Reducing the risk of infections for cystic fibrosis people in everyday life

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1. Definitions and terms used

Pathogen - (also called a bug, germ, organism, microbe etc.). A small, living thing that can cause infection and disease in the body. A pathogen could be a bacterium, a virus, a fungus or parasite.
Infection - a state where a pathogen invades the body causing illness, such as a chest infection
Acute infection - a recent or new infection
Chronic infection - a long-standing infection
Cross-infection - when harmful infections pass from one person to another

2. Purpose

The aim of this document is to offer people with CF and their carers information and guidance about how to lower the risks of getting potentially harmful infections from the environment and from other people (through *cross-infection*) during their everyday lives.

This document focuses on situations outside of the hospital and healthcare setting.

3. Background

Preventing infection is a serious issue for people with CF. Actions that can be taken to reduce everyday contact with, and exposure to, potentially harmful *pathogens* (see above) are an important part of daily life.

Chronic infection with certain pathogens in CF can lead to decreased lung function, poor growth, and increased hospitalisations. It is important, therefore, to prevent infection where possible.

Cross-infection occurs when pathogens pass from an infected person (with or without CF) to an uninfected person. This can happen by breathing in infected droplets and aerosols coughed or sneezed into the air. It can also occur by touching people and surfaces infected or soiled by germs, through kissing, handshaking, touching surfaces such as door-handles, etc.

Cross-infection can occur with many CF pathogens, in particular, *Burkholderia cepacia*, certain strains of *Pseudomonas aeruginosa, Methicillin Resistant Staphylococcal aureus* (MRSA), and *Non-tuberculous mycobacterium* (NTM). It also includes viruses such as influenza, the COVID-19 virus (SARS-CoV-2), measles etc.

In fact, the list of CF pathogens that may be spread from person to person is growing as research in this area continues.

4. How are pathogens spread (transmitted)?

In the laboratory, scientists have shown that some bacteria and viruses that affect people with CF can be propelled as far as **4-metres** into the air with coughing and sneezing. Viruses and bacteria coughed into the air can also survive in tiny aerosols and larger droplets that can be breathed in, or land on surfaces where they can survive for hours or days.

Cross-infection of pathogens can occur in several ways:

- Direct contact involves person to person spread through physical contact (touching). This includes close contact such as kissing, or casual contact such as touching hands that are contaminated (soiled) with secretions (e.g. a handshake after covering the mouth during coughing).
- Indirect contact involves contact with an object or surface that has been contaminated by secretions from an infected person e.g. sharing eating utensils, respiratory equipment, toys.
- Droplet route involves the spread of pathogens through the air in droplets that are made when a person coughs or sneezes. These droplets are fairly heavy and travel in the air around 1-2 metres and can be breathed into the nose and lungs if people are close to each other (hence the importance of "social distancing"). The droplets can also land on surfaces and be spread by touching these surfaces (as above).
- Airborne route also involves the spread of germs through the air following a cough or sneeze, or even heavy breathing, singing or shouting. In this situation, pathogens exist in tiny droplet particles (aerosols) that can remain in the air for a long time and travel long distances (**up to 4-metres and beyond**). This increases the chances of inhaling them and the risk of cross-infection. *Pseudomonas aeruginosa, Staphylococcus aureus* and certain viruses such as influenza (the flu), measles and the COVID-19 virus (SARS-CoV-2) can spread this way.

