IMPORTANT INFORMATION

BURKHOLDERIA CEPACIA

CYSTIC FIBROSIS TRUST

Cystic Fibrosis Trust

Infection Control Group

A Statement on

Burkholderia cepacia

July 1999

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CYSTIC FIBROSIS TRUST INFECTION CONTROL GROUP
A STATEMENT ON BURKHOLDERIA CEPACIA.
JULY 1999

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SUMMARY

This is a summary of the Cystic Fibrosis Trust Infection Control Group's recommendations on reducing the possibilities of people with CF transmitting the bacterium *B.cepacia* (a type of germ) from person to person. The most important points are listed below but please refer to the full document for more detailed information. If there are issues you are not sure about, please ask your doctor or contact the Cystic Fibrosis Trust.

- People with CF who have *B.cepacia* infection have more problems with their chest and some become very ill so it is better to prevent infection with these bacteria.

- *B.cepacia* does not cause infection in healthy people.

- All people with CF should know which bacteria they have in their sputum, and sputum should be checked regularly by your doctor.

- *B.cepacia* affects a minority of people with CF and is mostly caused by passing the infection from person to person.

- Close contact such as sharing rooms, sharing nebuliser equipment, kissing or coughing close to another patient are activities which are high risk for passing bacteria from person to person.

- Cross infection can be significantly reduced by keeping people with CF who are infected with *B.cepacia* apart from others with CF in hospital and outside, and by careful attention to good hygiene such as hand washing. People with *B.cepacia* infection should not attend meetings where there are other people with CF, and should not mix with other people with *B.cepacia.*

CYSTIC FIBROSIS TRUST INFECTION CONTROL GROUP STATEMENT ON BURKHOLDERIA CEPACIA. JULY 1999

This statement is prepared by the Cystic Fibrosis Trust's Infection Control Group for patients with Cystic Fibrosis (CF) and their parents, and for professionals involved in the care of CF patients. It replaces the previous statements on control of infection.

It gives you up-to-date information about *Burkholderia cepacia* and how it affects CF patients. It also gives advice to help reduce the risk of CF patients catching *B. cepacia* from each other. Because *B. cepacia* can be acquired during activities where CF patients meet together outside the hospital, this statement tells you what we know about the relative risks of various kinds of activity.

Unfortunately, there is still a great deal we do not know about *B. cepacia* in CF, and this statement cannot hope to cover everybody's individual circumstances. If you have further questions about *B. cepacia* please discuss them with your doctor.

WHAT IS BURKHOLDERIA CEPACIA?

B. cepacia is a bacterium, or type of germ, whose natural habitats are moist soil around plant roots, and freshwater environments such as river sediments[1]. It gets its name from its ability to infect damaged onions (the Latin word for onion is *'cepa*) and cause a condition called soft rot. It does not occur widely in homes, hospitals or other environments[2]. It is rarely harmful to healthy people[3].

WHY IS THERE CONCERN ABOUT BURKHOLDERIA CEPACIA?

Patients with CF often get lung infections. Particular types of bacteria or germs are especially common in CF. In young CF children these include *Staphylococcus aureus* and *Haemophilus influenzae,* but in older children and adults with CF *Pseudomonas aeruginosa* is more common[4]. Although all these bacteria can make people with CF ill and require treatment, doctors are used to dealing with them and can treat them with a range of antibiotic medicines, tablets or injections[4].

B. cepacia is relatively new on the scene. It was first reported in CF patients in the United States in 1979[5]. By the mid 1980s, it was becoming more common, and affecting more and more CF patients including those in the United Kingdom[6]. The occurrence of *B. cepacia* amongst CF patients is usually low (around 5%) but can differ from clinic to clinic and increases significantly if infection spreads from patient to patient[7].

There are many types of bacteria and *B. cepacia* is different from *P. aeruginosa.* Unfortunately, it is easier for people with CF to catch *B. cepacia* from each other, and it is much more resistant than other CF germs to antibiotics, making it more difficult to treat[7,8]. Although most CF patients do not become very ill when they catch *B. cepacia*, a few individuals develop very severe chest problems (pneumonia) and die[9,10,11].

