State of Kuwait

Ministry of Health

Infection Control Directorate

Title: *Candida auris* in Health Care Setting - Infection Control Policy

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Approved by:

Name	**Signature**
Head of Committee of Infection Control Policies	
Director of Infection Control Directorate	

Authorized by:

Name	**Signature**
Under Secretary of Ministry of Health	

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1. Introduction

Candida auris (*C. auris*) is an emerging pathogen which has been isolated in different global regions in a short period since itsinitially identified. It was first isolated in 2009 in Japan from the ear discharge of a hospitalised patient. Since then, cases of *C. auris* have been reported in Asia, Europe, South America, Africa, and, recently, North America.
This pathogen has been found almost exclusively in hospitals, many of these isolates are found to be multi-resistant to the available antifungal drugs.

Of all the *Candida* species that are known to cause infections in humans, *C. albicans*, *C. glabrata*, *C. tropicalis*, *C. parapsilosis*, and *C. krusei* are the *Candida* species that have been reported to cause over 95% of the cases of invasive candidiasis. Although *C. albicans* still accounts for most of the cases, recent surveillance studies have shown that the incidence of infections with non-albicans *Candida* species is rising.

Virulence factors of *C. auris* as biofilm-forming ability and innate resistance to antifungal agents may explain why it is so pathogenic and resilient on environmental surfaces despite disinfection.

The clinical presentation of *C. auris* infection is, in general, similar to that of the clinical presentation of other *Candida* infections. Candidemia is the most common clinical disease followed by a widerange of other healthcare-associated infections, including intravascular catheter infections, urinary tract infections, pulmonary infections, meningitis, osteomyelitis, otomastoiditis, and surgical wound infections.

The risk factors associated with the development of invasive *C. auris* infections are also similar to those associated with other *Candida* species. Reviews of patient cases with *C. auris* infections revealed that they were often critically ill, had prior antibiotic or antifungal therapy, had the presence of central venous catheters, underwent recent surgery, or were immunocompromised. Alarmingly, high mortality rates of invasive infections with *C. auris* have been reported.
The transmission of *C. auris* in healthcare settings has been well documented.

2. Purpose

Provide the healthcare workers (HCWs) with an evidence-based applicable guidance to manage and eliminate transmission of *C. auris* in healthcare settings.

3. Scope

It is applied to all HCWs in Kuwait governmental and private hospitals.

4. Procedure

4.1 Laboratory Diagnosis

The frequent misidentification of this pathogen by many clinical laboratories poses a significant infection control dilemma (Table 1). The primary concern is the delay in identification of *C. auris* which may result in the delay in the implementation of the appropriate infection control measures to prevent further spread of this pathogen within the healthcare facility.

Table 1: Common Misidentifications Based on the Identification Method Used

Identification Method	**Organism *C. auris* can be misidentified as**
Vitek 2 YST	*Candida haemulonii* *Candida duobushaemulonii*
API 20C	*Rhodotorula glutinis* (characteristic red color not present) *Candida sake*
BD Phoenix yeast identification system	*Candida haemulonii* *Candida catenulate*
MicroScan	*Candida famata* *Candida guilliermondii* *Candida lusitaniae* *Candida parapsilosis*
Rap ID Yeast Plus	*Candida parapsilosis*

Diagnostic devices based on matrix-assisted laser desorption/ ionisation time-of-flight (MALDI-TOF) can differentiate *C. auris* from other *Candida* species, but not all the reference databases included in MALDI-TOF devices allow for detection. Currently, accurate identification of *C. auris* (for research use only) can be performed using Bruker Bio-

typerbrand MALDI- and VITEK (MALDI-TOF) MS.Molecular methods based on sequencing can identify *C. auris.*

4.2 Screening Close Contacts of Newly Identified Patients with *C. auris*

Because patients with *C. auris* could have been colonized for months before detection of the organism, there is a potential that transmission of *C. auris* occurred to other patients around the case-patient while specific infection control measures were not in place. Therefore, it is important to identify the patient's prior healthcare exposures and contacts.

