

## 4 Cleaning chemicals, equipment and technique

The role of environmental cleaning is to reduce the number of infectious agents that may be present on surfaces and minimise the risk of transfer of micro-organisms from one person/object to another, thereby reducing the risk of infection.

Cleaning is a process which intends to remove foreign material (e.g. dust, soil, blood, secretions, excretions and micro-organisms) from a surface or an object through the use of water, detergent and mechanical action/friction. Although cleaning is known to successfully reduce the microbial load on surfaces there are some circumstances where disinfection is also required to be performed.

Disinfection is a process which intends to kill or remove pathogenic micro-organisms but which cannot usually kill bacterial spores. Some elements such as toilets, bidets and commodes must always be cleaned with detergent and disinfectant as a part of standard precautions. However there are some situations where the cleaning of all elements is upgraded to detergent and disinfectant as a means of minimising the risk of transmission of disease between patients. This is referred to as transmission-based precautions.

There are three important factors which together help ensure the cleaning and disinfection practices within the healthcare facility are of a high standard. These include: chemicals, equipment and techniques. All cleaning services staff should be aware of the importance of each factor and how they interrelate. For example, if the cleaning chemicals that are used in the facility are adequate for the purpose, but cleaning equipment is dirty (e.g. unclean mops or buckets) or the cleaning technique is poor, then the cleaning/disinfection of the area will be sub-standard. This chapter contains information about these three important factors.



### 4.1 Cleaning chemicals

There are two main groups of cleaning chemicals that are to be used in the healthcare facility:

- > **Detergents:** A detergent is a surfactant that facilitates the removal of dirt and organic matter. Most hard surfaces can be adequately cleaned with warm water and a neutral detergent as per the manufacturer's instructions. Allowing the cleaned surfaces to dry is an important aspect of cleaning.
- > **Disinfectants:** A disinfectant is a chemical agent that rapidly kills or inactivates most infectious agents. Disinfectants are not to be used as general cleaning agents, unless combined with a detergent as a combination cleaning agent (detergent-disinfectant).

### 4.1.1 Disinfectants

Disinfectants that are used for cleaning purposes within a healthcare setting must be either:

- > a TGA approved hospital-grade disinfectant, preferably with label claims against specific organisms, or
- > a chlorine-based product such as sodium hypochlorite.

Some items of equipment, particularly electronic equipment such as monitors and keyboards may be damaged by the use of certain chemical disinfectants, and the manufacturer's instructions should always be consulted prior to selecting a disinfectant for these items. The use of wipe-able keyboard covers or fully washable type keyboards should be considered.

When cleaning or disinfecting hard surfaces such as floors, compatibility of the agent with the material of the surface must be considered. Studies have shown that the use of disinfectant on floors offers no additional advantage over routine detergent and water cleaning. Additionally, newly cleaned floors become rapidly recontaminated from shoes, equipment wheels, dust etc. There is minimal risk to a patient from micro-organisms located on floors. ([CDC, Reduce Risk from Surfaces: 2020](#)).

### 4.1.2 Chemical application

When selecting a disinfectant there are two different types of systems to choose from defined as follows:

- > **2-step clean** which involves a physical clean using detergent solution followed by use of a chemical disinfectant
- > **2-in-1 clean** in which a combined detergent/disinfectant solution or wipe is used and mechanical/manual cleaning action is involved.

Care should be taken to ensure that the cleaning chemical is used appropriately and in accordance with the manufacturer's specifications. For example, certain chemicals, particularly chlorine-based disinfectants, may need to be rinsed off with water after the disinfectant contact time has been achieved. In these cases, the cleaning process will require an additional step to those specified above.

### 4.1.3 Chemical claims

All claims regarding the efficacy of a chemical should be carefully assessed and if necessary clarified. For example, a product may claim to kill *Clostridioides difficile* and be referring to the vegetative cells, not the spores. Vegetative cells are readily killed by most disinfectants, however spores are not. Cleaning and disinfecting agents should be reviewed and approved by Infection Prevention and Control Coordinators to assure the chemicals are effective for their intended use.

### 4.1.4 Chemical concentration

One of the most important aspects regarding the effectiveness of a disinfectant is to ensure that the concentration of the cleaning solution is correct and in accordance with the manufacturer's specifications. Using a solution that is too weak will not reliably kill micro-organisms on the surface. Using a solution that is more concentrated than specified is not cost effective, may be detrimental to the life of fixtures and fittings and may be a work health and safety risk.

