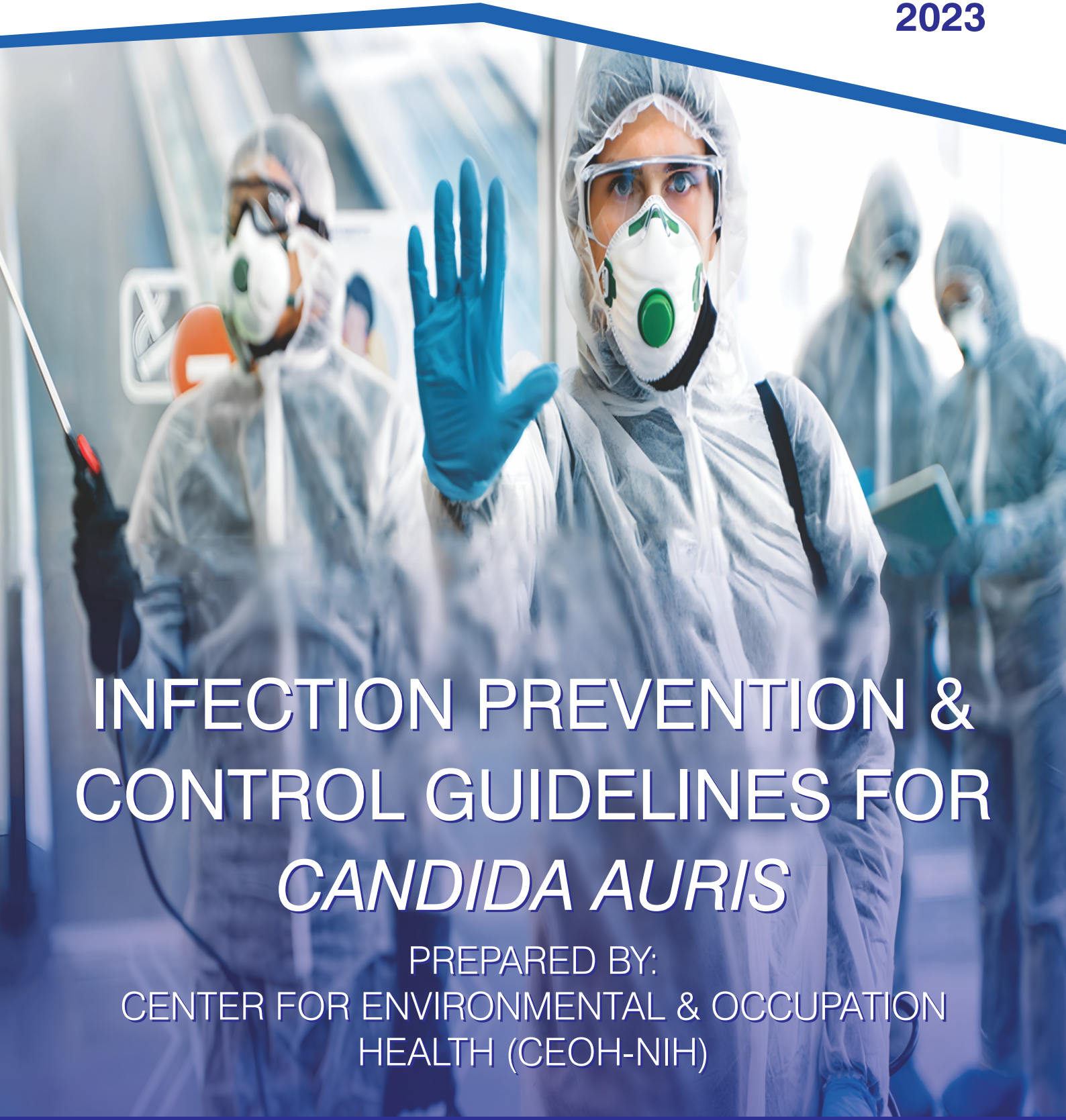
2023



INFECTION PREVENTION & CONTROL GUIDELINES FOR *CANDIDA AURIS*

PREPARED BY:
CENTER FOR ENVIRONMENTAL & OCCUPATION HEALTH (CEOH-NIH)

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National Fungal Disease Surveillance System National Institutes of Health (NIH)
Islamabad

INFECTION PREVENTION & CONTROL GUIDELINES FOR *CANDIDA AURIS*

2023

Foreword

It is a great pleasure to present the first comprehensive guidelines document on Infection Prevention and Control of *Candida auris,* to be implemented in healthcare facilities nationwide.

C. auris has been deemed an emerging fungal pathogen, capable of causing invasive diseases, particularly in critically ill patients. *C. auris* has disseminated globally and the overall burden of disease is likely to increase over time. As it is often a healthcare associated infection, optimal implementation of timely and stringent infection prevention and control strategies at the healthcare facilities is integral in reducing *C. auris* related morbidity and mortality.

This detailed document, will allow healthcare workers, facility managers and policy makers to exchange knowledge and experiences with infection prevention and control practitioners, for the successful implementation of multimodal strategies including rapid identification, surveillance, well timed infection control measures and appropriate treatment to prevent the spread. This is a living document which will need to be updated as new *C. auris* related information emerges in order to update changes in work practices.

National Institutes of Health extends deep gratitude to Dr. Muhammad Amjad Khan, Dr. Mumtaz Ali Khan, Dr. Amna Ali, Mr. Muhammad Waleed, Ms. Tarbia Aamir and Dr. Afreenish Amir for their excellent contribution in preparing these guidelines.

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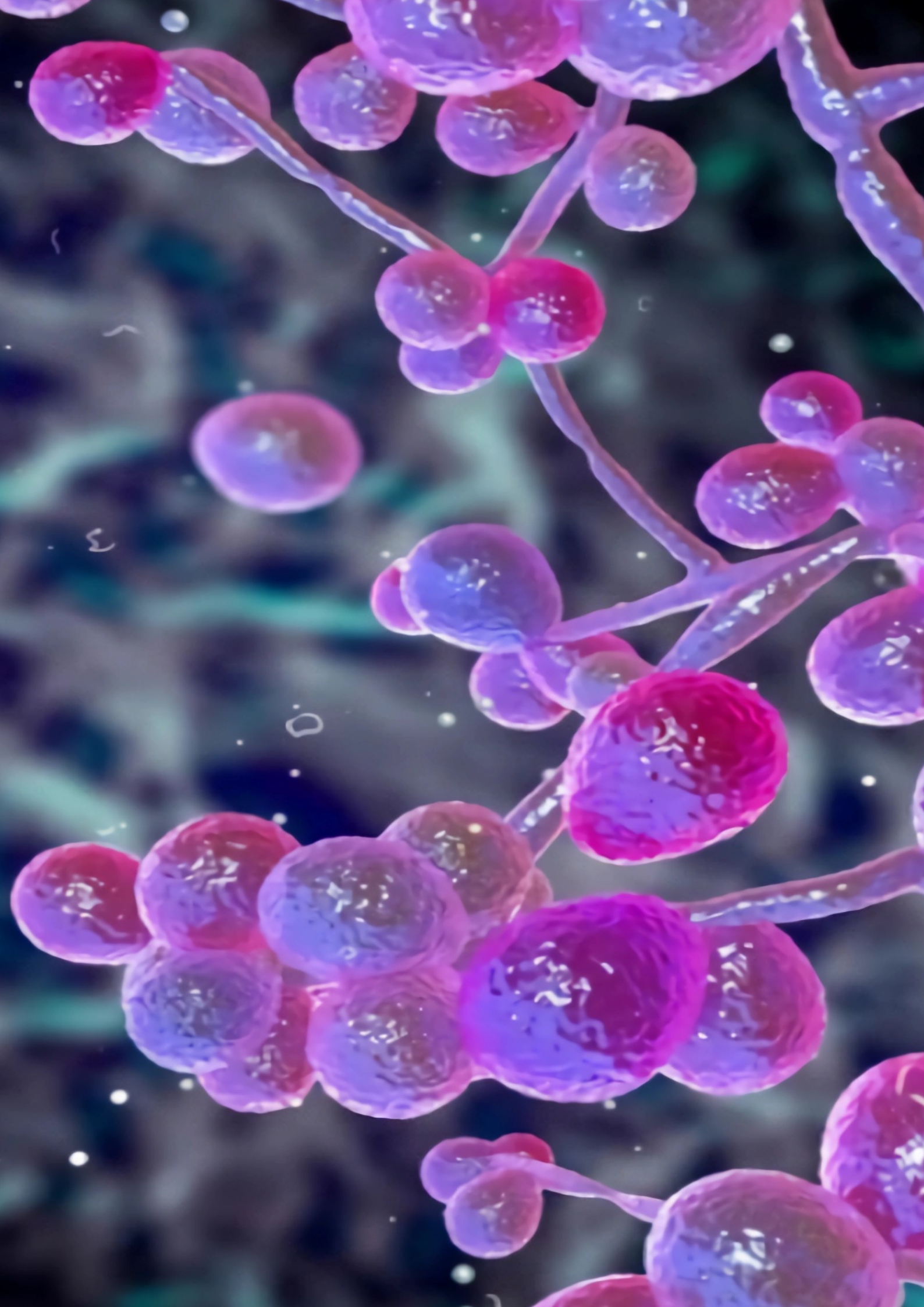


