Dental Instrument Cleaning, Disinfection, and Sterilization Toolkit

Wisconsin Healthcare-Associated Infections (HAI) Prevention Program
Division of Public Health, Wisconsin Department of Health Services

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About this toolkit

This toolkit is intended to help support oral health clinics in achieving proper sterilization of instruments and devices. Facilities should note that this toolkit is not a policy or procedural document. Facilities are encouraged to use the content of this toolkit as a resource when creating their own policies and procedures.

This toolkit includes background on the sterilization process and describes recommended processes for sterilizing instruments and devices, according to evidence-based guidance provided by the CDC (Centers for Disease Control and Prevention) and the Organization for Safety, Asepsis, and Prevention (OSAP). This toolkit also includes sample sterilization audit tools and a monitoring log. These are intended to help oral health providers track and audit their clinic's sterilization practices. The tools have been developed using best practice and guidance from the CDC, and therefore may be very general. Facilities should adapt the tools as needed to best align with their facility's policies.

Toolkit contents:

Beginning the sterilization process

Adequate sterilization requires a series of steps, all of which must be performed properly. Improperly sterilized instruments can lead to transmission of illnesses such as Hepatitis B, Hepatitis C, and HIV.

It's important to follow the **manufacturers' instructions for use (IFU)** when sterilizing instruments. IFUs are provided by the instrument manufacturer and provide guidance on how to properly clean, disinfect, and sterilize the instrument. Always refer to the manufacturer's IFU when creating facility-specific policies.

Prior to starting the sterilization process:

- Remove debris (also known as bioburden) from instruments as close to the point of use as possible. This can be achieved by carefully wiping them clean on gauze.
- Transport instruments to the sterilization area in a covered, leak-proof, and puncture-proof container labeled "biohazardous."
- Spray items or hold them in a solution such as an enzymatic cleaner if they cannot undergo the sterilization process immediately. This will make sterilization easier later by preventing caking of bioburden onto the instruments.

Once in the sterilization area:

- Conduct your work in a unidirectional fashion, moving from dirty to clean.
- Utilize personal protective equipment (PPE) as part of standard precautions (https://www.cdc.gov/dental-infection-control/hcp/summary/standard-precautions.html#cdc_generic_section_4-personal-protective-equipment) to protect against punctures, splashes, and sprays. Wear utility gloves, a long-sleeved cover jacket or gown, a mask, and safety glasses or a face shield.
- Follow the manufacturer's IFU for each dental instrument that must be sterilized. For example, some instruments should be wiped with a disinfectant wipe while others must be placed in an ultrasonic cleaner, or some can tolerate the use of a washer or washer-disinfector.

Audit tool: Sterilization preparation

Clinic name:				**Date:**
Observer:				
Process element	**Yes**	**No**	**N/A**	**Feedback or comments provided to employee**
Bioburden is removed from instruments at the point of use or held in an appropriate solution (such as enzymatic cleaner) if reprocessing will be delayed.				
Instruments are transported to the sterilization area in a covered, leak-proof, and puncture-resistant container labeled “biohazardous.”				
Hand hygiene is performed at completion of transport.				

Using an ultrasonic cleaner

Ultrasonic cleaners are used before the sterilization process to eliminate any remaining bioburden that may still be on the instrument. It's important to check the instrument manufacturer's IFU to determine if an ultrasonic cleaner is appropriate and necessary for that instrument.

