STANDARD OF PRACTICE

Approved by the College – November 2018

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Infection Prevention and Control in the Dental Office

CONTENTS

Royal College of
Dental Surgeons of Ontario

6 Crescent Road
Toronto, ON Canada M4W 1T1
T: 416.961.6555 F: 416.961.5814
Toll Free: 800.565.4591 www.rcdso.org

Introduction

The Standards of Practice of the Royal College of Dental Surgeons of Ontario (RCDSO) describe the minimum requirements that all dentists must meet in a particular area of clinical practice to maintain patient safety. On a regular basis, the RCDSO reviews and revises Standards to address any changes that are required. We urge all dentists to achieve excellence in every aspect of their work. They must ensure they are always up-to-date with the latest knowledge.

Infection prevention and control (IPAC) is a critically important part of safe patient care. In recent years, concerns about the possible spread of blood-borne diseases, and the impact of emerging, highly contagious respiratory and other illnesses have grown. Dentists and other health care workers have a clear responsibility to establish, evaluate, continually update and monitor their IPAC strategies and protocols.

The World Health Organization describes IPAC as:

> *....a practical, evidence-based approach which prevents patients and health workers from being harmed by avoidable infections. Preventing health care-associated infections avoids this unnecessary harm and at times even death, saves money, reduces the spread of antimicrobial resistance (AMR) and supports high quality, integrated, people-centred health services.*

Ontario's Provincial Infectious Diseases Advisory Committee (PIDAC) agrees that Infection Prevention and Control has never been more important:

> *Health care-associated infections affect 4% to 10% of patients and result in significant harm to patients/residents/clients. Maintaining a safe, clean and hygienic environment and minimizing microbial contamination of surfaces, items and equipment within the health care environment is increasingly recognized as an essential approach to reducing the risk of health care-associated infections for all patients/residents/clients, visitors and staff within health care settings.*

The World Health Organization and the PIDAC are among a growing number of organizations that advocate for antimicrobial stewardship.

The RCDSO is only one component of a larger system in Ontario to protect the health and well-being of patients. Public Health Ontario (PHO) provides the scientific evidence and expert guidance that shapes policies and practices for a healthier Ontario. The Ontario Ministry of Health and Long-Term Care (MOHLTC) has separate authority and legislation independent of the RCDSO and sets standards to be applied by local public health units. Those public health units have their own legislative mandate, expertise and role in their communities. They are also required to follow the MOHLTC's "Infection Prevention and Control Complaint Protocol" and the "Infection Prevention and Control Disclosure Protocol".

The RCDSO has worked with all of these partners to insure our IPAC Standard aligns with PHO, the Public Health Agency of Canada and the PIDAC.

We continue to collaborate with PHO and the MOHLTC to ensure that our standards, advice to members and the public are coherent and consistent with their guidelines and checklists for dental practices. This collaboration is reciprocal as we provide information to them about the practice of dentistry.

Wherever possible, recommendations are based on data from well-designed scientific studies. However, some infection prevention and control practices routinely used by health care practitioners cannot be rigorously examined for ethical or logistical reasons. In the absence of scientific evidence for such practices, certain recommendations are based on strong theoretical rationale, suggestive evidence or opinions of respected authorities.

Contravention of this or any Standard of the RCDSO may be considered professional misconduct.

PURPOSE OF THE DOCUMENT

This document is intended to provide all oral health care workers (OHCWs) with the knowledge to properly implement necessary IPAC measures in dental practice. It consolidates legislation, published standards and recommendations from government and other agencies, regulatory bodies and professional associations, as relevant to a dental context (see Appendix 2).

This document presents "best practices", reflecting the best evidence and expert opinion available at the time of writing.

In this document, the following assumptions have been made:

- **The terms "oral health care worker" (OHCW) and "staff" are used interchangeably. Staff encompasses all persons conducting activities within or associated with dental offices and includes dentists, dental hygienists, dental assistants, anesthetists and other support persons.**
- **The term "dental office" includes any facility in which oral health care is provided, such as traditional dental practices, community and school-based dental clinics, and collective living centres and other institutional settings.**
- **OHCWs are trained to take precautions in order to protect patients and staff. In addition to previous instruction, it is important that all OHCWs receive office-specific training in IPAC as part of their orientation, and whenever new tasks, procedures or equipment are introduced. It is recommended that one staff person should be appointed to manage the dental office's IPAC program and ensure that it remains current. While IPAC is the responsibility of all OHCWs, implementation and oversight rests with the principal dentist(s).**

PROFESSIONAL AND REGULATORY CONSIDERATIONS

Dentists have an obligation to maintain the standards of practice of the profession and must ensure that recommended IPAC policies and procedures are carried out in their offices.

OHCWs must maintain current knowledge of IPAC policies and procedures, and apply and maintain them appropriately and consistently. It is the dentist's responsibility to ensure that staff are adequately trained in IPAC policies and procedures, and that the necessary supplies and equipment are available, fully operational, up to date and routinely monitored for efficacy.

Dentists also have an ethical duty to maintain a safe and healthy office environment for both patients and staff, and to adhere to all rules and regulations related to the operation of a dental practice, including workplace health and safety, and environmental protection.

Principles of Infection Prevention and Control (IPAC)

The risk of infection as a result of a dental procedure is extremely low, but it represents an important patient safety consideration. By understanding how diseases are transmitted, and applying IPAC principles, OHCWs can develop strategies to interrupt the transmission of microorganisms among patients and OHCWs, and from dental instruments, handpieces, devices and equipment.

IPAC principles include:

- risk assessment;
- following routine practices;
- using barrier techniques to protect both patients and OHCWs;
- applying the principles of cleaning, disinfection, sterilization and storage of dental instruments;
- environmental cleaning;
- care of the overall office setting;
- safe handling and disposal of wastes.

An overall IPAC program must focus on strategies to reduce the risk of transmission. These strategies include:

a) identifying, communicating and implementing standards and guidelines by preparing specific written IPAC policies and procedures, as part of the Office Manual;
b) effective occupational health and safety programs for all OHCWs, such as written procedures for the workplace and guidance on immunization;
c) educating OHCWs, as well as patients and their families, about everyone's role in infection prevention;
d) ongoing review of policies and procedures, and evaluation of the IPAC program.

All dentists are strongly encouraged to undertake audits of the IPAC policies and procedures in their dental offices to ensure that patient safety standards are adhered to and best practices are implemented. These audits should assess all core components of IPAC, as well as the reprocessing of instruments.

While it is preferred to involve external individuals with expertise and certification in IPAC, periodic (i.e. at least annually) audits by internal OHCWs with sufficient knowledge to identify and remediate deficiencies may be reasonable.

In collaboration with the RCDSO, PHO has developed two checklists that may be used to audit the IPAC policies and procedures in dental offices.

Patient Safety

Three main elements are required to spread infection:

1. **A Susceptible Host**
2. **A Causative Agent**
3. **A Mode of Transmission**

By removing any one of these elements, an infection cannot occur. This principle forms the foundation of an acceptable IPAC strategy.

TRANSMISSION OF MICROORGANISMS

Understanding the modes of transmission of infection is necessary for designing and implementing effective IPAC strategies.

Dental patients and OHCWs can be exposed to pathogenic microorganisms, including viruses (e.g. HBV, HCV, HIV, human herpes group of viruses, human papilloma virus), bacteria (e.g. staphylococci, streptococci) and other microbes that colonize or infect the oral cavity and respiratory tract.

In the dental office, the three main modes of transmission of microorganisms are:

1. direct contact transmission – direct physical contact with blood, oral fluids or other materials;
2. indirect contact transmission – contact with an intermediate contaminated object, such as a dental instrument, equipment or an environmental surface;
3. droplet transmission – contact of oral, nasal or conjunctival mucosa with droplets, spatter or spray containing microorganisms generated from an infected person, such as by coughing, sneezing or talking.

SCREENING OF PATIENTS

From time to time, patients who are unwell may attend at a dental office. Their health condition may relate to a dental problem, such as an oral infection or a post-operative complication, but it may also relate to a non-dental problem, such as a severe respiratory illness (e.g. influenza) or simply a bad cold.

In order to protect other patients and OHCWs from the spread of microorganisms, patients who appear to be ill should be re-scheduled if at all possible. If their dental condition is of an urgent nature, every effort must be made to separate them from other patients by seating them in a secluded operatory as soon as possible. In this way, the spread of microorganisms by contact or droplet transmission can be minimized.

A prominent sign should be posted at the entrance to the reception area, requesting that patients who are ill to identify themselves to the receptionist. In addition, the reception area must have alcohol-based hand rub and masks available with signage for their use.

There must be a written policy and procedure for managing patients with suspected febrile respiratory infections, rash and eye infections to reduce the risk of transmission.

Another opportunity to screen for ill patients is when confirming dental appointments in advance. If staff learn that a particular patient has a fever or cough, dental appointments should be re-scheduled.

ROUTINE PRACTICES

The Public Health Agency of Canada uses the term "routine practices" to describe basic standards of IPAC that are required for all safe patient care. Routine practices are based on the concept that all patients are potentially infective, even when asymptomatic, and that the same safe standards of practice must routinely apply to contact with blood, body fluids and secretions (e.g. saliva), mucous membranes and non-intact skin.

Adherence to routine practices protects both OHCWs and patients.

There are four principles that are inherent in routine practices:

1. **Risk Assessment**
2. **Hand Hygiene**
3. **Use of Personal Protective Equipment**
4. **Safe Handling and Disposal of Sharps**

RISK ASSESSMENT

The first step in the effective use of routine practices is to perform a risk assessment. This must be done before each interaction with the patient in order to determine the interventions that are required to prevent the transmission of infection.

The risk of transmission of microorganisms will vary, depending on the type of dental procedure to be performed and the likelihood of exposure to blood, body fluids and secretions, mucous membranes and non-intact skin. Additional factors to consider include:

- the health status of the patient;
- the characteristics of the patient, such as level of cooperativeness;
- the physical environment and resources available;
- the immune status of the OHCW.

Procedures involving exposure to blood, body fluids and secretions, mucous membranes and non-intact skin require the use of appropriate personal protective equipment. On the other hand, procedures involving no anticipated exposure may require fewer precautions.

Perform a risk assessment before each interaction with the patient in order to determine the interventions that are required to prevent the transmission of infection.

HAND HYGIENE

Hand hygiene is the most important and effective IPAC measure to prevent the spread of microorganisms.

The use of gloves does not replace the need for hand hygiene.

Hand hygiene is a general term referring to any action of hand cleaning. Hand hygiene relates to the removal of visible soil and the removal or killing of transient microorganisms from the hands, while maintaining good skin integrity resulting from a hand care program. Hand hygiene may be accomplished by using an alcohol-based hand rub (ABHR) or soap and running water. Hand hygiene also includes surgical hand antisepsis (the preparation of hands for surgery, using either an alcohol-based hand rub with persistent activity or antimicrobial soap and water).

There should be a written policy and procedure regarding a hand hygiene program that includes easy access to hand hygiene agents at patient point-of-care and effective use of emollients. There should also be a program to monitor, evaluate and improve hand hygiene compliance, with feedback to individual employees and managers.

Hand hygiene is necessary:

- before an aseptic procedure
- before putting on gloves
- after glove removal
- before and after direct contact with individual patients
- after contact with environmental surfaces, instruments or other equipment in the dental operatory
- after contact with dental laboratory materials or equipment
- before leaving the clinical operatory
- before eating or drinking
- whenever in doubt

PHO has simplified a hand hygiene training program into the "4 Moments of Hand Hygiene" (the moments where the risk of transmission of microorganisms via the hands is highest). For assistance in developing a hand hygiene program, PHO has education tools that may be used by dental offices.

If hands are NOT visibly soiled (i.e. the majority of instances), the use of a 70 to 90% ABHR is the preferred method of hand hygiene. It is more effective than hand washing with soap and water when hands are not visibly soiled and takes less time.

Despite perceptions to the contrary, ABHR has been shown to be less irritating to skin than soap and water. Select a product that contains emollients. If an OHCW feels a burning sensation following the application of ABHR, it is generally due to pre-irritated skin. **ABHR should not be used immediately after hand washing**.

There is sufficient evidence that ABHR is superior to washing with soap and water, except in cases where the hands are visibly soiled or contaminated with body fluids.

