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# Standard of Practice: Infection Prevention and Control Standards and Risk Management for Dentistry

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## **Alberta Dental Association and College**

### **Standard of Practice: Infection Prevention and Control Standards and Risk Management for Dentistry**

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Dentists should implement this set of standards effective January 1, 2011; these standards must be fully implemented in all dental offices by January 1, 2012. At any time, a particular dental practice could be required by the ADA+C to implement these standards and/or Alberta Health and Wellness/Alberta Health Services could require a particular dental office to implement these standards or their standards. These ADA+C standards are mandatory immediately if implantable devices, including bone grafting, is involved.

Numerous terms in this Standards document are defined in the Glossary of Terms of the Appendix document (see page 26). Readers are advised to consult the Glossary when reviewing this Standards document or the Appendix document.

## **1.0. Written Policies and Procedures**

- 1.1. The dental office or clinic must have written Infection Prevention and Control policies and procedures. These policies and procedures must include but are not limited to:
  - 1.1.1. The reporting structure of individuals who have authorization, responsibility and accountability to develop, approve, monitor and maintain reprocessing policies and procedures:
  - 1.1.2. A hand hygiene policy and procedure must be developed by each dental office/clinic that includes the following:
    - Indications for hand hygiene;
    - Selection of hand hygiene agent;
    - Management of soap containers;
    - Hand lotion use;
    - Use of alcohol-based hand rubs; and
    - Hand hygiene monitoring and compliance audits.
  - 1.1.3. The selection, acquisition, transportation, receiving, handling, processing and disposal of new, loaned, shared and leased dental instruments and devices;
  - 1.1.4. Manufacturer's directions regarding maintenance and reprocessing;
  - 1.1.5. Sterilization processes following IPC principles as set out in the Alberta Dental Association and College Standards; and
  - 1.1.6. The protection and safety of personnel in accordance with the Occupational Health and Safety Act.
- 1.2. The dentist must ensure that the DHCP employed by the dentist are aware and comply with the documentation required for IPC and Occupational Health purposes.
- 1.3. The dental clinic owner and dentists working in that facility must review all policies annually to ensure policies are kept up-to-date with all current Alberta Dental Association and College Standards.
  - 1.3.1. IPC training and continuing education is to be in accordance with the ADA+C Standards.

## **2.0. Patient Evaluation**

- 2.1. Dentists must be vigilant with respect to the signs, symptoms and epidemiology of various communicable diseases when presented, including blood-borne pathogens, Methicillin Resistant Staphylococcus aureus (MRSA), pseudomembraneous colitis (*Clostridium difficile* infection), Severe Acute Respiratory Syndrome (SARS) and other influenza-like illnesses, Tuberculosis (TB) and Vancomycin Resistant Enterococcus (VRE).

Additional (transmission-based) Precautions:

Additional (transmission-based) precautions are taken while ensuring routine practices are maintained in the following situations.

- 2.1.1. Airborne Precautions must be used in addition to Routine Practices for patients with influenza-like illnesses or tuberculosis.
- 2.1.2. Contact Precautions (including gowns for example) must be used in addition to Routine Practices for patients with known or suspected MRSA or VRE colonization or infection.

## **3.0. Hand Hygiene**

- 3.1. Proper hand hygiene must be performed by the dentist and all DHCP:
  - 3.1.1. Before and after contact with any patient, their body substances or items contaminated by them.
  - 3.1.2. Before and after performing invasive procedures.
  - 3.1.3. Before preparing, handling, serving or eating food.
  - 3.1.4. After assisting patients with personal care (providing oral hygiene or oral hygiene instruction).
  - 3.1.5. Before putting on and after taking off gloves.
  - 3.1.6. After performing personal functions (e.g., using the toilet, blowing nose).
  - 3.1.7. When hands come into contact with secretions, excretions, blood or bodily fluids.
  - 3.1.8. Before handling clean supplies and setting up.
- 3.2. The hands of the DHCP must be washed using appropriate anti-microbial soap, water and disposable towel combination at the beginning of the workday, after eating, after using the washroom or whenever the hands become contaminated with blood, saliva or other bodily fluid, or have been in contact with contaminated instruments or devices. Although a separate sink for hand hygiene is desirable, sinks that have been used by patients to expectorate in or sinks that have being used to decontaminate instruments must be cleaned, disinfected and identified before being used by DHCP for hand washing.
- 3.3. The hands of the DHCP must undergo antisepsis, using either appropriate anti-microbial soap, water, disposable towel combination or an appropriate alcohol-based (70-90%) hand rub, prior to beginning patient treatment before donning gloves, between patients after removing gloves or whenever gloves are changed during a patient visit. Alcohol-based hand rubs are to be used only if the hands are not visibly soiled.
- 3.4. Anti-microbial soap and alcohol-based hand rub dispensers (including pump assemblies), if not single-use, must be cleaned and dried prior to refilling. A cartridge system that cannot be topped up is preferred.

- 3.5. DHCP must not wear hand jewellery, other than smooth metal band rings, when performing hand hygiene or during clinical treatment. All hand jewellery must be removed when invasive dental procedures are performed, as defined by 4.1.1.
- 3.6. DHCP must not wear artificial nails, nail enhancements or long nails. Fingernails should be kept short (less than 3-4mm). The nail should not show past the end of the finger.
  - 3.6.1. DHCP must not have chipped nail polish on their fingers. Only nail polish that is fresh and free of all cracks or chips is acceptable.
- 3.7. DHCP must not use a standing basin of water to rinse hands.
- 3.8. DHCP must use disposable hand towels to dry hands after hand hygiene.
- 3.9. DHCP must not use non-alcohol based waterless antiseptic agents for hand hygiene.

#### **4.0. Personal Protective Equipment**

- 4.1. DHCP must wear new single-use protective gloves for patient care; whenever the hands might be contaminated with blood, saliva or other bodily fluid, or will be in contact with contaminated instruments or devices.
  - 4.1.1. DHCP must wear sterile gloves whenever invasive surgical procedures are performed. This includes:
    - Whenever intentional gingival, mucosal or dermal flaps are raised;
    - Whenever the cutting or sectioning of bone is anticipated; and whenever a simple procedure becomes a surgical procedure; (e.g., a tooth breaking that then requires surgical extraction).
  - 4.1.2. DHCP must wear chemical resistant, puncture proof utility gloves when reprocessing instruments.
- 4.2. DHCP must wear a surgical mask that covers the nose and mouth during dental procedures whenever splashes, sprays or spatter of blood, saliva, other body fluids, or water contaminated with blood, saliva or other body fluids may be produced. The mask must be changed whenever it becomes contaminated or wet or according to manufacturer's directions.
- 4.3. DHCP must wear protective eyewear that completely covers the eyes during dental procedures whenever splashes, sprays or spatter of blood, saliva, other body fluids, or water contaminated with blood, saliva or other body fluids may be produced.
- 4.4. All PPE must be removed prior to leaving the patient care area.
- 4.5. All PPE (utility gloves, gowns, protective eyewear and masks or face shield) must be worn by personnel during instrument decontamination.

## **5.0. Purchasing and Assessing Dental Instruments and Devices and Products for Disinfection or Sterilization Processes**

- 5.1. Dentists must ensure that all instruments, medical devices and chemical products are licensed by Health Canada, and are used within these licensing parameters. Dental suction units are considered to be medical devices and as such must have a license issued by Health Canada Medical Devices Bureau in accordance with the Medical Device Regulations, Section 36. Reusable dental instruments and devices that cannot be reprocessed according to the manufacturer's instructions and Alberta Dental Association and College standards must not be used.
- 5.2. All dental and medical devices or chemical products used in reprocessing must meet Occupational Health and Safety (OHS) requirements.
- 5.3. The dental clinic must have available from the manufacturer of all reusable dental devices:
  - 5.3.1. Information about the design of the dental device; manuals/directions for use;
  - 5.3.2. Dental device-specific recommendations for cleaning and reprocessing of device;
  - 5.3.3. Personnel training materials on the use, cleaning and the correct reprocessing of all dental devices; and
  - 5.3.4. Recommendations for monitoring the procedures required for reprocessing of the device.
- 5.4. Newly purchased non-sterile critical and semi-critical dental instruments and devices must be inspected and processed according to manufacturer's written instructions prior to use. Examples would include, but not be limited to, burs, endodontic files, implant parts, etc.
- 5.5. Surgical instruments that are used on low risk neurological tissue (e.g., dental pulp tissue) from patients at high risk for Creutzfeldt-Jakob Disease (CJD) must be disposed of, or decontaminated in accordance with the Health Canada / Public Health Agency of Canada infection control guideline, *Classic Creutzfeldt-Jakob Disease in Canada*.

## **6.0. Selection of Products and Processes for Reprocessing**

- 6.1. All reusable dental instruments and devices must have written device-specific manufacturer's cleaning, decontamination, disinfection, wrapping and sterilization instructions.
  - 6.1.1. The processes and products used for reprocessing must be compatible with each other and the device.
  - 6.1.2. The reprocessing processes and products used in the reprocessing of a dental instrument or device must be determined by the intended use of the device in accordance with the Spaulding Classification.
  - 6.1.3. If disassembly or reassembly is required, responsible DHCP must ensure that manufacturer's instructions used include detailed instructions and diagrams.
- 6.2. The dentist is ultimately responsible for the selection of products and processes for reprocessing. The delegation of this responsibility must only be to an individual whose competency in the area of instrument reprocessing has been demonstrated to the dentist.
  - 6.2.1. Staff training must be provided on disassembly, reassembly and reprocessing before the dental instrument or device is placed into use.

## **7.0. Environmental and Structural Considerations**

- 7.1. There must be a centralized reprocessing area for collecting, cleaning and decontaminating contaminated dental instruments and devices.
- 7.2. The reprocessing space must:
  - 7.2.1. Have adequate space for the cleaning process and storage of necessary equipment and supplies;
  - 7.2.2. Have physically or spatially separate decontamination areas from areas where clean, disinfected or sterile dental instruments and devices are handled or stored;
  - 7.2.3. Have easy access to hand hygiene facilities;
  - 7.2.4. Have surfaces that can be easily cleaned;
  - 7.2.5. Have one-way movement of instruments through the reprocessing process, from dirty to sterile;
  - 7.2.6. Have air changes, temperature and humidity appropriate to the process and product being used as set out by manufacturer's instructions; and
  - 7.2.7. New construction, office renovation or relocation must consider environmental, structural and ventilation considerations, including a separate room for reprocessing with one-way instrument and personnel flow.
- 7.3. The dental clinic must use a water supply which is tested for and free of contaminants, such as a monitored municipal water supply.
  - 7.3.1. Sterile water or sterile saline must be used for irrigation during surgery where there are open vascular sites or whenever bone is cut.
- 7.4. The dental clinic must have written contingency plans for loss of potable water, boil water advisories and other situations where the water supply becomes compromised.
- 7.5. DHCP must not touch non-barrier protected environmental surfaces (door knobs, cupboards, pens, computer keyboard or mouse, clipboards, etc.) with contaminated gloves during or after patient treatment.
- 7.6. The dental facility premises must be kept neat, clean, and free of exposed waste material.

## **8.0. Transportation and Handling of Contaminated Dental Instruments and Devices**

- 8.1. Disposable sharps must be removed and disposed of in an approved sharps container at the point of use, or immediately following transportation to the reprocessing area. Sharps containers must be labeled and disposed of according to local municipal regulations.
- 8.2. DHCP must be aware of the handling and proper disposal of biomedical waste and hazardous materials from a clinical dental office or clinic. The Best Practice Management Dental Wastes document on the ADA+C members' only website has detailed instruction on best practice management in dental wastes.
  - 8.2.1. Blood saturated gauze, saliva saturated gauze, or removed tissue must be disposed of in properly identified biohazardous containers and transported for final disposal according to local municipal regulations (see Environmental Infection Control, Waste Management, page 82).

- 8.3. If dental instruments and devices cannot be cleaned immediately after use, the instruments or devices must be kept moist in a transport container by using a wet towel moistened with water, a holding solution or foam, spray or gel product (not saline) specifically intended for this use.
- 8.4. All personnel who handle contaminated dental instruments and devices must handle those devices in a manner which reduces the risk of:
  - 8.4.1. Exposure and/or injury to self, other personnel and patients; and
  - 8.4.2. Contamination of environmental surfaces.
- 8.5. From the point of use, contaminated critical and semi-critical dental instruments and devices must be taken directly to the area designated for handling contaminated devices and if required, initial disassembly completed.
- 8.6. Where there is no dedicated direct access from point of use to the area designated for handling contaminated dental instruments and devices, contaminated instruments and devices must be securely contained in a covered container, for example, covered trays or cassettes, and closed containers or carts must be used for transport of contaminated materials.
- 8.7. Contaminated dental instruments and devices which have not been reprocessed must be clearly labeled as not reprocessed by use of a labeling system such as color coding or tagging.

## **9.0. Cleaning Reusable Dental Instruments and Devices**

- 9.1. Reusable dental instruments and devices must be cleaned of all debris, including dental materials and bioburden before disinfection or sterilization.
- 9.2. The cleaning process must include disassembly (if required), sorting and soaking, physical removal of dental materials and organic material, rinsing, drying, physical inspection, corrosion reduction/ lubrication (if required) and wrapping.
- 9.3. In contrast to critical and semi-critical items, most non-critical reusable items may be decontaminated where they are used and do not need to be transported to a central reprocessing area. Low-level disinfectants must be used for cleaning then disinfecting non-critical patient care items.
- 9.4. Reusable dental instruments must be cleaned with an instrument detergent or enzymatic product that is utilized according to manufacturer's instructions and is discarded after each use.
- 9.5. Automated cleaning equipment (e.g., ultrasonic cleaners, instrument washers) must be operated and maintained according to manufacturer's instructions and this must be documented.
- 9.6. Cleaning accessories (e.g., long-handled brushes) must be disposable or thoroughly cleaned and high-level disinfected or sterilized between uses.

## **10.0. Disinfection of Reusable Dental Instruments and Devices**

- 10.1. Heat sensitive semi-critical dental instruments or devices must be disinfected as per manufacturer's instructions using high-level disinfection or a pasteurization process.
  - 10.1.1. X-Ray film packets are a single-use item and must be disinfected with a low-level disinfectant prior to developing to avoid contamination of the radiograph processor. Digital X-Ray sensors must be barrier protected and, if contaminated, disinfected between patient use.
- 10.2. All solutions used for disinfecting dental instruments and devices must have a Drug Identification Number (DIN) from Health Canada.
- 10.3. High-level disinfection solutions used for immersion disinfection for any dental instrument or device must be prepared and monitored according to the manufacturer's recommendation and the results of the monitoring must be recorded. If an immersion chemical product is used, the concentration of the active ingredient(s) must be verified and a logbook of daily concentration test results must be maintained.
- 10.4. Devices not readily disinfected, and not routinely used in dentistry, such as endoscopes, must be cleaned and disinfected/sterilized according to the manufacturer's instructions.

## **11.0. Sterilization of Reusable Dental Instruments and Devices**

- 11.1. Critical dental instruments and devices must be sterilized.
  - 11.1.1. Steam sterilization shall be used for critical or semi-critical dental instruments and devices that are compatible with heat and moisture. Manufacturer's instructions must be followed.
- 11.2. The following processes must not be used for sterilization of dental instruments or devices:
  - 11.2.1. Boiling;
  - 11.2.2. Ultraviolet light;
  - 11.2.3. Glass bead sterilization;
  - 11.2.4. Ovens designed for food preparation; or
  - 11.2.5. Microwave ovens.
- 11.3. All sterilization processes must follow the manufacturer's instructions for installation, operation, preventative maintenance and quality assurance monitoring of the equipment and must be documented.
- 11.4. The sterilization process must be tested, monitored, documented and audited. For all sterilizers:
  - 11.4.1. The following must be completed to ensure that effective sterilization has been achieved:
    - Mechanical monitoring – Mechanical or electronic failure alarms for time, temperature, and pressure must be in place, and their correct functioning recorded for each cycle; integrated printouts or data retrieval devices recording these parameters are recommended and preferred but this information may be recorded by staff on designated recording forms.

- Chemical monitoring – Each instrument pack or cassette must have an external Class 1 process indicator applied to, or visible from, the exterior of the package, and an internal chemical indicator that is a Class 4 multi-parameter indicator or a Class 5 integrating indicator. Class 5 integrating indicators must be used inside the material and/or instrument packs whenever implantable devices are used.
- Biologic monitoring – Sterilizers must be monitored with an appropriate biological indicator (BI) each day and for each type of cycle used (i.e., wrapped and unwrapped cycles if both are used).
- Bowie-Dick Test monitoring – A Bowie-Dick test must be performed for all pre-vacuum capable sterilizers in an empty chamber daily.

11.4.2. Daily operation of the sterilizer must be documented for each cycle that is run and any malfunction shall be noted and appropriate action taken to ensure that the dental instruments and devices are either properly treated or are returned for reprocessing.

- 11.5. Sterilizers must be subjected to biologic testing and monitoring on installation, and following disruptions to their normal activity with three biologic monitor tests and, in the case of pre-vacuum sterilizers, three biologic monitor tests and three Bowie-Dick tests. A log must be kept of all biological monitoring results.
- 11.6. Flash sterilization of critical instruments, where the instruments are unwrapped or not in cassettes, must only be used in emergency situations and must never be used for implantable equipment/devices.
- 11.7. A biologic monitor must be used with each load of surgical instruments if implantable dental or medical devices (for example, dental implants, bone grafting screws, temporary anchorage devices, bone plates, etc.) are being placed. These instrument packs and implantable devices or materials must not be used until the results of the biologic monitor test are known, and must be tracked for date, load and sterilizer used, and this information must be recorded in the patient's record at the time of placement.
- 11.8. In the event of a failure in the sterilization process (failure of the sterilizer, failure of chemical indicators or the failure of the biological indicator) there must be a process in place to investigate the cause of the event, document actions taken, and recall sterilization loads if necessary.

## **12.0. Storage and Use of Reprocessed Dental Instruments and Devices**

- 12.1. Packages containing the sterile dental instruments or devices must be labeled with the sterilizer number, load number of that sterilizer and sterilization date that they were reprocessed.
- 12.2. Sterile dental instruments or devices must be maintained as sterile until the point of use. If the integrity of the package or container has been compromised (e.g., wet, torn, visibly soiled) the contents must not be used and the devices must be reprocessed.
- 12.3. Reprocessed dental instruments or devices must be stored in a clean, dry location in a manner that prevents contamination or damage.

- 12.4. Reprocessed dental instruments or devices must be inspected for integrity upon opening the instrument or device pack or cassette at the point of use. The results of the internal chemical indicator, must be validated prior to the use of the dental instruments or devices.

### **13.0. Environmental Infection Prevention and Control Practices**

- 13.1. All finishes in the dental setting must be cleanable and intact (e.g., chair covers, counter tops and dental unit).
- 13.2. All clinical contact surfaces must be cleaned and disinfected OR single-use surface covers must be used between patients.
- 13.3. If surface covers are used:
  - 13.3.1. They must cover the entire surface including the edges.
  - 13.3.2. They must be moisture impervious.
  - 13.3.3. They must be applied with clean hands (hands that have recently had hand hygiene performed on them) or clean gloves.
  - 13.3.4. They must be removed and discarded, using single-use protective gloves, between patients. Following their removal, all surfaces must be inspected for evidence of contamination and cleaned and disinfected if contaminated.
  - 13.3.5. All clinical operatory surfaces must be cleaned and disinfected at least daily when surface covers are used.
- 13.4. If surface covers are not used:
  - 13.4.1. All surfaces must be cleaned and disinfected between each patient.
  - 13.4.2. A hospital-grade low-level disinfectant that is labeled, stored, prepared and applied according to the manufacturer's instructions must be used to clean and disinfect clinical contact surfaces.
- 13.5. Components of dental devices that are permanently attached to the dental unit water lines (e.g., electric handpiece motors, handles for ultrasonic devices attachments for saliva ejectors, high-speed air evacuators, etc.) must be disinfected or covered with surface barriers that are changed after each use.
- 13.6. Radiographic equipment (e.g., tube heads and control panel) must be cleaned and disinfected between patients or protected with surface barriers that are changed between patients.

