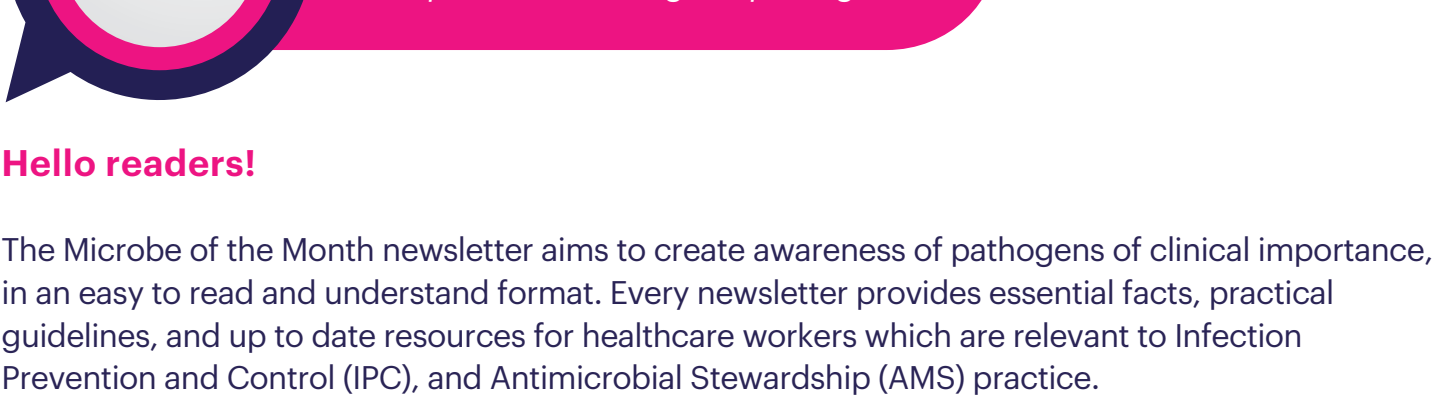


Microbe of the month

Breaking The Chain of Infection



Featured this month: Candida auris

An update on the fungal superbug

Hello readers!

The Microbe of the Month newsletter aims to create awareness of pathogens of clinical importance, in an easy to read and understand format. Every newsletter provides essential facts, practical guidelines, and up to date resources for healthcare workers which are relevant to Infection Prevention and Control (IPC), and Antimicrobial Stewardship (AMS) practice.

Please use this newsletter as a teaching tool in your workplace, share it widely and start an 'infectious dialogue' about topical issues in infection control!

Key words: *Candida auris*, *Candidemia*, *Diagnosis*, *Antifungal Treatment*, *Infection Control*, *Antifungal Stewardship*.



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BACKGROUND to *Candida auris*^{1,2}