WHAT IS CURRENTLY KNOWN ABOUT BURKHOLDERIA CEPACIA INFECTION?

People with CF who catch *B. cepacia* do not always become seriously ill – this only occurs in about one third of patients[9,10,11]. The outcome may also be affected by the particular strain of *B. cepacia* involved. Most CF patients with *B. cepacia* suffer symptoms similar to those associated with the more common germ, *P. aeruginosa;* some individuals may show little or no symptoms[9,11].

Unfortunately, we do not yet know which CF patients are at risk from the serious effects of *B. cepacia* infection, but we think severe effects are more common in those who already have severe lung problems[12]. Although *B. cepacia* infection is commoner in older children and adults (15 and over), some younger children have been infected. With rare exceptions, healthy non-CF children and adults, such as parents, brothers or sisters of CF patients are not at risk from *B. cepacia*[13].

Most of the information we have about *B. cepacia* comes from epidemiological studies and from collaborations between microbiologists and clinicians in Europe and North America. A good example of collaboration is the work of the International *B. cepacia* Working Group which meets every six months to discuss progress and further research on this unusual and challenging organism[14]. These studies look at how people catch *B. cepacia* and what happens to them after they catch it. *B. cepacia* is usually caught through close or frequent contact with another CF patient who has the organism[7,15]. It can probably also be caught through sharing eating or drinking utensils with an infected person. Some older CF patients have developed intimate relationships with each other, and this is associated with a high risk of infection[7].

It is now accepted practice to separate CF patients who have *B. cepacia* from those who do not. Although separation of patients with and without *B. cepacia* inside hospitals is important, it is not enough on its own to stop the spread of the organism to other CF patients[16]. Advice should be provided to CF patients about the segregation of *B. cepacia*-positive from *B. cepacia*-negative patients outside hospital. Where this has been done, fewer CF patients catch *B. cepacia* for the first time[11]. It is reassuring that these simple segregation measures have been effective in controlling outbreaks of *B. cepacia* infection by reducing the incidence of cross infection and the local prevalence[11].

Diagnostic laboratories serving CF clinics can face difficulties in identifying *B. cepacia.* CF patients often carry several different germs in their chest, and it can be hard to pick out *B. cepacia* from the others unless special laboratory tests recommended by the CF Trust are used[17]. The test we use to find *B. cepacia* at the moment is growing the germ from sputum. However a small number of patients with *B. cepacia* do not always show the germ in their sputum. It may be grown some times and not others. This is called intermittent or transient infection. Some patients can show many negative results after one positive result. Cases of transient infection pose a problem since we do not know at what stage we can say *B. cepacia* has gone altogether. In our present state of knowledge most clinics consider failure to grow *B. cepacia* from the sputum for one year, during which at least three specimens have been cultured, is regarded as clearance; some clinics require longer.

In the last few years we have discovered that the group of bacteria called *B. cepacia* actually comprise a number of closely-related germs which microbiologists now refer to as the *B. cepacia* complex[18]. There are different subpopulations and strains within the *B. cepacia* complex just as there are different types of cold or flu germs. From epidemiological studies, we know that some strains are more likely to be passed on between CF patients and are more likely to cause serious illness. Also CF patients who are infected by one type of *B. cepacia* may still pick up another type[19]. For the purposes of these guidelines, the term *B. cepacia* refers to all bacteria within the *B. cepacia* complex, including the new species *Burkholderia multivorans* and *Burkholderia vietnamiensis*[18].

The chance of being infected by *B. cepacia* from natural environments seems to be low[20,21]. However, acquisition from natural environments probably explains the small number of *B. cepacia* infections, which occur sporadically even when strict segregation and other infection control measures are practised[21].

RECOMMENDATIONS

In these recommendations, the term *B. cepacia*-positive refers to people who know that they are infected with the organism. This includes people whose sputum sometimes shows the *B. cepacia* germ is present and sometimes does not. People who have been *B. cepacia*-positive can be considered to have lost the germ if they have not had *B. cepacia* grown from their sputum for a whole year, as measured by at least three sputum tests spread over that year.

