**Science text**

Clostridium difficile, represented by Dirk in this story, is a bacteria which causes diarrhoea in patients. Particularly those patients who have recently been treated with antibiotics. C.difficile is able to form spores. Spores are forms of bacteria which are able to survive without nutrients for prolonged periods in the environment. Spores also survive some chemical disinfectants used to clean hospitals.

Spores from the environment can be ingested into the gastrointestinal tract via fomites. Inanimate objects like door handles, or apples, that are involved in transmitting infection, are examples of fomites.

When C. difficile spores are ingested they pass through to the bowel as they are able to survive the acid environment in the stomach.

C. difficile is often a normal component of a person’s colonic microbiome. In the bowel, C. difficile can live as both spores and vegetative cells. Vegetative cells all cells which grow and replicate, things that spores do not do. Other bacteria live in the bowel, including E.coli, Enterococcus and Bacteroides. When a patient receives antibiotics these vegetative bacteria in the bowel are killed by antibiotics, but spores and antibiotic resistant bacterial strains survive.

Antibiotics, by killing lots of bacteria alter the bowel environment in a way that induce surviving vegetative *C. difficile* to produce toxin. These toxins cause cell damage to the bowel.

This damage causes an inflamed colon, called colitis, which results in abdominal pain, fever, diarrhoea and raised blood markers of inflammation. C. difficile infection is treated by antibiotics called Vancomycin and Fidaxomicin. Treatment for severe C. difficile colitis may involve surgical bowel resection. Laboratory diagnosis of C. difficile infection requires testing of diarrhoeal faeces for the presence of toxin, as not all strains of C. difficile are toxigenic.

Diarrhoea associated with colitis results in environmental contamination.

C. difficile in the environment may infect new patients or re-infect a patient at a later date.