



Cystic
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Infection Control
Guidelines for
Cystic Fibrosis
Patients and
Carers

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"A Partnership in Caring"

Infection Control Guidelines for People with Cystic Fibrosis and Carers

CFA

It is known that chronic infection with certain organisms in people with cystic fibrosis is associated with increased respiratory symptoms and poorer outcomes. All people with CF can harbour important organisms in their respiratory secretions (such as bacteria and viruses) which can potentially be transmitted to other people with CF and the aim of these guidelines is to prevent transmission between people with CF and their carers by reducing the possibility of contact with infected respiratory secretions. The information about the acquisition and transmission of organisms in cystic fibrosis is still incomplete and so these guidelines should be considered a “best practice” based on current information and are likely to change as new information regarding infection in cystic fibrosis becomes available.

These guidelines have been developed for people with CF, their families and carers.

Epidemiology of CF pathogens

The source of most pathogens in cystic fibrosis remains unknown but a number of potential sources are possible. These include the natural environment (e.g. soil, water) the health care or hospital environment (e.g. sinks and surfaces), contaminated equipment (e.g. nebuliser, pulmonary function equipment), other contaminated objects or surfaces and other people with cystic fibrosis colonised with micro-organisms. People without CF and their family members are not generally responsible for transmission of bacterial pathogens to people with CF but can transmit viruses and other non bacterial organisms to them which can be equally important.

The most common organisms (pathogens) found in CF secretions are *Pseudomonas aeruginosa* (*P. aeruginosa*), *Staphylococcus aureus* (*Staph. aureus*) and less commonly *Haemophilus influenzae* (*H. influenzae*). Of these *Pseudomonas aeruginosa* is the most clinically significant pathogen in CF. Other important organisms in CF that require special precautions are *Burkholderia cepacia* complex (*B. cepacia*), multi drug resistant *Pseudomonas aeruginosa* (MDRSAP *aeruginosa*), multi-resistant *Staphylococcus aureus* (MRSA) and respiratory viruses. Of these *B. cepacia* has been the most studied and serves as a prototype for infection control in people with cystic fibrosis.

As people with CF survive longer and receive more powerful antibiotics other micro-organisms are being found in CF sputum. These have been termed “late emerging pathogens” and include *Stenotrophomonas maltophilia*, *Achromobacter xylosoxidans*, *Ralstonia picjketti*, *Aspergillus fumigatus*, *Pandoraea apista*, and non tuberculous microbacteria (NTM). They are environmental micro-organisms, found in water, soil and on plants, including fruit and vegetables. Whether all have a pathogenic role in CF lung disease and are capable of transmission between people with CF remains unclear.

Transmission of Organisms in Cystic Fibrosis

Methods of transmission

The following routes of transmission are considered important in the spread of organisms between people with cystic fibrosis.

Direct contact - Person to person spread occurs with actual physical contact. This includes intimate contact such as kissing or casual contact such as touching with hands that are contaminated with secretions e.g. a handshake after covering the mouth during coughing.

Indirect contact - Involves contact with an object which has been contaminated by secretions from an infected patient e.g. sharing eating utensils, respiratory equipment such as nebulisers and toys and contact with surfaces soiled by respiratory secretions.

Droplet route - This involves transmission of micro-organisms through the air in large particle droplets and can occur if a patient coughs or sneezes towards or onto the eyes, nose or mouth of a non colonised patient in close proximity i.e. less than 1 metre or an arms length away. They do not remain suspended in air for long, because of their large size. Droplets can also be generated by suctioning during bronchoscopy for example. Droplet spread is important in the transmission of respiratory viruses.

Airborne - Infection is transmitted by inhalation of micro-organisms on tiny droplet nuclei which have been expelled from the respiratory tract. These minute particles can remain suspended in air for a long time and carried substantial distances. Examples are TB, varicella and measles. This route is not believed to be important for transmitting respiratory pathogens typically associated with CF.

Whereas some organisms are spread predominantly by contact (*B. cepacia*, MRSA) or droplet route (respiratory viruses) it is likely most organisms can be transmitted by a combination of different routes (i.e. both contact and large droplet methods) and therefore attention to all areas of potential transmission is important, particularly for those organisms (such as *p. aeruginosa*, *s. maltophilia*) where accurate information regarding transmission is less readily available.

Risk Factors Associated with Acquisition of B. Cepacia Complex

Although these risk factors were developed by studying *B. cepacia* complex strains, they are relevant for all people with CF and carers wishing to reduce the spread of any micro-organism by the contact route.

- Attendance at CF camps/attendance at an education program/participation in a group for adults with CF.

Note: CF organisations in Australia no longer run any of the above activities. If people with CF choose to attend functions and events arranged by CF organisations they do so at their own risk.