5. How to avoid pathogens and cross-infection

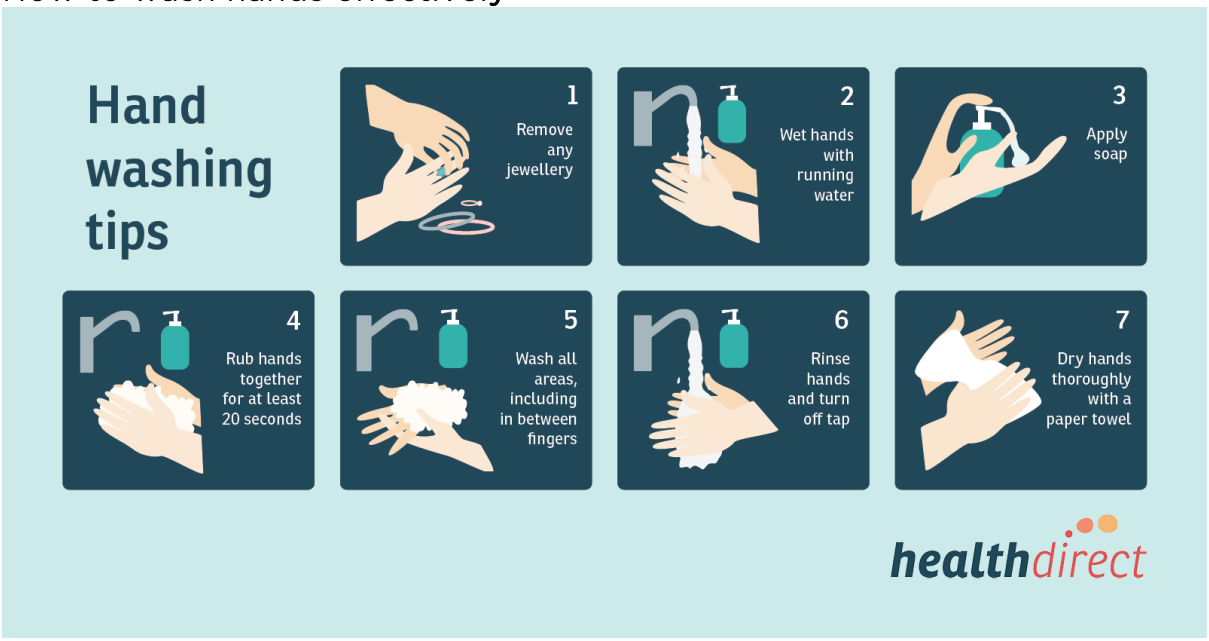
The ideal situation is for all people with CF to be able to go about their daily lives without restrictions and to do so safely. While it is not possible to avoid pathogens completely, the following information and actions may help reduce the risks of exposure and infection.

5.1 General hygiene measures for people with CF

❖ Wash your hands

- Wash hands thoroughly and often during the day with soap and water. Make sure you wash them for 20 seconds, including the backs of hands, between fingers and under and around fingernails (see diagram).
- Alternatively, you can use alcohol-based hand sanitiser (or both)
- Wash hands before:
    - eating and handling food
    - starting CF treatments
- Wash hands after:
    - coughing into your hands (we recommend coughing into elbow or tissue)
    - handling sputum or tissues
    - using the bathroom
    - CF treatments
    - touching shared objects such as pens, keyboards, door handles in the workplace and outside of the home
    - handling pets and animals
- Always dry your hands thoroughly
- **Learn how to hand wash effectively. Carers should teach good handwashing skills to children and adolescents with cystic fibrosis.**

How to wash hands effectively



https://www.healthdirect.gov.au/hand-washing

❖ Cover your mouth when you cough and sneeze

- Always cover your mouth and nose with your inner elbow or a tissue when you sneeze or cough. Coughing into your hands is not best practice, although preferable to not covering your cough/sneeze at all, and you should wash your hands afterwards
- Throw away tissues in the bin immediately after you use them and wash your hands thoroughly after coughing or sneezing.
- Do not leave sputum pots uncovered.

❖ Don't share personal items

- Do not share eating or drinking utensils, drink cans, cups or bottles.
- Do not share toothbrushes or towels.
- Do not share respiratory equipment such as nebulisers, inhalers, spacers etc.
- Avoid sharing computer keyboards, phones (desktop and mobile), pens etc with others. If you need to share them (for example at work or home) wipe them down with disinfectant before using them.

❖ Maintain a safe distance

Currently, we do not know what is the safest "social distance" to prevent cross-infection. A distance of 2-metres has been recommended to date by many CF experts (*reference 1 at the end of this guide*) and research is growing in this area. We now know that some CF bacteria and viruses (including influenza and the COVID-19 virus) can travel further than 2-

metres as tiny aerosols (*reference 5*). Our advice at present is to **maintain *at least* 2 metres** distance, and preferably keep **4 metres apart** if you can (*reference 5*).