### 4.1.5 Contact time

Contact time refers to the amount of time necessary for the disinfectant to be in contact with the surface to inactivate micro-organisms. Staff should always adhere to the manufacturer's specifications regarding contact time to ensure maximal disinfection effectiveness.

### 4.1.6 Other factors affecting the chemical effectiveness.

Cleaning solutions will become contaminated during use, and continued use of a contaminated solution may transfer micro-organisms to each subsequent surface being cleaned. Therefore, cleaning solutions should be regularly replaced in accordance with the manufacturer's specifications and more frequently when cleaning heavily contaminated areas, when solutions appear visibly dirty and immediately after cleaning blood and body fluid spills.



## 4.2 Cleaning equipment

In general, all cleaning equipment used in healthcare facilities should be fit for purpose, cleaned and stored dry between use, well maintained and used appropriately. Other factors regarding cleaning equipment are discussed below.

### 4.2.1 Dust control

Equipment which generates and disperses dust such as feather dusters and brooms should not be used within the healthcare facility. Vacuums which are used to clean carpets close to clinical areas should be fitted with high-efficiency particulate air (HEPA) filters and undergo regular maintenance, which includes changing the filters on a regular basis (i.e. included in a scheduled maintenance program).

### 4.2.2 Aerosols

The use of spray bottles or equipment that might generate aerosols during usage should be avoided. Chemicals in aerosols may cause irritation to eyes and mucous membranes. Containers that dispense liquid such as 'squeeze bottles' can be used to apply detergent/disinfectants directly to surfaces or to cleaning cloths with minimal aerosol generation.

### 4.2.3 Cleaning cloths (excluding microfibre type)

Cleaning cloths and buckets containing cleaning solution are the main materials that are used for cleaning of surfaces in healthcare facilities. Care needs to be taken to ensure that cleaning cloths are suitable for purpose, that there is sufficient quantity for staff to undertake their duties effectively and that they are used appropriately to prevent cross contamination of surfaces (refer to sub-section 4.3 Cleaning Techniques).

If a healthcare facility is choosing to use reusable cleaning cloths, a system should be developed that ensures that a clean cloth(s) is used for each patient area (single room, shared room, bay). Failure to do so could compromise the effectiveness of the cleaning process. The cloths should be laundered after each day's use and in accordance with the *Australian/New Zealand Standard AS/NZS 4146:2000 – Laundry practice*. However, facilities may also consider using disposable cloths instead, especially for wet areas where the contamination may be higher.

#### 4.2.4 Microfibre cleaning cloths/mops

The microfibre cloth technology is based on tiny charged fibres which allow dirt particles to cling to the cloth by electrostatic attraction, and this enables easier cleaning of difficult to reach areas. The material is strong and able to withstand repeated laundering. However they are only compatible with a limited number of chemical cleaning products. If using this system, cloths should only be used in a manner that prevents potential spread of micro-organisms from one patient area to another and cleaning staff will require additional training in their use.

#### 4.2.5 Detergent and/or disinfectant-impregnated wipes

These wipes are useful for decontaminating small items of patient care equipment or high touch surfaces, particularly in clinical outpatient areas, e.g. radiology. They should not be used for cleaning large surface areas since they do not generally contain enough product to cover large areas, and many wipes would be required for effective decontamination.

#### 4.2.6 Colour coded cleaning materials and equipment

There is no Department for Health and Wellbeing requirement for South Australia healthcare facilities to introduce a colour coding system for cleaning materials and equipment; however some facilities may consider doing this voluntarily.

In essence, the colour coding system helps to ensure that materials and equipment used for cleaning purposes are not used in multiple different areas, therefore reducing the risk of cross-infection. If choosing to implement this system, all cleaning materials and equipment, for example, cloths (re-usable and disposable), mops, buckets, aprons and gloves, should be given a specific colour code. For example, United Kingdom hospitals and NSW Health hospitals have implemented this system and all materials and equipment are colour coded for the areas specified below:

<b>Red:</b>	Bathrooms, washrooms, showers, toilets, basins and bathroom floors
<b>Blue:</b>	General areas including wards, departments, offices and basins in public areas
<b>Green:</b>	Catering departments, ward kitchen areas and patient food service at ward level
<b>Yellow:</b>	Isolation areas

If introducing this type of system, the method used to colour code items should be clear and permanent, and policies and procedures should be in place to ensure all staff are aware of the mechanics of the system. Further information and guidance can be obtained from:

> NSW colour coding chart:

[https://www.cec.health.nsw.gov.au/\\_\\_data/assets/pdf\\_file/0005/258656/colour\\_coding\\_chart\\_2012.pdf](https://www.cec.health.nsw.gov.au/__data/assets/pdf_file/0005/258656/colour_coding_chart_2012.pdf)

### 4.2.7 General maintenance of cleaning equipment

Cleaning equipment (including buckets, mop heads etc.) should be inspected regularly and changed when required. The following basic principles should be followed:

- > equipment such as buckets and containers should be washed with detergent and disinfectant after each use and stored upside down and allowed to dry between use
- > buckets and containers should be inspected for cracks and replaced accordingly
- > mop heads and cleaning cloths should be changed and laundered daily or after use (if used less frequently than daily) and changed when visibly soiled
- > equipment such as cloths and mop heads which are used to clean blood or body fluid spills or used in isolation rooms should either be disposable and discarded after use, or if re-usable, changed immediately after use and placed in a plastic bag for transport to the laundry.

## 4.3 Cleaning techniques

Incorrect or inappropriate cleaning techniques may spread micro-organisms around rather than removing them from the surface. The following points should form the basis of all standard operating procedures regarding cleaning in healthcare facilities:

- > The flow of cleaning should be from areas which are considered relatively clean to dirty. This means that areas/elements which are low touch or lightly soiled should be cleaned before areas/elements which are considered high touch or heavily soiled. For example:
  - when cleaning a bathroom, the toilet should be cleaned last as it is likely to be the most contaminated element in that area
  - in a patient room, items that would be considered high touch would include the patient bed, call-bell, locker, overway table, light switches, control knobs, hand basin etc., and low touch areas would include the walls, windows and floors.
- > The flow of cleaning should generally be from high to low reach surfaces. For example:
  - when dusting horizontal surfaces in a patient room, high areas such as those above shoulder height should be done first followed by all other elements. Dusting technique should not disperse the dust, (i.e. use damp cloths).
- > When using cloths and bucket/solution system to clean:
  - avoid 'double-dipping' used cloths into the bucket containing clean, unused cloths. Doing this can contaminate the remaining clean cloths which are in the solution and result in spreading micro-organisms to surfaces that are wiped thereafter
  - to maximise the use of cleaning cloths, they should be folded and rotated in a manner so as all surface areas of the cloth, including the front and back, are used progressively as elements are cleaned
  - more cloths may be required to clean 'high-touch surfaces' compared to the same surface area of 'low-touch surfaces'.

- > With the above points taken into consideration, cleaning of an area should then be performed in a methodical way by either using a clockwise or counter-clockwise approach or a checklist for guidance.
- > Upon completion, the whole area should be visually checked to ensure the area is thoroughly cleaned and that elements have not been missed.
- > All elements which are broken or deteriorated to a point where cleaning is compromised should be reported and scheduled for replacement/maintenance as necessary.

Samples of the following cleaning techniques can be found in:

- > Appendix 2: Sample of the general cleaning practices
- > Appendix 3: Sample of the discharge cleaning procedure
- > Appendix 4: Management of blood and body substance spills.

The information presented in these Appendices are a general guide and do not replace established policies and procedures that a facility may have in place regarding environmental cleaning.

Useful resources in the development of specific cleaning procedures are:

- > NSW Health (2012) Environmental Cleaning Standard Operating Procedures, available at
  - <https://www.cec.health.nsw.gov.au/keep-patients-safe/infection-prevention-and-control/cleaning-and-reprocessing>
  - [http://www.cec.health.nsw.gov.au/\\_\\_data/assets/pdf\\_file/0005/258665/ecsop-module-3-overview.pdf](http://www.cec.health.nsw.gov.au/__data/assets/pdf_file/0005/258665/ecsop-module-3-overview.pdf)

## 4.4 Emerging Environmental Cleaning Technologies

In recent years, there have been multiple emerging environmental cleaning techniques which have become commercially available. An emerging cleaning technology refers to new devices or products (automatic or manually controlled) that clean the environment and/or equipment surfaces.

Further information can be found in the Australian Commission on Safety and Quality in Health Care (ACSQHC) Environmental cleaning: Emerging environmental cleaning technologies fact sheet, <https://www.safetyandquality.gov.au/publications-and-resources/resource-library/environmental-cleaning-emerging-environmental-cleaning-technologies>