

## Infection control in dentistry

Infection control in healthcare has become a leading issue in the public consciousness in the past few years. There is increased pressure in all healthcare sectors to demonstrate continuous improvement in training, procedures and performance related to management of infection risks. The well documented challenges of MRSA and C.diff have been focussed on Hospital environments but other concerns such as potential infections from blood borne viruses, prion diseases and public health threats including norovirus, and tuberculosis are widening the focus of public attention to include dental health providers. This in turn is reflected in increasing levels of guidance and regulation on infection control procedures from the BDA A12 guidance document through to the anticipated publication of HTM 01-05.

## Causes of infection - pathogens

Pathogens are microbial species that cause harmful effects and include bacteria, viruses and prions.

## Bacteria

Microbiology has existed for as long as light microscopy has enabled us to see bacteria and observe their behaviour. Although lenses were crafted and used by the ancient Egyptians, it was not until the 17th Century that practical light microscopes were developed. The Dutch textile merchant Antonie van Leeuwenhoek (1632-1723) made lenses in his spare time and built over 400 microscopes. He is believed to have been the first person to view and describe bacteria and is widely acknowledged as the father of microbiology.

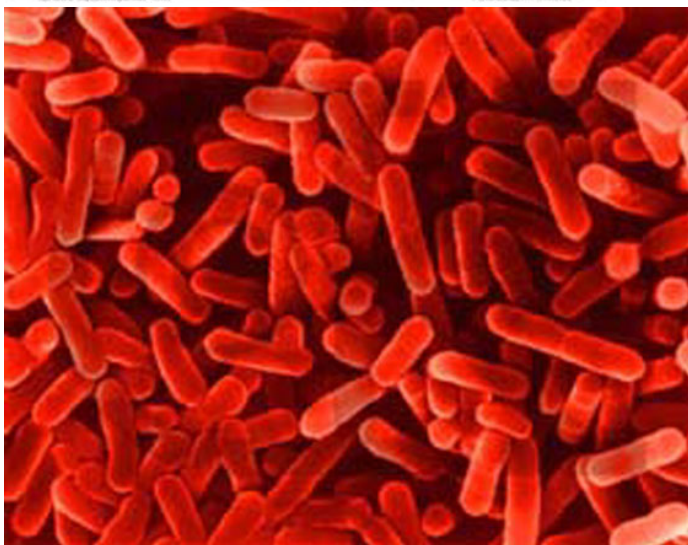
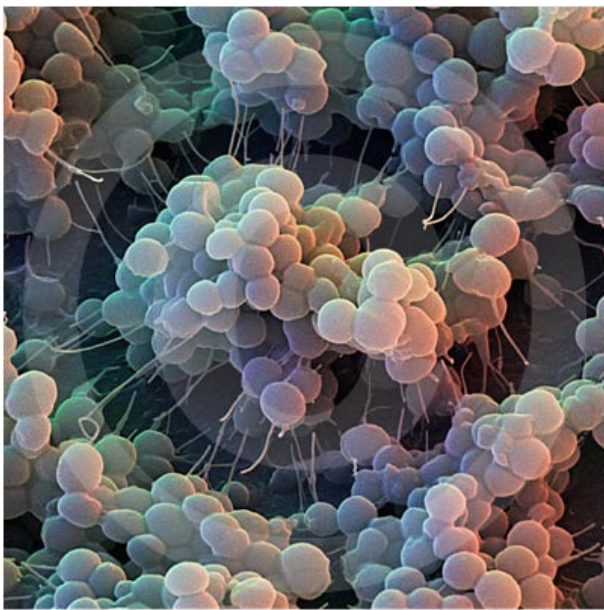


Bacteria are single celled organisms in the micron size range (1/1000 mm). They can reproduce rapidly by cell division when the prevailing conditions of temperature, moisture and nutrients allow.

Under ideal conditions, cell division can occur as often as once every 6 minutes; a single individual could thus give rise to over 1000 bacteria after one hour and, theoretically, continue to increase by 3 orders of magnitude each hour while ideal conditions prevail.