While prepping and maintaining the ultrasonic cleaner:

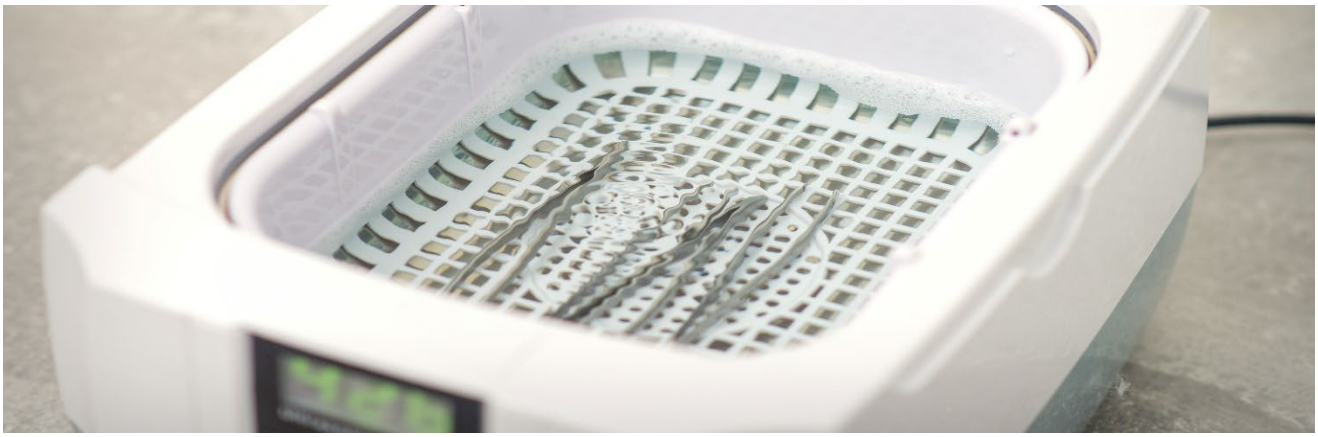
- Follow the manufacturer's IFU to determine the type and volume of solution used in the ultrasonic cleaner.
- Replace ultrasonic solution at least daily and whenever it becomes cloudy or soiled.
  - Degas the ultrasonic cleaner anytime the solution is changed. Allow the ultrasonic cleaner to run for 5 to 10 minutes to remove remaining air that could interfere with the cleaning process in the next cycle.
- Be sure to follow any manufacturer suggested maintenance protocols for the ultrasonic cleaner.

While loading the ultrasonic cleaner:

- Place the instruments in the ultrasonic basket or cassette (not loosely in the bottom).
- Do not to overload the ultrasonic cleaner.
- Ensure the lid is on prior to running the ultrasonic cleaner.

When the ultrasonic cleaning cycle is complete:

- Rinse instruments with water and inspect for any remaining bioburden. If debris remain, do not proceed to sterilization. Hand scrubbing may be necessary before proceeding, or the ultrasonic cycle can be repeated.
- Allow instruments to dry before proceeding to packaging for sterilization.



Audit tool: Ultrasonic cleaner

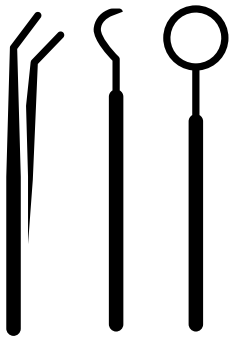
Clinic name:				**Date:**
Observer:				
Process element	**Yes**	**No**	**N/A**	**Feedback or comments provided to employee**
Only instruments with IFU stating that ultrasonic cleaning is appropriate undergo the ultrasonic cleaning process.				
Ultrasonic fluid appears clear and employee attests that fluid is changed daily and whenever it becomes cloudy.				
Ultrasonic cleaner is degassed whenever it is refilled, prior to using it for cleaning instruments.				
Utility gloves, protective eyewear, and a long-sleeved gown or jacket are worn.				
Ultrasonic cleaner is loaded appropriately (not overfilled).				
Ultrasonic cleaner is run with the lid on.				
Instruments are rinsed with water after cleaning cycle.				
Instruments are inspected for remaining bioburden after cleaning cycle.				
Instruments with remaining bioburden undergo further cleaning before proceeding to sterilization.				
Instruments are allowed to dry before beginning the packaging process for sterilization.				
Ultrasonic maintenance is being performed and documented according the IFU.				