### **14.0. Dental Unit Waterlines**

- 14.1. All waterlines must be purged at the beginning of each workday by flushing the lines thoroughly with water for a minimum of two minutes.
- 14.2. Waterlines must be purged for a minimum of twenty seconds after patient care.
- 14.3. Manufacturer's instructions of the dental units and dental equipment must be followed for daily and weekly maintenance whenever closed water systems or other special water delivery systems are utilized.

- 14.4. Suction lines must be aspirated with water or disinfectant solution between patients to reduce likelihood of infectious material backflow.
- 14.5. Suction lines must be cleaned once a week with an enzymatic cleaner.

## **15.0. Single-Use Instruments and Devices**

- 15.1. Single-use dental instruments or devices that are labeled by the manufacturer as single-use must not be reused on any other patient. Single-use medical/dental devices shall only be used on an individual patient for a single procedure and then must be discarded.
  - 15.1.1. Any item marked with the symbol below is considered single-use, and would include, but is not limited to: syringe needles, disposable syringes, prophylaxis cups and brushes, implant parts, temporary anchorage devices, bone grafting materials and some orthodontic brackets and wires.



- 15.1.2. Packaged bone grafting materials are single-use, and must only be used on a single patient, on a single day.
- 15.2. Dentists administering medications using multi-use vials (such as for intravenous sedation) must use a new single-use disposable needle and a new single-use disposable syringe for each entry into a multi-dose vial, and follow proper aseptic technique when administering the medication.
  - 15.2.1. Multi-dose vials must be dated upon opening and discarded prior to the expiry date listed on the label.
  - 15.2.2. The vial septum must be cleaned with a new disinfectant swab prior to each entry.
  - 15.2.3. A new needle and a new syringe must be used for each entry into a vial.
  - 15.2.4. Drugs must never be delivered to more than one patient or IV system attached to the patient from a common syringe or IV bag.

## **16.0. Occupational Health and Safety Requirements**

- 16.1. The dental clinic must comply with the Alberta *Occupational Health and Safety (OHS) Act, Regulation and Code*.
  - 16.1.1. A written hazard assessment must be completed to identify physical, biological, chemical and radiation risks in the dental clinic, according to Alberta Safe Workplaces Employment and Immigration Standards.
  - 16.1.2. The reprocessing area must be limited to reprocessing activities only and all other activities are prohibited, including eating or drinking, storage of food, smoking, application of cosmetics, or handling of contact lenses.
  - 16.1.3. Air handling systems must be adequate to protect personnel from toxic vapours.

- 16.1.4. Chemicals must be stored according to manufacturer's instructions, and Material Safety Data Sheets (MSDS) documentation must be available, as required by the Workplace Hazardous Materials Information System (WHMIS).
- 16.1.5. DHCPs handling contaminated dental instruments or devices must wear personal protective equipment (PPE).
- 16.1.6. All DHCP must comply with immunizations required in a clinical dental setting.
  - 16.1.6.1. All clinical DHCP and reprocessing personnel must be assessed regarding their immunity to Hepatitis B and, if not adequately protected, provided Hepatitis B immunization, if required.
- 16.1.7. A first aid plan, equipment and services must be in place.
- 16.1.8. All DHCP must be aware of the signs of possible latex adverse reactions and have a plan in place to deal with such reactions.
- 16.1.9. The dental clinic must have written policies regarding Work Practice Controls to prevent exposure to blood and body fluids, exposure to chemicals, and injuries from sharp objects.
- 16.1.10. Policies and procedures must be in place for immediate response to worker exposure to chemicals.
- 16.1.11. Policies and procedures must be in place for immediate response and post-exposure management of workers exposed to blood and body fluids.
- 16.1.12. Policies and procedures must be in place for immediate response to worker exposure to sharp objects.
- 16.1.13. The dental clinic must ensure that ventilation is in place to remove toxic vapours generated by, or emitted from, cleaning or disinfecting agents.

## **17.0. Ethical Responsibilities**

- 17.1. DHCP must not refuse oral health care to individuals solely based on the patient's seropositivity status to any blood-borne pathogen (including HIV, HBV, HCV).
- 17.2. If a dentist has a blood borne infection (HBV, HCV and/or HIV), the dentist must immediately inform the Alberta Dental Association and College.
- 17.3. If a dentist knows of or has reason to suspect the existence of a nuisance or a threat that is or may be injurious or dangerous to the public health, the dentist has a legal obligation to immediately notify the Medical Officer of Health of the appropriate regional health region by the fastest means possible, according to the Health Professions Act. Contact information can be obtained from [Alberta Health and Wellness](#).
- 17.4. These Standards must be followed by dentists in Alberta. Failure to do so constitutes unprofessional conduct and may result in disciplinary action by the Alberta Dental Association and College.

# APPENDIX

## **Alberta Dental Association and College**

### **Standard of Practice: Infection Prevention and Control Standards and Risk Management for Dentistry**

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Dentists and Dental Health Care Personnel have dealt with the concepts and principles of infection control and infection prevention since early in the history of the profession. Historically, the profession of dentistry has been at the forefront of developments in infection control in ambulatory health-care settings. Due to the biologic and micro-floral realities of the oral environment, as well as the difficulties in managing the surfaces and equipment involved in oral health care, creating a medical surgical operating room level of sterility is not necessary, as the oral cavity is not a sterile environment, however, flora or pathogens must not be transmitted between patients.

Alberta Health and Wellness has provided information and standards on infection control and infection prevention by publishing the following resources:

- [Alberta Infection Prevention and Control Strategy](#)
- [Standards for Infection Prevention and Control Accountability and Reporting](#)
- [Alberta Hand Hygiene Strategy](#)
- [Standards for Cleaning, Disinfection and Sterilization of Reusable Medical Devices for all Health Care Facilities and Settings](#)
- [Standards for Single-Use Medical Devices](#)
- [Manufacturer/Distributor Reprocessing Information](#)
- [Standards for Prevention and Management of Methicillin-Resistant-\*Staphylococcus aureus\*](#)

Information from the above resources has been used in this document where appropriate for the dental profession. This document also utilizes information gained from scientific discovery and technical advances in the past decade. This section of the ADA+C Infection Prevention and Control Standards is also based on the document, "Infection Prevention and Control in the Dental Office: An opportunity to improve safety and compliance", which is available from the [Canadian Dental Association](#).

These standards set minimum requirements for infection prevention and control policies and procedures as well as minimum requirements for cleaning, disinfection and sterilization of reusable medical devices in all dental facilities and settings. Higher standards may be required based on specific circumstances. Standards and guidelines established by Health Canada, the Public Health Agency of Canada, Occupational Health and Safety and the Canadian Standards Association (CSA) may also be applicable.

The term "Infection Prevention and Control" will be used throughout this document, as this phrase identifies the objectives of preventing cross-contamination and controlling infection spread in the dental setting.

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Due to the very nature of infection prevention and control, it is difficult, if not impossible, to establish the scientific validity for every recommendation provided in this document. Wherever possible, these recommendations are based on data from well-designed scientific studies or standard references (see Appendix References, page 99).

However, only a limited number of well-designed, rigorous scientific studies exist which characterize actual risk factors and the effectiveness of procedures. Many of the infection-control practices routinely used by health-care practitioners cannot be meticulously examined for ethical or logistical reasons. In the absence of high levels of evidence for such practices, many of these recommendations are based on strong theoretical rationale, suggestive evidence or opinions of respected authorities based on clinical experience, descriptive studies or committee consensus reports. As scientific knowledge regarding infection prevention and control in the dental health-care setting continues to evolve, many of these recommendations will be validated, some will be challenged and others may be added.

This document is intended to protect dentists, their staff and their patients from infectious disease transmission and exposure to harmful substances as defined in OHS legislation. Dental Health Care Personnel are encouraged to apply this information in a diligent, conscientious manner.

In this document, **Dental Health Care Personnel** (DHCP) refers to the variety of paid and unpaid personnel in the dental health-care setting who might be exposed to infectious materials, including body substances (blood, saliva, etc.) and contaminated supplies, equipment, environmental surfaces, water, or air. DHCP includes dentists, dental hygienists, dental assistants, dental laboratory technicians (in-office and commercial), students and trainees, contractual personnel, as well as other personnel that may not be directly involved in patient care, but may be potentially exposed to infectious agents (e.g., administrative, clerical, housekeeping, maintenance, or volunteer personnel).

The simple presence of this document in a dental office or clinic does not constitute meeting the requirement of a written IPC policy. However, if the dental office or clinic conscientiously goes through this document and personalizes the sections with notes indicating whom is responsible for what, exactly what materials and processes are used for instrument and equipment reprocessing, etc., then this document will serve as the office's or clinic's Infection Prevention and Control Policy Manual, and can be referred to for audit purposes. Each office needs to have an office specific procedure manual detailing how to implement IPC and reprocessing in their specific environment. One person should be designated to oversee the development and implementation of IPC practices within the clinic, but the ultimate responsibility rests with the principal dentist.

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For recommendations in this document:

- “Shall” indicates mandatory requirements based on legislated requirements;
- “Must” indicates best practice, i.e., the minimum standard based on current recommendations in the medical literature;
- “Should” indicates a recommendation or that which is advised but not mandatory; and
- “May” indicates an advisory or optional statement.

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Dentists in Alberta have a professional duty to cause no harm to their patients, and to provide a safe working environment for the other DHCP in their practice. Due to the biologic nature of the oral cavity, as well as the nature of dental and oral health care, transmission of infectious diseases before, during or after dental and oral health care is possible.

The dental profession in Alberta has a long tradition of providing appropriate and compassionate care to the public, including special groups with special needs. Individuals with infectious diseases should have access to oral health care, including dental treatment. This care and treatment should provide for the well being of these patients, as well as for the protection of the health of the public and all DHCP.

- As professionals with a unique body of knowledge and skills rendered by their educational preparation and license to practice, dentists recognize a moral and ethical requirement to provide necessary dental treatment to all members of the public without discrimination. Accordingly, dentists and all DHCP must not refuse to treat a patient solely on the grounds of the patient's infectious state. (e.g., patient with active TB should delay treatment until treated for TB or can be moved to the best location to provide care).
- People living with infectious diseases may, however, be severely or profoundly medically compromised as a result of that infectious disease. Such individuals may have severe hepatic or renal dysfunction, coagulopathies, respiratory depression, altered states of consciousness and may be taking multiple medications, which may interact or interfere with planned oral health care.
- Any DHCP providing oral health care to such individuals must be familiar with the oral manifestations of the specific infectious disease involved, the oral and systemic effects of the medications used to treat that infectious disease, any potential medication interactions, as well as any treatment modifications necessary to realistically provide appropriate oral health care. When a person living with an infectious disease is severely or profoundly medically compromised, it may be safest for the patient to treat that individual in a multidisciplinary hospital setting.

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- A dentist infected by an infectious agent does not normally pose a significant risk of infecting patients, other DHCP or the public, provided he or she is practicing current recommended infection prevention and control procedures. However, if the condition has either immediately affected, or may affect over time, his or her ability to practice safely and competently, the dentist must inform the Registrar of the Alberta Dental Association and College of the infectious status. Appropriate measures will then be taken to ensure the protection of the public and other DHCP by the ADA+C, including possible review by an expert panel.
- The dentist has a professional obligation to maintain the standards of practice of the profession and, accordingly, must ensure that these Infection Prevention and Control Standards are carried out in his or her practice. Only those products specifically designed to be used for infection prevention and control should be utilized in a dental health-care setting.
- DHCP have an obligation to maintain currency of knowledge of infection prevention and control procedures and to apply these procedures in the practice setting. Dental personnel should accept a responsibility to contribute to public understanding of effective approaches to infection prevention and control.

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Recommendations in this document are designed to prevent or reduce the potential for infectious disease transmission from patient to DHCP, from DHCP to patient and from patient to patient.

Dental patients and DHCP can be exposed to pathogenic microorganisms including:

- Viruses: cytomegalovirus (CMV), HIV, HBV, HCV, herpes simplex virus types 1 and 2,
- Bacteria: *Mycobacterium tuberculosis*, staphylococci, streptococci, and
- Other microbes that colonize or infect the oral cavity and respiratory tract.

### **Modes of Transmission**

These organisms can be transmitted in dental settings through:

1. **Direct transmission**  
Direct physical contact with blood, oral fluids, or other patient materials;
2. **Indirect transmission**  
Contact with an intermediate contaminated object (e.g., instruments, equipment, or environmental surfaces);
3. **Droplet transmission**  
Contact of conjunctival, nasal, or oral mucosa with droplets (e.g., spatter > 5 microns) containing microorganisms generated from an infected person and propelled a short distance (e.g., by coughing, sneezing, or talking); and
4. **Airborne transmission**  
Inhalation of airborne microorganisms (< 5 microns) that can remain suspended in the air for long periods.

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#### Criteria for Infection

Infection transmission through any of these routes requires that all of the following conditions are met:

- The presence of a pathogenic organism of sufficient virulence and in adequate numbers to cause disease;
- The presence of a reservoir or source that allows the pathogen to survive and multiply (e.g., blood);
- The presence of a vector of transmission from the source to the host;
- The presence of an appropriate portal of entry through which the pathogen can enter the host (e.g., needle-stick injury); and
- The presence of a susceptible host (i.e., someone who is not immune).

The simultaneous occurrence of these criteria for infection transmission is referred to as the chain of infection. Effective infection prevention and control procedures interrupt one or more links in this chain.

Medical histories and symptomology, whether written or verbal, physical examinations and laboratory tests may not always reveal the presence of an infectious process, disease, carrier state or pre-symptomatic phases of disease in an individual. Thus, the same minimal infection prevention and control protocols must be used for all patients, regardless of known or suspected infectious status.

This concept is known as Standard Precautions or Routine Practices. Health Canada uses the term routine practices to describe basic standards of IPC.

All DHCP should understand that comprehensive consistency in the implementation and practice of these recommendations helps to ensure a safe work environment and a safe treatment environment for their patients.

**Note:** The older term “Universal Precautions” specifically dealt with recommendations to prevent the transmission of blood-borne pathogens; specifically HBV, HCV and HIV. This term has been replaced by the term “Routine Practices” in Canada to address the universal application of recommendations to prevent the transmission of pathogens that can be spread not only by blood, but by any body fluid, excretion, or secretion.

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#### Medical History of Patient and Infection Prevention and Control Risk Assessment

Obtaining a thorough and relevant medical history of the patient is an important part of an Infection Prevention and Control program. This history must be reviewed and, if necessary, updated at subsequent visits, as appropriate. Depending on the mode of transmission of the infectious agent involved, Additional Precautions above and beyond Standard Precautions / Routine Practices may be necessary. For the purposes of risk assessment of infectious agents, dentists should expressly inquire about some or all of the following:

- New cough or shortness of breath;
- New fever or chills in the last 24 hours;
- New onset diarrhoea;
- New undiagnosed rash, lesion, or break in skin;
- Recent exposure to communicable infectious disease, (e.g., measles, chicken pox or tuberculosis);
- History of joint prostheses procedures in past two years;
- History of antimicrobial therapy;
- Family History of prion disease, or symptoms that may be indicative of CJD, such as sudden onset of dementia;
- Recent travel to areas where endemic diseases are present; and
  - Immunization history.
  - Medications which could be immunosuppressive.

The medical history alone cannot be relied on to identify all patients with infectious diseases, as many patients are asymptomatic carriers of transmissible diseases and/or are unaware of their infectious state. Therefore, Routine Practices must be used with all patients, regardless of symptomatology.

A patient who gives a positive history or is symptomatic for any of the above may require additional precautions based on the mode of transmission of the infectious agent involved.

For example, to minimize the risk of transmission of antibiotic resistant organisms, such as Methicillin Resistant Staphylococcus aureus (MRSA), Contact Precautions should be taken. Contact Precautions involve wearing gowns, ensuring that hand hygiene using waterless alcohol-based hand rubs or soap and water is performed before and after patient contact, and that all clinic surfaces that the patient touches are cleaned and disinfected using a low-level disinfectant.

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To minimize the risk of transmission of tuberculosis or influenza-like illness (e.g., SARS, pandemic flu, etc.) airborne precautions should be taken. Airborne precautions include wearing a fit tested, high-efficiency particulate respirator (e.g., N-95) mask. Patients should spend as little time as possible in the common waiting area, and should wear a surgical mask over their mouth and nose in the primary clinical area. Given the difficulty of doing dental treatment with a masked patient and the inherent dangers to DHCP involved and to any other patient in the office/building, patients with active TB should have their treatment delayed, if at all possible, until they are no longer infectious, or they should be referred to a more controlled environment for treatment (see Special Considerations, Patients Infected with M. tuberculosis, page 95).

#### Duty to Notify

When a patient is diagnosed with a notifiable communicable disease, the dentist must ensure that appropriate notification requirements are followed. This is done by contacting Public Health at the appropriate regional health authority, and documenting that this has been completed. A current list of notifiable communicable diseases, along with the appropriate protocols, is available from [Alberta Health and Wellness](#).

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**Accountability:** a state of being accountable, answerable or liable. Regarding IPC Standards, the dentist is accountable to the Alberta Dental Association and College.

**Additional Precautions:** practices used to prevent transmission of infectious agents that are spread by direct or indirect contact with the client or client's environment that are necessary in addition to Routine Practices for certain pathogens or clinical presentations. These precautions are based on the method of transmission of the infectious agent, and include Contact Precautions, Droplet Precautions, and Airborne Precautions.

**Administrative Controls:** if an existing or potential hazard to workers is identified during a hazard assessment, an employer must take measures to either eliminate or control the hazard. If the hazard cannot be eliminated or controlled the employer must use administrative controls that control the hazard to a level as low as reasonably achievable. The use of administrative measures includes policies, procedures and enforcement measures.

**Aerosol:** particles of respirable size ( $<10 \mu\text{m}$ ) generated by both humans and environmental sources that can remain viable and airborne for extended periods in the indoor environment; commonly generated in dentistry during use of handpieces, ultrasonic scalers, and air/water syringes.

**Aerosolization:** the process of creating an aerosol.

**Airborne Transmission:** a means of spreading infection in which airborne droplet nuclei ( $< 5$  microns) are inhaled by the susceptible host.

**Air Abrasion:** the application of a mixture of small abrasive particles by air blast to prepare a cavity in a tooth or remove deposits from teeth.

**Alcohol-Based Hand Rub (ABHR):** a liquid, gel or foam formulation of alcohol (e.g., ethanol, isopropanol) which is used to reduce the number of microorganisms on hands in clinical situations when the hands are not visibly soiled. ABHRs contain emollients to reduce skin irritation and are less time-consuming to use than washing with soap and water.

**Allergen:** an antigen, a substance capable of inducing allergy or specific hypersensitivity.

**Allergic Contact Dermatitis:** a type IV or delayed- hypersensitivity reaction resulting from contact with a chemical allergen (e.g., poison ivy, certain components of patient care gloves) generally localized to the contact area. Reactions occur slowly over 12-48 hours.

**Anaphylaxis (immediate anaphylactic hypersensitivity):** a severe and sometimes fatal Type 1 reaction in a susceptible person after a second exposure to a specific antigen (e.g., food, pollen, proteins in latex gloves, or penicillin) after previous sensitization. Anaphylaxis is characterized commonly by respiratory symptoms, itching, hives, and rarely by shock and death (anaphylactic shock).

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**Antibody:** a protein found in the blood that is produced in response to foreign substances (e.g., bacteria or viruses) invading the body. Antibodies protect the body from disease by binding to these organisms and destroying them.

**Antigen:** a foreign substance, usually protein or carbohydrate substance (as a toxin or enzyme) capable of stimulating an immune response, usually the production of antibodies.

