OFFICIAL

SA Health

Cystic fibrosis: Infection Prevention and Control (IPC) Clinical Guideline

Version 1.1

Approval date: 28/12/2023

Government of South Australia

SA Health

Contents

1. Name of clinical guideline

Cystic fibrosis: Infection prevention and control (IPC) clinical guideline

2. Introduction

This guideline is provided as an exemplar of best evidence-based practice IPC principles 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, residential aged / disability care facilities, 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, and these should be governed and operationalised at the local level.

This guideline 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 of, and understand, the purpose of the IPC precautions implemented.

Partnering with consumers is a requirement of the National Safety and Quality Health Service (NSQHS) Standards. IPC measures including the wearing of face masks by patients should be risk based and clinically appropriate. Refer to the SA Health Face masks webpage.

3. 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, influenza viruses and COVID-19 virus (SARS-CoV-2).

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

The origin of many 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.

Additionally, people with CF are at risk of pulmonary exacerbations associated with the acquisition of transmissible infectious respiratory pathogens. Early in the course of the COVID-19 pandemic there were concerns that COVID-19 infection might be generally more severe in people with CF due to factors such as increased cytokine dysfunction and hyperinflammation. COVID-19 has caused severe exacerbations in the CF population, particularly in those with severe CF lung diseases and in some

patients post lung transplant. However, overall the course of COVID-19 infection in CF patients has been documented as milder than anticipated, possibly due to cystic fibrosis transmembrane conductance regulator (CFTR) protein modulator therapy. The commitment of the CF population to prophylactic measures such as rapid adoption of vaccinations, access to anti-viral medications, and CF healthcare teams strongly promoting and facilitating access to the latter measures, has been recognised as valuable in addressing the risks to this population.

During 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.

The COVID-19 pandemic may have impacted on how care is delivered, with improvements in technology such as telemedicine and hybrid care models that can be provided in conjunction with face-to-face care.

4. Definitions

- **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.
- **Particulate filter respirator (PFR)** (i.e. P2/N95 or equivalent) means a tight-fitting, disposable high filtration mask that is designed to protect the wearer from airborne contaminants, including respiratory pathogens.

5. General

5.1. Infection prevention and control (IPC) principles for CF patient care in inpatient settings

The general IPC principles for the care of CF patients includes adhering to hand hygiene, source containment of respiratory secretions, appropriate use of personal protective equipment (PPE), 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 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.

NOTE: The use of gloves does not replace the need for strict hand hygiene to be practised as per the 5 moments for hand hygiene.

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 (such as patients with tracheostomies, are immune suppressed, or are neutropenic) because of the high likelihood of transmission of opportunistic pathogens to this vulnerable patient group.

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

- A single room with ensuite facilities or dedicated bathroom is preferred. CF patients should not share bathroom facilities with other patients who have: CF, tracheostomies, are immune suppressed or neutropenic.
- 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 cepacia* should be placed in different wards and away from immunocompromised patients.
- Ensure that appropriate precautions signage is clearly visible at the entrance to the room.
- Other bed management and IPC considerations should be followed, including the need for transmission-based precautions for respiratory illnesses e.g. COVID-19, RSV or influenza. For additional information, refer to the SA Health Bed Management Toolkit: For infectious diseases and multi-resistant organisms.

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.

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 or presence of an infectious illness. 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, e.g by the SA Ambulance Service, Medstar, they should be informed of the patient's MRO status when the booking for transport is made, and transmission-based precautions are required as indicated by a risk assessment.
- Transport via taxi requires standard precautions only, unless additional public health requirements apply. For example, if a patient has COVID-19 then they should wear a mask.

Transmission-based precautions (TBP)

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*, methicillin resistant *Staphylococcus aureus* (MRSA) and *P. aeruginosa*) or by the droplet route (*Bordetella pertussis*, and influenza viruses), it is likely that most respiratory pathogens can be transmitted by a combination of pathways (i.e. both by contact and droplet) therefore a risk assessment is required to indicate if droplet or airborne precautions are required.

- For information on application of IPC precautions to specific diseases see the Appendix 1: Recommended precautions and personal protective equipment (PPE) summary

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

The importance of respiratory hygiene and cough etiquette should be explained to patients.

Respiratory protection for staff

All staff who are required to be present during aerosol-generating procedures* (AGP) or who are providing care to a patient on airborne precautions, must wear a properly fit-tested and fit checked particulate filter respirator (PFR) (i.e. P2/N95 or equivalent) in accordance with the SA Health Respiratory Protection against Airborne Infectious Diseases Clinical Guideline.

Healthcare personnel who cannot wear or be adequately fitted with a disposable PFR 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.

Place signage indicating the need for additional TBPs and the use of appropriate PPE outside of the patient room. Appropriate signage can be accessed from the Australian Commission on Safety and Quality in Health Care – Australian Guidelines for the Prevention and Control of Infection in Healthcare webpage.

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 cleaned and disinfected prior to use and before returning to general use. Follow the manufacturers' guidelines, however this may include the use of a detergent disinfectant wipe or a large alcohol wipe.

