terminal cleaning, preparing cleaning and disinfection solutions, and reprocessing cleaning supplies and equipment. These job aids should be available and easily accessible on the unit and be developed considering language/literacy level of cleaning staff.■ Develop and implement accountability mechanisms, including clearly delineated roles and responsibilities for cleaning tasks (i.e., cleaning schedules) and records or logs that document when and by whom cleaning is performed, and make them available and easily accessible on the unit.	<ul style="list-style-type: none">■ Use national or subnational guidelines and protocols to develop these SOPs; however, if these do not exist, consult the GAIHN-AR External SharePoint site for example SOPs, cleaning schedules, and cleaning logs, which have been extracted from the Environmental Cleaning in Resource-Limited Settings (CDC) implementation toolkit

Built Environment

Best Practice Statements	Implementation considerations for resource-limited settings
<ul style="list-style-type: none">■ All finishes, furnishings, and patient care equipment should be cleanable (e.g., non-porous) and compatible with the cleaning chemicals used in the unit.■ Designated physical space is necessary for preparing, reprocessing (i.e., cleaning, disinfecting, and drying) and storing of cleaning supplies and equipment; this space should have water access and drains for disposing of used cleaning and disinfectant solutions as well as many other characteristics as described in the Environmental Cleaning Practice Assessment Answer Key Section D located in the GAIHN-AR External SharePoint site.■ Handwashing sinks and surroundings (e.g., splashback) should be made of a non-porous, waterproof material and sealed appropriately to enable effective environmental cleaning and disinfection.	<ul style="list-style-type: none">■ Consider the use of plastic coverings on porous furniture, while progressively replacing these items over time as resources allow.■ Repurpose existing space for reprocessing and storing of cleaning supplies and equipment; if needed, reprocessing activities can take place in a designated area outside the facility, ensuring access to on-site wastewater management systems (even if just drainage channels to on-site soak away pits), and a means to fully dry reprocessed supplies and equipment prior to reuse. Consult the "WASHTool" file within the GAIHN-AR External SharePoint site for suggested activities to ensure appropriate wastewater management.■ Water access to the reprocessing area can be enabled via the use of drums or other large storage containers if piped water access is limited. Water does not need to be drinking water quality. Consult the "WASHTool" file in the GAIHN-AR External SharePoint site for suggested activities to ensure appropriate water supply.■ For longer-term interventions to improve access to piped water and wastewater systems, users can refer to WASH FIT: A practical guide for improving quality of care through water, sanitation and hygiene in health care facilities. Second edition (who.int).

Supplies and Equipment

Best Practice Statements	Implementation considerations for resource-limited settings
<ul style="list-style-type: none">■ Cleaning and disinfection supplies and equipment should be available, fit for the intended purpose (i.e., functional) and well maintained; reusable supplies should be reprocessed at least daily and more often as needed (see the Environmental Cleaning Practice Assessment Answer Key Section C located in the GAIHN-AR External SharePoint site for details).<ul style="list-style-type: none">□ Cleaning and disinfectant products should always be prepared and used according to manufacturer’s instructions.□ This includes ensuring cleaning and disinfection products are diluted and stored appropriately.□ Healthcare facilities should ensure that the disinfection products they use are effective against commonly identified antimicrobial-resistant and non-antimicrobial-resistant organisms within the facility.□ Contact time is the time a disinfectant must be in contact with a surface or device to ensure that appropriate disinfection has occurred. For most disinfectants, the surface should remain wet for the required contact time. This time should be located on the manufacturer’s instructions and may vary by microorganism.	<ul style="list-style-type: none">■ Consult national or subnational guidelines to find specifications and characteristics of required basic cleaning supplies and equipment, with an emphasis on appropriate disinfectant products appropriate for use against commonly identified antimicrobial-resistant and non-antimicrobial-resistant organisms within the facility. If specifications are not available from local resources, consult Environmental Cleaning Supplies and Equipment (Environmental Cleaning in Resource-Limited Settings, CDC) for a list of suggested equipment and for ideal properties to help guide disinfectant product selection.■ Conduct an inventory of available and functional (i.e., in good repair) supplies and equipment in use at the unit level (see Practices Assessment and consult the “TemplateInspect_Equip” excel sheet in the GAIHN-AR External SharePoint site).■ Estimate the basic cleaning supplies and equipment needs in the TPU and meet with the procurement department or equivalent to estimate the budget (e.g., monthly, annual) to ensure availability of basic supplies and equipment.

4. Healthcare worker education and training

Education and training are cross-cutting topics across all IPC domains and are fundamental to successful IPC program implementation. Education and training can be conducted in a variety of formats ranging from in-person all-day workshops to short sessions conducted before or after shifts to online modules. It is important to receive feedback from the facility's HCWs to understand the effectiveness of the chosen training modality.