4.2.1 Who to Screen

Screening should be performed to identify colonisation among potentially epidemiologically-linked patients.

- Current roommates and roommates at the current or other facilities in the prior month. Roommates should be identified and screened even if they have been discharged from the facility.
- More extensive screening to detect transmission, like point prevalence surveys to identify colonized patients on units or floors on which the index patient currently resides or resided in the past, should be strongly considered.
- Surveys could initially be limited to the highest risk contacts including those who overlapped on the ward or unit with the index patient for 3 or more days or who require higher levels of care (e.g., mechanical ventilation).
- Wider surveys are clearly indicated if there is evidence or suspicion of ongoing transmission (e.g., *C.* auris is detected from multiple patients among those screened).
- A "ring" strategy for screening could be employed in which a smaller group of patients with the most extensive contact with the index patient are screened first; screening additional patients can be considered if transmission is documented in this higher risk group.

4.2.2 How to Screen

- Screening for *C. auris* should be done using a composite swab of the patient's axilla and groin. Patients have also been found to be colonised with *C. auris* in the nose, external ear canals, oropharynx, urine, wounds, and rectum. However, the axilla and groin appear to be the most common and consistent sites of colonisation.

- Once a patient is identified as colonised with *C. auris*, the same infection control precautions are needed as for patients with *C. auris* infection.
- While awaiting screening results, healthcare facilities may consider using contact precautions for high-risk contacts of *C. auris* patients (i.e., current roommates or roommates within the past month).

4.3 Identify Prior Healthcare Exposures

Review patient records to identify healthcare exposures before and after the positive culture, particularly overnight stays in healthcare facilities in the month before the patient's positive culture. Facilities that are identified as part of this review should be targeted for contact investigation and a review of clinical microbiology records to identify other cases at the facility. At a minimum, targeted facilities should include the:

- Patient's current facility
- Facilities at which the index patient stayed for more than seven days in the prior three months.
- Facilities with a longer length of stays (e.g., long-term acute care, nursing homes).

4.4 Infection Control of *C.auris*

The mainstay of infection control measures for *C. auris* in inpatient settings is as follows:

- Placing the patient with *C. auris* in a single-patient room and using standard and contact Precautions.
- Emphasizing adherence to hand hygiene.
- Cleaning and disinfecting the patient care environment (daily and final cleaning) with recommended products.
- Screening contacts of newly identified case-patients to identify *C. auris* colonisation. Because patients colonised with *C. auris* can be a source of *C. auris* transmission, these patients should be managed using the same infection control measures as for patients with *C. auris* infection.

4.4.1 Transmission-based Precautions

Patients with *C. auris* should be placed in single rooms and managed using Standard and Contact Precautions.

- If a limited number of single rooms are available, they should be reserved for patients who may be at highest risk of transmitting *C. auris*, particularly patients requiring higher levels of care (e.g., bed-bound).
- Patients with *C. auris* could be placed in rooms with other patients with *C. auris.*
- Patients colonised with *C. auris* and other multidrug-resistant organisms (MDROs) should be placed in rooms with patients colonised with the same MDROs. It is not recommended to place patients with *C. auris* in rooms with patients with other types of MDROs.
- To the extent possible, minimise the number of staff who care for the *C. auris* patient. If multiple *C. auris* patients are present in a facility, consider cohorting staff who care for these patients.