- Keep ***at least*** 2-metres, and **preferably 4 metres**, away from other people with CF and from people without CF who have colds or flu-like symptoms.
- People with CF should not socialise together (physically). Social media may be a safer way to keep in touch with each other.
- Where possible avoid contact with friends and extended family with colds or flu-like illness.
    - ask them to stay away until they are recovered
- If you have symptoms of a cold, flu or gastrointestinal illness ("tummy bug") do not go to school or work or attend an event.
    - make sure you follow the general hygiene measures closely
- Avoid car journeys with other people with CF (unless you live in the same household).
- Avoid sharing rooms with other people with CF if staying the night.

❖ Immunisations

- Keep immunisations up to date including the annual influenza vaccine.

❖ Home / work environment cleaning

Currently, we do not know what environmental risks are acceptable in the home and work environment.

There are small risks of infection in CF associated with the presence of:

- Indoor plants with potting mix or soil - risk for *Aspergillus*
- Aquariums / fish tanks - risk for *Pseudomonas species*
- Water humidifiers and electronic (essential oil) vaporisers, especially where water reservoir is not carefully cleaned and dried daily
- Air conditioners and evaporative cooling systems, especially with older systems and those systems that are not regularly serviced and well maintained – filters and water reservoirs need regular cleaning
- Hot water services with lower temperatures are associated with risk of *non-tuberculous mycobacteria* (NTM) in household plumbing – suggest set thermostat to > 55°C if possible

5.2 People with CF who live in the same household

- Follow the general hygiene measures listed above.
- Perform airway clearance and chest physiotherapy in different rooms, where possible, or at different times if not possible.

- Have separate nebulisers and other physiotherapy equipment (do not share these)
- Label, clean and store nebulisers and other equipment separately as recommended.

5.3 Kindergarten, Preschools and Schools

General recommendations

- Children with CF may go to the same school or kindergarten, but should keep as far apart as possible (see later)
- Children with CF are encouraged to take part in all usual school activities and sports / games for their physical and emotional health
    - some out of classroom activities (gardening or environmental exposures) may carry extra risks (see later)
- Letting the school/kindergarten know about your child's CF is your choice and you do not have to. However, getting help and support from the school can have the following benefits:
    - it may make it easier for your child to stay safe and follow CF hygiene measures, and to encourage good hygiene in the classroom for all children
    - it allows your local CF clinic to work with the school to help with education and information for staff
    - it makes it possible for you, your CF clinic and the school to develop a health-plan for your child at school
    - support for your child to take their medications at school

Specific recommendations

- Children with CF should follow the general hygiene measures at school.
    - young children may need help from teachers and staff
- Provide hand sanitiser (and anti-bacterial wipes) for your child to use at school.
- Children with CF who go to the same school / preschool should be placed in separate classes.
- Children with CF who go to the same school should always remain as far apart as possible, keeping ***at least*** 2m apart (preferably 4m), when indoors, during play time periods, school bus trips, canteen visits etc.
- Children with CF who go to the same school should have different times for:
    - the gym and sporting facilities and activities
    - school gatherings and assemblies
    - bathroom and changing rooms

- All (touchable) equipment should be wiped before and in-between use with antibacterial wipes.

5.4 The Workplace

- Follow general hygiene measures carefully in the workplace.
- Discuss your work choice and the infection risks with your CF clinic, and particularly if considering:
    - hospital or health care work (cross-infection risk see later)
    - teaching and working with young children (colds and flu exposures)
    - working with animals
    - working with soil and landscaping/gardening (see later)
    - pool and spa cleaning (see later)
- Do not go to work if you are sick
- Maintain ***at least*** 2-metres, preferably 4 metres, distance from co-workers with colds and flu-like symptoms.
- Consider the possibility of working from home to lower your exposure risk and discuss this with your employer.

5.5 Healthcare workers with CF

At present, there is limited information to guide and support healthcare workers with CF (HCWcf) around how to protect themselves and their patients from infection during training and employment. Before you consider a career as a healthcare worker, it is worthwhile talking with your clinic team about the risks and benefits.

