

# Clostridium difficile

*Clostridium difficile* is a bacterium found in the environment, but it is most common in hospitals and areas where symptomatic patients have been present. *C. difficile* infection is often hospital-acquired and is more common than infections caused by MRSA, with 50,461 cases in the over 65s in England alone in 2007.

## Where does it come from?

*C. difficile* is carried in the guts of a wide range of animals, as well as up to 3 % of humans. It is often found in young babies, and the young of other animals, where it is usually harmless.

*C. difficile* rarely causes problems in children or healthy adults, because it is kept under control by the normal bacteria (flora) in the intestine. Elderly people are more at risk of infection, but a recent Europe-wide survey showed that about 45 % of cases occurred in the under 60s.

## *C. difficile* infection (CDI)

Taking antibiotics can upset the balance of the normal gut flora. This allows *C. difficile* to become established, multiply quickly and produce the two toxins (A & B) that cause disease. Although it is mainly considered a healthcare-associated infection, it is being recognised more in the community.

## Symptoms

Symptoms vary in severity from mild to serious diarrhoea, with abdominal pain, fever, life-threatening inflammation of the colon and possible perforation of the bowel. Some people can be infected with *C. difficile*, but have no symptoms.

## Diagnosis and treatment

Infection is usually confirmed by testing for *C. difficile* toxins A & B in stool samples, but this method is unreliable. Diagnosis could be improved by culturing (growing) the bacterium.

Normally, the antibiotics metronidazole or vancomycin are used to treat infection. However, 20 - 30 % of patients relapse and other treatments may be required:

- ▶ new *C. difficile*-targeted antibiotics (e.g. Opt80)
- ▶ re-establish normal gut flora with probiotics, (although to date, none have been identified)
- ▶ re-populate the gut with healthy faeces from a suitable donor (faecal transplants)

- ▶ antibodies from *C. difficile* vaccinated cows (wey therapy) or normal human antibodies
- ▶ adsorbent agents to bind the toxins in the gut (recent trials have proved disappointing).

Currently, there is no vaccine to protect against CDI, but some are in development.

## Spread and prevention

When the bacteria encounter unfavourable conditions they produce spores, which can survive on surfaces for long periods - perhaps years - and are resistant to most commonly used disinfectants and antiseptics.

Healthcare workers are being urged to wash their hands with soap and water, as the alcohol gels used to combat MRSA do not work against the hardy spores of *C. difficile*. Rigorous cleaning of surfaces, especially around toilets, with warm water and chlorine-based disinfectant is probably the most effective way to remove the spores.

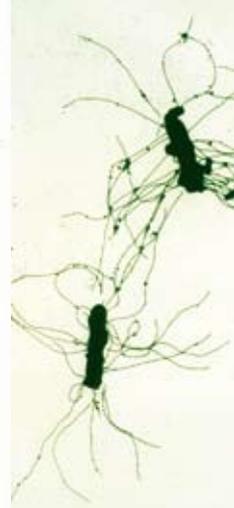
Certain antibiotics are known to trigger CDI. These should not be used for at-risk patients.

## Hypervirulent strain

In 2004 a new strain (027/BI/NAP1) was reported. The gene that controls toxin production in *C. difficile* 027 is faulty, so it makes toxins A & B faster, and at higher levels, than other strains. This leads to more serious disease, more surgical intervention and more deaths. *C. difficile* 027 is also resistant to the commonly used fluoroquinolone antibiotics.

## A zoonotic threat?

Recently a strain of *C. difficile*, previously found mainly in pigs and other domestic animals, has caused disease in humans. This 078 strain has replaced 027 as the major cause of CDI in the Netherlands and has been found more frequently in other countries around the world, including Scotland and Northern Ireland. Investigations have begun to see if it is being transmitted from animals to humans through consumption of meat.



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