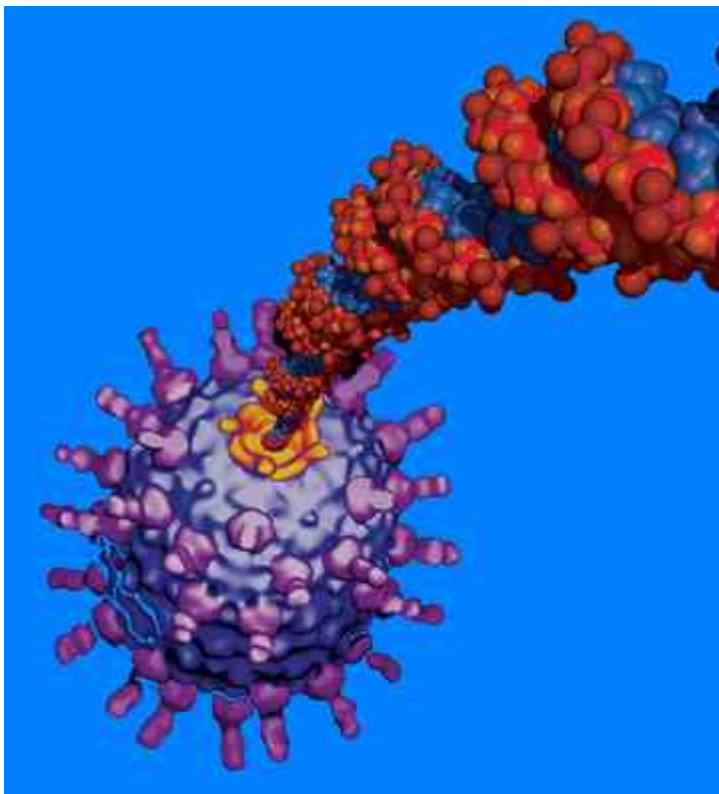
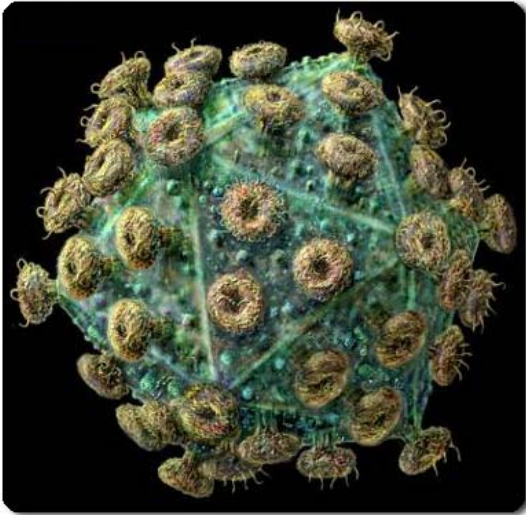
From an evolutionary standpoint, bacteria are among the most successful and adaptable forms of life on the planet. It has been estimated that there are as many as 5 million trillion trillion bacteria on earth divided into millions of species. They inhabit every part of the globe including the harshest environments; hot springs, radioactive areas, deep seas, high mountains. Both aerobic (oxygen respiring) and anaerobic forms exist. The vast majority of bacterial species are not pathogenic and in some cases are beneficial.

Pathogenic bacteria cause many serious diseases including tuberculosis, pneumonia, diphtheria, cholera and typhoid.



Viruses

Viruses are much smaller than bacteria (30-450nm) and consequently are invisible under a light microscope. They can infect all living things including plants and bacteria and are found wherever their target species exist. Viruses cannot reproduce without the use of a host cell's mechanisms and are therefore not classified as living things. The main viruses of concern in infection control are blood borne infections such as HIV and hepatitis B and C although others have the potential to become threats to human health including avian influenza (H5N1)

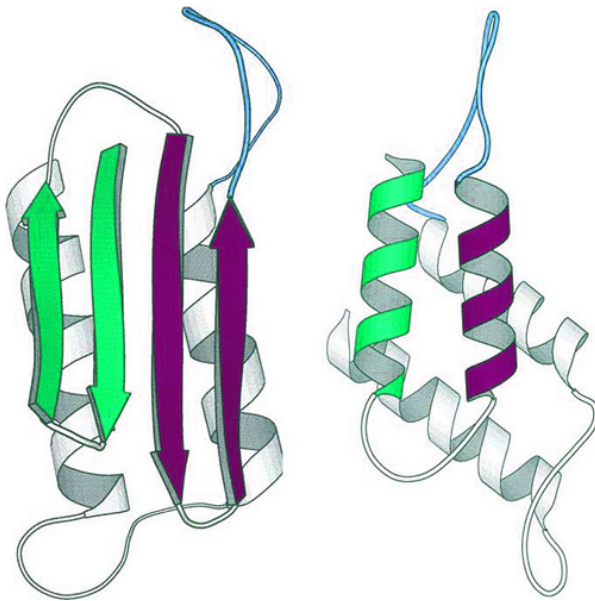


## Prions

Prions are the most recently discovered and the least understood of all the infective agents. Known prion diseases affect nerve and brain tissue and are referred to as TSE's (transmissible spongiform encephalopathies) as the disease causes brain tissue to form a spongy structure. All TSE's are fatal and this gives increased urgency to ensure adequate infection control measures. The outbreak of