A guide for healthcare workers with CF and their employers has been published (reference 4).

If you are training or working as a healthcare professional and have CF, the following recommendations have been developed to guide you and your manager/employer:

Summary of recommendations

- Make sure you undergo thorough training in infection control and prevention, with regular updates and competency assessments.
    - always follow the local infection control and prevention guidelines carefully
    - wear a face mask and eye protection during high risk tasks such as patient physiotherapy, nebulised therapies, suction through endotracheal tubes
- **You should not provide care for others with CF.**

- All HCWcf should be allocated a supervisor with knowledge and understanding of CF and the infection prevention/control issues and requirements.
- An individual work plan should be developed between you, your work supervisor, and your CF clinic that outlines:
    - your own personal exposure risks
    - risks to patient health
    - training requirements
    - suitable roles and task allocations that are safe for you and patients
    - flexible approaches to work that allow for illness and CF treatments
- Inform your supervisor, infection control unit and your team of your current, and any future changes, to your infection status.
- *Make sure you make the time for your CF treatment and care. Your own health must come first.*
- Make sure you attend regular CF clinic reviews and sputum testing.
- Ensure you are up to date with immunisations including chicken pox (varicella), influenza, whooping cough (pertussis), measles, mumps, rubella, pneumococcal (Pneumovax) and others before starting work (this is the same for workers without CF).
- Stay home from work if you have a cold or respiratory exacerbation/ infection until you are recovered and discuss returning to work with your clinic and supervisor, so you are cleared to do so.
- Perform airway clearance and physiotherapy away from patients and the ward, preferably outside the health care facility if possible.

5.6 Working and interacting with animals

Pets and animals bring joy and comfort to many people and have positive health benefits. Working with animals as a veterinarian / animal handler or farmer may increase risks of contact with germs that spread between animals and people, called "zoonotic infections" (such as Cat Scratch Fever, intestinal parasites and worms, Ross River Fever).

There is currently *no evidence* that people with CF are at increased risk of getting infections from animals or pets ("zoonotic infections") compared to people without CF. There are no reports of transmission of CF pathogens, such as *Pseudomonas*, from animals or pets to people with CF to date.

People with CF are, however, at increased risk of infection from CF pathogens that exist *in the environment* where animals are housed or kept (such as coops, stalls and stables). For example, mouldy hay in horse stables may contain *Aspergillus* which can cause infection in people with CF. *Pseudomonas* has been detected in fish tanks and aquariums (*see reference 7*).

The following is a list of recommendations that may reduce the risks of exposure to infections from pets and animals and from their enclosures

- Wash your hands after handling or being around animals or their waste, manure, food or supplies (including fish tanks, food bowls, toys, bedding).
- Avoid cleaning animal enclosures, stalls, pens, coops, aviaries and fish tanks
- Avoid handling manure from animals
- Avoid kissing pets and letting them lick your face.
- Wash scratches immediately with soap and water and seek medical attention for severe scratches or bites.
- Take sick pets and animals to the Vet and get them treated.

5.7 Working and interacting with the garden / landscape

Some pathogens found in the garden and in the soil can cause infections in people with CF. Working in the garden (paid or unpaid) can be beneficial to physical and mental health, but dusts from farming, construction and earth moving can increase the risk of contact with pathogens such as *Pseudomonas* aeruginosa, *non-tuberculous mycobacteria*, *Burkholderia*, *Legionella, Aspergillus and other fungi*.

Repeated and prolonged contact with soils, organic matter (potting mix, compost and mulch) may increase your risk of exposure to these pathogens. The following may help reduce exposure and risk of infection:

- In general, it is best to avoid handling potting mix and organic matter. Avoid animal manure as this is an important source of *Pseudomonas aeruginosa (see reference 7)*
- If you do handle these materials or are doing earth moving works that produce dust, wear gloves and a facemask.
- Make sure you wash your hands before, during and after gardening or landscaping activities.
- Use a spade to pierce/puncture bags of organic matter or soil rather than your hand, and wet the potting mix before pouring it out of the bag.
- Try not to touch your face and wash hands before eating or drinking after handling soil and organic matter.