1

Guidelines for Infection Prevention and Control of *Candida auris*


SAFE
DISEASE
SANITATION
OCTOBER 15
NAILS
PERSONAL
PREVENTION
HANDLING
CHEMICAL
WIPES
GELS
CLEANER
FINGERS
ALCOHOL
SOAP
NaOH
BASIN
TOILET
SNEEZE
GERMS
HEALTH
INFECTIONS
BACTERIUM
DISEASE
WASH
DANGER
IMPORTANT
WASHING
RUB
SANITIZER
ANTIBACTERIAL
SODIUM HYDROXIDE
DIRT
GERMS
CLEAN
KILL
DISINFECT
VIRUS
WC
WATER
HYGIENE
AGENTS
SICK
LIQUID SOAP
SOAP
CONTROL
HEALTH
PETS
TOUCHING
FREQUENT
PUBLIC
STAY HEALTHY!
ANTIOXIDANT
FOAM
PALM
RUB
SICK
PEOPLE
MICROBES
ANTISEPTIC
CARE
DISPENSER
HANDSOAP
METHODS
RINSE
PREVENT
SANITIZERS
EFFECTIVE
LEARN
MICROBES
INGREDIENTS
GARBAGE
LATHER
WASTE
HYGIENE
SAVE
DRY
FOAM
BASIN
GELS
CLEANING
DIRTY
BACTERIA
TOWEL
FAUCET
INFECTION
HANDWASHING
CHEMICAL
HYGIENE
AIR DRY
FOAM
DANGER
LATHER
WARNING
HANDWASHING
RUNNING WATER
PUBLIC HEALTH
VIRUSES
SEPTIC
DESTROY

1. Guidelines for Infection Prevention and Control of *Candida auris*

1.1. Purpose

This guideline provides recommendations regarding best practice to support infection prevention and control of *Candida auris*.

1.2. Scope

This document provides information for all Healthcare Workers and Laboratory Personnel working with *Candida auris* (*C. auris*) samples and patients.

1.3. Background

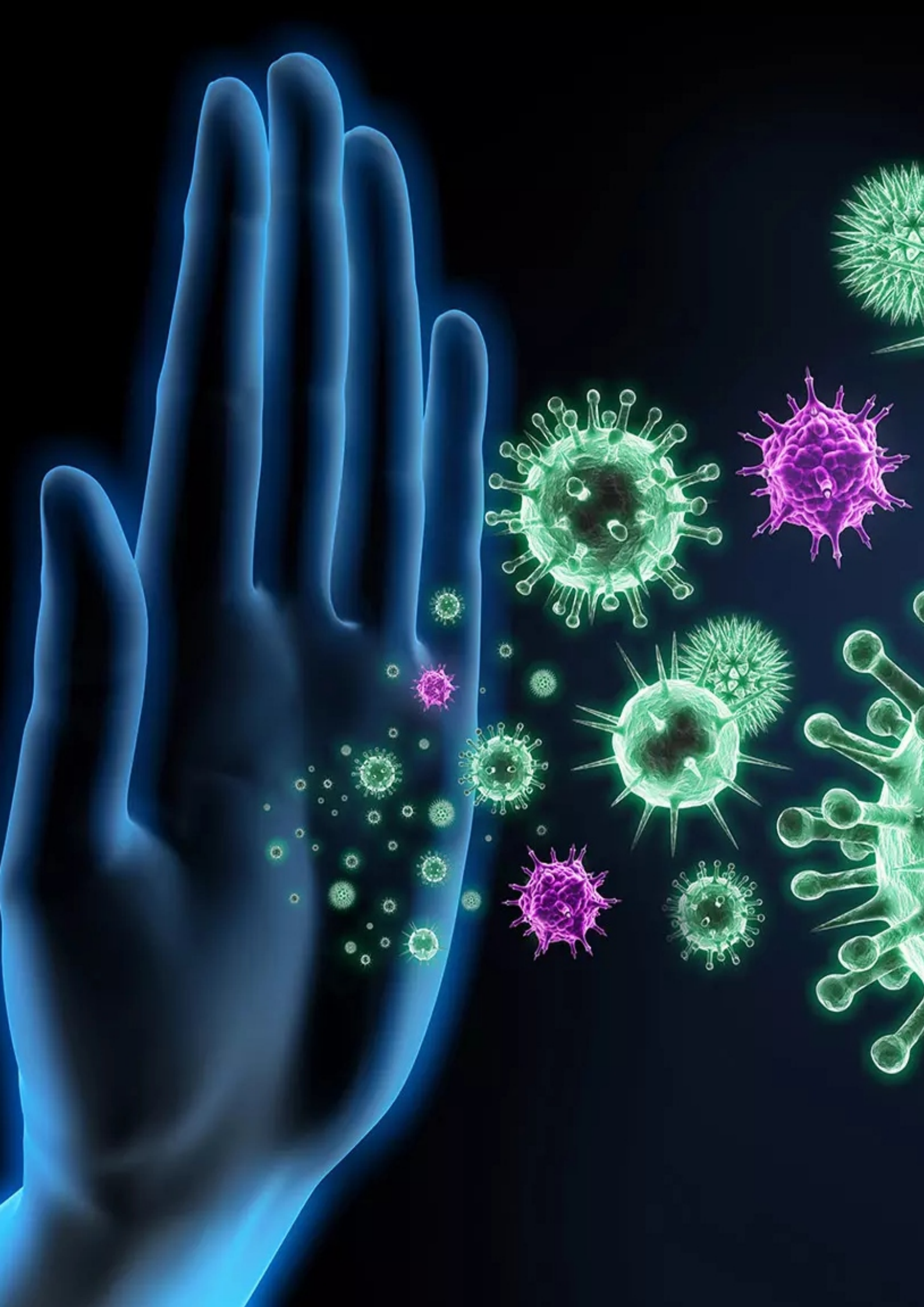
Candida auris is an emerging fungus (yeast) that presents a serious global threat[1]. It was first identified in 2009 in Japan but has since been identified in over 35 countries across all continents sparing Antarctica[2]. Correct identification of *C. auris* is rather challenging as misidentification with other species is common, making detection and hence the control of the pathogen rather difficult[3].

This is a pathogen of concern because of its behavior:

- It is associated with invasive infection, most notably blood stream infections (candidaemia) with significant mortality, especially in those with co-morbidities
- It is commonly multi-resistant to antifungal agents with some strains resistant to all three classes of antifungal agents[4]

The extraordinary abilities of *C. auris* to easily contaminate the environment around colonized patients and persist for long periods have recently resulted in major outbreaks in many countries including Pakistan[5]. *C. auris* resists elimination by robust cleaning and other decontamination procedures, likely due to the formation of 'dry' biofilms[6]. Susceptible hospitalized patients, particularly those with multiple comorbidities in intensive care settings, acquire *C. auris* rather easily from close contact with *C. auris*-infected patients, their environment, or the equipment used on colonized patients, often with fatal consequences[7]. This fungus can spread within health care facilities and interventions are needed to prevent transmission during this early stage of *C. auris* emergence[8]. Experience during outbreaks suggests that Multi drug resistant (MDR) *C. auris* might substantially contaminate the environment of rooms of colonized or infected patients. Transmission indirectly from equipment in contact with the case and direct contact transmission from the hands of healthcare workers (HCWs) are particular risks; therefore, there must be strict adherence to hand hygiene[9].

Considering the exceptional ability of this organism to cause outbreaks and the very high mortality rates reported among affected patients, specific recommendations and guidelines have been published by the US Centers for Disease Control and Prevention (CDC)[10].



2

Infection Prevention and Control Strategies for *Candida auris* in Healthcare Settings

Germs are small .... but still scary

Infection prevention works

2. Infection Prevention and Control Strategies for *Candida auris* in Healthcare Settings

The primary infection control measures for prevention of C. auris transmission in healthcare settings are standard precautions and transmission based precautions. The former is intended to be applied to the care of all patients in all healthcare settings, regardless of the suspected or confirmed presence of an infectious agent. Implementation of Standard Precautions constitutes the primary strategy for the prevention of healthcare-associated transmission of infectious agents among patients and healthcare personnel. Transmission-Based Precautions are for patients who are known or suspected to be infected or colonized with infectious agents, including certain epidemiologically important pathogens, which require additional control measures to effectively prevent transmission. Transmission-Based Precautions are used when the route(s) of transmission is (are) not completely interrupted using Standard Precautions alone.

2.1 Standard Precautions

i. Adherence to hand hygiene
ii. Appropriate use of Personal Protective Equipment (PPE)
iii. Cleaning and disinfecting the patient care environment (daily and terminal cleaning) and reusable equipment with recommended products.

2.1.1 Hand hygiene

When caring for patients with *C. auris*, healthcare personnel should follow standard hand hygiene practices. Hand Hygiene means cleaning your hands by using either handwashing (washing hands with soap and water), antiseptic hand wash, antiseptic hand rub (i.e. alcohol-based hand sanitizer including foam or gel), or surgical hand antisepsis.

Alcohol-based hand sanitizer (ABHS) is effective against *C. auris* and is the preferred method for cleaning hands when they are not visibly soiled. If hands are visibly soiled, wash with soap and water. Wearing gloves is not a substitute for hand hygiene.

There are two methods for hand hygiene as detailed below:

Use an Alcohol-Based Hand Sanitizer	Wash with Soap and Water
Immediately before touching a patient	When hands are visibly soiled
Before performing an aseptic task (e.g., placing an indwelling device) or handling invasive medical devices	After caring for a person with known or suspected infectious diarrhea
Before moving from work on a soiled body site to a clean body site on the same patient	After known or suspected exposure to spores (e.g. B. anthracis, C difficile outbreaks)
After touching a patient or the patient's immediate environment	-
After contact with blood, body fluids or contaminated surfaces	-
Immediately after glove removal	-

Increase hand hygiene audits on units where patients with *C. auris* reside. Consider re-educating healthcare personnel on hand hygiene through an in-service or retraining, especially if audits demonstrate low adherence to recommended hand hygiene practices[11].

