CPD4dentalhygienists

YOUR FUTURE IN YOUR HANDS

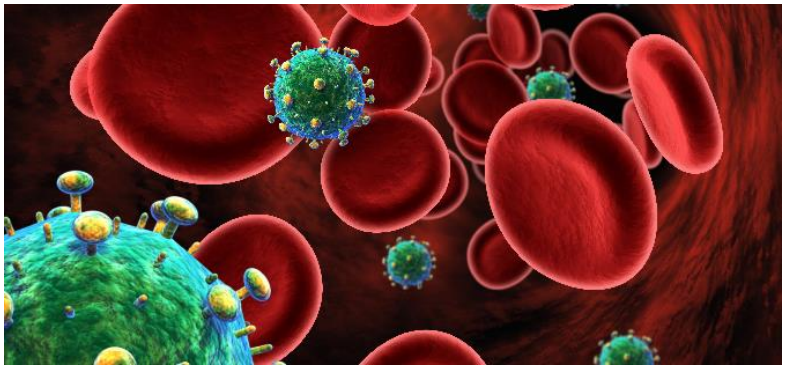
Disinfection and Decontamination: Blood-Borne Viruses and Immunisation in Dental Practice

Aims: To explain blood-borne viruses, the risks of occupational exposure and how to minimise the risks.

Objectives: On completion of this verifiable CPD article the participant will be able to demonstrate, through the completion of a questionnaire, the ability to:

- Define blood-borne viruses (BBVs) and identify the importance of this in dental practice.
- Identify some of the blood-borne viruses that dental professionals may be subjected to.
- Understand the term “Standard Precautions.”
- Know the 5 major types of viral hepatitis and the relative infectivity after an occupational exposure.
- Know the relative infectivity of Human Immunodeficiency Virus (HIV) after an occupational exposure.
- Understand how blood-borne viruses may be transmitted.
- Understand that SARS-CoV-2 is a novel virus and that there are a lot of scientific uncertainties about the virus, including whether it is a blood-borne pathogen.
- Identify which immunisations are required for dental staff, including the GDC statement on the COVID-19 vaccination
- Demonstrate knowledge of how to manage a sharps injury.

Introduction



BBVs are viruses that some people carry in their blood and which may cause severe disease in certain people and few or no symptoms in others. The virus can spread to another person, whether the carrier of the virus is ill or not.[1] A pathogenic or infectious agent may be present in the mouth as a result of four basic processes:

- Bloodborne diseases,
- Oral diseases,
- Systemic diseases with oral lesions; and,
- Respiratory diseases.

Blood-borne pathogens may infect different blood cells or other tissues in the body but can also be found in body fluids other than blood, for example, semen, vaginal secretions, intestinal secretions, joint fluid and breast milk.[2] Other body fluids or materials such as urine, faeces, saliva, sputum, sweat, tears and vomit carry a minimal risk of BBV infection, unless they are contaminated with blood. Care should still be taken as the presence of blood is not always obvious.[1]

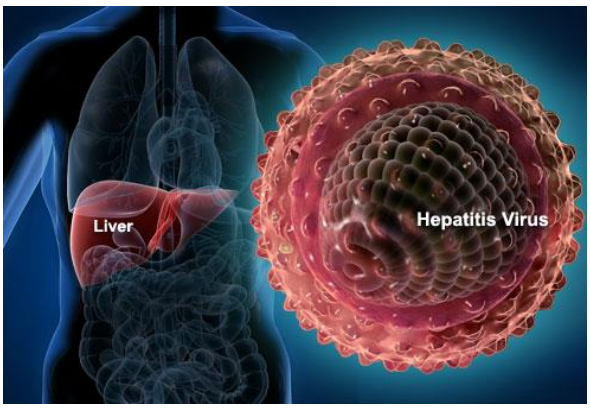
Since blood or other body fluids may contain pathogens, the disease may be spread from one person to another by contact with these fluids. Hence, the diseases are called blood-borne diseases.

Blood-Borne Viruses (BBVs)

The main BBVs of concern are:

- Hepatitis B virus, Hepatitis C virus and Hepatitis D virus, which all cause hepatitis, a disease of the liver;
- Human immunodeficiency Virus (HIV) which causes Acquired Immune Deficiency Syndrome (AIDS), affecting the immune system of the body.