**Antimicrobial Soap:** a soap (i.e., detergent) containing an antiseptic agent.

**Antiseptic:** a germicide that is used on skin or living tissue for the purpose of inhibiting or destroying microorganisms. Examples include alcohols, chlorhexidine, chlorine, hexachlorophene, iodine, chloroxylenol (PCMX), quaternary ammonium compounds and triclosan.

**Antiseptic Hand Washing:** washing hands with water and soap or detergents containing an antiseptic agent.

**Asepsis:** prevention from contamination with microorganisms. Includes sterile conditions on tissues, on materials and in rooms, as obtained by excluding, removing or killing organisms.

**Aseptic Technique:** specific practices aimed at preventing the introduction of or reducing the number of microorganisms in an area of the body, or preventing the spread of microorganisms in the dental office or clinic. Aseptic technique is also designed to prevent exposure of workers to blood, body fluids, tissue and other potentially infectious materials or surfaces during health care procedures. Aseptic techniques would include, but are not limited to: removing or killing microorganisms on hands and objects, using only sterile instruments in order to reduce patients' risk of exposure to microorganisms that cannot be removed. Both medical and surgical aseptic techniques (defined below) are employed in dental settings, depending on a number of factors and the resultant degree of sterility required for proper IPC.

**Bacterial Count:** a method of estimating the number of bacteria per unit sample. The term also refers to the estimated number of bacteria per unit sample, usually expressed as colony-forming units (CFUs) per square centimeter (cm<sup>2</sup>) per milliliter (ml).

**Bacterial Endocarditis:** a bacterial induced inflammation of the lining of the heart and its valves.

**Bead Sterilizer (endodontic dry heat sterilizer):** a device that used small glass beads (1.2–1.5 mm diameter) and high temperature (217–232°C) for brief exposures (e.g., 45 seconds) to inactivate microorganisms. The term is a misnomer because these devices are not cleared as sterilizers by CSA or Health Canada.

**Bioburden:** the microbiological load (i.e., number of viable organisms in or on the object or surface) or organic material on a surface or object prior to decontamination, or sterilization, also known as "bioload" or "microbial load."

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**Biological Indicator:** a device to monitor the sterilization process that consists of a standardized population bacterial spores known to have a high resistance to the mode of sterilization being monitored. Biological indicators indicate that all the parameters necessary for sterilization were present.

**Biological Monitoring:** a monitoring process used to validate and audit sterilization process. Biological monitoring uses Biological Indicators.

**Biomedical Waste:** waste in health care facilities is divided into three categories: general, biological, and pathological. In Canada, biomedical waste does not include domestic waste. Legislation requires that biomedical waste be handled and disposed of in such a way as to avoid transmission of potential infections. The most obvious biomedical wastes in dental offices or clinics are disposable single-use sharps and gauze soaked with blood. Non-anatomical waste, such as liquid blood or body fluid drainage (e.g., IV tubing filled with blood) must also be disposed of as biological waste. Anatomical waste such as body parts (not including teeth) are classified as pathological waste, and must be disposed of according to the regulations for handling pathological waste. All other waste such as general office waste, used gloves or non-sharp medical equipment, may be disposed of in regular waste and requires no special handling other than containment during disposal and removal.

**Bloodborne Pathogens:** disease-producing microorganisms spread by contact with blood or other body fluids contaminated with blood from an infected person.

**Canadian Standards Association (CSA):** a not-for-profit, non-statutory, voluntary membership association, engaged in standards development and certification activities. CSA standards reflect a national consensus of producers and users – including manufacturers, consumers, retailers, unions and professional organizations, and government agencies.

**Chemical Indicator:** a device to monitor the sterilization process that changes color or form with exposure to one or more of the physical conditions within the sterilizing chamber (e.g., temperature, steam). Chemical indicators are classified as 1, 2, 3, 4, 5 or 6. Class 1 chemical indicators are process indicators (e.g., indicator tape) that respond to heat only and are used to identify packs yet to be processed. Class 2 chemical indicators (also known as the Bowie Dick type indicators) are intended to demonstrate the rapid and even penetration of steam and, by implication, the adequacy of air removal. Class 3 chemical indicators respond to single parameters, such as pressure or steam heat. Class 4 chemical indicators are multi-parameter indicators, such as heat and pressure or heat and steam. Class 5 integrating indicators respond to heat, pressure and steam. Class 6 Emulating indicators are cycle verification indicators which are designed to react to all critical variables for specified sterilization cycles. Chemical indicators are intended to detect potential sterilization failures that could result from incorrect packaging, incorrect loading of the sterilizer, or malfunctions of the sterilizer. A “pass” response does not verify that the items are sterile, only that the chemical indicator has gone through a heat or steam cycle.

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**Chemical Sterilant:** chemicals used for the purpose of destroying all forms of microbial life including bacterial spores. High-Level Disinfectants can be chemical sterilants but require different contact times.

**Clean Hands:** hands that have had appropriate hand hygiene.

**Cleaning:** the removal of visible soil, organic and inorganic contamination from a device or surface, using either the physical action of scrubbing with a surfactant or detergent and water or an energy-based process (e.g., ultrasonic cleaners or washers) with appropriate chemical cleaning agents. Steps in the cleaning process include: disassembly, sorting and soaking, physical removal of organic material, rinsing, drying, inspection, and wrapping prior to disinfection and sterilization. The action of sterilization cannot occur unless cleaning has occurred.

**Clostridium Difficile (C. difficile or "C. diff"):** a bacterium that can cause symptoms (can also be asymptomatic and colonized) ranging from diarrhoea to life-threatening inflammation of the colon (pseudomembranous colitis). Illness from C. difficile most commonly affects older adults in hospitals or in long-term care facilities and typically occurs after use of antibiotic medications.

**Colony-Forming Unit (CFU):** the minimum number of separable cells on the surface of or in semi-solid agar medium which gives rise to a visible colony of progeny is on the order of tens of millions. CFUs may consist of pairs, chains, and clusters as well as single cells and are often expressed as colony-forming units per milliliter (CFU/ml).

**Competent:** an adequately qualified person suitably trained and with sufficient experience to safely perform work without supervision or with only a minimal degree of supervision.

**Contact Precautions:** a type of Additional Precautions used in addition to Standard Precautions or Routine Practices to prevent transmission of infectious agents that are spread by direct or indirect contact with an infectious person or an infectious person's environment. Contact Precautions also apply where the presence of uncontained wound drainage, fecal incontinence or other discharges from the body suggest an increased potential transmission risk of pathogens by this route.

**Contact Transmission:** an important and frequent mode of transmission of health-care associated infections. Direct contact transmission involves a direct body surface to body surface contact and physical transfer of microorganisms between an infected or colonized person and an uninfected person.

**Contaminated:** affected by the presence of a harmful substance on workers or at the work site in a quantity sufficient to pose a risk to health. As used in health care, the term generally refers to the presence of microorganisms on inanimate or animate objects that could be capable of producing disease or infection that could be transported on body surfaces such as hands, or in substances (e.g., food, water, milk).

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**Control Biological Indicator:** a biological indicator from the same lot as a test indicator that is left unexposed to the sterilization cycle and then incubated to verify the viability of the test indicator. The control indicator should yield positive results for bacterial growth.

**Creutzfeldt-Jakob Disease (CJD):** a degenerative neurological disorder of humans thought to be transmitted by abnormal isoforms of neural proteins called prions. CJD is one of a group of related diseases known as transmissible spongiform encephalopathies (TSEs).

**Critical:** part of the Spaulding Classification. Critical medical or dental devices or instruments are introduced directly into the human body, either into or in contact with the bloodstream or normally sterile areas of the body. These devices or instruments may be single-use disposable, or may be designed to be reprocessed by sterilization. Examples of critical medical or dental devices include, but are not limited to, needles, syringes, scalpels and invasive/surgical instruments, all implantable devices, biopsy forceps and dental handpieces. These items create a substantial risk of acquiring infection if the item is contaminated with microorganisms at the time of use.

**Decontamination:** a process or treatment that renders a medical device, instrument, or environmental surface safe to handle.

**Dental Facility:** any clinic, dental clinic, place, practice, office, health service, institution, including research and teaching settings, where a dentist provides dental services to patients.

**Dental Facility Owner/Operator:** the dentist who has the authority over and responsibility for the care and custody of all clinical matters, including IPC matters, in the dental facility.

**Dental Health Care Personnel (DHCP):** the variety of paid and unpaid personnel in the dental health-care setting who might be exposed to infectious materials, including body substances (blood, saliva, etc.) and contaminated supplies, equipment, environmental surfaces, water, or air. DHCP includes dentists, dental hygienists, dental assistants, dental laboratory technicians (in-office and commercial), students and trainees, contractual personnel, as well as other personnel that may not be directly involved in patient care, but may be potentially exposed to infectious agents (e.g., administrative, clerical, housekeeping, maintenance, or volunteer personnel).

**Dental Surgical Facility (DSF):** a dentist owned and operated non-hospital surgical facility providing services under the Alberta Health Care Protection Act and accredited by the ADA+C in accordance with standards set out in the Dental Surgical Facility Accreditation Regulation under the Health Professions Act.

**Dental Treatment Water:** non-sterile water used for dental therapeutic purposes, including irrigation of nonsurgical operative sites and cooling of high speed rotary and ultrasonic instruments.

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**Dentist:** a person who is a regulated member of the Alberta Dental Association and College. Under the Health Professions Act, all dentists are responsible for meeting the ADA+C IPC Standards as a practitioner in their practice, as a dental facility owner in their office or mobile practice, as a dental operator in a Dental Surgical Facility, and as an employer when Dental Owner/operator of the dental facility. Dentists are health practitioners under the Public Health Act.

**Detergents:** compounds that possess a cleaning action and have hydrophilic and lipophilic parts. Although products used for hand washing or antiseptic hand wash in a health-care setting represent various types of detergents, the term "soap" is commonly used to refer to such detergents in this context. Detergents make no antimicrobial claims on the label.

**Direct Contact Transmission:** physical transfer of microorganisms between an infected or colonized person and a susceptible host.

**Disinfectant:** a chemical agent used on inanimate objects (i.e., nonliving) (e.g., floors, walls, sinks) to destroy virtually all recognized pathogenic microorganisms, but not necessarily all microbial forms (e.g., bacterial endospores). Disinfectants used in the dental setting are categorized as low-level, intermediate-level and high-level. Disinfectants used in the dental setting must have a Drug Identification Number (DIN) from Health Canada.

**Disinfection:** the destruction of pathogenic and other kinds of microorganisms by physical or chemical means. Disinfection is less lethal than sterilization, because it destroys most recognized pathogenic microorganisms, but not necessarily all microbial forms, such as bacterial spores. Disinfection does not ensure the margin of safety associated with sterilization processes.

**Distilled Water:** water heated to the boiling point, vaporized, cooled, condensed and collected so that no impurities are reintroduced. Distilled water is not to be considered sterile water.

**Droplet Nuclei:** particles 5µm diameter or less that are formed by dehydration of airborne droplets containing microorganisms that can remain suspended in the air for long periods of time. Patients with active tuberculosis can cough droplet nuclei, which contain infectious TB particles.

**Droplets:** small particles of moisture (e.g., spatter) that may be generated when a person coughs or sneezes or when water is converted to a fine mist by an aerator or air-water syringe. Intermediate in size between drops and droplet nuclei, these particles, although they may still contain infectious microorganisms, tend to quickly settle out from the air so that any risk of disease transmission is generally limited to persons in close proximity to the droplet source.

**Endotoxin:** the lipopolysaccharide of gram negative bacteria, the toxic character of which reside in the lipid protein. Endotoxins can produce pyrogenic reactions in persons exposed to their bacterial component.

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**Engineering Controls:** controls (e.g., sharps disposal containers, self-sheathing needles, safer medical devices, such as sharps with engineered sharps injury protections and needleless systems) that isolate or remove the bloodborne pathogens hazard from the workplace.

**Event-Related Packaging:** a storage practice that recognizes that a package and its contents should remain sterile until some event causes the item(s) to become contaminated.

**Exposure Time:** period of time during a sterilization or disinfection process in which items are exposed to the sterilant or disinfectant at the parameters specified by the manufacturer (e.g., time, concentration, temperature, pressure).

**Fastest Means Possible:** certain reporting requirements in public health legislation whenever information needs to be conveyed quickly. It usually means by direct voice through telephone or swiftly through electronic means, especially to known recipient sites. It includes documenting date, time and contact information of Medical Officer of Health or designate.

**Flash Sterilization:** is a modification of conventional steam sterilization in which the flashed item is placed unwrapped in an open tray or is placed in a specifically designed, covered, rigid container to allow rapid penetration of steam. Flash sterilization should not be used for reasons of convenience, as an alternative to purchasing additional instruments or to save time. Because of the potential for serious infections, flash sterilization must not be used for implantable devices. Flash sterilization is considered acceptable for processing cleaned patient-care items that cannot be packaged, sterilized, and stored before use.

**Germicide:** an agent that destroys microorganisms, especially pathogenic organisms. Other terms with the suffix "-cide" (e.g., virucide, fungicide, bactericide, tuberculocide, sporicide) indicate an agent that destroys the microorganism identified by the prefix. Germicides are used on inanimate objects and antiseptics are used on people.

**Hand Hygiene:** a general term that applies to hand washing, antiseptic hand wash, antiseptic hand rub, and surgical hand antisepsis. The goal is to remove the transient pathogenic microbes from the hands and thus prevent cross-contamination with the hands as a vector of transmission. It is not the goal of hand hygiene to remove the helpful resident microbes on the hands that help protect the integrity of the skin on the hands and provide a protective barrier.

**Hazard:** a situation, condition or thing that may be dangerous to the safety or health of workers.

**Hazard Assessment:** an employer must assess a work site and identify existing and potential hazards before work begins at the work site. An employer must prepare a report of the results of a hazard assessment and the methods used to control or eliminate the hazards identified. An employer must ensure that the date on which the hazard assessment is prepared or revised is recorded on it. An employer must ensure that the hazard assessment is repeated at reasonably practical intervals, when a new work process is introduced or when a work process changes.

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**Health-Care Associated Infection:** any infection associated with a medical or surgical intervention. The term "health-care associated" replaces "nosocomial," which is limited to adverse infectious outcomes occurring in hospitals.

**Hepatitis B Immune Globulin (HBIG):** a product available for prophylaxis against hepatitis B virus infection. HBIG is prepared from plasma containing high titers of anti-HBs and provides short-term protection (3–6 months).

**Hepatitis B Surface Antigen (HBsAg):** a serologic marker on the surface of HBV. It can be detected in high levels in serum during acute or chronic hepatitis.

**Hepatitis B e Antigen (HBeAg):** a secreted product of the nucleocapsid gene of HBV and is found in serum during acute and chronic HBV infection. Its presence indicates that the virus is replicating and serves as a marker of increased infectivity.

**Hepatitis B Surface Antibody (anti-HBs):** the protective antibody against the surface antigen of the hepatitis B virus (HBsAg). Presence in the blood can indicate past infection with, and immunity to, hepatitis B virus, or an immune response from hepatitis B vaccine.

**High-Level Disinfectant:** agent capable of killing bacterial spores when used in sufficient concentration under suitable conditions. It is, therefore, expected to kill all other microorganisms.

**High-Level Disinfection (HLD):** a disinfection process that inactivates vegetative bacteria, mycobacteria, fungi, and viruses but not necessarily high numbers of bacterial spores. Common high-level disinfectant solutions include glutaraldehydes, glutaraldehydes with phenols, high-concentration hydrogen peroxide, and hydrogen peroxide with peracetic acid.

**Holding Solution:** tepid water and/or detergent and enzymatic used to prevent organic matter from drying on.

**Hospital-Grade Disinfectant:** a germicide that has a DIN from Health Canada for use on inanimate objects in hospitals, clinics, dental offices, or any other medical-related facility. Efficacy is demonstrated against *Salmonella choleraesuis*, *Staphylococcus aureus*, and *Pseudomonas aeruginosa*. Most hospital disinfectants are considered low-level disinfectants however; hospitals may use various disinfectants depending on the Spaulding Classification of the item requiring disinfection.

**Hypersensitivity:** an immune reaction (allergy) in which the body has an exaggerated response to a specific antigen (e.g., food, pet dander, wasp venom). (see Allergic Contact Dermatitis, Anaphylaxis, Latex Allergy).

**Iatrogenic:** a situation induced inadvertently by a DHCP or by medical treatment or diagnostic procedures. Used especially in reference to an infectious disease or other negative complication of medical or surgical treatment.

**Immunity:** protection against a disease using a person's immune system. Immunity is indicated by the presence of antibodies in the blood and can usually be determined with a laboratory test.

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**Immunization:** the process by which a person becomes immune, or protected, against a disease either actively by vaccine or passively via administration of immune globulin. This term is often used interchangeably with vaccination or inoculation. However, the term "vaccination" is defined as the injection of a killed or weakened infectious organism in order to prevent the disease. Thus, vaccination, by inoculation with a vaccine, does not always result in immunity.

**Implantable Device:** a device or material that is placed into a surgically or naturally formed cavity of the human body that is intended to remain there for a period of 30 days or more.

**Independent Water System:** a closed system of water reservoir and tubing used to hold water or other solutions and supply it to handpieces and air/water syringes attached to a dental unit. The independent water system, which isolates the unit from the public water system, may be provided as original equipment or as a retrofit device on all modern dental units.

**Indirect Contact Transmission:** contact of a susceptible host with a contaminated, intermediate object, usually inanimate.

**Infectious Microorganisms:** microorganisms capable of producing infection in susceptible hosts.

**Infectious Waste:** liquid or semi-liquid blood or other potentially infectious materials; contaminated items that would release blood or other potentially infectious materials in a liquid or semi-liquid state if compressed; items that are caked with dried blood or other potentially infectious materials and are capable of releasing these materials during handling; contaminated sharps; and pathological and microbiological wastes containing blood or other potentially infectious materials.

**Intermediate-Level Disinfection:** a disinfection process that inactivates vegetative bacteria, most fungi, mycobacteria, and most viruses (particularly the enveloped viruses), but not bacterial spores.

**Intermediate-Level Disinfectant:** a liquid chemical germicide with a Drug Identification Number (DIN) from Health Canada, with a label claim of potency as a tuberculocidal.

**Irritant Contact Dermatitis:** the development of dry, itchy, irritated areas on the skin, which can result from frequent hand washing and gloving as well as exposure to chemicals. This condition is not an allergic reaction.

**Latex Allergy:** a Type 1 or immediate anaphylactic hypersensitivity reaction to the proteins found in natural rubber latex. True latex allergies are extremely rare.

**Latex:** a milky white fluid extracted from the rubber tree *Hevea brasiliensis* that contains the rubber material cis-1,4 polyisoprene.

**Low-level Disinfection:** a process that will inactivate most vegetative bacteria, some fungi, and some viruses, but cannot be relied on to inactivate resistant microorganisms (e.g., mycobacteria or bacterial spores).

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**Low-Level Disinfectant:** a liquid chemical germicide with a Drug Identification Number (DIN) from Health Canada, which has a label claim for potency against HIV and HBV if used for disinfecting clinical contact surfaces.

**Manufacturer:** any person, partnership or incorporated association that manufactures and, under its own name or under a trade mark, design, trade name or other name or mark owned or controlled by it, sells medical and/or dental device(s).

**Manufacturer's Directions or Instructions:** information from a manufacturer as to the procedures recommended for achieving the optimum performance of the device for its intended use, and includes cautions, warnings, contraindications and possible adverse effects.

**Mechanical Indicator:** devices (e.g., gauges, meter, display, printout) that display an element or elements of the sterilization process (e.g., time, temperature, pressure).

**Medical Aseptic Technique:** procedures such as Routine Practices and Hand Hygiene which reduce the number of microorganisms introduced into a surgical site or sterile tissues from the DHCP or patient's own flora or from cross contamination and infection from a DHCP during treatment.