2.1.2 Personal Protective Equipment (PPE)[12]

Precautions	Applies to:	PPE used for these situations:	Required PPE	
Standard Precautions	All residents	Any potential exposure to: • Blood • Body fluids • Mucous membranes • Non-intact skin • Potentially contaminated environmental surfaces or equipment	Depending on anticipated exposure: gloves, gown, or face protection (change PPE before caring for another resident)	None
Enhanced Barrier Precautions	All residents with *any of the following:* • Infection or colonization with a novel or targeted Multi drug resistant organism (MDRO) *when Contact Precautions do not apply*. • Wounds and/or indwelling medical devices (e.g., central line, urinary catheter, feeding tube, tracheostomy/ventilator) *regardless of MDRO colonization status* who reside on a unit or wing where a resident known to be infected or colonized with a novel or targeted MDRO resides. Facilities may consider applying Enhanced Barrier Precautions to residents infected or colonized with other epidemiologically-important MDROs based on facility policy.	During high-contact resident care activities: • 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: any skin opening requiring a dressing	Gloves and gown prior to the high-contact care activity (change PPE before caring for another resident) (Face protection may also be needed if performing activity with risk of splash or spray)	None
Contact Precautions	All residents infected or colonized with a novel or targeted multidrug-resistant organism *in any of the following situations*: • Presence of acute diarrhea, draining wounds or other sites of secretions or excretions that are unable to be covered or contained • On units or in facilities where ongoing transmission is documented or suspected For infections (e.g., *C. difficile*, norovirus, scabies) and other conditions where Contact Precautions is recommended	Any room entry	Gloves and gown (don before room entry, doff before room exit; change before caring for another resident) (Face protection may also be needed if performing activity with risk of splash or spray)	Yes, except for medically necessary care

2.1.3 Cleaning and Environmental disinfection

C. auris can persist on surfaces in healthcare environments. *C. auris* has been cultured from multiple locations in patient rooms, including both high-touch surfaces, such as bedside tables and bedrails, and general environmental surfaces farther away from the patient, such as windowsills. *C. auris* has also been identified on mobile equipment that is shared between patients, such as glucometers, temperature probes, blood pressure cuffs, ultrasound machines, nursing carts, and crash carts.

Perform thorough routine (at least daily) and terminal cleaning and disinfection of patients' or residents' rooms and other areas where they receive care (e.g., radiology, physical therapy) using an appropriate disinfectant. Shared equipment (e.g., ventilators, physical therapy equipment) should also be cleaned and disinfected before being used by another patient.

All healthcare personnel providing patient care should be trained on which mobile and reusable equipment they are responsible for cleaning and how to clean the equipment properly. Numerous CDC and health department investigations have found that healthcare personnel are often unclear on who is responsible for cleaning mobile or reusable equipment and how it should be cleaned. Because equipment moves from room to room, often several times per day in the case of vital signs monitors and glucometers, mobile or reusable equipment is likely an important source of C. auris spread.

It is important to follow all manufacturers' directions for use of surface disinfectants and applying the product for the correct contact time. Some products with *C. albicans* or fungicidal claims may not be effective against *C. auris*, and accumulating data indicate that products solely dependent on quaternary ammonia compounds (QACs) are NOT effective[13,14].

CDC recommends use of an Environmental Protection Agency (EPA)–registered hospital-grade disinfectant effective against *C. auris*.

Current list of EPA-approved products for *C. auris*, can be found at this link: (https://www.epa.gov/pesticide-registration/list-p-antimicrobial-products-registered-epa-claims-against-candida-auris)

If the products in the aforementioned list are not accessible or otherwise suitable, interim guidance remains in place to permit use of an EPA-registered hospital-grade disinfectant

effective against *Clostridioides difficile* spores for the disinfection of *C. auris*. Regardless of the product selected, it is important to follow all manufacturer's directions for use, including applying the product for the correct contact time.

(Available at: https://www.epa.gov/pesticide-registration/list-k-epas-registered-antimicrobial-products-effective-against-clostridium)

Environmental sampling is generally not recommended to assess cleaning and disinfection processes and cannot be used to confirm absence of *C. auris*. In some limited scenarios, environmental sampling may be useful to support outbreak investigations, special studies, or environmental surveillance, especially when epidemiologic evidence implicates an environmental reservoir in ongoing transmission. Consultation with public health is recommended for facilities considering environmental sampling.

2.1.3.1 Disinfection Process

To disinfect surfaces contaminated with *C. auris*, use a product with Environmental Protection Agency (EPA) approval specifically for *C. auris*. The list of products approved by EPA is being updated as more is learned about this emergent pathogen. The most recent list of approved products can be found in CDC's environmental disinfection guidance. It is important to note that products with *C. albicans* or fungicidal claims may not be effective against *C. auris*, and accumulating data indicate products solely dependent on quaternary ammonium compounds are NOT effective.

In terms of laboratory safety when manipulating suspected or *confirmed C.auris* isolates, after work is complete in the laboratory, decontaminate the BSL2 with an EPA approved product specifically for *C.auris.* Remove PPE and clean hands before leaving the laboratory, according to your institution's policy and methods. Finally Dispose of contaminated materials as infectious waste following your institution's standard guidelines.

2.1.3.2 Terminal clean

Once the patient has left the environment a terminal clean should be undertaken. For terminal cleaning of a bed space or room vacated by a *C. auris* colonized/infected patient, disinfection, preceded by cleaning, of horizontal surfaces plus all items that may have come into contact with the patient or staff hands should occur. The disinfectants used should be those for each item in compliance with the healthcare facility's policy. A hypochlorite is currently

recommended for cleaning of the environment. As different staff groups may be responsible for different items, attention should be focused on all relevant items going non-decontaminated. Application of disinfectant should be thorough ensuring good contact before the disinfectant dries. Privacy curtains should be changed.

If any non-contact disinfection is used (e.g. gaseous hydrogen peroxide or UV), full cleaning and disinfection preceding it should still occur. Facilities should adopt a local cleaning policy and regimen depending on the level of contamination and case load. Domestic staff will require training and supervision until declared competent. Cleaning staff should change gloves and aprons with appropriate hand decontamination after cleaning each *C. auris* area. There should be appropriate decontamination of dynamic mattresses.

If a patient needs to be taken out of the side room or bay to theatre, procedure room, or for imaging, they should be scheduled last on the list for the day and the environment cleaned as described above. Several healthcare facilities (HCFs) have reported favorable use of gaseous hydrogen peroxide, following preparatory protocols.

2.1.3.3 Disinfection and reprocessing of medical equipment

The U.S. Food and Drug Administration (FDA) regulates products used for the reprocessing of medical devices based on device classification, and EPA's List P should not be referenced for this purpose. When selecting a product for the reprocessing of medical devices, please refer to the current list of FDA-cleared liquid chemical sterilant for critical devices and high-level disinfectants for semi-critical devices, which can be accessed here:
https://www.fda.gov/medical-devices/reprocessing-reusable-medical-devices-information-manufacturers/fda-cleared-sterilants-and-high-level-disinfectants-general-claims-processing-reusable-medical-and
Products should be used according to the FDA-cleared label claim and device manufacturer's instructions.

For the reprocessing of reusable medical equipment for *C. auris* patients, the HCF may use:

- Liquid chemical sterilant for critical devices:
    - 3100-3400 ppm peracetic acid (2 hrs at 20°C)
    - 3% glutaraldehyde (10 hrs at 25°C)
- High-level disinfectants for semi-critical devices:
    - 2.0% hydrogen peroxide (8 mins at 20°C)
    - 0.6% ortho-phthalaldehyde (12 mins at 20°C)

2.1.4 Linen and laundry management

2.1.4.1 Best practices for linen (and laundry) handling

- Always wear reusable rubber gloves before handling soiled linen (e.g., bed sheets, towels, curtains).
- Never carry soiled linen against the body. Always place it in the designated container.
- Carefully roll up soiled linen to prevent contamination of the air, surfaces, and cleaning staff. Do not shake linen.
- If there is any solid excrement on the linen, such as faeces or vomit, scrape it off carefully with a flat, firm object and put it in the commode or designated toilet/latrine before putting linen in the designated container.
- Place soiled linen into a clearly labelled, leak-proof container (e.g., bag, bucket) in the patient care area. Do not transport soiled linen by hand outside the specific patient care area from where it was removed.
- Reprocess (i.e., clean and disinfect) the designated container for soiled linen after each use.
- If reusable linen bags are used inside the designated container, do not overfill them, tie them securely, and launder after each use.
- Soiled linen bags can be laundered with the soiled linen they contained

Always launder soiled linens from patient care areas in a designated area, which should:

- Be a dedicated space for performing laundering of soiled linen
- Not contain any food, beverage or personal items
- Have floors and walls made of durable materials that can withstand the exposures of the area (e.g., large quantities of water and steam)
- Have a separation between the soiled linen and clean linen storage areas
- Have hand washing stations and supplies

Best practices for personal protective equipment (PPE) for laundry staff:

- Practice hand hygiene before application and after removal of PPE.
- Wear tear-resistant reusable rubber gloves when handling and laundering soiled linens.
- If there is risk of splashing, for example, if laundry is washed by hand, laundry staff should always wear gowns or aprons and face protection (e.g., face shield, goggles) when laundering soiled linens.