Hepatitis



Hepatitis is an inflammatory condition of the liver. It is most commonly caused by a viral infection, but there also other possible causes of hepatis which include autoimmune hepatitis and hepatitis that occurs as a secondary result of medications, drugs, toxins and alcohol.[3] There are five types of hepatitis viruses that cause clinically similar diseases: Hepatitis A,B,C,D and E.

Hepatitis A and E are mainly transmitted through contaminated food and water (transmission fecal-oral), whereas Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), and Hepatitis D Virus (HDC) are bloodborne diseases that are usually transmitted through direct or indirect contact with body fluids.[2] Therefore, it is HBV, HCV and HDC that are of concern to dental professionals.

The incubation period for hepatitis B (HBV) is between 30 -180 days and may be acute or chronic. It is most commonly spread from mother to child at birth, or from exposure to infected blood. HBV is also spread by needlestick injury, tattooing, piercing and exposure to infected blood and body fluids, such as saliva and, menstrual, vaginal, and seminal fluids.[4]

Many people with HBV do not experience symptoms when newly infected. It is estimated that clinical symptoms may occur in about one third of cases, and no symptoms or unrecognised symptoms are experienced in approximately two thirds of cases.[2] However some acute symptoms can include jaundice, extreme fatigue, nausea and vomiting. In some people, HBV can also cause a chronic liver infection that can later develop into cirrhosis (a scarring of the liver) or liver cancer. If acquired in adulthood, Hepatitis B infection leads to chronic hepatitis in less than 5% of cases. Conversely, in infant and early childhood, infection leads to chronic hepatitis in about 95% of cases.

The World Health Organisation estimated that in 2019, 296 million people were living with chronic Hepatitis B infection worldwide. Of the 296 million people living with HBV infection, and, in the same year there were an estimated 820 000 deaths, mostly from cirrhosis and liver cancer.[4] However, the UK is a low prevalence area, with a carriage rate of 0.1-0.5%.[1]

HBV can survive outside of the body for at least 7 days and during this time the virus can still cause infection (in ideal laboratory conditions, it can remain infectious for several weeks). It can be prevented by vaccinations which has been reported by the World Health Organisation as being 98-100% effective.[4]

Hepatitis C

The incubation period for Hepatitis C (HCV) is from 2 weeks to 6 months and HCV may be acute or chronic. It may range in severity from a mild illness lasting a few weeks, to a serious, lifelong illness. It is most commonly spread through exposure to small quantities of blood and is most commonly transmitted through the sharing of drug injection equipment, reuse or inadequate sterilisation of medical equipment, the

transfusion of unscreened blood and blood products, sexual practices that lead to exposure to blood.[5] Almost 90% of hepatitis C cases in the UK occur in people who inject drugs or have injected them in the past. It is estimated around half of the people in the UK who inject drugs have the infection.[6]

Following initial infection, approximately 80% of people do not exhibit any symptoms. When present, acute symptoms include fever, fatigue, decreased appetite, nausea, vomiting, abdominal pain, dark urine, grey-coloured faeces, joint pain and jaundice. A significant number of those infected will develop cirrhosis or liver cancer.[5]

The World Health Organisation estimate that globally, there are 71 million people living with chronic HCV and that in 2019, approximately 290,000 people died from HCV, mostly from cirrhosis and hepatocellular carcinoma (liver cancer). Antiviral medicines can cure more than 95% of people with HCV when it is diagnosed and there is access to treatment.[5]

At room temperature, it's thought the virus may be able survive outside the body in patches of dried blood on surfaces for up to several weeks.[6] There is currently no effective vaccine against HCV.[5]

Hepatitis D

Hepatitis D (HDV) is a virus that requires hepatitis B (HBV) for its replication, therefore HDV infection occurs only simultaneously or as a super infection of HBV. A study conducted in 2020, estimated that, “HDV affects globally nearly 5% of people who have a chronic infection with hepatitis B virus (HBV) and that HDV co-infection could explain about 1 in 5 cases of liver disease and liver cancer in people with HBV infection.” The routes of transmission for HDV are the same as for HBV. [7]

HDV-HBV co-infection is considered the most severe form of chronic viral hepatitis due to more rapid progression towards cirrhosis or liver cancer. HDV can be prevented with the HBV vaccination.[7]