- Social contact
 - Kissing
 - Intimate contact
 - Prolonged car rides
 - Fitness class
 - Sharing drinking utensils

- Sibling with *B. cepacia* complex

- Handshaking

- Inpatient exposures
 - Recent hospitalisation
 - Sharing room or bathroom facilities with a *B. cepacia* complex infected patient
 - Sharing respiratory therapy equipment

Transmission of Specific Cystic Fibrosis Organisms

B. cepacia complex

There is good epidemiologic evidence of person to person transfer in both health care and non health care settings via both contact and droplet routes with little evidence of true airborne transmission. Transmission has been interrupted successfully by a combination of universal (**standard**) and “**transmission based**” precautions and these are applied to all patients with *B. cepacia*. People infected with *B. cepacia* are segregated from each other and the general CF population. The same strict precautions should apply to all people with CF with *B. cepacia*.

MRSA (methicillin resistant S. aureus)

This can be transmitted from person to person or from carer to person by contact transmission. Because of the potential risks to people with and without cystic fibrosis, strict contact isolation of people with MRSA as currently recommended by hospital infection control units is appropriate. People with MRSA should be managed with both standard and strict contact infection control measures as currently recommended by hospital infection control units is appropriate.

P. aeruginosa

Available evidence suggests *p. aeruginosa* is acquired from the environment and that each person acquires their own unique strains. While people with CF in prolonged close contact situations (e.g. household members, CF camps) may share common

strains, whether these are gained by cross infection or from a common source exposure is still to be resolved. Most of the information regarding potential spread is derived from knowledge about *B. cepacia*, a much more highly transmissible organism. Person to person spread of clonal *P. aeruginosa* in strains has been reported in some clinics but this remains an uncommon means of acquisition for most people with CF. Nevertheless it is reasonable for people with CF with *P. aeruginosa* to observe an awareness of general hygiene measures to reduce potential transmission between themselves and other people with CF. Although in this setting strict contact precautions are not usually required, following reports of shared common *P. aeruginosa* strains within and between several Australian CF Clinics, it is recommended that, in order to avoid premature acquisition, those with *P. aeruginosa* should be separated from other people with CF who are still to acquire the organism. This might be, for example, by having separate clinics and inpatient areas..

P. aeruginosa (clonal or epidemic strains)

Although believed uncommon, direct and indirect person-person spread of "epidemic" clonal *P. aeruginosa* strains within and between CF clinics has been demonstrated in Europe, the United Kingdom and Australia. These "clonal" strains (identified by molecular biological typing of *P. aeruginosa*) tend to be more virulent and transmissible are typically multi-resistant and hence are difficult to treat. Not all clonal strains are highly transmissible but clearly some are. Only a few centres have the ability to isolate these organisms, using molecular biological methods, but suspicion should be raised by their multi-resistant pattern and less favourable clinical course, particularly if the patient is a recent new referral from a centre known to have clonal strains of *P. aeruginosa*. If clonal strains are identified they should be dealt with by a combination of standard and contact based precautions as for *B. cepacia* and other multi-resistant organisms.

Some authorities recommend additional transmission based precautions for all people with CF with *P. aeruginosa* isolates that demonstrate multi-resistance (i.e. resistance to all members of 2 or more classes of anti-pseudomonas antibiotics). However there is little evidence to support this recommendation. As a result, a general cohort isolation policy based upon antibiotic resistance makes little sense. If there is no epidemic strain, the evidence for cross infection of *P. aeruginosa* is negligible. Conversely, if an epidemic strain is present, placing people with CF together promotes the cross infection that such a strategy seeks to avoid. A cohort isolation policy must be strain specific and based upon molecular typing, not antibiograms or other equally unreliable phenotypic methods.

Respiratory viruses (RSV, parainfluenza, influenza)

Respiratory viruses are highly contagious and are spread predominantly by large particle droplet means or/and contact with infected secretions. Both additional contact and droplet precautions are recommended for people with CF with symptoms of respiratory viral infections. This should include isolation in a separate room or attendance at a separate clinic or day centre.

“Late emerging” pathogens

S.maltophilia, *A. xylosoxidans*, *R .pickettii* and *Pandoraea* spp are being seen more frequently in people with CF, especially in those with advanced lung disease and increased exposure to broad-spectrum antibiotics. They appear to be less virulent than other micro-organisms in CF respiratory secretions and their pathogenic role in CF lung disease is unclear. Person-to-person spread has only occasionally been documented and is controversial as some laboratory methodologies have given misleading results. Standard and contact precautions are recommended and colonized patients should not be nursed alongside those with immunocompromising conditions.

General Guidelines

The guiding principle is to reduce the spread of organisms between people by reducing the opportunity for contact with each others respiratory secretions either directly or indirectly. The risk of transfer through secretions increases with the time you spend together and the closeness of the contact between you. Respiratory viruses (colds and flu) are highly contagious in these situations particularly respiratory viruses (colds and flu) are highly contagious. The following precautions should be applied by all people at home, in hospital and in outpatient clinics irrespective of the organisms in your mucus.

