Infection Prevention and Control Part 2: Decontamination Processes and Practical Application

Aims: To update and consolidate the dental professional's knowledge of practical infection prevention and control procedures, with a focus on the safe and effective decontamination of instruments, treatment areas and equipment in everyday dental practice.

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

- Describe the stages of the instrument decontamination cycle, including the use of ultrasonic baths, washer-disinfectors, and sterilisers.
- Explain how to correctly prepare, package, and store instruments in line with current guidance.
- Describe the purpose of validation, testing, maintenance and record-keeping for decontamination equipment, and identify key daily/periodic checks required to demonstrate compliance.
- Define sterilisation and disinfection and distinguish between them in the context of dental practice.
- Apply principles of surface cleaning and decontamination to treatment areas in a dental setting.
- Demonstrate knowledge of dental disinfection and decontamination guidelines relevant to England, Northern Ireland, Scotland, and Wales.

Introduction

Infection prevention and control (IPC) is an essential responsibility for the dental team. Patients reserve the right to be treated in a surgery environment that is clean and

sterile.[1] Decontamination is “the process by which reusable items are rendered safe for further use and for staff to handle.”[1] The decontamination of instruments and equipment is a necessary requirement to reduce the risk of cross-infection from patient to patient and also between patients and staff.

As part of their registration, dental professionals have a responsibility to demonstrate competence in all aspects of their work and to take actions that protect patients. The GDC’s standards guidance ‘Standards for the Dental Team’ requires dental practices to follow current guidance in infection control, and Standard 1:5 states: ‘You must treat patients in a hygienic and safe environment’[2]

This article builds on Part 1, which covered the Chain of Infection, national standards, roles and Essential Quality Requirements.

Protocol for the Decontamination of Instruments

Instruments should first be segregated into those that can be reprocessed and those that need to be disposed of. (A full article on waste segregation is available on the website.)

If instruments are transported to a decontamination room, they need to be transported in a suitable container which should be:

- Rigid
- Easy to clean
- Able to be closed securely

The practice should have a policy for the safe transfer of instruments to the decontamination room.[1]

Fig.3 shows the protocol for decontamination of instruments and Fig.4 shows an example of a decontamination room.