Soiled hands or hands contaminated with body fluids (or powder from gloves) must be washed with soap and running water, because alcohol is inhibited by organic matter. Hands must also be washed following personal body functions.

Use professional judgement for either procedure. If you think your hands have accidentally become contaminated with body fluids, wash with soap and running water to remove organic matter.

Liquid or foam soap should be provided in disposable pump dispensers. Bar soap must not be used. Hand lotion to prevent dry or cracked skin should also be available in disposable pump dispensers. Encourage regular, frequent use of hand cream. The best hand cream is one with a fat content of approximately 70%.

Ensure that the hand hygiene products used (ABHR, soaps, lotions) are compatible with the gloves used. For example, petroleum-based hand lotion affects glove integrity and must not be used.

To avoid contamination, disposable pump dispensers of liquid products should be discarded when empty and not "topped-up" or refilled.

The best evidence suggests that ABHR is equivalent to anti-microbial soap in terms of microorganism reduction, but less harsh on hands and less time-consuming to use. Where ABHR is available at the point-of-care, antimicrobial soap is not required.

Long nails are difficult to clean, may pierce gloves and harbour more microorganisms than short nails. Chipped

nail polish or nail polish worn longer than 4 days may harbour microorganisms that are not removed by hand washing, even with surgical hand scrubs. Artificial nails and nail enhancements harbour microorganisms and are more difficult to clean than natural nails.

Hand and arm jewellery, such as rings, watches, bracelets and other arm adornments, interfere with proper hand hygiene and may contribute to contact dermititis.

All OHCWs having direct contact with a patient must keep nails clean and short. Nail polish, if worn, must be fresh and free of cracks or chips. Artificial nails and nail enhancements must not be worn. Before performing hand hygiene, hand jewelry must be removed and arm jewellery, including watches, must be either removed or pushed up above the wrist. Rings should not be worn.

How should hand hygiene be done?

When using an ABHR for routine care:

- ensure hands are visibly clean
- apply one to two pumps of the product to one palm and rub both hands together for a minimum of 15 seconds
- spread product all over finger tips, between fingers, back of hands, and base of thumbs; these are the most commonly missed areas
- continue rubbing hands until product is dry; this will take a minimum of 15 seconds if sufficient product is used

When using soap and running water for routine care:

- wet hands with warm, not hot, water
- apply one to two pumps of liquid or foam soap and lather hands
- vigorously rub all surfaces of hands for a minimum of 15 seconds
- pay particular attention to finger tips, between fingers, backs of hands and base of the thumbs; these are the most commonly missed areas
- using a rubbing motion, thoroughly rinse soap from hands; residual soap can lead to dryness and cracking of skin
- dry hands thoroughly by patting hands gently with a paper towel
- turn off taps with towel and discard towel in a bin

When using a surgical hand rub (an ABHR with persistent activity) for major surgical procedures:

- apply to dry hands and forearms for the length of time recommended by the manufacturer
- allow hands and forearms to dry thoroughly before donning sterile gloves

When using a surgical hand scrub (antimicrobial soap and running water) for major surgical procedures:

- wash hands and at least 2 inches above the wrists thoroughly for the length of time recommended by the manufacturer, which is usually 2 to 5 minutes
- pay special attention to nails, subungual areas, between fingers and between thumb and index finger; the direction of the scrubbing procedure is from the hands toward the elbows, without returning to the cleaned hands
- brushes should not be used for hand scrubs
- dry hands and arms with a sterile towel, ensuring that hands and arms are completely dry before donning sterile gloves

Do not sequentially combine a surgical hand scrub with a surgical hand rub.

Disposable paper hand-towels provide the lowest risk of cross-contamination and must be used for drying hands in clinical areas. Hot-air dryers must not be used in clinical areas or with hand hygiene sinks. If hot-air dryers are used in non-clinical areas, hands-free taps are required to avoid re-contaminating the hands when turning off the taps.

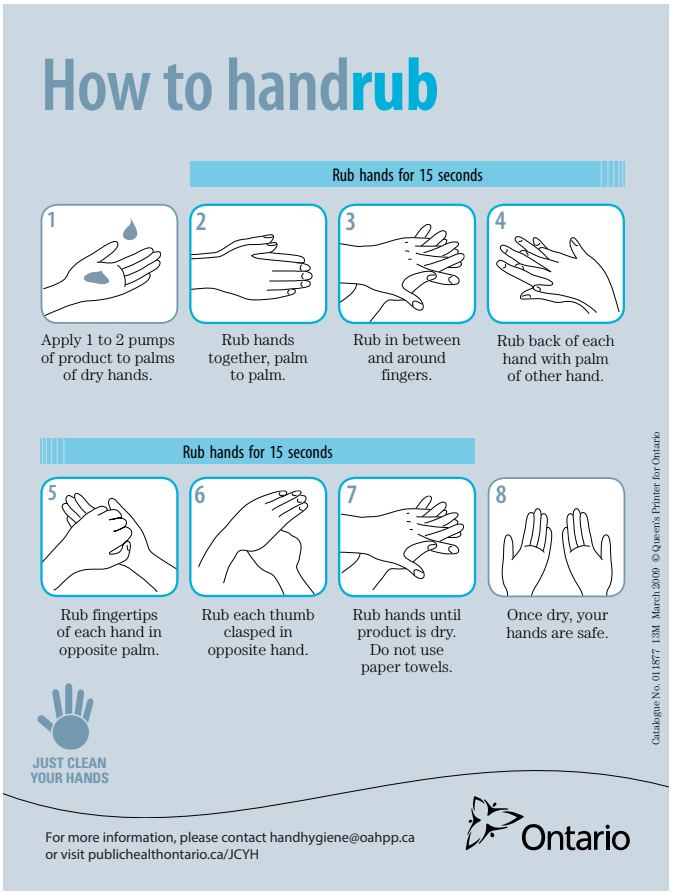
There must be easy access to a sink that is used for no other purpose than hand washing. Free-standing hand washing sinks are preferred. Do not clean equipment or discard waste in hand washing sinks. Maintain separate facilities for these tasks. Keep clean equipment away from sinks to avoid contamination.

Hand hygiene facilities should be located as close as possible to all dental operatories (point-of-care) and, preferably, in clear sight of patients. If they are out of sight, patients should be made aware that hand hygiene has taken place. In addition:

- soap dispensers should be placed at every sink
- ABHR dispensers should be strategically located for ease of use
- disposable paper towels should be readily available
- taps should be turned off with the aid of a paper towel to avoid recontamination of hands
- if renovating, consider installing hands-free faucets

Personal hand hygiene is also important for patients. ABHR should be provided to patients to reduce the risk of transmission of microorganisms (e.g. viruses, bacteria, fungi, parasites).

Cleaning with alcohol-based hand rub



Hand washing with soap and water

Source: "Just Clean Your Hands", Public Health Ontario

PROTECTIVE BARRIERS AND TECHNIQUES

General considerations

OHCWs wear personal protective equipment (PPE) to shield themselves from exposure to potentially infectious material. This also protects patients, by preventing the OHCW from becoming a source of transmission of microorganisms.

Additional protective barriers and techniques should be employed to shield patients from potentially infectious material.

Protective eyewear

Large particle droplets of water, saliva, blood, microorganisms and other debris are created by the use of dental handpieces, ultrasonic instruments and air / water syringes. This visible spray typically travels only a short distance and settles out quickly, landing on nearby surfaces, including the operatory countertops and equipment, as well as the OHCW and patient.

Patients should be provided with protective eyewear to shield their eyes from spatter and debris created during dental procedures. Protective eyewear should be worn throughout the dental appointment, then cleaned and disinfected after use and whenever becoming visibly contaminated.

Protective draping

Single-use bibs or drapes should be used to protect patients' clothing, and reduce their exposure to spatter and debris created during dental procedures. Single-use strips may be used to secure bibs and drapes, in place of reusable daisy chains.

Use of rubber dam and high-volume suction

Appropriate efforts must be made to minimize the spread of droplets, spatter and spray created during dental procedures. Accordingly, a rubber dam should be used whenever feasible and high-volume suction must be used whenever the creation of droplets, spatter and spray is possible.

The use of rubber dam and high-volume suction also minimizes the ingestion or inhalation of contaminated material and debris.

Latex sensitivity and allergies

Dental patients with true latex allergy may react to common dental products, such as gloves, rubber dams, prophylaxis cups, orthodontic elastics and some medication vials.

As part of the medical history taking process, patients should be asked questions relating to possible latex allergy. This includes asking whether true latex allergy has been diagnosed. Additional questions should probe for a history of common pre-disposing conditions for latex allergy, such as other allergies (e.g. avocados, kiwis, hazelnuts, bananas) or early latex exposure related to medical treatment (e.g. spina bifida, urogentital anomalies).

Patients with true latex allergy must be treated in an environment where contact with latex proteins, either directly or airborne, is kept as low as reasonably achievable. All latex-containing materials or devices must be removed from the operatory or adequately covered and isolated.

Check labels of dental products for latex content. Many items are available in latex-free forms.

HANDLING AND DISPOSAL OF SHARPS

While this subject will be reviewed in detail in the following section dealing with the responsibilities and safety of OHCWs, it must be stressed that extreme care should be taken at all times to ensure patients are protected from injuries involving sharp objects. Sharps must be kept out of the reach of patients and safely collected in a clearly labelled puncture-resistant container.

ADDITIONAL PRECAUTIONS

Routine practices may not be sufficient for patients who are infected or colonized with certain microorganisms that pose special problems in blocking their transmission. The term "additional precautions" is used to describe measures that are taken in addition to routine practices in order to interrupt the transmission of such microorganisms. They include the physical separation of infected or colonized patients from other individuals and the use of protective barriers (e.g. gowns, gloves, masks) to prevent or limit the transmission of the infectious agent.

These additional precautions are of particular relevance in health care institutions, where they may be determined by local IPAC committees and monitors. For example, in an institutional setting, patients may be at increased risk of becoming infected or colonized with methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant enterococcus (VRE) or respiratory tract viruses (e.g. influenza).

In an ambulatory setting, such as a dental office, additional precautions are required for patients who are known or suspected of having an infection that can be transmitted by large respiratory droplets. Examples of microorganisms that can be transmitted in this fashion include respiratory tract viruses, rubella, mumps and *Bordetella pertussis*.

Patients who are known or suspected of having an infection that can be transmitted by large respiratory droplets should be offered a mask and hand hygiene upon presentation, maintain a minimum two-metre spatial separation from other persons, and be removed from the reception / waiting area and seated in a secluded operatory as soon as possible. In this way, the spread of such microorganisms by droplet transmission can be minimized.

For more information about additional precautions, refer to *Routine Practices and Additional Precautions in All Health Care Settings*, revised November 2012 by the PIDAC.

HUMAN RIGHTS AND CONFIDENTIALITY

The Ontario *Human Rights Code* (the "*Code*") provides for equal rights and opportunities, and freedom from discrimination. It prohibits discrimination based on race, ancestry, place of origin, colour, ethnic origin, citizenship, creed, sex, sexual orientation, age, record of offences, marital status, same sex partnership status, family status or disability.

The Code recognizes persons living with AIDS or HIV-related illness as disabled. Consequently, dentists are prohibited from discriminating against such patients. This includes using extraordinary and unnecessary infection control or other measures that are not used for other patients. Dentists may require modifications to routine practices based on the risks associated with certain dental procedures, provided that they are employed for all patients undergoing the same procedures.

The information contained in patient records is confidential and must not be released to anyone without the consent of the patient, or his / her authorized representative, or as required or allowed by law. Patient records must be stored securely and not left unattended or in public areas of the office.

Sensitive medical information must not be recorded on the front of the patient's chart, where it could easily be seen by others. A "medical alert" should be coded in such a way that only staff recognize the significance of the information, while the exact nature of the condition is documented within the patient's chart.

If patient records are computerized, login and password protection must be used to prevent unauthorized access. In addition, screen savers and other measures must be employed to ensure information on computer screens is not visible to other patients in the office.

It is the dentist's responsibility to ensure that all staff are knowledgeable about and take appropriate steps to protect patient confidentiality.