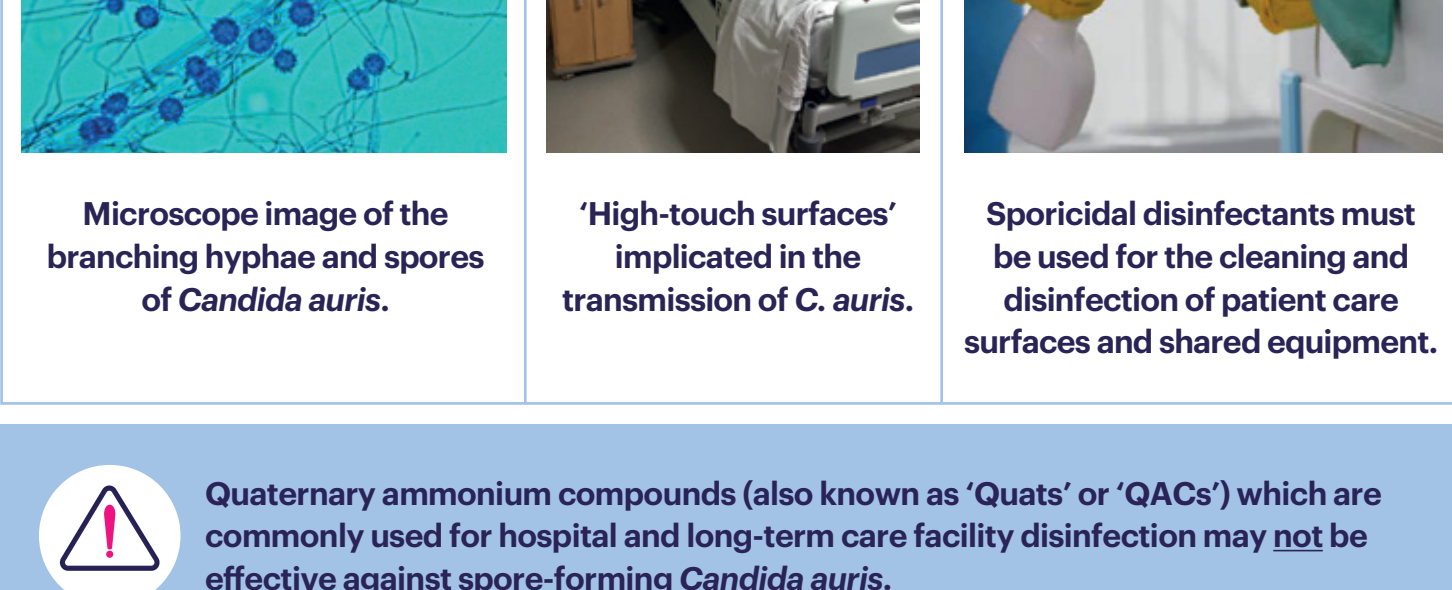
Candida auris is a multidrug-resistant fungal pathogen which causes invasive yeast infections (termed 'candidiasis') and outbreaks, particularly in immune-compromised and chronically ill individuals.

Associated with substantial morbidity and mortality, it represents a serious global health threat – and once established, is difficult to eradicate from the healthcare environment.

Cases of *Candida auris* (*C. auris*) were first reported from Japan in 2009, after it was isolated from a patient's ear ('auris' is from the Latin for 'ear'); although earlier cases have since been detected in culture repositories from as early as 1996.

By 2018, cases of *C. auris* had been reported from all six continents. Of particular concern is that large outbreaks of *C. auris* have been reported from resource-limited settings in Africa, Asia, and South and Central America.

Since then, *C. auris* has been detected in more than 100 South African hospitals – causing large outbreaks at some facilities – and this pathogen now accounts for at least 1 in 10 cases of drug-resistant candidemia. (Refer to Microbe of the Month October 2019)