Best Practice Statements	Implementation considerations for resource-limited settings
<ul style="list-style-type: none">■ HCWs should be trained on core IPC practices and protocols, including hand hygiene, Contact Precautions, and environmental cleaning and disinfection (for anyone with cleaning duties), prior to starting work on a unit, and at least annually via refresher trainings.■ HCWs should be trained when new IPC protocols and practices are introduced on a unit.■ Training should include a hands-on component with both demonstration of competency and opportunities for practice, (e.g., direct observation of hand hygiene technique, demonstration of appropriate donning and doffing of PPE, and intermittent quizzing on environmental cleaning procedures).■ Job aids and visual reminders on a unit should complement trainings and be used to facilitate familiarization with IPC resources and practices.■ Training methods should always be tailored to the intended audience in terms of education and literacy level.■ Particularly for carbapenem-resistant organisms, education should include how these organisms transmit within a healthcare facility so HCWs understand the “why” behind the IPC actions. For some HCWs, such as nurses and clinicians, additional education on these organisms should be considered such as carbapenemase production, treatment options, and testing considerations.	<ul style="list-style-type: none">■ Context-specific trainings that reference national or sub-national guidelines for core IPC practices and protocols should be used wherever possible; however, where these materials may not yet be developed, the following published training materials may be used as a starting place:<ul style="list-style-type: none">□ Introduction to Infection Prevention and Control (IPC), OpenWHO□ Standard precautions: The role of personal protective equipment, OpenWHO□ Transmission-based Precautions, OpenWHO□ Standard precautions: Environmental cleaning and disinfection, OpenWHO□ Standard precautions: Hand hygiene, OpenWHO <p>Note: All the trainings above are available in additional languages. Search here for relevant languages: Courses (OpenWHO)</p> <ul style="list-style-type: none">■ Evidence-based training materials for frontline environmental cleaning staff are available here: Environmental cleaning and infection prevention and control in health care facilities in low- and middle-income countries (who.int)■ Prioritize training for staff with direct patient care, e.g., nurses and clinicians.

5. Monitoring and feedback

The routine monitoring of adherence to hand hygiene, PPE donning and doffing during the care of patients requiring Contact Precautions, and environmental cleaning and disinfection on the selected TPUs is highly recommended. The monitoring process output can help inform facilities about how well HCWs are implementing the expected practices and help guide future quality improvement efforts.

Best Practice Statements	Implementation considerations for resource-limited settings
<ul style="list-style-type: none">■ Direct observations of HCW practice should be conducted at least weekly in TPUs (as applicable, for Contact Precautions) for adherence to best practices and defined protocols.<ul style="list-style-type: none">□ The frequency of monitoring of PPE donning and doffing by HCWs caring for patients on Contact Precautions and the monitoring of general Contact Precautions implementation will be dependent on the frequency of patients admitted requiring Contact Precautions. For units where this is common, weekly auditing of these practices is recommended.■ Covert and objective methods of monitoring practice should be utilized where possible (e.g., auditors observe hand hygiene practices without HCWs awareness of the monitoring, use of fluorescent markers for environmental cleaning).■ Additionally, quick and routine monitoring of hand hygiene infrastructure (e.g., ensuring ABHR dispensers contain product and are near the point of care), environmental cleaning and disinfection supplies and equipment (e.g., availability and condition of cleaning cloths, mops), and Contact Precaution implementation (e.g., signage is hung appropriately, PPE is near the point of care) is recommended.■ Roles and responsibilities for conducting routine monitoring activities on the unit should be developed, including both monitoring of HCW practices and monitoring of supplies/equipment (i.e., who will be conducting this monitoring).■ Timely feedback on monitoring results should be provided directly to HCWs so that immediate improvements can be made to practices. Feedback should come in many forms ranging from posting unit adherence rate graphs on the unit to verbally providing feedback to HCWs not routinely adhering to expected practices. It's important to emphasize that monitoring these practices is meant to serve as a non-punitive step leading to options such as re-education for underperforming HCWs as part of continuous quality improvement.■ Monitoring results should be aggregated and analyzed. At a minimum, overall adherence rates should be calculated; however, the facilities can elect to analyze their data in more detailed ways, such as by HCW type.■ Adherence rate trends should be monitored over time to demonstrate changes in performance. These trends can be visually represented, such as in graphs, which can serve as clear and concise aids for providing feedback on performance to HCWs and facility leadership.■ Monitoring results should also be shared periodically with administration and management via written reports to address high-level gaps and barriers (e.g., supply stock-outs) and plan corrective actions.	<ul style="list-style-type: none">■ Prioritize developing systematic monitoring processes that utilize standardized methods applied consistently across HCWs and shifts at a sustainable frequency (e.g., monthly) and work on increasing frequency over time as resources allow.■ Hand hygiene and PPE donning and doffing monitoring can be conducted together, when appropriate, to save time and resources.■ Prioritize providing direct and timely feedback to HCWs to enable immediate improvements to practice while working to secure resources (e.g., materials, staff time) needed to aggregate and analyze monitoring results over time.■ Some example paper-based monitoring tools to aid in this monitoring have been placed in the GAIHN-AR External SharePoint site; however, there are also several electronic based tools or other paper tools available. A summary of possible adherence rates and their calculation is also available on the SharePoint site.■ For examples of direct performance and objective (covert) monitoring tools for environmental cleaning, consult the examples in the GAIHN-AR External SharePoint site.■ For descriptions of how to use fluorescent markers for monitoring of environmental cleaning, consult https://www.cdc.gov/hai/toolkits/evaluating-environmental-cleaning.html and the example standard operating procedure on the GAIHN-AR External SharePoint site.



**Centers for Disease
Control and Prevention**
National Center for Emerging and
Zoonotic Infectious Diseases