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Cystic fibrosis: Infection prevention and control Clinical Guideline

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Government of South Australia
SA Health

Contents

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1. Policy Statement

This guideline describes recommended best practice infection prevention and control procedures for the management of patients (adult and paediatric) with cystic fibrosis (CF) in both inpatient and non-inpatient health care settings. Inpatient health care settings include any hospital settings where a patient is admitted for a least an overnight stay. Non-inpatient health care settings include outpatient clinics (including lung function and CF clinics), emergency departments, radiology, dental, perioperative settings, dialysis centres, ambulance and aeromedical transport services, community health care and residential care facilities (e.g. rehabilitation facilities, nursing homes, mental health facilities) and other settings in which people with CF may receive medical care.

The guideline presents a risk-based approach to the management of patients with CF to minimise the acquisition and transmission of multidrug-resistant organisms (MRO) and/or other microorganisms of clinical significance.

Individual facilities may require specific procedures and protocols relevant to their patient population and clinical setting.

2. Roles and Responsibility

This policy applies to all staff involved in the direct care of patients with CF.

Staff caring for patients with CF are responsible for ensuring that the patient, their relatives/visitors and all persons involved in their care are informed and understand the purpose of the infection control precautions implemented.

3. Policy Requirements

3.1. Background

It is known that chronic infection with certain microorganisms in people with CF is associated with increased respiratory symptoms and poorer outcomes. All people with CF can harbour microorganisms in their respiratory secretions that can potentially be transmitted to others with CF. These pathogens include (but are not limited to): *Burkholderia cepacia* complex, methicillin-resistant *Staphylococcus aureus*, *Pseudomonas aeruginosa*, human respiratory syncytial virus, human parainfluenza viruses, and influenza viruses.

There is no reliable way to completely eliminate the risk of cross-infection, however, the implementation of standard and transmission-based precautions is recommended to minimise this risk. Standard and contact precautions are recommended for the routine care of all CF patients.

The origin of most pathogens in CF remains unknown, but there are several potential sources; these include the natural environment (e.g. soil, water), the healthcare or hospital environment (e.g. sinks and surfaces), contaminated equipment (e.g. nebuliser, pulmonary function equipment) and other people with CF who harbour potentially transmissible pathogens. During

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the past decade, new evidence has led to a renewed emphasis on source containment of potential pathogens and the role played by the contaminated healthcare environment in the transmission of infectious agents. People without CF, including household and family members, are not generally responsible for transmission of respiratory bacterial pathogens to people with CF; however, they can transmit viruses to someone who has CF, which can be equally important.

As those with CF survive longer and have increasing exposure to antibiotics, other problematic colonising microorganisms are being found in sputum of CF patients. These have been termed "late emerging pathogens" and include *Stenotrophomonas maltophilia, Achromobacter xylosoxidans, Ralstonia picketti, Pandoraea apista, Inquilinus limosus, Aspergillus* species, and non-tuberculous mycobacteria (NTM). These microorganisms are environmental bacteria commonly found in water, soil, and on plants, including fruit and vegetables. Whether all of these organisms have a primary pathogenic role in CF lung disease and are capable of transmission between people with CF remains unclear.

3.2. Infection control principles for CF patient care in inpatient settings

The general infection control principles for the care of CF patients includes adhering to hand hygiene, source containment of respiratory secretions, appropriate use of personal protective equipment, environmental cleaning, and disinfection of reusable medical equipment.

CF patients should be managed with standard and transmission-based precautions (contact precautions and, when indicated, droplet or airborne precautions) in both inpatient and non-inpatient settings.

All healthcare personnel should wear gowns and gloves when caring for all people with CF patients **regardless** of respiratory tract culture results. The rationale for the universal use of gowns and gloves by healthcare personnel caring for people with CF is that direct and indirect contact with respiratory secretions that may contain transmissible pathogens is likely to occur, including through contact with contaminated environmental surfaces.

All healthcare facilities should develop a comprehensive risk-based, institution-specific, infection management plan to detect, prevent and control infection and/or colonisation risks for CF patients. Measures implemented to eliminate or minimise transmission should not interrupt the normal course of treatment required for the patient's recovery.