**Medical Equipment or Device:** any instrument, apparatus, appliance, material or other item, whether used alone or in combination, as intended by a manufacturer to be used for human beings for the purpose of: diagnosis, prevention, monitoring, treatment, surgery or alleviation of disease, injury or handicap; investigation, replacement or modification of the anatomy or of a physiologic process; and which does not achieve its principal intended action in or on the human body by pharmacological or immunological means, but which may be assisted in its function by such means.

**Methicillin Resistant Staphylococcus Aureus (MRSA):** Staphylococcus aureus is a bacteria that may commonly live on the skin or in the noses of healthy people. MRSA is the term for Staphylococcus aureus that have become resistant to semi-synthetic penicillins, such as cloxacillin and methicillin. Clinically, MRSA infections generally start as small red bumps that resemble pimples, boils or spider bites. These can quickly turn into deep, painful abscesses that require surgical draining. Sometimes the bacteria remain confined to the skin, but they can also penetrate into the body, causing potentially life-threatening infections in bones, joints, surgical wounds, the bloodstream, heart valves and lungs.

**Microfilter:** membrane filter used to trap microorganisms suspended in water. Filters are usually installed on dental unit waterlines near the point of use as a retrofit device. Microfiltration commonly occurs at a filter pore size of 0.03 to 10 microns. Sediment filters commonly found in dental unit water regulators range from 20 to 90 microns pore size and do not function as microbiological filters.

**Monitor:** to observe, record, or detect an operation or condition with instruments or devices that have no effect upon the operation or condition. For IPC purposes, it also means to oversee, supervise or regulate (as does the ADA+C). It also means to watch closely for purposes of control or surveillance.

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**N-95 Respirator:** one of nine types of disposable particulate respirators. "95" refers to the percentage of particles filtered (see "Particulate Respirator").

**Non-critical:** the category of medical and dental items or surfaces that carry the least risk of disease transmission. This category includes not only non-critical medical and dental devices, but also environmental surfaces. Non-critical medical and dental devices touch only unbroken intact skin (e.g., blood pressure cuff). Non-critical environmental surfaces can be further divided into clinical contact surfaces (e.g., light handle) and housekeeping surfaces (e.g., floors, countertops).

**NIOSH:** the National Institute for Occupational Safety and Health is the United States' federal agency responsible for conducting research and making recommendations for the prevention of work-related disease and injury. The Institute is part of the Centers for Disease Control and Prevention of the US Department of Health.

**Nosocomial:** an infection acquired in a hospital as a result of medical or dental care (see definition for Health-Care Associated Infection).

**Occupational Exposure:** a reasonably anticipated skin, eye, mucous membrane or parenteral contact with blood or other potentially infectious materials that may result from the performance of a DHCP's duties. The occupational exposure limit is the airborne concentration of a substance that cannot be exceeded.

**Other Potentially Infectious Materials (OPIM):** refers to: human body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood and all other body fluids in situations where it is difficult or impossible to differentiate between body fluids; any unfixed tissue or organ (other than intact skin) from a human (living or dead); and HBV- or HIV-containing cell or tissue cultures, organ cultures, culture medium or other solutions and blood, organs or other tissues from experimental animals infected with HBV or HIV.

**Opportunistic Infection:** an infection caused by a microorganism that does not ordinarily cause disease but is capable of doing so, under certain host conditions (e.g., impaired immune response).

**Parenteral:** means piercing mucous membranes or the skin barrier through such events as needlesticks, cuts and abrasions.

**Particulate Respirator:** a mask covering the mouth and nose, which protects the DHCP from infectious diseases that are spread through the air. Also known as "air-purifying respirators". NIOSH-approved disposable respirators are marked with the manufacturer's name, the part number (P/N), the protection provided by the filter (e.g., N-95), and "NIOSH." "95" refers to the percentage of particles filtered.

**Percutaneous Injury:** an injury that penetrates the skin (e.g., needlestick, or cut with a sharp object).

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**Persistent Activity:** the prolonged or extended activity that prevents or inhibits the proliferation or survival of microorganisms after application of the product. This activity may be demonstrated by sampling a site several minutes or hours after application and demonstrating bacterial antimicrobial effectiveness when compared with a baseline level. This property has also been called “residual activity.” Both substantive and non-substantive active ingredients can show a persistent antimicrobial effect if they lower the number of bacteria significantly during the hand washing period. Substantivity is an attribute of certain active ingredients that adhere to the stratum corneum (i.e., remain on the skin after rinsing or drying) to provide an inhibitory effect on the growth of bacteria remaining on the skin.

**Personal Protective Equipment (PPE):** equipment or clothing worn by a person for protection from health or safety hazards associated with conditions at a work site. Personal protective equipment may include gloves, gowns, fluid-resistant aprons, head and foot coverings, face shields or masks, eye protection and ventilation devices (e.g., mouthpieces, respirator bags, pocket masks). General work clothes (e.g., uniforms, pants, shirts or blouses) not intended to function as protection against a hazard and are not considered to be personal protective equipment.

**Plain or Non-Antimicrobial Soap:** soaps or detergents that do not contain antimicrobial agents or contain very low concentrations of such agents that are effective solely as preservatives.

**Post-Exposure Prophylaxis (PEP):** the administration of medications following an occupational exposure in an attempt to prevent infection.

**Potable (drinking) Water:** water suitable for drinking, according to applicable public health standards.

**PPM (Parts per million):** a measure of concentration in solution. For example, a 5.25% chlorine bleach solution (undiluted as supplied by the manufacturer) contains approximately 52,500 parts per million of free available chlorine.

**Prevalence:** the number of disease cases (new and existing) within a population at a given time.

**Prion:** a protein particle that lacks nucleic acid and has been implicated as the cause of various neurodegenerative diseases (e.g., Creutzfeldt-Jakob disease, bovine spongiform encephalopathy, etc.). It is a pathogenic form of a neural protein that is both less soluble and more resistant to enzyme degradation than the normal form.

**Pseudomembranous Colitis:** a severe infection from *C. difficile* (see *Clostridium difficile*).

**Qualified Health-Care Professional:** any licensed health care provider who can provide counselling and perform all medical evaluations and procedures in accordance with the most current recommendations of Health Canada, including Post-Exposure Prophylaxis, when indicated.

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**Reprocessing Area:** a segregated area in the dental facility for cleaning, disinfection or re-processing of reusable medical devices. The reprocessing area is separate from the primary clinical area, the staff lounge or lunchroom and also from any patient or visitor traffic. The reprocessing area further separates into dirty and clean areas as required for the steps in reprocessing, namely cleaning, rinsing, drying, physical inspection, corrosion reduction/lubrication, packaging, steam sterilization, cooling/drying, storage and delivery.

**Resident Flora:** species of microorganisms that are always present on or in the body and are not easily removed by mechanical friction. Resident flora are generally not considered pathogenic.

**Retraction:** the entry of oral fluids and microorganisms into waterlines through negative water pressure.

**Reusable Device:** any product or piece of equipment intended by the manufacturer for multiple uses. The manufacturer is to provide instructions for reprocessing, care and maintenance as appropriate to each medical device.

**Routine Practices (also known as Standard Precautions):** commonly accepted infection control precautions which outline safe ways of conducting medical and dental procedures when they involve contact with blood, body fluids, mucous membranes and non-intact skin (e.g., cuts, lesions, wounds). They are based on the assumption that the average person cannot determine whether an item has been contaminated with a hazardous microorganism. Therefore, anything that could transmit a hazardous microorganism (e.g., instruments that have been used on a patient, wastes, etc.), should be handled, contained or reprocessed as if it were contaminated. If infection control precautions are always used when handling such items, it is not essential to know in advance whether or not a patient has any sort of infection. Consistent use of Routine Practices or Standard Precautions with all patients, workers and visitors is critical to preventing transmission from patient to patient, patient to staff, and patient to other visitors. Routine Practices form the foundation for limiting the transmission of microorganisms in all health care settings and is the generally accepted care for all clients. Elements of Routine Practices are: hand hygiene; risk assessment related to client symptoms, care and service delivery, including screening for infectious diseases; risk reduction strategies through the use of personal protective equipment (PPE), cleaning of environment, laundry, disinfection and sterilization of equipment, waste management, safe sharps handling, client placement and healthy workplace practices; and education of healthcare providers, clients and families and visitors.

**Semi-Critical:** the category of medical and dental devices or instruments (e.g., mouth mirror, impression trays) that come into contact with mucous membranes and do not ordinarily penetrate body surfaces.

**Seroconversion:** development of antibodies in the blood of an individual who previously did not have detectable antibodies.

**Sharps:** objects capable of causing puncture or cuts (e.g., needles, scalpel blades, broken glass).

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**Single-Use or Disposable:** single-use medical/dental devices shall only be used on an individual patient for a single appointment and then must be discarded. The labeling of single-use devices by manufacturers is not standardized and labeling may include, but is not limited to, terms such as:

- Disposable,
- Consumable,
- Or by a symbol such as,



**Spatter:** visible drops of liquid or body fluid that are expelled forcibly into the air and settle out quickly, as distinguished from particles of an aerosol, which remain airborne indefinitely.

**Spaulding Classification:** a strategy for sterilization or disinfection of inanimate objects and surfaces based on the degree of risk involved in their use. The three categories are critical, semi-critical, or non-critical. The system also established three levels of germicidal activity for disinfection (high, intermediate and low).

**Standard Precautions:** see Routine Practices.

**Sterilant:** a liquid chemical germicide or high-level disinfectant that destroys all forms of microbiological life, including high numbers of resistant bacterial spores.

**Sterile/Sterility:** the state of being free from all living microorganisms. In practice, sterility is usually described as a probability function, (e.g., the probability of a surviving microorganism being 1 in 1,000,000).

**Sterile Water:** water that is sterilized and is free from viable micro-organisms. (Distilled water is not necessarily sterile or pyrogen-free).

**Sterilization:** the use of a physical or chemical procedure to destroy all microorganisms including large numbers of resistant bacterial spores.

**Substantive:** a products ability to shift microbial baseline levels on the hands progressively downwards when the product is used repeatedly over time. This property results from product adherence to the stratum corneum layer of the skin, inhibiting microbial recolonization.

**Surfactants:** surface-active agents that reduce surface tension. Surfactants help cleaning by loosening, emulsifying and holding soil or bioburden in suspension, which can then be more readily rinsed away.

**Surgical Hand Scrub:** an antiseptic-containing preparation that substantially reduces the number of microorganisms on intact skin. Surgical hand scrubs are broad-spectrum, fast acting and persistent.

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**Transient Flora:** microorganisms that may be present in or on the body under certain conditions and for certain lengths of time. Transient flora are easier to remove by mechanical friction than resident flora.

**Transmissible Spongiform Encephalopathies (TSEs):** a group of rapidly progressive, invariably fatal, degenerative neurological disorders affecting both humans and animals that are caused by infection with prions (see Creutzfeldt-Jakob disease and prion).

**Transmission:** the transfer of microorganisms from source to host in the infection chain. Transmission of infection during the provision of health care requires three elements: a source of infecting microorganisms in sufficient quantities and sufficient virulence to cause infection, a susceptible host and a means of transmission for the microorganism.

**Ultrasonic Cleaner:** a device that uses waves of acoustic energy (a process known as "cavitation") to loosen and break up debris on instruments.

**Vaccination:** see Immunization.

**Vaccine:** a product, typically a killed or weakened microbe or a component of a microbe, that when introduced into a body, produces immunity, typically by antibody formation, therefore protecting the body from becoming infected in the future with a particular infectious disease. Vaccines are administered through needle injections, by mouth and by aerosol.

**Vancomycin Resistant Enterococcus (VRE):** an intestinal bacterium, resistant to treatment with powerful antibiotics, such as vancomycin. A person can either be colonized with VRE or have an infection due to VRE. Colonization of VRE occurs most frequently in the gastrointestinal tract of an individual and the person shows no signs or symptoms of infection. Infection due to VRE occurs when the bacteria invades a body site and multiplies in tissue. The individual exhibits clinical signs of illness such as fever, purulence (pus), inflammation and pneumonia. Laboratory results may also indicate positive culture in blood, sputum, wound and/or urine samples.

**Ventilation:** the process of supplying and removing air by natural or mechanical means to and from any space; such air may be conditioned.

**Washer-Disinfector:** an automatic unit specifically designed to clean and thermally disinfect medical or dental devices and instruments. The unit uses a high-temperature cycle rather than a chemical bath.

**Workplace Hazardous Materials Information System (WHMIS):** Canada's national hazard communication standard. The key elements of the system are cautionary labeling of containers of WHMIS "controlled products", the provision of material safety data sheets (MSDSs) and worker education and training programs. WHMIS requirements place an onus on employers to ensure that controlled products used, stored, handled or disposed of in the workplace are properly labeled, MSDSs are made available to workers, and workers receive education and training to ensure the safe storage, handling and use of controlled products in the workplace.

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**Wicking:** absorption of a liquid by capillary action along a thread or through the material (e.g., the enhanced penetration of liquids through small, often undetected holes in a glove).

**Work Practice Controls:** practices or behaviours incorporated into the everyday work routine that reduce the likelihood of exposure by altering the manner in which a task is performed in order to reduce the likelihood of injury (e.g., identifying contaminated sharps prior to clean up, not recapping needles by a two-handed technique, not passing contaminated sharps during four-handed dentistry, etc.).

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An office infection prevention and control program that includes written policies and procedures must be developed to maintain and improve the health of all DHCP. A program should include:

- An infection prevention and control policy and procedure manual that clearly describes policies, procedures, and practices. This manual must include, but not be limited to, all local and provincial standards, guidelines and policies and procedures relating to infection prevention and control, a hand hygiene policy, as well as a record of all exposures to infectious agents, and the actions taken;
- Identification of an office or clinic Infection Prevention and Control Officer (dentist or other DHCP) assigned to instigate, coordinate and evaluate the infection prevention and control program. This individual's duties would include the education of DHCP regarding the principles of infection control, identifying work-related infection risks, instituting preventive measures, and ensuring prompt exposure management and medical follow-up;
- Guidelines for education and training;
- Immunization policies;
- Exposure prevention and post-exposure management;
- Special considerations regarding medical conditions, work-related illness, and associated work restrictions;
- Considerations regarding contact dermatitis and latex hypersensitivity;
- Maintenance of records, data management, and confidentiality; and
- Maintenance of equipment involved in infection prevention and control procedures (e.g., ultrasonic instrument cleaners and heat sterilizers).

Infection prevention and control services from external health-care facilities and health-care providers should be identified and established well before their services are necessary (e.g., in the event of a significant exposure to infectious material). Referral arrangements should be made with qualified health-care professionals in an occupational health program of a hospital, with educational institutions, or with health-care facilities that offer personnel health services. In Alberta, private dental offices or clinics should contact the local Medical Officer of Health, through [Health Link Alberta](#).

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Compliance of infection prevention and control procedures is improved when DHCP understand the reasons why the recommendations exist.

DHCP must receive infection-control training as part of the practice orientation, whenever new tasks or procedures are introduced, and then annually reviewed. Education and training should be appropriate to the assigned duties of specific DHCP (e.g., techniques to prevent cross-contamination, instrument sterilization).

For DHCP who perform tasks or procedures likely to result in occupational exposure to infectious agents, training should include:

1. A description of an individual's exposure risks.
2. A review of prevention strategies and infection-control policies and procedures.
3. A discussion regarding how to manage work-related illness and injuries, including Post-Exposure Prophylaxis.
4. A review of work restrictions for the exposure or infection.

All training and education must be documented.

Educational materials should be appropriate in content and vocabulary for each person's educational level, literacy and language, as well as be consistent with existing federal, provincial and municipal regulations, such as those referenced in Introduction, Purpose of This Document, page 17.

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Immunizations substantially reduce both the number of DHCP susceptible to infectious diseases and the potential for disease transmission to other DHCP and patients.

All DHCP should be adequately immunized against:

- Hepatitis B;
- Measles;
- Mumps;
- Rubella; (mandated under Public Health Act)
- Varicella;
- Influenza; and
- Diphtheria, tetanus.

Updates to the immunization recommendations for Health Care Workers may be accessed on the ADA+C website.

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DHCP are at an increased risk of acquiring hepatitis B in an occupational setting. Therefore, all DHCP must be assessed regarding their immunity to hepatitis B, and be provided hepatitis B immunization by their employer, if required.

Assessing for immunity to hepatitis B is done by testing DHCP for the presence of adequate amounts of hepatitis B surface antibody at least 1-2 months following completion of the 3-dose vaccination series. Serologic testing should produce antibody levels of anti-HBs  $\geq 10$  mIU/mL.

DHCP who do not develop an adequate antibody response (i.e., anti-HBs  $< 10$  mIU/mL) to the primary vaccine series should complete a second 3-dose vaccine series or be evaluated to determine if they are HBsAg-positive. Re-vaccinated persons should be re-tested for anti-HBs at the completion of the second vaccine series.

If an inadequate antibody response occurs following the second series of immunizations, testing for HBsAg should be performed. DHCP who prove to be HBsAg-positive or HBeAg-positive must report to their appropriate licensing authority and should be counselled regarding how to prevent HBV transmission to others and regarding the need for medical evaluation.

Non-responders to vaccination who are HBsAg-negative should be considered susceptible to HBV infection and should be counselled regarding precautions to prevent HBV infection and the need to obtain hepatitis B immunoglobulin (HBIG) prophylaxis for any known or probable parenteral exposure to HBsAg-positive blood.

The hepatitis B vaccine is very effective. Long-term data suggests that once adequate levels of anti-HBs antibodies are produced, the effect is essentially life-long. Thus, boosters of hepatitis B vaccine are generally not required.

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Exposure to blood through percutaneous injury, or by contact with mucous membranes of the eye, nose or mouth, or by contact with non-intact skin is the primary method DHCP are exposed to blood-borne pathogens, such as HBV, HCV, and HIV, in dental health-care settings. Percutaneous exposures involve the greatest risk for transmission, and would include needle-sticks or cuts with contaminated sharp objects. Non-intact skin includes all exposed skin that is chapped, abraded or has dermatitis.

Avoiding contact with blood, or any other body tissues, or fluids should be of paramount importance in any infection prevention and control program.

The majority of exposures in a dental health-care setting are preventable by using:

#### **Routine Practices**

Routine Practices includes the consistent and universal use of Personal Protective Equipment, including the use of gloves, masks, protective eyewear or face shields and protective clothing (see Personnel Health, General Considerations, page 42).

#### **Engineering Controls**

Engineering controls are technology-based safer designs for equipment, and devices intended to reduce percutaneous exposures. Examples of engineering controls include needle guards, self-sheathing anaesthetic needles and scalpel blades as well as dental units designed to shield burs on handpieces.

#### **Work-Practice Controls**

Work-practice controls are those practices established to avoid handling, using, assembling or cleaning contaminated sharp instruments, equipment or appliances, and the use of sharps containers. Sharps would include all needles, scalars, laboratory knives, burs, explorers and endodontic files and reamers. Work-practice controls can include, but are not limited to:

- Avoiding or using extreme caution when passing sharps during four-handed dentistry;
- Removing burs before removing the handpiece from the dental unit;
- Not using fingers in tissue retraction or palpation during suturing and administration of anaesthesia; and
- Identifying and removing all sharps at the point of use from an instrument tray prior to instrument cleaning.

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As percutaneous exposures comprise the greatest risk of transmission of blood-borne pathogens, avoiding percutaneous exposures should be a primary concern to the DHCP. The careful handling of needles and other sharps is an important aspect of avoiding percutaneous exposures.

Engineering controls and work-practice controls for needle handling safety are of particular importance to prevent percutaneous exposures. Newer designs of aspirating anaesthetic syringes with self-sheathing needles should be considered for use as they become available in the dental marketplace.