Oral Health Care Workers' Responsibilities and Safety

EDUCATION AND TRAINING

OHCWs are more likely to comply with IPAC protocols if they understand the rationale for them. Therefore, in addition to previous instruction, it is important that all OHCWs receive office-specific training in IPAC as part of their orientation, and whenever new tasks, procedures or equipment are introduced. This training should be supplemented whenever necessary and reviewed at least annually by means of staff meetings, attendance at continuing education courses and through self-learning programs.

All OHCWs must receive training that includes information about their exposure risks, IPAC strategies specific to their occupational tasks, and the management of any work-related illness or injury.

It is also recommended that this Standard, as well as key reference materials and manufacturers' instructions for use of equipment and instruments, form part of an Office Manual.

All OHCWs must receive appropriate and ongoing training in IPAC. The Office Manual should include a process for recording and reporting the attendance of all OHCWs at staff meetings and continuing education courses and programs.

IMMUNIZATION

Immunizations substantially reduce the number of OHCWs susceptible to infectious diseases, as well as the potential for disease transmission to other staff and patients. Therefore, immunizations are an essential part of IPAC programs.

All OHCWs should be adequately immunized against the following diseases:

- hepatitis B
- measles
- mumps
- rubella
- varicella
- influenza
- diphtheria
- pertussis
- tetanus
- polio

It is important that all OHCWs know their personal immunization status and ensure that it is up to date. In this regard, OHCWs should consult with their physician or other primary family health care provider about the status of their immunizations. Baseline and annual tuberculosis skin testing may also be considered. In addition, the Canadian Immunization Guide sets out recommendations and schedules for adults, including those engaged in the provision of health care.

Hepatitis B is the most important vaccine-preventable infectious disease for all workers engaged in health care. The risk of being infected is a consequence of the prevalence of virus carriers in the population receiving care, the frequency of exposure to blood and other body fluids, and the contagiousness of hepatitis B virus (HBV). Therefore, immunization against HBV is strongly recommended for all OHCWs who may be exposed to blood, body fluids or injury involving sharps. As part of the immunization policy for the dental office, include a record of hepatitis B vaccination and documented immunity to hepatitis B by serology for all OHCWs.

Serological testing for anti-HBs should be conducted 1 to 2 months after completion of the 3-dose vaccination series to establish antibody response. OHCWs who fail to develop an adequate antibody response should complete a second vaccination series, followed by retesting for anti-HBs. OHCWs who fail to respond to the second vaccination series should be tested for HBsAg.

Nonresponders to vaccination who are HBsAg-negative should be counselled regarding precautions to prevent HBV infection and the need to obtain immunoglobulin prophylaxis for any known or probable parenteral exposure to HBsAg-positive blood.

OHCWs who are HBsAg-positive should seek guidance regarding necessary and reasonable steps to prevent HBV transmission to others and the need for medical evaluation. In particular, OHCWs who might perform exposure-prone procedures should be assessed on a case-by-case basis regarding the need for possible work restrictions.

OHCWs who might perform exposure-prone procedures have an ethical obligation to know their serologic status. If infected, dentists should seek guidance from the RCDSO with respect to the potential for transmission of their infection to their patients.

ILLNESS AND WORK RESTRICTIONS

OHCWs are usually concerned about contracting illnesses in the dental office. Such occurrences can be minimized by practicing the principles discussed in this document, including:

- ensuring adequate and appropriate immunization of all OHCWs;
- triaging patients and re-scheduling those who are ill;
- adhering to routine practices, including effective hand hygiene before and after each patient contact.

As already noted, hand hygiene is the single most important measure for preventing the transmission of microorganisms, protecting both OHCWs and patients. Please refer to the previous section of this document for detailed information regarding recommended hand hygiene procedures.

Unique situations that might warrant particular attention by an OHCW include:

- Dermatitis – When the protective skin barrier is broken, as occurs with chapped hands or eczema, the OHCW is at increased risk of acquiring and transmitting infection through the exposed area. Good skin care should always be practiced. Any areas of dermatitis should be covered, in addition to wearing gloves.
- Immunocompromised staff – Immunocompromised OHCWs are at increased risk of becoming infected and developing severe complications. They might also be at risk of shedding viruses (e.g. influenza) for prolonged periods. Where feasible, job functions and associated exposure risks should be considered.

OHCWs who have an upper respiratory illness (e.g. common cold) must take the necessary precautions to prevent the transmission of microorganisms to patients and other staff. Diligent hand hygiene is especially important. OHCWs who have a severe respiratory illness with fever, acute viral gastroenteritis with vomiting and diarrhea, or acute conjunctivitis must not attend the dental office until their symptoms have subsided and the period of communicability has passed. For example, staff should not attend the dental office for 24 – 48 hours after the resolution of acute vomiting and diarrhea.

OHCWs who have herpes simplex infections (e.g. cold sores) must pay particular attention to hand hygiene and not touch the affected area. In this situation, the use of a mask may help to remind the worker not to touch the lesions.

EXPOSURE PREVENTION

The primary method of preventing the transmission of blood-borne pathogens (e.g. HBV, HCV and HIV) to OHCWs is by avoiding occupational exposures to blood. In the dental office, exposures may occur through percutaneous injuries (e.g. needle-sticks or cuts with sharp objects), or by contact with the mucous membranes of the eyes, nose and mouth, or by contact with non-intact skin (e.g. exposed skin that is abraded, chapped or has signs of dermatitis).

The majority of exposures are preventable by following routine practices, which include the use of personal protective equipment, such as gloves, protective eyewear, masks and protective clothing, and safe work habits for the handling and disposal of sharps.

PPE must be used consistently during the treatment of patients, based on the likelihood of exposure to blood, body fluids and secretions, as well as the care of instruments and equipment. Cuts, abrasions or dermatitis constitute a breach in the skin's protective barrier. During work, non-intact skin must be covered with a waterproof bandage, transparent film dressing or other protective dressing and changed as needed. Large cuts may require medical assessment and re-evaluation of work duties.

Percutaneous injuries pose the greatest risk of transmission of blood-borne pathogens to OHCWs. Best practices to prevent such injuries include the following:

- Sharps, needles and syringes must be safety-engineered medical sharps (SEMS), whenever reasonable options are available.
- Always use extreme caution when passing sharps during four-handed dentistry.
- Needles must remain capped prior to use.
- Needles must not be bent, recapped or otherwise manipulated by using both hands.
- Following use, needles must be recapped as soon as possible by using a one-handed scoop technique or a commercial recapping device.
- When suturing, tissues must be retracted using appropriate instruments (e.g. retractor, dental mirror), rather than fingers.
- Remove burs from handpieces immediately following the procedure.
- Identify and remove all sharps from trays before cleaning instruments.
- Used sharps must be collected in a clearly labelled puncture-resistant container.
- When cleaning contaminated instruments by hand, heavy-duty utility gloves, appropriate clothing and long-handled brushes must be used.

Where a syringe and needle are being used multiple times on the same patient, safe recapping of a needle is preferred to prolonged exposure to an unprotected needle.

Some instruments and equipment have been designed to increase safety, such as self-sheathing anesthetic needles and dental units that shield burs in handpieces. Safer versions of sharp devices must be considered as they become available in the dental marketplace.

PERSONAL PROTECTIVE EQUIPMENT

General considerations

Personal protective equipment is worn to shield the exposed tissues of OHCWs from exposure to potentially infectious material. PPE serves as a barrier to protect the skin of the hands and arms from exposure to splashing, spraying or spatter of blood, saliva or other body fluids, and from introducing microorganisms into deeper tissues by traumatic injuries. Such equipment also protects the conjunctival mucosa of the eyes, as well as the lining mucosa of the respiratory tract.

Primary barriers include gloves, protective eyewear, masks and protective clothing. PPE must be removed prior to leaving the operatory. Single-use barriers, such as gloves and masks, must be discarded immediately after use.

Gloves

Gloves are worn to protect the hands of the OHCW from contamination. Latex gloves are not recommended, because allergic reactions have been reported with their use. Since gloves are not completely free from leaks and may tear, their use does not replace the need for hand hygiene. Therefore, effective hand hygiene protocols must be performed before donning gloves and after removing them.

In the dental office:

- Gloves must be worn when contact with mucous membranes, non-intact skin (including rashes) or body fluids is anticipated.

- The same pair of gloves must not be used for more than one patient.
- Gloves must be put on immediately before the activity for which they are indicated.
- Gloves must be removed and discarded immediately after the activity for which they were used, and hand hygiene must be performed.
- Gloves must not be worn outside any room or area where they are required for personal protection.
- Gloves must not be washed and re-used.
- Double-gloving may be utilized for some specific procedures, which may involve the handling of multiple sharp instruments or during longer appointments. However, if used, double-gloving must be procedure-specific, not patient-specific. This would be in keeping with human rights considerations.

To reduce hand irritation related to gloves:

- Wear gloves for as short a time as possible.
- Hands must be clean and dry before donning gloves.
- Gloves must be intact, clean and dry inside.

There should be written policies and procedures regarding the use of gloves in the dental office, including education on the appropriate selection and limitations of glove use.

Protective eyewear

The conjunctival mucosa of OHCWs must be protected from spatter and debris created during dental procedures by wearing appropriate protective eyewear or face shields. Protective eyewear must be cleaned and disinfected between patients and whenever it becomes noticeably contaminated.

An eye-wash station must also be available in the dental office for both OHCWs and patients to aid in managing contact with any body fluid or dental chemical / solvent.

Masks

Appropriate masks that cover the nose and mouth must be worn during dental procedures to protect the respiratory mucosa of OHCWs from contact with potentially contaminated droplet material. Masks lose efficiency over time, as they become moist from the OHCW's breathing. Accordingly, masks must be changed when they become contaminated, wet, or more often such as during longer appointments, and always between patients.

Protective clothing

When it is anticipated that a dental procedure is likely to generate splashes or sprays of blood, saliva or other body fluids, protective clothing must be worn, such as a gown.

Discourage the wearing of uniforms and scrubs outside the dental office.

Latex sensitivity and allergies

Latex is commonly used in the manufacture of gloves and a large number of products employed in dental care, including rubber dams, prophylaxis cups, orthodontic elastics and some medication vials. Skin irritations can be confused with true allergy to latex. The vast majority of skin reactions involving gloves are, in fact, irritant contact dermatitis and not allergic reactions to latex.

Adverse reactions involving latex gloves range from mild to serious and can include:

- irritant contact dermatitis;
- delayed hypersensitivity reactions (allergic contact dermatitis);
- immediate allergic reactions.

Mild contact dermatitis can be managed by changing the types or brands of soap, towels or gloves, rinsing hands thoroughly after washing, and using proper hand hygiene practices.

Delayed hypersensitivity reactions require referral to a medical dermatologist, and using washed (powderless) low-protein latex gloves or non-latex gloves.

Immediate allergic reactions necessitate emergency medical care and subsequent referral to a medical dermatologist, as well as using only non-latex, powder-free gloves and the avoidance of all latex products in the workplace and at home.

MINIMIZING DROPLET SPATTER

By their very nature, the provision of dental services can involve the creation of droplets, spatter and spray contaminated with blood, saliva, other body fluids and debris.

As previously noted, rubber dam should be used whenever feasible, and high-volume suction must be used whenever the creation of droplets, spatter and spray is possible.

EXPOSURE MANAGEMENT

Blood-borne pathogens, such as HBV, HCV and HIV, can be transmitted to OHCWs through occupational exposures to blood, saliva and other body fluids. Significant exposures must be handled in a prompt and organized fashion. For this reason, an exposure management protocol is an important component of an Office Manual.

All OHCWs must know the dental office's exposure prevention policies and exposure management protocol and review them periodically.

Significant exposures include percutaneous injuries with contaminated needles, burs or other sharp instruments, as well as incidents in which blood, saliva or other body fluids are splashed on to non-intact skin or the mucosa of the eyes, nose or mouth. However, percutaneous injuries pose the greatest risk of transmission of blood-borne pathogens to OHCWs.

In the event of a significant exposure, immediate first-aid measures must be instituted:

- For percutaneous injuries, allow the wound to bleed briefly and freely. Then, gently wash the wound with soap and water, and bandage as needed.
- For exposures involving the eyes, nose or mouth, flush the area with copious amounts of water.
- For exposures involving non-intact skin, wash the site with soap and water.