3.2.1. Patient placement

Patient placement should be based on a risk management approach and will depend upon the setting of the health care facility. It is recommended that CF patients are not placed alongside those with impaired immunity because of the high likelihood of transmission of opportunistic pathogens to this vulnerable patient group.

To decrease the risk of transmission of MRO organisms from one CF patient to another patient (CF or non-CF patient) within the wards, it is important to include the following in planning patient placement:

- A single room with ensuite facilities or dedicated bathroom is preferred. Cohorting of patients with CF should **not** occur.
- CF patients with *Mycobacterium abscessus* colonisation should be placed in a single room, preferably with negative air pressure, to prevent "seeding" of the ward environment with the organisms.
- CF patients with significant organisms such as *Burkholderia cepacea* should be placed in different wards and away from immunocompromised patients.

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- Ensure that appropriate additional precautions signage is clearly visible at the entrance to the room.

3.2.2. Patient movement within the healthcare facility

The MRO status of a CF patient must not compromise patient management. Avoid unnecessary patient movement between wards, ensuring that the normal course of treatment is not interrupted.

Patients may go outside of their isolation room provided the following precautions are followed:

- the patient wears a single-use face mask
- hand hygiene is performed before leaving their room
- all lesions/wounds are covered and exudate contained
- the patient is requested not to visit other patients during their hospital admission.

Staff accompanying patients during transport or movement through the facility do not need to wear gowns and gloves if direct patient care is not anticipated, however staff must perform hand hygiene after completing the transport task.

3.2.3. Transport and patient movement between healthcare facilities

Patients with CF should not be refused admission or transfer to any health care facility on the basis of having CF or due to their MRO status. Patient management should not be compromised and transfer may be necessary from acute care hospitals to other facilities for convalescence, rehabilitation or long term care.

If transfer is required to another clinical area or health care facility, the receiving staff, and (if applicable) the ambulance service, must be informed of the precautions required for ongoing patient management.

The following are recommended:

- The medical/nursing documents accompanying the patient must clearly state details relating to the patient's MRO status and if they have any risk factors for transmission.
- If the transfer is being conducted by the SA Ambulance Service they should be informed of the patient's MRO status when the booking for transport is made, and that contact precautions are required.
- Transport via taxi requires standard precautions only.

3.2.4. Transmission-based precautions

Contact precautions are recommended as the baseline precautions to be implemented for all CF patients.

Whereas some microorganisms are spread predominantly by direct or indirect contact (e.g. *B. cepacia*, MRSA and *P. aeruginosa*) or by the droplet route (pertussis, influenza viruses), it is likely that most respiratory pathogens can be transmitted by a combination of pathways (i.e. both by contact and droplet).

For information on application of infection control precautions to specific diseases see the *SA Health Infection Control Management of Infectious Diseases Summary Table*.

See Appendix 2 for a summary of the personal protective equipment requirements.

Clearly document the precautions required in the patient's medical record. Additional precautions should only be ceased by the clinical care team.

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The importance of respiratory hygiene and cough etiquette should be explained to patients who are placed on droplet precautions.

3.2.5. Respiratory protection

All staff who are required to be present during aerosol-generating procedures* (AGP) must wear a properly fit-tested P2/N95 respirator in accordance with the *SA Health Respiratory Protection against Airborne Infectious Diseases Clinical Guideline, Dec 2013.*

Healthcare personnel who cannot wear or be adequately fitted with a disposable P2/N95 respirator may be required to use a powered air purifying respirator (PAPR) with a disposable hood. Training in the use of PAPR, including the safe removal of the equipment, must be undertaken prior to use.

***Note:** AGPs include but are not limited to open airway suctioning, intubation, bronchoscopy and use of a nebuliser.

3.2.6. Infection control signage

Place signage indicating the need for additional transmission-based precautions and the use of appropriate PPE outside of the patient room. Appropriate signage can be accessed from: http://www.safetyandquality.gov.au/our-work/healthcare-associated-infection/national-infection-control-guidelines/.

3.2.7. Dedicated patient equipment

Only take minimum amounts of equipment and supplies into the patient's room. Dedicate the use of non-critical items (e.g. stethoscope, sphygmomanometer etc.) to a single patient with CF where possible. If this is not possible, clean and disinfect shared patient equipment prior to use on another patient.