Human Immunodeficiency Virus (HIV)

HIV infects the CD4 cells of the immune system, destroying or impairing their function which weakens the ability to fight everyday infections and disease. The immune system is considered deficient when it can no longer fulfil its role in fighting infection

and disease. An individual with HIV may suffer with opportunistic infections because they take advantage of a weakened immune system. Acquired immunodeficiency syndrome (AIDS) is a term which applies to the most advanced stages of HIV infection. It is defined by the occurrence of any of more than 20 opportunistic infections or HIV-related cancers. It happens when the immune system has been severely damaged by the HIV virus. [8,9]

It is estimated that globally, approximately 38.4 million people were living with HIV in 2021. In the same year, approximately 1.5 million became newly infected and 650,000 died from AIDS related illnesses.[10] As of December 2021, 28.7 million people were accessing antiretroviral therapy, up from 7.8 million in 2010 The World Health Organisation state that: "Untreated, the majority of people who are infected with HIV will develop signs of HIV related illness within 5-10 years, although this can be shorter. The time between acquiring HIV and an AIDS diagnosis is usually between 10–15 years, but sometimes longer. Antiretroviral therapy (ART) can slow the disease progression by preventing the virus replicating and therefore decreasing the amount of virus in an infected person's blood (known as the 'viral load')."[8]

AIDS cannot be transmitted from one person to another, but HIV can. HIV is found in the body fluids of an infected person. This includes semen, vaginal and anal fluids, blood and breast milk. HIV cannot be transmitted through sweat, urine or saliva.The most common way of getting HIV in the UK is through having anal or vaginal sex without a condom. Other ways of getting HIV include sharing syringes or other injecting equipment, transfusion with contaminated blood or transmission from mother to baby during pregnancy, birth or breastfeeding.[8,9]

NHS, England, reports that HIV is a fragile virus and does not survive outside the body for long.[9] However, in ideal laboratory conditions, it can remain infectious for several weeks.[1]

COVID-19

SARS-CoV-2 virus that causes COVID-19 can be detected in the blood via serum blood testing. Due to this there is some confusion about whether this means it can be transmitted via blood, as a bloodborne pathogen. The virus primarily enters the body through the eyes, nose or mouth and progresses to the lungs and this is a similarity between the virus and bloodborne pathogens

However, the SARS-CoV-2 virus replicates in cells, including blood, and when it does, it alters the blood's environment. SARS-CoV-2 is a novel virus which means that humans do not have a natural ability to fight it off and it also means that there is a lot of scientific uncertainties about the virus, including whether it is a blood borne pathogen. Currently, it is thought to be unlikely that SARS-CoV-2 can be transmitted via occupational exposure to blood. In the dental practice it is important to follow protocols for protecting yourself from aerosol contact, in addition to following protocols to protect yourself from a bloodborne pathogen. [11]

Routes of transmission in the Dental Surgery

In the dental surgery, blood-borne pathogens may enter the mouth during procedures that induce bleeding. Since it is difficult to determine if blood is present in saliva, saliva from all patients should be treated as potentially infectious.[2] The dental professional could be exposed to the blood-borne virus as a result of a needle stick injury or sharp instrument injury. Infected blood could also spread through contamination of open wounds, skin abrasions, skin that has been damaged due to eczema or through splashes to the eyes, nose or mouth.

Under the Health and Safety at Work Act 1974 and the Management of Health and Safety at Work Regulations 1999, it is the employer's legal responsibility to protect the health of their employees. A safety policy should be in place outlining the risks and the measures needed to control them. It is the employer's responsibility which is outlined in COSHH 2002 (as amended) to assess the risk for their employees and ensure adequate training and instruction for their employees.[1]

Risk Assessment

The Health and Safety Executive has guidance on conducting risk assessments which advises five stages:

1) **Think about and identify the hazards** - Where BBVs may be present;

2) **Look at who may be harmed and how** - Which members of staff are exposed to BBVs and how may this happen?