Any kind of occupational injury must be reported to a dentist in the practice. However, in all cases involving a significant exposure, the dentist must assess the source patient's status and risk for blood-borne illnesses by reviewing the medical history and, if necessary, asking her / him additional questions.

If the patient's HBV, HCV or HIV status is unknown, or if the patient presents with known risk factors, then her / his co-operation should be sought to clarify such information. Every reasonable effort should be made to obtain the patient's informed consent to be tested for HBV, HCV and HIV. This can be accomplished by referring the patient to her / his family physician for consultation, assessment of risk factors and any blood tests that are considered necessary.

At the same time, the injured OHCW should be referred to her / his family physician, an infectious disease specialist or hospital emergency department for counselling, baseline blood tests and, if deemed necessary, post-exposure prophylaxis.

If necessary, post-exposure prophylaxis should be administered as soon as possible. For example, in the event of a high-risk exposure to HIV infection, anti-retroviral drugs should be administered within hours.

All cases involving a significant exposure must be documented, including:

- name of the exposed OHCW and details regarding her / his vaccination status;
- date and time of the exposure;
- nature of the exposure, including the dental procedure being performed, the extent of the exposure and the immediate action taken;
- name of the source and details regarding her / his known or suspected status related to blood-borne pathogens;
- follow-up counselling and post-exposure management.

OCCUPATIONAL HEALTH AND SAFETY REQUIREMENTS AND WHMIS

All Ontario employers and employees are subject to the requirements of the *Occupational Health and Safety Act* (OHSA), which includes Regulation 860: Workplace Hazardous Materials Information System (WHMIS).

Under OHSA, there is a general duty for an employer to establish written procedures for the health and safety of employees. These procedures may include, but are not limited to, the following:

- safe work practices and working conditions;
- proper hygiene practices and the use of hygiene facilities;
- control of infections.

In addition, employees must work in compliance with the Act and its regulations, and use or wear any equipment, protective devices or clothing required by the employer.

WHMIS is a national communication standard that deals with hazardous materials in the workplace. Any workplace, including a dental office, that uses materials classified as "controlled products" under federal legislation is required to:

- supply labels for all controlled products that do not have them;
- ensure safety data sheets (SDS) are available for these products;
- educate and train workers about hazardous materials in the workplace.

Employers are obligated to uphold WHMIS standards in their workplace and to that end, every dentist must be familiar with the legislation. *Workplace Hazardous Materials Information System (WHMIS): A Guide to the Legislation* is a useful resource and is available at the Ontario Ministry of Labour website (see Appendix 2).

PROHIBITION OF EATING AND DRINKING IN NON-DESIGNATED AREAS

The consumption of all foods and beverages should be restricted to designated areas (e.g. lunch area, staff lounge) or outside of the dental office.

Eating and drinking in operatories, instrument reprocessing areas and in-office dental laboratories is prohibited. Do not store foods and beverages in refrigerators dedicated for biomedical wastes, drugs and other supplies.

Cleaning, Disinfection and Sterilization of Patient-Care Items

GENERAL CONSIDERATIONS

The goals of safe reprocessing of reusable patient-care items (dental instruments, handpieces, devices and equipment) include:

- preventing transmission of micro-organisms to OHCWs and patients;
- minimizing damage to patient care items from foreign material or inappropriate handling;
- safe handling of chemical disinfectants.

Contaminated instruments must be handled carefully at all times to prevent percutaneous injuries.

All reusable instruments must be properly cleaned, rinsed and dried prior to either disinfection or sterilization. These steps are essential, as residual debris will compromise the disinfection and sterilization process.

Patient care items are categorized as critical, semi-critical or non-critical, depending on the potential risk for infection associated with their intended use. This classification determines their reprocessing requirements.

Category	Definition	Reprocessing
Critical reusable instruments	Penetrate soft tissue or contact bone (e.g. all surgical instruments, periodontal scalers, etc.)	Cleaning followed by sterilization
Semi-critical reusable instruments	Contact mucous membranes or non-intact skin (e.g. mouth mirrors, amalgam condensers, reusable impression trays, handpieces, etc.)	Cleaning followed by sterilization
Non-critical reusable items	Contact intact skin, but not mucous membranes, or do not directly contact the patient (e.g. radiograph head / cone, blood pressure cuff, facebow, pulse oximeter, etc.)	Cleaning followed by low-level disinfection

All critical and semi-critical instruments used in dentistry, including handpieces, are available in heat-tolerant and/or single-use (disposable) forms. All heat-tolerant reusable critical and semi-critical instruments must be heat-sterilized between uses. All single-use items must be disposed following use.

All newly-purchased reusable critical and semi-critical instruments must be inspected and sterilized prior to first use, in accordance with the manufacturer's instructions. If the instructions are unclear, incomplete or inadequate, the manufacturer must be contacted for clarification or additional information. If clear, validated instructions are unavailable for an instrument, it must not be used.

REPROCESSING OF INSTRUMENTS

To achieve sterilization, the reprocessing of instruments requires multiple steps. Sterilization is a complex process requiring specialized equipment, adequate space, qualified staff and regular monitoring for quality assurance. Correct sorting, cleaning, rinsing, drying, packaging, sterilizer loading procedures and sterilization methods must be followed to ensure that all instruments are adequately reprocessed and safe for reuse on patients.

All instruments must be reprocessed in a central area of the dental office that is designed to facilitate quality control and ensure safety. The instrument reprocessing area must provide for one-directional workflow of instruments with clear separation of dirty and clean sides to prevent cross-contamination. Depending on the design of the instrument reprocessing area (e.g. length of counter, placement of sinks), the separation of dirty and clean areas may be achieved with either physical distance, if space permits, or a physical barrier, such as a wall or shield.

Attention must be given to the placement of sinks in the instrument reprocessing area. In order that clean areas remain dry and free from contamination, efforts must be made to minimize splashing from sinks, which may necessitate the installation of a physical barrier in smaller dental offices. If a physical barrier is required, it must be constructed of materials that can withstand regular cleaning and disinfection.

The instrument reprocessing area must have separate sections for:

- receiving, cleaning and decontamination;
- rinsing and drying;
- preparation and packaging;
- sterilization;
- storage.

Receiving, cleaning and decontamination

To prevent percutaneous injuries, contaminated instruments must be placed in a puncture-resistant covered container or locked cassette at the point of use and then transported to the instrument reprocessing area. Reusable instruments must be received, disassembled in accordance with the manufacturer's instructions, sorted and cleaned in one section of the reprocessing area. A puncture-resistant sharps container must be available.

Cleaning involves the removal of debris (e.g. organic and inorganic matter). This is achieved either by scrubbing with a detergent formulated for medical device reprocessing or an enzymatic cleaner, or by an automated process (e.g. ultrasonic cleaner or automated washer with a cleaning solution).

The use of automated cleaning equipment is strongly recommended, as it may increase productivity, improve cleaning effectiveness and decrease worker exposure to blood and body fluids. Thus, the use of automated cleaning equipment may be safer and more efficient than manually cleaning contaminated instruments.

Gross debris must be removed from instruments prior to placement in an ultrasonic cleaner. In addition, ultrasonic cleaning solutions must be changed daily or more frequently if they become visibly soiled. Automated washers may not require presoaking or scrubbing of instruments. Refer to the manufacturer's instructions for use of the automated washer.

Organic matter may accumulate on brushes used for cleaning instruments. Cleaning brushes must be inspected frequently and discarded when worn or damaged. At the end of every day, cleaning brushes must be sterilized or discarded.

Automated systems must be routinely tested for efficacy according to the manufacturer's instructions, each day that automated washers are used and at least weekly for ultrasonic cleaners.

If cleaning cannot be performed immediately, instruments should be placed in a puncture-resistant holding container and soaked with a detergent formulated for medical device reprocessing or an enzymatic cleaner to prevent drying of organic material, and make subsequent cleaning easier and less time-consuming. Liquid chemical sterilants or high-level disinfectants (e.g. glutaraldehyde, ortho-phthalaldehyde) must not be used as holding solutions, due to the fixative nature of these chemicals making surfaces more difficult to clean, as well as their general toxicity.

To avoid injury from sharp instruments, the following precautions must be taken:

- Wear puncture-resistant, heavy-duty utility gloves when handling or manually cleaning contaminated instruments.
- DO NOT reach into trays or containers holding sharp instruments that cannot be seen (e.g. sinks filled with soapy water in which sharp instruments have been placed). Instead, use a strainer-type basket to hold instruments, as well as forceps to remove them.
- Wear a mask, protective eyewear or face shield, and a protective gown to protect from splashing.

An emergency eye-wash station must be available to allow OHCWs to flush their eyes in the event of a significant exposure to blood-borne pathogens or hazardous chemical agents. A plumbed or self-contained eye-wash station that meets occupational health and safety requirements must be situated within a 10-second walk (i.e. 16 to 17 metres) of the reprocessing area.

To avoid injury from sharp instruments, the instrument reprocessing area should have two sinks, such that one may be dedicated to hand washing and (possibly) serve as an eye-wash station. Hand washing sinks must be dedicated to this purpose and not be used for any other purpose. If space does not permit the placement of two sinks, alcohol-based hand rub should be placed in the instrument reprocessing area and, when necessary, hand washing should be performed in another sink nearby.

Rinsing and drying

After cleaning, instruments must be rinsed with water to remove detergent residue, dried (e.g. lint-free cloth) and visually inspected to ensure all debris has been removed.

Preparation and packaging

In another section of the reprocessing area, cleaned and dried instruments must be inspected, assembled into sets or trays, and packaged for sterilization. Critical and semi-critical instruments must be reprocessed in a manner that will maintain sterility during storage. Suitable packaging materials include wrapped perforated instrument cassettes, peel pouches of plastic or paper, and woven or nonwoven sterilization wraps. Packaging materials must be designed for the type of sterilization process being used.

Instruments should be evenly distributed in a single layer within the package or container, unless the container is designed and validated to allow for more than one layer. Hinged instruments must be reprocessed open and unlocked.

Peel pouches are a convenient option to package instruments for sterilization. They are easy to use, come in a variety of sizes to accept single or small groups of instruments, and often include features such as self-sealing closures and chemical indicator strips. If pouches are used, the manufacturer's instructions must be consulted regarding the number of instruments that may be accommodated. In order to allow for adequate air removal, steam penetration to all surfaces and lumens, and subsequent evacuation of steam and moisture, pouches must not be overloaded.

A packaged instrument must not be placed within another package, unless this is supported by the manufacturer of the device and the manufacturer of the internal packaging has designed and validated its product for this use.

Each package must be labelled with the date reprocessed, sterilizer used, cycle or load number and the OHCWs initials in a manner that does not puncture or dampen the package. If instruments are not visible (e.g. a

wrapped cassette), the package contents must be labelled.

Labels, chemical indicator tapes, and handwritten or printed inks must be compatible with the packaging system and colour-fast, so as not to degrade, run, leach, fade or become illegible with exposure to the sterilization process.

Do NOT write directly on the paper side of peel pouches. .

Sterilization

The sterilization section of the reprocessing area includes the sterilizer(s) and related supplies, with adequate space for loading, unloading and cool down. The area may also include biological indicators and incubators for conducting tests, as well as enclosed storage for sterile and single-use (disposable) items.

All instruments must be sterilized by either steam under pressure (i.e. autoclaving), which is dependable and economical, or dry heat. Chemiclaves and bead sterilizers are NOT acceptable methods of sterilization.

For steam sterilization, dynamic air removal steam sterilizers (e.g. pre-vacuum and steam-flush pressure pulse sterilizers) are preferred over gravity displacement sterilizers.

All sterilization must be performed by using medical sterilization equipment registered with Health Canada. Sterilization times, temperatures and other operating parameters recommended by the manufacturer of the equipment used, as well as instructions for correct use and placement of containers, wraps, and chemical or biological indicators, must be followed.

Steam sterilizers manufactured for use in dental offices use pre-programmed cycles with specific operating parameters for time, temperature and pressure.

Most dental instruments are made of solid metal and have uncomplicated design features (e.g. explorers, periodontal probes and scalers). All steam sterilizers using standard approved cycles should sterilize such instruments reliably, provided that all sterilization parameters recommended by the instrument manufacturer are met or exceeded. Excess instrument wear may occur when the sterilization parameters recommended by the manufacturer are exceeded, necessitating careful inspection of instruments throughout their life-cycle.