Using a washer or washer-disinfector

A washer or washer-disinfector, if available in the office, can be used as another cleaning method to remove remaining bioburden prior to the sterilization process. It's important to check the instrument manufacturer's IFU to determine if a washer or washer-disinfector is appropriate and necessary for that instrument.

When prepping and maintaining the water or washer-disinfector:

- Follow the manufacturer's IFU to determine the type and volume of solution used in the washer or washer-disinfector.
- Be sure to follow any manufacturer suggested maintenance protocols for the washer or washer-disinfector.



When loading the washer or washer-disinfector:

- Place instruments strategically so the washer water can access all surfaces.
- Avoid overloading the washer or washer-disinfector.

When the washer or washer-disinfector cleaning cycle is complete:

- Do not proceed to sterilization if debris remain. Hand scrubbing may be necessary before proceeding, or the wash cycle can be repeated.
- Allow instruments to dry before proceeding to packaging for sterilization.

Audit tool: Washer or washer-disinfector

Clinic name:				**Date:**
Observer:				
Process element	**Yes**	**No**	**N/A**	**Feedback or comments provided to employee**
Instrument IFUs are checked to ensure that using the washer or washer-disinfector is appropriate for each instrument.				
The type and volume of solution being used in the washer or washer-disinfector is appropriate according to the IFU.				
Utility gloves, protective eyewear, and a long-sleeved gown or jacket are worn.				
Instruments are placed appropriately to ensure each instrument can be properly cleaned (the washer or washer-disinfector is not overfilled).				
Instruments are inspected for remaining bioburden after cleaning cycle.				
Instruments that have remaining bioburden undergo further cleaning before proceeding to sterilization.				
Instruments are allowed to dry before beginning the packaging process for sterilization.				
Washer or washer-disinfector maintenance is being performed and documented according the IFU.				

Hand scrubbing instruments

Hand scrubbing is a cleaning method that can be used prior to sterilization. Due to the risk of accidental injury, hand scrubbing instruments is not preferred. It is recommended to use the ultrasonic cleaner or washer-disinfector if they are available and appropriate per the instrument manufacturer's IFU.

When hand scrubbing instruments:

- Wear utility gloves to protect against accidental bloodborne pathogen exposure caused by accidental pokes.
- Use a detergent.
- Hold instruments low in the sink under running water to reduce splashing.
- Use long handled brushes.
- Follow the manufacturer's IFU for proper hand scrubbing methods. For example, some instruments, such as handpieces, are sensitive to water and must not be submerged.

After hand scrubbing is complete:

- Inspect instruments to be sure all debris is removed. If bioburden remains, do not proceed to sterilization. Cleaning must be repeated.
- Rinse instruments and allow them to dry before proceeding to packaging.

Audit tool: Hand scrubbing

Clinic name:				**Date:**
Observer:				
Process element	**Yes**	**No**	**N/A**	**Feedback or comments provided to employee**
Utility gloves, protective eyewear, and a long-sleeved gown or jacket are worn.				
Instrument IFUs are reviewed to ensure a proper cleaner and detergent is being used.				
Instruments that require hand scrubbing with detergent and water are held low in the sink under running water to reduce splashing.				
Brushes, if used, have long handles.				
Brushes, if used, are replaced as needed.				
Instruments with remaining bioburden undergo further cleaning before proceeding to sterilization.				
Instruments are rinsed and allowed to dry before beginning the packaging process for sterilization.				

Instrument packaging for sterilization

After instruments have been hand scrubbed or cleaned using the ultrasonic cleaner, washer, or washer-disinfector, they must be appropriately packaged prior to sterilization. The most common types of sterilization devices used in the dental setting include autoclaves and dry heat sterilizers. It is imperative to check that sterilization pouches, wraps, or other packaging material are appropriate for the type of sterilizer being utilized, per the manufacturer's IFU.

? Did you know? Packaging material can have an expiration date.

Packaging material such as pouches and wraps can sometimes have an expiration date. Most often, this can be found on the box that the packaging material comes in.

Be sure that if the packaging material being used has an expiration date, the clinic has a process to ensure the instruments inside will either be used or reprocessed prior to that date.