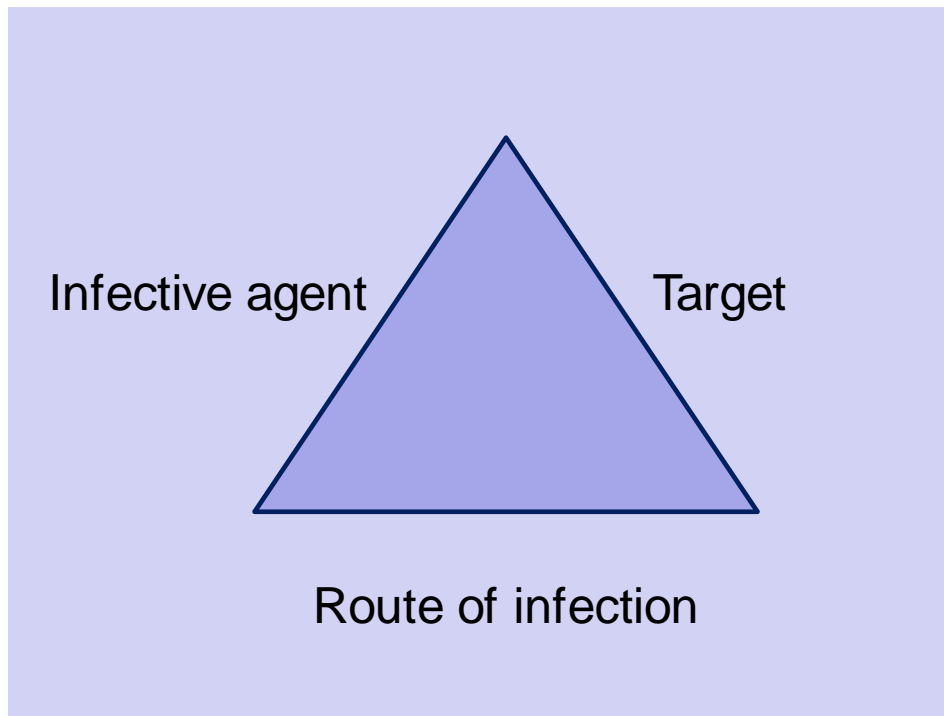
BSE in the UK that peaked in 1992 led to a crossover of infection into the human food chain which resulted in the appearance of new variant Creutzfeldt-Jacob disease (vCJD) in humans. TSE's tend to have a long incubation period before the onset of symptoms and there is no diagnostic test for the presence of infection. It is not known how many infected people there are in the population who have yet to develop symptoms, therefore, stringent infection control procedures are required to ensure that prion infections cannot be transmitted from one patient to another by contaminated instruments or equipment.

Prions are naturally occurring cellular proteins that exhibit a different folding structure from the normal form. In the presence of the abnormal prion form of protein, the structure of normal proteins changes to the abnormal form. Prion proteins differ from their standard equivalents in their ability to resist infection control measures.



#### Infection control

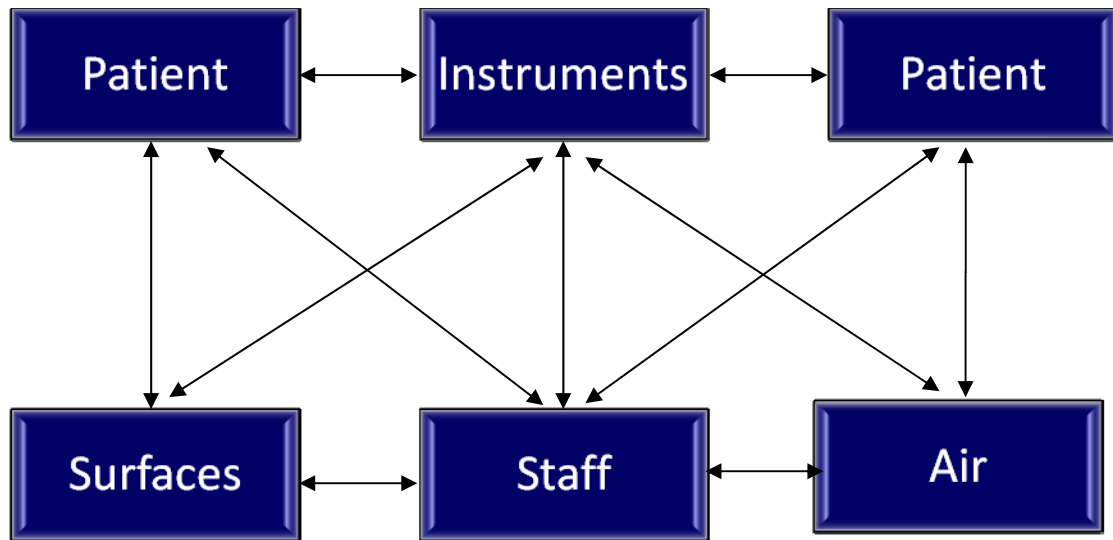
In principle, infection control is simple; by eliminating infective agents, blocking potential routes of infection or removing people from infectious areas the possibility of infection is minimised.