However, the design features of some dental instruments may affect sterilization efficacy (e.g. long or narrow lumens, sharp bends, screws, hinges). Examples include handpieces, surgical aspirators, bone grafting syringes, bone mills and guides, double action rongeurs, implant drills and screwdrivers, and torque wrenches and drivers. Sterilization temperatures and other operating parameters recommended by the manufacturer of these instruments must be followed. If sterilization parameters will be used that are different from those recommended, the dentist must obtain written, validated sterilization instructions from the instrument manufacturer.

Instrument packs must be allowed to dry inside the sterilizer chamber before removing and handling, in order to avoid wicking of moisture and, hence, contamination with bacteria from hands.

Monitoring of sterilization

Monitoring of sterilization must be conducted through a combination of physical, chemical and biological means, which evaluate both the sterilizing conditions and the procedure's effectiveness. The dental office must have written policies and procedures for monitoring of sterilization.

The information in this section of the Standard represents best practices for the monitoring of sterilization in the dental office, and meets or exceeds the recommendations of the PIDAC and the Canadian Standards Association (CSA). These are the prevailing standards for all healthcare settings in Ontario, including dental offices, and may be used as a basis for auditing purposes.

1. Physical indicators include the gauges or displays on the sterilizer for cycle time, temperature and pressure. Some tabletop sterilizers have recording devices that print out these parameters or store them electronically.

Tabletop sterilizers with recording devices are preferred. All new sterilizers must have this feature. If a sterilizer does not have a recording device, consideration should be given to replacing it in a reasonable time.

Physical indicators must be checked and recorded for each load. If the sterilizer has a recording device, the physical parameters must be checked at the conclusion of the sterilization cycle for each load and documented. This is to verify that the pre-programmed cycle operated correctly, and that the required conditions for sterilization existed in the chamber. If the sterilizer does not have a recording device, the physical parameters must be checked during the sterilization cycle for each load and documented.

2. Chemical indicators (i.e. internal and external) are designed to provide a chemical or physical change as a result of exposure to a defined sterilization process. For example, heat-sensitive tape, applied to the outside of a package, changes colour rapidly when a given temperature is reached. This signifies that the package has been exposed to heat, although it does not ensure that sterilization has been achieved.

A sterilizing agent has more difficulty penetrating a hollow object, such as a handpiece, than it does a solid object, such as a dental mirror. Air that is trapped inside these hollow areas cannot be easily removed, thus hindering the sterilizing agent's contact with the internal surface of the instrument.

In addition, when items are packaged, the sterilizing agent takes longer to penetrate to the instruments. The packaging envelops the instruments, creating a barrier, through which the sterilizing agent must be drawn or forced in.

For these reasons, each package must have external and internal chemical indicators. Place a Type 1 chemical indicator on the outside of each instrument package. Also, place a Type 4, Type 5 or Type 6 chemical indicator inside each package. Some pouches incorporate Type 1 external and Type 4 internal chemical indicators.

Air Removal Test (Bowie-Dick):

Sufficient air removal is necessary for steam penetration and contact with instrument surfaces. An air removal test with a Type 2 chemical indicator (Bowie-Dick) is used specifically for testing pre-vacuum sterilizers.

For pre-vacuum sterilizers, an air removal test must be performed at the beginning of each day that the sterilizer is used. An air removal process challenge device (PCD) must be placed in the chamber of an empty sterilizer as per the manufacturer's instructions for use.

NOTE: Physical and chemical indicators do not ensure that sterilization has been achieved. They merely offer verification that the necessary conditions have been met. However, they can also provide an early warning of a problem, such as sterilization failure, which may be caused by incorrect loading of the sterilizer or equipment malfunction. If either physical or chemical indicators demonstrate inadequate reprocessing, then the items in the load must be reprocessed.

3. Biological indicators (BIs or "spore tests") are the most accepted means for monitoring of sterilization, because they directly assess the procedure's effectiveness in killing the most resistant microorganisms. The spores used are more resistant and present in greater numbers than the common microbial contaminants found on patient-

care items. Therefore, an inactivated BI signifies that other potential pathogens in the load have been killed.

The following requirements apply to biological monitoring:

- A BI must be placed in a PCD and used to test the sterilizer each day that it is used AND for each type of cycle that is used. The manufacturer's directions concerning the appropriate placement of the BI in the sterilizer must be followed.
- A BI must be placed in a PCD and included in every load containing implantable devices (e.g. dental implants, temporary anchorage devices, surgical screws/plates/staples). Implantable devices must be quarantined until the BI test results are known.
- For routine loads, items in the reprocessed load should not be released until the results of the BI test are available. If quarantine pending BI results is not possible, evaluation of a Type 5 or Type 6 chemical indicator and the specific cycle physical parameters must be used to justify their release:
  - If the load will be quarantined, then a Type 4, Type 5 or Type 6 chemical indicator must be placed in each package.
  - If the load will not be quarantined and the sterilizer has a recording device, then one PCD with a Type 5 or Type 6 chemical indicator may be used to justify the release of the reprocessed load. In addition, a Type 4, Type 5 or Type 6 chemical indicator must be placed in each package.
  - If the load will not be quarantined, the sterilizer has a recording device and a PCD is not used, then a Type 5 or Type 6 chemical indicator must be placed in each package to be released.
  - If the load will not be quarantined and the sterilizer does not have a recording device, then a Type 5 or Type 6 chemical indicator must be placed in each package to be released.

A process challenge device (PCD) is a test used to assess the performance of the sterilization process and the results must be verified and recorded at the end of the sterilization cycle. A PCD may be commercially manufactured or created in-house by selecting one instrument package for the load that is the most challenging to sterilize and placing a Type 5 or Type 6 chemical indicator and / or a BI at the centre of this package. Factors that make an instrument package difficult to sterilize include those with large metal masses (e.g. multiple elevators) and sets with mixed materials (e.g. plastic and metal). To identify this package, label it "PCD", and place it in the most challenging location to sterilize (as per the sterilizer manufacturer's instructions for use). The PCD is checked at the conclusion of the sterilization cycle for the load to confirm that the Type 5 or Type 6 chemical indicator has passed (i.e. meets the parameters for sterilization, pending a BI test result) and/or the BI has passed.

For a sterilizer that has a recording device:

- **The physical parameters must be checked at the conclusion of the sterilization cycle for each load and documented.**
- **One PCD with a Type 5 or Type 6 chemical indicator may be used to justify the release of a reprocessed load. Alternatively, a Type 5 or Type 6 chemical indicator must be placed in each package.**

For a sterilizer that does not have a recording device:

- **The physical parameters must be checked during the sterilization cycle for each load and documented.**
- **A Type 5 or Type 6 chemical indicator must be placed in each package.**

For further information, refer to the algorithm on How to Use Chemical Indicators, Biological Indicators and Process Challenge Devices to Monitor Sterilization.

The daily operation of every sterilizer must be reviewed and documented. A log book must be kept for this purpose. Any malfunction must be noted and appropriate action taken. Like other administrative or office records, the log book must be maintained for at least 10 years from the date of the last entry in that record.

In the event of a positive BI (i.e. failed spore test):

- Remove the sterilizer from service.
- Review all records of physical and chemical indicators since the last negative BI, as well as all sterilization procedures to determine whether operator error could be responsible. In the absence of a mechanical failure, common reasons for a positive BI include overloading, failing to provide adequate package separation, and using incorrect or excessive packaging material.
- If the cause of the test failure is immediately identified (usually operator error), correct it by addressing any procedural problems and properly loading the sterilizer. Repeat the BI test immediately using the same cycle that produced the failure. While waiting for the repeat test results, the sterilizer must remain out of service. If the dental office does not have a second sterilizer, a colleague may be able to assist or a dental supply company may lend one.
- If the repeat BI test is negative, and all physical and chemical indicators demonstrate adequate reprocessing, then the sterilizer may be put back into service.
- If the repeat BI test is positive or the cause of the initial test failure is not immediately identified, and all sterilization procedures have been performed correctly, then the sterilizer must remain out of service until it has been inspected, repaired and successfully rechallenged with BI tests in three consecutive full chamber sterilization cycles. Consider using a BI with a different lot number. In addition, all items from suspect loads dating back to the last negative BI must be recalled, to the extent possible, and reprocessed.
- Assess the risk to patients. Determine if the notification of patients, other facilities or regulatory bodies, such as the RCDSO or a public health unit, is required. If in doubt, consult the RCDSO.

Storage

Sterile and single-use (disposable) items should be stored in an enclosed space, such as closed or covered cabinets, or drawers. They must not be stored under sinks, on counters adjacent to sinks or in other locations where they might become wet or contaminated.

To prevent contamination and maintain one-directional workflow, do not store sterile and single-use items on the dirty side of the reprocessing area.

Packages containing sterile instruments should be stored loosely, rather than tightly together, to avoid friction or shear action that may cause pinholes or tears of the packaging material and loss of instrument sterility.

Storage practices for packaged sterilized instruments may be either date or event-related. Dating assists in the recall of instruments should concerns arise with the results of sterilization tests. Some health-care facilities date every sterilized package and use shelf-life practices (e.g. "first in, first out"). Others use event-related practices. The latter approach recognizes that the packaged instruments should remain sterile indefinitely, unless an event causes them to become contaminated (e.g. torn or wet packaging).

Packages containing sterile instruments must be inspected before use to verify the results of external and internal chemical indicators, barrier integrity and dryness. If the packaging is compromised (e.g. unsealed, damaged, wet, visibly soiled or dropped on the floor), the instruments must be cleaned, packaged and sterilized again.

Critical and semi-critical instruments must be reprocessed in a manner that will maintain sterility during storage. This includes ensuring that the integrity of the package is maintained.

STERILIZATION OF UNPACKAGED INSTRUMENTS

An unpackaged sterilization cycle (sometimes called "flash sterilization" or "immediate use sterilization") is a method for sterilizing patient-care items for immediate use. **Unpackaged sterilization must only be used in URGENT situations in which no other option is available. Unpackaged sterilization must not be used to compensate for a low inventory of instruments and must never be used for implantable devices**. In those situations in which unpackaged sterilization must be used, the following conditions must be met:

- a record is kept for each instrument undergoing unpackaged sterilization, including the name of the patient, procedure, dentist and instrument used;
- thorough cleaning and drying of instruments precedes the unpackaged sterilization cycle;
- physical indicators and Type 5 or Type 6 chemical indicators are used and checked at the end of the cycle;
- care is taken to avoid thermal injury to staff or patients;
- the sterility of instruments is maintained during removal from the sterilizer and transport to the point of use.

REPROCESSING OF NON-CRITICAL ITEMS

Non-critical items pose the least risk of transmission of infection, as they either have no contact with the patient or contact only intact skin, which serves as an effective barrier to microorganisms. Non-critical items should be cleaned after use or, if contaminated, cleaned and then disinfected with an appropriate hospital-grade low-level disinfectant with a Drug Identification Number (DIN) from Health Canada (e.g. chlorine-based products, 0.5% accelerated hydrogen peroxide, 3% hydrogen peroxide, 60 to 95% alcohols, iodophors, phenolics and quaternary ammonium compounds).

Cleaning and disinfection of some non-critical items may be difficult or could damage surfaces. It may be preferable to use disposable barriers to protect these surfaces.

REPROCESSING EQUIPMENT PURCHASE, USE AND PREVENTIVE MAINTENANCE

All tabletop sterilizers and other reprocessing equipment must be CSA approved and accompanied by the manufacturer's instructions for use. Tabletop sterilizers undergo frequent use, and wear and tear. The manufacturer's recommendations must be consulted for guidance on use, weight limitations, load configurations and a preventive maintenance program, including regular inspection of gaskets and seals. The preventive maintenance, servicing and repair of all reprocessing equipment must be documented.

Office Cleaning, Housekeeping and Management of Waste

GENERAL CONSIDERATIONS

For the purposes of cleaning, a dental office has two component areas:

- public areas that are not involved in patient care, such as waiting rooms and reception areas;
- clinical areas that are involved in patient care, such as dental operatories and instrument reprocessing areas.