Work-practice controls for needles and other sharps would include:

- Used disposable syringes and needles, scalpel blades and other sharp items must be placed in appropriate puncture-resistant containers located as close as feasible to where the items were used.
- Needles should remain capped prior to use.
- Needles should not be bent or otherwise manipulated by hand, or handled so that they are pointed towards any part of a DHCP's body.
- Needles should be recapped as soon as possible after use by using a one-handed scoop technique or a commercial recapping device.
- Needles should be recapped before removing the needles from the syringe for disposal.
- One needle may be used for multiple injections on the same patient; however, the needle should be recapped between each use.
- Extreme caution should be used whenever contaminated sharps are passed between DHCP, such as during four-handed dentistry.
- When suturing, tissues should be retracted using appropriate instruments (e.g., retractor, dental mirror), rather than fingers.
- Remove burs from headpieces immediately following the procedure.
- When cleaning contaminated instruments by hand, heavy-duty utility gloves, appropriate clothing and long-handled brushes should be used.

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## **Percutaneous Injury**

Exposure to blood or saliva by percutaneous injury is the greatest risk for acquiring a blood-borne pathogen in the dental health-care setting. Every effort should be made by all DHCP to avoid percutaneous injury.

Significant exposures should be dealt with immediately. A significant exposure exists whenever any of the following events occurs:

- Percutaneous injury, where the skin of the DHCP is punctured (i.e., blood is drawn).
- Blood, saliva or other body fluid is splashed onto non-intact skin (dermatitis, cuts or abrasions).
- Blood, saliva or other body fluid is splashed onto mucosa of the eyes, the mouth or the nose.

The steps in managing a significant exposure are:

1. Remove gloves or immediate clothing, if necessary, to assess the extent of the injury.
2. First-aid should be administered, if necessary, for percutaneous exposures.
3. Immediately wash the area, including the puncture or wound using antimicrobial soap and water. Exposed eye, mouth or nose mucosa should be flushed with copious amounts of water.  
The application of caustic agents such as bleach, or the injection of antiseptic agents into the wound is not advisable.
4. Report the injury to the Office Infection Prevention and Control Officer, who should then contact the appropriate health-care professional, for advice and possible referral, and begin the necessary documentation. The Medical Officer of Health for each Zone is also available for consultation and can be contacted through Health Link Alberta. In some instances, the Zone-specific Medical Officer of Health may be able to re-direct the call to Communicable Disease Control Staff and subsequently the employer may be charged a fee-for-service to manage the occupational exposure. The Worker's Compensation Board should be contacted to report the injury, if applicable.

Documentation (see Personnel Health, Exposure Documentation, page 50) should include:

- The name of the exposed DHCP, and details regarding the exposed person's hepatitis B vaccination status.
- The date and time of the exposure.
- The nature of the exposure, including the dental procedure being performed, the extent of the exposure, and immediate action taken.
- The name and health status of the source person, including details regarding any known or suspected bloodborne pathogens (hepatitis B, hepatitis C, and HIV).
- Referral for follow-up counselling and post-exposure management as necessary.

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Every significant exposure must be evaluated by a qualified health-care professional for the potential to transmit bloodborne pathogen. The assessment of risk of transmission will be based on:

- The type and amount of body fluid or tissue involved.
- The nature of the exposure (e.g., percutaneous injury, mucous membrane or non-intact skin exposure).
- The known or unknown infection status of the source.
- The susceptibility of the exposed person.

All of these factors should be considered in determining the need for further follow-up care, including Post-Exposure Prophylaxis (PEP).

If the need to administer PEP is determined to be necessary, it should be done as soon as possible after the exposure. For example, anti-retroviral drugs to treat an HIV exposure should be given within one to two hours after the exposure.

The PEP regimens considered will be determined by the health-care professional contacted by the Office Infection Prevention and Control Officer following the exposure. The PEP regimen should be consistent with current infection prevention and control guidelines, as recommended by the Public Health Agency of Canada.

As previously discussed (see Personnel Health, General Considerations, page 42), the appropriate arrangements and contact health-care personnel should be determined well before an actual significant exposure occurs.





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Hand hygiene is a key IPC practice, yet it is not always performed or correctly performed by health care workers. The purpose of hand hygiene is to reduce the quantity and diversity of the transient microorganisms found on the surface of the hands, versus the resident microorganisms found in the deep skin layers. The spread of these transient microorganisms, through non-compliance with hand hygiene protocols, is connected with health-care associated infections and the spread of multi-resistant organisms.

Hand hygiene may be performed by thorough hand washing using a soap/water/disposable towel combination. Hand antisepsis may also be accomplished by using an alcohol-based hand rub, depending on the situation.

#### **Hand Hygiene with Soap and Water**

The hands of DHCP that come in direct contact with patients must be washed:

- At the beginning of the workday;
- After eating;
- After using the washroom; and
- Whenever the hands have become contaminated with blood, saliva or some other body fluid, or whenever the hands have come in contact with some instrument, agent or surface that may have been contaminated with blood, saliva or some other body fluid.

Hand washing must be done using an anti-microbial soap with persistent activity (e.g., chlorhexidine, chloroxylenol [PCMX], octenidine, or triclosan), and cool or warm (not hot) water. After washing, hands must be thoroughly rinsed and dried using single-use disposable towels, as bacteria can quickly multiply on moist hands, particularly under gloves.

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#### **Hand Antisepsis Using Alcohol-Based Hand Rub (ABHR)**

In addition to using an antimicrobial soap / water / disposable towel hand washing procedure, hand antisepsis may be achieved using an alcohol-based (70-90% alcohol) hand rub. The use of ABHR is recommended when hands are dry and not visibly soiled:

- Prior to beginning patient treatment, before donning gloves;
- Between patients, after removing gloves; and
- Whenever gloves are changed during a patient visit.

Concentrations higher than 90% are less effective because proteins are not denatured easily in the absence of water. Some viruses, such as norovirus and other non-enveloped viruses (e.g., rotavirus, enterovirus) cause acute gastroenteritis in humans and are a frequent cause of outbreaks in health care facilities and are inactivated by alcohol concentrations ranging from at least 70% to 90%.

Only commercial products specifically designed as an alcohol-based hand rub should be used for hand antisepsis. Hands should be rubbed until the alcohol-based rub is completely dry (approximately 15 seconds), as the alcohol can cause glove material degradation and result in loss of glove integrity. If alcohol-based hand rubs are not used in a practice, hand washing should be performed for all the above situations.

Standing water must not be used when rinsing hands after washing. If running water is not available, cleaning hands using moistened towelettes followed by an alcohol-based hand rub is acceptable.

Non-alcohol-based waterless antiseptic agents have not been proven to be adequate for hand hygiene in a healthcare setting, and must not be used.

Hand hygiene products should be stored and dispensed according to the manufacturer's instructions. Liquid products must be stored in closed containers and dispensed from either single-use disposable containers or from containers that have been washed and thoroughly dried between fillings. Liquid products should not be added to a partially empty dispenser or "topped up", due to the risk of bacterial contamination.

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## **Hand Care Regimen**

Emollient hand lotions should be considered for routine use at work and at home, in order to prevent hand irritation and dermatitis that comes from frequent hand hygiene and glove use. Petroleum based lotions should be avoided during the workday, as these may weaken the glove material, resulting in increased permeability. Washing hands in hot water should be avoided.

Manufacturers of hand hygiene products should be consulted regarding any possible interaction with hand lotions. Lotion manufacturers should be consulted regarding any interaction between the lotions, the antimicrobial soaps or alcohol-based hand rubs, as well as other dental materials. For example, if using a chlorhexidine solution for hand hygiene, only non-anionic hand lotions should be used; otherwise, there will be a loss in persistence of the antimicrobial action of the solution. Typically, lotions, soaps and alcohol-based hand rubs from the same manufacturer are compatible; however, actual compatibility should be checked with the manufacturer or from the manufacturer's literature.

### **Fingernails**

Fingernails are a common area of blood impaction and bacterial contamination. Fingernails must be kept short (less than 3-4mm) and trimmed in order to thoroughly clean underneath them and prevent glove tears. The nail should not show past the end of the finger. Long natural or artificial nails must not be worn by clinical staff, as they are more difficult to clean, have been known to transmit infectious agents, can make donning gloves more difficult and can cause gloves to tear more readily. Freshly applied nail polish on natural nails is acceptable, provided fingernails are kept short; however, chipped nail polish can promote bacterial growth and prevent adequate hand hygiene, and should be avoided.

### **Jewellery**

Jewellery, including rings, arm and wrist bands and bracelets and watches (other than smooth metal band rings) must not be worn on the hands or arms, as they prevent adequate hand hygiene, make donning gloves more difficult and can cause increased tearing of gloves. Before doing invasive surgical procedures, rings (including smooth metal band rings) must be removed.

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Personal Protective Equipment (PPE) protects the exposed tissue of a DHCP from exposure to potentially infectious material. PPE protects the skin of the hands and arms from exposure to splashing or spraying of blood, saliva or other body fluids, and also from introducing the surface flora into deeper tissues by traumatic and environmental injury. PPE protects the conjunctival mucosa of the eyes, as well as the lining mucosa of the respiratory tract.

Large particle droplets of water, saliva, blood, microorganisms and other debris are created by the use of rotary dental instruments from handpieces, ultrasonic and sonic scalers and endodontic equipment, and air-water syringes. This visible spray typically travels only a short distance (approximately two feet / 60cm. or less from the patient's mouth) and settles out quickly. This spray and spatter lands on nearby surfaces, including the operatory countertops and equipment, the DHCP and the patient. Aerosols, with particles less than 10 $\mu$ m in size, can also be created, and can be inhaled by the DHCP or patient.

Appropriate work-practice controls will minimize the spread of droplets, spatter, spray and aerosol. This includes the use of dental "rubber" dams whenever possible and high volume / high velocity suction whenever the creation of droplets, spatter, spray and aerosol is possible.

Primary PPE would include gloves, surgical masks, protective eyewear and protective clothing. Wearing gloves, masks, protective eyewear and protective clothing will reduce the risk of exposure to potentially infectious material.

PPE should be removed prior to leaving the patient-care area. PPE designed to be re-used (e.g., protective eyewear and gowns) should be cleaned with soap and water. If the re-usable PPE are known to be contaminated, the item should be disinfected between patient use, according to the manufacturer's directions. Disposable PPE items should be discarded immediately following use.

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Gloves are worn to protect the skin of the DHCP's hands from contamination. Gloves do not replace the need for proper hand hygiene (see Personnel Health, Hand Hygiene, page 52), as gloves may contain small, unapparent holes or can be torn during patient treatment or hands may become contaminated during removal.

Appropriate hand hygiene must be performed immediately before donning gloves, and immediately after removing gloves.

Gloves are designed as single-use disposable items. Thus, gloves must be used for only one patient, and then discarded. Gloves must not be re-used even on the same patient; once they have been removed, they should be immediately discarded. Gloves must be removed, hand hygiene performed, and then new gloves reapplied between patients, or whenever the gloves are torn or punctured.

The type of gloves selected for use depends on the procedure being performed. Types of gloves would include:

- **Patient Examining Gloves** – Used for routine patient care, examination and other non-surgical procedures involving contact with mucous membranes and skin, as well as laboratory duties. These are typically latex, nitrile or nitrile blends, polyurethane or styrene-based copolymers. Plastic (polyvinyl chloride) or vinyl gloves may also be used, however, gloves from these materials tend to tear easily and contain more defects from manufacturing. All of these gloves are for use on one patient only, and are discarded after use.
- **Sterile Surgical Gloves** – Must be used whenever invasive surgical procedures are performed; such as whenever intentional gingival, mucosal or dermal flaps are raised, or whenever the cutting or sectioning of bone is anticipated. These are sterile, in appropriate hand size, and made of latex, nitrile or nitrile blends, polyurethane or styrene-based copolymers. All of these gloves are for use on one patient only, and are discarded after use.
- **Utility Gloves** – Used for cleaning and disinfection procedures, such as during operatory cleanup and instrument reprocessing. These are typically nitrile or latex-nitrile blends, chloroprene / neoprene, butyl rubber, fluoro-elastomer, polyethylene or other vinyl copolymer. Commonly referred to as utility, industrial or general-purpose gloves, these are not for patient care, and should be puncture and chemical resistant. They are relatively thick and should be cleaned and disinfected after use. These gloves should be single person use.

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If alcohol-based hand rubs are used for hand hygiene, only non-powdered gloves should be used, not powdered or “lightly powdered” gloves. The powder on gloves makes the hands “visibly soiled” and thus, only hand washing using water and antiseptic soap is appropriate.

The integrity of gloves should be monitored after donning and during use, particularly when manipulating metal instruments. If the surface of the glove is compromised (e.g., manufacturing defect, punctured or torn during use), the glove should be changed as soon as possible.

Gloves should not be washed, as soaps (plain or antiseptic) and alcohols can compromise the surface of latex and synthetic materials, leading to micro-perforations and loss of integrity. Micro-porosities in the glove material can lead to wicking, where liquids such as water, blood or saliva, can be drawn through undetected holes and held against the skin surface of the hand.

Double-gloving may be utilized for some specific procedures, which may involve the handling of multiple sharp metal instruments or during longer procedures. However, double-gloving, if utilized, should be procedure specific, not patient specific. Double-gloving may affect manual dexterity and tactile sensitivity.

Gloves should not be stored exposed to heat sources, such as near X-ray unit controllers, lasers, fans, electrical generators, suction machines or motors.

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Latex is a common material found in the manufacturing process of gloves used in dental health-care settings, as well as a large host of other materials found in the dental office. DHCP should not casually ascribe skin irritations to a latex allergy, given the ubiquitous nature of latex in dental health-care settings. The vast majority of skin reactions to gloves are, in fact, only irritant contact dermatitis or delayed hypersensitivity reactions, and not actually true allergic reactions to latex.

Adverse latex reactions range from mild to serious. These include:

- **Irritant Contact Dermatitis** is a non-immunologic chemical reaction resulting from the destruction of superficial skin cells. Acute irritant contact dermatitis presents as inflammation of the hands, and chronically as dry, cracking sores. Both the acute and chronic signs stop at the glove boundary on the wrist. Irritant contact dermatitis is due to skin reactions to soaps (plain and antimicrobial), surface disinfectants, powder from gloves, and hyper-hydration from inadequate hand drying after washing and towel abrasion. Management of irritant contact dermatitis would include changing types or brands of soap, towels or gloves, rinsing hands thoroughly after washing and utilizing a proper hand care regimen.
- **Delayed Hypersensitivity Reactions (allergic contact dermatitis)** are Type IV immunologic reactions, which are T- lymphocyte mediated. Acute delayed hypersensitivity reactions present as clustered bumps, vesicles, itching, redness and pain, and chronically as dry, thickened skin, sores and spaced bumps. Both the acute and chronic signs extend beyond glove boundary onto the arm. Delayed hypersensitivity reactions are due to an immunologic response to the chemical accelerators (typically: thiurams, thiazoles and carbamates) used in the manufacturing of latex, nitrile, and neoprene gloves, as well as to soaps (plain and antimicrobial), surface disinfectants and endotoxins found in the glove material or created by transient microorganisms not completely washed off the hands. Management of delayed hypersensitivity reactions may include referral to a medical dermatologist, and/or using washed (powderless) low-protein latex gloves or non-latex gloves.

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- **Immediate Allergic Reactions** are Type I immunologic reactions, which are IgE antibody mediated. This type of reaction is exceedingly rare, and represents a true latex allergy. Immediate allergic reactions to latex may represent a life-threatening situation. Acute immediate allergic reactions present as urticaria, hives and swelling, which extends beyond the glove boundary, and may become systemic as dyspnea, tachycardia, hypotension and anaphylaxis. Immediate allergic reactions are due to an immunologic response to the natural rubber latex protein antigen. Management of immediate allergic reactions would include providing immediate emergency medical care, if necessary and referral to a medical dermatologist, as well as the use of only non-latex, powder-free gloves, and the absolute avoidance of all latex products in the workplace and at home.

Dental patients with histories of true latex allergy may react to common dental products (e.g., gloves, rubber dams, prophylaxis cups, orthodontic elastics, some mouth props and medication vials). Patients with a true latex allergy should be treated in an environment where contact with latex proteins, either directly or airborne, is kept as low as reasonably achievable (“ALARA”). Any latex-containing materials or devices should be removed from the treatment area, or adequately covered and isolated.

Medical histories for both patients and DHCP should include questions relating to possible latex allergy. Questions should include predisposing conditions for latex allergy, including previous history of allergies, a history of early latex exposure (e.g., spina bifida, urogenital anomalies), or related allergies to certain fruits and nuts, such as avocados, kiwis, hazelnuts or bananas.

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Management of patients with true latex allergies in the dental health-care setting should consider the following additional precautions to ensure a safe treatment environment:

- As the sterilization process does not remove the latex proteins, all instruments to be potentially used on a patient with a known latex allergy should be prepared by DHCP wearing only non-latex gloves. The instruments should not come in contact with any other instruments that may have contacted latex (e.g., ultrasonic cleaner solution, wrapping towels). The operatory should be set-up by DHCP that are not wearing latex gloves.
- Latex protein antigens can exist in the ambient air for several hours after a room or operatory has been used. These airborne allergens can cause respiratory or anaphylactic symptoms in people with latex hypersensitivity. Patients with latex allergy may be scheduled for the first appointment of the day, in order to minimize exposure to airborne latex particles. The use of powder-free “washed” latex gloves will reduce aerosolization of particles, which may also contain adhesive latex proteins.
- Other DHCP should be aware of patients with latex allergy in the office or practice that day (e.g., by oral instructions, written protocols and posted signage), in order to prevent them from bringing latex-containing materials into the treatment area.
- All working areas that may have been contaminated with latex powder or dust should be frequently cleaned.
- Emergency treatment kits with latex-free products should be available at all times.

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The respiratory mucosa of a DHCP must be protected from contact with potentially contaminated material by the wearing of a mask during a dental procedure which produces large particle droplets. DHCP must wear a surgical mask that covers the nose and mouth during dental procedures whenever splashes, sprays or spatter of blood, saliva, other body fluids, or water contaminated with blood, saliva or other body fluids may be produced.

The surgical mask should have more than 95% filtration efficiency for particles 3-5 microns in diameter. The efficiency of filtration is reduced significantly whenever the outer surface of the mask becomes contaminated with droplets of spray of oral fluids, or from touching the mask with contaminated gloves or hands.

The mask must be changed according to manufacturer's directions or whenever it becomes contaminated or wet. This would occur between patients whenever a handpiece, ultrasonic scaler or endodontic instrument was used, or if a splash, spray or spatter was created by an air-water syringe, or any other instrument or equipment. The mask should also be changed more often, such as during longer procedures, if it becomes wet during the procedure or from the DHCP's exhaled moist air.

DHCP should ensure the mask fits tightly over the nose and mouth, so that the DHCP is breathing through the mask, and not around it. Masks must not be worn around the neck. Masks must be removed by the ties and discarded after each use.

If airborne transmission precautions are necessary (e.g., for patients with influenza like illness or suspected infectious pulmonary or laryngeal tuberculosis / TB), a particulate-filter respirator or mask (e.g., N-95) should be worn. These masks will filter 1- $\mu$ m particles in the unloaded state with a filter efficiency of greater than 95% (i.e., filter leakage <5%), given flow rates of <50 L/min, which is an approximate maximum airflow rate during breathing. Only masks specifically designed for this purpose should be used. When airborne transmission precautions are necessary, these respirators or masks should be used in the context of a complete respiratory protection program. Such a program should include training and fit testing of the respirator or mask to ensure an adequate seal between the edges of the respirator and the DHCP's face.

Single-use disposable masks should be properly disposed of after use.

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The conjunctival mucosa of a DHCP must be protected from contact with potentially contaminated material by the wearing of protective eyewear during the dental procedure. DHCP must wear protective eyewear that covers the eyes during dental procedures whenever splashes, sprays or spatter of blood, saliva, other body fluids, or water contaminated with blood, saliva or other body fluids may be produced.

Protective eyewear with solid side shields or a face shield should be worn by DHCP during procedures and patient-care activities likely to generate splashes or sprays of blood or body fluids. Protective eyewear for patients should also be used to protect their eyes from spatter or debris created during dental procedures.