General hygiene measures

- Wash your hands using soap and water (or use waterless hand wipes, if available) frequently before eating, after coughing or handling sputum or tissues, and when using bathroom facilities. Waterless antiseptic is provided for use in hospitals and is very effective. It is very important to **dry your hands** thoroughly after washing with soap and water..
- Always cover your mouth and nose with your hand or tissue when you sneeze or cough. Throw away tissues immediately after use and wash your hands afterwards.
- Sit or stand a reasonable distance (1 metre) from each other to prevent transmission from coughing or sneezing.
- Try not to shake hands with each other, a light tap on shoulder for example is better.
- Throw away tissues immediately after you use them.
- Do not leave sputum pots uncovered.
- Do not share eating or drinking utensils with each other.
- Do not share drink cans, cup or bottles.
- Do not share toothbrushes or towels.

- Do not share rooms with other people with CF if staying overnight.
- Avoid long car journeys with CF friends.
- Don't share respiratory equipment (nebuliser, inhalers, spacers etc).
- If possible infants and children with CF should avoid sharing toys.
- If you have symptoms of a viral respiratory infection (e.g. runny nose, cold or flu like illness) you should take particular care with your personal hygiene.

Specific organisms

- You or your child should know their own organisms and understand the precautions you need to take. Some organisms (e.g. B. cepacia, MRSA, some multi-resistant pseudomonas strains) are more transmittable or infectious and can be difficult to treat. If you have these organisms you will be asked to undertake special precautions in the hospital and at clinic, for example, coming early or late to clinic, staying in a single room or attending a separate clinic or day centre to reduce possible contact with other people.
- Your doctors will check your respiratory secretions regularly so that they are aware of the usual organisms in your lungs when you come to clinic.

Hospital Outpatient

- Please wash your hands at the beginning and end of clinic and after contact with respiratory secretions (e.g. coughing into hands, sputum pots and tissues containing sputum). Waterless antiseptic hand wash (e.g. alcohol based hand rub) will be provided in all patient rooms and clinic waiting areas.
- Avoid sharing toys in common waiting area. Families should bring their own toys for children.
- Use waste bins provided for tissues. These should be easily available.
- People with CF should maintain a distance of at least one metre from other people with CF in the clinic waiting area.
- Avoid hand shaking and general physical contact.

Specific organisms

People not yet infected with *Pseudomonas aeruginosa* will be segregated from other people who harbour this organism (bug) and will be placed in a separate clinic, if available.

Burkholderia cepacia complex, MRSA and multi-resistant Pseudomonas aeruginosa strains

If you have these organisms you will be segregated from other unaffected people with CF and from each other in time and space. Separate rooms will be allocated which you will be immediately put into at the clinic and you will be visited by the CF team in your room. You may be asked to come early or late to the clinic and have separate times for respiratory function testing. It is important you do not enter the general waiting area unless requested by one of your CF team.

If single rooms are unavailable, pagers may be provided to you so that you can be called to the clinic when a room is available, to avoid mixing in the main clinic area.

Colds and flu

People with viral infections, colds and flu like illness should ideally be seen away from the clinic, either in separate rooms away from the main clinic area or in a cystic fibrosis day centre. If you have symptoms to suggest a cold or flu please inform the CF clinic in advance.

Inpatients

- You will be asked to follow good personal hygiene measures whilst in hospital.

Room sharing

- Whenever possible all people with CF will have single rooms with their own washing facilities.
- If this is not possible then you will be placed in a shared room with other people with CF who have the same bugs as you do (**except** those with *Burkholderia cepacia complex*) or people who do not have CF.
- You should not sit on the bed or visit rooms of other people with CF on the ward, particularly if they are having physiotherapy or nebuliser treatment.
- If group activities are allowed you should sit at least one metre apart. Take care when coughing and avoid touching so that you don't pass on to others any germs that you may carry.

Specific organisms

- If you have *Burkholderia cepacia complex* you will be placed in a single room and treated with isolation precautions. There will be no mixing with other people with CF or school visits.

- If you have MRSA, an epidemic Pseudomonas strain or a virus causing a respiratory infection (eg. A cold or the flu) you will be placed in a single room and treated with isolation precautions. No mixing with other people with CF or school visits is allowed. If a single room is unavailable you will share a room with another person with the same bugs as your own.

Hospital school

- People with Burkholderia cepacia complex, MRSA, epidemic strains of Pseudomonas aeruginosa or a respiratory virus (eg influenza) should not attend school, but have schooling in their own rooms.
- Other people with CF can attend school but should sit at least one metre apart from other people with CF.
- If you use a computer it should be wiped down after use.

Outside rooms or off the ward

- Observe good general hygiene measures, sit in well ventilated areas at least one metre apart. In certain circumstances you may be asked to wear a mask, for example if you have symptoms of the flu.

Equipment

- Do not share your nebulisers or physio equipment with other people with

Eating and drinking

- Observe the general hygiene rules for sharing utensils.

In the community

- Be aware of infection control hygiene measures
- People with CF and their carers should be aware of their infectious status.
- Spas should be avoided
- In the workplace people should be aware of their infection status and discuss infection risks.
- Siblings at home should have separate bedrooms.
- No communal CF camps or holidays.

Schooling

- People with CF may attend the same school.
- It is preferable for people with CF to attend different classes.
- Non-classroom contact should be minimised e.g. indoor gym session.
- Personal hygiene measure should be followed at all times.
- Involvement in school activities with non-CF people is encouraged.

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