The ease of cleaning is an important consideration in the choice of materials for a dental office, especially for clinical areas. For example, cloth furnishings and carpeting are difficult to clean and cannot be reliably disinfected. When choosing materials for a dental office, consider the following:

- furnishings, surfaces and finishes should be smooth, nonporous and seamless, where possible;
- worn, stained or torn items that cannot be cleaned due to damage should be replaced as soon as possible;
- in clinical areas, cloth furnishings and carpeting must not be used;
- in clinical areas, materials should be cleanable with hospital-grade detergents, cleaners and disinfectants.

Smooth, nonporous and seamless furnishings, surfaces and finishes are preferred. Cloth or wood furnishings and carpeting are difficult to clean, cannot be reliably disinfected and must not be used in clinical areas.

Generally speaking, environmental surfaces in clinical areas do not contact the patient and do not pose a direct risk to their safety. However, such surfaces as light handles and drawer knobs can become contaminated during patient care, acting as reservoirs of microorganisms. Transmission usually occurs through hand contact or by touching the surface with a contaminated instrument. When this happens, microorganisms can be transferred to other instruments, other environmental surfaces, or to the hands, nose, mouth and eyes of patients and OHCWs.

Proper hand hygiene and the use of personal protective equipment are essential to minimizing the transfer of microorganisms. In addition, the use of barriers or cleaning and disinfection of environmental surfaces will guard against such transferral.

Environmental surfaces are divided into **clinical contact surfaces** and **housekeeping surfaces**.

CLINICAL CONTACT SURFACES

Clinical contact surfaces are frequently touched in the course of patient care. They can become contaminated by direct spray or spatter generated during dental procedures, or by contact with an OHCW's gloved hands or contaminated instruments. Examples of clinical contact surfaces include:

- chair controls and switches
- light handles and switches
- radiography equipment
- chairside computer keyboards and monitors
- reusable containers of dental materials
- drawer and faucet handles
- countertops
- pens
- telephones
- doorknobs

Clinical contact surfaces should be cleaned and disinfected between patients and at the end of the workday using an appropriate hospital-grade low-level disinfectant (i.e. has a DIN from Health Canada). To facilitate this, treatment areas must be well-organized and kept free of unnecessary equipment and supplies, especially on countertops. Staff must take appropriate precautions, including wearing gloves, while cleaning and disinfecting surfaces to prevent occupational exposure to infectious agents and hazardous chemicals.

Ideally, clinical contact surfaces and equipment should be disinfected with a cloth and disinfectant, allowing adequate wet contact time with the disinfectant, as described in the manufacturers' instructions for use. Disinfectant wipes are a convenient option, but it is difficult to attain adequate wet contact time with them. Accordingly, when using disinfectant wipes:

- the active ingredient must be an appropriate hospital-grade disinfectant;
- they must be kept wet and discarded if they become dry;
- multiple wipes may be required for large surfaces and equipment.

Applications of cleaning chemicals by aerosol or trigger spray bottles may cause eye injuries or induce or compound respiratory problems or illness. In accordance with best practices, apply cleaning chemicals to a cloth before using. Do not apply cleaning chemicals by aerosol or trigger spray bottles.

Alternatively, clinical contact surfaces and equipment can be protected from contamination by the use of barriers. Barriers are particularly effective for those surfaces that are difficult to clean and disinfect, due to their shape, surface or material characteristics. Suitable barrier materials include:

- clear plastic wrap
- plastic bags
- plastic sheets
- plastic tubing
- plastic-backed paper
- other moisture-proof materials

Since barriers can become contaminated during dental procedures, they must be removed and discarded between patients using gloves. Following barrier removal, the underlying surfaces must be examined to ensure they did not inadvertently become contaminated. Those that did must be cleaned and disinfected. Otherwise, clean barriers must be placed prior to the next patient. At the end of the workday, all barriers must be removed and these surfaces must be cleaned.

HOUSEKEEPING SURFACES

Housekeeping surfaces, such as floors and walls, have a limited risk of disease transmission. These surfaces usually require only periodic cleaning with dilute detergents. If a surface is suspected to have become contaminated with blood, saliva or other bodily fluids, it must be cleaned first and then disinfected with an appropriate low-level disinfectant (e.g. bleach diluted 1:50 or 1000 ppm free chlorine). OHCWs must take appropriate precautions, including wearing gloves, for this purpose.

From a general housekeeping point of view, floors must be cleaned regularly and spills must be cleaned up promptly. Cleaning tools, such as mop heads, must be rinsed after use and allowed to dry before they are re-used. Fresh cleaning solutions must be made each day, discarding any that remain and allowing the container to dry between uses. In this way, the risk of these solutions becoming reservoirs for microorganisms can be minimized.

CLEANING UP BLOOD AND BODY FLUID SPILLS

Spills of blood and other body substances, such as urine, feces and emesis, must be contained, cleaned and the area disinfected immediately. If spills occur on carpets, a disinfectant other than bleach should be used. In certain cases, cleaning carpets may not be sufficient, and replacement and disposal of carpeting may be required.

The following procedure should be used for cleaning up a spill of blood or other body fluids:

- Restrict the activity around the spill until the area has been cleaned and disinfected and is completely dry.
- Put on gloves; if there is a possibility of splashing, wear a gown and facial protection (mask and eye protection or face shield).
- Confine and contain the spill; wipe up any blood or body fluid spills immediately using either disposable towels or a product designed for this purpose. Dispose of materials by placing them into regular waste receptacle, unless the soiled materials are so wet that blood can be squeezed out of them, in which case they must be segregated into the biomedical waste container (i.e. yellow bag).
- Disinfect the entire spill area with a hospital-grade disinfectant and allow it to stand for the amount of time recommended by the manufacturer.
- Wipe up the area again using disposable towels and discard into regular waste.
- Care should be taken to avoid splashing or generating aerosols during the cleanup.
- Remove gloves and perform hand hygiene.

MANAGEMENT OF WASTE

For the purposes of IPAC, waste from dental offices can be divided into two categories: **biomedical waste** and **general office waste**. Ontario legislation dictates that biomedical waste must be handled and disposed of in a manner that avoids transmission of potential infections. Therefore, it is necessary to understand the differences between these types of waste, so that they can be separated, stored and disposed of in an appropriate matter.

Biomedical waste

Biomedical waste is classified as hazardous waste and must not be disposed with regular garbage. It must be handled safely to protect human health and the environment. In general, all biomedical waste must be:

- stored in colour-coded containers that are marked with the universal biohazard symbol;
- released to an approved biomedical waste carrier for disposal.

Biomedical waste can be further divided into anatomical and non-anatomical waste.

i) Anatomical waste (i.e. human tissue)
The generation of anatomical waste is normally limited to oral surgeons and periodontists, such as in the course of harvesting human tissue for treatment. Anatomical waste must be separated and collected in a RED liner bag that is labelled with the universal biohazard symbol. This waste must then be handled in accordance with Ontario Regulation 347: General – Waste Management.

NOTE: Extracted teeth are not classified as biomedical waste and should be handled differently. Please refer to the appropriate section below.

ii) Non-anatomical waste (i.e. sharps and blood-soaked materials)
Sharps (e.g. needles, syringes with needles, scalpel blades, clinical glass) must be separated and collected in a YELLOW puncture-resistant, leak-proof container that is specifically designed for their management and labelled with the universal biohazard symbol. Once the container has reached the designated capacity, it must only be released to an approved biomedical waste carrier for disposal.

Non-anatomical waste includes blood-soaked materials that release liquid or semi-liquid blood if compressed. It must be separated and collected in a YELLOW liner bag that is labelled with the universal biohazard symbol. If blood-soaked materials are to remain on site for more than 4 days, they must be handled in accordance with Ontario Regulation 347: General – Waste Management.

In most instances, items such as gauze, cotton rolls and examination gloves that have come in contact with blood, saliva or other bodily fluids are NOT classified as biomedical waste. Provided that the item does not release liquid or semi-liquid blood if compressed, it should be considered as general office waste.

General office waste

General office waste is no more infective than residential waste. Therefore, the majority of soiled items generated in dental offices do not require any special disposal methods, other than careful containment and removal. Some recommendations for all types of general office waste include:

- Ensure all garbage containers are waterproof and have tight-fitting lids, preferably operated by a foot pedal. Open wastebaskets might be dangerous if children are around them.
- Use plastic bags to line the garbage containers. The use of double-bagging is not necessary, unless the integrity of the bag is jeopardized or the outside is visibly soiled.
- Do not overfill garbage containers.
- Do not place sharp, hard or heavy objects into plastic bags that could cause them to burst.

Certain types of waste generated in dental offices can be detrimental to the environment if not properly handled, and their disposal is subject to provincial regulations and municipal bylaws. In addition to biomedical waste, this includes waste that contains mercury, silver, lead and other chemicals. For further information regarding the disposal of these types of waste, refer to the Best Management Practices Flowcharts, available at the RCDSO's website.

Handling of extracted teeth

Extracted teeth may be returned to the patient without any special considerations for IPAC, other than simple cleaning of visible blood and gross debris.

If being discarded, extracted teeth without amalgam fillings may be disposed as general office waste. Extracted teeth with amalgam fillings should be treated as mercury-containing waste and disposed accordingly.

If being sent to a dental laboratory for shade or size comparisons, extracted teeth should be cleaned and surface disinfected with an appropriate low-level disinfectant. Extracted teeth being collected for use in pre-clinical education training should be cleaned of visible blood and gross debris, and maintained in a hydrated state in a closed container during transportation.

Equipment and Area Specific Practice Guidelines

DENTAL UNIT WATERLINES

Dental unit waterlines are made of narrow-bore plastic tubing that carry water to handpieces, ultrasonic instruments and air / water syringes. They can become heavily colonized with waterborne microorganisms, including bacteria, fungi and protozoa, which form a biofilm on the interior surface of the waterline. However, they are not a supportive environment for bacteria commonly found in the oral cavity.

High numbers of these opportunistic microorganisms are not necessarily dangerous to the general population, unless the patient or OHCW is a susceptible host. This includes persons who are immunocompromised (e.g. persons living with HIV, persons undergoing oncology treatment or organ transplantation procedures), and those with cystic fibrosis, chronic bronchitis and bronchiectasis.

The potential risk of infection from dental unit waterline microorganisms can be effectively reduced to counts similar to those in potable water standards by following regular waterline maintenance procedures.

For offices using municipal or communal water supplies:

- Waterline heaters must not be used, as the heat encourages the growth of microorganisms.
- All waterlines must be purged at the beginning of each workday by flushing them thoroughly with water for a minimum of 2 minutes. Before purging is carried out, handpieces, air / water syringe tips and ultrasonic tips must be removed from the waterlines.
- Handpieces using water coolant must be run for a minimum of 20 seconds after patient care in order to purge all potentially contaminated air and water. The handpiece is then removed and, following cleaning and disinfection of clinical contact surfaces, another sterilized handpiece may be attached for use with the next patient.
- Sterile water or sterile saline should be used when irrigating open surgical sites and whenever bone is cut during invasive surgical procedures. Appropriate devices, such as bulb syringes or single-use disposable products, should be used to deliver sterile irrigation solutions.

For offices using closed or other water delivery systems:

- The manufacturer's instructions related to dental units and equipment must be followed for daily and weekly maintenance.

BOIL WATER ADVISORIES

Boil water advisories occur when public health officials determine that municipally delivered tap water is unsafe to use or consume. 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 must be taken:

- Postpone treatment delivery, if possible. Develop a contingency plan in case of an extended boil water advisory.
- Public water must 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.
- Patients must not rinse their mouths with tap water. Bottled or distilled water should be used instead.
- Tap water must 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, they should be washed using bottled or distilled water and an antimicrobial soap. Alternatively, moistened towelettes may be used to

remove visible soil, followed by the use of alcohol-based hand rubs.
- Consider contacting a portable sink manufacturer about the possibility of renting a portable sink that can operate with commercial-sized bottled water.
- When the boil water advisory is cancelled, all incoming public water system lines, including any taps or other waterlines in the dental office, must be flushed for a minimum of 5 minutes. The dental unit waterlines in all dental units and equipment must be disinfected according to the manufacturer's instructions prior to use. There may be public health advisories that require further measures.

During a period of water interruption, the same principles apply. For example, treatment should be postponed, if possible.