4.4.2 Special Considerations for Nursing Home Residents

- In general, nursing home residents should be placed on Standard and Contact Precautions.
- Functional nursing home residents without wounds or indwelling medical devices (e.g., urinary and intravenous catheters and gastrostomy tubes) who can perform hand hygiene might be at lower risk of transmitting *C. auris*.
- Facilities could consider relaxing the requirement for Contact Precautions for these residents. However, in these instances, healthcare personnel should still use gowns and gloves when performing tasks that put them at higher risk of contaminating their hands or clothing. These tasks include changing wound dressings and linens and assisting with bathing, toileting, and dressing in the morning and evening.
- Nursing home residents with *C. auris* can leave their rooms if secretions and bodily fluids can be contained, and the patient can perform hand hygiene beforeleaving their room.
- If residents with *C. auris* receive physical therapy or other shared services (e.g., physical therapy equipment, recreational resources), staff should not work with other patients while working with the affected patient. They should use a gown and gloves when they anticipate touching the patient or potentially contaminated equipment. Ideally, affected patients should be the last to receive therapy on a given day. Shared equipment should be thoroughly cleaned and disinfected after use.

4.4.3 Duration of Infection Control Precautions

- Currently, the recommendation is to continue Contact Precautions for as long as the person is colonised with *C. auris*. Information is limited on the duration of *C. auris* colonisation; however, evidence suggests that patients remain colonised for many months, perhaps indefinitely.
- Periodic reassessments for the presence of *C. auris* colonisation (e.g., every three months) for a patient with known *C. auris* colonisation could help inform duration of infection control measures. Assessments of colonisation should involve testing of, at a minimum, swabs of the axilla and groin and sites yielding *C. auris* on previous cultures (e.g., urine and sputum). The patient should not be on antifungal medications active against *C. auris* at the time of these assessments. The optimal time between the last receipt of antifungal medications and testing for *C. auris* colonisation has not been established, but it is reasonable to wait one week. Wait at least 48 hours after administration of topical antiseptic (e.g., chlorhexidine), if such products are being used, before performing any testing for *C. auris* colonisation.
    - If a patient's swab is positive, there is no need to repeat sampling for at least another three months.
    - If a patient's swab is negative, then at least one more assessment at least one week later is needed before discontinuing *C. auris* specific-infection control precautions.
- 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, and not on the presence or absence of colonisation.

4.4.4 Patient Transfer between Healthcare Facilities

When patients are transferred to other healthcare facilities, receiving facilities should receive notification of the patient's *C. auris* infection or colonisation recommended infection control precautions. Admission screening for *C. auris* carriage and pre-emptive isolation of patients who are transferred from, or have recently been admitted to hospitals that have detected *C. auris* cases should be considered.

4.4.5 Facilitating Adherence to Infection Control Measures

Preventing *C. auris* transmission requires careful adherence to infection control recommendations by all healthcare personnel who care for the patient. To enhance adherence to infection control measures, consider the following steps:

- Educate all healthcare personnel, including staff who work with environmental cleaning services about *C. auris* and need for appropriate precautions.
- Ensure adequate supplies are available to implement infection control precautions.
- Monitor adherence to infection control practices and implement supervised cleaning of the patient care areas.
- "Flag" the patient's record to institute recommended infection control measures in case of re-admission.

4.4.6 Prevention of *C. auris* Colonization and Infection

- Prompt identification of *C. auris* and immediate implementation of recommended infection control measures is the best way to prevent additional patients from becoming infected or colonised with *C. auris*.
- Patients who become colonised with *C. auris* are at risk of developing invasive infections from this organism. Invasive infections can develop at any point after patients become colonised. Additional measures listed below can help prevent not only *C. auris* transmission but also invasive *C. auris* infection once patients become colonised with *C. auris*.

4.4.6.1 Appropriate Care of Medical Devices

- Many patients with *C. auris* colonisation already have or may need various types of invasive lines and tubes, including central venous catheters, urinary catheters, and tracheostomy tubes. These devices may be associated with the presence of *C. auris* and 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 attention 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 colonisation, the staff should review protocols for the care of medical devices and evaluate current adherence to protocols.

4.4.6.2 Surgical Procedures

Patients colonised 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.

4.4.6.3 Antibiotic Stewardship

Many patients with *C. auris* infection or colonisation 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* colonisation and infection.