The term *B. cepacia*-negative refers to patients knowing that they are not infected with *B. cepacia*.

1. GENERAL RECOMMENDATION TO ALL CF PATIENTS

It is important that you know whether or not you are infected with *B. cepacia* even if you do not feel ill. If you do not know, ask your doctor or consultant to arrange for you to be tested at your next clinic visit. The CF Trust can advise hospital laboratories on the best way to grow *B. cepacia*.

2. GENERAL RECOMMENDATION TO B. CEPACIA-POSITIVE PATIENTS (ALSO RELEVANT TO PARENTS OF YOUNG B. CEPACIA-POSITIVE CHILDREN)

These recommendations are based on what we know at the moment as a precaution to prevent *B. cepacia* being passed on to other people with CF.

- In the present state of our knowledge segregation of *B. cepacia*-positive patients from each other as well as from all other CF patients is now recommended. This may not be easy but is advisable since there are proven instances of *B. cepacia*-positive patients acquiring additional and more harmful strains by contact with other *B. cepacia*-positive patients[19]. Where many *B. cepacia*-positive patients are attending a CF clinic it may be possible to manage some groups together based on the strains involved. The clinic staff and the microbiologist will decide this. Contact with the parents of CF children and medical personnel do not pose a significant risk of indirect transmission to other CF patients.

- All persons who know they are *B. cepacia*-positive should not attend any meetings attended by people with CF or events that people with CF are likely to attend.

3. GENERAL RECOMMENDATIONS TO B. CEPACIA-NEGATIVE PATIENTS AND PARENTS

In general, avoiding activities or events where the risk of infection is high can reduce the risk of you or your CF children catching *B. cepacia* at social events. To help you pick out high-risk activities there is a chart on page 7.

4. GENERAL RECOMMENDATIONS TO ALL HOSPITALS TREATING PATIENTS WITH CF

Each hospital should address hospital *B. cepacia* issues. Details should be available from the local hospital Infection Control Committee (e.g. segregation policy, possible contamination of equipment etc) who will have a specific policy for the management of *B. cepacia*-positive patients. All CF patients attending the hospital should be given details of the local arrangements. Hospitals should test sputum from all CF patients for *B. cepacia* using the methods recommended by the CF Trust's Infection Control Group (Appendix A). Where specific checks for *B. cepacia* are not performed routinely at each clinic visit, six monthly checks are advised.

Whenever a patient becomes positive for *B. cepacia* for the first time, this should be thoroughly investigated to see if the source of infection can be determined. The organism should also be sent to the CF Microbiology Laboratory and Repository in Edinburgh for further investigation and preservation (See Appendix B).

5. SPECIFIC RECOMMENDATIONS

a) Hygiene

Good hygiene is important in reducing infection from all kinds of bacteria, and is just as important for *B. cepacia*[22]. Respiratory secretions are the principal source of *B. cepacia* and the main route of transmission[23,24]. Hygienic measures to avoid transfer of secretions should be taken. Here is some guidance for good practice.

- Always cover your mouth and nose when you cough or sneeze
- Wash your hands frequently, particularly if you cough a lot
- When using toilet/bathroom facilities avoid multi-use soap bars and opt for anti-bacterial dispenser soap, disposable paper towels or hot air hand dryers
- Do not leave sputum pots uncovered
- Throw tissues away immediately after you use them
- Do not share physiotherapy equipment such as nebulisers or frames
- Do not eat or drink using the same utensils as others
- Do not share drink cans, cups or bottles
- Refrain from shaking hands with others. An alternative friendly gesture might be a gentle touch of the arm or shoulder
- Use single rooms in the event of requiring overnight accommodation and avoid visiting other people's rooms

b) Home and work environment

Although *B. cepacia* can survive for long periods in water, the organism's natural habitats are moist soils around plant roots, and river and lake sediments. Attempts to grow *B. cepacia* from other