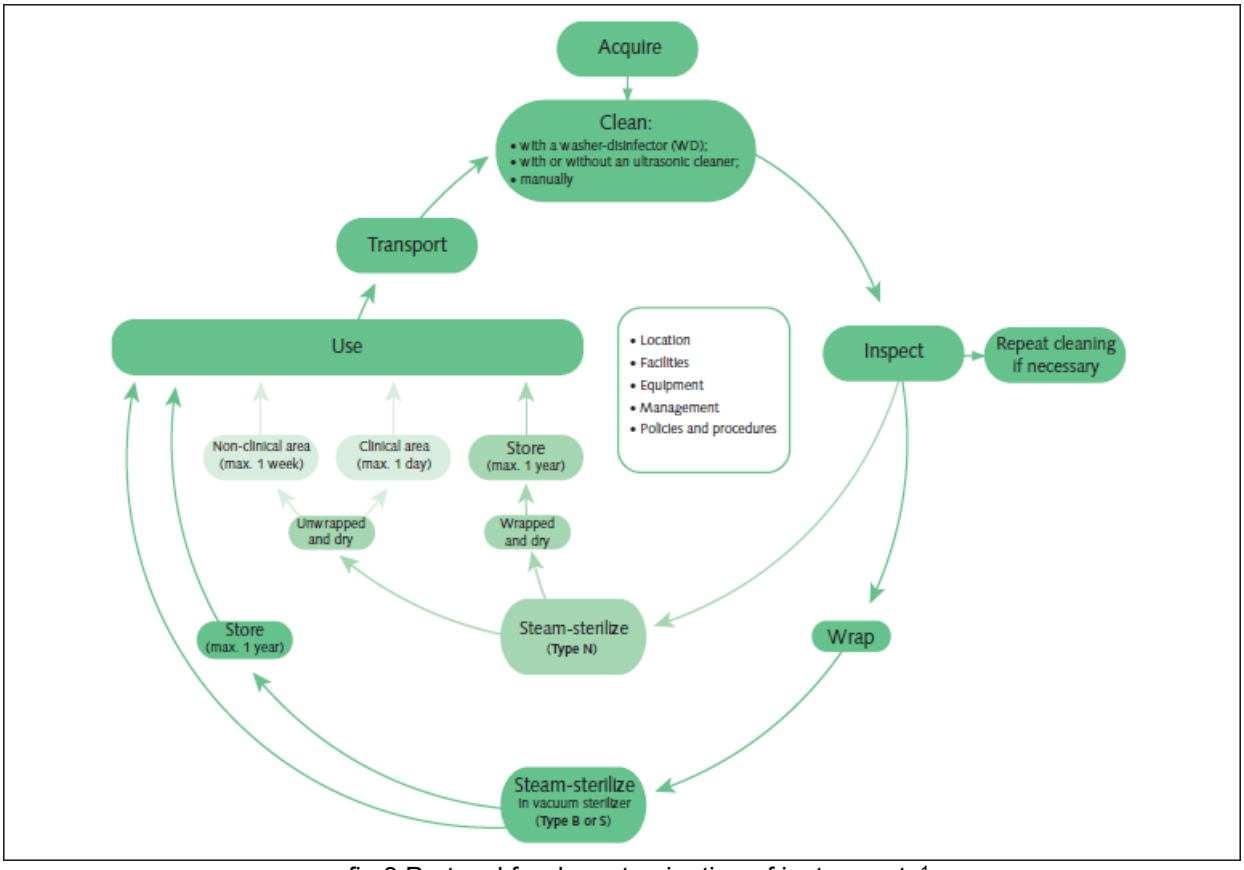

fig.3 Protocol for decontamination of instruments[1]