4.4.7 Environmental Disinfection

4.4.7.1 Disinfectants for the Decontamination of Environmental Surfaces

- The available data are limited regarding the most effective products and methods for the disinfection of environmental surfaces contaminated by *C. auris*. Many of these agents have been first tested against other *Candida* species, specifically sodium hypochlorite, hydrogen peroxide, ethanol.
- Chlorine-based disinfectants are commonly used in the healthcare setting for disinfection, especially against multidrug-resistant organisms such as methicillin-resistant *Staphylococcus aureus* (MRSA) and Carbapenemase-producing Enterobacteriaceae. They are the most studied for the disinfection against *C. auris* because they have been previously shown to be extremely effective against other *Candida* species.

We recommend the use of a hospital-grade disinfectant effective against *Clostridium difficile* spores, the detergent should hold:

- European norm certificate number 13697 (surface disinfectant)

  Or
- VAH certificate as a surface disinfectant effective against yeast.

  Or

- An (EPA)-registered hospital-grade disinfectant effective against *Clostridium difficile* spores.

It is essential to follow all manufacturers' directions for use, including applying the product for the correct contact time.

Thorough daily and terminal cleaning and disinfection of patients' rooms and cleaning and disinfection of areas outside of their rooms where they receive care (e.g., radiology, physical therapy) is necessary.

4.4.7.2 International Recommendations for Environmental Cleaning

- Currently, there is no established environmental cleaning method in controlling the spread of *C. auris* within healthcare facilities. Many of the major health organisations have issued guidelines and recommendations regarding the management of *C. auris*.
- The Centres for Disease Control and Prevention (CDC) recommends the use of the United States Environmental Protection Agency (EPA)-registered hospital-grade disinfectant effective against *Clostridium difficile* spores for the disinfection of surfaces contaminated with *C. auris*. Public Health England (PHE) recommends products containing hypochlorite at 1000 ppm for all cleaning. The European Centre for Disease Prevention and Control (ECDC) recommends final cleaning "using disinfectants and methods with certified antifungal activity".
- In Kuwait, our recommendation is similar to the Pan American Health Organization/World Health Organization (PAHO/WHO), which recommends cleaning with "soap and water followed by disinfection with 0.1% bleach."

  Table 2 shows the effectiveness of common environmental disinfectants.

Table 2: The Effectiveness of Common Environmental Disinfectants

Disinfectant	Concentrations tested	Effective	Level of evidence
Chlorine	1000 ppm, (0.1%)	Yes	Good
Hydrogen peroxide	8 g/m^3, 1.4%	Yes	Moderate
Hydrogen peroxide + silver nitrate	11%	Yes	Low
Phenolics	5%	Yes	Low
Glutaraldehyde	2%	Yes	Low
Alcohols	29.4%	Yes	Low
Acetic acid	>5%	No	Low
Peracetic acid	2000 ppm	Yes	Low
Peracetic acid + hydrogen peroxide	1200 ppm + <1%	Yes	Low
Quaternary ammonium compounds	2% didecyl dimethyl ammonium chloride, alkyl dimethyl ammonium chlorides, didecyl dimethyl ammonium chloride/dimethyl-benzyl ammonium chloride.	No	Low

4.4.8 Disinfectants for Decolonization and Hand Hygiene

4.4.8.1 Disinfectants for Decolonization

- Since *C. auris* colonisation has been recognised as a potential mode of transmission in the healthcare setting, efforts are also focused on decolonisation of patients.
- The goal of decolonisation is to reduce, if not eliminate, the microbial load on the patient's body to reduce the risk of infection and transmission.
- Present decolonisation efforts are primarily targeted toward patients who are at risk for infection, specifically surgical and ICU patients, as they are at higher risk of infection.
- Chlorhexidine gluconate (CHG), a commonly used antiseptic, is the most studied antiseptic against *C. auris*. It is frequently used in the decolonisation of patients as

well as added to hand soaps in healthcare settings. CHG has been reported to be effective against *Candida* species in several studies.