Patients should not use communal phones; however, if this is unavoidable ensure the phone is decontaminated using a large alcohol wipe prior to use and before returning to general use.

3.2.8. Respiratory therapy equipment: nebulisers and diagnostic equipment

Devices used for respiratory therapy (e.g., nebulisers) or for diagnostic evaluation (e.g., bronchoscopes and spirometers) are potential reservoirs for infectious organisms. Therefore, processes for proper cleaning and sterilization or disinfection of reusable equipment are essential components of a program to prevent infections of people with CF, both in the hospital and non-hospital setting.

Although a patient's own respiratory flora usually contaminate nebulisers, it is prudent not to introduce those microorganisms into the lower respiratory tract during aerosol treatments. Single-dose medication vials are always preferred, due to the risk of contamination; if multi-dose medication vials must be used, then the manufacturer's directions for handling, dispensing, and storing must be followed precisely to prevent contamination and the transmission of potential pathogens).

Proper training of personnel responsible for reprocessing equipment is important, including demonstration of competency initially and then at least annually, as is consistent adherence to reprocessing guidelines.

For details refer to: Appendix 3: Nebuliser cleaning and disinfecting recommendations.

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3.2.9. Environmental cleaning

Thorough cleaning of the environment is an important strategy to minimise the risk of MRO transmission amongst CF patients. Routine cleaning should be intensified by the use of a detergent/disinfection solution as per the *SA Health Cleaning Standard for Healthcare Facilities Policy Directive, Oct2014*.

Key points are:

- Use a Therapeutic Goods Authority (TGA) approved hospital grade disinfectant (preferably with label claims against MROs) or a chlorine-based product at 1000 ppm available chlorine.
- Pay particular attention to all frequently touched surfaces, such as bedrails, door handles, commodes, toilet, hand basins and taps.
- Clean all patient equipment with detergent and water and disinfect prior to use on or by another patient. A large detergent/disinfectant or alcohol wipe may be used to decontaminate small items of patient care equipment which are not visibly soiled. A new wipe should be used for each item of equipment.
- On discharge, change non-disposable patient bedside curtains. Change disposable antimicrobial curtains if visibly soiled, damaged or the use-by date has expired. The room may be safely re-used once all steps are completed and all surfaces are dry.
- Ensure that all cleaning equipment and solutions are changed before moving to the next patient area/room.

3.2.10. Staffing

To decrease the risk of transmission of infectious organisms to other patients within the wards, staff should be educated and demonstrate competency in the application of both standard and transmission-based precautions.

All healthcare personnel should be vaccinated against vaccine-preventable diseases, including annual vaccination against influenza. (Refer to the *SA Health Immunisation Guidelines for Health Care Workers in South Australia 2014*).

3.2.11. Visitors

Under normal circumstances, there is no requirement for visitors to wear personal protective equipment (PPE). However, there may be certain situations where PPE may be required (e.g., when a visitor is providing direct care and intends to visit another patient in the same facility).

- All visitors should be instructed to perform hand hygiene prior to leaving the patient's room.
- Patient's clothing may be taken home in a plastic bag for washing using a normal wash cycle.

3.3. Management of CF patients in out-patient clinics and pulmonary function laboratories

3.3.1. CF Outpatient Clinics

Colonisation or infection with MROs or transmissible pathogens in CF patients should not prevent their treatment in outpatient clinics or other ambulatory care settings.

Recommended infection control precautions for CF outpatient clinics include the following:

- Schedule CF patients in ways that minimises time in common waiting areas.
- Place people with CF, regardless of their respiratory culture results, in a consultation room immediately on arrival at the clinic.

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- Consider use of a pager system or personal mobile phone to alert people with CF that a consultation room is available.
- Keep the person with CF in one consultation room while the CF care team rotate through the consultation rooms.
- Infants under 2 years of age should be separated from other people with CF in CF clinics until adequate infection control education has been provided to care givers.
- Separate newly diagnosed people with CF from other people in CF clinics until adequate infection control education has been provided and understood by newly diagnosed individuals.
- Clean and disinfect consultation rooms between patients using a TGA registered hospital grade detergent/disinfectant in accordance with local policy and procedures. Allow 15 – 20 minutes between patients for airborne contaminants to settle before cleaning frequently touched surfaces.

