

Module 1:

What is decontamination, cleaning and disinfection?





Introduction

Learning outcome: *You will have a greater understanding of decontamination principles and more in depth understanding of the differences between cleaning and disinfection.*

This workbook is designed to provide additional information to enhance your learning experience and should not be used as a standalone resource, nor should it replace local and national policies and guidelines. Each of the course modules reference relevant material in each workbook for ease of learning.

You can either use this as an interactive PDF which you can save, or as a downloadable resource which you can print and complete. There is space at the end of each workbook for you to capture reflective thoughts and/or notes.

Key:



Throughout this workbook there will be some suggested activities, shown with the **lightbulb icon**. This icon encourages you to participate in interactive activities to further support the learnings in the module.



Definitions throughout the workbook will be marked with this **open book icon**.

What is decontamination, cleaning and disinfection?



Decontamination:

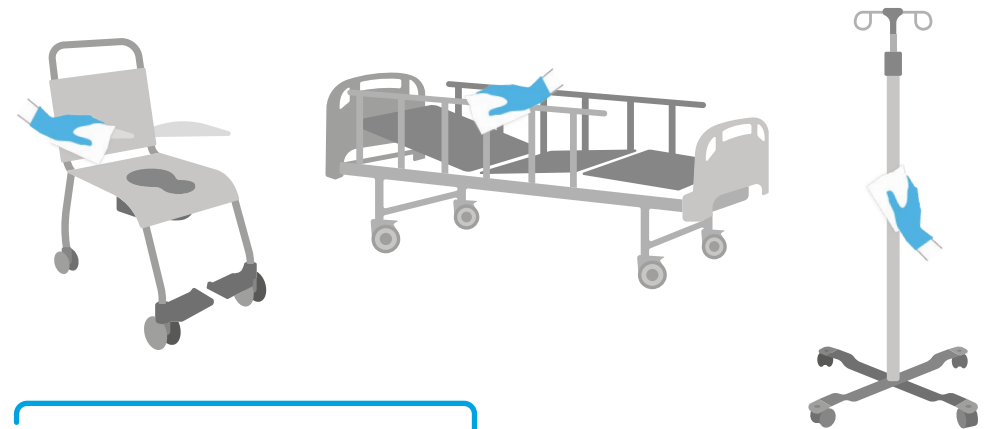
A process by which the healthcare environment is made free from a harmful level of contamination that may result in the transfer of microorganisms (germs) that can cause healthcare associated infections (HAIs).

A **H**ealthcare **A**ssociated **I**nfection (HAI/HCAI) is an infection that occurs because of medical care or treatment, in any healthcare setting which was not present or incubating at the time of admission (also known as nosocomial or hospital acquired infection).¹

To minimise patients' risk of HAIs, it is crucial that decontamination practices are adhered to, and organisations should have in place local protocols for environmental decontamination that comply with national evidence-based guidance.

- Decontamination is the use of physical or chemical means to remove, inactivate or destroy microorganisms on a surface to make it safe for handling, re-use or disposal
- Decontamination can be achieved by cleaning, disinfection and/or sterilisation so that surfaces or objects are no longer capable of transmitting infectious particles

The introduction of efficient and effective decontamination, as part of a successful infection prevention programme, can significantly reduce the rate of HAIs.



Think of some surfaces that can be decontaminated.

What is decontamination, cleaning and disinfection?



Decontamination can play an important role in helping to prevent the spread of antibiotic-resistant bacteria such as:

- Methicillin/Meticillin-resistant *Staphylococcus aureus* (MRSA)
- Vancomycin-resistant *enterococci* (VRE)
- Carbapenem-resistant *Enterobacterales* (CRE)

Other microorganisms associated with antibiotic usage, include *Clostridioides difficile* (*Clostridium difficile*).

Simply put, **decontamination** is an umbrella term for cleaning, disinfection and sterilisation. The level of decontamination required depends on the level of risk associated with the item or surface.

What decontamination methods are there?

Cleaning - The physical removal of foreign material (e.g., dust, soil) and organic matter (e.g., blood, secretions, excretions) on an item or a surface on which they thrive, by use of an appropriate cleaning agent such as detergent.

Disinfection - The reduction, inactivation or removal of microorganisms to a safe level for the use of the equipment or surface.

Sterility - Free from all living microorganisms; usually described as a probability (e.g., the probability of a surviving microorganism being 1 in 1 million).

Sterilisation - Use of a physical or chemical procedure to destroy all microorganisms including substantial numbers of resistant bacterial spores (usually by heat or chemical means).

Note: this module will not cover sterilisation as disinfection NEVER achieves sterility.

How can decontamination be achieved?

Decontamination of non-invasive equipment or the environment can be achieved through:

- Cleaning
- Disinfection
- A combination of the two




Think about how you decontaminate your workplace surroundings.

What is decontamination, cleaning and disinfection?




What is cleaning?

- Cleaning removes substantial amounts of any material which is not part of the item²
- Detergents help to loosen and lift pathogens from surfaces
- Friction and pressure aids removal
- Rinse with water to remove residue
- Dry surfaces after cleaning to prevent further growth
- A detergent alone will not kill pathogens and often needs a rinsing and drying step
- If surfaces are left wet, they become prone to biofilm development


 **Biofilms** - A group of microorganisms in which cells stick to each other and form communities. They form when there is a change in interface between solid, liquid and gas, primarily on dry and wet surfaces.


 **Note:** surfactants are an important component of cleaning products.

 **Surfactants** - A surface-active agent that stir up activity on the surface you are cleaning and act as a de-greasing agent that helps lift dirt and microorganisms from the surface.

What is disinfection?

- It is defined as a process used to reduce the number of viable microorganisms on items or surfaces to a safer level
- It is a higher level of decontamination, but it still may not eradicate some bacterial spores and prions

 **Spores** - A reproductive cell produced by fungi and some types of bacteria under certain environmental conditions. Spores can survive for long periods of time and are very resistant to heat, drying and chemicals.

 **Prions** - A type of protein that, by causing normal healthy proteins in the brain to fold abnormally, can cause disease in humans and animals.³

What is decontamination, cleaning and disinfection?



To ensure effective cleaning, disinfectants must:

- Be applied to a clean, dry surface – preclean with detergent
- Be used at the right concentration
- Have enough time in contact with the surface to kill the pathogen
- Be effective against specific pathogens
- Disinfecting products are available as a single substance product or in combinations and are available in a variety of formats such as wipes, granules, liquids, sprays and tablets



Look in your cupboards and see if you can find the contact times for your regular disinfectants.

2-in-1 decontamination system

- A 2-step decontamination system involves a physical clean using a detergent solution followed by the application of a disinfectant
- Physical removal of contamination is achieved by the actual wiping process
- The availability of combined cleaning and disinfection products is an important innovation that has brought effective decontamination to the point of care by increasing compliance with a one rather than two-step decontamination method



List some advantages of using a 2-in-1 detergent and disinfection option.

Think about ways in which you can make your cleaning and disinfection practices more environmentally friendly.

Check your regular household cleaning products. Can you identify which are detergents or disinfectants and which are a combined product?

See if you can find the log reduction values of your household cleaning products.

References

1. World Health Organization. (2016). Health care without avoidable infections: the critical role of infection prevention and control. World Health Organization. <https://apps.who.int/iris/handle/10665/246235>
2. Hoffman P, Ayliffe G, Bradley T. *Disinfection in Healthcare.*; 2008. Accessed September 14, 2022.
3. Prions | What is microbiology? | Microbiology Society. Accessed September 30, 2022. <https://microbiologysociety.org/why-microbiology-matters/what-is-microbiology/prions.html>



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