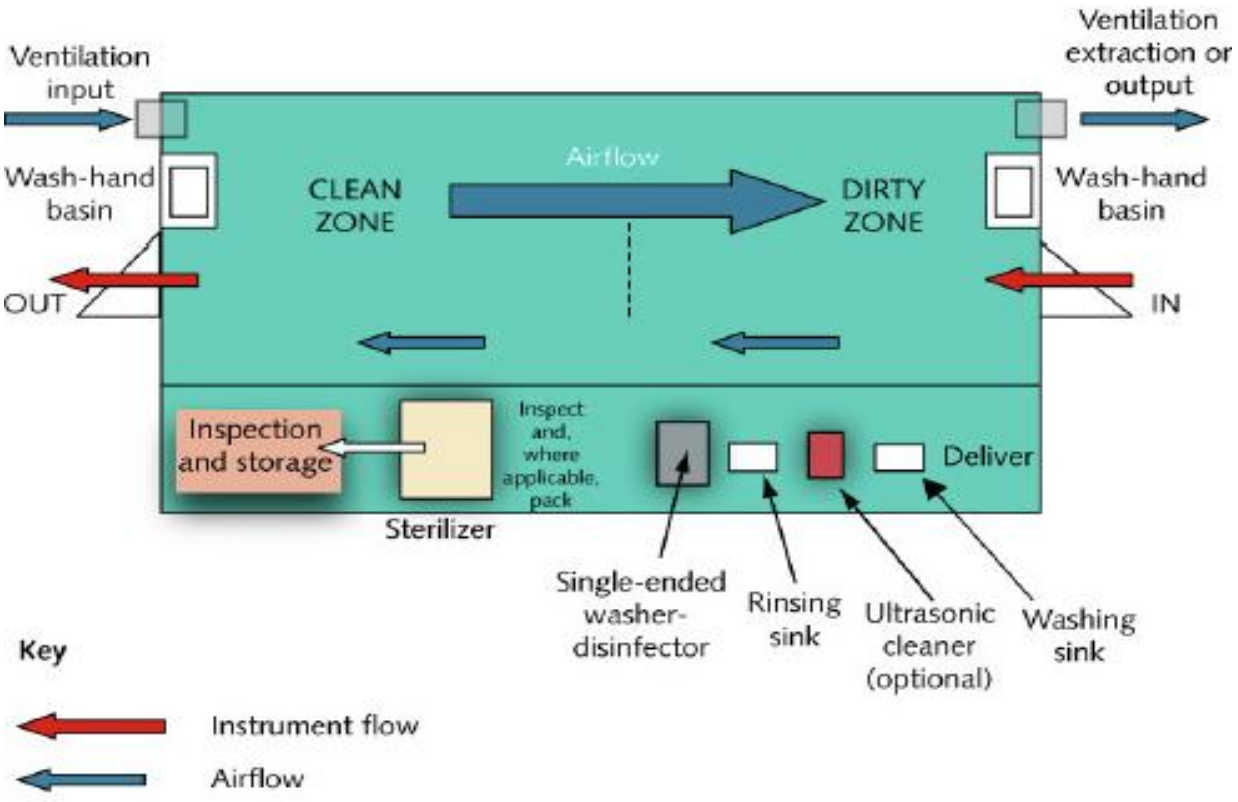

fig 4. Example decontamination room[1]

Once the instruments have been segregated, the decontamination of the instruments involves the following process:

- **Stage one**- Pre-sterilisation cleaning
- **Stage two**- Sterilisation
- **Stage three**- Storage

Stage one- Pre-sterilisation Cleaning

Manufacturers are required to provide instructions on how to decontaminate their instrument, and these instructions should be adhered to. Some instruments may need to be dismantled prior to cleaning.[1] Before purchasing instruments it is recommended that consideration should be given to the methods of decontamination that are applied within the practice.

1) Manual cleaning

Although acceptable under Essential Quality requirements, under Best Practice recommendations, manual cleaning alone is only acceptable for those instruments that cannot be initially cleaned using an automated process.[1] In Northern Ireland, the Department of Health, Social Services and Public Safety in Northern Ireland and SHTM 01-05 in Scotland, do not accept manual cleaning as a validated process, and practices must be working at Best Practice standards.[3,4]

When manual cleaning is necessary, the instruments should be immersed in warm water and detergent and scrubbed with a long-handled kitchen-type brush. Thick, waterproof household gloves and PPE should be worn to protect against accidental injury and instruments should be inspected afterwards.

A key disadvantage of the manual cleaning method is the increased risk of sharps injury compared to automated methods. It is also difficult to validate this method as it is difficult to ensure that it is carried out effectively on every occasion.[1]

2) Ultrasonic cleaning

Ultrasonic baths may be used to enhance the removal of debris and may be utilised as an optional part of the cleaning process before the instruments are placed in the washer-disinfector.[1]

The ultrasonic bath should be tested according to manufacturer's instructions, and the water and fluid solution should be maintained, cleaned, and changed as recommended. Cleaning instructions relating to each instrument should be followed as some instruments may need to be disassembled before being immersed in the ultrasonic bath solution. The instrument basket should not be overloaded.

After ultrasonic cleaning, instruments should be rinsed in the designated rinsing sink or bowl.