5.8 Sports and Recreation

The benefits of exercise and sport cannot be overstated in CF. Exercise helps with airway clearance of mucous, improves physical fitness and strength, and improves emotional wellbeing and quality of life. In childhood, exercise helps lung growth and development and introduces the value of teamwork and social skills. Later in life, many people with CF consider a career in sport or fitness training.

- Taking part in sport and recreation with *non-CF* team members is encouraged.
- Good hygiene around sports participation and sports equipment is encouraged.
    - wipe down sports equipment before and after use
    - practise handwashing and cough etiquette
    - avoid sharing water bottles and cups
    - cover skin abrasions and cuts with dressings to reduce skin infections
- People with CF should avoid being in the same sports team or fitness class.

Swimming pools and spas

- Swim only at well-maintained, chlorinated swimming pools.
- Home paddling pools should be emptied, cleaned and dried after use.
- Inflatable toys should be dried after use.

- Avoid squirting bath toys (*reference 7*). Water pistols should be cleaned and dried after each use
- Avoid swimming, bathing or playing in stagnant water such as ponds.
- Avoid swimming/bathing in hot spas, hydrotherapy pools, steam rooms, Jacuzzis or whirlpools because of the risk of *Pseudomonas,* fungal and *non-tuberculous mycobacteria* (*NTM*) infection.
- If working in the pool industry, make sure that you reduce your exposure to pool chemicals such as strong chlorine and acid as much as possible.

5.9 Events organised by Cystic Fibrosis Organisations

It is not possible to put an exact number to the risk of infection at events organised by CF organisations. People without CF can carry and spread bacteria or viruses that cause colds and chest infections in the community. Infection with these community pathogens can lead to chest infections and hospitalisation in people with CF.

Providing a sputum culture result before attending an event hosted by any of the CF organisations is not a reliable way to know whether a person is infected with a pathogen that could spread to others or not. There is no reliable way to completely prevent cross infection and the safest approach for people with CF is not to attend CF related events.

To reduce the risk of cross infection, the following recommendations are suggested: Outdoor events

- People with CF should not take part in "CF camps" or retreats involving more than one person with CF. Cross infection in these situations is difficult to avoid and person-to-person spread of pathogens has occurred in the past in these settings.
- If more than one person with CF attends an event, they should stay apart from each other by ***at least*** 2 metres and ideally 4-metres or further.
- Follow good hand hygiene and cough etiquette. Put used tissues in a covered container/bin.
- Avoid close contact with people (e.g. shaking hands, kissing) and do not share personal items such as drinking and eating utensils, cosmetics, soap bar.
- Avoid congregating in common areas (e.g. meal areas, elevators, restrooms), and avoid taking part in common activities (e.g. face painting, meals at pubs or restaurants).
- Avoid traveling in the same vehicle (bus, car) as another person with CF, unless you live in the same household.

- Whether you have CF or not, it is important that you do not attend an event if you are unwell with respiratory or gastrointestinal illness (including colds and flu).

Indoor events

The risk of person-to-person transmission is higher in enclosed spaces (e.g. cars, small rooms, elevators) and the safest approach is for persons with CF to not attend the event.

- Only one person with CF should be present at an indoor event organised by any CF organisation including regional volunteer branches, groups and committees.
- CF organisations will not support or promote indoor events where it is known that more than one person with CF is invited e.g. Christmas parties.
- Likewise, CF organisations will not support or endorse the use of holiday homes/accommodations offered to people with CF because of the risk of infection.

Future CF conferences and events

Because of the difficulties around cross infection, CF organisations in Australia are actively developing alternatives to physical attendance at events and conferences for people with CF and their carers. Social media, telephone support, webinars, online conferences, use of websites and Facebook are being used with the aim of including the CF community as widely and as safely as possible.

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On behalf of the CF Centre Directors, Australia

References

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   *This paper shows how *Staphylococcus aureus* and *Pseudomonas aeruginosa* (two important pathogens in CF) can travel up to 4-metres in a laminar flow cabinet after coughing.

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