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 sterilisation, 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 contaminates nebulisers, it is prudent not to introduce those microorganisms into the lower respiratory tract during aerosol treatments.

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 2: Nebuliser and airway device cleaning and disinfecting recommendations.

Current guidance from Australian Commission on Safety and Quality in Health Care (ACSQHC) on use of nebulisers in patients with COVID-19, published in 2020, recommends that nebulisation should be avoided in patients with COVID-19, but not withheld if required for children.

For patients self-managing COVID-19, a puffer or spacer should be used in preference to a nebuliser. Essential nebulised treatments such as Pulmozyme and hypertonic saline should not be withheld from people with CF. Where a nebuliser is required, local procedures to mitigate the risk of airborne spread of COVID-19 should be used.

Medication vials

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.

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 South Australian Healthcare Facilities.

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 parts per million available chlorine.
- Pay particular attention to all frequently touched surfaces, such as bedrails, door handles, commodes, toilet, hand basins and taps and any surfaces risk assessed, as at risk of contamination via contract or droplets.
- 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.
- Cleaning and disinfection of equipment should be in accordance with manufacturer's instructions.

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 TBPs.

All healthcare personnel should be vaccinated against vaccine-preventable diseases, including annual vaccination against influenza. (Refer to the SA Health Addressing Vaccine Preventable Disease: Occupational Assessment, Screening and Vaccination Policy).

Visitors

Under normal circumstances, there is no requirement for visitors to wear 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) or during outbreaks affecting the facility or community.

- 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.
- Visitors should follow the current advice provided by the healthcare facility.

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

CF Outpatient Clinics

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

Recommended IPC 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.
- 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 IPC education has been provided to care givers.
- Separate newly diagnosed people with CF from other people in CF clinics until adequate IPC 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.
- Clinics may also consider telehealth where clinically appropriate.

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 (PFL).
- All staff must don gown and gloves prior to performing pulmonary function testing.
- Use one of the following options for undertaking pulmonary function tests (where 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 the PFL
    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.

5.3. 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 community settings e.g., homes and 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.

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

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

5.5. 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.

5.6. Surveillance and screening for carriage of potential pathogens

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

Other screening may be indicated during outbreaks of infectious diseases e.g. COVID-19, and current local procedures should be followed.

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 CF, from environmental sources such as water, soil and biofilms. However, in recent years the data appears 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.

Screening for *Burkholderia cepacia* complex

There is insufficient evidence 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 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 IPC 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).

Screening for multi-drug 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. However, the wearing of gloves does not replace the need for hand hygiene.

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.

Alerting patient records

Infection control alerts (paper based or electronic) 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-Infection Control Information Management System (ICIMS) or electronic medical records.

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.

6. Workforce implications

SA Health Addressing Vaccine Preventable Disease: Occupational Assessment, Screening and Vaccination Policy and Cystic Fibrosis Australia guidelines.

7. 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 IPC practice in CF clinics and pulmonary function laboratory.
- regular review of the incidence of colonisation with key MROs 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.

8. 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

9. Associated policies / guidelines / clinical guidelines / resources

9.1. Policy and guidelines

- Australian Commission on Safety and Quality in Health Care (ACSQHC) National Safety and Quality Health Service (NSQHS) Standards
- Australian Guidelines for the Prevention and Control of Infection in Healthcare

- SA Health Addressing Vaccine Preventable Disease: Occupational Assessment, Screening and Vaccination Policy
- SA Health Antimicrobial Prescribing Clinical Guideline

9.2. Supporting resources

- Cystic Fibrosis Australia
- Cystic Fibrosis Foundation, Clinical Care Guidelines
- 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 Environmental hygiene in healthcare
- SA Health Hand hygiene in the healthcare environment
- SA Health Infection Prevention and Control Management of Infectious Diseases - Summary Table
- SA Health Bed Management Toolkit: For infectious disease and multi-resistant organisms
- Standards of Care for Cystic Fibrosis, Australia 2023

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11. Document Ownership and History

Developed by: Communicable Disease Control Branch

Contact: HealthICS@sa.gov.au

Endorsed by: Domain Custodian, Clinical Governance, Safety and Quality

Next review due: 30/11/2028 (usually 5 years' time)

ISBN number: N/A

CGSQ reference: CG261

CG history: Is this a new clinical guideline (V1)? **N**

Does this clinical guideline amend or update and existing clinical guideline? **Y**

If so, which version? **V1.0**

Does this clinical guideline replace another clinical guideline with a different title? **N**

Approval Date	Version	Who approved New/Revised Version	Reason for Change
30/07/2024	V1.1	Infection Control Service	Reviewed – link updated.
28/12/2023	V1.1	Domain Custodian, Clinical Governance, Safety and Quality	Reviewed – links updated and moved into current clinical guideline template Additional content relating to COVID-19.
01/08/2017	V1.0	SA Health Policy Committee	Original

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

PPE	Recommendations for healthcare staff, patients 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.	
PARTICULATE FILTER RESPIRATOR (i.e P2/N95 or equivalent)	> 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).

2. 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 minimised 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.

3. 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 is available. > No common use toys or computers. Patients should bring their own toys, books, 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 hospital/facility 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).