3.3.2. Pulmonary Function Laboratory (PFL)

In these settings, strict adherence to standard precautions (i.e. hand hygiene, cleaning shared patient equipment and environmental cleaning) for ALL patients will assist in minimising cross-transmission risks.

- Provide hand hygiene products in Pulmonary Function Laboratories (PFLs).
- All staff must don gown and gloves prior to performing pulmonary function testing. Use one of the following options (where current facilities permit):
  1. Perform in examination room at start of clinic visit
  2. Perform in PFL, allowing 30 minutes to elapse before next CF patient enters lab
  3. Perform in a negative pressure room
  4. Perform in a room with HEPA filtered air supply.

  Note: All new facilities should be designed to comply with this requirement.
- Use a disposable mouthpiece for each patient.
- Patients should not touch PFL machines or computers.
- Clean the surface of PFL machines and other frequently-touched surfaces (e.g., computer keyboard, door handles) after each patient using detergent/disinfectant wipes.

3.4. Management of CF patients in community settings

Contact precautions (gloves and gowns) should be used for all close contact with all patients with CF in out of hospital settings e.g. homes, schools, to minimise contact of clothes with respiratory secretions. Hand hygiene must be performed before and after patient contact and procedures.

Ensure that any shared patient equipment is cleaned and disinfected prior to use on another patient.

3.5. Patient education and support

It is important to effectively partner with the CF community to share information on best practices, including written policies, quality improvement initiatives, educational materials, and strategies for avoiding face-to-face interactions among individuals with CF, as well as information from studies related to infection prevention and control practices.

Inform the patient and their family/carer (as appropriate) of their MRO status as soon as possible and provide information that clearly explains the importance of infection control and

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MROs, how to prevent transmission whilst in hospital and how it is managed once discharged.

It is recommended that patients are informed of the importance of hand and respiratory hygiene, and immunisation against vaccine-preventable diseases.

3.6. Drug treatment and antimicrobial stewardship

It is recommended that policies and procedures are in place to promote judicious antibiotic use, particularly of broad spectrum antibiotics, in order to limit the increased development of antibiotic resistant microorganisms. Refer to the SA Health *Antimicrobial Prescribing Clinical Guideline*.

3.7. Surveillance and screening for carriage of potential pathogens

Routine real-time surveillance for epidemiologically significant microorganisms is recommended in the acute care setting to understand endemic rates of carriage and to identify outbreaks as soon as possible.

3.7.1. Screening for non-tuberculous mycobacteria (NTM)

Traditionally NTM have been regarded as environmental opportunistic pathogens and person-to-person transmission was thought to be unlikely. Most infections were thought to arise in susceptible individuals, including those with cystic fibrosis, from environmental sources such as water, soil and biofilms. However, in recent years the data appear to be conflicting, with some studies suggesting that person-to-person transmission is unlikely or rare, and others describing *M. abscessus* cross-infection associated with health facilities and hospitals.

The US Cystic Fibrosis Foundation and European Cystic Fibrosis society released guidelines regarding management of NTM in late 2015. These included the issue of cross-infection. Their recommendation is that, in the absence of definitive evidence, it should be assumed that cross-infection is an important mechanism for acquisition of *M. abscessus*.

The following actions are recommended:

- Perform sputum cultures for NTM annually in spontaneously expectorating individuals with a stable clinical course.
- Oropharyngeal swabs are not suitable for NTM screening.
- In the absence of clinical features of NTM pulmonary disease, individuals who are not capable of spontaneously producing sputum do not require screening cultures for NTM.
- All NTM isolates from individuals with CF should undergo molecular identification.

3.7.2. Screening for *Burkholderia cepacia* complex

There is insufficient evidence at the time of writing to recommend criteria by which to consider a person with CF who previously had *Burkholderia* species isolated from respiratory tract cultures to be "*Burkholderia* free".