In practice, things are not so simple. Interactions between dental staff and patients are unavoidable and many potential infection routes exist.

- Direct person to person infection
  - Airborne infections eg tuberculosis.
- Indirect infection routes
  - Transfer of pathogens from surfaces eg MRSA or norovirus via hand contact to patient.
  - Transfer of pathogens from hands or hard surfaces via instruments or equipment causing infection through mucosa or open wounds.
  - Infection from incorrectly processed instruments. This could include prion transfer from instruments not completely cleaned and inadequately sterilised.

Any number of potential infection routes can be combined with potential risks and studied to form a risk assessment model for a particular organisation.



Following assessment, measures can be put in place to deal with each potential infection route. These will include, correct use of protective equipment such as gloves and masks, handling procedures for sharps and items contaminated with blood, training and development of staff, decontamination procedures for instruments, effective sterilisation equipment and methods, decontamination and disinfection of surfaces and use of dedicated areas and work flows to keep clean and dirty items separate.

#### Dentisan

Dentisan has been developed by Derby based surface chemistry specialist Quadralene after many years of experience in supplying specialised surface treatment products, cleaners and disinfectants to medical laboratories, universities and high tech manufacturers all over the world.

The Dentisan range of infection control products was launched at the 2008 BDA conference in Manchester. Dentisan offers a comprehensive range of infection control products for dental practices.

Evaluation of the dental infection control market revealed a myriad of products with overlapping functionality and a marked lack of clarity and guidance on product selection and application. Dentisan comprises a compact range of products with proven microbiocidal efficacy based on independent third party testing to recognised EN standards. The Dentisan range was formulated to complement existing and anticipated guidance on infection control in dentistry, providing products that enable the recommended processes to be carried out effectively. Each product has a clearly defined area of application within the practice, making correct product selection easy for dental practitioners.

Biocleanse is a key link in the infection control chain. It is a highly effective surface cleaner and disinfectant with an impressive range of efficacy on bacteria, viruses, moulds fungi and spores. Biocleanse has been tested against a broad spectrum of pathogens including MRSA, C.diff, HIV, HBV, TB, avian flu amongst others and third party test certificates are available for all tests. Biocleanse has found extensive application in the hospital pathology area where it first came to prominence as an effective biocide for use in TB research laboratories requiring a very high level of containment and disinfection. Amongst existing Biocleanse users are many hospital laboratories at well known establishments such as Great Ormond Street, The London School of Hygiene and Tropical Medicine and Saint Bartholomew's.

Biocleanse is alcohol free and therefore, non-flammable and low in odour making it a popular product with users and patients. In its ready to use form it is not classified as hazardous and is not required to carry any warning symbols.

Most importantly, Biocleanse imparts residual activity to surfaces. In testing carried out by the Health Protection Agency, Biocleanse was shown to retain biocidal activity against MRSA and C.diff for 28 days after application. This means that residual biocide on surfaces goes on killing pathogens between cleans and is a major healthcare benefit compared with alcohols, bleaches and peroxides that simply evaporate or break down, leaving an unprotected surface behind.

The Dentisan range also includes

- Dentiflush, a non-foaming detergent cleaner for suction systems.
- Dentisan 100, a highly surface active cleaner for instruments that can be used with ultrasonics or manual cleaning techniques.
- Dentimatic liquid and powder form detergents and Dentirinse rinse aid for use in washer disinfectors.



Dentisan products are available exclusively in the UK and Eire from Claudius Ash [www.claudiusash.co.uk/webshop](http://www.claudiusash.co.uk/webshop) or freecall 0500 500 322.