Protective eyewear for the DHCP and patient should be cleaned and disinfected after use, at least between patients, or whenever the eyewear becomes visibly contaminated.

An eye-wash station or commercial eyewash bottle with proper eyepieces manufactured for that purpose should be available in the office or practice, to aid in managing any chemical or body fluid splashes, sprays or spills into the eyes of a DHCP or patient. All DHCP staff should be orientated as to the location, function and indications for use of the eyewash station or bottle.

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The skin on the arms and chest of a DHCP should be protected from contact with potentially contaminated material by the wearing of protective clothing during any dental procedure where splash or spray are anticipated. Long-sleeve, fluid-resistant, protective clothing, extending to the wrists, is ideal for this purpose. Short-sleeve protective clothing is acceptable, as long as there are no breaks in the skin integrity on the arms of the DHCP. If the arms are not protected, hand hygiene protocols should extend up the arms, past the wrists towards the elbows.

Protective clothing includes gowns and lab-coats, and is meant to be worn over regular clinic clothing, such as uniforms, scrubs or street clothing.

The protective clothing should be changed at least daily, or if it becomes visibly soiled or significantly contaminated, and as soon as feasible if penetrated by blood or other potentially infectious fluids or materials.

Protective clothing should be removed before leaving the work area, and should not be worn home. Protective clothing should be washed between uses in a normal wash cycle, or professionally cleaned.

Footwear to be worn in the patient treatment area and reprocessing area must meet provincial labour codes. Shoes that can be easily cleaned and have enclosed toes and heels are recommended.

Personal Protective Equipment for Reprocessing:

Full PPE must be worn for decontamination activities. Disposable PPE must be discarded immediately after use and prior to leaving decontamination area.

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Patient-care items, such as dental instruments, handpieces, devices and equipment, can be categorized as critical, semi-critical, or non-critical, depending on the potential risk for infection associated with their intended use. This categorization is based on a modified Spaulding classification developed by the U.S. Centers for Disease Control and Prevention (see Appendix, Charts, page 102).

- **Critical Items** are used to penetrate soft tissue or bone. Critical patient care items have the greatest risk of transmitting infection and must be sterilized by steam sterilization.
- **Semi-Critical Items** are those items that only touch mucous membranes or non-intact skin and have a lower risk of transmission. As the majority of semi-critical patient care items in dentistry are heat and moisture tolerant, all semi-critical items should be sterilized by using steam sterilization. If a semi-critical item is heat and moisture sensitive, it must be disinfected with high-level disinfection.
- **Non-critical Items** contact only intact skin, which serves as an effective barrier to microorganisms. Non-critical patient care items pose the least risk of transmission of infection. In the majority of cases, cleaning, or if contaminated by blood, saliva or other body fluid, cleaning followed by disinfection with a low-level disinfectant is adequate. Cleaning or disinfection of some non-critical items may be difficult or may damage the surfaces. In those instances, the use of disposable barriers to protect these surfaces may be a preferred alternative.

All devices used for sterilization of dental instruments and devices must be specifically designed for this purpose, and must be registered by Health Canada as a dental or medical device. All solutions used for disinfecting dental instruments and devices must have a Drug Identification Number (DIN) from Health Canada. All instruments processed must also be licensed by Health Canada and must be compatible with the device used for sterilization.

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#### **“Effective reprocessing requires rigorous compliance with recommended protocols”**

Public Health Agency of Canada

Critical patient care items include any instrument which penetrates soft tissue, contacts bone, enters into or contacts the bloodstream or any other normally sterile body tissue. Examples of critical items would include surgical instruments, periodontal scalers, scalpel blades and dental burs.

Critical items must be sterilized by heat in order to prevent cross-contamination and infection spread in the dental setting. DHCP can be exposed to microorganisms on contaminated critical instruments and devices through percutaneous injury, contact with non-intact skin on the hands or other body part, or contact with mucous membranes of the eyes, nose or mouth.

**Operatory Clean-up:** Contaminated instruments and devices should be handled carefully to prevent exposure to contaminated sharp instruments that can cause a percutaneous injury. Instruments that have been used on a patient should be handled with puncture-resistant utility gloves during operatory clean-up (see Personal Protective Equipment, Gloves, page 56).

**Transportation:** Contaminated instruments and devices should be placed in a rigid or puncture-resistant container at the point of use to prevent percutaneous injuries during transport to the instrument reprocessing area. If dental instruments and devices cannot be cleaned immediately after use, devices must be kept moist in a transport container by using a holding solution, a wet towel moistened with water, or foam, spray or gel product (not saline) specifically intended for this use.

**Instrument Reprocessing** requires multiple steps to achieve sterilization. These steps include: Pre-cleaning (disassembly, sorting and sorting), cleaning, rinsing, drying, physical inspection, corrosion reduction/lubrication, packaging, steam sterilization, cooling / drying, storage and delivery.

Sterilization is a complex process requiring specialized equipment, adequate space, qualified DHCP who are provided with ongoing training and regular monitoring for quality assurance. Correct cleaning, packaging, sterilizer loading procedures and sterilization methods must be followed to ensure that an instrument is adequately processed and safe for re-use on patients. The goal is to break the chain of infection of the potential for patient to patient transmission.

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**Instrument Reprocessing Area:** A designated instrument reprocessing area must be constructed in the dental office or practice. This central reprocessing area must have clearly designated and adequate sections for:

- Receiving, cleaning, and decontamination;
- Preparation and packaging;
- Sterilization; and
- Storage of processed instruments (or, suitable storage in the operatories).

Walls or partitions should separate the sections to control traffic flow and contain contaminants generated during reprocessing, such as splatter, spray or aerosolization from an ultrasonic cleaner. If physical separation of these sections is not possible, adequate spatial separation is necessary, whereby separate areas are clearly identified for dirty and clean areas, provided the DHCP reprocessing the instruments are trained in work practices to prevent contamination of clean areas. Space must be adequate for the volume of work anticipated and the items to be stored.

The reprocessing area must be designed so that there is a one-way movement of instruments through the reprocessing process, from contaminated to sterile. Surfaces in the reprocessing area must be easily cleaned. Hand hygiene facilities must be readily available to the reprocessing area.

Any new construction, future renovation or relocation of a dental office should consider providing a physically separate instrument reprocessing area, with one-way movement of staff through the area, negative pressure air-flow in decontamination areas and positive pressure air-flow in clean areas.

**Decontamination:** The surface of an instrument cannot be sterilized if there is blood, saliva, other body fluids or other debris, such as dental materials, adhering to the surface. Cleaning must precede all disinfection and sterilization processes. Cleaning involves the removal of debris as well as organic and inorganic contamination. Removal of debris and contamination is achieved either by scrubbing with a surfactant, detergent, and water, or by an automated process (e.g., ultrasonic cleaner or washer-disinfector) using chemical agents. An automated process using equipment specifically designed for cleaning dental / medical instruments or devices (e.g., ultrasonic cleaner or washer-disinfector) is preferable to hand scrubbing in order to reduce the risk of DHCP injury. After cleaning with an ultrasonic cleaner, instruments must be rinsed by submerging in water to remove chemical or detergent residue, taking care to minimize splashing.

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If cleaning cannot be done immediately, a **holding solution** may be used, or the contaminated instruments or devices must be kept moist in a transport container by using a wet towel moistened with water, or foam, spray or gel product (not saline) specifically intended for this use. A liquid chemical sterilant or high-level disinfectant (e.g., glutaraldehyde) must not be used as a holding solution, due to the fixative nature of these chemicals making surfaces more difficult to clean, and the general toxicity of these solutions.

#### Cleaning:

Heavily soiled devices requiring brushing must be brushed beneath the surface of the cleaning solution using a long-handled brush to prevent aerolization of contaminants and full PPE must be worn.

#### Ultrasonic:

If used, must be used with the lid closed. Manufacturer's recommendations for maintenance including performance testing must be followed. Cleaning solution must be changed at least daily and when visibly soiled. Instruments must have gross contamination removed prior to insertion into the ultrasonic and must be rinsed submerged after removal from the ultrasonic device.

#### Cleaning accessories:

Cleaning accessories must be disposable or cleaned and high-level disinfected or sterilized between uses.

Manufacturer's directions for the cleaning and decontamination of dental instruments or devices must be followed with special attention paid to the working end of composite instruments where the failure to pre-clean the instrument according to directions, even if material is not visible, may cause adherence of composite material to the instrument. Manual removal of any dried debris may permanently harm the surface finish.

Work-practice controls must be used to keep the hands away from sharp instruments; e.g., using puncture-resistant utility gloves and long-handled brush when handling or manually cleaning contaminated instruments and devices. DHCP should not reach into trays or containers holding sharp instruments that cannot be seen (e.g., use low sudsing instrument detergent to avoid sinks filled with soapy water). Work-practice controls should include the use of a strainer-type basket to hold instruments and forceps to remove the items. PPE should be worn during instrument decontamination to avoid exposure from splashing.

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**Instrument and Device Preparation and Packaging**

Decontaminated and cleaned instruments and devices must be inspected, assembled into sets or trays, and wrapped, packaged or placed into container systems for sterilization. Packaging and wrapping materials must be specifically designed for sterilization. Critical instruments must not be sterilized or stored unwrapped. Hinged instruments should be processed open and unlocked. Hinged instruments should be immersed in a rust inhibitor prior to sterilization. Each instrument pack or cassette must have an external Class 1 process indicator applied to, or visible from, the exterior of the package, and an internal chemical indicator that is a Class 4 multi-parameter indicator or a Class 5 integrating indicator. Class 5 integrating indicators must be used inside the material and/or instrument packs whenever implantable devices are used. DHCP should refer to the manufacturer's instructions regarding use and correct placement of chemical indicators.

Critical instruments must be wrapped or placed in containers (e.g., cassettes or organizing trays) designed to maintain sterility during storage. Packaging materials should be specifically designed for the type of sterilization process utilized in that practice. "Flash" sterilization, that is, reprocessing loose instruments not in wraps, packages or cassettes, must only be used for emergencies, and not done routinely. Flash sterilization must not be used for implantable devices. Scheduling of procedures and lack of instrumentation are not valid reasons for routine flash sterilization of instruments.

Manufacturer's instructions for use of packaging material must be followed. Multiple use products (textile wrappers) are discouraged due to the quality assurance requirements associated with the maintenance of textile wrappers (tracking to monitor the age and number of uses of a product, periodic random testing of barrier materials and targeted testing of products that appear misused or damaged). Textile wrappers also require validated written manufacturer's instructions specific to the device for preparation or first use, reprocessing and routine care.

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## **Sterilization**

Heat-tolerant dental instruments are sterilized in a dental office using:

- Steam under pressure (autoclaving);

All sterilization must only be performed using dental / medical sterilization equipment specifically designed for the sterilization of instruments and devices. Sterilization times, temperatures and other operating parameters must be used as recommended by the specific manufacturer of the equipment used. Instructions regarding the correct use of containers, wraps, placement and type of chemical or biological indicators must be followed as recommended by the specific manufacturer of the equipment used.

Items should be arranged in the sterilizer in such a way as to permit free circulation of the sterilizing agent (i.e., steam). The manufacturer's instructions for loading the sterilizer regarding capacity and arrangements of the instruments or packs within the sterilizer chamber must be followed.

Sterile instrument packs must be maintained as sterile until the point of use. Instrument packs should be allowed to dry inside the sterilizer chamber before removing and handling, in order to avoid wicking of moisture and, potentially, microorganisms from hands or gloves.

All sterile instrument packs must be marked with the date and time of the sterilization load, or marked so that this information can be cross-referenced with a particular load number from the sterilizer. In order to maintain sterility of the contents of the package, DHCP should utilize event-related packaging, and must not open the package until it is going to be used (i.e., do not open the package to remove an instrument, and then re-close the package), and should take care that the package is not touched with contaminated or wet hands or gloves, and is stored in a protected, dry environment. Packages must be monitored for integrity.

Processing parameters required to achieve sterilization must be monitored by mechanical, chemical, and biological indicators. Mechanical or electronic failure alarms for time, temperature, and pressure must be in place and recorded for each load that is processed in the sterilizer. The sterilizer manufacturer should be consulted regarding selection and use of chemical and biological indicators (see Sterilization and Disinfection of Patient Care Items, Sterilization Monitoring, page 73).

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Steam sterilizers used in the dental office must be appropriate for packaged and lumen devices, must be able to be monitored with physical parameters, chemical indicators and biological indicators and must be large enough to handle the work load of the office.

So-called “liquid chemical sterilants” must not be used to sterilize critical instruments. These sporidical chemicals (e.g., glutaraldehyde, peracetic acid and hydrogen peroxide) are highly toxic and their effectiveness cannot be verified with biological indicators. Critical dental devices or instruments that are not heat-stable, i.e., cannot tolerate a sterilization cycle, should not be used and should be replaced with sterile single-use disposable devices or instruments, or heat-stable items should be purchased for reprocessing by autoclaves.

So-called “glass bead sterilizers” must not be used to sterilize critical or semi-critical instruments (e.g., endodontic files), as their effectiveness is inconsistent for sterilization between patients. Boiling, ultraviolet light, ovens designed for food preparation and microwave ovens must not be used for instrument or device sterilization.

Low-temperature sterilization using ethylene oxide gas (ETO) is used extensively in larger health-care facilities, such as hospitals. Heat- and moisture-sensitive patient-care items may be sterilized with ETO without damaging effects. The extended sterilization times (typically, 10 to 48 hours), as well as the hazardous vapours produced, make this method impractical for private-practice dental care settings. As well, handpieces cannot be effectively sterilized using ETO due to the decreased penetration of ETO gas through small lumens.

Other types of low-temperature sterilization methods (e.g., hydrogen peroxide gas plasma) exist; however, these methods are not yet practical for dental offices.

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Semi-critical items contact mucous membranes or non-intact skin, but do not penetrate soft tissue, contact bone, enter into or contact the bloodstream or other normally sterile tissues. Examples of semi-critical patient care items would include dental mouth mirrors, amalgam condensers and reusable impression trays and nasal hoods.

Steam sterilization shall be used for semi-critical instruments that are compatible with heat and moisture to prevent cross-contamination and infection spread in the dental setting. All steps for the sterilization of critical items should be followed for semi-critical items, although wrapping and storing wrapped or in cassettes until use is not required, however, wrapping semi-critical items and storing these wrapped or in cassettes is becoming preferred in oral health care settings. Semi-critical instruments may be stored in a clean dry location and handled with clean hands, clean gloves or clean forceps.

Semi-critical patient care items that are heat sensitive and cannot be sterilized must receive high-level disinfection using a solution with a Drug Identification Number (DIN) from Health Canada. All steps involved in critical instrument handling, transportation, decontamination and storage should be followed for semi-critical item reprocessing, with the exception that high-level disinfection is utilized instead of heat sterilizer reprocessing.

High-level disinfection destroys all microorganisms, but not necessarily high numbers of bacterial spores. High-level disinfection can be achieved by using liquid immersion in a high-level disinfectant (e.g., glutaraldehyde, glutaraldehyde with phenol or high-concentration hydrogen peroxide; see Appendix, Charts, page 104) according to manufacturer's instructions.

Following high-level disinfection by liquid immersion, semi-critical items should be thoroughly rinsed with sterile water after removal to remove toxic or irritating residues. Manufacturer instructions regarding dilution, immersion time, rinsing, temperature and safety precautions must be followed carefully.

The process of high level disinfection requires monitoring and auditing:

Appropriate chemical test strips must be used to determine whether a minimum effective concentration (MEC) of active ingredients is present despite repeated use and dilution.

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MEC must be monitored and recorded each day it is used. Records should be retained as long as legally prudent. Some hospitals are now keeping these records for 20 years.

Chemical strips should be checked each time a new package/bottle is opened to verify they are accurate, using positive (e.g., full strength disinfectant solution) and negative (e.g., tap water) controls. See manufacturer's recommendations for appropriated controls.

Due to the toxicity of these chemicals, appropriate precautions should be taken to protect the DHCP, including using closed containers to limit vapour release, chemically resistant gloves and aprons, goggles and face shields.

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Monitoring of sterilization procedures and equipment, utilizing mechanical, chemical and biological indicators, ensures the condition of sterility.

**Mechanical Techniques** for monitoring sterilization include assessing cycle time, temperature, and pressure by observing the gauges or displays on the sterilizer and documenting by hand and retaining these parameters for each load. Correct readings do not ensure sterilization; however, incorrect readings may be an early indication of a problem with the sterilization cycle. Integrated printouts of these parameters for each cycle are the preferred and recommended technique. These printouts should be retained as long as legally prudent.

**Chemical Indicators** use sensitive chemicals to assess physical conditions (e.g., time, temperature and/or the presence of steam) during the sterilization process. Even though chemical indicators do not prove sterilization has been achieved, they allow detection of certain equipment malfunctions, and they can help identify procedural errors. Chemical indicators (e.g., chemical indicator tape or special markings) change color rapidly when a specific parameter is reached. This verifies that the package has been exposed to the sterilization process. Chemical indicators must be used on the inside and outside of each package to signify that the package has undergone a sterilization cycle and show that sterilant has penetrated the package.

Different classes of chemical indicators assess different physical parameters. For example, in a steam process, some of these chemical indicators must be exposed to steam for a minimal length of time to achieve the endpoint, (i.e., Class 1), some are intended to demonstrate the rapid and even penetration of steam (i.e., Class 2 Bowie-Dick), some must be exposed to a minimum temperature (i.e., Class 3), some are affected by a combination of temperature and time of exposure (i.e., Class 4) and others are affected by time, temperature, and saturated steam (i.e., Class 5). Class 5 chemical indicators must be used inside the material or instrument packs whenever implantable devices are used. Some chemical indicators are cycle specific (Class 6).

In all cases, the DHCP should compare the response of the chemical indicator to an endpoint described by the manufacturer of the indicator. If the endpoint is not reached, the DHCP should assume there is a sterilization processing problem. If this occurs, the DHCP responsible must investigate the cause of the problem.

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In the event that a chemical indicator fails to reach its endpoint, a documented protocol must be followed to investigate the cause of the problem, which could include, but not be limited to, the following considerations:

- a) Was there a sterilizer malfunction that could account for the failure to achieve the endpoint?
- b) Has there been a change(s) in the product and/or sterile barrier system?
- c) Has the loading density increased or decreased within the sterile barrier system?
- d) Has the sterilization processing container/configuration changed (e.g., number of packages has increased or decreased, or the configuration was not the same as that used during validation)?
- e) Was sterilizer calibration and/or routine maintenance conducted appropriately?
- f) Was the correct sterilizer process chosen for the product sterilized?
- g) Was the chemical indicator handled under manufacturer's recommended practices?
- h) Have there been changes in the utilities supplied to the sterilizer that could materially affect cycle execution (pressure, flow rate, non-condensable gases in the steam supply, etc.)?
- i) Did that instrument pack, in fact, actually go through a sterilizer cycle?

If either mechanical indicators, external or internal chemical indicators indicate inadequate processing, items in the load must not be used until after investigation, the problem is corrected and the load is successfully reprocessed.

**Biological Indicators** (BI) (i.e., spore tests) verify the sterilization process directly by assessing the killing of known highly resistant microorganisms. As spores used in BIs are more resistant and present in greater challenge numbers than the common microbial contaminants found on patient-care equipment, an inactivated BI signifies that other less resistant pathogens in the load have been killed.

Correct functioning of sterilization cycles must be verified for each sterilizer by the routine use of BIs, each day and for each type of cycle used (i.e., wrapped and unwrapped cycles if both are used). Every load containing implantable devices and/or the instruments used to place implantable devices must be monitored with a BI, and the items stored until the BI results are known.

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Notes on the preparation and use of in-house prepared Test Packs:

Biological monitoring of table-top sterilizers is conducted in the sterilizer chamber containing a routine load using a BI challenge test pack.