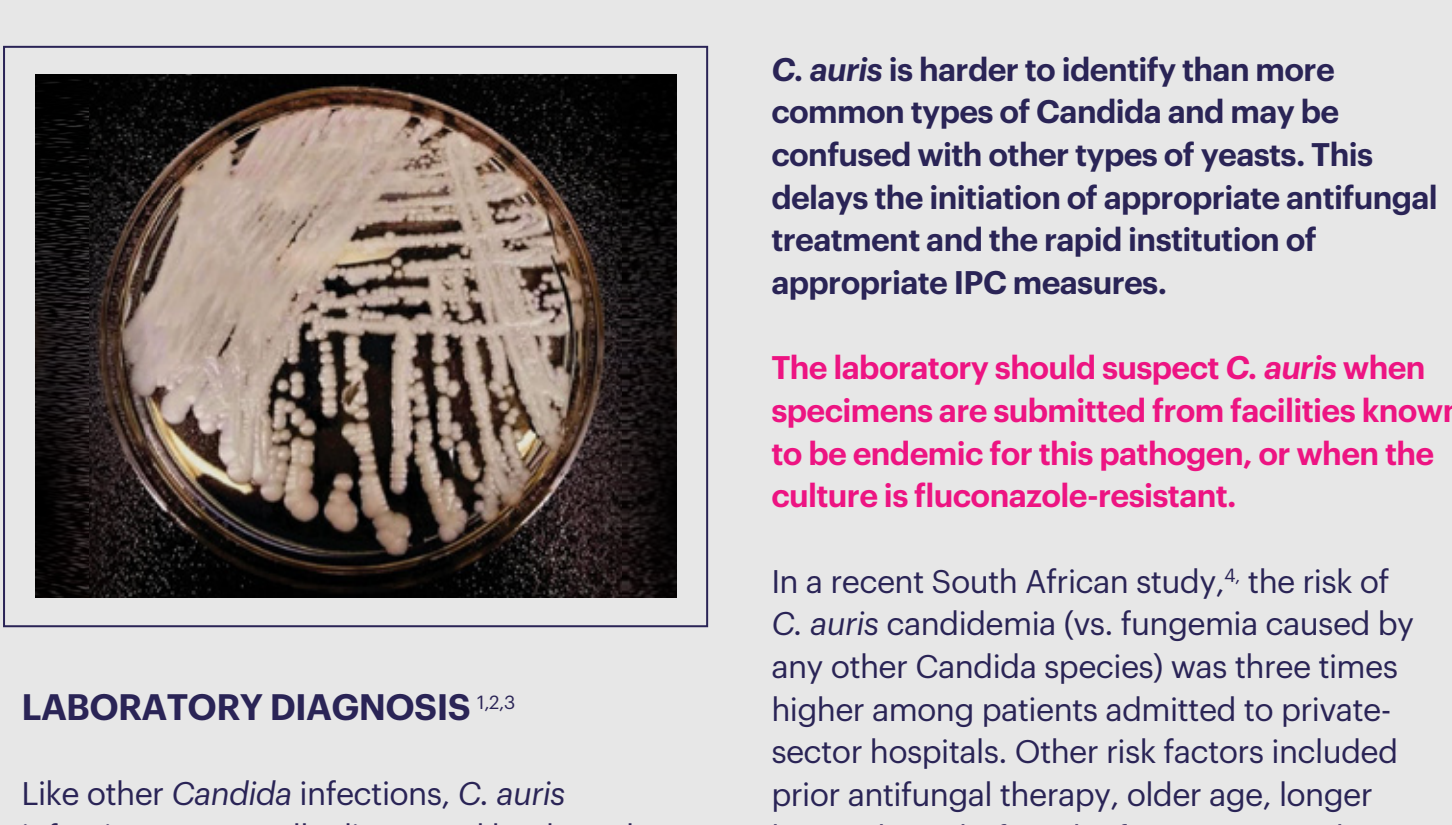


Candida auris (*C. auris*) is an emerging multidrug-resistant yeast (a type of fungus). It can cause severe infections and spreads easily between hospitalized patients and nursing home residents.

EPIDEMIOLOGY and TRANSMISSION of *Candida auris*^{1,2,3,4,5}

Invasive fungal infections pose an important threat to public health and are an under-recognised component of antimicrobial resistance (AMR), an emerging crisis worldwide.