3) Washer-disinfector

If working under best practice recommendations, the designated decontamination room will contain a washer-disinfector which should be used for all compatible instruments. This is the preferred method of pre-sterilisation cleaning, as it provides a controlled, reproducible and validated cleaning process. A typical disinfector cycle includes the following stages:[1]

- Flush
- Wash
- Rinse
- Thermal disinfection
- Drying

Washer-disinfectors must not be used as a substitute for sterilisation and the manufacturer's instructions must be followed. Staff should be appropriately trained in its use and the records of this should be maintained. Washer-disinfector logbooks and records should be kept by the operator and maintained for not less than two years.[1]

Stage two- Sterilisation

Prior to sterilisation all instruments should be inspected to ensure that they are 'clean, functional and in good condition'. It is recommended that an illuminated magnifier is used to aid the process of inspection.[1]

The following sterilisers are used within health care:

Type N (fig. 5) - non-vacuum sterilisers designed for unwrapped, non-hollow and non-air retentive instruments. With this method of sterilisation, instruments may be wrapped immediately after sterilisation after being dried with a disposable non-linting cloth.

Fig. 5 A type N steriliser

Type B (fig. 6) - Vacuum sterilisers used to process hollow, air-retentive, and packaged loads, including handpieces. With this method instruments need to be dried with a disposable non-linting cloth prior to wrapping. Manufacturers prefer vacuum autoclaves to sterilise hand pieces as the steam can penetrate up through the lumen using the vacuum. However, HTM 01-05 has refrained from making this a regulation.

Fig 6: A type B sterislier

Type S (fig. 7) - Sterilisers designed to reprocess specific load types, which may include hand pieces.

Fig 7. A type S steriliser

The most frequently used sterilisers in dental practice are type N and type B.

Validation of Decontamination Equipment

In all cases, it is important that the manufacturer's instructions are followed for the use and servicing of the steriliser used to ensure that it performs to the correct standard.

The process should be validated, and records kept for not less than two years. Where automatic records are not produced, manual record keeping is required.[1]

Daily tests should be completed by the operator or user and typically include

- A steam penetration test - Helix or Bowie Dick test (S & B vacuum only).
- An automatic control test (all benchtop sterilisers) in line with manufacturer's instructions.

Automated data-loggers or interfaced computer-based recording systems may be used, but any printouts should be copied, as thermal prints may fade. If the steriliser does not have a printer, the user will have to manually record the following information in the process log:

- Date.
- Satisfactory completion of the cycle (absence of failure light).
- Temperature/pressure achieved.
- Signature of the operator.

If an error code occurs then this should be noted, along with the action you took and confirmation that the instruments in that cycle at that time were reprocessed. At the end of each day, the reservoir should be emptied and cleaned. Door seals should be checked. If the surgery is not in use on a particular day, this should be noted in the log so it is clear that the omission is due to non-use rather than incomplete record keeping.

The CQC consider validation of decontamination equipment when they review if the practice is safe. This relates to regulation 15 (premises and equipment) and regulation 12 (safe care and treatment).

The CQC state the following as mandatory requirements:[5]

"Professional guidelines: Pressure Systems Safety Regulations 2000

Sterilisers are maintained by an appropriate and competent person. As sterilisers are pressure vessels, a suitable written scheme of examination needs to be in place for each one. Once in place, sterilisers need to be examined in accordance with the written scheme of examination. The maximum interval between these safety inspections is 14 months. Current certification must be available for inspection.

Professional guidelines: HTM 01-05: Decontamination in primary care dental practices

All decontamination equipment should be validated, tested, maintained and serviced as recommended by the manufacturer. Validation is needed for new decontamination equipment at installation and annually thereafter. Guidance relevant to each country should be read for information on how long to keep the equipment records and maintenance details.

The CQC state that "a record of every single sterilisation cycle should be made. This record should demonstrate that the steriliser is working within validated parameters such as time, temperature, and pressure, using the machine's own indicated measurements on the display. Records need to be kept for a minimum of two years."

Stage three- Storage

Pouched instruments can be stored for the following times:

Wrapped Instruments

Wrapped instruments can be stored for 1 year. They should be date stamped. The steriliser used determines when the instruments should be wrapped:

- Type N (displacement): Dried instruments can be wrapped after sterilisation. If you store instruments in trays, the entire tray should be placed in a sealed pack.
- Type B (vacuum): Dried instruments can be pre-wrapped.
- Type S (vacuum): Manufacturer's guidance should be followed.[1]

Unwrapped Instruments

HTM 01-05 (England and Northern Ireland) recommends that instruments stored away from the surgery (in a separate decontamination room, for example) should be used within one week.