It is recommended that that CF centres obtain and review quarterly surveillance reports (e.g. data from the local clinical microbiology laboratory) on the incidence and prevalence of respiratory tract pathogens at their centres. This review should be conducted in collaboration with institutional infection prevention teams and a clinical microbiologist from the laboratory.

The CF Foundation Guideline recommends that molecular typing of *B. cepacia* complex isolates and other significant microorganisms (e.g., *P. aeruginosa* and NTM) is performed when epidemiologically indicated (e.g., in suspected patient-to-patient transmission).

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3.7.3. Screening for multi-resistant organisms

CF patients are noted to have ongoing or re-emergence of MROs due to frequent antibiotic therapy.

In the acute health care setting, screening for clearance of MROs for the discontinuation of contact precautions is not recommended. All healthcare personnel must implement contact precautions at all times (i.e., wear a gown and gloves) when caring for all people with CF regardless of respiratory tract culture results, in both inpatient and non-inpatient settings.

3.7.4. Collection of specimens

Obtain specimens in accordance with local procedures with the additional steps of using a consultation room at the start of a clinic visit or in the patient's room away from other CF patients.

3.7.5. Alerting patient records

Infection control alerts should be placed in the patient's medical records in accordance with the practices of the health care facility. This can include alerts for MROs and other significant organisms (such as *Burkholderia* spp. and *M. abscessus*). Infection control alerts can be set electronically through either the facility's patient administration system, Oacis-ICIMS or EPAS.

3.7.6. Staff with cystic fibrosis

Staff who have CF and are colonised or infected with MROs should be managed in accordance with the Cystic Fibrosis Australia guidelines.

4. Implementation and Monitoring

It is the responsibility of LHNs to implement the measures contained in this guideline and to monitor the clinical outcomes.

This may be achieved by:

- regular audit of infection control practice in CF clinics and pulmonary function laboratory
- regular review of the incidence of colonisation with key multi-resistant organisms and other organisms of clinical significance in this patient group to determine whether there is any indication of cross-transmission occurring within the healthcare environment.

5. National Safety and Quality Health Service Standards

National Standard 1 Governance for Safety and Quality in Health Care	National Standard 2 Partnering with Consumers	National Standard 3 Preventing & Controlling Healthcare associated infections	National Standard 4 Medication Safety	National Standard 5 Patient Identification & Procedure Matching	National Standard 6 Clinical Handover	National Standard 7 Blood and Blood Products	National Standard 8 Preventing & Managing Pressure Injuries	National Standard 9 Recognising & Responding to Clinical Deterioration	National Standard 10 Preventing Falls & Harm from Falls
☒	☒	☒	☐	☐	☐	☐	☐	☐	☐

The following National Safety and Quality Health Service Standards (NSQHSS) standards apply:

Standard 1 - Governance for Safety and Quality in Health Service Organisations

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Standard 2 - Partnering with Consumers.

- Criterion 2.2.2. – Consumers and/or carers are actively involved in decision making about safety and quality.

Standard 3 - Preventing and Controlling Healthcare Associated Infections, in particular Managing patients with infection or colonisations:

- Criterion 3.11 - Implementing systems for using standard precautions and transmission-based precautions.
- Criterion 3.12 - Assessing the need for patient placement based on the risk of infection transmission.
- Criterion 3.13 - Developing and implementing protocols relating to the admission, receipt and transfer of patients with an infection

6. Definitions

In the context of this document:

AGP	*refers to:* aerosol-generating procedures, such as intubation, bronchoscopy, sputum induction including airway clearance techniques, nebulised drug administration.
Colonisation	*means:* the presence, growth and multiplication of microorganisms without observable signs or symptoms of infection.
Infection	*means:* invasion of microorganisms into host tissues with replication of the organism accompanied by signs or symptoms of illness.
MRO	*refers to:* multidrug-resistant organism.
NTM	*refers to:* non-tuberculous mycobacteria.
Pathogen	*means:* a microorganism that is capable of establishing infection and causing disease.
Respirator	*means:* a tight-fitting, disposable high filtration mask (N95 or P2) that is designed to protect the wearer from airborne contaminants, including respiratory pathogens.