Best practices for laundering soiled linen:

- Use hot water (70–80°C for 10 min) [158–176°F]) and an effective laundry detergent
- Disinfectants are generally not needed when soiling is at low levels.
- Use disinfectant on a case by case basis, depending on the origin of the soiled linen (e.g., linens from an area on contact precautions such as for *C. auris*)
- Dry linens completely in a commercial dryer, wherever available

2.1.4.2 Manual reprocessing steps

If laundry services with hot water are not available, reprocess soiled linens manually according to the following:

- Immerse in detergent solution and use mechanical action (e.g., scrubbing) to remove soil
- Disinfect by one of these methods:
    - Immersing the linen in boiling water or
    - Immersing the linen in disinfectant solution for the required contact time and rinsing with clean water to remove residue, for suspected and confirmed *C. auris* patients
- Allowing to fully dry, ideally in the sun

2.1.4.3 Best practices for management of clean linen

- Sort, package, transport, and store clean linens in a manner that prevents risk of contamination by dust, debris, soiled linens or other soiled items
- Each floor/ward should have a designated room for sorting and storing clean linens
- Transport clean linens to patient care areas on designated carts or within designated containers that are regularly (e.g., at least once daily) cleaned with a neutral detergent and warm water solution

2.2 Transmission based Precautions

i. Appropriate use of contact-based precautions based on setting.
ii. Inter-facility communication about patient's *C. auris* status when patient is transferred to another healthcare facility.
iii. Screening contacts of newly identified case patients to identify *C. auris* colonization.
iv. Laboratory surveillance of clinical specimens to detect additional cases.

2.2.1 Contact based precautions & room placement

Patients with *C. auris* in acute care HCFs with long-term acute care should be managed using contact precautions. Contact precautions are one type of transmission-based precautions that are used when pathogen transmission is not completely interrupted by Standard Precautions alone. Contact Precautions are intended to prevent transmission of infectious agents, like MDROs, that are spread by direct or indirect contact with the resident or the resident's environment.

Contact Precautions require the use of gown and gloves on every entry into a resident's room. The resident is given dedicated equipment (e.g., stethoscope and blood pressure cuff) and is placed into a private room. When private rooms are not available, some residents (e.g., residents with the same pathogen) may be cohorted, or grouped together. Residents on Contact Precautions should be restricted to their rooms except for medically necessary care and restricted from participation in group activities.

As Contact Precautions require room restriction, they are generally intended to be time limited and, when implemented, should include a plan for discontinuation or de-escalation.

Residents with *C. auris* in nursing homes, including skilled nursing facilities with ventilator units, should be managed using either contact precautions or enhanced barrier precautions, depending on the situation. Enhanced Barrier Precautions expand the use of PPE beyond situations in which exposure to blood and body fluids is anticipated and refer to the use of gown and gloves during high-contact resident care activities that provide opportunities for transfer of MDROs to staff hands and clothing[15,16].

Examples of high-contact resident care activities requiring gown and glove use for Enhanced Barrier Precautions include:

- 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: any skin opening requiring a dressing
- Gown and gloves would not be required for resident care activities other than those

listed above, unless otherwise necessary for adherence to Standard Precautions. Residents are not restricted to their rooms or limited from participation in group activities

Implementation of transmission-based precautions for *C. auris* is similar to its use for other multidrug-resistant organisms (MDROs). In most instances, facilities that care for patients with other MDROs or *Clostridioides difficile* can also care for patients with *C. auris*. Facilities may contact their state or local health department if they need additional guidance on caring for patients with *C. auris*. Note that decisions to discharge the patient from one level of care to another should be based on clinical criteria and the ability of the accepting facility to provide care—not on the presence or absence of colonization.

2.2.1.1 Contact precautions: Considerations for single rooms and roommate pairings

Patients or residents on contact precautions should be placed in a single room whenever possible. If a limited number of single rooms are available, they should be prioritized for people at higher risk of pathogen transmission (e.g., those with uncontained secretions or excretions, acute diarrhea). When single rooms are not available, people with the same MDROs may be housed together in the same room. However, since people are often colonized with different combinations of resistant pathogens, assigning rooms by MDROs may not be feasible. Room assignments for people on contact precautions might be considered based on a single pathogen (e.g., *C. auris*) without regard to co-colonizing organisms as a measure to control transmission during an acute outbreak.

2.2.1.2 Recommended practices to reduce transmission in shared rooms

In circumstances when patients or residents colonized with *C. auris* or other MDROs are placed in shared rooms, facilities must implement strategies to help minimize transmission between roommates. These strategies include:

- Maintaining spatial separation of at least 3 feet between roommates
- Using privacy curtains to limit direct contact
- Cleaning and disinfecting any shared reusable equipment, if dedicated equipment for each patient is not available
- Cleaning and disinfecting environmental surfaces on a more frequent schedule
- Having healthcare personnel change personal protective equipment (if worn) and performing hand hygiene when moving between roommates

2.2.1.3 Additional cohorting considerations

Before making decisions to cohort patients according to *C. auris* or other high-concern MDROs by room or place them together in a dedicated unit or area within a facility, facilities

should consider the following to ensure that these practices are implemented without increasing the risk of pathogen spread:

Benefits: Placing patients with *C. auris* or other high-concern MDROs in the same room, or in a dedicated unit, wing, or area (even if in single-patient rooms), and/or dedicating staff to their care can decrease movement of healthcare personnel and equipment from those colonized or infected with *C. auris* to those who are not. This strategy may be best used for initial room assignments in facilities performing admission screening for select MDROs or for a single MDRO in facilities with an acute outbreak.

Drawbacks: Increasing patient movement to place patients in the same room, unit, or area based on MDROs might, in some circumstances, increase *C. auris* transmission—for example, if there are gaps in environmental cleaning. Facilities choosing to implement this strategy should do so in a way that reduces overall exposures throughout the facility (e.g., avoiding frequent room changes that lead to environmental contamination in more areas and more healthcare contacts that could be exposed).

2.2.1.4 Duration of precautions

Patients and residents in healthcare facilities often remain colonized with *C. auris* for many months, perhaps indefinitely, even after acute infection (if present) has been treated and resolves.

CDC recommends continuing setting appropriate contact-based precautions for the entire duration of the patient's stay in the facility.

2.2.1.5 Reassessment of colonization

CDC does not recommend routine reassessments for *C. auris* colonization. Long-term follow-up of colonized patients in healthcare facilities, especially those patients who continue to require complex medical care, such as ventilator support, suggests colonization persists for a prolonged period of time. Repeat colonization swabs may alternate between detecting and not detecting *C. auris*. Surveillance has identified patients that remained colonized for longer than 2 years. It is likely that colonization may even persist longer as we learn more about colonized patients. A considerable number of patients have had a positive *C. auris* specimen after multiple negative swabs. Among patients who had a positive *C. auris* screening result followed by one or more negative screening results, more than 50% had a subsequent positive screening result according to research by Pacilli et al[17]. Additional information is being collected to understand the duration of colonization and the role of colonization in spread of *C. auris*.

The decision to discharge a patient from one level of care to another should be based on clinical criteria and the ability of the accepting facility to provide care—not on the presence or absence of infection or colonization.

2.2 Transmission based Precautions

2.2.2 Patient transfer between healthcare facilities

When transferring a patient or resident with *C. auris* colonization or infection to another healthcare facility, make sure to notify the receiving facility of patient's *C. auris* infection or colonization status, including recommended infection control precautions.

2.2.2.1 Facilitating adherence to infection control measures

Ensuring that all healthcare personnel adhere to infection control recommendations is critical to preventing *C. auris* transmission. Consider taking the following steps to enhance adherence:

- Educate all healthcare personnel, including staff who work with environmental cleaning services, about *C. auris* and the need for appropriate precautions. In-house refresher trainings may be needed to reinforce concepts and to account for healthcare personnel turnover and guidance updates.
- Ensure adequate supplies are available to implement infection control measures.
- Monitor adherence to infection control practices, and implement supervised cleaning of patient care areas.
- Strict supervision of laundry/cleaning staff responsible for linen washing and appropriate disinfection
- "Flag" the patient's record to alert healthcare personnel to institute recommended infection control measures in case of readmission

2.2.3 Screening

Screening patients to identify *C. auris* colonization is essential for implementing appropriate infection prevention and control practices.

2.2.3.1 Who to Screen

Consider screening patients who are at high risk for *C. auris*, including:

- Close healthcare contacts of patients with newly identified *C. auris* infection or colonization
- Patients who have had an overnight stay in a healthcare facility in the previous one year, in a country with documented *C. auris* cases.
- Strongly consider screening when patients have had infection or colonization with carbapenemase-producing Gram-negative bacteria, as *C. auris* co-colonization with these organisms has been observed regularly.

2.2.3.2 Screening of close healthcare contacts

Health departments and healthcare facilities should consider the following factors when deciding which patients to screen who have had contact with a patient with *C. auris* infection

or colonization (referred to here as index patients):

- At a minimum, screen roommates at healthcare facilities, where the index patient resided in the previous month.
- Ideally, identify and screen roommates of the index patient even if they were discharged from the facility.
- Consider also screening patients who require higher levels of care (e.g., mechanical ventilation) and who overlapped on the ward or unit with the index patient for 3 or more days, as these patients are also at substantial risk for colonization.
- Patients with newly identified C. auris infection or colonization might have been colonized for months before detection of the organism. Therefore, it is also important to consider the patient's prior healthcare exposures and contacts when devising a screening strategy.
-

2.2.3.3 Screening to detect ongoing transmission

Healthcare facilities should strongly consider performing more extensive screening, such as a point prevalence survey, if there is evidence or suspicion of ongoing transmission in a facility (e.g., *C. auris* detected from multiple patients through contact screening or clinical cultures, increase in infections from unidentified Candida species). In a point prevalence survey, every patient on a given unit or floor where transmission is suspected should be screened. Consider doing a point prevalence survey even if all known *C. auris* patients have been discharged.