environmental sites, including the home, workplace, salad bars and grocery stores have been relatively unsuccessful and suggest that such environments do not pose a significant risk of acquiring *B. cepacia.* At the moment, we think that household sinks, vegetables and typical garden soils are not important sources for acquiring *B. cepacia*. It is not necessary for patients with CF to avoid contact with onions and other vegetables. 'Healthy' onions are not a source of *B. cepacia* - if an onion was infected and showed 'soft rot' you would not want to eat it! Special disinfection of toilets and sinks is not required. The greatest threat to the survival of *B. cepacia* is a dry environment and such a condition should be sought whenever possible. If disinfection or de-contamination is performed, we recommend ordinary disinfection with household bleach rather than weaker disinfectants, then rinsing and drying. Remember to keep all disinfectants out of the reach of small children and pets.

c) Brothers and Sisters (siblings)

Occasionally, one brother or sister with CF may be *B. cepacia*-positive and the other *B. cepacia*-negative. This is a difficult situation. The best advice must be to avoid high-risk situations as much as possible; for example, sharing toothbrushes and drinks and avoiding other activities that involve exchange of respiratory secretions or contact with sputum. Research shows that some strains of *B. cepacia* are more likely to be transmitted than others[11]. Although epidemic markers in some strains can be identified in specialised laboratories, it is not always possible to guarantee that other strains will not spread[25,26]. Despite close contact which occurs between the members of a CF family, transmission of *B. cepacia* between the CF members is not inevitable. In one Italian study, transmission of *B. cepacia* occurred in only three out of eight pairs of CF siblings[27]. The risk is higher with some strains and advice should be sought from your local CF Specialist Clinic.

d) Children's CF Holiday Camps

Children's CF holiday camps and other forms of communal holidays for people who have CF are not recommended[28,29]. Holidays should be supported on an individual family basis.

e) CF Trust Caravan Holidays

There is now evidence that potentially harmful organisms, including *B. cepacia* will survive in moist environments for many months[30]. In view of the difficulty of ensuring complete sanitisation of enclosed environments, including caravans, such holidays present an unnecessary risk for CF patients and have been stopped.

f) CF Meetings and Conferences

It is recommended that *B. cepacia*-positive people do not attend CF meetings and conferences. Accumulated evidence suggests that potentially more harmful strains of *B. cepacia* can be transmitted to people with CF who already have a different strain of *B. cepacia*. Thus, if *B. cepacia*-positive patients attend the same meetings they should be aware that they might catch another strain of *B. cepacia*. We cannot predict how people may react to infection with multiple strains of *B. cepacia*; however, the risk of catching a second strain, particularly one with high transmissibility or a 'bad reputation', should be avoided[19].

The Group recommends that every effort be made to introduce electronic methods of conferencing as a matter of urgency for those people with CF who are denied the definite advantages of attending conventional meetings.

RISKS OF VARIOUS FORMS OF SOCIAL CONTACT

We do not know the exact risk associated with each different type of social contact and it would be wrong to deliberately expose patients to *B. cepacia* to find out. However, we do know that the risk of being infected increases with closer types of contact, and also with the duration of contact. Thus we can pick out the risks associated with some typical situations.

An important thing to remember is that contacts that do not last very long, or do not occur very often, are less risky than things which are prolonged or frequent. Outdoor events are thought to be less risky than indoor events, provided good hygiene is observed.

Activities shared with other people with CF	Risk of transmission
Brief encounters indoors or outdoors	Low
Closer social contact – evenings in the pub or restaurant	High
Hand shaking	High
Contacts involving CF siblings	High
Sharing bedrooms	High
Social kissing	High
Travelling together in closed conditions e.g. car or lift	High
Sports or exercise classes	High
Sharing eating or drinking utensils	High
Intimate contact - kissing, sexual relationship	High

Methods of testing for *B. cepacia* and awareness of the clinical consequences of infection have improved remarkably in the last few years, however, please remember there is still a lot we do not yet know.