When packaging instruments:

- Wear utility gloves to prevent accidental injury. Although instruments are considered clean, pathogens are still present on them at this stage of the process.
- Ensure that instruments are dry.
- Ensure that packaging, such as pouches, peel packs, or wraps, are compatible with the type of sterilizer being used.
- Functional sets may be packaged together, so long as the package is not overfilled.
- Position hinged instruments in the open position to help ensure proper sterilization.
- Place a chemical indicator inside every package. If not visible from the outside of the package, an external chemical indicator should also be utilized.

  i Some pouches come with a chemical indicator integrated into the packaging. This is acceptable, and an additional chemical indicator does not need to be added.

When sealing the sterilization packs:

- Ensure packages are not overloaded.
- Be sure to fold the package over the designated area when sealing. This ensures steam can reach the instruments for proper sterilization.

- Label each pack with the date of sterilization, sterilizer used, load number, and if applicable, the expiration date.

? Did you know? Facilities may choose to use "event-based sterility."

This means items are considered sterile indefinitely (www.cdc.gov/oralhealth/infectioncontrol/faqs/packaging-storing.html), as long as the package remains clean and intact. Alternatively, facilities can choose the duration of the shelf life of sterilized packages.

Audit tool: Instrument packaging

Clinic name:				**Date:**
Observer:				
Process element	**Yes**	**No**	**N/A**	**Feedback or comments provided to employee**
Packaging material being used is compatible with the sterilizer being used.				
Packaging material is not outdated.				
Instruments are dry before starting the packaging process.				
Utility gloves are worn.				
Hinged instruments are packaged in the open position.				
Packages are not overloaded.				
Chemical indicators are integrated into the packaging or placed in every package and are visible from the exterior.				
Pouches are folded over appropriately within the indicated area.				
Packages are properly labeled according to facility policy.				

Sterilization process

The most common methods for sterilizing dental instruments are autoclaves and dry heat sterilizers. It's important to verify which type of sterilizer should be used for each instrument by checking the manufacturer's IFU.

When loading the sterilizer:

- Always load according to the manufacturer's IFU. Some chambers and packaging will have specific instructions regarding the orientation of packages within the chamber (for example, horizontal, vertical, paper side up, or down).
- Avoid overfilling the chambers.

While conducting sterilization monitoring:

- Mechanical, chemical, and biological monitoring must be performed.
  - **Mechanical monitoring** means physically checking gauges or reviewing a printout with every load.
  - **Chemical monitoring** means utilizing a chemical indicator that is either inserted into the instrument package, integrated into the instrument package, or applied externally on the package with every instrument package.
  - **Biological monitoring** (or spore testing) involves utilizing a biological indicator. This can be performed in-house or mailed out to a monitoring service but must be done at least weekly, and any time an implantable device is included in the load.

- Keep a log of all monitoring results. In case of a failure, refer to CDC (https://www.cdc.gov/dental-infection-control/hcp/dental-ipc-faqs/sterilization-monitoring.html) for next steps.

When running the sterilizer:

- Select the proper cycle, according to the manufacturer's IFU of each instrument that is inside the chamber.
- Perform mechanical monitoring of the sterilizer. This involves either reviewing a printout provided by the sterilizer (if applicable), or physically checking the gauges to ensure sterilization parameters have been met.

After the sterilization cycle is complete:

- Allow instrument packages to cool and dry.
- Inspect packages to ensure their integrity. If wet, torn, or damaged, the instruments inside the damaged package must be recleaned, repackaged, and resterilized.
- Inspect each package to verify the chemical indicator has changed as expected. If a chemical indicator has failed, that instrument package must be reprocessed.
- Keep a log with all load information including date, time, sterilizer used, load number, staff performing, contents of load, and mechanical and chemical monitoring results.
- Store items in a designated clean area. Ideally, utilize closed cabinets or cupboards, where instrument packs will be protected from extreme temperature variation, dust, and water contamination.