2.2.3.4 How to screen

Screen for *C. auris* colonization using a composite swab of the patient's bilateral axilla and groin. Available data suggest that these sites are the most common and consistent sites of colonization. Although patients have been colonized with *C. auris* in the nose, mouth, external ear canals, urine, wounds, and rectum, these sites are usually less sensitive for colonization screening.

When screening identifies a patient with *C. auris* colonization, use the same infection control precautions as for patients with *C. auris* infection. While awaiting screening results, healthcare facilities could consider placing patients at highest risk of *C. auris* colonization on appropriate transmission-based precautions. Examples of patients at highest risk include patients from healthcare facilities with high prevalence or ongoing transmission or patients with recent overnight stays in countries with documented *C. auris* cases.

2.2.4 Prospective surveillance

In facilities that have had new cases identified or have seen *C. auris* transmission, prospective laboratory surveillance can help identify other *C. auris* cases. For facilities or units where *C. auris* was detected, identify the species of all Candida isolates from any specimen source (normally sterile and nonsterile sites) for at least 1 month until there is no evidence of *C. auris* transmission.

2.2.4.1 Reporting

Candida auris is a notifiable condition and is reportable in many countries. Laboratories that identify cases of *C. auris* should report cases immediately to the local relevant health authorities.

2.2.4.2 Surveillance for clinical cases

It is recommended that all yeast isolates obtained from a normally sterile site (e.g., preferably bloodstream or cerebrospinal fluid if indicated) be identified to the species level so that appropriate initial treatment can be administered based on the typical, species-specific susceptibility patterns.

C. auris has been identified from many body sites including bloodstream, urine, respiratory tract, biliary fluid, wounds, and external ear canal. Approximately half of clinical cases in the United States have been in the bloodstream and the remainder have been found in non-invasive body sites. Many clinical laboratories do not typically determine the species of isolates from non-sterile sites since presence of Candida in these sites may represent colonization rather than infection and would not require treatment. However, *C. auris* is important to identify even from a non-sterile body site because presence of *C. auris* in any body site can represent wider colonization, posing a risk for transmission and requiring implementation of infection control precautions.

When Candida is isolated from non-sterile sites, species-level identification should be considered in certain circumstances, including:

- When clinically indicated in the care of a patient
- When a case of *C. auris* infection or colonization has been detected in a facility or unit, in order to detect additional patients colonized. Species identification when Candida is found in non-sterile sites can be implemented for at least one month until no evidence exists of *C. auris* transmission
- When a patient has had an overnight stay in a healthcare facility outside the country in the previous one year, especially if in a country with documented *C. auris* transmission. Colonization for longer than a year has been identified among some *C. auris* patients; therefore HCFs might also consider determining the species for Candida isolated from patients with more remote exposure to healthcare abroad

All laboratories, especially laboratories serving healthcare facilities where cases of *C. auris* have been detected should do the following:

- Review past microbiology records to identify cases of confirmed or suspected *C. auris*
- Conduct prospective surveillance to identify and report *C. auris* cases in the future

2.2.4.3 Drug resistance

Antifungal susceptibility testing should be performed for all clinical *C. auris* cases to guide

3

Management of *C. auris* Isolated from Non-invasive and Non-sterile Body Sites

Did ya hear?

Infection prevention works

3. Management of *C. auris* Isolated from Non-invasive and Non-sterile Body Sites

3.1 Treatment

CDC does not recommend treatment of *C. auris* identified from non-invasive sites (such as respiratory tract, urine, and skin colonization) when there is no evidence of infection. Similar to recommendations for other Candida species, treatment is generally only indicated if clinical disease is present. However, infection control measures should be used for all patients with *C. auris*, regardless of source of specimen.

3.2 Prevention of invasive infections

Patients who become colonized with *C. auris* are at risk of developing invasive infections from this organism. Invasive infections can develop at any point after patients become colonized. Additional measures listed below can help prevent invasive *C. auris* infection once patients become colonized with *C. auris*.

3.2.1 Appropriate care of medical devices

Many patients with *C. auris* colonization already have or may need various types of invasive lines and tubes, including central venous catheters, urinary catheters, and tracheostomy tubes. These devices can serve as portals of entry for the organism into invasive body sites.

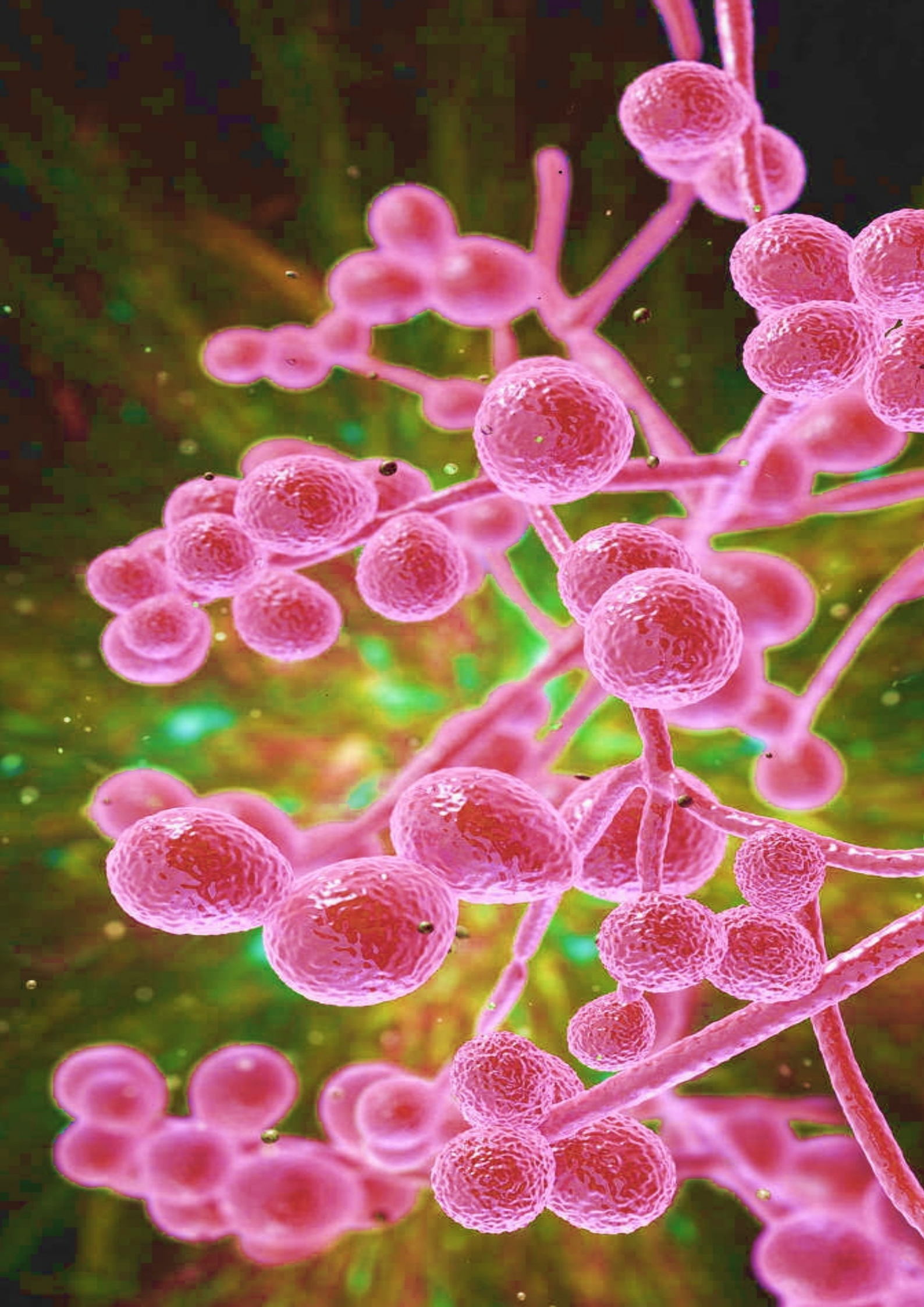
Appropriate care of medical devices is needed to prevent infections. This care includes strict adherence to recommended central venous catheter and urinary catheter insertion and maintenance practices and meticulous care of tracheostomy sites. Clinicians should continually assess the need for invasive devices and promptly remove them when they are no longer needed. When a healthcare facility determines that a patient has *C. auris* infection or colonization, the staff should review protocols for care of medical devices and evaluate current adherence to protocols. More information on appropriate care of medical devices is available in the Infection Control Guidelines Library.

3.2.2 Surgical procedures

Patients colonized with *C. auris* and undergoing surgical procedures may also be at increased risk for surgical site infections. Meticulous skin preparation in the operating room should be performed using an alcohol-based agent unless contraindicated. Further guidance on preventing surgical site infections is available in the CDC Guideline for the Prevention of Surgical Site Infection.

3.2.3 Antibiotic stewardship

Many patients with *C. auris* infection or colonization have received broad-spectrum antibacterial and antifungal medications in the weeks before their first culture yielding *C. auris.* Assessing the appropriateness of antibiotics, especially antifungals, and discontinuing them when not needed may help prevent *C. auris* colonization and infection.



4

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Germs...