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7. Associated Directives / Guidelines & Resources

7.1. SA Health policies and guidelines

SA Health Antimicrobial Prescribing Clinical Guideline. Available at: http://www.sahealth.sa.gov.au/wps/wcm/connect/public+content/sa+health+internet/clinical+resources/clinical+topics/medicines+and+drugs/antimicrobial+guidelines/antimicrobial+guidelines?contentIDR=26299e004f9fd09c8f34dfc4163822ed&useDefaultText=0&useDefaultDesc=1

SA Health Cleaning Standard for Healthcare Facilities Policy Directive, Oct 2014. Available at: https://www.sahealth.sa.gov.au/infectionprevention

SA Health Hand Hygiene Policy Directive, Jan 2016. Available at: https://www.sahealth.sa.gov.au/HandHygiene

SA Health Immunisation Guidelines for Health Care Workers in South Australia 2014 Policy Guideline. Available at: http://inside.sahealth.sa.gov.au/wps/wcm/connect/non-public+content/sa+health+intranet/business+units/health+system+development/office+of+the+chief+executive/policies/guidelines/immunisation+guidelines+for+health+care+workers+in+south+australia+2014+policy+guideline

7.2. Resources

Australian Guidelines for the Prevention and Control of Infection in Healthcare, 2010. Available at: https://www.nhmrc.gov.au/guidelines-publications/cd33

Cystic Fibrosis Australia. Infection Control Guidelines for cystic fibrosis patients and carers. 2nd ed., 2012. Available at: http://www.cysticfibrosis.org.au/cfa/infection-control

Cystic Fibrosis Australia. Infection Control Policy, 2015. Available at: http://www.cysticfibrosis.org.au/cfa/infection-control

Cystic Fibrosis Australia patient fact sheets: http://www.cysticfibrosis.org.au/all/fact_sheets

Cystic Fibrosis Australia Standards of Care: http://www.cysticfibrosis.org.au/cfa/standards-of-care

Infection Prevention and Control Guideline for Cystic Fibrosis: 2013 Update. Saiman L et al, Infection Control and Hospital Epidemiology, Vol. 35, S1, pp S1-S67. The Society for Healthcare Epidemiology of America (SHEA).

SA Health Management of Infectious Diseases Summary Table. Available at: https://www.sahealth.sa.gov.au/infectionprevention

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7.4. Appendices

Appendix 1: Recommended precautions and personal protective equipment (PPE) summary

Appendix 2: Nebuliser and airway clearance device cleaning and disinfecting recommendations

Appendix 3: Summary of strategies to minimise the risk of transmission of potential pathogens

8. Document Ownership & History

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Approval Date	Version	Who approved New/Revised Version	Reason for Change
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Appendix 1: Recommended precautions and personal protective equipment (PPE)

PPE	Recommendations for healthcare staff, patient or visitors		
	Healthcare staff	**People with CF**	**Family members & visitors**
GLOVES	> Wear when caring for all people with CF.	> Not recommended routinely. > Perform hand hygiene.	> Not recommended routinely. > Use as defined in local health care facility policy when visiting hospitalised patients.
GOWN or APRON	> Wear when caring for all people with CF.	> Not recommended routinely.	
SINGLE-USE FACE MASK	> Wear when caring for all people with CF as indicated for Contact / Droplet Precautions.	> Patient recommended to wear a mask on leaving their room or when in common areas including out-patient clinics.	
P2 / N95 RESPIRATOR	> Wear when caring for all people with CF under airborne precautions and when performing any aerosol-generating procedures.	> Not required.	
GOGGLES / FACE PROTECTION	> Wear when caring for all people with CF, as per Standard Precautions and as indicated for Droplet / Airborne Precautions.	> Not recommended routinely.	

Adapted from: Infection Prevention and Control Guideline for Cystic Fibrosis: 2013 Update. Saiman L et al, Infection Control and Hospital Epidemiology, Vol. 35, No.S1, Cystic Fibrosis Foundation Guideline (August 2014), pp S1-S67. The Society for Healthcare Epidemiology of America (SHEA).

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Appendix 2: Nebuliser and airway clearance device cleaning and disinfecting recommendations

Proper processes for cleaning and sterilisation or disinfection of reusable equipment are essential components of a program to prevent infections in people with CF. Training of personnel responsible for reprocessing reusable equipment is important, including demonstration of competency. Specific manufacturers' instructions for reprocessing should be followed.