GETTING FURTHER ADVICE AND FACTS ABOUT BURKHOLDERIA CEPACIA

These general guidelines cannot provide specific advice for all situations. Further advice and information about *B. cepacia* in your local area can be obtained from your CF Clinic. Make sure you know whether you have *B. cepacia* and discuss any concerns you may have about the organism with staff from your CF Clinic. If you want more information on *B. cepacia* you may wish to read an article[31] (available from the CF Trust) written by three members of the International *B. cepacia* Working Group which takes account of questions raised by CF individuals and *B. cepacia* research including *B. cepacia* subpopulations (genomovars and new species) and virulent and highly transmissible strains.

FURTHER ADVICE TO CF ADULTS

CF adults' reactions to these guidelines will inevitably differ. Some may feel the only safe course of action for now is to avoid all social contact with other people who have CF. Some may feel that contact with others who have CF is an important part of their lives because of the support, friendship and understanding gained from these relationships - they may decide to continue the relationships but follow the guidelines closely but they should also consider the possible risk to other people with CF. Perhaps the most helpful advice to give is that people with CF should consider following a social life that does not depend too heavily on contact with other people with CF.

Members of the CF Trust Infection Control Group (July 1999)

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Appendix A.

Microbiological methods and B. cepacia.

Infection control strategies and laboratory tests for *'B. cepacia'* require an awareness of the problems which may arise in culture and identification, including the consequences of recent taxonomic research pioneered by Peter Vandamme in Gent, Belgium[18]. Briefly, isolates presently identified as *B. cepacia* by conventional methods comprise at least five bacterial subpopulations; these include genomovars I, III and IV, and the newly described species *Burkholderia multivorans* and *Burkholderia vietnamiensis* (previously genomovars II and V). Because of their phenotypic similarities, and until issues concerning the virulence of these individual groups are clarified all should be referred to as the *B. cepacia* complex. Ideally, all new isolates suspected as *B. cepacia* complex should be sent to a laboratory experienced in the phenotypic and genotypic identification of the group, with facilities for identification of epidemic strain markers, and genomic fingerprinting to identify cross-infection or acquisition from a common contaminated source.

To ensure optimum culture and identification of the *B. cepacia* complex from CF respiratory secretions it is *essential* to use selective media ** and incubate at 37°C for at least 72 hr. Bacterial colonies tentatively identified as *B. cepacia* complex can be further identified by a multitest commercial system (e.g. API 20NE). Further tests available on request to the Edinburgh CF Microbiology Laboratory and Repository *** include 'speciation' and genomovar identification within the *B. cepacia* complex based on additional phenotypic tests and *rec*A-based PCR. PCR identification of epidemic markers (bcesm and *cbl*A) is available as well as genomic fingerprinting (RAPD and PFGE) to investigate clonality of individual isolates for infection control surveillance and other studies[25,26].

****Recommended selective culture media:**
Mast *cepacia* agar: Mast Diagnostics Ltd, Bootle, UK[17] or *Burkholderia cepacia* selective agar[32,33].

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Appendix B

Some of the laboratory-based tests referred to above can be performed by the Central Public Health Laboratory, Colindale, London which serves as a microbiological reference facility for hospitals and CF centres located in England and Wales. The Edinburgh Cystic Fibrosis Microbiology Laboratory and Repository (ECFMLR), sponsored by the Cystic Fibrosis Trust and under the direction of Professor John Govan will also be set up to support local laboratories and complement the Central Public Health Laboratory Service facility. Details of services available from the ECFMLR are available from the CF Trust Headquarters.

July 1999

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Useful Web Sites:

International *B.cepacia* Working Group: http://allserv.rug.ac.be/ntcoenye/

Cystic Fibrosis Trust: www.cftrust.org.uk

Canadian Cystic Fibrosis Foundation: www.ccff.co

Cystic Fibrosis Foundation (USA): www.cff.org

APS net (American Phytopathological Society): www.scisoc.org

EPA (United States Environmental Protection Agency): www.epa.gov\pestacides\SAP\

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