Lurking where you touch

5

Annexures

5.1 IPC Surveillance Checklists
5.2 IEC Material)

A. Hand Hygiene

Facility: _____

Date: _____

Unit/ward + Room number: _____

Name and designation of IPC staff: _____

S. #	Hand Hygiene Principle	Yes	No	Remarks
1	Healthcare workers (HCWs) have received hand hygiene training within the past 2 years. Ask HCW on duty/check training records			
2	HCWs nails are short, clean and free from nail varnish, nail polish, nail enhancements			
3	No hand or wrist jewelry are worn by staff on duty including stone rings and wrist watches			
4	HCWs are observed to have bare wrists when delivering care (short sleeved top or sleeves rolled up)			
5	Dedicated hand wash sinks with running water, soap mounted in dispenser and paper towel is available at care areas			
6	Alcohol hand rubs are available to staff and accessible at the point of care			
7	Posters displaying hand hygiene technique are available and displayed in prominent areas			
8	Appropriate designated hand rubs (wall mounted/pump operated are available for staff which are in date and staff are aware of their location			
9	Hand hygiene facilities are available to all patients/residents			

Signature _____

B. Personal Protective Equipment

Facility: _____

Date: _____

Unit/ward: _____

Room Number: _____

Name and designationof IPC staff: _____

General	YES	N	COMMENTS
Are the PPEs required available in the HCF in sufficient quantities?			
Is the staff trained in the correct usage of the PPEs?			
All facility staff are wearing PPE consistent with current guidance?			
Preparation			
1. Determine and assemble appropriate PPE			
2. Perform Hand Hygiene			
Donning of Personal Protective Equipment			
1. Gown is donned first, outside the roomand tied at waist and neck			
2. Don mask outside the room			
3. Secure nosepiece with both hands			
4. Secure elastic bands or ties			
5. Mask fits snug to face and below chin			
6. Goggles or face shield is donned outside the room			
7. Hand Hygiene is performed			
8. Gloves extend to cover wrist of gown			

B. Contd.

Doffing of Personal Protective Equipment	YES	NO	COMMENTS
Gloves			
1. Grasps outside of glove with opposite glovedhand and peels off			
2. Holds removed glove in gloved hand			
3. Slides fingers of ungloved hand under remainingglove at wrist			
4. Peels glove off over first glove			
5. Discards gloves in waste container, inside the room			
Goggles/Face shields			
1. Removes goggles/face shield using care to pull away from face not to touch front of shield or goggles.			
Gown			
1. Unfasten ties			
2. Pulls away from neck and shoulders, touching inside of gown only			
3. Turn gown inside out			
4. Folds or rolls into a bundle and discards a. Disposable gowns: Discards in waste receptacle b. Reusable/cloth gowns: Places in soiled laundry receptacle			
Exits Room after Glove/Gown Removal			
Performs Hand Hygiene			

Signature: _____

C. Environmental Cleaning and Disinfection

Facility: _____
Date: _____
Unit/ward + Room number: _____
Name and designationof IPC staff: _____

S. #	High Touch Surfaces	Cleaned	Not Cleaned	Remarks
Evaluate the following priority sites for each patient room:				
1	Bed rails / controls			
2	Tray table			
3	IV pole (grab area)			
4	Call box / button			
5	Telephone			
6	Bedside table handle			
7	Chair			
8	Room sink			
9	Room light switch			
10	Room door knob			
11	Bathroom door knob / plate			
12	Bathroom light switch			
13	Bathroom handrails by toilet			
14	Bathroom sink			
15	Toilet seat			
16	Toilet flush handle			
17	Toilet bedpan cleaner			
Evaluate the following additional sites if this equipment is present in the room:				
1	IV pump control			
2	Multi-module Monitor controls			
3	Multi-module Monitor touch screen			
4	Multi-module Monitor cables			
5	Ventilator control panel			
6	Any other			

Signature: _____

D. Isolation and Cohorting

Facility: _____

Date: _____

Unit/ward + Room number: _____

Name and designation of IPC staff: _____

S. #	Isolation Principles			Yes	No	Remarks
1.	Are patients or residents on contact precautions placed in a single room?					
2.	Are patients at higher risk of pathogen transmission (e.g., those with uncontained secretions or excretions, acute diarrhea) prioritized for single room admission?					
3.	In case of non -availability of single rooms, are isolation wards available for Cohorting of *C. auris* patients.					
4.	In case of an acute outbreak , is room assignment for people on contact precaution prioritized for *C. auris* without regard to co -colonization of other pathogens?					
5.	**In case of Cohorting:**	**i.**	Is spatial separation of 3ft maintained between all patients at all times?			
		ii.	Are privacy curtains used to limit direct contact?			
		iii.	Are shared/reusable equipment cleaned and disinfected regularly according to the manufacturer's instructions?			
		iv.	Are high touch environmental surfaces cleaned and disinfected regularly with disinfectant recommended for *C. auris*?			
		v.	Do HCWs change PPE between patients?			
		vi.	Do HCWs perform five moments of hand hygiene while in the patient zone?			
		vii.	Are healthcare personnel who provide the most regular care to these patients or residents also Cohorted (e.g., nurses, nursing assistants) during a shift?			

Signature: _____

E. Reprocessing of Reusable Medical Equipment

Facility: _____

Date: _____

Unit/ward: _____

Room Number: _____

Name and designationof IPC staff: _____

S. #	Area/Device/Equipment	Disinfected	Not Disinfected	Remarks
1	Anesthesia equipment and controls			
2	Bladder scanner			
3	Blood pressure cuffs, sphygmomanometer			
4	Nebulizer			
5	Dispensers for towels, soap, sanitizer, etc.			
6	Thermometer			
7	Feeding pumps, stands			
8	Glove box holders			
9	Infusion pumps and control			
10	ISO holder			
11	IV poles			
12	Pulse monitor			
13	Glucometer			
14	Ventilator machine/oxygen device, tubes			

Signature: _____

F. Waste Management

Facility: _____

Date: _____

Unit/ward: _____

Room Number: _____

Name and designationof IPC staff: _____

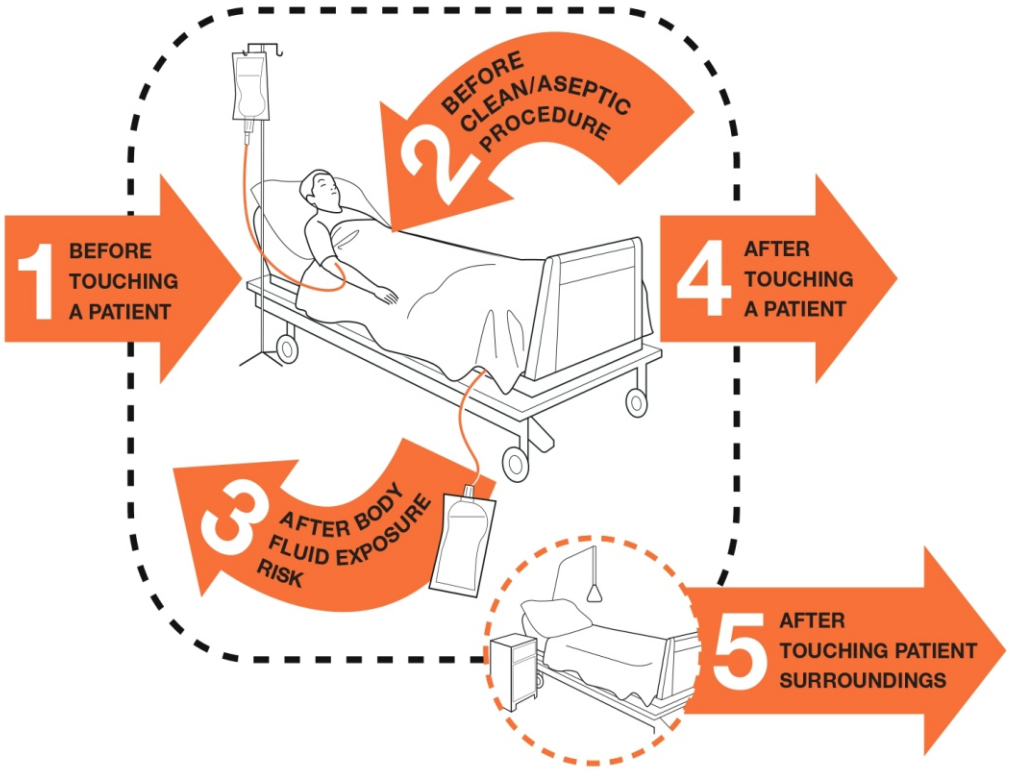
S. #	Infectious Waste Management Principles	Yes	No	Remarks
1	Does site have a written waste management plan for all the waste generated in the facility (e.g., nonhazardous general waste, liquid medical waste, and solid medical waste)?			
2	Is there any staff trained in Infection Prevention relating to Biomedical Waste Management? If yes, state the number of personnel trained.			
3	Does site have appropriate and adequate supplies and Equipment for waste management, including containers, bags, and PPEs?			
4	Are there internal rules for appropriate segregation of waste by type at the place where it is generated (e.g., needles and sharps disposed of in special sharps containers, such as covered leak-proof, puncture-proof cardboard boxes, plastic bottles, or tin cans)?			
5	Are there adequate number of biomedical waste containers and bags available at the site according to the Biomedical waste guideline?			
6	Are the waste bins/containers covered? If covered, are they paddle-operated?			
7	Are the bags properly fitted according to the color codes in the waste containers/bins?			
8	Is the biohazard symbol imprinted over the waste bags and containers/bins?			
9	Are there posters displayed to guide the workers?			