A BI challenge test pack can be one that is commercially prepared or can be constructed in-house by placing a BI along with several dental instruments and a chemical indicator inside a sealed peel pouch. This sealed peel pouch should be placed in the area of the sterilizer considered least favourable to sterilization (cold point). If the dental office/clinic typically reprocesses instruments using wrapped instrument trays then the BI should be placed inside a typical wrapped tray containing dental instruments along with a chemical indicator. The "cold point" in table-top sterilizers varies with sterilizer design but is normally located in an area near the drain in a normally fully loaded chamber (check your sterilizer's user manual for details.)

Following inspection and retrieval of the BI from the test pack, the remaining contents of the test pack should be reprocessed before use.

A control BI, from the same lot as the test indicator and not processed through the sterilizer, should be incubated with the test BI; the control BI should yield positive results for bacterial growth. The results of the BI testing shall be recorded and records retained as long as legally prudent.

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Mail-in sterilization monitoring services or in-office biological monitoring systems are available to test both the test biological indicator and the control biological indicator.

In the event of a positive result, the BI test should be repeated immediately in an empty sterilizer chamber and using the same cycle that produced the failure. The sterilizer should be removed from service, and all records reviewed of chemical and mechanical monitoring since the last negative BI test. Sterilizer operating procedures should be reviewed, including packaging, loading and spore testing, with all DHCPs who work with the sterilizer to determine whether operator error could be responsible.

Common reasons for a positive BI in the absence of mechanical failure of the sterilizer include:

- Overloading.
- Failure to provide adequate package separation.
- Incorrect or excessive packaging material.

A second monitored sterilizer in the office can be used, or a loaner obtained, to minimize office disruption while waiting for the repeat BI results.

If the repeat BI test is negative and chemical and mechanical monitoring indicates adequate processing, the sterilizer may be put back into service. If the repeat BI test is positive, and packaging, loading, and operating procedures have been confirmed as performing correctly, the sterilizer should remain out of service until it has been inspected, repaired, and re-challenged with BI tests in three consecutive empty chamber sterilization cycles. Whenever possible, items from suspect loads dating back to the last negative BI test should be recalled, re-wrapped, and re-sterilized.

Results of biological monitoring must be recorded and retained as long as necessary for medical legal purposes.

If the dental clinic has a pre-vacuum (dynamic air removal) sterilizer, then a Bowie-Dick test must be done in an empty chamber according to the manufacturer's instructions for placement and must be performed every day that the sterilizer is used. The results of the Bowie-Dick test must be recorded and retained as long as is legally prudent.

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Non-critical patient-care items pose the least risk of transmission of infection, contacting only intact skin, which serves as an effective barrier to microorganisms. Examples of non-critical items would include radiograph heads / cones, blood pressure cuffs, facebows and pulse oximeters.

Non-critical patient care items must be cleaned, or, if contaminated, cleaned and then disinfected with low-level disinfectant.

Cleaning and disinfection of some non-critical items may be difficult or may damage the surfaces. In those instances, the use of disposable barriers to protect these surfaces may be a preferred alternative (see page 80).

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Environmental surfaces in the dental operatory that do not contact the patient directly are not a direct risk to patient safety. These surfaces (e.g., light handles, drawer knobs), however, can become contaminated during patient care, and then act as a reservoir for microbial contamination. Transmission of this type occurs primarily through DHCP hand contact, or by touching the environmental surface with a contaminated instrument. Microorganisms can then be transferred to other instruments or to the hands, nose, mouth or eyes of DHCP or patients.

Proper hand hygiene and the wearing of PPE is an essential part in minimizing such potential cross-contamination. Surface protection, however, using either barrier protection or cleaning and disinfection, also protects against microbial transfer from environmental surfaces.

Environmental surfaces can be divided into:

- **Clinical Contact Surfaces:** These surfaces may come in direct contact with a DHCP's hands, patient-care items, or with a patient, and have a minimal, but potential risk of infectious disease transmission. Examples would include light handles, dental radiograph equipment, drawer handles and doorknobs.
- **Housekeeping Surfaces:** These surfaces have limited risk of disease transmission, unless they inadvertently come in direct contact with DHCP's hands, patient-care items or dental appliances. Examples would include floors, walls and sinks.

Environmental surfaces typically need to be cleaned only. However, whenever an environmental surface is known or is suspected to be contaminated with blood, saliva, other bodily fluids or water containing any bodily fluid, then the environmental surface should be cleaned and then disinfected using a low-level disinfectant.

An important first step in disinfecting any surface is cleaning. Cleaning removes debris such as organic matter, salts and soils that are adherent to a surface. This debris may interfere with microbial inactivation by a disinfectant.

A cleaning protocol for aquariums should be established which contains safeguards against environmental contamination of the dental setting. Aquariums should be kept away from patient care areas.

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Clinical contact surfaces can be directly contaminated with blood, saliva, other bodily fluids or water containing bodily fluids either by direct spray or spatter or by contact with contaminated instruments or a DHCP's gloved hands. These surfaces can subsequently contaminate other instruments, devices, hands or gloves. Examples of such surfaces include:

- Light handles;
- Switches;
- Radiograph equipment;
- Chair-side computer keyboards and monitors;
- Reusable containers of dental materials;
- Drawer handles;
- Faucet handles;
- Countertops;
- Writing utensils, such as pens;
- Telephones; and
- Doorknobs.

Clinical contact surfaces should be protected after use to avoid cross-contamination. Surface protection is accomplished by either:

- Surface cleaning and disinfection;  
OR
- Barrier protection.

### **Surface Cleaning and Disinfection**

All clinical contact surfaces that have been contaminated or may have been contaminated should be cleaned and disinfected between patients and at the end of the workday using a low-level disinfectant. DHCP should wear appropriate PPE while cleaning and disinfecting clinical contact surfaces.

Treatment areas should be kept uncluttered of unnecessary equipment and supplies to make daily cleaning easier. Manufacturer's instructions should be consulted regarding compatibility of devices and equipment with liquid chemical disinfectants.

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#### **Barrier Protection**

Clinical contact surfaces and equipment can be protected from contamination using barrier protection. Barrier protection is particularly effective for those clinical contact surfaces that are difficult to clean and disinfect due to surface topography or material chemical incompatibilities. Barrier protection materials include:

- Clear plastic wrap;
- Plastic bags;
- Plastic sheets;
- Plastic tubing;
- Plastic-backed paper; and
- Other materials impervious to moisture.

Barriers become contaminated during patient care. Barriers should be removed and discarded between patients using gloves. Following removal of the barrier, the clinical contact surface should be examined to ensure it did not become inadvertently contaminated. The surface should be cleaned and disinfected if contaminated.

Following removal of the barrier, gloves should be removed, hand hygiene should be performed and clean barriers should be placed prior to the next patient treatment.

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Housekeeping surfaces, such as floors, walls and sinks, have a limited risk of disease transmission in dental health-care settings. Periodic cleaning with dilute detergents or household low-level disinfectants is typically all that is required. If the surface becomes contaminated with blood, saliva or other bodily fluids, the surface should be cleaned and then disinfected with a low-level disinfectant.

Floors should be cleaned regularly, and spills should be quickly cleaned up. Routine disinfection of floors, windows, walls, drapes, window blinds and other vertical surfaces is not necessary unless the surfaces are known or are suspected to be contaminated.

Cleaning tools, such as mop heads or cleaning cloths, should be cleaned after use and allowed to dry before reuse. Single-use, disposable mop heads and cloths are also available and should be used to avoid spreading contamination.

Dilute solutions of detergents or disinfectants, especially if prepared in dirty containers, stored for long periods of time or prepared incorrectly, may become reservoirs for microorganisms. Manufacturer's instructions for preparation and use should be followed. Fresh cleaning solution should be made each day, discarding any remaining solution and allowing the container to dry between uses.

Contaminated housekeeping surfaces should be dealt with promptly by cleaning and surface disinfection. Blood spills or splashes should be contained and managed as quickly as possible to reduce the risk of contact by patients and DHCP. The DHCP responsible to clean the spill should be pre-assigned so that a delay does not occur. This DHCP should wear appropriate PPE. Visible organic material should be removed with absorbent material (e.g., disposable paper towels discarded in a leak-proof container). Non-porous surfaces should be cleaned and then decontaminated with a low-level disinfectant. However, if such products are unavailable, a 1:10 dilution of sodium hypochlorite (e.g., 1 part 5.25% bleach and 9 parts household water prepared daily) is an inexpensive and effective intermediate-level disinfecting agent for housekeeping surfaces.

Carpeting and cloth furnishings are difficult to clean and cannot be reliably disinfected. Carpeting and cloth furnishings should not be used in patient care areas.

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General waste from dental health-care settings is no more infectious than residential waste. Biomedical waste (infectious) requires special storage, handling, neutralization and disposal, according to Alberta provincial and local municipal regulations. Such waste includes:

- Solid waste soaked or saturated with blood or saliva (e.g., gauze saturated with blood following surgery);
- Surgically removed hard or soft tissue (not including extracted teeth; see Special Considerations, Handling of Extracted Teeth, page 91);
- Contaminated disposable sharp items (e.g., needles, scalpel blades, wires) to be placed in a Sharps Container that meets CSA Standards; and
- Consult the ADA+C Best Practice Management Dental Waste document on the ADA+C members' only website for detail instruction on best practice management in dental wastes.

Any item that may have come in contact with blood, saliva, other bodily fluids or water or other liquid that contains bodily fluids (biomedical waste- contaminated) is not likely to be infectious, and treating all such waste as infective is not practical or necessary. Biomedical waste (contaminated) can be disposed of with general garbage; heavy-duty bags or double bagging is recommended.

Non-sharp biomedical waste (infectious) should be placed in a leak-resistant sturdy bag. Local regulations may require that this bag is labeled as "Biohazardous" waste. The exterior of the bag should not be contaminated prior to disposal. If the exterior of the bag is contaminated or punctured, the bag should be placed in a second sturdy bag, similarly labeled, if required. All bags should be securely closed for transportation and disposal. Puncture-resistant sharps containers should be located at the point of use (i.e., in the operatory) for immediate disposal of scalpel blades, needles, syringes and unused sterile sharps.

Dental offices should dispose of general and biomedical waste (infectious) regularly to avoid accumulation. Every dental care facility should have a plan for management of biomedical waste that complies with Alberta provincial and local municipal regulations to ensure health and environmental safety.

All containers with blood or saliva (e.g., suctioned fluids) may be safely poured into a utility sink, drain or toilet, which drains into a sanitary sewer system or septic tank. DHCP should wear appropriate PPE during this task.

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Dental unit waterlines (DUW) (i.e., narrow-bore plastic tubing that carries water to handpieces, air/water syringe and ultrasonic scaler) can become heavily colonized with waterborne microorganisms, including bacteria, fungi, and protozoa. However, DUW are not a conducive environment for bacterial flora commonly found in the oral cavity.

High numbers of these opportunistic microorganisms are not necessarily dangerous to the general population from dental treatment water, unless the DHCP or patient is a susceptible host. Susceptible hosts would include DHCP or patients that are immunocompromised (e.g., those living with HIV and people undergoing oncology treatment or organ transplantation procedures), those with cystic fibrosis, chronic bronchitis and bronchiectasis.

The potential risk of infection from dental treatment water microorganisms can be effectively reduced to counts to potable water standards (i.e., less than 500 cfu/ml) by following regular waterline maintenance procedures. These procedures are as follows:

- The dental clinic must use a water supply, which is tested for, and free of contaminants, such as from a monitored municipal water supply; unless there is a boil water advisory (see Environmental Infection Control, Boil Water Advisories, page 84). Non-monitored water supplies should be tested bi-annually.
- Waterline heaters should not be used in a dental unit or in dental equipment, as these heaters encourage waterline microorganism growth.
- All waterlines must be purged at the beginning of each workday by flushing the lines thoroughly with water for at least two minutes. This purging should not be done with handpieces, air/water syringe tips and ultrasonic tips attached to the waterlines.
- Handpieces utilizing water coolant must be run for at least twenty seconds after patient care, in order to purge all potentially contaminated air and water. A sterilized handpiece can then be attached, following regular clinical contact surface management (see Environmental Infection Control, Housekeeping Surfaces, page 81).
- Sterile water or sterile saline must be used when irrigating open vascular sites and whenever bone is cut during invasive surgical procedures. Conventional dental units do not reliably deliver sterile solutions, even when equipped with independent water reservoirs or microfilters, due to the formation of biofilm along the water pathway. Delivery systems, such as a bulb syringe, should be used to deliver sterile irrigation solutions.
- When closed water systems are used, DHCP should be careful not to touch the tubing with the fingers or gloved hand when changing the water coolant bottle, as this easily contaminates the entire system.
- Manufacturer's instructions of the dental units and dental equipment must be followed for daily and weekly maintenance whenever closed water systems or other special water delivery systems are utilized.

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Boil water advisories occur whenever public health officials determine that municipally delivered tap water is unsafe to drink. Circumstances that compromise the safety of the municipal water system include compromises in the distribution system (e.g., water-main breaks), water treatment system failures and natural disasters (e.g., floods, hurricanes or earthquakes).

During a boil water advisory, the following precautions should be taken:

- Public water should not be delivered to the patient through the dental unit, ultrasonic scaler or other devices or equipment.
- Use alternative water sources through closed delivery systems.
- Postpone treatment delivery, if necessary.
- Patients should not rinse their mouths with tap water; bottled or distilled water should be used instead.
- Tap water should not be used for hand hygiene. Antimicrobial products that do not require water, such as alcohol-based hand rubs, should be used for hand hygiene. If the hands have been known or suspected to be contaminated, hands should be washed using bottled or distilled water and an antimicrobial soap.
- When the boil water advisory is cancelled, all incoming public water system lines, including any taps or other waterlines in the dental office, should be flushed for 1-5 minutes. The dental unit waterlines in all dental units and equipment should be disinfected according to the manufacturer's instructions prior to use. There may be public health advisories which may require further measures.

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Several dental devices contact mucous membranes and expel air and water into the patient's mouth and potentially into open wounds. These devices are attached to the air or waterlines of the dental unit, and include:

- High- and low-speed handpieces, including low-speed motors;
- Prophylaxis angles;
- Ultrasonic and sonic scaling tips;
- Ultrasonic and sonic endodontic devices;
- Air abrasion devices; and
- Air and water syringe tips.

These devices have the potential of retracting oral fluids into internal compartments of the device. This retained patient material can then subsequently be expelled in the oral cavity of a patient during later use. Restricted physical access often limits the cleaning of these internal compartments, and compromises decontamination.

Any dental device connected to the dental air/water system that enters the patient's mouth must be run to discharge water and air for at least twenty seconds after each patient use. This procedure is intended to physically flush out any patient material that might have entered the turbine and air and waterlines.

Dental handpieces and other intraoral devices attached to air or waterlines must be heat sterilized after each patient use. Ethylene oxide gas (ETO) cannot adequately sterilize internal components of handpieces and should not be used to sterilize handpieces or other devices with small lumens (see *Sterilization and Disinfection of Patient Care Items, Reprocessing Critical Items*, page 65).

Manufacturer's instructions for cleaning, lubrication and sterilization must be followed closely to ensure both the effectiveness of the process and the longevity of handpieces.

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Backflow in low-volume suction lines can occur when a seal around the saliva ejector is created (e.g., by a patient closing lips around the tip of the ejector, creating a partial vacuum). This can result in microorganisms from the suction lines to be retracted into the patient's mouth and a potential source of cross-contamination.

DHCP should be careful not to allow patients to seal their mouths over the saliva ejector tip.

Engineering controls exist with specially designed saliva ejector tips that do not allow a negative pressure to form around the tip of the saliva ejector.

Suction lines should be rinsed at least with water between patients to remove loosely adherent debris and microorganisms and to reduce the likelihood of infectious material backflow. The procedure is to aspirate water or appropriate cleaning or disinfecting solution in the lines with air to produce turbulent flow in the lines. Suction lines should be cleaned at least once a week with an enzymatic cleaner or according to manufacturer's instructions.

Saliva ejector tips must be single-use patient use.

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Cross-contamination of radiographic equipment and environmental surfaces with blood or saliva is possible. Gloves and other PPE as appropriate must be worn when taking radiographs and handling contaminated film packets. Heat-tolerant versions of intraoral radiograph accessories are available and these semi-critical items (e.g., film-holding and positioning devices) must be heat sterilized between patient uses.

Radiography equipment (e.g., radiograph tube head and control panel) should be protected with surface barriers that are changed after each patient use. If barriers are not used, equipment that has come into contact with DHCP's gloved hands or contaminated film packets must be cleaned and then disinfected after each patient use.

X-ray film packets are considered a single-use item. After exposure of the radiograph and before glove removal, the film packet should be rinsed and dried to remove blood or excess saliva and protected for transport to the developing area. The film packet must be disinfected using a low-level disinfectant. The film packet should then be rinsed and dried before opening to develop the film. Alternately, the contaminated film packets may be opened using gloved hands, the film dropped onto a clean surface without touching and the empty packets disposed in an area where cross-contamination is not possible. The gloves should then be removed, and the film processed.

Film barrier pouches may alternately be used. The film packets should be carefully removed from the pouch to avoid contamination of the inner film packet.

Care should be taken to avoid contamination of the developing equipment. Protective barriers should be used, or any surfaces that become contaminated must be cleaned and disinfected using a low-level disinfectant.

Digital radiography sensors and other associated instruments (e.g., intraoral camera, electronic periodontal probe, occlusal analyzers and lasers) come into contact with mucous membranes and are considered semi-critical devices. These devices must be cleaned and steam sterilized or high-level disinfected between patients. Alternatively, these devices could be barrier protected during use. The device should be carefully inspected following removal of the barrier, and if contaminated, must be cleaned and disinfected using a high-level disinfectant prior to next patient use. Manufacturer's instructions should be carefully followed regarding appropriate barrier and disinfection or sterilization procedures for these devices.

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A single-use device is designed to be used on one patient for a single appointment and then discarded, not re-processed for use on that same patient at a later date, or on another patient (e.g., cleaned, disinfected or sterilized). Examples of single-use or disposable devices include syringe needles, prophylaxis cups and brushes, implant parts, temporary anchorage devices, bone grafting materials and certain orthodontic brackets. Single-use materials and devices are often marked with the following symbol:



Single-use devices in dentistry are usually not heat-tolerant and cannot be reliably cleaned or disinfected. Certain items (e.g., prophylaxis angles, brushes, cups, saliva ejectors, high-volume evacuator tips and air/water syringe tips) are commonly available in a disposable form and should be disposed of appropriately after each use.

Single-use sterile packaged burs and endodontic files are becoming more prevalent from manufacturers. When ordering supplies, manufacturer’s instructions regarding sterilization and/or reprocessing should be investigated, whether it is sterilization of a single-use (non-sterile) item or the reprocessing and sterilization of a multi-use critical item before it is first used.

Dentists administering medications using multi-use vials (such as for intravenous sedation) must use a new single-use disposable needle and a new single-use disposable syringe for each entry into a multi-dose vial, and follow proper Aseptic Technique when administering the medication. Multi-dose vials should be dated upon opening and discarded according to the product monograph.

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Antimicrobial mouth rinses (e.g., chlorhexidine gluconate, essential oils or povidone-iodine) should be used by a patient prior to a dental procedure. This is done to reduce the number of microorganisms that might be released from the patient's mouth in the form of aerosols or spatter, which can subsequently contaminate DHCP and equipment operator environmental surfaces.

Pre-procedural mouth rinses can also decrease the number of microorganisms introduced in the patient's bloodstream during invasive dental procedures, thus reducing the risk of transient bacteremias.

This procedure may not be practical in those patients that cannot rinse or spit, and considerations may be given where the antimicrobial solution is first brushed or swabbed in the patient's mouth prior to beginning oral health care.

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Biopsy specimens should be placed in a sturdy, leak-proof container with a secure lid for transportation. The DHCP should take care when collecting the specimen to avoid contaminating the outside of the container. If the outside of the container becomes or is suspected to be contaminated, it should be cleaned and disinfected or placed in an impervious bag prior to transportation.