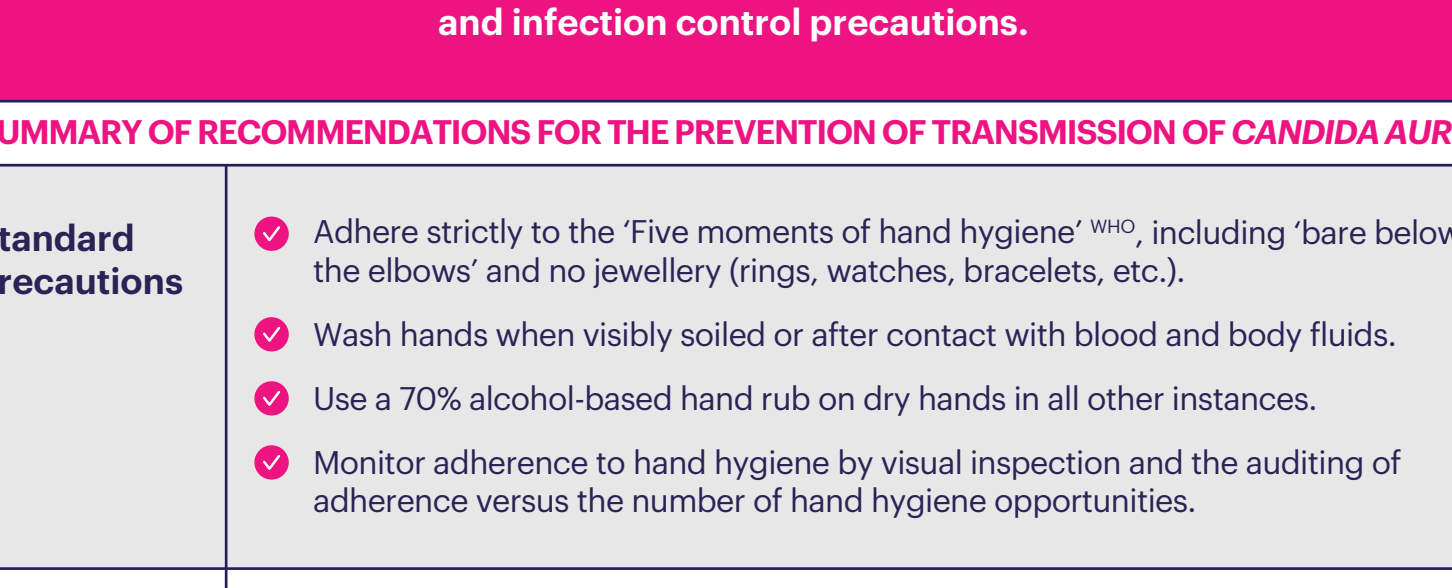
There are over 150 species of *Candida*, but only six commonly appear in humans. *C. auris* has rapidly emerged as a major cause of candidemia in South Africa, surpassing the number of cases caused by *C. albicans*, *C. glabrata*, *C. tropicalis*, and *C. krusei* over the past 7 years. The reasons for the dramatic emergence of *C. auris* as a pathogen in healthcare settings are not clear. It is known that South Asia, East Asia, Africa and South America have unique *C. auris* clades, which are separated from other clades by thousands of genetic differences in their DNA nucleotides. This supports the hypothesis that *C. auris* emerged independently and simultaneously on several continents – most probably from an environmental reservoir.



Most fungi and yeasts prefer the cooler temperatures in soil, but *C. auris* can grow at relatively high temperatures (42°C). To our knowledge, it has never been isolated from the natural environment; however, it is believed that changes in environmental temperatures may have led to its emergence.

Candida auris can live on the skin, inside the gut or in the environment, and causes invasive infections such as bloodstream infections (candidemia), meningitis, bone infections, burn / wound infections, and urinary tract infections.

This fungus rarely colonises the hands of healthcare workers; however, due to its ability to form biofilms, it can survive for prolonged periods on environmental surfaces near to colonised or infected wounds, invasive medical devices, and reusable patient equipment.



Quaternary ammonium compounds (also known as 'Quats' or 'QACs') which are commonly used for hospital and long-term care facility disinfection may not be effective against spore-forming *Candida auris*.

It is imperative that IPC Managers liaise with Cleaning Supervisors and provide oversight of cleaning methods to ensure the use of sporicidal surface disinfectants, including the application of the product for the correct contact time.