Disposable and reusable nebulisers are for **single patient use only.**

Airway clearance devices must be sterilised by a hospital sterilising department between patients according to manufacturer recommendations.

Disposable nebulisers

Key principles for the care of disposable nebulisers in the healthcare setting are:

- Disposable nebulisers and associated equipment should be replaced as per manufacturer's instructions.
- When handling the nebuliser and dispensing medications, aseptic technique should be followed.
- Nebulisers should be handled away from sinks to prevent contamination.
- Only sterile water should be used for rinsing nebulisers, and filling of humidifier reservoirs.
- Use sterile saline for nasal rinses.
- After each use, residual volume should be rinsed out with sterile water, and masks/mouthpieces wiped with an alcohol wipe.
- Air-dry the nebuliser away from sinks to prevent contamination. The safety of storing moist nebulisers in plastic bags is unknown.
- Nebuliser contamination between uses can be avoided by not placing them in line with a ventilator circuit, which may expose the nebuliser to tubing condensation.

Reusable nebulisers and airway clearance devices e.g. Pari nebulisers, PariPEPs

- After use, dismantle the nebuliser or airway clearance device, and manually clean all parts using a hospital approved detergent in a clean bowl or jug.

Note: Do not use room hand basin for cleaning.

- Rinse nebuliser or airway clearance device parts in bottled sterile water. After rinsing, shake off excess water and leave to air dry.
- After drying store in a manner that will prevent contamination. For example wrap the nebuliser in a single use lint-free cloth and place in a kidney dish or bowl which could then be placed into a single use brown paper bag or bedside drawer.

Note: If patients or their carers are able to do so, they should be encouraged to clean their own nebuliser whilst in hospital as per the above instructions.

Patients should be educated regarding the importance of continuing the above cleaning process when discharged home.

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Appendix 3: Summary of strategies to minimise the risk of transmission of potential pathogens in CF clinics

Item	Specific Strategies
Scheduling	> Stagger clinic schedule. > Place patient in consultation room immediately.
Reception area	> Provide hand hygiene supplies, tissues and single use face masks. > Encourage all people entering the facility to perform hand hygiene. > CF patients to put on single use face masks on entry into the clinic. > Maintain a distance of at least 2 metres between all people with CF.
Waiting room	> Continue strategies used in reception area. > Advise people with CF, if necessary, to wait in another identified location where no others with CF will be present. > Call patients' mobile phones when examination room available. > No common use toys or computers. Patients should bring their own toys, books, iPods, iPads, etc.
Common areas	> CF patients to wear a single use face mask in all public areas of the hospital.
Consultation room activities	> All patients and staff to perform hand hygiene on entry into and exiting from the consultation room. > Obtain heights and weights in consultation rooms. > All staff members to don gowns and gloves either before or on entry into consultation room. > Shared patient equipment should be decontaminated with detergent/disinfectant wipes between patient use. > People with CF do not need to wear a face mask whilst in the room.
Pulmonary Function Testing (PFT)	> All patients and staff to perform hand hygiene prior to procedure. > Decontaminate surface of PFT machines and other high-touch surfaces (e.g., computer keyboard, door handles) after each patient. > Use disposable mouthpiece for each patient. > Patients should not touch PFT machines or computers.
Restrooms	> CF patient to keep face mask on when entering and using public restrooms. > Perform hand hygiene before and after using toilet.
Respiratory specimens	> Obtain specimens in consultation room at start of clinic visit.
Clinic cleaning	> All frequently touched surfaces in the consultation room must be decontaminated using a TGA registered hospital-grade disinfectant/detergent after each patient. > Schedule daily cleaning by hotel services of consultation rooms and common areas, including reception area, waiting room, PFT laboratory, sinks, and bathrooms. > Perform regular audits of cleaning.

Adapted from: Infection Prevention and Control Guideline for Cystic Fibrosis: 2013 Update. Saiman L et al, *Infection Control and Hospital Epidemiology,* Vol. 35, Suppl.1, pp S1-S67. The Society for Healthcare Epidemiology of America (SHEA).

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