DENTAL HANDPIECES AND OTHER INTRA-ORAL DEVICES

Several dental devices that contact mucous membranes are attached to the air or waterlines of the dental unit, including:
- high and low-speed handpieces;
- prophylaxis angles;
- ultrasonic and sonic instruments;
- air abrasion devices;
- air / water syringe tips.

These devices have the potential of retracting oral fluids into their internal compartments, which can then be expelled into the oral cavity of another patient during subsequent use. In order to flush out any patient material that might have entered the turbine or air and waterlines, these devices must be activated to discharge air and water for a minimum of 20 seconds after each patient use.

Dental handpieces and other intra-oral devices that are attached to air or waterlines must be sterilized after each patient use. The manufacturer's instructions for cleaning, lubricating and sterilizing these devices must be strictly followed.

Some instrument components are permanently attached to dental unit waterlines; for example, electric handpiece motors, handles for ultrasonic devices, and attachments for saliva ejectors, high-volume suction and air / water syringes. Such components must be covered with barriers that are changed after each patient use. If the item is contaminated or suspected to have been contaminated, it must be cleaned and disinfected with an appropriate low-level disinfectant before the next patient is seated in the operatory.

SALIVA EJECTORS

Backflow from a low-volume saliva ejector can occur when a patient closes his or her lips around the tip, forming a seal that creates a partial vacuum. This backflow can result in microorganisms from the suction lines entering the patient's mouth, a potential source of cross-contamination. Therefore, OHCWs must be careful not to allow patients to close their mouths over the saliva ejector tip. In addition, specially designed saliva ejectors exist that do not allow a negative pressure to form around the tip.

Suction lines must be purged between patients by aspirating water or an appropriate cleaning solution, thereby removing loosely adherent debris and microorganisms. At least once per week, suction lines must be flushed out with an enzymatic cleaner or appropriate cleaning solution.

SINGLE-USE DEVICES

Single-use (i.e. disposable) devices are designed to be used on one patient and then discarded, and not to be reprocessed and used on another patient. Examples include syringe needles, prophylaxis cups and brushes. Some items, such as prophylaxis angles, high-volume suction tips and air / water syringe tips are commonly available in single-use forms.

Single-use devices are usually not heat-tolerant and cannot be reliably cleaned or disinfected. Therefore, they must be disposed of appropriately after use.

DENTAL RADIOGRAPHY EQUIPMENT

When taking radiographs, appropriate steps must be taken to prevent cross-contamination of equipment and environmental surfaces with blood or saliva. This includes the use of gloves when taking radiographs and handling contaminated film packets. Accessories for taking intra-oral radiographs (e.g. film-holders and positioning devices) must be sterilized between patients.

Radiography equipment (e.g. tube heads and control panels) 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 the OHCW's gloved hands or contaminated film packets must be cleaned and disinfected after each patient use.

After a radiograph is exposed, the film packet must be dried with disposable gauze or a paper towel to remove blood or excess saliva and then placed in a container, such as a disposable cup, for transport to the developing area.

The film packet may be disinfected with an appropriate low-level disinfectant before opening to develop the film. Alternatively, a contaminated film packet may be opened using gloves. The film should be dropped onto a clean surface without touching it and the empty packet should be discarded, being careful to avoid contamination. Gloves must then be removed and hand hygiene performed before developing the film.

Another option is to use a barrier pouch to prevent contamination of the film packet. If used, the film packet must be carefully removed from the pouch to avoid contamination and then placed in a container for transport to the developing area.

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

DIGITAL RADIOGRAPHY SENSORS AND INTRA-ORAL CAMERAS

Digital radiography sensors and intra-oral cameras come into contact with mucous membranes. These devices should be cleaned and heat-sterilized between patients. Alternatively, they must be protected with barriers to reduce gross contamination. However, following barrier removal, the underlying surfaces must be examined and if found contaminated, they must be cleaned and disinfected.

As with other dental equipment, the manufacturer's instructions must be followed regarding the use of appropriate barriers, and recommended sterilization and disinfection procedures for these devices.

LASERS AND ELECTROSURGERY EQUIPMENT

During surgical procedures, the use of lasers and electrosurgery equipment causes thermal destruction of tissues, creating a smoke by-product that may contain viable microorganisms. In addition, lasers transfer electromagnetic energy into the tissues, resulting in the release of a heated plume that may include particles, gases, tissue debris, viruses and offensive odours.

OHCWs must take appropriate precautions to avoid inhaling or otherwise coming into contact with laser plumes and electrosurgery smoke, including the use of:

- routine practices (e.g. masks and face shields);
- central room suction units with in-line filters to collect particulate matter;
- dedicated mechanical smoke exhaust systems with a high-efficiency filter to remove substantial amounts of laser plume particles.

The manufacturer's instructions for cleaning, sterilization and maintenance of these devices must be strictly followed.

DENTAL LABORATORY ASEPSIS

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

Effective communication and coordination between the dental office and the commercial dental laboratory will ensure that:

- appropriate cleaning and disinfection procedures are performed in the dental office or the commercial dental laboratory;
- materials are not damaged or distorted because of overexposure to disinfectants;
- disinfection procedures are not unnecessarily duplicated.

Impressions, prostheses or appliances must be cleaned and disinfected as soon as possible after removal from the patient's mouth, before drying of blood or other organic debris. The manufacturer's instructions regarding the stability of specific materials during disinfection should be consulted. "Wet" impressions or appliances should be placed in an impervious bag prior to transportation to a commercial dental laboratory.

Heat-tolerant items used in the mouth, such as impression trays or face bow forks, must be sterilized after each patient use. Other items that do not normally come in contact with the patient, but frequently become contaminated, such as articulators and case pans, must be cleaned and disinfected according to the manufacturer's instructions.

Finished prostheses and appliances delivered to the patient must be free of contamination. This can be accomplished with an appropriate low-level disinfectant by either the commercial dental laboratory or dental office.

Items used in the typical in-office dental laboratory, such as burs, polishing points, rag wheels, laboratory knives and dental lathes, frequently become contaminated during adjustments to prostheses and appliances. These items must be cleaned and sterilized, cleaned and disinfected or discarded after use, as per the manufacturer's recommendations.

SAFE HANDLING OF INJECTABLES

The transmission of blood-borne viruses and other microbial pathogens to patients may occur due to unsafe and improper handling of injectables (e.g. local anesthetics, drugs and solutions for sedation).

The following practices must be adhered to when preparing and administering injectables.

Aseptic technique

- Perform hand hygiene prior to accessing supplies, handling vials and IV solutions, and preparing or administering drugs.
- Prepare drugs and supplies in a clean area on a clean surface.
- Use aseptic technique in all aspects of parenteral drug administration, drug vial use and injections. Limit access to select trained individuals, if possible.
- Never administer a drug from the same syringe to more than one patient, even if the needle is changed between patients.
- Never store needles and syringes unwrapped, as sterility cannot be assured.
- If an administration set is prepared ahead of time, all drugs should be drawn up as close to use as possible to prevent contamination. Once set up, an administration set should be covered.
- Do not use IV solution bags as a common source of supply for multiple patients.

Single dose vials

Single dose vials, intended for single patient use, typically lack preservatives. The use of these vials for multiple patients carries substantial risk for bacterial contamination and infection.

- Do not reuse single dose vials. Enter the vial once and immediately discard after use.

- Always use a sterile syringe and needle/cannula when entering a vial. Never enter a vial with a syringe or needle/cannula that has been used on a patient.
- Never combine or pool the leftover contents of single dose vials.
- A syringe for the administration of a local anesthetic must only be prepared at the time of use.

Multidose vials

Any error in following protocols for the correct use of multidose vials can result in the transmission of both bacterial and blood-borne viral pathogens. Transmission of HBV, HCV and HIV have been associated with the use of multidose vials.

The use of multidose vials for injectable drugs increases the risk of transmission of blood-borne pathogens and bacterial contamination of the vial **and should be avoided**. Patient safety should be prioritized over cost when choosing between multidose and single dose vials.

If multidose vials are used, the following practices must be followed each time the multidose vial is used:

- NEVER re-enter a vial with a used needle OR used syringe.
- Once medication is drawn up, the needle should be IMMEDIATELY withdrawn from the vial. A needle should NEVER be left in a vial to be attached to a new syringe.
- Use a multidose vial for a single patient whenever possible and mark the vial with the patient's name.
- Mark the multidose vial with the date it was first used and ensure that it is discarded at the appropriate time.
- Adhere to aseptic technique when accessing multidose vials. Multidose vials should be accessed on a surface that is clean and where no dirty, used or potentially contaminated equipment is placed or stored. Scrub the access diaphragm of vials using friction and 70% alcohol. Allow to dry before inserting a new needle and new syringe into the vial.
- Discard the multidose vial immediately if sterility is questioned or compromised or if the vial is not marked with the patient's name and original entry date.
- Review the product leaflet for recommended duration of use after entry of the multidose vial. Discard opened multidose vials according to the manufacturer's instructions or within 28 days, whichever is shorter.

The use of multidose vials increases the risk of transmission of blood-borne pathogens and bacterial contamination. Single dose vials are ALWAYS preferred.

HANDLING OF BIOPSY SPECIMENS

To protect persons handling and transporting biopsy specimens, they must be placed in a sturdy, leak-proof container that has a secure lid and is clearly labelled with the universal biohazard symbol.

Care must be taken when collecting the specimen to avoid contaminating the outside of the container. If the outside of the container is suspected to be or has been contaminated, it must be cleaned and disinfected or placed in an impervious bag prior to transportation.

Biopsy kits, along with instructions for proper handling and shipping of specimens, can be obtained from both Ontario dental faculties:

Toronto Oral Pathology Service
University of Toronto

Oral Pathology Diagnostic Service
Western University

General and Surgical Aseptic Technique

The mouth is considered a clean-contaminated environment and the patient's own defences (e.g. antibacterial enzymes in saliva and immune responses) play a large role in healing and preventing infection after a dental procedure. Infection is usually the result of the patient's own oral flora.

Aseptic technique is a term used to describe practices that prevent microbial contamination. These practices include environmental cleaning, effective hand hygiene, wearing appropriate clinical attire (e.g. gloves, protective eyewear, masks, gowns), proper handling of clean instruments, wrapping and sterilization, proper handling of sterile instruments as they are unwrapped, preventing sterile instruments from being contaminated from environmental sources and properly administering medicines. Surgical aseptic technique refers to practices that render and maintain objects and the surrounding area maximally free of microorganisms, prevent contamination of a wound, isolate the operative site from the surrounding unsterile physical environment, and create a sterile field in order to perform surgery as safely as possible (e.g. draping where appropriate).

For most dental procedures, hand hygiene is performed, sterile instruments are placed at a clean chair-side area and care is taken to avoid placing unsterile equipment near sterile items. Depending on the complexity of the procedure, the chair-side area is separated into clean or sterile versus contaminated areas. Once the procedure begins, items are no longer sterile due to contamination with organisms from the patient's mouth, but the goal is to keep the tray and instruments as clean as possible, and avoid contamination from other sources. When hands or gloves contact certain surfaces that are frequently touched by others, microorganisms can be transferred to instruments or other environmental surfaces, and to the eyes, nose or mouth.

For major surgical procedures (e.g. osteotomies, use of rigid internal fixation), the patient is prepared, surgical hand hygiene is performed, a sterile gown and sterile gloves are worn, and all items that go onto the sterile field are kept sterile, including instruments, materials and supplies that come in contact with the surgical site. Every item handled by the dental surgeon must be sterile or have a protective sterile covering.

In addition to following routine practices, and performing appropriate disinfection and sterilization of dental instruments and devices, OHCWs reduce the risk of transferring bacteria from the environment to patients by adhering to some basic steps:

1. Prepare and organize work procedures so that all of the required equipment is gathered for the task.
2. Sterile instruments and devices should be stored in an enclosed space, such as closed or covered cabinets. They must remain wrapped until ready for use.
3. Spatially separate work areas and equipment into clean versus contaminated, sterile versus unsterile.
4. Use protective covers and barriers according to approved office-specific work procedures.
5. If an item is needed for a procedure, but not on the procedure tray, it must only be retrieved using transfer forceps or by first ensuring that the OHCW's hands are clean.
6. Gloves must be applied just before initiating the procedure for the patient.
7. If you observe or suspect that gloves have become torn or perforated, remove them, perform hand hygiene and re-glove.

