

CACHE Level 2

Certificate in the Principles of the Prevention and Control of Infection in Health Care Settings

COLONISATION

PREVENTION

BACTERIA

DECONTAMINATION

HYGIENE

LEGISLATION

Workbook 1

Section 1: Principles of the causes and spread of infection in health care settings



Did you know?

Microorganisms can survive extreme temperatures and difficult living conditions. It's what makes them so hard to get rid of!

When someone says they have an infection, we know what they mean but how do you actually define the term infection?

An **infection** is an invasion and multiplication of harmful microorganisms within any organ or system of a host. The host can be a person or an animal. If an infection can be passed from person to person then it is said to be contagious. An infection may:

- affect any organ or system in the body
- be passed from person to person if it is contagious
- lead to unpleasant signs and symptoms
- range from being mild to serious; treatable to fatal

Potentially harmful microorganisms can sometimes grow and multiply on a person without causing them any harm. This is known as **colonisation**. Colonising microorganisms establish themselves in a particular environment, for example on the body, but do not necessarily cause harm to the individual. Many people carry a bacteria called staphylococcus aureus in their nose and throat without experiencing any symptoms, though for others it can lead to an infection. Another colonising bacteria is Meticillin-resistant Staphylococcus aureus (MRSA) which can live on a person's skin without them being aware of it and be carried unknowingly into healthcare settings where it may cause infection.

The person who is colonised is known as a carrier. This is because they carry the microorganisms which can transfer to another person and cause infection. A carrier poses a potential risk to the other people they come into contact with.

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Pathogenic and non-pathogenic microorganisms

Please read the following as it will help you to answer question 2.

You may have come across the terms 'pathogenic' and 'non-pathogenic' in relation to microorganisms, but what do these terms mean?

Did you know?



The term pathogenic comes from two Greek words – 'pathos' meaning a disease and 'genesis' meaning bringing into being. Therefore pathogenic means bringing disease into being.

Pathogenic microorganisms are infective agents that cause disease. Pathogenic microorganisms represent only a few of the total numbers of microorganisms, it is important to identify them as they can be a threat to health.

The majority of microorganisms are known as non-pathogenic. Non-pathogenic microorganisms are harmless and in some cases are beneficial to the natural world and to humans. Non-pathogenic microorganisms can be found on and in everything, for example, on the skin, in water and in the human stomach. Microorganisms found in the stomach, mouth or on the skin's surface are known as normal flora. Normal flora help to prevent the invasion of pathogenic microorganisms. They are necessary to the healthy functioning of any life form because they help with functions such as digestion. They help to break down waste matter, help vitamin absorption and form part of the body's defence mechanisms. These bacteria are constantly moving through the systems of the human body and cause no harm.

Did you know?



Non-pathogenic microorganisms are used in the process of creating some foods such as yoghurt, cheese and bread.



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Systemic and localised infection

Please read the following as it will help you to answer questions 3, 4a and 4b.

When a person experiences an infection, the body's immune system will be activated. There are two types of infectious responses and these are dependent on whether the infection is localised or systemic.

A **localised infection** is one which is limited to a specific area or single organ. A localised infection will affect only one part of the body with symptoms related to inflammation; for example, redness, tenderness, pain and swelling.

Localised infections can be serious if they are internal, for example if they affect the appendix or the heart.

A common example of a localised infection is an infected wound. This type of localised infection does not generally make a person feel unwell, but without appropriate treatment, it could cause more serious problems, eventually leading to a systemic infection.

A **systemic infection** is one that affects the entire body and multiple organs. One example of a systemic infection is tonsillitis. As well as making the individual feel unwell, tonsillitis will also cause throat pain. The individual will develop a temperature, the whole body will ache and the individual will probably feel lethargic. Some systemic infections can be life-threatening if left untreated.

Knowledge Activity 2: Make a note of any localised and systemic infections that you have come across. An example has been provided for you below.



Localised infections	Systemic infections
Example: infected ingrowing toe nail, ear and eye infections, endocarditis	Example: flu, malaria, TB

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Different types of pathogens

Please read the following as it will help you to answer question 5.

You have already learned that pathogens are microscopic infective microorganisms that cause disease. There are different types of pathogens. The four most common types of pathogen that you will come across within a healthcare setting are:

- bacteria
- viruses
- fungi
- parasites

We will now look at each of these in a little more depth.

Bacteria	Viruses
<ul style="list-style-type: none">● Bacteria are microscopic single-cell organisms.● Different types of bacteria can be identified by their size and shape.● Bacteria can multiply outside the body.● Most bacteria need moisture, time, warmth and nutrients to survive and multiply.● Some bacteria are helpful.● Some bacteria produce toxins which cause unpleasant symptoms.● Most bacteria can be treated with antibiotics.● Some bacteria are resistant to antibiotics.	<ul style="list-style-type: none">● Viruses can only be seen with an electron microscope because they are so small.● Only one or two particles are required to cause an infection.● Viruses cannot survive for very long outside the body.● Viruses cannot be treated with antibiotics but in some cases are treated with antiviral medication.● The best defence against viruses is immunisation.● Viruses can mutate to create new strains.● Viruses can only multiply once they invade their host cell.
Fungi	Parasites
<ul style="list-style-type: none">● Fungi appear in the form of yeasts and moulds.● Fungal infections can be localised or systemic.● Some fungi are helpful.● Fungal infections are treated with antifungal medication.	<ul style="list-style-type: none">● Parasites can live in or on a host body.● Parasites survive by feeding from a host.● Parasites are controlled and destroyed by antiparasitic medication.● Parasites are not infections in themselves but can cause infection and disease.

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Knowledge Activity 3: Fill in the following table to indicate any infections you have previously come across. See if you can place them in the correct microorganism group.



Bacteria	Fungi
Viruses	Parasites

Common illnesses and infections caused by different pathogens

Bacterial infections:

- Bacterial meningitis
- Cellulitis
- Clostridium Difficile Toxin (CDT)
- Gastroenteritis
- Impetigo
- Legionella
- Lyme disease
- Salmonella
- MRSA
- Syphilis
- Tetanus
- Tuberculosis

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