3) **How will you control the risks?** – How likely is it that BBVs could control ill health and how this may happen? What can be done to control the risks? (See reducing the risks below);

4) **Record the findings**; and,

5) **Review your risk assessment and revise it if necessary.**[1,12]

Reducing the Risk of Blood-Borne Virus Transmission

The Health and Safety Executive recommend that certain measures are put in place to prevent or control risks. The following measures are applicable to dental practice:

- Prohibit eating, drinking, smoking and application of cosmetics in working environments where there is a risk of contamination;

- Prevent puncture wounds, cuts and abrasions, especially in the presence of blood and body fluids;
- Take care when using sharps;
- cover all breaks in exposed skin by using waterproof dressings and suitable gloves;
- Wear Personal Protective Equipment;
- Use good basic hygiene practices and adhere to handwashing guidelines (A full verifiable CPD article is available on Hand Hygiene);
- Control contamination of surfaces by containment and using appropriate decontamination procedures; and,
- Dispose of contaminated waste safely - The appropriate and controlled disposal of waste is a key aspect of risk control in dental practice and regular risk assessment and audits on waste should be carried out. A policy for the management and disposal of clinical waste (waste disposal policy) should be in place (A full verifiable CPD article is available on Waste Management).[1]

Personal Protective Equipment (PPE)

The local infection control policy should specify when personal protective equipment (PPE) is to be worn and changed. PPE training should be incorporated into staff induction programmes. PPE is there to protect **YOU** and **YOUR PATIENTS**. PPE Includes:

➢ Disposable clinical gloves (non-latex, powder free, well fitting).
➢ Household gloves and plastic disposable aprons (which should be used for decontamination procedures).
➢ Face masks which should be disposed of after every patient.
➢ Eye protection to protect against contaminated aerosol and debris.[13]

During the current situation with COVID-19, it may be necessary to wear additional PPE for patients on the respiratory pathway such as single use apron, fluid repellent gown and FFP3 respirator/hood.

Sharps Protocol

The dental practice must have practices must have written policies for sharps management, significant splashes to the eyes and broken skin.

The most serious types of occupational exposure to blood borne pathogens are accidental percutaneous (through the skin) injuries involving sharps. It is estimated that non-hospital health care workers experience approximately 205,000 sharps related injuries each year.

Sharps injuries have been implicated in the transmission of more than 20 pathogens. However, the blood-borne viruses of most concern to dental professionals are Hepatitis B, C and D and Human Immunodeficiency virus.

For percutaneous injuries with contaminated blood, the probability of transmission is assumed to be the following:

- Hepatitis B (HBV)- 30% for patients that are HBeAg positive (however, a vaccination against Hepatitis B virtually eliminates the risk for contracting Hepatitis B).
- Hepatitis C (HVC)- 1-3 %.
- Human Immunodeficiency Virus (HIV)- 0.3%. After mucous membrane exposure, it is estimated at 0.1%. A mucocutaneous exposure involves contact of an infectious substance with mucous membranes, rather than a sharps injury.[14]

What to do in the event of a sharps injury If you suffer an injury from a sharp which may be contaminated:

- Encourage the wound to gently bleed, ideally holding it under running water.
- Wash the wound using running water and plenty of soap.
- Don't scrub the wound whilst you are washing it.
- Don't suck the wound.
- Dry the wound and cover it with a waterproof plaster or dressing.
- Seek urgent medical advice (for example from your Occupational Health Service) as effective prophylaxis (medicines to help fight infection) are available
- Report the injury to your employer.[15]

The employer should keep a record of any sharps injuries and the circumstances in which the injury took place. The investigation should establish whether the employer's existing risk control measures are adequate. (A full verifiable CPD article is available on Sharps Management)

Immunisation and Vaccination

Immunisation is "the process whereby a person is made immune or resistant to an infectious disease, typically by the administration of a vaccine".[16]

Immunisation and vaccination should never be regarded as a substitute for good and safe working practices, and In the COSHH hierarchy of control measures, immunisation as protection against infection at work is the last line of defence. However, the Public Health England state that staff should be up to date with the following immunisations:

- Tetanus

- Diphtheria
- Polio
- Measles, Mumps and Rubella (MMR)
- Tuberculosis (BCG)
- Hepatitis B. Antibody titres for hepatitis B should be checked one-four months after completion of a primary course of vaccine.
- Influenza
- Varicella (chicken pox). Those with a definite history of chicken pox or herpes zoster should be serologically tested and vaccine only offered to those without the varicella zoster antibody [17]

As of 24th August 2022, 93.5% of the UK population over the age of 12, had received their first dose of the COVID-19 vaccine, 88.1% had received their second dose and 69.2% had received a booster or 3rd dose.[18]

Currently, a COVID-19 vaccination has not been made compulsory for dental professionals, however, the GDC make the following statements:

“We encourage everyone who can be vaccinated to be vaccinated. This is in keeping with the Standards for the Dental Team, which require you to provide a safe environment for patients (1.5) and to manage the risks posed to patients and colleagues by your health (9.2). This applies to dental professionals across the UK, in all settings.