Local provincial or municipal regulations may require a biopsy container to be labeled with the biohazard symbol during storage, transport, shipment and disposal.

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Extracted teeth may be returned to a patient without any special considerations for infection prevention and control.

Extracted teeth that are being discarded should be handled carefully and disposed in general waste. Extracted teeth sent to a dental laboratory for shade or size comparisons should be cleaned and surface-disinfected with a low-level disinfectant. Extracted teeth containing dental amalgam should not be placed in waste containers that are subsequently incinerated.

Extracted teeth collected for use in preclinical educational training should be cleaned of visible blood and gross debris and maintained in a hydrated state in a well-constructed closed container during transportation. High-level disinfectant solutions may be used as a transportation medium; however, these agents do not reliably disinfect both external surface and interior pulp tissue. Local regulations may require that the container should be labeled with the biohazard symbol.

Prior to being used in an educational setting, the teeth should be heat sterilized by autoclaving to allow safe handling. Extracted teeth containing amalgam restorations should not be heat sterilized, due to the potential health hazard from mercury vaporization and exposure. If extracted teeth containing amalgam restorations are to be used, the teeth should be immersed in a 10% formalin solution for at least 2 weeks.

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Dental prostheses, appliances and items used in their fabrication (e.g., impressions, occlusal rims, and bite registrations) are potential sources for cross-contamination and should be handled in a manner that prevents exposure of DHCP, patients or the office environment to infectious agents.

The laboratory and dental practice personnel should communicate to ensure that appropriate cleaning and disinfection procedures are performed in the dental office or laboratory that materials are not damaged or distorted because of disinfectant overexposure, and that effective disinfection procedures are not unnecessarily duplicated. Clinical materials that are not decontaminated and are transported from a dental office to an off-site laboratory may be subject to Alberta provincial and municipal regulations regarding transportation and shipping of infectious materials.

Dental prostheses, appliances or impressions brought into the laboratory may be contaminated with microorganisms. Dental prostheses, impressions, orthodontic appliances and other prosthodontic materials (e.g., occlusal rims, temporary prostheses, face bow forks or bite registrations) should be thoroughly cleaned of all debris, disinfected with a low-level disinfectant and thoroughly rinsed before being handled in the in-office laboratory or sent to an off-site laboratory. Cleaning and disinfection should be done as soon as possible after removal from the patient's mouth and before drying of blood or other organic debris occurs. "Wet" impressions or appliances should be placed in an impervious bag prior to transportation to an off-site laboratory. Manufacturer's instructions should be consulted regarding the stability of specific materials during disinfection.

A separate receiving and disinfecting area should be established in the laboratory to reduce contamination. If no communication has been received regarding prior cleaning and disinfection of a material, the dental laboratory staff should perform cleaning and disinfection procedures before handling the material or device. If during manipulation of a material or appliance a previously undetected area of blood or other organic debris becomes apparent, cleaning and disinfection procedures should be repeated.

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Dental laboratory staff must wear appropriate PPE (mask, gloves and protective eyewear) while cleaning and disinfecting contaminated dental prostheses, impressions, orthodontic appliances and other prosthodontic materials (see Personal Protective Equipment, General Consideration, page 55).

If laboratory items (e.g., burs, polishing points, rag wheels or laboratory knives) are used on contaminated or potentially contaminated appliances, prostheses, or other material, they must be cleaned, heat sterilized, disinfected between patients or discarded after patient use.

Heat-tolerant items used in the mouth (e.g., metal impression trays or face bow forks) must be cleaned and heat sterilized before being used on another patient. Items that do not normally contact the patient, prosthetic device or appliance, but frequently become contaminated and cannot withstand heat sterilization (e.g., articulators, case pans or lathes) must be cleaned and disinfected between patients, according to the manufacturer's instructions. Pressure pots and water baths must be cleaned and disinfected between patients. Environmental surfaces must be barrier-protected or cleaned and disinfected in the same manner as in the dental treatment area (see Environmental Infection Control, General Considerations, page 78).

Waste generated in the dental laboratory (e.g., disposable trays or impression materials) may be discarded with general waste. Dental laboratory staff must dispose of sharp items (e.g., burs, disposable blades and orthodontic wires) in puncture-resistant containers.

Appliances and prostheses delivered to the patient must be free of contamination. If the dental laboratory staff provides the disinfection, a low-level disinfectant must be used and the item placed in a tamper-evident container before returning the item to the dental office. If the dental laboratory cannot provide documentation of this process, the dental office must provide final disinfection procedures.

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The thermal destruction of tissue, during procedures that use a laser or electrosurgical unit, creates a smoke by-product, which may contain viable microorganisms.

Lasers transfer electromagnetic energy into tissues, resulting in the release of laser generated airborne contaminants (LGAC). This heated plume includes particles, gases (e.g., hydrogen cyanide, benzene, and formaldehyde), tissue debris, viruses' offensive odours and possibly metal fumes.

DHCP should use work-practice and engineering controls to avoid inhaling or otherwise coming in contact with laser and electrosurgical plumes and surgical smoke. These practices include, but are not limited to using:

- Routine Practices and airborne precautions (e.g., fit tested, high-filtration particulate filter N-95 masks and possibly full face shields);
- Central room suction units with in-line filters to collect particulate matter from smoke plumes; and
- Dedicated mechanical smoke exhaust systems with a high-efficiency filter to remove substantial amounts of laser plume particles.

Local smoke evacuation systems may be used to improve the quality of the operating field.

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Patients infected with *M. tuberculosis* (TB) occasionally seek routine and urgent dental treatment. DHCP or the community served by the dental facility are at risk for exposure to TB. DHCP treating patients infected with *M. tuberculosis* should understand the pathogenesis of the development of TB to help determine how to manage such patients.

*M. tuberculosis* is a bacterium carried in airborne infective droplet nuclei that can be generated when persons with pulmonary or laryngeal TB sneeze, cough, speak or sing. These small particles (1-5  $\mu\text{m}$ ) can stay suspended in the air for several hours.

Infection occurs when a susceptible person inhales droplet nuclei containing *M. tuberculosis*, which then travel to the alveoli of the lungs. Typically, within 2-12 weeks after initial infection with *M. tuberculosis*, an immune response prevents further spread of the TB bacteria, although the bacteria can remain viable in the lungs for years, a condition termed "latent TB infection". People with latent TB infection usually exhibit a reactive tuberculin skin test (TST), have no symptoms of active disease and are not infectious. However, people with latent TB infection can develop active disease later in life if they do not receive treatment for their latent infection.

Approximately 5% of persons who have been recently infected and not adequately treated for latent TB infection will progress from infection to active disease during the first 1-2 years after infection; another 5% will develop active disease later in life. Although both latent TB infection and active TB disease are described as TB, only the person with active disease is contagious and presents a risk of transmission. Symptoms of active TB disease include a productive cough, night sweats, fatigue, malaise, fever, unexplained weight loss and occasionally oral ulceration(s). Certain immunocompromising medical conditions (e.g., HIV disease) increase the risk that TB infection will progress to active disease at a faster rate.

Surgical masks typically used in the dental health-care setting do not prevent inhalation of *M. tuberculosis* droplet nuclei due to their small diameter. Routine Practices are not sufficient to prevent transmission of this organism therefore additional airborne transmission precautions are required.

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TB transmission is controlled through a hierarchy of measures, including:

- **Administrative Controls:** Administrative goals of a TB infection-control program include detection of a person with active TB disease and prompt isolation from susceptible persons to reduce the risk of transmission. Although DHCP are not responsible for diagnosis and treatment of TB, they should be trained to recognize signs and symptoms to help with prompt detection. Because potential for transmission of *M. tuberculosis* exists in outpatient settings, dental practices should develop a TB control program appropriate for their level of risk. While taking patients' initial medical histories and at periodic updates, DHCP should routinely ask all patients whether they have a history of TB disease or symptoms indicative of TB. A positive TB skin test (tuberculin or PPD test) alone is not necessarily a concern, as 90% of people with positive TB skin tests are not infectious or complain of TB symptoms. Patients with a medical history or symptoms indicative of undiagnosed active TB should be referred promptly for medical evaluation to determine possible infectious risk. These patients should not remain in the dental-care facility any longer than required to evaluate their dental condition and arrange a medical referral. While in the dental health-care facility, the patient should be isolated from other patients and DHCP, should wear a surgical mask when not being evaluated and should be instructed to cover their mouth and nose when coughing or sneezing. Elective dental treatment should be deferred until a physician confirms that a patient does not have infectious TB, or if the patient is diagnosed with active TB disease, until confirmed the patient is no longer infectious; typically, 48 hours following institution of anti-tuberculosis therapy.
- **Environmental Controls:** If urgent dental care is provided for a patient who has, or is suspected of having active TB disease, the care should be provided in a facility (e.g., hospital) that provides airborne infection isolation (i.e., using such engineering controls as TB isolation rooms, negatively pressured relative to the corridors, with air either exhausted to the outside or HEPA-filtered if recirculation is necessary).
- **DHCP Respiratory Protection:** Standard surgical facemasks do not protect against TB transmission. DHCP treating patients with active TB should use airborne transmission precautions which include respiratory protection (e.g., fit-tested, disposable N-95 respirators), (see Personal Protective Equipment, Masks, page 61).

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Creutzfeldt-Jakob disease (CJD) belongs to a group of rapidly progressive, invariably fatal, degenerative neurological disorders, called transmissible spongiform encephalopathies (TSEs). TSEs affect both humans and animals and are thought to be caused by infection with an unusual pathogen called a prion. Prions are isoforms of a normal protein, capable of self-propagation even though they lack nucleic acid. Prion diseases have an incubation period from 1 to 30 years and are typically fatal within 1 year of diagnosis. Prions adhere strongly to steel and are not inactivated by the standard sterilization methods used in dental health-care settings.

Human TSEs include CJD, Gerstmann-Straussler-Scheinker (GSS) syndrome, fatal familial insomnia, kuru and variant CJD (vCJD). Occurring in sporadic, familial, and acquired (i.e., iatrogenic) forms, human TSEs are exceedingly rare. In approximately 85% of affected patients, CJD occurs as a sporadic disease with no recognizable pattern of transmission. A smaller proportion of patients (5%-15%) experience familial CJD caused by inherited mutations of the prion protein gene.

vCJD is distinguishable clinically and neuropathologically from classic CJD, and strong epidemiologic and laboratory evidence indicates a causal relationship with bovine spongiform encephalopathy (BSE), a progressive neurological disorder of cattle commonly known as "mad cow disease". Compared to patients with CJD, those with vCJD are younger (28 years versus 68 years median age at death), and have a longer duration of illness (13 months versus 4.5 months). Patients with vCJD characteristically exhibit sensory and psychiatric symptoms that are uncommon with CJD.

CJD and vCJD are transmissible diseases, but not through the air or casual contact. Virtually all known cases of iatrogenic CJD have resulted from exposure to infected central nervous tissue (e.g., brain and dura mater), pituitary or eye tissue. There have been no known cases of contracting CJD from dental procedures. Animal models and experimental designs indicate a theoretical risk of transmitting prion diseases through perioral neural tissue exposures. Disease associated prion protein has not been detected in most dental and oral tissues.

DHCP should include medical history questions regarding dura mater transplantation, and familial history of CJD and vCJD. For patients with confirmed prion disease, end of day scheduling is preferable to allow for more extensive cleaning and decontamination. It is recommended to avoid activating waterlines due to the risk of retraction of prions in oral fluids. Also, a stand-alone suction unit with disposable reservoir, rather than the suction component of the dental unit, and a disposable bowl instead of the dental unit spittoon should be used. To avoid environmental contamination, dental equipment should be adequately shielded using disposable, impermeable cover sheets. Dental instruments and devices touching pulpal tissue (e.g., endodontic broaches and files, access opening burs) must be discarded in sharps containers after each patient use, and not reprocessed when CJD or vCJD is diagnosed or suspected. Surgical instruments used on individuals when CJD is suspected should be quarantined pending confirmation of diagnosis and must be disposed of, or decontaminated in accordance with Health Canada/ Public Health Agency of Canada infection control guideline Classic Creutzfeldt-Jakob Disease in Canada.

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The goal of a dental infection-control program is to provide a safe treatment environment for the patient and a safe working environment for the DHCP. This is accomplished by reducing the risk of Health-Care Associated (nosocomial) Infections in patients and occupational exposures in DHCP. Errors in infection prevention and control practices are caused by faulty systems, processes and conditions that lead DHCP to make mistakes or fail to prevent errors being made by others.

Effective program evaluation is a systematic way to ensure procedures are useful, feasible, ethical and accurate. Program evaluation is an essential organizational practice. Evaluation offers an opportunity to improve the effectiveness of both the infection prevention and control program and dental practice protocols. Such program evaluation should be practiced consistently across program areas, and should be well integrated into the day-to-day management of the infection prevention and control program.

A successful infection prevention and control program depends on developing standard operating procedures, evaluating practices, routinely documenting adverse outcomes (e.g., occupational exposures to blood) and work-related illnesses in DHCP and monitoring health-care associated infections in patients. Strategies and tools to evaluate the infection-control program can include:

- Periodic observational assessments;
- Posted reminders of Infection Prevention and Control Standards and procedures;
- Checklists to document procedures; and
- Routine review of occupational exposures to blood-borne pathogens.

If deficiencies or problems in the implementation of infection prevention and control procedures are identified, further evaluation is needed to eliminate the problems. Effective implementation of infection prevention and control programs is an on-going process, requiring the DHCP to monitor the scientific literature and stay abreast of new knowledge of emerging infectious diseases.

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**Patient Care Items – Modified Spaulding Classification**

<b>Category</b>	<b>Description</b>	<b>Management</b>	<b>Examples</b>
<b>Critical Items</b>	Penetrates soft tissue or bone	Items that are not single-use disposable must be sterilized and stored wrapped until point of use. Single-use disposable items must not be re-processed.	Air/water syringe tips Anaesthetic syringes Endodontic instruments, including files (hand and rotary), reamers, and broaches Gauze for surgery Handpieces Instrument trays Metal Matrix Bands Mouth mirrors (when used during a procedure where tissue is cut or manipulated) Orthodontic Bands Periodontal instruments including ultrasonic tips Polishing cups, points and mandrels Restorative / operative instruments Rotary burs and diamonds Rubber dam clamps Scalers Stainless Steel Crowns Surgical instruments Surgical suction tips
<b>Semi-Critical Items</b>	Touches intact mucous membrane or non-intact skin	Items that are not single-use disposable, must be sterilized, may be stored unwrapped in a clean, dry, covered area and handled with clean hands or forceps. Single-use disposable items must not be re-processed. Heat-sensitive items must receive high-level disinfection between patient use.	Articulating ribbon holder Cotton rolls Crown removing instruments Gauze for non-surgical procedures Impression trays Lab burs Mouth mirrors (when used for examination only) Mixing spatula Nasal hoods Orthodontic pliers Rubber dam frame Rubber dam and rubber dam clamp forceps Suction tips other than for surgery Wedges

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<b>Category</b>	<b>Description</b>	<b>Management</b>	<b>Examples</b>
<b>Non-Critical Items</b>	Contacts intact skin only	Items must be protected with barriers, or cleaned and disinfected between uses if blood/saliva spills, splashes or otherwise contaminated.	Blood pressure cuffs Curing lights Face bows Intra-oral camera and radiograph sensors Laboratory knives and spatulas Rubber dam punch Shade guides

**Environmental Surfaces**

<b>Category</b>	<b>Description</b>	<b>Management</b>	<b>Examples</b>
<b>Clinical Contact Surfaces</b>	Direct contact with DHCP hands, patient-care items or patient skin	Protect with barriers, or clean then tuberculocidal low-level disinfection if contaminated.	Dental chairs Dental units and countertops Doorknobs Drawer and cupboard handles Light handles Radiograph equipment
<b>Housekeeping Surfaces</b>	Inadvertent contact with DHCP hands, patient-care items or dental appliances	Periodic cleaning, or clean and low-level disinfection if blood/saliva spills, splashes or otherwise contaminated.	Floors Sinks Walls

Note: The examples given are for illustration only and these lists are not to be considered exhaustive. Semi-critical instruments or devices that have been exposed to blood or have the potential to be exposed to blood must be treated as critical. DHCPs must use professional judgment for every instrument, device and surface for their specific practices to ensure that the Standards are being met.

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**Disinfectants**

Category	Examples	Advantages	Disadvantages
<b>High-Level Disinfectant</b> (destroys vegetative bacteria, mycobacteria, fungi and enveloped / lipid and non-enveloped / non-lipid viruses; bacterial spores if long exposure time)	Glutaraldehyde 2.0-3.5%  Glutaraldehyde 1.12% with phenol 1.93%	Non-corrosive to metal; Active in presence of organic material; Compatible with most materials, including lensed instruments; Sterilization may be possible in 6-10 hours.	Extremely irritating to skin and mucous membranes; Shelf life shortens when diluted (effective for 14-30 days depending on formulation); High cost; Monitor concentration in reusable solutions; Fixative.
	Hydrogen peroxide 7.5%	Strong oxidant; Fast acting; Breaks down into water and oxygen.	Can be corrosive to aluminum, copper, brass or zinc.
	Hydrogen peroxide 1.0-7.35% with peracetic acid 0.8-0.23%	As for hydrogen peroxide, plus: Innocuous decomposition (water, oxygen, acetic acid, hydrogen peroxide); Rapid action at low temperature; Active in presence of organic materials.	As for hydrogen peroxide, plus: Can be corrosive; Unstable when diluted.
	Ortho-phthalaldehyde 0.55%	Fast acting; Relatively less toxic than other high-level disinfectants; Non-irritating to skin and exposed mucous membranes; Little or no odour; Very stable.	Sensitivity reactions, including anaphylaxis; Stains protein gray, including skin.

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Category	Examples	Advantages	Disadvantages
<b>Intermediate/-Level Disinfectant</b> (destroys all vegetative bacteria, mycobacteria, most viruses and most fungi, but not bacterial spores)	Chlorine-based products (sodium hypochlorite diluted in-office, chlorine dioxide, commercial preparations with surfactants)	Low cost; Fast acting; Readily available.	Corrosive to metals; May destroy fabrics; Inactivated if not well cleaned; Irritating to exposed skin and mucous membranes; Chlorine dioxide is poor cleaner Unstable when diluted; must be prepared daily.
	Halogens (sodium bromide & chlorine)	Fast acting; Simple to mix; Minimal storage space required.	Used on hard surfaces only; Strong chlorine odour.
	Hydrogen peroxide, 0.5% accelerated	Fast acting; Non-irritating; Effective cleaner and disinfectant; Does not affect surfaces.	Slow fungicidal activity; An oxidizing agent which will accelerate rusting of metal instruments; Relatively expensive.
	Iodophors (iodine combined with surfactant)	Rapid action; Relatively less toxic and less irritating; Residual action; Effective cleaner and disinfectant.	Stains fabrics and synthetic materials; Irritating to exposed skin and mucous membranes; Inactivated by alcohol and hard water; Unstable when diluted - must be prepared daily.
	Quaternary ammonium compounds with alcohols ("dual" or "synergized")	Generally non-irritating; Non-corrosive.	Older generation had narrow spectrum; Inactivated by anionic detergent and organic matter; Can damage some materials.
	Phenolics ("complex" or "synthetic" containing multiple phenolic agents)	Residual, substantive action; Available with detergents to be used as cleaner and disinfectant.	May be absorbed through skin or by latex; May dissolve or discolour plastics; Not to be used on food contact surfaces.

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<b>Category</b>	<b>Examples</b>	<b>Advantages</b>	<b>Disadvantages</b>
<b>Low-Level Disinfectant</b> (destroys most vegetative bacteria and some fungi, as well as enveloped / lipid viruses, e.g., HBV, HIV)	Hydrogen peroxide 3% Iodophors Quaternary ammonium compounds (single, simple or old generation) Phenolics	As above.	As above.