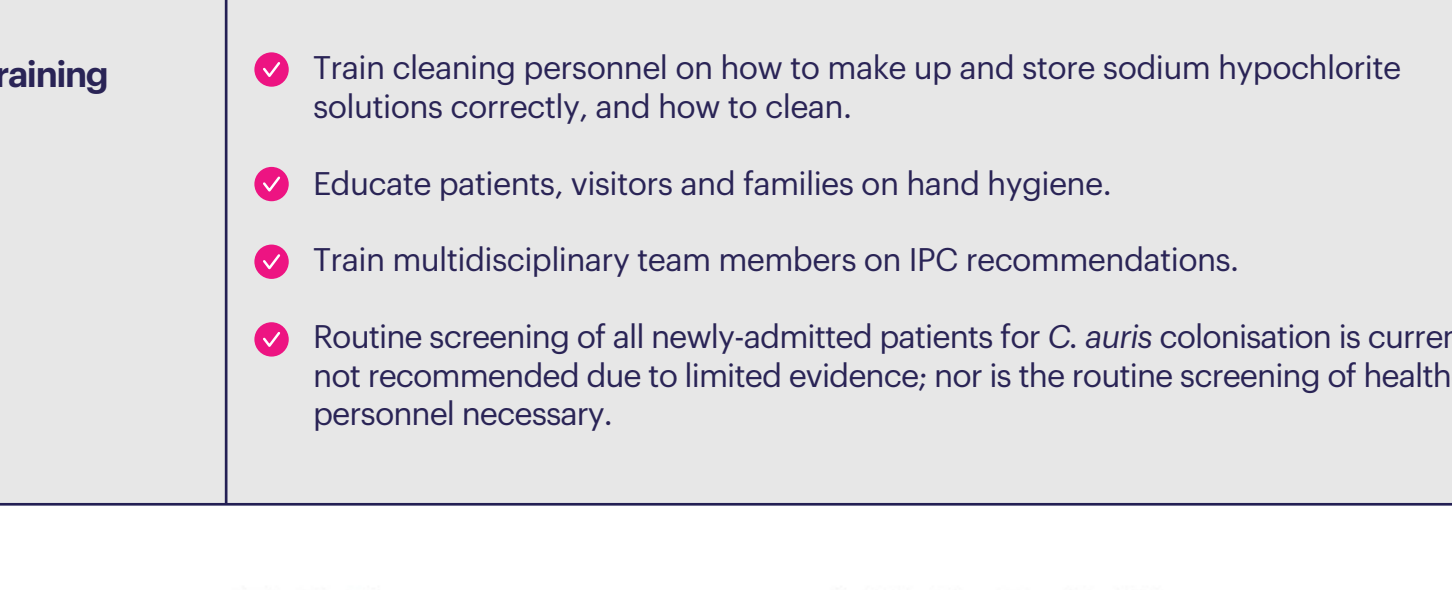
WHO IS AT RISK?^{1,2,3,4,5}

Opportunistic pathogenic fungi are commonly found within our close living environments, and many produce abundant airborne spores. Consequently, humans are exposed to diverse environmental fungal pathogens as bio-aerosols every day.

Whereas most environmental fungi cause no noticeable pathophysiological events in healthy individuals, those with compromised health or immunity are susceptible to a spectrum of disease, including superficial, allergic, chronic or life-threatening invasive and drug-resistant fungal infections.

The patient populations at risk of invasive infections are expanding, and include:

- the elderly and debilitated residents of long-term care facilities and critically ill patients (including neonates)
- those with immune systems compromised by diabetes mellitus, HIV, cancer chemotherapy or transplant-necessitated immune suppression therapy
- prior or prolonged exposure to broad-spectrum antimicrobial agents
- invasive surgical and medical procedures
- those with severe viral infections, such as the influenza virus and COVID-19



LABORATORY DIAGNOSIS^{1,2,3}

Like other *Candida* infections, *C. auris* infections are usually diagnosed by the culture of blood or other body fluids.