F. Cont.

S. #	Infectious Waste Management Principles	Yes	No	Remarks
10	Is there appropriate collection and transportation of medical waste within the facility (e.g., handling medical waste as little as possible before temporary storage and disposal; removing and emptying waste containers from operating, procedure, and sluice rooms before completely full, at least once a day; Observing good hygiene; and wearing protective clothing)?			
11	Are the waste bags properly tied and changed as per shift or whenever they are 3/4th full?			
12	Are appropriate PPEs provided to the staff dealing with BMW?			
13	Is the staff utilizing the provided PPEs properly for handling of BMW?			
14	Are the BMW containers/bins decontaminated when necessary?			
15	Does the BMW containers/bins look neat and clean?			
16	Is there appropriate on-site transport of biomedical waste?			
17	Is medical waste appropriately and temporarily stored safely, packaged, and labeled within the facility (e.g.,always for less than 24 hours, before disposal; stored in a designated, closed - off area that is minimally accessible to staff, visitors, and food; correct response for spills, injury, exposure is followed)			
18	Is the BMW stored for more than 48 hours?			
19	Is the BMW transport vehicle only used for this purpose?			
20	Is the sharps container properly disposed of according to BMW guidelines?			
21	If final disposal is off -site, are precautions taken to ensure that waste is transported and disposed of safely?			

Signature: _____

Your 5 Moments for Hand Hygiene



1	BEFORE TOUCHING A PATIENT	WHEN?	Clean your hands before touching a patient when approaching him/her.
		WHY?	To protect the patient against harmful germs carried on your hands.
2	BEFORE CLEAN/ ASEPTIC PROCEDURE	WHEN?	Clean your hands immediately before performing a clean/aseptic procedure.
		WHY?	To protect the patient against harmful germs, including the patient's own, from entering his/her body.
3	AFTER BODY FLUID EXPOSURE RISK	WHEN?	Clean your hands immediately after an exposure risk to body fluids (and after glove removal).
		WHY?	To protect yourself and the health-care environment from harmful patient germs.
4	AFTER TOUCHING A PATIENT	WHEN?	Clean your hands after touching a patient and her/his immediate surroundings, when leaving the patient's side.
		WHY?	To protect yourself and the health-care environment from harmful patient germs.
5	AFTER TOUCHING PATIENT SURROUNDINGS	WHEN?	Clean your hands after touching any object or furniture in the patient's immediate surroundings, when leaving – even if the patient has not been touched.
		WHY?	To protect yourself and the health-care environment from harmful patient germs.

World Health Organization | Patient Safety — A World Alliance for Safer Health Care | SAVE LIVES Clean Your Hands

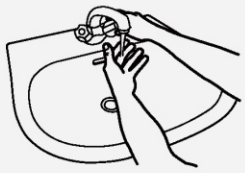
WHO acknowledges the Hôpitaux Universitaires de Genève (HUG), in particular the members of the Infection Control Programme, for their active participation in developing this material.

How to Handwash?

WASH HANDS WHEN VISIBLY SOILED! OTHERWISE, USE HANDRUB

Duration of the entire procedure: 40-60 seconds

0

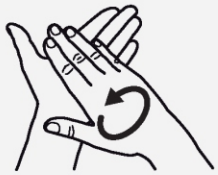


Wet hands with water;

1

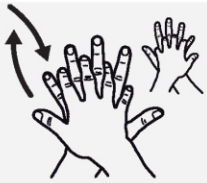
Apply enough soap to cover all hand surfaces;

2



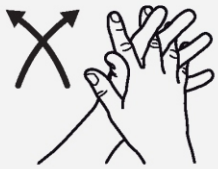
Rub hands palm to palm;

3



Right palm over left dorsum with interlaced fingers and vice versa;

4



Palm to palm with fingers interlaced;

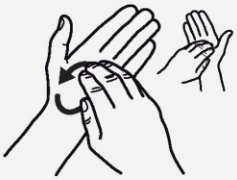
5

Backs of fingers to opposing palms with fingers interlocked;

6

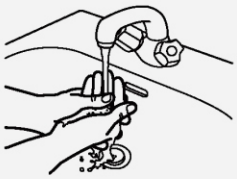
Rotational rubbing of left thumb clasped in right palm and vice versa;

7



Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;

8

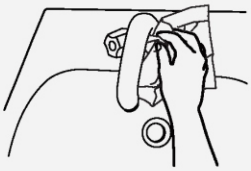


Rinse hands with water;

9

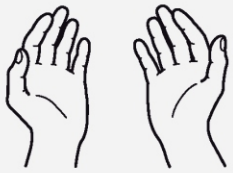
Dry hands thoroughly with a single use towel;

10



Use towel to turn off faucet;

11



Your hands are now safe.

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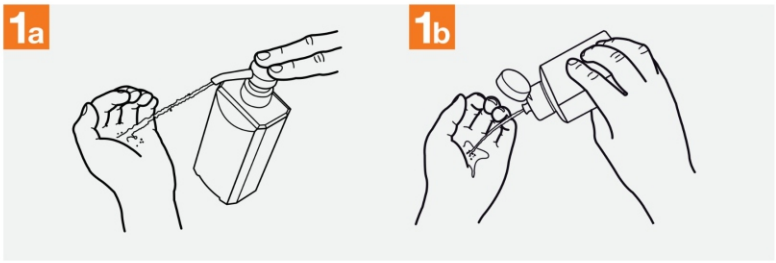
May 2009

How to Handrub?

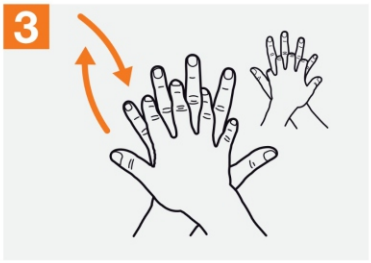
RUB HANDS FOR HAND HYGIENE! WASH HANDS WHEN VISIBLY SOILED

Duration of the entire procedure: 20-30 seconds



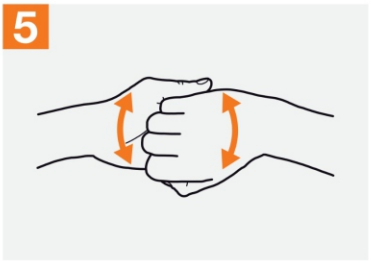
Apply a palmful of the product in a cupped hand, covering all surfaces;

Rub hands palm to palm;



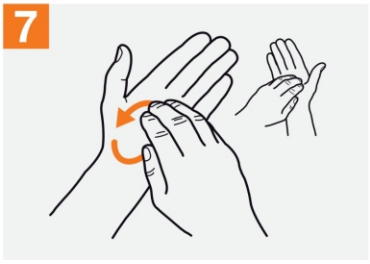
Right palm over left dorsum with interlaced fingers and vice versa;

Palm to palm with fingers interlaced;

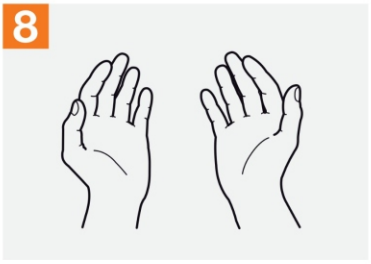


Backs of fingers to opposing palms with fingers interlocked;

Rotational rubbing of left thumb clasped in right palm and vice versa;



Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;



Once dry, your hands are safe.

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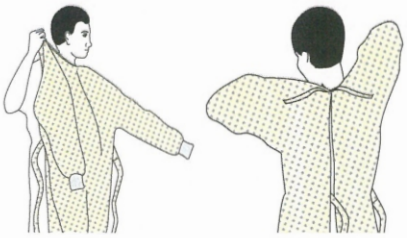
May 2009

SEQUENCE FOR PUTTING ON PERSONAL PROTECTIVE EQUIPMENT (PPE)

The type of PPE used will vary based on the level of precautions required, such as standard and contact, droplet or airborne infection isolation precautions. The procedure for putting on and removing PPE should be tailored to the specific type of PPE.

1. GOWN

- Fully cover torso from neck to knees, arms to end of wrists, and wrap around the back
- Fasten in back of neck and waist



2. MASK OR RESPIRATOR

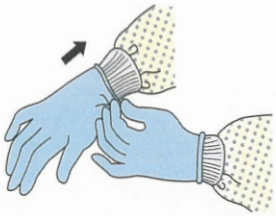
- Secure ties or elastic bands at middle of head and neck
- Fit flexible band to nose bridge
- Fit snug to face and below chin
- Fit-check respirator

3. GOGGLES OR FACE SHIELD

- Place over face and eyes and adjust to fit

4. GLOVES

- Extend to cover wrist of isolation gown



USE SAFE WORK PRACTICES TO PROTECT YOURSELF AND LIMIT THE SPREAD OF CONTAMINATION

- Keep hands away from face
- Limit surfaces touched
- Change gloves when torn or heavily contaminated
- Perform hand hygiene

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HOW TO SAFELY REMOVE PERSONAL PROTECTIVE EQUIPMENT (PPE) EXAMPLE 1

There are a variety of ways to safely remove PPE without contaminating your clothing, skin, or mucous membranes with potentially infectious materials. Here is one example. **Remove all PPE before exiting the patient room** except a respirator, if worn. Remove the respirator **after** leaving the patient room and closing the door. Remove PPE in the following sequence:

1. GLOVES

- Outside of gloves are contaminated!
- If your hands get contaminated during glove removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Using a gloved hand, grasp the palm area of the other gloved hand and peel off first glove
- Hold removed glove in gloved hand
- Slide fingers of ungloved hand under remaining glove at wrist and peel off second glove over first glove
- Discard gloves in a waste container

2. GOGGLES OR FACE SHIELD

- Outside of goggles or face shield are contaminated!
- If your hands get contaminated during goggle or face shield removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Remove goggles or face shield from the back by lifting head band or ear pieces
- If the item is reusable, place in designated receptacle for reprocessing. Otherwise, discard in a waste container