Never store sterile instrument packs underneath a sink. It is good practice to utilize a "first in, first out" system when storing instrument packages used for patient care.

Audit tool: Loading and running the sterilizer

Clinic name:				**Date:**
Observer:				
Process element	**Yes**	**No**	**N/A**	**Feedback or comments provided to employee**
Packages are loaded in an orientation according to the sterilizer's IFU.				
Sterilizer is loaded appropriately (is not overloaded).				
Mechanical parameters are observed and documented with each sterilizer run.				
Chemical indicators are visible from the exterior of each package.				
The proper sterilization cycle is selected for each instrument being sterilized, according to the IFU.				
Sterilizer maintenance is being performed and documented, according to the IFU.				

Sample sterilization monitoring log

Clinic name:									
Autoclave name:									
Date	**Cycle start time**	**Contents**	**Cycle initiation personnel**	**Instrument removal date and time**	**Mechanical parameters met (Y/N/NA)**	**Chemical indicators changed (Y/N/NA)**	**Biological indicator passed (Y/N/NA)**	**Cycle completion personnel**	**Corrective action taken**
1/1/24	*1300*	*Perio set*	*AR*	*1/1/24 1500*	*Y*	*Y*	*N/A*	*AR*	*n/a*

Retrieving instruments for patient use

When preparing for a patient's arrival, you may organize and set up the treatment area. It's important to verify that instruments were properly sterilized before using them on a patient.

When retrieving instrument packages:

- Inspect the package for proper chemical indicator change and any damage to the integrity of the package. Even though the assumption is that the person who emptied the sterilizer has checked the package and indicators, the end-user should always verify this before the instrument is used.
- Bring instrument packages to the patient care area. Allow them to remain in the sterile packaging until the patient's arrival. Open sterilized instruments in front of the patient to provide assurance to the patient that the instruments used for their care are sterile before use.

  Avoid opening sterile packages and leaving them unattended in anticipation of a patient's arrival. Air contaminants can reach these instruments and render them non-sterile prior to use.

Audit tool: Post-sterilization

Clinic name:				**Date:**
Observer:				
Process element	**Yes**	**No**	**N/A**	**Feedback or comments provided to employee**
The sterilization cycle is allowed to complete before the sterilizer is opened.				
The staff member verifies proper sterilization parameters were met during cycle.				
Packages are allowed to cool and dry before manipulating.				
Packages are inspected for chemical indicator change prior to storing.				
Packages are inspected to ensure they are not torn or otherwise damaged prior to storage.				
Acceptable packages are stored in a clean, dry location to protect against damage and contamination.				
If proceeding to utilize package for instrument care, the staff member waits until the patient arrives before opening sterile packages.				

Additional resources

- **Infection prevention and control support for Wisconsin dental practices:** The Wisconsin Department of Health Services (DHS) Healthcare-Associated Infections (HAI) Prevention Program offers free, educational, collaborative, and non-regulatory infection prevention and control support services to Wisconsin oral health and dental clinics. Contact the HAI Prevention Program (https://www.dhs.wisconsin.gov/hai/contacts.htm) for more information
- **Infection Prevention in Oral Health Settings webpage** (https://www.dhs.wisconsin.gov/hai/oral-health.htm)**:** This webpage developed by the DHS Wisconsin HAI Prevention Program provides a summary of basic infection prevention and control resources for dental and oral health clinics including private dental practices, dental schools, and federally qualified health centers offering dental services.
- **Information for Health Care Professionals webpage** (https://www.dhs.wisconsin.gov/oral-health/resource-center.htm): This webpage developed by the DHS Wisconsin Oral Health Program provides professionals with information about oral health and resources to share with patients.
- **Data and Reports webpage** (https://www.dhs.wisconsin.gov/oral-health/data.htm): This webpage contains interactive data dashboards, developed by the DHS Wisconsin Oral Health Program, on oral health and pregnancy, opioid prescribing, and dental professional shortages.