Unwrapped instruments in the clinical area may be stored for up to a day. They should be stored dry and protected from contamination.

It is important that practices have well developed protocols and procedures in place to prevent contamination of these instruments by ensuring that those required for a particular patient are removed from their protected environment before treatment commences.

Surface Decontamination

Sterilisation is a process "intended to kill all microorganisms and is the highest level of microbial kill that can be achieved."[6]

Disinfection is "a less lethal process than sterilisation and is intended to kill disease-producing microorganisms but not bacterial endo spores. Disinfection usually refers to the use of liquid chemicals to kill microorganisms at room temperature on surfaces."[6] It is important to realise that the manufacturer's instructions need to be followed as disinfectants need to have the appropriate contact time to be effective. Disinfectant products should be allowed to air dry to allow maximum contact with the surface.

Detergents are cleaning solutions which increase the contact between the water, the surface and the organic/inorganic soil (for example blood, dirt and proteins). In contrast to using a disinfectant, when using a detergent product, the surface should be dried after cleaning.

Disinfectants should not be used as cleaning solutions. Surface decontamination is most commonly achieved with approved disinfectant and detergent combinations. Manufacturers' advice should be sought in terms of the compatibility of detergents and disinfectants with the surface materials used. The products used should be risk assessed, and staff should be trained in their use.

When cleaning surfaces, spray bottles, whether supplied prefilled or empty, should be single use. This is due to the risk of bacterial contamination of the bottles which may become adapted to the solutions and multiply in the spray mechanisms. Wipes are increasingly being used to clean and/or disinfect surfaces and equipment. Disinfection only wipes, such as alcohol wipes, are now rarely used.

HTM and WHTM 01-05 states that "alcohol has been shown to bind blood and protein to stainless steel. The use of alcohol with dental instruments should therefore be avoided."[1,7] In addition, HTM 01-05 states that, "the use of disinfectant or detergent

will reduce contamination on surfaces. If there is obvious blood contamination, the presence of protein will compromise the efficacy of alcohol-based wipes."[1]

HTM 01-05 also states that surfaces and equipment used in decontamination processes should be cleaned carefully before and after each cycle, in line with local policy. Dental practices should have a local protocol that outlines surface cleaning schedules, and records should be kept in line with the relevant Code of Practice. [1]

All surfaces should be designed to aid in successful cleaning. This means that, wherever possible, surfaces (including walls) should be continuous and free from damage and abrasion. They should be free from dust and visible dirt. In addition, all clinical work surfaces, and surface where decontamination takes place should be:

- Impervious and easily cleanable.
- jointless as far as far as is reasonable.
- where jointed, such joints should be welded or sealed.

Flooring should be:

- Impervious.
- Welded or sealed if joints are unavoidable.
- Easily cleanable.
- Coved to the wall to prevent accumulation of dirt where the floor meets the wall.

Carpets should **NOT** be used.

Decontamination of treatment areas

After each session, the treatment area should be cleaned using disposable cloths or a clean microfibre cloth.

Between patients, the following areas should be cleaned:

- Local work surfaces.
- Dental chairs (which should be free of visible damage, for example rips and tears).
- Curing lamps.
- Overhead lights and handles.
- Hand controls.
- Trolleys/delivery units.
- Spittoons.
- Aspirators.
- X-ray units.

Disposable, single use covers are available for many of the above areas, and whilst their use is in encouraged, they are not a substitute for regular cleaning.