This normally means you should be vaccinated. If you cannot be vaccinated then you need to follow clinical guidance to protect yourself, colleagues and patients. This also applies to students and trainees.

COVID-19 vaccines are recognised around the world as being safe and effective. This position is supported by the UK’s medicines regulator, the Medicines and Healthcare products Regulatory Agency (MHRA): "Vaccines are the best way to protect people from COVID-19 and have already saved tens of thousands of lives. Everyone should continue to get their vaccination when invited to do so unless specifically advised otherwise."
The MHRA and the Joint Committee on Vaccination and Immunisation (JCVI) have provided further information for healthcare professionals in relation to COVID-19 vaccines.

The Government previously planned to make vaccination a legal requirement for health and care workers in England. The lower impact of the Omicron variant, however, led to a changed risk assessment and the legal requirement was withdrawn. Our expectations for all UK dental professionals are unaffected by this change."[19]

Standard Precautions

Standard precautions (formally called universal precautions), are the "minimum infection prevention practices that apply to all patient care, regardless of suspected or confirmed infection status of the patient, in any setting where health care is delivered."

Some standard precautions in dental practice include:

- Hand hygiene.
- Use of personal protective (e.g., gloves, masks, eyewear).
- Respiratory hygiene / cough etiquette.
- Sharps safety.
- Safe injection practices.
- Sterile instruments and devices.
- Clean and disinfected environmental surfaces.[20]

Dental practices are required to have infection control policies and procedures and comply with the requirements in the Department of Health Guidance HTM 01-05.[12]

Blood and body spillage

All spillages must be dealt with promptly using an appropriate spillage kit as per manufacturer's instructions. It is important to regularly check that the spillage kit is within the expiry date.

Reporting Incidents

Under the requirements of the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR), the employer has legal duties to report certain incidents and dangerous occurrences to your relevant enforcing authority. Incidents such as a puncture wound from a needle known to contain blood contaminated with a BBV should be reported as a dangerous occurrence.[21]

Legal and Ethical Responsibilities

Under the Equality Act (2010)[22], people living with blood borne viruses are entitled to fair access and equitable care. This means that patients living with blood borne viruses cannot be refused care or asked to attend an appointment at the end of the day or clinical session. Such practices are unlawful and clinically unnecessary since all patients should be treated as if they are potentially infected and standard precautions should be applied.

Management of the Infected Worker

Public Health England, in conjunction with Health Protection Scotland, has released a publication entitled 'Integrated guidance on the management of healthcare workers infected with bloodborne viruses (HIV, hepatitis B and / or hepatitis C) (2017)'. The guidance can be found by clicking on the link at the end of this article.

Conclusion

Dental Professionals have an ethical and legal responsibility to protect the health and safety of themselves, their colleagues and their patients. It is important that dental professionals are aware of the potential risk of transmission of blood-borne viruses and that the risk can be minimised by applying the appropriate control measures.

Personal Development Plan and Reflective Learning

This CPD is linked to the following GDC Enhanced CPD Development Outcomes:
A. Effective communication with patients, the dental team, and others across dentistry, including when obtaining consent, dealing with complaints, and raising concerns when patients are at risk.
D. Maintenance of skills, behaviours and attitudes which maintain patient confidence in you and the dental profession and put patients' interests first.

Reflective learning is now a requirement of the GDC Enhanced Professional Development Scheme. As such, you will be given the option to answer some reflective learning questions, before your certificate is generated.

Please remember that you can choose if you wish to fill this in on completion of the exam, but you can also update this at any time from your CPD log. If you take a few moments to write your reflection on completion, you will have fulfilled the Enhanced CPD requirements.

Further Reading
Integrated guidance on the management of healthcare workers infected with bloodborne viruses
Blood borne viruses in the Work Place
HTM 01-05

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