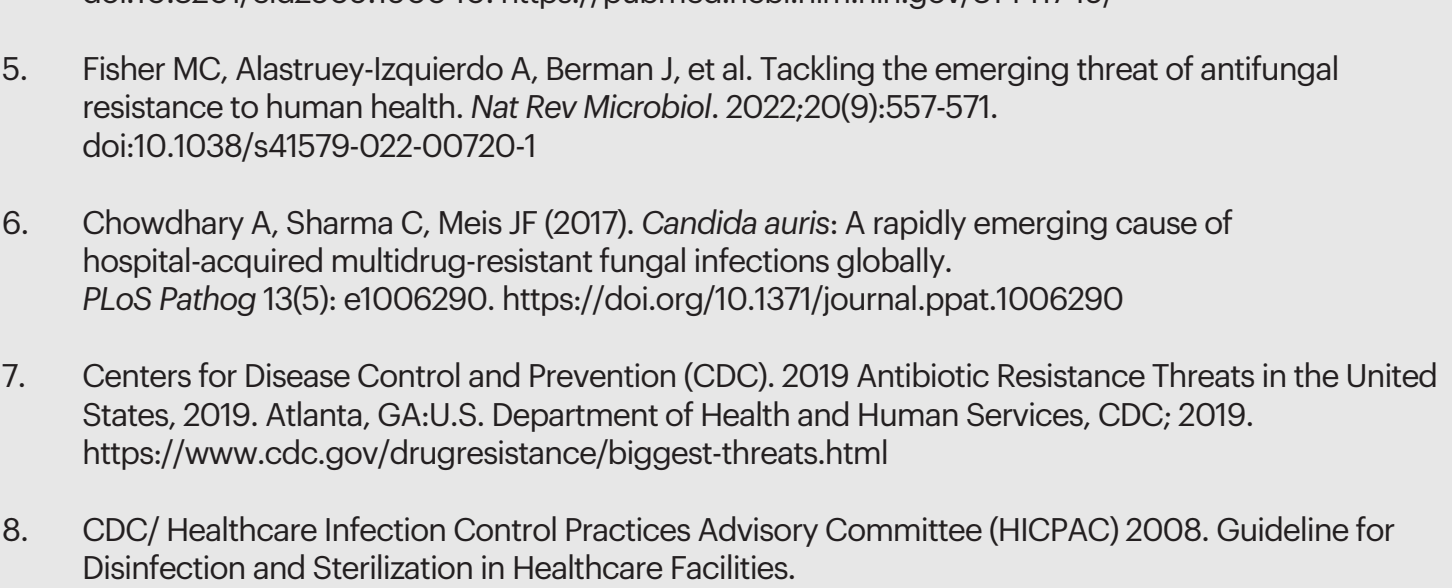
C. auris is harder to identify than more common types of *Candida* and may be confused with other types of yeasts. This delays the initiation of appropriate antifungal treatment and the rapid institution of appropriate IPC measures.

The laboratory should suspect *C. auris* when specimens are submitted from facilities known to be endemic for this pathogen, or when the culture is fluconazole-resistant.

In a recent South African study,⁴ the risk of *C. auris* candidemia (vs. fungemia caused by any other *Candida* species) was three times higher among patients admitted to private-sector hospitals. Other risk factors included prior antifungal therapy, older age, longer hospital stay before the first positive culture, and the presence of a central venous catheter.

Clinical relevance?

- Most *C. auris* isolates are resistant to azole, an important first-line antifungal agent.
- More than 40% of isolates are also resistant to amphotericin-B and/or the echinocandins.
- Patients with invasive *C. auris* infections are at high risk of dying, with a reported in-hospital mortality of approximately 45%.^{2,3}
- It is likely that inadequate Antifungal Stewardship (AFS) and Infection Prevention and Control (IPC) programmes are the underlying drivers of the emergence and transmission of this pathogen.²



Healthcare facilities that suspect they have a patient with *C. auris* should contact the Medical Microbiologist for immediate guidance on treatment and infection control precautions.