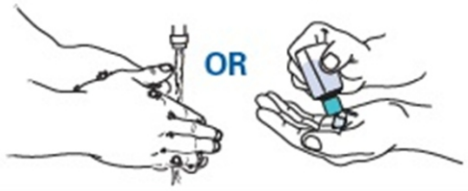
3. GOWN

- Gown front and sleeves are contaminated!
- If your hands get contaminated during gown removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Unfasten gown ties, taking care that sleeves don't contact your body when reaching for ties
- Pull gown away from neck and shoulders, touching inside of gown only
- Turn gown inside out
- Fold or roll into a bundle and discard in a waste container

4. MASK OR RESPIRATOR

- Front of mask/respirator is contaminated — DO NOT TOUCH!
- If your hands get contaminated during mask/respirator removal, immediately wash your hands or use an alcohol-based hand sanitizer
- Grasp bottom ties or elastics of the mask/respirator, then the ones at the top, and remove without touching the front
- Discard in a waste container

5. WASH HANDS OR USE AN ALCOHOL-BASED HAND SANITIZER IMMEDIATELY AFTER REMOVING ALL PPE



PERFORM HAND HYGIENE BETWEEN STEPS IF HANDS BECOME CONTAMINATED AND IMMEDIATELY AFTER REMOVING ALL PPE

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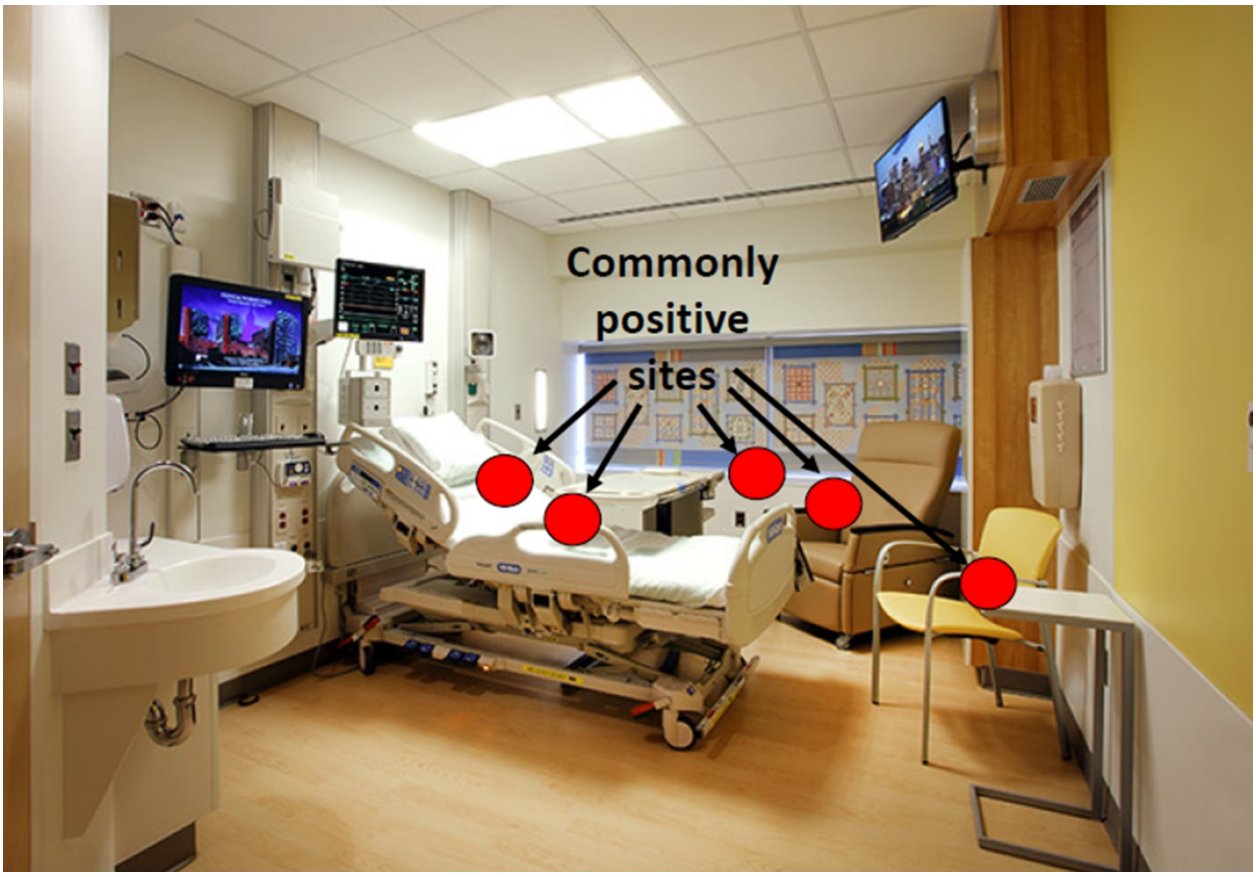
5.2 IEC Material




STOP
CONTACT PRECAUTIONS
(In addition to Standard Precautions)
(If you have questions, ask nursing staff)
STOP
Everyone Must:
Clean hands when entering and leaving room
AND
Gown and glove at door
Doctors and Staff Must:
Use patient-dedicated or disposable equipment
Clean & disinfect shared equipment

STOP

ENHANCED BARRIER PRECAUTIONS

STOP

EVERYONE MUST:

Clean their hands, including before entering and when leaving the room.

PROVIDERS AND STAFF MUST ALSO:

Wear gloves and a gown for the following High-Contact Resident Care Activities.

- Dressing
- Bathing/Showering
- Transferring
- Changing Linens
- Providing Hygiene
- Changing briefs or assisting with toileting
- Device care or use:
  - central line, urinary catheter, feeding tube, tracheostomy
- Wound Care: any skin opening requiring a dressing

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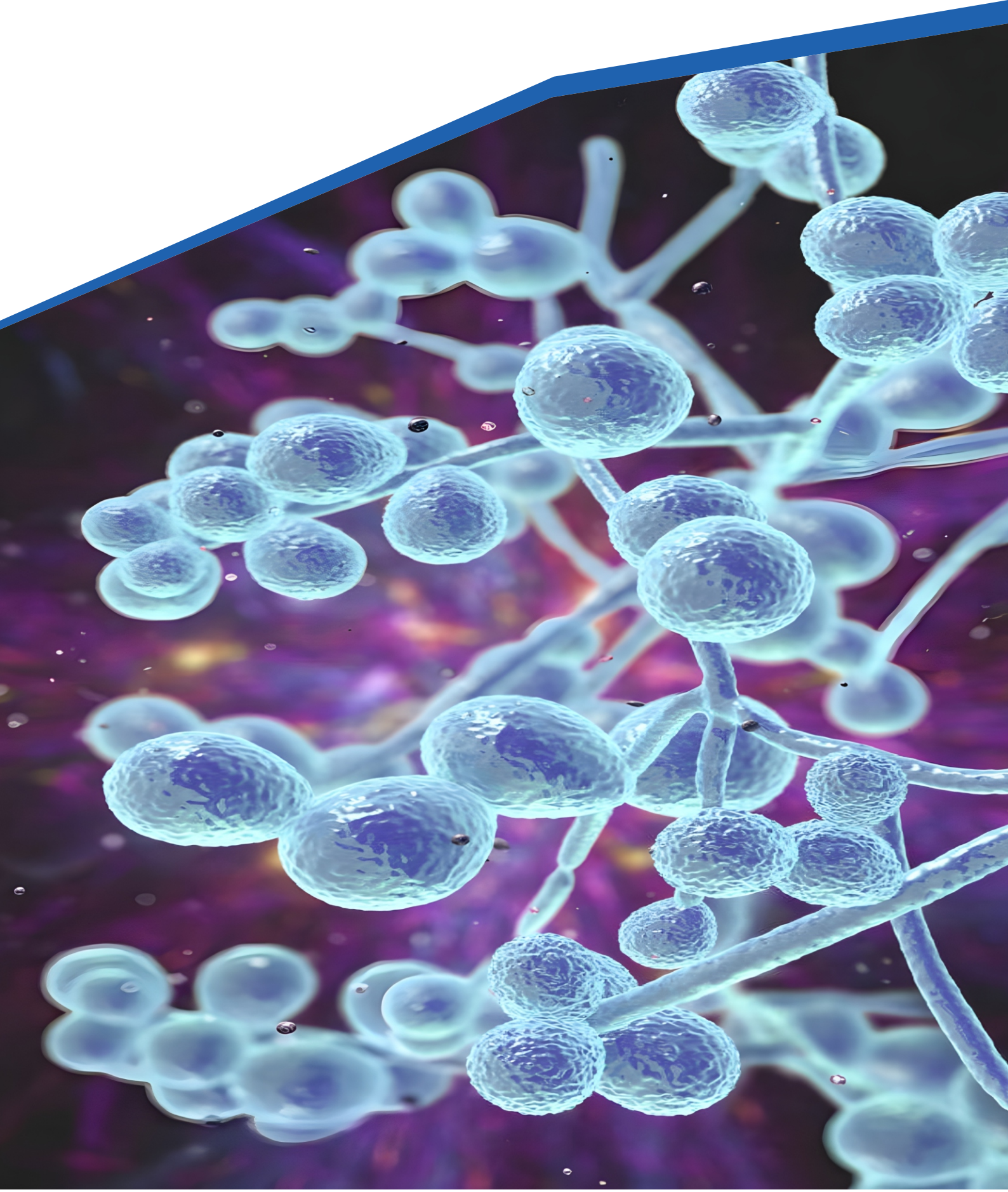
Do not wear the same gown and gloves for the care of more than one person.

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

For questions and queries

E-mail: nfdss@nih.org.pk



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