Maintaining aseptic technique is a cooperative responsibility of the entire dental team. Each member must develop a professional conscience for IPAC, as well as a willingness to supervise and be supervised by others regarding aseptic technique.

If an item is needed for a procedure, but not on the procedure tray, it must only be retrieved using transfer forceps or by first ensuring that the OHCW's hands are clean. Transfer forceps must be readily available at all times.

Glossary of IPAC Terms

Additional precautions: A term used to describe IPAC interventions that are taken in addition to routine precautions for certain pathogens or clinical presentations, based on the mode of transmission (e.g. contact, droplet, airborne).

Asepsis: The absence of pathogenic (i.e. disease-producing) microorganisms.

Aseptic technique: A term used to describe practices that minimize the risk of microbial contamination.

Biological indicator (BI): A device that is used to monitor the sterilization process, which consists of a standardized population of bacterial spores known to be resistant to the mode of sterilization being monitored. BIs indicate that all the parameters necessary for sterilization were present.

Chemical indicator (CI): A monitoring device that is designed to respond with a chemical or physical change to one or more of the sterilization process parameters. CIs do not verify sterility, but they do assist in the detection of potential sterilization failures, which could result from incorrect packaging, incorrect loading of the sterilizer or equipment malfunction. There are several types of CIs:

> **Process indicator (Type 1):** An external indicator that is used to demonstrate that an item has been exposed to a sterilization process, and to distinguish between processed and non-processed items. Type 1 CIs are usually applied to or visible on the outside of packages (e.g. sterilization tape or packaging printed with colour-changing inks). Type 1 CIs are directly exposed to the sterilization environment, so they usually "fail" only when there is a gross malfunction of the sterilizer.
>
> **Specialty indicator (Type 2):** An indicator that is designed for use in specific test procedures in certain sterilizers (e.g. pre-vacuum sterilizers). Examples of Type 2 CIs include the indicators used in Bowie-Dick and Dart products, which are used for steam sterilizers.
>
> **Single-parameter indicator (Type 3):** An internal indicator that responds to only one critical parameter of the sterilization process (usually time or temperature). It is important to note that the sterilization process has more than one critical parameter, all of which must be reached for sterilization to occur.
>
> **Multi-parameter indicator (Type 4):** An internal indicator that responds to two or more critical parameters of the sterilization process.
>
> **Integrating indicator (Type 5):** An internal indicator that responds to all critical parameters of the sterilization process. Type 5 CIs are correlated to the performance of biological indicators (BIs).
>
> **Emulating indicator (Type 6):** An internal indicator that responds to all critical parameters of the sterilization process for a specified sterilization cycle.

Cleaning: The physical removal of foreign material (i.e. organic and inorganic matter) from an object or item using water and mechanical action, with or without detergents. Cleaning removes rather than kills microorganisms. Cleaning and then rinsing is performed before further reprocessing.

Decontamination: A process of cleaning, followed by inactivation of pathogenic microorganisms from objects to render them safe to handle.

Disinfection: A process that kills most pathogenic microorganisms, but rarely kills all bacterial spores. Disinfection is achieved through pasteurization or the use of some chemical agents (i.e. disinfectants). The term falls between physical cleaning and sterilization.

Low-level disinfection (LLD): A process capable of killing most vegetative bacteria, as well as some fungi and enveloped viruses. LLD is the level of decontamination required for non-critical patient-care items and some environmental surfaces. LLD is performed after items are thoroughly cleaned and rinsed. LLDs must have a DIN from Health Canada and include chlorine-based products, 0.5% accelerated hydrogen peroxide, 3% hydrogen peroxide, 60 to 95% alcohols, iodophors, phenolics and quaternary ammonium compounds.

Exposure-prone procedures: A term used for the purpose of managing the risk of transmitting blood-borne pathogens. They are procedures during which transmission of HBV, HCV or HIV from a healthcare worker to patients is most likely to occur. Exposure-prone procedures include:

- digital palpation of a needle tip in a body cavity, or the simultaneous presence of the healthcare worker's fingers and a needle or other sharp object in a blind or highly confined anatomic site;
- repair of major traumatic injuries;
- major cutting or removal of any oral or perioral tissue, including tooth structures.

Personal protective equipment (PPE): Specialized clothing or equipment worn by staff for protection against hazards.

Process challenge device (PCD): A test used to assess the performance of the sterilization process.

Reusable device: A device that has been designed by the manufacturer, through the selection of materials and / or components, to be reused.

Risk class: The class assigned to patient-care items based on the potential risk for infection associated with their intended use. The risk class determines the reprocessing requirements of an item. The risk classes are as follows:

> **Critical items:** Items that penetrate soft tissue or contact bone. Critical items present a high risk of infection if the item is contaminated with any type of microorganism, including bacterial spores. Reprocessing of critical items involves meticulous cleaning followed by sterilization.
>
> **Semi-critical items:** Items that contact mucous membranes or non-intact skin, but ordinarily do not penetrate them. Reprocessing of semi-critical items involves meticulous cleaning followed by sterilization.
>
> **Non-critical items:** Items that contact intact skin, but not mucous membranes, or do not directly contact the patient. Reprocessing of non-critical items involves cleaning followed by low-level disinfection.

Routine practices: A term used to describe basic standards of IPAC that are required for all safe patient care. Routine practices are based on the concept that all patients are potentially infective, even when asymptomatic, and that the same safe standards of practice must routinely apply to contact with blood, body fluids and secretions (e.g. saliva), mucous membranes and non-intact skin.

Single-use / disposable device: A device that has been designed by the manufacturer for single-use only.

Sterilization: A validated process that kills all pathogenic microorganisms, including bacteria, fungi, viruses and spores.

Ultrasonic cleaner: A machine that cleans patient-care items by the cavitations produced by ultrasound waves.

Appendix 1

Methods for Cleaning, Disinfection and Sterilization of Patient-Care Instruments, Items and Environmental Surfaces

Process	Result	Examples for Dentistry	Specific Indications	Comments
Sterilization	Kills all forms of pathogenic microorganisms, including bacteria, fungi, viruses and spores.	Steam Dry heat	Critical and semi-critical instruments.	Steam sterilization is the preferred method. Sterilization process must be audited and monitored with physical, chemical and biological indicators.
Low-level disinfection (LLD) All disinfectants (except household bleach) must have a Drug Identification Number (DIN) from Health Canada.	Kills most vegetative bacteria, as well as some fungi and enveloped viruses. **Cannot** be relied on to kill mycobacteria, including Mycobacterium tuberculosis, or bacterial spores.	Chlorine-based products (e.g. diluted sodium hypochlorite) 0.5% accelerated hydrogen peroxide, 3 to 5% hydrogen peroxide 60 to 95% alcohols Some iodophors, phenolics and quaternary ammonium compounds	Non-critical items and environmental surfaces.	Follow manufacturer's instructions regarding concentration and contact time. Diluted household bleach is inexpensive and readily available, but must be prepared daily. Items and surfaces must be cleaned first, as chlorine-based products are inactivated by organic material. Corrosive to metals and may destroy fabrics. Hydrogen peroxide is active in presence of organic matter, but is corrosive to non-ferous metals (e.g. aluminum, brass, copper, zinc), and some plastics and rubber. Alcohols are fast-acting, but are flammable and evaporate quickly. Items and surfaces must be cleaned first, as alcohols are inactivated by organic material. May harden plastic and rubber. Quaternary ammonium compounds are used for disinfecting non-critical equipment and environmental surfaces, but not instruments. They require careful dilution, as they may support microbial growth.
Cleaning	Physical removal of soil, dust and foreign material.	Soap and water, detergents and enzymatic cleaners 0.5% accelerated hydrogen peroxide Quaternary ammonium compounds	All reusable items.	Follow manufacturer's instructions regarding concentration and contact time.

Appendix 2

Additional Resources and Reference Materials Available on the Internet

Antibiotic Stewardship
Canadian Association of Hospital Dentists
https://cahd-acdh.ca/antibiotic-stewardship/

Best Management Practices Flowcharts, 2003
Royal College of Dental Surgeons of Ontario
www.rcdso.org/en-ca/rcdso-members/positions-and-special-initiatives

Best Practices for Cleaning, Disinfection and Sterilization of Medical Equipment/Devices in All Heath Care Settings, 2013
Provincial Infectious Diseases Advisory Committee, Ontario Ministry of Health and Long-Term Care
www.publichealthontario.ca/en/eRepository/PIDAC_Cleaning_Disinfection_and_Sterilization_2013.pdf

Best Practices for Environmental Cleaning for Prevention and Control of Infections in All Health Care Settings, 2018
Provincial Infectious Diseases Advisory Committee, Ontario Ministry of Health and Long-Term Care
www.publichealthontario.ca/en/eRepository/Best_Practices_Environmental_Cleaning.pdf

Best Practices for Hand Hygiene in All Heath Care Settings, 2014
Provincial Infectious Diseases Advisory Committee, Ontario Ministry of Health and Long-Term Care
www.publichealthontario.ca/en/eRepository/2010-12%20BP%20Hand%20Hygiene.pdf

Best Practices for Infection Prevention and Control Programs in Ontario In All Health Care Settings, 2012
Provincial Infectious Diseases Advisory Committee, Ontario Ministry of Health and Long-Term Care
www.publichealthontario.ca/en/eRepository/BP_IPAC_Ontario_HCSettings_2012.pdf

Canadian Immunization Guide
Public Health Agency of Canada
www.canada.ca/en/public-health/services/canadian-immunization-guide.html

Canadian Medical Device Reprocessing (CAN/CSA-Z314-18), 2018
Canadian Standards Association
www.csagroup.org

Checklist: Infection Prevention and Control (IPAC) Core Elements in Dental Practice Settings, 2017
Public Health Ontario
www.publichealthontario.ca/en/eRepository/IPAC_Checklist_DENTAL_Core_Elements.pdf

Checklist: Reprocessing in Dental Practice Settings, 2017
Public Health Ontario
www.publichealthontario.ca/en/eRepository/IPAC_Checklist_DENTAL_Reprocessing.pdf

Guideline C-4: The Management of Biomedical Waste in Ontario, 2016
Ontario Ministry of the Environment
www.ontario.ca/page/c-4-management-biomedical-waste-ontario

Infection Prevention and Control Complaint Protocol, 2018
Ontario Ministry of Health and Long-Term Care
www.health.gov.on.ca/en/pro/programs/publichealth/oph_standards/docs/protocols_guidelines/IPAC_Complaint_Protocol_2018_en.pdf

Infection Prevention and Control Disclosure Protocol, 2018
Ontario Ministry of Health and Long-Term Care
www.health.gov.on.ca/en/pro/programs/publichealth/oph_standards/docs/protocols_guidelines/Infection_Prevention_and_Control_Disclosure_Protocol_2018_en.pdf

Infection Prevention and Control for Clinical Office Practice, 2015
Provincial Infectious Diseases Advisory Committee, Ontario Ministry of Health and Long-Term Care
www.publichealthontario.ca/en/eRepository/IPAC_Clinical_Office_Practice_2013.pdf

Routine Practices and Additional Precautions in All Heath Care Settings, 2012
Provincial Infectious Diseases Advisory Committee, Ontario Ministry of Health and Long-Term Care
www.publichealthontario.ca/en/eRepository/RPAP_All_HealthCare_Settings_Eng2012.pdf

Standard of Practice: Infection Prevention and Control Standards and Risk Management for Dentistry, 2010
Alberta Dental Association and College
www.dentalhealthalberta.ca/index/Sites-Management/FileDownload/DataDownload/10028/Standard-of-Practice-Infection-Prevention-and-Control_P/pdf/1/1033

Workplace Hazardous Materials Information System (WHMIS): A Guide to the Legislation, 2017
Ontario Ministry of Labour
www.ontario.ca/document/workplace-hazardous-materials-information-system-guide-legislation

Royal College of
Dental Surgeons of Ontario

6 Crescent Road
Toronto, ON Canada M4W 1T1
T: 416.961.6555 F: 416.961.5814
Toll Free: 800.565.4591 www.rcdso.org

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