SUMMARY OF RECOMMENDATIONS FOR THE PREVENTION OF TRANSMISSION OF CANDIDA AURIS.

Standard precautions	<ul style="list-style-type: none"> Adhere strictly to the 'Five moments of hand hygiene'^{WHO}, including 'bare below the elbows' and no jewellery (rings, watches, bracelets, etc.). Wash hands when visibly soiled or after contact with blood and body fluids. Use a 70% alcohol-based hand rub on dry hands in all other instances. Monitor adherence to hand hygiene by visual inspection and the auditing of adherence versus the number of hand hygiene opportunities.
Contact transmission-based precautions	<ul style="list-style-type: none"> Make gloves and disposable impervious aprons available. Wear disposable (impervious) gowns when there is close contact with a patient, or a high risk of blood and body fluid exposure. Wear eye protection and a mask during procedures where there might be a risk of splashes. Don all personal protective equipment (PPE) prior to entering the room and before touching a patient or the immediate environment (i.e., bed, linen, equipment, invasive devices and personal items). Remove and discard PPE inside the room, and wash your hands before leaving the patient or the immediate vicinity. Visitors need not use PPE unless performing a nursing duty. Dedicate equipment to individual patients where possible (e.g., blood pressure cuffs, thermometers, etc.).
Isolation or cohorting	<ul style="list-style-type: none"> Accommodate each infected and/or colonised patient in a single room with en suite facilities. Affix 'contact precautions' signage to the door. If single rooms are not available, 'cohort' patients who are infected or colonised with the same pathogen (i.e., same species, similar antimicrobial susceptibility profile) in the same room. Ensure at least 2m between beds when patients are cohorted (i.e., to allow adequate movement and the use of mobile equipment without touching the adjacent patient). Restrict the number of visitors at a single time.
Environmental cleaning	<ul style="list-style-type: none"> Clean rooms at least daily, and 'high touch surfaces' twice daily. Clean and disinfect walls with a detergent-based sodium hypochlorite solution (1000 parts per million). Clean and disinfect equipment (according to the manufacturer's guidelines) after use if single-use items are not available. Handle all linen from infected or colonised patients as infectious linen – place in a yellow plastic bag and wash separately at 65°C for at least 10 min. All linen (including bed curtains) should be removed and laundered after discharge. Consider hydrogen peroxide fogging or wipes as an adjunctive measure when the patient vacates the room (there is insufficient evidence based on studies done in healthcare environments to currently recommend UV light disinfection).
Medical devices and care bundles	<ul style="list-style-type: none"> Adherence to the relevant care bundles should be monitored and measured: <ul style="list-style-type: none"> Tracheostomy / ventilator-associated pneumonia (VAP) Central line-associated bloodstream infection (CLABSI) Catheter-associated urinary tract infection (CAUTI) Remove all devices as soon as possible
Patient movement	<ul style="list-style-type: none"> Notify receiving departments if the patient is to be transported between departments. Notify the receiving hospital if the patient is transferred to another hospital or long-term care facility.
Training	<ul style="list-style-type: none"> Train cleaning personnel on how to make up and store sodium hypochlorite solutions correctly, and how to clean. Educate patients, visitors and families on hand hygiene. Train multidisciplinary team members on IPC recommendations. Routine screening of all newly-admitted patients for <i>C. auris</i> colonisation is currently not recommended due to limited evidence; nor is the routine screening of healthcare personnel necessary.

Your 5 Moments for Hand Hygiene

- BEFORE TOUCHING A PATIENT
- BEFORE CLEAN / ASEPTIC PROCEDURE
- AFTER BODY FLUID EXPOSURE RISK
- AFTER TOUCHING A PATIENT
- AFTER TOUCHING PATIENT SURROUNDINGS



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