- Iodophors, such as povidone-iodine, are used in skin disinfection pre-operatively and in preparation for blood draws that require sterile technique, i.e., for blood cultures. A recent study showed that 10% povidone-iodine was effective against all clinical isolates of *C. auris* with 2-min contact time.

  Table 3 lists the antiseptics that have been studied.

4.4.8.2 Disinfectants for Hand Hygiene

Increased emphasis on hand hygiene is needed on the unit where a patient with *C. auris* resides. When caring for patients for *C. auris*, healthcare personnel should follow standard hand hygiene practices, which include alcohol-based hand sanitizer use or, if hands are visibly soiled, washing with soap and water. Wearing gloves is not a substitute for hand hygiene.

Table 3: The Effectiveness of Common Skin Disinfectant

Disinfectant	**Concentrations tested**	**Effective**	**Level of Evidence**
Chlorhexidine gluconate	0.5%, 4%	Yes	Good
Chlorhexidine gluconate in isopropyl alcohol	2%/70%	Yes	Low
Povidone-iodine	10%	Yes	Moderate
Alcohol	70%	Yes	Low

4.4.9 Cleaning and Decontamination of Equipment

All equipment (including patient monitoring devices and mobility aids) should be cleaned in accordance with manufacturer's instructions. Particular attention should be paid to cleaning of reusable equipment (e.g. pulse oximeters, thermometer probes, computers on wheels, ultrasound machines) from the bed space of an infected/colonised patient.Shared equipment (e.g., ventilators, physical therapy equipment should also be cleaned and disinfected before being used by another patient. Single-patient use items such as blood pressure cuffs and pillows should be considered, especially in outbreak situations.

4.4.10 Waste and Linen Disposal

Healthcare facilities should follow their current waste and used linen policies as for any other multi-resistant healthcare-associated organism:

- Attention should be paid to appropriate bagging and isolation of used linen and waste so that the environment is not contaminated
- In paediatric and neonatal units, specific attention should be paid to disposal of used nappies
- At no time should contaminated material be discarded / washed in the clinical hand wash basins.

4.4.11 Additional Control Options for Outbreaks

Raising awareness and providing education to all healthcare groups is essential to manage the outbreak. Prompt initiation of an epidemiological investigation, complemented by cross-sectional screening of patients for *C. auris* carriage, is useful to establish the source of the outbreak and thus prevent further cases. Hospital management support is needed to provide adequate resources for the implementation of appropriate infection control measures.

Potentially effective enhanced measures to control *C. auris* outbreaks include:

- Regular active surveillance cultures for *C. auris* carriage of all patients in affected wards,
- Cohorting of *C. auris*-positive patients with dedicated nursing staff in separate areas,
- Rigorous environmental cleaning and disinfection,
- Education and practice audits to improve compliance of healthcare workers with hand hygiene and contact precautions,
- Supervision of appropriate implementation of environmental cleaning.

5. References:

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6. Appendices: Considerations for Specific Settings

6.1 Appendix 1: Dialysis Clinics and Infusion Centres

Some patients with *C. auris* have required dialysis care. Recommendations for dialysis clinics are similar to infection control precautions for inpatient settings and include the following:

- Standard Precautions should be used with strict adherence to hand hygiene.
- A mask and eye protection or face shield should be worn if performing procedures likely to generate splash or splatter (e.g., wound manipulation, suctioning) of contaminated material (e.g., blood, body fluids, secretions, excretions).
- Hand hygiene should be performed using an appropriate agent (e.g., alcohol-based hand sanitizer or hand washing with soap and water).
- Disposable gowns and gloves should be worn when caring for patients or touching equipment at the dialysis station. Gowns and gloves should be removed and disposed of carefully, and hand hygiene should be performed when leaving the patient's station.
- If available, use a separate room that is **not** in use as a hepatitis B isolation room (in the case of dialysis clinics) for patient treatment. If a separate room is not available, dialyze the patient at a station with as few adjacent stations as possible (e.g., at the end or corner of the unit) and consider dialyzing the patient on the last shift of the day.
- Ensure any reusable equipment brought to the dialysis station properly cleaned and disinfected before use with another patient. Items that cannot be disinfected should be discarded.
- The dialysis station (e.g., chairs, beds, tables, machines) should be thoroughly cleaned and disinfected between patients. Until further information about the efficacy of disinfectants against *C. auris* is available, environmental surface disinfection should be performed with a ministry approved disinfectant effective against *Clostridium difficile* spores.
- To the extent possible, the number of persons who care for the *C. auris* patient should be minimized. Appropriate personnel should be educated and informed about the presence of a patient with *C. auris* and the need for special precautions.
- If the patient needs to be admitted or referred to another facility, the receiving facility should be informed of the patient's *C. auris* status.

6.2 Appendix 2: Outpatient Settings (eg.,Primary Care Office, Wound Clinic)

Recommendations for outpatient settings are similar to infection control precautions for inpatient settings and include the following:

- Standard Precautions should be used with strict adherence to hand hygiene.
- A mask and eye protection or face shield should be worn if performing procedures likely to generate splash or splatter (e.g., wound manipulation, suctioning) of contaminated material (e.g., blood, body fluids, secretions, excretions).
- Hand hygiene should be performed using an appropriate agent (e.g., alcohol-based hand sanitizer or hand washing with soap and water).
- Disposable gown and gloves should be used if extensive patient contact is anticipated or contact with infected areas is planned (e.g. debridement or dressing of colonized or infected wound). Gowns and gloves should be removed and disposed of carefully, and hand hygiene should be performed when leaving the patient's room.
- Ensure any reusable equipment brought into the patient room is properly cleaned and disinfected before use with another patient.
- Meticulous cleaning and disinfection of the room/care area should be performed with a ministry approved disinfectant effective against *Clostridium difficile* spores at the end of each visit until further information on the efficacy of disinfectants against *C. auris* is available.
- To the extent possible, the number of persons who care for the *C. auris* patient should be minimized (e.g., dedicate a single staff person).
- Appropriate personnel should be educated and informed about the presence of a patient with *C. auris* and the need for special precautions.
- If the patient needs to be admitted or referred to another facility, the receiving facility should be informed of the patient's *C. auris* status.

6.3 Appendix 3: Home Healthcare Settings:

Recommendations for home healthcare settings are similar to infection control precautions for inpatient settings and include the following:

- Standard Precautions should be used with strict adherence to hand hygiene.
- A mask and eye protection or face shield should be worn if performing procedures likely to generate splash or splatter (e.g., wound manipulation, suctioning) of contaminated material (e.g., blood, body fluids, secretions, excretions).
- Hand hygiene should be performed using an appropriate agent (e.g., alcohol-based hand sanitizer or hand washing with plain or antibacterial soap and water).
- Disposable gown and gloves should be worn upon entering the area of house where the patient care will be provided. Gowns and gloves should be removed and disposed of carefully, and hand hygiene should be performed when leaving the patient care area.
- Ensure any reusable equipment is properly cleaned and disinfected before use with another patient.
- If the patient needs to be admitted or referred to another facility, the receiving facility should be informed of the patient's *C. auris* status.

6.4 Appendix 4: Home and Family Members

- The risk of *C. auris* infection for otherwise healthy household members, even those with extensive contact, is believed to be low. Household members should practice good hand hygiene (frequent hand washing with soap and water or use of alcohol-based hand rubs).
- If household members are providing extensive care to a patient with *C. auris* (such as changing the dressing on an infected wound), these persons could consider wearing disposable gloves while providing this level of care.