After each session, the items that should be cleaned include:

- Taps.
- Drainage pipes.
- Splashbacks.
- Sinks.
- Cupboard doors.
- Other exposed surfaces such as dental lights and fittings.
- Floor surfaces.[1]

A disinfectant agent such as a solution of chlorine at 0.1% or 1000ppm or an equivalent disinfectant effective against viruses, bacteria and fungi to EN standard 14476 for viricidal activity should be used.

For floor and general surface cleaning, the national colour coding scheme for cleaning materials and equipment in primary care medical and dental premises can be utilised. This is outlined in the image below:

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.

During the COVID-19 pandemic, additional PPE was required, including gowns, FFP3 masks, PAPR hoods, hair covers and foot covers.

HTM 01-05 guidelines advise that PPE should be removed in the following order.

1) Gloves- Roll up inside out and then wash hands.
2) Plastic disposable apron- Breakneck straps and only touch inside of the apron.
3) Face mask- Break straps or lift over the ears. Avoid touching outer surface of mask.
4) Face and eye protection- Take care not to touch outer surfaces.[1]

Safe Management of Linen

Uniforms and scrubs should be laundered separately and washed at the highest temperature setting for the fabric.

Conclusion

Patients reserve the right to be treated in a surgery environment that is clean and sterile.[1] As part of CQC registration (in England), dental practices must demonstrate that they meet the Essential Quality Requirements outlined in HTM 01-05 and are working towards Best Practice standards of decontamination. Regulators will want to see that your practice is striving to make ongoing improvements.

The decontamination process is discussed in more detail in HTM 01-05 (2013), which is available via the link below. It is recommended that dental professionals keep themselves up to date with any changes to national guidance and consult guidelines relevant to other UK nations as required.

Personal Development Plan and Reflective Learning

This CPD is linked to the following GDC Enhanced CPD Development Outcomes:

C. Maintenance and development of knowledge and skill within your field of practice.

Reflective learning is now a requirement of the GDC Enhanced Professional Development Scheme. As such, you will have the opportunity to provide reflection after completing the exam.

Further Reading

England

Health and Social Care Act 2008: Code of practice on the prevention and control of infections

Northern Ireland

Scotland

Wales

Latest Guidance on Managing healthcare staff with symptoms of a respiratory infection or a positive COVID-19 test result (released March 2023)

References

1. The Department of Health (2013) Health Technical Memorandum 01-05: Decontamination in primary dental care practice. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/170689/HTM_01-05_2013.pdf (accessed 05/12/2025)
2. General Dental Council (2013) Standards for the Dental Team. Available at: https://www.gdc-uk.org/standards-guidance/standards-and-guidance/standards-for-the-dental-team (accessed 05/12/2025)
3.Health, Social Services and Public Safety (2013) Updated Northern Ireland Guidance on Decontamination in Primary Care Dental Practices: HTM 01-05 20113 Edition. Available at: https://www.rqia.org.uk/RQIA/files/3f/3fcafc64-d793-4dc6-bb40-f1152a33297b.pdf (accessed 05/12/2025)
4.NHS National Services Scotland (2024) SHTM 01-05. Available at: https://www.nss.nhs.scot/publications/management-equipment-and-process-of-the-decontamination-of-dental-instruments-in-a-local-decontamination-unit-ldu-in-nhsscotland-shtm-01-05 (05/12/2025)
5. Care Quality Commission (2023) Dental mythbuster 12: Validation of decontamination equipment . Available at: https://www.cqc.org.uk/guidance-providers/dentists/dental-mythbuster-12-validation-decontamination-equipment (accessed 05/12/2025)
6. Miller, C.H (2014) Infection Control and the Management of Hazardous Materials for the Dental Team 5 edn. Elsevier: Missouri.
7, GIG CYMRU NHS Wales (2014) WHTM 01-05. Available at: https://nwssp.nhs.wales/ourservices/specialist-estates-services/publications-and-information/welsh-health-technical-memoranda-whtms-health-technical-memoranda-htms/ (accessed 05/12/2025).